



Hewlett-Packard Company

TPC Benchmark™ H
Full Disclosure Report
for
HP Integrity rx8640
using
Microsoft SQL Server 2005 Enterprise Edition for
Itanium-based Systems (SP1)
and
Windows Server 2003 Datacenter Edition 64-bit (SP1)

First Edition
July 2006

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Abstract

Overview

This report documents the methodology and results of the TPC Benchmark™ H test conducted on the HP Integrity rx8640 using Microsoft SQL Server 2005 Enterprise Edition for Itanium-based systems SP1, in conformance with the requirements of the TPC Benchmark™ H Standard Specification, Revision 2.3.0. The operating system used for the benchmark was Microsoft Windows 2003 Datacenter Edition (64-bit) SP1.

The TPC Benchmark™ H was developed by the Transaction Processing Performance Council (TPC). The TPC was founded to define transaction processing benchmarks and to disseminate objective, verifiable performance data to the industry.

Requests for this TPC Benchmark H Full Disclosure Report should be sent to:

Transaction Processing Performance Council (TPC)
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Telephone: (408) 295-8894
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Standard and Executive Summary Statements

Pages iv - viii contain the Executive Summary and Numerical Quantities Summary of the benchmark results for the HP Integrity rx8640.

Auditor

The benchmark configuration, environment and methodology used to produce and validate the test results, and the pricing model used to calculate the cost per QppH and QthH were audited by Lorna Livingtree of Performance Metrics, Inc. to verify compliance with the relevant TPC specifications.

The auditor's letter of attestation is attached in Section 9.1 "Auditors' Report."



HP Integrity rx8640

TPC-H Rev. 2.3.0
Report Date July 18 2006

Total System Cost

Composite Query per Hour Rating

Price Performance

USD \$903,908

33,488.1
QpH @ 1000G

USD \$27.00
\$/ QpH @1000G

Database size

Database Manager

Operating System

Other Software

Availability Date

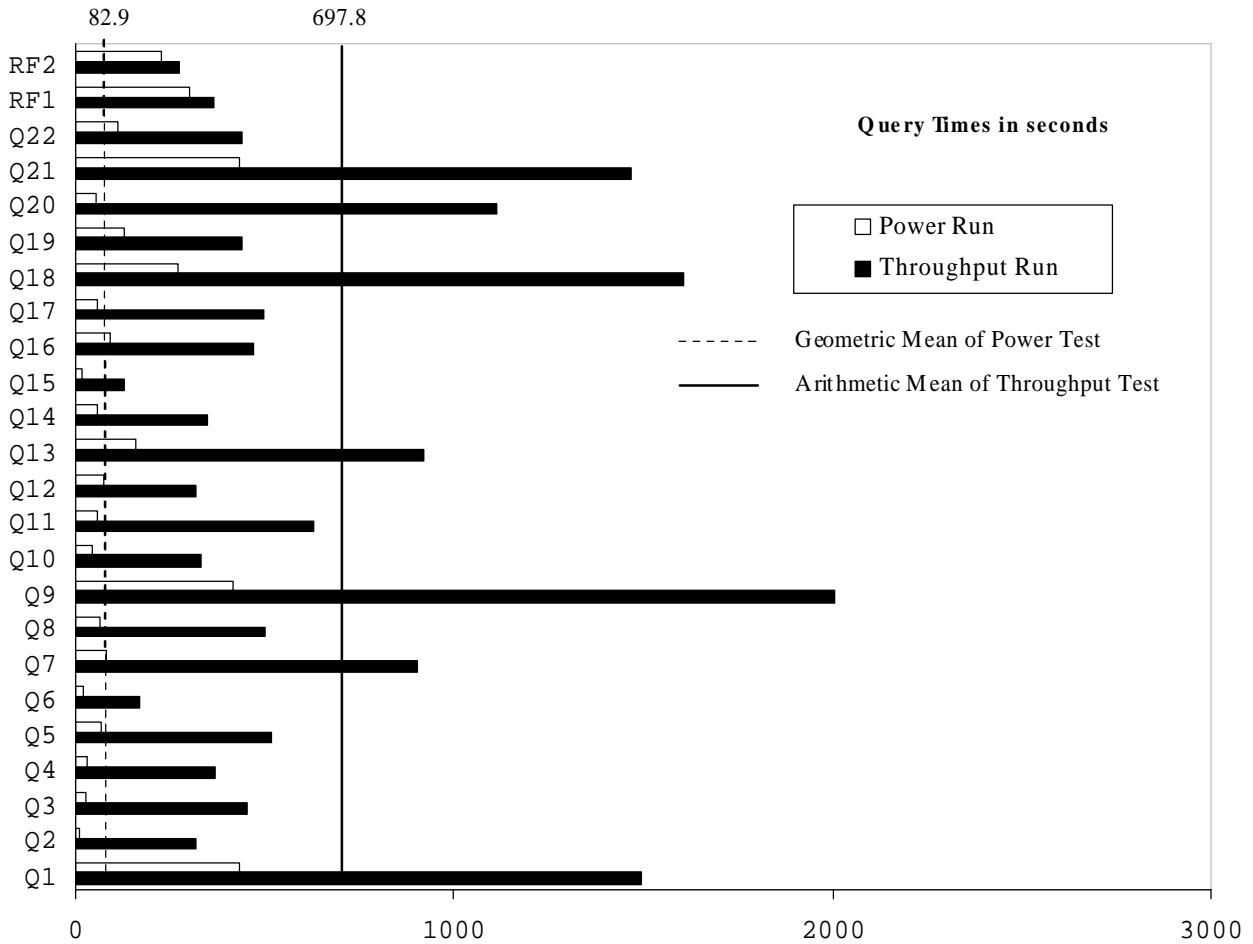
1000G

**Microsoft SQL Server
2005 Enterprise
Edition for Itanium-
based systems SP1**

**Microsoft Windows
Server 2003,
Datacenter Edition
(64-bit) SP1**

**MS Visual Basic
MS Visual C++
MS Resource Kit**

October 01 2006



Database Load Time = 11:40:49 Load included backup: Y Total Data Storage / Database Size = 11.16
RAID(Base Tables): Y RAID(Base Tables and Auxiliary Data Structure): Y RAID(All)= N

System configuration

Processors/Cores/Threads	16/32/64 DC Itanium 2 Processor 9050 @ 1.6GHz / 24MB
Memory	128GB Main Memory
Disk Controllers	32 SmartArray 6402
Disk Drives	320 36GB SCSI (DB) 2 146GB SCSI (Log) 2 36GB SCSI (Local)
Total Disk Storage	11,158 GB



HP Integrity rx8640

TPC-H Rev. 2.3.0

TPC Pricing 1.1.0

Report Date: July 18 2006

Availability Date: October 01 2006

Description	Price Key	Part Number	Unit Price	Qty	Extended Price	3 Yr Maint Price
rx8640 16-way SMP Base System, incl (4) cell boards, (1) core IO, (6) power supplies, 16x1.6GHz/24MB cache DC Itanium II processors	1 **	AB446A #003	\$450,108	1	\$450,108	
3 Year Support Price (Hardware and Software)	1	HA1103A	\$170,019	1		\$170,019
HP Integrity rx8640 I/O Backplane	1	AD160A	\$7,700	2	\$15,400	
HP 4GB HD SyncDRAM Midrange Memory	1	AB454A	\$8,000	32	\$256,000	
HP Integrity rx8640 Sys. Expansion Unit	1	AB301A	\$35,785	1	\$35,785	
36GB, 15K hard disk for rx76/86	1	AD146A	\$1,800	2	\$3,600	
DVD+RW Drive for rx76/86	1	AB351B	\$850	1	\$850	
HP Smart Array Controller 6402	1	A9890A	\$1,669	32	\$53,408	
HP Rack Kit for rx86xx Server	1	J1528B	\$582	1	\$582	
HP Rack Kit for SEU Server	1	J1530C	\$709	1	\$709	
HP Storageworks MSA 30 SB Storage	1	302969-B21	\$2,829	32	\$90,528	
HP Storageworks MSA 30 SB Storage 10% Spares	1	302969-B21	\$2,829	3	\$8,487	
36GB, 15krpm Ultra320 Pluggable Hard Drive	1	286776-B22	\$269	320	\$86,080	
36GB, 15krpm Ultra320 Pluggable Hard Drive 10% Spares	1	286776-B22	\$269	32	\$8,608	
146GB, 10krpm U320 Pluggable Hard drive	1	286716-B22	\$409	2	\$818	
146GB, 10krpm U320 Pluggable Hard drive 10% Spares	1	286716-B22	\$409	2	\$818	
HP Universal Rack 10642 G2	1	AF003A	\$1,489	3	\$4,467	
HP 16A High Voltage Modular PDU	1	252663-B24	\$299	4	\$1,196	
ML110 G3 SATA / 17" Monitor	1	www.hp.com	\$1,076	1	\$1,076	
Server Subtotal					\$1,018,520	\$170,019
Microsoft Windows Server 2003, Datacenter edition (64-bit)	1	T2372A opt016	\$32,000	1	\$32,000	
Microsoft SQL Server 2005 Enterprise Edition	2	810-04794	\$8,318	1	\$8,318	\$245
Microsoft SQL Server 2005 Client License	2	359-01911	\$156	45	\$7,020	
Microsoft Visual C++ Standard	2	254-00170	\$109	1	\$109	
Microsoft Visual Basic	2	046-00856	\$109	1	\$109	
Server Software Subtotal					\$47,556	\$245
Total Extended Price:					\$1,236,340	
HP's Large Configuration Discount *					Total Discount: \$332,432	
Price Key: 1-HP, 2-Microsoft Audited by Lorna Livingtree of Performance Metrics, Inc.					3 year cost of ownership: USD \$903,908	
* All discounts are based on US list prices and for similar quantities and configurations. A 27.23 % discount was based on the overall specific components from vendor 1 in this single quotation. Discounts for similarly sized configurations will be similar to those quoted here, but may vary based on the components in the configuration.					QpH 33,488.1	
					\$/QpH: USD \$27.00	



HP Integrity rx8640

TPC-H Rev. 2.3.0
TPC Pricing 1.1.0

Report Date: July 18 2006

**Availability Date: October 01
2006**

** These components are not immediately orderable. See the FDR for more information.

Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmark specifications. If you find that stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.

Sales contact Vendor 1: HP Sales Development, 19111 Pruneridge Ave., Cupertino, CA 95014 (408) 447 2320
Sales contact Vendor 2: Jamie Reding (425) 703-0510 jamiere@microsoft.com



Numerical Quantities

Measurement Results

Database Scale Factor	1000
Total Data Storage / Database Size	11.16
Start of Database Load	2006-07-05 13:47:03
End of Database Load	2006-07-06 01:27:52
Database Load Time	11:40:49
Query Streams for Throughput Test	7
TPC-H Power	43,425.8
TPC-H Throughput	25,824.5
TPC-H Composite Query-per-Hour (QpH@1000GB)	33,488.1
Total System Price over 3 Years	USD \$903,908
TPC-H Price/Performance Metric (USD /QpH@1000GB)	USD \$27.00 / QpH@1000GB

Measurement Interval

Measurement Interval in Throughput Test (Ts) 21,468 seconds

Duration of Stream Execution

	Seed	Query Start Date/Time	Query End Date/Time	RF1 Start Date/Time	RF1 End Date/Time	RF2 Start Date/Time	RF2 End Date/Time	Duration
Stream 00	706012753	07/06/06 2:01:20	07/06/06 2:46:20	07/06/06 1:56:17	07/06/06 2:01:18	07/06/06 2:46:21	07/06/06 2:50:10	0:53:53
Stream 01	706012754	07/06/06 2:50:14	07/06/06 7:04:55	07/06/06 7:31:00	07/06/06 7:36:31	07/06/06 7:36:35	07/06/06 7:40:47	4:50:33
Stream 02	706012755	07/06/06 2:50:15	07/06/06 7:10:10	07/06/06 7:40:54	07/06/06 7:46:41	07/06/06 7:46:45	07/06/06 7:50:50	5:00:35
Stream 03	706012756	07/06/06 2:50:15	07/06/06 6:56:41	07/06/06 7:50:55	07/06/06 7:56:41	07/06/06 7:56:44	07/06/06 8:00:55	5:10:40
Stream 04	706012757	07/06/06 2:50:16	07/06/06 7:17:09	07/06/06 8:01:10	07/06/06 8:07:12	07/06/06 8:07:20	07/06/06 8:11:50	5:21:34
Stream 05	706012758	07/06/06 2:50:16	07/06/06 7:30:56	07/06/06 8:12:05	07/06/06 8:18:23	07/06/06 8:18:35	07/06/06 8:23:21	5:33:05
Stream 06	706012759	07/06/06 2:50:17	07/06/06 6:47:54	07/06/06 8:23:41	07/06/06 8:30:17	07/06/06 8:30:30	07/06/06 8:35:29	5:45:12
Stream 07	706012760	07/06/06 2:50:18	07/06/06 6:55:08	07/06/06 8:35:52	07/06/06 8:42:32	07/06/06 8:42:46	07/06/06 8:48:03	5:57:45



HP Integrity rx8640

TPC-H Rev. 2.3.0
Report Date July 18 2006

TPC-H Timing Intervals (in seconds):

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream 0	432.6	11.8	27.4	31.2	67.0	19.8	80.7	63.4
Stream 1	711.8	147.5	659.9	29.8	415.1	77.6	1485.8	626.7
Stream 2	2034.7	299.6	857.3	155.0	508.6	94.0	970.2	644.4
Stream 3	1278.8	215.3	59.1	540.6	1146.1	82.5	575.8	345.8
Stream 4	2057.6	172.1	48.9	665.7	245.5	530.7	1184.0	489.1
Stream 5	2377.5	972.7	473.7	582.7	365.7	148.8	1017.6	617.9
Stream 6	1058.6	217.5	1028.0	191.5	455.2	199.1	821.9	361.7
Stream 7	956.7	177.9	52.0	406.7	474.1	43.8	256.1	416.9
Min Qi	711.8	147.5	48.9	29.8	245.5	43.8	256.1	345.8
Max Qi	2377.5	972.7	1028.0	665.7	1146.1	530.7	1485.8	644.4
Avg Qi	1496.5	314.7	454.1	367.4	515.8	168.1	901.6	500.4
Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream 0	416.0	44.0	57.9	72.9	158.0	58.6	17.5	88.7
Stream 1	2791.9	270.9	537.2	530.0	1267.8	1080.9	70.3	578.5
Stream 2	1569.2	453.9	464.6	247.2	1049.5	319.5	124.0	490.8
Stream 3	2105.3	188.1	1218.0	474.9	461.7	170.4	79.1	340.5
Stream 4	2117.6	323.9	625.1	509.4	555.4	298.4	114.3	609.5
Stream 5	452.7	44.8	432.2	105.9	622.1	332.8	141.6	240.9
Stream 6	2428.9	615.1	436.3	787.1	664.8	60.8	297.7	376.4
Stream 7	2600.0	438.1	680.3	159.3	645.4	184.2	52.1	669.9
Min Qi	452.7	44.8	432.2	105.9	555.4	60.8	52.1	240.9
Max Qi	2791.9	615.1	1218.0	530.0	1625.0	1080.9	297.7	669.9
Avg Qi	2009.4	333.5	627.7	318.0	918.6	349.6	125.6	472.4
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 0	56.0	270.2	128.4	52.8	433.3	111.5	301.3	229.0
Stream 1	534.3	1094.9	325.0	485.6	1042.1	517.1	330.5	252.4
Stream 2	1225.2	1564.5	870.1	497.1	784.9	371.6	347.8	244.9
Stream 3	865.9	1625.0	407.0	373.0	1832.9	400.8	345.6	251.0
Stream 4	279.8	1321.0	431.7	1198.4	2105.4	129.7	362.7	270.0
Stream 5	55.0	1443.6	311.8	4317.5	1097.9	684.4	378.0	286.6
Stream 6	299.3	1350.5	472.4	389.8	1288.8	455.9	396.7	299.0
Stream 7	205.6	2826.7	263.1	555.6	2128.0	497.4	399.2	316.9
Min Qi	55.0	1094.9	263.1	373.0	784.9	129.7	330.5	244.9
Max Qi	1225.2	2826.7	870.1	4317.5	2128.0	684.4	399.2	316.9
Avg Qi	495.0	1603.7	440.2	1116.7	1468.6	436.7	365.8	274.4

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1.0 General Items

1.1 Test Sponsor

A statement identifying the benchmark sponsor(s) and other participating companies must be provided.

This benchmark was sponsored by Hewlett-Packard Company. The benchmark was developed and engineered by Hewlett-Packard Company. Testing took place at Microsoft facilities in Redmond, Washington.

1.2 Parameter Settings

Settings must be provided for all customer-tunable parameters and options which have been changed from the defaults found in actual products, including by not limited to:

- *Database Tuning Options*
- *Optimizer/Query execution options*
- *Query processing tool/language configuration parameters*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and configuration parameters*
- *Configuration parameters and options for any other software component incorporated into the pricing structure*
- *Compiler optimization options*

This requirement can be satisfied by providing a full list of all parameters and options, as long as all those which have been modified from their default values have been clearly identified and these parameters and options are only set once.

Appendix A, "Tunable Parameters," contains a list of all database parameters and operating system parameters.

1.3 Configuration Items

Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences. This includes, but is not limited to:

- *Number and type of processors*
- *Size of allocated memory, and any specific mapping/partitioning of memory unique to the test.*
- *Number and type of disk units (and controllers, if applicable).*
- *Number of channels or bus connections to disk units, including their protocol type.*
- *Number of LAN (e.g. Ethernet) Connections, including routers, workstations, terminals, etc., that were physically used in the test or are incorporated into the pricing structure.*
- *Type and the run-time execution location of software components (e.g., DBMS, query processing tools /languages, middle-ware components, software drivers, etc.).*

The server System Under Test (SUT), an HP Integrity rx8640, depicted in Figure 1.1, consisted of :

- 16 DC Itanium 2 Processor 9050 @ 1.6GHz / 24MB
- 128 GB of memory
- 32 6402 Smart Array Controllers
- 32 HP StorageWorks MSA 30 Enclosures
- 320 36GB Pluggable Ultra320 15K rpm 1" height drives
- 2 146GB Pluggable 10K rpm drives

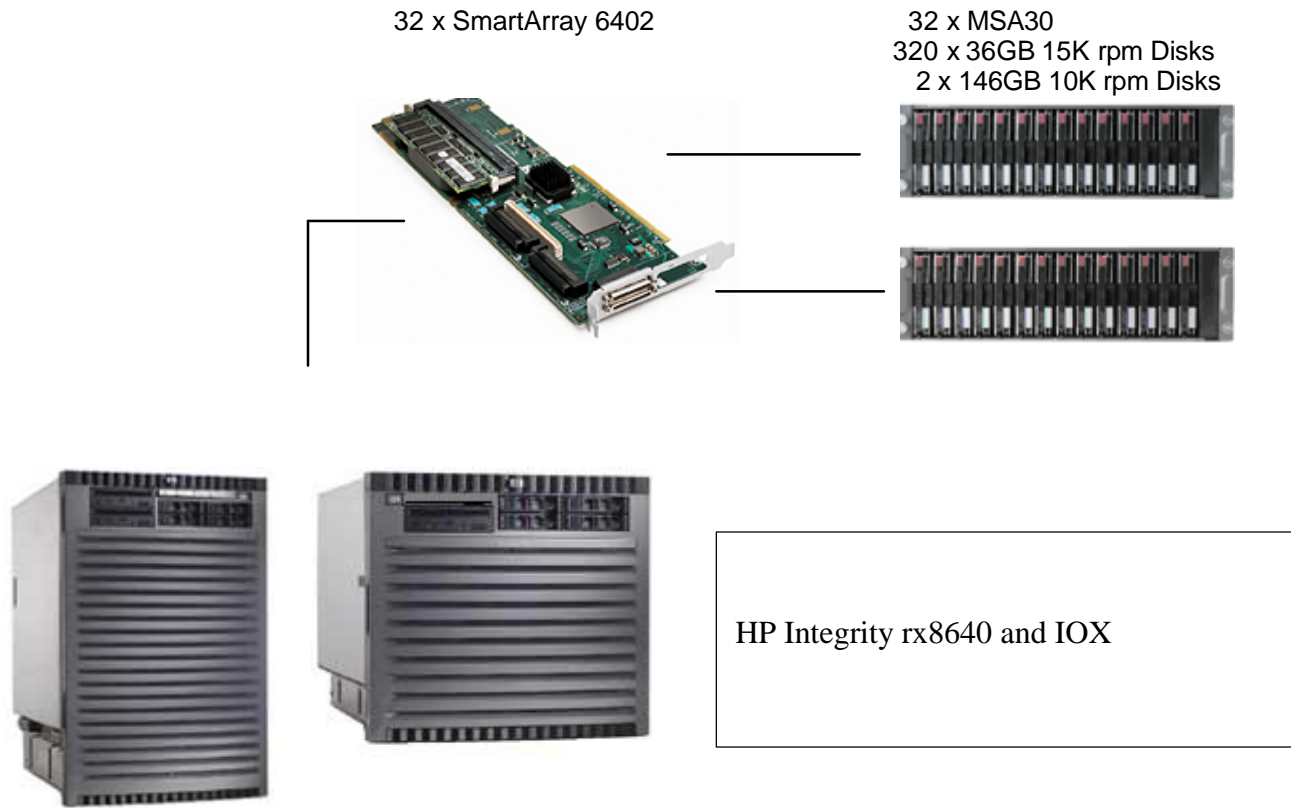


Figure 1.1 Benchmark and priced configuration for rx8640

2.0 Clause 1: Logical Database Design

2.1 Table Definitions

Listings must be provided for all table definition statements and all other statements used to set up the test and qualification databases. (8.1.2.1)

Appendix B, "Database Build Scripts," contains the table definitions and the program used to load the database.

2.2 Physical Organization of Database

The physical organization of tables and indices, within the test and qualification databases, must be disclosed. If the column ordering of any table is different from that specified in Clause 1.4, it must be noted.

Appendix B, "Database Build Scripts," contains the DDL for the index definitions.

2.3 Horizontal Partitioning

Horizontal partitioning of tables and rows in the test and qualification databases (see Clause 1.5.4) must be disclosed.

Horizontal partitioning was not used

2.4 Replication

Any replication of physical objects must be disclosed and must conform to the requirements of Clause 1.5.6.

No replication was used.

3.0 Clause 2: Queries and Refresh Functions - Related Items

3.1 Query Language

The query language used to implement the queries must be identified.

T-SQL was the query language used.

3.2 Random Number Generation

The method of verification for the random number generation must be described unless the supplied DBGEN and QGEN were used.

DBGEN version 2.3.0 and QGEN version 2.3.0 were used to generate all database populations.

3.3 Substitution Parameters Generation

The method used to generate values for substitution parameters must be disclosed. If QGEN is not used for this purpose, then the source code of any non-commercial tool used must be disclosed. If QGEN is used, the version number, release number, modification number and patch level of QGEN must be disclosed.

The TPC source based QGEN version 2.3.0 was used to generate the substitution parameters

3.4 Query Text and Output Data from Database

The executable query text used for query validation must be disclosed along with the corresponding output data generated during the execution of the query text against the qualification database. If minor modifications (see Clause 2.2.3) have been applied to any functional query definitions or approved variants in order to obtain executable query text, these modifications must be disclosed and justified. The justification for a particular minor query modification can apply collectively to all queries for which it has been used. The output data for the power and throughput tests must be made available electronically upon request..

Appendix C contains the query text and query output. The following modifications were used:

- In Q1 the function "count_big" is used in place of "count"
- The "dateadd" function is used to perform date arithmetic in Q1, Q4, Q5, Q6, Q10, Q12, Q14, Q15 and Q20.
- The "datepart" function is used to extract part of a date ("YY") in Q7, Q8 and Q9.
- The "top" function is used to restrict the number of output rows in Q2, Q3, Q10, Q18 and Q21.

3.5 Query Substitution Parameters and Seeds Used

All the query substitution parameters used during the performance test must be disclosed in tabular format, along with the seeds used to generate these parameters.

Appendix D contains the seed and query substitution parameters used.

3.6 Isolation Level

The isolation level used to run the queries must be disclosed. If the isolation level does not map closely to one of the isolation levels defined in Clause 3.4, additional descriptive detail must be provided.

The queries and transactions were run with isolation P2, Read Committed.

3.7 Refresh Functions

The details of how the refresh functions were implemented must be disclosed

Appendix E contains the source code for the refresh functions.

4.0 Clause 3: Database System Properties

4.1 Atomicity Requirements

The results of the ACID tests must be disclosed along with a description of how the ACID requirements were met. This includes disclosing the code written to implement the ACID Transaction and Query.

All ACID tests were conducted according to specification. The Atomicity, Isolation, Consistency and Durability tests were performed on the HP Integrity rx8640.

4.1.1 Atomicity of the Completed Transactions

Perform the ACID Transaction for a randomly selected set of input data and verify that the appropriate rows have been changed in the ORDER, LINEITEM, and HISTORY tables.

The following steps were performed to verify the Atomicity of completed transactions:

1. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.
2. The ACID Transaction was performed using the order key from step 1.
3. The ACID Transaction committed.
4. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for the same order key. It was verified that the appropriate rows had been changed.

4.1.2 Atomicity of Aborted Transactions

Perform the ACID transaction for a randomly selected set of input data, submitting a ROLLBACK of the transaction for the COMMIT of the transaction. Verify that the appropriate rows have not been changed in the ORDER, LINEITEM, and HISTORY tables.

The following steps were performed to verify the Atomicity of the aborted ACID transaction:

1. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for a randomly selected order key.
2. The ACID Transaction was performed using the order key from step 1. The transaction was stopped prior to the commit.
3. The ACID Transaction was ROLLED BACK. .
4. The total price from the ORDER table and the extended price from the LINEITEM table were retrieved for the same order key used in steps 1 and 2. It was verified that the appropriate rows had not been changed.

4.2 Consistency Requirements

Consistency is the property of the application that requires any execution of transactions to take the database from one consistent state to another. A consistent state for the TPC-H database is defined to exist when:

$$O_TOTALPRICE = SUM(trunc(trunc((L_EXTENDEDPRICE - L_DISCOUNT) * (1 + L_TAX)))$$

for each ORDER and LINEITEM defined by (O_ORDERKEY = L_ORDERKEY)

4.2.1 Consistency Tests

Verify that ORDER and LINEITEM tables are initially consistent as defined in Clause 3.3.2.1, based upon a random sample of at least 10 distinct values of O_ORDERKEY.

The following steps were performed to verify consistency:

1. The consistency of the ORDER and LINEITEM tables was verified based on a sample of O_ORDERKEYs.
2. One hundred ACID Transactions were submitted from each of six execution streams.
3. The consistency of the ORDER and LINEITEM tables was re-verified.

4.3 Isolation Requirements

Operations of concurrent transactions must yield results which are indistinguishable from the results which would be obtained by forcing each transaction to be serially executed to completion in some order.

4.3.1 Isolation Test 1 - Read-Write Conflict with Commit

Demonstrate isolation for the read-write conflict of a read-write transaction and a read-only transaction when the read-write transaction is committed)

The following steps were performed to satisfy the test of isolation for a read-only and a read-write committed transaction:

1. An ACID Transaction was started for a randomly selected O_KEY, L_KEY and DELTA. The ACID Transaction was suspended prior to Commit.
2. An ACID query was started for the same O_KEY used in step 1. The ACID query blocked and did not see any uncommitted changes made by the ACID Transaction.
3. The ACID Transaction was resumed and committed. The ACID query completed. It returned the data as committed by the ACID Transaction.

4.3.2 Isolation Test 2 - Read-Write Conflict with Rollback

Demonstrate isolation for the read-write conflict of a read-write transaction and a read-only transaction when the read-write transaction is rolled back.

The following steps were performed to satisfy the test of isolation for read-only and a rolled back read-write transaction:

1. An ACID transaction was started for a randomly selected O_KEY, L_KEY and DELTA. The ACID Transaction was suspended prior to Rollback.
2. An ACID query was started for the same O_KEY used in step 1. The ACID query did not see any uncommitted changes made by the ACID Transaction.
3. The ACID Transaction was ROLLED BACK.
4. The ACID query completed.

4.3.3 Isolation Test 3 - Write-Write Conflict with Commit

Demonstrate isolation for the write-write conflict of two update transactions when the first transaction is committed.

The following steps were performed to verify isolation of two update transactions:

1. An ACID Transaction T1 was started for a randomly selected O_KEY, L_KEY and DELTA. The ACID transaction T1 was suspended prior to Commit.
2. Another ACID Transaction T2 was started using the same O_KEY and L_KEY and a randomly selected DELTA.
3. T2 waited.
4. The ACID transaction T1 was allowed to Commit and T2 completed.
5. It was verified that: $T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE + (DELTA1 * (T1.L_EXTENDEDPRICE / T1.L_QUANTITY))$

4.3.4 Isolation Test 4 - Write-Write Conflict with Rollback

Demonstrate isolation for the write-write conflict of two update transactions when the first transaction is rolled back.

The following steps were performed to verify the isolation of two update transactions after the first one is rolled back:

1. An ACID Transaction T1 was started for a randomly selected O_KEY, L_KEY and DELTA. The ACID Transaction T1 was suspended prior to Rollback.
2. Another ACID Transaction T2 was started using the same O_KEY and L_KEY used in step 1 and a randomly selected DELTA.
3. T2 waited.
4. T1 was allowed to ROLLBACK and T2 completed.

5. It was verified that T2.L_EXTENDEDPRICE = T1.L_EXTENDEDPRICE.

4.3.5 Isolation Test 5 – Concurrent Read and Write Transactions on Different Tables

Demonstrate the ability of read and write transactions affecting different database tables to make progress concurrently.

The following steps were performed:

1. An ACID Transaction T1 for a randomly selected O_KEY, L_KEY and DELTA. The ACID Transaction T1 was suspended prior to Commit.
2. Another ACID Transaction T2 was started using random values for PS_PARTKEY and PS_SUPPKEY.
3. T2 completed.
4. T1 completed and the appropriate rows in the ORDER, LINEITEM and HISTORY tables were changed.

4.3.6 Isolation Test 6 – Update Transactions During Continuous Read-Only Query Stream

Demonstrate the continuous submission of arbitrary (read-only) queries against one or more tables of the database does not indefinitely delay update transactions affecting those tables from making progress.

The following steps were performed:

1. An ACID Transaction T1 was started, executing Q1 against the qualification database. The substitution parameter was chosen from the interval [0..2159] so that the query ran for a sufficient amount of time.
2. Before T1 completed, an ACID Transaction T2 was started using randomly selected values of O_KEY, L_KEY and DELTA.
3. T2 completed before T1 completed.
4. It was verified that the appropriate rows in the ORDER, LINEITEM and HISTORY tables were changed.

4.4 Durability Requirements

The tested system must guarantee durability: the ability to preserve the effects of committed transactions and insure database consistency after recovery from any one of the failures listed in Clause 3.5.2.

4.4.1 Permanent Unrecoverable Failure of Any Durable Medium and Loss of System Power

Guarantee the database and committed updates are preserved across a permanent irrecoverable failure of any single durable medium containing TPC-H database tables or recovery log tables

The test database log was stored on a RAID-1 array of 2 physical drives. The tables for the test database were stored on 64 logical volumes on 64 RAID-0 arrays each containing 5 physical drives. A backup of the test database was taken. The backup was stored on 32 logical volumes (striped) on 64 RAID-5 arrays.

The tests were conducted on the qualification database. The qualification database was loaded in the same fashion as the test database but used fewer disks. The steps performed are shown below:

1. The complete database was backed up.
2. Eight streams of ACID transactions were started. Each stream executed a minimum of 100 transactions.
3. While the test was running, one of the disks from the database RAID-1 log was removed.
4. After it was determined that the test would still run with the loss of a log disk, one physical drive of a RAID-0 data volume was removed.
5. A checkpoint was issued to force a failure.
6. The eight streams of ACID transactions failed and recorded their number of committed transaction in the success files.
7. The database log was dumped to disk and the database was shut down.
8. The database and log disks were replaced with new disks and the RAID rebuild process started
9. When the RAID rebuild process finished a database restore was done.
10. A command was issued causing the database to run through its recovery.
11. The counts in the success files and the HISTORY table count were compared and were found to match.

4.4.2 System Crash

Guarantee the database and committed updates are preserved across an instantaneous interruption (system crash/system hang) in processing which requires the system to reboot to recover.

1. Eight streams of ACID transactions were started. Each stream executed a minimum of 100 transactions.
2. While the streams of ACID transactions were running a system hardware reset was issued.
3. The system rebooted and the database was restarted.
4. The database went through a recovery period.
5. The success file and the HISTORY table counts were compared and were found to match.

4.4.3 Memory Failure

Guarantee the database and committed updates are preserved across failure of all or part of memory (loss of contents).

See section 4.4.2

5.0 Clause 4: Scaling and Database Population

5.1 Initial Cardinality of Tables

The cardinality (i.e., the number of rows) of each table of the test database, as it existed at the completion of the database load (see clause 4.2.5) must be disclosed.

Table 5.1 lists the TPC-H Benchmark defined tables and the row count for each table as they existed upon completion of the build.

TABLE	# of Rows
Lineitem	5,999,989,709
Orders	1,500,000,000
Partsupp	800,000,000
Part	200,000,000
Customer	150,000,000
Supplier	10,000,000
Nation	25
Region	5

Table 5.1 Initial Number of Rows

5.2 Distribution of Tables and Logs Across Media

The distribution of tables and logs across all media must be explicitly described for the tested and priced systems.

Microsoft SQL Server was configured on an HP Integrity rx8640 with the following configuration:

- 32 Smart Array 6402 Disk RAID Controllers
- 32 HP StorageWorks MSA 30 enclosures
- 320 36GB 15k rpm external disk drives
- 2 146GB 10k rpm external disk drives
- 2 36GB internal disk drives

322 disks were used to hold table data, indexes, database log and the temporary database (TempDB).

The raw partitions for the database and the NTFS partition for the backup and flat files were mounted to a folder on the G: drive

```
G:\mnt\li  
G:\mnt\gen  
G:\mnt\temp  
G:\mnt\ntfs
```

A description of distribution of database filegroups and log can be found in the Table below.

SmartArray 6402	# of Disks	Array Fault Tolerance	Size in GB	Partition Format	Content
Slot 1 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 2 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 3 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		97	NTFS
Slot 4 Channel A/B	10	RAID 0	50	RAW	Tpch1000g
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 5 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 6 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 7 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 8 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 101 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 102 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 103 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS

SmartArray 6402	# of Disks	Array Fault Tolerance	Size in GB	Partition Format	Content		
Slot 104 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 105 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 106 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 107 Channel A/B	12	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
				RAID 10	97GB	RAW	TPCH Log
					35GB	NTFS	TempDB Log
					3GB	NTFS	G:\
Slot 108 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 129 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 130 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 131 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 132 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles
Slot 133 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI		
				RAW	Tpch1000g GEN		
				RAW	Tpch1000g TempDB		
				RAID 5	99	NTFS	Backup, Flatfiles

SmartArray 6402	# of Disks	Array Fault Tolerance	Size in GB	Partition Format	Content
Slot 134 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 135 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 136 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 229 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 230 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 231 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 232 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 233 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 234 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS
Slot 235 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5		99	NTFS

SmartArray 6402	# of Disks	Array Fault Tolerance	Size in GB	Partition Format	Content
Slot 236 Channel A/B	10	RAID 0	50	RAW	Tpch1000g LI
				RAW	Tpch1000g GEN
				RAW	Tpch1000g TempDB
		RAID 5	99	NTFS	Backup, Flatfiles

SCSI Controller	# of Disks	Array Fault Tolerance	Size in GB	Partition Format	Content
Embedded	2	Basic Disk	32	NTFS	OS, SQL C:\ D:\

5.3 Mapping of Database Partitions/Replications

The mapping of database partitions/replications must be explicitly described.

Database partitioning/replication was not used.

5.4 Implementation of RAID

Implementations may use some form of RAID to ensure high availability. If used for data, auxiliary storage (e.g. indexes) or temporary space, the level of RAID used must be disclosed for each device.

RAID 0 was used for database filegroups and tempdb, RAID 1 for database recovery logs, RAID 5 for Backup.

5.5 DBGEN Modifications

The version number, release number, modification number, and patch level of DBGEN must be disclosed. Any modifications to the DBGEN (see Clause 4.2.1) source code must be disclosed. In the event that a program other than DBGEN was used to populate the database, it must be disclosed in its entirety.

DBGEN version 2.3.0 was used.

5.6 Database Load time

The database load time for the test database (see clause 4.3) must be disclosed.

The database load time was 11:40:49

5.7 Data Storage Ratio

The data storage ratio must be disclosed. It is computed by dividing the total data storage of the priced configuration (expressed in GB) by the size chosen for the test database as defined in 4.1.3.1. The ratio must be reported to the nearest 1/100th, rounded up.

Disk Type	# of Disks	Total (GB)
36 GB 15k rpm U320	320	11,158
146 GB 10K rpm U320	2	
36 GB 15K Internal Disk	2	

Size of test database: 1000G

Data Storage Ratio: 11.16

5.8 Database Load Mechanism Details and Illustration

The details of the database load must be disclosed, including a block diagram illustrating the overall process. Disclosure of the load procedure includes all steps, scripts, input and configuration files required to completely reproduce the test and qualification databases.

Flat files for each of the tables were created using DBGEN. The tables were loaded as depicted in Figure 5-8.

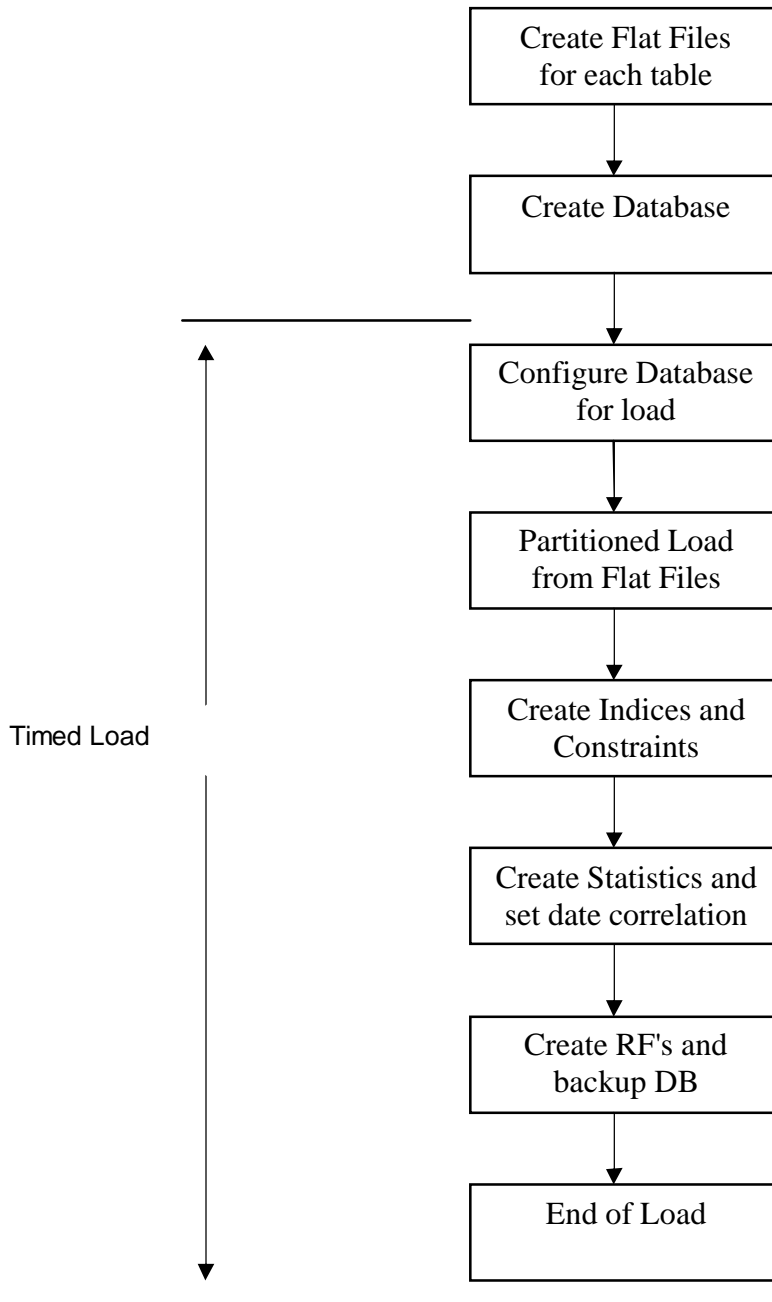


Figure 5.8: Block Diagram of Database Load Process

6.0 Clause 5: Performance Metrics and Execution Rules Related Items

6.1 Steps after the Load Test

Any system activity on the SUT that takes place between the conclusion of the load test and the beginning of the performance test must be fully disclosed including listings of scripts or command logs.

Auditor requested queries were run against the database to verify the correctness of the load. The system was rebooted and SQL Server was restarted.

6.2 Steps in the Power Test

The details of the steps followed to implement the power test (e.g., system boot, database restart, etc.) must be disclosed.

The following steps were used to implement the power test:

1. RF1 Refresh Transaction
2. Stream 0 Execution
3. RF2 Refresh Transaction.

6.3 Timing Intervals for Each Query and Refresh Function

The timing intervals (see Clause 5.3.6) for each query of the measured set and for both refresh functions must be reported for the power test.

The timing intervals for each query and both refresh functions are given in the Numerical Quantities Summary earlier in this document on page vii.

6.4 Number of Streams for The Throughput Test

The number of execution streams used for the throughput test must be disclosed.

7 streams were used for the Throughput Test.

6.5 Start and End Date/Times for Each Query Stream

The start time and finish time for each query execution stream must be reported for the throughput test.

The Numerical Quantities Summary on page vii contains the start and stop times for the query execution streams run on the system reported.

6.6 Total Elapsed Time for the Measurement Interval

The total elapsed time of the measurement interval(see Clause 5.3.5) must be reported for the throughput test.

The Numerical Quantities Summary on page vii contains the timing intervals for the throughput test run on the system reported.

6.7 Refresh Function Start Date/Time and Finish Date/Time

Start and finish time for each update function in the update stream must be reported for the throughput test.

The Numerical Quantities Summary on page vii contains the start and finish times for the refresh functions of each stream.

6.8 Timing Intervals for Each Query and Each Refresh Function for Each Stream

The timing intervals (see Clause 5.3.6) for each query of each stream and for each update function must be reported for the throughput test.

The timing intervals for each query and each update function are given in the Numerical Quantities Summary earlier in this document on page vii.

6.9 Performance Metrics

The computed performance metrics, related numerical quantities and the price performance metric must be reported.

The Numerical Quantities Summary contains the performance metrics, related numerical quantities, and the price/performance metric for the system reported.

6.10 The Performance Metric and Numerical Quantities from Both Runs

The performance metric (QphH@Size) and the numerical quantities (TPC-H Power@Size and TPC-H Throughput@ Size) from both of the runs must be disclosed

Run ID	QppH@1000G	QthH@1000G	QphH@1000G
Run 1	43,425.8	25,824.5	33,488.1
Run 2	44,720.5	25,964.8	34,075.8

6.11 System Activity Between Tests

Any activity on the SUT that takes place between the conclusion of Run1 and the beginning of Run2 must be disclosed.

The system was rebooted and SQL Server was restarted.

7.0 Clause 6: SUT and Driver Implementation Related Items

7.1 Driver

A detailed description of how the driver performs its functions must be supplied, including any related source code or scripts. This description should allow an independent reconstruction of the driver.

The TPC-H benchmark was implemented using a Microsoft tool called StepMaster. StepMaster is a general purpose test tool which can drive ODBC and shell commands. Within StepMaster, the user designs a workspace corresponding to the sequence of operations (or steps) to be executed. When the workspace is executed, StepMaster records information about the run into a database as well as a log file for later analysis.

StepMaster provides a mechanism for creating parallel streams of execution. This is used in the throughput tests to drive the query and refresh streams. Each step is timed using a millisecond resolution timer. A timestamp T1 is taken before beginning the operation and a timestamp T2 is taken after completing the operation. These times are recorded in a database as well as a log file for later analysis.

Two types of ODBC connections are supported. A dynamic connection is used to execute a single operation and is closed when the operation finishes. A static connection is held open until the run completes and may be used to execute more than one step. A connection (either static or dynamic) can only have one outstanding operation at any time.

In TPC-H, static connections are used for the query streams in the power and throughput tests. StepMaster reads an Access database to determine the sequence of steps to execute. These commands are represented as the Implementation Specific Layer. StepMaster records its execution history, including all timings, in the Access database. Additionally, StepMaster writes a textual log file of execution for each run.

The source code is disclosed on Appendix F

7.2 Implementation Specific Layer (ISL)

If an implementation-specific layer is used, then a detailed description of how it performs its functions must be supplied, including any related source code or scripts. This description should allow an independent reconstruction of the implementation-specific layer.

The following steps are performed, to accomplish the Power and Throughput Runs:

1. Power Run

- Execute 144 concurrent RF1 threads, each of which will apply a segment of a refresh set generated by DBGen. Each thread submits multiple transactions, where a transaction spans a set of orders and their associated line items.
- Execute the Stream 0 queries in the order according to TPC Benchmark H Specification, Appendix A
- Execute 144 concurrent RF2 threads, each of which will apply a segment of a refresh set generated by DBGen. Each thread submits multiple transactions, where a transaction spans a set of orders and their associated line items.

2. Throughput Run

- Execute 7 concurrent query streams. Each stream executes queries in the order according to TPC Benchmark H Specification, Appendix A, for the appropriate Stream ID (01-07). Upon completion of each stream, a semaphore is signaled to indicate completion.
- Execute 7 consecutive RF1/RF2 transactions, against ascending Refresh sets produced by DBGen. The first RF1 waits on a semaphore prior to beginning its insert operations.

Each step is timed by StepMaster. The timing information, together with an activity log, are stored for later analysis. The inputs and results of steps are stored in text files for later analysis.

7.3 Profile-Directed Optimization

If profile-directed optimization as described in Clause 5.2.9 is used, such use must be disclosed.

Profile-directed optimization was not used.

8. Clause 7: Pricing Related Items

8.1 Hardware and Software Used

A detailed list of hardware and software used in the priced system must be reported. Each item must have a vendor part number, description, and release/revision level, and indicate General Availability status or committed delivery date. If package pricing is used, contents of the package must be disclosed. Pricing source(s) and effective date(s) of price(s) must also be reported.

The pricing summary sheet is given on page v in the Executive Summary at the front of this report. The source for all prices is indicated.

The HP Integrity rx8640, system memory, additional processors will be available October 01 2006.

The pricing and availability of the Microsoft software used is given in a quote from Microsoft, which is included in this report in Appendix H.

8.2 Three-Year Cost of System Configuration

The total 3-year price of the entire configuration must be reported, including: hardware, software, and maintenance charges. Separate component pricing is required.

The pricing summary sheet on page v in the front of this report contains all details.

8.3 Availability Dates

The committed delivery date for general availability (availability date) of products used in the priced calculations must be reported. When the priced system includes products with different availability dates, the single availability date reported on the first page of the executive summary must be the date by which all components are committed to being available. The full disclosure report must report availability dates individually for at least each of the categories for which a pricing subtotal must be provided (see Clause 7.3.1.4). All availability dates, whether for individual components or for the SUT as a whole, must be disclosed to a precision of 1 day, but the precise format is left to the test sponsor.

Category	Available
Server Hardware	October 01 2006
Storage	Now (date of publication)
Server Software	Now (date of publication)
SQL Server	Now (date of publication)

Server rx8640 (AB446A #003) will be orderable as of October 1st 2006.

For details please contact:

HP Sales Development, 19111 Pruneridge Ave., Cupertino, CA 95014 (408) 447 2320

9. Clause 8: Audit Related Items

9.1 Auditors' Report

The auditor's agency name, address, phone number, and Attestation letter with a brief audit summary report indicating compliance must be included in the full disclosure report. A statement should be included specifying who to contact in order to obtain further information regarding the audit process.

This implementation of the TPC Benchmark H was audited by Lorna Livingtree of Performance Metrics, a certified TPC-H auditor. Further information regarding the audit process may be obtained from:

Lorna Livingtree
Performance Metrics Inc.
PO Box 984
Klamath, CA 95548
(707) 482 0523

Requests for this TPC Benchmark H Full Disclosure Report should be sent to:

Transaction Processing Performance Council
c/o Shanley Public Relations
777 North First Street, Suite 6000
San Jose, CA 95112-6311 USA
Telephone: (408) 295-8894
Fax: (408) 295-9768



PERFORMANCE METRICS INC.
TPC Certified Auditors

July 11, 2006

Mr. Mike Fitzner
Senior Performance Engineer
Hewlett-Packard Company
14475 24th Street NE
Bellevue, WA 98007

I have verified the TPC Benchmark™ H for the following configuration:

Platform: HP Integrity rx8640
Database Manager: Manager: Microsoft SQL Server 2005 Enterprise Edition
for Itanium-based systems (SP1)
Operating System: Microsoft Windows Server 2003, Datacenter Edition (64-bit)

CPU's	Memory	Total Disks	Qpph@ 1000GB	QthH@1000GB	QphH@1000GB
16 Intel DC Itanium 2 Processor 9050 @ 1.6GHz / 24MB	128 GB	2 @ 146 GB 320 @ 36GB 1 @ 36GB (OS)	43,425.8	25,824.5	33,488.1

In my opinion, these performance results were produced in compliance with the TPC requirements for the benchmark. The following attributes of the benchmark were given special attention:

- The database tables were defined with the proper columns, layout and sizes.
- The tested database was correctly scaled and populated for 1000GB using DBGEN. The version of DBGEN was 2.3.0.
- The qualification database layout was identical to the tested database except for the number and size of the files and nodes.
- The query text was verified to use only compliant variants and minor modifications.
- The executable query text was generated by QGEN and submitted through SQL Server's standard interactive interface. The version of QGEN was 2.3.0.

PO Box 984 Klamath, CA 95548
(707) 482-0523 fax: (707) 482-0575

Page 1
email: LornaL@PerfMetrics.com

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TPC Certified Auditors

- The validation of the query text against the qualification database produced compliant results.
- The refresh functions were properly implemented and executed the correct number of inserts and deletes.
- The load timing was properly measured and reported.
- The execution times were correctly measured and reported.
- The performance metrics were correctly computed and reported.
- The repeatability of the measurement was verified.
- The ACID properties were successfully demonstrated and verified.
- The system pricing was checked for major components and maintenance.
- The executive summary pages of the FDR were verified for accuracy.

Auditor's Notes:
None.

Sincerely,



Lorna Livingtree
Auditor

Appendix A: Tunable Parameters

System Info

System Information report written at: 07/08/06 20:01:16

System Name: SQLKONA

[System Summary]

Item Value

OS Name Microsoft(R) Windows(R) Server 2003, Datacenter Edition for 64-Bit Itanium-based Systems

Version 5.2.3790 Service Pack 1 Build 3790

Other OS Description Not Available

OS Manufacturer Microsoft Corporation

System Name SQLKONA

System Manufacturer hp

System Model CELL000

System Type Itanium (TM) -based System

Processor ia64 Family 32 Model 0 Stepping 5 GenuineIntel ~1598 Mhz

Processor ia64 Family 32 Model 0 Stepping 5 GenuineIntel ~1598 Mhz

Processor ia64 Family 32 Model 0 Stepping 5 GenuineIntel ~1598 Mhz

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Processor ia64 Family 32 Model 0 Stepping 5 GenuineIntel ~1598 Mhz

0x00008000-0x00008FFF PCI busOK
0x00008000-0x00008FFF PCI standard PCI-to-PCI bridge OK
0x00008000-0x00008FFF Smart Array 6400 Controller OK
0x0000A000-0x0000AFFF PCI busOK
0x0000A000-0x0000AFFF PCI standard PCI-to-PCI bridge OK
0x0000A000-0x0000AFFF Smart Array 6400 Controller OK
0x0000A000-0x0000AFFF PCI busOK
0x0000A000-0x0000AFFF PCI standard PCI-to-PCI bridge OK
0x0000A000-0x0000AFFF Smart Array 6400 Controller OK
0x0000A000-0x0000AFFF PCI busOK
0x0000A000-0x0000AFFF PCI standard PCI-to-PCI bridge OK
0x0000A000-0x0000AFFF Smart Array 6400 Controller OK
0x0000A000-0x0000AFFF PCI busOK
0x0000A000-0x0000AFFF PCI standard PCI-to-PCI bridge OK
0x0000A000-0x0000AFFF Smart Array 6400 Controller OK
0x0000C000-0x0000CFFF PCI busOK
0x0000C000-0x0000CFFF PCI standard PCI-to-PCI bridge OK
0x0000C000-0x0000CFFF Smart Array 6400 Controller OK
0x0000C000-0x0000CFFF PCI busOK
0x0000C000-0x0000CFFF PCI standard PCI-to-PCI bridge OK
0x0000C000-0x0000CFFF Smart Array 6400 Controller OK
0x0000C000-0x0000CFFF PCI busOK
0x0000C000-0x0000CFFF PCI standard PCI-to-PCI bridge OK
0x0000C000-0x0000CFFF Smart Array 6400 Controller OK
0x0000E000-0x0000EFFF PCI busOK
0x0000E000-0x0000EFFF PCI standard PCI-to-PCI bridge OK
0x0000E000-0x0000EFFF Smart Array 6400 Controller OK
0x0000E000-0x0000EFFF PCI busOK
0x0000E000-0x0000EFFF PCI standard PCI-to-PCI bridge OK
0x0000E000-0x0000EFFF Smart Array 6400 Controller OK
0x0000E000-0x0000EFFF PCI busOK
0x0000E000-0x0000EFFF Smart Array 6400 Controller OK
0x0000E000-0x0000EFFF PCI busOK
0x0000E000-0x0000EFFF PCI standard PCI-to-PCI bridge OK
0x0000E000-0x0000EFFF Smart Array 6400 Controller OK

[IRQs]

Resource Device Status

IRQ 16 Microsoft ACPI-Compliant System OK
IRQ 29 Broadcom NetXtreme Gigabit Ethernet #4 OK
IRQ 25 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 26 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 27 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 28 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 17 HP Baseboard Management Controller Interface Device OK
IRQ 36 Smart Array 6400 Controller OK
IRQ 47 Smart Array 6400 Controller OK
IRQ 58 Smart Array 6400 Controller OK
IRQ 69 Smart Array 6400 Controller OK
IRQ 80 Smart Array 6400 Controller OK
IRQ 91 Smart Array 6400 Controller OK
IRQ 102 Smart Array 6400 Controller OK
IRQ 113 Smart Array 6400 Controller OK
IRQ 144 Smart Array 6400 Controller OK
IRQ 155 Smart Array 6400 Controller OK
IRQ 166 Smart Array 6400 Controller OK
IRQ 177 Smart Array 6400 Controller OK
IRQ 188 Smart Array 6400 Controller OK
IRQ 199 Smart Array 6400 Controller OK
IRQ 210 Smart Array 6400 Controller OK
IRQ 221 Smart Array 6400 Controller OK
IRQ 245 Broadcom NetXtreme Gigabit Ethernet #6 OK
IRQ 241 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK

IRQ 242 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 243 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 244 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 252 Smart Array 6400 Controller OK
IRQ 263 Smart Array 6400 Controller OK
IRQ 274 Smart Array 6400 Controller OK
IRQ 285 Smart Array 6400 Controller OK
IRQ 296 Smart Array 6400 Controller OK
IRQ 307 Smart Array 6400 Controller OK
IRQ 318 Smart Array 6400 Controller OK
IRQ 329 Smart Array 6400 Controller OK
IRQ 353 Broadcom NetXtreme Gigabit Ethernet #5 OK
IRQ 349 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 350 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 351 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 352 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) OK
IRQ 360 Smart Array 6400 Controller OK
IRQ 371 Smart Array 6400 Controller OK
IRQ 382 Smart Array 6400 Controller OK
IRQ 393 Smart Array 6400 Controller OK
IRQ 404 Smart Array 6400 Controller OK
IRQ 415 Smart Array 6400 Controller OK
IRQ 426 Smart Array 6400 Controller OK
IRQ 437 Smart Array 6400 Controller OK

[Memory]

Resource Device Status

0x80000000-0xFEDFFFFFFF PCI busOK
0x80000000-0xFEDFFFFFFF PCI busOK
0x80000000-0xFEDFFFFFFF PCI standard PCI-to-PCI bridge OK
0x80000000-0xFEDFFFFFFF PCI busOK
0x80000000-0xFEDFFFFFFF PCI standard PCI-to-PCI bridge OK
0x80000000-0xFEDFFFFFFF PCI busOK
0x80000000-0xFEDFFFFFFF PCI standard PCI-to-PCI bridge OK
0x80000000-0xFEDFFFFFFF PCI busOK
0x80000000-0xFEDFFFFFFF PCI standard PCI-to-PCI bridge OK
0x80000000-0xFEDFFFFFFF PCI busOK
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0x80000000-0xFEDFFFFFFF PCI busOK
0x80000000-0xFEDFFFFFFF PCI standard PCI-to-PCI bridge OK
0x80000000-0xFEDFFFFFFF PCI busOK

[Multimedia]

[Audio Codecs]

CODEC	Manufacturer	Description	Status	File Version	Size	Creation Date
c:\windows\system32\imaadp32.acm	Microsoft Corporation		OK	C:\windows\system32\IMAADP32.ACM	5.2.3790.0	(srv03_rtm.030324-2048) 55.00 KB (56,320 bytes) 3/25/2005 4:00 AM
c:\windows\system32\msadp32.acm	Microsoft Corporation		OK	C:\windows\system32\MSADP32.ACM	5.2.3790.0	(srv03_rtm.030324-2048) 49.00 KB (50,176 bytes) 3/25/2005 4:00 AM
c:\windows\system32\msg711.acm	Microsoft Corporation		OK	C:\windows\system32\MSG711.ACM	5.2.3790.0	(srv03_rtm.030324-2048) 33.00 KB (33,792 bytes) 3/25/2005 4:00 AM
c:\windows\system32\msgsm32.acm	Microsoft Corporation		OK	C:\windows\system32\MSGSM32.ACM	5.2.3790.0	(srv03_rtm.030324-2048) 66.50 KB (68,096 bytes) 3/25/2005 4:00 AM
c:\windows\system32\tssoft32.acm	DSP GROUP, INC.		OK	C:\windows\system32\TSSOFT32.ACM	1.01	29.00 KB (29,696 bytes) 3/25/2005 4:00 AM

[Video Codecs]

CODEC	Manufacturer	Description	Status	File Version	Size	Creation Date
c:\windows\system32\msrle32.dll	Microsoft Corporation		OK	C:\windows\system32\MSRLE32.DLL	5.2.3790.0	(srv03_rtm.030324-2048) 24.50 KB (25,088 bytes) 3/25/2005 4:00 AM
c:\windows\system32\msvidc32.dll	Microsoft Corporation		OK	C:\windows\system32\MSVIDC32.DLL	5.2.3790.0	(srv03_rtm.030324-2048) 67.00 KB (68,608 bytes) 3/25/2005 4:00 AM

[CD-ROM]

Item	Value
Drive	D:
Description	CD-ROM Drive
Media Loaded	Yes
Media Type	CD-ROM
Name	_NEC DVD+RW ND-2100AD SCSI CdRom Device
Manufacturer	(Standard CD-ROM drives)
Status	OK
Transfer Rate	7885.71 kbytes/sec
SCSI Target ID	2
PNP Device ID	SCSI\CDROM&VEN_NEC&PROD_DVD+RW_ND-2100AD&REV_1.28\6&1AB23DE8&0&020
Driver	c:\windows\system32\drivers\cdrom.sys (5.2.3790.1830 (srv03_sp1_rtm.050324-1447), 144.50 KB (147,968 bytes), 3/25/2005 4:00 AM)

[Sound Device]

Item	Value
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[Display]

Item	Value
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[Infrared]

Item	Value
------	-------

[Input]

[Keyboard]

Item	Value
------	-------

[Pointing Device]

Item	Value
------	-------

[Modem]

Item	Value
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[Network]

[Adapter]

Item	Value
Name	[00000001] Broadcom NetXtreme Gigabit Ethernet
Adapter Type	Not Available
Product Type	Broadcom NetXtreme Gigabit Ethernet
Installed	Yes
PNP Device ID	Not Available
Last Reset	7/8/2006 7:43 PM
Index	1
Service Name	b57nd
IP Address	Not Available
IP Subnet	Not Available
Default IP Gateway	Not Available
DHCP Enabled	Yes
DHCP Server	Not Available
DHCP Lease Expires	Not Available
DHCP Lease Obtained	Not Available
MAC Address	Not Available

Item	Value
Name	[00000002] RAS Async Adapter
Adapter Type	Not Available
Product Type	RAS Async Adapter
Installed	Yes
PNP Device ID	Not Available
Last Reset	7/8/2006 7:43 PM
Index	2
Service Name	AsyncMac
IP Address	Not Available
IP Subnet	Not Available
Default IP Gateway	Not Available
DHCP Enabled	No
DHCP Server	Not Available
DHCP Lease Expires	Not Available
DHCP Lease Obtained	Not Available
MAC Address	Not Available

Item	Value
Name	[00000003] WAN Miniport (L2TP)
Adapter Type	Not Available
Product Type	WAN Miniport (L2TP)
Installed	Yes
PNP Device ID	ROOT\MS_L2TPMINIPORT\0000
Last Reset	7/8/2006 7:43 PM
Index	3
Service Name	Rasl2tp
IP Address	Not Available
IP Subnet	Not Available
Default IP Gateway	Not Available
DHCP Enabled	No
DHCP Server	Not Available
DHCP Lease Expires	Not Available
DHCP Lease Obtained	Not Available
MAC Address	Not Available

Item	Value
Name	[00000004] WAN Miniport (PPTP)
Adapter Type	Wide Area Network (WAN)
Product Type	WAN Miniport (PPTP)
Installed	Yes

PNP Device ID ROOT\MS_PPTPMINIPORT\0000
Last Reset 7/8/2006 7:43 PM
Index 4
Service Name PptpMiniport
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 50:50:54:50:30:30

Name [00000005] WAN Miniport (PPPOE)
Adapter Type Wide Area Network (WAN)
Product Type WAN Miniport (PPPOE)
Installed Yes
PNP Device ID ROOT\MS_PPPOEMINIPORT\0000
Last Reset 7/8/2006 7:43 PM
Index 5
Service Name RasPppoe
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 33:50:6F:45:30:30

Name [00000006] Direct Parallel
Adapter Type Not Available
Product Type Direct Parallel
Installed Yes
PNP Device ID ROOT\MS_PTMINIPORT\0000
Last Reset 7/8/2006 7:43 PM
Index 6
Service Name Raspti
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000007] WAN Miniport (IP)
Adapter Type Not Available
Product Type WAN Miniport (IP)
Installed Yes
PNP Device ID ROOT\MS_NDISWANIP\0000
Last Reset 7/8/2006 7:43 PM
Index 7
Service Name NdisWan
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled No
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000008] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Not Available
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID Not Available
Last Reset 7/8/2006 7:43 PM
Index 8
Service Name b57nd
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available

DHCP Enabled Yes
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000009] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Not Available
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID Not Available
Last Reset 7/8/2006 7:43 PM
Index 9
Service Name b57nd
IP Address Not Available
IP Subnet Not Available
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server Not Available
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address Not Available

Name [00000010] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Ethernet 802.3
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID
PCI\VEN_14E4&DEV_16C7&SUBSYS_1321103C&REV_10\4&4F5EBC7&0&08
Last Reset 7/8/2006 7:43 PM
Index 10
Service Name b57nd
IP Address 15.1.101.31
IP Subnet 255.255.0.0
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server 15.1.101.1
DHCP Lease Expires 7/16/2006 7:46 PM
DHCP Lease Obtained 7/8/2006 7:46 PM
MAC Address 00:12:79:B3:6D:DF
Memory Address 0x80520000-0x8052FFFF
IRQ Channel IRQ 29
Driver c:\windows\system32\drivers\b57xp64.sys (8.39.1.0 built by: WinDDK, 424.50 KB (434,688 bytes), 7/21/2005 9:10 AM)

Name [00000011] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Ethernet 802.3
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes
PNP Device ID
PCI\VEN_14E4&DEV_16C7&SUBSYS_1321103C&REV_10\5&19EBB955&0&08
Last Reset 7/8/2006 7:43 PM
Index 11
Service Name b57nd
IP Address 0.0.0.0
IP Subnet 0.0.0.0
Default IP Gateway Not Available
DHCP Enabled Yes
DHCP Server
DHCP Lease Expires Not Available
DHCP Lease Obtained Not Available
MAC Address 00:12:79:B3:6D:13
Memory Address 0x80520000-0x8052FFFF
IRQ Channel IRQ 353
Driver c:\windows\system32\drivers\b57xp64.sys (8.39.1.0 built by: WinDDK, 424.50 KB (434,688 bytes), 7/21/2005 9:10 AM)

Name [00000012] Broadcom NetXtreme Gigabit Ethernet
Adapter Type Ethernet 802.3
Product Type Broadcom NetXtreme Gigabit Ethernet
Installed Yes

PNP Device ID
 PCI\VEN_14E4&DEV_16C7&SUBSYS_1321103C&REV_10
 5&915E908&0&08
 Last Reset 7/8/2006 7:43 PM
 Index 12
 Service Name b57nd
 IP Address 0.0.0.0
 IP Subnet 0.0.0.0
 Default IP Gateway Not Available
 DHCP Enabled Yes
 DHCP Server
 DHCP Lease Expires Not Available
 DHCP Lease Obtained Not Available
 MAC Address 00:12:79:B3:5D:33
 Memory Address 0x80520000-0x8052FFFF
 IRQ Channel IRQ 245
 Driver c:\windows\system32\drivers\b57xp64.sys (8.39.1.0 built
 by: WinDDK, 424.50 KB (434,688 bytes), 7/21/2005 9:10 AM)

[Protocol]

Item Value
 Name MSAFD Tcpip [TCP/IP]
 Connectionless Service No
 Guarantees Delivery Yes
 Guarantees Sequencing Yes
 Maximum Address Size 16 bytes
 Maximum Message Size 0 bytes
 Message Oriented No
 Minimum Address Size 16 bytes
 Pseudo Stream Oriented No
 Supports Broadcasting No
 Supports Connect Data No
 Supports Disconnect Data No
 Supports Encryption No
 Supports Expedited Data Yes
 Supports Graceful Closing Yes
 Supports Guaranteed Bandwidth No
 Supports Multicasting No

Name MSAFD Tcpip [UDP/IP]
 Connectionless Service Yes
 Guarantees Delivery No
 Guarantees Sequencing No
 Maximum Address Size 16 bytes
 Maximum Message Size 63.93 KB (65,467 bytes)
 Message Oriented Yes
 Minimum Address Size 16 bytes
 Pseudo Stream Oriented No
 Supports Broadcasting Yes
 Supports Connect Data No
 Supports Disconnect Data No
 Supports Encryption No
 Supports Expedited Data No
 Supports Graceful Closing No
 Supports Guaranteed Bandwidth No
 Supports Multicasting Yes

Name RSVP UDP Service Provider
 Connectionless Service Yes
 Guarantees Delivery No
 Guarantees Sequencing No
 Maximum Address Size 16 bytes
 Maximum Message Size 63.93 KB (65,467 bytes)
 Message Oriented Yes
 Minimum Address Size 16 bytes
 Pseudo Stream Oriented No
 Supports Broadcasting Yes
 Supports Connect Data No
 Supports Disconnect Data No
 Supports Encryption Yes
 Supports Expedited Data No
 Supports Graceful Closing No
 Supports Guaranteed Bandwidth No
 Supports Multicasting Yes

Name RSVP TCP Service Provider
 Connectionless Service No
 Guarantees Delivery Yes
 Guarantees Sequencing Yes
 Maximum Address Size 16 bytes
 Maximum Message Size 0 bytes
 Message Oriented No
 Minimum Address Size 16 bytes
 Pseudo Stream Oriented No
 Supports Broadcasting No
 Supports Connect Data No
 Supports Disconnect Data No
 Supports Encryption Yes
 Supports Expedited Data Yes
 Supports Graceful Closing Yes
 Supports Guaranteed Bandwidth No
 Supports Multicasting No

[WinSock]

Item Value
 File c:\windows\system32\wssock32.dll
 Size 23.00 KB (23,552 bytes)
 Version 5.2.3790.0 (srv03_rtm.030324-2048)

[Ports]

[Serial]

Item Value

[Parallel]

Item Value

[Storage]

[Drives]

Item Value
 Drive C:
 Description Local Fixed Disk
 Compressed No
 File System NTFS
 Size 32.00 GB (34,359,734,272 bytes)
 Free Space 9.02 GB (9,680,703,488 bytes)
 Volume Name
 Volume Serial Number 283B8C43

Drive D:
 Description CD-ROM Disc

Drive G:
 Description Local Fixed Disk
 Compressed No
 File System NTFS
 Size 3.79 GB (4,066,373,632 bytes)
 Free Space 2.53 GB (2,721,890,304 bytes)
 Volume Name G-Drive
 Volume Serial Number 24FD38E8

Drive L:
 Description Local Fixed Disk
 Compressed Not Available
 File System Not Available
 Size Not Available
 Free Space Not Available
 Volume Name Not Available
 Volume Serial Number Not Available

Drive T:
Description Local Fixed Disk
Compressed No
File System NTFS
Size 35.16 GB (37,748,670,464 bytes)
Free Space 934.75 MB (980,156,416 bytes)
Volume Name TempDB
Volume Serial Number 00DED144

[Disks]

Item Value
Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 30
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #75, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #75, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #75, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 30
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #76, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #76, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 30
SCSI Target ID 6
Sectors/Track 63

Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #77, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #77, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #77, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 30
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #78, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #78, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 27
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #63, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #63, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #63, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0

SCSI Port 27
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #64, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #64, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 27
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #65, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #65, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #65, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 27
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #66, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #66, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0

SCSI Port 25
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #54, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #54, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #54, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 25
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #55, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #55, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 25
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #56, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #56, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #56, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk

Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 25
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #57, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #57, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 25
SCSI Target ID 8
Sectors/Track 63
Size 136.72 GB (146,804,797,440 bytes)
Total Cylinders 17,848
Total Sectors 286,728,120
Total Tracks 4,551,240
Tracks/Cylinder 255
Partition Disk #58, Partition #0
Partition Size 97.66 GB (104,857,600,000 bytes)
Partition Starting Offset 134,235,136 bytes
Partition Disk #58, Partition #1
Partition Size 35.16 GB (37,748,736,000 bytes)
Partition Starting Offset 104,991,835,136 bytes
Partition Disk #58, Partition #2
Partition Size 3.79 GB (4,066,377,728 bytes)
Partition Starting Offset 142,740,571,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 28
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #67, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #67, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #67, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device

Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 28
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #68, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #68, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 28
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #69, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #69, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #69, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 28
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #70, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #70, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device

Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 36
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #99, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #99, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #99, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 36
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #100, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #100, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 36
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #101, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #101, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #101, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 36
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #102, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #102, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 38
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #107, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #107, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #107, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 38
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #108, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #108, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 38
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #109, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #109, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #109, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 38
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #110, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #110, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 41
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #119, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #119, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #119, Partition #2

Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 41
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #120, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #120, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 41
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #121, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #121, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #121, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 41
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #122, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #122, Partition #1

Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 15
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #14, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #14, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #14, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 15
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #15, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #15, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 15
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #16, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #16, Partition #1

Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #16, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 15
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #17, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #17, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 42
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #123, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #123, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #123, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 42
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #124, Partition #0

Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #124, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 42
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #125, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #125, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #125, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 42
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #126, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #126, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 18
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #26, Partition #0

Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #26, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #26, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 18
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #27, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #27, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 18
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #28, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #28, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #28, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 18
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585

Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #29, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #29, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 26
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #59, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #59, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #59, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 26
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #60, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #60, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 26
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310

Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #61, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #61, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #61, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 26
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #62, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #62, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 40
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #115, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #115, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #115, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 40
SCSI Target ID 5
Sectors/Track 63

Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #116, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #116, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 40
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #117, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #117, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #117, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 40
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #118, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #118, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 31
SCSI Target ID 4
Sectors/Track 63

Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #79, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #79, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #79, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 31
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #80, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #80, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 31
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #81, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #81, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #81, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0

SCSI Port 31
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #82, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #82, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 12
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #2, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #2, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #2, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 12
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #3, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #3, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0

SCSI Port 12
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #4, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #4, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #4, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 12
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #5, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #5, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 35
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #95, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #95, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #95, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk

Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 35
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #96, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #96, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 35
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #97, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #97, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #97, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 35
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #98, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #98, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk

Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 21
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #38, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #38, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #38, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 21
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #39, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #39, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 21
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #40, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #40, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #40, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device

Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 21
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #41, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #41, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 24
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #50, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #50, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #50, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 24
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #51, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #51, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device

Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 24
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #52, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #52, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #52, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 24
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #53, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #53, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 32
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #83, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #83, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #83, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 32
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #84, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #84, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 32
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #85, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #85, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #85, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 32
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #86, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #86, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 37
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #103, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #103, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #103, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 37
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #104, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #104, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 37
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #105, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #105, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #105, Partition #2

Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 37
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #106, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #106, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 22
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #42, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #42, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #42, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 22
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #43, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #43, Partition #1

Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 22
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #44, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #44, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #44, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 22
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #45, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #45, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 19
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #30, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #30, Partition #1

Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #30, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 19
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #31, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #31, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 19
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #32, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #32, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #32, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 19
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #33, Partition #0

Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #33, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 33
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #87, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #87, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #87, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 33
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #88, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #88, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 33
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #89, Partition #0

Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #89, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #89, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 33
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #90, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #90, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 34
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #91, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #91, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #91, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 34
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585

Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #92, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #92, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 34
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #93, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #93, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #93, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 34
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #94, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #94, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 39
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310

Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #111, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #111, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #111, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 39
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #112, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #112, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 39
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #113, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #113, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #113, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 39
SCSI Target ID 7
Sectors/Track 63

Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #114, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #114, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 17
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #22, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #22, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #22, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 17
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #23, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #23, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 17
SCSI Target ID 6
Sectors/Track 63

Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #24, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #24, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #24, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 17
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #25, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #25, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 43
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #127, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #127, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #127, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0

SCSI Port 43
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #128, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #128, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 43
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #129, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #129, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #129, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 43
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #130, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #130, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0

SCSI Port 14
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #10, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #10, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #10, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 14
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #11, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #11, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 14
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #12, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #12, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #12, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk

Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 14
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #13, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #13, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 16
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #18, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #18, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #18, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 16
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #19, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #19, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk

Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 16
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #20, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #20, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #20, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 16
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #21, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #21, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 23
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #46, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #46, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #46, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device

Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 23
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #47, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #47, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 23
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #48, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #48, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #48, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 23
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #49, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #49, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device

Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 13
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #6, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #6, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #6, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 13
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #7, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #7, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 13
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #8, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #8, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #8, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 13
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #9, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #9, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 29
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #71, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #71, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #71, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 29
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #72, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #72, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 29
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #73, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #73, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #73, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 29
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #74, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #74, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 20
SCSI Target ID 4
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #34, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #34, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #34, Partition #2

Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 20
SCSI Target ID 5
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #35, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #35, Partition #1
Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 20
SCSI Target ID 6
Sectors/Track 63
Size 48.83 GB (52,427,934,720 bytes)
Total Cylinders 6,374
Total Sectors 102,398,310
Total Tracks 1,625,370
Tracks/Cylinder 255
Partition Disk #36, Partition #0
Partition Size 22.95 GB (24,641,536,000 bytes)
Partition Starting Offset 135,266,304 bytes
Partition Disk #36, Partition #1
Partition Size 8.79 GB (9,437,184,000 bytes)
Partition Starting Offset 24,776,802,304 bytes
Partition Disk #36, Partition #2
Partition Size 16.96 GB (18,214,714,880 bytes)
Partition Starting Offset 34,213,986,304 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP LOGICAL VOLUME SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 2
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 20
SCSI Target ID 7
Sectors/Track 63
Size 96.59 GB (103,712,555,520 bytes)
Total Cylinders 12,609
Total Sectors 202,563,585
Total Tracks 3,215,295
Tracks/Cylinder 255
Partition Disk #37, Partition #0
Partition Size 1.00 MB (1,048,576 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #37, Partition #1

Partition Size 96.46 GB (103,578,434,048 bytes)
Partition Starting Offset 134,235,136 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP 36.4G MAS3367NC SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 2
SCSI Target ID 6
Sectors/Track 63
Size 33.91 GB (36,413,314,560 bytes)
Total Cylinders 4,427
Total Sectors 71,119,755
Total Tracks 1,128,885
Tracks/Cylinder 255
Partition Disk #1, Partition #0
Partition Size 100.00 MB (104,857,600 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #1, Partition #1
Partition Size 400.00 MB (419,430,400 bytes)
Partition Starting Offset 104,875,008 bytes
Partition Disk #1, Partition #2
Partition Size 33.31 GB (35,761,534,976 bytes)
Partition Starting Offset 658,523,648 bytes

Description Disk drive
Manufacturer (Standard disk drives)
Model HP 36.4G MAS3367NC SCSI Disk Device
Bytes/Sector 512
Media Loaded Yes
Media Type Fixed hard disk
Partitions 3
SCSI Bus 0
SCSI Logical Unit 0
SCSI Port 0
SCSI Target ID 6
Sectors/Track 63
Size 33.91 GB (36,413,314,560 bytes)
Total Cylinders 4,427
Total Sectors 71,119,755
Total Tracks 1,128,885
Tracks/Cylinder 255
Partition Disk #0, Partition #0
Partition Size 100.00 MB (104,857,600 bytes)
Partition Starting Offset 17,408 bytes
Partition Disk #0, Partition #1
Partition Size 400.00 MB (419,430,400 bytes)
Partition Starting Offset 104,875,008 bytes
Partition Disk #0, Partition #2
Partition Size 32.00 GB (34,359,738,368 bytes)
Partition Starting Offset 658,523,648 bytes

[SCSI]

Item	Value
Name	LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer	LSI Logic
Status	OK
PNP Device ID	PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08V4&4F5EBC7&0&10
I/O Port	0x00000800-0x000008FF
Memory Address	0x80420000-0x8043FFFF
Memory Address	0x80440000-0x8045FFFF
IRQ Channel	IRQ 25
Driver	c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name	LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer	LSI Logic
Status	OK
PNP Device ID	PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08V4&4F5EBC7&0&11
I/O Port	0x00000900-0x000009FF
Memory Address	0x80460000-0x8047FFFF
Memory Address	0x80480000-0x8049FFFF
IRQ Channel	IRQ 26
Driver	c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name	LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer	LSI Logic
Status	OK
PNP Device ID	PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08V4&4F5EBC7&0&18
I/O Port	0x00000A00-0x00000AFF
Memory Address	0x804A0000-0x804BFFFF
Memory Address	0x804C0000-0x804DFFFF
IRQ Channel	IRQ 27
Driver	c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name	LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer	LSI Logic
Status	OK
PNP Device ID	PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08V4&4F5EBC7&0&19
I/O Port	0x00000B00-0x00000BFF
Memory Address	0x804E0000-0x804FFFFF
Memory Address	0x80500000-0x8051FFFF
IRQ Channel	IRQ 28
Driver	c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name	Smart Array 6400 Controller
Manufacturer	Hewlett-Packard Company
Status	OK
PNP Device ID	PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&C09128E&0&2008
Memory Address	0x80080000-0x80081FFF
I/O Port	0x00001000-0x00001FFF
Memory Address	0x80040000-0x8007FFFF
IRQ Channel	IRQ 36
Driver	c:\windows\system32\drivers\cpqcissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name	Smart Array 6400 Controller
Manufacturer	Hewlett-Packard Company
Status	OK
PNP Device ID	PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&ED32FE9&0&2008
Memory Address	0x80080000-0x80081FFF
I/O Port	0x00002000-0x00002FFF
Memory Address	0x80040000-0x8007FFFF
IRQ Channel	IRQ 47
Driver	c:\windows\system32\drivers\cpqcissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name	Smart Array 6400 Controller
Manufacturer	Hewlett-Packard Company

Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&3977A5C3&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00004000-0x00004FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 58
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&30B60401&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00006000-0x00006FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 69
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&266093A2&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00008000-0x00008FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 80
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&F87D029&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000A000-0x0000AFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 91
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&7E3BA13&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000C000-0x0000CFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 102
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&B8B6E61&0&2008
Memory Address 0x80080000-0x80081FFF

I/O Port 0x0000E000-0x0000EFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 113
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&1C300449&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00001000-0x00001FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 144
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&12D4A840&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00002000-0x00002FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 155
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&26823BEB&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00004000-0x00004FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 166
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&3CD3CE3&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00006000-0x00006FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 177
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&100227BE&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00008000-0x00008FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 188

Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&2E53A30F&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000A000-0x0000AFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 199
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&274F890&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000C000-0x0000CFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 210
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&26DA8FD1&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000E000-0x0000EFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 221
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with
1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&915E908&0&10
I/O Port 0x00008000-0x00008FFF
Memory Address 0x80420000-0x8043FFFF
Memory Address 0x80440000-0x8045FFFF
IRQ Channel IRQ 241
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01
built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51
AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with
1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&915E908&0&11
I/O Port 0x00009000-0x00009FFF
Memory Address 0x80460000-0x8047FFFF
Memory Address 0x80480000-0x8049FFFF
IRQ Channel IRQ 242
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01
built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51
AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with
1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&915E908&0&18
I/O Port 0x0000A000-0x0000AFF
Memory Address 0x804A0000-0x804BFFFF
Memory Address 0x804C0000-0x804DFFFF
IRQ Channel IRQ 243
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01
built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51
AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with
1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&915E908&0&19
I/O Port 0x0000B000-0x0000BFFF
Memory Address 0x804E0000-0x804FFFFF
Memory Address 0x80500000-0x8051FFFF
IRQ Channel IRQ 244
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01
built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51
AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&1F1D5A81&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00001000-0x00001FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 252
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&650C1E4&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00002000-0x00002FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 263
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&E2E01E9&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00004000-0x00004FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 274
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company

Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&76160D2&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00006000-0x00006FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 285
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&147E125A&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00008000-0x00008FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 296
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&27232AD3&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000A000-0x0000AFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 307
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&20B3043E&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000C000-0x0000CFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 318
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&27BD2E9A&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000E000-0x0000EFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 329
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&19EBB955&0&10

I/O Port 0x00000800-0x000008FF
Memory Address 0x80420000-0x8043FFFF
Memory Address 0x80440000-0x8045FFFF
IRQ Channel IRQ 349
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&19EBB955&0&11
I/O Port 0x00000900-0x000009FF
Memory Address 0x80460000-0x8047FFFF
Memory Address 0x80480000-0x8049FFFF
IRQ Channel IRQ 350
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&19EBB955&0&18
I/O Port 0x00000A00-0x00000AFF
Memory Address 0x804A0000-0x804BFFFF
Memory Address 0x804C0000-0x804DFFFF
IRQ Channel IRQ 351
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030)
Manufacturer LSI Logic
Status OK
PNP Device ID
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&19EBB955&0&19
I/O Port 0x00000B00-0x00000BFF
Memory Address 0x804E0000-0x804FFFFF
Memory Address 0x80500000-0x8051FFFF
IRQ Channel IRQ 352
Driver c:\windows\system32\drivers\symmpi.sys (1.10.05.01 built by: WinDDK, 173.00 KB (177,152 bytes), 3/24/2005 9:51 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&1ED704C6&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00001000-0x00001FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 360
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64 Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005 9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&213FB7A6&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00002000-0x00002FFF

Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 371
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&3378EB75&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00004000-0x00004FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 382
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&88C2C1B&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00006000-0x00006FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 393
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&1B146EF9&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x00008000-0x00008FFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 404
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&575F0CD&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000A000-0x0000AFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 415
Driver c:\windows\system32\drivers\cpqccissm.sys (5.70.0.64
Build 1 (ia64) built by: skav, 53.00 KB (54,272 bytes), 3/24/2005
9:31 AM)

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company
Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&96C54B6&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000C000-0x0000CFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 426

Name Smart Array 6400 Controller
Manufacturer Hewlett-Packard Company

Status OK
PNP Device ID
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&A35666F&0&2008
Memory Address 0x80080000-0x80081FFF
I/O Port 0x0000E000-0x0000EFFF
Memory Address 0x80040000-0x8007FFFF
IRQ Channel IRQ 437

[IDE]

Item Value

[Printing]

Name Driver Port Name Server Name

[Problem Devices]

Device PNP Device ID Error Code

[USB]

Device PNP Device ID

[Software Environment]

[System Drivers]

Name	Description	File Type	Started	Start Mode	State
abiosdsk	Abiosdsk	Not Available	Kernel Driver	No	No
acpi	Microsoft ACPI Driver				
acpiec	ACPIEC	c:\windows\system32\drivers\acpiec.sys	Kernel Driver	No	Disabled Stopped OK Normal No
adpu160m	adpu160m	c:\windows\system32\drivers\adpu160m.sys	Kernel Driver	No	Disabled Stopped OK Normal No
adpu320	adpu320	c:\windows\system32\drivers\adpu320.sys	Kernel Driver	No	Disabled Stopped OK Normal No
afcnt	afcnt	c:\windows\system32\drivers\afcnt.sys	Kernel Driver	No	Disabled Stopped OK Normal No
afd	AFD	c:\windows\system32\drivers\afd.sys	Kernel Driver	Yes	System Running OK Normal No
agp460	Intel AGP Bus Filter	c:\windows\system32\drivers\agp460.sys	Kernel Driver	No	Disabled Stopped OK Normal No
aic78u2	aic78u2	c:\windows\system32\drivers\aic78u2.sys	Kernel Driver	No	Disabled Stopped OK Normal No
aic78xx	aic78xx	c:\windows\system32\drivers\aic78xx.sys	Kernel Driver	No	Disabled Stopped OK Normal No
aliide	Alilde	c:\windows\system32\drivers\aliide.sys	Kernel Driver	No	Disabled Stopped OK Normal No
arc	arc	Not Available	Kernel Driver	No	Disabled Stopped OK Normal No
asynmac	RAS Asynchronous Media Driver	c:\windows\system32\drivers\asynmac.sys	Kernel Driver	No	Manual Stopped OK Normal No
atapi	Standard IDE/ESDI Hard Disk Controller	c:\windows\system32\drivers\atapi.sys	Kernel Driver	No	Disabled Stopped OK Normal No
atdisk	Atdisk	Not Available	Kernel Driver	No	Disabled Stopped OK Ignore No
ati2mtag	ati2mtag	c:\windows\system32\drivers\ati2mtag.sys	Kernel Driver	No	Manual Stopped OK Ignore No

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atmarpc  ATM ARP Client Protocol
c:\windows\system32\drivers\atmarpc.sys  Kernel Driver
No Manual Stopped  OK Normal No No
audstub Audio Stub Driver
c:\windows\system32\drivers\audstub.sys  Kernel Driver
YesManual Running  OK Normal No Yes
b57nd  Broadcom NetXtreme Gigabit Ethernet
c:\windows\system32\drivers\b57xp64.sys  Kernel Driver
YesManual Running  OK Normal No Yes
beep  Beep c:\windows\system32\drivers\beep.sys  Kernel
Driver YesSystem Running  OK Normal No Yes
cbidf  cbidf c:\windows\system32\drivers\cbidf2k.sysKernel
Driver No Disabled  Stopped  OK Normal No No
cbidf2k  cbidf2k c:\windows\system32\drivers\cbidf2k.sysKernel
Driver No Disabled  Stopped  OK Normal No No
cdfs  CdFs c:\windows\system32\drivers\cdfs.sys  File
System Driver YesDisabled  Running  OK Normal No Yes
cdrom  CD-ROM Driver c:\windows\system32\drivers\cdrom.sys
Kernel Driver YesSystem Running  OK Normal No Yes
changer  Changer Not Available  Kernel Driver  No
System Stopped  OK Ignore No No
clusdiskCluster Disk Driver
c:\windows\system32\drivers\clusdisk.sys  Kernel Driver
No Disabled  Stopped  OK Normal No No
cmdide  CmdIde c:\windows\system32\drivers\cmdide.sys
Kernel Driver  No Disabled  Stopped  OK Normal No
No
cpqarry2  cpqarry2
c:\windows\system32\drivers\cpqarry2.sys  Kernel Driver
No Disabled  Stopped  OK Normal No No
cpqcisse  CPQCISSE
c:\windows\system32\drivers\cpqcisse.sys  Kernel Driver
YesManual Running  OK Normal No Yes
cpqcissm  cpqcissm
c:\windows\system32\drivers\cpqcissm.sys  Kernel Driver
YesBoot  Running  OK Normal No Yes
cpqfcalm  cpqfcalm
c:\windows\system32\drivers\cpqfcalm.sys  Kernel Driver
No Disabled  Stopped  OK Normal No No
cpqteam  HP Network Configuration Utility
c:\windows\system32\drivers\cpqteam.sys  Kernel Driver
No Manual Stopped  OK Normal No No
cqdetect  Compaq Hardware Detection Service
c:\windows\system32\drivers\cqdetect.sys  Kernel Driver
No Manual Stopped  OK Normal No No
crcdisk  CRC Disk Filter Driver
c:\windows\system32\drivers\crcdisk.sysKernel Driver  Yes
Boot  Running  OK Normal No Yes
dfsdriver  DfsDriver c:\windows\system32\drivers\dfs.sysFile
System Driver YesBoot  Running  OK Normal No Yes
disk  Disk Driver c:\windows\system32\drivers\disk.sys  Kernel
Driver YesBoot  Running  OK Normal No Yes
dmboot  dmboot c:\windows\system32\drivers\dmboot.sys
Kernel Driver YesDisabled  Running  OK Normal No
Yes
dmio  Logical Disk Manager Driver
c:\windows\system32\drivers\dmio.sys  Kernel Driver  Yes
Boot  Running  OK Normal No Yes
dmload  dmload c:\windows\system32\drivers\dmload.sys
Kernel Driver YesBoot  Running  OK Normal No Yes
dpti2o  dpti2o c:\windows\system32\drivers\dpti2o.sys  Kernel
Driver No Disabled  Stopped  OK Normal No No
elxstor  elxstor Not Available  Kernel Driver  No Disabled
Stopped  OK Normal No No
fastfat  Fastfat c:\windows\system32\drivers\fastfat.sys  File
System Driver No Disabled  Stopped  OK Normal No No
fdc  Fdc c:\windows\system32\drivers\fdc.sysKernel Driver  No
System Stopped  OK Ignore No No
fips  Fips c:\windows\system32\drivers\fips.sys  Kernel Driver
YesSystem Running  OK Normal No Yes
flpydisk  Flpydisk c:\windows\system32\drivers\flpydisk.sys
Kernel Driver No System Stopped  OK Ignore No No
fltmgr  FltMgr c:\windows\system32\drivers\fltmgr.sys  File
System Driver YesBoot  Running  OK Normal No Yes
ftdisk  Volume Manager Driver
c:\windows\system32\drivers\ftdisk.sys  Kernel Driver  Yes
Boot  Running  OK Normal No Yes
gpc  Generic Packet Classifier
c:\windows\system32\drivers\msgpc.sys  Kernel Driver  Yes
Manual Running  OK Normal No Yes
hidusb  Microsoft HID Class Driver
c:\windows\system32\drivers\hidusb.sys  Kernel Driver  No
Manual Stopped  OK Ignore No No
hpcisss  hpcisss c:\windows\system32\drivers\hpcisss.sys
Kernel Driver  No Disabled  Stopped  OK Normal No
No
hpcsr  HP CSR OpRegion Driver
c:\windows\system32\drivers\hpcsr.sys  Kernel Driver  Yes
Boot  Running  OK Normal No Yes
hphlth  HP Baseboard Management Controller Interface Device
c:\windows\system32\drivers\hphlth.sys  Kernel Driver  Yes
Manual Running  OK Normal No Yes
hmpmser  HP MP Driver
c:\windows\system32\drivers\hmpmser.sys  Kernel Driver
No Manual Stopped  OK Normal No No
hpn  hpn c:\windows\system32\drivers\hpn.sys  Kernel Driver
No Disabled  Stopped  OK Normal No No
http  HTTP c:\windows\system32\drivers\http.sys  Kernel Driver
No Manual Stopped  OK Normal No No
i2omgmt  i2omgmt Not Available  Kernel Driver  No
System Stopped  OK Normal No No
iirsp  iirsp Not Available  Kernel Driver  No Disabled
Stopped  OK Normal No No
imapi  CD-Burning Filter Driver
c:\windows\system32\drivers\imapi.sys  Kernel Driver  Yes
System Running  OK Normal No Yes
intelide  IntelIde c:\windows\system32\drivers\intelide.sysKernel
Driver No Disabled  Stopped  OK Normal No No
ip6fw  IPv6 Windows Firewall Driver
c:\windows\system32\drivers\ip6fw.sys  Kernel Driver  No
Manual Stopped  OK Normal No No
ipfilterdriver  IP Traffic Filter Driver
c:\windows\system32\drivers\ipfltdrv.sys  Kernel Driver  No
Manual Stopped  OK Normal No No
ipinip  IP in IP Tunnel Driver
c:\windows\system32\drivers\ipinip.sys  Kernel Driver  No
Manual Stopped  OK Normal No No
ipnat  IP Network Address Translator
c:\windows\system32\drivers\ipnat.sys  Kernel Driver  No
Manual Stopped  OK Normal No No
ipsec  IPSEC driver c:\windows\system32\drivers\ipsec.sys
Kernel Driver YesSystem Running  OK Normal No Yes
isapnp  PnP ISA/EISA Bus Driver
c:\windows\system32\drivers\isapnp.sys  Kernel Driver  No
Disabled  Stopped  OK Critical No No
kbdclass  Keyboard Class Driver
c:\windows\system32\drivers\kbdclass.sys  Kernel Driver
YesSystem Running  OK Normal No Yes
kbdhid  Keyboard HID Driver
c:\windows\system32\drivers\kbdhid.sys  Kernel Driver  No
System Stopped  OK Ignore No No
ksecdd  KSecDD c:\windows\system32\drivers\ksecdd.sys
Kernel Driver YesBoot  Running  OK Normal No Yes
ksthunk  Kernel Streaming WOW64 Thunk Service
c:\windows\system32\drivers\ksthunk.sys  Kernel Driver
YesManual Running  OK Normal No Yes
lp6nds35  lp6nds35
c:\windows\system32\drivers\lp6nds35.sys  Kernel Driver
No Disabled  Stopped  OK Normal No No
lpxftr  lpxftr c:\windows\system32\drivers\lpxftr.sys  Kernel
Driver YesBoot  Running  OK Normal No Yes
lpxnds  lpxnds c:\windows\system32\drivers\lpxnds.sys  Kernel
Driver YesBoot  Running  OK Normal No Yes
mnmdd  mnmdd Not Available  Kernel Driver  No System
Stopped  OK Ignore No No
modem  Modem c:\windows\system32\drivers\modem.sys
Kernel Driver  No Manual Stopped  OK Ignore No No

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mouclass Mouse Class Driver
c:\windows\system32\drivers\mouclass.sys Kernel Driver
Yes System Running OK Normal No Yes
mouhid Mouse HID Driver
c:\windows\system32\drivers\mouhid.sys Kernel Driver
No Manual Stopped OK Ignore No No
mountmgr Mount Point Manager
c:\windows\system32\drivers\mountmgr.sys Kernel Driver
Yes Boot Running OK Normal No Yes
mraid35x mraid35x
c:\windows\system32\drivers\mraid35x.sys Kernel Driver
No Disabled Stopped OK Normal No No
mrxdav WebDav Client Redirector
c:\windows\system32\drivers\mrxdav.sys File System
Driver No Manual Stopped OK Normal No No
mrxsmb MRXSMB c:\windows\system32\drivers\mrxsmb.sys
File System Driver Yes System Running OK Normal No
Yes
msfs Msfs c:\windows\system32\drivers\msfs.sys File
System Driver Yes System Running OK Normal No Yes
mssmbios Microsoft System Management BIOS Driver
c:\windows\system32\drivers\mssmbios.sys Kernel Driver
Yes Manual Running OK Normal No Yes
mup Mup c:\windows\system32\drivers\mup.sys File
System Driver Yes Boot Running OK Normal No Yes
ndis NDIS System Driver c:\windows\system32\drivers\ndis.sys
Kernel Driver Yes Boot Running OK Normal No Yes
ndistapi Remote Access NDIS TAPI Driver
c:\windows\system32\drivers\ndistapi.sys Kernel Driver
Yes Manual Running OK Normal No Yes
ndisuio NDIS Usermode I/O Protocol
c:\windows\system32\drivers\ndisuio.sys Kernel Driver Yes
Manual Running OK Normal No Yes
ndiswan Remote Access NDIS WAN Driver
c:\windows\system32\drivers\ndiswan.sys Kernel Driver
Yes Manual Running OK Normal No Yes
ndproxy NDIS Proxy c:\windows\system32\drivers\ndproxy.sys
Kernel Driver Yes Manual Running OK Normal No Yes
netbios NetBIOS Interface
c:\windows\system32\drivers\netbios.sys File System
Driver Yes System Running OK Normal No Yes
netbt NetBios over Tcpip
c:\windows\system32\drivers\netbt.sys Kernel Driver Yes
System Running OK Normal No Yes
nfrd960 nfrd960 c:\windows\system32\drivers\nfrd960.sys
Kernel Driver No Disabled Stopped OK Normal No
No
npfs Npfs c:\windows\system32\drivers\npfs.sys File
System Driver Yes System Running OK Normal No Yes
ntfs Ntfs c:\windows\system32\drivers\ntfs.sys File System
Driver Yes Disabled Running OK Normal No Yes
null Null c:\windows\system32\drivers\null.sys Kernel Driver
Yes System Running OK Normal No Yes
partmgr Partition Manager
c:\windows\system32\drivers\partmgr.sys Kernel Driver
Yes Boot Running OK Normal No Yes
pci PCI Bus Driver c:\windows\system32\drivers\pci.sys Kernel
Driver Yes Boot Running OK Critical No Yes
pciide PCIIDE c:\windows\system32\drivers\pciide.sys Kernel
Driver No Disabled Stopped OK Normal No No
pcmcia Pcmcia c:\windows\system32\drivers\pcmcia.sys Kernel
Driver No Disabled Stopped OK Normal No No
pdcomp PDCOMP Not Available Kernel Driver No Manual
Stopped OK Ignore No No
pdframe PDFFRAME Not Available Kernel Driver No
Manual Stopped OK Ignore No No
pdreli PDRELI Not Available Kernel Driver No Manual
Stopped OK Ignore No No
pdframe PDRFRAME Not Available Kernel Driver No
Manual Stopped OK Ignore No No
pptpminiport WAN Miniport (PPTP)
c:\windows\system32\drivers\rasppptp.sys Kernel Driver
Yes Manual Running OK Normal No Yes
processor Processor Driver
c:\windows\system32\drivers\processr.sys Kernel Driver
Yes Manual Running OK Normal No Yes
ptilink Direct Parallel Link Driver
c:\windows\system32\drivers\ptilink.sys Kernel Driver Yes
Manual Running OK Normal No Yes
ql1080 ql1080 c:\windows\system32\drivers\ql1080.sys Kernel
Driver No Disabled Stopped OK Normal No No
ql12160 ql12160 c:\windows\system32\drivers\ql12160.sys
Kernel Driver No Disabled Stopped OK Normal No
No
ql1240 ql1240 c:\windows\system32\drivers\ql1240.sys Kernel
Driver No Disabled Stopped OK Normal No No
ql1280 ql1280 c:\windows\system32\drivers\ql1280.sys Kernel
Driver No Disabled Stopped OK Normal No No
ql2100 ql2100 c:\windows\system32\drivers\ql2100.sys Kernel
Driver No Disabled Stopped OK Normal No No
ql2200 ql2200 c:\windows\system32\drivers\ql2200.sys Kernel
Driver No Disabled Stopped OK Normal No No
ql2300 QLogic Fibre Channel STOR Miniport Driver (wia64 IP)
c:\windows\system32\drivers\ql2300.sys Kernel Driver No
Disabled Stopped OK Normal No No
rasacd Remote Access Auto Connection Driver
c:\windows\system32\drivers\rasacd.sys Kernel Driver Yes
System Running OK Normal No Yes
rasl2tp WAN Miniport (L2TP)
c:\windows\system32\drivers\rasl2tp.sys Kernel Driver Yes
Manual Running OK Normal No Yes
rasppoe Remote Access PPOE Driver
c:\windows\system32\drivers\rasppoe.sys Kernel Driver
Yes Manual Running OK Normal No Yes
raspti Direct Parallel c:\windows\system32\drivers\raspti.sys
Kernel Driver Yes Manual Running OK Normal No Yes
rdbss Rdbss c:\windows\system32\drivers\rdbss.sys File
System Driver Yes System Running OK Normal No Yes
rdpcdd RDPDCC c:\windows\system32\drivers\rdpcdd.sys
Kernel Driver Yes System Running OK Ignore No Yes
rdpdr Terminal Server Device Redirector Driver
c:\windows\system32\drivers\rdpdr.sys Kernel Driver Yes
Manual Running OK Normal No Yes
rdpwd RDPWD c:\windows\system32\drivers\rdpwd.sys
Kernel Driver Yes Manual Running OK Ignore No Yes
redbook Digital CD Audio Playback Filter Driver
c:\windows\system32\drivers\redbook.sys Kernel Driver
Yes System Running OK Normal No Yes
serenum Serenum Filter Driver
c:\windows\system32\drivers\serenum.sys Kernel Driver
No Manual Stopped OK Normal No No
serial Serial c:\windows\system32\drivers\serial.sys Kernel
Driver No Auto Stopped OK Ignore No No
sfloppy Sfloppy c:\windows\system32\drivers\sfloppy.sys Kernel
Driver No System Stopped OK Ignore No No
simbad Simbad Not Available Kernel Driver No Disabled
Stopped OK Normal No No
srv Srv c:\windows\system32\drivers\srv.sys File System Driver
Yes Manual Running OK Normal No Yes
swenum Software Bus Driver
c:\windows\system32\drivers\swenum.sys Kernel Driver
Yes Manual Running OK Normal No Yes
symc8xx symc8xx
c:\windows\system32\drivers\symc8xx.sys Kernel Driver
No Disabled Stopped OK Normal No No
symmpi symmpi c:\windows\system32\drivers\symmpi.sys
Kernel Driver Yes Boot Running OK Normal No Yes
sym_hi sym_hi c:\windows\system32\drivers\sym_hi.sys Kernel
Driver No Disabled Stopped OK Normal No No
sym_u3 sym_u3 c:\windows\system32\drivers\sym_u3.sys
Kernel Driver No Disabled Stopped OK Normal No
No
tcpip TCP/IP Protocol Driver
c:\windows\system32\drivers\tcpip.sys Kernel Driver Yes
System Running OK Normal No Yes
tdpipe TDPIPE c:\windows\system32\drivers\tdpipe.sys
Kernel Driver No Manual Stopped OK Ignore No No

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tdtcp TDTCP c:\windows\system32\drivers\tdtcp.sys Kernel Driver Yes Manual Running OK Ignore No Yes
 termdd Terminal Device Driver
 c:\windows\system32\drivers\termdd.sys Kernel Driver Yes System Running OK Normal No Yes
 toside Toside c:\windows\system32\drivers\toside.sys Kernel Driver No Disabled Stopped OK Normal No No
 udfs Udfs c:\windows\system32\drivers\udfs.sys File System Driver No Disabled Stopped OK Normal No No
 usbccgp Microsoft USB Generic Parent Driver
 c:\windows\system32\drivers\usbccgp.sys Kernel Driver No Manual Stopped OK Normal No No
 usbehci Microsoft USB 2.0 Enhanced Host Controller Miniport Driver c:\windows\system32\drivers\usbehci.sys Kernel Driver No Manual Stopped OK Normal No No
 usbhub USB2 Enabled Hub
 c:\windows\system32\drivers\usbhub.sys Kernel Driver No Manual Stopped OK Normal No No
 usbohci Microsoft USB Open Host Controller Miniport Driver c:\windows\system32\drivers\usbohci.sys Kernel Driver No Manual Stopped OK Normal No No
 vgasave VGA Display Controller.
 c:\windows\system32\drivers\vga.sys Kernel Driver No System Stopped OK Ignore No No
 viaide Vialde c:\windows\system32\drivers\viaide.sys Kernel Driver No Disabled Stopped OK Normal No No
 volsnap Storage volumes
 c:\windows\system32\drivers\volsnap.sys Kernel Driver Yes Boot Running OK Normal No Yes
 wanarp Remote Access IP ARP Driver
 c:\windows\system32\drivers\wanarp.sys Kernel Driver Yes Manual Running OK Normal No Yes
 wdica WDICA Not Available Kernel Driver No Manual Stopped OK Ignore No No
 wlbs Network Load Balancing
 c:\windows\system32\drivers\wlbs.sys Kernel Driver No Manual Stopped OK Normal No No

[Signed Drivers]

Device Name	Signed	Device Class	Driver Version	Driver Date	Manufacturer	INF Name	Driver Name	Device ID
Microsoft System Management BIOS Driver	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf	ROOT\SYSTEM\0001	Not Available
Plug and Play Software Device Enumerator	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf	ROOT\SYSTEM\0000	Not Available
Terminal Server Mouse Driver	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf	ROOT\RDP_MOU\0000	Not Available
Terminal Server Keyboard Driver	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf	ROOT\RDP_KBD\0000	Not Available
Terminal Server Device Redirector	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf	ROOT\RDPDR\0000	Not Available
Direct Parallel	Yes	NET	5.2.3790.1830	10/1/2002	Microsoft netrasa.inf	Not Available	ROOT\MS_PT\MINIPORT\0000	Not Available
WAN Miniport (PPTP)	Yes	NET	5.2.3790.1830	10/1/2002	Microsoft netrasa.inf	Not Available	ROOT\MS_PPTP\MINIPORT\0000	Not Available
WAN Miniport (PPPOE)	Yes	NET	5.2.3790.1830	10/1/2002	Microsoft netrasa.inf	Not Available	ROOT\MS_PPPOE\MINIPORT\0000	Not Available
WAN Miniport (IP)	Yes	NET	5.2.3790.1830	10/1/2002	Microsoft netrasa.inf	Not Available	ROOT\MS_NDIS\WANIP\0000	Not Available
WAN Miniport (L2TP)	Yes	NET	5.2.3790.1830	10/1/2002	Microsoft netrasa.inf	Not Available	ROOT\MS_L2TP\MINIPORT\0000	Not Available
Video Codecs	Yes	MEDIA	5.2.3790.0	10/1/2002	(Standard system devices)	wave.inf	Not Available	ROOT\MEDIA\MS_MMVID

Legacy Video Capture Devices	Yes	MEDIA	5.2.3790.0	10/1/2002	(Standard system devices)	wave.inf	Not Available	ROOT\MEDIA\MS_MMVCD
Media Control Devices	Yes	MEDIA	5.2.3790.0	10/1/2002	(Standard system devices)	wave.inf	Not Available	ROOT\MEDIA\MS_MMMCI
Legacy Audio Drivers	Yes	MEDIA	5.2.3790.0	10/1/2002	(Standard system devices)	wave.inf	Not Available	ROOT\MEDIA\MS_MMDRV
Audio Codecs	Yes	MEDIA	5.2.3790.0	10/1/2002	(Standard system devices)	wave.inf	Not Available	ROOT\MEDIA\MS_MMACM
Remote Access IP ARP Driver	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_WANARP\0000
volsnap	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_VOLS\SNAP\0000
TDTCP	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_TDTCP\0000
TCP/IP Protocol Driver	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_TCPIP\0000
sacdrv	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_SACDRV\0000
RDPWD	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_RDPWD\0000
RDPCCDD	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_RDPCCDD\0000
Remote Access Auto Connection Driver	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_RASACD\0000
Partition Manager	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_PARTMGR\0000
Null	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_NULL\0000
NetBios over Tcpip	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_NETBT\0000
NDProxy	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_NDPROXY\0000
NDIS Usermode I/O Protocol	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_NDISUIO\0000
Remote Access NDIS TAPI Driver	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_NDISTAPI\0000
NDIS System Driver	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_NDIS\0000
mountmgr	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_MOUNTMGR\0000
lpxnds	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_LPXNDS\0000
lpxftr	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_LPXFTR\0000
ksecdd	Not Available	LEGACYDRIVER	Not Available	Not Available	Not Available	Not Available	Not Available	ROOT\LEGACY_KSECDD\0000

IPSEC driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available Not Available
 Available ROOTLEGACY_IPSEC\0000
 IP Network Address Translator Not Available
 LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available Not Available Not Available
 ROOTLEGACY_IPNAT\0000
 Generic Packet Classifier Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available ROOTLEGACY_GPC\0000
 Fips Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available Not Available Not Available Not Available
 ROOTLEGACY_FIPS\0000
 dmload Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available Not Available Not Available Not Available
 ROOTLEGACY_DMLoad\0000
 dmboot Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available Not Available Not Available Not Available
 ROOTLEGACY_DMBOOT\0000
 CRC Disk Filter Driver Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available Not Available Not Available Not Available Not Available
 Available ROOTLEGACY_CRCDISK\0000
 Beep Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available Not Available Not Available Not Available Not Available
 ROOTLEGACY_BEEP\0000
 AFD Not Available LEGACYDRIVER Not Available Not Available Not Available Not Available
 Available Not Available Not Available Not Available Not Available Not Available
 ROOTLEGACY_AFD\0000
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{8BF18F4F-683-49B0-AC2D-8A25A1571484}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{808A03E5-5B14-449D-9450-51C54B01CC79}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{DBA A8074-8570-4035-9FBB-E7CF2D05B326}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{4E27 E059-45DB-4B97-8B02-4847A5BA0356}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{54B3 4AC4-5BDE-439B-A2F5-EF96E9BDA2FE}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{E23 D6C8E-5302-4479-8AE5-4A477B55A588}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{A3B 14936-CCA1-422C-AEB5-010B7D5C85B0}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{1D1 B14F5-6ABE-4F9D-9C06-319D148CBE67}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{7D6 59009-E6C7-4FDC-A12E-B8C46D80E1FD}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{9700 14FA-EB5C-4E37-BD5D-9D4FF0419E48}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{842E 0941-D379-49C5-86A9-DDDEE85F2260}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available

STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{214B 62AB-4408-4F66-A1C4-D23A36AABCD9}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{17C 9FA86-3B03-4A80-A586-D7B568DBCFF6}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{6DE 5772A-C335-442C-84ED-66F001940EF9}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{9C9 953C3-E889-423F-8288-98235B65DECE}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{4A52 391F-8FA1-46A2-B175-8636B92849E2}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{3553 33C5-9B9C-4968-93BE-2F6D290B1E46}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{0F64 5114-B3AE-400F-B61F-F09ED9498A46}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{6B82 3418-714B-42C3-8135-B35EA4E92AB8}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{64A2 0FF2-0B94-4C08-A783-868E3E35D502}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{F559 A430-19CC-4804-BF62-E185753965F9}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{1896 350D-5510-4E10-AA6B-E98272ECF78B}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{B161 3070-9EBF-4226-97F9-B68E5B34956D}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{190 D7123-C7B7-4848-9698-CFD3B022E9E3}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME\1&30A96598&0&GPTPARTITION{4D5 479DA-9D7D-4A34-B835-FC115819B446}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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CC0C-1A4E-4555-AF0F-0E7FCFAF05B4}

Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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CAB48-0668-11DB-BBD3-000000000000}

Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
STORAGE\VOLUME1&30A96598&0&GPTPARTITION{FF2
B9554-0667-11DB-BBD3-000000000000}

Volume Manager Yes SYSTEM 5.2.3790.1830 10/1/2002
(Standard system devices) machine.inf Not Available
ROOT\FTDISK\0000

Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
STORAGE\VOLUME1&3735C57B&0&LDM#{B46E72C7-
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
STORAGE\VOLUME1&3735C57B&0&LDM#{FF66C66B-
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
STORAGE\VOLUME1&3735C57B&0&LDM#{7E4854A2-
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
STORAGE\VOLUME1&3735C57B&0&LDM#{EC4F6A53-
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available
STORAGE\VOLUME1&3735C57B&0&LDM#{BA7B3CF5-
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Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
Microsoft volume.inf Not Available

STORAGE\VOLUME1&3735C57B&0&LDM#{2B53EEA4-71EA-4517-A2DA-D72C792FCBCE}
 Generic volume Yes VOLUME 5.2.3790.1830 10/1/2002
 Microsoft volume.inf Not Available
 STORAGE\VOLUME1&3735C57B&0&LDM#{10F6F71E-5857-4BAE-911F-23F060C89C25}
 Logical Disk Manager Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 ROOT\DMIO\0000
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&60AC818&0&070
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&60AC818&0&060
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&60AC818&0&050
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&60AC818&0&040
 Smart Array 5x and 6x Notification Driver Yes SYSTEM
 5.68.0.64 10/3/2005 Hewlett-Packard Company
 oem15.inf Not Available
 SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&60AC818&0&000
 Smart Array 6400 Controller Yes SCSIADAPTER5.70.0.64
 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
 PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&A35666F&0&2008
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5 &213DFF1B&0&08
 PCI bus Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0002\30E
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1CD0D32A&0&070
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 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1CD0D32A&0&060
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 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1CD0D32A&0&040
 Smart Array 5x and 6x Notification Driver Yes SYSTEM
 5.68.0.64 10/3/2005 Hewlett-Packard Company
 oem15.inf Not Available
 SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&1CD0D32A&0&000
 Smart Array 6400 Controller Yes SCSIADAPTER5.70.0.64
 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
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 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &67E4186&0&08

PCI bus Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0002\30C
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&18B628C2&0&070
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
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 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&18B628C2&0&050
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&18B628C2&0&040
 Smart Array 5x and 6x Notification Driver Yes SYSTEM
 5.68.0.64 10/3/2005 Hewlett-Packard Company
 oem15.inf Not Available
 SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&18B628C2&0&000
 Smart Array 6400 Controller Yes SCSIADAPTER5.70.0.64
 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
 PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6 &575F0CD&0&2008
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &1CA5AA43&0&08
 PCI bus Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0002\30A
 Disk drive Yes DISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
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 Smart Array 5x and 6x Notification Driver Yes SYSTEM
 5.68.0.64 10/3/2005 Hewlett-Packard Company
 oem15.inf Not Available
 SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&20961EB8&0&000
 Smart Array 6400 Controller Yes SCSIADAPTER5.70.0.64
 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
 PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6 &1B146EF9&0&2008
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &14ABF77C&0&08
 PCI bus Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0002\30B
 Generic Bus Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
 ACPI\HWP0004\301

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&50E9ABE&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&50E9ABE&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&50E9ABE&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&50E9ABE&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
 SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&50E9ABE&0&000

Smart Array 6400 Controller YesSCSIADAPTER 5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
 PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&88C2C1B&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
 PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&3A1F58C6&0&08

PCI bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0002\306

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
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Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&18204B1&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&18204B1&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&18204B1&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
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Smart Array 6400 Controller YesSCSIADAPTER 5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
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PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
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PCI bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0002\304

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Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&36F794E6&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
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Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&36F794E6&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
 SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&16E4F2C4&0&000

Smart Array 6400 Controller YesSCSIADAPTER 5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
 PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&1ED704C6&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
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PCI bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0002\301

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER 1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available
 PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5&19EBB955&0&19

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER 1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available
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LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER 1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available

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 LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes
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 oem11.inf Not Available
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 Broadcom NetXtreme Gigabit Ethernet Yes NET 8.39.1.0
 7/21/2005 Broadcom oem4.inf Not Available
 PCI\VEN_14E4&DEV_16C7&SUBSYS_1321103C&REV_10\5
 &19EBB955&0&08
 PCI bus Yes SYSTEM 5.2.3790.1830 10/1/2002 (Standard
 system devices) machine.inf Not Available ACPI\HWP0002\300

 Generic Bus Yes SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not Available
 ACPI\HWP0004\300
 Generic Bus Yes SYSTEM 5.2.3790.1830 10/1/2002
 (Standard system devices) machine.inf Not Available
 ACPI\HWP0005\3
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053810X__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY0538122__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY05370V9__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053813R__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY05370P1__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053811V__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY05370DV__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053706P__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053701J__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053810L__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY05370WU__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053811X__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY05370VA__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053708L__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY053706H__
 HP System Memory Device Yes SYSTEM 5.0.0.2 6/19/2003
 HP oem8.inf Not Available
 ACPI\HWP1000\PRY05370HP__
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\63
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\62

 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\61
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\60
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\59
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\58
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\57
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\56
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\55
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\54
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\53
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\52
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\51
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\50
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\49
 Processor Yes PROCESSOR 5.2.3790.1830 10/1/2002
 (Standard processor types) cpu.inf Not Available
 ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\48
 Disk drive Yes DISKDRIVE 5.2.3790.0 10/1/2002 (Standard
 disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
 62\7&2FB315AD&0&070
 Disk drive Yes DISKDRIVE 5.2.3790.0 10/1/2002 (Standard
 disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
 62\7&2FB315AD&0&060
 Disk drive Yes DISKDRIVE 5.2.3790.0 10/1/2002 (Standard
 disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
 62\7&2FB315AD&0&050
 Disk drive Yes DISKDRIVE 5.2.3790.0 10/1/2002 (Standard
 disk drives) disk.inf Not Available
 SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
 62\7&2FB315AD&0&040
 Smart Array 5x and 6x Notification Driver Yes SYSTEM
 5.68.0.64 10/3/2005 Hewlett-Packard Company
 oem15.inf Not Available
 SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA
 TE&REV_CISS\7&2FB315AD&0&000
 Smart Array 6400 Controller Yes SCSIADAPTER 5.70.0.64
 8/17/2005 Hewlett-Packard Company oem14.inf Not
 Available
 PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6
 &27BD2E9A&0&2008
 PCI standard PCI-to-PCI bridge Yes SYSTEM 5.2.3790.1830
 10/1/2002 (Standard system devices) machine.inf Not
 Available
 PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5
 &8A4D771&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\20E

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3AB7C483&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3AB7C483&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3AB7C483&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3AB7C483&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&3AB7C483&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&20B3043E&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &1F176930&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\20C

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3A3EFB59&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3A3EFB59&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3A3EFB59&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&3A3EFB59&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&3A3EFB59&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&27232AD3&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5 &353ED1ED&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\20A

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&32258917&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&32258917&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&32258917&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&32258917&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&32258917&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&147E125A&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &37AD99D9&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\208

Generic Bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
ACPI\HWP0004\201

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&2B42EA85&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&2B42EA85&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&2B42EA85&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&2B42EA85&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&2B42EA85&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&76160D2&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &2BA970CF&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\206

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&131CEC3A&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&131CEC3A&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&131CEC3A&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&131CEC3A&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&131CEC3A&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&E2E01E9&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &6360F85&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\204

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&E88D16F&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&E88D16F&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&E88D16F&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&E88D16F&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&E88D16F&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&650C1E4&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5 &1C5D7842&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\202

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15AF50FA&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15AF50FA&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15AF50FA&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15AF50FA&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA TE&REV_CISS\7&15AF50FA&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&1F1D5A81&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5 &9A3C79D&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\201

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER 1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5 &915E908&0&19

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER 1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5 &915E908&0&18

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER 1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5 &915E908&0&11

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER 1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\5 &915E908&0&10

Broadcom NetXtreme Gigabit Ethernet YesNET 8.39.1.0 7/21/2005 Broadcom oem4.inf Not Available
PCI\VEN_14E4&DEV_16C7&SUBSYS_1321103C&REV_10\ 5&915E908&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\200

Generic Bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
ACPI\HWP0004\200

Generic Bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available
ACPI\HWP0005\2

HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003 HP oem8.inf Not Available
ACPI\HWP1000\PRY053704S__

HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003 HP oem8.inf Not Available
ACPI\HWP1000\PRY053813N__

HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003 HP oem8.inf Not Available
ACPI\HWP1000\PRY053706K__

HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003 HP oem8.inf Not Available
ACPI\HWP1000\PRY053810Y__

HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003 HP oem8.inf Not Available
ACPI\HWP1000\PRY05370S0__

HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003 HP oem8.inf Not Available
ACPI\HWP1000\PRY0538116__

HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003 HP oem8.inf Not Available
ACPI\HWP1000\PRY05370V4__

HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY05370YY__									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&14A8910A&0&070
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY05370RW__									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&14A8910A&0&060
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY053811Z__									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&14A8910A&0&050
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY0538121__									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&14A8910A&0&040
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	Smart Array 5x and 6x Notification Driver	Yes	SYSTEM	5.68.0.64	10/3/2005 Hewlett-Packard Company
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY05370VB__									oem15.inf Not Available
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA				TE&REV_CISS\7&14A8910A&0&000
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY05370EK__									Smart Array 6400 Controller Yes
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	SCSIADAPTER	5.70.0.64			8/17/2005 Hewlett-Packard Company oem14.inf Not Available
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY0537032__									PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&26DA8FD1&0&2008
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices) machine.inf Not Available
HP oem8.inf	Not Available								
ACPI\HWP1000\PRY053811Z__									PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&2189281D&0&08
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	PCI bus	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices) machine.inf Not Available
(Standard processor types)									ACPI\HWP0002\10E
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\47									
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\46									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1EE672FA&0&070
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\45									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1EE672FA&0&060
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\44									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1EE672FA&0&050
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\43									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1EE672FA&0&040
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	Smart Array 5x and 6x Notification Driver	Yes	SYSTEM	5.68.0.64	10/3/2005 Hewlett-Packard Company
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\42									oem15.inf Not Available
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA				TE&REV_CISS\7&1EE672FA&0&000
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\41									Smart Array 6400 Controller Yes
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	SCSIADAPTER	5.70.0.64			8/17/2005 Hewlett-Packard Company oem14.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\39									PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&274F890&0&2008
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices) machine.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\38									PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&37B090DA&0&08
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	PCI bus	Yes	SYSTEM	5.2.3790.1830	10/1/2002 (Standard system devices) machine.inf Not Available
(Standard processor types)									ACPI\HWP0002\10C
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\37									
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\36									SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15125BC8&0&080
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives) disk.inf Not Available
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\35									
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002					
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\34									
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002					
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\33									
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002					
(Standard processor types)									
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\32									

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15125BC8&0&070
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15125BC8&0&060
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15125BC8&0&050
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&15125BC8&0&040
Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available

SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&15125BC8&0&000
Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available

PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&2E53A30F&0&2008
PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available

PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&123D2F90&0&08
PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\10A

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31CB8A8B&0&070
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31CB8A8B&0&060
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31CB8A8B&0&050
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31CB8A8B&0&040
Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available

SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&31CB8A8B&0&000
Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available

PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&100227BE&0&2008
PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available

PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&2E1B2FBC&0&08
PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\108

Generic Bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP0004\101

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&B4FA1FF&0&070
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&B4FA1FF&0&060
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&B4FA1FF&0&050
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&B4FA1FF&0&040
Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available

SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&B4FA1FF&0&000
Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available

PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&3CD3CE3&0&2008
PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available

PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&8A7CE72&0&08
PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\106

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&373D1F64&0&070
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&373D1F64&0&060
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&373D1F64&0&050
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&373D1F64&0&040
Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available

SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&373D1F64&0&000
Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available

PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&26823BEB&0&2008
PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available

PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&1ECF372F&0&08
PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\104

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31741F17&0&070
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31741F17&0&060
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available

SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31741F17&0&050

Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives)	disk.inf	Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&31741F17&0&040						
Smart Array 5x and 6x Notification Driver	Yes	SYSTEM	5.68.0.64	10/3/2005	Hewlett-Packard Company	
oem15.inf Not Available						
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA						
TE&REV_CISS\7&31741F17&0&000						
Smart Array 6400 Controller	Yes	SCSIADAPTER5.70.0.64	8/17/2005	Hewlett-Packard Company	oem14.inf	Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&12D4A840&0&2008						
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf
Not Available						
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&6A42A1B&0&08						
PCI bus	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf
Not Available ACPI\HWP0002\102						
Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives)	disk.inf	Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&FCCAC78&0&070						
Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives)	disk.inf	Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&FCCAC78&0&060						
Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives)	disk.inf	Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&FCCAC78&0&050						
Disk drive	Yes	DISKDRIVE5.2.3790.0	10/1/2002	(Standard disk drives)	disk.inf	Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&FCCAC78&0&040						
Smart Array 5x and 6x Notification Driver	Yes	SYSTEM	5.68.0.64	10/3/2005	Hewlett-Packard Company	
oem15.inf Not Available						
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA						
TE&REV_CISS\7&FCCAC78&0&000						
Smart Array 6400 Controller	Yes	SCSIADAPTER5.70.0.64	8/17/2005	Hewlett-Packard Company	oem14.inf	Not Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&1C300449&0&2008						
PCI standard PCI-to-PCI bridge	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf
Not Available						
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&195DDAC0&0&08						
PCI bus	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf
Not Available ACPI\HWP0002\101						
PCI bus	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf
Not Available ACPI\HWP0002\100						
Generic Bus	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf
Not Available ACPI\HWP0004\100						
Generic Bus	Yes	SYSTEM	5.2.3790.1830	10/1/2002	(Standard system devices)	machine.inf
Not Available ACPI\HWP0005\1						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY053811W__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370CC__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY053813W__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY053813U__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY0537011__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370V3__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370RF__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY0537078__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370NE__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY053811Y__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370WT__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY0538136__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370TK__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370ND__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370WV__						
HP System Memory Device	Yes	SYSTEM	5.0.0.2	6/19/2003	HP oem8.inf	Not Available
ACPI\HWP1000\PRY05370WW__						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\31						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\30						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\29						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\28						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\27						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\26						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\25						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\24						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\23						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\22						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\21						
Processor	Yes	PROCESSOR	5.2.3790.1830	10/1/2002	(Standard processor types)	cpu.inf
Not Available ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\20						

Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\19
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\18
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\17
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-IA64_FAMILY_32_MODEL_0\16
ACPI Fixed Feature Button YesSYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf Not
Available ACPI\FIXEDBUTTON2&DABA3FF&0
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&3893EB60&0&070
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&3893EB60&0&060
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&3893EB60&0&050
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&3893EB60&0&040
Smart Array 5x and 6x Notification Driver YesSYSTEM
5.68.0.64 10/3/2005 Hewlett-Packard Company
oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA
TE&REV_CISS\7&3893EB60&0&000
Smart Array 6400 Controller YesSCSIADAPTER 5.70.0.64
8/17/2005 Hewlett-Packard Company oem14.inf Not
Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\
6&B8B6E61&0&2008
PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf Not
Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5
&3633CCA9&0&08
PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard
system devices)machine.inf Not Available ACPI\HWP0002\E
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&1D279CE2&0&070
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&1D279CE2&0&060
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&1D279CE2&0&050
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.
62\7&1D279CE2&0&040
Smart Array 5x and 6x Notification Driver YesSYSTEM
5.68.0.64 10/3/2005 Hewlett-Packard Company
oem15.inf Not Available
SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICA
TE&REV_CISS\7&1D279CE2&0&000
Smart Array 6400 Controller YesSCSIADAPTER 5.70.0.64
8/17/2005 Hewlett-Packard Company oem14.inf Not
Available
PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\
6&7E3BA13&0&2008
PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830
10/1/2002 (Standard system devices) machine.inf Not
Available
PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5
&29A1C50A&0&08
PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard
system devices)machine.inf Not Available ACPI\HWP0002\B

Generic Bus YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available ACPI\HWP00041

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1B8DF546&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1B8DF546&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1B8DF546&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&1B8DF546&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&1B8DF546&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&30B60401&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_02\5&137A5C4D&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\6

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&A6C01E4&0&070

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&A6C01E4&0&060

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&A6C01E4&0&050

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP&PROD_LOGICAL_VOLUME&REV_2.62\7&A6C01E4&0&040

Smart Array 5x and 6x Notification Driver YesSYSTEM 5.68.0.64 10/3/2005 Hewlett-Packard Company oem15.inf Not Available SCSI\OTHER&VEN_COMPAQ&PROD_SCSI_COMMUNICATE&REV_CISS\7&A6C01E4&0&000

Smart Array 6400 Controller YesSCSIADAPTER5.70.0.64 8/17/2005 Hewlett-Packard Company oem14.inf Not Available PCI\VEN_0E11&DEV_0046&SUBSYS_409C0E11&REV_01\6&C09128E&0&2008

PCI standard PCI-to-PCI bridge YesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices) machine.inf Not Available PCI\VEN_1014&DEV_01A7&SUBSYS_00000000&REV_03\5&17AF9C6C&0&08

PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard system devices)machine.inf Not Available ACPI\HWP0002\1

HP Baseboard Management Controller Interface Device Yes SYSTEM 7.2.3790.6 8/12/2005 Hewlett Packard Co. oem0.inf Not Available ACPI\PI0001\0

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\4&4F5EBC7&0&19

Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard disk drives) disk.inf Not Available SCSI\DISK&VEN_HP_36.4G&PROD_MAS3367NC&REV_HPC3\6&2CC6CC94&0&060

LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes SCSIADAPTER1.10.5.1 2/25/2005 LSI Logic oem11.inf Not Available

```

PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\4
&4F5EBC7&0&18
CD-ROM Drive YesCDROM 5.2.3790.0 10/1/2002
(Standard CD-ROM drives) cdrom.inf Not Available
SCSI\CDROM&VEN__NEC&PROD_DVD+RW_ND-
2100AD&REV_1.28\6&1AB23DE8&0&020
LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes
SCSIADAPTER1.10.5.1 2/25/2005 LSI Logic
oem11.inf Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\4
&4F5EBC7&0&11
Disk drive YesDISKDRIVE5.2.3790.0 10/1/2002 (Standard
disk drives) disk.inf Not Available
SCSI\DISK&VEN_HP_36.4G&PROD_MAS3367NC&REV_H
PC3\6&2D6BEE8D&0&060
LSI Adapter, Ultra320 SCSI 2000 series, (with 1020/1030) Yes
SCSIADAPTER1.10.5.1 2/25/2005 LSI Logic
oem11.inf Not Available
PCI\VEN_1000&DEV_0030&SUBSYS_1323103C&REV_08\4
&4F5EBC7&0&10
Broadcom NetXtreme Gigabit Ethernet YesNET 8.39.1.0
7/21/2005 Broadcom oem4.inf Not Available
PCI\VEN_14E4&DEV_16C7&SUBSYS_1321103C&REV_10\
4&4F5EBC7&0&08
PCI busYesSYSTEM 5.2.3790.1830 10/1/2002 (Standard
system devices)machine.inf Not Available ACPI\HWP0002\0
Generic Bus YesSYSTEM 5.2.3790.1830 10/1/2002
(Standard system devices) machine.inf Not Available
ACPI\HWP0004\0
Generic Bus YesSYSTEM 5.2.3790.1830 10/1/2002
(Standard system devices) machine.inf Not Available
ACPI\HWP0005\0
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY05370DZ__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY053812J__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY05370RD__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY05370RZ__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY05370K4__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY053705N__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY05370GM__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY05370TH__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY05370CZ__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY053810Z__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY053709B__
HP System Memory Device YesSYSTEM 5.0.0.2 6/19/2003
HP oem8.inf Not Available
ACPI\HWP1000\PRY053810W__
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\15
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\14
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\13
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\12
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\11
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\10
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\9
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\8
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\7
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\6
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\5
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\4
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\3
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\2
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\1
Processor YesPROCESSOR 5.2.3790.1830 10/1/2002
(Standard processor types) cpu.inf Not Available
ACPI\GENUINEINTEL_-_IA64_FAMILY_32_MODEL_0\0
HP Reserved Device YesSYSTEM 5.0.0.2 12/14/2005 HP
oem10.inf Not Available ACPI\HWP5004\2&DABA3FF&0
HP CSR OpRegion Driver YesSYSTEM 1.1.0.0 6/5/2003
Hewlett-Packard oem9.inf Not Available
ACPI\HWP5003\2&DABA3FF&0
ACPI Power Button YesSYSTEM 5.2.3790.1830 10/1/2002
(Standard system devices) machine.inf Not Available
ACPI\PNP0C0C\2&DABA3FF&0
Microsoft ACPI-Compliant System YesSYSTEM 5.2.3790.0
10/1/2002 Microsoft acpi.inf Not Available
ACPI_HAL\PNP0C08\0
ACPI IA64-based PC YesCOMPUTER 5.2.3790.1830
10/1/2002 (Standard computers) hal.inf Not Available
ROOT\ACPI_HAL\0000
Not Available Not Available Not Available Not Available
Not Available Not Available Not Available Not
Available HTREE\ROOT\0

[Environment Variables]

Variable Value User Name
ComSpec %SystemRoot%\system32\cmd.exe <SYSTEM>
Path
%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\
System32\Wbem;%SystemRoot%\syswow64;C:\Program Files
(x86)\The Open Group\WMI Mapper\bin;C:\Program Files
(x86)\Hewlett-Packard\ParCommands\ <SYSTEM>
windir %SystemRoot% <SYSTEM>
FP_NO_HOST_CHECKNO <SYSTEM>
OS Windows_NT <SYSTEM>
PROCESSOR_ARCHITECTURE IA64 <SYSTEM>
PROCESSOR_LEVEL 32 <SYSTEM>

```

PROCESSOR_IDENTIFIER ia64 Family 32 Model 0 Stepping 5,
 GenuineIntel <SYSTEM>
 PROCESSOR_REVISION 0005 <SYSTEM>
 NUMBER_OF_PROCESSORS 64 <SYSTEM>
 ClusterLog C:\WINDOWS\Cluster\cluster.log <SYSTEM>
 PATHEXT
 .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
 <SYSTEM>
 TEMP %SystemRoot%\TEMP <SYSTEM>
 TMP %SystemRoot%\TEMP <SYSTEM>
 PEGASUS_PLATFORM WIN32_IX86_MSVC <SYSTEM>
 PEGASUS_HOME C:\Program Files (x86)\The Open Group\WMI
 Mapper\ <SYSTEM>
 HP_SSL_SHARE C:\hp\sslshare\ <SYSTEM>
 HP_NPAR_MOFS C:\Program Files\Hewlett-
 Packard\WMINParProvider\mof\ <SYSTEM>
 TEMP %USERPROFILE%\Local Settings\Temp NT
 AUTHORITY\SYSTEM
 TMP %USERPROFILE%\Local Settings\Temp NT
 AUTHORITY\SYSTEM
 TEMP %USERPROFILE%\Local Settings\Temp NT
 AUTHORITY\LOCAL SERVICE
 TMP %USERPROFILE%\Local Settings\Temp NT
 AUTHORITY\LOCAL SERVICE
 TEMP %USERPROFILE%\Local Settings\Temp NT
 AUTHORITY\NETWORK SERVICE
 TMP %USERPROFILE%\Local Settings\Temp NT
 AUTHORITY\NETWORK SERVICE
 TEMP %USERPROFILE%\Local Settings\Temp
 SQLKONA\Administrator
 TMP %USERPROFILE%\Local Settings\Temp
 SQLKONA\Administrator

[Print Jobs]

Document	Size	Owner	Notify	Status	Time Submitted	Start Time	Until Time	Elapsed Time	Pages Printed	Job ID
Priority Queue	Parameters	Driver	Print	Processor	Host	Print				

[Network Connections]

Local Name	Remote Name	Type	Status	User Name
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[Running Tasks]

Name	Path	Process ID	Priority	Min Working Set	Max Working Set	Start Time	Version	Size	File Date
system	idle process	Not Available	0	0	Not Available	Not Available	Not Available	Not Available	Not Available
system	Not Available	4	8	0	2826240	Not Available	Not Available	Not Available	Not Available
smss.exe	Not Available	1444	11	409600	2826240	7/8/2006 7:46 PM	Not Available	Not Available	Not Available
csrss.exe	Not Available	428	13	Not Available	Not Available	7/8/2006 7:46 PM	Not Available	Not Available	Not Available
winlogon.exe	c:\windows\system32\winlogon.exe	1896	13	409600	2826240	7/8/2006 7:46 PM	5.2.3790.1830	664.50 KB (680,448 bytes)	3/25/2005 4:00 AM
services.exe	c:\windows\system32\services.exe	1988	9	409600	2826240	7/8/2006 7:46 PM	5.2.3790.1830	300.00 KB (307,200 bytes)	3/25/2005 4:00 AM
lsass.exe	c:\windows\system32\lsass.exe	2024	9	409600	2826240	7/8/2006 7:46 PM	5.2.3790.0	15.00 KB (15,360 bytes)	3/25/2005 4:00 AM
svchost.exe	c:\windows\system32\svchost.exe	6168	409600	2826240	7/8/2006 7:46 PM	5.2.3790.1830	36.00 KB (36,864 bytes)		3/25/2005 4:00 AM

svchost.exe	Not Available	7568	Not Available	Not Available	7/8/2006 7:46 PM	Not Available	Not Available		
svchost.exe	Not Available	8968	Not Available	Not Available	7/8/2006 7:46 PM	Not Available	Not Available		
svchost.exe	Not Available	9448	Not Available	Not Available	7/8/2006 7:46 PM	Not Available	Not Available		
svchost.exe	c:\windows\system32\svchost.exe	9768	409600	2826240	7/8/2006 7:46 PM	5.2.3790.1830	36.00 KB (36,864 bytes)		3/25/2005 4:00 AM
spoolsv.exe	c:\windows\system32\spoolsv.exe	8008	409600	2826240	7/8/2006 7:46 PM	5.2.3790.1830	144.00 KB (147,456 bytes)		3/25/2005 4:00 AM
msdtc.exe	Not Available	8488	Not Available	Not Available	7/8/2006 7:46 PM	Not Available	Not Available		
vcagent.exe	c:\hp\hpsmh\data\cgi-bin\vcagent\vcagent.exe	10488	409600	2826240	7/8/2006 7:46 PM	2.1.2.740	704.06 KB (720,956 bytes)		6/28/2006 9:12 AM
svchost.exe	c:\windows\system32\svchost.exe	1172	8	409600	2826240	7/8/2006 7:46 PM	5.2.3790.1830	36.00 KB (36,864 bytes)	3/25/2005 4:00 AM
svchost.exe	Not Available	1240	8	Not Available	Not Available	7/8/2006 7:46 PM	Not Available	Not Available	
snmp.exe	c:\windows\system32\snmp.exe	1264	8	409600	2826240	7/8/2006 7:46 PM	5.2.3790.1830	113.00 KB (115,712 bytes)	3/25/2005 4:00 AM
snmptrap.exe	Not Available	1308	8	Not Available	Not Available	7/8/2006 7:46 PM	Not Available	Not Available	
smhstart.exe	c:\hp\hpsmh\bin\smhstart.exe	1332	8	409600	2826240	7/8/2006 7:46 PM	2.1.3.132	1.32 MB (1,380,418 bytes)	6/28/2006 9:10 AM
wmiserver.exe	c:\program files (x86)\the open group\wmi mapper\bin\wmiserver.exe	4488	409600	2826240	7/8/2006 7:46 PM	Not Available	52.00 KB (53,248 bytes)		7/6/2005 3:45 PM
wminparprovider.exe	c:\program files\hewlett-packard\wminparprovider\wminparprovider.exe	2324	8	409600	2826240	7/8/2006 7:47 PM	2, 1, 0, 3	2.83 MB (2,971,648 bytes)	12/3/2005 8:30 PM
hpsmhd.exe	c:\hp\hpsmh\bin\hpsmhd.exe	2360	8	409600	2826240	7/8/2006 7:47 PM	2.1.3.132	24.05 KB (24,631 bytes)	6/28/2006 9:10 AM
cpqnmgt.exe	c:\windows\system32\cpqnmgt\cpqnmgt.exe	2424	8	409600	2826240	7/8/2006 7:47 PM	7.50.40039.11	10.50 KB (10,752 bytes)	12/16/2005 2:50 PM
cqmgstg.exe	c:\windows\system32\cpqnmgt\cqmgstg\cqmgstg.exe	2480	8	409600	2826240	7/8/2006 7:47 PM	7.50.40039.1	39.50 KB (40,448 bytes)	12/16/2005 2:31 PM
cqmgstor.exe	c:\windows\system32\cpqnmgt\cqmgstor\cqmgstor.exe	2500	8	409600	2826240	7/8/2006 7:47 PM	7.40.1.0	39.50 KB (40,448 bytes)	12/16/2005 4:40 AM
hpmgtstg.exe	c:\windows\system32\cpqnmgt\cqmgstg\hpmgtstg.exe	2564	8	409600	2826240	7/8/2006 7:47 PM	7.50.40039.2	195.50 KB (200,192 bytes)	12/16/2005 2:42 PM
hpmcalog.exe	c:\windows\system32\cpqnmgt\cqmgstg\hpmcalog.exe	2596	8	409600	2826240	7/8/2006 7:47 PM	7.50.40039.9	94.50 KB (96,768 bytes)	12/16/2005 2:23 PM
cqmgstg.exe	c:\windows\system32\cpqnmgt\cqmgstg\cqmgstg.exe	2668	8	409600	2826240	7/8/2006 7:47 PM	7.50.40039.16	7.00 KB (7,168 bytes)	12/16/2005 2:59 PM


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hpesysvc.exe
c:\windows\system32\cpqmgmt\cqmgserver\hpesysvc.exe 2784
8 409600 2826240 7/8/2006 7:47 PM 7.50.40039.
143.50 KB (146,944 bytes) 12/16/2005 2:33 PM
hpevtshim.exe
c:\windows\system32\cpqmgmt\cqmgserver\hpevtshim.exe 2792
8 409600 2826240 7/8/2006 7:47 PM 7.50.40039.
380.50 KB (389,632 bytes) 12/16/2005 2:34 PM
hplersvc.exe
c:\windows\system32\cpqmgmt\cqmgserver\hplersvc.exe 2800
8 409600 2826240 7/8/2006 7:47 PM 7.50.40039.
712.50 KB (729,600 bytes) 12/16/2005 2:34 PM
hpmprvc.exe
c:\windows\system32\cpqmgmt\cqmgserver\hpmprvc.exe 2808
8 409600 2826240 7/8/2006 7:47 PM 7.50.40039.4
16.50 KB (16,896 bytes) 12/16/2005 2:41 PM
hppfmsvc.exe
c:\windows\system32\cpqmgmt\cqmgserver\hppfmsvc.exe 2816
8 409600 2826240 7/8/2006 7:47 PM 7.50.40039.16
487.00 KB (498,688 bytes) 12/16/2005 2:45 PM
asrsrv.exe c:\windows\system32\cpqmgmt\cqmgserver\asrsrv.exe
2824 8 409600 2826240 7/8/2006 7:47 PM
7.50.40039.27.50 KB (28,160 bytes) 12/16/2005 2:22 PM
wmiprvse.exe Not Available 3116 8 Not Available Not
Available 7/8/2006 7:47 PM Not Available Not Available
Not Available
svchost.exe c:\windows\system32\svchost.exe 3132 8
409600 2826240 7/8/2006 7:47 PM 5.2.3790.1830
(srv03_sp1_rtm.050324-1447) 36.00 KB (36,864 bytes)
3/25/2005 4:00 AM
rotatelog.exe c:\hpl\hpsmh\bin\rotatelog.exe 3480 8
409600 2826240 7/8/2006 7:47 PM 2.0.49 40.07 KB
(41,027 bytes) 6/28/2006 9:10 AM
rotatelog.exe c:\hpl\hpsmh\bin\rotatelog.exe 3488 8
409600 2826240 7/8/2006 7:47 PM 2.0.49 40.07 KB
(41,027 bytes) 6/28/2006 9:10 AM
hpsmhd.exe c:\hpl\hpsmh\bin\hpsmhd.exe 3636 8
409600 2826240 7/8/2006 7:47 PM 2.1.3.132 24.05
KB (24,631 bytes) 6/28/2006 9:10 AM
rotatelog.exe c:\hpl\hpsmh\bin\rotatelog.exe 3880 8
409600 2826240 7/8/2006 7:47 PM 2.0.49 40.07 KB
(41,027 bytes) 6/28/2006 9:10 AM
rotatelog.exe c:\hpl\hpsmh\bin\rotatelog.exe 3888 8
409600 2826240 7/8/2006 7:47 PM 2.0.49 40.07 KB
(41,027 bytes) 6/28/2006 9:10 AM
wmiprvse.exe Not Available 3648 8 Not Available Not
Available 7/8/2006 7:47 PM Not Available Not Available
Not Available
csrss.exe Not Available 3780 13 Not Available Not
Available 7/8/2006 7:50 PM Not Available Not Available
Not Available
winlogon.exe c:\windows\system32\winlogon.exe 3748 13
409600 2826240 7/8/2006 7:50 PM 5.2.3790.1830
(srv03_sp1_rtm.050324-1447) 664.50 KB (680,448 bytes)
3/25/2005 4:00 AM
rdpclip.exe c:\windows\system32\rdpclip.exe 3144 8
409600 2826240 7/8/2006 7:50 PM 5.2.3790.1830
(srv03_sp1_rtm.050324-1447) 211.00 KB (216,064 bytes)
3/25/2005 4:00 AM
explorer.exe c:\windows\explorer.exe 3128 8 409600
2826240 7/8/2006 7:50 PM 6.00.3790.1830
(srv03_sp1_rtm.050324-1447) 1.64 MB (1,720,320 bytes)
3/25/2005 4:00 AM
cpqteam.exe c:\windows\system32\cpqteam.exe 3852 8
409600 2826240 7/8/2006 7:50 PM 8.15.0.5 101.50
KB (103,936 bytes) 12/6/2005 9:12 AM
cmd.exe c:\windows\system32\cmd.exe 4168 8 409600
2826240 7/8/2006 7:51 PM 5.2.3790.1830
(srv03_sp1_rtm.050324-1447) 507.50 KB (519,680 bytes)
3/25/2005 4:00 AM
helpctr.exe c:\windows\pchealth\helpctr\binaries\helpctr.exe 4444
8 409600 2826240 7/8/2006 7:54 PM 5.2.3790.1830
(srv03_sp1_rtm.050324-1447) 2.01 MB (2,105,344 bytes)
3/25/2005 4:00 AM

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helpsvc.exe c:\windows\pchealth\helpctr\binaries\helpsvc.exe 5088
8 409600 2826240 7/8/2006 7:54 PM 5.2.3790.1830
(srv03_sp1_rtm.050324-1447) 2.21 MB (2,320,384 bytes)
3/25/2005 4:00 AM
[Loaded Modules]
Name Version Size File Date Manufacturer Path
winlogon 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
664.50 KB (680,448 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\winlogon.exe
ntdll 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.56 MB
(1,638,400 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\ntdll.dll
kernel32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.87
MB (1,965,056 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\kernel32.dll
msvcrt 7.0.3790.1830 (srv03_sp1_rtm.050324-1447) 932.00
KB (954,368 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\msvcrt.dll
advapi32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.41
MB (1,482,752 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\advapi32.dll
rpcrt4 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 2.34 MB
(2,457,600 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\rpcrt4.dll
user32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.41 MB
(1,476,096 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\user32.dll
gdi32 5.2.3790.2542 (srv03_sp1_rtm.051005-1515) 886.00
KB (907,264 bytes) 10/5/2005 1:03 PM Microsoft Corporation
c:\windows\system32\gdi32.dll
userenv 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.49 MB
(1,563,648 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\userenv.dll
nddeapi 5.2.3790.0 (srv03_rtm.030324-2048) 39.50 KB
(40,448 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\nddeapi.dll
crypt32 5.131.3790.1830 (srv03_sp1_rtm.050324-1447) 1.68 MB
(1,759,232 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\crypt32.dll
msasn1 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 179.50
KB (183,808 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\msasn1.dll
secur32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 186.00
KB (190,464 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\secur32.dll
winsta 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 143.50
KB (146,944 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\winsta.dll
netapi32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
885.50 KB (906,752 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\netapi32.dll
profmap 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
59.50 KB (60,928 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\profmap.dll
regapi 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 141.50
KB (144,896 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\regapi.dll
ws2_32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 248.00
KB (253,952 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\ws2_32.dll
ws2help 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
51.00 KB (52,224 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\ws2help.dll
msgina 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.40 MB
(1,465,344 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\msgina.dll
shsvcs 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 354.50
KB (363,008 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\shsvcs.dll
shlwapi 6.00.3790.2564 (srv03_sp1_rtm.051104-1524) 805.00
KB (824,320 bytes) 11/30/2005 1:51 PM Microsoft
Corporation c:\windows\system32\shlwapi.dll

```


sfc 5.2.3790.0 (srv03_rtm.030324-2048) 7.50 KB (7,680 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\sfc.dll

sfc_os 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 273.00 KB (279,552 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\sfc_os.dll

wintrust 5.131.3790.1830 (srv03_sp1_rtm.050324-1447) 459.50 KB (470,528 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wintrust.dll

imagehlp 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 140.50 KB (143,872 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\imagehlp.dll

ole32 5.2.3790.2492 (srv03_sp1_gdr.050720-1523) 3.81 MB (3,992,064 bytes) 8/29/2005 10:48 AM Microsoft Corporation c:\windows\system32\ole32.dll

comctl32 6.0 (srv03_sp1_rtm.050324-1447) 2.50 MB (2,622,976 bytes) 3/24/2005 1:56 AM Microsoft Corporation c:\windows\winsxs\ia64_microsoft.windows.common-controls_6595b64144ccf1df_6.0.3790.1830_x-ww_aa3e736f\comctl32.dll

version 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 51.00 KB (52,224 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\version.dll

winscard 5.2.3790.0 (srv03_rtm.030324-2048) 291.50 KB (298,496 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\winscard.dll

wtsapi32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 54.00 KB (55,296 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wtsapi32.dll

winmm 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 428.00 KB (438,272 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\winmm.dll

sxs 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.82 MB (1,904,640 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\sxs.dll

shell32 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 12.63 MB (13,243,392 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\shell32.dll

setupapi 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.99 MB (2,086,400 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\setupapi.dll

wldap32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 441.50 KB (452,096 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wldap32.dll

cscdll 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 207.00 KB (211,968 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\cscdll.dll

dimsntfy 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 51.50 KB (52,736 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\dimsntfy.dll

wlnotify 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 239.50 KB (245,248 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wlnotify.dll

winspool 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 400.50 KB (410,112 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\winspool.drv

mpr 5.2.3790.0 (srv03_rtm.030324-2048) 163.00 KB (166,912 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\mpr.dll

oleaut32 5.2.3790.1830 3.75 MB (3,930,624 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\oleaut32.dll

comctl32 5.82 (srv03_sp1_rtm.050324-1447) 1.72 MB (1,806,336 bytes) 3/24/2005 1:56 AM Microsoft Corporation c:\windows\winsxs\ia64_microsoft.windows.common-controls_6595b64144ccf1df_5.82.3790.1830_x-ww_4aca2dea\comctl32.dll

uxtheme 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 543.00 KB (556,032 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\uxtheme.dll

scredir 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 69.00 KB (70,656 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\scredir.dll

samlib 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 106.50 KB (109,056 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\samlib.dll

clbcatq 2001.12.4720.2492 (srv03_sp1_gdr.050720-1523) 1.29 MB (1,351,680 bytes) 8/29/2005 10:48 AM Microsoft Corporation c:\windows\system32\clbcatq.dll

comres 2001.12.4720.0 (srv03_rtm.030324-2048) 779.50 KB (798,208 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\comres.dll

cscui 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 628.00 KB (643,072 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\cscui.dll

rdpsnd 5.2.3790.0 (srv03_rtm.030324-2048) 63.00 KB (64,512 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\rdpsnd.dll

psapi 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 53.00 KB (54,272 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\psapi.dll

ntmarta 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 366.00 KB (374,784 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\ntmarta.dll

xpsp2res 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 2.76 MB (2,897,920 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\xpsp2res.dll

printui 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.13 MB (1,186,304 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\printui.dll

activeds 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 581.50 KB (595,456 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\activeds.dll

adslrpc 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 326.00 KB (333,824 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\adslrpc.dll

credui 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 311.00 KB (318,464 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\credui.dll

atl 3.00.2282 348.00 KB (356,352 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\atl.dll

cfgmgr32 5.2.3790.0 (srv03_rtm.030324-2048) 16.00 KB (16,384 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\cfgmgr32.dll

drprov 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 32.50 KB (33,280 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\drprov.dll

msacm32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 87.00 KB (89,088 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\msacm32.drv

msacm32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 276.50 KB (283,136 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\msacm32.dll

ntlanman 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 117.00 KB (119,808 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\ntlanman.dll

netui0 5.2.3790.0 (srv03_rtm.030324-2048) 181.50 KB (185,856 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\netui0.dll

netui1 5.2.3790.0 (srv03_rtm.030324-2048) 482.00 KB (493,568 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\netui1.dll

davclnt 5.2.3790.0 (srv03_rtm.030324-2048) 59.00 KB (60,416 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\davclnt.dll

imaadp32 5.2.3790.0 (srv03_rtm.030324-2048) 55.00 KB (56,320 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\imaadp32.acm

msadp32 5.2.3790.0 (srv03_rtm.030324-2048) 49.00 KB (50,176 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\msadp32.acm

msg7115 5.2.3790.0 (srv03_rtm.030324-2048) 33.00 KB (33,792 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\msg711.acm

msgsm32 5.2.3790.0 (srv03_rtm.030324-2048) 66.50 KB (68,096 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\msgsm32.acm

tssoft32	1.01	29.00 KB (29,696 bytes)	3/25/2005 4:00 AM	DSP GROUP, INC.	c:\windows\system32\tssoft32.acm
tsd32	1.03	38.00 KB (38,912 bytes)	3/25/2005 4:00 AM	DSP GROUP, INC.	c:\windows\system32\tsd32.dll
services	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	300.00 KB (307,200 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\services.exe
scesrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	806.50 KB (825,856 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\scesrv.dll
authz	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	220.50 KB (225,792 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\authz.dll
umpnpgm	5.2.3790.2477 (srv03_sp1_gdr.050629-1534)	323.50 KB (331,264 bytes)	6/30/2005 3:06 AM	Microsoft Corporation	c:\windows\system32\umpnpgm.dll
ncobjapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	121.00 KB (123,904 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\ncobjapi.dll
msvcp60	6.10.2240.8.941.50 KB (964,096 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\msvcp60.dll	
eventlog	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	180.00 KB (184,320 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\eventlog.dll
lsass	5.2.3790.0 (srv03_rtm.030324-2048)	15.00 KB (15,360 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\lsass.exe
lsasrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.07 MB (2,166,784 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\lsasrv.dll
ntdsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	204.50 KB (209,408 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\ntdsapi.dll
dnsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	428.00 KB (438,272 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\dnsapi.dll
samsrv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.09 MB (1,142,784 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\samsrv.dll
cryptdll	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	68.50 KB (70,144 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\cryptdll.dll
msprivs	5.2.3790.0 (srv03_rtm.030324-2048)	46.00 KB (47,104 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\msprivs.dll
kerberos	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	932.00 KB (954,368 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\kerberos.dll
msv1_0	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	380.00 KB (389,120 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\msv1_0.dll
iphlpapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	254.50 KB (260,608 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\iphlpapi.dll
netlogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	956.00 KB (978,944 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\netlogon.dll
w32time	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	565.00 KB (578,560 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\w32time.dll
schannel	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	456.00 KB (466,944 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\schannel.dll
wdigest	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	210.00 KB (215,040 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wdigest.dll
rsaenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	415.98 KB (425,960 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\rsaenh.dll
rassfm	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	68.50 KB (70,144 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\rassfm.dll
kdcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	596.00 KB (610,304 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\kdcsvc.dll
ntdsa	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	4.04 MB (4,239,360 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\ntdsa.dll
esent	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.65 MB (2,776,064 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\esent.dll
ntdsatq	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	79.50 KB (81,408 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\ntdsatq.dll
mswsock	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	763.00 KB (781,312 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\mswsock.dll
scecli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	459.50 KB (470,528 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\scecli.dll
ws03res	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	792.50 KB (811,520 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\ws03res.dll
hnetcfg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.04 MB (1,094,144 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\hnetcfg.dll
wshtcpip	5.2.3790.0 (srv03_rtm.030324-2048)	38.00 KB (38,912 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wshtcpip.dll
ipsecsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	465.00 KB (476,160 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\ipsecsvc.dll
oakley	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	516.50 KB (528,896 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\oakley.dll
windowsipsec	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	83.00 KB (84,992 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\windowsipsec.dll
ptstorsvc	5.2.3790.0 (srv03_rtm.030324-2048)	56.00 KB (57,344 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\ptstorsvc.dll
psbase	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	167.50 KB (171,520 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\psbase.dll
dssenh	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	363.98 KB (372,712 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\dssenh.dll
wlbcctrl	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	207.00 KB (211,968 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wlbcctrl.dll
svchost	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	36.00 KB (36,864 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\svchost.exe
rpcss	5.2.3790.2492 (srv03_sp1_gdr.050720-1523)	828.00 KB (847,872 bytes)	8/29/2005 10:48 AM	Microsoft Corporation	c:\windows\system32\rpcss.dll
wzcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	818.00 KB (837,632 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wzcsvc.dll
rtutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	91.50 KB (93,696 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\rtutils.dll
wmi	5.2.3790.0 (srv03_rtm.030324-2048)	5.00 KB (5,120 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wmi.dll
dhcpcsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	299.50 KB (306,688 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\dhcpcsvc.dll
rastls	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	426.00 KB (436,224 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\rastls.dll
cryptui	5.131.3790.1830 (srv03_sp1_rtm.050324-1447)	1.11 MB (1,159,168 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\cryptui.dll
mprapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	265.00 KB (271,360 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\mprapi.dll

rasapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	632.50 KB (647,680 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\rasapi32.dll
rasman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	170.00 KB (174,080 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\rasman.dll
tapi32	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	518.00 KB (530,432 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\tapi32.dll
raschap	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	226.50 KB (231,936 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\raschap.dll
schedsv	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	567.00 KB (580,608 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\schedsv.dll
mside	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	11.50 KB (11,776 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\mside.dll
wkssvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	315.50 KB (323,072 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wkssvc.dll
wiarpc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	76.00 KB (77,824 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wiarpc.dll
aelupsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	55.50 KB (56,832 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\aelupsvc.dll
apphelp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	301.50 KB (308,736 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\apphelp.dll
cryptsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	139.00 KB (142,336 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\cryptsvc.dll
certcli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	580.00 KB (593,920 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\certcli.dll
vssapi	5.2.3790.2476 (srv03_sp1_qfe.050628-1725)	1.57 MB (1,642,496 bytes)	6/29/2005 12:49 AM	Microsoft Corporation	c:\windows\system32\vssapi.dll
dmserver	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	52.00 KB (53,248 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\dmserver.dll
es	2001.12.4720.2492 (srv03_sp1_gdr.050720-1523)	685.50 KB (701,952 bytes)	8/29/2005 10:48 AM	Microsoft Corporation	c:\windows\system32\es.dll
pchsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	113.00 KB (115,712 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\pchealth\helpctr\binaries\pchsvc.dll
srvsvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	197.50 KB (202,240 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\srvsvc.dll
sacsvr	5.2.3790.0 (srv03_rtm.030324-2048)	27.50 KB (28,160 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\sacsvr.dll
seclogon	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	47.00 KB (48,128 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\seclogon.dll
comsvcs	2001.12.4720.2518 (srv03_sp1_gdr.050826-1537)	3.15 MB (3,299,840 bytes)	8/29/2005 10:48 AM	Microsoft Corporation	c:\windows\system32\comsvcs.dll
trkwks	5.2.3790.0 (srv03_rtm.030324-2048)	246.00 KB (251,904 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\trkwks.dll
wmisvc	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	445.50 KB (456,192 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wmisvc.dll
wuauerv	5.7.3790.1830 (srv03_sp1_rtm.050324-1447)	24.50 KB (25,088 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wuauerv.dll
wuaueng	5.7.3790.1830 (srv03_sp1_rtm.050324-1447)	3.08 MB (3,225,088 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wuaueng.dll
advpack	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	259.50 KB (265,728 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\advpack.dll
shfolder	6.00.3790.1830 (srv03_sp1_rtm.050324-1447)	42.50 KB (43,520 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\shfolder.dll
winhttp	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	995.00 KB (1,018,880 bytes)	3/24/2005 1:56 AM	Microsoft Corporation	c:\windows\winsxs\ia64_microsoft.windows.winhttp_6595b64144ccf1df_5.1.3790.1830_x-ww_a36ff59b\winhttp.dll
cabinet	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	250.50 KB (256,512 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\cabinet.dll
mspatcha	5.2.3790.0 (srv03_rtm.030324-2048)	80.00 KB (81,920 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\mspach.dll
browser	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	200.50 KB (205,312 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\browser.dll
wbemcore	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.94 MB (2,038,784 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemcore.dll
esscli	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.01 MB (1,057,280 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\esscli.dll
wbemcomn	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	665.50 KB (681,472 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemcomn.dll
fastprox	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.63 MB (1,710,592 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\fastprox.dll
sens	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	98.00 KB (100,352 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\sens.dll
wbemsvc	5.2.3790.0 (srv03_rtm.030324-2048)	62.50 KB (64,000 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemsvc.dll
wmiutils	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	302.00 KB (309,248 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wmiutils.dll
repdrvfs	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	649.00 KB (664,576 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\repdrvfs.dll
wmiprvsd	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.39 MB (1,454,592 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wmiprvsd.dll
wbemess	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.02 MB (1,070,080 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemess.dll
ncprov	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	146.00 KB (149,504 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\ncprov.dll
wbemcons	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	154.50 KB (158,208 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wbem\wbemcons.dll
netrap	5.2.3790.0 (srv03_rtm.030324-2048)	30.00 KB (30,720 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\netrap.dll
netman	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	706.50 KB (723,456 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\netman.dll
netshell	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	2.95 MB (3,094,528 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\netshell.dll
clusapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	158.00 KB (161,792 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\clusapi.dll
wininet	6.00.3790.2564 (srv03_sp1_gdr.051104-1524)	1.62 MB (1,697,792 bytes)	11/30/2005 1:51 PM	Microsoft Corporation	c:\windows\system32\wininet.dll
wzcsapi	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	86.50 KB (88,576 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\wzcsapi.dll
rasdlg	5.2.3790.1830 (srv03_sp1_rtm.050324-1447)	1.44 MB (1,509,888 bytes)	3/25/2005 4:00 AM	Microsoft Corporation	c:\windows\system32\rasdlg.dll

rasadhlp 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 18.00 KB (18,432 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\rasadhlp.dll
 ntlsapapi 5.2.3790.0 (srv03_rtm.030324-2048) 14.50 KB (14,848 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\ntlsapi.dll
 spoolsv 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 144.00 KB (147,456 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\spoolsv.exe
 spoolss 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 246.50 KB (252,416 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\spoolss.dll
 localspl 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 943.50 KB (966,144 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\localspl.dll
 cnbjmon 5.2.3790.1224 (dnsvr\skatari).040514-1058) 100.00 KB (102,400 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\cnbjmon.dll
 pjlmn 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 42.50 KB (43,520 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\pjlmn.dll
 tcpmon 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 143.00 KB (146,432 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\tcpmon.dll
 wsnmp32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 128.50 KB (131,584 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wsnmp32.dll
 tcpmib 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 47.00 KB (48,128 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\tcpmib.dll
 wsock32 5.2.3790.0 (srv03_rtm.030324-2048) 23.00 KB (23,552 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wsock32.dll
 mgmtapi 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 47.00 KB (48,128 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\mgmtapi.dll
 snmpapi 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 61.00 KB (62,464 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\snmpapi.dll
 usbmon 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 49.00 KB (50,176 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\usbmon.dll
 winnr 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 47.50 KB (48,640 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\winnr.dll
 win32spl 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 276.00 KB (282,624 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\win32spl.dll
 inetpp 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 214.50 KB (219,648 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\inetpp.dll
 icmp 5.2.3790.0 (srv03_rtm.030324-2048) 2.50 KB (2,560 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\icmp.dll
 vcagent 2.1.2.740 704.06 KB (720,956 bytes) 6/28/2006 9:12 AM Hewlett-Packard Company c:\hp\hpsmh\data\cgi-bin\vcagent\vcagent.exe
 wow64 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 487.00 KB (498,688 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wow64.dll
 wow64win 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 567.50 KB (581,120 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wow64win.dll
 wow64cpu 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 44.00 KB (45,056 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\wow64cpu.dll
 wowia32x 5,3,5021,0 54.00 KB (55,296 bytes) 3/25/2005 4:00 AM Intel Corporation c:\windows\system32\wowia32x.dll
 ia32exec 5,3,5338,0 7.13 MB (7,471,104 bytes) 5/20/2005 2:47 AM Intel Corporation c:\windows\system32\ia32exec.bin
 ersvc 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 66.50 KB (68,096 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\ersvc.dll
 snmp 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 113.00 KB (115,712 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\snmp.exe
 Immib2 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 104.00 KB (106,496 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\Immib2.dll
 inetmib1 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 129.50 KB (132,608 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\inetmib1.dll
 hostmib 5.2.3790.0 (srv03_rtm.030324-2048) 103.00 KB (105,472 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\hostmib.dll
 snmpmib 5.2.3790.0 (srv03_rtm.030324-2048) 9.50 KB (9,728 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\snmpmib.dll
 evttagnt 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 172.50 KB (176,640 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\evttagnt.dll
 igmpagnt 5.2.3790.0 (srv03_rtm.030324-2048) 19.00 KB (19,456 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\igmpagnt.dll
 mcastmib 5.2.3790.0 (srv03_rtm.030324-2048) 29.50 KB (30,208 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\mcastmib.dll
 ripagnt 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 61.00 KB (62,464 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\ripagnt.dll
 ospfagnt 5.2.3790.0 (srv03_rtm.030324-2048) 13.50 KB (13,824 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\ospfagnt.dll
 btpagnt 5.2.3790.0 (srv03_rtm.030324-2048) 27.50 KB (28,160 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\btpagnt.dll
 hpevtagn 7.50.40039.141.00 KB (144,384 bytes) 12/16/2005 2:33 PM Hewlett-Packard c:\windows\system32\cpqmgmt\cqmgserver\hpevtagn.dll
 hpevtapi 7.50.40039.130.50 KB (133,632 bytes) 12/16/2005 2:32 PM Hewlett-Packard c:\windows\system32\cpqmgmt\cqmgserver\hpevtapi.dll
 hpipmapi 7.50.40039.830.50 KB (850,432 bytes) 12/16/2005 2:20 PM Hewlett-Packard c:\windows\system32\hpipmapi.dll
 hpmgtapi 7.50.40039.162.50 KB (166,400 bytes) 12/16/2005 2:21 PM Hewlett-Packard c:\windows\system32\hpmgtapi.dll
 hpimutil 7.50.40039.36.50 KB (37,376 bytes) 12/16/2005 2:18 PM Hewlett-Packard c:\windows\system32\hpimutil.dll
 msvcirt 7.0.3790.0 (srv03_rtm.030324-2048) 161.50 KB (165,376 bytes) 3/25/2005 4:00 AM Microsoft Corporation c:\windows\system32\msvcirt.dll
 nsagent 7.50.40039.141.00 KB (144,384 bytes) 12/16/2005 2:32 PM Hewlett-Packard c:\windows\system32\cpqmgmt\cqmgserver\nsagent.dll
 hostmib 7.50.40039.16 355.00 KB (363,520 bytes) 12/16/2005 2:59 PM Hewlett-Packard Company c:\windows\system32\cpqmgmt\cqmgserver\hostmib.dll
 cqhstutl 7.50.40039.16 50.00 KB (51,200 bytes) 12/16/2005 2:59 PM Hewlett-Packard Company c:\windows\system32\cqhstutl.dll
 hostsnm 7.50.40039.16 51.50 KB (52,736 bytes) 12/16/2005 2:59 PM Hewlett-Packard Company c:\windows\system32\cpqmgmt\cqmgserver\hostsnm.dll
 cpqmib1k 7.50.40039.16 7.50 KB (7,680 bytes) 12/16/2005 2:59 PM Hewlett-Packard Company c:\windows\system32\cpqmgmt\cqmgserver\cpqmib1k.dll
 svrclu 7.50.40039.16 139.00 KB (142,336 bytes) 12/16/2005 3:00 PM Hewlett-Packard Company c:\windows\system32\cpqmgmt\cqmgserver\svrclu.dll
 servmib 7.50.40039.1 775.50 KB (794,112 bytes) 12/16/2005 2:30 PM Hewlett-Packard Company c:\windows\system32\cpqmgmt\cqmgserver\servmib.dll
 cqsrvutl 7.50.40039.1 68.50 KB (70,144 bytes) 12/16/2005 2:30 PM Hewlett-Packard Company c:\windows\system32\cpqmgmt\cqmgserver\cqsrvutl.dll

servsnmp 7.50.40039.1 33.00 KB (33,792 bytes) 12/16/2005
2:30 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgserver\servsnmp.dll
hpentagt 7.50.40039.10 116.00 KB (118,784 bytes)
12/16/2005 2:41 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hpentagt.dll
hpentapi 7.50.40039.8 40.50 KB (41,472 bytes) 12/16/2005
2:40 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hpentapi.dll
cpqnimib 7.50.40039.11 71.50 KB (73,216 bytes) 12/16/2005
2:47 PM Hewlett-Packard
c:\windows\system32\cpqnimgt\cpqnimib.dll
w2kmgdll 7.50.40039.11 233.50 KB (239,104 bytes)
12/16/2005 2:49 PM Hewlett-Packard
c:\windows\system32\cpqnimgt\w2kmgdll.dll
cqnisnmp 7.50.40039.11 24.00 KB (24,576 bytes) 12/16/2005
2:47 PM Hewlett-Packard
c:\windows\system32\cpqnimgt\cqnisnmp.dll
nicmib 7.50.40039.11 29.50 KB (30,208 bytes) 12/16/2005 2:47
PM Hewlett-Packard c:\windows\system32\cpqnimgt\nicmib.dll

stormib Not Available 365.00 KB (373,760 bytes) 12/16/2005
4:40 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\stormib.dll
cqstruti Not Available 48.00 KB (49,152 bytes) 12/16/2005 4:40
AM Not Available c:\windows\system32\cqstruti.dll
storsnmp Not Available 19.50 KB (19,968 bytes) 12/16/2005
4:40 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\storsnmp.dll
symsnmp Not Available 46.50 KB (47,616 bytes) 12/6/2004
8:30 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\symsnmp.dll
symtrap Not Available 70.50 KB (72,192 bytes) 12/6/2004 8:30
AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\symtrap.dll
smhstart 2.1.3.132 1.32 MB (1,380,418 bytes) 6/28/2006
9:10 AM Hewlett-Packard Company
c:\hp\hpsmh\bin\smhstart.exe
WMIserver Not Available 52.00 KB (53,248 bytes) 7/6/2005
3:45 PM Not Available c:\program files (x86)\the open
group\wmi mapper\bin\wmi server.exe
WMIProvider 2.1.0.3 2.83 MB (2,971,648 bytes)
12/3/2005 8:30 PM Hewlett-Packard c:\program
files\hewlett-packard\wminparprovider\wminparprovider.exe
pegcommon Not Available 3.16 MB (3,316,736 bytes)
7/13/2004 1:24 PM Not Available c:\program files\hewlett-
packard\wminparprovider\pegcommon.dll
pegprovider Not Available 328.00 KB (335,872 bytes)
7/13/2004 1:26 PM Not Available c:\program files\hewlett-
packard\wminparprovider\pegprovider.dll
pegwmi client Not Available 698.50 KB (715,264 bytes)
7/13/2004 2:38 PM Not Available c:\program files\hewlett-
packard\wminparprovider\pegwmi client.dll
WMIProvider Not Available 644.50 KB (659,968 bytes)
7/13/2004 2:37 PM Not Available c:\program files\hewlett-
packard\wminparprovider\wmi provider.dll
framedyn 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
536.50 KB (549,376 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\wbem\framedyn.dll
wmidcprv 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
475.00 KB (486,400 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\wbem\wmidcprv.dll
wbemprox 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
65.00 KB (66,560 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\wbem\wbemprox.dll
hpsmhd 2.1.3.132 24.05 KB (24,631 bytes) 6/28/2006 9:10 AM
Hewlett-Packard Company c:\hp\hpsmh\bin\hpsmhd.exe
cpqnimgt 7.50.40039.11 10.50 KB (10,752 bytes) 12/16/2005
2:50 PM Hewlett-Packard
c:\windows\system32\cpqnimgt\cpqnimgt.exe
cqmgserver 7.50.40039.1 39.50 KB (40,448 bytes) 12/16/2005
2:31 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgserver\cqmgserver.exe

cqmgserver 7.50.40039.6 45.00 KB (46,080 bytes) 12/16/2005
2:31 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgserver\cqmgserver.dll
cpqhlth 7.50.40039.1 1,012.50 KB (1,036,800 bytes)
12/16/2005 2:31 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgserver\cpqhlth.dll
cqmgstor 7.40.1.0 39.50 KB (40,448 bytes) 12/16/2005 4:40
AM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgstor\cqmgstor.exe
cqmgstor Not Available 46.00 KB (47,104 bytes) 12/16/2005
4:40 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\cqmgstor.dll
cpqmida Not Available 198.00 KB (202,752 bytes)
12/16/2005 4:40 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\cpqmida.dll
cpqmdisk Not Available 68.00 KB (69,632 bytes) 12/16/2005
4:40 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\cpqmdisk.dll
cpqfca Not Available 259.50 KB (265,728 bytes) 12/16/2005
4:40 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\cpqfca.dll
storalt Not Available 44.00 KB (45,056 bytes) 12/16/2005 4:40
AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\storalt.dll
cpqmcsdi Not Available 138.50 KB (141,824 bytes)
12/16/2005 4:40 AM Not Available
c:\windows\system32\cpqmgmt\cqmgstor\cpqmcsdi.dll
hpmgtsvc 7.50.40039.2 195.50 KB (200,192 bytes)
12/16/2005 2:42 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hpmgtsvc.exe
hpmcalog 7.50.40039. 94.50 KB (96,768 bytes) 12/16/2005 2:23
PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgserver\hpmcalog.exe
cqmgghost 7.50.40039.16 7.00 KB (7,168 bytes) 12/16/2005
2:59 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\cqmgghost.exe
cqmgghost 7.50.40039.16 35.50 KB (36,352 bytes) 12/16/2005
2:59 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\cqmgghost.dll
cpqmghost 7.50.40039.16 104.00 KB (106,496 bytes)
12/16/2005 2:59 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\cpqmghost.dll
cpqperf 7.50.40039.16 93.00 KB (95,232 bytes) 12/16/2005 2:59
PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\cpqperf.dll
cpqstat 7.50.40039.16 42.50 KB (43,520 bytes) 12/16/2005 2:59
PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\cpqstat.dll
cpqswv 7.50.40039.16 57.00 KB (58,368 bytes) 12/16/2005 2:59
PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\cpqswv.dll
cpqthrs 7.50.40039.16 59.50 KB (60,928 bytes) 12/16/2005
2:59 PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\cpqthrs.dll
hostalt 7.50.40039.16 44.00 KB (45,056 bytes) 12/16/2005 2:59
PM Hewlett-Packard Company
c:\windows\system32\cpqmgmt\cqmgghost\hostalt.dll
pdh 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 807.00 KB
(826,368 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\pdh.dll
comdlg32 6.00.3790.1830 (srv03_sp1_rtm.050324-1447)
745.50 KB (763,392 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\comdlg32.dll
odbc32 3.526.1830.0 (srv03_sp1_rtm.050324-1447) 704.00 KB
(720,896 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\odbc32.dll
odbc bcp 2000.086.1830.00 (srv03_sp1_rtm.050324-1447)
52.00 KB (53,248 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\odbc bcp.dll
odbcint 3.526.1830.0 (srv03_sp1_rtm.050324-1447) 88.00 KB
(90,112 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\odbcint.dll
perfdisk 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 63.00
KB (64,512 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\perfdisk.dll

```

hpesysvc 7.50.40039.143.50 KB (146,944 bytes) 12/16/2005
2:33 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hpesysvc.exe
hpevtscv 7.50.40039.380.50 KB (389,632 bytes) 12/16/2005
2:34 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hpevtscv.exe
hplersvc 7.50.40039.712.50 KB (729,600 bytes) 12/16/2005
2:34 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hplersvc.exe
hpmpsv 7.50.40039.4 16.50 KB (16,896 bytes) 12/16/2005
2:41 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hpmpsv.exe
hppfmsvc 7.50.40039.16 487.00 KB (498,688 bytes)
12/16/2005 2:45 PM Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\hppfmsvc.exe
asrsv 7.50.40039.27.50 KB (28,160 bytes) 12/16/2005 2:22 PM
Hewlett-Packard
c:\windows\system32\cpqmgmt\cqmgserver\asrsv.exe
termsrv 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 680.00
KB (696,320 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\termsrv.dll
icaapi 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 33.50
KB (34,304 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\icaapi.dll
mstlsapi 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
340.50 KB (348,672 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\mstlsapi.dll
rdpwsx 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 325.13
KB (332,936 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\rdpwsx.dll
rotatlogs 2.0.49 40.07 KB (41,027 bytes) 6/28/2006 9:10 AM
Apache Software Foundation
c:\hp\hpsmh\bin\rotatlogs.exe
rdpclip 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 211.00
KB (216,064 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\rdpclip.exe
urlmon 6.00.3790.2564 (srv03_sp1_gdr.051104-1524) 1.53 MB
(1,604,608 bytes) 11/30/2005 1:51 PM Microsoft
Corporation c:\windows\system32\urlmon.dll
explorer 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 1.64
MB (1,720,320 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\explorer.exe
browseui 6.00.3790.2564 (srv03_sp1_gdr.051104-1524) 2.43
MB (2,546,688 bytes) 11/30/2005 1:51 PM Microsoft
Corporation c:\windows\system32\browseui.dll
shdocvw 6.00.3790.2580 (srv03_sp1_gdr.051130-1605) 3.51
MB (3,679,232 bytes) 11/30/2005 1:51 PM Microsoft
Corporation c:\windows\system32\shdocvw.dll
themeui 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 891.00
KB (912,384 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\themeui.dll
msimg32 5.2.3790.0 (srv03_rtm.030324-2048) 7.00 KB
(7,168 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\msimg32.dll
actxprxy 6.00.3790.1830 (srv03_sp1_rtm.050324-1447)
237.00 KB (242,688 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\actxprxy.dll
linkinfo 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 46.50
KB (47,616 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\linkinfo.dll
ntshrui 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 244.00
KB (249,856 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\ntshrui.dll
msi 3.1.4000.1830 5.71 MB (5,984,768 bytes) 3/25/2005 4:00
AM Microsoft Corporation c:\windows\system32\msi.dll
browselc 6.00.3790.0 (srv03_rtm.030324-2048) 61.50 KB
(62,976 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\browselc.dll
webcheck 6.00.3790.1830 (srv03_sp1_rtm.050324-1447)
699.00 KB (715,776 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\webcheck.dll
stobject 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 175.00
KB (179,200 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\stobject.dll

batmeter 6.00.3790.1830 (srv03_sp1_rtm.050324-1447)
61.00 KB (62,464 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\batmeter.dll
powrprof 6.00.3790.1830 (srv03_sp1_rtm.050324-1447)
44.00 KB (45,056 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\powrprof.dll
mlang 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 813.50
KB (833,024 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\mlang.dll
shdoclc 6.00.3790.0 (srv03_rtm.030324-2048) 588.00 KB
(602,112 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\shdoclc.dll
cpqteam 8.15.0.5 101.50 KB (103,936 bytes) 12/6/2005
9:12 AM Hewlett-Packard Company
c:\windows\system32\cpqteam.exe
cmd 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 507.50
KB (519,680 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\cmd.exe
helpctr 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 2.01 MB
(2,105,344 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\helpctr.exe
hcappres 5.2.3790.0 (srv03_rtm.030324-2048) 6.00 KB
(6,144 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\hcappres.dll
itss 5.2.3790.2427 (srv03_sp1_gdr.050421-1629) 411.00 KB
(420,864 bytes) 4/22/2005 1:17 AM Microsoft Corporation
c:\windows\system32\itss.dll
msxml3 8.70.1104.0 3.33 MB (3,488,768 bytes) 3/25/2005 4:00
AM Microsoft Corporation c:\windows\system32\msxml3.dll
pchshell 5.2.3790.1830 (srv03_sp1_rtm.050324-1447)
290.50 KB (297,472 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\pchealth\helpctr\binaries\pchshell.dll
mshtml 6.00.3790.2577 (srv03_sp1_gdr.051123-1244) 8.86 MB
(9,290,240 bytes) 11/30/2005 1:51 PM Microsoft
Corporation c:\windows\system32\mshtml.dll
msls31 3.10.349.0 502.50 KB (514,560 bytes) 3/25/2005 4:00
AM Microsoft Corporation c:\windows\system32\msls31.dll
msimtf 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 586.50
KB (600,576 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\msimtf.dll
msctf 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 983.50
KB (1,007,104 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\msctf.dll
jscript 5.6.0.8827 1.24 MB (1,304,576 bytes) 3/25/2005 4:00
AM Microsoft Corporation c:\windows\system32\jscript.dll
imm32 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 322.50
KB (330,240 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\imm32.dll
mshtml 6.00.3790.1830 (srv03_sp1_rtm.050324-1447) 1.46
MB (1,531,392 bytes) 3/25/2005 4:00 AM Microsoft
Corporation c:\windows\system32\mshtml.dll
vbscript 5.6.0.8827 1.07 MB (1,118,208 bytes) 3/25/2005 4:00
AM Microsoft Corporation c:\windows\system32\vbscript.dll
msinfo 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 1.26 MB
(1,321,472 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\msinfo.dll
mfc42u 6.50.4245.0 3.35 MB (3,510,272 bytes) 3/25/2005 4:00
AM Microsoft Corporation c:\windows\system32\mfc42u.dll
riched32 5.2.3790.0 (srv03_rtm.030324-2048) 5.00 KB
(5,120 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\riched32.dll
riched20 5.31.23.1224 1.38 MB (1,451,008 bytes)
3/25/2005 4:00 AM Microsoft Corporation
c:\windows\system32\riched20.dll
helpsvc 5.2.3790.1830 (srv03_sp1_rtm.050324-1447) 2.21 MB
(2,320,384 bytes) 3/25/2005 4:00 AM Microsoft Corporation
c:\windows\pchealth\helpctr\binaries\helpsvc.exe

[Services]

Display Name Name State Start Mode Service Type Path
Error Control Start Name Tag ID
Application Experience Lookup Service AeLookupSvc Running
Auto Share Process c:\windows\system32\svchost.exe -k
netsvcs Normal LocalSystem 0

```

Alerter	Alerter	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Application Layer Gateway Service	ALG	Stopped	Manual	Own Process	c:\windows\system32\alg.exe	Normal	NT AUTHORITY\LocalService	0
Application Management	AppMgmt	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Windows Audio	AudioSrv	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Background Intelligent Transfer Service	BITS	Stopped	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Computer Browser	Browser	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
HP Insight Event Notifier	CimNotify	Stopped	Disabled	Own Process	c:\windows\system32\cimntfy\cimntfy.exe	Normal	LocalSystem	0
Indexing Service	CiSvc	Stopped	Disabled	Share Process	c:\windows\system32\cisvc.exe	Normal	LocalSystem	0
ClipBook	ClipSrv	Stopped	Disabled	Own Process	c:\windows\system32\clipsrv.exe	Normal	LocalSystem	0
COM+ System Application	COMSysApp	Stopped	Manual	Own Process	c:\windows\system32\dlhst.exe /processid:{02d4b3f1-fd88-11d1-960d-00805fc79235}	Normal	LocalSystem	0
HP Insight NIC Agent	CPQNicMgmt	Running	Auto	Own Process	c:\windows\system32\cpqnmgt\cpqnmgt.exe	Normal	LocalSystem	0
HP Version Control Agent	cpqvcagent	Running	Auto	Own Process	c:\hp\hpsmh\data\cgi-bin\vcagent\vcagent.exe	Normal	LocalSystem	0
HP Insight Foundation Agent	CqMgHost	Running	Auto	Own Process	c:\windows\system32\cpqmgmt\cqmgghost\cqmgghost.exe	Normal	LocalSystem	0
HP Insight Server Agents	CqMgServ	Running	Auto	Own Process	c:\windows\system32\cpqmgmt\cqmgserver\cqmgserver.exe	Normal	LocalSystem	0
HP Insight Storage Agents	CqMgStor	Running	Auto	Own Process	c:\windows\system32\cpqmgmt\cqmgstor\cqmgstor.exe	Normal	LocalSystem	0
Cryptographic Services	CryptSvc	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
DCOM Server Process Launcher	DcomLaunch	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k dcomlaunch	Normal	LocalSystem	0
Distributed File System	Dfs	Stopped	Manual	Own Process	c:\windows\system32\dfsrv.exe	Normal	LocalSystem	0
DHCP Client	Dhcp	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k networkservice	Normal	NT AUTHORITY\NetworkService	0
Logical Disk Manager Administrative	ServiceDmadmin	Stopped	Manual	Share Process	c:\windows\system32\dmadmin.exe	Normal	LocalSystem	0
Logical Disk Manager	dmserver	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
DNS Client	Dnscache	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k networkservice	Normal	NT AUTHORITY\NetworkService	0
Error Reporting Service	ERSvc	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k winerr	Ignore	LocalSystem	0
Event Log	Eventlog	Running	Auto	Share Process	c:\windows\system32\services.exe	Normal	LocalSystem	0
COM+ Event System	EventSystem	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Help and Support	helpsvc	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Human Interface Device Access	HidServ	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
HP Insight Management Service	HPManagementService	Running	Auto	Own Process	c:\windows\system32\cpqmgmt\cqmgserver\hpmgtsvc.exe	Normal	LocalSystem	0
HP Insight MCA Monitor	hpmcalog	Running	Auto	Own Process	c:\windows\system32\cpqmgmt\cqmgserver\hpmcalog.exe	Normal	LocalSystem	0
HTTP SSL	HTTPFilter	Stopped	Manual	Share Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0
IAS Jet Database Access	IASJet	Stopped	Manual	Share Process	c:\windows\syswow64\svchost.exe -k iasjet	Normal	LocalSystem	0
IMAPI CD-Burning COM Service	ImapiService	Stopped	Disabled	Own Process	c:\windows\system32\imapi.exe	Normal	LocalSystem	0
Intersite Messaging	Ismserv	Stopped	Disabled	Own Process	c:\windows\system32\ismserver.exe	Normal	LocalSystem	0
Kerberos Key Distribution Center	kdc	Stopped	Disabled	Share Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0
Server lanmanserver	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	
Workstation lanmanworkstation	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0	
License Logging	LicenseService	Stopped	Disabled	Own Process	c:\windows\system32\llssrv.exe	Normal	NT AUTHORITY\NetworkService	0
TCP/IP NetBIOS Helper	LmHosts	Running	Auto	Share Process	c:\windows\system32\svchost.exe -k localservice	Normal	NT AUTHORITY\LocalService	0
Messenger	Messenger	Stopped	Disabled	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
NetMeeting Remote Desktop Sharing	mnmsrvc	Stopped	Disabled	Own Process	c:\windows\system32\mnmsrvc.exe	Normal	LocalSystem	0
Distributed Transaction Coordinator	MSDTC	Running	Auto	Own Process	c:\windows\system32\msdtc.exe	Normal	NT AUTHORITY\NetworkService	0
Windows Installer	MSIServer	Stopped	Manual	Share Process	c:\windows\system32\msiexec.exe /v	Normal	LocalSystem	0
Network DDE	NetDDE	Stopped	Disabled	Share Process	c:\windows\system32\netdde.exe	Normal	LocalSystem	0
Network DDE DSDM	NetDDEdsdm	Stopped	Disabled	Share Process	c:\windows\system32\netdde.exe	Normal	LocalSystem	0
Net Logon	Netlogon	Stopped	Manual	Share Process	c:\windows\system32\lsass.exe	Normal	LocalSystem	0
Network Connections	Netman	Running	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
Network Location Awareness (NLA)	Nla	Running	Manual	Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal	LocalSystem	0
File Replication	NtFrs	Stopped	Manual	Own Process	c:\windows\system32\ntfrs.exe	Ignore	LocalSystem	0

NT LM Security Support Provider	NtLmSsp	Stopped				Microsoft Software Shadow Copy Provider	swprv	Stopped			
Manual Share Process	c:\windows\system32\lsass.exe					Manual Own Process	c:\windows\system32\svchost.exe -k swprv	Normal LocalSystem	0		
Removable Storage NTmsSvc	Stopped	Manual Share				HP System Management Homepage	SysMgmtHp	Running			
Process	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0			Auto Own Process	c:\hp\hpsmh\bin\smhstart.exe	Normal LocalSystem	0		
Plug and Play PlugPlay	Running	Auto	Share Process			Performance Logs and Alerts	SysmonLog	Stopped	Auto		
	c:\windows\system32\services.exe	Normal LocalSystem	0			Own Process	c:\windows\system32\smlogsvc.exe	Normal NT Authority\NetworkService	0		
IPSEC Services PolicyAgent	Running	Auto	Share Process			Telephony TapiSrv	Stopped	Manual Share Process			
	c:\windows\system32\lsass.exe	Normal LocalSystem	0				c:\windows\system32\svchost.exe -k tapisrv	Normal LocalSystem	0		
Protected Storage ProtectedStorage	Running	Auto	Share Process			Terminal Services TermService	Running	Manual Share			
	c:\windows\system32\lsass.exe	Normal LocalSystem	0			Process	c:\windows\system32\svchost.exe -k termsvcs	Normal LocalSystem	0		
Remote Access Auto Connection Manager	RasAuto	Stopped				Themes Themes	Stopped	Disabled	Share Process		
Manual Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0				c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0		
Remote Access Connection Manager	RasMan	Stopped				Distributed Link Tracking Server	TrkSvr	Stopped	Disabled		
Manual Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0			Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0		
Remote Desktop Help Session Manager	RDSessMgr	Stopped				Distributed Link Tracking Client	TrkWks	Running	Auto		
Manual Own Process	c:\windows\system32\sessmgr.exe	Normal LocalSystem	0			Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0		
Routing and Remote Access	RemoteAccess	Stopped				Terminal Services Session Directory	Tssdis	Stopped	Disabled		
Disabled Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0			Own Process	c:\windows\system32\tssdis.exe	Normal LocalSystem	0		
Remote Registry RemoteRegistry	Running	Auto	Share Process			Uninterruptible Power Supply	UPS	Stopped	Manual Own		
	c:\windows\system32\svchost.exe -k regsvc	Normal NT AUTHORITY\LocalService	0			Process	c:\windows\system32\ups.exe	Normal NT AUTHORITY\LocalService	0		
Remote Procedure Call (RPC) Locator	RpcLocator	Stopped				Virtual Disk Service	vds	Stopped	Manual Own Process		
Manual Own Process	c:\windows\system32\locator.exe	Normal NT AUTHORITY\NetworkService	0				c:\windows\system32\vds.exe	Normal LocalSystem	0		
Remote Procedure Call (RPC)	RpcSs	Running	Auto			Volume Shadow Copy VSS	Stopped	Manual Own Process			
Share Process	c:\windows\system32\svchost.exe -k rpcss	Normal NT AUTHORITY\NetworkService	0			Process	c:\windows\system32\vssvc.exe	Normal LocalSystem	0		
Resultant Set of Policy Provider	RSOPProv	Stopped	Manual Share Process			Windows Time	W32Time	Running	Auto	Share Process	
	c:\windows\system32\rsopprov.exe	Normal LocalSystem	0				c:\windows\system32\svchost.exe -k localservice	Normal NT AUTHORITY\LocalService	0		
Special Administration Console Helper	sacsvr	Running				WebClient WebClient	Stopped	Disabled	Share Process		
Manual Share Process	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0				c:\windows\system32\svchost.exe -k localservice	Normal NT AUTHORITY\LocalService	0		
Security Accounts Manager	SamSs	Running	Auto	Share Process		WinHTTP Web Proxy Auto-Discovery Service					
	c:\windows\system32\lsass.exe	Normal LocalSystem	0			WinHttpAutoProxySvc	Stopped	Manual Share Process			
Smart Card SCardSvr	Stopped	Manual Share Process					c:\windows\system32\svchost.exe -k localservice	Normal NT AUTHORITY\LocalService	0		
	c:\windows\system32\scardsvr.exe	Ignore NT AUTHORITY\LocalService	0			Windows Management Instrumentation	winmgmt	Running			
Task Scheduler Schedule	Running	Auto	Share Process			Auto Share Process	c:\windows\system32\svchost.exe -k netsvcs	Ignore LocalSystem	0		
	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0			Windows Management Instrumentation Driver Extensions		Wmi			
Secondary Logon	seclogon	Running	Auto	Share Process			c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0		
	c:\windows\system32\svchost.exe -k netsvcs	Ignore LocalSystem	0			Pegasus WMI Mapper	WMI Mapper	Running	Auto	Own Process	
System Event Notification	SENS	Running	Auto	Share Process			"c:\program files (x86)\the open group\wmi mapper\bin\wmiserver.exe"	Normal LocalSystem	0		
	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0			WMI Performance Adapter	WmiApSrv	Stopped	Manual Own Process		
Windows Firewall/Internet Connection Sharing (ICS)							c:\windows\system32\wbem\wmiapsrv.exe	Normal LocalSystem	0		
SharedAccess	Stopped	Disabled	Share Process			WMI nPar Provider	WMINParProvider	Running	Auto	Own Process	
	c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0				"c:\program files\hewlett-packard\wminparprovider\wminparprovider.exe"	-service Normal LocalSystem	0		
Shell Hardware Detection	ShellHWDetection	Running	Auto	Share Process		Automatic Updates	wuauclt	Running	Auto	Share Process	
	c:\windows\system32\svchost.exe -k netsvcs	Ignore LocalSystem	0				c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0		
SNMP Service	SNMP	Running	Auto	Own Process		Wireless Configuration	WZCSVC	Running	Auto	Share Process	
	c:\windows\system32\snmp.exe	Normal LocalSystem	0				c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0		
SNMP Trap Service	SNMPTRAP	Running	Manual Own Process			Network Provisioning Service	xmlprov	Stopped	Manual Share Process		
	c:\windows\system32\snmptrap.exe	Normal NT AUTHORITY\LocalService	0				c:\windows\system32\svchost.exe -k netsvcs	Normal LocalSystem	0		
Print Spooler	Spooler	Running	Auto	Own Process							
	c:\windows\system32\spoolsv.exe	Normal LocalSystem	0								
Windows Image Acquisition (WIA)	stisvc	Stopped	Disabled	Share Process							
	c:\windows\system32\svchost.exe -k imgsvc	Normal NT AUTHORITY\LocalService	0								

[Program Groups]

Group Name	Name	User Name
------------	------	-----------

AccessoriesDefault User:Accessories Default User
 Accessories\Accessibility Default
 User:Accessories\Accessibility Default User
 Accessories\Entertainment Default
 User:Accessories\Entertainment Default User
 Startup Default User:Startup Default User
 AccessoriesAll Users:Accessories All Users
 Accessories\Accessibility All Users:Accessories\Accessibility
 All Users
 Accessories\Communications All
 Users:Accessories\Communications All Users
 Accessories\Entertainment All Users:Accessories\Entertainment
 All Users
 Accessories\System Tools All Users:Accessories\System Tools
 All Users
 Administrative Tools All Users:Administrative Tools All Users

Hewlett-Packard All Users:Hewlett-Packard All Users
 Hewlett-Packard\nPar Management All Users:Hewlett-
 Packard\nPar Management All Users
 HP Management Agents All Users:HP Management Agents
 All Users
 HP System Tools All Users:HP System Tools All Users
 HP System Tools\HP Array Configuration Utility All Users:HP
 System Tools\HP Array Configuration Utility All Users
 HP System Tools\HP Array Diagnostic Utility All Users:HP System
 Tools\HP Array Diagnostic Utility All Users
 Startup All Users:Startup All Users
 AccessoriesNT AUTHORITY\SYSTEM:Accessories NT
 AUTHORITY\SYSTEM
 Accessories\Accessibility NT
 AUTHORITY\SYSTEM:Accessories\Accessibility NT
 AUTHORITY\SYSTEM
 Accessories\Entertainment NT
 AUTHORITY\SYSTEM:Accessories\Entertainment NT
 AUTHORITY\SYSTEM
 Startup NT AUTHORITY\SYSTEM:Startup NT
 AUTHORITY\SYSTEM
 AccessoriesSQLKONA\Administrator:Accessories
 SQLKONA\Administrator
 Accessories\Accessibility
 SQLKONA\Administrator:Accessories\Accessibility
 SQLKONA\Administrator
 Accessories\Entertainment
 SQLKONA\Administrator:Accessories\Entertainment
 SQLKONA\Administrator
 Startup SQLKONA\Administrator:Startup
 SQLKONA\Administrator

[Startup Programs]

Program	Command	User Name	Location
desktop	desktop.ini	NT AUTHORITY\SYSTEM	Startup
desktop	desktop.ini	SQLKONA\Administrator	Startup
desktop	desktop.ini	.DEFAULT	Startup
desktop	desktop.ini	All Users	Common Startup
CPQTEAM	cpqteam.exe	All Users	
	HKLMSOFTWARE\Microsoft\Windows\CurrentVersion\Run		

[OLE Registration]

Object	Local Server
Sound (OLE2)	sndrec32.exe
Media Clip	mplay32.exe
Video Clip	mplay32.exe /avi
MIDI Sequence	mplay32.exe /mid
Sound	Not Available
Media Clip	Not Available
WordPad Document	"%programfiles%\windows nt\accessories\wordpad.exe"
Bitmap Image	mspaint.exe

[Windows Error Reporting]

Time	Type	Details
------	------	---------

[Internet Settings]

[Internet Explorer]

[Following are sub-categories of this main category]
 [Summary]

Item	Value
Version	6.0.3790.1830
Build	63790.1830
Application Path	C:\Program Files\Internet Explorer
Language	English (United States)
Active Printer	Not Available

Cipher Strength 128-bit
 Content Advisor Disabled
 IEAK Install No

[File Versions]

File	Version	Size	Date	Path	Company
actxprxy.dll	6.0.3790.1830	237 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
actxprxy.dll	6.0.3790.1830	97 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
advpack.dll	6.0.3790.1830	260 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
advpack.dll	6.0.3790.1830	98 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
asctrls.ocx	6.0.3790.0	219 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
asctrls.ocx	6.0.3790.0	90 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
browselc.dll	6.0.3790.0	62 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
browselc.dll	6.0.3790.0	62 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
browseui.dll	6.0.3790.2564	2,487 KB	11/30/2005 2:51:44 PM	C:\WINDOWS\system32	Microsoft Corporation
browseui.dll	6.0.3790.2564	1,012 KB	11/30/2005 2:51:44 PM	C:\WINDOWS\SysWOW64	Microsoft Corporation
cdfview.dll	6.0.3790.1830	307 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
cdfview.dll	6.0.3790.1830	149 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
comctl32.dll	5.82.3790.1830	1,764 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
comctl32.dll	5.82.3790.1830	585 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
dxtmsft.dll	6.3.3790.2564	626 KB	11/30/2005 2:51:44 PM	C:\WINDOWS\system32	Microsoft Corporation
dxtmsft.dll	6.3.3790.2564	208 KB	11/30/2005 2:51:44 PM	C:\WINDOWS\SysWOW64	Microsoft Corporation
dxtmsft.dll	6.3.3790.1830	986 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
dxtmsft.dll	6.3.3790.1830	355 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
iecont.dll	<File Missing>	Not Available	Not Available	Not Available	Not Available
iecontic.dll	<File Missing>	Not Available	Not Available	Not Available	Not Available
iedkcs32.dll	16.0.3790.1830	702 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation
iedkcs32.dll	16.0.3790.1830	324 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\SysWOW64	Microsoft Corporation
iepeers.dll	6.0.3790.2564	702 KB	11/30/2005 2:51:44 PM	C:\WINDOWS\system32	Microsoft Corporation
iepeers.dll	6.0.3790.2564	248 KB	11/30/2005 2:51:44 PM	C:\WINDOWS\SysWOW64	Microsoft Corporation
iesetup.dll	6.0.3790.1830	98 KB	3/25/2005 5:00:00 AM	C:\WINDOWS\system32	Microsoft Corporation

iesetup.dll 6.0.3790.1830 61 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 ieuinit.inf Not Available 24 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Not Available
 ieuinit.inf Not Available 24 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Not Available
 iexplore.exe 6.0.3790.1830 108 KB 3/25/2005 5:00:00 AM
 C:\Program Files\Internet Explorer Microsoft Corporation
 imgutil.dll 6.0.3790.1830 114 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 imgutil.dll 6.0.3790.1830 38 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 inetctl.cpl 6.0.3790.1830 666 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 inetctl.cpl 6.0.3790.1830 358 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 inetctlc.dll 6.0.3790.0 108 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 inetctlc.dll 6.0.3790.0 109 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 inseng.dll 6.0.3790.1830 276 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 inseng.dll 6.0.3790.1830 94 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 mlang.dll 6.0.3790.1830 814 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mlang.dll 6.0.3790.1830 578 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 msencode.dll 2002.10.4.0 112 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Not Available
 mshta.exe 6.0.3790.1830 68 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshta.exe 6.0.3790.1830 30 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 mshtml.dll 6.0.3790.2577 9,073 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtml.dll 6.0.3790.2577 3,040 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 mshtml.tlb 6.0.3790.1830 1,319 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtml.tlb 6.0.3790.1830 1,320 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 mshtmlmled.dll 6.0.3790.1830 1,496 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtmlmled.dll 6.0.3790.1830 455 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 mshtmlr.dll 6.0.3790.1830 56 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 mshtmlr.dll 6.0.3790.1830 56 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 msident.dll 6.0.3790.1830 144 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msident.dll 6.0.3790.1830 48 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 msidntld.dll 6.0.3790.0 14 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msidntld.dll 6.0.3790.0 15 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 msieftp.dll 6.0.3790.1830 579 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msieftp.dll 6.0.3790.1830 244 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 msrating.dll 6.0.3790.1830 415 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 msrating.dll 6.0.3790.1830 144 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 mstime.dll 6.0.3790.2564 1,800 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\system32 Microsoft Corporation
 mstime.dll 6.0.3790.2564 524 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 occache.dll 6.0.3790.1830 218 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 occache.dll 6.0.3790.1830 94 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation

proctexe.ocx 6.3.3790.1830 83 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Intel Corporation
 sendmail.dll 6.0.3790.1830 109 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 sendmail.dll 6.0.3790.1830 56 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 shdoclc.dll 6.0.3790.0 588 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 shdoclc.dll 6.0.3790.0 589 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 shdocvw.dll 6.0.3790.2580 3,593 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\system32 Microsoft Corporation
 shdocvw.dll 6.0.3790.2580 1,478 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 shfolder.dll 6.0.3790.1830 43 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 shfolder.dll 6.0.3790.1830 25 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 shlwapl.dll 6.0.3790.2564 805 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\system32 Microsoft Corporation
 shlwapl.dll 6.0.3790.2564 314 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 tdc.ocx 1.3.0.3130 177 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 tdc.ocx 1.3.0.3130 58 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 url.dll 6.0.3790.1830 49 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 url.dll 6.0.3790.1830 37 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 urlmon.dll 6.0.3790.2564 1,567 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\system32 Microsoft Corporation
 urlmon.dll 6.0.3790.2564 675 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 webcheck.dll 6.0.3790.1830 699 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\system32 Microsoft Corporation
 webcheck.dll 6.0.3790.1830 273 KB 3/25/2005 5:00:00 AM
 C:\WINDOWS\SysWOW64 Microsoft Corporation
 wininet.dll 6.0.3790.2564 1,658 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\system32 Microsoft Corporation
 wininet.dll 6.0.3790.2564 647 KB 11/30/2005 2:51:44 PM
 C:\WINDOWS\SysWOW64 Microsoft Corporation

[Connectivity]

Item Value
 Connection Preference Never dial

LAN Settings

AutoConfigProxy wininet.dll
 AutoProxyDetectMode Enabled
 AutoConfigURL
 Proxy Disabled
 ProxyServer
 ProxyOverride

[Cache]

[Following are sub-categories of this main category]
 [Summary]

Item Value
 Page Refresh Type Automatic
 Temporary Internet Files Folder C:\Documents and Settings\Administrator\Local Settings\Temporary Internet Files
 Total Disk Space Not Available
 Available Disk Space Not Available
 Maximum Cache Size Not Available
 Available Cache Size Not Available

[List of Objects]

Program File Status CodeBase
 No cached object information available

[Content]	Issued To Issued By Validity Signature Algorithm No other people certificate information available
[Following are sub-categories of this main category] [Summary]	[Publishers]
Item Value Content Advisor Disabled	Name No publisher information available
[Personal Certificates]	[Security]
Issued To Issued By Validity Signature Algorithm No personal certificate information available	Zone Security Level My Computer Custom Local intranet Custom Trusted sites Low Internet Medium Restricted sites Custom
[Other People Certificates]	

SQL Server

Version:

Microsoft SQL Server 2005 - 9.00.2047.00 (Intel IA-64)

SQL install: The installation followed the default options. For the sort order Latin1_General_binary was chosen. Client tools and development tools were not installed on the server. Mixed mode authentication was used.

SQL Startup parameters: -c -x - E -T834 -T2301 -T661

- x Disable the Keeping of CPU time and cache-hit ratio statistics.
- c Start SQL Server independently of Windows NT Service Control Manager
- E Increase the number of consecutive extents allocated per file to 4
- T2301 Trace flag to enable more accurate query run-time behavior modeling in the SQL Server query optimizer typically only needed for large data set decision support processing.
- T834 On systems with 8GB or more, this traceflag causes the buffer pool to use large pages. These are allocated at startup and are kept throughout the lifetime of the process. This trace flag can only be set on 64-bit installations of SQL Server.
- T661 Turn off the ghost thread

The following parameters were changed from their default values:

name	minimum	maximum	config_value	run_value
affinity mask	-2147483648	2147483648	-1	-1
affinity64 mask	-2147483648	2147483648	-1	-1
allow updates	0	1	1	1
lightweight pooling	0	1	1	1
max server memory (MB)	16	2147483647	120000	120000
min server memory (MB)	0	2147483647	118000	118000
network packet size (B)	512	32767	32767	32767
recovery interval (min)	0	32767	32767	32767
show advanced options	0	1	1	1
query wait	-1	2147483647	2147483647	2147483647

Appendix B: Database Build Scripts

Create Database

```
-- Create Database
--
-- MikeF
--
if exists (select name from sysdatabases where name = 'tpch1000g') drop database tpch1000g

CREATE DATABASE tpch1000g
ON PRIMARY
(NAME = TpchRoot, FILENAME = "g:\database\TpchRoot.mdf", SIZE = 8MB, FILEGROWTH = 1MB),

FILEGROUP Load_FG
(NAME=Load_1, FILENAME="g:\mnt\ntfs\1\load\load1.mdf", SIZE=30000MB),
(NAME=Load_2, FILENAME="g:\mnt\ntfs\2\load\load2.mdf", SIZE=30000MB),
(NAME=Load_3, FILENAME="g:\mnt\ntfs\3\load\load3.mdf", SIZE=30000MB),
(NAME=Load_4, FILENAME="g:\mnt\ntfs\4\load\load4.mdf", SIZE=30000MB),
(NAME=Load_5, FILENAME="g:\mnt\ntfs\5\load\load5.mdf", SIZE=30000MB),
(NAME=Load_6, FILENAME="g:\mnt\ntfs\6\load\load6.mdf", SIZE=30000MB),
(NAME=Load_7, FILENAME="g:\mnt\ntfs\7\load\load7.mdf", SIZE=30000MB),
(NAME=Load_8, FILENAME="g:\mnt\ntfs\8\load\load8.mdf", SIZE=30000MB),
(NAME=Load_9, FILENAME="g:\mnt\ntfs\9\load\load9.mdf", SIZE=30000MB),
(NAME=Load_10, FILENAME="g:\mnt\ntfs\10\load\load10.mdf", SIZE=30000MB),
(NAME=Load_11, FILENAME="g:\mnt\ntfs\11\load\load11.mdf", SIZE=30000MB),
(NAME=Load_12, FILENAME="g:\mnt\ntfs\12\load\load12.mdf", SIZE=30000MB),
(NAME=Load_13, FILENAME="g:\mnt\ntfs\13\load\load13.mdf", SIZE=30000MB),
(NAME=Load_14, FILENAME="g:\mnt\ntfs\14\load\load14.mdf", SIZE=30000MB),
(NAME=Load_15, FILENAME="g:\mnt\ntfs\15\load\load15.mdf", SIZE=30000MB),
(NAME=Load_16, FILENAME="g:\mnt\ntfs\16\load\load16.mdf", SIZE=30000MB),
(NAME=Load_17, FILENAME="g:\mnt\ntfs\17\load\load17.mdf", SIZE=30000MB),
(NAME=Load_18, FILENAME="g:\mnt\ntfs\18\load\load18.mdf", SIZE=30000MB),
(NAME=Load_19, FILENAME="g:\mnt\ntfs\19\load\load19.mdf", SIZE=30000MB),
(NAME=Load_20, FILENAME="g:\mnt\ntfs\20\load\load20.mdf", SIZE=30000MB),
(NAME=Load_21, FILENAME="g:\mnt\ntfs\21\load\load21.mdf", SIZE=30000MB),
(NAME=Load_22, FILENAME="g:\mnt\ntfs\22\load\load22.mdf", SIZE=30000MB),
(NAME=Load_23, FILENAME="g:\mnt\ntfs\23\load\load23.mdf", SIZE=30000MB),
(NAME=Load_24, FILENAME="g:\mnt\ntfs\24\load\load24.mdf", SIZE=30000MB),
(NAME=Load_25, FILENAME="g:\mnt\ntfs\25\load\load25.mdf", SIZE=30000MB),
(NAME=Load_26, FILENAME="g:\mnt\ntfs\26\load\load26.mdf", SIZE=30000MB),
(NAME=Load_27, FILENAME="g:\mnt\ntfs\27\load\load27.mdf", SIZE=30000MB),
(NAME=Load_28, FILENAME="g:\mnt\ntfs\28\load\load28.mdf", SIZE=30000MB),
(NAME=Load_29, FILENAME="g:\mnt\ntfs\29\load\load29.mdf", SIZE=30000MB),
(NAME=Load_30, FILENAME="g:\mnt\ntfs\30\load\load30.mdf", SIZE=30000MB),
(NAME=Load_31, FILENAME="g:\mnt\ntfs\31\load\load31.mdf", SIZE=30000MB),
(NAME=Load_32, FILENAME="g:\mnt\ntfs\32\load\load32.mdf", SIZE=30000MB),

FILEGROUP LINEITEM_FG
(NAME = tpch1000g_li1, FILENAME = 'G:\mnt\li\1\', SIZE = 23000MB),
(NAME = tpch1000g_li2, FILENAME = 'G:\mnt\li\2\', SIZE = 23000MB),
(NAME = tpch1000g_li3, FILENAME = 'G:\mnt\li\3\', SIZE = 23000MB),
(NAME = tpch1000g_li4, FILENAME = 'G:\mnt\li\4\', SIZE = 23000MB),
(NAME = tpch1000g_li5, FILENAME = 'G:\mnt\li\5\', SIZE = 23000MB),
(NAME = tpch1000g_li6, FILENAME = 'G:\mnt\li\6\', SIZE = 23000MB),
(NAME = tpch1000g_li7, FILENAME = 'G:\mnt\li\7\', SIZE = 23000MB),
(NAME = tpch1000g_li8, FILENAME = 'G:\mnt\li\8\', SIZE = 23000MB),
(NAME = tpch1000g_li9, FILENAME = 'G:\mnt\li\9\', SIZE = 23000MB),
(NAME = tpch1000g_li10, FILENAME = 'G:\mnt\li\10\', SIZE = 23000MB),
(NAME = tpch1000g_li11, FILENAME = 'G:\mnt\li\11\', SIZE = 23000MB),
(NAME = tpch1000g_li12, FILENAME = 'G:\mnt\li\12\', SIZE = 23000MB),
(NAME = tpch1000g_li13, FILENAME = 'G:\mnt\li\13\', SIZE = 23000MB),
(NAME = tpch1000g_li14, FILENAME = 'G:\mnt\li\14\', SIZE = 23000MB),
(NAME = tpch1000g_li15, FILENAME = 'G:\mnt\li\15\', SIZE = 23000MB),
(NAME = tpch1000g_li16, FILENAME = 'G:\mnt\li\16\', SIZE = 23000MB),
(NAME = tpch1000g_li17, FILENAME = 'G:\mnt\li\17\', SIZE = 23000MB),
(NAME = tpch1000g_li18, FILENAME = 'G:\mnt\li\18\', SIZE = 23000MB),
(NAME = tpch1000g_li19, FILENAME = 'G:\mnt\li\19\', SIZE = 23000MB),
(NAME = tpch1000g_li20, FILENAME = 'G:\mnt\li\20\', SIZE = 23000MB),
(NAME = tpch1000g_li21, FILENAME = 'G:\mnt\li\21\', SIZE = 23000MB),
(NAME = tpch1000g_li22, FILENAME = 'G:\mnt\li\22\', SIZE = 23000MB),
(NAME = tpch1000g_li23, FILENAME = 'G:\mnt\li\23\', SIZE = 23000MB),
```



```
(NAME = tpch1000g_gen33, FILENAME = 'G:\mnt\gen\33\', SIZE=9000MB),
(NAME = tpch1000g_gen34, FILENAME = 'G:\mnt\gen\34\', SIZE=9000MB),
(NAME = tpch1000g_gen35, FILENAME = 'G:\mnt\gen\35\', SIZE=9000MB),
(NAME = tpch1000g_gen36, FILENAME = 'G:\mnt\gen\36\', SIZE=9000MB),
(NAME = tpch1000g_gen37, FILENAME = 'G:\mnt\gen\37\', SIZE=9000MB),
(NAME = tpch1000g_gen38, FILENAME = 'G:\mnt\gen\38\', SIZE=9000MB),
(NAME = tpch1000g_gen39, FILENAME = 'G:\mnt\gen\39\', SIZE=9000MB),
(NAME = tpch1000g_gen40, FILENAME = 'G:\mnt\gen\40\', SIZE=9000MB),
(NAME = tpch1000g_gen41, FILENAME = 'G:\mnt\gen\41\', SIZE=9000MB),
(NAME = tpch1000g_gen42, FILENAME = 'G:\mnt\gen\42\', SIZE=9000MB),
(NAME = tpch1000g_gen43, FILENAME = 'G:\mnt\gen\43\', SIZE=9000MB),
(NAME = tpch1000g_gen44, FILENAME = 'G:\mnt\gen\44\', SIZE=9000MB),
(NAME = tpch1000g_gen45, FILENAME = 'G:\mnt\gen\45\', SIZE=9000MB),
(NAME = tpch1000g_gen46, FILENAME = 'G:\mnt\gen\46\', SIZE=9000MB),
(NAME = tpch1000g_gen47, FILENAME = 'G:\mnt\gen\47\', SIZE=9000MB),
(NAME = tpch1000g_gen48, FILENAME = 'G:\mnt\gen\48\', SIZE=9000MB),
(NAME = tpch1000g_gen49, FILENAME = 'G:\mnt\gen\49\', SIZE=9000MB),
(NAME = tpch1000g_gen50, FILENAME = 'G:\mnt\gen\50\', SIZE=9000MB),
(NAME = tpch1000g_gen51, FILENAME = 'G:\mnt\gen\51\', SIZE=9000MB),
(NAME = tpch1000g_gen52, FILENAME = 'G:\mnt\gen\52\', SIZE=9000MB),
(NAME = tpch1000g_gen53, FILENAME = 'G:\mnt\gen\53\', SIZE=9000MB),
(NAME = tpch1000g_gen54, FILENAME = 'G:\mnt\gen\54\', SIZE=9000MB),
(NAME = tpch1000g_gen55, FILENAME = 'G:\mnt\gen\55\', SIZE=9000MB),
(NAME = tpch1000g_gen56, FILENAME = 'G:\mnt\gen\56\', SIZE=9000MB),
(NAME = tpch1000g_gen57, FILENAME = 'G:\mnt\gen\57\', SIZE=9000MB),
(NAME = tpch1000g_gen58, FILENAME = 'G:\mnt\gen\58\', SIZE=9000MB),
(NAME = tpch1000g_gen59, FILENAME = 'G:\mnt\gen\59\', SIZE=9000MB),
(NAME = tpch1000g_gen60, FILENAME = 'G:\mnt\gen\60\', SIZE=9000MB),
(NAME = tpch1000g_gen61, FILENAME = 'G:\mnt\gen\61\', SIZE=9000MB),
(NAME = tpch1000g_gen62, FILENAME = 'G:\mnt\gen\62\', SIZE=9000MB),
(NAME = tpch1000g_gen63, FILENAME = 'G:\mnt\gen\63\', SIZE=9000MB),
(NAME = tpch1000g_gen64, FILENAME = 'G:\mnt\gen\64\', SIZE=9000MB)
```

LOG ON

```
(NAME = tpch1000g_log1, FILENAME = "L:\", SIZE = 97000MB)
```

Foreign Keys

```
alter table SUPPLIER add constraint FK_S_NATIONKEY foreign key (S_NATIONKEY) references NATION(N_NATIONKEY)
alter table PARTSUPP add constraint FK_PS_PARTKEY foreign key (PS_PARTKEY) references PART(P_PARTKEY)
alter table PARTSUPP add constraint FK_PS_SUPPKEY foreign key (PS_SUPPKEY) references SUPPLIER(S_SUPPKEY)
alter table CUSTOMER add constraint FK_C_NATIONKEY foreign key (C_NATIONKEY) references NATION(N_NATIONKEY)
alter table ORDERS add constraint FK_O_CUSTKEY foreign key (O_CUSTKEY) references CUSTOMER(C_CUSTKEY)
alter table LINEITEM add constraint FK_L_ORDERKEY foreign key (L_ORDERKEY) references ORDERS(O_ORDERKEY)
alter table LINEITEM add constraint FK_L_PARTKEY foreign key (L_PARTKEY) references PART(P_PARTKEY)
alter table LINEITEM add constraint FK_L_SUPPKEY foreign key (L_SUPPKEY) references SUPPLIER(S_SUPPKEY)
alter table LINEITEM add constraint FK_L_PARTKEY_SUPPKEY foreign key (L_PARTKEY,L_SUPPKEY) references
PARTSUPP(PS_PARTKEY, PS_SUPPKEY)
alter table NATION add constraint FK_N_REGIONKEY foreign key (N_REGIONKEY) references REGION(R_REGIONKEY)
```

Primary Keys

```
ALTER table NATION ADD constraint PK_N_NATIONKEY primary key (N_NATIONKEY) ON GENERAL_FG
ALTER table REGION ADD constraint PK_R_REGIONKEY primary key (R_REGIONKEY) ON GENERAL_FG
ALTER table SUPPLIER ADD constraint PK_S_SUPPKEY primary key (S_SUPPKEY) ON GENERAL_FG
ALTER table CUSTOMER ADD constraint PK_C_CUSTKEY primary key (C_CUSTKEY) ON GENERAL_FG
ALTER table ORDERS ADD constraint PK_O_ORDERKEY primary key (O_ORDERKEY) WITH (FILLFACTOR = 95) ON GENERAL_FG
ALTER table PARTSUPP ADD constraint PK_PS_PARTKEY_PS_SUPPKEY primary key (PS_PARTKEY, PS_SUPPKEY) ON
GENERAL_FG
ALTER table PART ADD constraint PK_P_PARTKEY primary key (P_PARTKEY) ON GENERAL_FG
```

Clustered Indexes

```
create clustered index L_SHIPDATE_CLUIDX on LINEITEM(L_SHIPDATE) WITH FILLFACTOR=95, SORT_IN_TEMPDB
on LINEITEM_FG

create clustered index O_ORDERDATE_CLUIDX on ORDERS(O_ORDERDATE) WITH FILLFACTOR=95, SORT_IN_TEMPDB
on GENERAL_FG
```

Create Base Tables

```
create table PART
(P_PARTKEY int not null,
 P_NAME varchar(55) not null,
 P_MFGR char(25) not null,
 P_BRAND char(10) not null,
 P_TYPE varchar(25) not null,
 P_SIZE int not null,
 P_CONTAINER char(10) not null,
 P_RETAILPRICE float not null,
 P_COMMENT varchar(23) not null)
on LOAD_FG

create table SUPPLIER
(S_SUPPKEY int not null,
 S_NAME char(25) not null,
 S_ADDRESS varchar(40) not null,
 S_NATIONKEY int not null,
 S_PHONE char(15) not null,
 S_ACCTBAL float not null,
 S_COMMENT varchar(101) not null)
on LOAD_FG

create table PARTSUPP
(PS_PARTKEY int not null,
 PS_SUPPKEY int not null,
 PS_AVAILQTY int not null,
 PS_SUPPLYCOST float not null,
 PS_COMMENT varchar(199) not null)
on LOAD_FG

create table CUSTOMER
(C_CUSTKEY int not null,
 C_NAME varchar(25) not null,
 C_ADDRESS varchar(40) not null,
 C_NATIONKEY int not null,
 C_PHONE char(15) not null,
 C_ACCTBAL float not null,
 C_MKTSEGMENT char(10) not null,
 C_COMMENT varchar(117) not null)
on LOAD_FG
```

```
create table ORDERS
(O_ORDERKEY bigint not null,
 O_CUSTKEY int not null,
 O_ORDERSTATUS char(1) not null,
 O_TOTALPRICE float not null,
 O_ORDERDATE datetime not null,
 O_ORDERPRIORITY char(15) not null,
 O_CLERK char(15) not null,
 O_SHIPPRIORITY int not null,
 O_COMMENT varchar(79) not null)
on LOAD_FG

create table REGION
(R_REGIONKEY int not null,
 R_NAME char(25) not null,
 R_COMMENT varchar(152) not null)
on LOAD_FG

create table LINEITEM
(L_ORDERKEY bigint not null,
 L_PARTKEY int not null,
 L_SUPPKEY int not null,
 L_LINENUMBER int not null,
 L_QUANTITY float not null,
 L_EXTENDEDPRICE float not null,
 L_DISCOUNT float not null,
 L_TAX float not null,
 L_RETURNFLAG char(1) not null,
 L_LINESTATUS char(1) not null,
 L_SHIPDATE datetime not null,
 L_COMMITDATE datetime not null,
 L_RECEIPTDATE datetime not null,
 L_SHIPINSTRUCT char(25) not null,
 L_SHIPMODE char(10) not null,
 L_COMMENT varchar(44) not null)
on LOAD_FG

create table NATION
(N_NATIONKEY int not null,
 N_NAME char(25) not null,
 N_REGIONKEY int not null,
 N_COMMENT varchar(152) not null)
on LOAD_FG
```

Create Indexes

```
create index PS_SUPPKEY_IDX
on PARTSUPP(PS_SUPPKEY)
with fillfactor=100, SORT_IN_TEMPDB
on GENERAL_FG

create index L_PARTKEY_SUPPKEY_IDX on
LINEITEM(L_PARTKEY)
with FILLFACTOR=95, SORT_IN_TEMPDB on
LINEITEM_FG
```

```
create index S_NATIONKEY_IDX
on SUPPLIER(S_NATIONKEY)
with fillfactor=100, SORT_IN_TEMPDB
on GENERAL_FG

create index L_ORDERKEY_IDX
on LINEITEM(L_ORDERKEY)
with FILLFACTOR=95, SORT_IN_TEMPDB
on LINEITEM_FG

create index N_REGIONKEY_IDX
on NATION(N_REGIONKEY)
with fillfactor=100, SORT_IN_TEMPDB
on GENERAL_FG
```

Backup

backup database tpch1000g to

```
DISK = 'G:\mnt\nfs\1\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\2\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\3\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\4\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\5\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\6\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\7\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\8\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\9\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\10\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\11\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\12\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\13\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\14\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\15\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\16\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\17\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\18\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\19\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\20\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\21\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\22\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\23\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\24\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\25\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\26\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\27\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\28\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\29\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\30\backup\tpch1000g.bak', DISK = 'G:\mnt\nfs\31\backup\tpch1000g.bak',  
DISK = 'G:\mnt\nfs\32\backup\tpch1000g.bak'  
with init, maxtransfersize=1048576, BUFFERCOUNT=100, stats = 1
```


Appendix C: Query Text and Output

Using Standard Substitutions

/* TPC_H Query 1 - Pricing Summary Report */

```
SELECT L_RETURNFLAG, L_LINESTATUS, SUM(L_QUANTITY) AS SUM_QTY, SUM(L_EXTENDEDPRI
  AS SUM_BASE_PRICE, SUM(L_EXTENDEDPRI*(1-L_DISCOUNT)) AS SUM_DISC_PRICE,
  SUM(L_EXTENDEDPRI*(1-L_DISCOUNT)*(1+L_TAX)) AS SUM_CHARGE, AVG(L_QUANTITY) AS AVG_QTY,
  AVG(L_EXTENDEDPRI) AS AVG_PRICE, AVG(L_DISCOUNT) AS AVG_DISC, COUNT(*) AS COUNT_ORDER
FROM LINEITEM
WHERE L_SHIPDATE <= dateadd(dd, -90, '1998-12-01') GROUP BY L_RETURNFLAG, L_LINESTATUS
ORDER BY L_RETURNFLAG, L_LINESTATUS
```

L_RETURNFLAG	L_LINESTATUS	SUM_QTY	SUM_BASE_PRICE	SUM_DISC_PRICE	SUM_CHARGE
AVG_QTY	AVG_PRICE	AVG_DISC	COUNT_ORDER		
A	F	37734107.000000	56586554400.730179	53758257134.870125	55909065222.827667
38273.129735	0.049985		1478493		
N	F	991417.000000	1487504710.380003	1413082168.054099	1469649223.194373
38284.467761	0.050093		38854		25.516472
N	O	74476040.000000	111701729697.740110	106118230307.605670	110367043872.497160
38249.117989	0.049997		2920374		25.502227
R	F	37719753.000000	56568041380.900055	53741292684.604050	55889619119.831886
38250.854626	0.050009		1478870		25.505794

(4 row(s) affected)

/* TPC_H Query 2 - Minimum Cost Supplier */

```
SELECT TOP 100 S_ACCTBAL, S_NAME, N_NAME, P_PARTKEY, P_MFGR, S_ADDRESS, S_PHONE, S_COMMENT
FROM PART, SUPPLIER, PARTSUPP, NATION, REGION
WHERE P_PARTKEY = PS_PARTKEY AND S_SUPPKEY = PS_SUPPKEY AND P_SIZE = 15 AND
  P_TYPE LIKE '%%BRASS' AND S_NATIONKEY = N_NATIONKEY AND N_REGIONKEY = R_REGIONKEY AND
  R_NAME = 'EUROPE' AND
  PS_SUPPLYCOST = (SELECT MIN(PS_SUPPLYCOST) FROM PARTSUPP, SUPPLIER, NATION, REGION
  WHERE P_PARTKEY = PS_PARTKEY AND S_SUPPKEY = PS_SUPPKEY
  AND S_NATIONKEY = N_NATIONKEY AND N_REGIONKEY = R_REGIONKEY AND R_NAME = 'EUROPE')
ORDER BY S_ACCTBAL DESC, N_NAME, S_NAME, P_PARTKEY
```

S_ACCTBAL	S_NAME	N_NAME	P_PARTKEY	P_MFGR	S_ADDRESS
S_PHONE	S_COMMENT				
9938.530000	Supplier#000005359	UNITED KINGDOM	185358	Manufacturer#4	QKuHYh,vZGiwu2FWEJoLDx04
33-429-790-6131	blithely silent pinto beans are furiously. slyly final deposits across				
9937.840000	Supplier#000005969	ROMANIA	108438	Manufacturer#1	
ANDENSOSmk,miq23Xfb5RWt6dvUcvt6Qa	29-520-692-3537 carefully slow deposits use furiously. slyly ironic platelets above the ironic				
9936.220000	Supplier#000005250	UNITED KINGDOM	249	Manufacturer#4	B3rqp0xbSEim4Mpy2RH J
33-320-228-2957	blithely special packages are. stealthily express deposits across the closely final instructi				
9923.770000	Supplier#000002324	GERMANY	29821	Manufacturer#4	y3OD9UyWSTok
17-779-299-1839	quickly express packages breach quiet pinto beans. requ				
9871.220000	Supplier#000006373	GERMANY	43868	Manufacturer#5	J8fcXWsTqM
17-813-485-8637	never silent deposits integrate furiously blit				
9870.780000	Supplier#000001286	GERMANY	81285	Manufacturer#2	
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH	17-516-924-4574 final theodolites cajole slyly special,				
9870.780000	Supplier#000001286	GERMANY	181285	Manufacturer#4	
YKA,E2fjiVd7eUrzp2Ef8j1QxGo2DFnosaTEH	17-516-924-4574 final theodolites cajole slyly special,				
9852.520000	Supplier#000008973	RUSSIA	18972	Manufacturer#2	t5L67YdBYYH6o,Vz24jpDyQ9
32-188-594-7038	quickly regular instructions wake-- carefully unusual braids into the expres				
9847.830000	Supplier#000008097	RUSSIA	130557	Manufacturer#2	xMe97bpE69NzdwLoX
32-375-640-3593	slyly regular dependencies sleep slyly furiously express dep				
9847.570000	Supplier#000006345	FRANCE	86344	Manufacturer#1	
VSt3rzK3qG698u6ld8HhOByvrTcSTSvQIDQDag	16-886-766-7945 silent pinto beans should have to snooze carefully along the final reques				
.					
7843.520000	Supplier#000006683	FRANCE	11680	Manufacturer#4	2Z0JGkiv01Y00oCFwUGfvlbhZCdy
16-464-517-8943	carefully bold accounts doub				

(100 row(s) affected)

/* TPC_H Query 3 - Shipping Priority */

```
SELECT TOP 10 L_ORDERKEY, SUM(L_EXTENDEDPRISE*(1-L_DISCOUNT))AS REVENUE, O_ORDERDATE, O_SHIPRIORITY
FROM CUSTOMER, ORDERS, LINEITEM
WHERE C_MKTSEGMENT = 'BUILDING' AND C_CUSTKEY = O_CUSTKEY AND L_ORDERKEY = O_ORDERKEY AND
O_ORDERDATE < '1995-03-15' AND L_SHIPDATE > '1995-03-15'
GROUP BY L_ORDERKEY, O_ORDERDATE, O_SHIPRIORITY
ORDER BY REVENUE DESC, O_ORDERDATE
```

L_ORDERKEY	REVENUE	O_ORDERDATE	O_SHIPRIORITY
2456423	406181.011100	1995-03-05 00:00:00.000	0
3459808	405838.698900	1995-03-04 00:00:00.000	0
492164	390324.061000	1995-02-19 00:00:00.000	0
1188320	384537.935900	1995-03-09 00:00:00.000	0
2435712	378673.055800	1995-02-26 00:00:00.000	0
4878020	378376.795200	1995-03-12 00:00:00.000	0
5521732	375153.921500	1995-03-13 00:00:00.000	0
2628192	373133.309400	1995-02-22 00:00:00.000	0
993600	371407.459500	1995-03-05 00:00:00.000	0
2300070	367371.145200	1995-03-13 00:00:00.000	0

(10 row(s) affected)

/* TPC_H Query 4 - Order Priority Checking */

```
SELECT O_ORDERPRIORITY, COUNT(*) AS ORDER_COUNT FROM ORDERS
WHERE O_ORDERDATE >= '1993-07-01' AND O_ORDERDATE < dateadd (mm, 3, '1993-07-01') AND
EXISTS (SELECT * FROM LINEITEM WHERE L_ORDERKEY = O_ORDERKEY AND
L_COMMITDATE < L_RECEIPTDATE)
GROUP BY O_ORDERPRIORITY
ORDER BY O_ORDERPRIORITY
```

O_ORDERPRIORITY ORDER_COUNT

1-URGENT	10594
2-HIGH	10476
3-MEDIUM	10410
4-NOT SPECIFIED	10556
5-LOW	10487

(5 row(s) affected)

/* TPC_H Query 5 - Local Supplier Volume */

```
SELECT N_NAME, SUM(L_EXTENDEDPRISE*(1-L_DISCOUNT)) AS REVENUE
FROM CUSTOMER, ORDERS, LINEITEM, SUPPLIER, NATION, REGION
WHERE C_CUSTKEY = O_CUSTKEY AND L_ORDERKEY = O_ORDERKEY AND L_SUPPKEY = S_SUPPKEY AND
C_NATIONKEY = S_NATIONKEY AND S_NATIONKEY = N_NATIONKEY AND N_REGIONKEY = R_REGIONKEY
AND R_NAME = 'ASIA' AND O_ORDERDATE >= '1994-01-01' AND O_ORDERDATE < DATEADD(Y, 1, '1994-01-01')
GROUP BY N_NAME
ORDER BY REVENUE DESC
```

N_NAME	REVENUE
INDONESIA	55502041.169700
VIETNAM	55295086.996700
CHINA	53724494.256600
INDIA	52035512.000200
JAPAN	45410175.695400

(5 row(s) affected)

/* TPC_H Query 6 - Forecasting Revenue Change */

```
SELECT SUM(L_EXTENDEDPRISE*L_DISCOUNT) AS REVENUE
FROM LINEITEM
WHERE L_SHIPDATE >= '1994-01-01' AND L_SHIPDATE < dateadd (yy, 1, '1994-01-01') AND L_DISCOUNT BETWEEN .06 - 0.01
AND .06 + 0.01 AND L_QUANTITY < 24
```

REVENUE

123141078.228300

(1 row(s) affected)

/* TPC_H Query 7 - Volume Shipping */

```

SELECT SUPP_NATION, CUST_NATION, L_YEAR, SUM(VOLUME) AS REVENUE
FROM ( SELECT N1.N_NAME AS SUPP_NATION, N2.N_NAME AS CUST_NATION, datepart(yy, L_SHIPDATE) AS
L_YEAR,
L_EXTENDEDPRICE*(1-L_DISCOUNT) AS VOLUME
FROM SUPPLIER, LINEITEM, ORDERS, CUSTOMER, NATION N1, NATION N2
WHERE S_SUPPKEY = L_SUPPKEY AND O_ORDERKEY = L_ORDERKEY AND C_CUSTKEY = O_CUSTKEY
AND S_NATIONKEY = N1.N_NATIONKEY AND C_NATIONKEY = N2.N_NATIONKEY AND
((N1.N_NAME = 'FRANCE' AND N2.N_NAME = 'GERMANY') OR
(N1.N_NAME = 'GERMANY' AND N2.N_NAME = 'FRANCE')) AND
L_SHIPDATE BETWEEN '1995-01-01' AND '1996-12-31' )
AS SHIPPING
GROUP BY SUPP_NATION, CUST_NATION, L_YEAR
ORDER BY SUPP_NATION, CUST_NATION, L_YEAR

```

SUPP_NATION	CUST_NATION	L_YEAR	REVENUE
FRANCE	GERMANY	1995	54639732.733600
FRANCE	GERMANY	1996	54633083.307600
GERMANY	FRANCE	1995	52531746.669700
GERMANY	FRANCE	1996	52520549.022400

(4 row(s) affected)

/* TPC_H Query 8 - National Market Share */

```

SELECT O_YEAR, SUM(CASE WHEN NATION = 'BRAZIL' THEN VOLUME ELSE 0 END) / SUM(VOLUME) AS MKT_SHARE
FROM (SELECT datepart(yy, O_ORDERDATE) AS O_YEAR, L_EXTENDEDPRICE * (1-L_DISCOUNT) AS VOLUME,
N2.N_NAME AS NATION
FROM PART, SUPPLIER, LINEITEM, ORDERS, CUSTOMER, NATION N1, NATION N2, REGION
WHERE P_PARTKEY = L_PARTKEY AND S_SUPPKEY = L_SUPPKEY AND L_ORDERKEY = O_ORDERKEY
AND O_CUSTKEY = C_CUSTKEY AND C_NATIONKEY = N1.N_NATIONKEY AND
N1.N_REGIONKEY = R_REGIONKEY AND R_NAME = 'AMERICA' AND
S_NATIONKEY = N2.N_NATIONKEY AND O_ORDERDATE BETWEEN '1995-01-01' AND
'1996-12-31' AND P_TYPE= 'ECONOMY ANODIZED STEEL') AS ALL_NATIONS
GROUP BY O_YEAR
ORDER BY O_YEAR

```

O_YEAR	MKT_SHARE
1995	0.034436
1996	0.041486

(2 row(s) affected)

/* TPC_H Query 9 - Product Type Profit Measure */

```

SELECT NATION, O_YEAR, SUM(AMOUNT) AS SUM_PROFIT
FROM (SELECT N_NAME AS NATION, datepart(yy, O_ORDERDATE) AS O_YEAR,
L_EXTENDEDPRICE*(1-L_DISCOUNT)-PS_SUPPLYCOST*L_QUANTITY AS AMOUNT
FROM PART, SUPPLIER, LINEITEM, PARTSUPP, ORDERS, NATION
WHERE S_SUPPKEY = L_SUPPKEY AND PS_SUPPKEY= L_SUPPKEY AND PS_PARTKEY = L_PARTKEY AND
P_PARTKEY=L_PARTKEY AND O_ORDERKEY = L_ORDERKEY AND S_NATIONKEY = N_NATIONKEY AND
P_NAME LIKE '%%green%%') AS PROFIT
GROUP BY NATION, O_YEAR
ORDER BY NATION, O_YEAR DESC

```

NATION	O_YEAR	SUM_PROFIT
ALGERIA	1998	31342867.234500
ALGERIA	1997	57138193.023300
ALGERIA	1996	56140140.133000
ALGERIA	1995	53051469.653400
ALGERIA	1994	53867582.128600
ALGERIA	1993	54942718.132400
ALGERIA	1992	54628034.712700
ARGENTINA	1998	30211185.708100
.		
VIETNAM	1992	49613838.315100

(175 row(s) affected)

/* TPC_H Query 10 - Returned Item Reporting */

```
SELECT TOP 20 C_CUSTKEY, C_NAME, SUM(L_EXTENDEDPRISE*(1-L_DISCOUNT)) AS REVENUE, C_ACCTBAL,
N_NAME, C_ADDRESS, C_PHONE, C_COMMENT
FROM CUSTOMER, ORDERS, LINEITEM, NATION
WHERE C_CUSTKEY = O_CUSTKEY AND L_ORDERKEY = O_ORDERKEY AND O_ORDERDATE >= '1993-10-01 AND
O_ORDERDATE < dateadd(mm, 3, '1993-10-01') AND
L_RETURNFLAG = 'R' AND C_NATIONKEY = N_NATIONKEY
GROUP BY C_CUSTKEY, C_NAME, C_ACCTBAL, C_PHONE, N_NAME, C_ADDRESS, C_COMMENT
ORDER BY REVENUE DESC
```

C_CUSTKEY	C_NAME C_PHONE	REVENUE C_COMMENT	C_ACCTBAL	N_NAME	C_ADDRESS
57040	Customer#000057040 22-895-641-3466	734235.245500 requests sleep blithely about the furiously i	632.870000	JAPAN	Eioyjf4pp
143347	Customer#000143347 14-742-935-3718	721002.694800 fluffily bold excuses haggle finally after the u	2557.470000	EGYPT	1aReFYv,Kw4
60838	Customer#000060838 64EaJ5vMAHWJIBOXJkIpNc2RjiWE	679127.307700 12-913-494-9813 furiously even pinto beans integrate under the ruthless foxes; ironic, even dolphins across the sly!	2454.770000	BRAZIL	
101998	Customer#000101998 01c9ClLnNfOQYmZj	637029.566700 33-593-865-6378 accounts doze blithely! enticing, final deposits sleep blithely special accounts. slyly express accounts pla	3790.890000	UNITED KINGDOM	
23431	Customer#000023431 29-915-458-2654	554269.536000 instructions nag quickly. furiously bold accounts cajol	3381.860000	ROMANIA	HgiV0pghala9aydNoIbb

(20 row(s) affected)

/* TPC_H Query 11 - Important Stock Identification */

```
SELECT PS_PARTKEY, SUM(PS_SUPPLYCOST*PS_AVAILQTY) AS VALUE
FROM PARTSUPP, SUPPLIER, NATION
WHERE PS_SUPPKEY = S_SUPPKEY AND S_NATIONKEY = N_NATIONKEY AND N_NAME = 'GERMANY'
GROUP BY PS_PARTKEY
HAVING SUM(PS_SUPPLYCOST*PS_AVAILQTY) > (SELECT SUM(PS_SUPPLYCOST*PS_AVAILQTY) * 0.0001000000
FROM PARTSUPP, SUPPLIER, NATION
WHERE PS_SUPPKEY = S_SUPPKEY AND S_NATIONKEY = N_NATIONKEY AND N_NAME = 'GERMANY')
ORDER BY VALUE DESC
```

PS_PARTKEY	VALUE
129760	17538456.860000
166726	16503353.920000
191287	16474801.970000
161758	16101755.540000
72073	7877736.110000
5182	7874521.730000

(1048 row(s) affected)

/* TPC_H Query 12 - Shipping Modes and Order Priority */

```
SELECT L_SHIPMODE,
SUM(CASE WHEN O_ORDERPRIORITY = '1-URGENT' OR O_ORDERPRIORITY = '2-HIGH' THEN 1 ELSE 0 END)
AS HIGH_LINE_COUNT, SUM(CASE WHEN O_ORDERPRIORITY <> '1-URGENT' AND O_ORDERPRIORITY <> '2-HIGH'
THEN 1 ELSE 0 END) AS LOW_LINE_COUNT
FROM ORDERS, LINEITEM
WHERE O_ORDERKEY = L_ORDERKEY AND L_SHIPMODE IN ('MAIL','SHIP') AND L_COMMITDATE < L_RECEIPTDATE AND
L_SHIPDATE < L_COMMITDATE AND L_RECEIPTDATE >= '1994-01-01' AND L_RECEIPTDATE < dateadd(yy, 1, '1994-01-01')
GROUP BY L_SHIPMODE
ORDER BY L_SHIPMODE
```

L_SHIPMODE	HIGH_LINE_COUNT	LOW_LINE_COUNT
MAIL	6202	9324
SHIP	6200	9262

(2 row(s) affected)

/* TPC_H Query 13 - Customer Distribution */

```
SELECT C_COUNT, COUNT(*) AS CUSTDIST
FROM (SELECT C_CUSTKEY, COUNT(O_ORDERKEY)
      FROM CUSTOMER left outer join ORDERS on C_CUSTKEY = O_CUSTKEY
      AND O_COMMENT not like '%%special%%requests%%'
      GROUP BY C_CUSTKEY) AS C_ORDERS (C_CUSTKEY, C_COUNT)
GROUP BY C_COUNT
ORDER BY CUSTDIST DESC, C_COUNT DESC
```

C_COUNT CUSTDIST

```
-----
0          50004
9          6641
10         6566
11         6058
8          5949
12         5553
13         4989
19         4748
7          4707
18         4625
.
.
39         2
41         1
```

(42 row(s) affected)

/* TPC_H Query 14 - Promotion Effect */

```
SELECT 100.00 * SUM (CASE WHEN P_TYPE LIKE 'PROMO%%' THEN L_EXTENDEDPRI*(1-L_DISCOUNT)
                     ELSE 0 END) / SUM(L_EXTENDEDPRI*(1-L_DISCOUNT)) AS PROMO_REVENUE
FROM LINEITEM, PART
WHERE L_PARTKEY = P_PARTKEY AND L_SHIPDATE >= '1995-09-01' AND L_SHIPDATE < dateadd(mm, 1, '1995-09-01')
```

PROMO_REVENUE

```
-----
16.380779
```

(1 row(s) affected)

/* TPC_H Query 15 - Create View for Top Supplier Query */

```
CREATE VIEW REVENUE0 (SUPPLIER_NO, TOTAL_REVENUE) AS
  SELECT L_SUPPKEY, SUM(L_EXTENDEDPRI*(1-L_DISCOUNT)) FROM LINEITEM
  WHERE L_SHIPDATE >= '1996-01-01' AND L_SHIPDATE < dateadd(mm, 3, '1996-01-01')
GROUP BY L_SUPPKEY
GO
```

/* TPC_H Query 15 - Top Supplier */

```
SELECT S_SUPPKEY,
       S_NAME,
       S_ADDRESS,
       S_PHONE,
       TOTAL_REVENUE
FROM SUPPLIER, REVENUE0
WHERE S_SUPPKEY = SUPPLIER_NO AND TOTAL_REVENUE = ( SELECT MAX(TOTAL_REVENUE) FROM REVENUE0)
ORDER BY S_SUPPKEY
```

DROP VIEW REVENUE0

```
S_SUPPKEY S_NAME          S_ADDRESS          S_PHONE          TOTAL_REVENUE
-----
8449      Supplier#000008449    Wp34zim9qYFbVctdW    20-469-856-8873 1772627.208700
```

(1 row(s) affected)

/* TPC_H Query 16 - Parts/Supplier Relationship */

```
SELECT P_BRAND, P_TYPE, P_SIZE, COUNT(DISTINCT PS_SUPPKEY) AS SUPPLIER_CNT
FROM PARTSUPP, PART
WHERE P_PARTKEY = PS_PARTKEY AND P_BRAND <> 'Brand#45' AND P_TYPE NOT LIKE 'MEDIUM POLISHED%'
AND P_SIZE IN (49, 14, 23, 45, 19, 3, 36, 9) AND PS_SUPPKEY NOT IN (SELECT S_SUPPKEY FROM SUPPLIER
WHERE S_COMMENT LIKE '%%Customer%%Complaints%%')
GROUP BY P_BRAND, P_TYPE, P_SIZE
ORDER BY SUPPLIER_CNT DESC, P_BRAND, P_TYPE, P_SIZE
```

P_BRAND	P_TYPE	P_SIZE	SUPPLIER_CNT
---------	--------	--------	--------------

Brand#41	MEDIUM BRUSHED TIN	3	28
Brand#54	STANDARD BRUSHED COPPER	14	27
Brand#11	STANDARD BRUSHED TIN	23	24
Brand#11	STANDARD BURNISHED BRASS	36	24
Brand#15	MEDIUM ANODIZED NICKEL	3	24

Brand#55	STANDARD PLATED TIN	49	3
----------	---------------------	----	---

(18314 row(s) affected)

/* TPC_H Query 17 - Small-Quantity-Order Revenue */

```
SELECT SUM(L_EXTENDEDPRISE)/7.0 AS AVG_YEARLY FROM LINEITEM, PART
WHERE P_PARTKEY = L_PARTKEY AND P_BRAND = 'Brand#23' AND P_CONTAINER = 'MED BOX'
AND L_QUANTITY < (SELECT 0.2 * AVG(L_QUANTITY) FROM LINEITEM WHERE L_PARTKEY = P_PARTKEY)
```

AVG_YEARLY

348406.054286

(1 row(s) affected)

/* TPC_H Query 18 - Large Volume Customer */

```
SELECT TOP 100 C_NAME, C_CUSTKEY, O_ORDERKEY, O_ORDERDATE, O_TOTALPRICE,
SUM(L_QUANTITY)
FROM CUSTOMER, ORDERS, LINEITEM
WHERE O_ORDERKEY IN (SELECT L_ORDERKEY FROM LINEITEM GROUP BY L_ORDERKEY HAVING
SUM(L_QUANTITY) > 300) AND C_CUSTKEY = O_CUSTKEY AND O_ORDERKEY = L_ORDERKEY
GROUP BY C_NAME, C_CUSTKEY, O_ORDERKEY, O_ORDERDATE, O_TOTALPRICE
ORDER BY O_TOTALPRICE DESC, O_ORDERDATE
```

C_NAME	C_CUSTKEY	O_ORDERKEY	O_ORDERDATE	O_TOTALPRICE
--------	-----------	------------	-------------	--------------

Customer#000128120	128120	4722021	1994-04-07 00:00:00.000	544089.090000	323.000000
Customer#000144617	144617	3043270	1997-02-12 00:00:00.000	530604.440000	317.000000
Customer#000013940	13940	2232932	1997-04-13 00:00:00.000	522720.610000	304.000000
Customer#000066790	66790	2199712	1996-09-30 00:00:00.000	515531.820000	327.000000
Customer#000088703	88703	2995076	1994-01-30 00:00:00.000	363812.120000	302.000000

(57 row(s) affected)

/* TPC_H Query 19 - Discounted Revenue */

```
SELECT SUM(L_EXTENDEDPRISE * (1 - L_DISCOUNT)) AS REVENUE
FROM LINEITEM, PART
WHERE (P_PARTKEY = L_PARTKEY AND P_BRAND = 'Brand#12' AND P_CONTAINER IN ('SM CASE', 'SM BOX',
'SM PACK', 'SM PKG') AND L_QUANTITY >= 1 AND L_QUANTITY <= 1 + 10 AND P_SIZE BETWEEN 1 AND 5
AND L_SHIPMODE IN ('AIR', 'AIR REG') AND L_SHIPINSTRUCT = 'DELIVER IN PERSON')
OR (P_PARTKEY = L_PARTKEY AND P_BRAND = 'Brand#23' AND P_CONTAINER IN ('MED BAG', 'MED BOX',
'MED PKG', 'MED PACK') AND L_QUANTITY >= 10 AND L_QUANTITY <= 10 + 10 AND P_SIZE BETWEEN 1
AND 10 AND L_SHIPMODE IN ('AIR', 'AIR REG') AND L_SHIPINSTRUCT = 'DELIVER IN PERSON') OR
(P_PARTKEY = L_PARTKEY AND P_BRAND = 'Brand#34' AND P_CONTAINER IN ('LG CASE', 'LG BOX',
'LG PACK', 'LG PKG') AND L_QUANTITY >= 20 AND L_QUANTITY <= 20 + 10 AND P_SIZE BETWEEN 1 AND 15
AND L_SHIPMODE IN ('AIR', 'AIR REG') AND L_SHIPINSTRUCT = 'DELIVER IN PERSON')
```

REVENUE

3083843.057800

(1 row(s) affected)

/* TPC_H Query 20 - Potential Part Promotion */

```
SELECT S_NAME, S_ADDRESS FROM SUPPLIER, NATION
WHERE S_SUPPKEY IN ( SELECT PS_SUPPKEY FROM PARTSUPP
  WHERE PS_PARTKEY in (SELECT P_PARTKEY FROM PART WHERE P_NAME like 'forest%') AND
  PS_AVAILQTY (SELECT 0.5 * sum(L_QUANTITY) FROM LINEITEM WHERE L_PARTKEY = PS_PARTKEY AND
  L_SUPPKEY = PS_SUPPKEY AND L_SHIPDATE >= '1994-01-01' AND
  L_SHIPDATE < dateadd(yy,1,'1994-01-01')) AND S_NATIONKEY = N_NATIONKEY AND N_NAME = 'CANADA'
ORDER BY S_NAME
```

S_NAME	S_ADDRESS
Supplier#000000020	iybAE,RmTymrZVYaFZva2SH,j
Supplier#000000091	YV45D7TkfdQanOOZ7q9QxkyGUapU1oOWU6q3
Supplier#000000197	YC2Acon6kjY3zj3Fbxs2k4Vdf7X0cd2F
Supplier#000000226	83qOdU2EYRdPQAQhEtn GRZEEd
Supplier#000000285	Br7e1nnt1yxrw6lmgpJ7YdhFDjuBf
Supplier#000000378	FfbhyCxWvcPrO8ltp9
.	.
Supplier#000009899	7XdpaHrzr1t,UQFZE
Supplier#000009974	7wJ,J5DKcxSU4Kp1cQLpbcAvB5AsvKT

(204 row(s) affected)

/* TPC_H Query 21 - Suppliers Who Kept Orders Waiting */

```
SELECT TOP 100 S_NAME, COUNT(*) AS NUMWAIT
FROM SUPPLIER, LINEITEM L1, ORDERS, NATION WHERE S_SUPPKEY = L1.L_SUPPKEY AND
O_ORDERKEY = L1.L_ORDERKEY AND O_ORDERSTATUS = 'F' AND L1.L_RECEIPTDATE > L1.L_COMMITDATE
AND EXISTS (SELECT * FROM LINEITEM L2 WHERE L2.L_ORDERKEY = L1.L_ORDERKEY
AND L2.L_SUPPKEY <> L1.L_SUPPKEY) AND
NOT EXISTS (SELECT * FROM LINEITEM L3 WHERE L3.L_ORDERKEY = L1.L_ORDERKEY AND
L3.L_SUPPKEY <> L1.L_SUPPKEY AND L3.L_RECEIPTDATE > L3.L_COMMITDATE) AND
S_NATIONKEY = N_NATIONKEY AND N_NAME = 'SAUDI ARABIA'
GROUP BY S_NAME
ORDER BY NUMWAIT DESC, S_NAME
```

S_NAME	NUMWAIT
Supplier#000002829	20
Supplier#000005808	18
Supplier#000000262	17
Supplier#000000496	17
Supplier#000002160	17
.	.
Supplier#000002357	12
Supplier#000002483	12

(100 row(s) affected)

/* TPC_H Query 22 - Global Sales Opportunity */

```
SELECT CNTRYCODE, COUNT(*) AS NUMCUST, SUM(C_ACCTBAL) AS TOTACCTBAL
FROM (SELECT SUBSTRING(C_PHONE,1,2) AS CNTRYCODE, C_ACCTBAL
  FROM CUSTOMER WHERE SUBSTRING(C_PHONE,1,2) IN ('13', '31', '23', '29', '30', '18', '17') AND
  C_ACCTBAL > (SELECT AVG(C_ACCTBAL) FROM CUSTOMER WHERE C_ACCTBAL > 0.00 AND
  SUBSTRING(C_PHONE,1,2) IN ('13', '31', '23', '29', '30', '18', '17')) AND
  NOT EXISTS ( SELECT * FROM ORDERS WHERE O_CUSTKEY = C_CUSTKEY)) AS CUSTSALE
GROUP BY CNTRYCODE
ORDER BY CNTRYCODE
```

CNTRYCODE	NUMCUST	TOTACCTBAL
13	888	6737713.990000
17	861	6460573.720000
18	964	7236687.400000
23	892	6701457.950000
29	948	7158866.630000
30	909	6808436.130000
31	922	6806670.180000

(7 row(s) affected)

Appendix D: Seeds and Query Substitution Parameters

Stream0 Substitution Parameters Seed 706012753	Stream1 Substitution Parameters Seed 706012754
1 101	1 63
2 25 NICKEL MIDDLE EAST	2 23 COPPER ASIA
3 HOUSEHOLD1995-03-29	3 HOUSEHOLD1995-03-17
4 1997-06-01	4 1995-08-01
5 AMERICA 1995-01-01	5 AFRICA 1993-01-01
6 1995-01-01 0.02 25	6 1993-01-01 0.04 24
7 ALGERIA UNITED STATES	7 INDIA FRANCE
8 UNITED STATESAMERICA MEDIUM PLATED TIN	8 FRANCE EUROPE LARGE POLISHED NICKEL
9 indian	9 navajo
10 1993-07-01	10 1994-11-01
11 ETHIOPIA 0.0001000000	11 GERMANY 0.0001000000
12 AIR TRUCK 1993-01-01	12 TRUCK SHIP 1993-01-01
13 unusual packages	13 express packages
14 1993-12-01	14 1994-01-01
15 1995-03-01	15 1994-06-01
16 Brand#45 STANDARD BURNISHED 39 17 8 0 1 29 45 25	16 Brand#54 LARGE ANODIZED 39 3 32 21 33 20 42 40
17 Brand#51 WRAP BAG	17 Brand#43 SM DRUM
18 312	18 314
19 Brand#52 Brand#15 Brand#25 8 20 27	19 Brand#13 Brand#14 Brand#14 5 18 25
20 hot 1993-01-01 VIETNAM	20 misty 1993-01-01 MOZAMBIQUE
21 EGYPT	21 ALGERIA
22 30 19 10 32 11 27 18	22 26 12 19 20 29 21 32

Stream2 Substitution Parameters Seed 706012755	Stream3 Substitution Parameters Seed 706012756
1 71	1 79
2 11 STEEL AFRICA	2 49 NICKEL ASIA
3 BUILDING 1995-03-02	3 HOUSEHOLD1995-03-19
4 1993-05-01	4 1995-12-01
5 AMERICA 1993-01-01	5 ASIA 1993-01-01
6 1993-01-01 0.02 25	6 1993-01-01 0.07 25
7 ALGERIA UNITED KINGDOM	7 PERU MOROCCO
8 UNITED KINGDOM EUROPE LARGE BURNISHED NICKEL	8 MOROCCO AFRICA MEDIUM BRUSHED NICKEL
9 medium	9 lemon
10 1993-08-01	10 1994-05-01
11 SAUDI ARABIA 0.0001000000	11 INDIA 0.0001000000
12 RAIL SHIP 1994-01-01	12 AIR REG AIR 1994-01-01
13 express packages	13 specialrequests
14 1994-04-01	14 1994-07-01
15 1997-01-01	15 1994-10-01
16 Brand#44 PROMO BURNISHED 10 32 36 13 49 1 48 45	16 Brand#24 SMALL POLISHED 17 42 45 11 29 27 15 50
17 Brand#45 LG BAG	17 Brand#42 LG PKG
18 315	18 313
19 Brand#21 Brand#42 Brand#53 10 19 21	19 Brand#23 Brand#25 Brand#53 5 20 28
20 almond 1996-01-01 FRANCE	20 ivory 1994-01-01 VIETNAM
21 PERU	21 INDONESIA
22 10 34 25 33 32 28 12	22 31 17 22 13 34 30 12

Stream4 Substitution Parameters Seed 706012757	Stream5 Substitution Parameters Seed 706012758
1 87 2 37 TIN AFRICA 3 AUTOMOBILE 1995-03-04 4 1993-09-01 5 MIDDLE EAST 1993-01-01 6 1993-01-01 0.05 24 7 INDONESIA GERMANY 8 GERMANY EUROPE MEDIUM PLATED NICKEL 9 indian 10 1993-03-01 11 VIETNAM 0.0001000000 12 SHIP REG AIR 1994-01-01 13 specialrequests 14 1994-11-01 15 1997-05-01 16 Brand#14 LARGE BRUSHED 7 42 18 8 43 29 20 21 17 Brand#44 LG DRUM 18 314 19 Brand#25 Brand#13 Brand#52 1 10 24 20 seashell 1993-01-01 IRAN 21 BRAZIL 22 13 26 16 22 32 10 11	1 95 2 25 COPPER EUROPE 3 FURNITURE 1995-03-21 4 1996-04-01 5 AFRICA 1994-01-01 6 1994-01-01 0.02 25 7 ARGENTINA UNITED STATES 8 UNITED STATES AMERICA MEDIUM ANODIZED NICKEL 9 ghost 10 1993-12-01 11 INDONESIA 0.0001000000 12 FOB REG AIR 1995-01-01 13 specialrequests 14 1995-02-01 15 1995-01-01 16 Brand#44 STANDARD BURNISHED 24 4 11 13 8 40 32 10 17 Brand#41 MED BAG 18 312 19 Brand#32 Brand#41 Brand#41 6 11 20 20 dim 1996-01-01 ALGERIA 21 ROMANIA 22 10 29 15 24 18 17 13

Stream6 Substitution Parameters Seed 706012759	Stream7 Substitution Parameters Seed 706012760
1 103 2 12 STEELAFRICA 3 AUTOMOBILE 1995-03-06 4 1994-01-01 5 AMERICA 1994-01-01 6 1994-01-01 0.07 25 7 CHINAMOZAMBIQUE 8 MOZAMBIQUE AFRICA SMALL POLISHED BRASS 9 drab 10 1994-09-01 11 RUSSIA 0.0001000000 12 MAIL REG AIR 1995-01-01 13 specialrequests 14 1995-05-01 15 1997-08-01 16 Brand#24 MEDIUM PLATED 43 34 17 7 36 12 19 13 17 Brand#43 MED PKG 18 313 19 Brand#34 Brand#34 Brand#45 1 12 28 20 papaya 1995-01-01 MOROCCO 21 IRAQ 22 34 13 18 10 22 15 21	1 111 2 50 BRASS EUROPE 3 FURNITURE 1995-03-23 4 1996-07-01 5 ASIA 1994-01-01 6 1994-01-01 0.05 24 7 IRAN INDIA 8 INDIA ASIA SMALL BURNISHED BRASS 9 cream 10 1993-06-01 11 IRAN 0.0001000000 12 TRUCK AIR 1995-01-01 13 special accounts 14 1995-08-01 15 1995-05-01 16 Brand#14 ECONOMY BRUSHED 12 5 41 35 24 29 37 26 17 Brand#45 MED DRUM 18 315 19 Brand#31 Brand#11 Brand#44 6 13 24 20 blue 1993-01-01 EGYPT 21 CANADA 22 10 26 15 23 18 19 27

Appendix E: Refresh Function Source Code

RF1

```
if exists (select name from sysobjects where name = 'RF1') drop procedure RF1
GO
--
-- Create a stored Refresh Insert procedure which will catch the deadlock
-- victim abort and restart the insert transaction.
--
CREATE PROCEDURE RF1
    @current_execution INTEGER, @insert_sets INTEGER, @parallel_executions INTEGER, @total_executions INTEGER
AS
BEGIN

    DECLARE @startdate DATETIME
    DECLARE @enddate DATETIME
    DECLARE @edate DATETIME
    DECLARE @rangeStart INTEGER
    DECLARE @rangeSize INTEGER
    DECLARE @range INTEGER

    declare @index integer
    declare @div integer
    declare @mod integer
    declare @skip integer
    declare @i integer
    declare @rangeSum integer
    declare @totRangeSize integer
    declare @stmt nchar(1000)
    declare @orderSql nchar(1000)
    declare @liSql nchar(1000)

    set @skip = @total_executions/@parallel_executions
    set @div = (@current_execution - 1)/@parallel_executions
    set @mod = (@current_execution - 1) - @div * @parallel_executions
    set @index = @mod*@skip + @div + 1

    --
    -- Get the range for this execution
    --
    set @stmt = N'select @sdate = dateadd(day,-1,min(O_ORDERDATE)), @edate = max(O_ORDERDATE)
    from NEWORDERS'
    exec sp_executesql @stmt,N'@sdate datetime output, @edate datetime output',@startdate output, @enddate output

    if (@total_executions > @parallel_executions)
    begin
        set @div = (@index-1)/@skip
        set @mod = (@index-1) - @div * @skip
        set @rangeSize = datediff(day, @startdate, @enddate)/@parallel_executions + 1
        set @totRangeSize = @rangeSize
        set @rangeSum = 0
        set @rangeStart = @div * @rangeSize
        set @i = @mod
        while (@i > 0)
        begin
            set @rangeSize = (@totRangeSize - @rangeSum)/2
            set @rangeSum = @rangeSum + @rangeSize
            set @rangeStart = @rangeStart + @rangeSize
            set @insert_sets = @insert_sets/2
            set @i = @i - 1
        end

        if (@mod + 1 = @skip) set @rangeSize = @totRangeSize - @rangeSum
        else
            set @rangeSize = (@totRangeSize - @rangeSum)/2
        if (@rangeSize < 0) set @rangeSize = 0
        if (@insert_sets <= 0) set @insert_sets = 1
        end
    end
else
```

```

begin
set @rangeSize = datediff(day, @startdate, @enddate)/@total_executions
set @rangeStart = @rangeSize * (@index - 1)
end

set @startdate = dateadd(day, @rangeStart, @startdate)
if (@index < @total_executions) set @enddate = dateadd(day, @rangeSize, @startdate)
-- print @startdate
-- print @enddate

SET @range = datediff(day, @startdate, @enddate) / @insert_sets
--
-- This handles the case when the max-min/insert_sets is less than 1
--
IF @range = 0 SET @range = 1
--
-- Loop through the order keys only inserting a sets into the
-- ORDERS and LINTEITEM tables
--
SET @edate = dateadd(day, @range, @startdate)
SET @orderSql = N'insert into ORDERS (O_ORDERKEY, O_CUSTKEY, O_ORDERSTATUS, O_TOTALPRICE, O_ORDERDATE,
O_ORDERPRIORITY, O_CLERK, O_SHIPPRIORITY, O_COMMENT) (select O_ORDERKEY, O_CUSTKEY,
O_ORDERSTATUS, O_TOTALPRICE, O_ORDERDATE, O_ORDERPRIORITY, O_CLERK, O_SHIPPRIORITY,
O_COMMENT from NEWORDERS
where O_ORDERDATE > @startdate AND O_ORDERDATE <= @edate) '
SET @liSql = N'insert into LINEITEM (L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUMBER,L_QUANTITY,
L_EXTENDEDPRICE, L_DISCOUNT, L_TAX, L_RETURNFLAG, L_LINESTATUS,
L_SHIPDATE, L_COMMITDATE, L_RECEIPTDATE, L_SHIPINSTRUCT, L_SHIPMODE, L_COMMENT)
(select L_ORDERKEY,L_PARTKEY,L_SUPPKEY,L_LINENUMBER,L_QUANTITY, L_EXTENDEDPRICE, L_DISCOUNT,
L_TAX, L_RETURNFLAG, L_LINESTATUS, L_SHIPDATE, L_COMMITDATE, L_RECEIPTDATE, L_SHIPINSTRUCT,
L_SHIPMODE, L_COMMENT from NEWLINEITEM, NEWORDERS
where L_ORDERKEY = O_ORDERKEY AND O_ORDERDATE > @startdate AND O_ORDERDATE <= @edate)'

WHILE @startdate < @enddate
BEGIN
INSERT_TRANS:
begin transaction
exec sp_executesql @orderSql, N'@startdate datetime, @edate datetime', @startdate, @edate
if (@@error = 1205)
begin
print 'Insert deadlock - restarting RF2_' + RTRIM(CONVERT(varchar(30),@current_execution)) + ' transaction'
rollback transaction
goto INSERT_TRANS
end
exec sp_executesql @liSql, N'@startdate datetime, @edate datetime', @startdate, @edate
if (@@error = 1205)
begin
print 'Insert deadlock - restarting RF2_' + RTRIM(CONVERT(varchar(30),@current_execution)) + ' transaction'
rollback transaction
goto INSERT_TRANS
end
commit transaction
set @startdate = @edate
set @edate = dateadd(day, @range, @edate)
if (@edate > @enddate)
set @edate = @enddate
END
END
GO

```

RF2

```
if exists (select name from sysobjects where name = 'RF2') drop procedure RF2
GO
```

```
--
-- Create a stored Refresh Delete procedure which will catch the deadlock
-- victim abort and restart the delete transaction.
--
CREATE PROCEDURE RF2
    @current_execution INTEGER, @delete_sets INTEGER, @parallel_executions INTEGER, @total_executions INTEGER
AS
BEGIN

    DECLARE @startdate DATETIME
    DECLARE @enddate DATETIME
    DECLARE @edate DATETIME
    DECLARE @rangeStart INTEGER
    DECLARE @rangeSize INTEGER
    DECLARE @range INTEGER

    declare @index integer
    declare @div integer
    declare @mod integer
    declare @skip integer
    declare @i integer
    declare @rangeSum integer
    declare @totRangeSize integer
    declare @sql nchar(1000)
    declare @orderSql nchar(1000)
    declare @liSql nchar(1000)

    set @skip = @total_executions/@parallel_executions
    set @div = floor((@current_execution-1)/@parallel_executions)
    set @mod = (@current_execution - 1) - @div * @parallel_executions
    set @index = @mod*@skip + @div + 1

    set @sql = N'select @sdate = dateadd(day,-1,min(O_ORDERDATE)), @edate = max(O_ORDERDATE)
        from MOD_OLDORDERS'
    exec sp_executesql @sql,N@sdate datetime output, @edate datetime output,@startdate output, @enddate output

    if (@total_executions > @parallel_executions)
    begin
        set @div = (@index-1)/@skip
        set @mod = (@index-1) - @div * @skip
        set @rangeSize = datediff(day, @startdate, @enddate)/@parallel_executions + 1
        set @totRangeSize = @rangeSize
        set @rangeSum = 0
        set @rangeStart = @div * @rangeSize
        set @i = @mod
        while (@i > 0)
        begin
            set @rangeSize = (@totRangeSize - @rangeSum)/2
            set @rangeSum = @rangeSum + @rangeSize
            set @rangeStart = @rangeStart + @rangeSize
            set @delete_sets = @delete_sets/2
            set @i = @i - 1
        end
        if (@mod + 1 = @skip) -- last allocation set @rangeSize = @totRangeSize - @rangeSum
        else
            set @rangeSize = (@totRangeSize - @rangeSum)/2
        if (@rangeSize < 0) set @rangeSize = 0
        if (@delete_sets <= 0) set @delete_sets = 1
        end
    else
        begin
            set @rangeSize = datediff(day, @startdate, @enddate)/@total_executions
            set @rangeStart = @rangeSize * (@index - 1)
        end

        set @startdate = dateadd(day, @rangeStart, @startdate)
        if (@index < @total_executions) set @enddate = dateadd(day, @rangeSize, @startdate)
```

```

SET @range = datediff(day, @startdate, @enddate) / @delete_sets
--
-- This handles the case when the max-min/delete_sets is less than 1
--
IF @range = 0 SET @range = 1

--
-- Loop through the order keys only deleting sets from orders
-- and lineitem tables
--
SET @edate = dateadd(day, @range, @startdate)
SET @liSql = N'delete from LINEITEM where L_ORDERKEY in (select O_ORDERKEY from MOD_OLDORDERS
    WHERE O_ORDERDATE > @startdate AND O_ORDERDATE <= @edate)'

SET @orderSql = N'delete from ORDERS where O_ORDERKEY in (select O_ORDERKEY from MOD_OLDORDERS
    WHERE O_ORDERDATE > @startdate AND O_ORDERDATE <= @edate)'

WHILE @startdate < @enddate
BEGIN
--
-- Delete from ORDERS and LINEITEM table
--
DELETE_TRANS:
begin transaction

    exec sp_executesql @liSql, N'@startdate datetime, @edate datetime', @startdate, @edate

--
-- If deadlock victim abort then restart the transaction
--
if (@@error = 1205)
begin
    print 'Delete deadlock - restarting RF2_' + RTRIM(CONVERT(varchar(30),@current_execution)) +
'transaction'
    rollback transaction
    goto DELETE_TRANS
end

exec sp_executesql @orderSql, N'@startdate datetime, @edate datetime', @startdate, @edate

--
-- If deadlock victim abort then restart the transaction
--
if (@@error = 1205)
begin
    print 'Delete deadlock - restarting RF2_' + RTRIM(CONVERT(varchar(30),@current_execution)) + 'transaction'
    rollback transaction
    goto DELETE_TRANS
end

commit transaction

set @startdate = @edate
set @edate = dateadd(day, @range, @edate)

if (@edate > @enddate) set @edate = @enddate

END
END
GO

```

Appendix F: Implementation Specific Layer and Source Code

```

VERSION 1.0 CLASS
BEGIN
  MultiUse = -1 True
END
Attribute VB_Name = "cArrConstraints"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cArrConstraints.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Implements an array of
cConstraint objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains additional functions
that determine all the
' constraints for a step, all
constraints in a workspace,
' validation functions, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Private mcarrConstraints As
cNodeCollections

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cArrConstraints."
Public Sub SaveWspConstraints(ByVal
lngWorkspace As Long)
' Calls a procedure to commit all changes
to the constraints
' in the passed in workspace.

Call
mcarrConstraints.Save(lngWorkspace)

End Sub
Public Property Set ConstraintDB(vdata As
Database)

Set mcarrConstraints.NodeDB = vdata

End Property
Public Property Get ConstraintDB() As
Database

Set ConstraintDB =
mcarrConstraints.NodeDB

End Property

Public Sub Modify(cConsToUpdate As
cConstraint)

' Modify the constraint record
Call
mcarrConstraints.Modify(cConsToUpdate)

End Sub

Public Sub
CreateNewConstraintVersion(ByVal lngStepId
As Long, _
ByVal strNewVersion As String, _
ByVal strOldVersion As String, _
ByVal intStepType As Integer)

' Does all the processing needed to create
new versions of
' all the constraints for a given step
' It inserts new constraint records in the
database with
' the new version numbers on them
' It also updates the version number on all
constraints
' for the step in the array to the new version
passed in
' Since it handles both global and
manager/worker steps,
' it checks for the step_id or global_step_id
fields,
' depending on the type of step

Dim lngIndex As Long
Dim cUpdateConstraint As cConstraint

On Error GoTo
CreateNewConstraintVersionErr
mstrSource = mstrModuleName &
"CreateNewConstraintVersion"

' Update the version/global version on
Constraint with the
' passed in step/global step id
For lngIndex = 0 To mcarrConstraints.Count
- 1
Set cUpdateConstraint =
mcarrConstraints(lngIndex)
If intStepType = gintGlobalStep Then
If cUpdateConstraint.GlobalStepId =
lngStepId And _
cUpdateConstraint.IndOperation
<> DeleteOp Then
cUpdateConstraint.GlobalVersionNo
= strNewVersion

' Set the operation to indicate an
insert
cUpdateConstraint.IndOperation =
InsertOp
End If
Else
If cUpdateConstraint.StepId =
lngStepId And _
cUpdateConstraint.IndOperation
<> DeleteOp Then
cUpdateConstraint.VersionNo =
strNewVersion

' Set the operation to indicate an
insert
cUpdateConstraint.IndOperation =
InsertOp
End If
End If
Next lngIndex

Exit Sub
CreateNewConstraintVersionErr:
LogErrors Errors

gstrSource = mstrModuleName &
"CreateNewConstraintVersion"
On Error GoTo 0
Err.Raise vbObjectError +
errCreateNewConstraintVersionFailed, _
mstrSource, _

LoadResString(errCreateNewConstraintVersionFail
ed)

End Sub
Private Sub Class_Initialize()

Set mcarrConstraints = New cNodeCollections
BugMessage "cArrConstraints: Initialize event -
setting Constraint count to 0"

End Sub

Private Sub Class_Terminate()

Set mcarrConstraints = Nothing
BugMessage "cArrConstraints: Terminate event
triggered"

End Sub

Public Sub Add(ByVal cConstraintToAdd As
cConstraint)

Set cConstraintToAdd.NodeDB =
mcarrConstraints.NodeDB

' Retrieve a unique constraint identifier
cConstraintToAdd.ConstraintId =
cConstraintToAdd.NextIdentifier

' Call a procedure to load the constraint record in
the array
Call mcarrConstraints.Add(cConstraintToAdd)

End Sub
Public Sub Delete(ByVal cOldConstraint As
cConstraint)

Dim lngDeleteElement As Long
Dim cConsToDelete As cConstraint

lngDeleteElement =
QueryConstraintIndex(cOldConstraint.ConstraintId)
Set cConsToDelete =
mcarrConstraints(lngDeleteElement)

Call
mcarrConstraints.Delete(cConsToDelete.Position)

Set cConsToDelete = Nothing

End Sub
Private Function
QueryConstraintIndex(lngConstraintId As Long) _
As Long

Dim lngIndex As Integer

' Find the element in the array to be deleted
For lngIndex = 0 To mcarrConstraints.Count - 1

' Note: The constraint id is not a primary key
field in

```

```

' the database - there can be multiple
records with the
' same constraint_id but for different
versions of a step
' However, since we'll always load the
constraint information
' for the latest version of a step, we'll
have just one
' constraint record with a given
constraint_id
If
mcarrConstraints(IngIndex).ConstraintId =
IngConstraintId Then
    QueryConstraintIndex = IngIndex
    Exit Function
End If

Next IngIndex

' Raise error that Constraint has not been
found
ShowError errConstraintNotFound
On Error GoTo 0
Err.Raise vbObjectError +
errConstraintNotFound, mstrSource, _
    LoadResString(errConstraintNotFound)

End Function

Public Function QueryConstraint(ByVal
IngConstraintId As Long) _
    As cConstraint

' Returns a cConstraint object with the
property values
' corresponding to the Constraint
Identifier, IngConstraintId

Dim IngQueryElement As Long

IngQueryElement =
QueryConstraintIndex(IngConstraintId)

' Set the return value to the queried
Constraint
Set QueryConstraint =
mcarrConstraints(IngQueryElement)

End Function

Public Sub LoadConstraints(ByVal
IngWorkspaceId As Long, rstStepsInWsp
As Recordset)

' Loads the constraints array with all the
constraints
' for the workspace
Dim recConstraints As Recordset
Dim qyCons As DAO.QueryDef
Dim strSql As String
Dim dtStart As Date

On Error GoTo LoadConstraintsErr
mstrSource = mstrModuleName &
"LoadConstraints"

If rstStepsInWsp.RecordCount = 0 Then
    Exit Sub
End If

' First check if the database object has
been set
If mcarrConstraints.NodeDB Is Nothing
Then
    On Error GoTo 0

```

```

Err.Raise vbObjectError +
errSetDBBeforeLoad, _
    mstrSource, _

LoadResString(errSetDBBeforeLoad)
End If

dtStart = Now

' Select based on the global step id since
there might
' be constraints for a global step that run are
executed
' for the workspace
' This method has the advantage that if the
steps are queried right, everything else follows
strSql = "Select a.constraint_id, a.step_id,
a.version_no, " & _
    " a.constraint_type, a.global_step_id,
a.global_version_no, " & _
    " a.sequence_no, b.workspace_id " & _
    " from step_constraints a, att_steps b " &
_
    " where a.global_step_id = b.step_id " &
_
    " and a.global_version_no = b.version_no
" & _
    " and a.global_step_id = [g_s_id] " & _
    " and a.global_version_no = [g_ver_no] "
& _
    " and b.archived_flag = [archived] "

' Find the highest X-component of the
version number
strSql = strSql & " AND ( a.step_id = 0 or (
cint( mid( a.version_no, 1, instr( a.version_no,
" & gstrDQ & gstrVerSeparator & gstrDQ & "
) - 1 ) ) = " & _
    " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) ) " & _
    " from att_steps AS d " & _
    " WHERE a.step_id = d.step_id " & _
    " and d.archived_flag = [archived] ) "

' Find the highest Y-component of the
version number for the highest X-component
strSql = strSql & " AND cint( mid(
a.version_no, instr( a.version_no, " & gstrDQ
& gstrVerSeparator & gstrDQ & " ) + 1 ) ) = "
& _
    " ( select max( cint( mid( version_no,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) + 1 ) ) ) " &
_
    " from att_steps AS y " & _
    " Where a.step_id = y.step_id " & _
    " AND cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) = " & _
    " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) ) " & _
    " from att_steps AS c " & _
    " WHERE y.step_id = c.step_id " & _
    " and c.archived_flag = [archived] ) ) ) "

' Order the constraints by sequence within a
given step
strSql = strSql & " order by a.sequence_no "

Set qyCons =
mcarrConstraints.NodeDB.CreateQueryDef(gst
rEmptyString, strSql)

```

```

qyCons.Parameters("archived").Value = False

rstStepsInWsp.MoveFirst

While Not rstStepsInWsp.EOF

    If Not (rstStepsInWsp!global_flag) Then
        qyCons.Close
        BugMessage "Query constraints Read +
load took: " & CStr(DateDiff("s", dtStart, Now))
        Exit Sub
    End If

    qyCons.Parameters("g_s_id").Value =
rstStepsInWsp!step_id
    qyCons.Parameters("g_ver_no").Value =
rstStepsInWsp!version_no

    Set recConstraints =
qyCons.OpenRecordset(dbOpenSnapshot)

    Call
LoadRecordsetInConstraintArray(recConstraints)
recConstraints.Close

    rstStepsInWsp.MoveNext
Wend

qyCons.Close
BugMessage "Query constraints Read + load
took: " & CStr(DateDiff("s", dtStart, Now))

Exit Sub

LoadConstraintsErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadConstraints"
On Error GoTo 0
Err.Raise vbObjectError + errLoadDataFailed, _
    mstrSource, _
    LoadResString(errLoadDataFailed)

End Sub

Public Sub UnloadStepConstraints(ByVal IngStepId
As Long)

' Unloads all the constraints for the workspace
from
' the constraints array

Dim IngIndex As Long

' Find all constraints in the array with a matching
step id
' It is important to step in reverse order through
the array,
' since we delete constraint records!
For IngIndex = mcarrConstraints.Count - 1 To 0
Step -1
    If mcarrConstraints(IngIndex).GlobalStepId =
IngStepId Then

        ' Unload the constraint from the array
        Call mcarrConstraints.Unload(IngIndex)

    End If
Next IngIndex

End Sub

Public Sub UnloadConstraint(cOldConstraint As
cConstraint)
' Unloads the constraint from the constraints array

Dim IngDeleteElement As Long

```

```

    lngDeleteElement =
QueryConstraintIndex(cOldConstraint.ConstraintId)

    Call
m carrConstraints.Unload(lngDeleteElement)

End Sub
Private Sub
LoadRecordsetInConstraintArray(ByVal
recConstraints As Recordset)
' Loads all the constraint records in the
passed in
' recordset into the array

Dim cNewConstraint As cConstraint

On Error GoTo
LoadRecordsetInConsArrayErr
mstrSource = mstrModuleName &
"LoadRecordsetInConstraintArray"

If recConstraints.RecordCount = 0 Then
Exit Sub
End If

recConstraints.MoveFirst
While Not recConstraints.EOF
Set cNewConstraint = New cConstraint

' Initialize Constraint values
cNewConstraint.ConstraintId =
CLng(ErrorOnNullField(recConstraints,
"Constraint_id"))
cNewConstraint.StepId =
CLng(ErrorOnNullField(recConstraints,
"step_id"))
cNewConstraint.VersionNo =
CStr(ErrorOnNullField(recConstraints,
"version_no"))

cNewConstraint.GlobalStepId =
CLng(ErrorOnNullField(recConstraints,
"global_step_id"))
cNewConstraint.GlobalVersionNo =
CStr(ErrorOnNullField(recConstraints,
"global_version_no"))
cNewConstraint.SequenceNo =
CInt(ErrorOnNullField(recConstraints,
"sequence_no"))

cNewConstraint.WorkspaceId =
CLng(ErrorOnNullField(recConstraints,
FLD_ID_WORKSPACE))
cNewConstraint.ConstraintType =
CInt(ErrorOnNullField(recConstraints,
"constraint_type"))

' Add this record to the array of
Constraints
m carrConstraints.Load cNewConstraint

Set cNewConstraint = Nothing
recConstraints.MoveNext
Wend

Exit Sub

LoadRecordsetInConsArrayErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadRecordsetInConstraintArray"
On Error GoTo 0

Err.Raise vbObjectError +
errLoadRsInArrayFailed, _
mstrSource, _

LoadResString(errLoadRsInArrayFailed)

End Sub

Public Function ConstraintsForStep( _
ByVal lngStepId As Long, _
ByVal strVersionNo As String, _
Optional ByVal intConstraintType As
ConstraintType = 0, _
Optional ByVal blnSort As Boolean =
True, _
Optional ByVal blnGlobal As Boolean =
False, _
Optional ByVal
blnGlobalConstraintsOnly As Boolean = False)
As Variant

' Returns a variant containing an array of
cConstraint objects,
' containing all the constraints that have been
defined for the
' given step. If the Global flag is set to true,
the
' search will be made for all the constraints
that have
' a matching global_step_id

Dim lngIndex As Long
Dim cStepConstraint() As cConstraint
Dim lngConstraintCount As Long
Dim cTempConstraint As cConstraint

On Error GoTo ConstraintsForStepErr
mstrSource = mstrModuleName &
"ConstraintsForStep"

lngConstraintCount = 0

' Find each element in the constraints array
For lngIndex = 0 To m carrConstraints.Count
- 1
' If a constraint type has been specified
then check
' if the constraint type for the record
matches the
' passed in type
Set cTempConstraint =
m carrConstraints(lngIndex)
If Not blnGlobal Then
If cTempConstraint.StepId = lngStepId
And _
cTempConstraint.VersionNo =
strVersionNo And _
cTempConstraint.IndOperation <>
DeleteOp And _
(intConstraintType = 0 Or _
cTempConstraint.ConstraintType
= intConstraintType) Then
' We have a matching constraint for
the given step
AddArrayElement cStepConstraint, _
cTempConstraint,
lngConstraintCount
End If
Else
If cTempConstraint.GlobalStepId =
lngStepId And _
cTempConstraint.GlobalVersionNo =
strVersionNo And _
cTempConstraint.IndOperation <>
DeleteOp Then
If blnGlobalConstraintsOnly = False Or _
(blnGlobalConstraintsOnly And _
cTempConstraint.StepId = 0 And _
cTempConstraint.VersionNo =
gstrMinVersion) Then

' We have a matching constraint for the
global step
AddArrayElement cStepConstraint, _
cTempConstraint,
lngConstraintCount
End If
End If
End If

Next lngIndex

' Set the return value of the function to the array
of
' constraints that has been built above
If lngConstraintCount = 0 Then
ConstraintsForStep = Empty
Else
ConstraintsForStep = cStepConstraint()
End If

' Sort the constraints
If blnSort Then
Call QuickSort(ConstraintsForStep)
End If

Exit Function

ConstraintsForStepErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errConstraintsForStepFailed, _
mstrSource, _

LoadResString(errConstraintsForStepFailed)

End Function
Private Sub AddArrayElement(ByRef arrNodes()
As cConstraint, _
ByVal objToAdd As cConstraint, _
ByRef lngCount As Long)
' Adds the passed in object to the array

' Increase the array dimension and add the object
to it
ReDim Preserve arrNodes(lngCount)
Set arrNodes(lngCount) = objToAdd
lngCount = lngCount + 1

End Sub

Public Function ConstraintsForWsp( _
ByVal lngWorkspaceId As Long, _
Optional ByVal intConstraintType As Integer
= 0, _
Optional ByVal blnSort As Boolean = True, _
Optional ByVal blnGlobalConstraintsOnly As
Boolean = False) _
As Variant

' Returns a variant containing an array of
cConstraint objects,
' containing all the constraints that have been
defined for the
' given workspace.

Dim lngIndex As Long

```



```

Dim cWspConstraint() As cConstraint
Dim lngConstraintCount As Long
Dim cTempConstraint As cConstraint

On Error GoTo ConstraintsForWspErr
mstrSource = mstrModuleName &
"ConstraintsForWsp"

    lngConstraintCount = 0

    ' Find each element in the constraints
    array
    For lngIndex = 0 To
mccarrConstraints.Count - 1
        ' If a constraint type has been specified
        then check
        ' if the constraint type for the record
        matches the
        ' passed in type
        Set cTempConstraint =
mccarrConstraints(lngIndex)
        If cTempConstraint.WorkspaceId =
lngWorkspaceId And _
            cTempConstraint.IndOperation <>
DeleteOp And _
            (intConstraintType = 0 Or _
            cTempConstraint.ConstraintType
= intConstraintType) Then

                If blnGlobalConstraintsOnly = False
Or _
                    (blnGlobalConstraintsOnly And
                    _
                    cTempConstraint.StepId = 0
And _
                    cTempConstraint.VersionNo =
gstrMinVersion) Then

                        ' We have a matching constraint
                        for the workspace
                        AddArrayElement
                        cWspConstraint, _
                        cTempConstraint,
                        lngConstraintCount
                        End If
                        End If
                        Next lngIndex

                    ' Set the return value of the function to the
                    array of
                    ' constraints that has been built above
                    If lngConstraintCount = 0 Then
                        ConstraintsForWsp = Empty
                    Else
                        ConstraintsForWsp = cWspConstraint()
                    End If

                    ' Sort the constraints
                    If blnSort Then
                        Call QuickSort(ConstraintsForWsp)
                    End If

                Exit Function

ConstraintsForWspErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError +
errConstraintsForWspFailed, _
        mstrSource, _

LoadResString(errConstraintsForWspFailed
)

End Function

```

```

Public Function PreConstraintsForStep( _
    ByVal lngStepId As Long, _
    ByVal strVersionNo As String, _
    Optional ByVal blnSort As Boolean) As
Variant

    ' Returns a variant containing an array of
    cConstraint objects,
    ' containing all the pre-execution constraints
    that have
    ' been defined for the given step_id and
    version

    ' Call a function that will return a variant
    containing
    ' all the constraints of the passed in type
    PreConstraintsForStep =
ConstraintsForStep(lngStepId, _
    strVersionNo, gintPreStep, blnSort)

End Function

Public Function PostConstraintsForStep( _
    ByVal lngStepId As Long, _
    ByVal strVersionNo As String, _
    Optional ByVal blnSort As Boolean) As
Variant

    ' Returns a variant containing an array of
    cConstraint objects,
    ' containing all the Post-execution
    constraints that have
    ' been defined for the given step_id and
    version

    ' Call a function that will return a variant
    containing
    ' all the constraints of the passed in type
    PostConstraintsForStep =
ConstraintsForStep(lngStepId, _
    strVersionNo, gintPostStep, blnSort)

End Function

Public Function PostConstraintsForWsp( _
    ByVal lngWorkspaceId As Long, _
    Optional ByVal blnSort As Boolean) As
Variant

    ' Returns a variant containing an array of
    cConstraint objects,
    ' containing all the Post-execution globals
    that have
    ' been defined for the workspace

    ' Call a function that will return a variant
    containing
    ' all the constraints of the passed in type
    PostConstraintsForWsp =
ConstraintsForWsp(lngWorkspaceId, _
    gintPostStep, blnSort, True)

End Function

Public Function PreConstraintsForWsp( _
    ByVal lngWorkspaceId As Long, _
    Optional ByVal blnSort As Boolean) As
Variant

    ' Returns a variant containing an array of
    cConstraint objects,
    ' containing all the Pre-execution globals that
    have
    ' been defined for the workspace

    ' Call a function that will return a variant
    containing
    ' all the constraints of the passed in type

```

```

PreConstraintsForWsp =
ConstraintsForWsp(lngWorkspaceId, _
    gintPreStep, blnSort, True)

End Function

Public Property Get ConstraintCount() As Long

    ConstraintCount = mccarrConstraints.Count

End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cArrParameters"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cArrParameters.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Implements an array of cParameter
objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains additional functions to
determine parameter
' values, validation functions, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mccarrParameters As cNodeCollections

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cArrParameters."

Public Sub InitBuiltInsForRun(IWspId As Long,
IRunId As Long)

    Dim cParamRec As cParameter

    ' Initialize the values of the run_id and output_dir
    built-in parameters and save them
    ' to the database
    Set cParamRec = GetParameterValue(IWspId,
PARAM_RUN_ID)
    cParamRec.ParameterValue = CStr(IRunId)
    Call Modify(cParamRec)

    Set cParamRec = GetParameterValue(IWspId,
PARAM_OUTPUT_DIR)
    cParamRec.ParameterValue =
GetDefaultDir(IWspId, Me)
    cParamRec.ParameterValue =
cParamRec.ParameterValue & gstrFileSeparator &
CStr(IRunId)
    Call Modify(cParamRec)

    Call SaveParametersInWsp(IWspId)

End Sub

```

```

Public Property Set ParamDatabase(vdata
As Database)

    Set mcarrParameters.NodeDB = vdata

End Property
Public Sub Modify(cModifiedParam As
cParameter)

    ' First check if the parameter record is
valid
    Call
    CheckDupParamName(cModifiedParam)

    Call
    mcarrParameters.Modify(cModifiedParam)

End Sub
Public Sub Load(ByRef cParamToAdd As
cParameter)

    Call
    mcarrParameters.Load(cParamToAdd)

End Sub
Public Sub Add(ByRef cParamToAdd As
cParameter)

    Set cParamToAdd.NodeDB =
    mcarrParameters.NodeDB

    ' First check if the parameter record is
valid
    Call Validate(cParamToAdd)

    ' Retrieve a unique parameter identifier
    cParamToAdd.ParameterId =
    cParamToAdd.NextIdentifier

    Call
    mcarrParameters.Add(cParamToAdd)

End Sub

Public Sub Unload(IngParamToDelete As
Long)

    Dim IngDeleteElement As Long

    IngDeleteElement =
    QueryIndex(IngParamToDelete)

    Call
    mcarrParameters.Unload(IngDeleteElement)

End Sub

Public Sub SaveParametersInWsp(ByVal
IngWorkspace As Long)
    ' Calls a procedure to commit all changes
to the parameters
    ' for the passed in workspace.

    ' Call a procedure to save all parameter
records for the
    ' workspace
    Call
    mcarrParameters.Save(IngWorkspace)

End Sub
Public Function GetParameterValue(ByVal
IngWorkspace As Long, _
ByVal strParamName As String) As
cParameter

```

```

' Returns the value for the passed in
workspace parameter

Dim cParamRec As cParameter
Dim lngIndex As Long

On Error GoTo GetParameterValueErr

' Find all parameters in the array with a
matching workspace id
For lngIndex = 0 To mcarrParameters.Count
- 1
    Set cParamRec =
    mcarrParameters(lngIndex)
    If cParamRec.WorkspaceId =
    lngWorkspace And _
        cParamRec.ParameterName =
        strParamName Then

        Set GetParameterValue = cParamRec
        Exit For
    End If
Next lngIndex

If lngIndex > mcarrParameters.Count - 1
Then
    ' The parameter has not been defined for
the workspace
    ' Raise an error
    On Error GoTo 0
    Err.Raise vbObjectError +
    errParamNameInvalid, _
        mstrModuleName &
        "GetParameterValue", _
LoadResString(errParamNameInvalid)
End If

Exit Function

GetParameterValueErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
gstrSource = mstrModuleName &
"GetParameterValue"
On Error GoTo 0
Err.Raise vbObjectError +
errGetParamValueFailed, _
    gstrSource, _
LoadResString(errGetParamValueFailed)

End Function
Public Sub Delete(IngParamToDelete As
Long)

    ' Delete the passed in parameter

    Dim IngDeleteElement As Long

    IngDeleteElement =
    QueryIndex(IngParamToDelete)
    Call
    mcarrParameters.Delete(IngDeleteElement)

End Sub
Private Function QueryIndex(IngParameterId
As Long) As Long

    Dim lngIndex As Long

    ' Find the matching parameter record in the
array
    For lngIndex = 0 To mcarrParameters.Count
- 1

```

```

    If mcarrParameters(lngIndex).ParameterId =
    lngParameterId And _
        mcarrParameters(lngIndex).IndOperation
    <> DeleteOp Then
        QueryIndex = lngIndex
        Exit Function
    End If
Next lngIndex

' Raise error that parameter has not been found
On Error GoTo 0
Err.Raise vbObjectError + errParamNotFound,
"c ArrParameters.QueryIndex", _
    LoadResString(errParamNotFound)

End Function

Public Function QueryParameter(IngParameterId
As Long) _
As cParameter

    Dim lngQueryElement As Long

    lngQueryElement = QueryIndex(IngParameterId)

    ' Return the queried parameter object
    Set QueryParameter =
    mcarrParameters(lngQueryElement)

End Function
Public Property Get ParameterCount() As Long

    ParameterCount = mcarrParameters.Count

End Property
Public Property Get Item(IngIndex As Long) As
cParameter
Attribute Item.VB_UserMemId = 0

    Set Item = mcarrParameters(IngIndex)

End Property

Public Sub Validate(ByVal cParamToValidate As
cParameter)
    ' This procedure is necessary since the class
cannot validate
    ' all the parameter properties on it's own. This is
'coz we
    ' might have created new parameters in the
workspace, but not
    ' saved them to the database yet - hence the
duplicate check
    ' has to be repeated in the array

    Dim lngIndex As Long
    Dim cTempParam As cParameter

    On Error GoTo ValidateErr

    ' Check if the parameter name already exists in
the workspace
    For lngIndex = 0 To mcarrParameters.Count - 1
        Set cTempParam = mcarrParameters(lngIndex)
        If cTempParam.WorkspaceId =
        cParamToValidate.WorkspaceId And _
            cTempParam.ParameterName =
            cParamToValidate.ParameterName And _
                cTempParam.IndOperation <> DeleteOp
        Then
            On Error GoTo 0
            Err.Raise vbObjectError +
            errDuplicateParameterName, _
                mstrSource,
                LoadResString(errDuplicateParameterName)

```

```

    End If
    Next lngIndex

    Exit Sub

ValidateErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"Validate"
    On Error GoTo 0
    Err.Raise vbObjectError +
errValidateFailed, _
    mstrSource,
LoadResString(errValidateFailed)

End Sub
Public Sub CheckDupParamName(ByVal
cParamToValidate As cParameter)

    Dim lngIndex As Long
    Dim cTempParam As cParameter

    ' Check if the parameter name already
exists in the workspace
    For lngIndex = 0 To
mcarrParameters.Count - 1
        Set cTempParam =
mcarrParameters(lngIndex)
        If cTempParam.WorkspaceId =
cParamToValidate.WorkspaceId And _
            cTempParam.ParameterName =
cParamToValidate.ParameterName And _
            cTempParam.ParameterId <>
cParamToValidate.ParameterId And _
            cTempParam.IndOperation <>
DeleteOp Then
            ShowError
errDuplicateParameterName
            On Error GoTo 0
            Err.Raise vbObjectError +
errDuplicateParameterName, _
            mstrSource,
LoadResString(errDuplicateParameterName
)
        End If
    Next lngIndex

End Sub

Private Sub Class_Initialize()

    'bugmessage "cArrParameters: Initialize
event - setting parameter count to 0"
    Set mcarrParameters = New
cNodeCollections

End Sub

Private Sub Class_Terminate()

    Set mcarrParameters = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cArrSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cArrSteps.cls
' Microsoft TPC-H Kit Ver. 1.00

```

```

' Copyright Microsoft, 1999
' All Rights Reserved
'
'
' PURPOSE: Implements an array of cStep
objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains additional functions to
update parent version
' on substeps, validation functions, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcarrSteps As cNodeCollections

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cArrSteps."

Public Sub Unload(lngStepToDelete As Long)

    Dim lngDeleteElement As Long
    Dim cUnloadStep As cStep

    lngDeleteElement =
QueryStepIndex(lngStepToDelete)
    Set cUnloadStep =
QueryStep(lngStepToDelete)

    ' First unload all iterators for the step
    Call cUnloadStep.UnloadIterators

    ' Unload the step from the collection
    Call mcarrSteps.Unload(lngDeleteElement)

End Sub
Public Sub Modify(cModifiedStep As cStep)

    Dim iAppend As Integer
    Dim sLabel As String

    On Error GoTo ModifyErr

    iAppend = 0
    sLabel = cModifiedStep.StepLabel

    Validate cModifiedStep

    Call mcarrSteps.Modify(cModifiedStep)

    Exit Sub

ModifyErr:
    ' If the error raised by the add function is due
to a duplication
    ' of the step label, then try to generate a
unique label
    If Err.Number - vbObjectError =
errStepLabelUnique Then
        iAppend = iAppend + 1
        cModifiedStep.StepLabel = sLabel &
CStr(iAppend)
        ' Try to insert the step record again
        Resume
    End If

    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0

```

```

Err.Raise vbObjectError + errModifyStepFailed,
-
    gstrSource, _
    LoadResString(errModifyStepFailed)

End Sub
Public Sub UpdateParentVersion(ByVal lngStepId
As Long, _
    ByVal strNewVersion As String, _
    ByVal strOldVersion As String, _
    ByVal intStepType As Integer)

    ' Does all the processing needed to update the
parent version
    ' number on all the sub-steps for a given step
    ' It updates the parent version no in the database
for all
    ' sub-steps of the passed in step id
    ' It also updates the parent version number on all
sub-steps
    ' in the array to the new version passed in

    Dim lngIndex As Long
    Dim cUpdateStep As cStep

    On Error GoTo UpdateParentVersionErr

    If intStepType <> gintManagerStep Then
        ' Only a manager can have sub-steps - if the
passed
        ' in step is not a manager, exit
        Exit Sub
    End If

    ' For all steps in the array
    For lngIndex = 0 To mcarrSteps.Count - 1

        Set cUpdateStep = mcarrSteps(lngIndex)

        ' If the current step is a sub-step of the passed
in step
        If cUpdateStep.ParentStepId = lngStepId And
-
            cUpdateStep.ParentVersionNo =
strOldVersion And _
            Not cUpdateStep.ArchivedFlag Then

            ' Update the parent version number for the
sub-step
            ' in the array
            cUpdateStep.ParentVersionNo =
strNewVersion

            ' Update the parent version number for the
sub-step
            ' in the array
            Call Modify(cUpdateStep)

        End If
    Next lngIndex

    Exit Sub

UpdateParentVersionErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"UpdateParentVersion"
    On Error GoTo 0
    Err.Raise vbObjectError +
errUpdateParentVersionFailed, _
    mstrSource, _

LoadResString(errUpdateParentVersionFailed)

End Sub

```

```

Private Sub Validate(cCheckStep As cStep)
    ' Step validations that depend on other
    steps in the collection

    Dim lngIndex As Long

    ' Ensure that the step label is unique in the
    workspace
    For lngIndex = 0 To mcarrSteps.Count - 1

        ' If the current step is a sub-step of the
        passed in step
        If mcarrSteps(lngIndex).WorkspaceId
        = cCheckStep.WorkspaceId And _
        mcarrSteps(lngIndex).StepLabel =
        cCheckStep.StepLabel And _
        mcarrSteps(lngIndex).StepId <>
        cCheckStep.StepId And _

mcarrSteps(lngIndex).IndOperation <>
DeleteOp Then
        On Error GoTo 0
        Err.Raise vbObjectError +
        errStepLabelUnique, _
        mstrModuleName &
        "Validate", _

LoadResString(errStepLabelUnique)
        End If
        Next lngIndex

    End Sub

    Public Sub ValidateStep(cCheckStep As
    cStep)

        On Error GoTo ValidateStepErr

        ' Public wrapper for Validate function (2
        many Validates)
        Call Validate(cCheckStep)

        Exit Sub

    ValidateStepErr:
        ShowError errStepLabelUnique
        On Error GoTo 0
        Err.Raise vbObjectError +
        errValidateFailed, _
        gstrSource, _
        LoadResString(errValidateFailed)
    End Sub

    Private Sub Class_Initialize()

        BugMessage "cArrSteps: Initialize event -
        setting step count to 0"
        Set mcarrSteps = New cNodeCollections

    End Sub

    Private Sub Class_Terminate()

        BugMessage "cArrSteps: Terminate event
        triggered"
        Set mcarrSteps = Nothing

    End Sub

    Public Sub Add(ByVal cStepToAdd As
    cStep)

        Dim iAppend As Integer
        Dim sLabel As String

```

```

        On Error GoTo AddErr

        iAppend = 0
        sLabel = cStepToAdd.StepLabel

        Set cStepToAdd.NodeDB =
        mcarrSteps.NodeDB

        ' Retrieve a unique step identifier
        cStepToAdd.StepId =
        cStepToAdd.NextStepId

        Validate cStepToAdd

        ' Call a procedure to add the step record
        Call mcarrSteps.Add(cStepToAdd)

        ' Call a procedure to add all iterators for the
        step
        cStepToAdd.AddAllIterators

        Exit Sub

    AddErr:
        ' If the error raised by the add function is due
        to a duplication
        ' of the step label, then try to generate a
        unique label
        If Err.Number - vbObjectError =
        errStepLabelUnique Then
            iAppend = iAppend + 1
            cStepToAdd.StepLabel = sLabel &
            CStr(iAppend)
            ' Try to insert the step record again
            Resume
        End If

        ' Log the error code raised by Visual Basic
        Call LogErrors(Errors)
        On Error GoTo 0
        Err.Raise vbObjectError +
        errInsertStepFailed, _
        gstrSource, _
        LoadResString(errInsertStepFailed)

    End Sub

    Public Sub Load(cStepToLoad As cStep)

        Call mcarrSteps.Load(cStepToLoad)

    End Sub

    Public Sub SaveStepsInWsp(ByVal
    lngWorkspace As Long)
        ' Calls a procedure to commit all changes to
        the steps
        ' in the passed in workspace.

        Dim lngIndex As Integer

        ' Find all steps in the array with a matching
        workspace id
        ' It is important to step in reverse order
        through the array,
        ' since we delete step records sometimes!
        For lngIndex = mcarrSteps.Count - 1 To 0
        Step - 1
            If mcarrSteps(lngIndex).WorkspaceId =
            lngWorkspace Then

                ' Call a procedure to commit all
                changes to the
                ' Step record, if any
                Call
                CommitStep(mcarrSteps(lngIndex), lngIndex)

```

```

        End If
        Next lngIndex

    End Sub

    Private Sub CommitStep(ByVal cCommitStep As
    cStep, _
        ByVal intIndex As Integer)
        ' This procedure checks if any changes have been
        made to the
        ' passed in Step. If so, it calls the step methods to
        commit
        ' the changes.

        ' First commit all changes to the iterator records
        for
        ' the step
        cCommitStep.SaveIterators

        Call mcarrSteps.Commit(cCommitStep, intIndex)

    End Sub

    Public Sub Delete(lngStepToDelete As Long)

        Dim lngDeleteElement As Long

        lngDeleteElement =
        QueryStepIndex(lngStepToDelete)
        Call mcarrSteps.Delete(lngDeleteElement)

    End Sub

    Public Function QueryStepIndex(lngStepId As
    Long) As Long

        Dim lngIndex As Long

        ' Find the element in the array that corresponds to
        the
        ' passed in step id - note that while there will be
        multiple
        ' versions of a step in the database, only one
        version will
        ' be currently loaded in the array - meaning that
        the stepid
        ' is enough to uniquely identify a step
        For lngIndex = 0 To mcarrSteps.Count - 1
            If mcarrSteps(lngIndex).StepId = lngStepId
            Then
                QueryStepIndex = lngIndex
                Exit Function
            End If
        Next lngIndex

        ' Raise error that step has not been found
        On Error GoTo 0
        Err.Raise vbObjectError + errStepNotFound,
        mstrSource, _
        LoadResString(errStepNotFound)

    End Function

    Public Function QueryStep(ByVal lngStepId As
    Long) As cStep

        ' Populates the passed in cStep object with the
        property
        ' values corresponding to the Step Identifier,
        lngStepId

        Dim lngQueryElement As Integer

        lngQueryElement = QueryStepIndex(lngStepId)

        ' Initialize the passed in step object to the queried
        step

```

```

Set QueryStep =
mcarrSteps(IngQueryElement)

End Function
Public Property Get Item(ByVal Position As
Long) As cStep
Attribute Item.VB_UserMemId = 0

' Returns the element at the passed in
position in the array
If Position >= 0 And Position <
mcarrSteps.Count Then
Set Item = mcarrSteps(Position)
Else
On Error GoTo 0
Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _

LoadResString(errItemDoesNotExist)
End If

End Property
Public Property Set Item(ByVal Position As
Long, _
ByVal cStepRec As cStep)

' Returns the element at the passed in
position in the array
If Position >= 0 And Position <
mcarrSteps.Count Then
Set mcarrSteps(Position) = cStepRec
Else
On Error GoTo 0
Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _

LoadResString(errItemDoesNotExist)
End If

End Property
Public Property Set StepDB(vdata As
Database)

Set mcarrSteps.NodeDB = vdata

End Property
Public Function SubSteps(ByVal IngStepId
As Long, _
ByVal strVersionNo As String) As
Variant

' Returns a variant containing an array of
all the substeps
' for the passed in step

Dim intIndex As Integer
Dim cSubSteps() As cStep
Dim lngStepCount As Long
Dim cQueryStep As cStep

On Error GoTo SubStepsErr

lngStepCount = 0

Set cQueryStep = QueryStep(IngStepId)

' Only a manager can have sub-steps
If cQueryStep.StepType =
gintManagerStep Then

' For each element in the Steps array
For intIndex = 0 To mcarrSteps.Count -
1
' Check if the parent step id and
parent version number

```

```

' match the passed in step
If mcarrSteps(intIndex).ParentStepId =
IngStepId And _

mcarrSteps(intIndex).ParentVersionNo =
strVersionNo And _

mcarrSteps(intIndex).IndOperation <>
DeleteOp Then

' Increase the array dimension and
add the step
' to it
ReDim Preserve
cSubSteps(IngStepCount)
Set cSubSteps(IngStepCount) =
mcarrSteps(intIndex)
lngStepCount = lngStepCount + 1

End If
Next intIndex

End If

' Set the return value of the function to the
array of
' Steps that has been built above
If lngStepCount = 0 Then
SubSteps = Empty
Else
SubSteps = cSubSteps()
End If

Exit Function

SubStepsErr:
LogErrors Errors
mstrSource = mstrModuleName &
"SubSteps"
On Error GoTo 0
Err.Raise vbObjectError +
errSubStepsFailed, _
mstrSource, _
LoadResString(errSubStepsFailed)

End Function

Public Property Get StepCount() As Integer

StepCount = mcarrSteps.Count

End Property

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 'True
END
Attribute VB_Name = "cAsyncShell"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'-----
' Copyright © 1997 Microsoft Corporation. All
rights reserved.
'
' You have a royalty-free right to use, modify,
reproduce and distribute the
' Sample Application Files (and/or any
modified version) in any way you find
' useful, provided that you agree that Microsoft
has no warranty, obligations or
' liability for any Sample Application Files.

```

```

'-----
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cAsyncShell."

Public Event Terminated()

Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Private proc As PROCESS_INFORMATION
Private mfShelling As Boolean

'-----
'Initialization and cleanup:

Private Sub Class_Initialize()
Set moTimer = New cTimerSM
End Sub

Private Sub Class_Terminate()
If mfShelling Then CloseHandle proc.hProcess
End Sub

'-----
'Shelling:

Public Sub Shell(CommandLine As String,
Optional PollingInterval As Long = 1000)
Dim Start As STARTUPINFO

If mfShelling Then
On Error GoTo 0
Err.Raise vbObjectError + errInstanceInUse, _
mstrSource, _
LoadResString(errInstanceInUse)
End If
mfShelling = True

' Initialize the STARTUPINFO structure:
Start.cb = Len(Start)
Start.dwFlags =
STARTF_USESHOWWINDOW
Start.wShowWindow =
SW_SHOWMINNOACTIVE

' Start the shelled application:
CreateProcessA 0&, CommandLine, 0&, 0&,
1&, _
NORMAL_PRIORITY_CLASS, 0&, 0&,
Start, proc

With moTimer
If PollingInterval > 0 Then
.Interval = PollingInterval
Else
.Interval = 1000
End If
.Enabled = True
End With
End Sub

'-----
'Aborting:
Public Sub Abort()
Dim nCode As Long

```

```

' Dim X As Integer
' Dim ReturnVal As Integer

On Error GoTo AbortErr

If Not mfShelling Then
    Call WriteError(errProgramError,
mstrSource)
    Else
        ' If IsWindow(proc.hProcess) = False
Then Exit Sub
        ' If (GetWindowLong(proc.hProcess,
GWL_STYLE) And WS_DISABLED)
Then Exit Sub
        ' If IsWindow(proc.hProcess) Then
        ' If Not
(GetWindowLong(proc.hProcess,
GWL_STYLE) And WS_DISABLED)
Then
            X = PostMessage(proc.hProcess,
WM_CANCELMODE, 0, 0&)
            X = PostMessage(proc.hProcess,
WM_CLOSE, 0, 0&)
        ' End If
        ' End If

        If TerminateProcess(proc.hProcess,
0&) = 0 Then
            Debug.Print "Unable to terminate
process: " & proc.hProcess
            Call
WriteError(errTerminateProcessFailed,
mstrSource, _
            ApiError(GetLastError()))
        Else
            ' Should always come here!
            GetExitCodeProcess proc.hProcess,
nCode
            If nCode = STILL_ACTIVE Then
                ' Write an error and close the
handles to the
                ' process anyway
                Call
WriteError(errTerminateProcessFailed,
mstrSource)
            End If
            End If

            ' Close all open handles to the shelled
process, even
            ' if any of the above calls error out
            CloseHandle proc.hProcess
            moTimer.Enabled = False
            mfShelling = False
            RaiseEvent Terminated

        End If

        Exit Sub

AbortErr:
    Call LogErrors(Errors)
    mstrSource = mstrModuleName &
"Abort"
    On Error GoTo 0
    Err.Raise vbObjectError +
errProgramError, _
    mstrSource, _
    LoadResString(errProgramError)

End Sub
Private Sub moTimer_Timer()
    Dim nCode As Long

```

```

GetExitCodeProcess proc.hProcess, nCode
If nCode <> STILL_ACTIVE Then
    CloseHandle proc.hProcess
    moTimer.Enabled = False
    mfShelling = False
    RaiseEvent Terminated
End If
End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cConnDtl"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConnDtl.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Encapsulates the properties
and methods of a connection.
' Contains functions to insert, update
and delete
' connection_dtls records from the
database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Public WorkspaceId As Long
Public ConnNameId As Long
Public ConnName As String
Public ConnectionString As String
Public ConnType As ConnectionType
Public Position As Long
Public NodeDB As Database

Private mintOperation As Operation

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnDtl."

' The cSequence class is used to generate
unique Connection identifiers
Private mConnectionSeq As cSequence

' The StringSM class is used to carry out string
operations
Private mFieldValue As cStringSM

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
    ' Assigns values to the parameters in the
querydef object
    ' The parameter names are cryptic to
differentiate them from the field names.
    ' When the parameter names are the same as
the field names, parameters in the where
    ' clause do not get created.

    Dim prmParam As DAO.Parameter

    On Error GoTo AssignParametersErr

```

```

For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
        Case "[w_id]"
            prmParam.Value = WorkspaceId

        Case "[c_id]"
            prmParam.Value = ConnNameId

        Case "[c_name]"
            prmParam.Value = ConnName

        Case "[c_str]"
            prmParam.Value = ConnectionString

        Case "[c_type]"
            prmParam.Value = ConnType

        Case Else
            ' Write the parameter name that is faulty
            WriteError errInvalidParameter,
mstrSource, prmParam.Name
            On Error GoTo 0
            Err.Raise errInvalidParameter,
mstrModuleName & "AssignParameters", _
            LoadResString(errInvalidParameter)
        End Select
    Next prmParam

Exit Sub

AssignParametersErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errAssignParametersFailed, _
    mstrModuleName & "AssignParameters",
LoadResString(errAssignParametersFailed)

End Sub

Public Function Clone() As cConnDtl

    ' Creates a copy of a given Connection

    Dim cCloneConn As cConnDtl

    On Error GoTo CloneErr

    Set cCloneConn = New cConnDtl

    ' Copy all the Connection properties to the newly
created Connection
    cCloneConn.WorkspaceId = WorkspaceId
    cCloneConn.ConnNameId = ConnNameId
    cCloneConn.ConnName = ConnName
    cCloneConn.ConnectionString =
ConnectionString
    cCloneConn.ConnType = ConnType
    cCloneConn.IndOperation = mintOperation
    cCloneConn.Position = Position

    ' And set the return value to the newly created
Connection
    Set Clone = cCloneConn
    Set cCloneConn = Nothing

Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0

```

```

Err.Raise vbObjectError +
errCloneFailed, mstrSource,
LoadResString(errCloneFailed)

End Function
Private Sub CheckDupConnectionName()
' Check if the Connection name already
exists in the workspace

Dim rstConnection As Recordset
Dim strSql As String
Dim qy As DAO.QueryDef

On Error GoTo
CheckDupConnectionNameErr
mstrSource = mstrModuleName &
"CheckDupConnectionName"

' Create a recordset object to retrieve the
count of all Connections
' for the workspace with the same name
strSql = "Select count(*) as
Connection_count " & _
" from " &
TBL_CONNECTION_DTLS & _
" where " & FLD_ID_WORKSPACE
& " = [w_id]" & _
" and " &
FLD_CONN_DTL_CONNECTION_NAME
& " = [c_name]" & _
" and " & FLD_ID_CONN_NAME & "
<> [c_id]"

Set qy =
dbsAttTool.CreateQueryDef(gstrEmptyStrin
g, strSql)
Call AssignParameters(qy)

Set rstConnection =
qy.OpenRecordset(dbOpenForwardOnly)

If rstConnection![Connection_count] > 0
Then
rstConnection.Close
qy.Close
ShowError errDupConnDtlName
On Error GoTo 0
Err.Raise vbObjectError +
errDupConnDtlName, _
mstrSource,
LoadResString(errDupConnDtlName)
End If

rstConnection.Close
qy.Close

Exit Sub

CheckDupConnectionNameErr:
LogErrors Errors
mstrSource = mstrModuleName &
"CheckDupConnectionName"
On Error GoTo 0
Err.Raise vbObjectError +
errProgramError, _
mstrSource,
LoadResString(errProgramError)

End Sub
Public Property Let IndOperation(ByVal
vdata As Operation)

' The valid operations are define in the
cOperations
' class. Check if the operation is valid

```

```

Select Case vdata
Case QueryOp, InsertOp, UpdateOp,
DeleteOp
mintOperation = vdata

Case Else
BugAssert True
End Select

End Property
Public Sub Validate()
' Each distinct object will have a Validate
method which
' will check if the class properties are valid.
This method
' will be used to check interdependant
properties that
' cannot be validated by the let procedures.
' It should be called by the add and modify
methods of the class

If ConnName = gstrEmptyString Then

ShowError
errConnectionNameMandatory
On Error GoTo 0
' Propagate this error back to the caller
Err.Raise vbObjectError +
errConnectionNameMandatory, _
mstrSource,
LoadResString(errConnectionNameMandatory
)
End If

' Raise an error if the Connection name
already exists in the workspace
Call CheckDupConnectionName

End Sub
Public Sub Add()

Dim strInsert As String
Dim qy As DAO.QueryDef

On Error GoTo AddErr

' Validate the record before trying to insert
the record
Call Validate

' Create a temporary querydef object
strInsert = "insert into " &
TBL_CONNECTION_DTLS & _
" (" & FLD_ID_WORKSPACE & _
", " & FLD_ID_CONN_NAME & _
", " &
FLD_CONN_DTL_CONNECTION_NAME
& _
", " &
FLD_CONN_DTL_CONNECTION_STRING
& _
", " &
FLD_CONN_DTL_CONNECTION_TYPE &
") " & _
" values ( [w_id], [c_id], " & _
" [c_name], [c_str], [c_type] )"

Set qy =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strInsert)

' Call a procedure to assign the Connection
values
Call AssignParameters(qy)

```

```

qy.Execute dbFailOnError
qy.Close

Exit Sub

AddErr:

Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errInsertFailed, _
mstrModuleName & "Add",
LoadResString(errInsertFailed)

End Sub
Public Sub Delete()

Dim strDelete As String
Dim qy As DAO.QueryDef

On Error GoTo DeleteErr

strDelete = "delete from " &
TBL_CONNECTION_DTLS & _
" where " & FLD_ID_CONN_NAME & " =
[c_id]"
Set qy =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strDelete)

Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

Exit Sub

DeleteErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errDeleteFailed, _
mstrModuleName & "Delete",
LoadResString(errDeleteFailed)

End Sub

Public Sub Modify()

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo ModifyErr

' Validate the updated values before trying to
modify the db
Call Validate

' Create a temporary querydef object with the
modify string
strUpdate = "update " &
TBL_CONNECTION_DTLS & _
" set " & FLD_ID_WORKSPACE & " =
[w_id], " & _
FLD_CONN_DTL_CONNECTION_NAME & " =
[c_name], " & _
FLD_CONN_DTL_CONNECTION_STRING & "
= [c_str], " & _
FLD_CONN_DTL_CONNECTION_TYPE
& " = [c_type] " & _
" where " & FLD_ID_CONN_NAME & " =
[c_id]"
Set qy =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strUpdate)

```

```
' Call a procedure to assign the
Connection values to the
' querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError
```

```
qy.Close
```

```
Exit Sub
```

```
ModifyErr:
```

```
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errModifyFailed, _
mstrModuleName & "Modify",
LoadResString(errModifyFailed)
```

```
End Sub
```

```
Public Property Get NextIdentifier() As
Long
```

```
Dim lngNextId As Long
```

```
On Error GoTo NextIdentifierErr
```

```
' Retrieve the next identifier using the
sequence class
Set mConnectionSeq = New cSequence
Set mConnectionSeq.IdDatabase =
dbsAttTool
mConnectionSeq.IdentifierColumn =
FLD_ID_CONN_NAME
lngNextId = mConnectionSeq.Identifier
Set mConnectionSeq = Nothing
```

```
NextIdentifier = lngNextId
Exit Property
```

```
NextIdentifierErr:
```

```
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errIdGetFailed,
_
mstrModuleName & "NextIdentifier",
LoadResString(errIdGetFailed)
```

```
End Property
```

```
Public Property Get IndOperation() As
Operation
```

```
IndOperation = mintOperation
```

```
End Property
```

```
Private Sub Class_Initialize()
```

```
Set mFieldValue = New cStringSM
```

```
' Initialize the operation indicator variable
to Query
' It will be modified later by the collection
class when
' inserts, updates or deletes are performed
mintOperation = QueryOp
```

```
ConnType = giDefaultConnType
```

```
End Sub
```

```
Private Sub Class_Terminate()
```

```
Set mFieldValue = Nothing
```

```
End Sub
VERSION 1.0 CLASS
BEGIN
```

```
MultiUse = -1 True
END
```

```
Attribute VB_Name = "cConnDtls"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
```

```
' FILE: cConnDtls.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
```

```
' PURPOSE: Implements an array of
cConnDtl objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains additional functions to
determine the connection
' string value, validation functions, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
```

```
Option Explicit
```

```
Private mcarrConnDtls As cNodeCollections
```

```
' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnDtls."
```

```
Public Property Set ConnDb(vdata As
Database)
```

```
Set mcarrConnDtls.NodeDB = vdata
```

```
End Property
```

```
Public Sub Modify(cModifiedConn As
cConnDtl)
```

```
' First check if the parameter record is valid
Call CheckDupConnName(cModifiedConn)
```

```
Call
mcarrConnDtls.Modify(cModifiedConn)
```

```
End Sub
```

```
Public Sub Load(ByRef cConnToAdd As
cConnDtl)
```

```
Call mcarrConnDtls.Load(cConnToAdd)
```

```
End Sub
```

```
Public Sub Add(ByRef cConnToAdd As
cConnDtl)
```

```
' First check if the record is valid
Call Validate(cConnToAdd)
```

```
' Retrieve a unique identifier
cConnToAdd.ConnNameId =
cConnToAdd.NextIdentifier
```

```
Call mcarrConnDtls.Add(cConnToAdd)
```

```
End Sub
```

```
Public Sub Unload(lConnNameId As Long)
```

```
Dim lngDeleteElement As Long
```

```
lngDeleteElement = QueryIndex(lConnNameId)
```

```
Call mcarrConnDtls.Unload(lngDeleteElement)
```

```
End Sub
```

```
Public Sub SaveConnDtlsInWsp(ByVal
lngWorkspace As Long)
```

```
' Call a procedure to save all connection details
records for the workspace
Call mcarrConnDtls.Save(lngWorkspace)
```

```
End Sub
```

```
Public Function GetConnectionDtl(ByVal
lngWorkspace As Long, _
ByVal strConnectionName As String) As
cConnDtl
```

```
' Returns the connection dtl for the passed in
connection name
```

```
Dim lngIndex As Long
```

```
' Find all parameters in the array with a matching
workspace id
For lngIndex = 0 To mcarrConnDtls.Count - 1
If mcarrConnDtls(lngIndex).WorkspaceId =
lngWorkspace And _
mcarrConnDtls(lngIndex).ConnName =
strConnectionName Then
```

```
Set GetConnectionDtl =
mcarrConnDtls(lngIndex)
Exit For
End If
Next lngIndex
```

```
If lngIndex > mcarrConnDtls.Count - 1 Then
' The parameter has not been defined for the
workspace
```

```
' Raise an error
On Error GoTo 0
Err.Raise vbObjectError +
errConnNameInvalid, mstrModuleName &
"GetConnection", _
LoadResString(errConnNameInvalid)
End If
```

```
End Function
```

```
Public Sub Delete(lConnNameId As Long)
```

```
' Delete the passed in parameter
```

```
Dim lngDeleteElement As Long
```

```
lngDeleteElement = QueryIndex(lConnNameId)
Call mcarrConnDtls.Delete(lngDeleteElement)
```

```
End Sub
```

```
Private Function QueryIndex(lConnNameId As
Long) As Long
```

```
Dim lngIndex As Long
```

```
' Find the matching parameter record in the array
For lngIndex = 0 To mcarrConnDtls.Count - 1
If mcarrConnDtls(lngIndex).ConnNameId =
lConnNameId And _
mcarrConnDtls(lngIndex).IndOperation
```

```
<> DeleteOp Then
```

```
QueryIndex = lngIndex
Exit Function
```

```
End If
```

```
Next lngIndex
```



```

' Raise error that parameter has not been
found
On Error GoTo 0
Err.Raise vbObjectError +
errQueryIndexFailed,
"cArrParameters.QueryIndex", _
LoadResString(errQueryIndexFailed)
End Function

Public Function
QueryConnDtl(IConnNameId As Long) As
cConnDtl

Dim lngQueryElement As Long

lngQueryElement =
QueryIndex(IConnNameId)

' Return the queried connection object
Set QueryConnDtl =
mcarrConnDtls(lngQueryElement)
End Function
Public Property Get Count() As Long

Count = mcarrConnDtls.Count

End Property
Public Property Get Item(lngIndex As Long)
As cConnDtl
Attribute Item.VB_UserMemId = 0

Set Item = mcarrConnDtls(lngIndex)
End Property

Private Sub Validate(ByVal
cConnToValidate As cConnDtl)
' This procedure is necessary since the
class cannot validate
' all the connection_dtl properties on it's
own. This is 'coz we
' might have created new connections in
the workspace, but not
' saved them to the database yet - hence
the duplicate check
' has to be repeated in the array

Dim lngIndex As Long
Dim cTempParam As cConnDtl

' Check if the parameter name already
exists in the workspace
For lngIndex = 0 To
mcarrConnDtls.Count - 1
Set cTempParam =
mcarrConnDtls(lngIndex)
If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnName =
cConnToValidate.ConnName And _
cTempParam.ConnNameId <>
cConnToValidate.ConnNameId And _
cTempParam.IndOperation <>
DeleteOp Then
On Error GoTo 0
Err.Raise vbObjectError +
errDupConnDtlName, _
mstrSource,
LoadResString(errDupConnDtlName)
End If
Next lngIndex
End Sub

```

```

Private Sub CheckDupConnName(ByVal
cConnToValidate As cConnDtl)

Dim lngIndex As Long
Dim cTempParam As cConnDtl

' Check if the parameter name already exists
in the workspace
For lngIndex = 0 To mcarrConnDtls.Count -
1
Set cTempParam =
mcarrConnDtls(lngIndex)
If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnName =
cConnToValidate.ConnName And _
cTempParam.ConnNameId <>
cConnToValidate.ConnNameId And _
cTempParam.IndOperation <>
DeleteOp Then
ShowError errDupConnDtlName
On Error GoTo 0
Err.Raise vbObjectError +
errDupConnDtlName, _
mstrSource,
LoadResString(errDupConnDtlName)
End If
Next lngIndex
End Sub

Private Sub Class_Initialize()

Set mcarrConnDtls = New cNodeCollections
End Sub

Private Sub Class_Terminate()

Set mcarrConnDtls = Nothing
End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 'True
END
Attribute VB_Name = "cConnection"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConnection.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: Encapsulates the properties
and methods of a connection string.
' Contains functions to insert, update
and delete
' workspace_connections records from
the database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Public WorkspaceId As Long
Public ConnectionId As Long
Public ConnectionValue As String
Public Description As String
Public NodeDB As Database

```

```

Public Position As Long
Public NoCountDisplay As Boolean
Public NoExecute As Boolean
Public ParseQueryOnly As Boolean
Public QuotedIdentifiers As Boolean
Public AnsiNulls As Boolean
Public ShowQueryPlan As Boolean
Public ShowStatsTime As Boolean
Public ShowStatsIO As Boolean
Public ParseOdbcMsg As Boolean
Public RowCount As Long
Public TsqlBatchSeparator As String
Public QueryTimeout As Long
Public ServerLanguage As String
Public CharacterTranslation As Boolean
Public RegionalSettings As Boolean

Private mstrConnectionName As String
Private mintOperation As Operation

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnection."

' The cSequence class is used to generate unique
Connection identifiers
Private mConnectionSeq As cSequence

' The StringSM class is used to carry out string
operations
Private mFieldValue As cStringSM

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
' Assigns values to the parameters in the querydef
object
' The parameter names are cryptic to differentiate
them from the field names.
' When the parameter names are the same as the
field names, parameters in the where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr

For Each prmParam In qyExec.Parameters
Select Case prmParam.Name
Case "[w_id]"
prmParam.Value = WorkspaceId

Case "[c_id]"
prmParam.Value = ConnectionId

Case "[c_name]"
prmParam.Value = mstrConnectionName

Case "[c_value]"
prmParam.Value = ConnectionValue

Case "[desc]"
prmParam.Value = Description

Case "[no_count]"
prmParam.Value = NoCountDisplay

Case "[no_exec]"
prmParam.Value = NoExecute

Case "[parse_only]"
prmParam.Value = ParseQueryOnly

```

```

    Case "[quoted_id]"
    prmParam.Value =
QuotedIdentifiers

    Case "[a_nulls]"
    prmParam.Value = AnsiNulls

    Case "[show_qp]"
    prmParam.Value =
ShowQueryPlan

    Case "[stats_tm]"
    prmParam.Value =
ShowStatsTime

    Case "[stats_io]"
    prmParam.Value = ShowStatsIO

    Case "[parse_odbc]"
    prmParam.Value = ParseOdbcMsg

    Case "[row_cnt]"
    prmParam.Value = RowCount

    Case "[batch_sep]"
    prmParam.Value =
TsqlBatchSeparator

    Case "[qry_tmout]"
    prmParam.Value = QueryTimeOut

    Case "[lang]"
    prmParam.Value =
ServerLanguage

    Case "[char_trans]"
    prmParam.Value =
CharacterTranslation

    Case "[reg_settings]"
    prmParam.Value =
RegionalSettings

    Case Else
    ' Write the parameter name that is
faulty
    WriteError errInvalidParameter,
mstrSource, prmParam.Name
    On Error GoTo 0
    Err.Raise errInvalidParameter,
mstrModuleName & "AssignParameters", _

LoadResString(errInvalidParameter)
End Select
Next prmParam

Exit Sub

AssignParametersErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrModuleName &
"AssignParameters",
LoadResString(errAssignParametersFailed)

End Sub

Public Function Clone() As cConnection

    ' Creates a copy of a given Connection

    Dim cCloneConn As cConnection

```

```

    On Error GoTo CloneErr

    Set cCloneConn = New cConnection

    ' Copy all the Connection properties to the
newly
    created Connection
    Set cCloneConn.NodeDB = NodeDB
    cCloneConn.WorkspaceId = WorkspaceId
    cCloneConn.ConnectionId = ConnectionId
    cCloneConn.ConnectionName =
mstrConnectionName
    cCloneConn.ConnectionValue =
ConnectionValue
    cCloneConn.Description = Description
    cCloneConn.IndOperation = mintOperation
    cCloneConn.Position = Position
    cCloneConn.NoCountDisplay =
NoCountDisplay
    cCloneConn.NoExecute = NoExecute
    cCloneConn.ParseQueryOnly =
ParseQueryOnly
    cCloneConn.QuotedIdentifiers =
QuotedIdentifiers
    cCloneConn.AnsiNulls = AnsiNulls
    cCloneConn.ShowQueryPlan =
ShowQueryPlan
    cCloneConn.ShowStatsTime =
ShowStatsTime
    cCloneConn.ShowStatsIO = ShowStatsIO
    cCloneConn.ParseOdbcMsg =
ParseOdbcMsg
    cCloneConn.RowCount = RowCount
    cCloneConn.TsqlBatchSeparator =
TsqlBatchSeparator
    cCloneConn.QueryTimeOut =
QueryTimeOut
    cCloneConn.ServerLanguage =
ServerLanguage
    cCloneConn.CharacterTranslation =
CharacterTranslation
    cCloneConn.RegionalSettings =
RegionalSettings

    ' And set the return value to the newly
created Connection
    Set Clone = cCloneConn
    Set cCloneConn = Nothing

Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed,
mstrSource, LoadResString(errCloneFailed)

End Function
Private Sub CheckDupConnectionName()
    ' Check if the Connection name already
exists in the workspace

    Dim rstConnection As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef

    On Error GoTo
CheckDupConnectionNameErr
    mstrSource = mstrModuleName &
"CheckDupConnectionName"

    ' Create a recordset object to retrieve the
count of all Connections

```

```

' for the workspace with the same name
strSql = "Select count(*) as Connection_count "
& _
    " from workspace_connections " & _
    " where workspace_id = [w_id]" & _
    " and connection_name = [c_name]" & _
    " and connection_id <> [c_id]"

    Set qy =
NodeDB.CreateQueryDef(gstrEmptyString, strSql)
    Call AssignParameters(qy)

    Set rstConnection =
qy.OpenRecordset(dbOpenForwardOnly)

    If rstConnection![Connection_count] > 0 Then
rstConnection.Close
qy.Close
    ShowError errDuplicateConnectionName
    On Error GoTo 0
    Err.Raise vbObjectError +
errDuplicateConnectionName, _
mstrSource,
LoadResString(errDuplicateConnectionName)
    End If

rstConnection.Close
qy.Close

Exit Sub

CheckDupConnectionNameErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"CheckDupConnectionName"
    On Error GoTo 0
    Err.Raise vbObjectError + errProgramError, _
mstrSource, LoadResString(errProgramError)

End Sub
Private Sub CheckDB()
    ' Check if the database object has been initialized

    If NodeDB Is Nothing Then
    On Error GoTo 0
    Err.Raise vbObjectError + errInvalidDB, _
mstrModuleName & "CheckDB",
LoadResString(errInvalidDB)
    End If

End Sub
Public Property Let ConnectionName(vdata As
String)

    If vdata = gstrEmptyString Then

        ShowError errConnectionNameMandatory
        On Error GoTo 0
        ' Propagate this error back to the caller
        Err.Raise vbObjectError +
errConnectionNameMandatory, _
mstrSource,
LoadResString(errConnectionNameMandatory)
    Else
        mstrConnectionName = vdata
    End If

End Property

Public Property Let IndOperation(ByVal vdata As
Operation)

    ' The valid operations are define in the
cOperations
    ' class. Check if the operation is valid

```

```

Select Case vdata
    Case QueryOp, InsertOp, UpdateOp,
DeleteOp
        mintOperation = vdata

    Case Else
        BugAssert True
    End Select

End Property
Public Sub Validate()
    ' Each distinct object will have a Validate
method which
    ' will check if the class properties are
valid. This method
    ' will be used to check interdependant
properties that
    ' cannot be validated by the let
procedures.
    ' It should be called by the add and
modify methods of the class

    ' Check if the db object is valid
    Call CheckDB

    ' Raise an error if the Connection name
already exists in the workspace
    Call CheckDupConnectionName

End Sub
Public Sub Add()

    Dim strInsert As String
    Dim qy As DAO.QueryDef

    On Error GoTo AddErr

    ' Validate the record before trying to
insert the record
    Call Validate

    ' Create a temporary querydef object
strInsert = "insert into
workspace_connections " & _
    "( workspace_id, connection_id, " &
_
    "connection_name,
connection_value, " & _
    "description, no_count_display, " &
_
    "no_execute, parse_query_only, " &
_
    "ANSI_quoted_identifiers,
ANSI_nulls, " & _
    "show_query_plan,
show_stats_time, " & _
    "show_stats_io,
parse_odbc_msg_prefixes, " & _
    "row_count, tsq_batch_separator, "
& _
    "query_time_out, server_language, "
& _
    "character_translation,
regional_settings )" & _
    " values ( [w_id], [c_id], [c_name],
[c_value], " & _
    "[desc], [no_count], [no_exec],
[parse_only], " & _
    "[quoted_id], [a_nulls], [show_qp],
[stats_tm], " & _
    "[stats_io], [parse_odbc], [row_cnt],
[batch_sep], " & _
    "[qry_tmout], [lang], [char_trans],
[reg_settings] )"

```

```

Set qy =
NodeDB.CreateQueryDef(gstrEmptyString,
strInsert)

' Call a procedure to assign the Connection
values
Call AssignParameters(qy)

qy.Execute dbFailOnError
qy.Close

Exit Sub

AddErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errInsertFailed, _
mstrModuleName & "Add",
LoadResString(errInsertFailed)

End Sub
Public Sub Delete()

    Dim strDelete As String
    Dim qy As DAO.QueryDef

    On Error GoTo DeleteErr

    ' Check if the db object is valid
    Call CheckDB

    strDelete = "delete from
workspace_connections " & _
    " where connection_id = [c_id]"

    Set qy =
NodeDB.CreateQueryDef(gstrEmptyString,
strDelete)

    Call AssignParameters(qy)
    qy.Execute dbFailOnError

    qy.Close

Exit Sub

DeleteErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errDeleteFailed, _
mstrModuleName & "Delete",
LoadResString(errDeleteFailed)

End Sub
Public Sub Modify()

    Dim strUpdate As String
    Dim qy As QueryDef

    On Error GoTo ModifyErr

    ' Validate the updated values before trying to
modify the db
    Call Validate

    ' Create a temporary querydef object with
the modify string
strUpdate = "update workspace_connections
" & _
    " set workspace_id = [w_id], " & _
    "connection_name = [c_name], " & _
    "connection_value = [c_value], " & _
    "description = [desc], " & _
    "no_count_display = [no_count], " & _

```

```

"no_execute = [no_exec], " & _
"parse_query_only = [parse_only], " & _
"ANSI_quoted_identifiers = [quoted_id], "
& _
"ANSI_nulls = [a_nulls], " & _
"show_query_plan = [show_qp], " & _
"show_stats_time = [stats_tm], " & _
"show_stats_io = [stats_io], " & _
"parse_odbc_msg_prefixes = [parse_odbc],
" & _
"row_count = [row_cnt], " & _
"tsq_batch_separator = [batch_sep], " & _
"query_time_out = [qry_tmout], " & _
"server_language = [lang], " & _
"character_translation = [char_trans], " & _
"regional_settings = [reg_settings] " & _
" where connection_id = [c_id]"

Set qy =
NodeDB.CreateQueryDef(gstrEmptyString,
strUpdate)

' Call a procedure to assign the Connection values
to the
' querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

Exit Sub

ModifyErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errModifyFailed, _
mstrModuleName & "Modify",
LoadResString(errModifyFailed)

End Sub
Public Property Get ConnectionName() As String

    ConnectionName = mstrConnectionName

End Property

Public Property Get NextIdentifier() As Long

    Dim lngNextId As Long

    On Error GoTo NextIdentifierErr

    ' First check if the database object is valid
    Call CheckDB

    ' Retrieve the next identifier using the sequence
class
    Set mConnectionSeq = New cSequence
    Set mConnectionSeq.IdDatabase = NodeDB
    mConnectionSeq.IdentifierColumn =
"connection_id"
    lngNextId = mConnectionSeq.Identifier
    Set mConnectionSeq = Nothing

    NextIdentifier = lngNextId
    Exit Property

NextIdentifierErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errIdGetFailed, _
mstrModuleName & "NextIdentifier",
LoadResString(errIdGetFailed)

End Property

```

```

Public Property Get IndOperation() As
Operation

    IndOperation = mintOperation

End Property

Private Sub Class_Initialize()

    Set mFieldValue = New cStringSM

    ' Initialize the operation indicator variable
to Query
    ' It will be modified later by the collection
class when
    ' inserts, updates or deletes are performed
mintOperation = QueryOp

    ' Initialize connection properties to their
default values
    NoCountDisplay =
DEF_NO_COUNT_DISPLAY
    NoExecute = DEF_NO_EXECUTE
    ParseQueryOnly =
DEF_PARSE_QUERY_ONLY
    QuotedIdentifiers =
DEF_ANSI_QUOTED_IDENTIFIERS
    AnsiNulls = DEF_ANSI_NULLS
    ShowQueryPlan =
DEF_SHOW_QUERY_PLAN
    ShowStatsTime =
DEF_SHOW_STATS_TIME
    ShowStatsIO = DEF_SHOW_STATS_IO
    ParseOdbcMsg =
DEF_PARSE_ODBC_MSG_PREFIXES
    RowCount = DEF_ROW_COUNT
    TsqlBatchSeparator =
DEF_TSQL_BATCH_SEPARATOR
    QueryTimeOut =
DEF_QUERY_TIME_OUT
    ServerLanguage =
DEF_SERVER_LANGUAGE
    CharacterTranslation =
DEF_CHARACTER_TRANSLATION
    RegionalSettings =
DEF_REGIONAL_SETTINGS

End Sub

Private Sub Class_Terminate()

    Set NodeDB = Nothing
    Set mFieldValue = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cConnections"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cConnections.cls
'          Microsoft TPC-H Kit Ver. 1.00
'          Copyright Microsoft, 1999
'          All Rights Reserved
'
' PURPOSE:  Implements an array of
cConnection objects.
'           Type-safe wrapper around
cNodeCollections.

```

```

'           Also contains validation functions,
etc.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcarrConnections As
cNodeCollections

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnections."

Public Property Set ConnDb(vdata As
Database)

    Set mcarrConnections.NodeDB = vdata

End Property
Public Sub Modify(cModifiedConn As
cConnection)

    ' First check if the parameter record is valid
    Call CheckDupConnName(cModifiedConn)

    Call
mcarrConnections.Modify(cModifiedConn)

End Sub
Public Sub Load(ByRef cConnToAdd As
cConnection)

    Call mcarrConnections.Load(cConnToAdd)

End Sub
Public Sub Add(ByRef cConnToAdd As
cConnection)

    Set cConnToAdd.NodeDB =
mcarrConnections.NodeDB

    ' First check if the record is valid
    Call Validate(cConnToAdd)

    ' Retrieve a unique identifier
cConnToAdd.ConnectionId =
cConnToAdd.NextIdentifier

    Call mcarrConnections.Add(cConnToAdd)

End Sub

Public Sub Unload(IngConnId As Long)

    Dim IngDeleteElement As Long

    IngDeleteElement = QueryIndex(IngConnId)

    Call
mcarrConnections.Unload(IngDeleteElement)

End Sub

Public Sub SaveConnectionsInWsp(ByVal
IngWorkspace As Long)

    ' Call a procedure to save all connection
records for the workspace
    Call mcarrConnections.Save(IngWorkspace)

End Sub

```

```

Public Function GetConnection(ByVal
IngWorkspace As Long, _
ByVal strConnectionName As String) As
cConnection

    ' Returns the connection string for the passed in
connection name

    Dim IngIndex As Long

    ' Find all parameters in the array with a matching
workspace id
    For IngIndex = 0 To mcarrConnections.Count - 1
        If mcarrConnections(IngIndex).WorkspaceId =
IngWorkspace And _

mcarrConnections(IngIndex).ConnectionName =
strConnectionName Then

            Set GetConnection =
mcarrConnections(IngIndex)
            Exit For
        End If
    Next IngIndex

    If IngIndex > mcarrConnections.Count - 1 Then
        ' The parameter has not been defined for the
workspace
        ' Raise an error
        On Error GoTo 0
        Err.Raise vbObjectError +
errConnNameInvalid, mstrModuleName &
"GetConnection", _
            LoadResString(errConnNameInvalid)
    End If

End Function
Public Sub Delete(IngConnId As Long)

    ' Delete the passed in parameter

    Dim IngDeleteElement As Long

    IngDeleteElement = QueryIndex(IngConnId)
    Call
mcarrConnections.Delete(IngDeleteElement)

End Sub
Private Function QueryIndex(IngConnId As Long)
As Long

    Dim IngIndex As Long

    ' Find the matching parameter record in the array
    For IngIndex = 0 To mcarrConnections.Count - 1
        If mcarrConnections(IngIndex).ConnectionId =
IngConnId And _

mcarrConnections(IngIndex).IndOperation <>
DeleteOp Then
            QueryIndex = IngIndex
            Exit Function
        End If
    Next IngIndex

    ' Raise error that parameter has not been found
    On Error GoTo 0
    Err.Raise vbObjectError + errQueryIndexFailed,
"cArrParameters.QueryIndex", _
        LoadResString(errQueryIndexFailed)

End Function

Public Function QueryConnection(IngConnId As
Long) As cConnection

    Dim IngQueryElement As Long

```

```

    lngQueryElement =
    QueryIndex(lngConnId)

    ' Return the queried connection object
    Set QueryConnection =
    mcarrConnections(lngQueryElement)

End Function
Public Property Get Count() As Long

    Count = mcarrConnections.Count

End Property
Public Property Get Item(lngIndex As Long)
As cConnection
Attribute Item.VB_UserMemId = 0

    Set Item = mcarrConnections(lngIndex)

End Property

Public Sub Validate(ByVal
cConnToValidate As cConnection)
    ' This procedure is necessary since the
class cannot validate
    ' all the parameter properties on it's own.
This is 'coz we
    ' might have created new parameters in
the workspace, but not
    ' saved them to the database yet - hence
the duplicate check
    ' has to be repeated in the array

    Dim lngIndex As Long
    Dim cTempParam As cConnection

    ' Check if the parameter name already
exists in the workspace
    For lngIndex = 0 To
mcarrConnections.Count - 1
        Set cTempParam =
mcarrConnections(lngIndex)
        If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnectionName =
cConnToValidate.ConnectionName And _
cTempParam.IndOperation <>
DeleteOp Then
            On Error GoTo 0
            Err.Raise vbObjectError +
errDuplicateConnectionName, _
mstrSource,
LoadResString(errDuplicateConnectionName)
        End If
        Next lngIndex

End Sub
Public Sub CheckDupConnName(ByVal
cConnToValidate As cConnection)

    Dim lngIndex As Long
    Dim cTempParam As cConnection

    ' Check if the parameter name already
exists in the workspace
    For lngIndex = 0 To
mcarrConnections.Count - 1
        Set cTempParam =
mcarrConnections(lngIndex)
        If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnectionName =
cConnToValidate.ConnectionName And _
cTempParam.IndOperation <>
DeleteOp Then
            On Error GoTo 0
            Err.Raise vbObjectError +
errDuplicateConnectionName, _
mstrSource,
LoadResString(errDuplicateConnectionName)
        End If
        Next lngIndex

End Sub
Private Sub Class_Initialize()
    Set mcarrConnections = New
cNodeCollections

End Sub

Private Sub Class_Terminate()
    Set mcarrConnections = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cConstraint"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConstraint.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: Encapsulates the properties
and methods of a constraint.
' Contains functions to insert, update
and delete
' step_constraints records from the
database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

' Module level variables to store the property
values
Private mlngConstraintId As Long
Private mlngStepId As Long
Private mstrVersionNo As String
Private mintConstraintType As Integer
Private mlngGlobalStepId As Long
Private mstrGlobalVersionNo As String
Private mintSequenceNo As Integer
Private mdbmsConstraintDB As Database
Private mlngWorkspaceId As Integer
Private mintOperation As Operation
Private mlngPosition As Long

' The cSequence class is used to generate
unique step identifiers
Private mConstraintSeq As cSequence

Private Const mstrModuleName As String =
".cConstraint."
Private mstrSource As String

Public Enum ConstraintType
    gintPreStep = 1
    gintPostStep = 2
End Enum

Private Const mstrSQ As String = ""
Public Property Get WorkspaceId() As Long
    WorkspaceId = mlngWorkspaceId
End Property
Public Property Let WorkspaceId(ByVal vdata As
Long)
    mlngWorkspaceId = vdata
End Property

Public Property Get IndOperation() As Operation

    IndOperation = mintOperation

End Property
Public Property Let IndOperation(ByVal vdata As
Operation)

    On Error GoTo IndOperationErr
    mstrSource = mstrModuleName &
"IndOperation"

    ' The valid operations are define in the
cOperations
    ' class. Check if the operation is valid
    Select Case vdata
        Case QueryOp, InsertOp, UpdateOp, DeleteOp
            mintOperation = vdata

        Case Else
            On Error GoTo 0
            Err.Raise vbObjectError +
errInvalidOperation, _
mstrSource,
LoadResString(errInvalidOperation)
        End Select

    Exit Property

IndOperationErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"IndOperation"
    On Error GoTo 0
    Err.Raise vbObjectError +
errLetOperationFailed, _
mstrSource,
LoadResString(errLetOperationFailed)

End Property

Public Function Clone() As cConstraint

    ' Creates a copy of a given constraint

    Dim cConsClone As cConstraint

    On Error GoTo CloneErr
    mstrSource = mstrModuleName & "Clone"

    Set cConsClone = New cConstraint

    ' Copy all the workspace properties to the newly
created workspace
    cConsClone.ConstraintId = mlngConstraintId
    cConsClone.StepId = mlngStepId
    cConsClone.VersionNo = mstrVersionNo
    cConsClone.ConstraintType =
mintConstraintType
    cConsClone.GlobalStepId = mlngGlobalStepId

```

```

cConsClone.GlobalVersionNo =
mstrGlobalVersionNo
cConsClone.SequenceNo =
mintSequenceNo
cConsClone.WorkspaceId =
mIngWorkspaceId
cConsClone.IndOperation =
mintOperation

' And set the return value to the newly
created constraint
Set Clone = cConsClone

Exit Function

CloneErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Clone"
On Error GoTo 0
Err.Raise vbObjectError +
errCloneFailed, _
mstrSource,
LoadResString(errCloneFailed)

End Function

Public Property Get SequenceNo() As
Integer

SequenceNo = mintSequenceNo

End Property

Public Property Let SequenceNo(ByVal
vdata As Integer)
mintSequenceNo = vdata
End Property

Public Sub Add()
' Inserts a new step constraint into the
database

Dim strInsert As String
Dim qy As DAO.QueryDef

On Error GoTo AddErr

' First check if the database object is valid
Call CheckDB

' Any record validations
Call Validate

' Create a temporary querydef object
strInsert = "insert into step_constraints "
& _
"( constraint_id, step_id, version_no,
" & _
" constraint_type, global_step_id,
global_version_no, sequence_no )" & _
" values ( [cons_id], [s_id], [ver_no],
" & _
" [cons_type], [g_step_id],
[g_ver_no], " & _
" [seq_no] )"
Set qy =
mdbsConstraintDB.CreateQueryDef(gstrEm
ptyString, strInsert)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy)

qy.Execute dbFailOnError

```

```

qy.Close

' strInsert = "insert into step_constraints " &
_
"( constraint_id, step_id, version_no, " &
_
" constraint_type, global_step_id,
global_version_no, sequence_no )" & _
" values ( " & _
' Str(mIngConstraintId) & ", " &
Str(mIngStepId) & ", " & _
' mstrSQ & mstrVersionNo & mstrSQ & ",
" & Str(mintConstraintType) & ", " & _
' Str(mIngGlobalStepId) & ", " & mstrSQ
& mstrGlobalVersionNo & mstrSQ & ", " & _
' Str(mintSequenceNo) & " )" '
'
' BugMessage strInsert
' mdbsConstraintDB.Execute strInsert,
dbFailOnError
Exit Sub

AddErr:
LogErrors Errors
mstrSource = mstrModuleName & "Add"
On Error GoTo 0
Err.Raise vbObjectError +
errAddConstraintFailed, _
mstrSource, _

LoadResString(errAddConstraintFailed)
End Sub

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
' Assigns values to the parameters in the
querydef object
' The parameter names are cryptic to make
them different
' from the field names. When the parameter
names are
' the same as the field names, parameters in
the where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

For Each prmParam In qyExec.Parameters
Select Case prmParam.Name
Case "[cons_id]"
prmParam.Value = mIngConstraintId

Case "[s_id]"
prmParam.Value = mIngStepId

Case "[ver_no]"
prmParam.Value = mstrVersionNo

Case "[cons_type]"
prmParam.Value =
mintConstraintType

Case "[g_step_id]"
prmParam.Value =
mIngGlobalStepId

Case "[g_ver_no]"
prmParam.Value =
mstrGlobalVersionNo

Case "[seq_no]"
prmParam.Value = mintSequenceNo

```

```

Case Else
' Write the parameter name that is faulty
WriteError errInvalidParameter,
mstrSource, _
prmParam.Name
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource, _
LoadResString(errInvalidParameter)
End Select
Next prmParam

Exit Sub

AssignParametersErr:
mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrSource,
LoadResString(errAssignParametersFailed)

End Sub

Public Property Get NextIdentifier() As Long

Dim lngNextId As Long

On Error GoTo NextIdentifierErr

' First check if the database object is valid
Call CheckDB

' Retrieve the next constraint identifier using the
' sequence class
Set mConstraintSeq = New cSequence
Set mConstraintSeq.IdDatabase =
mdbsConstraintDB
mConstraintSeq.IdentifierColumn =
"constraint_id"
lngNextId = mConstraintSeq.Identifier
Set mConstraintSeq = Nothing

NextIdentifier = lngNextId
Exit Property

NextIdentifierErr:
LogErrors Errors
mstrSource = mstrModuleName &
"NextIdentifier"
On Error GoTo 0
Err.Raise vbObjectError + errStepIdGetFailed, _
mstrSource,
LoadResString(errStepIdGetFailed)

End Property

Private Sub CheckDB()
' Check if the database object has been initialized

If mdbsConstraintDB Is Nothing Then
ShowError errInvalidDB
On Error GoTo 0
Err.Raise vbObjectError + errInvalidDB, _
mstrModuleName,
LoadResString(errInvalidDB)
End If

End Sub

Public Sub Delete()

```

```

' Deletes the step constraint record from
the database

Dim strDelete As String
Dim qy As DAO.QueryDef

On Error GoTo DeleteErr
mstrSource = mstrModuleName &
"Delete"

' There can be multiple constraints for a
step,
' meaning that there can be multiple
constraint records
' with the same constraint_id. Only a
combination
' of the step_id, version and constraint_id
will be
' unique
strDelete = "delete from step_constraints
" & _
" where constraint_id = [cons_id]" & _
" and step_id = [s_id]" & _
" and version_no = [ver_no]"
Set qy =
mdbsConstraintDB.CreateQueryDef(gstrEm
ptyString, strDelete)

Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

strDelete = "Delete from step_constraints
" & _
" where constraint_id = " &
Str(mlngConstraintId) & _
" and step_id = " & Str(mlngStepId)
& _
" and version_no = " & mstrSQ &
mstrVersionNo & mstrSQ

' BugMessage strDelete
' mdbsConstraintDB.Execute strDelete,
dbFailOnError

Exit Sub

DeleteErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Delete"
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteConstraintFailed, _
mstrSource, _

LoadResString(errDeleteConstraintFailed)
End Sub
Public Sub Modify()
' Updates the sequence no of the step
constraint record
' in the database

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo Modify

' First check if the database object is valid
Call CheckDB

' Any record validations
Call Validate

```

```

' There can be multiple constraints for a step,
' meaning that there can be multiple
constraint records
' with the same constraint_id. Only a
combination
' of the step_id, version and constraint_id
will be
' unique
' Create a temporary querydef object with
the modify string
strUpdate = "Update step_constraints " & _
" set sequence_no = [seq_no]" & _
" where constraint_id = [cons_id]" & _
" and step_id = [s_id]" & _
" and version_no = [ver_no]"
Set qy =
mdbsConstraintDB.CreateQueryDef(gstrEmpt
yString, strUpdate)

' Call a procedure to assign the parameter
values to the
' querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

strUpdate = "Update step_constraints " & _
" set sequence_no = " &
Str(mintSequenceNo) & _
" where constraint_id = " &
Str(mlngConstraintId) & _
" and step_id = " & Str(mlngStepId) &
_
" and version_no = " & mstrSQ &
mstrVersionNo & mstrSQ

' BugMessage strUpdate
' mdbsConstraintDB.Execute strUpdate,
dbFailOnError
Exit Sub

Modify:
LogErrors Errors
mstrSource = mstrModuleName & "Modify"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateConstraintFailed, _
mstrSource, _

LoadResString(errUpdateConstraintFailed)
End Sub
Public Property Get Position() As Long

Position = mlngPosition

End Property
Public Property Let Position(ByVal RHS As
Long)

mlngPosition = RHS

End Property

Public Sub Validate()
' Each distinct object will have a Validate
method which
' will check if the class properties are valid.
This method
' will be used to check interdependant
properties that
' cannot be validated by the let procedures.
' It should be called by the add and modify
methods of the class

```

```

' No validations are necessary for the constraint
object

End Sub

Public Property Set NodeDB(vdata As Database)

Set mdbsConstraintDB = vdata

End Property

Public Property Get NodeDB() As Database

Set NodeDB = mdbsConstraintDB

End Property

Public Property Get GlobalVersionNo() As String

GlobalVersionNo = mstrGlobalVersionNo

End Property

Public Property Let GlobalVersionNo(ByVal vdata
As String)

mstrGlobalVersionNo = vdata

End Property

Public Property Get GlobalStepId() As Long

GlobalStepId = mlngGlobalStepId

End Property

Public Property Get ConstraintId() As Long

ConstraintId = mlngConstraintId

End Property

Public Property Get VersionNo() As String

VersionNo = mstrVersionNo

End Property

Public Property Get StepId() As Long

StepId = mlngStepId

End Property

Public Property Let VersionNo(ByVal vdata As
String)

mstrVersionNo = vdata

End Property

Public Property Let StepId(ByVal vdata As Long)

mlngStepId = vdata

End Property

Public Property Let ConstraintId(ByVal vdata As
Long)

On Error GoTo ConstraintIdErr
mstrSource = mstrModuleName &
"ConstraintId"

If (vdata > 0) Then

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```

    mlngConstraintId = vdata
Else
    ' Propagate this error back to the caller
    On Error GoTo 0
    Err.Raise vbObjectError +
errConstraintIdInvalid, _
    mstrSource,
LoadResString(errConstraintIdInvalid)
End If

Exit Property

ConstraintIdErr:
LogErrors Errors
mstrSource = mstrModuleName &
"ConstraintId"
On Error GoTo 0
Err.Raise vbObjectError +
errConstraintIdSetFailed, _
mstrSource,
LoadResString(errConstraintIdSetFailed)

End Property

Public Property Let GlobalStepId(ByVal
vdata As Long)

    On Error GoTo GlobalStepIdErr
mstrSource = mstrModuleName &
"GlobalStepId"

    If (vdata > 0) Then
        mlngGlobalStepId = vdata
    Else
        ' Propagate this error back to the caller
        On Error GoTo 0
        Err.Raise vbObjectError +
errGlobalStepIdInvalid, _
        mstrSource,
LoadResString(errGlobalStepIdInvalid)
    End If

Exit Property

GlobalStepIdErr:
LogErrors Errors
mstrSource = mstrModuleName &
"GlobalStepId"
On Error GoTo 0
Err.Raise vbObjectError +
errGlobalStepIdSetFailed, _
mstrSource,
LoadResString(errGlobalStepIdSetFailed)

End Property

Public Property Let ConstraintType(ByVal
vdata As ConstraintType)

    On Error GoTo ConstraintTypeErr

    ' A global step can be either a pre- or a
post-execution step.
    ' These constants have been defined in the
enumeration,
    ' ConstraintType, which is exposed
Select Case vdata
    Case gintPreStep, gintPostStep
        mintConstraintType = vdata

    Case Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errConstraintTypeInvalid, _

```

```

    mstrSource,
LoadResString(errConstraintTypeInvalid)
End Select

Exit Property

ConstraintTypeErr:
LogErrors Errors
mstrSource = mstrModuleName &
"ConstraintType"
On Error GoTo 0
Err.Raise vbObjectError +
errConstraintTypeLetFailed, _
mstrSource,
LoadResString(errConstraintTypeLetFailed)

End Property

Public Property Get ConstraintType() As
ConstraintType

    ConstraintType = mintConstraintType

End Property

Private Sub Class_Initialize()

    ' Initialize the operation indicator variable to
Query
    ' It will be modified later by the collection
class when
    ' inserts, updates or deletes are performed
mintOperation = QueryOp

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cFailedStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cFailedStep.cls
'
Microsoft TPC-H Kit Ver. 1.00
Copyright Microsoft, 1999
All Rights Reserved
'
' PURPOSE: Properties of a step execution
failure.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Public InstanceId As Long
Public StepId As Long
Public ParentStepId As Long
Public ContCriteria As ContinuationCriteria
Public EndTime As Currency
Public AskResponse As Long
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cFailedSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cFailedSteps.cls

```

```

Microsoft TPC-H Kit Ver. 1.00
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'
' PURPOSE: This module encapsulates a
collection of failed steps. It
' also determines whether sub-steps of a
passed in step need
' to be skipped due to a failure.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcFailedSteps As cVector
Public Function ExecuteSubStep(IParentStepId As
Long) As Boolean
    ' Returns False if there is any condition that
prevents sub-steps of the passed
' in instance from being executed
Dim IIndex As Long

    ExecuteSubStep = True

    For IIndex = 0 To Count() - 1
        If mcFailedSteps(IIndex).ContCriteria =
gintOnFailureCompleteSiblings And _
            IParentStepId <>
mcFailedSteps(IIndex).ParentStepId Then
            ExecuteSubStep = False
            Exit For
        End If

        If mcFailedSteps(IIndex).ContCriteria =
gintOnFailureAbortSiblings And _
            IParentStepId =
mcFailedSteps(IIndex).ParentStepId Then
            ExecuteSubStep = False
            Exit For
        End If

        If mcFailedSteps(IIndex).ContCriteria =
gintOnFailureSkipSiblings And _
            IParentStepId =
mcFailedSteps(IIndex).ParentStepId Then
            ExecuteSubStep = False
            Exit For
        End If

        If mcFailedSteps(IIndex).ContCriteria =
gintOnFailureAbort Then
            ExecuteSubStep = False
            Exit For
        End If

    Next IIndex

End Function

Public Sub Add(ByVal objItem As cFailedStep)

    mcFailedSteps.Add objItem

End Sub

Public Function Delete(ByVal IPosition As Long)
As cFailedStep

    Set Delete = mcFailedSteps.Delete(IPosition)

End Function

Public Sub Clear()

    mcFailedSteps.Clear

```



```

End Sub
Public Function Count() As Long

    Count = mcFailedSteps.Count

End Function
Public Property Get Item(ByVal Position As Long) As cFailedStep
Attribute Item.VB_UserMemId = 0

    Set Item = mcFailedSteps.Item(Position)

End Property

Public Function StepFailed(IStepId As Long) As Boolean

    ' Returns True if a failure record already exists for the passed in step
    Dim IIndex As Long

    StepFailed = False

    For IIndex = 0 To Count() - 1
        If mcFailedSteps(IIndex).StepId = IStepId Then
            StepFailed = True
            Exit For
        End If
    Next IIndex

End Function

Private Sub Class_Initialize()

    Set mcFailedSteps = New cVector

End Sub

Private Sub Class_Terminate()

    Set mcFailedSteps = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cFileInfo"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cFileInfo.cls
'
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  File Properties viz. name, handle, etc.
' Contact:  Reshma Tharamal
'           (reshmat@microsoft.com)
'
Option Explicit

Private mstrFileName As String
Private mintFileHandle As Integer
Private mdbsNodeDb As Database ' Since it is used to form a cNodeCollection
Private mlngPosition As Long ' Since it is used to form a cNodeCollection
Public Property Get FileName() As String

    FileName = mstrFileName

```

```

End Property
Public Property Let FileName(ByVal vdata As String)

    mstrFileName = vdata

End Property
Public Property Let FileHandle(ByVal vdata As Integer)

    mintFileHandle = vdata

End Property
Public Property Set NodeDB(vdata As Database)

    Set mdbsNodeDb = vdata

End Property

Public Property Get NodeDB() As Database

    Set NodeDB = mdbsNodeDb

End Property
Public Property Get Position() As Long

    Position = mlngPosition

End Property
Public Property Let Position(ByVal vdata As Long)

    mlngPosition = vdata

End Property

Public Property Get FileHandle() As Integer

    FileHandle = mintFileHandle

End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cFileSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY = "Save dWithClassBuilder", "Yes"
Attribute VB_Ext_KEY = "Top_Level", "Yes"
' FILE:    cFileSM.cls
'
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  Encapsulates functions to open a file and write to it.
' Contact:  Reshma Tharamal
'           (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cFileSM."
Private mstrSource As String

```

```

Private mstrFileName As String
Private mintHFile As Integer
Private mstrFileHeader As String
Private mstrProjectName As String

Public Sub CloseFile()

    ' Close the file
    If mintHFile > 0 Then
        Call CloseFileSM(mstrFileName)
        mintHFile = 0
    End If

End Sub

Public Property Let ProjectName(ByVal vdata As String)
' An optional field - will be appended to the file
' header string if specified

    Const strProjectHdr As String = "Project Name:"

    mstrProjectName = vdata
    mstrFileHeader = mstrFileHeader & _
        Space$(1) & strProjectHdr & Space$(1) & _
        gstrSQ & vdata & gstrSQ

End Property
Public Property Get ProjectName() As String

    ProjectName = mstrProjectName

End Property
Public Property Get FileName() As String

    FileName = mstrFileName

End Property
Public Property Let FileName(ByVal vdata As String)

    mstrFileName = vdata

End Property
Public Sub WriteLine(strMsg As String)

    ' Writes the passed in string to the file
    Call WriteToFile(strMsg, False)

End Sub

Public Sub WriteField(strMsg As String)

    ' Writes the passed in string to the file
    Call WriteToFile(strMsg, True)

End Sub

Private Sub WriteToFile(strMsg As String, _
    bInContinue As Boolean)
    ' Writes the passed in string to the file - the
    ' Continue flag indicates whether the next line will
    ' be continued on the same line or printed on a new one

    On Error GoTo WriteToFileErr

    ' Open the file if it hasn't been already
    If mintHFile = 0 Then

        ' If the filename has not been initialized, do not
        ' attempt to open it
        If mstrFileName <> gstrEmptyString Then

```

```

    mintHFile =
OpenFileSM(mstrFileName)

    If mintHFile = 0 Then
        ' The Open File command failed
for some reason
        ' No point in trying to write the
file header
    Else
        ' Print a file header, if a header
string has been
        ' initialized
    If mstrFileHeader <>
gstrEmptyString Then
        Print #mintHFile,
        Print #mintHFile,
mstrFileHeader
        Print #mintHFile,
    End If
    End If
    End If
    End If

If mintHFile <> 0 Then
    If strMsg = gstrEmptyString Then
        Print #mintHFile,
    Else
        If blnContinue Then
            ' Write the message to the file -
continue
            ' all subsequent characters on the
same line
            Print #mintHFile, strMsg;
        Else
            ' Write the message to the file
            Print #mintHFile, strMsg
        End If
    End If
    Else
        ' Display the string to the user instead
of
        ' trying to write it to the file
        ' This could be the project error log that
we were
        ' trying to open! Play it safe and display
errors - do
        ' not try to log them.
        MsgBox strMsg, vbOKOnly
    End If

    Exit Sub

WriteToFileErr:
    ' Log the error code raised by Visual
Basic
    Call DisplayErrors(Errors)

    ' Display the string to the user instead of
    ' trying to write it to the file
    MsgBox strMsg, vbOKOnly

End Sub
Public Property Let FileHeader(ByVal vdata
As String)

    mstrFileHeader = vdata

End Property
Public Property Get FileHeader() As String

    FileHeader = mstrFileHeader

End Property

```

```

Private Sub Class_Terminate()

    ' Close the file opened by this instance
    Call CloseFile

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cGlobalStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cGlobalStep.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
'
' PURPOSE:  Encapsulates the properties
and methods of a global step.
'           Implements the cStep class - carries
out initializations
'           and validations that are specific to
global steps.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Implements cStep

' Object variable to keep the reference in
Private mcStep As cStep

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cGlobalStep."

Private Sub cStep_AddAllIterators()

    Call mcStep.AddAllIterators

End Sub

Private Sub cStep_AddIterator(cItRecord As
cIterator)

    Call mcStep.AddIterator(cItRecord)

End Sub

Private Property Let
cStep_ArchivedFlag(ByVal RHS As Boolean)

    mcStep.ArchivedFlag = RHS

End Property

Private Property Get cStep_ArchivedFlag() As
Boolean

    cStep_ArchivedFlag = mcStep.ArchivedFlag

End Property

Private Sub Class_Initialize()

```

```

' Create the object
Set mcStep = New cStep

' Initialize the object with valid values for a
global step
' The global flag should be the first field to be
initialized
' since subsequent validations might try to check
if the
' step being created is global
mcStep.GlobalFlag = True
mcStep.StepType = gintGlobalStep

' A global step cannot have any sub-steps
associated with it
' Hence, it will always be at Step Level 0
mcStep.ParentStepId = 0
mcStep.ParentVersionNo = gstrMinVersion
mcStep.StepLevel = 0

' The enabled flag must be False for all global
steps
' Global steps can be of two types
' a. Those that are run globally within a
workspace either
' before every step, after every step or during
the entire
' run, depending on the global run method
' b. Those that are not run globally, but qualify to
be either
' pre or post-execution steps for other steps in
the workspace.
' Whether or not such a step will be executed
depends on
' whether the step for which it is defined as a
pre/post
' step will be executed
mcStep.EnabledFlag = False

mcStep.ContinuationCriteria = gintNoOption
mcStep.DegreeParallelism =
gstrGlobalParallelism

End Sub
Private Sub Class_Terminate()

    ' Remove the step object
    Set mcStep = Nothing

End Sub

Private Sub cStep_Add()

    ' Call a private procedure to see if the step text
has been
    ' entered - since a global step actually executes a
step, entry
    ' of the text is mandatory
    Call StepTextOrFileEntered

    ' Call the Add method of the step class to carry
out the insert
    mcStep.Add

End Sub

Private Function cStep_Clone(Optional cCloneStep
As cStep) As cStep

    Dim cNewGlobal As cGlobalStep

    Set cNewGlobal = New cGlobalStep
    Set cStep_Clone = mcStep.Clone(cNewGlobal)

End Function

```

<pre> Private Property Get cStep_ContinuationCriteria() As ContinuationCriteria cStep_ContinuationCriteria = mcStep.ContinuationCriteria End Property Private Property Let cStep_ContinuationCriteria(ByVal RHS As ContinuationCriteria) ' The continuation criteria field will always be empty for a ' global step mcStep.ContinuationCriteria = 0 End Property Private Property Let cStep_DegreeParallelism(ByVal RHS As String) ' Will always be zero for a global step mcStep.DegreeParallelism = gstrGlobalParallelism End Property Private Property Get cStep_DegreeParallelism() As String cStep_DegreeParallelism = mcStep.DegreeParallelism End Property Private Sub cStep_DeleteIterator(cItRecord As cIterator) Call mcStep.DeleteIterator(cItRecord) End Sub Private Sub cStep_Delete() mcStep.Delete End Sub Private Property Get cStep_EnabledFlag() As Boolean cStep_EnabledFlag = mcStep.EnabledFlag End Property Private Property Let cStep_EnabledFlag(ByVal RHS As Boolean) ' The enabled flag must be False for all global steps ' Global steps can be of two types ' a. Those that are run globally within a workspace either ' before every step, after every step or during the entire ' run, depending on the global run method </pre>	<pre> ' b. Those that are not run globally, but qualify to be either ' pre or post-execution steps for other steps in the workspace. ' Whether or not such a step will be executed depends on ' whether the step for which it is defined as a pre/post ' step will be executed mcStep.EnabledFlag = False End Property Private Property Let cStep_ErrorFile(ByVal RHS As String) mcStep.ErrorFile = RHS End Property Private Property Get cStep_ErrorFile() As String cStep_ErrorFile = mcStep.ErrorFile End Property Private Property Let cStep_ExecutionMechanism(ByVal RHS As ExecutionMethod) ' Whether or not the Execution Mechanism is valid will be ' checked by the Step class mcStep.ExecutionMechanism = RHS End Property Private Property Get cStep_ExecutionMechanism() As ExecutionMethod cStep_ExecutionMechanism = mcStep.ExecutionMechanism End Property Private Property Get cStep_FailureDetails() As String ' Whether or not the Failure Details are valid for the ' selected failure criteria will be checked by the Step class mcStep.FailureDetails = RHS End Property Private Property Get cStep_FailureDetails() As String cStep_FailureDetails = mcStep.FailureDetails End Property Private Property Get cStep_GlobalFlag() As Boolean cStep_GlobalFlag = mcStep.GlobalFlag End Property Private Property Let cStep_GlobalFlag(ByVal RHS As Boolean) </pre>	<pre> ' Set the global flag to true mcStep.GlobalFlag = True End Property Private Function cStep_IncVersionX() As String cStep_IncVersionX = mcStep.IncVersionX End Function Private Function cStep_IncVersionY() As String cStep_IncVersionY = mcStep.IncVersionY End Function Private Property Let cStep_GlobalRunMethod(ByVal RHS As Integer) ' ' ' Whether or not the Global Run Method is valid for the step ' ' will be checked by the Step class ' mcStep.GlobalRunMethod = RHS ' End Property Private Property Get cStep_GlobalRunMethod() As Integer ' ' cStep_GlobalRunMethod = mcStep.GlobalRunMethod ' End Property Private Property Get cStep_IndOperation() As Operation cStep_IndOperation = mcStep.IndOperation End Property Private Property Let cStep_IndOperation(ByVal RHS As Operation) mcStep.IndOperation = RHS End Property Private Sub cStep_InsertIterator(cItRecord As cIterator) Call mcStep.InsertIterator(cItRecord) End Sub Private Function cStep_IsNewVersion() As Boolean cStep_IsNewVersion = mcStep.IsNewVersion End Function Private Function cStep_IteratorCount() As Long cStep_IteratorCount = mcStep.IteratorCount End Function Private Property Let cStep_IteratorName(ByVal RHS As String) mcStep.IteratorName = RHS End Property </pre>
--	--	--

```

Private Property Get cStep_IteratorName()
As String

    cStep_IteratorName =
mcStep.IteratorName
End Property

Private Function cStep_Iterators() As
Variant

    cStep_Iterators = mcStep.Iterators

End Function

Private Sub cStep_LoadIterator(cItRecord
As cIterator)

    Call mcStep.LoadIterator(cItRecord)

End Sub

'Private Property Let cStep_LogFile(ByVal
RHS As String)
'
' mcStep.LogFile = RHS
'
'End Property
'
'Private Property Get cStep_LogFile() As
String
'
' cStep_LogFile = mcStep.LogFile
'
'End Property

Private Sub cStep_ModifyIterator(cItRecord
As cIterator)

    Call mcStep.ModifyIterator(cItRecord)

End Sub

Private Sub cStep_Modify()

    ' Call a private procedure to see if the step
text has been
    ' entered - since a global step actually
executes a step,
    ' entry of the text is mandatory
    Call StepTextOrFileEntered

    ' Call the Modify method of the step class
to carry out the update
    mcStep.Modify

End Sub

Private Property Get cStep_NextStepId() As
Long

    cStep_NextStepId = mcStep.NextStepId

End Property

Private Property Set cStep_NodeDB(RHS
As DAO.Database)

    Set mcStep.NodeDB = RHS

End Property

Private Property Get cStep_NodeDB() As
DAO.Database

```

```

    Set cStep_NodeDB = mcStep.NodeDB

End Property

Private Function cStep_OldVersionNo() As
String
    cStep_OldVersionNo =
mcStep.OldVersionNo
End Function

Private Property Let cStep_OutputFile(ByVal
RHS As String)

    mcStep.OutputFile = RHS

End Property

Private Property Get cStep_OutputFile() As
String

    cStep_OutputFile = mcStep.OutputFile

End Property

Private Property Let
cStep_ParentStepId(ByVal RHS As Long)

    ' A global step cannot have any sub-steps
associated with it
    ' Hence, the parent step id and parent version
number will be zero
    mcStep.ParentStepId = 0

End Property

Private Property Get cStep_ParentStepId() As
Long

    cStep_ParentStepId = mcStep.ParentStepId

End Property

Private Property Let
cStep_ParentVersionNo(ByVal RHS As
String)

    ' A global step cannot have any sub-steps
associated with it
    ' Hence, the parent step id and parent version
number will be zero
    mcStep.ParentVersionNo = gstrMinVersion

End Property

Private Property Get cStep_ParentVersionNo()
As String

    cStep_ParentVersionNo =
mcStep.ParentVersionNo

End Property

Private Property Let cStep_Position(ByVal
RHS As Long)

    mcStep.Position = RHS

End Property

Private Property Get cStep_Position() As Long

    cStep_Position = mcStep.Position

End Property

```

```

Private Sub cStep_RemoveIterator(cItRecord As
cIterator)

    Call mcStep.RemoveIterator(cItRecord)

End Sub

Private Sub cStep_SaveIterators()

    Call mcStep.SaveIterators

End Sub

Private Property Let cStep_SequenceNo(ByVal
RHS As Integer)

    mcStep.SequenceNo = RHS

End Property

Private Property Get cStep_SequenceNo() As
Integer

    cStep_SequenceNo = mcStep.SequenceNo

End Property

Private Property Let cStep_StepId(ByVal RHS As
Long)

    mcStep.StepId = RHS

End Property

Private Property Get cStep_StepId() As Long

    cStep_StepId = mcStep.StepId

End Property

Private Property Let cStep_StepLabel(ByVal RHS
As String)

    mcStep.StepLabel = RHS

End Property

Private Property Get cStep_StepLabel() As String

    cStep_StepLabel = mcStep.StepLabel

End Property

Private Property Let cStep_StartDir(ByVal RHS As
String)

    mcStep.StartDir = RHS

End Property

Private Property Get cStep_StartDir() As String

    cStep_StartDir = mcStep.StartDir

End Property

Private Property Let cStep_StepLevel(ByVal RHS
As Integer)

    ' A global step cannot have any sub-steps
associated with it
    ' Hence, it will always be at step level 0
    mcStep.StepLevel = 0

```

```

End Property

Private Property Get cStep_StepLevel() As Integer
    cStep_StepLevel = mcStep.StepLevel
End Property

Private Property Let cStep_StepText(ByVal RHS As String)
    mcStep.StepText = RHS
End Property

Private Property Get cStep_StepText() As String
    cStep_StepText = mcStep.StepText
End Property

Private Property Let cStep_StepTextFile(ByVal RHS As String)
    mcStep.StepTextFile = RHS
End Property

Private Property Get cStep_StepTextFile() As String
    cStep_StepTextFile = mcStep.StepTextFile
End Property

Private Property Let cStep_StepType(RHS As gintStepType)
    mcStep.StepType = gintGlobalStep
End Property

Private Property Get cStep_StepType() As gintStepType
    cStep_StepType = mcStep.StepType
End Property

Private Sub cStep_UnloadIterators()
    Call mcStep.UnloadIterators
End Sub

Private Sub cStep_UpdateIterator(cItRecord As cIterator)
    Call mcStep.UpdateIterator(cItRecord)
End Sub

Private Sub cStep_UpdateIteratorVersion()
    Call mcStep.UpdateIteratorVersion
End Sub

Private Sub cStep_Validate()
    ' The validate routines for each of the steps will
    ' carry out the specific validations for the type and
    ' call the generic validation routine
    On Error GoTo cStep_ValidateErr
    mstrSource = mstrModuleName & "cStep_Validate"

    ' Validations specific to global steps

    ' Check if the step text or a file name has been
    ' specified
    Call StepTextOrFileEntered

    ' The step level must be zero for all globals
    If mcStep.StepLevel <> 0 Then
        ShowError errStepLevelZeroForGlobal
        On Error GoTo 0
        Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.EnabledFlag Then
        ShowError errEnabledFlagFalseForGlobal
        On Error GoTo 0
        Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.DegreeParallelism > 0 Then
        ShowError
        errDegParallelismNullForGlobal
        On Error GoTo 0
        Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.ContinuationCriteria > 0 Then
        ShowError errContCriteriaNullForGlobal
        On Error GoTo 0
        Err.Raise vbObjectError + errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    mcStep.Validate

    Exit Sub

cStep_ValidateErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "cStep_Validate"
    On Error GoTo 0
    Err.Raise vbObjectError + errValidateFailed, _
        mstrSource, _
        LoadResString(errValidateFailed)
End Sub

Private Sub StepTextOrFileEntered()
    ' Checks if either the step text or the name of the file containing
    ' the text has been entered
    ' If both of them are null or both of them are not null,
    ' the global step is invalid and an error is raised

    If StringEmpty(mcStep.StepText) And StringEmpty(mcStep.StepTextFile) Then
        ShowError errStepTextAndFileNull
        On Error GoTo 0
        Err.Raise vbObjectError + errStepTextAndFileNull, _
            mstrSource,
            LoadResString(errStepTextAndFileNull)
    ElseIf Not StringEmpty(mcStep.StepText) And Not StringEmpty(mcStep.StepTextFile) Then
        ShowError errStepTextOrFile
        On Error GoTo 0
        Err.Raise vbObjectError + errStepTextOrFile, _
            mstrSource,
            LoadResString(errStepTextOrFile)
    End If
End Sub

Private Property Let cStep_VersionNo(ByVal RHS As String)
    mcStep.VersionNo = RHS
End Property

Private Property Get cStep_VersionNo() As String
    cStep_VersionNo = mcStep.VersionNo
End Property

Private Property Let cStep_WorkspaceId(ByVal RHS As Long)
    mcStep.WorkspaceId = RHS
End Property

Private Property Get cStep_WorkspaceId() As Long
    cStep_WorkspaceId = mcStep.WorkspaceId
End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cInstance"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cInstance.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:   Encapsulates the properties and methods of an instance.
'           An instance is created when a step is executed for a
'           particular iterator value (if applicable) at 'run' time.
'           Contains functions to determine if an instance is running,
'           complete, and so on.
' Contact:   Reshma Tharamal
'           (reshmat@microsoft.com)
'
Option Explicit

```

```

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cInstance."
Private mstrSource As String

Private mcStep As cStep
Public Key As String ' Node key for the step
being executed
Public InstanceId As Long
Public ParentInstanceId As Long ' The
parent instance
Private mblnNoMoreToStart As Boolean
Private mblnComplete As Boolean
Public StartTime As Currency
Public EndTime As Currency
Public ElapsedTime As Currency
Private mintStatus As InstanceStatus
Public DegreeParallelism As Integer
Private mcIterators As cRunCollt

' A collection of all the sub-steps for this
step
Private mcSubSteps As cSubSteps
Public Sub UpdateStartTime(lStepId As
Long, Optional ByVal StartTm As Currency
= gdtmEmpty, _
Optional ByVal EndTm As Currency =
gdtmEmpty, _
Optional ByVal Elapsed As Currency =
0)
' We do not maintain start and end
timestamps for the constraint
' of a step. Hence we check if the process
that just started/
' terminated is the worker step that is
being executed. If so,
' we update the start/end time and status
on the instance record.

BugAssert (StartTm <> gdtmEmpty) Or
(EndTm <> gdtmEmpty), "Mandatory
parameter missing."

' Make sure that we are executing the
actual step and not
' a pre or post-execution constraint
If mcStep.StepId = lStepId Then
If StartTm <> 0 Then
StartTime = StartTm
mintStatus = gintRunning
Else
EndTime = EndTm
ElapsedTime = Elapsed
mintStatus = gintComplete
End If
End If

End Sub
Public Function
ValidForIteration(cParentInstance As
cInstance, _
ByVal intConsType As
ConstraintType) As Boolean
' Returns true if the instance passed in is
the first or
' last iteration for the step, depending on
the constraint type

Dim cSubStepRec As cSubStep
Dim vntIterators As Variant

On Error GoTo ValidForIterationErr

```

```

If cParentInstance Is Nothing Then
' This will only be true for the dummy
instance, which
' cannot have any iterators defined for it
ValidForIteration = True
Exit Function
End If

vntIterators = mcStep.Iterators

If Not StringEmpty(mcStep.IteratorName)
And Not IsEmpty(vntIterators) Then

Set cSubStepRec =
cParentInstance.QuerySubStep(mcStep.StepId)

If intConsType = gintPreStep Then
' Pre-execution constraints will only be
executed
' before the first iteration
If
cSubStepRec.LastIterator.IteratorType =
gintValue Then
ValidForIteration =
(cSubStepRec.LastIterator.Sequence = _
gintMinIteratorSequence)
Else
ValidForIteration =
(cSubStepRec.LastIterator.Value = _
cSubStepRec.LastIterator.RangeFrom)
End If
Else
' Post-execution constraints will only be
executed
' after the last iteration - check if there
are any
' pending iterations
ValidForIteration =
cSubStepRec.NextIteration(mcStep) Is
Nothing
End If
Else
ValidForIteration = True
End If

Exit Function

ValidForIterationErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"ValidForIteration"
Err.Raise vbObjectError +
errExecInstanceFailed, _
mstrSource,
LoadResString(errExecInstanceFailed)

End Function

Public Sub CreateSubStep(cSubStepDtls As
cStep, RunParams As cArrParameters)

Dim cNewSubStep As cSubStep

On Error GoTo CreateSubStepErr

Set cNewSubStep = New cSubStep

cNewSubStep.StepId = cSubStepDtls.StepId
cNewSubStep.TasksComplete = 0
cNewSubStep.TasksRunning = 0

' Initialize the iterator for the instance

```

```

Set cNewSubStep.LastIterator = New
cRunItDetails
Call cNewSubStep.InitializeIt(cSubStepDtls,
RunParams)

' Add add the substep to the collection
mcSubSteps.Add cNewSubStep

Set cNewSubStep = Nothing

Exit Sub

CreateSubStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"CreateSubStep"
Err.Raise vbObjectError + errProgramError,
mstrSource, _
LoadResString(errProgramError)

End Sub

Public Function QuerySubStep(ByVal SubStepId
As Long) As cSubStep
' Retrieves the sub-step record for the passed in
sub-step id

Dim lngIndex As Long

On Error GoTo QuerySubStepErr

' Find the sub-step node with the matching step id
For lngIndex = 0 To mcSubSteps.Count - 1
If mcSubSteps(lngIndex).StepId = SubStepId
Then
Set QuerySubStep = mcSubSteps(lngIndex)
Exit For
End If
Next lngIndex

Exit Function

QuerySubStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"QuerySubStep"
Err.Raise vbObjectError +
errNavInstancesFailed, _
mstrSource,
LoadResString(errNavInstancesFailed)

End Function
Public Property Let AllStarted(ByVal vdata As
Boolean)

"bugmessage "Set All Started to " & vData & "
for : " & _
mstrKey

mblnNoMoreToStart = vdata

End Property
Public Property Get AllStarted() As Boolean

AllStarted = mblnNoMoreToStart

End Property
Public Property Let AllComplete(ByVal vdata As
Boolean)

```

```

'bugmessage "Set All Complete to " &
vData & " for : " & _
    mstrKey

    mblnComplete = vdata
End Property

Public Property Get AllComplete() As
Boolean
    AllComplete = mblnComplete
End Property

Public Sub ChildExecuted(mlngStepId As
Long)
' This procedure is called when a sub-step
executes.

    Dim lngIndex As Long

    On Error GoTo ChildExecutedErr

    BugAssert mcStep.StepType =
gintManagerStep

    For lngIndex = 0 To mcSubSteps.Count -
1
        If mcSubSteps(lngIndex).StepId =
mlngStepId Then
            mcSubSteps(lngIndex).TasksRunning = _
            mcSubSteps(lngIndex).TasksRunning + 1
            BugMessage "Tasks Running for
Step Id : " & _
            CStr(mcSubSteps(lngIndex).StepId) & _
            " Instance Id: " & InstanceId &
_
            " = " &
            mcSubSteps(lngIndex).TasksRunning
            Exit For
        End If
    Next lngIndex

    If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an
error
        On Error GoTo 0
        Err.Raise vbObjectError +
errInvalidChild, mstrModuleName, _
        LoadResString(errInvalidChild)
    End If

    Exit Sub

ChildExecutedErr:
' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errInstanceOpFailed, mstrModuleName &
"ChildExecuted", _
    LoadResString(errInstanceOpFailed)
End Sub

Public Sub ChildTerminated(mlngStepId As
Long)
' This procedure is called when any sub-
step process
terminates. Note: The TasksComplete
field will be

```

```

' updated only when all the instances for a
sub-step
complete execution.
    Dim lngIndex As Long

    On Error GoTo ChildTerminatedErr

    BugAssert mcStep.StepType =
gintManagerStep

    For lngIndex = 0 To mcSubSteps.Count - 1

        If mcSubSteps(lngIndex).StepId =
mlngStepId Then
            mcSubSteps(lngIndex).TasksRunning =
_
            mcSubSteps(lngIndex).TasksRunning - 1
            BugMessage "Tasks Running for Step
Id : " & _
            CStr(mcSubSteps(lngIndex).StepId) & _
            " Instance Id: " & InstanceId & _
            " = " &
            mcSubSteps(lngIndex).TasksRunning
            BugAssert
            mcSubSteps(lngIndex).TasksRunning >= 0, _
            "Tasks running for " &
            CStr(mlngStepId) & _
            " Instance Id " & InstanceId & " is
less than 0."
            Exit For
        End If
    Next lngIndex

    If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an
error
        On Error GoTo 0
        Err.Raise errInvalidChild,
mstrModuleName & "ChildTerminated", _
        LoadResString(errInvalidChild)
    End If

    Exit Sub

ChildTerminatedErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
"ChildTerminated"
    Err.Raise vbObjectError +
errInstanceOpFailed, mstrSource, _
    LoadResString(errInstanceOpFailed)
End Sub

Public Sub ChildCompleted(mlngStepId As
Long)
' This procedure is called when any a sub-
step completes
execution. Note: The TasksComplete field
will be
incremented.
    Dim lngIndex As Long

    On Error GoTo ChildCompletedErr

    BugAssert mcStep.StepType =
gintManagerStep

    For lngIndex = 0 To mcSubSteps.Count - 1
        BugAssert
        mcSubSteps(lngIndex).TasksComplete >= 0, _

```

```

"Tasks complete for " &
CStr(mcSubSteps(lngIndex).StepId) & _
" Instance Id " & InstanceId & " is less
than 0."

        If mcSubSteps(lngIndex).StepId = mlngStepId
Then
            mcSubSteps(lngIndex).TasksComplete = _
            mcSubSteps(lngIndex).TasksComplete
+ 1
            BugMessage "Tasks Complete for Step Id :
" & _
            CStr(mcSubSteps(lngIndex).StepId) &
_
            " Instance Id: " & InstanceId & _
            " = " &
            mcSubSteps(lngIndex).TasksComplete
            Exit For
        End If
    Next lngIndex

    If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an error
    On Error GoTo 0
    Err.Raise errInvalidChild, mstrModuleName, _
    LoadResString(errInvalidChild)
    End If

    Exit Sub

ChildCompletedErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errInstanceOpFailed,
mstrModuleName & "ChildCompleted", _
    LoadResString(errInstanceOpFailed)
End Sub

Public Sub ChildDeleted(mlngStepId As Long)
' This procedure is called when a sub-step needs
to be re-executed
' Note: The TasksComplete field is decremented.
We needn't worry about
' the TasksRunning field since no steps are
currently running.
    Dim lngIndex As Long

    On Error GoTo ChildDeletedErr

    BugAssert mcStep.StepType = gintManagerStep

    For lngIndex = 0 To mcSubSteps.Count - 1

        If mcSubSteps(lngIndex).StepId = mlngStepId
Then
            mcSubSteps(lngIndex).TasksRunning = _
            mcSubSteps(lngIndex).TasksRunning -
1

            BugAssert
            mcSubSteps(lngIndex).TasksRunning >= 0, _
            "Tasks running for " &
            CStr(mcSubSteps(lngIndex).StepId) & _
            " Instance Id " & InstanceId & " is less
than 0."
            Exit For
        End If
    Next lngIndex

    If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an error
    On Error GoTo 0
    Err.Raise errInvalidChild, mstrModuleName, _
    LoadResString(errInvalidChild)

```

```

End If
Exit Sub

ChildDeletedErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errInstanceOpFailed, mstrModuleName &
"ChildDeleted", _
LoadResString(errInstanceOpFailed)

End Sub
Private Sub RaiseErrForWorker()

If mcStep.StepType <> gintManagerStep
Then
On Error GoTo 0
mstrSource = mstrModuleName &
"RaiseErrForWorker"
Err.Raise vbObjectError +
errInvalidForWorker, _
mstrSource, _

LoadResString(errInvalidForWorker)
End If

End Sub

Public Property Get Step() As cStep

Set Step = mcStep

End Property
Public Property Get Iterators() As cRunCollt

Set Iterators = mcIterators

End Property
Public Property Get SubSteps() As
cSubSteps

Call RaiseErrForWorker

Set SubSteps = mcSubSteps

End Property
Public Property Set Step(cRunStep As
cStep)

Set mcStep = cRunStep

End Property

Public Property Set Iterators(cIts As
cRunCollt)

Set mcIterators = cIts

End Property
Public Property Get IsPending() As Boolean
' Returns true if the step has any substeps
that need
' execution
Dim lngIndex As Long
Dim lngRunning As Long

Call RaiseErrForWorker

If Not mblnComplete And Not
mblnNoMoreToStart Then
' Get a count of all the substeps that are
already being

```

```

' executed
lngRunning = 0
For lngIndex = 0 To mcSubSteps.Count -
1
lngRunning = lngRunning +
mcSubSteps(lngIndex).TasksRunning
Next lngIndex

IsPending = (lngRunning <
DegreeParallelism)
Else
' This should be sufficient to prove that
there r no
' more sub-steps to be executed.
' mblnComplete: Handles the case where
all steps have
' been executed
' mblnNoMoreToStart: Handles the case
where the step
' has a degree of parallelism greater than
the total
' number of sub-steps available to execute
IsPending = False
End If

End Property
Public Property Get IsRunning() As Boolean
' Returns true if the any one of the substeps
is still
' executing
Dim lngIndex As Long

Call RaiseErrForWorker

IsRunning = False

' If a substep has no currently executing
tasks and
' the tasks completed is greater than zero,
then we can
' assume that it has completed execution
(otherwise we
' would've run a new task the moment one
completed!)
For lngIndex = 0 To mcSubSteps.Count - 1
If mcSubSteps(lngIndex).TasksRunning >
0 Then
IsRunning = True
Exit For
End If
Next lngIndex

End Property
Public Property Get TotalRunning() As Long
' Returns the total number of substeps that
are executing
Dim lngTotalProcesses As Long
Dim lngIndex As Long

Call RaiseErrForWorker

lngTotalProcesses = 0
For lngIndex = 0 To mcSubSteps.Count - 1
BugAssert
mcSubSteps(lngIndex).TasksRunning >= 0, _
"Tasks running for " &
CStr(mcSubSteps(lngIndex).StepId) & _
" is less than 0."

lngTotalProcesses = lngTotalProcesses +
mcSubSteps(lngIndex).TasksRunning
Next lngIndex

TotalRunning = lngTotalProcesses
End Property

```

```

Public Property Get RunningForStep(lngSubStepId
As Long) As Long
' Returns the total number of instances of the
substep
' that are executing
Dim lngIndex As Long

Call RaiseErrForWorker

For lngIndex = 0 To mcSubSteps.Count - 1
BugAssert
mcSubSteps(lngIndex).TasksRunning >= 0, _
"Tasks running for " &
CStr(mcSubSteps(lngIndex).StepId) & _
" is less than 0."

If mcSubSteps(lngIndex).StepId =
lngSubStepId Then
RunningForStep =
mcSubSteps(lngIndex).TasksRunning
Exit For
End If
Next lngIndex

If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an error
On Error GoTo 0
Err.Raise errInvalidChild, mstrSource, _
LoadResString(errInvalidChild)
End If

End Property

Public Property Let Status(ByVal vdata As
InstanceStatus)

mintStatus = vdata

End Property

Public Property Get Status() As InstanceStatus

Status = mintStatus

End Property
Private Sub Class_Initialize()

Set mcSubSteps = New cSubSteps

mblnNoMoreToStart = False
mblnComplete = False
StartTime = gdtmEmpty
EndTime = gdtmEmpty

End Sub

Private Sub Class_Terminate()

mcSubSteps.Clear
Set mcSubSteps = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cInstances"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cInstances.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

```



```

'
'
' PURPOSE: Implements a collection of
cInstance objects.
'
' Type-safe wrapper around cVector.
' Also contains additional functions
to query an instance, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cInstance."
Private mstrSource As String

Private mcInstances As cVector

Public Function QueryInstance(ByVal
InstanceID As Long) As cInstance
' Retrieves the record for the passed in
instance from
' the collection

Dim lngIndex As Long

On Error GoTo QueryInstanceErr

' Check for valid values of the instance id
If InstanceID > 0 Then
' Find the run node with the matching
step id
For lngIndex = 0 To Count() - 1
If mcInstances(lngIndex).InstanceID
= InstanceID Then
Set QueryInstance =
mcInstances(lngIndex)
Exit For
End If
Next lngIndex

If lngIndex > mcInstances.Count - 1
Then
On Error GoTo 0
Err.Raise vbObjectError +
errQueryFailed, mstrSource, _
LoadResString(errQueryFailed)
End If
Else
On Error GoTo 0
Err.Raise vbObjectError +
errQueryFailed, mstrSource, _
LoadResString(errQueryFailed)
End If

Exit Function

QueryInstanceErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"QueryInstance"
Err.Raise vbObjectError +
errQueryFailed, _
mstrSource,
LoadResString(errQueryFailed)

End Function

```

```

Public Function QueryPendingInstance(ByVal
ParentInstanceID As Long, _
ByVal lngSubStepID As Long) As
cInstance
' Retrieves a pending instance for the passed
in substep
' and the given parent instance id.

Dim lngIndex As Long

On Error GoTo QueryPendingInstanceErr

' Find the run node with the matching step id
For lngIndex = 0 To Count() - 1
If mcInstances(lngIndex).ParentInstanceID
= ParentInstanceID And _
mcInstances(lngIndex).Step.StepID =
lngSubStepID Then
' Put in a separate if condition since the
IsPending
' property is valid only for manager
steps. If the
' calling procedure does not pass a
manager step
' identifier, the procedure will error out.
If mcInstances(lngIndex).IsPending
Then
Set QueryPendingInstance =
mcInstances(lngIndex)
Exit For
End If
Next lngIndex

Exit Function

QueryPendingInstanceErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"QueryPendingInstance"
Err.Raise vbObjectError + errQueryFailed, _
mstrSource,
LoadResString(errQueryFailed)

End Function

Public Function InstanceAborted(cSubStepRec
As cSubStep) As Boolean

Dim lngIndex As Long

InstanceAborted = False

For lngIndex = 0 To Count() - 1
If mcInstances(lngIndex).Step.StepID =
cSubStepRec.StepID And _
mcInstances(lngIndex).Status =
gintAborted Then
InstanceAborted = True
Exit For
End If
Next lngIndex

End Function

Public Function
CompletedInstanceExists(IParentInstance As
Long, _
cSubStepDtls As cStep) As Boolean
' Checks if there is a completed instance of
the passed in step

Dim lngIndex As Long

CompletedInstanceExists = False

```

```

If cSubStepDtls.StepType = gintManagerStep
Then
' Find the run node with the matching step id
For lngIndex = 0 To Count() - 1
If mcInstances(lngIndex).ParentInstanceID =
IParentInstance And _
mcInstances(lngIndex).Step.StepID =
cSubStepDtls.StepID Then
' Put in a separate if condition since the
IsPending
' property is valid only for manager steps.
BugAssert (Not
mcInstances(lngIndex).IsPending), "Pending
instance exists!"

CompletedInstanceExists = True
Exit Function
End If
Next lngIndex
End If

End Function

Public Sub Add(ByVal objItem As cInstance)

mcInstances.Add objItem

End Sub

Public Sub Clear()

mcInstances.Clear

End Sub

Public Function Count() As Long

Count = mcInstances.Count

End Function

Public Function Delete(ByVal lngDelete As Long)
As cInstance

Set Delete = mcInstances.Delete(lngDelete)

End Function

Public Property Set Item(Optional ByVal Position
As Long, _
RHS As cInstance)

If Position = -1 Then
Position = 0
End If
Set mcInstances(Position) = RHS

End Property

Public Property Get Item(Optional ByVal Position
As Long = -1) _
As cInstance
Attribute Item.VB_UserMemId = 0

If Position = -1 Then
Position = 0
End If
Set Item = mcInstances.Item(Position)

End Property

```

```

Private Sub Class_Initialize()
    Set mcInstances = New cVector
End Sub

Private Sub Class_Terminate()
    Set mcInstances = Nothing
End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cIterator"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cIterator.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:  Encapsulates the properties
and methods of an iterator.
'           Contains functions to insert,
update and delete
'           iterator_values records from the
database.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Implements cNode

' Module level variables to store the property
values
Private mintType As Integer
Private mintSequenceNo As Integer
Private mstrValue As String
Private mdbsIteratorDB As Database
Private mintOperation As Integer
Private mlngPosition As Long

Private Const mstrModuleName As String =
"cIterator."
Private mstrSource As String

Public Enum ValueType
    gintFrom = 1
    gintTo
    gintStep
    gintValue
End Enum
Public Property Get Value() As String

    Value = mstrValue

End Property
Public Property Let Value(ByVal vdata As
String)

    mstrValue = vdata

End Property

Public Property Get IndOperation() As
Operation

```

```

    IndOperation = mintOperation
End Property
Public Property Let IndOperation(ByVal vdata
As Operation)

    On Error GoTo IndOperationErr
    mstrSource = mstrModuleName &
"IndOperation"

' The valid operations are define in the
cOperations
' class. Check if the operation is valid
Select Case vdata
    Case QueryOp, InsertOp, UpdateOp,
DeleteOp
        mintOperation = vdata

    Case Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errInvalidOperation, _
mstrSource,
LoadResString(errInvalidOperation)
End Select

Exit Property

IndOperationErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"IndOperation"
    On Error GoTo 0
    Err.Raise vbObjectError +
errLetOperationFailed, _
mstrSource,
LoadResString(errLetOperationFailed)

End Property

Public Function Clone() As cIterator

' Creates a copy of a given Iterator

Dim cItClone As cIterator

On Error GoTo CloneErr

Set cItClone = New cIterator

' Copy all the iterator properties to the newly
created object
cItClone.IteratorType = mintType
cItClone.SequenceNo = mintSequenceNo
cItClone.IndOperation = mintOperation
cItClone.Value = mstrValue

' And set the return value to the newly
created Iterator
Set Clone = cItClone

Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, _
mstrSource,
LoadResString(errCloneFailed)

End Function
Public Property Get SequenceNo() As Integer

```

```

    SequenceNo = mintSequenceNo
End Property

Public Property Let SequenceNo(ByVal vdata As
Integer)
    mintSequenceNo = vdata
End Property

Public Sub Add(ByVal lngStepId As Long, _
strVersion As String)
' Inserts a new iterator values record into the
database

Dim strInsert As String
Dim qy As DAO.QueryDef

On Error GoTo AddIteratorErr

' First check if the database object is valid
Call CheckDB

' Create a temporary querydef object
strInsert = "insert into iterator_values " & _
"(" & step_id, version_no, type, " & _
" iterator_value, sequence_no )" & _
" values ( [st_id], [ver_no], [it_tpy], " & _
" [it_val], [seq_no] )"

Set qy =
mdbsIteratorDB.CreateQueryDef(gstrEmptyString,
strInsert)

' Call a procedure to execute the Querydef object
Call AssignParameters(qy, lngStepId, strVersion)

qy.Execute dbFailOnError
qy.Close

Exit Sub

AddIteratorErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "AddIterator"
    On Error GoTo 0
    Err.Raise vbObjectError + errInsertIteratorFailed,
_
mstrSource, _
LoadResString(errInsertIteratorFailed)

End Sub

Private Sub AssignParameters(qyExec As
DAO.QueryDef, _
ByVal lngStepId As Long, _
strVersion As String)
' Assigns values to the parameters in the querydef
object
' The parameter names are cryptic to make them
different
' from the field names. When the parameter
names are
' the same as the field names, parameters in the
where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
        Case "[st_id]"
            prmParam.Value = lngStepId

```

```

Case "[ver_no]"
    prmParam.Value = strVersion

Case "[it_tpy]"
    prmParam.Value = mintType

Case "[it_val]"
    prmParam.Value = mstrValue

Case "[seq_no]"
    prmParam.Value =
mintSequenceNo

Case Else
    ' Write the parameter name that is
faulty
    WriteError errInvalidParameter,
mstrSource, _
        prmParam.Name
    On Error GoTo 0
    Err.Raise errInvalidParameter,
mstrSource, _

LoadResString(errInvalidParameter)
End Select
Next prmParam

Exit Sub

AssignParametersErr:

    mstrSource = mstrModuleName &
"AssignParameters"
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errAssignParametersFailed, _
        mstrSource,
LoadResString(errAssignParametersFailed)

End Sub
Private Sub CheckDB()
    ' Check if the database object has been
initialized

    If mdbIteratorDB Is Nothing Then
        ShowError errInvalidDB
        On Error GoTo 0
        Err.Raise vbObjectError +
errInvalidDB, _
            mstrModuleName,
LoadResString(errInvalidDB)
    End If

End Sub

Public Sub Delete(ByVal lngStepId As
Long, _
    strVersion As String)
    ' Deletes the step iterator record from the
database

    Dim strDelete As String
    Dim qy As DAO.QueryDef

    On Error GoTo DeleteIteratorErr
    mstrSource = mstrModuleName &
"DeleteIterator"

    ' There can be multiple iterators for a step.
' However the values that an iterator for a
step can
' assume will be unique, meaning that a
combination of
' the iterator_id and value will be unique.

```

```

    strDelete = "delete from iterator_values " &
_
    " where step_id = [st_id]" & _
    " and version_no = [ver_no]" & _
    " and iterator_value = [it_val] "
    Set qy =
mdbIteratorDB.CreateQueryDef(gstrEmptyStr
ing, strDelete)

    Call AssignParameters(qy, lngStepId,
strVersion)
    qy.Execute dbFailOnError

    qy.Close

Exit Sub

DeleteIteratorErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"DeleteIterator"
    On Error GoTo 0
    Err.Raise vbObjectError +
errDeleteIteratorFailed, _
        mstrSource, _
        LoadResString(errDeleteIteratorFailed)
End Sub
Public Sub Update(ByVal lngStepId As Long,
strVersion As String)
    ' Updates the sequence no of the step iterator
record
    ' in the database

    Dim strUpdate As String
    Dim qy As QueryDef

    On Error GoTo UpdateErr

    ' First check if the database object is valid
    Call CheckDB

    If mintType = gintValue Then
        ' If the iterator is of type value, only the
sequence of the values can get updated
        strUpdate = "Update iterator_values " & _
            " set sequence_no = [seq_no]" & _
            " where step_id = [st_id]" & _
            " and version_no = [ver_no]" & _
            " and iterator_value = [it_val] "
    Else
        ' If the iterator is of type range, only the
values can get updated
        strUpdate = "Update iterator_values " & _
            " set iterator_value = [it_val]" & _
            " where step_id = [st_id]" & _
            " and version_no = [ver_no]" & _
            " and type = [it_tpy] "
    End If

    Set qy =
mdbIteratorDB.CreateQueryDef(gstrEmptyStr
ing, strUpdate)

    ' Call a procedure to assign the parameter
values to the
' querydef object
    Call AssignParameters(qy, lngStepId,
strVersion)
    qy.Execute dbFailOnError

    qy.Close

Exit Sub

UpdateErr:

```

```

LogErrors Errors
mstrSource = mstrModuleName & "Update"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateConstraintFailed, _
    mstrSource, _
    LoadResString(errUpdateConstraintFailed)

End Sub
Public Property Set NodeDB(vdata As Database)

    Set mdbIteratorDB = vdata

End Property

Public Property Get NodeDB() As Database

    Set NodeDB = mdbIteratorDB

End Property
Public Property Get Position() As Long

    Position = mlngPosition

End Property
Public Property Let Position(ByVal vdata As Long)

    mlngPosition = vdata

End Property

Public Property Let IteratorType(ByVal vdata As
ValueType)

    On Error GoTo TypeError
    mstrSource = mstrModuleName & "Type"

    ' These constants have been defined in the
enumeration,
' Type, which is exposed
    Select Case vdata
        Case gintFrom, gintTo, gintStep, gintValue
            mintType = vdata

        Case Else
            On Error GoTo 0
            Err.Raise vbObjectError + errTypeInvalid, _
                mstrSource,
LoadResString(errTypeInvalid)
    End Select

Exit Property

TypeError:
    LogErrors Errors
    mstrSource = mstrModuleName & "Type"
    On Error GoTo 0
    Err.Raise vbObjectError + errTypeInvalid, _
        mstrSource, LoadResString(errTypeInvalid)

End Property

Public Property Get IteratorType() As ValueType

    IteratorType = mintType

End Property
Public Sub Validate()

    ' No validations necessary for the iterator class

End Sub

Private Sub Class_Initialize()

```

```

' Initialize the operation indicator variable
to Query
' It will be modified later by the collection
class when
' inserts, updates or deletes are performed
mintOperation = QueryOp
End Sub

Private Property Let
cNode_IndOperation(ByVal vdata As
Operation)

    On Error GoTo IndOperationErr
mstrSource = mstrModuleName &
"IndOperation"

    ' The valid operations are define in the
cOperations
' class. Check if the operation is valid
Select Case vdata
    Case QueryOp, InsertOp, UpdateOp,
DeleteOp
        mintOperation = vdata

    Case Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errInvalidOperation, _
            mstrSource,
LoadResString(errInvalidOperation)
    End Select

Exit Property

IndOperationErr:
LogErrors Errors
mstrSource = mstrModuleName &
"IndOperation"
On Error GoTo 0
Err.Raise vbObjectError +
errLetOperationFailed, _
    mstrSource,
LoadResString(errLetOperationFailed)

End Property

Private Property Get cNode_IndOperation()
As Operation

    IndOperation = mintOperation

End Property

Private Property Set cNode_NodeDB(RHS
As DAO.Database)

    Set mdbIteratorDB = RHS

End Property

Private Property Get cNode_NodeDB() As
DAO.Database

    Set cNode_NodeDB = mdbIteratorDB

End Property

Private Property Let cNode_Position(ByVal
vdata As Long)

    mlngPosition = vdata

```

```

End Property

Private Property Get cNode_Position() As
Long

    cNode_Position = mlngPosition

End Property

Private Sub cNode_Validate()

    ' No validations necessary for the iterator
class

End Sub

Private Property Let cNode_Value(ByVal
vdata As String)

    mstrValue = vdata

End Property

Private Property Get cNode_Value() As String

    Value = mstrValue

End Property
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cManager"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cManager.cls
'          Microsoft TPC-H Kit Ver. 1.00
'          Copyright Microsoft, 1999
'          All Rights Reserved
'
' PURPOSE:  Encapsulates the properties
and methods of a manager step.
'           Implements the cStep class - carries
out initializations
'           and validations that are specific to
manager steps.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Implements cStep

' Object variable to keep the step reference in
Private mcStep As cStep

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cManager."
Private Sub cStep_AddAllIterators()

    Call mcStep.AddAllIterators

End Sub

```

```

Private Property Let cStep_StartDir(ByVal RHS As
String)

    mcStep.StartDir = RHS

End Property

Private Property Get cStep_StartDir() As String

    cStep_StartDir = mcStep.StartDir

End Property
Private Sub cStep_Delete()

    Call mcStep.Delete

End Sub

Private Property Set cStep_NodeDB(RHS As
DAO.Database)

    Set mcStep.NodeDB = RHS

End Property

Private Function cStep_IncVersionY() As String

    cStep_IncVersionY = mcStep.IncVersionY

End Function
Private Function cStep_IsNewVersion() As
Boolean

    cStep_IsNewVersion = mcStep.IsNewVersion

End Function
Private Function cStep_OldVersionNo() As String

    cStep_OldVersionNo = mcStep.OldVersionNo

End Function

Private Function cStep_IncVersionX() As String

    cStep_IncVersionX = mcStep.IncVersionX

End Function
Private Sub cStep_UpdateIteratorVersion()

    Call mcStep.UpdateIteratorVersion

End Sub

Private Function cStep_IteratorCount() As Long

    cStep_IteratorCount = mcStep.IteratorCount

End Function

Private Sub cStep_UnloadIterators()

    Call mcStep.UnloadIterators

End Sub

Private Sub cStep_DeleteIterator(cItRecord As
cIterator)

    Call mcStep.DeleteIterator(cItRecord)

End Sub
Private Property Get cStep_IteratorName() As
String

    cStep_IteratorName = mcStep.IteratorName

End Property
Private Property Let cStep_IteratorName(ByVal
RHS As String)

```

```

    mcStep.IteratorName = RHS
End Property

Private Sub cStep_SaveIterators()
    Call mcStep.SaveIterators
End Sub
Private Sub cStep_LoadIterator(cItRecord
As cIterator)
    Call mcStep.LoadIterator(cItRecord)
End Sub

Private Property Let cStep_Position(ByVal
RHS As Long)
    mcStep.Position = RHS
End Property
Private Sub cStep_InsertIterator(cItRecord
As cIterator)
    Call mcStep.InsertIterator(cItRecord)
End Sub
Private Function cStep_Iterators() As
Variant
    cStep_Iterators = mcStep.Iterators
End Function
Private Sub cStep_ModifyIterator(cItRecord
As cIterator)
    Call mcStep.ModifyIterator(cItRecord)
End Sub
Private Sub
cStep_RemoveIterator(cItRecord As
cIterator)
    Call mcStep.RemoveIterator(cItRecord)
End Sub
Private Sub cStep_UpdateIterator(cItRecord
As cIterator)
    Call mcStep.UpdateIterator(cItRecord)
End Sub
Private Sub cStep_AddIterator(cItRecord As
cIterator)
    Call mcStep.AddIterator(cItRecord)
End Sub

Private Property Get cStep_Position() As
Long
    cStep_Position = mcStep.Position
End Property

Private Function cStep_Clone(Optional
cCloneStep As cStep) As cStep
    Dim cNewManager As cManager
    Set cNewManager = New cManager

```

```

    Set cStep_Clone =
mcStep.Clone(cNewManager)
End Function

Private Property Get cStep_IndOperation() As
Operation
    cStep_IndOperation = mcStep.IndOperation
End Property

Private Property Let
cStep_IndOperation(ByVal RHS As
Operation)
    mcStep.IndOperation = RHS
End Property

Private Property Get cStep_NextStepId() As
Long
    cStep_NextStepId = mcStep.NextStepId
End Property

Private Property Let cStep_OutputFile(ByVal
RHS As String)
    mcStep.OutputFile = RHS
End Property

Private Property Get cStep_OutputFile() As
String
    cStep_OutputFile = mcStep.OutputFile
End Property

Private Property Let cStep_ErrorFile(ByVal
RHS As String)
    mcStep.ErrorFile = RHS
End Property

Private Property Get cStep_ErrorFile() As
String
    cStep_ErrorFile = mcStep.ErrorFile
End Property
Private Property Let cStep_LogFile(ByVal
RHS As String)
    ' mcStep.LogFile = RHS
'
'End Property
'
Private Property Get cStep_LogFile() As
String
    ' cStep_LogFile = mcStep.LogFile
'
'End Property

Private Property Let
cStep_ArchivedFlag(ByVal RHS As Boolean)
    mcStep.ArchivedFlag = RHS
End Property

```

```

Private Property Get cStep_ArchivedFlag() As
Boolean
    cStep_ArchivedFlag = mcStep.ArchivedFlag
End Property

Private Property Get cStep_NodeDB() As
DAO.Database
    Set cStep_NodeDB = mcStep.NodeDB
End Property

Private Sub Class_Initialize()
    ' Create the object
    Set mcStep = New cStep

    ' Initialize the object with valid values for a
manager step
    ' The global flag should be the first field to be
initialized
    ' since subsequent validations might try to check
if the
    ' step being created is global
    mcStep.GlobalFlag = False
    ' mcStep.GlobalRunMethod = gintNoOption
    mcStep.StepType = gintManagerStep

    ' Since the manager step does not take any action,
the step
    ' text and file name will always be empty
    mcStep.StepText = gstrEmptyString
    mcStep.StepTextFile = gstrEmptyString

    ' Since the manager step does not take any action,
execution
    ' properties for the step will be empty
    mcStep.ExecutionMechanism = gintNoOption
    mcStep.FailureDetails = gstrEmptyString
    mcStep.ContinuationCriteria = gintNoOption
End Sub
Private Sub Class_Terminate()
    ' Remove the step object
    Set mcStep = Nothing
End Sub
Private Sub cStep_Add()
    ' Call the Add method of the step class to carry
out the insert
    mcStep.Add
End Sub
Private Property Get cStep_ContinuationCriteria()
As ContinuationCriteria
    cStep_ContinuationCriteria =
mcStep.ContinuationCriteria
End Property

Private Property Let
cStep_ContinuationCriteria(ByVal RHS As
ContinuationCriteria)
    ' Since a manager step cannot take any action, the
continuation
    ' criteria property does not apply to it
    mcStep.ContinuationCriteria = gintNoOption
End Property

```

<pre> Private Property Let cStep_DegreeParallelism(ByVal RHS As String) mcStep.DegreeParallelism = RHS End Property Private Property Get cStep_DegreeParallelism() As String cStep_DegreeParallelism = mcStep.DegreeParallelism End Property Private Sub cStep_DeleteStep() On Error GoTo cStep_DeleteStepErr mstrSource = mstrModuleName & "cStep_DeleteStep" mcStep.Delete Exit Sub cStep_DeleteStepErr: LogErrors Errors mstrSource = mstrModuleName & "cStep_DeleteStep" On Error GoTo 0 Err.Raise vbObjectError + errDeleteStepFailed, _ mstrSource, _ LoadResString(errDeleteStepFailed) End Sub Private Property Get cStep_EnabledFlag() As Boolean cStep_EnabledFlag = mcStep.EnabledFlag End Property Private Property Let cStep_EnabledFlag(ByVal RHS As Boolean) mcStep.EnabledFlag = RHS End Property Private Property Let cStep_ExecutionMechanism(ByVal RHS As ExecutionMethod) ' Since a manager step cannot take any action, the Execution ' Mechanism property does not apply to it mcStep.ExecutionMechanism = gintNoOption End Property Private Property Get cStep_ExecutionMechanism() As ExecutionMethod cStep_ExecutionMechanism = mcStep.ExecutionMechanism End Property </pre>	<pre> Private Property Let cStep_FailureDetails(ByVal RHS As String) ' Since a manager step cannot take any action, the Failure ' Details property does not apply to it mcStep.FailureDetails = gstrEmptyString End Property Private Property Get cStep_FailureDetails() As String cStep_FailureDetails = mcStep.FailureDetails End Property Private Property Get cStep_GlobalFlag() As Boolean cStep_GlobalFlag = mcStep.GlobalFlag End Property Private Property Let cStep_GlobalFlag(ByVal RHS As Boolean) ' Set the global flag to false - this flag is initialized when ' an instance of the class is created. Just making sure that ' nobody changes the value inadvertently mcStep.GlobalFlag = False End Property Private Sub cStep_Modify() ' Call the Modify method of the step class to carry out the update mcStep.Modify End Sub Private Property Let cStep_ParentStepId(ByVal RHS As Long) mcStep.ParentStepId = RHS End Property Private Property Get cStep_ParentStepId() As Long cStep_ParentStepId = mcStep.ParentStepId End Property Private Property Let cStep_ParentVersionNo(ByVal RHS As String) mcStep.ParentVersionNo = RHS End Property Private Property Get cStep_ParentVersionNo() As String cStep_ParentVersionNo = mcStep.ParentVersionNo End Property </pre>	<pre> Private Property Let cStep_SequenceNo(ByVal RHS As Integer) mcStep.SequenceNo = RHS End Property Private Property Get cStep_SequenceNo() As Integer cStep_SequenceNo = mcStep.SequenceNo End Property Private Property Let cStep_StepId(ByVal RHS As Long) mcStep.StepId = RHS End Property Private Property Get cStep_StepId() As Long cStep_StepId = mcStep.StepId End Property Private Property Let cStep_StepLabel(ByVal RHS As String) mcStep.StepLabel = RHS End Property Private Property Get cStep_StepLabel() As String cStep_StepLabel = mcStep.StepLabel End Property Private Property Let cStep_StepLevel(ByVal RHS As Integer) mcStep.StepLevel = RHS End Property Private Property Get cStep_StepLevel() As Integer cStep_StepLevel = mcStep.StepLevel End Property Private Property Let cStep_StepText(ByVal RHS As String) ' Since the manager step does not take any action, the step ' text and file name will always be empty mcStep.StepText = gstrEmptyString End Property Private Property Get cStep_StepText() As String cStep_StepText = mcStep.StepText End Property Private Property Let cStep_StepTextFile(ByVal RHS As String) </pre>
--	---	---

```

' Since the manager step does not take any
action, the step
' text and file name will always be empty
mcStep.StepTextFile = gstrEmptyString

End Property

Private Property Get cStep_StepTextFile()
As String

    cStep_StepTextFile =
mcStep.StepTextFile

End Property

Private Property Let cStep_StepType(RHS
As gintStepType)

    mcStep.StepType = gintManagerStep

End Property

Private Property Get cStep_StepType() As
gintStepType

    cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_Validate()
' The validate routines for each of the
steps will
' carry out the specific validations for the
type and
' call the generic validation routine

    On Error GoTo cStep_ValidateErr
mstrSource = mstrModuleName &
"cStep_Validate"

' Validations specific to manager steps

' Check if the step text or a file name has
been
' specified
    If Not StringEmpty(mcStep.StepText) Or
Not StringEmpty(mcStep.StepTextFile)
Then
        ShowError
errTextAndFileNullForManager
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.ExecutionMechanism <>
gintNoOption Then
        ShowError
errExecutionMechanismInvalid
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.FailureDetails <>
gstrEmptyString Then
        ShowError
errFailureDetailsNullForMgr
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _

```

```

        gstrSource, _
        LoadResString(errValidateFailed)
    End If

    If mcStep.ContinuationCriteria <>
gintNoOption Then
        ShowError errContCriteriaInvalid
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    mcStep.Validate

Exit Sub

cStep_ValidateErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"cStep_Validate"
    On Error GoTo 0
    Err.Raise vbObjectError +
errValidateFailed, _
        mstrSource, _
        LoadResString(errValidateFailed)
End Sub

Private Property Let cStep_VersionNo(ByVal
RHS As String)

    mcStep.VersionNo = RHS

End Property

Private Property Get cStep_VersionNo() As
String

    cStep_VersionNo = mcStep.VersionNo

End Property

Private Property Let
cStep_WorkspaceId(ByVal RHS As Long)

    mcStep.WorkspaceId = RHS

End Property

Private Property Get cStep_WorkspaceId() As
Long

    cStep_WorkspaceId = mcStep.WorkspaceId

End Property
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cNode"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cNode.cls
'
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  Defines the properties that an
object has to implement.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)

```

```

'
Option Explicit

Public Property Get IndOperation() As Operation
End Property
Public Property Let IndOperation(ByVal vdata As
Operation)
End Property
Public Sub Validate()
End Sub
Public Property Get Value() As String
End Property
Public Property Let Value(ByVal vdata As String)
End Property

Public Property Get NodeDB() As Database
End Property
Public Property Set NodeDB(vdata As Database)
End Property

Public Property Get Position() As Long
End Property
Public Property Let Position(ByVal vdata As Long)
End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cNodeCollections"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cNodeCollections.cls
'
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  Implements an array of objects.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Node counter
Private mIngnodeCount As Long
Private mdbNodeDb As Database
Private mcarrNodes() As Object

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cNodeCollections."

Public Property Set Item(ByVal Position As Long,
ByVal objNode As Object)

' Returns the element at the passed in position in
the array
    If Position >= 0 And Position < mIngnodeCount
Then
        Set mcarrNodes(Position) = objNode
    Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
            LoadResString(errItemDoesNotExist)
    End If

End Property

```

```

Public Property Get Item(ByVal Position As
Long) As Object
Attribute Item.VB_UserMemId = 0

' Returns the element at the passed in
position in the array
If Position >= 0 And Position <
mIngnodeCount Then
Set Item = mcarrNodes(Position)
Else
On Error GoTo 0
Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _

LoadResString(errItemDoesNotExist)
End If

End Property

Public Sub Commit(ByVal cSaveObj As
Object, _
ByVal lngIndex As Long)
' This procedure checks if any changes
have been made to the
' passed in object. If so, it calls the
corresponding method
' to commit the changes.

On Error GoTo CommitErr
mstrSource = mstrModuleName &
"Commit"

Select Case cSaveObj.IndOperation
Case QueryOp
' No changes were made to the
queried parameter.
' Do nothing

Case InsertOp
cSaveObj.Add
cSaveObj.IndOperation = QueryOp

Case UpdateOp
cSaveObj.Modify
cSaveObj.IndOperation = QueryOp

Case DeleteOp
cSaveObj.Delete
' Now we can remove the record
from the array
Call Unload(lngIndex)

End Select

Exit Sub

CommitErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Commit"
On Error GoTo 0
Err.Raise vbObjectError +
errCommitFailed, _
mstrSource, _
LoadResString(errCommitFailed)

End Sub
Public Sub Save(ByVal lngWorkspace As
Long)
' Calls a procedure to commit all changes
for the passed
' in workspace.

Dim lngIndex As Long

```

```

On Error GoTo SaveErr

' Find all parameters in the array with a
matching workspace id
' It is important to step backwards through
the array, since
' we delete parameter records as we go
along!
For lngIndex = mIngnodeCount - 1 To 0
Step -1
If mcarrNodes(lngIndex).WorkspaceId =
lngWorkspace Then

' Call a procedure to commit all
changes to the
' parameter record, if any
Call Commit(mcarrNodes(lngIndex),
lngIndex)

End If
Next lngIndex

Exit Sub

SaveErr:
LogErrors Errors
mstrSource = mstrModuleName & "Save"
On Error GoTo 0
Err.Raise vbObjectError + errSaveFailed, _
mstrSource, _
LoadResString(errSaveFailed)

End Sub
Public Property Get Count() As Long

Count = mIngnodeCount

End Property

Public Property Get NodeDB() As Database

Set NodeDB = mdbNodesDb

End Property
Public Property Set NodeDB(vdata As
Database)

Set mdbNodesDb = vdata

End Property

Public Sub Load(cNodeToLoad As Object)
' Adds the passed in object to the array

On Error GoTo LoadErr

' If this procedure is called by the add to
array procedure,
' the database object has already been
initialized
If cNodeToLoad.NodeDB Is Nothing Then

' All the Nodes will be initialized with the
database
' objects before being added to the array
Set cNodeToLoad.NodeDB =
mdbNodesDb

End If

ReDim Preserve
mcarrNodes(mIngnodeCount)

' Set the newly added element in the array to
the passed in Node

```

```

cNodeToLoad.Position = mIngnodeCount
Set mcarrNodes(mIngnodeCount) =
cNodeToLoad

mIngnodeCount = mIngnodeCount + 1

Exit Sub

LoadErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errLoadFailed,
mstrModuleName & "Load", _
LoadResString(errLoadFailed)

End Sub
Public Sub Unload(lngDeletePosition As Long)
' Unloads the passed in object from the array

On Error GoTo UnloadErr

If lngDeletePosition < (mIngnodeCount - 1)
Then

' Set the Node at the position being deleted to
' the last Node in the Node array
Set mcarrNodes(lngDeletePosition) =
mcarrNodes(mIngnodeCount - 1)
mcarrNodes(lngDeletePosition).Position =
lngDeletePosition
End If

' Delete the last Node from the array
mIngnodeCount = mIngnodeCount - 1
If mIngnodeCount > 0 Then
ReDim Preserve mcarrNodes(0 To
mIngnodeCount - 1)
Else
ReDim mcarrNodes(0)
End If

Exit Sub

UnloadErr:
LogErrors Errors
mstrSource = mstrModuleName & "Unload"
On Error GoTo 0
Err.Raise vbObjectError + errUnloadFailed, _
mstrSource, _
LoadResString(errUnloadFailed)

End Sub
Public Sub Delete(lngDeletePosition As Long)
' Deletes the object at the specified position in the
' array

Dim cDeleteObj As Object

On Error GoTo DeleteErr
mstrSource = mstrModuleName & "Delete"

Set cDeleteObj = mcarrNodes(lngDeletePosition)

If cDeleteObj.IndOperation = InsertOp Then
' If we are deleting a record that has just been
inserted,
' blow it away
Call Unload(lngDeletePosition)
Else
' Set the operation for the deleted object to
indicate a
' delete - we actually delete the element only at
the time
' of a save operation
cDeleteObj.IndOperation = DeleteOp

```



```

End If

Exit Sub

DeleteErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Delete"
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteFailed, _
mstrSource, _
LoadResString(errDeleteFailed)

End Sub
Public Sub Modify(cModifiedNode As
Object)
'Sets the object at the passed in position
to the
'modified object passed in

On Error GoTo ModifyErr

'First check if the record is valid - all
objects that
'use this collection class must have a
Validate routine
cModifiedNode.Validate

'If we are updating a record that hasn't yet
been inserted,
'do not change the operation indicator -
or we try to update
'a non-existent record
If cModifiedNode.IndOperation <>
InsertOp Then
'Set the operations to indicate an
update
cModifiedNode.IndOperation =
UpdateOp
End If

'Modify the object at the queried position
- the Position
'will be maintained by this class
Set mcarrNodes(cModifiedNode.Position)
= cModifiedNode

Exit Sub

ModifyErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Modify"
On Error GoTo 0
Err.Raise vbObjectError +
errModifyFailed, _
mstrSource, _
LoadResString(errModifyFailed)

End Sub
Public Sub Add(cNodeToAdd As Object)

On Error GoTo AddErr

Set cNodeToAdd.NodeDB =
mdbNodeDb

'First check if the record is valid
cNodeToAdd.Validate

'Set the operation to indicate an insert
cNodeToAdd.IndOperation = InsertOp

```

```

' Call a procedure to load the record in the
array
Call Load(cNodeToAdd)

Exit Sub

AddErr:
LogErrors Errors
mstrSource = mstrModuleName & "Add"
On Error GoTo 0
Err.Raise vbObjectError + errAddFailed, _
mstrSource, _
LoadResString(errAddFailed)

End Sub

Private Sub Class_Terminate()

ReDim mcarrNodes(0)
lngNodeCount = 0

End Sub

Attribute VB_Name = "Common"
' FILE: Common.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Module containing common
functionality throughout
' StepMaster
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'

Option Explicit

Private Const mstrModuleName As String =
"Common."

'Used to separate the variable data from the
constant error
'message being raised when a context-sensitive
error is displayed
Private Const mintDelimiter As String = " : "
Private Const mstrFormatString = "mmddy"

'Identifiers for the different labels that need to
be loaded
'into the tree view for each workspace
Public Const mstrWorkspacePrefix = "W"
Public Const mstrParameterPrefix = "P"
Public Const mstrParamConnectionPrefix =
"C"
Public Const mstrConnectionDtlPrefix = "N"
Public Const mstrParamExtensionPrefix = "E"
Public Const mstrParamBuiltInPrefix = "B"
Public Const gstrGlobalStepPrefix = "G"
Public Const gstrManagerStepPrefix = "M"
Public Const gstrWorkerStepPrefix = "S"
Public Const gstrDummyPrefix = "D"
Public Const mstrLabelPrefix = "L"
Public Const mstrInstancePrefix = "I"
Public Function
LabelStep(lngWorkspaceIdentifier As Long)
As String
'Returns the step label for the workspace
identifier passed in
'Basically this is a wrapper around the
MakeKeyValid function

LabelStep = MakeKeyValid(gintStepLabel,
gintStepLabel, lngWorkspaceIdentifier)

```

```

End Function

Public Function JulianDateToString(dt64Bit As
Currency) As String

Dim lYear As Long
Dim lMonth As Long
Dim lDay As Long
Dim lHour As Long
Dim lMin As Long
Dim lSec As Long
Dim lMs As Long

Call JulianToTime(dt64Bit, lYear, lMonth, lDay,
lHour, lMin, lSec, lMs)
JulianDateToString = Format$(lYear,
gsYearFormat) & gsDateSeparator & _
Format$(lMonth, gsDtFormat) &
gsDateSeparator & _
Format$(lDay, gsDtFormat) & gstrBlank &
_
Format$(lHour, gsTmFormat) &
gsTimeSeparator & _
Format$(lMin, gsTmFormat) &
gsTimeSeparator & _
Format$(lSec, gsTmFormat) &
gsMsSeparator & _
Format$(lMs, gsMSecondFormat)

End Function
Public Sub DeleteFile(strFile As String, Optional
ByVal bCheckIfEmpty As Boolean = False)

'Ensure that there is only a single file of the
name before delete, since
'Kill supports wildcards and can potentially
delete a number of files
Dim strTemp As String

If CheckFileExists(strFile) Then
If bCheckIfEmpty Then
If FileLen(strFile) = 0 Then
Kill strFile
End If
Else
Kill strFile
End If
End If

End Sub
Public Function CheckFileExists(strFile As String)
As Boolean

'Returns true if the passed in file exists
'Raises an error if multiple files are found
(filename contains a wildcard)
CheckFileExists = False

If Not StringEmpty(Dir(strFile)) Then
If Not StringEmpty(Dir()) Then
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteSingleFile, _
mstrModuleName & "DeleteFile",
LoadResString(errDeleteSingleFile)
End If

CheckFileExists = True
End If

End Function

Public Function GetVersionString() As String

```

```

GetVersionString = "Version " & gsVersion
End Function

Function IsLabel(strKey As String) As Boolean

    ' The tree view control on frmMain can contain two types of
    ' nodes -
    ' 1. Nodes that contain data for the workspace - this could
    ' be data for the different types of steps or parameters
    ' 2. Nodes that display static data - these kind of nodes
    ' are referred to as label nodes e.g. "Global Steps" is a
    ' label node
    ' This function returns True if the passed in key corresponds
    ' to a label node

    IsLabel = InStr(strKey, mstrLabelPrefix) > 0

End Function

Function MakeKeyValid(IngIdentifier As Long, _
    intTypeOfNode As Integer, _
    Optional ByVal WorkspaceId As Long = 0, _
    Optional ByVal InstanceId As Long = 0) As String

    ' We use a numbering scheme while loading the tree view with
    ' all node data, since it needs a unique key and we want to
    ' use the key to identify the data it contains.
    ' Moreover, add a character to the beginning of the identifier
    ' so that the tree view control accepts it as a valid string,
    ' viz. "456" doesn't work, so change it to "W456"
    ' The general scheme is to concatenate a Label with the Identifier
    ' e.g A Global Step Node will have the Label, G and the Step Id
    ' concatenated to form the unique key
    ' The list of all such node types is given below
    ' 1. "W" + Workspace_Id for Workspace nodes
    ' 2. "P" + Parameter_Id for Parameter nodes
    ' 3. "M" + Step_Id for Manager Step nodes
    ' 4. "S" + Step_Id for Worker Step nodes
    ' 5. "G" + Step_Id for Global Step nodes
    ' 6. Instance_id + "I" + Step_Id for Instance nodes
    ' 7. Workspace_id + "L" + the label identifier = node type for all Label nodes
    ' Since the manager, worker and global steps are stored in the
    ' same table and the step identifiers will always be unique, we
    ' can use the same character as the prefix, but this is a
    ' convenient way to know the type of step being processed.

```

```

    ' The workspace id is appended to the label identifier to make
    ' it unique, since multiple workspaces may be open during a session
    ' Strip the prefix characters off while saving the Ids to the db

    Dim strPrefixChar As String

    On Error GoTo MakeKeyValidErr
    gstrSource = mstrModuleName & "MakeKeyValid"

    Select Case intTypeOfNode
    Case gintWorkspace
        strPrefixChar = mstrWorkspacePrefix
    Case gintGlobalStep
        strPrefixChar = gstrGlobalStepPrefix
    Case gintManagerStep
        strPrefixChar = gstrManagerStepPrefix
    Case gintWorkerStep
        strPrefixChar = gstrWorkerStepPrefix
    Case gintRunManager, gintRunWorker
        If InstanceId = 0 Then
            On Error GoTo 0
            Err.Raise vbObjectError + errMandatoryParameterMissing, _
                gstrSource, _

        LoadResString(errMandatoryParameterMissing)

        End If
        ' Concatenate the instance identifier and the step
        ' identifier to form a unique key
        strPrefixChar =
        Trim$(Str$(InstanceId) & mstrInstancePrefix
    Case gintParameter
        strPrefixChar = mstrParameterPrefix
    Case gintNodeParamConnection
        strPrefixChar =
        mstrParamConnectionPrefix
    Case gintConnectionDtl
        strPrefixChar =
        mstrConnectionDtlPrefix
    Case gintNodeParamExtension
        strPrefixChar =
        mstrParamExtensionPrefix
    Case gintNodeParamBuiltIn
        strPrefixChar = mstrParamBuiltInPrefix
    Case gintGlobalsLabel,
        gintParameterLabel,
        gintParamConnectionLabel, _
        gintConnDtlLabel, _
        gintParamExtensionLabel,
        gintParamBuiltInLabel, gintGlobalStepLabel, _
        gintStepLabel
        If WorkspaceId = 0 Then
            ' The Workspace Id has to be specified for a label node
            ' Otherwise it will not be possible to generate unique label
            ' identifiers if multiple workspaces are open

            On Error GoTo 0
            Err.Raise vbObjectError + errWorkspaceIdMandatory, _
                gstrSource, _

        LoadResString(errWorkspaceIdMandatory)

        End If
        ' For all labels, the workspace identifier and the
        ' label prefix are concatenated to form the key

```

```

        strPrefixChar = Trim$(Str$(WorkspaceId)) & mstrLabelPrefix
    Case Else
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidNodeType, _
            gstrSource, _
            LoadResString(errInvalidNodeType)
    End Select

    MakeKeyValid = strPrefixChar & Trim$(Str$(IngIdentifier))

Exit Function

MakeKeyValidErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errMakeKeyValidFailed, _
        gstrSource, _
        LoadResString(errMakeKeyValidFailed)

End Function

Function MakeIdentifierValid(strKey As String) As Long

    ' Returns the Identifier corresponding to the passed in key
    ' (Reverse of what was done in MakeKeyValid)

    On Error GoTo MakeIdentifierValidErr

    If IsLabel(strKey) Then
        ' If the key corresponds to a label node, the identifier
        ' appears to the right of the label prefix
        MakeIdentifierValid = Val(Mid(strKey, InStr(strKey, mstrLabelPrefix) + 1))
    ElseIf InStr(strKey, mstrInstancePrefix) = 0 Then
        ' For all other nodes, stripping the first character off
        ' returns a valid Id
        MakeIdentifierValid = Val(Mid(strKey, 2))
    Else
        ' Instance node - strip of all characters till the
        ' instance prefix
        MakeIdentifierValid = Val(Mid(strKey, InStr(strKey, mstrInstancePrefix) + 1))
    End If

    Exit Function

MakeIdentifierValidErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errMakeIdentifierValidFailed, _
        mstrModuleName & "MakeIdentifierValid", _
        _

    LoadResString(errMakeIdentifierValidFailed)

End Function

Public Function IsInstanceNode(strNodeKey As String) As Boolean

    ' Returns true if the passed in node key corresponds to a step instance
    IsInstanceNode = InStr(strNodeKey, mstrInstancePrefix) > 0

End Function

```

```

Public Function IsBuiltInLabel(strNodeKey
As String) As Boolean

    ' Returns true if the passed in node key
    corresponds to a step instance
    IsBuiltInLabel = (IsLabel(strNodeKey)
    And _
    (MakeIdentifierValid(strNodeKey) =
    gintParamBuiltInLabel))

End Function

Public Sub ShowBusy()
    ' Modifies the mousepointer to indicate
    that the
    ' application is busy

    On Error Resume Next

    Screen.MousePointer = vbHourglass

End Sub

Public Sub ShowFree()
    ' Modifies the mousepointer to indicate
    that the
    ' application has finished processing and
    is ready
    ' to accept user input

    On Error Resume Next

    Screen.MousePointer = vbDefault

End Sub

Public Function InstrR(strMain As String, _
strSearch As String) As Integer
    ' Finds the last occurrence of the passed in
    string

    Dim intPos As Integer
    Dim intPrev As Integer

    On Error GoTo InstrRErr

    intPrev = intPos
    intPos = InStr(1, strMain, strSearch)

    Do While intPos > 0
        intPrev = intPos
        intPos = InStr(intPos + 1, strMain,
strSearch)
    Loop
    InstrR = intPrev

    Exit Function

InstrRErr:
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
    "InstrR"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errInstrRFailed, _
    gstrSource, _
    LoadResString(errInstrRFailed)

End Function

Public Function GetDefaultDir(IWspId As
Long, WspParameters As cArrParameters)
As String

    Dim sDir As String
    sDir = SubstituteParameters(_

```

```

    gstrEnvVarSeparator &
    PARAM_DEFAULT_DIR &
    gstrEnvVarSeparator, _
    IWspId,
    WspParameters:=WspParameters)
    MakePathValid (sDir & gstrFileSeparator &
"a.txt")
    GetDefaultDir = GetShortName(sDir)
    If StringEmpty(GetDefaultDir) Then
        GetDefaultDir = App.Path
    End If

End Function

Public Sub AddArrayElement(ByRef
arrNodes() As Object, _
ByVal objToAdd As Object, _
ByRef lngCount As Long)
    ' Adds the passed in object to the array

    On Error GoTo AddArrayElementErr

    ' Increase the array dimension and add the
    object to it
    ReDim Preserve arrNodes(lngCount)
    Set arrNodes(lngCount) = objToAdd
    lngCount = lngCount + 1

    Exit Sub

AddArrayElementErr:
    LogErrors Errors
    gstrSource = mstrModuleName &
    "AddArrayElement"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errAddArrayElementFailed, _
    gstrSource, _

LoadResString(errAddArrayElementFailed)

End Sub

Public Function CheckForNullField(rstRecords
As Recordset, strFieldName As String) As
String

    ' Returns an empty string if a given field is
    null

    On Error GoTo CheckForNullFieldErr

    If IsNull(rstRecords.Fields(strFieldName))
    Then
        CheckForNullField = gstrEmptyString
    Else
        CheckForNullField =
rstRecords.Fields(strFieldName)
    End If
    Exit Function

CheckForNullFieldErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
    errCheckForNullFieldFailed, _
    mstrModuleName &
    "CheckForNullField", _

LoadResString(errCheckForNullFieldFailed)

End Function

```

```

Public Function ErrorOnNullField(rstRecords As
Recordset, strFieldName As String) As Variant

    ' If a given field is null, raises an error
    ' Else, returns the field value in a variant
    ' The calling function must convert the return
    value to the
    ' appropriate type
    On Error GoTo ErrorOnNullFieldErr
    gstrSource = mstrModuleName &
    "ErrorOnNullField"

    If IsNull(rstRecords.Fields(strFieldName)) Then
        On Error GoTo 0
        Err.Raise vbObjectError +
        errMandatoryFieldNull, _
        gstrSource, _
        strFieldName & mintDelimiter &
        LoadResString(errMandatoryFieldNull)
    Else
        ErrorOnNullField =
rstRecords.Fields(strFieldName)
    End If
    Exit Function

ErrorOnNullFieldErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
    errUnableToCheckNull, _
    gstrSource, _
    strFieldName & mintDelimiter &
    LoadResString(errUnableToCheckNull)

End Function

Public Function StringEmpty(strCheckString As
String) As Boolean

    StringEmpty = (strCheckString =
gstrEmptyString)

End Function

Public Function GetIteratorValue(cStepIterators As
cRunCollt, _
ByVal strItName As String)

    Dim lngIndex As Long
    Dim strValue As String

    On Error GoTo GetIteratorValueErr
    gstrSource = mstrModuleName &
    "GetIteratorValue"

    ' Find the iterator in the Iterators collection
    For lngIndex = 0 To cStepIterators.Count - 1
        If cStepIterators(lngIndex).IteratorName =
strItName Then
            strValue = cStepIterators(lngIndex).Value
            Exit For
        End If
    Next lngIndex

    If lngIndex > cStepIterators.Count - 1 Then
        ' The iterator has not been defined for the
        branch
        ' Raise an error
        On Error GoTo 0
        Err.Raise vbObjectError +
        errParamNameInvalid, _
        gstrSource, _
        LoadResString(errParamNameInvalid)
    End If

    GetIteratorValue = strValue
    Exit Function

```

```

GetIteratorValueErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
gstrSource = mstrModuleName &
"GetIteratorValue"
On Error GoTo 0
Err.Raise vbObjectError +
errGetParamValueFailed, _
gstrSource, _

LoadResString(errGetParamValueFailed)

End Function
Public Function SubstituteParameters(ByVal
strComString As String, _
ByVal lngWorkspaceId As Long, _
Optional StepIterators As cRunCollt =
Nothing, _
Optional WspParameters As
cArrParameters = Nothing) As String
' This function substitutes all parameter
names and
' environment variables in the passed in
string with
' their values. It also substitutes the value
for the
' iterators, if any.
' Since the syntax is to enclose parameter
names and
' environment variables in "%", we check
if a given
' variable is a parameter - if so, we
substitute the
' parameter value - else we try to get the
value from
' the environment

Dim intPos As Integer
Dim intEndPos As Integer
Dim strEnvVariable As String
Dim strValue As String
Dim strCommand As String
Dim cTempStr As cStringSM

' Initialize the return value of the function
to the
' passed in command
strCommand = strComString

If WspParameters Is Nothing Then Set
WspParameters = gcParameters

Set cTempStr = New cStringSM

intPos = InStr(strCommand,
gstrEnvVarSeparator)
Do While intPos <> 0
If Mid(strCommand, intPos + 1, 1) =
gstrEnvVarSeparator Then
' Wildcard character - to be
substituted by a single % - later!
intPos = intPos + 2
If intPos > Len(strCommand) Then
Exit Do
Else
' Extract the environment variable
from the passed
' in string
intEndPos = InStr(intPos + 1,
strCommand, gstrEnvVarSeparator)

If intEndPos > 0 Then
strEnvVariable = Mid(strCommand,
intPos + 1, intEndPos - intPos - 1)
Else
On Error GoTo 0
Err.Raise vbObjectError +
errParamSeparatorMissing, _
gstrSource, _

LoadResString(errParamSeparatorMissing)
End If
strValue = gstrEmptyString

' Get the value of the variable and call a
function
' to replace the variable with it's value
strValue = GetValue(strEnvVariable,
lngWorkspaceId, StepIterators,
WspParameters)
' The function raises an error if the
variable is
' not found
strCommand =
cTempStr.ReplaceSubString(strCommand, _
gstrEnvVarSeparator &
strEnvVariable & gstrEnvVarSeparator, _
strValue)
End If

intPos = InStr(intPos, strCommand,
gstrEnvVarSeparator)
Loop

strCommand =
cTempStr.ReplaceSubString(strCommand, _
gstrEnvVarSeparator &
gstrEnvVarSeparator, gstrEnvVarSeparator)

Set cTempStr = Nothing
SubstituteParameters = strCommand

End Function
Private Function GetValue(ByVal strParameter
As String, _
ByVal lngWorkspaceId As Long, _
cStepIterators As cRunCollt, _
WspParameters As cArrParameters) As
String
' This function returns the value for the
passed in
' parameter - it may be a workspace
parameter, an
' environment variable or an iterator

Dim intPos As Integer
Dim intEndPos As Integer
Dim strVariable As String
Dim strValue As String
Dim cParamRec As cParameter

On Error GoTo GetValueErr

' Initialize the return value of the function to
the
' empty
strValue = gstrEmptyString

intPos = InStr(strParameter,
gstrEnvVarSeparator)
If intPos > 0 Then
' Extract the variable from the passed in
string
intEndPos = InStr(intPos + 1,
strParameter, gstrEnvVarSeparator)
If intEndPos = 0 Then
intEndPos = Len(strParameter)
End If

strVariable = Mid(strParameter, intPos + 1,
intEndPos - intPos - 1)
Else
' The separator character has not been passed
in -
' try to find the value of the passed in
parameter
strVariable = strParameter
End If

If Not StringEmpty(strVariable) Then
' Check if this is the timestamp parameter first
If strVariable = gstrTimeStamp Then
strValue = Format$(Now, mstrFormatString,
vbUseSystemDayOfWeek,
vbUseSystem)
Else
' Try to find a parameter for the workspace
with
' the same name
Set cParamRec =
WspParameters.GetParameterValue(lngWorkspaceI
d, _
strVariable)
If cParamRec Is Nothing Then
If Not cStepIterators Is Nothing Then
' If the string is not a parameter, then
check
' if it is an iterator
strValue =
GetIteratorValue(cStepIterators, strVariable)
End If

If StringEmpty(strValue) Then
' Neither - Check if it is an environment
variable
strValue = Environ$(strVariable)
If StringEmpty(strValue) Then
On Error GoTo 0
WriteError errSubValuesFailed, _
OptArgs:="Invalid parameter: "
& gstrSQ & strVariable & gstrSQ
Err.Raise vbObjectError +
errSubValuesFailed, _
mstrModuleName &
"GetValue", _
LoadResString(errSubValuesFailed) & "Invalid
parameter: " & gstrSQ & strVariable & gstrSQ
End If
End If
Else
strValue = cParamRec.ParameterValue
End If
End If
End If

GetValue = strValue

Exit Function

GetValueErr:
If Err.Number = vbObjectError +
errParamNameInvalid Then
' If the parameter has not been defined for the
' workspace then check if it is an environment
' variable
Resume Next
End If

' Log the error code raised by Visual Basic
Call LogErrors(Errors)

```

```

    gstrSource = mstrModuleName &
"GetValue"
    WriteError errSubValuesFailed,
gstrSource, "Parameter: " & gstrSQ &
strVariable & gstrSQ
    On Error GoTo 0
    Err.Raise vbObjectError +
errSubValuesFailed, _
        gstrSource, _
        LoadResString(errSubValuesFailed)
& "Parameter: " & gstrSQ & strVariable &
gstrSQ

End Function
Public Function SQLFixup(strField As
String) As String
    ' Returns a string that can be executed by
SQL Server

    Dim cMyStr As New cStringSM
    Dim strTemp As String

    On Error GoTo SQLFixupErr

    strTemp = strField
    SQLFixup = strTemp

    ' Single-quotes have to be replaced by two
single-quotes,
    ' since a single-quote is the identifier
delimiter
    ' character - call a procedure to do the
replace
    ' SQLFixup =
cMyStr.ReplaceSubString(strTemp, gstrDQ,
"\\" & gstrDQ)

    ' Replace pipe characters with the
corresponding chr function
    ' SQLFixup =
cMyStr.ReplaceSubString(strTemp, gstrDQ,
gstrDQ & gstrDQ)

    Exit Function

SQLFixupErr:
    gstrSource = mstrModuleName &
"SQLFixup"
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError +
errMakeFieldValidFailed, _
        gstrSource,
LoadResString(errMakeFieldValidFailed)

End Function
Public Function TranslateStepLabel(sLabel
As String) As String
    ' Translates the passed in step label to a
valid file name
    ' All characters in the label that are invalid
for filenames (viz. \ / : * ? " < > )
    ' and spaces are substituted with
underscores - also ensure that the resulting
filename
    ' is not greater than 255 characters
    Dim cTempStr As New cStringSM
    TranslateStepLabel =
cTempStr.ReplaceSubString(sLabel,
gstrFileSeparator, "_")
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepL
abel, "/", gstrUnderscore)

```

```

    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, ".", gstrUnderscore)
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, "*", gstrUnderscore)
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, "?", gstrUnderscore)
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, gstrDQ, gstrUnderscore)
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, "<", gstrUnderscore)
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, ">", gstrUnderscore)
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, "|", gstrUnderscore)
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, gstrBlank, gstrUnderscore)

    ' Commas are substituted with underscores
since the command shell uses a comma to
' delimit commands
    TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, ",", gstrUnderscore)

    If Len(TranslateStepLabel) > MAX_PATH
Then
        TranslateStepLabel =
Mid(TranslateStepLabel, 1, MAX_PATH)
    End If

End Function

Public Function TypeOfObject(ByVal objNode
As Object) As Integer
    ' Determines the type of object that is passed
in

    On Error GoTo TypeOfObjectErr
    gstrSource = mstrModuleName &
"TypeOfObject"

    Select Case TypeName(objNode)
        Case "cWorkspace"
            TypeOfObject = gintWorkspace

        Case "cParameter"
            TypeOfObject = gintParameter

        Case "cConnection"
            TypeOfObject = gintParameterConnect

        Case "cConnDtl"
            TypeOfObject = gintConnectionDtl

        Case "cGlobalStep"
            TypeOfObject = gintGlobalStep

        Case "cManager"
            TypeOfObject = gintManagerStep

        Case "cWorker"
            TypeOfObject = gintWorkerStep

        Case "cStep"
            ' If a step record is passed in, call a
function
            ' to determine the type of step

```

```

    TypeOfObject =
TypeOfStep(StepClass:=objNode)

    Case Else
        WriteError errTypeOfObjectFailed,
gstrSource, _
            TypeName(objNode)
        On Error GoTo 0
        Err.Raise vbObjectError +
errTypeOfObjectFailed, _
            gstrSource, _

LoadResString(errTypeOfObjectFailed)
    End Select

    Exit Function

TypeOfObjectErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errTypeOfObjectFailed, _
        gstrSource, _
        LoadResString(errTypeOfObjectFailed)

End Function
Attribute VB_Name = "ConnDtlCommon"
' FILE: ConnDtlCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
'
' PURPOSE: Contains functionality common
across StepMaster and
' SMRunOnly, pertaining to connections
' Specifically, functions to load connections
in an array
' and so on.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this module
Private Const mstrModuleName As String =
"ConnDtlCommon."

Public Sub LoadRSInConnDtlArray(rstConns As
Recordset, cConns As cConnDtls)

    Dim cNewConnDtl As cConnDtl

    On Error GoTo LoadRSInConnDtlArrayErr

    If rstConns.RecordCount = 0 Then
        Exit Sub
    End If

    rstConns.MoveFirst
    While Not rstConns.EOF

        Set cNewConnDtl = New cConnDtl

        ' Initialize ConnDtl values
        ' Call a procedure to raise an error if mandatory
fields are null.
        cNewConnDtl.ConnNameId =
ErrorOnNullField(rstConns,
FLD_ID_CONN_NAME)

```

```

cNewConnDtl.WorkspaceId =
ErrorOnNullField(rstConns,
FLD_ID_WORKSPACE)
cNewConnDtl.ConnName =
CStr(ErrorOnNullField(rstConns,
FLD_CONN_DTL_CONNECTION_NAME))
cNewConnDtl.ConnectionString =
CheckForNullField(rstConns,
FLD_CONN_DTL_CONNECTION_STRING)
cNewConnDtl.ConnType =
CheckForNullField(rstConns,
FLD_CONN_DTL_CONNECTION_TYPE)

cConns.Load cNewConnDtl

Set cNewConnDtl = Nothing
rstConns.MoveNext
Wend

Exit Sub

LoadRSInConnDtlArrayErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadRSInConnDtlArray"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadRsInArrayFailed, gstrSource, _

LoadResString(errLoadRsInArrayFailed)
End Sub
Attribute VB_Name =
"ConnectionCommon"
' FILE: ConnectionCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Contains functionality
common across StepMaster and
' SMRunOnly, pertaining to
connection strings
' Specifically, functions to load
connections strings
' in an array and so on.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"ConnectionCommon."

Public Sub
LoadRecordsetInConnectionArray(rstConns
As Recordset, cConns As cConnections)

Dim cNewConnection As cConnection

On Error GoTo
LoadRecordsetInConnectionArrayErr

If rstConns.RecordCount = 0 Then
Exit Sub
End If

rstConns.MoveFirst
While Not rstConns.EOF

```

```

Set cNewConnection = New cConnection

' Initialize Connection values
' Call a procedure to raise an error if
mandatory fields are null.
cNewConnection.ConnectionId =
ErrorOnNullField(rstConns, "connection_id")
cNewConnection.WorkspaceId =
CStr(ErrorOnNullField(rstConns,
FLD_ID_WORKSPACE))
cNewConnection.ConnectionName =
CStr(ErrorOnNullField(rstConns,
"connection_name"))
cNewConnection.ConnectionValue =
CheckForNullField(rstConns,
"connection_value")
cNewConnection.Description =
CheckForNullField(rstConns, "description")

cNewConnection.NoCountDisplay =
CheckForNullField(rstConns,
"no_count_display")
cNewConnection.NoExecute =
CheckForNullField(rstConns, "no_execute")
cNewConnection.ParseQueryOnly =
CheckForNullField(rstConns,
"parse_query_only")
cNewConnection.QuotedIdentifiers =
CheckForNullField(rstConns,
"ANSI_quoted_identifiers")
cNewConnection.AnsiNulls =
CheckForNullField(rstConns, "ANSI_nulls")
cNewConnection.ShowQueryPlan =
CheckForNullField(rstConns,
"show_query_plan")
cNewConnection.ShowStatsTime =
CheckForNullField(rstConns,
"show_stats_time")
cNewConnection.ShowStatsIO =
CheckForNullField(rstConns, "show_stats_io")
cNewConnection.ParseOdbcMsg =
CheckForNullField(rstConns,
"parse_odbc_msg_prefixes")
cNewConnection.RowCount =
CheckForNullField(rstConns, "row_count")
cNewConnection.TsqlBatchSeparator =
CheckForNullField(rstConns,
"tsql_batch_separator")
cNewConnection.QueryTimeOut =
CheckForNullField(rstConns,
"query_time_out")
cNewConnection.ServerLanguage =
CheckForNullField(rstConns,
"server_language")
cNewConnection.CharacterTranslation =
CheckForNullField(rstConns,
"character_translation")
cNewConnection.RegionalSettings =
CheckForNullField(rstConns,
"regional_settings")

cConns.Load cNewConnection

Set cNewConnection = Nothing
rstConns.MoveNext
Wend

Exit Sub

LoadRecordsetInConnectionArrayErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadRecordsetInConnectionArray"
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errLoadRsInArrayFailed, gstrSource, _
LoadResString(errLoadRsInArrayFailed)
End Sub
VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cParameter"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cParameter.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Encapsulates the properties and
methods of a parameter.
' Contains functions to insert, update and
delete
' workspace_parameters records from the
database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Private mlngWorkspaceId As Long
Private mlngParameterId As Long
Private mstrParameterName As String
Private mstrParameterValue As String
Private mstrDescription As String
Private mintParameterType As Integer
Private mdbStepMaster As Database
Private mintOperation As Operation
Private mlngPosition As Long

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cParameter."

' The cSequence class is used to generate unique
parameter identifiers
Private mParameterSeq As cSequence

' The StringSM class is used to carry out string
operations
Private mFieldValue As cStringSM

' Parameter types
Public Enum ParameterType
gintParameterGeneric = 0
gintParameterConnect
gintParameterApplication
gintParameterBuiltIn
End Enum

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
' Assigns values to the parameters in the querydef
object
' The parameter names are cryptic to make them
different
' from the field names. When the parameter
names are

```

```

' the same as the field names, parameters
in the where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr

For Each prmParam In
qyExec.Parameters
    Select Case prmParam.Name
        Case "[w_id]"
            prmParam.Value =
mIngWorkspaceId

        Case "[p_id]"
            prmParam.Value =
mIngParameterId

        Case "[p_name]"
            prmParam.Value =
mstrParameterName

        Case "[p_value]"
            prmParam.Value =
mstrParameterValue

        Case "[desc]"
            prmParam.Value =
mstrDescription

        Case "[p_type]"
            prmParam.Value =
mintParameterType

        Case Else
            ' Write the parameter name that is
            faulty
            WriteError errInvalidParameter,
mstrSource, _
                prmParam.Name
            On Error GoTo 0
            Err.Raise errInvalidParameter,
mstrModuleName & "AssignParameters", _

LoadResString(errInvalidParameter)
End Select
Next prmParam

' qyExec.Parameters("w_id").Value =
mIngWorkspaceId
' qyExec.Parameters("p_id").Value =
mIngParameterId
' qyExec.Parameters("p_name").Value =
mstrParameterName
' qyExec.Parameters("p_value").Value =
mstrParameterValue
'

Exit Sub

AssignParametersErr:

mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
    mstrSource,
LoadResString(errAssignParametersFailed)
End Sub

```

```

Public Property Let Position(ByVal RHS As
Long)

    mIngPosition = RHS

End Property

Public Property Get Position() As Long

    Position = mIngPosition

End Property

Public Function Clone() As cParameter

    ' Creates a copy of a given parameter

    Dim cCloneParam As cParameter

    On Error GoTo CloneErr
mstrSource = mstrModuleName & "Clone"

    Set cCloneParam = New cParameter

    ' Copy all the parameter properties to the
    newly
    ' created parameter
    Set cCloneParam.NodeDB =
mdbsStepMaster
cCloneParam.WorkspaceId =
mIngWorkspaceId
cCloneParam.ParameterId =
mIngParameterId
cCloneParam.ParameterName =
mstrParameterName
cCloneParam.ParameterValue =
mstrParameterValue
cCloneParam.Description = mstrDescription
cCloneParam.ParameterType =
mintParameterType
cCloneParam.IndOperation = mintOperation
cCloneParam.Position = mIngPosition

    ' And set the return value to the newly
    created parameter
    Set Clone = cCloneParam
    Set cCloneParam = Nothing

    Exit Function

CloneErr:
    LogErrors Errors
mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, _
        mstrSource,
LoadResString(errCloneFailed)

End Function
Public Property Set NodeDB(vdata As
Database)

    Set mdbsStepMaster = vdata

End Property
Public Property Get NodeDB() As Database

    Set NodeDB = mdbsStepMaster

End Property

Private Sub CheckDupParameterName()
    ' Check if the parameter name already exists
    in the workspace

```

```

Dim rstParameter As Recordset
Dim strSql As String
Dim qy As DAO.QueryDef

On Error GoTo CheckDupParameterNameErr
mstrSource = mstrModuleName &
"CheckDupParameterName"

    ' Create a recordset object to retrieve the count of
    all parameters
    ' for the workspace with the same name
    strSql = "Select count(*) as parameter_count " &
-
        " from workspace_parameters " & _
        " where workspace_id = [w_id]" & _
        " and parameter_name = [p_name]" & _
        " and parameter_id <> [p_id]"

    Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString,
strSql)
    Call AssignParameters(qy)

    Set rstParameter =
qy.OpenRecordset(dbOpenForwardOnly)

    If rstParameter![parameter_count] > 0 Then
        rstParameter.Close
        qy.Close
        ShowError errDuplicateParameterName
        On Error GoTo 0
        Err.Raise vbObjectError +
errDuplicateParameterName, _
            mstrSource,
LoadResString(errDuplicateParameterName)
        End If

        rstParameter.Close
        qy.Close

    Exit Sub

CheckDupParameterNameErr:
    LogErrors Errors
mstrSource = mstrModuleName &
"CheckDupParameterName"
    On Error GoTo 0
    Err.Raise vbObjectError +
errCheckDupParameterNameFailed, _
        mstrSource,
LoadResString(errCheckDupParameterNameFailed)
)

End Sub
Private Sub CheckDB()
    ' Check if the database object has been initialized

    If mdbsStepMaster Is Nothing Then
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidDB, _
            mstrModuleName & "CheckDB",
LoadResString(errInvalidDB)
        End If

    End Sub
Public Property Let ParameterValue(vdata As
String)

    mstrParameterValue = vdata

End Property
Public Property Let Description(vdata As String)

    mstrDescription = vdata

```

```

End Property
Public Property Let ParameterType(vdata
As ParameterType)

    mintParameterType = vdata
End Property

Public Property Let ParameterName(vdata
As String)

    If vdata = gstrEmptyString Then

        ShowError
        errParameterNameMandatory
        On Error GoTo 0
        ' Propagate this error back to the caller
        Err.Raise vbObjectError +
        errParameterNameMandatory, _
        mstrSource,
        LoadResString(errParameterNameMandator
y)
    Else
        mstrParameterName = vdata
    End If

End Property

Public Property Let ParameterId(vdata As
Long)
    mlngParameterId = vdata
End Property

Public Property Let IndOperation(ByVal
vdata As Operation)

    ' The valid operations are define in the
cOperations
    ' class. Check if the operation is valid
    Select Case vdata
        Case QueryOp, InsertOp, UpdateOp,
DeleteOp
            mintOperation = vdata

        Case Else
            On Error GoTo 0
            Err.Raise vbObjectError +
            errInvalidOperation, _
            mstrSource,
            LoadResString(errInvalidOperation)
    End Select

End Property
Public Sub Validate()
    ' Each distinct object will have a Validate
method which
    ' will check if the class properties are
valid. This method
    ' will be used to check interdependant
properties that
    ' cannot be validated by the let
procedures.
    ' It should be called by the add and
modify methods of the class

    On Error GoTo ValidateErr

    ' Check if the db object is valid
    Call CheckDB

    ' Call procedure to raise an error if the
parameter name
    ' already exists in the workspace -
    ' if there are duplicates, we don't know
what value for the

```

```

' parameter to use at runtime
Call CheckDupParameterName

Exit Sub

ValidateErr:

    mstrSource = mstrModuleName &
"Validate"
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errValidateFailed, _
    mstrSource,
    LoadResString(errValidateFailed)

End Sub
Public Property Let WorkspaceId(vdata As
Long)

    mlngWorkspaceId = vdata

End Property

Public Sub Add()

    Dim strInsert As String
    Dim qy As DAO.QueryDef

    On Error GoTo AddErr

    ' Validate the record before trying to insert
the record
    Call Validate

    ' Create a temporary querydef object
    strInsert = "insert into
workspace_parameters " & _
        "( workspace_id, parameter_id, " & _
        " parameter_name, parameter_value, "
& _
        " description, parameter_type )" & _
        " values ( [w_id], [p_id], [p_name],
[p_value], [desc], [p_type] )"
    Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyStr
ing, strInsert)

    ' Call a procedure to assign the parameter
values
    Call AssignParameters(qy)

    qy.Execute dbFailOnError
    qy.Close

    ' strInsert = "insert into
workspace_parameters " & _
    ' "( workspace_id, parameter_id, " & _
    ' " parameter_name, parameter_value )"
& _
    ' " values ( " & _
    ' Str(mlngWorkspaceId) & ", " &
Str(mlngParameterId) & _
    ' ", " &
mFieldValue.MakeStringFieldValid(mstrPara
meterName) & _
    ' ", " &
mFieldValue.MakeStringFieldValid(mstrPara
meterValue) & " )"
    ' mdbsStepMaster.Execute strInsert,
dbFailOnError + dbSQLPassThrough

Exit Sub

AddErr:

```

```

mstrSource = mstrModuleName & "Add"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errParameterInsertFailed, _
    mstrSource,
    LoadResString(errParameterInsertFailed)

End Sub
Public Sub Delete()

    Dim strDelete As String
    Dim qy As DAO.QueryDef

    On Error GoTo DeleteErr

    ' Check if the db object is valid
    Call CheckDB

    strDelete = "delete from workspace_parameters "
& _
        " where parameter_id = [p_id]"
    Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString,
strDelete)

    Call AssignParameters(qy)
    qy.Execute dbFailOnError

    qy.Close

Exit Sub

DeleteErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Delete"
    On Error GoTo 0
    Err.Raise vbObjectError +
errDeleteParameterFailed, _
        mstrSource, _
        LoadResString(errDeleteParameterFailed)

End Sub

Public Sub Modify()

    Dim strUpdate As String
    Dim qy As QueryDef

    On Error GoTo ModifyErr

    ' Validate the updated values before trying to
modify the db
    Call Validate

    ' Create a temporary querydef object with the
modify string
    strUpdate = "update workspace_parameters " & _
        " set workspace_id = [w_id], " & _
        "parameter_name = [p_name], " & _
        "parameter_value = [p_value], " & _
        "description = [desc], " & _
        "parameter_type = [p_type]" & _
        " where parameter_id = [p_id]"
    Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString,
strUpdate)

    ' Call a procedure to assign the parameter values
to the
    ' querydef object
    Call AssignParameters(qy)
    qy.Execute dbFailOnError

```



```

    qy.Close

    ' mddbStepMaster.Execute strUpdate,
    dbFailOnError
    '
    Exit Sub
ModifyErr:
    mstrSource = mstrModuleName &
    "Modify"
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
    errParameterUpdateFailed, _
    mstrSource,
    LoadResString(errParameterUpdateFailed)
End Sub
Public Property Get ParameterName() As
String

    ParameterName = mstrParameterName
End Property

Public Property Get ParameterId() As Long

    ParameterId = mlngParameterId
End Property
Public Property Get NextIdentifier() As
Long

    Dim lngNextId As Long

    On Error GoTo NextIdentifierErr

    ' First check if the database object is valid
    Call CheckDB

    ' Retrieve the next identifier using the
    sequence class
    Set mParameterSeq = New cSequence
    Set mParameterSeq.IdDatabase =
    mddbStepMaster
    mParameterSeq.IdentifierColumn =
    FLD_ID_PARAMETER
    lngNextId = mParameterSeq.Identifier
    Set mParameterSeq = Nothing

    NextIdentifier = lngNextId
    Exit Property
NextIdentifierErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
    "NextIdentifier"
    On Error GoTo 0
    Err.Raise vbObjectError + errIdGetFailed,
    _
    mstrSource,
    LoadResString(errIdGetFailed)
End Property
Public Property Get IndOperation() As
Operation

    IndOperation = mintOperation
End Property

Public Property Get WorkspaceId() As Long

    WorkspaceId = mlngWorkspaceId

```

```

End Property

Public Property Get ParameterValue() As
String

    ParameterValue = mstrParameterValue
End Property
Public Property Get Description() As String

    Description = mstrDescription
End Property
Public Property Get ParameterType() As
ParameterType

    ParameterType = mintParameterType
End Property

Private Sub Class_Initialize()

    Set mFieldValue = New cStringSM

    ' Initialize the operation indicator variable to
    Query
    ' It will be modified later by the collection
    class when
    ' inserts, updates or deletes are performed
    mintOperation = QueryOp
End Sub

Private Sub Class_Terminate()

    Set mddbStepMaster = Nothing
    Set mFieldValue = Nothing
End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cRunCollt"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunCollt.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module implements a
stack of Iterator nodes.
' Ensures that only cRunItNode
objects are stored in the stack.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
are raised by this class
Private Const mstrModuleName As String =
"cRunCollt."
Private mstrSource As String

Private mcIterators As cStack
Public Sub Clear()

```

```

    mcIterators.Clear
End Sub

Private Sub Class_Initialize()

    Set mcIterators = New cStack
End Sub

Private Sub Class_Terminate()

    Set mcIterators = Nothing
End Sub

Public Function Value(strItName As String) As
String

    Dim lngIndex As Long

    For lngIndex = 0 To mcIterators.Count - 1
        If mcIterators(lngIndex).IteratorName =
strItName Then
            Value = mcIterators(lngIndex).Value
            Exit For
        End If
    Next lngIndex
End Function

Public Property Get Item(ByVal Position As Long)
As cRunItNode
Attribute Item.VB_UserMemId = 0

    Set Item = mcIterators(Position)
End Property

Public Function Count() As Long

    Count = mcIterators.Count
End Function

Public Function Pop() As cRunItNode

    Set Pop = mcIterators.Pop
End Function

Public Sub Push(objToPush As cRunItNode)

    Call mcIterators.Push(objToPush)
End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
    Persistable = 0 'NotPersistable
    DataBindingBehavior = 0 'vbNone
    DataSourceBehavior = 0 'vbNone
    MTSTransactionMode = 0 'NotAnMTSObject
END
Attribute VB_Name = "cRunInst"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunCollt.cls
' Microsoft TPC-H Kit Ver. 1.00

```

```

' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module controls the
run processing. It runs a branch
' at a time and raises events when
each step completes execution.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cRunInst."
Private mstrSource As String

' Local variable(s) to hold property value(s)
Private mstrRootKey As String
Public WspId As Long
Private mcParameters As cArrParameters
Private mcRunSteps As cArrSteps
Private mcRunConstraints As
cArrConstraints
Public RunConnections As cConnections
Public RunConnDtls As cConnDtls
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mcNavSteps As cStepTree

Private mcInstances As cInstances
Private mcFreeSteps As cVectorLng
Private mcFailures As cFailedSteps
Private mblnAsk As Boolean ' Set to True
when the a step with continuation
criteria=Ask fails
Private mblnAbort As Boolean ' Set to True
when the run is aborted
Private msAbortDtls As String
Private mbarrFree() As Byte
Private WithEvents mcTermSteps As
cTermSteps
Attribute mcTermSteps.VB_VarHelpID = -1
Public RunId As Long
Public CreateInputFiles As Boolean
Private Enum WspLogEvents
mintRunStart
mintRunComplete
mintStepStart
mintStepComplete
End Enum

Private mcWspLog As cFileSM
Private mstrCurBranchRoot As String
Private mcDummyRootInstance As
cInstance
' Key for the dummy root instance - Should
be a key that is invalid for an actual step
record
Private Const mstrDummyRootKey As
String = "D"
' Public events to notify the calling function
of the
' start and end time for each step
Public Event RunStart(dtmStartTime As
Currency, strWspLog As String)
Public Event RunComplete(dtmEndTime As
Currency)
Public Event StepStart(cStepRecord As
cStep, dtmStartTime As Currency, _

```

```

lngInstanceId As Long, lParentInstanceId
As Long, sPath As String, _
sIts As String, sltValue As String)
Public Event StepComplete(cStepRecord As
cStep, dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)
Public Event ProcessStart(cStepRecord As
cStep, strCommand As String, _
dtmStartTime As Currency, lngInstanceId
As Long, lParentInstanceId As Long, _
sltValue As String)
Public Event ProcessComplete(cStepRecord
As cStep, dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)
' The class that will execute each step - we trap
the events
' that are raised by it when a step
starts/completes
' execution
Private WithEvents cExecStep1 As cRunStep
Attribute cExecStep1.VB_VarHelpID = -1
Private WithEvents cExecStep2 As cRunStep
Attribute cExecStep2.VB_VarHelpID = -1
Private WithEvents cExecStep3 As cRunStep
Attribute cExecStep3.VB_VarHelpID = -1
Private WithEvents cExecStep4 As cRunStep
Attribute cExecStep4.VB_VarHelpID = -1
Private WithEvents cExecStep5 As cRunStep
Attribute cExecStep5.VB_VarHelpID = -1
Private WithEvents cExecStep6 As cRunStep
Attribute cExecStep6.VB_VarHelpID = -1
Private WithEvents cExecStep7 As cRunStep
Attribute cExecStep7.VB_VarHelpID = -1
Private WithEvents cExecStep8 As cRunStep
Attribute cExecStep8.VB_VarHelpID = -1
Private WithEvents cExecStep9 As cRunStep
Attribute cExecStep9.VB_VarHelpID = -1

Private WithEvents cExecStep10 As cRunStep
Attribute cExecStep10.VB_VarHelpID = -1
Private WithEvents cExecStep11 As cRunStep
Attribute cExecStep11.VB_VarHelpID = -1
Private WithEvents cExecStep12 As cRunStep
Attribute cExecStep12.VB_VarHelpID = -1
Private WithEvents cExecStep13 As cRunStep
Attribute cExecStep13.VB_VarHelpID = -1
Private WithEvents cExecStep14 As cRunStep
Attribute cExecStep14.VB_VarHelpID = -1
Private WithEvents cExecStep15 As cRunStep
Attribute cExecStep15.VB_VarHelpID = -1
Private WithEvents cExecStep16 As cRunStep
Attribute cExecStep16.VB_VarHelpID = -1
Private WithEvents cExecStep17 As cRunStep
Attribute cExecStep17.VB_VarHelpID = -1
Private WithEvents cExecStep18 As cRunStep
Attribute cExecStep18.VB_VarHelpID = -1
Private WithEvents cExecStep19 As cRunStep
Attribute cExecStep19.VB_VarHelpID = -1

Private WithEvents cExecStep20 As cRunStep
Attribute cExecStep20.VB_VarHelpID = -1
Private WithEvents cExecStep21 As cRunStep
Attribute cExecStep21.VB_VarHelpID = -1
Private WithEvents cExecStep22 As cRunStep
Attribute cExecStep22.VB_VarHelpID = -1
Private WithEvents cExecStep23 As cRunStep
Attribute cExecStep23.VB_VarHelpID = -1
Private WithEvents cExecStep24 As cRunStep
Attribute cExecStep24.VB_VarHelpID = -1
Private WithEvents cExecStep25 As cRunStep
Attribute cExecStep25.VB_VarHelpID = -1
Private WithEvents cExecStep26 As cRunStep
Attribute cExecStep26.VB_VarHelpID = -1
Private WithEvents cExecStep27 As cRunStep
Attribute cExecStep27.VB_VarHelpID = -1

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Private WithEvents cExecStep28 As cRunStep
Attribute cExecStep28.VB_VarHelpID = -1
Private WithEvents cExecStep29 As cRunStep
Attribute cExecStep29.VB_VarHelpID = -1

Private WithEvents cExecStep30 As cRunStep
Attribute cExecStep30.VB_VarHelpID = -1
Private WithEvents cExecStep31 As cRunStep
Attribute cExecStep31.VB_VarHelpID = -1
Private WithEvents cExecStep32 As cRunStep
Attribute cExecStep32.VB_VarHelpID = -1
Private WithEvents cExecStep33 As cRunStep
Attribute cExecStep33.VB_VarHelpID = -1
Private WithEvents cExecStep34 As cRunStep
Attribute cExecStep34.VB_VarHelpID = -1
Private WithEvents cExecStep35 As cRunStep
Attribute cExecStep35.VB_VarHelpID = -1
Private WithEvents cExecStep36 As cRunStep
Attribute cExecStep36.VB_VarHelpID = -1
Private WithEvents cExecStep37 As cRunStep
Attribute cExecStep37.VB_VarHelpID = -1
Private WithEvents cExecStep38 As cRunStep
Attribute cExecStep38.VB_VarHelpID = -1
Private WithEvents cExecStep39 As cRunStep
Attribute cExecStep39.VB_VarHelpID = -1

Private WithEvents cExecStep40 As cRunStep
Attribute cExecStep40.VB_VarHelpID = -1
Private WithEvents cExecStep41 As cRunStep
Attribute cExecStep41.VB_VarHelpID = -1
Private WithEvents cExecStep42 As cRunStep
Attribute cExecStep42.VB_VarHelpID = -1
Private WithEvents cExecStep43 As cRunStep
Attribute cExecStep43.VB_VarHelpID = -1
Private WithEvents cExecStep44 As cRunStep
Attribute cExecStep44.VB_VarHelpID = -1
Private WithEvents cExecStep45 As cRunStep
Attribute cExecStep45.VB_VarHelpID = -1
Private WithEvents cExecStep46 As cRunStep
Attribute cExecStep46.VB_VarHelpID = -1
Private WithEvents cExecStep47 As cRunStep
Attribute cExecStep47.VB_VarHelpID = -1
Private WithEvents cExecStep48 As cRunStep
Attribute cExecStep48.VB_VarHelpID = -1
Private WithEvents cExecStep49 As cRunStep
Attribute cExecStep49.VB_VarHelpID = -1

Private WithEvents cExecStep50 As cRunStep
Attribute cExecStep50.VB_VarHelpID = -1
Private WithEvents cExecStep51 As cRunStep
Attribute cExecStep51.VB_VarHelpID = -1
Private WithEvents cExecStep52 As cRunStep
Attribute cExecStep52.VB_VarHelpID = -1
Private WithEvents cExecStep53 As cRunStep
Attribute cExecStep53.VB_VarHelpID = -1
Private WithEvents cExecStep54 As cRunStep
Attribute cExecStep54.VB_VarHelpID = -1
Private WithEvents cExecStep55 As cRunStep
Attribute cExecStep55.VB_VarHelpID = -1
Private WithEvents cExecStep56 As cRunStep
Attribute cExecStep56.VB_VarHelpID = -1
Private WithEvents cExecStep57 As cRunStep
Attribute cExecStep57.VB_VarHelpID = -1
Private WithEvents cExecStep58 As cRunStep
Attribute cExecStep58.VB_VarHelpID = -1
Private WithEvents cExecStep59 As cRunStep
Attribute cExecStep59.VB_VarHelpID = -1

Private WithEvents cExecStep60 As cRunStep
Attribute cExecStep60.VB_VarHelpID = -1
Private WithEvents cExecStep61 As cRunStep
Attribute cExecStep61.VB_VarHelpID = -1
Private WithEvents cExecStep62 As cRunStep
Attribute cExecStep62.VB_VarHelpID = -1
Private WithEvents cExecStep63 As cRunStep

```

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Attribute cExecStep63.VB_VarHelpID = -1
Private WithEvents cExecStep64 As
cRunStep
Attribute cExecStep64.VB_VarHelpID = -1
Private WithEvents cExecStep65 As
cRunStep
Attribute cExecStep65.VB_VarHelpID = -1
Private WithEvents cExecStep66 As
cRunStep
Attribute cExecStep66.VB_VarHelpID = -1
Private WithEvents cExecStep67 As
cRunStep
Attribute cExecStep67.VB_VarHelpID = -1
Private WithEvents cExecStep68 As
cRunStep
Attribute cExecStep68.VB_VarHelpID = -1
Private WithEvents cExecStep69 As
cRunStep
Attribute cExecStep69.VB_VarHelpID = -1

Private WithEvents cExecStep70 As
cRunStep
Attribute cExecStep70.VB_VarHelpID = -1
Private WithEvents cExecStep71 As
cRunStep
Attribute cExecStep71.VB_VarHelpID = -1
Private WithEvents cExecStep72 As
cRunStep
Attribute cExecStep72.VB_VarHelpID = -1
Private WithEvents cExecStep73 As
cRunStep
Attribute cExecStep73.VB_VarHelpID = -1
Private WithEvents cExecStep74 As
cRunStep
Attribute cExecStep74.VB_VarHelpID = -1
Private WithEvents cExecStep75 As
cRunStep
Attribute cExecStep75.VB_VarHelpID = -1
Private WithEvents cExecStep76 As
cRunStep
Attribute cExecStep76.VB_VarHelpID = -1
Private WithEvents cExecStep77 As
cRunStep
Attribute cExecStep77.VB_VarHelpID = -1
Private WithEvents cExecStep78 As
cRunStep
Attribute cExecStep78.VB_VarHelpID = -1
Private WithEvents cExecStep79 As
cRunStep
Attribute cExecStep79.VB_VarHelpID = -1

Private WithEvents cExecStep80 As
cRunStep
Attribute cExecStep80.VB_VarHelpID = -1
Private WithEvents cExecStep81 As
cRunStep
Attribute cExecStep81.VB_VarHelpID = -1
Private WithEvents cExecStep82 As
cRunStep
Attribute cExecStep82.VB_VarHelpID = -1
Private WithEvents cExecStep83 As
cRunStep
Attribute cExecStep83.VB_VarHelpID = -1
Private WithEvents cExecStep84 As
cRunStep
Attribute cExecStep84.VB_VarHelpID = -1
Private WithEvents cExecStep85 As
cRunStep
Attribute cExecStep85.VB_VarHelpID = -1
Private WithEvents cExecStep86 As
cRunStep
Attribute cExecStep86.VB_VarHelpID = -1
Private WithEvents cExecStep87 As
cRunStep
Attribute cExecStep87.VB_VarHelpID = -1

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```

Private WithEvents cExecStep88 As cRunStep
Attribute cExecStep88.VB_VarHelpID = -1
Private WithEvents cExecStep89 As cRunStep
Attribute cExecStep89.VB_VarHelpID = -1

Private WithEvents cExecStep90 As cRunStep
Attribute cExecStep90.VB_VarHelpID = -1
Private WithEvents cExecStep91 As cRunStep
Attribute cExecStep91.VB_VarHelpID = -1
Private WithEvents cExecStep92 As cRunStep
Attribute cExecStep92.VB_VarHelpID = -1
Private WithEvents cExecStep93 As cRunStep
Attribute cExecStep93.VB_VarHelpID = -1
Private WithEvents cExecStep94 As cRunStep
Attribute cExecStep94.VB_VarHelpID = -1
Private WithEvents cExecStep95 As cRunStep
Attribute cExecStep95.VB_VarHelpID = -1
Private WithEvents cExecStep96 As cRunStep
Attribute cExecStep96.VB_VarHelpID = -1
Private WithEvents cExecStep97 As cRunStep
Attribute cExecStep97.VB_VarHelpID = -1
Private WithEvents cExecStep98 As cRunStep
Attribute cExecStep98.VB_VarHelpID = -1
Private WithEvents cExecStep99 As cRunStep
Attribute cExecStep99.VB_VarHelpID = -1

Private Const msIt As String = " Iterator: "
Private Const msItValue As String = " Value: "
Public Sub Abort()

    On Error GoTo AbortErr

    ' Make sure that we don't execute any more
    steps
    Call StopRun

    If cExecStep1 Is Nothing And cExecStep2 Is
Nothing And cExecStep3 Is Nothing And
cExecStep4 Is Nothing And cExecStep5 Is
Nothing And cExecStep6 Is Nothing And
cExecStep7 Is Nothing And cExecStep8 Is
Nothing And cExecStep9 Is Nothing And _
    cExecStep10 Is Nothing And cExecStep11
Is Nothing And cExecStep12 Is Nothing And
cExecStep13 Is Nothing And cExecStep14 Is
Nothing And cExecStep15 Is Nothing And
cExecStep16 Is Nothing And cExecStep17 Is
Nothing And cExecStep18 Is Nothing And
cExecStep19 Is Nothing And _
    cExecStep20 Is Nothing And cExecStep21
Is Nothing And cExecStep22 Is Nothing And
cExecStep23 Is Nothing And cExecStep24 Is
Nothing And cExecStep25 Is Nothing And
cExecStep26 Is Nothing And cExecStep27 Is
Nothing And cExecStep28 Is Nothing And
cExecStep29 Is Nothing And _
    cExecStep30 Is Nothing And cExecStep31
Is Nothing And cExecStep32 Is Nothing And
cExecStep33 Is Nothing And cExecStep34 Is
Nothing And cExecStep35 Is Nothing And
cExecStep36 Is Nothing And cExecStep37 Is
Nothing And cExecStep38 Is Nothing And
cExecStep39 Is Nothing And _
    cExecStep40 Is Nothing And cExecStep41
Is Nothing And cExecStep42 Is Nothing And
cExecStep43 Is Nothing And cExecStep44 Is
Nothing And cExecStep45 Is Nothing And
cExecStep46 Is Nothing And cExecStep47 Is
Nothing And cExecStep48 Is Nothing And
cExecStep49 Is Nothing And _
    cExecStep50 Is Nothing And cExecStep51
Is Nothing And cExecStep52 Is Nothing And
cExecStep53 Is Nothing And cExecStep54 Is
Nothing And cExecStep55 Is Nothing And
cExecStep56 Is Nothing And cExecStep57 Is

```

```

Nothing And cExecStep58 Is Nothing And
cExecStep59 Is Nothing And _
    cExecStep60 Is Nothing And cExecStep61 Is
Nothing And cExecStep62 Is Nothing And
cExecStep63 Is Nothing And cExecStep64 Is
Nothing And cExecStep65 Is Nothing And
cExecStep66 Is Nothing And cExecStep67 Is
Nothing And cExecStep68 Is Nothing And
cExecStep69 Is Nothing And _
    cExecStep70 Is Nothing And cExecStep71 Is
Nothing And cExecStep72 Is Nothing And
cExecStep73 Is Nothing And cExecStep74 Is
Nothing And cExecStep75 Is Nothing And
cExecStep76 Is Nothing And cExecStep77 Is
Nothing And cExecStep78 Is Nothing And
cExecStep79 Is Nothing And _
    cExecStep80 Is Nothing And cExecStep81 Is
Nothing And cExecStep82 Is Nothing And
cExecStep83 Is Nothing And cExecStep84 Is
Nothing And cExecStep85 Is Nothing And
cExecStep86 Is Nothing And cExecStep87 Is
Nothing And cExecStep88 Is Nothing And
cExecStep89 Is Nothing And _
    cExecStep90 Is Nothing And cExecStep91 Is
Nothing And cExecStep92 Is Nothing And
cExecStep93 Is Nothing And cExecStep94 Is
Nothing And cExecStep95 Is Nothing And
cExecStep96 Is Nothing And cExecStep97 Is
Nothing And cExecStep98 Is Nothing And
cExecStep99 Is Nothing Then
    ' Then...
    WriteToWspLog (mintRunComplete)
    RaiseEvent
    RunComplete(Determine64BitTime())
Else
    ' Abort each of the steps that is currently
    executing.
    If Not cExecStep1 Is Nothing Then
        cExecStep1.Abort
    End If
    If Not cExecStep2 Is Nothing Then
        cExecStep2.Abort
    End If
    If Not cExecStep3 Is Nothing Then
        cExecStep3.Abort
    End If
    If Not cExecStep4 Is Nothing Then
        cExecStep4.Abort
    End If
    If Not cExecStep5 Is Nothing Then
        cExecStep5.Abort
    End If
    If Not cExecStep6 Is Nothing Then
        cExecStep6.Abort
    End If
    If Not cExecStep7 Is Nothing Then
        cExecStep7.Abort
    End If
    If Not cExecStep8 Is Nothing Then
        cExecStep8.Abort
    End If
    If Not cExecStep9 Is Nothing Then
        cExecStep9.Abort
    End If
    If Not cExecStep10 Is Nothing Then
        cExecStep10.Abort
    End If
    If Not cExecStep11 Is Nothing Then
        cExecStep11.Abort
    End If
    If Not cExecStep12 Is Nothing Then
        cExecStep12.Abort
    End If
    If Not cExecStep13 Is Nothing Then
        cExecStep13.Abort
    End If

```

```

End If

If Not cExecStep14 Is Nothing Then
  cExecStep14.Abort
End If

If Not cExecStep15 Is Nothing Then
  cExecStep15.Abort
End If

If Not cExecStep16 Is Nothing Then
  cExecStep16.Abort
End If

If Not cExecStep17 Is Nothing Then
  cExecStep17.Abort
End If

If Not cExecStep18 Is Nothing Then
  cExecStep18.Abort
End If

If Not cExecStep19 Is Nothing Then
  cExecStep19.Abort
End If

If Not cExecStep20 Is Nothing Then
  cExecStep20.Abort
End If

If Not cExecStep21 Is Nothing Then
  cExecStep21.Abort
End If

```

```

If Not cExecStep22 Is Nothing Then
  cExecStep22.Abort
End If

If Not cExecStep23 Is Nothing Then
  cExecStep23.Abort
End If

If Not cExecStep24 Is Nothing Then
  cExecStep24.Abort
End If

If Not cExecStep25 Is Nothing Then
  cExecStep25.Abort
End If

If Not cExecStep26 Is Nothing Then
  cExecStep26.Abort
End If

If Not cExecStep27 Is Nothing Then
  cExecStep27.Abort
End If

If Not cExecStep28 Is Nothing Then
  cExecStep28.Abort
End If

If Not cExecStep29 Is Nothing Then
  cExecStep29.Abort
End If

```

' ===== 30 - 39

```

=====
If Not cExecStep30 Is Nothing Then
  cExecStep30.Abort
End If

If Not cExecStep31 Is Nothing Then
  cExecStep31.Abort
End If

```

```

If Not cExecStep32 Is Nothing Then
  cExecStep32.Abort
End If

If Not cExecStep33 Is Nothing Then
  cExecStep33.Abort
End If

If Not cExecStep34 Is Nothing Then
  cExecStep34.Abort
End If

If Not cExecStep35 Is Nothing Then
  cExecStep35.Abort
End If

If Not cExecStep36 Is Nothing Then
  cExecStep36.Abort
End If

If Not cExecStep37 Is Nothing Then
  cExecStep37.Abort
End If

If Not cExecStep38 Is Nothing Then
  cExecStep38.Abort
End If

If Not cExecStep39 Is Nothing Then
  cExecStep39.Abort
End If

```

' ===== 40 - 49

```

=====
If Not cExecStep40 Is Nothing Then
  cExecStep40.Abort
End If

If Not cExecStep41 Is Nothing Then
  cExecStep41.Abort
End If

If Not cExecStep42 Is Nothing Then
  cExecStep42.Abort
End If

If Not cExecStep43 Is Nothing Then
  cExecStep43.Abort
End If

If Not cExecStep44 Is Nothing Then
  cExecStep44.Abort
End If

If Not cExecStep45 Is Nothing Then
  cExecStep45.Abort
End If

If Not cExecStep46 Is Nothing Then
  cExecStep46.Abort
End If

If Not cExecStep47 Is Nothing Then
  cExecStep47.Abort
End If

```

```

If Not cExecStep48 Is Nothing Then
  cExecStep48.Abort
End If

If Not cExecStep49 Is Nothing Then
  cExecStep49.Abort
End If

```

' ===== 50 - 59

```

=====
If Not cExecStep50 Is Nothing Then
  cExecStep50.Abort
End If

If Not cExecStep51 Is Nothing Then
  cExecStep51.Abort
End If

If Not cExecStep52 Is Nothing Then
  cExecStep52.Abort
End If

If Not cExecStep53 Is Nothing Then
  cExecStep53.Abort
End If

If Not cExecStep54 Is Nothing Then
  cExecStep54.Abort
End If

If Not cExecStep55 Is Nothing Then
  cExecStep55.Abort
End If

If Not cExecStep56 Is Nothing Then
  cExecStep56.Abort
End If

If Not cExecStep57 Is Nothing Then
  cExecStep57.Abort
End If

```

```

If Not cExecStep58 Is Nothing Then
  cExecStep58.Abort
End If

```

```

If Not cExecStep59 Is Nothing Then
  cExecStep59.Abort
End If

```

' ===== 60 - 69

```

=====
If Not cExecStep60 Is Nothing Then
  cExecStep60.Abort
End If

If Not cExecStep61 Is Nothing Then
  cExecStep61.Abort
End If

If Not cExecStep62 Is Nothing Then
  cExecStep62.Abort
End If

If Not cExecStep63 Is Nothing Then
  cExecStep63.Abort
End If

If Not cExecStep64 Is Nothing Then
  cExecStep64.Abort
End If

If Not cExecStep65 Is Nothing Then
  cExecStep65.Abort
End If

If Not cExecStep66 Is Nothing Then
  cExecStep66.Abort
End If

If Not cExecStep67 Is Nothing Then
  cExecStep67.Abort
End If

```

```

If Not cExecStep68 Is Nothing Then
  cExecStep68.Abort
End If

If Not cExecStep69 Is Nothing Then
  cExecStep69.Abort
End If

' ===== 70 - 79
=====
If Not cExecStep70 Is Nothing Then
  cExecStep70.Abort
End If

If Not cExecStep71 Is Nothing Then
  cExecStep71.Abort
End If

If Not cExecStep72 Is Nothing Then
  cExecStep72.Abort
End If

If Not cExecStep73 Is Nothing Then
  cExecStep73.Abort
End If

If Not cExecStep74 Is Nothing Then
  cExecStep74.Abort
End If

If Not cExecStep75 Is Nothing Then
  cExecStep75.Abort
End If

If Not cExecStep76 Is Nothing Then
  cExecStep76.Abort
End If

If Not cExecStep77 Is Nothing Then
  cExecStep77.Abort
End If

If Not cExecStep78 Is Nothing Then
  cExecStep78.Abort
End If

If Not cExecStep79 Is Nothing Then
  cExecStep79.Abort
End If

' ===== 80 - 89
=====
If Not cExecStep80 Is Nothing Then
  cExecStep80.Abort
End If

If Not cExecStep81 Is Nothing Then
  cExecStep81.Abort
End If

If Not cExecStep82 Is Nothing Then
  cExecStep82.Abort
End If

If Not cExecStep83 Is Nothing Then
  cExecStep83.Abort
End If

If Not cExecStep84 Is Nothing Then
  cExecStep84.Abort
End If

If Not cExecStep85 Is Nothing Then
  cExecStep85.Abort

```

```

End If

If Not cExecStep86 Is Nothing Then
  cExecStep86.Abort
End If

If Not cExecStep87 Is Nothing Then
  cExecStep87.Abort
End If

If Not cExecStep88 Is Nothing Then
  cExecStep88.Abort
End If

If Not cExecStep89 Is Nothing Then
  cExecStep89.Abort
End If

' ===== 90 - 99
=====
If Not cExecStep90 Is Nothing Then
  cExecStep90.Abort
End If

If Not cExecStep91 Is Nothing Then
  cExecStep91.Abort
End If

If Not cExecStep92 Is Nothing Then
  cExecStep92.Abort
End If

If Not cExecStep93 Is Nothing Then
  cExecStep93.Abort
End If

If Not cExecStep94 Is Nothing Then
  cExecStep94.Abort
End If

If Not cExecStep95 Is Nothing Then
  cExecStep95.Abort
End If

If Not cExecStep96 Is Nothing Then
  cExecStep96.Abort
End If

If Not cExecStep97 Is Nothing Then
  cExecStep97.Abort
End If

If Not cExecStep98 Is Nothing Then
  cExecStep98.Abort
End If

If Not cExecStep99 Is Nothing Then
  cExecStep99.Abort
End If

End If

Exit Sub

AbortErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  ShowError errAbortFailed
  ' Try to abort the remaining steps, if any
  Resume Next

End Sub
Public Sub AbortSiblings(cTermInstance As
cInstance)

```

```

  On Error GoTo AbortSiblingsErr

  ' Abort each of the steps that is currently
  executing.
  If Not cExecStep1 Is Nothing Then
    If cExecStep1.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep1.Abort
    End If
  End If

  If Not cExecStep2 Is Nothing Then
    If cExecStep2.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep2.Abort
    End If
  End If

  If Not cExecStep3 Is Nothing Then
    If cExecStep3.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep3.Abort
    End If
  End If

  If Not cExecStep4 Is Nothing Then
    If cExecStep4.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep4.Abort
    End If
  End If

  If Not cExecStep5 Is Nothing Then
    If cExecStep5.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep5.Abort
    End If
  End If

  If Not cExecStep6 Is Nothing Then
    If cExecStep6.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep6.Abort
    End If
  End If

  If Not cExecStep7 Is Nothing Then
    If cExecStep7.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep7.Abort
    End If
  End If

  If Not cExecStep8 Is Nothing Then
    If cExecStep8.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep8.Abort
    End If
  End If

  If Not cExecStep9 Is Nothing Then
    If cExecStep9.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep9.Abort
    End If
  End If

  If Not cExecStep10 Is Nothing Then
    If cExecStep10.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep10.Abort
    End If
  End If

  If Not cExecStep11 Is Nothing Then

```



```

    End If
End If

If Not cExecStep72 Is Nothing Then
    If
cExecStep72.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep72.Abort
    End If
End If

If Not cExecStep73 Is Nothing Then
    If
cExecStep73.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep73.Abort
    End If
End If

If Not cExecStep74 Is Nothing Then
    If
cExecStep74.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep74.Abort
    End If
End If

If Not cExecStep75 Is Nothing Then
    If
cExecStep75.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep75.Abort
    End If
End If

If Not cExecStep76 Is Nothing Then
    If
cExecStep76.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep76.Abort
    End If
End If

If Not cExecStep77 Is Nothing Then
    If
cExecStep77.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep77.Abort
    End If
End If

If Not cExecStep78 Is Nothing Then
    If
cExecStep78.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep78.Abort
    End If
End If

If Not cExecStep79 Is Nothing Then
    If
cExecStep79.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep79.Abort
    End If
End If

' ===== 80
=====
If Not cExecStep80 Is Nothing Then
    If
cExecStep80.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep80.Abort
    End If
End If

```

```

    End If

If Not cExecStep81 Is Nothing Then
    If cExecStep81.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep81.Abort
    End If
End If

If Not cExecStep82 Is Nothing Then
    If cExecStep82.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep82.Abort
    End If
End If

If Not cExecStep83 Is Nothing Then
    If cExecStep83.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep83.Abort
    End If
End If

If Not cExecStep84 Is Nothing Then
    If cExecStep84.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep84.Abort
    End If
End If

If Not cExecStep85 Is Nothing Then
    If cExecStep85.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep85.Abort
    End If
End If

If Not cExecStep86 Is Nothing Then
    If cExecStep86.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep86.Abort
    End If
End If

If Not cExecStep87 Is Nothing Then
    If cExecStep87.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep87.Abort
    End If
End If

If Not cExecStep88 Is Nothing Then
    If cExecStep88.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep88.Abort
    End If
End If

If Not cExecStep89 Is Nothing Then
    If cExecStep89.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep89.Abort
    End If
End If

' ===== 90
=====
If Not cExecStep90 Is Nothing Then
    If cExecStep90.ExecuteStep.ParentStepId
= cTermInstance.Step.ParentStepId Then
        cExecStep90.Abort
    End If
End If

If Not cExecStep91 Is Nothing Then

```

```

    If cExecStep91.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep91.Abort
    End If
End If

If Not cExecStep92 Is Nothing Then
    If cExecStep92.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep92.Abort
    End If
End If

If Not cExecStep93 Is Nothing Then
    If cExecStep93.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep93.Abort
    End If
End If

If Not cExecStep94 Is Nothing Then
    If cExecStep94.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep94.Abort
    End If
End If

If Not cExecStep95 Is Nothing Then
    If cExecStep95.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep95.Abort
    End If
End If

If Not cExecStep96 Is Nothing Then
    If cExecStep96.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep96.Abort
    End If
End If

If Not cExecStep97 Is Nothing Then
    If cExecStep97.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep97.Abort
    End If
End If

If Not cExecStep98 Is Nothing Then
    If cExecStep98.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep98.Abort
    End If
End If

If Not cExecStep99 Is Nothing Then
    If cExecStep99.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
        cExecStep99.Abort
    End If
End If

Exit Sub

AbortSiblingsErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    ShowError errAbortFailed
    ' Try to abort the remaining steps, if any
    Resume Next

End Sub
Private Sub ExecutionFailed(cTermStep As
cRunStep)

```



```

' Called when execution of a step fails for
any reason - ensure that execution
' continues

On Error GoTo ExecutionFailedErr

Call AddFreeProcess(cTermStep.Index)

Call RunBranch(mstrCurBranchRoot)

Exit Sub

ExecutionFailedErr:
' Log the error code raised by Visual
Basic - do not raise an error here!
Call LogErrors(Errors)

End Sub
Private Sub FreeExecStep(lnIndex As
Long)
' Frees an instance of a cExecuteSM
object depending on the index
On Error GoTo FreeExecStepErr

Select Case lngIndex + 1
Case 1
Set cExecStep1 = Nothing
Case 2
Set cExecStep2 = Nothing
Case 3
Set cExecStep3 = Nothing
Case 4
Set cExecStep4 = Nothing
Case 5
Set cExecStep5 = Nothing
Case 6
Set cExecStep6 = Nothing
Case 7
Set cExecStep7 = Nothing
Case 8
Set cExecStep8 = Nothing
Case 9
Set cExecStep9 = Nothing
Case 10
Set cExecStep10 = Nothing
Case 11
Set cExecStep11 = Nothing
Case 12
Set cExecStep12 = Nothing
Case 13
Set cExecStep13 = Nothing
Case 14
Set cExecStep14 = Nothing
Case 15
Set cExecStep15 = Nothing
Case 16
Set cExecStep16 = Nothing
Case 17
Set cExecStep17 = Nothing
Case 18
Set cExecStep18 = Nothing
Case 19
Set cExecStep19 = Nothing
Case 20
Set cExecStep20 = Nothing
Case 21
Set cExecStep21 = Nothing
Case 22
Set cExecStep22 = Nothing
Case 23
Set cExecStep23 = Nothing
Case 24
Set cExecStep24 = Nothing
Case 25
Set cExecStep25 = Nothing

```

```

Case 26
Set cExecStep26 = Nothing
Case 27
Set cExecStep27 = Nothing
Case 28
Set cExecStep28 = Nothing
Case 29
Set cExecStep29 = Nothing
Case 30
Set cExecStep30 = Nothing
Case 31
Set cExecStep31 = Nothing
Case 32
Set cExecStep32 = Nothing
Case 33
Set cExecStep33 = Nothing
Case 34
Set cExecStep34 = Nothing
Case 35
Set cExecStep35 = Nothing
Case 36
Set cExecStep36 = Nothing
Case 37
Set cExecStep37 = Nothing
Case 38
Set cExecStep38 = Nothing
Case 39
Set cExecStep39 = Nothing
Case 40
Set cExecStep40 = Nothing
Case 41
Set cExecStep41 = Nothing
Case 42
Set cExecStep42 = Nothing
Case 43
Set cExecStep43 = Nothing
Case 44
Set cExecStep44 = Nothing
Case 45
Set cExecStep45 = Nothing
Case 46
Set cExecStep46 = Nothing
Case 47
Set cExecStep47 = Nothing
Case 48
Set cExecStep48 = Nothing
Case 49
Set cExecStep49 = Nothing
Case 50
Set cExecStep50 = Nothing
Case 51
Set cExecStep51 = Nothing
Case 52
Set cExecStep52 = Nothing
Case 53
Set cExecStep53 = Nothing
Case 54
Set cExecStep54 = Nothing
Case 55
Set cExecStep55 = Nothing
Case 56
Set cExecStep56 = Nothing
Case 57
Set cExecStep57 = Nothing
Case 58
Set cExecStep58 = Nothing
Case 59
Set cExecStep59 = Nothing
Case 60
Set cExecStep60 = Nothing
Case 61
Set cExecStep61 = Nothing
Case 62
Set cExecStep62 = Nothing
Case 63

```

```

Set cExecStep63 = Nothing
Case 64
Set cExecStep64 = Nothing
Case 65
Set cExecStep65 = Nothing
Case 66
Set cExecStep66 = Nothing
Case 67
Set cExecStep67 = Nothing
Case 68
Set cExecStep68 = Nothing
Case 69
Set cExecStep69 = Nothing
Case 70
Set cExecStep70 = Nothing
Case 71
Set cExecStep71 = Nothing
Case 72
Set cExecStep72 = Nothing
Case 73
Set cExecStep73 = Nothing
Case 74
Set cExecStep74 = Nothing
Case 75
Set cExecStep75 = Nothing
Case 76
Set cExecStep76 = Nothing
Case 77
Set cExecStep77 = Nothing
Case 78
Set cExecStep78 = Nothing
Case 79
Set cExecStep79 = Nothing
Case 80
Set cExecStep80 = Nothing
Case 81
Set cExecStep81 = Nothing
Case 82
Set cExecStep82 = Nothing
Case 83
Set cExecStep83 = Nothing
Case 84
Set cExecStep84 = Nothing
Case 85
Set cExecStep85 = Nothing
Case 86
Set cExecStep86 = Nothing
Case 87
Set cExecStep87 = Nothing
Case 88
Set cExecStep88 = Nothing
Case 89
Set cExecStep89 = Nothing
Case 90
Set cExecStep90 = Nothing
Case 91
Set cExecStep91 = Nothing
Case 92
Set cExecStep92 = Nothing
Case 93
Set cExecStep93 = Nothing
Case 94
Set cExecStep94 = Nothing
Case 95
Set cExecStep95 = Nothing
Case 96
Set cExecStep96 = Nothing
Case 97
Set cExecStep97 = Nothing
Case 98
Set cExecStep98 = Nothing
Case 99
Set cExecStep99 = Nothing
Case Else

```

```

BugAssert False, "FreeExecStep:
Invalid index value!"
End Select

Exit Sub

FreeExecStepErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)

End Sub
Private Sub ProcessAskFailures()
' This procedure is called when a step
with a continuation criteria = Ask has failed.
' Wait for all running processes to
complete before displaying an
Abort/Retry/Fail
' message to the user. We process every
Ask step that has failed and use a simple
' algorithm to determine what to do next.
' 1. An abort response to any failure
results in an immediate abort of the run
' 2. A continue means the run continues -
this failure is popped off the failure list.
' 3. A retry means that the execution
details for the instance are cleared and the
' step is re-executed.
Dim IIndex As Long
Dim cStepRec As cStep
Dim cNextInst As cInstance
Dim cFailureRec As cFailedStep

On Error GoTo ProcessAskFailuresErr

' Display a popup message for all steps
that have failed with a continuation
' criteria of Ask
For IIndex = mcFailures.Count - 1 To 0
Step -1

Set cFailureRec = mcFailures(IIndex)

If cFailureRec.ContCriteria =
gintOnFailureAsk Then
Set cStepRec =
mcRunSteps.QueryStep(cFailureRec.StepId)
' Ask the user whether to
abort/retry/continue
#If RUN_ONLY Then
cFailureRec.AskResponse =
ShowMessageBox(0, _
"Step " &
GetStepNodeText(cStepRec) & " failed." &
_
"Select Abort to abort run
and Ignore to continue." & _
"Select Retry to re-execute
the failed step.", _
"Step Failure", _
MB_ABORTRETRYIGNORE +
MB_APPLMODAL +
MB_ICONEXCLAMATION)
#Else
cFailureRec.AskResponse =
ShowMessageBox(frmRunning.hWnd, _
"Step " &
GetStepNodeText(cStepRec) & " failed." &
_
"Select Abort to abort run
and Ignore to continue." & _
"Select Retry to re-execute
the failed step.", _
"Step Failure", _

```

```

MB_ABORTRETRYIGNORE
+ MB_APPLMODAL +
MB_ICONEXCLAMATION)
#End If

' Process an abort response immediately
If cFailureRec.AskResponse =
IDABORT Then
mblnAbort = True
Set cNextInst =
mcInstances.QueryInstance(cFailureRec.Instan
ceId)
Call RunPendingSiblings(cNextInst,
cFailureRec.EndTime)
Exit For
End If
End If

Next IIndex

' Process all failed steps for which we have
Ignore and Retry responses.
If Not mblnAbort Then
' Navigate in reverse order since we'll be
deleting items from the collection
For IIndex = mcFailures.Count - 1 To 0
Step -1
If mcFailures(IIndex).ContCriteria =
gintOnFailureAsk Then
mblnAsk = False
Set cFailureRec =
mcFailures.Delete(IIndex)

Select Case
cFailureRec.AskResponse
Case IDABORT
BugAssert True

Case IDRETRY
' Delete all instances for the
failed step and re-try
' Returns a parent instance
reference
Set cNextInst =
ProcessRetryStep(cFailureRec)
Call
RunPendingStepInBranch(mstrCurBranchRoot
, cNextInst)

Case IDIGNORE
Set cNextInst =
mcInstances.QueryInstance(cFailureRec.Instan
ceId)

Call
RunPendingSiblings(cNextInst,
cFailureRec.EndTime)

End Select
End If
Next IIndex
End If

Exit Sub

ProcessAskFailuresErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrModuleName, _
LoadResString(errExecuteBranchFailed)

End Sub

```

```

Private Function ProcessRetryStep(cFailureRec As
cFailedStep) As cInstance
' This procedure is called when a step with a
continuation criteria = Ask has failed
' and the user wants to re-execute the step.
' We delete all existing instances for the step and
reset the iterator, if
' any on the parent instance - this way we ensure
that the step will be executed
' in the next pass.
Dim IIndex As Long
Dim cParentInstance As cInstance
Dim cSubStepRec As cSubStep
Dim cStepRec As cStep

On Error GoTo ProcessRetryStepErr

' Navigate in reverse order since we'll be deleting
items from the collection
For IIndex = mcInstances.Count - 1 To 0 Step -1

If mcInstances(IIndex).Step.StepId =
cFailureRec.StepId Then
Set cParentInstance =
mcInstances.QueryInstance(mcInstances(IIndex).Pa
rentInstanceId)
Set cSubStepRec =
cParentInstance.QuerySubStep(cFailureRec.StepId)
Set cStepRec =
mcRunSteps.QueryStep(cFailureRec.StepId)

' Decrement the child count on the parent
instance and reset the
' step iterators on the sub-step record, if any
-
' all the iterations of the step will be re-
executed.
cParentInstance.ChildDeleted
cFailureRec.StepId
cParentInstance.AllComplete = False
cParentInstance.AllStarted = False

cSubStepRec.InitializeIt cStepRec,
mcParameters

' Now delete the current instance
Set ProcessRetryStep =
mcInstances.Delete(IIndex)
End If
Next IIndex

Exit Function

ProcessRetryStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrModuleName, _
LoadResString(errExecuteBranchFailed)

End Function

Private Sub RunNextStep(ByVal
dtmCompleteTime As Currency, ByVal lngIndex
As Long, _
ByVal InstanceId As Long, ByVal
ExecutionStatus As InstanceStatus)
' Checks if there are any steps remaining to be
' executed in the current branch. If so, it executes
' the step.
Dim cTermInstance As cInstance
Dim cFailure As cFailedStep

On Error GoTo RunNextStepErr

```

```

BugMessage "RunNextStep: cExecStep"
& CStr(IngIndex + 1) & " has completed."

Call mcTermSteps.Delete
Call FreeExecStep(IngIndex)

' Call a procedure to add the freed up
object to the list
Call AddFreeProcess(IngIndex)

Set cTermInstance =
mcInstances.QueryInstance(InstanceId)
cTermInstance.Status = ExecutionStatus

If ExecutionStatus = gintFailed Then
If
cTermInstance.Step.ContinuationCriteria =
gintOnFailureAbortSiblings Then
Call AbortSiblings(cTermInstance)
End If

If Not
mcFailures.StepFailed(cTermInstance.Step.
StepId) Then
Set cFailure = New cFailedStep
cFailure.InstanceId =
cTermInstance.InstanceId
cFailure.StepId =
cTermInstance.Step.StepId
cFailure.ParentStepId =
cTermInstance.Step.ParentStepId
cFailure.ContCriteria =
cTermInstance.Step.ContinuationCriteria
cFailure.EndTime =
dtmCompleteTime
mcFailures.Add cFailure
Set cFailure = Nothing
End If
End If

If ExecutionStatus = gintFailed And
cTermInstance.Step.ContinuationCriteria =
gintOnFailureAbort Then
If StringEmpty(msAbortDtls) Then
' Initialize the abort message
msAbortDtls = "Step " &
GetStepNodeText(cTermInstance.Step) & ""
failed. " & _
"Aborting execution. Please
check the error file for details."
End If
Call Abort
ElseIf ExecutionStatus = gintFailed And
cTermInstance.Step.ContinuationCriteria =
gintOnFailureAsk Then
mblnAsk = True

' If the step failed due to a Cancel
operation (Abort), abort the run
If mblnAbort Then
Call
RunPendingSiblings(cTermInstance,
dtmCompleteTime)
End If
Else
Call
RunPendingSiblings(cTermInstance,
dtmCompleteTime)
End If

If mblnAbort Then
If Not AnyStepRunning(mcFreeSteps,
mbarrFree) And Not
StringEmpty(msAbortDtls) Then

```

```

' Display an error only if the abort is
due to a failure
' We had to abort since a step failed -
since no other steps are currently
' running, we can display a message to
the user saying that we had to abort
#If RUN_ONLY Then
Call ShowMessageBox(0,
msAbortDtls, "Run Aborted", _
MB_APPLMODAL + MB_OK
+ MB_ICONEXCLAMATION)
#Else
Call
ShowMessageBox(frmRunning.hWnd,
msAbortDtls, "Run Aborted", _
MB_APPLMODAL + MB_OK
+ MB_ICONEXCLAMATION)
#End If
' MsgBox msAbortDtls, vbOKOnly,
"Run Aborted"
End If
ElseIf mblnAsk Then
If Not AnyStepRunning(mcFreeSteps,
mbarrFree) Then
' Ask the user whether to
abort/retry/ignore failed steps
Call ProcessAskFailures
End If
End If

Exit Sub

RunNextStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errExecuteBranchFailed,
mstrSource
Call ResetForm(IngIndex)

End Sub
Public Sub StopRun()

' Setting the Abort flag to True will ensure
that we
' don't execute any more steps
mblnAbort = True

End Sub

Private Sub CreateDummyInstance(strRootKey
As String)

Dim cNewInstance As cInstance
Dim cSubStepDtls As cStep
Dim lngSubStepId As Long

On Error GoTo CreateDummyInstanceErr

' Create a new instance of the step
' initialize substeps for the step
Set cNewInstance = New cInstance

' There can be multiple iterations of the top
level nodes
' running at the same time, but only one
branch at any
' time - so enforce a degree of parallelism of
1 on this
' node!
Set cNewInstance.Step = New cStep
cNewInstance.DegreeParallelism = 1
cNewInstance.Key = mstrDummyRootKey

cNewInstance.InstanceId = NewInstanceId
cNewInstance.ParentInstanceId = 0

```

```

lngSubStepId =
MakeIdentifierValid(strRootKey)

Set cSubStepDtls =
mcRunSteps.QueryStep(lngSubStepId)
If cSubStepDtls.EnabledFlag Then
' Create a child node for the step corresponding
to
' the root node of the branch being currently
executed,
' only if it has been enabled
Call
cNewInstance.CreateSubStep(cSubStepDtls,
mcParameters)
End If

mcInstances.Add cNewInstance
Set cNewInstance.Iterators =
DetermineIterators(cNewInstance)

' Set a reference to the newly created dummy
instance
Set mcDummyRootInstance = cNewInstance

Set cNewInstance = Nothing

Exit Sub

CreateDummyInstanceErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"CreateDummyInstance"
Err.Raise vbObjectError +
errCreateInstanceFailed, _
mstrSource,
LoadResString(errCreateInstanceFailed)

End Sub
Private Function CreateInstance(cExecStep As
cStep, _
cParentInstance As cInstance) As cInstance
' Creates a new instance of the passed in step.
Returns
' a reference to the newly created instance object.

Dim cNewInstance As cInstance
Dim nodChild As cStep
Dim lngSubStepId As Long

On Error GoTo CreateInstanceErr

' Create a new instance of the step
' initialize substeps for the step
Set cNewInstance = New cInstance
Set cNewInstance.Step = cExecStep
cNewInstance.Key =
MakeKeyValid(cExecStep.StepId,
cExecStep.StepType)
cNewInstance.ParentInstanceId =
cParentInstance.InstanceId
cNewInstance.InstanceId = NewInstanceId
' Validate the degree of parallelism field before
assigning it to the instance -
' (the parameter value might have been set to an
invalid value at runtime)
Call
ValidateParallelism(cExecStep.DegreeParallelism,
_
cExecStep.WorkspaceId,
ParamsInWsp:=mcParameters)

```

```

cNewInstance.DegreeParallelism =
SubstituteParameters(cExecStep.DegreeParallelism, _
    cExecStep.WorkspaceId,
WspParameters:=mcParameters)

If
mcNavSteps.HasChild(StepKey:=cNewInstance.Key) Then
    Set nodChild =
mcNavSteps.ChildStep(StepKey:=cNewInstance.Key)
    Do
        If nodChild.EnabledFlag Then
            ' Create nodes for all it's substeps
only
            ' if the substeps have been enabled
            Call
cNewInstance.CreateSubStep(nodChild,
mcParameters)
            End If

            Set nodChild =
mcNavSteps.NextStep(StepId:=nodChild.StepId)
            Loop While (Not nodChild.Is Nothing)
            End If

            mcInstances.Add cNewInstance
            Set cNewInstance.Iterators =
DetermineIterators(cNewInstance)

            ' Increment the number of executing steps
            on the parent
            cParentInstance.ChildExecuted
            (cExecStep.StepId)

            Set CreateInstance = cNewInstance

            Exit Function

CreateInstanceErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"CreateInstance"
Err.Raise vbObjectError +
errCreateInstanceFailed, _
    mstrSource,
LoadResString(errCreateInstanceFailed)

End Function
Private Function
DetermineIterators(cInstanceRec As cInstance) As cRunCollt
' Returns a collection of all the iterator
values for this
' instance - since an iterator that is defined
at a
' particular level can be used in all it's
substeps, we
' need to navigate the step tree all the way
to the root

Dim cRunIts As cRunCollt
Dim cRunIt As cRunItNode
Dim cStepIt As cIterator
Dim cParentInst As cInstance
Dim cSubStepRec As cSubStep
Dim cSubStepDtIs As cStepDtIs
Dim lngSubStepId As Long
Dim lngIndex As Long

```

```

On Error GoTo DetermineIteratorsErr

Set cRunIts = New cRunCollt

If cInstanceRec.ParentInstanceId > 0 Then
' The last iterator for an instance of a step
is stored
' on it's parent! So navigate up before
beginning the
' search for iterator values.
Set cParentInst =
mcInstances.QueryInstance(cInstanceRec.ParentInstanceId)

' Get the sub-step record for the current
step
' on it's parent's instance!
lngSubStepId = cInstanceRec.Step.StepId
Set cSubStepRec =
cParentInst.QuerySubStep(lngSubStepId)
Set cSubStepDtIs =
mcRunSteps.QueryStep(lngSubStepId)

' And determine the next iteration value
for the
' substep in this instance
Set cStepIt =
cSubStepRec.NewIteration(cSubStepDtIs)

If Not cStepIt.Is Nothing Then
' Add the iterator details to the
collection since
' an iterator has been defined for the
step
Set cRunIt = New cRunItNode
cRunIt.IteratorName =
cSubStepDtIs.IteratorName
cRunIt.Value =
SubstituteParameters(cStepIt.Value,
cSubStepDtIs.WorkspaceId,
WspParameters:=mcParameters)
cRunIt.StepId = cSubStepRec.StepId
cRunIts.Push cRunIt
End If

' Since the parent instance has all the
iterators upto
' that level, read them and push them on to
the stack for
' this instance
For lngIndex = 0 To
cParentInst.Iterators.Count - 1
Set cRunIt =
cParentInst.Iterators(lngIndex)
cRunIts.Push cRunIt
Next lngIndex
End If

Set DetermineIterators = cRunIts

Exit Function

DetermineIteratorsErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"DetermineIterators"
Err.Raise vbObjectError +
errExecInstanceFailed, _
    mstrSource,
LoadResString(errExecInstanceFailed)

End Function

```

```

Private Function
DetermineConstraints(cInstanceRec As cInstance, _
    intConsType As ConstraintType) As Variant
' Returns a collection of all the constraints for this
' instance of the passed in type - all the
constraints defined
' for the manager are executed first, followed by
those defined
' for the step. If a step has an iterator defined for
it, each
' constraint is executed only once.

Dim cParentInst As cInstance
Dim cTempInst As cInstance
Dim vntConstraints As Variant
Dim vntTempCons As Variant
Dim cColConstraints() As Variant
Dim lngConsCount As Long

On Error GoTo DetermineConstraintsErr

Set cTempInst = cInstanceRec
lngConsCount = 0

' Go all the way to the root
Do
    If cTempInst.ParentInstanceId > 0 Then
        Set cParentInst =
mcInstances.QueryInstance(cTempInst.ParentInstanceId)
    Else
        Set cParentInst = Nothing
    End If

    ' Check if the step has an iterator defined for it
    If cTempInst.ValidForIteration(cParentInst,
intConsType) Then
        vntTempCons =
mcRunConstraints.ConstraintsForStep(_
            cTempInst.Step.StepId,
cTempInst.Step.VersionNo, _
            intConsType, blnSort:=True, _
            blnGlobal:=False,
blnGlobalConstraintsOnly:=False)

        If Not IsEmpty(vntTempCons) Then
            ReDim Preserve
cColConstraints(lngConsCount)
            cColConstraints(lngConsCount) =
vntTempCons
            lngConsCount = lngConsCount + 1
        End If
    End If

    Set cTempInst = cParentInst

Loop While Not cTempInst.Is Nothing

If lngConsCount > 0 Then
    vntTempCons =
OrderConstraints(cColConstraints, intConsType)
End If

DetermineConstraints = vntTempCons

Exit Function

DetermineConstraintsErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"DetermineConstraints"
Err.Raise vbObjectError +
errExecInstanceFailed, _

```

```

    mstrSource,
LoadResString(errExecInstanceFailed)

End Function
Private Function
GetInstanceToExecute(cParentNode As
cInstance, _
    cSubStepRec As cSubStep, _
    cSubStepDtIs As cStep) As cInstance

    Dim cSubStepInst As cInstance

    On Error GoTo GetInstanceToExecuteErr

    BugAssert Not (cParentNode Is Nothing
Or _
    cSubStepRec Is Nothing Or _
    cSubStepDtIs Is Nothing), _
    "GetInstanceToExecute: Input
invalid"

    ' Check if it has iterators
    If cSubStepDtIs.IteratorCount = 0 Then
        ' Check if the step has been executed
        If cSubStepRec.TasksRunning = 0 And
cSubStepRec.TasksComplete = 0 And _
            Not
mcInstances.CompletedInstanceExists(cPare
ntNode.InstanceId, cSubStepDtIs) Then
            ' The sub-step hasn't been executed
yet.
            ' Create an instance for it and exit
            Set cSubStepInst =
CreateInstance(cSubStepDtIs, cParentNode)
        Else
            Set cSubStepInst = Nothing
        End If
    Else
        ' Check if there are pending iterations
for the sub-step
        If Not
cSubStepRec.NextIteration(cSubStepDtIs) Is
Nothing Then
            ' Pending iterations exist - create an
instance for the sub-step and exit
            Set cSubStepInst =
CreateInstance(cSubStepDtIs, cParentNode)
        Else
            ' No more iterations - continue with
the next substep
            Set cSubStepInst = Nothing
        End If
    End If

    Set GetInstanceToExecute = cSubStepInst
Exit Function

GetInstanceToExecuteErr:
    ' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
"GetInstanceToExecute"
    Err.Raise vbObjectError +
errNavInstancesFailed, _
        mstrSource,
LoadResString(errNavInstancesFailed)

End Function

Public Function InstancesForStep(IngStepId
As Long, ByRef StepStatus As
InstanceStatus) As cInstances

```

```

' Returns an array of all the instances for a
step
Dim lngIndex As Long
Dim cTempInst As cInstance
Dim cStepInstances As cInstances
Dim cStepRec As cStep

On Error GoTo InstancesForStepErr

Set cStepInstances = New cInstances

For lngIndex = 0 To mcInstances.Count - 1
    Set cTempInst = mcInstances(lngIndex)

    If cTempInst.Step.StepId = lngStepId
Then
        cStepInstances.Add cTempInst
    End If
Next lngIndex

If cStepInstances.Count = 0 Then
    Set cStepRec =
mcRunSteps.QueryStep(IngStepId)
    If Not
mcFailures.ExecuteSubStep(cStepRec.ParentSt
epId) Then
        StepStatus = gintAborted
    End If
    Set cStepRec = Nothing
End If

' Set the return value of the function to the
array of
' constraints that has been built above
Set InstancesForStep = cStepInstances

Set cStepInstances = Nothing
Exit Function

InstancesForStepErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
"InstancesForStep"
    Err.Raise vbObjectError +
errNavInstancesFailed, mstrSource, _
        LoadResString(errNavInstancesFailed)

End Function
Private Sub
RemoveFreeProcess(IngRunningProcess As
Long)
    ' Removes the passed in element from the
collection of
    ' free objects

    ' Confirm that the last element in the array is
the one
    ' we need to delete
    If mcFreeSteps(mcFreeSteps.Count - 1) =
IngRunningProcess Then
        mcFreeSteps.Delete
    Position:=mcFreeSteps.Count - 1
    Else
        ' Ask the class to find the element and
delete it
        mcFreeSteps.Delete
    Item:=IngRunningProcess
    End If

End Sub
Private Sub
AddFreeProcess(IngTerminatedProcess As
Long)

```

```

' Adds the passed in element to the collection of
' free objects

mcFreeSteps.Add lngTerminatedProcess

End Sub

Private Sub ResetForm(Optional ByVal lngIndex
As Long)

    Dim lngTemp As Long

    On Error GoTo ResetFormErr

    ' Check if there are any running instances to wait
for
    If mcFreeSteps.Count <>
lngNumConcurrentProcesses Then

        For lngTemp = 0 To mcFreeSteps.Count - 1
            If mcFreeSteps(lngTemp) = lngIndex Then
                Exit For
            End If
        Next lngTemp

        If lngTemp <= mcFreeSteps.Count - 1 Then
            ' This process that just completed did not
exist in the list of
            ' free processes
            Call AddFreeProcess(IngIndex)
        End If

        If Not AnyStepRunning(mcFreeSteps,
mbarrFree) Then
            WriteToWspLog (mintRunComplete)
            ' All steps are complete
            RaiseEvent
RunComplete(Determine64BitTime())
        End If
    Else
        WriteToWspLog (mintRunComplete)
        RaiseEvent
RunComplete(Determine64BitTime())
    End If

Exit Sub

ResetFormErr:

End Sub
Private Function NewInstanceId() As Long
    ' Will return new instance id's - uses a static
counter
    ' that it increments each time
    Static lngInstance As Long

    lngInstance = lngInstance + 1
    NewInstanceId = lngInstance

End Function

Private Function
RunPendingStepInBranch(strCurBranchRoot As
String, _
    Optional cExecInstance As cInstance =
Nothing) As cInstance
    ' Runs a worker step in the branch being
executed, if
    ' there are any pending execution
    ' This function is also called when a step has just
completed
    ' execution - in which case the terminated
instance is
    ' passed in as the optional parameter. When that
happens,

```

```

' we first try to execute the siblings of the
terminated
' step if any are pending execution.
' If the terminated instance has not been
passed in, we
' start with the dummy root instance and
navigate down,
' trying to find a pending worker step.

Dim cExecSubStep As cStep
Dim cParentInstance As cInstance
Dim cNextInst As cInstance

On Error GoTo
RunPendingStepInBranchErr

If Not cExecInstance Is Nothing Then
' Called when an instance has
terminated
' When a worker step terminates, then
we need to
' decrement the number of running
steps on it's
' manager
Set cParentInstance = _

mcInstances.QueryInstance(cExecInstance.P
arentInstanceId)

Else
If StringEmpty(strCurBranchRoot) Or
mcDummyRootInstance Is Nothing Then
' Run complete - event raised by Run
method
Set RunPendingStepInBranch =
Nothing
Exit Function
End If

' If there are no pending steps on the
root instance,
' then there are no steps within the
branch that need
' to be executed
If
mcDummyRootInstance.AllComplete Or
mcDummyRootInstance.AllStarted Then
Set RunPendingStepInBranch =
Nothing
Exit Function
End If

Set cParentInstance =
mcDummyRootInstance
End If

Do
Set cNextInst =
GetSubStepToExecute(cParentInstance)
If cNextInst Is Nothing Then
' There are no steps within the branch
that can
' be executed - If we are at the
dummy instance,
' this branch has completed executing
If cParentInstance.Key =
mstrDummyRootKey Then
Set cNextInst = Nothing
Exit Do
Else
' Go to the parent instance and try
to find
' some other sibling is pending
execution

```

```

Set cNextInst =
mcInstances.QueryInstance(cParentInstance.Pa
rentInstanceId)

If cParentInstance.SubSteps.Count =
0 Then
cNextInst.ChildTerminated
cParentInstance.Step.StepId
End If
End If
End If

BugAssert Not cNextInst Is Nothing
Set cParentInstance = cNextInst

Loop While cNextInst.Step.StepType <>
gintWorkerStep

If Not cNextInst Is Nothing Then
Call ExecuteStep(cNextInst)
End If

Set RunPendingStepInBranch = cNextInst

Exit Function

RunPendingStepInBranchErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errNavInstancesFailed, _
mstrModuleName &
"RunPendingStepInBranch",
LoadResString(errNavInstancesFailed)

End Function
Private Function
RunPendingSibling(cTermInstance As
cInstance, _
dtmCompleteTime As Currency) As
cInstance
' This process is called when a step
terminates. Tries to
' run a sibling of the terminated step, if one
is pending
' execution.

Dim cParentInstance As cInstance
Dim cNextInst As cInstance

On Error GoTo RunPendingSiblingErr

If StringEmpty(mstrCurBranchRoot) Or
mcDummyRootInstance Is Nothing Then
' Run complete - event raised by Run
method
Set RunPendingSibling = Nothing
Exit Function
End If

BugAssert cTermInstance.ParentInstanceId
> 0, "Orphaned instance in array!"

' When a worker step terminates, then we
need to
' decrement the number of running steps
on it's
' manager
Set cParentInstance =
mcInstances.QueryInstance(cTermInstance.Par
entInstanceId)

' Decrement the number of running
processes on the

```

```

' parent by 1
Call
cParentInstance.ChildTerminated(cTermInstance.St
ep.StepId)

' The first step that terminates has to be a worker
' If it is complete, update the completed steps on
the
' parent by 1.
Call
cParentInstance.ChildCompleted(cTermInstance.St
ep.StepId)
cParentInstance.AllStarted = False

Do
Set cNextInst =
GetSubStepToExecute(cParentInstance,
dtmCompleteTime)
If cNextInst Is Nothing Then
If cParentInstance.Key =
mstrDummyRootKey Then
Set cNextInst = Nothing
Exit Do
Else
' Go to the parent instance and try to find
' some other sibling is pending execution
Set cNextInst =
mcInstances.QueryInstance(cParentInstance.ParentI
nstanceId)
If cParentInstance.IsRunning Then
cNextInst.AllStarted = True
Else
' No more sub-steps to execute
Call
cNextInst.ChildCompleted(cParentInstance.Step.Ste
pId)
Call
cNextInst.ChildTerminated(cParentInstance.Step.St
epId)
cNextInst.AllStarted = False
End If
End If
End If

BugAssert Not cNextInst Is Nothing
Set cParentInstance = cNextInst

Loop While cNextInst.Step.StepType <>
gintWorkerStep

If Not cNextInst Is Nothing Then
Call ExecuteStep(cNextInst)
End If

Set RunPendingSibling = cNextInst

Exit Function

RunPendingSiblingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"RunPendingSibling"
Err.Raise vbObjectError +
errNavInstancesFailed, mstrSource, _
LoadResString(errNavInstancesFailed)

End Function
Private Sub RunPendingSiblings(cTermInstance As
cInstance, _
dtmCompleteTime As Currency)
' This process is called when a step terminates.
Tries to

```

```

' run siblings of the terminated step, if
they are pending
' execution.

Dim cExecInst As cInstance

On Error GoTo RunPendingSiblingsErr
BugMessage "In RunPendingSiblings"

' Call a procedure to run the sibling of the
terminated
' step, if any. This procedure will also
update the
' number of complete/running tasks on the
manager steps.
Set cExecInst =
RunPendingSibling(cTermInstance,
dtmCompleteTime)

If Not cExecInst Is Nothing Then
Do
' Execute any other pending steps in
the branch.
' The step that has just terminated
might be
' the last one that was executing in a
sub-branch.
' That would mean that we can
execute another
' sub-branch that might involve more
than 1 step.
' Pass the just executed step as a
parameter.
Set cExecInst =
RunPendingStepInBranch(mstrCurBranchR
oot, cExecInst)
Loop While Not cExecInst Is Nothing
Else
If Not
mcDummyRootInstance.IsRunning Then
' All steps have been executed in the
branch - run
' a new branch
Call RunNewBranch
Else
' There are no more steps to execute
in the current
' branch but we have running
processes.
End If
End If

Exit Sub

RunPendingSiblingsErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"RunPendingSiblings"
Err.Raise vbObjectError +
errNavInstancesFailed, _
mstrSource,
LoadResString(errNavInstancesFailed)

End Sub

Private Sub
NoSubStepsToExecute(cMgrInstance As
cInstance, Optional dtmCompleteTime As
Currency = gdtmEmpty)
' Called when we cannot find any more
substeps to run for

```

```

' manager step - set the allcomplete or
allstarted
' properties to true

If cMgrInstance.IsRunning() Then
cMgrInstance.AllStarted = True
Else
cMgrInstance.AllComplete = True
If dtmCompleteTime <> gdtmEmpty
Then
' Update the end time on the manager
step
Call
TimeCompleteUpdateForStep(cMgrInstance,
dtmCompleteTime)
End If
End Sub

Private Function
GetSubStepToExecute(cParentNode As
cInstance, _
Optional dtmCompleteTime As Currency
= 0) As cInstance
' Returns the child of the passed in node that
is to be
' executed next. Checks if we are in the
middle of an instance
' being executed in which case it returns the
pending
' instance. Creates a new instance if there are
pending
' instances for a sub-step.

Dim lngIndex As Long
Dim cSubStepRec As cSubStep
Dim cSubStepDtls As cStep
Dim cSubStepInst As cInstance

On Error GoTo GetSubStepToExecuteErr

' There are a number of cases that need to be
accounted
' for here.
' 1. While traversing through all enabled
nodes for the
' first time - instance records may not exist
for the
' substeps.
' 2. Instance records exist, and there are
processes
' that need to be executed for a sub-step
' 3. There are no more processes that need to
be currently
' executed (till a process completes)
' 4. There are no more processes that need to
be executed
' (All substeps have completed execution)

' This is the only point where we check the
Abort flag -
' since this is the heart of the navigation
routine that
' selects processes to execute. Also, when a
step terminates
' selection of the next process goes through
here.
If mblnAbort Then
Set GetSubStepToExecute = Nothing
cParentNode.Status = gintAborted
Exit Function
End If

If mblnAsk Then

```

```

Set GetSubStepToExecute = Nothing
Exit Function
End If

If Not
mcFailures.ExecuteSubStep(cParentNode.Step.Step
Id) Then
Set GetSubStepToExecute = Nothing
cParentNode.Status = gintAborted
Exit Function
End If

' First check if there are pending steps for the
parent!
If cParentNode.IsPending Then
' Loop through all the sub-steps for the parent
node
For lngIndex = 0 To
cParentNode.SubSteps.Count - 1
Set cSubStepRec =
cParentNode.SubSteps(lngIndex)
Set cSubStepDtls =
mcRunSteps.QueryStep(cSubStepRec.StepId)
If Not
mcInstances.InstanceAborted(cSubStepRec) Then
' Check if the sub-step is a worker
If cSubStepDtls.StepType =
gintWorkerStep Then
' Find/create an instance to execute
Set cSubStepInst =
GetInstanceToExecute(_
cParentNode, cSubStepRec,
cSubStepDtls)
If Not cSubStepInst Is Nothing Then
Exit For
Else
' Continue w/ the next sub-step
End If
Else
' The sub-step is a manager step
' Check if there are any pending
instances for
' the manager
Set cSubStepInst =
mcInstances.QueryPendingInstance(_
cParentNode.InstanceId,
cSubStepRec.StepId)
If cSubStepInst Is Nothing Then
' Find/create an instance to execute
Set cSubStepInst =
GetInstanceToExecute(_
cParentNode, cSubStepRec,
cSubStepDtls)
If Not cSubStepInst Is Nothing Then
Exit For
Else
' Continue w/ the next sub-step
End If
Else
' We have found a pending instance
for the
' sub-step (manager) - exit the loop
Exit For
End If
End If
End If
Next lngIndex

If lngIndex > cParentNode.SubSteps.Count - 1
Or cParentNode.SubSteps.Count = 0 Then
' If we could not find any sub-steps to
execute,
' mark the parent node as complete/all
started

```

```

Call
NoSubStepsToExecute(cParentNode,
dtmCompleteTime)
    Set cSubStepInst = Nothing
End If
End If

Set GetSubStepToExecute = cSubStepInst
Exit Function

GetSubStepToExecuteErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"GetSubStepToExecute"
Err.Raise vbObjectError +
errNavInstancesFailed, mstrSource, _
    LoadResString(errNavInstancesFailed)

End Function

Private Sub
TimeCompleteUpdateForStep(cMgrInstance
As cInstance, ByVal EndTime As Currency)

' Called when there are no more sub-steps
to execute for
' the manager step. It updates the end time
and status on
' the manager.
Dim lElapsed As Long

On Error GoTo
TimeCompleteUpdateForStepErr

If cMgrInstance.Key <>
mstrDummyRootKey Then
    cMgrInstance.EndTime = EndTime
    cMgrInstance.Status = gintComplete
    lElapsed = (EndTime -
cMgrInstance.StartTime) * 10000
    cMgrInstance.ElapsedTime = lElapsed
    RaiseEvent
StepComplete(cMgrInstance.Step, EndTime,
cMgrInstance.InstanceId, lElapsed)
End If

Exit Sub

TimeCompleteUpdateForStepErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
WriteError errUpdateDisplayFailed,
mstrModuleName &
"TimeCompleteUpdateForStep"

End Sub

Private Function GetFreeObject() As Long

' Check the array of free objects and
retrieve the first one
If mcFreeSteps.Count > 0 Then
    GetFreeObject =
mcFreeSteps(mcFreeSteps.Count - 1)
Else
    mstrSource = mstrModuleName &
"GetFreeObject"
ShowError errMaxProcessesExceeded
On Error GoTo 0
Err.Raise vbObjectError +
errMaxProcessesExceeded, _

```

```

mstrSource, _

LoadResString(errMaxProcessesExceeded)
End If

End Function
Private Function
StepTerminated(cCompleteStep As cStep,
ByVal dtmCompleteTime As Currency, _
ByVal lngIndex As Long, ByVal
InstanceId As Long, ByVal ExecutionStatus
As InstanceStatus) As cStep
' This procedure is called whenever a step
terminates.
Dim cTermRec As cTermStep
Dim cInstRec As cInstance
Dim cStartInst As cInstance
Dim lElapsed As Long
Dim sLogLabel As String
Dim LogLabels As New cVectorStr
Dim iItIndex As Long

On Error GoTo StepTerminatedErr

Set cInstRec =
mcInstances.QueryInstance(InstanceId)
If dtmCompleteTime <> 0 And
cInstRec.StartTime <> 0 Then
' Convert to milliseconds since that is the
default precision
lElapsed = (dtmCompleteTime -
cInstRec.StartTime) * 10000
Else
lElapsed = 0
End If

Set cStartInst = cInstRec
iItIndex = 0
Do While cInstRec.Key <>
mstrDummyRootKey
    sLogLabel = gstrSQ &
cInstRec.Step.StepLabel & gstrSQ

    If iItIndex < cInstRec.Iterators.Count
Then
        If cStartInst.Iterators(iItIndex).StepId =
cInstRec.Step.StepId Then
            sLogLabel = sLogLabel & msIt &
gstrSQ &
cStartInst.Iterators(iItIndex).IteratorName &
gstrSQ & _
                msItValue & gstrSQ &
cStartInst.Iterators(iItIndex).Value & gstrSQ
            iItIndex = iItIndex + 1
        End If
    End If

    If cInstRec.Key = cStartInst.Key Then
' Append the execution status
sLogLabel = sLogLabel & " Status: " &
gstrSQ & gsExecutionStatus(ExecutionStatus)
& gstrSQ
        If ExecutionStatus = gintFailed Then
' Append the continuation criteria for
the step since it failed
sLogLabel = sLogLabel & "
Continuation Criteria: " & gstrSQ &
gsContCriteria(cInstRec.Step.ContinuationCrit
eria) & gstrSQ
        End If
    End If
    LogLabels.Add sLogLabel

```

```

Set cInstRec =
mcInstances.QueryInstance(cInstRec.ParentInstanc
eId)
Loop

Call WriteToWspLog(mintStepComplete,
LogLabels, dtmCompleteTime)
Set LogLabels = Nothing

' Adds the terminated step details to a queue.
Set cTermRec = New cTermStep
cTermRec.ExecutionStatus = ExecutionStatus
cTermRec.Index = lngIndex
cTermRec.InstanceId = InstanceId
cTermRec.TimeComplete = dtmCompleteTime
Call mcTermSteps.Add(cTermRec)
Set cTermRec = Nothing

RaiseEvent StepComplete(cCompleteStep,
dtmCompleteTime, InstanceId, lElapsed)

Exit Function

StepTerminatedErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errExecuteBranchFailed, mstrSource
Call ResetForm(lngIndex)

End Function
Public Property Let RootKey(ByVal vdata As
String)

    mstrRootKey = vdata

End Property

Public Property Get RootKey() As String
    RootKey = mstrRootKey
End Property

Private Function InitExecStep() As cRunStep
' Since arrays of objects cannot be declared as
 WithEvents,
' we use a limited number of objects and set a
 maximum
' on the number of steps that can run in parallel
' This is a wrapper that will create an instance of
' a cExecuteSM object depending on the index
Dim lngIndex As Long

On Error GoTo InitExecStepErr

lngIndex = GetFreeObject

Select Case lngIndex + 1
    Case 1
        Set cExecStep1 = New cRunStep
        Set InitExecStep = cExecStep1
    Case 2
        Set cExecStep2 = New cRunStep
        Set InitExecStep = cExecStep2
    Case 3
        Set cExecStep3 = New cRunStep
        Set InitExecStep = cExecStep3
    Case 4
        Set cExecStep4 = New cRunStep
        Set InitExecStep = cExecStep4
    Case 5
        Set cExecStep5 = New cRunStep
        Set InitExecStep = cExecStep5
    Case 6
        Set cExecStep6 = New cRunStep
        Set InitExecStep = cExecStep6
    Case 7

```



```

Set cExecStep82 = New cRunStep
Set InitExecStep = cExecStep82
Case 83
Set cExecStep83 = New cRunStep
Set InitExecStep = cExecStep83
Case 84
Set cExecStep84 = New cRunStep
Set InitExecStep = cExecStep84
Case 85
Set cExecStep85 = New cRunStep
Set InitExecStep = cExecStep85
Case 86
Set cExecStep86 = New cRunStep
Set InitExecStep = cExecStep86
Case 87
Set cExecStep87 = New cRunStep
Set InitExecStep = cExecStep87
Case 88
Set cExecStep88 = New cRunStep
Set InitExecStep = cExecStep88
Case 89
Set cExecStep89 = New cRunStep
Set InitExecStep = cExecStep89
Case 90
Set cExecStep90 = New cRunStep
Set InitExecStep = cExecStep90
Case 91
Set cExecStep91 = New cRunStep
Set InitExecStep = cExecStep91
Case 92
Set cExecStep92 = New cRunStep
Set InitExecStep = cExecStep92
Case 93
Set cExecStep93 = New cRunStep
Set InitExecStep = cExecStep93
Case 94
Set cExecStep94 = New cRunStep
Set InitExecStep = cExecStep94
Case 95
Set cExecStep95 = New cRunStep
Set InitExecStep = cExecStep95
Case 96
Set cExecStep96 = New cRunStep
Set InitExecStep = cExecStep96
Case 97
Set cExecStep97 = New cRunStep
Set InitExecStep = cExecStep97
Case 98
Set cExecStep98 = New cRunStep
Set InitExecStep = cExecStep98
Case 99
Set cExecStep99 = New cRunStep
Set InitExecStep = cExecStep99
Case Else
Set InitExecStep = Nothing
End Select

BugMessage "Sending cExecStep" &
(IngIndex + 1) & "!"

If Not InitExecStep Is Nothing Then
InitExecStep.Index = IngIndex

' Remove this element from the
collection of free objects
Call RemoveFreeProcess(IngIndex)
End If

Exit Function

InitExecStepErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
Set InitExecStep = Nothing

```

```

End Function
Public Sub Run()
' Calls procedures to build a list of all the
steps that
' need to be executed and to execute them
' Determines whether the run has
started/terminated and
' raises the Run Start and Complete events.
Dim cTempStep As cStep

On Error GoTo RunErr

If StringEmpty(mstrRootKey) Then
Call ShowError(errExecuteBranchFailed)
On Error GoTo 0
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrModuleName &
"Run", _

LoadResString(errExecuteBranchFailed)
Else
' Execute the first branch
WriteToWspLog (mintRunStart)
RaiseEvent
RunStart(Determine64BitTime(),
mcWspLog.FileName)

If
mcNavSteps.HasChild(StepKey:=mstrRootKe
y) Then
Set cTempStep =
mcNavSteps.ChildStep(StepKey:=mstrRootKe
y)

mstrCurBranchRoot =
MakeKeyValid(cTempStep.StepId,
cTempStep.StepType)

Call
CreateDummyInstance(mstrCurBranchRoot)

' Run all pending steps in the branch
If Not RunBranch(mstrCurBranchRoot)
Then
' Execute a new branch if there aren't
any
' steps to run
Call RunNewBranch
End If
Else
WriteToWspLog (mintRunComplete)
' No children to execute - the run is
complete
RaiseEvent
RunComplete(Determine64BitTime())
End If
End If

Exit Sub

RunErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
Call ShowError(errExecuteBranchFailed,
OptArgs:=mstrCurBranchRoot)
Call ResetForm

End Sub
Private Sub RunNewBranch()
' We will build a tree of all instances that
occur and
' the count of the sub-steps that are running
will be
' stored at each node in the tree (maintained
internally

```

```

' as an array). Since there can be multiple
iterations
' of the top level nodes running at the same time,
we
' create a dummy node at the root that keeps a
record of
' the instances of the top level node.

' Determines whether the run has
started/terminated and
' raises the Run Start and Complete events.
Dim cNextStep As cStep
Dim bRunComplete As Boolean

On Error GoTo RunNewBranchErr

bRunComplete = False

Do
If StringEmpty(mstrCurBranchRoot) Then
Exit Do
' On Error GoTo 0
' Err.Raise vbObjectError +
errExecuteBranchFailed, mstrSource, _
' LoadResString(errExecuteBranchFailed)
Else
Set cNextStep =
mcNavSteps.NextStep(StepKey:=mstrCurBranchRo
ot)

If cNextStep Is Nothing Then
mstrCurBranchRoot = gstrEmptyString
bRunComplete = True
Exit Do
Else
' Starting execution of a new branch -
initialize the
' module-level variable
mstrCurBranchRoot =
MakeKeyValid(cNextStep.StepId,
cNextStep.StepType)
Call
CreateDummyInstance(mstrCurBranchRoot)
End If
End If
Debug.Print "Running new branch: " &
mstrCurBranchRoot

' Loop until we find a branch that has steps to
execute
Loop While Not
RunBranch(mstrCurBranchRoot)

If bRunComplete Then
WriteToWspLog (mintRunComplete)
' Run is complete
RaiseEvent
RunComplete(Determine64BitTime())
End If

Exit Sub

RunNewBranchErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
Call ShowError(errExecuteBranchFailed,
OptArgs:=mstrCurBranchRoot)
On Error GoTo 0
mstrSource = mstrModuleName &
"RunNewBranch"
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrSource, _
LoadResString(errExecuteBranchFailed)

End Sub

```

```

Private Function RunBranch(strRootNode
As String) As Boolean
' This procedure is called to run all the
necessary steps
' in a branch. It can also be called when a
step terminates,
' in which case the terminated step is
passed in as the
' optional parameter. When a step
terminates, we need to
' either wait for some other steps to
terminate before
' we execute more steps or run as many
steps as necessary
' Returns True if there are steps currently
executing
' in the branch, else returns False
Dim cRunning As cInstance

On Error GoTo RunBranchErr

If Not StringEmpty(strRootNode) Then
' Call a procedure to execute all the
enabled steps
' in the branch - will return the step
node that is
' being executed - nothing means 'No
more steps to
' execute in the branch'.
Do
Set cRunning =
RunPendingStepInBranch(strRootNode,
cRunning)

Loop While Not cRunning Is Nothing

RunBranch =
mcDummyRootInstance.IsRunning
End If

Exit Function

RunBranchErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"RunBranch"
Err.Raise vbObjectError +
errExecuteBranchFailed, _
mstrSource,
LoadResString(errExecuteBranchFailed)

End Function
Private Sub
TimeUpdateForProcess(StepRecord As
cStep, _
ByVal InstanceId As Long, _
Optional ByVal StartTime As Currency
= 0, _
Optional ByVal EndTime As Currency
= 0, _
Optional ByVal ElapsedTime As Long
= 0, _
Optional Command As String)
' We do not maintain start and end
timestamps for the constraint
' of a step. Hence we check if the process
that just started/
' terminated is the worker step that is
being executed. If so,
' we update the start/end time and status
on the instance record.

```

```

Dim cInstanceRec As cInstance
Dim sItVal As String

On Error GoTo TimeUpdateForProcessErr

Set cInstanceRec =
mcInstances.QueryInstance(InstanceId)

If StartTime = 0 Then
RaiseEvent ProcessComplete(StepRecord,
EndTime, InstanceId, ElapsedTime)
Else
sItVal =
GetInstanceItValue(cInstanceRec)
RaiseEvent ProcessStart(StepRecord,
Command, StartTime, InstanceId, _
cInstanceRec.ParentInstanceId,
sItVal)
End If

Call
cInstanceRec.UpdateStartTime(StepRecord.Ste
pId, StartTime, EndTime, ElapsedTime)

Exit Sub

TimeUpdateForProcessErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errUpdateDisplayFailed,
mstrModuleName & "TimeUpdateForProcess"

End Sub
Private Sub
TimeStartUpdateForStep(StepRecord As
cStep, _
ByVal InstanceId As Long, _
ByVal StartTime As Currency)

' Called when a step starts execution. Checks
if this is the
' first enabled child of the manager step. If
so, updates
' the start time and status on the manager.
' Also raises the Step Start event for the
completed step.

Dim cStartInst As cInstance
Dim cInstanceRec As cInstance
Dim LogLabels As New cVectorStr
Dim iItIndex As Long
Dim sLogLabel As String
Dim sPath As String
Dim sIt As String
Dim sItVal As String

On Error GoTo TimeStartUpdateForStepErr

Set cStartInst =
mcInstances.QueryInstance(InstanceId)

' Determine the step path and iterator values
for the step and raise a step start event
Set cInstanceRec = cStartInst
Do While cInstanceRec.Key <>
mstrDummyRootKey
If Not StringEmpty(sPath) Then
sPath = sPath & gstrFileSeparator
End If
sPath = sPath & gstrSQ &
cInstanceRec.Step.StepLabel & gstrSQ
Set cInstanceRec =
mcInstances.QueryInstance(cInstanceRec.Pare
ntInstanceId)
Loop

```

```

For iItIndex = cStartInst.Iterators.Count - 1 To 0
Step -1
If Not StringEmpty(sIt) Then
sIt = sIt & gstrFileSeparator
End If
sIt = sIt & gstrSQ &
cStartInst.Iterators(iItIndex).Value & gstrSQ
Next iItIndex

sItVal = GetInstanceItValue(cStartInst)
RaiseEvent StepStart(StepRecord, StartTime,
InstanceId, cStartInst.ParentInstanceId, _
sPath, sIt, sItVal)

iItIndex = 0
Set cInstanceRec = cStartInst
' Raise a StepStart event for the manager step, if
this is it's first sub-step being executed
Do While cInstanceRec.Key <>
mstrDummyRootKey

sLogLabel = gstrSQ &
cInstanceRec.Step.StepLabel & gstrSQ
If iItIndex < cStartInst.Iterators.Count Then
If cStartInst.Iterators(iItIndex).StepId =
cInstanceRec.Step.StepId Then
sLogLabel = sLogLabel & msIt & gstrSQ
& cStartInst.Iterators(iItIndex).IteratorName &
gstrSQ & _
msItValue & gstrSQ &
cStartInst.Iterators(iItIndex).Value & gstrSQ
iItIndex = iItIndex + 1
End If
End If
LogLabels.Add sLogLabel

If cInstanceRec.Key <> cStartInst.Key And
cInstanceRec.StartTime = 0 Then
cInstanceRec.StartTime = StartTime
cInstanceRec.Status = gintRunning
sItVal = GetInstanceItValue(cInstanceRec)
' The step path and iterator values are not
needed for manager steps, since
' they are primarily used by the run status
form
RaiseEvent StepStart(cInstanceRec.Step,
StartTime, cInstanceRec.InstanceId, _
cInstanceRec.ParentInstanceId,
gstrEmptyString, gstrEmptyString, _
sItVal)
End If

Set cInstanceRec =
mcInstances.QueryInstance(cInstanceRec.ParentIns
tanceId)
Loop

Call WriteToWspLog(mintStepStart, LogLabels,
StartTime)
Set LogLabels = Nothing

Exit Sub

TimeStartUpdateForStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errUpdateDisplayFailed,
mstrModuleName & "TimeStartUpdateForStep"

End Sub
Private Sub WriteToWspLog(iLogEvent As
WspLogEvents, Optional StepDtls As cVectorStr, _
Optional dtStamp As Currency = gdtmEmpty)

```

```

' Writes to the workspace log that is
generated for the run. The last three
' parameters are valid only for Step Start
and Step Complete events.
Static bError As Boolean
Dim sLabel As String
Dim lIndex As Long
Dim bHdr As Boolean
Dim cTempConn As cConnection

On Error GoTo WriteToWspLogErr

Select Case iLogEvent
Case mintRunStart
Set mcWspLog = New cFileSM
mcWspLog.FileName =
GetDefaultDir(WspId, mcParameters) &
gstrFileSeparator & _
Trim(Str(RunId)) &
gstrFileSeparator & "SMLog-" &
Format(Now, FMT_WSP_LOG_FILE) &
gstrLogFileSuffix
mcWspLog.WriteLine
(JulianDateToString(Determine64BitTime()
) & " Start Run: " & vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId
)) & gstrSQ

' Write all current parameter values
to the log
bHdr = False
For lIndex = 0 To
mcParameters.ParameterCount - 1
If
mcParameters(lIndex).ParameterType <>
gintParameterApplication Then
If Not bHdr Then
mcWspLog.WriteLine
JulianDateToString(Determine64BitTime()
) & " Parameters: "
bHdr = True
Else
mcWspLog.WriteLine
vbTab & vbTab & vbTab
End If
mcWspLog.WriteLine vbTab &
gstrSQ &
mcParameters(lIndex).ParameterName &
gstrSQ & vbTab & vbTab & gstrSQ &
mcParameters(lIndex).ParameterValue &
gstrSQ
End If
Next lIndex

' Write all connection properties to
the log
For lIndex = 0 To
RunConnections.Count - 1
Set cTempConn =
RunConnections(lIndex)
If lIndex = 0 Then
mcWspLog.WriteLine
JulianDateToString(Determine64BitTime()
) & " Connections: "
Else
mcWspLog.WriteLine vbTab
& vbTab & vbTab
End If
mcWspLog.WriteLine vbTab &
gstrSQ & cTempConn.ConnectionName &
gstrSQ & _
vbTab & vbTab & gstrSQ &
cTempConn.ConnectionValue & gstrSQ &
_

```

```

vbTab & "No Count: " &
gstrSQ & cTempConn.NoCountDisplay &
gstrSQ & gstrBlank & _
"No Execute: " & gstrSQ &
cTempConn.NoExecute & gstrSQ & gstrBlank
& _
"Parse Query Only: " & gstrSQ
& cTempConn.ParseQueryOnly & gstrSQ &
gstrBlank & _
"Quoted Identifiers: " & gstrSQ
& cTempConn.QuotedIdentifiers & gstrSQ &
gstrBlank & _
"ANSI Nulls: " & gstrSQ &
cTempConn.AnsiNulls & gstrSQ & gstrBlank
& _
"Show Query Plan: " & gstrSQ
& cTempConn.ShowQueryPlan & gstrSQ &
gstrBlank & _
"Show Stats Time: " & gstrSQ
& cTempConn.ShowStatsTime & gstrSQ &
gstrBlank & _
"Show Stats IO: " & gstrSQ &
cTempConn.ShowStatsIO & gstrSQ &
gstrBlank & _
"Row Count" & gstrSQ &
cTempConn.RowCount & gstrSQ & gstrBlank
& _
"Query Timeout" & gstrSQ &
cTempConn.QueryTimeout & gstrSQ
Next lIndex

Case mintRunComplete
BugAssert Not mcWspLog Is Nothing
mcWspLog.WriteLine
(JulianDateToString(Determine64BitTime()
) & " Comp. Run: " & vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId)
) & gstrSQ
Set mcWspLog = Nothing

Case mintStepStart
For lIndex = StepDtls.Count - 1 To 0
Step - 1
sLabel = StepDtls(lIndex)
If lIndex = StepDtls.Count - 1 Then
mcWspLog.WriteLine
JulianDateToString(dtStamp) & " Start Step: "
& vbTab & sLabel
Else
mcWspLog.WriteLine vbTab &
vbTab & vbTab & vbTab & sLabel
End If
Next lIndex

Case mintStepComplete
For lIndex = StepDtls.Count - 1 To 0
Step - 1
sLabel = StepDtls(lIndex)
If lIndex = StepDtls.Count - 1 Then
mcWspLog.WriteLine
JulianDateToString(dtStamp) & " Comp. Step: "
& vbTab & sLabel
Else
mcWspLog.WriteLine vbTab &
vbTab & vbTab & vbTab & sLabel
End If
Next lIndex

End Select

Exit Sub

WriteToWspLogErr:
If Not bError Then
bError = True

```

```

End If

End Sub

Private Sub WriteToWspLog(iLogEvent As
WspLogEvents, Optional StepDtls As cVectorStr, _
Optional dtStamp As Date = gdtmEmpty)
'
' This function uses the LogWriter dll - memory
corruption problems since the vb exe
' and the vc Execute DLL both use the same dll to
write.
' ' Writes to the workspace log that is generated
for the run. The last three
' ' parameters are valid only for StepStart and
StepComplete events.
' Static bError As Boolean
' Static sFile As String
' Dim sLabel As String
' Dim lIndex As Long
' Dim bHdr As Boolean
'
' On Error GoTo WriteToWspLogErr
'
' Select Case iLogEvent
' Case mintRunStart
' Set mcWspLog = New
LOGWRITERLib.SMLog
' sFile = App.Path & "\ " & "SMLog-" &
Format(Now, FMT_WSP_LOG_FILE) &
gstrLogFileSuffix
' mcWspLog.FileName = sFile
' mcWspLog.Init
' mcWspLog.WriteLine (Format(Now,
FMT_WSP_LOG_DATE) & " Start Run: " &
vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId)) &
gstrSQ
'
' Write all current parameter values to the
log
' bHdr = False
' For lIndex = 0 To
mcParameters.ParameterCount - 1
' If mcParameters(lIndex).ParameterType
<> gintParameterApplication Then
' If Not bHdr Then
' mcWspLog.WriteLine
Format(Now, FMT_WSP_LOG_DATE) & "
Parameters: " & vbTab & gstrSQ &
mcParameters(lIndex).ParameterName & gstrSQ &
vbTab & vbTab & gstrSQ &
mcParameters(lIndex).ParameterValue & gstrSQ
' bHdr = True
' Else
' mcWspLog.WriteLine vbTab &
vbTab & vbTab & vbTab & gstrSQ &
mcParameters(lIndex).ParameterName & gstrSQ &
vbTab & vbTab & gstrSQ &
mcParameters(lIndex).ParameterValue & gstrSQ
' End If
' End If
' Next lIndex
'
' Case mintRunComplete
' BugAssert Not mcWspLog Is Nothing
' mcWspLog.WriteLine (Format(Now,
FMT_WSP_LOG_DATE) & " Comp. Run: " &
vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId)) &
gstrSQ
' Set mcWspLog = Nothing
'
' Case mintStepStart
' For lIndex = StepDtls.Count - 1 To Step -
1

```

```

'      sLabel = StepDtls(IIndex)
'      If IIndex = StepDtls.Count - 1
Then
'          mcWspLog.WriteLine
Format(dtStamp, FMT_WSP_LOG_DATE)
& " Start Step: " & vbTab & sLabel
'          Else
'          mcWspLog.WriteLine vbTab
& vbTab & vbTab & vbTab & sLabel
'          End If
'          Next IIndex
'      Case mintStepComplete
'      For IIndex = StepDtls.Count - 1 To
0 Step -1
'          sLabel = StepDtls(IIndex)
'          If IIndex = StepDtls.Count - 1
Then
'              mcWspLog.WriteLine
Format(dtStamp, FMT_WSP_LOG_DATE)
& " Comp. Step: " & vbTab & sLabel
'              Else
'              mcWspLog.WriteLine vbTab
& vbTab & vbTab & vbTab & sLabel
'              End If
'              Next IIndex
'          End Select
'      Exit Sub
WriteToWspLogErr:
'      If Not bError Then
'      bError = True
'      End If
'  End Sub
Public Property Get WspPreExecution() As
Variant
'      WspPreExecution = mcvntWspPreCons
End Property
Public Property Let
WspPreExecution(ByVal vdata As Variant)
'      mcvntWspPreCons = vdata
End Property
Public Property Get WspPostExecute() As
Variant
'      WspPostExecute = mcvntWspPostCons
End Property
Public Property Let
WspPostExecute(ByVal vdata As Variant)
'      mcvntWspPostCons = vdata
End Property
Private Sub ExecuteStep(cCurStep As
cInstance)
'      Initializes a cRunStep object with all the
properties
'      corresponding to the step to be executed
and calls it's
'      execute method to execute the step
'
Dim cExecStep As cRunStep
'
On Error GoTo ExecuteStepErr
mstrSource = mstrModuleName &
"ExecuteStep"
'
'      Confirm that the step is a worker
If cCurStep.Step.StepType <>
gintWorkerStep Then
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errExecInstanceFailed, mstrSource, _
LoadResString(errExecInstanceFailed)
End If
'
Set cExecStep = InitExecStep()
' Exceeded the number of processes that we
can run simultaneously
If cExecStep Is Nothing Then
'      Raise an error
On Error GoTo 0
Err.Raise vbObjectError +
errProgramError, mstrSource, _
LoadResString(errProgramError)
End If
'      Initialize the instance id - not needed for
step execution
'      but necessary to identify later which
instance completed
cExecStep.InstanceId = cCurStep.InstanceId
'
Set cExecStep.ExecuteStep = cCurStep.Step
Set cExecStep.Iterators = cCurStep.Iterators
Set cExecStep.Globals = mcRunSteps
Set cExecStep.WspParameters =
mcParameters
Set cExecStep.WspConnections =
RunConnections
Set cExecStep.WspConnDtls =
RunConnDtls
'
'      Initialize all the pre and post-execution
constraints that
'      have been defined globally for the
workspace
cExecStep.WspPreCons =
mcvntWspPreCons
cExecStep.WspPostCons =
mcvntWspPostCons
'
'      Initialize all the pre and post-execution
constraints for
'      the step being executed
cExecStep.PreCons =
DetermineConstraints(cCurStep, gintPreStep)
cExecStep.PostCons =
DetermineConstraints(cCurStep, gintPostStep)
'
cExecStep.RunId = RunId
cExecStep.CreateInputFiles =
CreateInputFiles
'
'      Call the execute method to execute the step
cExecStep.Execute
'
Set cExecStep = Nothing
Exit Sub
ExecuteStepErr:
'      Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Call ExecutionFailed(cExecStep)
End Sub
Public Property Set Steps(cRunSteps As
cArrSteps)
'
Set mcRunSteps = cRunSteps
Set mcNavSteps.StepRecords = cRunSteps
End Property

```

```

Public Property Set Parameters(cParameters As
cArrParameters)
'      A reference to the parameter array - we use it to
'      substitute parameter values in the step text
'
Set mcParameters = cParameters
End Property
Public Property Get Steps() As cArrSteps
'
Set Steps = mcRunSteps
End Property
Public Property Get Constraints() As
cArrConstraints
'
Set Constraints = mcRunConstraints
End Property
Public Property Set Constraints(vdata As
cArrConstraints)
'
Set mcRunConstraints = vdata
End Property
Private Sub
cExecStep1_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)
'
Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, dtmEndTime:=dtmEndTime,
Elapsed:=lElapsed)
End Sub
Private Sub cExecStep1_ProcessStart(cStepRecord
As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)
'
Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, dtmStartTime:=dtmStartTime,
Command:=strCommand)
End Sub
Private Sub
cExecStep1_StepComplete(cStepRecord As cStep,
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)
'
Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep1.Index, InstanceId, Status)
End Sub
Private Sub cExecStep1_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId As
Long)
'
Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)
End Sub

```



```

    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep13.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep13_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub
Private Sub
cExecStep14_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep14_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep14_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep14.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep14_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub
Private Sub
cExecStep15_ProcessComplete(cStepRecor
d As cStep, _

```

```

    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep15_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep15_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep15.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep15_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub
Private Sub
cExecStep16_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep16_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep16_StepComplete(cStepRecord As
cStep, _

```

```

    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep16.Index, InstanceId, Status)

End Sub

Private Sub cExecStep16_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub
Private Sub
cExecStep17_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep17_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep17_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep17.Index, InstanceId, Status)

End Sub

Private Sub cExecStep17_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep18_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

```
Private Sub  
cExecStep18_ProcessStart(cStepRecord As  
cStep, _  
    strCommand As String, dtmStartTime  
As Currency, lngInstanceId As Long)
```

```
    Call  
TimeUpdateForProcess(cStepRecord,  
lngInstanceId, StartTime:=dtmStartTime,  
Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep18_StepComplete(cStepRecord  
As cStep, _  
    dtmEndTime As Currency, InstanceId  
As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord,  
dtmEndTime, cExecStep18.Index,  
InstanceId, Status)
```

```
End Sub
```

```
Private Sub  
cExecStep18_StepStart(cStepRecord As  
cStep, _  
    dtmStartTime As Currency, InstanceId  
As Long)
```

```
    Call  
TimeStartUpdateForStep(cStepRecord,  
InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep19_ProcessComplete(cStepReco  
rd As cStep, _  
    dtmEndTime As Currency,  
lngInstanceId As Long, lElapsed As Long)
```

```
    Call  
TimeUpdateForProcess(cStepRecord,  
lngInstanceId, EndTime:=dtmEndTime,  
ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub  
cExecStep19_ProcessStart(cStepRecord As  
cStep, _  
    strCommand As String, dtmStartTime  
As Currency, lngInstanceId As Long)
```

```
    Call  
TimeUpdateForProcess(cStepRecord,  
lngInstanceId, StartTime:=dtmStartTime,  
Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep19_StepComplete(cStepRecord  
As cStep, _  
    dtmEndTime As Currency, InstanceId  
As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord,  
dtmEndTime, cExecStep19.Index, InstanceId,  
Status)
```

```
End Sub
```

```
Private Sub  
cExecStep19_StepStart(cStepRecord As cStep,  
_  
    dtmStartTime As Currency, InstanceId As  
Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord,  
InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep20_ProcessComplete(cStepRecord  
As cStep, _  
    dtmEndTime As Currency, lngInstanceId  
As Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
lngInstanceId, EndTime:=dtmEndTime,  
ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub  
cExecStep20_ProcessStart(cStepRecord As  
cStep, _  
    strCommand As String, dtmStartTime As  
Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
lngInstanceId, StartTime:=dtmStartTime,  
Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep20_StepComplete(cStepRecord As  
cStep, _  
    dtmEndTime As Currency, InstanceId As  
Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord,  
dtmEndTime, cExecStep20.Index, InstanceId,  
Status)
```

```
End Sub
```

```
Private Sub  
cExecStep20_StepStart(cStepRecord As cStep,  
_  
    dtmStartTime As Currency, InstanceId As  
Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord,  
InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep21_ProcessComplete(cStepRecord  
As cStep, _  
    dtmEndTime As Currency, lngInstanceId  
As Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
lngInstanceId, EndTime:=dtmEndTime,  
ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub  
cExecStep21_ProcessStart(cStepRecord As cStep, _  
    strCommand As String, dtmStartTime As  
Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
lngInstanceId, StartTime:=dtmStartTime,  
Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep21_StepComplete(cStepRecord As cStep,  
_  
    dtmEndTime As Currency, InstanceId As  
Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime,  
cExecStep21.Index, InstanceId, Status)
```

```
End Sub
```

```
Private Sub cExecStep21_StepStart(cStepRecord  
As cStep, _  
    dtmStartTime As Currency, InstanceId As  
Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord,  
InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep22_ProcessComplete(cStepRecord As  
cStep, _  
    dtmEndTime As Currency, lngInstanceId As  
Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
lngInstanceId, EndTime:=dtmEndTime,  
ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub  
cExecStep22_ProcessStart(cStepRecord As cStep, _  
    strCommand As String, dtmStartTime As  
Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
lngInstanceId, StartTime:=dtmStartTime,  
Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep22_StepComplete(cStepRecord As cStep,  
_  
    dtmEndTime As Currency, InstanceId As  
Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime,  
cExecStep22.Index, InstanceId, Status)
```

```
End Sub
```

```
Private Sub cExecStep22_StepStart(cStepRecord  
As cStep, _  
    dtmStartTime As Currency, InstanceId As  
Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord,  
InstanceId, dtmStartTime)
```



```

End Sub

Private Sub
cExecStep23_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep23_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep23_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep23.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep23_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep24_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep24_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

```

```

End Sub

Private Sub
cExecStep24_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep24.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep24_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep25_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep25_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep25_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep25.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep25_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

```

```

Private Sub
cExecStep26_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep26_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep26_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep26.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep26_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep27_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep27_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep27_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep27.Index, InstanceId, Status)

End Sub

```

```

End Sub

Private Sub
cExecStep27_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep28_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep28_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep28_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep28.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep28_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep29_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

```

End Sub

Private Sub
cExecStep29_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep29_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep29.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep29_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep30_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep30_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep30_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep30.Index, InstanceId,
Status)

End Sub

```

```

Private Sub cExecStep30_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep31_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep31_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep31_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep31.Index, InstanceId, Status)

End Sub

Private Sub cExecStep31_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep32_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep32_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

```

End Sub

Private Sub
cExecStep32_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep32.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep32_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep33_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep33_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep33_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep33.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep33_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep34_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep34_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep34_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep34.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep34_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep35_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep35_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep35_StepComplete(cStepRecord As
cStep, _

dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep35.Index, InstanceId, Status)

End Sub

Private Sub cExecStep35_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep36_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep36_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep36_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep36.Index, InstanceId, Status)

End Sub

Private Sub cExecStep36_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep37_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```
Private Sub
cExecStep37_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub
```

```
Private Sub
cExecStep37_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep37.Index, lngInstanceId, Status)
```

```
End Sub
```

```
Private Sub
cExecStep37_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call
    TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub
cExecStep38_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
```

```
    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub
cExecStep38_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub
```

```
Private Sub
cExecStep38_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep38.Index, lngInstanceId, Status)
```

```
End Sub
```

```
Private Sub
cExecStep38_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub
cExecStep39_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub
cExecStep39_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub
```

```
Private Sub
cExecStep39_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep39.Index, lngInstanceId, Status)
```

```
End Sub
```

```
Private Sub
cExecStep39_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub
cExecStep40_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub
cExecStep40_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub
```

```
Private Sub
cExecStep40_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep40.Index, lngInstanceId, Status)
```

```
End Sub
```

```
Private Sub cExecStep40_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub
cExecStep41_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub
cExecStep41_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)
```

```
End Sub
```

```
Private Sub
cExecStep41_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep41.Index, lngInstanceId, Status)
```

```
End Sub
```

```
Private Sub cExecStep41_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub
cExecStep42_ProcessComplete(cStepRecord As cStep, _
```

```

    dtmEndTime As Currency,
    lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

```

```
End Sub
```

```

Private Sub
cExecStep42_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

```

```

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

```

```
End Sub
```

```

Private Sub
cExecStep42_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

```

```

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep42.Index,
    InstanceId, Status)

```

```
End Sub
```

```

Private Sub
cExecStep42_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

```

```

    Call
    TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

```

```
End Sub
```

```

Private Sub
cExecStep43_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
    lngInstanceId As Long, lElapsed As Long)

```

```

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

```

```
End Sub
```

```

Private Sub
cExecStep43_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

```

```

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

```

```
End Sub
```

```

Private Sub
cExecStep43_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

```

```

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep43.Index, InstanceId,
    Status)

```

```
End Sub
```

```

Private Sub
cExecStep43_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

```

```

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

```

```
End Sub
```

```

Private Sub
cExecStep44_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

```

```
End Sub
```

```

Private Sub
cExecStep44_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

```

```
End Sub
```

```

Private Sub
cExecStep44_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

```

```

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep44.Index, InstanceId,
    Status)

```

```
End Sub
```

```

Private Sub
cExecStep44_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

```

```

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

```

```
End Sub
```

```

Private Sub
cExecStep45_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

```

```
End Sub
```

```

Private Sub
cExecStep45_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

```

```
End Sub
```

```

Private Sub
cExecStep45_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

```

```

    Call StepTerminated(cStepRecord, dtmEndTime,
    cExecStep45.Index, InstanceId, Status)

```

```
End Sub
```

```

Private Sub cExecStep45_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

```

```

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

```

```
End Sub
```

```

Private Sub
cExecStep46_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

```

```
End Sub
```

```

Private Sub
cExecStep46_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

```

```
End Sub
```

```

Private Sub
cExecStep46_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

```

```

    Call StepTerminated(cStepRecord, dtmEndTime,
    cExecStep46.Index, InstanceId, Status)

```

```
End Sub
```

```

Private Sub cExecStep46_StepStart(cStepRecord
As cStep, _

```


dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep51.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep51_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, InstanceId As Long)

Call
TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep52_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep52_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep52_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep52.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep52_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, InstanceId As Long)

Call
TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep53_ProcessComplete(cStepRecord As cStep, _

dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep53_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep53_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep53.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep53_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep54_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep54_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep54_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep54.Index, InstanceId, Status)

End Sub

Private Sub cExecStep54_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep55_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep55_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep55_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep55.Index, InstanceId, Status)

End Sub

Private Sub cExecStep55_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep56_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep56_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

```

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep56_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep56.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep56_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep57_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep57_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep57_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep57.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep57_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

```

```

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep58_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep58_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep58_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep58.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep58_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep59_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep59_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

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End Sub

Private Sub
cExecStep59_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep59.Index, InstanceId, Status)

End Sub

Private Sub cExecStep59_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep60_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep60_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep60_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep60.Index, InstanceId, Status)

End Sub

Private Sub cExecStep60_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep61_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

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Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep61_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep61_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep61.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep61_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep62_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep62_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep62_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

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Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep62.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep62_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep63_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep63_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep63_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep63.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep63_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep64_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

```

End Sub

Private Sub
cExecStep64_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep64_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep64.Index, InstanceId, Status)

End Sub

Private Sub cExecStep64_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep65_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep65_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep65_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep65.Index, InstanceId, Status)

End Sub

Private Sub cExecStep65_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

```

```

End Sub

Private Sub
cExecStep66_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep66_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep66_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep66.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep66_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep67_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep67_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

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lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep67_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep67.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep67_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep68_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep68_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep68_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep68.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep68_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

```

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Private Sub
cExecStep69_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep69_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep69_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep69.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep69_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep70_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep70_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep70_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep70.Index, InstanceId, Status)

```

```

End Sub

Private Sub
cExecStep70_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep71_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep71_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep71_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep71.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep71_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep72_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

```

End Sub

Private Sub
cExecStep72_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep72_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep72.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep72_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep73_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep73_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep73_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep73.Index, InstanceId,
Status)

End Sub

```

```

Private Sub cExecStep73_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep74_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep74_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep74_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep74.Index, InstanceId, Status)

End Sub

Private Sub cExecStep74_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep75_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep75_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

```

End Sub

Private Sub
cExecStep75_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep75.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep75_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep76_ProcessComplete(cStepReco
rd As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep76_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep76_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep76.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep76_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep77_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep77_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep77_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep77.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep77_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep78_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep78_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep78_StepComplete(cStepRecord As
cStep, _

dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep78.Index, InstanceId, Status)

End Sub

Private Sub cExecStep78_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep79_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep79_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep79_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep79.Index, InstanceId, Status)

End Sub

Private Sub cExecStep79_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep80_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

Private Sub
cExecStep80_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep80_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep80.Index, lngInstanceId, Status)

End Sub

Private Sub
cExecStep80_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep81_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep81_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep81_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep81.Index, lngInstanceId, Status)

End Sub

```

```

Private Sub
cExecStep81_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep82_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep82_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep82_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep82.Index, lngInstanceId, Status)

End Sub

Private Sub
cExecStep82_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep83_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep83_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

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    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep83_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep83.Index, lngInstanceId, Status)

End Sub

Private Sub cExecStep83_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep84_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep84_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep84_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep84.Index, lngInstanceId, Status)

End Sub

Private Sub cExecStep84_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep85_ProcessComplete(cStepRecord As cStep, _

```

```

    dtmEndTime As Currency,
    lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep85_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep85_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep85.Index,
    InstanceId, Status)

End Sub

Private Sub
cExecStep85_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
    TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep86_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
    lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep86_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

```

```

Private Sub
cExecStep86_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep86.Index, InstanceId,
    Status)

End Sub

Private Sub
cExecStep86_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
    Long)

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep87_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep87_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
    Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep87_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep87.Index, InstanceId,
    Status)

End Sub

Private Sub
cExecStep87_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
    Long)

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep88_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep88_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
    Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep88_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
    cExecStep88.Index, InstanceId, Status)

End Sub

Private Sub cExecStep88_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
    Long)

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep89_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
    Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep89_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
    Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep89_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
    cExecStep89.Index, InstanceId, Status)

End Sub

Private Sub cExecStep89_StepStart(cStepRecord
As cStep, _

```



```

    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep94.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep94_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep95_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep95_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep95_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep95.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep95_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep96_ProcessComplete(cStepRecor
d As cStep, _

```

```

    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep96_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep96_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep96.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep96_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep97_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep97_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep97_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

```

```

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep97.Index, InstanceId, Status)

End Sub

Private Sub cExecStep97_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep98_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep98_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep98_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep98.Index, InstanceId, Status)

End Sub

Private Sub cExecStep98_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep99_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep99_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

```



```

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep99_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep99.Index, _
InstanceId, Status)

End Sub

Private Sub
cExecStep99_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep2_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep2_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep2_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep2.Index, _
InstanceId, Status)

End Sub

Private Sub
cExecStep2_StepStart(cStepRecord As
cStep, _

```

```

dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep3_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep3_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep3_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep3.Index, _
InstanceId, Status)

End Sub

Private Sub
cExecStep3_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep4_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep4_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)


```

```

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep4_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep4.Index, _
InstanceId, Status)

End Sub

Private Sub cExecStep4_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep5_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub cExecStep5_ProcessStart(cStepRecord
As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep5_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep5.Index, _
InstanceId, Status)

End Sub

Private Sub cExecStep5_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

```

```

Private Sub
cExecStep6_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep6_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep6_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep6.Index, _
    InstanceId, Status)

End Sub

Private Sub
cExecStep6_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep7_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep7_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

```

```

Private Sub
cExecStep7_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep7.Index, _
    InstanceId, Status)

End Sub

Private Sub
cExecStep7_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep8_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep8_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep8_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep8.Index, _
    InstanceId, Status)

End Sub

Private Sub
cExecStep8_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub Class_Initialize()

    Dim lngCount As Long
    Dim lngTemp As Long

```

```

On Error GoTo InitializeErr

Set mcFreeSteps = New cVectorLng
' Initialize the array of free objects with all
elements
' for now
For lngCount = 0 To
glngNumConcurrentProcesses - 1 Step 1
    mcFreeSteps.Add lngCount
Next lngCount

' Initialize a byte array with the number of free
processes. It will
' be used later to determine if any step is running
' Each element in the array can represent 8 steps,
1 for each bit
ReDim mbarrFree(glngNumConcurrentProcesses
\ gintBitsPerByte)

' Initialize each element in the byte array w/ all
1's
' (upto glngNumConcurrentProcesses)
For lngCount = LBound(mbarrFree) To
UBound(mbarrFree) Step 1
    lngTemp = IIf( _
        glngNumConcurrentProcesses -
(gintBitsPerByte * lngCount) > gintBitsPerByte, _
        gintBitsPerByte, _
        glngNumConcurrentProcesses -
(gintBitsPerByte * lngCount))

    mbarrFree(lngCount) = (2 ^ lngTemp) - 1
Next lngCount

Set mcInstances = New cInstances
Set mcFailures = New cFailedSteps
Set mcNavSteps = New cStepTree
Set mcTermSteps = New cTermSteps

' Initialize the Abort flag to False
mblnAbort = False
mblnAsk = False

Exit Sub

InitializeErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errInitializeFailed,
mstrModuleName & "Initialize", _
    LoadResString(errInitializeFailed)

End Sub
Private Sub Class_Terminate()

    On Error GoTo Class_TerminateErr

    mcFreeSteps.Clear
Set mcFreeSteps = Nothing
ReDim mbarrFree(0)

    mcInstances.Clear
Set mcInstances = Nothing

    Set mcFailures = Nothing
Set mcNavSteps = Nothing
Set mcTermSteps = Nothing

Exit Sub

Class_TerminateErr:
Call LogErrors(Errors)

```

```

End Sub

Private Sub
mcTermSteps_TermStepExists(cStepDetails
As cTermStep)

    Call
RunNextStep(cStepDetails.TimeComplete,
cStepDetails.Index, _
    cStepDetails.InstanceId,
cStepDetails.ExecutionStatus)

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cRunItDetails"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cRunItDetails.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:   This module encapsulates
the properties of iterator values
'           that are used by the step being
executed at runtime.
' Contact:   Reshma Tharamal
(reshmat@microsoft.com)
'

Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cRunItDetails."
Private mstrSource As String

Private mstrIteratorName As String
Private mintType As ValueType
Private mlngSequence As Long
Private mlngFrom As Long
Private mlngTo As Long
Private mlngStep As Long
Private mstrValue As String

Public Property Get RangeTo() As Long

    RangeTo = mlngTo

End Property
Public Property Let RangeTo(ByVal vdata
As Long)

    mlngTo = vdata

End Property

Public Property Get RangeFrom() As Long

    RangeFrom = mlngFrom

End Property
Public Property Get Sequence() As Long

    Sequence = mlngSequence

```

```

End Property

Public Property Get RangeStep() As Long

    RangeStep = mlngStep

End Property
Public Property Let RangeStep(vdata As Long)

    mlngStep = vdata

End Property

Public Property Let RangeFrom(ByVal vdata
As Long)

    mlngFrom = vdata

End Property
Public Property Let Sequence(ByVal vdata As
Long)

    mlngSequence = vdata

End Property

Public Property Get IteratorType() As
ValueType

    IteratorType = mintType

End Property
Public Property Let IteratorType(ByVal vdata
As ValueType)

    On Error GoTo TypeErr
mstrSource = mstrModuleName & "Type"

' These constants have been defined in the
enumeration,
' Type, which is exposed
Select Case vdata
    Case gintFrom, gintTo, gintStep,
gintValue
        mintType = vdata

    Case Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errTypeInvalid, _
            mstrSource,
LoadResString(errTypeInvalid)
    End Select

Exit Property

TypeErr:
LogErrors Errors
mstrSource = mstrModuleName & "Type"
On Error GoTo 0
Err.Raise vbObjectError + errTypeInvalid, _
    mstrSource,
LoadResString(errTypeInvalid)

End Property
Private Sub IsList()

    If mintType <> gintValue Then
        On Error GoTo 0
        Err.Raise vbObjectError +
errInvalidProperty, mstrSource, _
            LoadResString(errInvalidProperty)
    End If

End Sub

```

```

Private Sub IsRange()

    If mintType = gintValue Then
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidProperty,
mstrSource, _
            LoadResString(errInvalidProperty)
    End If

End Sub

Public Property Get Value() As String

    Value = mstrValue

End Property
Public Property Let Value(vdata As String)

    mstrValue = vdata

End Property

Public Property Get IteratorName() As String

    IteratorName = mstrIteratorName

End Property
Public Property Let IteratorName(ByVal vdata As
String)

    mstrIteratorName = vdata

End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cRunItNode"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' An iterator class containing the properties that are
used
' by the stpe being executed.
' These iterators might actually come from steps that
are at
' a higher level than the step actually being executed
(viz.
' direct ascendants of the step at any level).

Option Explicit

Public IteratorName As String
Public Value As String
Public StepId As Long

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cRunOnly"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Option Explicit

Public Event Done()
Private WithEvents mcRunWsp As
cRunWorkspace
Attribute mcRunWsp.VB_VarHelpID = -1

```

```

Public WspName As String
Public WorkspaceId As Long
Public WspLog As String

Public Sub RunWsp()

    On Error GoTo RunWspErr

    Set mcRunWsp = New cRunWorkspace
    Set mcRunWsp.LoadDb = dbsAttTool
    mcRunWsp.WorkspaceId = WorkspaceId
    mcRunWsp.CreateInputFiles = True
    mcRunWsp.RunWorkspace

    Exit Sub

RunWspErr:
    ' Log the VB error code
    LogErrors Errors

End Sub

Private Sub
mcRunWsp_RunComplete(dtmEndTime As
Currency)

    MsgBox "Completed executing
workspace: " & gstrSQ & WspName &
gstrSQ & " at " & _
        JulianDateToString(dtmEndTime) &
"." & vbCrLf & vbCrLf & _
        "The log file for the run is: " &
gstrSQ & WspLog & gstrSQ & "."
    RaiseEvent Done

End Sub

Private Sub
mcRunWsp_RunStart(dtmStartTime As
Currency, strWspLog As String, lRunId As
Long)
    WspLog = strWspLog
End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cRunStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunStep.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
' PURPOSE: This class executes the step
that is assigned to the
' ExecuteStep property. It executes
the pre-execution constraints
' in sequence and then the step
itself. At the end it executes
' the post-execution constraints.
Since these steps should always
' be executed in sequence, each step
is only fired on the
' completion of the previous step.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

```

```

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cRunStep."
Private mstrSource As String

' Local variable(s) to hold property value(s)
Private mcStep As cStep
Private mcGlobals As cArrSteps
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mcvntPreCons As Variant
Private mcvntPostCons As Variant
Private mcIterators As cRunCollt
Private mlngInstanceId As Long ' Identifier for
the current instance
Private mlngIndex As Long ' Index value for
the current instance
Private mstrCommand As String ' The
command string
Private msRunStepDtl As String ' Step text/file
name that will go into the run_step_details
table
Private mblnAbort As Boolean ' Set to True
when the user aborts the run
Private msOutputFile As String
Private msErrorFile As String
Private miStatus As InstanceStatus
Private mcVBErr As cVBErrorsSM
Public WspParameters As cArrParameters
Public WspConnections As cConnections
Public WspConnDtls As cConnDtls

Private WithEvents mcTermProcess As
cTermProcess
Attribute mcTermProcess.VB_VarHelpID = -1
Public RunId As Long
Public CreateInputFiles As Boolean
Private msOutputDir As String

' Object that will execute the step
Private WithEvents mcExecObj As
EXECUTEDLLLib.Execute
Attribute mcExecObj.VB_VarHelpID = -1

' Holds the step that is currently being executed
(constraint or
' worker step)
Private mcExecStep As cStep

Private Const msCompareExe As String =
"\diff.exe"

Private Enum NextNodeType
    mintWspPreConstraint = 1
    mintPreConstraint
    mintStep
    mintWspPostConstraint
    mintPostConstraint
End Enum

' Public events to notify the calling function of
the
' start and end time for each step
Public Event StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)
Public Event StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

```

```

Public Event ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, _
    InstanceId As Long)
Public Event ProcessComplete(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId As
Long, lElapsed As Long)

Private Function AppendDiffErrors(sDiffFile As
String)
    ' The file containing the errors generated by the
diff utility is passed in
    ' These errors are appended to the error file for
the step

    Dim sTemp As String
    Dim InputFile As Integer

    If Not StringEmpty(sDiffFile) Then

        InputFile = FreeFile
        Open sDiffFile For Input Access Read As
InputFile

        Do While Not EOF(InputFile) ' Loop
until end of file.
            Line Input #InputFile, sTemp ' Read line
into variable.
            mcVBErr.LogMessage sTemp
        Loop

        Close InputFile
    End If

End Function

Private Sub CreateStepTextFile()
    ' Creates a file containing the step text being
executed
    On Error GoTo CreateStepTextFileErr

    Dim sInputFile As String

    If mcExecStep.ExecutionMechanism =
gintExecuteShell Then
        sInputFile = GetOutputFile(gsCmdFileSuffix)
    Else
        sInputFile = GetOutputFile(gsSqlFileSuffix)
    End If

    ' Generate a file containing the step text being
executed
    If Not StringEmpty(mcExecStep.StepTextFile)
Or mcExecStep.ExecutionMechanism =
gintExecuteShell Then
        FileCopy mstrCommand, sInputFile
    Else
        Call WriteCommandToFile(mstrCommand,
sInputFile)
    End If

    Exit Sub

CreateStepTextFileErr:

    mcVBErr.LogVBErrors

End Sub

Private Function GetOutputFile(strFileExt As
String) As String
    ' This function generates the output file name for
the step currently being executed
    ' The value of the built-in parameter 'DefaultDir'
is appended with the run identifier

```

```

' for the file location
' The step label is used for the file name
and a combination of all iterator values
' for the step is used to make the output
files unique for each instance
Dim sFile As String
Dim sIt As String
Dim lIt As Long

On Error GoTo GetOutputFileErr

sFile =
SubstituteParametersIfPossible(mcExecStep
.StepLabel)

sFile = TranslateStepLabel(sFile)

If mcExecStep Is mcStep Then
' Use iterators that have been defined
for the worker or any of it's managers
' to make the error/log file unique for
this instance
For lIt = mcIterators.Count - 1 To 0
Step -1
sIt = sIt & gsExtSeparator &
mcIterators(lIt).Value
Next lIt
End If
sIt = sIt & strFileExt

' Ensure that the length of the complete
path does not exceed 255 characters
If Len(msOutputDir) + Len(sFile) +
Len(sIt) > MAX_PATH Then
sFile = Mid(sFile, 1, MAX_PATH -
Len(sIt) - Len(msOutputDir))
End If
GetOutputFile = msOutputDir & sFile &
sIt
Exit Function

GetOutputFileErr:

' Does not make sense to log error to the
error file yet. Write to the project
' log and return the step label as default
GetOutputFile = mcExecStep.StepLabel
& gsExtSeparator & strFileExt

End Function

Private Sub HandleExecutionError()

On Error GoTo HandleExecutionError

' Log the error code raised by Visual
Basic
miStatus = gintFailed
mcVbErr.LogVBErrors
Call
mcVbErr.WriteError(errExecuteStepFailed,
-
OptArgs:="Continuation criteria for
the step is: " &
gsContCriteria(mcStep.ContinuationCriteria
))

HandleExecutionError:

' Logging failed - return

End Sub

Public Property Get Index() As Long

```

```

Index = mlngIndex

End Property
Public Property Let Index(ByVal vdata As
Long)

mlngIndex = vdata

End Property
Private Function InitializeExecStatus() As
InstanceStatus
Dim sCompareFile As String

On Error GoTo InitializeExecStatusErr

InitializeExecStatus =
mcExecObj.StepStatus

If InitializeExecStatus = gintComplete Then
If Not
StringEmpty(mcExecStep.FailureDetails) Then
' Compare output to determine whether
the step failed
sCompareFile =
GetShortName(SubstituteParameters( _
mcExecStep.FailureDetails,
mcExecStep.WorkspaceId, mcIterators, _
WspParameters))
InitializeExecStatus =
If(CompareOutput(sCompareFile,
msOutputFile), gintComplete, gintFailed)
End If
End If

Exit Function

InitializeExecStatusErr:
mcVbErr.LogVBErrors
' Call LogErrors(Errors)
InitializeExecStatus =
mcExecObj.StepStatus

End Function
Private Function
CompareOutput(sCompareFile As String,
sOutputFile As String) As Boolean

Dim sCmpOutput As String
Dim sDiffOutput As String

On Error GoTo CompareOutputErr

' Create temporary files to store the file
compare output and
' the errors generated by the compare
function
sCmpOutput = CreateTempFile()
sDiffOutput = CreateTempFile()

' Run the compare utility and redirect it's
output and errors
SyncShell ("cmd /c " & _
GetShortName(App.Path &
msCompareExe) & gstrBlank & _
sCompareFile & gstrBlank &
sOutputFile & _
" > " & sCmpOutput & " 2> " &
sDiffOutput)

If FileLen(sDiffOutput) > 0 Then
' The compare generated errors - append
error msgs to the error file
Call AppendDiffErrors(sDiffOutput)
CompareOutput = False

```

```

Else
CompareOutput = (FileLen(sCmpOutput) = 0)
End If

If Not CompareOutput Then
mcVbErr.WriteError errDiffFailed
End If

' Delete the temporary files used to store the
output of the compare and
' the errors generated by the compare
Kill sDiffOutput
Kill sCmpOutput

Exit Function

CompareOutputErr:
mcVbErr.LogVBErrors
CompareOutput = False

End Function
Public Property Get InstanceId() As Long

InstanceId = mlngInstanceId

End Property
Public Property Let InstanceId(ByVal vdata As
Long)

mlngInstanceId = vdata

End Property

Private Function ExecuteConstraint(vntConstraints
As Variant, _
ByRef intLoopIndex As Integer) As Boolean

' Returns True if there is a constraint in the
passed in
' array that remains to be executed

If IsArray(vntConstraints) And Not
IsEmpty(vntConstraints) Then
ExecuteConstraint = (LBound(vntConstraints)
<= intLoopIndex) And (intLoopIndex <=
UBound(vntConstraints))
Else
ExecuteConstraint = False
End If

End Function
Private Function NextStep() As cStep

' Determines which is the next step to be executed
- it could
' be either a pre-execution step, the worker step
itself
' or a post-execution step

Dim cConsRec As cConstraint
Dim cNextStepRec As cStep
Dim vntStepConstraints As Variant

' Static variable to remember exactly where we
are in the
' processing
Static intIndex As Integer
Static intNextStepType As NextNodeType

On Error GoTo NextStepErr

If mblnAbort = True Then
' The user has aborted the run - do not run any
more
' processes for the step

```

```

Set NextStep = Nothing
Exit Function
End If

If intNextStepType = 0 Then
' First time through this function - set
the Index and
' node type to initial values
intNextStepType =
mintWspPreConstraint
intIndex = 0
RaiseEvent StepStart(mcStep,
Determine64BitTime(), mInglInstanceId)
End If

Do
Select Case intNextStepType
Case mintWspPreConstraint
vntStepConstraints =
mcvntWspPreCons

Case mintPreConstraint
vntStepConstraints =
mcvntPreCons

Case mintStep
' CONS:
If mcStep.StepType =
gintWorkerStep Then
Set cNextStepRec = mcStep
End If

Case mintWspPostConstraint
vntStepConstraints =
mcvntWspPostCons

Case mintPostConstraint
vntStepConstraints =
mcvntPostCons

End Select

If intNextStepType <> mintStep Then
' Check if there is a constraint to be
executed
If
ExecuteConstraint(vntStepConstraints,
intIndex) Then
' Get the corresponding step record
to be executed
' Query the global step record for
the current
' constraint
Set cConsRec =
vntStepConstraints(intIndex)

Set cNextStepRec =
mcGlobals.QueryStep(cConsRec.GlobalStep
Id)
intIndex = intIndex + 1
Else
If intNextStepType =
mintPostConstraint Then
' No more stuff to be executed
for the step
' Raise a Done event
Set cNextStepRec = Nothing

' Set the next step type to an
invalid value
intNextStepType = -1
Else
Call
NextType(intNextStepType, intIndex)
End If

```

```

End If
Else
' Increment the step type so we look at
the post-
' execution steps the next time through
Call NextType(intNextStepType,
intIndex)
End If

Loop Until (Not cNextStepRec Is Nothing)
Or _
intNextStepType = -1

Set NextStep = cNextStepRec

Exit Function

NextStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"NextStep"
Err.Raise vbObjectError +
errNextStepFailed, mstrSource, _
LoadResString(errNextStepFailed)

End Function
Public Sub Execute()
' This procedure is the method that executes
the step that
' is assigned to the ExecuteStep property. It
call a procedure
' to determine the next step to be executed.
' Then it initializes all the properties of the
cExecuteSM object
' and calls it's run method to execute it.
Dim cConn As cConnection
Dim cRunConnDtl As cConnDtl

On Error GoTo ExecuteErr

' If this procedure is called after a step has
completed,
' we would have to check if we created any
temporary files
' while executing that step
If Not mcExecStep Is Nothing Then
If Not
StringEmpty(mcExecStep.StepTextFile) Or
mcExecStep.ExecutionMechanism =
gintExecuteShell Then
' Remove the temporary file that we
created while
' running this command
Kill mstrCommand
End If

Call StepCompleted

' The VB errors class stores a reference to
the Execute class since it uses
' a method of the class to write errors to
the error log. Hence,
' release all references to the Execute
object before destroying it.
Set mcVBErr.ErrorFile = Nothing
Set mcExecObj = Nothing

' Delete empty output and error files
(generated by shell commands)
' (Can be done only after cleaning up
cExecObj)
Call DeleteEmptyOutputFiles
Else

```

```

' First time through - initialize the location of
output files
msOutputDir =
GetDefaultDir(mcStep.WorkspaceId,
WspParameters)
msOutputDir = msOutputDir &
gstrFileSeparator & Trim(Str(RunId)) &
gstrFileSeparator
' Dummy file since the function expects a file
name
MakePathValid (msOutputDir & "a.txt")
End If

' Call a procedure to determine the next step to be
executed
' - could be a constraint or the step itself
' Initialize a module-level variable to the step
being
' executed
Set mcExecStep = NextStep
If mcExecStep Is Nothing Then
RaiseEvent StepComplete(mcStep,
Determine64BitTime(), mInglInstanceId, miStatus)
' No more stuff to execute
Exit Sub
End If

Dim sStartDir As String

Set mcExecObj = New
EXECUTEDLLLib.Execute

' The VB errors class uses the WriteError method
of the Execute class to write
' all VB errors to the error file for the step (this
prevents a clash when the
' VB errors and Execution errors have to be
written to the same log). Hence, store
' a reference to the Execute object in mcVBErr
msErrorFile = GetOutputFile(gsErrorFileSuffix)
mcExecObj.ErrorFile = msErrorFile
Call DeleteFile(msErrorFile,
bCheckIfEmpty:=False)
Set mcVBErr.ErrorFile = mcExecObj

If mcExecStep.ExecutionMechanism =
gintExecuteShell Then
sStartDir =
Trim$(GetShortName(SubstituteParameters( _
mcExecStep.StartDir,
mcExecStep.WorkspaceId, mcIterators,
WspParameters:=WspParameters)))
' Dummy connection object
Set cConn = New cConnection
Set cRunConnDtl = New cConnDtl
Else
' Find the connection string value and
substitute parameter values in it
Set cRunConnDtl =
WspConnDtls.GetConnectionDtl(mcExecStep.Wor
kpaceId, mcExecStep.StartDir)
Set cConn =
WspConnections.GetConnection(mcExecStep.Wor
kpaceId, cRunConnDtl.ConnectionString)
sStartDir =
Trim$(SubstituteParameters(cConn.ConnectionVal
ue, _
mcExecStep.WorkspaceId, mcIterators,
WspParameters:=WspParameters))
End If

msOutputFile =
GetOutputFile(gsOutputFileSuffix)
Call DeleteFile(msOutputFile,
bCheckIfEmpty:=False)

```

```

mcExecObj.OutputFile = msOutputFile
' mcExecObj.LogFile =
GetShortName(SubstituteParameters( _
' mcExecStep.LogFile,
mcExecStep.WorkspaceId, mcIterators,
WspParameters:=WspParameters))
If mcExecStep.ExecutionMechanism =
gintExecuteODBC And _
cRunConnDtl.ConnType =
ConnTypeDynamic Then
Call
mcExecObj.DoExecute(BuildCommandStri
ng(), sStartDir,
mcExecStep.ExecutionMechanism, _
cConn.NoCountDisplay,
cConn.NoExecute, cConn.ParseQueryOnly,
cConn.QuotedIdentifiers, _
cConn.AnsiNulls,
cConn.ShowQueryPlan,
cConn.ShowStatsTime,
cConn.ShowStatsIO, _
cConn.RowCount,
cConn.QueryTimeout, gstrEmptyString)
Else
Call
mcExecObj.DoExecute(BuildCommandStri
ng(), sStartDir,
mcExecStep.ExecutionMechanism, _
cConn.NoCountDisplay,
cConn.NoExecute, cConn.ParseQueryOnly,
cConn.QuotedIdentifiers, _
cConn.AnsiNulls,
cConn.ShowQueryPlan,
cConn.ShowStatsTime,
cConn.ShowStatsIO, _
cConn.RowCount,
cConn.QueryTimeout,
mcExecStep.StartDir)
End If

Exit Sub

ExecuteErr:
Call HandleExecutionError

' We can assume that if we are in this
function, a StepStart event has been
triggered already.
RaiseEvent StepComplete(mcStep,
Determine64BitTime(), mInglInstanceId,
miStatus)

End Sub
Private Function BuildCommandString() As
String
' Process text to be executed - either from
the text
' field or read it from a file.
' This function will always return the
command text for ODBC commands
' and a file name for Shell commands
Dim sFile As String
Dim sCommand As String
Dim sTemp As String

On Error GoTo BuildCommandStringErr

If Not
StringEmpty(mcExecStep.StepTextFile)
Then
' Substitute parameter values and
environment variables
' in the filename

```

```

msRunStepDtl =
SubstituteParameters(mcExecStep.StepTextFil
e, _
' mcExecStep.WorkspaceId,
mcIterators, WspParameters:=WspParameters)

sFile = GetShortName(msRunStepDtl)

mstrCommand =
SubstituteParametersInText(sFile,
mcExecStep.WorkspaceId)

If mcExecStep.ExecutionMechanism =
gintExecuteODBC Then
' Read the contents of the file and pass
it to ODBC
BuildCommandString =
ReadCommandFromFile(mstrCommand)
Else
BuildCommandString = mstrCommand
End If
Else
' Substitute parameter values and
environment variables
' in the step text
msRunStepDtl =
SubstituteParameters(mcExecStep.StepText, _
mcExecStep.WorkspaceId,
mcIterators, WspParameters:=WspParameters)
mstrCommand = msRunStepDtl

If mcExecStep.ExecutionMechanism =
gintExecuteShell Then
' Write the command to a temp file
(enables us to execute multiple
' commands via the command
interpreter)
mstrCommand =
WriteCommandToFile(msRunStepDtl)
BuildCommandString = mstrCommand
Else
BuildCommandString =
SQLFixup(msRunStepDtl)
End If
End If

If CreateInputFiles Then
Call CreateStepTextFile
End If

Exit Function

BuildCommandStringErr:
' Log the error code raised by the Execute
procedure
' Call LogErrors(Errors)
mcVBErr.LogVBErrors

On Error GoTo 0
mstrSource = mstrModuleName &
"Execute"
Err.Raise vbObjectError +
errExecuteStepFailed, mstrSource, _
LoadResString(errExecuteStepFailed) &
mstrCommand

End Function
Public Sub Abort()

On Error GoTo AbortErr

' Setting the Abort flag to True will ensure
that we
' don't execute any more processes for this
step

```

```

mblnAbort = True

If Not mcExecObj Is Nothing Then
mcExecObj.Abort
Else
' We are not in the middle of execution yet
End If

Exit Sub

AbortErr:
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errProgramError, _
mstrModuleName & "Abort", _
LoadResString(errProgramError)

End Sub
Private Sub NextType(ByRef StepType As
NextNodeType, _
ByRef Position As Integer)

StepType = StepType + 1
Position = 0

End Sub
Private Sub StepCompleted()

On Error GoTo StepCompletedErr

If Not mcExecStep Is Nothing Then
If mcExecStep Is mcStep Then
miStatus = InitializeExecStatus
If miStatus = gintFailed Then
' Create input files if the step failed
execution and one hasn't been created already
If Not CreateInputFiles Then
CreateStepTextFile
Call
mcVBErr.WriteError(errExecuteStepFailed, _
OptArgs:="Continuation criteria for
the step is: " &
gsContCriteria(mcStep.ContinuationCriteria))
End If
End If
End If

Exit Sub

StepCompletedErr:
' Log the error code raised by Visual Basic
miStatus = gintFailed
mcVBErr.LogVBErrors
Call mcVBErr.WriteError(errExecuteStepFailed,
_
OptArgs:="Continuation criteria for the step
is: " &
gsContCriteria(mcStep.ContinuationCriteria))

End Sub
Private Sub DeleteEmptyOutputFiles()

On Error GoTo DeleteEmptyOutputFilesErr

' Delete empty output and error files
If Not mcExecStep Is Nothing Then
Call DeleteFile(msErrorFile,
bCheckIfEmpty:=True)
Call DeleteFile(msOutputFile,
bCheckIfEmpty:=True)
End If

Exit Sub

DeleteEmptyOutputFilesErr:

```

```

' Not a critical error - continue

End Sub
Private Function
ReadCommandFromFile(strFileName As
String) As String

' Returns the contents of the passed in file

Dim sCommand As String
Dim sTemp As String
Dim InputFile As Integer

On Error GoTo
ReadCommandFromFileErr

If Not StringEmpty(strFileName) Then

InputFile = FreeFile
Open strFileName For Input Access
Read As InputFile

Line Input #InputFile, sCommand '
Read line into variable.

Do While Not EOF(InputFile) ' Loop
until end of file.
Line Input #InputFile, sTemp ' Read
line into variable.
sCommand = sCommand & vbCrLf
& sTemp
Loop

Close InputFile
End If

ReadCommandFromFile = sCommand

Exit Function

ReadCommandFromFileErr:

' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ReadCommandFromFile"
On Error GoTo 0
Err.Raise vbObjectError +
errSubValuesFailed, _
gstrSource, _
LoadResString(errSubValuesFailed)

End Function
Private Function
SubstituteParametersIfPossible(strLabel As
String)

On Error GoTo
SubstituteParametersIfPossibleErr

SubstituteParametersIfPossible =
SubstituteParameters(strLabel, _
mcExecStep.WorkspaceId,
mcIterators,
WspParameters:=WspParameters)
Exit Function

SubstituteParametersIfPossibleErr:
SubstituteParametersIfPossible = strLabel

End Function
Private Function
SubstituteParametersInText(strFileName As
String, _

```

```

lngWorkspace As Long) As String

' Reads each line in the passed in file,
substitutes parameter

' values in the line and writes out the
modified line to a

' temporary file that we create. The
temporary file will be

' removed once the step completes
execution.

' Returns the name of the newly created
temporary file.

Dim strTempFile As String
Dim strTemp As String
Dim strOutput As String
Dim InputFile As Integer
Dim OutputFile As Integer

On Error GoTo
SubstituteParametersInTextErr

strTempFile = CreateTempFile()

If Not StringEmpty(strFileName) Then

InputFile = FreeFile
Open strFileName For Input Access Read
As InputFile

OutputFile = FreeFile
Open strTempFile For Output Access
Write As OutputFile

Do While Not EOF(InputFile) ' Loop until
end of file.
Line Input #InputFile, strTemp ' Read
line into variable.
strOutput =
SubstituteParameters(strTemp, lngWorkspace,
mcIterators, WspParameters:=WspParameters)

If mcExecStep.ExecutionMechanism =
gintExecuteODBC Then strOutput =
SQLFixup(strOutput)

Print #OutputFile, strOutput
BugMessage strOutput
Loop

End If

Close InputFile
Close OutputFile

SubstituteParametersInText = strTempFile

Exit Function

SubstituteParametersInTextErr:

' Log the error code raised by Visual Basic
' Call LogErrors(Errors)
mcVBErr.LogVBErrors
mstrSource = mstrModuleName &
"SubstituteParametersInText"
On Error GoTo 0
Err.Raise vbObjectError +
errSubValuesFailed, _
gstrSource, _
LoadResString(errSubValuesFailed)

End Function

```

```

Private Function WriteCommandToFile(sCommand
As String, Optional sFile As String =
gstrEmptyString) As String

' Writes the command text to a temporary file
' Returns the name of the temporary file

Dim OutputFile As Integer

On Error GoTo WriteCommandToFileErr

If StringEmpty(sFile) Then
sFile = CreateTempFile()
End If

OutputFile = FreeFile
Open sFile For Output Access Write As
OutputFile

Print #OutputFile, sCommand

Close OutputFile

WriteCommandToFile = sFile

Exit Function

WriteCommandToFileErr:

' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"WriteCommandToFile"
On Error GoTo 0
Err.Raise vbObjectError + errSubValuesFailed, _
gstrSource, _
LoadResString(errSubValuesFailed)

End Function

Public Property Get WspPreCons() As Variant
WspPreCons = mcvntWspPreCons
End Property
Public Property Let WspPreCons(ByVal vdata As
Variant)
mcvntWspPreCons = vdata
End Property

Public Property Get WspPostCons() As Variant
WspPostCons = mcvntWspPostCons
End Property
Public Property Let WspPostCons(ByVal vdata As
Variant)
mcvntWspPostCons = vdata
End Property

Public Property Get PreCons() As Variant
PreCons = mcvntPreCons
End Property
Public Property Let PreCons(ByVal vdata As
Variant)
mcvntPreCons = vdata
End Property

Public Property Get PostCons() As Variant
PostCons = mcvntPostCons
End Property
Public Property Let PostCons(ByVal vdata As
Variant)
mcvntPostCons = vdata
End Property

Public Property Set Globals(cRunSteps As
cArrSteps)

```



```

Set mcGlobals = cRunSteps

End Property
Public Property Set ExecuteStep(cRunStep As cStep)

    Set mcStep = cRunStep

End Property
Public Property Get Globals() As cArrSteps

    Set Globals = mcGlobals

End Property
Public Property Get ExecuteStep() As cStep

    Set ExecuteStep = mcStep

End Property
Public Property Set Iterators(vdata As cRunCollt)

    Set mcIterators = vdata

End Property
Private Sub Class_Initialize()

    ' Initialize the Abort flag to False
    mblnAbort = False
    Set mcVBErr = New cVBErrorsSM
    Set mcTermProcess = New cTermProcess

End Sub

Private Sub Class_Terminate()

    On Error GoTo Class_TerminateErr

    Set mcExecObj = Nothing
    Set mcVBErr = Nothing
    Set mcTermProcess = Nothing

Exit Sub

Class_TerminateErr:
    Call LogErrors(Errors)

End Sub

Private Sub mcExecObj_Start(ByVal StartTime As Currency)

    ' Raise an event indicating that the step has begun execution
    RaiseEvent ProcessStart(mcExecStep, msRunStepDtl, StartTime, mlngInstanceId)
End Sub

Private Sub mcExecObj_Complete(ByVal EndTime As Currency, ByVal Elapsed As Long)

    On Error GoTo mcExecObj_CompleteErr

    Debug.Print Elapsed
    RaiseEvent

ProcessComplete(mcExecStep, EndTime, mlngInstanceId, Elapsed)
    mcTermProcess.ProcessTerminated

Exit Sub

mcExecObj_CompleteErr:
    Call LogErrors(Errors)

```

```

End Sub

Private Sub mcTermProcess_TermProcessExists()

    On Error GoTo TermProcessExistsErr

    ' Call a procedure to execute the next step, if any
    Call Execute

Exit Sub

TermProcessExistsErr:
    ' Log the error code raised by the Execute procedure
    Call LogErrors(Errors)

End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cRunWorkspace"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunWorkspace.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
'
' PURPOSE: This class loads all the information necessary to
' execute a workspace and calls cRunInst to execute the workspace.
' It also propagates Step start and complete and
' Run start and complete events.
' Contact: Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "cRunWorkspace."
Private mstrSource As String

Private mcRunSteps As cArrSteps
Private mcRunParams As cArrParameters
Private mcRunConstraints As cArrConstraints
Private mcRunConnections As cConnections
Private mcRunConnDtls As cConnDtls
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mdbLoadDb As Database
Private mlngRunId As Long
Private mlngWorkspaceId As Long
Private mField As cStringSM
Public CreateInputFiles As Boolean

Private WithEvents mcRun As cRunInst
Attribute mcRun.VB_VarHelpID = -1

Public Event RunStart(dtmStartTime As Currency, strWspLog As String, lRunId As Long)
Public Event RunComplete(dtmEndTime As Currency)

```

```

Public Event StepStart(cStepRecord As cStep, dtmStartTime As Currency, lngInstanceId As Long, _
    sPath As String, slts As String)
Public Event StepComplete(cStepRecord As cStep, dtmEndTime As Currency, lngInstanceId As Long)
Public Event ProcessStart(cStepRecord As cStep, strCommand As String, _
    dtmStartTime As Currency, lngInstanceId As Long)
Public Event ProcessComplete(cStepRecord As cStep, dtmEndTime As Currency, lngInstanceId As Long)
Public Function InstancesForStep(lngStepId As Long, iStatus As InstanceStatus) As cInstances
    ' Returns an array of all the instances for a step

    If mcRun Is Nothing Then
        Set InstancesForStep = Nothing
    Else
        Set InstancesForStep = mcRun.InstancesForStep(lngStepId, iStatus)
    End If

End Function
Private Sub InsertRunDetail(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, _
    lngInstanceId As Long, lParentInstanceId As Long, sltValue As String)
    ' Inserts a new run detail record into the database

    Dim strInsert As String
    Dim qy As QueryDef

    On Error GoTo InsertRunDetailErr
    mstrSource = mstrModuleName & "InsertRunDetail"

    strInsert = "insert into run_step_details " & _
        "(" & run_id, step_id, version_no, instance_id, parent_instance_id, " & _
        " command, start_time, iterator_value ) " & _
        " values ( "

    #If USE_JET Then

        strInsert = strInsert & " [r_id], [s_id], [ver_no], [i_id], [p_i_id], " & _
            " [com], [s_date], [it_val] )"

        Set qy = mdbLoadDb.CreateQueryDef( _
            gstrEmptyString, strInsert)

        ' Call a procedure to assign the Querydef parameters
        Call AssignParameters(qy, _
            StartTime:=dtmStartTime, _
            StepId:=cStepRecord.StepId, _
            Version:=cStepRecord.VersionNo, _
            InstanceId:=lngInstanceId, _
            Command:=strCommand)

        qy.Execute dbFailOnError
        qy.Close

    #Else

        strInsert = strInsert & Str(mlngRunId) & _
            & ", " & Str(cStepRecord.StepId) & _
            & ", " &
        mField.MakeStringFieldValid(cStepRecord.VersionNo) & _

```

```

    & ", " & Str(IngInstanceId) _
    & ", " & Str(IParentInstanceId) _
    & ", " &
mField.MakeStringFieldValid(strCommand)
-
    & ", " & Str(dtmStartTime) _
    & ", " &
mField.MakeStringFieldValid(sItValue)

    strInsert = strInsert & " ) "

    mdbLoadDb.Execute strInsert,
dbFailOnError

#End If

Exit Sub

InsertRunDetailErr:
LogErrors Errors
mstrSource = mstrModuleName &
"InsertRunDetail"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _

LoadResString(errUpdateRunDataFailed)

End Sub
Private Sub UpdateRunDetail(cStepRecord
As cStep, _
dtmEndTime As Currency,
IngInstanceId As Long, lElapsed As Long)
' Updates the run detail record in the
database

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo UpdateRunDetailErr

strUpdate = "update run_step_details " &
-
" set end_time = [e_date],
elapsed_time = [elapsed] " & _
" where run_id = [r_id] " & _
" and step_id = [s_id] " & _
" and version_no = [ver_no] " & _
" and instance_id = [i_id] "

Set qy = mdbLoadDb.CreateQueryDef( _
gstrEmptyString, strUpdate)

' Call a procedure to assign the Querydef
parameters
Call AssignParameters(qy,
EndTime:=dtmEndTime, _
StepId:=cStepRecord.StepId, _
Version:=cStepRecord.VersionNo, _
InstanceId:=IngInstanceId,
Elapsed:=lElapsed)

qy.Execute dbFailOnError
qy.Close

Exit Sub

UpdateRunDetailErr:
LogErrors Errors
mstrSource = mstrModuleName &
"UpdateRunDetail"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _

```

```

mstrSource, _

LoadResString(errUpdateRunDataFailed)

End Sub
Private Function
InsertRunHeader(dtmStartTime As Currency)
As Long
' Inserts a new run header record into the
database
' and returns the id for the run

Dim strInsert As String
Dim qy As QueryDef

On Error GoTo InsertRunHeaderErr

strInsert = "insert into run_header " & _
"( run_id, workspace_id, start_time ) " &
-
" values ( " & _
" [r_id], [w_id], [s_date] )"

Set qy = mdbLoadDb.CreateQueryDef( _
gstrEmptyString, strInsert)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy,
StartTime:=dtmStartTime)

qy.Execute dbFailOnError
qy.Close

InsertRunHeader = mIngRunId
Exit Function

InsertRunHeaderErr:
LogErrors Errors
mstrSource = mstrModuleName &
"InsertRunHeader"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _

LoadResString(errUpdateRunDataFailed)

End Function
Private Sub
InsertRunParameters(dtmStartTime As
Currency)
' Inserts a new run header record into the
database
' and returns the id for the run

Dim strInsert As String
Dim qy As QueryDef
Dim cParamRec As cParameter
Dim lngIndex As Long

On Error GoTo InsertRunParametersErr

strInsert = "insert into run_parameters " & _
"( run_id, parameter_name,
parameter_value ) " & _
" values ( " & _
" [r_id], [p_name], [p_value] )"

Set qy = mdbLoadDb.CreateQueryDef( _
gstrEmptyString, strInsert)
qy.Parameters("r_id").Value = mIngRunId

For lngIndex = 0 To
mcRunParams.ParameterCount - 1

```

```

Set cParamRec = mcRunParams(lngIndex)

qy.Parameters("p_name").Value =
cParamRec.ParameterName
qy.Parameters("p_value").Value =
cParamRec.ParameterValue
qy.Execute dbFailOnError

Next lngIndex

qy.Close

Exit Sub

InsertRunParametersErr:
LogErrors Errors
mstrSource = mstrModuleName &
"InsertRunParameters"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _
LoadResString(errUpdateRunDataFailed)

End Sub
Private Sub AssignParameters(qyExec As
DAO.QueryDef, _
Optional StartTime As Currency = 0, _
Optional EndTime As Currency = 0, _
Optional StepId As Long = 0, _
Optional Version As String = gstrEmptyString,
-
Optional InstanceId As Long = 0, _
Optional ParentInstanceId As Long = 0, _
Optional Command As String =
gstrEmptyString, _
Optional Elapsed As Long = 0, _
Optional ItValue As String = gstrEmptyString)
' Assigns values to the parameters in the querydef
object

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

For Each prmParam In qyExec.Parameters
Select Case prmParam.Name
Case "[w_id]"
prmParam.Value = mIngWorkspaceId

Case "[r_id]"
prmParam.Value = mIngRunId

Case "[s_id]"
BugAssert StepId <> 0
prmParam.Value = StepId

Case "[ver_no]"
BugAssert Not StringEmpty(Version)
prmParam.Value = Version

Case "[i_id]"
BugAssert InstanceId <> 0
prmParam.Value = InstanceId

Case "[p_i_id]"
prmParam.Value = ParentInstanceId

Case "[com]"
BugAssert Not StringEmpty(Command)
prmParam.Value = Command

Case "[s_date]"

```

```

BugAssert StartTime <> 0
prmParam.Value = StartTime

Case "[e_date]"
BugAssert EndTime <> 0
prmParam.Value = EndTime

Case "[elapsed]"
prmParam.Value = Elapsed

Case "[it_val]"
prmParam.Value = ItValue

Case Else
' Write the parameter name that is
faulty
WriteError errInvalidParameter,
mstrSource, _
prmParam.Name
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource, _

LoadResString(errInvalidParameter)
End Select
Next prmParam

Exit Sub

AssignParametersErr:

mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrSource,
LoadResString(errAssignParametersFailed)

End Sub
Private Sub
RunStartProcessing(dtmStartTime As
Currency)

On Error GoTo RunStartProcessingErr

' Insert the run header into the database
Call InsertRunHeader(dtmStartTime)

' Insert the run parameters into the
database
Call InsertRunParameters(dtmStartTime)

Exit Sub

RunStartProcessingErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"RunStartProcessing"
ShowError errUpdateRunDataFailed
WriteError errUpdateRunDataFailed,
mstrSource

End Sub
Private Sub
ProcessStartProcessing(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Long, _
IParentInstanceId As Long, sltValue As
String)

On Error GoTo ProcessStartProcessingErr

' Insert the run detail into the database
Call InsertRunDetail(cStepRecord,
strCommand, dtmStartTime, lngInstanceId, _
IParentInstanceId, sltValue)

Exit Sub

ProcessStartProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ProcessStartProcessing"
ShowError errUpdateRunDataFailed
WriteError errUpdateRunDataFailed,
mstrSource

End Sub
Private Sub
StepStartProcessing(cStepRecord As
cStep, dtmStartTime As Currency, _
lngInstanceId As Long, IParentInstanceId
As Long, sltValue As String)

On Error GoTo StepStartProcessingErr

' Since ProcessStart events won't be
triggered for manager steps
If cStepRecord.StepType = gintManagerStep
Then
' Insert the run detail into the database
Call InsertRunDetail(cStepRecord,
cStepRecord.StepLabel, _
dtmStartTime, lngInstanceId,
IParentInstanceId, sltValue)
End If

Exit Sub

StepStartProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"StepStartProcessing"
ShowError errUpdateRunDataFailed

End Sub
Private Sub
ProcessCompleteProcessing(cStepRecord As
cStep, _
dtmStartTime As Currency, lngInstanceId
As Long, lElapsed As Long)

On Error GoTo
ProcessCompleteProcessingErr

' Insert the run detail into the database
Call UpdateRunDetail(cStepRecord,
dtmStartTime, lngInstanceId, lElapsed)

Exit Sub

ProcessCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ProcessCompleteProcessing"
ShowError errUpdateRunDataFailed

End Sub
Private Sub
StepCompleteProcessing(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

On Error GoTo StepCompleteProcessingErr

' Since ProcessComplete events won't be
triggered for manager steps
If cStepRecord.StepType = gintManagerStep
Then
' Update the run detail in the database
Call UpdateRunDetail(cStepRecord,
dtmEndTime, lngInstanceId, lElapsed)
End If

Exit Sub

StepCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
ShowError errUpdateRunDataFailed

End Sub
Private Sub
RunCompleteProcessing(dtmEndTime
As Currency)

On Error GoTo RunCompleteProcessingErr

' Update the header record with the end time for
the run
Call UpdateRunHeader(dtmEndTime)

Exit Sub

RunCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
ShowError errUpdateRunDataFailed

End Sub
Private Sub
UpdateRunHeader(ByVal dtmEndTime
As Currency)
' Updates the run header record with the end date

Dim strUpdate As String
Dim qry As QueryDef

On Error GoTo UpdateRunHeaderErr

strUpdate = "update run_header " & _
" set end_time = [e_date] " & _
" where run_id = [r_id] "

Set qry = mdbLoadDb.CreateQueryDef( _
gstrEmptyString, strUpdate)

' Call a procedure to execute the Querydef object
Call AssignParameters(qry,
EndTime:=dtmEndTime)

qry.Execute dbFailOnError
qry.Close

Exit Sub

UpdateRunHeaderErr:
LogErrors Errors
mstrSource = mstrModuleName &
"UpdateRunHeader"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _
LoadResString(errUpdateRunDataFailed)

End Sub

```

```

On Error GoTo ProcessStartProcessingErr

' Insert the run detail into the database
Call InsertRunDetail(cStepRecord,
strCommand, dtmStartTime, lngInstanceId, _
IParentInstanceId, sltValue)

Exit Sub

ProcessStartProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ProcessStartProcessing"
ShowError errUpdateRunDataFailed
WriteError errUpdateRunDataFailed,
mstrSource

End Sub
Private Sub
StepStartProcessing(cStepRecord As
cStep, dtmStartTime As Currency, _
lngInstanceId As Long, IParentInstanceId
As Long, sltValue As String)

On Error GoTo StepStartProcessingErr

' Since ProcessStart events won't be
triggered for manager steps
If cStepRecord.StepType = gintManagerStep
Then
' Insert the run detail into the database
Call InsertRunDetail(cStepRecord,
cStepRecord.StepLabel, _
dtmStartTime, lngInstanceId,
IParentInstanceId, sltValue)
End If

Exit Sub

StepStartProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"StepStartProcessing"
ShowError errUpdateRunDataFailed

End Sub
Private Sub
ProcessCompleteProcessing(cStepRecord As
cStep, _
dtmStartTime As Currency, lngInstanceId
As Long, lElapsed As Long)

On Error GoTo
ProcessCompleteProcessingErr

' Insert the run detail into the database
Call UpdateRunDetail(cStepRecord,
dtmStartTime, lngInstanceId, lElapsed)

Exit Sub

ProcessCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ProcessCompleteProcessing"
ShowError errUpdateRunDataFailed

End Sub
Private Sub
StepCompleteProcessing(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

On Error GoTo StepCompleteProcessingErr

' Since ProcessComplete events won't be
triggered for manager steps
If cStepRecord.StepType = gintManagerStep
Then
' Update the run detail in the database
Call UpdateRunDetail(cStepRecord,
dtmEndTime, lngInstanceId, lElapsed)
End If

Exit Sub

StepCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
ShowError errUpdateRunDataFailed

End Sub
Private Sub
RunCompleteProcessing(dtmEndTime
As Currency)

On Error GoTo RunCompleteProcessingErr

' Update the header record with the end time for
the run
Call UpdateRunHeader(dtmEndTime)

Exit Sub

RunCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
ShowError errUpdateRunDataFailed

End Sub
Private Sub
UpdateRunHeader(ByVal dtmEndTime
As Currency)
' Updates the run header record with the end date

Dim strUpdate As String
Dim qry As QueryDef

On Error GoTo UpdateRunHeaderErr

strUpdate = "update run_header " & _
" set end_time = [e_date] " & _
" where run_id = [r_id] "

Set qry = mdbLoadDb.CreateQueryDef( _
gstrEmptyString, strUpdate)

' Call a procedure to execute the Querydef object
Call AssignParameters(qry,
EndTime:=dtmEndTime)

qry.Execute dbFailOnError
qry.Close

Exit Sub

UpdateRunHeaderErr:
LogErrors Errors
mstrSource = mstrModuleName &
"UpdateRunHeader"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _
LoadResString(errUpdateRunDataFailed)

End Sub

```

```

On Error GoTo StepCompleteProcessingErr

' Since ProcessComplete events won't be
triggered for manager steps
If cStepRecord.StepType = gintManagerStep
Then
' Update the run detail in the database
Call UpdateRunDetail(cStepRecord,
dtmEndTime, lngInstanceId, lElapsed)
End If

Exit Sub

StepCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
ShowError errUpdateRunDataFailed

End Sub
Private Sub
RunCompleteProcessing(dtmEndTime
As Currency)

On Error GoTo RunCompleteProcessingErr

' Update the header record with the end time for
the run
Call UpdateRunHeader(dtmEndTime)

Exit Sub

RunCompleteProcessingErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
ShowError errUpdateRunDataFailed

End Sub
Private Sub
UpdateRunHeader(ByVal dtmEndTime
As Currency)
' Updates the run header record with the end date

Dim strUpdate As String
Dim qry As QueryDef

On Error GoTo UpdateRunHeaderErr

strUpdate = "update run_header " & _
" set end_time = [e_date] " & _
" where run_id = [r_id] "

Set qry = mdbLoadDb.CreateQueryDef( _
gstrEmptyString, strUpdate)

' Call a procedure to execute the Querydef object
Call AssignParameters(qry,
EndTime:=dtmEndTime)

qry.Execute dbFailOnError
qry.Close

Exit Sub

UpdateRunHeaderErr:
LogErrors Errors
mstrSource = mstrModuleName &
"UpdateRunHeader"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _
LoadResString(errUpdateRunDataFailed)

End Sub

```

```

Public Property Let WorkspaceId(ByVal
vdata As Long)
    mlngWorkspaceId = vdata
End Property
Public Property Get WorkspaceId() As Long
    WorkspaceId = mlngWorkspaceId
End Property
Public Sub RunWorkspace()

    Dim cRunSeq As cSequence

    On Error GoTo RunWorkspaceErr

    ' Call a procedure to load the module-
level structures
    ' with all the step and parameter data for
the run
    If LoadRunData = False Then
        ' Error handled by the function already
        Exit Sub
    End If

    ' Retrieve the next run identifier using the
sequence class
    Set cRunSeq = New cSequence
    Set cRunSeq.IdDatabase = dbsAttTool
    cRunSeq.IdentifierColumn = "run_id"
    mlngRunId = cRunSeq.Identifier
    Set cRunSeq = Nothing

    Call
mcRunParams.InitBuiltInsForRun(mlngWor
kpaceId, mlngRunId)

    Set mcRun.Constraints =
mcRunConstraints
    mcRun.WspPreExecution =
mcvntWspPreCons
    mcRun.WspPostExecution =
mcvntWspPostCons

    Set mcRun.Steps = mcRunSteps
    Set mcRun.Parameters = mcRunParams
    Set mcRun.RunConnections =
mcRunConnections
    Set mcRun.RunConnDtls =
mcRunConnDtls

    mcRun.WspId = mlngWorkspaceId
    mcRun.RootKey =
LabelStep(mlngWorkspaceId)
    mcRun.RunId = mlngRunId
    mcRun.CreateInputFiles =
CreateInputFiles

    mcRun.Run

    Exit Sub

RunWorkspaceErr:
    ' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)

End Sub
Public Property Get LoadDb() As Database

    Set LoadDb = mdbLoadDb

End Property
Public Property Set LoadDb(vdata As
Database)

    Set mdbLoadDb = vdata

```

```

End Property
Private Function LoadRunData() As Boolean

    ' Loads the step, parameter and constraint
arrays
    ' with all the data for the workspace. Returns
False
    ' if a failure occurs

    Dim strWorkspaceName As String
    Dim recWspSteps As Recordset
    Dim qySteps As DAO.QueryDef
    Dim recWspParams As Recordset
    Dim qyParams As DAO.QueryDef
    Dim recWspConns As Recordset
    Dim qyConns As DAO.QueryDef
    Dim recWspConnDtls As Recordset
    Dim qyConnDtls As DAO.QueryDef

    On Error GoTo LoadRunDataErr

    Set mcRunSteps.StepDB = mdbLoadDb
    Set mcRunParams.ParamDatabase =
mdbLoadDb
    Set mcRunConstraints.ConstraintDB =
mdbLoadDb
    Set mcRunConnections.ConnDb =
mdbLoadDb
    Set mcRunConnDtls.ConnDb =
mdbLoadDb

    ' Read all the step and parameter data for the
workspace
    Call
ReadWorkspaceData(mlngWorkspaceId,
mcRunSteps, _
                mcRunParams, mcRunConstraints,
mcRunConnections, mcRunConnDtls, _
                recWspSteps, qySteps, recWspParams,
qyParams, recWspConns, qyConns, _
                recWspConnDtls, qyConnDtls)

    ' Load all the pre- and post-execution
constraints that
    ' have been defined for the workspace
    mcvntWspPreCons =
mcRunConstraints.ConstraintsForWsp( _
        mlngWorkspaceId, _
        gintPreStep, _
        blnSort:=True, _
        blnGlobalConstraintsOnly:=True)
    mcvntWspPostCons =
mcRunConstraints.ConstraintsForWsp( _
        mlngWorkspaceId, _
        gintPostStep, _
        blnSort:=True, _
        blnGlobalConstraintsOnly:=True)

    On Error Resume Next
    recWspSteps.Close
    qySteps.Close
    recWspParams.Close
    qyParams.Close
    recWspConns.Close
    qyConns.Close

    LoadRunData = True

    Exit Function

LoadRunDataErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    ShowError errLoadRunDataFailed
    LoadRunData = False

```

```

End Function
Public Sub StopRun()

    On Error GoTo StopRunErr

    If mcRun Is Nothing Then
        ' We haven't been the run yet, so do nothing
        Else
            mcRun.StopRun
        End If

    Exit Sub

StopRunErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    ' Errors would have been displayed by the called
process

End Sub
Public Sub AbortRun()

    On Error GoTo AbortRunErr

    If mcRun Is Nothing Then
        ' We haven't been the run yet, so do nothing
        Else
            mcRun.Abort
        End If

    Exit Sub

AbortRunErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    ' Errors would have been displayed by the called
process

End Sub

Private Sub Class_Initialize()

    ' Create instances of the step, parameter and
constraint arrays
    Set mcRunSteps = New cArrSteps
    Set mcRunParams = New cArrParameters
    Set mcRunConstraints = New cArrConstraints
    Set mcRunConnections = New cConnections
    Set mcRunConnDtls = New cConnDtls
    Set mcRun = New cRunInst
    Set mField = New cStringSM

End Sub
Private Sub Class_Terminate()

    On Error GoTo UnLoadRunDataErr

    ' Clears the step, parameter and constraint arrays
    Set mcRunSteps = Nothing
    Set mcRunParams = Nothing
    Set mcRunConstraints = Nothing
    Set mcRunConnections = Nothing
    Set mcRunConnDtls = Nothing

    Set mcRun = Nothing
    Set mdbLoadDb = Nothing
    Set mField = Nothing

    Exit Sub

UnLoadRunDataErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    ' Not a critical error - continue

```

```

Resume Next
End Sub

Private Sub
mcRun_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

RaiseEvent
ProcessComplete(cStepRecord,
dtmEndTime, lngInstanceId)
Call
ProcessCompleteProcessing(cStepRecord,
dtmEndTime, lngInstanceId, lElapsed)

End Sub

Private Sub
mcRun_ProcessStart(cStepRecord As cStep,
_
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long, _
lParentInstanceId As Long, sltValue As
String)

RaiseEvent ProcessStart(cStepRecord,
strCommand, dtmStartTime, lngInstanceId)
Call ProcessStartProcessing(cStepRecord,
strCommand, dtmStartTime, lngInstanceId,
_
lParentInstanceId, sltValue)

End Sub

Private Sub
mcRun_RunComplete(dtmEndTime As
Currency)

Debug.Print "Run ended at: " &
CStr(dtmEndTime)
Call
RunCompleteProcessing(dtmEndTime)

RaiseEvent RunComplete(dtmEndTime)

End Sub

Private Sub mcRun_RunStart(dtmStartTime
As Currency, strWspLog As String)

RaiseEvent RunStart(dtmStartTime,
strWspLog, mlngRunId)
Debug.Print "Run started at: " &
CStr(dtmStartTime)

Call RunStartProcessing(dtmStartTime)

End Sub

Private Sub
mcRun_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

RaiseEvent StepComplete(cStepRecord,
dtmEndTime, lngInstanceId)
' BugMessage "Step: " &
cStepRecord.StepLabel & " has completed!"

Call
StepCompleteProcessing(cStepRecord,
dtmEndTime, lngInstanceId, lElapsed)

End Sub

```

```

Private Sub mcRun_StepStart(cStepRecord As
cStep, dtmStartTime As Currency, _
lngInstanceId As Long, lParentInstanceId
As Long, sPath As String, slts As String,
sltValue As String)

RaiseEvent StepStart(cStepRecord,
dtmStartTime, lngInstanceId, sPath, slts)
"bugmessage "Step: " &
cStepRecord.StepLabel & " has started."

Call StepStartProcessing(cStepRecord,
dtmStartTime, lngInstanceId,
lParentInstanceId, sltValue)

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cSequence"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cSequence.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This class uses the
att_identifiers table to generate unique
identifiers.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Private mlngIdentifier As Long
Private mstrIdentifierColumn As String
Private mreIdentifiers As Recordset
Private mddbDatabase As Database

Private Const mstrEmptyString = ""

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cSequence."

Private Sub CreateIdRecord()
' Creates a record with all identifiers having
an initial value of 1

Dim sSql As String
Dim pld As DAO.Parameter
Dim qryId As DAO.QueryDef

sSql = "insert into att_identifiers (" & _
" workspace_id, parameter_id, step_id,
" & _
" constraint_id, run_id, connection_id "
& _
", " & FLD_ID_CONN_NAME & _
") values (" & _
"[w_id], [p_id], [s_id], [c_id], [r_id],
[conn_id], [conn_dtl_id] )"
Set qryId =
mddbDatabase.CreateQueryDef(gstrEmptyStri
ng, sSql)
For Each pld In qryId.Parameters

```

```

pld.Value = glMinId
Next pld
qryId.Execute dbFailOnError
qryId.Close

End Sub

Private Sub CreateIdRecordset()

Dim strSql As String

' Initialize the recordset with all identifiers
strSql = "select * from att_identifiers"
Set mreIdentifiers =
mddbDatabase.OpenRecordset(strSql,
dbOpenForwardOnly)

If mreIdentifiers.RecordCount = 0 Then
CreateIdRecord
Set mreIdentifiers =
mddbDatabase.OpenRecordset(strSql,
dbOpenForwardOnly)
End If

BugAssert mreIdentifiers.RecordCount <> 0

End Sub

Public Property Set IdDatabase(vdata As Database)

Set mddbDatabase = vdata

End Property

Public Property Let IdentifierColumn(vdata As
String)

Dim intIndex As Integer

On Error GoTo IdentifierColumnErr

' Initialize the return value to an empty string
mstrIdentifierColumn = mstrEmptyString
Call CreateIdRecordset

For intIndex = 0 To mreIdentifiers.Fields.Count
- 1

If
LCASE(Trim(mreIdentifiers.Fields(intIndex).Name
)) = _
LCASE(Trim(vdata)) Then

' Valid column name
mstrIdentifierColumn = vdata
Exit Property

End If

Next intIndex

BugAssert True, "Invalid column name!"

Exit Property

IdentifierColumnErr:
LogErrors Errors
mstrSource = mstrModuleName &
"IdentifierColumn"
On Error GoTo 0
Err.Raise vbObjectError +
errIdentifierColumnFailed, _
mstrSource, _
LoadResString(errIdentifierColumnFailed)

End Property

Public Property Get Identifier() As Long

```

```

Dim strSql As String

On Error GoTo GetIdentifierErr

BugAssert mstrIdentifierColumn <>
mstrEmptyString

' Increment the identifier column by 1
strSql = "update att_identifiers " & _
" set " & mstrIdentifierColumn & _
" = " & mstrIdentifierColumn & " + 1"
mdbsDatabase.Execute strSql,
dbFailOnError

' Refresh the recordset with identifier
values
Call CreateIdRecordset

mIngIdentifier =
mrecIdentifiers.Fields(mstrIdentifierColumn
).Value

Identifier = mIngIdentifier

Exit Property

GetIdentifierErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Identifier"
On Error GoTo 0
Err.Raise vbObjectError +
errGetIdentifierFailed, _
mstrSource, _

LoadResString(errGetIdentifierFailed)

End Property
Private Sub Class_Terminate()

mrecIdentifiers.Close

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cStack"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cStack.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This class implements a
stack of objects.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cStack."
Private mstrSource As String

Private mcVector As cVector
Private mIngCount As Long

```

```

Public Property Get Item(ByVal Position As
Long) As Object
Attribute Item.VB_UserMemId = 0

Set Item = mcVector(Position)

End Property

Public Sub Push(objToPush As Object)

mcVector.Add objToPush

End Sub
Public Sub Clear()

mcVector.Clear

End Sub

Public Function Pop() As Object

If mcVector.Count > 0 Then
Set Pop =
mcVector.Delete(mcVector.Count - 1)
Else
Set Pop = Nothing
End If

End Function
Public Function Count() As Long

Count = mcVector.Count

End Function

Private Sub Class_Initialize()

Set mcVector = New cVector

End Sub

Private Sub Class_Terminate()

Set mcVector = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY =
"SaveWithClassBuilder", "Yes"
Attribute VB_Ext_KEY = "Top_Level", "Yes"
' FILE: cStep.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Encapsulates the properties
and methods of a step.
' Contains functions to insert, update
and delete
' att_steps records from the database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

```

```

Option Explicit

' Local variable(s) to hold property value(s)
Private mIngStepId As Long
Private mstrVersionNo As String
Private mstrStepLabel As String
Private mstrStepTextFile As String
Private mstrStepText As String
Private mstrStartDir As String
Private mIngWorkspaceId As Integer
Private mIngParentStepId As Integer
Private mstrParentVersionNo As String
Private mintSequenceNo As Integer
Private mintStepLevel As Integer
Private mblnEnabledFlag As Boolean
Private mstrDegreeParallelism As String
Private mintExecutionMechanism As Integer
Private mstrFailureDetails As String
Private mintContinuationCriteria As Integer
Private mblnGlobalFlag As Boolean
Private mblnArchivedFlag As Boolean
Private mstrOutputFile As String
'Private mstrLogFile As String
Private mstrErrorFile As String
Private mdbsDatabase As Database
Private mintStepType As Integer
Private mintOperation As Operation
Private mIngPosition As Long
Private mstrIteratorName As String
Private mcIterators As cNodeCollections
Private mblsNewVersion As Boolean
Private msOldVersion As String

' The following constants are used throughout the
project to
' indicate the different options selected by the user
' The options are presented to the user as control
arrays of
' option buttons. These constants have to be in sync
with the
' indexes of the option buttons.
' All the control arrays have an lbound of 1. The
value 0 is
' used to indicate that the property being represented
by the
' control array is not valid for the step
' Public enums are used since we cannot expose
public constants
' in class modules. gintNoOption is applicable to all
enums,
' but declared in the Execution method enum, since
we cannot
' declare it more than once.

' Is here as a comment
' Has been defined in public.bas with the other
object types
Public Enum gintStepType
' gintGlobalStep = 3
' gintManagerStep
' gintWorkerStep
End Enum

' Execution Method options
Public Enum ExecutionMethod
gintNoOption = 0
gintExecuteODBC
gintExecuteShell
End Enum

' Failure criteria options
Public Enum FailureCriteria
gintFailureODBC = 1
gintFailureTextCompare

```

```

End Enum

' Continuation criteria options
' Note: Update the initialization of
gsContCriteria in Initialize() if the
' continuation criteria are modified
Public Enum ContinuationCriteria
gintOnFailureAbort = 1
gintOnFailureContinue
gintOnFailureCompleteSiblings
gintOnFailureAbortSiblings
gintOnFailureSkipSiblings
gintOnFailureAsk
End Enum

' The initial version #
Private Const mstrMinVersion As String =
"0.0"

' End of constants for option button control
arrays
' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cStep."

' The cSequence class is used to generate
unique step identifiers
Private mStepSeq As cSequence

' The StringSM class is used to carry out
string operations
Private mFieldValue As cStringSM
Private Sub NewVersion()

mblsNewVersion = True
msOldVersion = mstrVersionNo

End Sub
Public Function IsNewVersion() As Boolean
IsNewVersion = mblsNewVersion
End Function

Public Function OldVersionNo() As String
OldVersionNo = msOldVersion
End Function

Public Sub SaveIterators()
' This procedure checks if any changes
have been made
' to the iterators for the step. If so, it calls
the
' methods of the iterator class to commit
the changes
Dim cItRec As cIterator
Dim lngIndex As Long

On Error GoTo SaveIteratorsErr

For lngIndex = 0 To mcIterators.Count - 1
Set cItRec = mcIterators(lngIndex)

Select Case cItRec.IndOperation
Case QueryOp
' No changes were made to the
queried Step.
' Do nothing

Case InsertOp
cItRec.Add mlngStepId,
mstrVersionNo
cItRec.IndOperation = QueryOp

```

```

Case UpdateOp
cItRec.Update mlngStepId,
mstrVersionNo
cItRec.IndOperation = QueryOp

Case DeleteOp
cItRec.Delete mlngStepId,
mstrVersionNo
' Remove the record from the
collection
mcIterators.Delete lngIndex

End Select
Next lngIndex

Exit Sub

SaveIteratorsErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Save Iterators"
On Error GoTo 0
Err.Raise vbObjectError + errSaveFailed, _
mstrSource, _
LoadResString(errSaveFailed)

End Sub
Public Property Get IndOperation() As
Operation

IndOperation = mintOperation

End Property
Public Property Let IndOperation(ByVal vdata
As Operation)

BugAssert vdata = QueryOp Or vdata =
InsertOp Or vdata = UpdateOp Or vdata =
DeleteOp, "Invalid operation"
mintOperation = vdata

End Property

Public Function Iterators() As Variant
' Returns a variant containing all the iterators
that
' have been defined for the step

Dim cStepIterators() As cIterator
Dim cTempIt As cIterator
Dim lngIndex As Long
Dim lngItCount As Long

On Error GoTo IteratorsErr

lngItCount = 0
For lngIndex = 0 To mcIterators.Count - 1
' Increase the array dimension and add the
constraint
' to it
Set cTempIt = mcIterators(lngIndex)

If cTempIt.IndOperation <> DeleteOp
Then
ReDim Preserve
cStepIterators(lngItCount)
Set cStepIterators(lngItCount) =
cTempIt
lngItCount = lngItCount + 1
End If

Next lngIndex

If lngItCount = 0 Then
Iterators = Empty

```

```

Else
Iterators = cStepIterators()
End If

Call QuickSort(Iterators)

Exit Function

IteratorsErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errIteratorsFailed, _
mstrModuleName & "Iterators", _
LoadResString(errIteratorsFailed)

End Function
Public Function IteratorCount() As Long
' Returns a count of all the iterators for the step

Dim lngItCount As Long
Dim lngIndex As Long
Dim cTempIt As cIterator

On Error GoTo IteratorsErr

lngItCount = 0
For lngIndex = 0 To mcIterators.Count - 1

If mcIterators(lngIndex).IndOperation <>
DeleteOp Then
lngItCount = lngItCount + 1
End If

Next lngIndex

IteratorCount = lngItCount

Exit Function

IteratorsErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errIteratorsFailed, _
mstrSource, _
LoadResString(errIteratorsFailed)

End Function
Public Sub Validate()
' Each distinct object will have a Validate method
which
' will check if the class properties are valid. This
method
' will be used to check interdependant properties
that
' cannot be validated by the let procedures.
' It should be called by the add and modify
methods of the class

' Check if the step label has been specified
If StringEmpty(mstrStepLabel) Then
ShowError errStepLabelMandatory
On Error GoTo 0
Err.Raise vbObjectError + errValidateFailed, _
"Validate",
LoadResString(errValidateFailed)
End If

If Not IsStringEmpty(mstrStepText) And Not
IsStringEmpty(mstrStepTextFile) Then
ShowError errStepTextOrFile
On Error GoTo 0
Err.Raise vbObjectError + errStepTextOrFile,
-
"Validate",
LoadResString(errStepTextOrFile)

```

```

End If
End Sub

Public Function IncVersionY() As String
    ' The version number for a step is stored
    in the x,y
    ' format where x is the parent component
    and y is the
    ' child component of the step. This
    function will increment
    ' the y component of the step by 1

    On Error GoTo IncVersionYErr

    ' Store the old version number for the step
    Call NewVersion

    mstrVersionNo =
    Trim$(Str$(GetX(mstrVersionNo))) &
    gstrVerSeparator & _
    Trim$(Str$(GetY(mstrVersionNo) +
    1))
    IncVersionY = mstrVersionNo

    Exit Function

IncVersionYErr:
    ' Log the error code raised by Visual
    Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
    "IncVersionY"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errIncVersionYFailed, _
    gstrSource, _

LoadResString(errIncVersionYFailed)

End Function

Public Function IncVersionX() As String
    ' The version number for a step is stored
    in the x,y
    ' format where x is the parent component
    and y is the
    ' child component of the step. This
    function will increment
    ' the y component of the step by 1 and
    reset the x component
    ' to 0

    On Error GoTo IncVersionXErr

    ' Store the old version number for the step
    Call NewVersion

    mstrVersionNo =
    Trim$(Str$(GetX(mstrVersionNo) + 1)) &
    gstrVerSeparator & "0"
    IncVersionX = mstrVersionNo

    Exit Function

IncVersionXErr:
    ' Log the error code raised by Visual
    Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
    "IncVersionX"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errIncVersionXFailed, _
    gstrSource, _

```

```

LoadResString(errIncVersionXFailed)

End Function

Private Function GetY(strVersion As String)
    As Long
    ' The version number for a step is stored in
    the x,y
    ' format where x is the parent component and
    y is the
    ' child component of the step. Given an
    argument of type
    ' x,y, it returns y

    ' Truncate the fractional part to get the parent
    component
    ' of the version number (x,y)
    GetY = Val(Mid(strVersion,
    InStr(strVersion, gstrVerSeparator) + 1))

End Function

Private Function GetX(strVersion As String)
    As Long
    ' The version number for a step is stored in
    the x,y
    ' format where x is the parent component and
    y is the
    ' child component of the step. Given an
    argument of type
    ' x,y, it returns x

    ' Truncate the fractional part to get the parent
    component
    ' of the version number (x,y)
    GetX = Val(Left(strVersion,
    InStr(strVersion, gstrVerSeparator) - 1))

End Function

Public Function Clone(Optional cCloneStep As
    cStep) As cStep

    ' Creates a copy of a given step

    Dim lngIndex As Long
    Dim cltRec As cIterator
    Dim cltClone As cIterator

    On Error GoTo CloneErr

    If cCloneStep Is Nothing Then
        Set cCloneStep = New cStep
    End If

    ' Copy all the step properties to the newly
    created step
    ' Initialize the global flag first since
    subsequent
    ' validations might depend on it
    cCloneStep.GlobalFlag = mblnGlobalFlag
    ' cCloneStep.GlobalRunMethod =
    mintGlobalRunMethod

    cCloneStep.StepType = mintStepType
    cCloneStep.StepId = mlngStepId
    cCloneStep.VersionNo = mstrVersionNo
    cCloneStep.StepLabel = mstrStepLabel
    cCloneStep.StepTextFile = mstrStepTextFile
    cCloneStep.StepText = mstrStepText
    cCloneStep.StartDir = mstrStartDir
    cCloneStep.WorkspaceId =
    mlngWorkspaceId
    cCloneStep.ParentStepId =
    mlngParentStepId

```

```

cCloneStep.ParentVersionNo =
mstrParentVersionNo
cCloneStep.StepLevel = mintStepLevel
cCloneStep.SequenceNo = mintSequenceNo
cCloneStep.EnabledFlag = mblnEnabledFlag
cCloneStep.DegreeParallelism =
mstrDegreeParallelism
cCloneStep.ExecutionMechanism =
mintExecutionMechanism
cCloneStep.FailureDetails = mstrFailureDetails
cCloneStep.ContinuationCriteria =
mintContinuationCriteria
cCloneStep.ArchivedFlag = mblnArchivedFlag
cCloneStep.OutputFile = mstrOutputFile
' cCloneStep.LogFile = mstrLogFile
cCloneStep.ErrorFile = mstrErrorFile
cCloneStep.IteratorName = mstrIteratorName

cCloneStep.IndOperation = mintOperation
cCloneStep.Position = mlngPosition

Set cCloneStep.NodeDB = mdbDatabase

' Clone all the iterators for the step
For lngIndex = 0 To mclIterators.Count - 1
    Set cltRec = mclIterators(lngIndex)
    Set cltClone = cltRec.Clone
    cCloneStep.LoadIterator cltClone
Next lngIndex

' And set the return value to the newly created
step
Set Clone = cCloneStep

Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, _
    mstrSource, LoadResString(errCloneFailed)

End Function
'End Sub
'

Public Property Let OutputFile(ByVal vdata As
    String)

    mstrOutputFile = vdata

End Property

Public Property Get OutputFile() As String

    OutputFile = mstrOutputFile

End Property

'Public Property Let LogFile(ByVal vdata As
    String)
'
'    mstrLogFile = vdata
'

End Property

'Public Property Get LogFile() As String
'
'    LogFile = mstrLogFile
'

End Property

Public Property Let ErrorFile(ByVal vdata As
    String)

```



```

mstrErrorFile = vdata
End Property
Public Property Let IteratorName(ByVal
vdata As String)

    mstrIteratorName = vdata
End Property

Public Property Get ErrorFile() As String

    ErrorFile = mstrErrorFile
End Property
Public Property Get IteratorName() As
String

    IteratorName = mstrIteratorName
End Property

Public Property Set NodeDB(vdata As
Database)

    Set mdbsDatabase = vdata
    Set mcIterators.NodeDB = vdata
End Property
Public Property Get NodeDB() As Database

    Set NodeDB = mdbsDatabase
End Property

Private Function IsStringEmpty(strToCheck
As String) As Boolean

    IsStringEmpty = (strToCheck =
gstrEmptyString)
End Function

Public Property Let EnabledFlag(ByVal
vdata As Boolean)

    ' The enabled flag must be False for all
global steps.
    ' This check must be made by the global
step class. Only
    ' generic step validations will be carried
out by this
    ' class
    mblnEnabledFlag = vdata
End Property

Public Property Let GlobalFlag(ByVal vdata
As Boolean)

    mblnGlobalFlag = vdata
End Property
Public Property Get EnabledFlag() As
Boolean

    EnabledFlag = mblnEnabledFlag
End Property

Public Property Let ArchivedFlag(ByVal
vdata As Boolean)

    mblnArchivedFlag = vdata

```

```

End Property

Public Property Get ArchivedFlag() As
Boolean

    ArchivedFlag = mblnArchivedFlag
End Property

Public Property Get GlobalFlag() As Boolean

    GlobalFlag = mblnGlobalFlag
End Property

Public Sub Add()
    ' Inserts a step record into the database - it
initializes
    ' the necessary properties for the step and
calls InsertStepRec
    ' to do the database work

    On Error GoTo AddErr

    ' A new record would have the deleted_flag
turned off!
    mblnArchivedFlag = False

    Call InsertStepRec

    ' If a new version of a step has been created,
reset the old version info, since
    ' it's already been saved to the db
    If IsNewVersion() Then
        mblnNewVersion = False
        msOldVersion = gstrEmptyString
    End If

    Exit Sub

AddErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError +
errAddStepFailed, _
        mstrModuleName & "Add",
LoadResString(errAddStepFailed)
End Sub

Private Sub InsertStepRec()
    ' Inserts a step record into the database
    ' It first generates the insert statement using
the different
    ' step properties and then executes it

    Dim strInsert As String
    Dim qy As DAO.QueryDef

    On Error GoTo InsertStepRecErr

    ' First check if the database object is valid
    Call CheckDB

    ' Check if the step record is valid
    Call Validate

    If IsNewVersion() Then
        Call UpdOldVersionsArchFlg
    End If

    ' Create a temporary querydef object
    strInsert = "insert into att_steps " & _
        "( workspace_id, step_id, version_no, " & _
        " step_label, step_file_name, step_text,
start_directory, " & _

```

```

    parent_step_id, parent_version_no,
sequence_no, " & _
    " enabled_flag, step_level, " & _
    " degree_parallelism, execution_mechanism, "
& _
    " failure_details, " & _
    " continuation_criteria, global_flag, " & _
    " archived_flag, " & _
    " output_file_name, error_file_name, " & _
    " iterator_name ) values ( "

    ' log_file_name,

    #If USE_JET Then

        strInsert = strInsert & " [w_id], [s_id], [ver_no], "
& _
        " [s_label], [s_file_name], [s_text],
[s_start_dir], " & _
        " [p_step_id], [p_version_no], [seq_no], " & _
        " [enabled], [s_level], [deg_parallelism], " & _
        " [exec_mechanism], [fail_dtls], " & _
        " [cont_criteria], [global], [archived], " & _
        " [output_file], [error_file], " & _
        " [it_name] )"

        ' [log_file],

        Set qy =
mdbsDatabase.CreateQueryDef(gstrEmptyString,
strInsert)

        ' Call a procedure to execute the Querydef object
        Call AssignParameters(qy)

        qy.Execute dbFailOnError
        qy.Close
    #Else

        strInsert = strInsert & Str(mlngWorkspaceId)
& ", " & Str(mlngStepId) & _
        ", " &
mFieldValue.MakeStringFieldValid(mstrVersionNo
)

        ' For fields that may be null, call a function to
determine
        ' the string to be appended to the insert statement
        strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStepLabel)
        strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStepTextFile)
        strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStepText)
        strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStartDir)

        strInsert = strInsert & ", " &
Str(mlngParentStepId) & _
        ", " &
mFieldValue.MakeStringFieldValid(mstrParentVer
sionNo) & _
        ", " & Str(mintSequenceNo) & _
        ", " & Str(mblnEnabledFlag) & ", " &
Str(mintStepLevel)

        strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrDegreePar
allelism)
        strInsert = strInsert & ", " &
Str(mintExecutionMechanism)

```

```

strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrFailureDetails) & _
", " & Str(mintContinuationCriteria) &
-
", " & Str(mblnGlobalFlag) & _
", " & Str(mblnArchivedFlag)

strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrOutputFile)
' strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrLogFile)
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrErrorFile)
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrIteratorName)

strInsert = strInsert & ") "

BugMessage strInsert
mdbsDatabase.Execute strInsert,
dbFailOnError

#End If

Exit Sub

InsertStepRecErr:
mstrSource = mstrModuleName &
"InsertStepRec"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errInsertStepFailed, _
mstrSource,
LoadResString(errInsertStepFailed)
End Sub
Private Sub UpdOldVersionsArchFlg()
' Updates the archived flag on all old
version for the step to True

Dim sUpdate As String
Dim qy As DAO.QueryDef

On Error GoTo
UpdOldVersionsArchFlgErr
mstrSource = mstrModuleName &
"UpdOldVersionsArchFlg"

#If USE_JET Then

sUpdate = "update att_steps " & _
" set archived_flag = True "

' Append the Where clause
sUpdate = sUpdate & " where step_id =
[s_id] " & _
" and version_no <> [ver_no]"

Set qy =
mdbsDatabase.CreateQueryDef(gstrEmptyString, sUpdate)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy)
qy.Execute dbFailOnError

If qy.RecordsAffected = 0 Then
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errModifyStepFailed, _
mstrSource,
LoadResString(errModifyStepFailed)
End If

qy.Close

#Else

sUpdate = "update att_steps " & _
" set archived_flag = True "

sUpdate = sUpdate & " where step_id = " &
Str(mlngStepId) & _
" and version_no <> " &
mFieldValue.MakeStringFieldValid(mstrVersionNo)

BugMessage sUpdate
mdbsDatabase.Execute sUpdate,
dbFailOnError
#End If

Exit Sub

UpdOldVersionsArchFlgErr:
mstrSource = mstrModuleName &
"UpdOldVersionsArchFlg"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errModifyStepFailed, _
mstrSource,
LoadResString(errModifyStepFailed)
End Sub
Public Sub InsertIterator(cItRecord As
cIterator)
' Inserts the iterator record into the database

Call cItRecord.Add(mlngStepId,
mstrVersionNo)

End Sub
Public Sub UpdateIterator(cItRecord As
cIterator)
' Updates the iterator record in the database

Call cItRecord.Update(mlngStepId,
mstrVersionNo)

End Sub
Public Sub UpdateIteratorVersion()
' Updates the iterator record in the database

Dim lngIndex As Long
Dim cTempIt As cIterator

On Error GoTo UpdateIteratorVersionErr

For lngIndex = 0 To mcIterators.Count - 1
' Increase the array dimension and add the
constraint
' to it
Set cTempIt = mcIterators(lngIndex)

If cTempIt.IndOperation <> DeleteOp
Then
' Set the operation to indicate an insert
cTempIt.IndOperation = InsertOp
End If

Next lngIndex

Exit Sub

```

```

UpdateIteratorVersionErr:
mstrSource = mstrModuleName &
"UpdateIteratorVersion"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errUpdateFailed, _
mstrSource,
LoadResString(errUpdateFailed)

End Sub
Public Sub AddIterator(cItRecord As cIterator)
' Adds the iterator record to the collection of
iterators
' for the step

Call mcIterators.Add(cItRecord)

End Sub
Public Sub AddAllIterators()
' Sets the indicator variable for all iterators to
insert

Dim lngIndex As Long

For lngIndex = 0 To mcIterators.Count - 1
mcIterators(lngIndex).Validate
mcIterators(lngIndex).IndOperation = InsertOp
Next lngIndex

End Sub

Public Sub LoadIterator(cItRecord As cIterator)
' Adds the iterator record to the collection of
iterators
' for the step

Call mcIterators.Load(cItRecord)

End Sub
Public Sub UnloadIterators()
' Unloads all iterator records for the step

Dim lngIndex As Long

For lngIndex = mcIterators.Count - 1 To 0 Step -
1
' Calls the collection method to unload the
node
' from the array
mcIterators.Unload lngIndex
Next lngIndex

End Sub
Public Sub ModifyIterator(cItRecord As cIterator)
' Modifies the iterator record in the collection

Call mcIterators.Modify(cItRecord)

End Sub
Public Sub DeleteIterator(cItRecord As cIterator)
' Deletes the iterator record from the database

Call cItRecord.Delete(mlngStepId,
mstrVersionNo)

End Sub
Public Sub RemoveIterator(cItRecord As cIterator)
' Marks the iterator record in the collection to
' indicate a delete

Call mcIterators.Delete(cItRecord.Position)

End Sub

```

```

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
' Assigns values to the parameters in the
querydef object
' The parameter names are cryptic to make
them different
' from the actual field names. When the
parameter names
' are the same as the field names,
parameters in the
' where clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

For Each prmParam In
qyExec.Parameters
Select Case prmParam.Name
Case "[w_id]"
prmParam.Value =
mlngWorkspaceId
Case "[s_id]"
prmParam.Value = mlngStepId
Case "[ver_no]"
prmParam.Value =
mstrVersionNo
Case "[s_label]"
prmParam.Value = mstrStepLabel
Case "[s_file_name]"
prmParam.Value =
mstrStepTextFile
Case "[s_text]"
prmParam.Value = mstrStepText
Case "[s_start_dir]"
prmParam.Value = mstrStartDir
Case "[p_step_id]"
prmParam.Value =
mlngParentStepId
Case "[p_version_no]"
prmParam.Value =
mstrParentVersionNo
Case "[seq_no]"
prmParam.Value =
mintSequenceNo
Case "[enabled]"
prmParam.Value =
mblnEnabledFlag
Case "[s_level]"
prmParam.Value = mintStepLevel
Case "[deg_parallelism]"
prmParam.Value =
mstrDegreeParallelism
Case "[exec_mechanism]"
prmParam.Value =
mintExecutionMechanism
Case "[fail_dtls]"
prmParam.Value =
mstrFailureDetails
Case "[cont_criteria]"
prmParam.Value =
mintContinuationCriteria
Case "[global]"
prmParam.Value =
mblnGlobalFlag
Case "[archived]"
prmParam.Value =
mblnArchivedFlag
Case "[output_file]"
prmParam.Value = mstrOutputFile
' Case "[log_file]"
' prmParam.Value = mstrLogFile

```

```

Case "[error_file]"
prmParam.Value = mstrErrorFile
Case "[it_name]"
prmParam.Value = mstrIteratorName
Case Else
' Write the parameter name that is
faulty
WriteError errInvalidParameter,
mstrSource, _
prmParam.Name
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource, _

LoadResString(errInvalidParameter)
End Select
Next prmParam

If qyExec.Parameters("s_id") = 0 Or
StringEmpty(qyExec.Parameters("ver_no"))
Then
WriteError errInvalidParameter,
mstrSource
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource,
LoadResString(errInvalidParameter)
End If

Exit Sub

AssignParametersErr:
mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrSource,
LoadResString(errAssignParametersFailed)

End Sub

Public Sub Modify()

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo ModifyErr
mstrSource = mstrModuleName & "Modify"

' Check if the database object is valid
Call CheckDB

' Check if the step record is valid
Call Validate

' The step_id and version_no will never be
updated -
' whenever a step is modified a copy of the
old step will
' be created with an incremented version_no

#if USE_JET Then

strUpdate = "update att_steps " & _
" set step_label = [s_label] " & _
", step_file_name = [s_file_name] " & _
", step_text = [s_text] " & _
", start_directory = [s_start_dir] " & _
", workspace_id = [w_id] " & _
", parent_step_id = [p_step_id] " & _
", parent_version_no = [p_version_no] "
& _

```

```

", sequence_no = [seq_no] " & _
", step_level = [s_level] " & _
", enabled_flag = [enabled] " & _
", degree_parallelism = [deg_parallelism] " &
_
", execution_mechanism = [exec_mechanism]
" & _
", failure_details = [fail_dtls] " & _
", continuation_criteria = [cont_criteria] " & _
", global_flag = [global] " & _
", archived_flag = [archived] " & _
", output_file_name = [output_file] " & _
", error_file_name = [error_file] " & _
", iterator_name = [it_name] "

' ", log_file_name = [log_file] " & _

' Append the Where clause
strUpdate = strUpdate & " where step_id = [s_id]
" & _
" and version_no = [ver_no]"

Set qy =
mdbDatabase.CreateQueryDef(gstrEmptyString,
strUpdate)

' Call a procedure to execute the Querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError

If qy.RecordsAffected = 0 Then
On Error GoTo 0
Err.Raise vbObjectError +
errModifyStepFailed, _
mstrSource,
LoadResString(errModifyStepFailed)
End If

qy.Close

#Else

strUpdate = "update att_steps " & _
" set step_label = "

' For fields that may be null, call a function to
determine
' the string to be appended to the update statement
strUpdate = strUpdate &
mFieldValue.MakeStringFieldValid(mstrStepLabel)

strUpdate = strUpdate & ", step_file_name = " &
mFieldValue.MakeStringFieldValid(mstrStepTextF
ile)
strUpdate = strUpdate & ", step_text = " &
mFieldValue.MakeStringFieldValid(mstrStepText)
strUpdate = strUpdate & ", start_directory = " &
mFieldValue.MakeStringFieldValid(mstrStartDir)

strUpdate = strUpdate & ", workspace_id = " &
Str(mlngWorkspaceId) & _
", parent_step_id = " & Str(mlngParentStepId)
& _
", parent_version_no = " &
mFieldValue.MakeStringFieldValid(mstrParentVer
sionNo) & _
", sequence_no = " & Str(mintSequenceNo) &
_
", step_level = " & Str(mintStepLevel) & _
", enabled_flag = " & Str(mblnEnabledFlag)
& _
", degree_parallelism = " &
mFieldValue.MakeStringFieldValid(mstrDegreePar
allelism) & _

```

```

    ", execution_mechanism = " &
Str(mintExecutionMechanism) & _
    ", failure_details = " &
mFieldValue.MakeStringFieldValid(mstrFailureDetails) & _
    ", continuation_criteria = " &
Str(mintContinuationCriteria) & _
    ", global_flag = " &
Str(mblnGlobalFlag) & _
    ", archived_flag = " &
Str(mblnArchivedFlag) & _
    ", output_file_name = " &
mFieldValue.MakeStringFieldValid(mstrOutputFile) & _
    ", error_file_name = " &
mFieldValue.MakeStringFieldValid(mstrErrorFile) & _
    ", iterator_name = " &
mFieldValue.MakeStringFieldValid(mstrIteratorName)

'    ", log_file_name = " &
mFieldValue.MakeStringFieldValid(mstrLogFile) & _

    strUpdate = strUpdate & " where step_id
= " & Str(mlngStepId) & _
    " and version_no = " &
mFieldValue.MakeStringFieldValid(mstrVersionNo)

    BugMessage strUpdate
mdbsDatabase.Execute strUpdate,
dbFailOnError
#End If

Exit Sub

ModifyErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Modify"
On Error GoTo 0
Err.Raise vbObjectError +
errModifyStepFailed, _
    mstrSource,
LoadResString(errModifyStepFailed)
End Sub
Private Sub CheckDB()
' Check if the database object has been
initialized

If mdbsDatabase Is Nothing Then
ShowError errInvalidDB
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidDB, _
    mstrModuleName,
LoadResString(errInvalidDB)
End If

End Sub

Public Sub Delete()

Dim strDelete As String
Dim qy As DAO.QueryDef

On Error GoTo DeleteErr

Call CheckDB

strDelete = "delete from att_steps " & _
    " where step_id = [s_id] " & _
    " and version_no = [ver_no] "

```

```

' mdbsDatabase.Execute strDelete,
dbFailOnError
Set qy =
mdbsDatabase.CreateQueryDef(gstrEmptyString, strDelete)

Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

Exit Sub

DeleteErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteStepFailed, _
    mstrModuleName & "Delete",
LoadResString(errDeleteStepFailed)
End Sub
Public Property Get DegreeParallelism() As String

DegreeParallelism = mstrDegreeParallelism

End Property
Public Property Get Position() As Long

Position = mlngPosition

End Property

Public Property Let DegreeParallelism(ByVal vdata As String)

' The degree of parallelism must be zero for
all global steps
' This check must be made by the global step
class. Only
' generic step validations will be carried out
by this
' class
mstrDegreeParallelism = vdata

End Property

Public Property Let
ExecutionMechanism(ByVal vdata As
ExecutionMethod)

BugAssert vdata = gintExecuteODBC Or
vdata = gintExecuteShell Or vdata =
gintNoOption, _
    "Execution mechanism invalid"
mintExecutionMechanism = vdata

End Property

Public Property Let FailureDetails(ByVal vdata As String)

mstrFailureDetails = vdata

End Property

Public Property Let SequenceNo(ByVal vdata As Integer)

mintSequenceNo = vdata

End Property

Public Property Let Position(ByVal vdata As Long)

mlngPosition = vdata

End Property

```

```

Public Property Let ParentStepId(ByVal vdata As Long)

mlngParentStepId = vdata

End Property

Public Property Get SequenceNo() As Integer

SequenceNo = mintSequenceNo

End Property

Public Property Get StepLevel() As Integer

StepLevel = mintStepLevel

End Property

Public Property Get ParentVersionNo() As String

ParentVersionNo = mstrParentVersionNo

End Property

Public Property Let ParentVersionNo(ByVal vdata As String)

mstrParentVersionNo = vdata

End Property

Public Property Get ParentStepId() As Long

ParentStepId = mlngParentStepId

End Property

Public Property Let WorkspaceId(ByVal vdata As Long)

mlngWorkspaceId = vdata

End Property

Public Property Let VersionNo(ByVal vdata As String)

' The version number of a step is stored in the x.y
format where
' x represents a change to the step as a result of
modifications
' to any of the step properties
' y represents a change to the step as a result of
modifications
' to the sub-steps associated with it. Hence the y-
component
' of the version will be incremented when a sub-
step is added,
' modified or deleted
' x will be referred to throughout this code as the
parent
' component of the version and y will be referred
to as the
' child component of the version
' The version information for a step is maintained
by the
' calling function

mstrVersionNo = vdata

End Property

Public Property Get StepType() As gintStepType

On Error GoTo StepTypeErr

If mintStepType = 0 Then
' The step type variable has not been initialized
-
If mblnGlobalFlag Then
mintStepType = gintGlobalStep
ElseIf IsStringEmpty(mstrStepText) And _
IsStringEmpty(mstrStepTextFile) Then
mintStepType = gintManagerStep
Else
mintStepType = gintWorkerStep
End If

```

<pre> End If StepType = mintStepType Exit Property StepTypeErr: LogErrors Errors mstrSource = mstrModuleName & "StepType" On Error GoTo 0 Err.Raise vbObjectError + errGetStepTypeFailed, _ mstrSource, _ LoadResString(errGetStepTypeFailed) End Property Public Property Let StepType(vdata As gintStepType) On Error GoTo StepTypeErr Select Case vdata Case gintGlobalStep, gintManagerStep, gintWorkerStep mintStepType = vdata Case Else On Error GoTo 0 Err.Raise vbObjectError + errStepTypeInvalid, _ mstrModuleName & "StepType", LoadResString(errStepTypeInvalid) End Select Exit Property StepTypeErr: LogErrors Errors mstrSource = mstrModuleName & "StepType" On Error GoTo 0 Err.Raise vbObjectError + errLetStepTypeFailed, _ mstrSource, _ LoadResString(errLetStepTypeFailed) End Property Public Property Get WorkspaceId() As Long WorkspaceId = mlngWorkspaceId End Property Public Property Get ContinuationCriteria() As ContinuationCriteria ContinuationCriteria = mintContinuationCriteria End Property Public Property Let ContinuationCriteria(ByVal vdata As ContinuationCriteria) ' The Continuation criteria must be null for all global steps ' and non-null for all manager and worker steps ' These checks will have to be made by the corresponding </pre>	<pre> ' classes - only generic step validations will be made ' by this class BugAssert vdata = gintOnFailureAbortSiblings Or vdata = gintOnFailureCompleteSiblings _ Or vdata = gintOnFailureSkipSiblings Or vdata = gintOnFailureAbort _ Or vdata = gintOnFailureContinue Or vdata = gintOnFailureAsk _ Or vdata = gintNoOption, _ "Invalid continuation criteria" mintContinuationCriteria = vdata End Property Public Property Get ExecutionMechanism() As ExecutionMethod ExecutionMechanism = mintExecutionMechanism End Property Public Property Get FailureDetails() As String FailureDetails = mstrFailureDetails End Property Public Property Let StepText(ByVal vdata As String) ' Has to be null for manager steps ' The check will have to be made by the user interface or ' by the manager step class mstrStepText = vdata End Property Public Property Let StepLevel(ByVal vdata As Integer) ' The step level must be zero for all global steps ' This check must be made in the global step class mintStepLevel = vdata End Property Public Property Get StepText() As String StepText = mstrStepText End Property Public Property Let StepTextFile(ByVal vdata As String) ' Has to be null for manager steps ' The check will have to be made by the user interface and ' by the manager step class mstrStepTextFile = vdata End Property Public Property Get StepTextFile() As String StepTextFile = mstrStepTextFile End Property Public Property Let StepLabel(ByVal vdata As String) ' Cannot be null for manager steps ' But this check cannot be made here since we do not know ' at this point if the step being created is a manager ' or a worker step </pre>	<pre> ' The check will have to be made by the user interface and ' by the manager step class mstrStepLabel = vdata End Property Public Property Get StepLabel() As String StepLabel = mstrStepLabel End Property Public Property Let StartDir(ByVal vdata As String) mstrStartDir = vdata End Property Public Property Get StartDir() As String StartDir = mstrStartDir End Property Public Property Get VersionNo() As String ' The version number of a step is stored in the x.y format where ' x represents a change to the step as a result of modifications ' to any of the step properties ' y represents a change to the step as a result of modifications ' to the sub-steps associated with it. Hence the y- component ' of the version will be incremented when a sub- step is added, ' modified or deleted ' x will be referred to throughout this code as the parent ' component of the version and y will be referred to as the ' child component of the version ' The version information for a step is maintained by the ' calling function VersionNo = mstrVersionNo End Property Public Property Get StepId() As Long StepId = mlngStepId End Property Public Property Get NextStepId() As Long Dim lngNextId As Long On Error GoTo NextStepIdErr ' First check if the database object is valid Call CheckDB ' Retrieve the next identifier using the sequence class Set mStepSeq = New cSequence Set mStepSeq.IdDatabase = mdbDatabase mStepSeq.IdentifierColumn = "step_id" lngNextId = mStepSeq.Identifier Set mStepSeq = Nothing NextStepId = lngNextId Exit Property NextStepIdErr: LogErrors Errors mstrSource = mstrModuleName & "NextStepId" On Error GoTo 0 Err.Raise vbObjectError + errStepIdGetFailed, _ </pre>
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```

    mstrSource,
LoadResString(errStepIdGetFailed)

End Property
Public Property Let StepId(ByVal vdata As Long)

    mlngStepId = vdata

End Property

Private Sub Class_Initialize()

    ' Initialize the operation indicator variable to Query
    ' It will be modified later by the collection class when
    ' inserts, updates or deletes are performed
    mintOperation = QueryOp
    mbIsNewVersion = False
    msOldVersion = gstrEmptyString

    Set mFieldValue = New cStringSM
    Set mcIterators = New cNodeCollections

End Sub

Private Sub Class_Terminate()

    Set mFieldValue = Nothing
    Set mcIterators = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cStepTree"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cStepTree.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:  Implements step navigation functions such as determining
'           the child of a step and so on.
' Contact:  Reshma Tharamal
'           (reshmat@microsoft.com)
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cStepTree."
Private mstrSource As String

Public StepRecords As cArrSteps
Public Property Get HasChild(Optional ByVal StepKey As String, _
    Optional ByVal StepId As Long = 0) As Boolean

    Dim lTemp As Long

    HasChild = False
    StepId = GetStepId(StepKey, StepId)

```

```

    For lTemp = 0 To StepRecords.StepCount - 1
        If StepRecords(lTemp).StepType <> gintGlobalStep And
            StepRecords(lTemp).ParentStepId = StepId Then
            HasChild = True
            Exit For
        End If
    Next lTemp

End Property
Public Property Get ChildStep(Optional ByVal StepKey As String, _
    Optional ByVal StepId As Long = 0) As cStep

    Dim lTemp As Long
    Dim cChildStep As cStep

    Set ChildStep = Nothing
    StepId = GetStepId(StepKey, StepId)

    For lTemp = 0 To StepRecords.StepCount - 1
        If StepRecords(lTemp).StepType <> gintGlobalStep And
            StepRecords(lTemp).ParentStepId = StepId And _
            StepRecords(lTemp).SequenceNo = gintMinSequenceNo Then
            Set ChildStep = StepRecords(lTemp)
            Exit For
        End If
    Next lTemp

End Property
Public Property Get NextStep(Optional ByVal StepKey As String, _
    Optional ByVal StepId As Long = 0) As cStep

    Dim lTemp As Long
    Dim cChildStep As cStep

    Set NextStep = Nothing
    StepId = GetStepId(StepKey, StepId)
    Set cChildStep = StepRecords.QueryStep(StepId)

    For lTemp = 0 To StepRecords.StepCount - 1
        If StepRecords(lTemp).StepType <> gintGlobalStep And _
            StepRecords(lTemp).ParentStepId = cChildStep.ParentStepId And _
            StepRecords(lTemp).SequenceNo = cChildStep.SequenceNo + 1 Then
            Set NextStep = StepRecords(lTemp)
            Exit For
        End If
    Next lTemp

End Property
Private Function GetStepId(Optional ByVal StepKey As String, _
    Optional ByVal StepId As Long = 0) As Long

    If StepId = 0 Then
        If StringEmpty(StepKey) Then
            Err.Raise vbObjectError + errMandatoryParameterMissing, _
                mstrModuleName & "GetStepId", LoadResString(errMandatoryParameterMissing)
        End If
    End If

```

```

Else
    GetStepId = IIf(IsLabel(StepKey), 0, MakeIdentifierValid(StepKey))
End If
Else
    GetStepId = StepId
End If
End Function
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cStringSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cStringSM.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:  This module contains common procedures that can be used
'           to manipulate strings
'           It is called StringSM, since String is a Visual Basic keyword
' Contact:  Reshma Tharamal
'           (reshmat@microsoft.com)
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cStringSM."

Private mstrText As String

Private Const mstrNullValue = "null"
Private Const mstrSQ = ""
Private Const mstrEnvVarSeparator = "%"
Public Function InsertEnvVariables(_
    Optional ByVal strComString As String) As String

    ' This function replaces all environment variables in
    ' the passed in string with their values - they are
    ' enclosed by "%"

    Dim intPos As Integer
    Dim intEndPos As Integer
    Dim strEnvVariable As String
    Dim strValue As String
    Dim strCommand As String

    On Error GoTo InsertEnvVariablesErr
    mstrSource = mstrModuleName & "InsertEnvVariables"

    ' Initialize the return value of the function to the
    ' passed in command
    If IsStringEmpty(strComString) Then
        strCommand = mstrText
    Else
        strCommand = strComString
    End If

    intPos = InStr(strCommand, mstrEnvVarSeparator)
    Do While intPos <> 0

```

```

' Extract the environment variable from
the passed
' in string
intEndPos = InStr(intPos + 1,
strCommand, mstrEnvVarSeparator)
strEnvVariable = Mid(strCommand,
intPos + 1, intEndPos - intPos - 1)

' Get the value of the variable and call a
function
' to replace the variable with it's value
strValue = Environ$(strEnvVariable)
strCommand =
ReplaceSubString(strCommand, _
mstrEnvVarSeparator &
strEnvVariable & mstrEnvVarSeparator, _
strValue)

intPos = InStr(strCommand,
mstrEnvVarSeparator)
Loop

InsertEnvVariables = strCommand
Exit Function

InsertEnvVariablesErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
' Return an empty string
InsertEnvVariables = gstrEmptyString

End Function
Public Function MakeStringFieldValid( _
Optional strField As String =
gstrEmptyString) As String
' Returns a string that can be appended to
any insert
' or modify (sql) statement
' If an argument is not passed to this
function, the
' default text property is used

Dim strTemp As String

On Error GoTo MakeStringFieldValidErr

If IsStringEmpty(strField) Then
strTemp = mstrText
Else
strTemp = strField
End If

' It checks whether the text is empty
' If so, it returns the string, "null"
If IsStringEmpty(strTemp) Then
MakeStringFieldValid =
mstrNullValue
Else
' Single-quotes have to be replaced by
two single-quotes,
' since a single-quote is the identifier
delimiter
' character - call a procedure to do the
replace
strTemp = ReplaceSubString(strTemp,
mstrSQ, mstrSQ & mstrSQ)

' Replace pipe characters with the
corresponding chr function
strTemp = ReplaceSubString(strTemp,
"|", "" & Chr(124) & "")

' Enclose the string in single quotes

```

```

MakeStringFieldValid = mstrSQ &
strTemp & mstrSQ

End If

Exit Function

MakeStringFieldValidErr:
mstrSource = mstrModuleName &
"MakeStringFieldValid"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errMakeFieldValidFailed, _
mstrSource,
LoadResString(errMakeFieldValidFailed)

End Function
Public Function MakeDateFieldValid( _
Optional dtmField As Date = gdtmEmpty)
As String
' Returns a string that can be appended to
any insert
' or modify (sql) statement

' Enclose the date in single quotes
MakeDateFieldValid = mstrSQ & dtmField
& mstrSQ

End Function

Private Function IsStringEmpty(strToCheck
As String) As Boolean

If strToCheck = gstrEmptyString Then
IsStringEmpty = True
Else
IsStringEmpty = False
End If

End Function
Public Function ReplaceSubString(ByVal
MainString As String, _
ByVal ReplaceString As String, _
ByVal ReplaceWith As String) As String

' Replaces all occurrences of ReplaceString
in MainString with ReplaceWith

Dim intPos As Integer
Dim strTemp As String

On Error GoTo ReplaceSubStringErr

strTemp = MainString

intPos = InStr(strTemp, ReplaceString)
Do While intPos <> 0
strTemp = Left(strTemp, intPos - 1) &
ReplaceWith & _
Mid(strTemp, intPos +
Len(ReplaceString))
intPos = InStr(intPos +
Len(ReplaceString) + 1, strTemp,
ReplaceString)
Loop
ReplaceSubString = strTemp

Exit Function

ReplaceSubStringErr:
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ReplaceSubString"
On Error GoTo 0

```

```

Err.Raise vbObjectError + errParseStringFailed,
_
mstrSource, _
LoadResString(errParseStringFailed)

End Function

Public Property Get Text() As String
Attribute Text.VB_UserMemId = 0
Text = mstrText
End Property

Public Property Let Text(ByVal vdata As String)
mstrText = vdata
End Property

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cSubStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cSubStep.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module encapsulates the
properties of sub-steps
that are used during the execution of a
workspace.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private Const mstrModuleName As String =
"cSubStep"

Private mlngStepId As Long
Private mintRunning As Integer ' Number of
running tasks
Private mintComplete As Integer ' Number of
completed tasks
' The last iterator for this sub-step
Private mclastIterator As cRunItDetails

Public Function NewIteration(cStepRec As cStep)
As cIterator
' Calls a procedure to determine the next iterator
value
' for the passed in step - returns the value to be
used
' in the iteration.
' It updates the instance node with the new
iteration
' for the step.

Dim cltRec As cIterator

On Error GoTo NewIterationErr

' Call a function that will populate an iterator
record
' with the iterator values
Set cltRec = NextIteration(cStepRec)

' Initialize the run node with the new iterator

```

```

' values
If Not mcLastIterator Is Nothing Then
    If cItRec Is Nothing Then
        mcLastIterator.Value =
gstrEmptyString
    Else
        mcLastIterator.Value = cItRec.Value

        ' And if the iterator is a list of values,
then update
        ' the sequence number as well
        If mcLastIterator.IteratorType =
gintValue Then
            mcLastIterator.Sequence =
cItRec.SequenceNo
        End If
    End If
End If
End If

Set NewIteration = cItRec
Set cItRec = Nothing

Exit Function

NewIterationErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errIterateFailed, mstrModuleName, _
    LoadResString(errIterateFailed)

End Function
Public Function NextIteration(cStepRec As
cStep) As cIterator

' Retrieves the next iterator value for the
passed in step -
' returns an iterator record with the new
iterator values

Dim cItRec As cIterator
Dim vntIterators As Variant
Dim lngValue As String

On Error GoTo NextIterationErr

vntIterators = cStepRec.Iterators

If Not mcLastIterator Is Nothing Then
    ' The run node contains the iterator
details
    ' Get the next value for the iterator
    If mcLastIterator.IteratorType =
gintValue Then
        ' Find the next iterator that appears in
the list of
        ' iterator values
        Set cItRec =
NextInSequence(vntIterators,
mcLastIterator.Sequence)
    Else
        lngValue =
CLng(Trim$(mcLastIterator.Value))
        ' Determine whether the new iterator
value falls in the
        ' range between From and To
        If (mcLastIterator.RangeStep > 0
And _
            (mcLastIterator.RangeFrom <=
mcLastIterator.RangeTo) And _
            (mcLastIterator.RangeStep +
lngValue) <= mcLastIterator.RangeTo) Or _

```

```

        (mcLastIterator.RangeStep < 0
And _
            (mcLastIterator.RangeFrom >=
mcLastIterator.RangeTo) And _
            (mcLastIterator.RangeStep +
lngValue) >= mcLastIterator.RangeTo) Then
            Set cItRec = New cIterator
            cItRec.Value =
Trim$(CStr(mcLastIterator.RangeStep +
lngValue))
        Else
            Set cItRec = Nothing
        End If
    End If
Else
    Set cItRec = Nothing
End If

Set NextIteration = cItRec
Exit Function

NextIterationErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errIterateFailed,
mstrModuleName, _
    LoadResString(errIterateFailed)

End Function
Public Sub InitializeIt(cPendingStep As cStep,
_
    ColParameters As cArrParameters, _
    Optional vntIterators As Variant)

' Initializes the LastIteration structure with
the iterator details for the
' passed in step

On Error GoTo InitializeItErr

If IsMissing(vntIterators) Then
    vntIterators = cPendingStep.Iterators
End If

If IsArray(vntIterators) And Not
IsEmpty(vntIterators) Then
    mcLastIterator.IteratorName =
cPendingStep.IteratorName
    If
vntIterators(LBound(vntIterators)).IteratorTyp
e = _
        gintValue Then
            mcLastIterator.IteratorType =
gintValue
            ' Since the sequence numbers begin at 0
            mcLastIterator.Sequence =
gintMinIteratorSequence - 1
        Else
            mcLastIterator.IteratorType = gintFrom
            Call InitializeItRange(vntIterators,
cPendingStep.WorkspaceId, _
                ColParameters)
        End If
    Else
        Set mcLastIterator = Nothing
    End If

Exit Sub

InitializeItErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0

```

```

Err.Raise vbObjectError + errIterateFailed,
mstrModuleName, _
    LoadResString(errIterateFailed)

End Sub

Private Sub InitializeItRange(vntIterators As
Variant, ByVal IWorkspace As Long, _
    ColParameters As cArrParameters)

' Initializes the LastIteration structure for range
iterators from the
' passed in variant containing the iterator records

Dim lngIndex As Long
Dim cItRec As cIterator

On Error GoTo InitializeItRangeErr

If IsArray(vntIterators) And Not
IsEmpty(vntIterators) Then

    ' Check if the iterator range has been
completely initialized
    RangeComplete (vntIterators)

    ' Initialize the Run node with the values for the
From,
    ' To and Step boundaries
    For lngIndex = LBound(vntIterators) To
UBound(vntIterators)
        Set cItRec = vntIterators(lngIndex)
        Select Case cItRec.IteratorType
            Case gintFrom
                mcLastIterator.RangeFrom =
SubstituteParameters(cItRec.Value, IWorkspace,
WspParameters:=ColParameters)
                Case gintTo
                    mcLastIterator.RangeTo =
SubstituteParameters(cItRec.Value, IWorkspace,
WspParameters:=ColParameters)
                Case gintStep
                    mcLastIterator.RangeStep =
SubstituteParameters(cItRec.Value, IWorkspace,
WspParameters:=ColParameters)
                Case Else
                    On Error GoTo 0
                    Err.Raise vbObjectError +
errTypeInvalid, mstrModuleName, _
                        LoadResString(errTypeInvalid)
                End Select
            Next lngIndex

            mcLastIterator.Value =
Trim$(CStr(mcLastIterator.RangeFrom -
mcLastIterator.RangeStep))
        End If

Exit Sub

InitializeItRangeErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errIterateFailed,
mstrModuleName, _
    LoadResString(errIterateFailed)

End Sub
Private Function NextInSequence(vntIterators As
Variant, _
    lngOldSequence As Long) As cIterator

Dim lngIndex As Long
Dim cItRec As cIterator

```



```

On Error GoTo NextInSequenceErr

If IsArray(vntIterators) And Not
IsEmpty(vntIterators) Then
    For lngIndex = LBound(vntIterators)
    To UBound(vntIterators)
        Set cItRec = vntIterators(lngIndex)
        If cItRec.IteratorType <> gintValue
Then
            On Error GoTo 0
            Err.Raise vbObjectError +
errTypeInvalid, mstrModuleName, _

LoadResString(errTypeInvalid)
        End If
        If cItRec.SequenceNo =
lngOldSequence + 1 Then
            Exit For
        End If

        Next lngIndex

        If cItRec.SequenceNo <>
lngOldSequence + 1 Then
            Set cItRec = Nothing
        End If
    Else
        Set cItRec = Nothing
    End If

    Set NextInSequence = cItRec

Exit Function

NextInSequenceErr:
' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errIterateFailed, mstrModuleName, _
        LoadResString(errIterateFailed)

End Function

Public Property Get LastIterator() As
cRunItDetails

    Set LastIterator = mcLastIterator

End Property
Public Property Set LastIterator(vdata As
cRunItDetails)

    Set mcLastIterator = vdata

End Property

Public Property Get TasksRunning() As
Integer

    TasksRunning = mintRunning

End Property

Public Property Let TasksRunning(ByVal
vdata As Integer)

    mintRunning = vdata

End Property

Public Property Get TasksComplete() As
Integer

```

```

TasksComplete = mintComplete

End Property
Public Property Let TasksComplete(ByVal
vdata As Integer)

    mintComplete = vdata

End Property
Public Property Get StepId() As Long

    StepId = mlngStepId

End Property
Public Property Let StepId(ByVal vdata As
Long)

    mlngStepId = vdata

End Property
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cSubSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cSubSteps.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
'
' PURPOSE:   This module provides a type-
safe wrapper around cVector to
'           implement a collection of cSubStep
objects.
' Contact:   Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcSubSteps As cVector

Public Sub Add(ByVal objItem As cSubStep)

    mcSubSteps.Add objItem

End Sub

Public Sub Clear()

    mcSubSteps.Clear

End Sub

Public Function Count() As Long

    Count = mcSubSteps.Count

End Function

Public Function Delete(ByVal lngDelete As
Long) As cSubStep

    Set Delete = mcSubSteps.Delete(lngDelete)

End Function

```

```

Public Property Get Item(ByVal Position As Long)
As cSubStep
Attribute Item.VB_UserMemId = 0

    Set Item = mcSubSteps.Item(Position)

End Property

Private Sub Class_Initialize()

    Set mcSubSteps = New cVector

End Sub

Private Sub Class_Terminate()

    Set mcSubSteps = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTermProcess"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cTermProcess.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
'
' PURPOSE:   This module raises an event if a
completed step exists.
' Contact:   Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Private bTermProcessExists As Boolean
Public Event TermProcessExists()

Public Sub ProcessTerminated()

    bTermProcessExists = True
    moTimer.Enabled = True

End Sub

Private Sub Class_Initialize()

    bTermProcessExists = False

    Set moTimer = New cTimerSM
    moTimer.Enabled = False

End Sub

Private Sub Class_Terminate()

    Set moTimer = Nothing

End Sub

Private Sub moTimer_Timer()

    On Error GoTo moTimer_TimerErr

```

```

If bTermProcessExists Then
    RaiseEvent TermProcessExists
End If

moTimer.Enabled = False
bTermProcessExists = False

Exit Sub

moTimer_TimerErr:
    LogErrors Errors

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTermStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cTermStep.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:   This module encapsulates
the properties of steps that
'           have completed execution such as
status and time of completion.
' Contact:   Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Public TimeComplete As Currency
Public Index As Long
Public InstanceId As Long
Public ExecutionStatus As InstanceStatus

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTermSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cTermSteps.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:   This module provides a
type-safe wrapper around cVector to
'           implement a collection of
cTermStep objects. Raises an
'           event if a step that has completed
execution exists.
' Contact:   Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Private mcTermSteps As cVector
Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Public Event TermStepExists(cStepDetails
As cTermStep)

```

```

Public Sub Add(ByVal citem As cTermStep)

    Call mcTermSteps.Add(citem)
    moTimer.Enabled = True

End Sub

Public Sub Clear()

    mcTermSteps.Clear

End Sub

Public Function Delete()

    Call mcTermSteps.Delete(0)
' Disable the timer if there are no more
pending events
    If mcTermSteps.Count = 0 Then
        moTimer.Enabled = False

    End Function

Public Property Get Item(ByVal Position As
Long) As cTermStep

    Set Item = mcTermSteps(Position)

End Property

Public Function Count() As Long

    Count = mcTermSteps.Count

End Function

Private Sub Class_Initialize()

    Set mcTermSteps = New cVector

    Set moTimer = New cTimerSM
    moTimer.Enabled = False

End Sub

Private Sub Class_Terminate()

    Set mcTermSteps = Nothing
    Set moTimer = Nothing

End Sub

Private Sub moTimer_Timer()

    On Error GoTo moTimer_TimerErr

    If mcTermSteps.Count > 0 Then
        ' Since items are appended to the end of
the array
        RaiseEvent
TermStepExists(mcTermSteps(0))
    Else
        moTimer.Enabled = False
    End If
    Exit Sub

moTimer_TimerErr:
    LogErrors Errors

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTimerSM"

```

```

Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cTimer.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
' PURPOSE:   This module implements a timer.
' Contact:   Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Public Event Timer()

Private Const mnDefaultInterval As Long = 1

Private mnTimerID As Long
Private mnInterval As Long
Private mfEnabled As Boolean

Public Property Get Interval() As Long
    Interval = mnInterval
End Property
Public Property Let Interval(Value As Long)
    If mnInterval <> Value Then
        mnInterval = Value
        If mfEnabled Then
            SetInterval mnInterval, mnTimerID
        End If
    End If
End Property

Public Property Get Enabled() As Boolean
    Enabled = mfEnabled
End Property
Public Property Let Enabled(Value As Boolean)
    If mfEnabled <> Value Then
        If Value Then
            mnTimerID = StartTimer(mnInterval)
            If mnTimerID <> 0 Then
                mfEnabled = True
                ' Storing Me in the global would add a
reference to Me, which
                ' would prevent Me from being released,
which in turn would
                ' prevent my Class_Terminate code from
running. To prevent
                ' this, I store a "soft reference" - the
collection holds a
                ' pointer to me without incrementing my
reference count.
                gcTimerObjects.Add ObjPtr(Me),
Str$(mnTimerID)
            End If
        Else
            StopTimer mnTimerID
            mfEnabled = False
            gcTimerObjects.Remove Str$(mnTimerID)
        End If
    End If
End Property

Private Sub Class_Initialize()
    If gcTimerObjects Is Nothing Then Set
gcTimerObjects = New Collection
    mnInterval = mnDefaultInterval
End Sub

Private Sub Class_Terminate()
    Enabled = False

```

```

End Sub

Friend Sub Tick()
    RaiseEvent Timer
End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cVBErrorsSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY =
"SaveWithClassBuilder", "Yes"
Attribute VB_Ext_KEY = "Top_Level"
, "Yes"
' FILE:      cVBErrors.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
'
' PURPOSE:  This module encapsulates
the handling of Visual Basic errors.
'           This module does not do any error
handling - any error handler
'           will erase the errors object!
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' The Execute class exposes a method,
WriteError through which we can write to
the
' error log that is currently being used by the
Execute object. Store a reference to
' Execute object locally.
Private mcExecObjRef As
EXECUTEDLLLib.Execute
Public Sub WriteError(ByVal ErrorCode As String
errErrorConstants, _
    Optional ByVal ErrorSource As String =
gstrEmptyString, _
    Optional ByVal OptArgs As String =
gstrEmptyString)

    Dim sError As String

    sError = "StepMaster Error:" &
ErrorCode & vbCrLf &
LoadResString(ErrorCode) & vbCrLf

    If Not StringEmpty(ErrorSource) Then
        sError = sError & "(Source: " &
ErrorSource & ")" & vbCrLf
    End If
    sError = sError & OptArgs

    Call LogMessage(sError)
End Sub
Private Function InitErrorString() As String
' Initializes a string with all the properties
of the
' Err object

    Dim strError As String
    Dim errCode As Long

    If Err.Number = 0 Then
        InitErrorString = gstrEmptyString
    Else

```

```

With Err
    If Err.Number > vbObjectError And
Err.Number < (vbObjectError + 65536) Then
        errCode = .Number - vbObjectError
    Else
        errCode = .Number
    End If
    strError = "Error #: " & errCode &
vbCrLf
        strError = strError & "Description: " &
.Description & vbCrLf
        strError = strError & "Source: " &
Err.Source & vbCrLf
    End With

    Debug.Print strError
    InitErrorString = strError
End If

End Function
Public Sub LogVBErrors()

    Dim strErr As String

    strErr = InitErrorString

    On Error GoTo LogVBErrorsErr

    If Not StringEmpty(strErr) Then
        ' Write an error using the WriteError
method of the Execute object.
        If Not mcExecObjRef Is Nothing Then
            mcExecObjRef.WriteError strErr
        Else
            WriteMessage strErr
        End If
    End If

    Err.Clear

Exit Sub

LogVBErrorsErr:
    Call LogErrors(Errors)
    ' Since write to the error file for the step has
failed, write to the project log
    Call WriteMessage(strErr)

End Sub
Public Sub DisplayErrors()

    Dim strErr As String

    strErr = InitErrorString

    If Not StringEmpty(strErr) Then
        ' Display the error message
        MsgBox strErr
    End If

    Err.Clear

End Sub
Public Sub LogMessage(strMsg As String)

    On Error GoTo LogMessageErr

    ' Write an error using the WriteError method
of the Execute object.
    If Not mcExecObjRef Is Nothing Then
        mcExecObjRef.WriteError strMsg
    Else
        WriteMessage strMsg
    End If

```

```

Exit Sub

LogMessageErr:
    Call LogErrors(Errors)
    ' Since write to the error file for the step has
failed, write to the project log
    Call WriteMessage(strMsg)

End Sub
Public Property Set ErrorFile(vdata As
EXECUTEDLLLib.Execute)

    Set mcExecObjRef = vdata

End Property
Private Sub Class_Terminate()

    Set mcExecObjRef = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cVector"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:      cVector.cls
'           Microsoft TPC-H Kit Ver. 1.00
'           Copyright Microsoft, 1999
'           All Rights Reserved
'
'
' PURPOSE:  This class implements an array of
objects.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cVector."

' Array counter
Private mlngCount As Long
Private mcarrItems() As Object

Public Sub Add(ByVal objItem As Object)
' Adds the passed in Object variable to the array

    On Error GoTo AddErr

    ReDim Preserve mcarrItems(mlngCount)

    ' Set the newly added element in the array to the
' passed in variable
    Set mcarrItems(mlngCount) = objItem
    mlngCount = mlngCount + 1

Exit Sub

AddErr:
    LogErrors Errors
    gstrSource = mstrModuleName & "Add"
    On Error GoTo 0
    Err.Raise vbObjectError + errLoadInArrayFailed,
-
        mstrSource, _
        LoadResString(errLoadInArrayFailed)

```

<pre> End Sub Public Sub Clear() ' Clear the array ReDim mcarrItems(0) mlngCount = 0 End Sub Public Function Delete(ByVal lngDelete As Long) As Object Dim lngIndex As Long On Error GoTo DeleteErr If lngDelete < (mlngCount - 1) Then ' We want to maintain the order of all items in the ' array - so move all remaining elements in the array ' up by 1 For lngIndex = lngDelete To mlngCount - 2 MoveDown lngIndex Next lngIndex End If ' Return the deleted node Set Delete = mcarrItems(mlngCount - 1) ' Delete the last Node from the array mlngCount = mlngCount - 1 If mlngCount > 0 Then ReDim Preserve mcarrItems(0 To mlngCount - 1) Else ReDim mcarrItems(0) End If Exit Function DeleteErr: LogErrors Errors mstrSource = mstrModuleName & "Delete" On Error GoTo 0 Err.Raise vbObjectError + errDeleteArrayElementFailed, _ mstrSource, _ LoadResString(errDeleteArrayElementFaile d) End Function Public Property Get Item(ByVal Position As Long) As Object Attribute Item.VB_UserMemId = 0 ' Returns the element at the passed in position in the array If Position >= 0 And Position < mlngCount Then Set Item = mcarrItems(Position) Else On Error GoTo 0 Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _ LoadResString(errItemDoesNotExist) End If </pre>	<pre> End Property Public Property Set Item(ByVal Position As Long, _ ByVal Value As Object) ' Returns the element at the passed in position in the array If Position >= 0 Then ' If the passed in position is outside the array ' bounds, then resize the array If Position >= mlngCount Then ReDim Preserve mcarrItems(Position) mlngCount = Position + 1 End If ' Set the newly added element in the array to the ' passed in variable Set mcarrItems(Position) = Value Else On Error GoTo 0 Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _ LoadResString(errItemDoesNotExist) End If End Property Public Sub MoveUp(ByVal Position As Long) ' Moves the element at the passed in position up by 1 Dim cTemp As Object If Position > 0 And Position < mlngCount Then Set cTemp = mcarrItems(Position) Set mcarrItems(Position) = mcarrItems(Position - 1) Set mcarrItems(Position - 1) = cTemp End If End Sub Public Sub MoveDown(ByVal Position As Long) ' Moves the element at the passed in position down by 1 Dim cTemp As Object If Position >= 0 And Position < mlngCount - 1 Then Set cTemp = mcarrItems(Position) Set mcarrItems(Position) = mcarrItems(Position + 1) Set mcarrItems(Position + 1) = cTemp End If End Sub Public Function Count() As Long Count = mlngCount End Function Private Sub Class_Initialize() mlngCount = 0 End Sub </pre>	<pre> Private Sub Class_Terminate() Call Clear End Sub VERSION 1.0 CLASS BEGIN MultiUse = -1 ' True END Attribute VB_Name = "c VectorLng" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = True Attribute VB_PredeclaredId = False Attribute VB_Exposed = False ' FILE: cVectorLng.cls ' Microsoft TPC-H Kit Ver. 1.00 ' Copyright Microsoft, 1999 ' All Rights Reserved ' ' PURPOSE: This class implements an array of longs. ' Contact: Reshma Tharamal (reshmat@microsoft.com) ' Option Explicit ' Used to indicate the source module name when errors ' are raised by this class Private mstrSource As String Private Const mstrModuleName As String = "cVectorLng." ' Array counter Private mlngCount As Long Private mcarrItems() As Long Public Sub Add(ByVal lngItem As Long) ' Adds the passed in long variable to the array On Error GoTo AddErr ReDim Preserve mcarrItems(mlngCount) ' Set the newly added element in the array to the ' passed in variable mcarrItems(mlngCount) = lngItem mlngCount = mlngCount + 1 Exit Sub AddErr: LogErrors Errors gstrSource = mstrModuleName & "Add" On Error GoTo 0 Err.Raise vbObjectError + errLoadInArrayFailed, _ mstrSource, _ LoadResString(errLoadInArrayFailed) End Sub Public Sub Clear() ' Clear the array ReDim mcarrItems(0) End Sub Public Sub Delete(Optional ByVal Position As Long = -1, _ Optional ByVal Item As Long = -1) </pre>
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```

' The user can opt to delete either a
specific item in
' the list or the item at a specified position.
If no
' parameters are passed in, we delete the
element at
' position 0!

Dim lngDelete As Long
Dim lngIndex As Long

On Error GoTo DeleteErr

If Position = -1 Then
' Since we can never store an element at
position -1,
' we can be sure that the user is trying
to delete
' a given item
lngDelete = Find(Item)
Else
lngDelete = Position
End If

If lngDelete < (mInGCount - 1) Then

' We want to maintain the order of all
items in the
' array - so move all remaining
elements in the array
' up by 1
For lngIndex = lngDelete To
mInGCount - 2
MoveDown lngIndex
Next lngIndex

End If

' Delete the last Node from the array
mInGCount = mInGCount - 1
If mInGCount > 0 Then
ReDim Preserve mcarrItems(0 To
mInGCount - 1)
Else
ReDim mcarrItems(0)
End If

Exit Sub

DeleteErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Delete"
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteArrayElementFailed, _
mstrSource, _

LoadResString(errDeleteArrayElementFaile
d)

End Sub
Public Function Find(ByVal Item As Long)
As Long

' Returns the position at which the passed
in value occurs
' in the array

Dim lngIndex As Long

On Error GoTo FindErr

' Find the element in the array to be
deleted

```

```

For lngIndex = 0 To mInGCount - 1

If mcarrItems(lngIndex) = Item Then
Find = lngIndex
Exit Function
End If

Next lngIndex

Find = -1

Exit Function

FindErr:
LogErrors Errors
mstrSource = mstrModuleName & "Find"
On Error GoTo 0
Err.Raise vbObjectError +
errItemNotFound, mstrSource, _
LoadResString(errItemNotFound)

End Function
Public Property Get Item(ByVal Position As
Long) As Long
Attribute Item.VB_UserMemId = 0

' Returns the element at the passed in
position in the array
If Position >= 0 And Position < mInGCount
Then
Item = mcarrItems(Position)
Else
On Error GoTo 0
Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
LoadResString(errItemDoesNotExist)
End If

End Property
Public Property Let Item(ByVal Position As
Long, _
ByVal Value As Long)

' Returns the element at the passed in
position in the array
If Position >= 0 Then
' If the passed in position is outside the
array
' bounds, then resize the array
If Position >= mInGCount Then
ReDim Preserve mcarrItems(Position)
mInGCount = Position + 1
End If

' Set the newly added element in the array
to the
' passed in variable
mcarrItems(Position) = Value
Else
On Error GoTo 0
Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
LoadResString(errItemDoesNotExist)
End If

End Property
Public Sub MoveUp(ByVal Position As Long)
' Moves the element at the passed in position
up by 1

Dim lngTemp As Long

If Position > 0 And Position < mInGCount
Then
lngTemp = mcarrItems(Position)

```

```

mcarrItems(Position) = mcarrItems(Position -
1)
mcarrItems(Position - 1) = lngTemp
End If

End Sub
Public Sub MoveDown(ByVal Position As Long)
' Moves the element at the passed in position
down by 1

Dim lngTemp As Long

If Position >= 0 And Position < mInGCount - 1
Then
lngTemp = mcarrItems(Position)

mcarrItems(Position) = mcarrItems(Position +
1)
mcarrItems(Position + 1) = lngTemp
End If

End Sub

Public Function Count() As Long

Count = mInGCount

End Function

Private Sub Class_Initialize()

mInGCount = 0

End Sub

Private Sub Class_Terminate()

Call Clear

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 'True
END
Attribute VB_Name = "cVectorStr"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cVectorStr.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This class implements an array of
strings.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cVectorStr."

' Array counter
Private mInGCount As Long

```

```

Private mcarrItems() As String

Public Sub Add(ByVal strItem As String)
    ' Adds the passed in string variable to the array

    On Error GoTo AddErr

    ReDim Preserve mcarrItems(mlngCount)

    ' Set the newly added element in the array to the
    ' passed in variable
    mcarrItems(mlngCount) = strItem
    mlngCount = mlngCount + 1

    Exit Sub

AddErr:
    Call LogErrors(Errors)
    gstrSource = mstrModuleName & "Add"
    On Error GoTo 0
    Err.Raise vbObjectError +
errLoadInArrayFailed, _
        mstrSource, _

LoadResString(errLoadInArrayFailed)

End Sub
Public Sub Clear()

    ' Clear the array
    ReDim mcarrItems(0)

End Sub

Public Sub Delete(Optional ByVal Position
As Long = -1, _
    Optional ByVal Item As String = -1)
    ' The user can opt to delete either a
    specific item in
    ' the list or the item at a specified position.
    If no
    ' parameters are passed in, we delete the
    element at
    ' position 0!

    Dim lngDelete As Long
    Dim lngIndex As Long

    On Error GoTo DeleteErr
    mstrSource = mstrModuleName &
"Delete"

    If Position = -1 Then
        ' Since we can never store an element at
        position -1,
        ' we can be sure that the user is trying
        to delete
        ' a given item
        lngDelete = Find(Item)
    Else
        lngDelete = Position
    End If

    If lngDelete < (mlngCount - 1) Then

        ' We want to maintain the order of all
        items in the
        ' array - so move all remaining
        elements in the array
        ' up by 1
        For lngIndex = lngDelete To
mlngCount - 2
            MoveDown lngIndex

Next lngIndex

        End If

        ' Delete the last Node from the array
        mlngCount = mlngCount - 1
        If mlngCount > 0 Then
            ReDim Preserve mcarrItems(0 To
mlngCount - 1)
        Else
            ReDim mcarrItems(0)
        End If

        Exit Sub

DeleteErr:
    Call LogErrors(Errors)
    mstrSource = mstrModuleName & "Delete"
    On Error GoTo 0
    Err.Raise vbObjectError +
errDeleteArrayElementFailed, _
        mstrSource, _

LoadResString(errDeleteArrayElementFailed)

End Sub
Public Function Find(ByVal Item As String)
As Long

    ' Returns the position at which the passed in
    value occurs
    ' in the array

    Dim lngIndex As Long

    On Error GoTo FindErr
    mstrSource = mstrModuleName & "Find"

    ' Find the element in the array to be deleted
    For lngIndex = 0 To mlngCount - 1

        If mcarrItems(lngIndex) = Item Then
            Find = lngIndex
            Exit Function
        End If

Next lngIndex

    Find = -1

    Exit Function

FindErr:
    Call LogErrors(Errors)
    mstrSource = mstrModuleName & "Find"
    On Error GoTo 0
    Err.Raise vbObjectError +
errItemNotFound, mstrSource, _
        LoadResString(errItemNotFound)

End Function
Public Property Get Item(ByVal Position As
Long) As String
    Attribute Item.VB_UserMemId = 0

    ' Returns the element at the passed in
    position in the array
    If Position >= 0 And Position < mlngCount
Then
        Item = mcarrItems(Position)
    Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
            LoadResString(errItemDoesNotExist)

End If

End Property
Public Property Let Item(ByVal Position As Long,
ByVal Value As String)

    ' Returns the element at the passed in position in
    the array
    If Position >= 0 Then
        ' If the passed in position is outside the array
        ' bounds, then resize the array
        If Position >= mlngCount Then
            ReDim Preserve mcarrItems(Position)
            mlngCount = Position + 1
        End If

        ' Set the newly added element in the array to
        the
        ' passed in variable
        mcarrItems(Position) = Value
    Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
            LoadResString(errItemDoesNotExist)
    End If

End Property
Public Sub MoveUp(ByVal Position As Long)
    ' Moves the element at the passed in position up
    by 1

    Dim strTemp As String

    If Position > 0 And Position < mlngCount Then
        strTemp = mcarrItems(Position)

        mcarrItems(Position) = mcarrItems(Position -
1)
        mcarrItems(Position - 1) = strTemp
    End If

End Sub
Public Sub MoveDown(ByVal Position As Long)
    ' Moves the element at the passed in position
    down by 1

    Dim strTemp As String

    If Position >= 0 And Position < mlngCount - 1
Then
        strTemp = mcarrItems(Position)

        mcarrItems(Position) = mcarrItems(Position +
1)
        mcarrItems(Position + 1) = strTemp
    End If

End Sub

Public Function Count() As Long

    Count = mlngCount

End Function

Private Sub Class_Initialize()

    mlngCount = 0

End Sub
Private Sub Class_Terminate()

```

<pre> Call Clear End Sub VERSION 1.0 CLASS BEGIN MultiUse = -1 True END Attribute VB_Name = "cWorker" Attribute VB_GlobalNameSpace = False Attribute VB_Creatable = True Attribute VB_PredeclaredId = False Attribute VB_Exposed = False ' FILE: cWorker.cls ' Microsoft TPC-H Kit Ver. 1.00 ' Copyright Microsoft, 1999 ' All Rights Reserved ' ' PURPOSE: Encapsulates the properties and methods of a worker step. ' Implements the cStep class - carries out initializations ' and validations that are specific to worker steps. ' Contact: Reshma Tharamal (reshmat@microsoft.com) ' Option Explicit Implements cStep ' Object variable to keep the step reference in Private mcStep As cStep ' Used to indicate the source module name when errors ' are raised by this class Private mstrSource As String Private Const mstrModuleName As String = "cWorker." Private Sub cStep_AddAllIterators() Call mcStep.AddAllIterators End Sub Private Property Let cStep_StartDir(ByVal RHS As String) mcStep.StartDir = RHS End Property Private Property Get cStep_StartDir() As String cStep_StartDir = mcStep.StartDir End Property Private Property Set cStep_NodeDB(RHS As DAO.Database) Set mcStep.NodeDB = RHS End Property Private Property Get cStep_NodeDB() As DAO.Database Set cStep_NodeDB = mcStep.NodeDB </pre>	<pre> End Property Private Function cStep_IncVersionY() As String cStep_IncVersionY = mcStep.IncVersionY End Function Private Function cStep_IsNewVersion() As Boolean cStep_IsNewVersion = mcStep.IsNewVersion End Function Private Function cStep_OldVersionNo() As String cStep_OldVersionNo = mcStep.OldVersionNo End Function Private Function cStep_IncVersionX() As String cStep_IncVersionX = mcStep.IncVersionX End Function Private Sub cStep_UpdateIteratorVersion() Call mcStep.UpdateIteratorVersion End Sub Private Function cStep_IteratorCount() As Long cStep_IteratorCount = mcStep.IteratorCount End Function Private Sub cStep_UnloadIterators() Call mcStep.UnloadIterators End Sub Private Sub cStep_SaveIterators() Call mcStep.SaveIterators End Sub Private Property Get cStep_IteratorName() As String cStep_IteratorName = mcStep.IteratorName End Property Private Property Let cStep_IteratorName(ByVal RHS As String) mcStep.IteratorName = RHS End Property Private Sub cStep_LoadIterator(cItRecord As cIterator) Call mcStep.LoadIterator(cItRecord) End Sub Private Sub cStep_DeleteIterator(cItRecord As cIterator) Call mcStep.DeleteIterator(cItRecord) End Sub </pre>	<pre> Private Sub cStep_InsertIterator(cItRecord As cIterator) Call mcStep.InsertIterator(cItRecord) End Sub Private Function cStep_Iterators() As Variant cStep_Iterators = mcStep.Iterators End Function Private Sub cStep_ModifyIterator(cItRecord As cIterator) Call mcStep.ModifyIterator(cItRecord) End Sub Private Sub cStep_RemoveIterator(cItRecord As cIterator) Call mcStep.RemoveIterator(cItRecord) End Sub Private Sub cStep_UpdateIterator(cItRecord As cIterator) Call mcStep.UpdateIterator(cItRecord) End Sub Private Sub cStep_AddIterator(cItRecord As cIterator) Call mcStep.AddIterator(cItRecord) End Sub Private Property Let cStep_Position(ByVal RHS As Long) mcStep.Position = RHS End Property Private Property Get cStep_Position() As Long cStep_Position = mcStep.Position End Property Private Function cStep_Clone(Optional cCloneStep As cStep) As cStep Dim cNewWorker As cWorker Set cNewWorker = New cWorker Set cStep_Clone = mcStep.Clone(cNewWorker) End Function Private Sub StepTextOrFileEntered() ' Checks if either the step text or the name of the file containing ' the text has been entered ' If both of them are null or both of them are not null, ' the worker step is invalid and an error is raised If StringEmpty(mcStep.StepText) And StringEmpty(mcStep.StepTextFile) Then ShowError errStepTextAndFileNull On Error GoTo 0 Err.Raise vbObjectError + errStepTextAndFileNull, _ mstrSource, LoadResString(errStepTextAndFileNull) End If </pre>
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<pre> End Sub Private Property Get cStep_IndOperation() As Operation cStep_IndOperation = mcStep.IndOperation End Property Private Property Let cStep_IndOperation(ByVal RHS As Operation) mcStep.IndOperation = RHS End Property Private Property Get cStep_NextStepId() As Long cStep_NextStepId = mcStep.NextStepId End Property Private Property Let cStep_OutputFile(ByVal RHS As String) mcStep.OutputFile = RHS End Property Private Property Get cStep_OutputFile() As String cStep_OutputFile = mcStep.OutputFile End Property Private Property Let cStep_ErrorFile(ByVal RHS As String) mcStep.ErrorFile = RHS End Property Private Property Get cStep_ErrorFile() As String cStep_ErrorFile = mcStep.ErrorFile End Property Private Property Let cStep_LogFile(ByVal RHS As String) ' ' mcStep.LogFile = RHS ' End Property Private Property Get cStep_LogFile() As String ' ' cStep_LogFile = mcStep.LogFile ' End Property Private Property Let cStep_ArchivedFlag(ByVal RHS As Boolean) mcStep.ArchivedFlag = RHS End Property </pre>	<pre> Private Property Get cStep_ArchivedFlag() As Boolean cStep_ArchivedFlag = mcStep.ArchivedFlag End Property Private Sub Class_Initialize() ' Create the object Set mcStep = New cStep ' Initialize the object with valid values for a Worker step ' The global flag should be the first field to be initialized ' since subsequent validations might try to check if the ' step being created is global mcStep.GlobalFlag = False ' mcStep.GlobalRunMethod = gintNoOption mcStep.StepType = gintWorkerStep End Sub Private Sub Class_Terminate() ' Remove the step object Set mcStep = Nothing End Sub Private Sub cStep_Add() ' Call a private procedure to see if the step text has been ' entered - since a worker step actually executes a step, entry ' of the text is mandatory Call StepTextOrFileEntered ' Call the Add method of the step class to carry out the insert mcStep.Add End Sub Private Property Get cStep_ContinuationCriteria() As ContinuationCriteria cStep_ContinuationCriteria = mcStep.ContinuationCriteria End Property Private Property Let cStep_ContinuationCriteria(ByVal RHS As ContinuationCriteria) ' The Continuation criteria must be non-null for all worker steps. ' Check if the Continuation Criteria is valid Select Case RHS Case gintOnFailureAbortSiblings, gintOnFailureCompleteSiblings, _ gintOnFailureSkipSiblings, _ gintOnFailureAbort, _ gintOnFailureContinue, gintOnFailureAsk mcStep.ContinuationCriteria = RHS Case Else On Error GoTo 0 Err.Raise vbObjectError + errContCriteriaInvalid, _ </pre>	<pre> mstrModuleName, LoadResString(errContCriteriaInvalid) End Select End Property Private Property Let cStep_DegreeParallelism(ByVal RHS As String) mcStep.DegreeParallelism = RHS End Property Private Property Get cStep_DegreeParallelism() As String cStep_DegreeParallelism = mcStep.DegreeParallelism End Property Private Sub cStep_Delete() mcStep.Delete End Sub Private Property Get cStep_EnabledFlag() As Boolean cStep_EnabledFlag = mcStep.EnabledFlag End Property Private Property Let cStep_EnabledFlag(ByVal RHS As Boolean) mcStep.EnabledFlag = RHS End Property Private Property Let cStep_ExecutionMechanism(ByVal RHS As ExecutionMethod) On Error GoTo ExecutionMechanismErr mstrSource = mstrModuleName & "cStep_ExecutionMechanism" Select Case RHS Case gintExecuteShell, gintExecuteODBC mcStep.ExecutionMechanism = RHS Case Else On Error GoTo 0 Err.Raise vbObjectError + errExecutionMechanismInvalid, _ mstrSource, LoadResString(errExecutionMechanismInvalid) End Select Exit Property ExecutionMechanismErr: LogErrors Errors mstrSource = mstrModuleName & "cStep_ExecutionMechanism" On Error GoTo 0 Err.Raise vbObjectError + errExecutionMechanismLetFailed, _ mstrSource, LoadResString(errExecutionMechanismLetFailed) End Property </pre>
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```

Private Property Get
cStep_ExecutionMechanism() As
ExecutionMethod

    cStep_ExecutionMechanism =
mcStep.ExecutionMechanism

End Property

Private Property Let
cStep_FailureDetails(ByVal RHS As String)

    mcStep.FailureDetails = RHS

End Property

Private Property Get cStep_FailureDetails()
As String

    cStep_FailureDetails =
mcStep.FailureDetails

End Property

Private Property Get cStep_GlobalFlag() As
Boolean

    cStep_GlobalFlag = mcStep.GlobalFlag

End Property

Private Property Let
cStep_GlobalFlag(ByVal RHS As Boolean)

    ' Set the global flag to false - this flag is
initialized when
    ' an instance of the class is created. Just
making sure that
    ' nobody changes the value inadvertently
    mcStep.GlobalFlag = False

End Property
Private Sub cStep_Modify()

    ' Call a private procedure to see if the step
text has been
    ' entered - since a worker step actually
executes a step, entry
    ' of the text is mandatory
    Call StepTextOrFileEntered

    ' Call the Modify method of the step class
to carry out the update
    mcStep.Modify

End Sub

Private Property Let
cStep_ParentStepId(ByVal RHS As Long)

    mcStep.ParentStepId = RHS

End Property

Private Property Get cStep_ParentStepId()
As Long

    cStep_ParentStepId =
mcStep.ParentStepId

End Property

Private Property Let
cStep_ParentVersionNo(ByVal RHS As
String)

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```

    mcStep.ParentVersionNo = RHS

End Property

Private Property Get cStep_ParentVersionNo()
As String

    cStep_ParentVersionNo =
mcStep.ParentVersionNo

End Property

Private Property Let
cStep_SequenceNo(ByVal RHS As Integer)

    mcStep.SequenceNo = RHS

End Property

Private Property Get cStep_SequenceNo() As
Integer

    cStep_SequenceNo = mcStep.SequenceNo

End Property

Private Property Let cStep_StepId(ByVal RHS
As Long)

    mcStep.StepId = RHS

End Property

Private Property Get cStep_StepId() As Long

    cStep_StepId = mcStep.StepId

End Property

Private Property Let cStep_StepLabel(ByVal
RHS As String)

    mcStep.StepLabel = RHS

End Property

Private Property Get cStep_StepLabel() As
String

    cStep_StepLabel = mcStep.StepLabel

End Property

Private Property Let cStep_StepLevel(ByVal
RHS As Integer)

    mcStep.StepLevel = RHS

End Property

Private Property Get cStep_StepLevel() As
Integer

    cStep_StepLevel = mcStep.StepLevel

End Property

Private Property Let cStep_StepText(ByVal
RHS As String)

    mcStep.StepText = RHS

```

```

End Property

Private Property Get cStep_StepText() As String

    cStep_StepText = mcStep.StepText

End Property

Private Property Let cStep_StepTextFile(ByVal
RHS As String)

    mcStep.StepTextFile = RHS

End Property

Private Property Get cStep_StepTextFile() As
String

    cStep_StepTextFile = mcStep.StepTextFile

End Property

Private Property Let cStep_StepType(RHS As
gintStepType)

    mcStep.StepType = gintWorkerStep

End Property

Private Property Get cStep_StepType() As
gintStepType

    cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_Validate()
    ' The validate routines for each of the steps will
    ' carry out the specific validations for the type
and
    ' call the generic validation routine

    On Error GoTo cStep_ValidateErr

    ' Validations specific to worker steps

    ' Check if the step text or a file name has been
    ' specified
    Call StepTextOrFileEntered

    mcStep.Validate

    Exit Sub

cStep_ValidateErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"cStep_Validate"
    On Error GoTo 0
    Err.Raise vbObjectError + errValidateFailed, _
        mstrSource, _
        LoadResString(errValidateFailed)
End Sub

Private Property Let cStep_VersionNo(ByVal RHS
As String)

    mcStep.VersionNo = RHS

End Property

Private Property Get cStep_VersionNo() As String

    cStep_VersionNo = mcStep.VersionNo

```

```

End Property

Private Property Let
cStep_WorkspaceId(ByVal RHS As Long)

    mcStep.WorkspaceId = RHS

End Property

Private Property Get cStep_WorkspaceId()
As Long

    cStep_WorkspaceId =
mcStep.WorkspaceId

End Property
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cWorkspace"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cWorkspace.cls
'
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  Encapsulates the properties
and methods of a workspace.
'           Contains functions to insert,
update and delete
'           att_workspaces records from the
database.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Local variable(s) to hold property value(s)
Private mlngWorkspaceId As Long
Private mstrWorkspaceName As String
Private mblnArchivedFlag As Boolean
Private mdbStepMaster As Database

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cWorkspace."

' The cSequence class is used to generate
unique workspace identifiers
Private mWorkspaceSeq As cSequence

' The StringSM class is used to carry out
string operations
Private mFieldValue As cStringSM

Public Function Clone() As cWorkspace

    ' Creates a copy of a given workspace

    Dim cCloneWsp As cWorkspace

    On Error GoTo CloneErr

    Set cCloneWsp = New cWorkspace

    ' Copy all the workspace properties to the
newly

```

```

' created workspace
cCloneWsp.WorkspaceId =
mlngWorkspaceId
cCloneWsp.WorkspaceName =
mstrWorkspaceName
cCloneWsp.ArchivedFlag =
mblnArchivedFlag

' And set the return value to the newly
created workspace
Set Clone = cCloneWsp

Exit Function

CloneErr:
LogErrors Errors
mstrSource = mstrModuleName & "Clone"
On Error GoTo 0
Err.Raise vbObjectError + errCloneFailed, _
mstrSource,
LoadResString(errCloneFailed)

End Function

Public Property Let ArchivedFlag(ByVal vdata
As Boolean)

    mblnArchivedFlag = vdata

End Property

Public Property Get ArchivedFlag() As
Boolean

    ArchivedFlag = mblnArchivedFlag

End Property

Public Property Set WorkDatabase(vdata As
Database)

    Set mdbStepMaster = vdata

End Property

Private Sub WorkspaceNameDuplicate()
' Check if the workspace name already exists
in the workspace

    Dim rstWorkspace As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef

    On Error GoTo
WorkspaceNameDuplicateErr
mstrSource = mstrModuleName &
"WorkspaceNameDuplicate"

' Create a recordset to retrieve the count of
records
' having the same workspace name
strSql = "Select count(*) as
workspace_count " & _
" from att_workspaces " & _
" where workspace_name = [w_name] "
& _
" and workspace_id <> [w_id] "
Set qy =
mdbStepMaster.CreateQueryDef(gstrEmptySt
ring, strSql)

' Call a procedure to assign the parameter
values
Call AssignParameters(qy)

```

```

Set rstWorkspace =
qy.OpenRecordset(dbOpenForwardOnly)

' mFieldValue.MakeStringFieldValid
(mstrWorkspaceName) & _
" and workspace_id <> " & _
Str(mlngWorkspaceId)

'
' Set rstWorkspace =
mdbStepMaster.OpenRecordset(_
strSQL, dbOpenForwardOnly)

If rstWorkspace![workspace_count] > 0 Then
rstWorkspace.Close
qy.Close
ShowError errDuplicateWorkspaceName
On Error GoTo 0
Err.Raise vbObjectError +
errDuplicateWorkspaceName, _
mstrSource,
LoadResString(errDuplicateWorkspaceName)
End If
rstWorkspace.Close
qy.Close

Exit Sub

WorkspaceNameDuplicateErr:
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"WorkspaceNameDuplicate"
On Error GoTo 0
Err.Raise vbObjectError +
errWorkspaceNameDuplicateFailed, _
mstrSource,
LoadResString(errWorkspaceNameDuplicateFailed
)

End Sub

Public Property Let WorkspaceName(vdata As
String)

    On Error GoTo WorkspaceNameErr
mstrSource = mstrModuleName &
"WorkspaceName"

If vdata = gstrEmptyString Then

    On Error GoTo 0
' Propagate this error back to the caller
Err.Raise vbObjectError +
errWorkspaceNameMandatory, _
mstrSource,
LoadResString(errWorkspaceNameMandatory)
Else
mstrWorkspaceName = vdata
End If
Exit Property

WorkspaceNameErr:
LogErrors Errors
mstrSource = mstrModuleName &
"WorkspaceName"
On Error GoTo 0
Err.Raise vbObjectError +
errWorkspaceNameSetFailed, _
mstrSource,
LoadResString(errWorkspaceNameSetFailed)

End Property

Public Property Let WorkspaceId(vdata As Long)

    On Error GoTo WorkspaceIdErr

```

```

mstrSource = mstrModuleName &
"WorkspaceId"

If (vdata > 0) Then
    mlngWorkspaceId = vdata
Else
    ' Propagate this error back to the caller
    On Error GoTo 0
    Err.Raise vbObjectError +
errWorkspaceIdInvalid, _
    mstrSource,
LoadResString(errWorkspaceIdInvalid)
End If

Exit Property

WorkspaceIdErr:
LogErrors Errors
mstrSource = mstrModuleName &
"WorkspaceId"
On Error GoTo 0
Err.Raise vbObjectError +
errWorkspaceIdSetFailed, _
mstrSource,
LoadResString(errWorkspaceIdSetFailed)

End Property

Public Sub AddWorkspace()

    Dim strInsert As String
    Dim qy As DAO.QueryDef

    On Error GoTo AddWorkspaceErr

    ' Retrieve the next identifier using the
    sequence class
    Set mWorkspaceSeq = New cSequence
    Set mWorkspaceSeq.IdDatabase =
mdbsStepMaster
    mWorkspaceSeq.IdentifierColumn =
FLD_ID_WORKSPACE
    mlngWorkspaceId =
mWorkspaceSeq.Identifier
    Set mWorkspaceSeq = Nothing

    ' Call procedure to raise an error if the
    Workspace name
    ' already exists in the db
    Call WorkspaceNameDuplicate

    ' A new record will have the
    archived_flag turned off
    mblnArchivedFlag = False

    ' Create a temporary querydef object
    strInsert = "insert into att_workspaces " &
_
    "(" workspace_id, workspace_name, "
& _
    " archived_flag )" & _
    " values ( " & _
    " values ( [w_id], [w_name],
[archived] )"
    Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmpt
yString, strInsert)

    ' Call a procedure to assign the parameter
    values
    Call AssignParameters(qy)

    qy.Execute dbFailOnError
    qy.Close

```

```

' strInsert = "insert into att_workspaces " &
_
    "(" workspace_id, workspace_name, "
& _
    " archived_flag )" & _
    " values ( " & _
    Str(mlngWorkspaceId) & _
    ", " &
mFieldValue.MakeStringFieldValid(mstrWork
spaceName) & _
    ", " & Str(mblnArchivedFlag) & _
    " )"
' mdbsStepMaster.Execute strInsert,
dbFailOnError

Exit Sub

AddWorkspaceErr:

    Call LogErrors(Errors)
    mstrSource = mstrModuleName &
"AddWorkspace"
    On Error GoTo 0
    Err.Raise vbObjectError +
errWorkspaceInsertFailed, _
    mstrSource,
LoadResString(errWorkspaceInsertFailed)

End Sub

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
    ' Assigns values to the parameters in the
    querydef object
    ' The parameter names are cryptic to make
    them different
    ' from the field names. When the parameter
    names are
    ' the same as the field names, parameters in
    the where
    ' clause do not get created.

    Dim prmParam As DAO.Parameter

    On Error GoTo AssignParametersErr
    mstrSource = mstrModuleName &
"AssignParameters"

    For Each prmParam In qyExec.Parameters
        Select Case prmParam.Name
            Case "[w_id]"
                prmParam.Value =
mlngWorkspaceId

                Case "[w_name]"
                    prmParam.Value =
mstrWorkspaceName

                Case "[archived]"
                    prmParam.Value =
mblnArchivedFlag

                Case Else
                    ' Write the parameter name that is
                    faulty
                    WriteError errInvalidParameter,
mstrSource, _
                    prmParam.Name
                    On Error GoTo 0
                    Err.Raise errInvalidParameter,
mstrSource, _

LoadResString(errInvalidParameter)
                    End Select
                Next prmParam

Exit Sub

```

```

AssignParametersErr:

    mstrSource = mstrModuleName &
"AssignParameters"
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errAssignParametersFailed, _
    mstrSource,
LoadResString(errAssignParametersFailed)

End Sub

Public Sub DeleteWorkspace()

    Dim strDelete As String
    Dim qy As DAO.QueryDef

    On Error GoTo DeleteWorkspaceErr

    strDelete = "delete from att_workspaces " & _
    " where workspace_id = [w_id]"
    Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString,
strDelete)

    ' Call a procedure to assign the parameter values
    Call AssignParameters(qy)

    qy.Execute dbFailOnError
    qy.Close

    ' mdbsStepMaster.Execute strDelete,
    dbFailOnError
    ' " where workspace_id = " & _
    ' Str(mlngWorkspaceId)

Exit Sub

DeleteWorkspaceErr:
    Call LogErrors(Errors)
    mstrSource = mstrModuleName &
"DeleteWorkspace"
    On Error GoTo 0
    Err.Raise vbObjectError +
errWorkspaceDeleteFailed, _
    mstrSource,
LoadResString(errWorkspaceDeleteFailed)
End Sub

Public Sub ModifyWorkspace()

    Dim strUpdate As String
    Dim qy As DAO.QueryDef

    On Error GoTo ModifyWorkspaceErr

    ' Call procedure to raise an error if the Workspace
    name
    ' already exists in the db
    Call WorkspaceNameDuplicate

    strUpdate = "update att_workspaces " & _
    " set workspace_name = [w_name]" & _
    ", archived_flag = [archived]" & _
    " where workspace_id = [w_id]"

    Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString,
strUpdate)

    ' Call a procedure to assign the parameter values
    Call AssignParameters(qy)

    qy.Execute dbFailOnError
    qy.Close

```

```

' strUpdate = "update att_workspaces " &
'
' " set workspace_name = " & _
'
mFieldValue.MakeStringFieldValid(mstrW
orkspaceName) & _
'
' ", archived_flag = " & _
' Str(mblnArchivedFlag) & _
' " where workspace_id = " & _
' Str(mlngWorkspaceId)
'
' mdbaStepMaster.Execute strUpdate,
dbFailOnError
'
Exit Sub

ModifyWorkspaceErr:

Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ModifyWorkspace"
On Error GoTo 0
Err.Raise vbObjectError +
errWorkspaceUpdateFailed, _
mstrSource,
LoadResString(errWorkspaceUpdateFailed)

End Sub
Public Property Get WorkspaceName() As
String

WorkspaceName = mstrWorkspaceName

End Property

Public Property Get WorkspaceId() As Long

WorkspaceId = mlngWorkspaceId

End Property

Private Sub Class_Initialize()

' Each function will append it's own name
to this
' variable
mstrSource = "cWorkspace."

Set mFieldValue = New cStringSM

End Sub

Private Sub Class_Terminate()

Set mdbaStepMaster = Nothing
Set mFieldValue = Nothing

End Sub
Attribute VB_Name = "DatabaseSM"
' FILE: DatabaseSM.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Contains all the database
initialization/cleanup
' procedures for the project. Also
contains upgrade
' database upgrade functions.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'

```

```

' This module is called DatabaseSM, since
Database is a standard
' Visual Basic object and we want to avoid any
confusion with it.

Option Explicit

Public wrkJet As Workspace
Public dbsAttTool As Database
Public gblnDbOpen As Boolean
Public gRunEngine As rdoEngine

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"DatabaseSM."
Public Const gsDefDBFileExt As String =
".stp"
Private Const msDefDBFile As String =
"\SMData" & gsDefDBFileExt

Private Const merrFileNotFound As Integer =
3024
Private Const merrDaoTableMissing As
Integer = 3078

Private Const
STEPMASTER_SETTINGS_VAL_NAME_D
BFILE As String = "WorkspaceFile"

Public Const DEF_NO_COUNT_DISPLAY
As Boolean = False
Public Const DEF_NO_EXECUTE
As Boolean = False
Public Const DEF_PARSE_QUERY_ONLY
As Boolean = False
Public Const
DEF_ANSI_QUOTED_IDENTIFIERS As
Boolean = False
Public Const DEF_ANSI_NULLS As
Boolean = True
Public Const DEF_SHOW_QUERY_PLAN
As Boolean = False
Public Const DEF_SHOW_STATS_TIME
As Boolean = False
Public Const DEF_SHOW_STATS_IO
As Boolean = False
Public Const
DEF_PARSE_ODBC_MSG_PREFIXES As
Boolean = True
Public Const DEF_ROW_COUNT
As Long = 0
Public Const
DEF_TSQL_BATCH_SEPARATOR As
String = "GO"
Public Const DEF_QUERY_TIME_OUT
As Long = 0
Public Const DEF_SERVER_LANGUAGE
As String = "(Default)"
Public Const
DEF_CHARACTER_TRANSLATION As
Boolean = True
Public Const DEF_REGIONAL_SETTINGS
As Boolean = False

Public Const PARAM_DEFAULT_DIR
As String = "DEFAULT_DIR"
Public Const
PARAM_DEFAULT_DIR_DESC As
String = "Default destination directory " & _
"for all output and error files. If it is
blank, the StepMaster installation directory
will be used."

```

```

Public Const PARAM_RUN_ID As
String = "RUN_ID"
Public Const PARAM_RUN_ID_DESC As
String = "The run identifier for a run. " & _
"Any modifications will be overwritten
before each run."

Public Const PARAM_OUTPUT_DIR As
String = "OUTPUT_DIR"
Public Const PARAM_OUTPUT_DIR_DESC
As String = "The output directory for a run. " & _
"Any modifications will be overwritten
before each run."

Public Const
CONNECTION_STRINGS_TO_NAME_SUFFIX
As String = "_NAME"

Private Const TBL_RUN_STEP_HDR As String =
"run_header"
Private Const TBL_RUN_STEP_DTLS As String =
"run_step_details"
Public Const TBL_CONNECTION_DTLS As
String = "connection_dtls"
Public Const TBL_CONNECTION_STRINGS As
String = "workspace_connections"
Public Const TBL_STEPS As String = "att_steps"

Public Const FLD_ID_CONN_NAME As String =
"connection_name_id"
Public Const FLD_ID_WORKSPACE As String =
"workspace_id"
Public Const FLD_ID_STEP As String = "step_id"
Public Const FLD_ID_PARAMETER As String =
"parameter_id"

Public Const
FLD_CONN_DTL_CONNECTION_NAME As
String = "connection_name"
Public Const
FLD_CONN_DTL_CONNECTION_STRING As
String = "connection_string_name"
Public Const
FLD_CONN_DTL_CONNECTION_TYPE As
String = "connection_type"

Public Const
FLD_CONN_STR_CONNECTION_NAME As
String = "connection_name"

Public Const FLD_STEPS_EXEC_MECHANISM
As String = "execution_mechanism"
Public Const FLD_STEPS_EXEC_DTL As String =
"start_directory"
Public Const FLD_STEPS_VERSION_NO As
String = "version_no"

Public Const DATA_TYPE_CURRENCY As
String = "CURRENCY"
Public Const DATA_TYPE_LONG As String =
"Long"
Public Const DATA_TYPE_INTEGER As String =
"INTEGER"
Public Const DATA_TYPE_TEXT255 As String =
"Text(255)"

Private Sub InsertBuiltInParameter(dbFile As
Database, sParamName As String, _
sParamValue As String, sParamDesc As
String)

Dim sBuf As String
Dim cTempStr As New cStringSM
Dim lld As Long
Dim rTemp As DAO.Recordset

```

```

Dim rParam As DAO.Recordset
Dim cTempSeq As cSequence

' Create the passed in built-in parameter,
for each workspace in the db
Set cTempSeq = New cSequence
Set cTempSeq.IdDatabase = dbFile
cTempSeq.IdentifierColumn =
FLD_ID_PARAMETER

sBuf = "select * from att_workspaces "
Set rTemp = dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)
If rTemp.RecordCount <> 0 Then
rTemp.MoveFirst

While Not rTemp.EOF
sBuf = "select * from
workspace_parameters " & _
" where workspace_id = " &
Str(rTemp!workspace_id) & _
" and parameter_name = " &
cTempStr.MakeStringFieldValid(sParamName)
Set rParam =
dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)
If rParam.RecordCount <> 0 Then
rParam.MoveFirst
' Since the parameter already
exists, change it to a built-in type
sBuf = "update
workspace_parameters " & _
" set parameter_type = " &
CStr(gintParameterBuiltIn) & _
", description = " &
cTempStr.MakeStringFieldValid(sParamDesc) & _
" where workspace_id = " &
Str(rTemp!workspace_id) & _
" and parameter_id = " &
Str(rParam!parameter_id)
Else
' Else, insert a parameter record
IId = cTempSeq.Identifier
sBuf = "insert into
workspace_parameters " & _
"( workspace_id,
parameter_id, " & _
" parameter_name,
parameter_value, " & _
" description, parameter_type
) " & _
" values ( " & _
Str(rTemp!workspace_id) &
", " & Str(IId) & ", " & _
cTempStr.MakeStringFieldValid(sParamName) & ", " & _
cTempStr.MakeStringFieldValid(sParamValue) & ", " & _
cTempStr.MakeStringFieldValid(sParamDesc) & ", " & _
CStr(gintParameterBuiltIn) &
-
" ) "
End If
dbFile.Execute sBuf, dbFailOnError
rParam.Close

rTemp.MoveNext
Wend
End If

```

```

rTemp.Close

End Sub
Public Sub InitRunEngine()

Set gRunEngine = New rdoEngine
gRunEngine.rdoDefaultCursorDriver =
rDUseServer

End Sub

Public Function DefaultDBFile() As String
DefaultDBFile = GetSetting(App.Title,
"Settings",
STEPMASER_SETTINGS_VAL_NAME_D
BFILE, App.Path & msDefDBFile)
End Function

Public Sub CloseDatabase()

Dim dbsInstance As Database
Dim recInstance As Recordset

On Error GoTo CloseDatabaseErr

' Close all open recordsets and databases in
the workspace
For Each dbsInstance In wrkJet.Databases

For Each recInstance In
dbsAttTool.Recordsets
recInstance.Close
Next recInstance
dbsInstance.Close

Next dbsInstance

Set dbsAttTool = Nothing

gblnDbOpen = False
wrkJet.Close

Exit Sub

CloseDatabaseErr:

Call LogErrors(Errors)
Resume Next

End Sub

Private Function NoDbChanges(sVerTo As
String, sVerFrom As String) As Boolean

If sVerTo = gsVersion242 And sVerFrom =
gsVersion241 Then
NoDbChanges = True
ElseIf sVerTo = gsVersion242 And
sVerFrom = gsVersion24 Then
NoDbChanges = True
ElseIf sVerTo = gsVersion253 And
sVerFrom = gsVersion251 Then
NoDbChanges = True
ElseIf sVerTo = gsVersion255 And
sVerFrom = gsVersion251 Then
NoDbChanges = True
Else
NoDbChanges = False
End If

End Function

Public Function SMOpenDatabase(Optional
strDbName As String = gstrEmptyString) As
Boolean

```

```

Dim sVersion As String
Dim bOpeningDb As Boolean ' This flag is used
to check if OpenDatabase failed

On Error GoTo OpenDatabaseErr

bOpeningDb = False
SMOpenDatabase = False

' Create Microsoft Jet Workspace object.
If Not gblnDbOpen Then
Set wrkJet =
CreateWorkspace("att_tool_workspace_setup",
"admin", gstrEmptyString, dbUseJet)
End If

' Prompt the user for the database file if it is not
passed in
If StringEmpty(strDbName) Then
strDbName = BrowseDBFile
If StringEmpty(strDbName) Then
Exit Function
End If
End If

Do
If gblnDbOpen Then
#If Not RUN_ONLY Then
CloseOpenWorkspaces
#End If
Set wrkJet =
CreateWorkspace("att_tool_workspace_setup",
"admin", gstrEmptyString, dbUseJet)
End If

' Toggle the bOpeningDb flag around the
OpenDatabase method - the value
' of this flag will be checked by the error
handler to determine if it is
' the OpenDatabase that failed.
BugMessage "DB File: " & strDbName

bOpeningDb = True
' Open the database for exclusive use
Set dbsAttTool =
wrkJet.OpenDatabase(strDbName, Options:=True)
bOpeningDb = False

If dbsAttTool Is Nothing Then
' If the file is not present in the directory,
display
' an error and ask the user to enter a new
path
Call ShowError(errOpenDbFailed,
OptArgs:=strDbName)

strDbName = BrowseDBFile
Else
sVersion = DBVersion(dbsAttTool)

' Make sure the application and db version
numbers match
If sVersion = gsVersion Then
Call InitializeData(strDbName)
gblnDbOpen = True
SMOpenDatabase = True
Else
If UpgradeDb(wrkJet, dbsAttTool,
gsVersion, sVersion) Then
Call InitializeData(strDbName)
gblnDbOpen = True
SMOpenDatabase = True
Else
dbsAttTool.Close
Set dbsAttTool = Nothing

```

```

        ShowError
errVersionMismatch, _
        OptArgs:=" Please install
Version " & gsVersion & " of the
workspace definition file."
        strDbName = BrowseDBFile
        End If
        End If
        End If
        Loop While gbInDbOpen = False And
Not StringEmpty(strDbName)

        Exit Function

OpenDatabaseErr:
        Call DisplayErrors(Errors)

        ' If the OpenDatabase failed, continue
        If bOpeningDb Then
            Resume Next
        End If

        Call ShowError(errOpenDbFailed,
OptArgs:=strDbName)

End Function
Private Sub InitializeData(sDb As String)

        Set gcParameters = New cArrParameters
        Set gcParameters.ParamDatabase =
dbsAttTool

        Set gcSteps = New cArrSteps
        Set gcSteps.StepDB = dbsAttTool

        Set gcConstraints = New cArrConstraints
        Set gcConstraints.ConstraintDB =
dbsAttTool

        Set gcConnections = New cConnections
        Set gcConnections.ConnDb = dbsAttTool

        Set gcConnDtIs = New cConnDtIs
        Set gcConnDtIs.ConnDb = dbsAttTool

        ' Disable the error handler since this is not
a critical step
        On Error GoTo 0
        SaveSetting App.Title, "Settings",
STEPMASTER_SETTINGS_VAL_NAME
_DBFILE, sDb
        End Sub
Private Sub
UpdateContinuationCriteria(dbFile As
DAO.Database)

        Dim qyTemp As DAO.QueryDef
        Dim sBuf As String

        On Error GoTo
UpdateContinuationCriteriaErr

        sBuf = "Since this version of the
executable incorporates failure processing, "
& _
        "the upgrade will update the On
Failure field for each of the steps " & _
        "to 'Continue' to be compatible with
the existing behaviour. " & _
        "Proceed?"

        If Not Confirm(Buttons:=vbYesNo,
strMessage:=sBuf, strTitle:="Upgrade
database") Then
            Exit Sub

```

```

        End If

        ' Create a recordset object to retrieve all
steps for
        ' the given workspace
        sBuf = " update att_steps a " & _
        " set continuation_criteria = " &
CStr(gintOnFailureContinue) & _
        " where archived_flag = {archived} "

        ' Find the highest X-component of the
version number
        sBuf = sBuf & " AND cint( mid(
version_no, 1, instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") - 1 )) = " &
_
        " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") - 1 )) ) " & _
        " from att_steps AS d " & _
        " WHERE a.step_id = d.step_id ) "

        ' Find the highest Y-component of the
version number for the highest X-component
        sBuf = sBuf & " AND cint( mid(
version_no, instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") + 1 )) = " &
_
        " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") + 1 )) ) " & _
        " from att_steps AS b " & _
        " Where a.step_id = b.step_id " & _
        " AND cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & ") - 1 )) = " & _
        " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") - 1 )) ) " & _
        " from att_steps AS c " & _
        " WHERE a.step_id = c.step_id ) "

        ' Create a temporary Querydef object
        Set qyTemp =
dbFile.CreateQueryDef(gstrEmptyString,
sBuf)
        qyTemp.Parameters("archived").Value =
False

        qyTemp.Execute dbFailOnError
        qyTemp.Close

        Exit Sub

UpdateContinuationCriteriaErr:
        Call LogErrors(Errors)
        Err.Raise vbObjectError +
errModifyStepFailed, mstrModuleName, _
        LoadResString(errModifyStepFailed)

End Sub

Private Sub UpdateDbDtIs(dbFile As
Database, sNewVersion As String)

        Dim sSql As String
        Dim cTemp As New cStringSM

        On Error GoTo UpdateDbDtIsErr

        sSql = "update db_details " & _
        " set db_version = " &
cTemp.MakeStringFieldValid(sNewVersion)

```

```

        dbFile.Execute sSql, dbFailOnError

        Exit Sub

UpdateDbDtIsErr:
        Call LogErrors(Errors)
        Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade10to21(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

        Dim sSql As String

        On Error GoTo Upgrade10to21Err

        Call UpdateDbDtIs(dbFile, sVersion)

        Call UpdateContinuationCriteria(dbFile)

        Exit Sub

Upgrade10to21Err:
        UpgradeWsp.Rollback
        Call LogErrors(Errors)
        Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade21to23(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

        Dim sBuf As String
        Dim cTempStr As New cStringSM

        On Error GoTo Upgrade21to23Err

        ' Add a parameter type field and a description
field to the parameter table
        sBuf = "alter table workspace_parameters " & _
        " add column description TEXT(255) "
        dbFile.Execute sBuf, dbFailOnError

        sBuf = "alter table workspace_parameters " & _
        " add column parameter_type INTEGER "
        dbFile.Execute sBuf, dbFailOnError

        ' Initialize the parameter type on all parameters to
indicate generic parameters
        sBuf = "update workspace_parameters " & _
        " set parameter_type = " &
CStr(gintParameterGeneric)
        dbFile.Execute sBuf, dbFailOnError

        sBuf = "Release 2.3 onwards, connection string
parameters will be " & _
        "displayed in a separate node. After this
upgrade, all connection " & _
        "string parameters will appear under the
Globals/Connection Strings " & _
        "node in the workspace. "
        Call MsgBox(sBuf, vbOKOnly +
vbApplicationModal, "Upgrade database")

        ' Update the parameter type on all parameters that
look like db connection strings
        sBuf = "update workspace_parameters " & _
        " set parameter_type = " &
CStr(gintParameterConnect) & _

```

```

    ' where UCCase(parameter_value)
like '*DRIVER*' " & _
    ' or UCCase(parameter_value) like
'*DSN*'
    dbFile.Execute sBuf, dbFailOnError

' Add an elapsed time field to the
run_step_details table - this field is
' needed to store the elapsed time in
milliseconds.
sBuf = "alter table run_step_details " & _
    " add column elapsed_time LONG "
dbFile.Execute sBuf, dbFailOnError

' The failure_details field has some data
for the case when an ODBC failure
' threshold was specified. Since that's no
longer relevant, update the failure_details
' field for records with failure_criteria =
gintFailureODBC to empty.
' failure_criteria = gintFailureODBC = 1
sBuf = "update att_steps " & _
    " set failure_details = " &
cTempStr.MakeStringFieldValid(gstrEmpty
String) & _
    " where failure_criteria = '1'"
dbFile.Execute sBuf, dbFailOnError

Call UpdateDbDtls(dbFile, sVersion)

UpgradeWsp.CommitTrans

On Error GoTo DropColumnErr

UpgradeWsp.BeginTrans

' This ddl cannot be in the same
transaction as the failure_details update
' But we can do this in a separate
transaction since we do not expect this
' statement to fail - AND, it doesn't matter
if this transaction fails
' Drop the failure_criteria column from
the att_steps table
sBuf = "alter table att_steps " & _
    " drop column failure_criteria "
dbFile.Execute sBuf, dbFailOnError

Exit Sub

DropColumnErr:
Call LogErrors(Errors)
ShowError errDeleteColumnFailed
Exit Sub

Upgrade21to23Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
    LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade23to24(UpgradeWsp
As DAO.Workspace, dbFile As Database,
sVersion As String)

Dim sBuf As String
Dim Ild As Long
Dim rTemp As DAO.Recordset
Dim cTempStr As New cStringSM

On Error GoTo Upgrade23to24Err

```

```

' Add a new table for connection properties
sBuf = CreateConnectionsTableScript()
' TODO: Not sure of column sizes for row
count, tsqL_batch_separator and
server_language
dbFile.Execute sBuf, dbFailOnError

' Move all connection parameters from the
parameter table to the connections tables
' Insert default values for the newly added
connection properties
sBuf = "select * from workspace_parameters
" & _
    "where parameter_type = " &
CStr(gintParameterConnect)
Set rTemp = dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)
Ild = 1
If rTemp.RecordCount <> 0 Then
    rTemp.MoveFirst

    While Not rTemp.EOF
        sBuf = "insert into
workspace_connections " & _
            "( workspace_id, connection_id, " & _
            "connection_name, connection_value,
" & _
            "description, no_count_display, " & _
            "no_execute, parse_query_only, " & _
            "ANSI_quoted_identifiers,
ANSI_nulls, " & _
            "show_query_plan, show_stats_time, "
& _
            "show_stats_io,
parse_odbc_msg_prefixes, " & _
            "row_count, tsqL_batch_separator, " & _
            "query_time_out, server_language, " & _
            "character_translation,
regional_settings )" & _
            " values ( " & _
            Str(rTemp!workspace_id) & ", " &
Str(Ild) & ", " & _
            cTempStr.MakeStringFieldValid(" " &
rTemp!parameter_name) & ", " & _
            cTempStr.MakeStringFieldValid(" " &
rTemp!parameter_value) & ", " & _
            cTempStr.MakeStringFieldValid(" " &
rTemp!Description) & ", " & _
            Str(DEF_NO_COUNT_DISPLAY) &
", " & _
            Str(DEF_NO_EXECUTE) & ", " &
Str(DEF_PARSE_QUERY_ONLY) & ", " & _
            Str(DEF_ANSI_QUOTED_IDENTIFIERS) &
", " & Str(DEF_ANSI_NULLS) & ", " & _
            Str(DEF_SHOW_QUERY_PLAN) &
", " & Str(DEF_SHOW_STATS_TIME) & ", " &
            & _
            Str(DEF_SHOW_STATS_IO) & ", " &
Str(DEF_PARSE_ODBC_MSG_PREFIXES)
& ", " & _
            Str(DEF_ROW_COUNT) & ", " &
cTempStr.MakeStringFieldValid(DEF_TSQL_
BATCH_SEPARATOR) & ", " & _
            Str(DEF_QUERY_TIME_OUT) & ", "
&
            cTempStr.MakeStringFieldValid(DEF_SERV
ER_LANGUAGE) & ", " & _
            Str(DEF_CHARACTER_TRANSLATION) &
", " & Str(DEF_REGIONAL_SETTINGS) &
_
            " ) "
        dbFile.Execute sBuf, dbFailOnError
    
```

```

Ild = Ild + 1
rTemp.MoveNext
Wend
End If
rTemp.Close

' Add an identifier column for the connection_id
field
sBuf = "alter table att_identifiers " & _
    " add column connection_id long "
dbFile.Execute sBuf, dbFailOnError

' Initialize the value of the connection identifier,
initialized above
sBuf = "update att_identifiers " & _
    " set connection_id = " & Str(Ild)
dbFile.Execute sBuf, dbFailOnError

' Delete all connection strings from the parameter
table
sBuf = "delete from workspace_parameters " & _
    "where parameter_type = " &
CStr(gintParameterConnect)
dbFile.Execute sBuf, dbFailOnError

' Create the built-in parameter, default directory,
for each workspace in the db
Call InsertBuiltInParameter(dbFile,
PARAM_DEFAULT_DIR, gstrEmptyString,
PARAM_DEFAULT_DIR_DESC)

Call UpdateDbDtls(dbFile, sVersion)

Exit Sub

Upgrade23to24Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
    LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade24to25(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

Dim sBuf As String
Dim qy As DAO.QueryDef
Dim rTemp As DAO.Recordset
Dim Ild As Long
Dim cTempStr As New cStringSM

On Error GoTo Upgrade24to25Err

sBuf = "Release " & gsVersion25 & " onwards,
new 'Connections' must be created for all " & _
    "connection strings. " & vbCrLf & vbCrLf
& _
    "Connections will appear under the
Globals/Connections " & _
    "node in the workspace. " & vbCrLf & _
    "A list of all 'Connections' (instead of
'Connection Strings') " & _
    "in the workspace will be displayed in the
'Connections' field for " & _
    "ODBC steps on the Step definition screen.
" & vbCrLf & vbCrLf & _
    "Each Connection can be marked as static or
dynamic. " & vbCrLf & _
    "Dynamic connections will be created when
a step starts execution and " & _
    "closed once the step completes. " & vbCrLf
& _

```

```

"Static connections will be kept open
till the run completes." & vbCrLf & vbCrLf
& _
    "Currently dynamic 'Connections'
have been created for all existing
'Connection Strings' " & _
    "with the suffix " &
CONNECTION_STRINGS_TO_NAME_S
UFFIX
    Call MsgBox(sBuf, vbOKOnly +
vbApplicationModal, "Upgrade database")

' Add a new table for the connection name
entity
' This table has been added in order to
satisfy the TPC-H requirement that
' all the queries in a stream need to be
executed on a single connection.
sBuf =
CreateConnectionDtlsTableScript()
dbFile.Execute sBuf, dbFailOnError

' Add an identifier column for the
connection_name_id field
sBuf = "alter table att_identifiers " & _
    " add column " &
FLD_ID_CONN_NAME & " long "
dbFile.Execute sBuf, dbFailOnError

    Call UpdateDbDtls(dbFile, sVersion)

' insert connection_dtl records for each of
the connection strings
sBuf = "select * from " &
TBL_CONNECTION_STRINGS
    Set rTemp = dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)

    sBuf = "insert into " &
TBL_CONNECTION_DTLS & _
    "(" & FLD_ID_WORKSPACE & _
    "," & FLD_ID_CONN_NAME & _
    "," &
FLD_CONN_DTL_CONNECTION_NAM
E & _
    "," &
FLD_CONN_DTL_CONNECTION_STRIN
G & _
    "," &
FLD_CONN_DTL_CONNECTION_TYPE
& ")" & _
    " values ( [w_id], [c_id], [c_name],
[c_str], [c_type] )"
    Set qy = dbFile.CreateQueryDef("", sBuf)

    Ild = glMinId
    If rTemp.RecordCount <> 0 Then
        rTemp.MoveFirst

        While Not rTemp.EOF
            qy.Parameters("w_id").Value =
rTemp.Fields(FLD_ID_WORKSPACE)
            qy.Parameters("c_id").Value = Ild
            qy.Parameters("c_name").Value =
rTemp.Fields(FLD_CONN_STR_CONNEC
TION_NAME) &
CONNECTION_STRINGS_TO_NAME_S
UFFIX
            qy.Parameters("c_str").Value =
rTemp.Fields(FLD_CONN_STR_CONNEC
TION_NAME)
            qy.Parameters("c_type").Value =
ConnTypeDynamic

            qy.Execute dbFailOnError

```

```

        Ild = Ild + 1
        rTemp.MoveNext
    Wend
End If
qy.Close
rTemp.Close

' Initialize the value of the
connection_name_id
sBuf = "update att_identifiers " & _
    " set " & FLD_ID_CONN_NAME & "
= " & Str(Ild)
dbFile.Execute sBuf, dbFailOnError

' Update the start_directory field in att_steps
to point to the newly
' created connections
    Call ReadStepsInWorkspace(rTemp, qy,
glInvalidId, dbLoad:=dbFile, _
    bSelectArchivedRecords:=False)

    sBuf = "update " & TBL_STEPS & _
    " set " & FLD_STEPS_EXEC_DTL & " =
[c_name] " & _
    " where " & FLD_ID_STEP & " = [s_id] "
& _
    " and " & FLD_STEPS_VERSION_NO
& " = [ver_no] "
    Set qy = dbFile.CreateQueryDef("", sBuf)

    If rTemp.RecordCount <> 0 Then
        rTemp.MoveFirst

        While Not rTemp.EOF
            If
rTemp.Fields(FLD_STEPS_EXEC_MECHAN
ISM).Value = gintExecuteODBC Then
                If Not (StringEmpty("" &
rTemp.Fields(FLD_STEPS_EXEC_DTL)))
                    Then
                        sBuf =
rTemp.Fields(FLD_STEPS_EXEC_DTL)
                        ' Strip the enclosing "%"
characters
                        sBuf = Mid(sBuf, 2, Len(sBuf) -
2) &
CONNECTION_STRINGS_TO_NAME_SUF
FIX

                        qy.Parameters("c_name").Value =
sBuf
                        qy.Parameters("s_id").Value =
rTemp.Fields(FLD_ID_STEP)
                        qy.Parameters("ver_no").Value =
rTemp.Fields(FLD_STEPS_VERSION_NO)

                        qy.Execute dbFailOnError
                    End If
                End If
                rTemp.MoveNext
            Wend
        End If

        qy.Close
        rTemp.Close

        Exit Sub

Upgrade243to25Err:
    UpgradeWsp.Rollback
    Call LogErrors(Errors)
    Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
        LoadResString(errUpgradeFailed)

```

```

End Sub
Private Sub Upgrade25to251(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

    On Error GoTo Upgrade25to251Err

    ' Create the built-in parameters, run_id and
output_dir, for each workspace in the db
    Call InsertBuiltInParameter(dbFile,
PARAM_RUN_ID, gstrEmptyString,
PARAM_RUN_ID_DESC)
    Call InsertBuiltInParameter(dbFile,
PARAM_OUTPUT_DIR, gstrEmptyString,
PARAM_OUTPUT_DIR_DESC)

    Call UpdateDbDtls(dbFile, sVersion)

    Exit Sub

Upgrade25to251Err:
    UpgradeWsp.Rollback
    Call LogErrors(Errors)
    Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
        LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade242to243(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

    Dim sBuf As String
    Dim cTempStr As New cStringSM
    Dim iResponse As Integer

    On Error GoTo DeleteHistoryErr

    Call DeleteRunHistory(dbFile)

    On Error GoTo Upgrade242to243Err

    UpgradeWsp.CommitTrans

    UpgradeWsp.BeginTrans

    ' Add a parameter type field and a description
field to the parameter table
    sBuf = "alter table run_step_details " & _
    " add column parent_instance_id LONG "

    dbFile.Execute sBuf, dbFailOnError

    sBuf = "alter table run_step_details " & _
    " add column iterator_value TEXT(255) "

    dbFile.Execute sBuf, dbFailOnError

    Call AlterFieldType(dbFile,
TBL_RUN_STEP_DTLS, "start_time",
DATA_TYPE_CURRENCY)
    Call AlterFieldType(dbFile,
TBL_RUN_STEP_DTLS, "end_time",
DATA_TYPE_CURRENCY)
    Call AlterFieldType(dbFile,
TBL_RUN_STEP_HDR, "start_time",
DATA_TYPE_CURRENCY)
    Call AlterFieldType(dbFile,
TBL_RUN_STEP_HDR, "end_time",
DATA_TYPE_CURRENCY)

    Call UpdateDbDtls(dbFile, sVersion)

```



```

Exit Sub
DeleteHistoryErr:
' This is not a critical error - continue with
upgrade
Call LogErrors(Errors)
Resume Next

Upgrade242to243Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub
*****
*****
' The AlterFieldType Sub procedure requires
three string
' parameters. The first string specifies the
name of the table
' containing the field to be changed. The
second string specifies
' the name of the field to be changed. The
third string specifies
' the new data type for the field.
*****
*****
Private Sub AlterFieldType(dbFile As
Database, TblName As String, FieldName
As String, _
NewDataType As String)
Dim qdf As DAO.QueryDef
Dim sSql As String

' Add a temporary field to the table.
sSql = "ALTER TABLE [" & TblName &
_
"] ADD COLUMN AlterTempField
" & NewDataType
Set qdf = dbFile.CreateQueryDef("",
sSql)
qdf.Execute

' Copy the data from old field into the new
field.
qdf.SQL = "UPDATE DISTINCTROW
[" & TblName & "] SET AlterTempField =
[" & FieldName & "]"
qdf.Execute

' Delete the old field.
qdf.SQL = "ALTER TABLE [" &
TblName & "] DROP COLUMN [" &
FieldName & "]"
qdf.Execute

' Rename the temporary field to the old
field's name.
dbFile.TableDefs("[[" & TblName &
"]").Fields("AlterTempField").Name =
FieldName
dbFile.TableDefs.Refresh

' Clean up.
End Sub
Private Sub Upgrade01to21(UpgradeWsp
As DAO.Workspace, dbFile As
DAO.Database, sVersion As String)
Dim sSql As String

On Error GoTo Upgrade01to21Err

```

```

sSql = "Create table db_details (" & _
"db_version          Text(50) " & _
");"

dbFile.Execute sSql, dbFailOnError

sSql = "insert into db_details " & _
"( db_version ) values ( '" & sVersion
& "' )"

dbFile.Execute sSql, dbFailOnError

Call UpdateContinuationCriteria(dbFile)

Exit Sub

Upgrade01to21Err:
Call LogErrors(Errors)
UpgradeWsp.Rollback
Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub
Private Function UpgradeDb(UpgradeWsp As
DAO.Workspace, dbFile As Database, _
sVerTo As String, sVerFrom As String)
As Boolean

Dim sMsg As String

On Error GoTo UpgradeDbErr

UpgradeDb = False
If Not ValidUpgrade(sVerTo, sVerFrom)
Then Exit Function

If NoDbChanges(sVerTo, sVerFrom) Then
UpgradeDb = True
Exit Function
End If

sMsg = "The database needs to be upgraded
from Version " & sVerFrom & _
" to Version " & sVerTo & "." &
vbCrLf & _
"Proceed?"
If Not Confirm(Buttons:=vbYesNo,
strMessage:=sMsg, strTitle:="Upgrade
database") Then
Exit Function
End If

UpgradeWsp.BeginTrans

Select Case sVerFrom
Case gsVersion25
Call Upgrade25to251(UpgradeWsp,
dbFile, gsVersion251)

Case gsVersion243
Call Upgrade243to25(UpgradeWsp,
dbFile, gsVersion25)
Call Upgrade25to251(UpgradeWsp,
dbFile, gsVersion251)

Case gsVersion24, gsVersion241,
gsVersion242
sMsg = "After this upgrade, the run
history for previous runs will no longer be
available. " & _
"Continue?"
If Not Confirm(Buttons:=vbYesNo,
strMessage:=sMsg, strTitle:="Upgrade
database") Then

```

```

UpgradeWsp.CommitTrans
Exit Function
End If
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion243)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion23
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion21
Call Upgrade21to23(UpgradeWsp, dbFile,
gsVersion23)
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion10
Call Upgrade10to21(UpgradeWsp, dbFile,
gsVersion21)
Call Upgrade21to23(UpgradeWsp, dbFile,
gsVersion23)
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion01
Call Upgrade01to21(UpgradeWsp, dbFile,
gsVersion21)
Call Upgrade21to23(UpgradeWsp, dbFile,
gsVersion23)
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

End Select

UpgradeWsp.CommitTrans

UpgradeDb = True
Exit Function

UpgradeDbErr:
Call LogErrors(Errors)
ShowError errUpgradeFailed

End Function
Private Function DBVersion(TestDb As Database)
As String
' Retrieves the database version

```

```

Dim rVersion As Recordset

On Error GoTo DBVersionErr

Set rVersion =
TestDb.OpenRecordset("Select db_version
from db_details ", _
dbOpenForwardOnly)

BugAssert rVersion.RecordCount <> 0
DBVersion = rVersion!db_version

rVersion.Close
Exit Function

DBVersionErr:
If Err.Number = merrDaoTableMissing
Then
    DBVersion = gsVersion01
Else
    LogErrors Errors
    Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
LoadResString(errUpgradeFailed)
End If

End Function

Private Function ValidUpgrade(sVerTo As
String, sVerFrom As String) As Boolean

    If sVerTo = gsVersion And sVerFrom =
gsVersion251 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion25 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion243 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion242 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion241 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion24 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion23 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion21 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion10 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion01 Then
        ValidUpgrade = True
    Else
        ValidUpgrade = False
    End If

End Function

Attribute VB_Name = "DebugSM"
' FILE: DebugSM.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
'

```

```

' PURPOSE: Contains all the functions that
carry out error/debug
' processing for the project.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
' Most of the functions in this module that
manipulate the
' error object do not have an On Error GoTo
statement - this
' is because it will clear the passed in error
object - let
' the calling functions handle the errors raised
by this
' module, if any
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"DebugSM."

Private mcLogFile As cFileSM
Private mcErrorFile As cFileSM

Private Const
FORMAT_MESSAGE_FROM_SYSTEM =
&H1000
Private Const
FORMAT_MESSAGE_IGNORE_INSERTS =
&H200
Private Const pNull = 0

Declare Function FormatMessage Lib
"kernel32" Alias "FormatMessageA" (ByVal
dwFlags As Long, lpSource As Any, ByVal
dwMessageId As Long, ByVal dwLanguageId
As Long, ByVal lpbuffer As String, ByVal
nSize As Long, Arguments As Long) As Long
Public Function Confirm(Optional
lngMessageCode As conConfirmMsgCodes, _
Optional lngTitleCode As
conConfirmMsgTitleCodes, _
Optional TitleParameter As String, _
Optional ByVal Buttons As Integer = -1, _
Optional strMessage As String =
gstrEmptyString, _
Optional strTitle As String =
gstrEmptyString) _
As Boolean
    ' Displays a confirmation message
corresponding to the
    ' passed in message code. Returns True if the
user says
    ' Ok and False otherwise

    Dim intResponse As Integer
    Dim intButtonStyle As Integer

    On Error GoTo ConfirmErr

    Confirm = False

    ' If the buttons style hasn't been specified, set
the
    ' default style to display OK and Cancel
buttons
    If Buttons = -1 Then
        intButtonStyle = vbOKCancel
    Else
        intButtonStyle = Buttons
    End If

```

```

' Find the message string for the passed in code
If StringEmpty(strMessage) Then
    strMessage =
Trim$(LoadResString(lngMessageCode))
End If

If StringEmpty(strTitle) Then
    strTitle =
Trim$(LoadResString(lngTitleCode))
End If

If Not StringEmpty(TitleParameter) Then
    strTitle = strTitle & Chr$(vbKeySpace) & _
gstrSQ & TitleParameter & gstrSQ
End If

' Display the confirmation message with the
Cancel button
' set to the default - assume that we are
confirming
' potentially dangerous operations!
intResponse = MsgBox(strMessage, _
intButtonStyle + vbQuestion +
vbApplicationModal, _
strTitle)

' Translate the user response into a True/False
return code
If intButtonStyle = vbOKCancel Then
    If intResponse = vbOK Then
        Confirm = True
    Else
        Confirm = False
    End If
Else
    If intResponse = vbYes Then
        Confirm = True
    Else
        Confirm = False
    End If
End If

Exit Function

ConfirmErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
gstrSource = mstrModuleName & "Confirm"
Err.Raise vbObjectError + errConfirmFailed, _
gstrSource, _
LoadResString(errConfirmFailed)

End Function
Public Sub LogSystemError()
    Dim eErrCode As Long

    eErrCode = GetLastError()
    If eErrCode <> 0 Then
        WriteToFile "System Error: " & eErrCode &
vbCrLf & ApiError(eErrCode), _
blnError:=True
    End If
End Sub
Public Function ApiError(ByVal e As Long) As
String

    Dim s As String
    Dim c As Long

    s = String(256, 0)
    c =
FormatMessage(FORMAT_MESSAGE_FROM_S
YSTEM Or _

```

```

FORMAT_MESSAGE_IGNORE_INSERT
S, _
    pNull, e, 0&, s, Len(s), ByVal pNull)
    If c Then ApiError = e & " " & Left$(s,
c)
End Function

' Output flags determine output destination
of BugAsserts and messages
#Const afLogFile = 1
#Const afMsgBox = 2
#Const afDebugWin = 4
#Const afAppLog = 8

' Display appropriate error message, and
then stop
' program. These errors should NOT be
possible in
' shipping product.
Sub BugAssert(ByVal fExpression As
Boolean, _
    Optional sExpression As String)
#If afDebug Then
    If fExpression Then Exit Sub
    BugMessage "BugAssert failed: " &
sExpression
    Stop
#End If
End Sub

Sub BugMessage(sMsg As String)

#If afDebug And afLogFile Then
    ' Since we are writing log messages, the
error flag is turned off
    Call WriteToFile(sMsg, False)
#End If
#If afDebug And afMsgBox Then
    MsgBox sMsg
#End If
#If afDebug And afDebugWin Then
    Debug.Print sMsg
#End If
#If afDebug And afAppLog Then
    App.LogEvent sMsg
#End If

End Sub
Public Function ProjectLogFile() As String

    ProjectLogFile = mcLogFile.FileName

End Function
Public Function ProjectErrorFile() As String

    ProjectErrorFile = mcErrorFile.FileName

End Function

Private Sub WriteToFile(sMsg As String,
Optional ByVal blnError As Boolean)

' Calls procedures to write the passed in
message to the log -
' The blnError flag is used to indicate that
the message
' should be logged to the error file - by
default the log
' file is used

    Dim mcFileObj As cFileSM
    Dim strFileName As String
    Dim strFileHdr As String

```

```

On Error GoTo WriteToFileErr

If blnError Then
    If mcErrorFile Is Nothing Then
        Set mcErrorFile = New cFileSM
    End If
    Set mcFileObj = mcErrorFile
Else
    If mcLogFile Is Nothing Then
        Set mcLogFile = New cFileSM
    End If
    Set mcFileObj = mcLogFile
End If

If StringEmpty(mcFileObj.FileName) Then
    If blnError Then
        strFileName = gstrProjectPath & "\ " &
App.EXENAME & ".ERR"
        strFileHdr = "Stepmaster Errors"
    Else
        strFileName = gstrProjectPath & "\ " &
App.EXENAME & ".DBG"
        strFileHdr = "Stepmaster Log"
    End If

    mcFileObj.FileName = strFileName
    mcFileObj.WriteLine strFileHdr
    mcFileObj.WriteLine "Log start time : "
& Now
End If

    mcFileObj.WriteLine sMsg

Exit Sub

WriteToFileErr:
' Display the error code raised by Visual
Basic
    Call DisplayErrors(Errors)
' An error message would've been displayed
by the called
' procedures

End Sub
Public Sub WriteMessage(sMsg As String)

    Call WriteToFile(sMsg, True)

End Sub

Sub BugTerm()
#If afDebug And afLogFile Then
    ' Close log file
    mcLogFile.CloseFile
#End If
End Sub

Public Sub ShowError(ByVal ErrorCode As
errErrorConstants, _
    Optional ByVal ErrorSource As String =
gstrEmptyString, _
    Optional ByVal OptArgs As String =
gstrEmptyString, _
    Optional ByVal DoWriteError As
Boolean = True)

    If DoWriteError Then
        ' Call a procedure to write the error to a
log file
        Call WriteError(ErrorCode, ErrorSource,
OptArgs)
    End If

```

```

' Re-initialize the values of the Error object
before
' displaying the error to the user
    Call InitErrObject(ErrorCode, ErrorSource,
OptArgs)

    Call DisplayErrors(Errors)

    Err.Clear

End Sub
Public Sub WriteError(ByVal ErrorCode As
errErrorConstants, _
    Optional ByVal ErrorSource As String =
gstrEmptyString, _
    Optional ByVal OptArgs As String =
gstrEmptyString)

' Initialize the values of the Error object before
' calling the log function
    Call InitErrObject(ErrorCode, ErrorSource,
OptArgs)

    Call LogErrors(Errors)

    Err.Clear

End Sub
Private Sub InitErrObject(ByVal ErrorCode As
errErrorConstants, _
    Optional ByVal ErrorSource As String =
gstrEmptyString, _
    Optional ByVal OptArgs As String =
gstrEmptyString)

    Dim lngError As Long

    lngError = IIf(ErrorCode > vbObjectError And
ErrorCode < vbObjectError + 65535, _
        ErrorCode - vbObjectError, ErrorCode)
    Err.Number = lngError + vbObjectError
    Err.Description = LoadResString(lngError) &
OptArgs
    Err.Source = App.EXENAME & ErrorSource

End Sub
Public Sub ShowMessage(ByVal MessageCode As
errErrorConstants, _
    Optional ByVal OptArgs As String)

    Dim strMessage As String

    On Error GoTo ShowMessageErr

    strMessage = LoadResString(MessageCode) &
OptArgs

' Write the error to a log file
    BugMessage strMessage

    MsgBox strMessage, vbOKOnly

Exit Sub

ShowMessageErr:
' Log the error and exit
    Call DisplayErrors(Errors)

End Sub
Public Sub ShowMessageStr(sMessage As String)

' Write the error to a log file
    BugMessage sMessage

    MsgBox sMessage, vbOKOnly

```

```

End Sub

Public Sub DisplayErrors(myErrCollection
As Errors)
    Dim strError As String
    Dim errLoop As Error
    Dim errCode As Long

    ' Enumerate Errors collection and display
    properties of
    ' each Error object.
    If Err.Number <> 0 Then
        If Err.Number > vbObjectError And
Err.Number < (vbObjectError + 65536)
Then
            errCode = Err.Number -
vbObjectError
            Else
                errCode = Err.Number
            End If
            strError = "Error # " & Str(errCode) &
" was generated by " _
& Err.Source & Chr(13) &
Err.Description
            MsgBox strError, "Error",
Err.HelpFile, Err.HelpContext
            Else
                For Each errLoop In myErrCollection
                    With errLoop
                        If Err.Number > vbObjectError
And Err.Number < (vbObjectError + 65536)
Then
                            errCode = .Number -
vbObjectError
                            Else
                                errCode = .Number
                            End If
                            strError = "Error #" & errCode &
vbCrLf
                            strError = strError & " " &
.Description & vbCrLf
                            strError = strError & _
" (Source: " & .Source & ")"
& vbCrLf
                            strError = strError & _
"Press F1 to see topic " &
.HelpContext & vbCrLf
                            strError = strError & _
" in the file " & .HelpFile &
"."
                        End With

                        MsgBox strError
                    Next
                End If
            End Sub

Public Sub LogErrors(myErrCollection As
Errors)
    Dim cColErrors As cVectorStr
    Dim strError As String
    Dim errLoop As Error
    Dim errCode As Long
    Dim lngIndex As Long

    Set cColErrors = New cVectorStr

    ' Enumerate Errors collection and display
    properties of
    ' each Error object.
    If Err.Number <> 0 Then
        If Err.Number > vbObjectError And
Err.Number < (vbObjectError + 65536)
Then

```

```

            errCode = Err.Number - vbObjectError
            Else
                errCode = Err.Number
            End If
            strError = "Error # " & Str(errCode) & "
was generated by " _
& Err.Source & vbCrLf &
Err.Description

            cColErrors.Add strError
        End If

        ' Log all database errors, if any
        For Each errLoop In myErrCollection
            With errLoop
                If Err.Number > vbObjectError And
Err.Number < (vbObjectError + 65536) Then
                    errCode = .Number - vbObjectError
                Else
                    errCode = .Number
                End If
                strError = "Error #" & errCode &
vbCrLf
                strError = strError & " " &
.Description & vbCrLf
                strError = strError & _
" (Source: " & .Source & ")"
vbCrLf
                End With

                cColErrors.Add strError
            Next

            ' We can have a error handler now that we
            have stored all
            ' errors away safely! - having an error
            handler before
            ' enumerating all the errors would have
            cleared the error
            ' collection
            On Error GoTo LogErrorsErr
            gstrSource = mstrModuleName &
"LogErrors"

            For lngIndex = 0 To cColErrors.Count - 1
                strError = cColErrors(lngIndex)
                Debug.Print strError
                Call WriteToFile(strError, True)
            Next lngIndex

            Set cColErrors = Nothing

        Exit Sub

LogErrorsErr:
    ' Display the error code raised by Visual
    Basic
    DisplayErrors Errors
    On Error GoTo 0
    ShowError errUnableToWriteError,
DoWriteError:=False

End Sub
Attribute VB_Name = "FileCommon"
' FILE: FileCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: This module contains common
functionality to display
' the File Open dialog.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

```

```

Option Explicit

' Used to indicate the source module name when
errors
' are raised by this module
Private Const mstrModuleName As String =
"FileCommon."

Private Enum EOpenFile
    OFN_OVERWRITEPROMPT = &H2
    OFN_HIDEREADONLY = &H4
    OFN_FILEMUSTEXIST = &H1000
    OFN_EXPLORER = &H80000
End Enum

' The locations for the different output files are
presented to
' the user in a list box. These constants are used
while loading the
' data and while reading the data from the list box.
' These constants also represent the different file
types that are
' displayed to the user in File Open dialogs
Public Enum gFileTypes
    gintOutputFile = 0
    ' gintLogFile = 1
    gintErrorFile
    gintStepTextFile
    gintOutputCompareFile
    gintDBFile
    gintDBFileNew
    gintImportFile
    gintExportFile
End Enum

Public Const gsSqlFileSuffix = ".sql"
Public Const gsCmdFileSuffix = ".cmd"

Public Const gsOutputFileSuffix = ".out"
Public Const gstrLogFileSuffix = ".log"
Public Const gsErrorFileSuffix = ".err"
Public Function BrowseDBFile() As String
    ' Prompts the user for a database file with the
    workspace information
    ' Call CallFileDialog to display the open file
    dialog
    BrowseDBFile = CallFileDialog(gintDBFile)

End Function
Public Function CallFileDialog(intFileType As
Integer, _
Optional ByVal strDefaultFile As String =
gstrEmptyString) As String
    ' This function initializes the values of the filter
    property,
    ' the dialog title and flags for the File Open dialog
    depending
    ' on the FileType passed in
    ' It then calls ShowFileOpenDialog to set these
    properties and
    ' display the File Open dialog to the user

    ' All the properties used by the File Open dialog
    are defined
    ' as constants in this function and passed to
    ShowFileOpenDialog
    ' as parameters. So if any of the dialog properties
    need to be
    ' modified, these constants are what need to be
    changed
    Const s_DLG_TITLE_OPEN = "Open"
    Const s_DLG_TITLE_NEW = "New"
    Const s_DLG_TITLE_IMPORT = "Import
From"

```

```

Const s_DLG_TITLE_EXPORT =
"Export To"

Const mlng_FILE_STEP_TEXT_FLAGS
= OFN_EXPLORER Or
OFN_FILEMUSTEXIST Or
OFN_HIDEREADONLY
Const
mlng_FILE_OUTPUT_COMPARE_FLAG
S = mlng_FILE_STEP_TEXT_FLAGS
Const mlng_FILE_DB_FLAGS =
mlng_FILE_STEP_TEXT_FLAGS
Const mlng_FILE_OUTPUT_FLAGS =
OFN_EXPLORER Or
OFN_HIDEREADONLY Or
OFN_OVERWRITEPROMPT
Const mlng_FILE_LOG_FLAGS =
mlng_FILE_OUTPUT_FLAGS
Const mlng_FILE_ERROR_FLAGS =
mlng_FILE_OUTPUT_FLAGS
Const mlng_FILE_DB_NEW_FLAGS =
mlng_FILE_OUTPUT_FLAGS

Const mstr_FILE_ALL_FILTER = "|All
Files (*.*)*.*"
Const mstr_FILE_STEP_TEXT_FILTER
= "Query Files (*.*) & gsSqlFileSuffix &
")*" & gsSqlFileSuffix &
"|Command Script Files (*.*) &
gsCmdFileSuffix &
")*" & gsCmdFileSuffix
Const
mstr_FILE_OUTPUT_COMPARE_FILTER
R = "Text Files (*.txt)*.txt"
Const mstr_FILE_OUTPUT_FILTER =
"Output Files (*.out)*.out"
Const mstr_FILE_LOG_FILTER = "Log
Files (*.log)*.log"
Const mstr_FILE_ERROR_FILTER =
"Error Files (*.err)*.err"
Const mstr_FILE_DB_FILTER =
"Stepmaster Workspace Files (*.*) &
gsDefDBFileExt & *)*" & gsDefDBFileExt

Dim strFileName As String

On Error GoTo CallFileDialogErr

Select Case intFileType
Case gintStepTextFile
strFileName =
ShowFileDialog( _
mstr_FILE_STEP_TEXT_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_STEP_TEXT_FLAGS, _
strDefaultFile)

Case gintOutputCompareFile
strFileName =
ShowFileDialog( _
mstr_FILE_OUTPUT_COMPARE_FILTER
R & mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_OUTPUT_COMPARE_FLAG
S, _
strDefaultFile)

Case gintOutputFile
strFileName =
ShowFileDialog( _

```

```

mstr_FILE_OUTPUT_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_OUTPUT_FLAGS, _
strDefaultFile)

Case gintLogFile
strFileName = ShowFileDialog( _
mstr_FILE_LOG_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_LOG_FLAGS, _
strDefaultFile)

Case gintErrorFile
strFileName = ShowFileDialog( _
mstr_FILE_ERROR_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_ERROR_FLAGS, _
strDefaultFile)

Case gintDBFile
strFileName = ShowFileDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_DB_FLAGS, _
strDefaultFile)

Case gintDBFileNew
strFileName = ShowFileDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_NEW, _
mlng_FILE_DB_NEW_FLAGS, _
strDefaultFile)

Case gintImportFile
strFileName = ShowFileDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_IMPORT, _
mlng_FILE_DB_FLAGS, _
strDefaultFile)

Case gintExportFile
strFileName = ShowFileDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_EXPORT, _
mlng_FILE_DB_FLAGS, _
strDefaultFile)

Case Else
BugAssert True, "Incorrect file type
passed in."
'Default processing will be for the
output file
strFileName = ShowFileDialog( _
mstr_FILE_OUTPUT_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_OUTPUT_FLAGS, _
strDefaultFile)

End Select
CallFileDialog = strFileName

Exit Function

CallFileDialogErr:
CallFileDialog = gstrEmptyString
'Log the error code raised by Visual Basic
Call LogErrors(Errors)

```

```

gstrSource = mstrModuleName &
"CallFileDialog"
Call ShowError(errBrowseFailed)

End Function

VERSION 5.00
Begin VB.Form frmSplash
BorderStyle = 3 'Fixed Dialog
ClientHeight = 4710
ClientLeft = 45
ClientTop = 45
ClientWidth = 7455
ControlBox = 0 'False
Icon = "frmSplash.frx":0000
LinkTopic = "Form1"
LockControls = -1 'True
MaxButton = 0 'False
MinButton = 0 'False
ScaleHeight = 4710
ScaleWidth = 7455
ShowInTaskbar = 0 'False
StartupPosition = 2 'CenterScreen
Visible = 0 'False
Begin VB.Frame fraMainFrame
Height = 4590
Left = 45
TabIndex = 0
Top = -15
Width = 7380
Begin VB.PictureBox picLogo
Height = 2385
Left = 510
Picture = "frmSplash.frx":0442
ScaleHeight = 2325
ScaleWidth = 1755
TabIndex = 1
Top = 855
Width = 1815
End
Begin VB.Label lblReserved
AutoSize = -1 'True
Caption = "All Rights Reserved."
Height = 195
Left = 5520
TabIndex = 8
Top = 4080
Width = 1440
End
Begin VB.Label lblCopyright
AutoSize = -1 'True
Caption = "Copyright © 1998"
BeginProperty Font
Name = "Arial"
Size = 8.25
Charset = 0
Weight = 400
Underline = 0 'False
Italic = 0 'False
Strikethrough = 0 'False
EndProperty
Height = 210
Left = 5550
TabIndex = 7
Tag = "Copyright"
Top = 3850
Width = 1380
WordWrap = -1 'True
End
Begin VB.Label lblCompany
AutoSize = -1 'True
Caption = "Microsoft Corporation"
BeginProperty Font
Name = "Arial"
Size = 8.25

```

```

    Charset = 0
    Weight = 400
    Underline = 0 'False
    Italic = 0 'False
    Strikethrough = 0 'False
EndProperty
Height = 210
Left = 5460
TabIndex = 6
Tag = "Company"
Top = 3640
Width = 1560
End
Begin VB.Label lblRestrictions
    AutoSize = -1 'True
    Caption = "See License
Agreement for Restrictions"
    Height = 195
    Left = 460
    TabIndex = 5
    Top = 4080
    Width = 2790
End
Begin VB.Label lblProductName
    AutoSize = -1 'True
    Caption = "StepMaster"
    BeginProperty Font
        Name = "Arial"
        Size = 32.25
        Charset = 0
        Weight = 700
        Underline = 0 'False
        Italic = 0 'False
        Strikethrough = 0 'False
    EndProperty
    Height = 765
    Left = 2670
    TabIndex = 4
    Tag = "Product"
    Top = 1200
    Width = 3495
End
Begin VB.Label lblVersion
    Alignment = 1 'Right Justify
    AutoSize = -1 'True
    Caption = "Version 2.4"
    BeginProperty Font
        Name = "Arial"
        Size = 12
        Charset = 0
        Weight = 700
        Underline = 0 'False
        Italic = 0 'False
        Strikethrough = 0 'False
    EndProperty
    Height = 285
    Left = 4800
    TabIndex = 3
    Tag = "Version"
    Top = 2040
    Width = 1275
End
Begin VB.Label lblWarning
    AutoSize = -1 'True
    Caption = "Do Not Redistribute"
    BeginProperty Font
        Name = "Arial"
        Size = 8.25
        Charset = 0
        Weight = 400
        Underline = 0 'False
        Italic = 0 'False
        Strikethrough = 0 'False
    EndProperty
    Height = 210

```

```

    Left = 480
    TabIndex = 2
    Tag = "Warning"
    Top = 3850
    Width = 1380
End
End
Attribute VB_Name = "frmSplash"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
' FILE: frmSplash.frm
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Splash screen for StepMaster
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private Sub Form_Load()
    lblVersion.Caption = "Version " &
App.Major & "." & App.Minor & "." &
App.Revision
    lblProductName.Caption = App.Title
    lblVersion.Caption = GetVersionString
End Sub

VERSION 5.00
Begin VB.Form frmWorkspaceOpen
    BorderStyle = 3 'Fixed Dialog
    Caption = "Open Workspace"
    ClientHeight = 2550
    ClientLeft = 45
    ClientTop = 330
    ClientWidth = 4695
    LinkTopic = "Form1"
    LockControls = -1 'True
    MaxButton = 0 'False
    MinButton = 0 'False
    ScaleHeight = 2550
    ScaleWidth = 4695
    ShowInTaskbar = 0 'False
    StartUpPosition = 1 'CenterOwner
    Begin VB.CommandButton cmdOK
        Caption = "OK"
        Default = -1 'True
        Height = 375
        Left = 2160
        TabIndex = 2
        Top = 2040
        Width = 1095
    End
    Begin VB.CommandButton cmdCancel
        Cancel = -1 'True
        Caption = "Cancel"
        Height = 375
        Left = 3360
        TabIndex = 3
        Top = 2040
        Width = 1095
    End
    Begin VB.ListBox lstWorkspaces
        Height = 1425
        ItemData =
"frmWorkspaceOpen.frx":0000

```

```

    Left = 240
    List = "frmWorkspaceOpen.frx":0002
    MultiSelect = 2 'Extended
    TabIndex = 1
    Top = 480
    Width = 4215
End
Begin VB.Label lblWorkspaces
    AutoSize = -1 'True
    Caption = "Workspace"
    Height = 195
    Left = 240
    TabIndex = 0
    Top = 120
    Width = 825
End
Attribute VB_Name = "frmWorkspaceOpen"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
' FILE: frmWorkspaceOpen.frm
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Used to display a list of all
workspaces in a
' workspace definition file for Open, Import,
Export
' and Run (in SMRunOnly) workspace
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
#If RUN_ONLY Then
    Private WithEvents cRunOnlyInst As cRunOnly
    Attribute cRunOnlyInst.VB_VarHelpID = -1

Private Sub cRunOnlyInst_Done()
    ShowFree
End Sub

Private Sub Run()
    Dim iIndex As Integer

    Set cRunOnlyInst = New cRunOnly

    For iIndex = 0 To Me.lstWorkspaces.ListCount -
1
        If Me.lstWorkspaces.Selected(iIndex) Then
            ShowBusy
            cRunOnlyInst.WorkspaceId =
Me.lstWorkspaces.ItemData(Me.lstWorkspaces.List
Index)
            cRunOnlyInst.WspName =
Me.lstWorkspaces.List(Me.lstWorkspaces.ListInde
x)
            cRunOnlyInst.RunWsp
        End If
    Next iIndex
End Sub

#End If

Private Sub cmdCancel_Click()

    Unload Me
End Sub

Private Sub cmdOK_Click()

```

```

#If RUN_ONLY Then
  Call Run
#Else
  Call WorkspaceOpenOk
#End If

End Sub

Private Sub lstWorkspaces_DblClick()

  ' A double click on the workspaces list
  box is considered
  ' equivalent to selecting an item in the list
  and then selecting
  ' the OK command
  Call cmdOK_Click

End Sub

Attribute VB_Name = "IteratorCommon"
' FILE:  IteratorCommon.bas
'       Microsoft TPC-H Kit Ver. 1.00
'       Copyright Microsoft, 1999
'       All Rights Reserved
'
' PURPOSE:  Contains functionality
common across StepMaster and
'           SMRunOnly, pertaining to iterators
'           Specifically, functions to read
iterators records
'           in the workspace, load them in an
array and so on.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"IteratorCommon."

Public Const gintMinIteratorSequence As
Integer = 0

Public Sub RangeComplete(vntIterators As
Variant)
  ' This is a debug procedure
  ' Checks if the from, to and step values
are present in
  ' the array

  Dim bReset As Byte
  Dim bShift As Byte
  Dim lngIndex As Long

  ' Set the three lowest order bits to 1
  bReset = 7

  BugAssert IsArray(vntIterators) And Not
IsEmpty(vntIterators), _
  "Iterators not specified!"

  For lngIndex = LBound(vntIterators) To _
UBound(vntIterators)
    bShift = 1
    bShift = bShift * (2 ^
(vntIterators(lngIndex).IteratorType - 1))

    bReset = bReset Xor bShift
  Next lngIndex

```

```

' Assert that all the elements are present
BugAssert bReset = 0, "Range not
completely specified!"

End Sub

Public Sub LoadIteratorsForWsp(cStepsCol As
cArrSteps, _
  ByVal lngWorkspaceId As Long,
rstStepsInWsp As Recordset)
  ' Initializes the step records in with all the
iterator
  ' values for each step

  Dim recIterators As Recordset

  On Error GoTo LoadIteratorsForWspErr

#If QUERY_ALL Then
  Dim dtStart As Date

  dtStart = Now
  Set recIterators =
ReadWspIterators(lngWorkspaceId)

  Call LoadIteratorsArray(cStepsCol,
recIterators)

  recIterators.Close

  BugMessage "QueryAll Read + load took: "
& CStr(DateDiff("s", dtStart, Now))

#Else
  Dim dtStart As Date
  Dim qryIt As DAO.QueryDef
  Dim strSql As String

  dtStart = Now
  If rstStepsInWsp.RecordCount = 0 Then
    Exit Sub
  End If

  ' This method has the advantage that if the
steps are queried right, everything else follows
  strSql = "Select step_id, version_no, type,
iterator_value, " & _
" sequence_no " & _
" from iterator_values " & _
" where step_id = [s_id] " & _
" and version_no = [ver_no] "

  ' Order the iterators by sequence within a
step
  strSql = strSql & " order by sequence_no "

  Set qryIt =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strSql)
  rstStepsInWsp.MoveFirst

  While Not rstStepsInWsp.EOF

    qryIt.Parameters("s_id").Value =
rstStepsInWsp!step_id
    qryIt.Parameters("ver_no").Value =
rstStepsInWsp!version_no

    Set recIterators =
qryIt.OpenRecordset(dbOpenSnapshot)

    Call LoadIteratorsArray(cStepsCol,
recIterators)

    recIterators.Close

```

```

rstStepsInWsp.MoveNext
Wend

qryIt.Close

  BugMessage "Query step at a time Read + load
took: " & CStr(DateDiff("s", dtStart, Now))

#End If

Exit Sub

LoadIteratorsForWspErr:
  LogErrors Errors
  gstrSource = mstrModuleName &
"LoadIteratorsForWsp"
  On Error GoTo 0
  Err.Raise vbObjectError +
errLoadRsInArrayFailed, _
  gstrSource, _
  LoadResString(errLoadRsInArrayFailed)

End Sub

Private Function ReadWspIterators(ByVal
lngWorkspaceId As Long) As Recordset

  ' This function will return a recordset that is
populated
  ' with the iterators for all the steps in a given
workspace

  Dim recIterators As Recordset
  Dim qryIt As DAO.QueryDef
  Dim strSql As String

  On Error GoTo ReadWspIteratorsErr
  gstrSource = mstrModuleName &
"ReadWspIterators"

  strSql = "Select i.step_id, i.version_no, " & _
" i.type, i.iterator_value, " & _
" i.sequence_no " & _
" from iterator_values i, att_steps a " & _
" where i.step_id = a.step_id " & _
" and i.version_no = a.version_no " & _
" and a.workspace_id = [w_id] " & _
" and a.archived_flag = [archived] "

  ' Find the highest X-component of the version
number
  strSql = strSql & " AND cint( mid( a.version_no,
1, instr( a.version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) = " & _
" ( select max( cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) ) " & _
" from att_steps AS d " & _
" WHERE a.step_id = d.step_id ) "

  ' Find the highest Y-component of the version
number for the highest X-component
  strSql = strSql & " AND cint( mid( a.version_no,
instr( a.version_no, " & gstrDQ & gstrVerSeparator
& gstrDQ & " ) + 1 ) ) = " & _
" ( select max( cint( mid( version_no, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) + 1 ) ) ) " & _
" from att_steps AS b " & _
" Where a.step_id = b.step_id " & _
" AND cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) = " & _
" ( select max( cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) ) " & _

```

```

" from att_steps AS c " & _
" WHERE a.step_id = c.step_id ) ) "

' Order the iterators by sequence within a
step
strSql = strSql & " order by i.step_id,
i.sequence_no "

Set qyIt =
dbAttrTool.CreateQueryDef(gstrEmptyStrin
g, strSql)
qyIt.Parameters("w_id").Value =
lngWorkspaceId
qyIt.Parameters("archived").Value =
False

Set recIterators =
qyIt.OpenRecordset(dbOpenSnapshot)

qyIt.Close
Set ReadWspIterators = recIterators

Exit Function

ReadWspIteratorsErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errReadDataFailed, _
gstrSource,
LoadResString(errReadDataFailed)

End Function
Private Sub LoadIteratorsArray(cStepsCol
As cArrSteps, _
recIterators As Recordset)
' Initializes the step records with the
iterators for
' the step

Dim cNewIt As cIterator
Dim cStepRec As cStep
Dim lngStepId As Long

On Error GoTo LoadIteratorsArrayErr
gstrSource = mstrModuleName &
"LoadIteratorsArray"

If recIterators.RecordCount = 0 Then
Exit Sub
End If

recIterators.MoveFirst
While Not recIterators.EOF
Set cNewIt = New cIterator

lngStepId =
CLng(ErrorOnNullField(recIterators,
"step_id"))
If Not cStepRec Is Nothing Then
If cStepRec.StepId <> lngStepId
Then
Set cStepRec =
cStepsCol.QueryStep(lngStepId)
End If
Else
Set cStepRec =
cStepsCol.QueryStep(lngStepId)
End If

' Initialize iterator values

```

```

cNewIt.IteratorType =
CInt(ErrorOnNullField(recIterators, "type"))
cNewIt.Value =
CStr(ErrorOnNullField(recIterators,
"iterator_value"))
cNewIt.SequenceNo =
CInt(ErrorOnNullField(recIterators,
"sequence_no"))

' Add this record to the array of iterators
cStepRec.LoadIterator cNewIt

Set cNewIt = Nothing
recIterators.MoveNext
Wend

Exit Sub

LoadIteratorsArrayErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadIteratorsArray"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadRsInArrayFailed, _
gstrSource, _

LoadResString(errLoadRsInArrayFailed)

End Sub

Attribute VB_Name = "MsgConfirm"
' FILE: MsgConfirm.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: Contains constants for
confirmation messages that
' will be displayed by StepMaster
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

' A public enum containing the codes for all the
confirmation
' messages that will be used by the project -
each of the codes
Public Enum conConfirmMsgCodes
conWspDelete = 2000
conSave
conStopRun
conSaveConnect
conSaveDB
End Enum

' A public enum containing the titles for all the
confirmation
' messages that will be used by the project -
each of the codes
' has the prefix, cont - most confirmation
message codes will
' have a corresponding title code in here
Public Enum conConfirmMsgTitleCodes
contWspDelete = 3000
contSave
contStopRun
contSaveConnect
contSaveDB
End Enum

```

```

Attribute VB_Name = "OpenFiles"
' FILE: OpenFiles.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: This module holds a list of all files
that have been
' opened by the project. This module is
needed since there
' is no way to share static data between
different instances
' of a class.
' Many procedure in this module do not do
any error handling -
' this is 'coz it is also used by procedures
that log error
' messages and any error handler will erase
the collection
' of errors!

' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private Const mstrModuleName As String =
".OpenFiles."

Private mOpenFiles As cNodeCollections

Private Const mstrTempDir As String = "\Temp\"

' The maximum number of temporary files that we
can create in a
' session
Private Const mlngMaxFileIndex As Long =
999999
Private Const mstrFileIndexFormat As String =
"000000"
Private Const mstrTempFilePrefix As String =
"SM"
Private Const mstrTempFileSuffix As String =
".cmd"

Private Const merrFileNotFound As Long = 76
Private Function GetFileHandle(strFileName) As
cFileInfo

Dim lngIndex As Long
Dim blnFileOpen As Boolean

If Not mOpenFiles Is Nothing Then

blnFileOpen = False
For lngIndex = 0 To mOpenFiles.Count - 1
If mOpenFiles(lngIndex).FileName =
strFileName Then
blnFileOpen = True
Exit For
End If
Next lngIndex

If blnFileOpen Then
Set GetFileHandle = mOpenFiles(lngIndex)
Else
Set GetFileHandle = Nothing
End If
Else
Set GetFileHandle = Nothing

```



```

End If
End Function

Private Function GetTempFileDir() As String
    Dim strTempFileDir As String

    On Error GoTo GetTempFileDirErr

    strTempFileDir = gstrProjectPath &
mstrTempDir

    If StringEmpty(Dir$(strTempFileDir,
vbDirectory)) Then
        MkDir strTempFileDir
    End If

    GetTempFileDir = strTempFileDir

Exit Function

GetTempFileDirErr:
    ' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
"GetTempFileDir"
    On Error GoTo 0
    Err.Raise vbObjectError +
errProgramError, gstrSource, _
        LoadResString(errProgramError)

End Function
Public Function
MakePathValid(strFileName As String) As String
    ' Checks if the passed in file path is valid

    Dim strFileDir As String
    Dim strTempDir As String
    Dim strTempFile As String
    Dim intPos As Integer
    Dim intStart As Integer

    On Error GoTo MakePathValidErr
gstrSource = mstrModuleName &
"MakePathValid"

    strTempFile = strFileName
    intPos = InstrR(strFileName,
gstrFileSeparator)

    If intPos > 0 Then
        strFileDir = Left$(strTempFile, intPos -
1)
        If StringEmpty(Dir$(strFileDir,
vbDirectory)) Then
            ' Loop through the entire path
starting at the root
            ' since Mkdir can create only one
level of sub-directory
            ' at a time
            intStart = Instr(strFileDir,
gstrFileSeparator)

            Do While strTempDir <> strFileDir

                If intStart > 0 Then
                    strTempDir = Left$(strFileDir,
intStart - 1)
                Else
                    strTempDir = strFileDir
                End If
            End While
        End If
    End If

```

```

        If StringEmpty(Dir$(strTempDir,
vbDirectory)) Then
            ' If the specified directory doesn't
exist, try to
            ' create it.
            MkDir strTempDir
        Else
            ' The directory exists - go to it's
sub-directory
        End If
        intStart = Instr(intStart + 1,
strFileDir, gstrFileSeparator)
    Loop

    ' Sanity check
    If StringEmpty(Dir$(strFileDir,
vbDirectory)) Then
        ' We were unable to create the file
directory
        ShowError errCreateDirectoryFailed,
gstrSource, _
            strFileDir, DoWriteError:=False
        MakePathValid = gstrEmptyString
    Else
        MakePathValid = strTempFile
    End If
    Else
        ' The specified directory exists - we
should be able
        ' to create the output file in it
        MakePathValid = strTempFile
    End If
    Else
        ' The user has only specified a filename -
VB will try
        ' to create it in the current directory
        MakePathValid = strTempFile
    End If

Exit Function

MakePathValidErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
"MakePathValid"
    ' Log the filename for debug
    Call WriteError(errInvalidFile, gstrSource,
strTempFile)
    On Error GoTo 0
    Err.Raise vbObjectError + errProgramError,
gstrSource, _
        LoadResString(errProgramError)

End Function
Public Function OpenFileSM(strFileName As
String) As Integer
    Dim intHFile As Integer
    Dim NewFileInfo As cFileInfo

    On Error GoTo OpenFileSMErr
gstrSource = mstrModuleName &
"OpenFileSM"

    If StringEmpty(strFileName) Then
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidFile,
gstrSource, _
            LoadResString(errInvalidFile)
    End If

    If mOpenFiles Is Nothing Then
        Set mOpenFiles = New cNodeCollections
    End If

```

```

Set NewFileInfo = GetFileHandle(strFileName)

If NewFileInfo Is Nothing Then
    ' The file has not been opened yet

    ' If the filename has not been initialized, do not
attempt to open it
    strFileName = MakePathValid(strFileName)

    If strFileName <> gstrEmptyString Then
        intHFile = FreeFile
        Open strFileName For Output Shared As
intHFile

        Set NewFileInfo = New cFileInfo
        NewFileInfo.FileHandle = intHFile
        NewFileInfo.FileName = strFileName
        mOpenFiles.Load NewFileInfo
    Else
        ' Either the directory was invalid or s'thing
failed
        ' Display the error to the user instead of
trying
        ' to log to the file
        ShowError errInvalidFile, gstrSource,
strFileName, _
            DoWriteError:=False
        intHFile = 0
    End If
    Else
        intHFile = NewFileInfo.FileHandle
    End If

    OpenFileSM = intHFile

Exit Function

OpenFileSMErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    ' The Open command failed for some reason -
write an error
    ' and let the calling function handle the error
    ShowError errInvalidFile, gstrSource,
strFileName, _
        DoWriteError:=False
    OpenFileSM = 0

End Function
Public Function CreateTempFile() As String

    Dim strTempFileDir As String
    Dim strTempFileName As String

    Static lngLastFileIndex As Long

    On Error GoTo CreateTempFileErr

    strTempFileDir = GetTempFileDir()

    Do
        If lngLastFileIndex = mlngMaxFileIndex Then
            On Error GoTo 0
            Err.Raise vbObjectError +
errMaxTempFiles, gstrSource, _
                LoadResString(errMaxTempFiles)
        End If

        lngLastFileIndex = lngLastFileIndex + 1
        strTempFileName = mstrTempFilePrefix & _
            Format$(lngLastFileIndex,
mstrFileIndexFormat) & _
            mstrTempFileSuffix
    Loop

```

```

If Not
StringEmpty(Dir$(strTempFileDir &
strTempFileName)) Then
    ' Remove any files left over from a
previous run,
    ' if they still exist
    Kill strTempFileDir &
strTempFileName
End If

' Looping in case the file delete doesn't go
through for
' some reason
Loop While Not
StringEmpty(Dir$(strTempFileDir &
strTempFileName))

CreateTempFile =
GetShortName(strTempFileDir)
CreateTempFile = CreateTempFile &
strTempFileName

Exit Function

CreateTempFileErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
gstrSource = gstrSource &
"CreateTempFile"
On Error GoTo 0
Err.Raise vbObjectError +
errProgramError, gstrSource, _
LoadResString(errProgramError)

End Function
Public Sub CloseFileSM(strFileName As
String)
Dim FileToClose As cFileInfo

If Not mOpenFiles Is Nothing Then

' Get the handle to the open file, if it
exists
Set FileToClose =
GetFileHandle(strFileName)

If Not FileToClose Is Nothing Then
Close FileToClose.FileHandle

' Remove the file info from the
collection of open files
mOpenFiles.Unload
FileToClose.Position
End If
End If

End Sub
Public Sub CloseOpenFiles()
Dim IIndex As Long

If Not mOpenFiles Is Nothing Then
For IIndex = mOpenFiles.Count - 1 To
0
CloseFileSM
(mOpenFiles(IIndex).FileName)
Next IIndex
End If

End Sub

Attribute VB_Name = "ParameterCommon"
' FILE: ParameterCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999

```

```

' All Rights Reserved
'
' PURPOSE: Contains functionality common
across StepMaster and
SMRunOnly, pertaining to parameters
Specifically, functions to load
parameter records
in an array.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
are raised by this module
Private Const mstrModuleName As String =
"ParameterCommon."

Public Sub
LoadRecordsetInParameterArray(rstWorkSpac
eParameters As Recordset, _
cParamCol As cArrParameters)

Dim cNewParameter As cParameter

On Error GoTo
LoadRecordsetInParameterArrayErr

If rstWorkspaceParameters.RecordCount =
0 Then
Exit Sub
End If

rstWorkspaceParameters.MoveFirst
While Not rstWorkspaceParameters.EOF

Set cNewParameter = New cParameter

' Initialize parameter values
cNewParameter.ParameterId =
rstWorkspaceParameters.Fields(0)

' Call a procedure to raise an error if
mandatory fields are
null.
cNewParameter.ParameterName = CStr( _
ErrorOnNullField(rstWorkspaceParameters,
"parameter_name"))
cNewParameter.ParameterValue =
CheckForNullField(_
rstWorkspaceParameters,
"parameter_value")
cNewParameter.WorkspaceId = CStr( _
ErrorOnNullField(rstWorkspaceParameters,
FLD_ID_WORKSPACE))
cNewParameter.ParameterType = CStr( _
ErrorOnNullField(rstWorkspaceParameters,
"parameter_type"))
cNewParameter.Description =
CheckForNullField(_
rstWorkspaceParameters,
"description")

cParamCol.Load cNewParameter

Set cNewParameter = Nothing
rstWorkspaceParameters.MoveNext
Wend

Exit Sub

```

```

LoadRecordsetInParameterArrayErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadRecordsetInParameterArray"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadRsInArrayFailed, gstrSource, _
LoadResString(errLoadRsInArrayFailed)
End Sub
Attribute VB_Name = "Public"
' FILE: Public.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains all the public
constants for this project
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Public Const gsVersion01 As String = "0.1"
Public Const gsVersion10 As String = "1.0"
Public Const gsVersion21 As String = "2.1"
Public Const gsVersion23 As String = "2.3"
Public Const gsVersion24 As String = "2.4"
Public Const gsVersion241 As String = "2.4.1"
Public Const gsVersion242 As String = "2.4.2"
Public Const gsVersion243 As String = "2.4.3"
Public Const gsVersion25 As String = "2.5"
Public Const gsVersion251 As String = "2.5.1"
Public Const gsVersion253 As String = "2.5.3"
Public Const gsVersion254 As String = "2.5.4"
Public Const gsVersion255 As String = "2.5.5"
Public Const gsVersion As String = gsVersion255

' The same form is used for the creation of new
nodes and
updates to existing nodes (where each node can be
a parameter,
global step, etc.) A tag is set on each flag is used to
indicate
whether it is being called in the insert or update
mode. The
constants for these modes are defined below
Public Const gstrInsertMode = "Insert"
Public Const gstrUpdateMode = "Update"
Public Const gstrPropertiesMode = "View"

Public Const gstrEmptyString = ""
Public Const gstrSQ = ""
Public Const gstrDQ = ""
Public Const gstrVerSeparator = "."
Public Const gstrBlank = ""

' Constants used to indicate type of node being
processed
' The constants for the different objects correspond
to the
indexes in the menu control arrays (for both the
main and popup
menus) that are used to create new objects. That
way we can
use the index passed in by the click event to
determine the
type of node being processed
Public Const gintWorkspace = 1

' Decided to leave it here after some debate over
whether it
actually belongs in the cStep class definition
Public Enum gintStepType

```

```

gintGlobalStep = 3
gintManagerStep
gintWorkerStep
End Enum

Public Const gintRunManager = 6
Public Const gintRunWorker = 7

Public Enum gintParameterNodeType
gintParameter = 8
gintNodeParamConnection
gintNodeParamExtension
gintNodeParamBuiltIn
End Enum

' Leave some constants free for newer types
of parameters (?)
Public Const gintConnectionDtl = 15

Public Enum gintLabelNodeType
gintGlobalsLabel = 21
gintParameterLabel
gintParamConnectionLabel
gintParamExtensionLabel
gintParamBuiltInLabel
gintConnDtlLabel
gintGlobalStepLabel
gintStepLabel
End Enum

Public Enum ConnectionType
ConnTypeStatic = 1
ConnTypeDynamic
End Enum

Public Const giDefaultConnType As Integer
= ConnTypeStatic

' The constants defined below are used to
identify the different
' tabs. If any more step properties and
thereby tabs are added
' to the tabbed dialog on the Step Properties
form, they should
' be defined here and accessed in the code
only using these
' pre-defined constants
' Note: These constants will mainly be used
by the functions that
' initialize, customize and display the Step
Properties form
Public Const gintDefinition = 0
Public Const gintExecution = 1
Public Const gintMgrDefinition = 2
Public Const gintPreExecutionSteps = 3
Public Const gintPostExecutionSteps = 4
Public Const gintFileLocations = 5

' These constants correspond to the index
values in the imagelist
' associated with the tree view control. The
imagelist contains
' the icons that will be displayed for each
node.
Public Enum TreeImages
gintImageWorkspaceClosed = 1
gintImageWorkspaceOpen
gintImageLabelClosed
gintImageLabelOpen
gintImageManagerClosedDis
gintImageManagerClosedEn
gintImageManagerOpenDis
gintImageManagerOpenEn
gintImageWorkerDis
gintImageWorkerEn

```

```

gintImageGlobalClosed
gintImageGlobalOpen
gintImageParameter
gintImageRun
gintImagePending
gintImageStop
gintImageDisabled
gintImageAborted
gintImageFailed
End Enum

' Public variable used to indicate the name of
the function
' that raises an error
Public gstrSource As String

' Public instances of the different collections
Public gcParameters As cArrParameters
Public gcSteps As cArrSteps
Public gcConstraints As cArrConstraints
Public gcConnections As cConnections
Public gcConnDtls As cConnDtls

' Public constants for the index values of the
different toolbar
' options. Will be used while dynamically
enabling/disabling
' these options.
Public Const tbNew = 1
Public Const tbOpen = 2
Public Const tbSave = 3

Public Const tbCut = 5
Public Const tbCopy = 6
Public Const tbPaste = 7
Public Const tbDelete = 8

Public Const tbProperties = 10
Public Const tbRun = 11
Public Const tbStop = 12

' The initial version #
Public Const gstrMinVersion As String = "0.0"
Public Const gstrGlobalParallelism As String =
"0"
Public Const gintMinParallelism As Integer =
1
Public Const gintMaxParallelism As Integer =
100

' Constant for the minimum identifier, used for
all identifier, viz.
' step, workspace, etc.
Public Const giMinId As Long = 1
Public Const giInvalidId As Long = -1

' A parameter that has a special meaning to
Stepmaster
' The system time will be substituted wherever
it occurs
' (typically as a part of the error, log ... file
names
Public Const gstrTimeStamp As String =
"TIMESTAMP"
Public Const gstrEnvVarSeparator = "%"
Public Const gstrFileSeparator = "\"
Public Const gstrUnderscore = "_"

' Constants used by date and time formatting
functions
Public Const gsTimeSeparator = ":"
Public Const gsDateSeparator = "-"
Public Const gsMsSeparator = "."
Public Const gsDtFormat = "00"
Public Const gsYearFormat = "0000"

```

```

Public Const gsTmFormat = "00"
Public Const gsMSecondFormat = "000"

' Default nothing value for a date variable
Public Const gdtmEmpty As Currency = 0

Public Const FMT_WSP_LOG_FILE As String =
"yyyymmdd-hhnnss"

Public gsContCriteria() As String
' Note: Update the initialization of
gsExecutionStatus in Initialize() if the
' InstanceStatus values are modified - also the
boundary checks
Public gsExecutionStatus() As String

Public Const gsConnTypeStatic As String =
"Static"
Public Const gsConnTypeDynamic As String =
"Dynamic"

#If RUN_ONLY Then
Public Const gsCaptionRunWsp As String = "Run
Workspace"
#End If

' Valid operations on a cNode object
Public Enum Operation
QueryOp = 1
InsertOp = 2
UpdateOp = 3
DeleteOp = 4
End Enum

Attribute VB_Name = "RunCommon"
' FILE: RunCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Contains common functions that are
used during the execution
' of a workspace.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private Const mstrModuleName As String =
".RunCommon."

Public Function GetInstanceItValue(cInstanceRec
As cInstance) As String

' Returns the iterator value for the instance, if an
' iterator has been defined for it
Dim cStepIt As cRunCollt
Dim cRunIterator As cRunItNode

On Error GoTo GetInstanceItValueErr

' Since we create a dummy instance for Disabled
and Pending steps,
' doesn't make sense to look at their iterators
If cInstanceRec.Status <> gintDisabled And
cInstanceRec.Status <> gintPending Then
Set cStepIt = cInstanceRec.Iterators

```

```

    If Not
StringEmpty(cInstanceRec.Step.IteratorName) Then
    If cStepIt.Count > 0 Then
        Set cRunIterator = cStepIt(0)
        BugAssert
cRunIterator.IteratorName =
cInstanceRec.Step.IteratorName, _
"The first iterator in the
collection is the " & _
"one that has been defined for
the step."
    If cRunIterator.IteratorName =
cInstanceRec.Step.IteratorName Then
        GetInstanceItValue =
cRunIterator.Value
    Else
        GetInstanceItValue =
gstrEmptyString
    End If
    Else
        GetInstanceItValue =
gstrEmptyString
    End If
    Else
        GetInstanceItValue =
gstrEmptyString
    End If
    Else
        GetInstanceItValue =
gstrEmptyString
    End If
    Else
        GetInstanceItValue = gstrEmptyString
    End If

Exit Function

GetInstanceItValueErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
gstrSource = mstrModuleName &
"GetInstanceItValue"
Err.Raise vbObjectError +
errProgramError, gstrSource, _
LoadResString(errProgramError)

End Function

Attribute VB_Name = "RunInstHelper"
' FILE: RunInstHelper.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains helper
procedures that are called by
' cRunInst.cls
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"RunInstHelper."

' Should be equal to the number of steps
defined in cRunInst.cls
Public Const glngNumConcurrentProcesses
As Long = 99
Public Const gintBitsPerByte = 8

```

```

Public Function AnyStepRunning(cFreeSteps
As cVectorLng, arrFree() As Byte) As Boolean

    Dim lngIndex As Long
    Dim intPosInByte As Integer
    Dim lngTemp As Long

    ' Check if there are any running instances to
wait for
    If cFreeSteps.Count <>
glngNumConcurrentProcesses Then

        ' For every free step, reset the
corresponding element
        ' in the byte array to 0
        For lngIndex = 0 To cFreeSteps.Count - 1

            lngTemp = cFreeSteps(lngIndex) \
gintBitsPerByte
            intPosInByte = cFreeSteps(lngIndex)
Mod gintBitsPerByte

            arrFree(lngTemp) = arrFree(lngTemp)
Xor 2 ^ intPosInByte
            Next lngIndex

            AnyStepRunning = False

        ' Check if we have a non-zero bit in the
byte array
        For lngIndex = LBound(arrFree) To
UBound(arrFree) Step 1
            If arrFree(lngIndex) <> 0 Then
                ' We are waiting for a step to
complete
                AnyStepRunning = True
                Exit For
            End If
            Next lngIndex

        Else
            AnyStepRunning = False
        End If

    End Function

Public Function
OrderConstraints(vntTempCons() As Variant,
_
intConsType As ConstraintType) As
Variant
    ' Returns a variant containing all the
constraint records in the order
    ' in which they should be executed

    Dim vntTemp As Variant
    Dim lngOuter As Long
    Dim lngInner As Long
    Dim cTempConstraint As cConstraint
    Dim cConstraints() As cConstraint
    Dim lngConsCount As Long
    Dim lngLbound As Long
    Dim lngUbound As Long
    Dim lngStep As Long

    On Error GoTo OrderConstraintsErr

    If intConsType = gintPreStep Then
        ' Since we are travelling up and we need
to execute the constraints
        ' for the top-level steps first, reverse the
order that they
        ' have been stored in the array
        lngLbound = UBound(vntTempCons)

```

```

        lngUbound = LBound(vntTempCons)
        lngStep = -1
    Else
        lngLbound = LBound(vntTempCons)
        lngUbound = UBound(vntTempCons)
        lngStep = 1
    End If

    lngConsCount = 0

    For lngOuter = lngLbound To lngUbound Step
lngStep
        vntTemp = vntTempCons(lngOuter)

        If Not IsEmpty(vntTemp) Then
            ' Each of the elements is an array
            For lngInner = LBound(vntTemp) To
UBound(vntTemp) Step 1
                If Not IsEmpty(vntTemp(lngInner)) Then
                    Set cTempConstraint =
vntTemp(lngInner)

                    If Not cTempConstraint Is Nothing
Then
                        ReDim Preserve
cConstraints(lngConsCount)
                        Set cConstraints(lngConsCount) =
cTempConstraint
                        lngConsCount = lngConsCount + 1
                    End If
                End If
            Next lngInner
        End If
        Next lngOuter

        ' Set the return value of the function to the array
of
        ' constraints that has been built above
        If lngConsCount = 0 Then
            OrderConstraints = Empty
        Else
            OrderConstraints = cConstraints()
        End If

    Exit Function

OrderConstraintsErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errExecInstanceFailed, _
mstrModuleName,
LoadResString(errExecInstanceFailed)

End Function
Attribute VB_Name = "ShellSM"
' FILE: ShellSM.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains a function
that creates a process and
' waits for it to complete.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Public Function SyncShell(CommandLine As
String, Optional Timeout As Long, _
Optional WaitForInputIdle As Boolean) As
Boolean

```

```

Dim proc As
PROCESS_INFORMATION
Dim Start As STARTUPINFO
Dim ret As Long
Dim nMilliseconds As Long

BugMessage "Executing: " &
CommandLine
If Timeout > 0 Then
nMilliseconds = Timeout
Else
nMilliseconds = INFINITE
End If

'Initialize the STARTUPINFO structure:
Start.cb = Len(Start)
Start.dwFlags =
STARTF_USESHOWWINDOW
Start.wShowWindow =
SW_SHOWMINNOACTIVE

'Start the shelled application:
CreateProcessA 0&, CommandLine, 0&,
0&, 1&, _
NORMAL_PRIORITY_CLASS, 0&,
0&, Start, proc

If WaitForInputIdle Then
'Wait for the shelled application to
finish setting up its UI:
ret = InputIdle(proc.hProcess,
nMilliseconds)
Else
'Wait for the shelled application to
terminate:
ret =
WaitForSingleObject(proc.hProcess,
nMilliseconds)
End If

CloseHandle proc.hProcess

'Return True if the application finished.
Otherwise it timed out or erred.
SyncShell = (ret = WAIT_OBJECT_0)
End Function

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cArrConstraints"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cArrConstraints.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Implements an array of
cConstraint objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains additional functions
that determine all the
' constraints for a step, all
constraints in a workspace,
' validation functions, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'

```

```

Option Explicit

Private mcarrConstraints As cNodeCollections

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cArrConstraints."
Public Sub SaveWspConstraints(ByVal
IngWorkspace As Long)
' Calls a procedure to commit all changes to
the constraints
' in the passed in workspace.

Call mcarrConstraints.Save(IngWorkspace)

End Sub
Public Property Set ConstraintDB(vdata As
Database)

Set mcarrConstraints.NodeDB = vdata

End Property
Public Property Get ConstraintDB() As
Database

Set ConstraintDB =
mcarrConstraints.NodeDB

End Property

Public Sub Modify(cConsToUpdate As
cConstraint)

' Modify the constraint record
Call
mcarrConstraints.Modify(cConsToUpdate)

End Sub
Public Sub
CreateNewConstraintVersion(ByVal lngStepId
As Long, _
ByVal strNewVersion As String, _
ByVal strOldVersion As String, _
ByVal intStepType As Integer)

' Does all the processing needed to create
new versions of
' all the constraints for a given step
' It inserts new constraint records in the
database with
' the new version numbers on them
' It also updates the version number on all
constraints
' for the step in the array to the new version
passed in
' Since it handles both global and
manager/worker steps,
' it checks for the step_id or global_step_id
fields,
' depending on the type of step

Dim lngIndex As Long
Dim cUpdateConstraint As cConstraint

On Error GoTo
CreateNewConstraintVersionErr
mstrSource = mstrModuleName &
"CreateNewConstraintVersion"

' Update the version/global version on
Constraint with the
' passed in step/global step id

```

```

For lngIndex = 0 To mcarrConstraints.Count - 1
Set cUpdateConstraint =
mcarrConstraints(lngIndex)
If intStepType = gintGlobalStep Then
If cUpdateConstraint.GlobalStepId =
lngStepId And _
cUpdateConstraint.IndOperation <>
DeleteOp Then
cUpdateConstraint.GlobalVersionNo =
strNewVersion

' Set the operation to indicate an insert
cUpdateConstraint.IndOperation =

InsertOp
End If
Else
If cUpdateConstraint.StepId = lngStepId
And _
cUpdateConstraint.IndOperation <>
DeleteOp Then
cUpdateConstraint.VersionNo =
strNewVersion

' Set the operation to indicate an insert
cUpdateConstraint.IndOperation =

InsertOp
End If
End If
Next lngIndex

Exit Sub

CreateNewConstraintVersionErr:
LogErrors Errors
gstrSource = mstrModuleName &
"CreateNewConstraintVersion"
On Error GoTo 0
Err.Raise vbObjectError +
errCreateNewConstraintVersionFailed, _
mstrSource, _

LoadResString(errCreateNewConstraintVersionFail
ed)

End Sub
Private Sub Class_Initialize()

Set mcarrConstraints = New cNodeCollections
BugMessage "cArrConstraints: Initialize event -
setting Constraint count to 0"

End Sub

Private Sub Class_Terminate()

Set mcarrConstraints = Nothing
BugMessage "cArrConstraints: Terminate event
triggered"

End Sub

Public Sub Add(ByVal cConstraintToAdd As
cConstraint)

Set cConstraintToAdd.NodeDB =
mcarrConstraints.NodeDB

' Retrieve a unique constraint identifier
cConstraintToAdd.ConstraintId =
cConstraintToAdd.NextIdentifier

' Call a procedure to load the constraint record in
the array
Call mcarrConstraints.Add(cConstraintToAdd)

```

```

End Sub
Public Sub Delete(ByVal cOldConstraint As cConstraint)

    Dim lngDeleteElement As Long
    Dim cConsToDelete As cConstraint

    lngDeleteElement =
QueryConstraintIndex(cOldConstraint.ConstraintId)
    Set cConsToDelete =
mcarrConstraints(lngDeleteElement)

    Call
mcarrConstraints.Delete(cConsToDelete.Position)

    Set cConsToDelete = Nothing

End Sub
Private Function
QueryConstraintIndex(lngConstraintId As Long) _
    As Long

    Dim lngIndex As Integer

    ' Find the element in the array to be
deleted
    For lngIndex = 0 To
mcarrConstraints.Count - 1

        ' Note: The constraint id is not a
primary key field in
        ' the database - there can be multiple
records with the
        ' same constraint_id but for different
versions of a step
        ' However, since we'll always load the
constraint information
        ' for the latest version of a step, we'll
have just one
        ' constraint record with a given
constraint_id
        If
mcarrConstraints(lngIndex).ConstraintId =
lngConstraintId Then
            QueryConstraintIndex = lngIndex
            Exit Function
        End If

    Next lngIndex

    ' Raise error that Constraint has not been
found
    ShowError errConstraintNotFound
    On Error GoTo 0
    Err.Raise vbObjectError +
errConstraintNotFound, mstrSource, _
    LoadResString(errConstraintNotFound)

End Function

Public Function QueryConstraint(ByVal
lngConstraintId As Long) _
    As cConstraint

    ' Returns a cConstraint object with the
property values
    ' corresponding to the Constraint
Identifier, lngConstraintId

    Dim lngQueryElement As Long

```

```

    lngQueryElement =
QueryConstraintIndex(lngConstraintId)

    ' Set the return value to the queried
Constraint
    Set QueryConstraint =
mcarrConstraints(lngQueryElement)

End Function

Public Sub LoadConstraints(ByVal
lngWorkspaceId As Long, rstStepsInWsp As
Recordset)

    ' Loads the constraints array with all the
constraints
    ' for the workspace
    Dim recConstraints As Recordset
    Dim qryCons As DAO.QueryDef
    Dim strSQL As String
    Dim dtStart As Date

    On Error GoTo LoadConstraintsErr
mstrSource = mstrModuleName &
"LoadConstraints"

    If rstStepsInWsp.RecordCount = 0 Then
        Exit Sub
    End If

    ' First check if the database object has been
set
    If mcarrConstraints.NodeDB Is Nothing
Then
        On Error GoTo 0
        Err.Raise vbObjectError +
errSetDBBeforeLoad, _
        mstrSource, _

LoadResString(errSetDBBeforeLoad)
    End If

    dtStart = Now

    ' Select based on the global step id since
there might
    ' be constraints for a global step that run are
executed
    ' for the workspace
    ' This method has the advantage that if the
steps are queried right, everything else follows
    strSQL = "Select a.constraint_id, a.step_id,
a.version_no, " & _
        " a.constraint_type, a.global_step_id,
a.global_version_no, " & _
        " a.sequence_no, b.workspace_id " & _
        " from step_constraints a, att_steps b " & _
        " where a.global_step_id = b.step_id " & _
        " and a.global_version_no = b.version_no
" & _
        " and a.global_step_id = [g_s_id] " & _
        " and a.global_version_no = [g_ver_no] "
    & _
        " and b.archived_flag = [archived] "

    ' Find the highest X-component of the
version number
    strSQL = strSQL & " AND ( a.step_id = 0 or (
cint( mid( a.version_no, 1, instr( a.version_no,
" & gstrDQ & gstrVerSeparator & gstrDQ &
") - 1 ) ) = " & _

```

```

        " ( select max( cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) ) " & _
        " from att_steps AS d " & _
        " WHERE a.step_id = d.step_id " & _
        " and d.archived_flag = [archived] ) "

    ' Find the highest Y-component of the version
number for the highest X-component
    strSQL = strSQL & " AND cint( mid( a.version_no,
instr( a.version_no, " & gstrDQ & gstrVerSeparator
& gstrDQ & " ) + 1 ) ) = " & _
        " ( select max( cint( mid( version_no, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) + 1 ) ) ) " & _
        " from att_steps AS y " & _
        " Where a.step_id = y.step_id " & _
        " AND cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) = " & _
        " ( select max( cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) ) " & _
        " from att_steps AS c " & _
        " WHERE y.step_id = c.step_id " & _
        " and c.archived_flag = [archived] ) ) ) "

    ' Order the constraints by sequence within a given
step
    strSQL = strSQL & " order by a.sequence_no "

    Set qryCons =
mcarrConstraints.NodeDB.CreateQueryDef(gstrEm
ptyString, strSQL)
    qryCons.Parameters("archived").Value = False

    rstStepsInWsp.MoveFirst

    While Not rstStepsInWsp.EOF

        If Not (rstStepsInWsp!global_flag) Then
            qryCons.Close
            BugMessage "Query constraints Read +
load took: " & CStr(DateDiff("s", dtStart, Now))
            Exit Sub
        End If

        qryCons.Parameters("g_s_id").Value =
rstStepsInWsp!step_id
        qryCons.Parameters("g_ver_no").Value =
rstStepsInWsp!version_no

        Set recConstraints =
qryCons.OpenRecordset(dbOpenSnapshot)

        Call
LoadRecordsetInConstraintArray(recConstraints)
        recConstraints.Close

        rstStepsInWsp.MoveNext
    Wend

    qryCons.Close
    BugMessage "Query constraints Read + load
took: " & CStr(DateDiff("s", dtStart, Now))

    Exit Sub

LoadConstraintsErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadConstraints"
On Error GoTo 0
Err.Raise vbObjectError + errLoadDataFailed, _
mstrSource, _

```

```

LoadResString(errLoadDataFailed)
End Sub
Public Sub UnloadStepConstraints(ByVal lngStepId As Long)
    ' Unloads all the constraints for the workspace from
    ' the constraints array
    Dim lngIndex As Long
    ' Find all constraints in the array with a matching step id
    ' It is important to step in reverse order through the array,
    ' since we delete constraint records!
    For lngIndex = mcarrConstraints.Count - 1 To 0 Step -1
        If mcarrConstraints(lngIndex).GlobalStepId = lngStepId Then
            ' Unload the constraint from the array
            Call mcarrConstraints.Unload(lngIndex)
        End If
    Next lngIndex
End Sub
Public Sub UnloadConstraint(cOldConstraint As cConstraint)
    ' Unloads the constraint from the constraints array
    Dim lngDeleteElement As Long
    lngDeleteElement = QueryConstraintIndex(cOldConstraint.ConstraintId)
    Call mcarrConstraints.Unload(lngDeleteElement)
End Sub
Private Sub LoadRecordsetInConstraintArray(ByVal recConstraints As Recordset)
    ' Loads all the constraint records in the passed in
    ' recordset into the array
    Dim cNewConstraint As cConstraint
    On Error GoTo
LoadRecordsetInConsArrayErr
mstrSource = mstrModuleName & "LoadRecordsetInConstraintArray"
    If recConstraints.RecordCount = 0 Then Exit Sub
    End If
    recConstraints.MoveFirst
    While Not recConstraints.EOF
        Set cNewConstraint = New cConstraint
        ' Initialize Constraint values
        cNewConstraint.ConstraintId = CLng(ErrorOnNullField(recConstraints, "Constraint_id"))

```

```

cNewConstraint.StepId = CLng(ErrorOnNullField(recConstraints, "step_id"))
cNewConstraint.VersionNo = CStr(ErrorOnNullField(recConstraints, "version_no"))
cNewConstraint.GlobalStepId = CLng(ErrorOnNullField(recConstraints, "global_step_id"))
cNewConstraint.GlobalVersionNo = CStr(ErrorOnNullField(recConstraints, "global_version_no"))
cNewConstraint.SequenceNo = CInt(ErrorOnNullField(recConstraints, "sequence_no"))
cNewConstraint.WorkspaceId = CLng(ErrorOnNullField(recConstraints, FLD_ID_WORKSPACE))
cNewConstraint.ConstraintType = CInt(ErrorOnNullField(recConstraints, "constraint_type"))
    ' Add this record to the array of Constraints
    mcarrConstraints.Load cNewConstraint
    Set cNewConstraint = Nothing
    recConstraints.MoveNext
Wend
Exit Sub
LoadRecordsetInConsArrayErr:
LogErrors Errors
gstrSource = mstrModuleName & "LoadRecordsetInConstraintArray"
On Error GoTo 0
Err.Raise vbObjectError + errLoadRsInArrayFailed, _ mstrSource, _
LoadResString(errLoadRsInArrayFailed)
End Sub
Public Function ConstraintsForStep(_ ByVal lngStepId As Long, _ ByVal strVersionNo As String, _ Optional ByVal intConstraintType As ConstraintType = 0, _ Optional ByVal blnSort As Boolean = True, _ Optional ByVal blnGlobal As Boolean = False, _ Optional ByVal blnGlobalConstraintsOnly As Boolean = False)
    As Variant
    ' Returns a variant containing an array of cConstraint objects,
    ' containing all the constraints that have been defined for the
    ' given step. If the Global flag is set to true, the
    ' search will be made for all the constraints that have
    ' a matching global_step_id
    Dim lngIndex As Long
    Dim cStepConstraint() As cConstraint
    Dim lngConstraintCount As Long
    Dim cTempConstraint As cConstraint

```

```

    On Error GoTo ConstraintsForStepErr
    mstrSource = mstrModuleName & "ConstraintsForStep"
    lngConstraintCount = 0
    ' Find each element in the constraints array
    For lngIndex = 0 To mcarrConstraints.Count - 1
        ' If a constraint type has been specified then check
        ' if the constraint type for the record matches the
        ' passed in type
        Set cTempConstraint = mcarrConstraints(lngIndex)
        If Not blnGlobal Then
            If cTempConstraint.StepId = lngStepId And
                cTempConstraint.VersionNo = strVersionNo And
                cTempConstraint.IndOperation <> DeleteOp And
                (intConstraintType = 0 Or
                cTempConstraint.ConstraintType = intConstraintType) Then
            ' We have a matching constraint for the given step
            AddArrayElement cStepConstraint, _ cTempConstraint,
            lngConstraintCount
        End If
        Else
            If cTempConstraint.GlobalStepId = lngStepId And
                cTempConstraint.GlobalVersionNo = strVersionNo And
                cTempConstraint.IndOperation <> DeleteOp Then
                If blnGlobalConstraintsOnly = False Or
                (blnGlobalConstraintsOnly And
                cTempConstraint.StepId = 0 And
                cTempConstraint.VersionNo = gstrMinVersion) Then
                    ' We have a matching constraint for the global step
                    AddArrayElement cStepConstraint, _ cTempConstraint,
                    lngConstraintCount
                End If
            End If
        End If
    Next lngIndex
    ' Set the return value of the function to the array of
    ' constraints that has been built above
    If lngConstraintCount = 0 Then
        ConstraintsForStep = Empty
    Else
        ConstraintsForStep = cStepConstraint()
    End If
    ' Sort the constraints
    If blnSort Then
        Call QuickSort(ConstraintsForStep)
    End If
    Exit Function
ConstraintsForStepErr:
LogErrors Errors
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errConstraintsForStepFailed, _
    mstrSource, _

LoadResString(errConstraintsForStepFailed)

End Function
Private Sub AddArrayElement(ByRef
arrNodes() As cConstraint, _
    ByVal objToAdd As cConstraint, _
    ByRef lngCount As Long)
' Adds the passed in object to the array

' Increase the array dimension and add the
object to it
ReDim Preserve arrNodes(lngCount)
Set arrNodes(lngCount) = objToAdd
lngCount = lngCount + 1

End Sub

Public Function ConstraintsForWsp( _
    ByVal lngWorkspaceId As Long, _
    Optional ByVal intConstraintType As
Integer = 0, _
    Optional ByVal blnSort As Boolean =
True, _
    Optional ByVal
blnGlobalConstraintsOnly As Boolean =
False) _
    As Variant

' Returns a variant containing an array of
cConstraint objects,
' containing all the constraints that have
been defined for the
' given workspace.

Dim lngIndex As Long
Dim cWspConstraint() As cConstraint
Dim lngConstraintCount As Long
Dim cTempConstraint As cConstraint

On Error GoTo ConstraintsForWspErr
mstrSource = mstrModuleName &
"ConstraintsForWsp"

lngConstraintCount = 0

' Find each element in the constraints
array
For lngIndex = 0 To
mcarrConstraints.Count - 1
' If a constraint type has been specified
then check
' if the constraint type for the record
matches the
' passed in type
Set cTempConstraint =
mcarrConstraints(lngIndex)
If cTempConstraint.WorkspaceId =
lngWorkspaceId And _
    cTempConstraint.IndOperation <>
DeleteOp And _
    (intConstraintType = 0 Or _
    cTempConstraint.ConstraintType
= intConstraintType) Then

    If blnGlobalConstraintsOnly = False
Or _
        (blnGlobalConstraintsOnly And
_
            cTempConstraint.StepId = 0
And _

```

```

    cTempConstraint.VersionNo =
gstrMinVersion) Then

' We have a matching constraint for
the workspace
AddArrayElement cWspConstraint,
_
    cTempConstraint,
lngConstraintCount
End If
End If
Next lngIndex

' Set the return value of the function to the
array of
' constraints that has been built above
If lngConstraintCount = 0 Then
    ConstraintsForWsp = Empty
Else
    ConstraintsForWsp = cWspConstraint()
End If

' Sort the constraints
If blnSort Then
    Call QuickSort(ConstraintsForWsp)
End If

Exit Function

ConstraintsForWspErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errConstraintsForWspFailed, _
    mstrSource, _

LoadResString(errConstraintsForWspFailed)

End Function
Public Function PreConstraintsForStep( _
    ByVal lngStepId As Long, _
    ByVal strVersionNo As String, _
    Optional ByVal blnSort As Boolean) As
Variant

' Returns a variant containing an array of
cConstraint objects,
' containing all the pre-execution constraints
that have
' been defined for the given step_id and
version

' Call a function that will return a variant
containing
' all the constraints of the passed in type
PreConstraintsForStep =
ConstraintsForStep(lngStepId, _
    strVersionNo, gintPreStep, blnSort)

End Function
Public Function PostConstraintsForStep( _
    ByVal lngStepId As Long, _
    ByVal strVersionNo As String, _
    Optional ByVal blnSort As Boolean) As
Variant

' Returns a variant containing an array of
cConstraint objects,
' containing all the Post-execution
constraints that have
' been defined for the given step_id and
version

' Call a function that will return a variant
containing

```

```

' all the constraints of the passed in type
PostConstraintsForStep =
ConstraintsForStep(lngStepId, _
    strVersionNo, gintPostStep, blnSort)

End Function
Public Function PostConstraintsForWsp( _
    ByVal lngWorkspaceId As Long, _
    Optional ByVal blnSort As Boolean) As
Variant

' Returns a variant containing an array of
cConstraint objects,
' containing all the Post-execution globals that
have
' been defined for the workspace

' Call a function that will return a variant
containing
' all the constraints of the passed in type
PostConstraintsForWsp =
ConstraintsForWsp(lngWorkspaceId, _
    gintPostStep, blnSort, True)

End Function
Public Function PreConstraintsForWsp( _
    ByVal lngWorkspaceId As Long, _
    Optional ByVal blnSort As Boolean) As
Variant

' Returns a variant containing an array of
cConstraint objects,
' containing all the Pre-execution globals that
have
' been defined for the workspace

' Call a function that will return a variant
containing
' all the constraints of the passed in type
PreConstraintsForWsp =
ConstraintsForWsp(lngWorkspaceId, _
    gintPreStep, blnSort, True)

End Function
Public Property Get ConstraintCount() As Long

    ConstraintCount = mcarrConstraints.Count

End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cArrParameters"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cArrParameters.cls
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  Implements an array of cParameter
objects.
'    Type-safe wrapper around
cNodeCollections.
'    Also contains additional functions to
determine parameter
'    values, validation functions, etc.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'

```


<pre> Option Explicit Private mcarrParameters As cNodeCollections ' Used to indicate the source module name when errors ' are raised by this class Private mstrSource As String Private Const mstrModuleName As String = "cArrParameters." Public Sub InitBuiltInsForRun(IWspId As Long, IRunId As Long) Dim cParamRec As cParameter ' Initialize the values of the run_id and output_dir built-in parameters and save them ' to the database Set cParamRec = GetParameterValue(IWspId, PARAM_RUN_ID) cParamRec.ParameterValue = CStr(IRunId) Call Modify(cParamRec) Set cParamRec = GetParameterValue(IWspId, PARAM_OUTPUT_DIR) cParamRec.ParameterValue = GetDefaultDir(IWspId, Me) cParamRec.ParameterValue = cParamRec.ParameterValue & gstrFileSeparator & CStr(IRunId) Call Modify(cParamRec) Call SaveParametersInWsp(IWspId) End Sub Public Property Set ParamDatabase(vdata As Database) Set mcarrParameters.NodeDB = vdata End Property Public Sub Modify(cModifiedParam As cParameter) ' First check if the parameter record is valid Call CheckDupParamName(cModifiedParam) Call mcarrParameters.Modify(cModifiedParam) End Sub Public Sub Load(ByRef cParamToAdd As cParameter) Call mcarrParameters.Load(cParamToAdd) End Sub Public Sub Add(ByRef cParamToAdd As cParameter) Set cParamToAdd.NodeDB = mcarrParameters.NodeDB ' First check if the parameter record is valid </pre>	<pre> Call Validate(cParamToAdd) ' Retrieve a unique parameter identifier cParamToAdd.ParameterId = cParamToAdd.NextIdentifier Call mcarrParameters.Add(cParamToAdd) End Sub Public Sub Unload(IngParamToDelete As Long) Dim IngDeleteElement As Long IngDeleteElement = QueryIndex(IngParamToDelete) Call mcarrParameters.Unload(IngDeleteElement) End Sub Public Sub SaveParametersInWsp(ByVal IngWorkspace As Long) ' Calls a procedure to commit all changes to the parameters ' for the passed in workspace. ' Call a procedure to save all parameter records for the ' workspace Call mcarrParameters.Save(IngWorkspace) End Sub Public Function GetParameterValue(ByVal IngWorkspace As Long, _ ByVal strParamName As String) As cParameter ' Returns the value for the passed in workspace parameter Dim cParamRec As cParameter Dim IngIndex As Long On Error GoTo GetParameterValueErr ' Find all parameters in the array with a matching workspace id For IngIndex = 0 To mcarrParameters.Count - 1 Set cParamRec = mcarrParameters(IngIndex) If cParamRec.WorkspaceId = IngWorkspace And _ cParamRec.ParameterName = strParamName Then Set GetParameterValue = cParamRec Exit For End If Next IngIndex If IngIndex > mcarrParameters.Count - 1 Then ' The parameter has not been defined for the workspace ' Raise an error On Error GoTo 0 Err.Raise vbObjectError + errParamNameInvalid, _ mstrModuleName & "GetParameterValue", _ LoadResString(errParamNameInvalid) </pre>	<pre> End If Exit Function GetParameterValueErr: ' Log the error code raised by Visual Basic Call LogErrors(Errors) gstrSource = mstrModuleName & "GetParameterValue" On Error GoTo 0 Err.Raise vbObjectError + errGetParamValueFailed, _ gstrSource, _ LoadResString(errGetParamValueFailed) End Function Public Sub Delete(IngParamToDelete As Long) ' Delete the passed in parameter Dim IngDeleteElement As Long IngDeleteElement = QueryIndex(IngParamToDelete) Call mcarrParameters.Delete(IngDeleteElement) End Sub Private Function QueryIndex(IngParameterId As Long) As Long Dim IngIndex As Long ' Find the matching parameter record in the array For IngIndex = 0 To mcarrParameters.Count - 1 If mcarrParameters(IngIndex).ParameterId = IngParameterId And _ mcarrParameters(IngIndex).IndOperation <> DeleteOp Then QueryIndex = IngIndex Exit Function End If Next IngIndex ' Raise error that parameter has not been found On Error GoTo 0 Err.Raise vbObjectError + errParamNotFound, "cArrParameters.QueryIndex", _ LoadResString(errParamNotFound) End Function Public Function QueryParameter(IngParameterId As Long) _ As cParameter Dim IngQueryElement As Long IngQueryElement = QueryIndex(IngParameterId) ' Return the queried parameter object Set QueryParameter = mcarrParameters(IngQueryElement) End Function Public Property Get ParameterCount() As Long ParameterCount = mcarrParameters.Count End Property Public Property Get Item(IngIndex As Long) As cParameter Attribute Item.VB_UserMemId = 0 Set Item = mcarrParameters(IngIndex) End Property </pre>
--	---	---

```

Public Sub Validate(ByVal
cParamToValidate As cParameter)
' This procedure is necessary since the
class cannot validate
' all the parameter properties on it's own.
This is 'coz we
' might have created new parameters in
the workspace, but not
' saved them to the database yet - hence
the duplicate check
' has to be repeated in the array

Dim lngIndex As Long
Dim cTempParam As cParameter

On Error GoTo ValidateErr

' Check if the parameter name already
exists in the workspace
For lngIndex = 0 To
mcarrParameters.Count - 1
Set cTempParam =
mcarrParameters(lngIndex)
If cTempParam.WorkspaceId =
cParamToValidate.WorkspaceId And _
cTempParam.ParameterName =
cParamToValidate.ParameterName And _
cTempParam.IndOperation <>
DeleteOp Then
On Error GoTo 0
Err.Raise vbObjectError +
errDuplicateParameterName, _
mstrSource,
LoadResString(errDuplicateParameterName
)
End If
Next lngIndex

Exit Sub

ValidateErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Validate"
On Error GoTo 0
Err.Raise vbObjectError +
errValidateFailed, _
mstrSource,
LoadResString(errValidateFailed)

End Sub
Public Sub CheckDupParamName(ByVal
cParamToValidate As cParameter)

Dim lngIndex As Long
Dim cTempParam As cParameter

' Check if the parameter name already
exists in the workspace
For lngIndex = 0 To
mcarrParameters.Count - 1
Set cTempParam =
mcarrParameters(lngIndex)
If cTempParam.WorkspaceId =
cParamToValidate.WorkspaceId And _
cTempParam.ParameterName =
cParamToValidate.ParameterName And _
cTempParam.ParameterId <>
cParamToValidate.ParameterId And _
cTempParam.IndOperation <>
DeleteOp Then
ShowError
errDuplicateParameterName
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errDuplicateParameterName, _
mstrSource,
LoadResString(errDuplicateParameterName)
End If
Next lngIndex

End Sub

Private Sub Class_Initialize()

'bugmessage "cArrParameters: Initialize
event - setting parameter count to 0"
Set mcarrParameters = New
cNodeCollections

End Sub

Private Sub Class_Terminate()

Set mcarrParameters = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cArrSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cArrSteps.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: Implements an array of cStep
objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains additional functions to
update parent version
' on substeps, validation functions, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Private mcarrSteps As cNodeCollections

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cArrSteps."

Public Sub Unload(lngStepToDelete As Long)

Dim lngDeleteElement As Long
Dim cUnloadStep As cStep

lngDeleteElement =
QueryStepIndex(lngStepToDelete)
Set cUnloadStep =
QueryStep(lngStepToDelete)

' First unload all iterators for the step
Call cUnloadStep.UnloadIterators

' Unload the step from the collection
Call mcarrSteps.Unload(lngDeleteElement)

```

```

End Sub
Public Sub Modify(cModifiedStep As cStep)

Dim iAppend As Integer
Dim sLabel As String

On Error GoTo ModifyErr

iAppend = 0
sLabel = cModifiedStep.StepLabel

Validate cModifiedStep

Call mcarrSteps.Modify(cModifiedStep)

Exit Sub

ModifyErr:
' If the error raised by the add function is due to a
duplication
' of the step label, then try to generate a unique
label
If Err.Number - vbObjectError =
errStepLabelUnique Then
iAppend = iAppend + 1
cModifiedStep.StepLabel = sLabel &
CStr(iAppend)
' Try to insert the step record again
Resume
End If

' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errModifyStepFailed,
-
gstrSource, _
LoadResString(errModifyStepFailed)

End Sub
Public Sub UpdateParentVersion(ByVal lngStepId
As Long, _
ByVal strNewVersion As String, _
ByVal strOldVersion As String, _
ByVal intStepType As Integer)

' Does all the processing needed to update the
parent version
' number on all the sub-steps for a given step
' It updates the parent version no in the database
for all
' sub-steps of the passed in step id
' It also updates the parent version number on all
sub-steps
' in the array to the new version passed in

Dim lngIndex As Long
Dim cUpdateStep As cStep

On Error GoTo UpdateParentVersionErr

If intStepType <> gintManagerStep Then
' Only a manager can have sub-steps - if the
passed
' in step is not a manager, exit
Exit Sub
End If

' For all steps in the array
For lngIndex = 0 To mcarrSteps.Count - 1

Set cUpdateStep = mcarrSteps(lngIndex)

```

```

' If the current step is a sub-step of the
passed in step
If cUpdateStep.ParentStepId =
lngStepId And _
cUpdateStep.ParentVersionNo =
strOldVersion And _
Not cUpdateStep.ArchivedFlag
Then

' Update the parent version number
for the sub-step
' in the array
cUpdateStep.ParentVersionNo =
strNewVersion

' Update the parent version number
for the sub-step
' in the array
Call Modify(cUpdateStep)

End If
Next lngIndex

Exit Sub

UpdateParentVersionErr:
LogErrors Errors
mstrSource = mstrModuleName &
"UpdateParentVersion"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateParentVersionFailed, _
mstrSource, _

LoadResString(errUpdateParentVersionFail
ed)

End Sub
Private Sub Validate(cCheckStep As cStep)

' Step validations that depend on other
steps in the collection

Dim lngIndex As Long

' Ensure that the step label is unique in the
workspace
For lngIndex = 0 To mcarrSteps.Count - 1

' If the current step is a sub-step of the
passed in step
If mcarrSteps(lngIndex).WorkspaceId
= cCheckStep.WorkspaceId And _
mcarrSteps(lngIndex).StepLabel =
cCheckStep.StepLabel And _
mcarrSteps(lngIndex).StepId <>
cCheckStep.StepId And _

mcarrSteps(lngIndex).IndOperation <>
DeleteOp Then
On Error GoTo 0
Err.Raise vbObjectError +
errStepLabelUnique, _
mstrModuleName &
"Validate", _

LoadResString(errStepLabelUnique)
End If
Next lngIndex

End Sub

Public Sub ValidateStep(cCheckStep As
cStep)

```

```

On Error GoTo ValidateStepErr

'Public wrapper for Validate function (2
many Validates)
Call Validate(cCheckStep)

Exit Sub

ValidateStepErr:
ShowError errStepLabelUnique
On Error GoTo 0
Err.Raise vbObjectError +
errValidateFailed, _
gstrSource, _
LoadResString(errValidateFailed)
End Sub

Private Sub Class_Initialize()

BugMessage "cArrSteps: Initialize event -
setting step count to 0"
Set mcarrSteps = New cNodeCollections

End Sub

Private Sub Class_Terminate()

BugMessage "cArrSteps: Terminate event
triggered"
Set mcarrSteps = Nothing

End Sub

Public Sub Add(ByVal cStepToAdd As cStep)

Dim iAppend As Integer
Dim sLabel As String

On Error GoTo AddErr

iAppend = 0
sLabel = cStepToAdd.StepLabel

Set cStepToAdd.NodeDB =
mcarrSteps.NodeDB

' Retrieve a unique step identifier
cStepToAdd.StepId =
cStepToAdd.NextStepId

Validate cStepToAdd

' Call a procedure to add the step record
Call mcarrSteps.Add(cStepToAdd)

' Call a procedure to add all iterators for the
step
cStepToAdd.AddAllIterators

Exit Sub

AddErr:
' If the error raised by the add function is due
to a duplication
' of the step label, then try to generate a
unique label
If Err.Number - vbObjectError =
errStepLabelUnique Then
iAppend = iAppend + 1
cStepToAdd.StepLabel = sLabel &
CStr(iAppend)
' Try to insert the step record again
Resume
End If

```

```

' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errInsertStepFailed, _
gstrSource, _
LoadResString(errInsertStepFailed)

End Sub

Public Sub Load(cStepToLoad As cStep)

Call mcarrSteps.Load(cStepToLoad)

End Sub

Public Sub SaveStepsInWsp(ByVal lngWorkspace
As Long)

' Calls a procedure to commit all changes to the
steps
' in the passed in workspace.

Dim lngIndex As Integer

' Find all steps in the array with a matching
workspace id
' It is important to step in reverse order through
the array,
' since we delete step records sometimes!
For lngIndex = mcarrSteps.Count - 1 To 0 Step -
1
If mcarrSteps(lngIndex).WorkspaceId =
lngWorkspace Then

' Call a procedure to commit all changes to
the
' Step record, if any
Call CommitStep(mcarrSteps(lngIndex),
lngIndex)

End If
Next lngIndex

End Sub

Private Sub CommitStep(ByVal cCommitStep As
cStep, _
ByVal intIndex As Integer)

' This procedure checks if any changes have been
made to the
' passed in Step. If so, it calls the step methods to
commit
' the changes.

' First commit all changes to the iterator records
for
' the step
cCommitStep.SaveIterators

Call mcarrSteps.Commit(cCommitStep, intIndex)

End Sub

Public Sub Delete(lngStepToDelete As Long)

Dim lngDeleteElement As Long

lngDeleteElement =
QueryStepIndex(lngStepToDelete)
Call mcarrSteps.Delete(lngDeleteElement)

End Sub

Public Function QueryStepIndex(lngStepId As
Long) As Long

Dim lngIndex As Long

' Find the element in the array that corresponds to
the

```

```

' passed in step id - note that while there
will be multiple
' versions of a step in the database, only
one version will
' be currently loaded in the array -
meaning that the stepid
' is enough to uniquely identify a step
For lngIndex = 0 To mcarrSteps.Count - 1
  If mcarrSteps(lngIndex).StepId =
lngStepId Then
    QueryStepIndex = lngIndex
    Exit Function
  End If
Next lngIndex

' Raise error that step has not been found
On Error GoTo 0
Err.Raise vbObjectError +
errStepNotFound, mstrSource, _
  LoadResString(errStepNotFound)

End Function

Public Function QueryStep(ByVal lngStepId
As Long) As cStep

' Populates the passed in cStep object with
the property
' values corresponding to the Step
Identifier, lngStepId

  Dim lngQueryElement As Integer

  lngQueryElement =
QueryStepIndex(lngStepId)

' Initialize the passed in step object to the
queried step
  Set QueryStep =
mcarrSteps(lngQueryElement)

End Function
Public Property Get Item(ByVal Position As
Long) As cStep
Attribute Item.VB_UserMemId = 0

' Returns the element at the passed in
position in the array
If Position >= 0 And Position <
mcarrSteps.Count Then
  Set Item = mcarrSteps(Position)
Else
  On Error GoTo 0
  Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _

LoadResString(errItemDoesNotExist)
End If

End Property
Public Property Set Item(ByVal Position As
Long, _
  ByVal cStepRec As cStep)

' Returns the element at the passed in
position in the array
If Position >= 0 And Position <
mcarrSteps.Count Then
  Set mcarrSteps(Position) = cStepRec
Else
  On Error GoTo 0
  Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _

LoadResString(errItemDoesNotExist)

```

```

End If

End Property
Public Property Set StepDB(vdata As
Database)

  Set mcarrSteps.NodeDB = vdata

End Property
Public Function SubSteps(ByVal lngStepId As
Long, _
  ByVal strVersionNo As String) As
Variant

' Returns a variant containing an array of all
the substeps
' for the passed in step

  Dim intIndex As Integer
  Dim cSubSteps() As cStep
  Dim lngStepCount As Long
  Dim cQueryStep As cStep

  On Error GoTo SubStepsErr

  lngStepCount = 0

  Set cQueryStep = QueryStep(lngStepId)

' Only a manager can have sub-steps
  If cQueryStep.StepType = gintManagerStep
Then

' For each element in the Steps array
  For intIndex = 0 To mcarrSteps.Count - 1
' Check if the parent step id and parent
version number
' match the passed in step
    If mcarrSteps(intIndex).ParentStepId =
lngStepId And _

mcarrSteps(intIndex).ParentVersionNo =
strVersionNo And _

mcarrSteps(intIndex).IndOperation <>
DeleteOp Then

' Increase the array dimension and
add the step
' to it
    ReDim Preserve
cSubSteps(lngStepCount)
    Set cSubSteps(lngStepCount) =
mcarrSteps(intIndex)
    lngStepCount = lngStepCount + 1

  End If
Next intIndex

End If

' Set the return value of the function to the
array of
' Steps that has been built above
If lngStepCount = 0 Then
  SubSteps = Empty
Else
  SubSteps = cSubSteps()
End If

Exit Function

SubStepsErr:
  LogErrors Errors

```

```

mstrSource = mstrModuleName & "SubSteps"
On Error GoTo 0
Err.Raise vbObjectError + errSubStepsFailed, _
mstrSource, _
  LoadResString(errSubStepsFailed)

End Function

Public Property Get StepCount() As Integer

  StepCount = mcarrSteps.Count

End Property

VERSION 1.0 CLASS
BEGIN
  MultiUse = -1 'True
END
Attribute VB_Name = "cAsyncShell"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
'-----
' Copyright © 1997 Microsoft Corporation. All
rights reserved.
'
' You have a royalty-free right to use, modify,
reproduce and distribute the
' Sample Application Files (and/or any modified
version) in any way you find
' useful, provided that you agree that Microsoft has
no warranty, obligations or
' liability for any Sample Application Files.
'-----

Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cAsyncShell."

Public Event Terminated()

Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Private proc As PROCESS_INFORMATION
Private mfShelling As Boolean

'-----
' Initialization and cleanup:

Private Sub Class_Initialize()
  Set moTimer = New cTimerSM
End Sub

Private Sub Class_Terminate()
  If mfShelling Then CloseHandle proc.hProcess
End Sub

'-----
'Shelling:

Public Sub Shell(CommandLine As String,
Optional PollingInterval As Long = 1000)
  Dim Start As STARTUPINFO

```

```

If mfShelling Then
  On Error GoTo 0
  Err.Raise vbObjectError +
errInstanceInUse, _
  mstrSource, _
  LoadResString(errInstanceInUse)
End If
mfShelling = True

' Initialize the STARTUPINFO structure:
Start.cb = Len(Start)
Start.dwFlags =
STARTF_USESHOWWINDOW
Start.wShowWindow =
SW_SHOWMINNOACTIVE

' Start the shelled application:
CreateProcessA 0&, CommandLine, 0&,
0&, 1&, _
  NORMAL_PRIORITY_CLASS, 0&,
0&, Start, proc

With moTimer
  If PollingInterval > 0 Then
    .Interval = PollingInterval
  Else
    .Interval = 1000
  End If
  .Enabled = True
End With
End Sub
'-----
'Aborting:
Public Sub Abort()
  Dim nCode As Long
  ' Dim X As Integer
  ' Dim ReturnVal As Integer

  On Error GoTo AbortErr

  If Not mfShelling Then
    Call WriteError(errProgramError,
mstrSource)
  Else
    ' If IsWindow(proc.hProcess) = False
Then Exit Sub
  '
  ' If (GetWindowLong(proc.hProcess,
GWL_STYLE) And WS_DISABLED)
Then Exit Sub
  '
  ' If IsWindow(proc.hProcess) Then
  ' If Not
(GetWindowLong(proc.hProcess,
GWL_STYLE) And WS_DISABLED)
Then
    X = PostMessage(proc.hProcess,
WM_CANCELMODE, 0, 0&)
    X = PostMessage(proc.hProcess,
WM_CLOSE, 0, 0&)
  End If
  End If

  If TerminateProcess(proc.hProcess,
0&) = 0 Then
    Debug.Print "Unable to terminate
process: " & proc.hProcess
    Call
WriteError(errTerminateProcessFailed,
mstrSource, _
  ApiError(GetLastError()))
  Else
    ' Should always come here!

```

```

  GetExitCodeProcess proc.hProcess,
nCode
  If nCode = STILL_ACTIVE Then
    ' Write an error and close the handles
to the
    ' process anyway
    Call
WriteError(errTerminateProcessFailed,
mstrSource)
  End If
  End If

  ' Close all open handles to the shelled
process, even
  ' if any of the above calls error out
CloseHandle proc.hProcess
moTimer.Enabled = False
mfShelling = False
RaiseEvent Terminated

End If

Exit Sub

AbortErr:
Call LogErrors(Errors)
mstrSource = mstrModuleName & "Abort"
On Error GoTo 0
Err.Raise vbObjectError + errProgramError,
_
  mstrSource, _
  LoadResString(errProgramError)

End Sub

Private Sub moTimer_Timer()
  Dim nCode As Long

  GetExitCodeProcess proc.hProcess, nCode
  If nCode <> STILL_ACTIVE Then
    CloseHandle proc.hProcess
    moTimer.Enabled = False
    mfShelling = False
    RaiseEvent Terminated
  End If
End Sub

VERSION 1.0 CLASS
BEGIN
  MultiUse = -1 True
END
Attribute VB_Name = "cConnDtl"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConnDtl.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: Encapsulates the properties
and methods of a connection.
' Contains functions to insert, update
and delete
' connection_dtls records from the
database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Public WorkspaceId As Long
Public ConnNameId As Long

```

```

Public ConnName As String
Public ConnectionString As String
Public ConnType As ConnectionType
Public Position As Long
Public NodeDB As Database

Private mintOperation As Operation

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnDtl."

' The cSequence class is used to generate unique
Connection identifiers
Private mConnectionSeq As cSequence

' The StringSM class is used to carry out string
operations
Private mFieldValue As cStringSM

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
  ' Assigns values to the parameters in the querydef
object
  ' The parameter names are cryptic to differentiate
them from the field names.
  ' When the parameter names are the same as the
field names, parameters in the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr

  For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
      Case "[w_id]"
        prmParam.Value = WorkspaceId

      Case "[c_id]"
        prmParam.Value = ConnNameId

      Case "[c_name]"
        prmParam.Value = ConnName

      Case "[c_str]"
        prmParam.Value = ConnectionString

      Case "[c_type]"
        prmParam.Value = ConnType

      Case Else
        ' Write the parameter name that is faulty
WriteError errInvalidParameter,
mstrSource, prmParam.Name
        On Error GoTo 0
        Err.Raise errInvalidParameter,
mstrModuleName & "AssignParameters", _
          LoadResString(errInvalidParameter)

    End Select
  Next prmParam

Exit Sub

AssignParametersErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError +
errAssignParametersFailed, _
  mstrModuleName & "AssignParameters",
LoadResString(errAssignParametersFailed)

```

```

End Sub

Public Function Clone() As cConnDtl

    ' Creates a copy of a given Connection

    Dim cCloneConn As cConnDtl

    On Error GoTo CloneErr

    Set cCloneConn = New cConnDtl

    ' Copy all the Connection properties to the
    newly created Connection
    cCloneConn.WorkspaceId = WorkspaceId
    cCloneConn.ConnNameId =
ConnNameId
    cCloneConn.ConnName = ConnName
    cCloneConn.ConnectionString =
ConnectionString
    cCloneConn.ConnType = ConnType
    cCloneConn.IndOperation =
mintOperation
    cCloneConn.Position = Position

    ' And set the return value to the newly
    created Connection
    Set Clone = cCloneConn
    Set cCloneConn = Nothing

    Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"Clone"
    On Error GoTo 0
    Err.Raise vbObjectError +
errCloneFailed, mstrSource,
LoadResString(errCloneFailed)

End Function
Private Sub CheckDupConnectionName()
    ' Check if the Connection name already
    exists in the workspace

    Dim rstConnection As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef

    On Error GoTo
CheckDupConnectionNameErr
    mstrSource = mstrModuleName &
"CheckDupConnectionName"

    ' Create a recordset object to retrieve the
    count of all Connections
    ' for the workspace with the same name
    strSql = "Select count(*) as
Connection_count " & _
        " from " &
TBL_CONNECTION_DTLS & _
        " where " & FLD_ID_WORKSPACE
& " = [w_id]" & _
        " and " &
FLD_CONN_DTL_CONNECTION_NAME
& " = [c_name]" & _
        " and " & FLD_ID_CONN_NAME & "
<> [c_id]"

    Set qy =
dbsAttTool.CreateQueryDef(gstrEmptyStrin
g, strSql)
    Call AssignParameters(qy)

```

```

Set rstConnection =
qy.OpenRecordset(dbOpenForwardOnly)

If rstConnection![Connection_count] > 0
Then
    rstConnection.Close
    qy.Close
    ShowError errDupConnDtlName
    On Error GoTo 0
    Err.Raise vbObjectError +
errDupConnDtlName, _
mstrSource,
LoadResString(errDupConnDtlName)
End If

rstConnection.Close
qy.Close

Exit Sub

CheckDupConnectionNameErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"CheckDupConnectionName"
    On Error GoTo 0
    Err.Raise vbObjectError + errProgramError,
_
mstrSource,
LoadResString(errProgramError)

End Sub
Public Property Let IndOperation(ByVal vdata
As Operation)

    ' The valid operations are define in the
    cOperations
    ' class. Check if the operation is valid
    Select Case vdata
        Case QueryOp, InsertOp, UpdateOp,
DeleteOp
            mintOperation = vdata

        Case Else
            BugAssert True
    End Select

End Property
Public Sub Validate()
    ' Each distinct object will have a Validate
    method which
    ' will check if the class properties are valid.
    This method
    ' will be used to check interdependant
    properties that
    ' cannot be validated by the let procedures.
    ' It should be called by the add and modify
    methods of the class

    If ConnName = gstrEmptyString Then

        ShowError
errConnectionNameMandatory
        On Error GoTo 0
        ' Propagate this error back to the caller
        Err.Raise vbObjectError +
errConnectionNameMandatory, _
mstrSource,
LoadResString(errConnectionNameMandatory
)
    End If

    ' Raise an error if the Connection name
    already exists in the workspace
    Call CheckDupConnectionName

```

```

End Sub
Public Sub Add()

    Dim strInsert As String
    Dim qy As DAO.QueryDef

    On Error GoTo AddErr

    ' Validate the record before trying to insert the
    record
    Call Validate

    ' Create a temporary querydef object
    strInsert = "insert into " &
TBL_CONNECTION_DTLS & _
        "( " & FLD_ID_WORKSPACE & _
        ", " & FLD_ID_CONN_NAME & _
        ", " &
FLD_CONN_DTL_CONNECTION_NAME & _
        ", " &
FLD_CONN_DTL_CONNECTION_STRING & _
        ", " &
FLD_CONN_DTL_CONNECTION_TYPE & " ) "
& _
        " values ( [w_id], [c_id], " & _
        " [c_name], [c_str], [c_type] )"

    Set qy =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strInsert)

    ' Call a procedure to assign the Connection values
    Call AssignParameters(qy)

    qy.Execute dbFailOnError
    qy.Close

    Exit Sub

AddErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errInsertFailed, _
mstrModuleName & "Add",
LoadResString(errInsertFailed)

End Sub
Public Sub Delete()

    Dim strDelete As String
    Dim qy As DAO.QueryDef

    On Error GoTo DeleteErr

    strDelete = "delete from " &
TBL_CONNECTION_DTLS & _
        " where " & FLD_ID_CONN_NAME & " =
[c_id]"
    Set qy =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strDelete)

    Call AssignParameters(qy)
    qy.Execute dbFailOnError

    qy.Close

    Exit Sub

DeleteErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errDeleteFailed, _

```

```

    mstrModuleName & "Delete",
    LoadResString(errDeleteFailed)

End Sub

Public Sub Modify()

    Dim strUpdate As String
    Dim qy As QueryDef

    On Error GoTo ModifyErr

    ' Validate the updated values before trying
    to modify the db
    Call Validate

    ' Create a temporary querydef object with
    the modify string
    strUpdate = "update " &
    TBL_CONNECTION_DTLS & _
    " set " & FLD_ID_WORKSPACE &
    " = [w_id], " & _

    FLD_CONN_DTL_CONNECTION_NAM
    E & " = [c_name], " & _

    FLD_CONN_DTL_CONNECTION_STRIN
    G & " = [c_str], " & _

    FLD_CONN_DTL_CONNECTION_TYPE
    & " = [c_type] " & _
    " where " &
    FLD_ID_CONN_NAME & " = [c_id]"
    Set qy =
    dbsAttTool.CreateQueryDef(gstrEmptyStrin
    g, strUpdate)

    ' Call a procedure to assign the
    Connection values to the
    ' querydef object
    Call AssignParameters(qy)
    qy.Execute dbFailOnError

    qy.Close

Exit Sub

ModifyErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
    errModifyFailed, _
    mstrModuleName & "Modify",
    LoadResString(errModifyFailed)

End Sub
Public Property Get NextIdentifier() As
Long

    Dim lngNextId As Long

    On Error GoTo NextIdentifierErr

    ' Retrieve the next identifier using the
    sequence class
    Set mConnectionSeq = New cSequence
    Set mConnectionSeq.IdDatabase =
    dbsAttTool
    mConnectionSeq.IdentifierColumn =
    FLD_ID_CONN_NAME
    lngNextId = mConnectionSeq.Identifier
    Set mConnectionSeq = Nothing

    NextIdentifier = lngNextId

```

```

Exit Property

NextIdentifierErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errIdGetFailed, _
    mstrModuleName & "NextIdentifier",
    LoadResString(errIdGetFailed)

End Property
Public Property Get IndOperation() As
Operation

    IndOperation = mintOperation

End Property

Private Sub Class_Initialize()

    Set mFieldValue = New cStringSM

    ' Initialize the operation indicator variable to
    Query
    ' It will be modified later by the collection
    class when
    ' inserts, updates or deletes are performed
    mintOperation = QueryOp

    ConnType = giDefaultConnType

End Sub

Private Sub Class_Terminate()

    Set mFieldValue = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cConnDtls"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConnDtls.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Implements an array of
cConnDtl objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains additional functions to
determine the connection
' string value, validation functions, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcarrConnDtls As cNodeCollections

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnDtls."

Public Property Set ConnDb(vdata As
Database)

```

```

    Set mcarrConnDtls.NodeDB = vdata

End Property
Public Sub Modify(cModifiedConn As cConnDtl)

    ' First check if the parameter record is valid
    Call CheckDupConnName(cModifiedConn)

    Call mcarrConnDtls.Modify(cModifiedConn)

End Sub
Public Sub Load(ByRef cConnToAdd As
cConnDtl)

    Call mcarrConnDtls.Load(cConnToAdd)

End Sub
Public Sub Add(ByRef cConnToAdd As cConnDtl)

    ' First check if the record is valid
    Call Validate(cConnToAdd)

    ' Retrieve a unique identifier
    cConnToAdd.ConnNameId =
    cConnToAdd.NextIdentifier

    Call mcarrConnDtls.Add(cConnToAdd)

End Sub

Public Sub Unload(lConnNameId As Long)

    Dim lngDeleteElement As Long

    lngDeleteElement = QueryIndex(lConnNameId)

    Call mcarrConnDtls.Unload(lngDeleteElement)

End Sub

Public Sub SaveConnDtlsInWsp(ByVal
lngWorkspace As Long)
    ' Call a procedure to save all connection details
    records for the workspace
    Call mcarrConnDtls.Save(lngWorkspace)

End Sub
Public Function GetConnectionDtl(ByVal
lngWorkspace As Long, _
ByVal strConnectionName As String) As
cConnDtl
    ' Returns the connection dtl for the passed in
    connection name

    Dim lngIndex As Long

    ' Find all parameters in the array with a matching
    workspace id
    For lngIndex = 0 To mcarrConnDtls.Count - 1
        If mcarrConnDtls(lngIndex).WorkspaceId =
        lngWorkspace And _
            mcarrConnDtls(lngIndex).ConnName =
        strConnectionName Then

            Set GetConnectionDtl =
            mcarrConnDtls(lngIndex)
            Exit For
        End If
    Next lngIndex

    If lngIndex > mcarrConnDtls.Count - 1 Then
        ' The parameter has not been defined for the
        workspace
        ' Raise an error

```

```

    On Error GoTo 0
    Err.Raise vbObjectError +
errConnNameInvalid, mstrModuleName &
"GetConnection", _
LoadResString(errConnNameInvalid)
End If
End Function
Public Sub Delete(IConnNameId As Long)
' Delete the passed in parameter

Dim lngDeleteElement As Long

lngDeleteElement =
QueryIndex(IConnNameId)
Call
mcarrConnDtls.Delete(lngDeleteElement)
End Sub
Private Function QueryIndex(IConnNameId
As Long) As Long

Dim lngIndex As Long

' Find the matching parameter record in
the array
For lngIndex = 0 To
mcarrConnDtls.Count - 1
If
mcarrConnDtls(lngIndex).ConnNameId =
IConnNameId And _

mcarrConnDtls(lngIndex).IndOperation <>
DeleteOp Then
DeleteOp Then
QueryIndex = lngIndex
Exit Function
End If
Next lngIndex

' Raise error that parameter has not been
found
On Error GoTo 0
Err.Raise vbObjectError +
errQueryIndexFailed,
"cArrParameters.QueryIndex", _
LoadResString(errQueryIndexFailed)
End Function
Public Function
QueryConnDtl(IConnNameId As Long) As
cConnDtl

Dim lngQueryElement As Long

lngQueryElement =
QueryIndex(IConnNameId)

' Return the queried connection object
Set QueryConnDtl =
mcarrConnDtls(lngQueryElement)
End Function
Public Property Get Count() As Long

Count = mcarrConnDtls.Count
End Property
Public Property Get Item(lngIndex As Long)
As cConnDtl
Attribute Item.VB_UserMemId = 0

Set Item = mcarrConnDtls(lngIndex)

```

```

End Property
Private Sub Validate(ByVal cConnToValidate
As cConnDtl)

' This procedure is necessary since the class
cannot validate
' all the connection_dtl properties on it's
own. This is 'coz we
' might have created new connections in the
workspace, but not
' saved them to the database yet - hence the
duplicate check
' has to be repeated in the array

Dim lngIndex As Long
Dim cTempParam As cConnDtl

' Check if the parameter name already exists
in the workspace
For lngIndex = 0 To mcarrConnDtls.Count -
1
Set cTempParam =
mcarrConnDtls(lngIndex)
If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnName =
cConnToValidate.ConnName And _
cTempParam.IndOperation <>
DeleteOp Then
On Error GoTo 0
Err.Raise vbObjectError +
errDupConnDtlName, _
mstrSource,
LoadResString(errDupConnDtlName)
End If
Next lngIndex
End Sub
Private Sub CheckDupConnName(ByVal
cConnToValidate As cConnDtl)

Dim lngIndex As Long
Dim cTempParam As cConnDtl

' Check if the parameter name already exists
in the workspace
For lngIndex = 0 To mcarrConnDtls.Count -
1
Set cTempParam =
mcarrConnDtls(lngIndex)
If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnName =
cConnToValidate.ConnName And _
cTempParam.ConnNameId <>
cConnToValidate.ConnNameId And _
cTempParam.IndOperation <>
DeleteOp Then
ShowError errDupConnDtlName
On Error GoTo 0
Err.Raise vbObjectError +
errDupConnDtlName, _
mstrSource,
LoadResString(errDupConnDtlName)
End If
Next lngIndex
End Sub
Private Sub Class_Initialize()

Set mcarrConnDtls = New cNodeCollections
End Sub

```

```

Private Sub Class_Terminate()

Set mcarrConnDtls = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cConnection"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConnection.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Encapsulates the properties and
methods of a connection string.
' Contains functions to insert, update and
delete
' workspace_connections records from the
database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Public WorkspaceId As Long
Public ConnectionId As Long
Public ConnectionValue As String
Public Description As String
Public NodeDB As Database
Public Position As Long
Public NoCountDisplay As Boolean
Public NoExecute As Boolean
Public ParseQueryOnly As Boolean
Public QuotedIdentifiers As Boolean
Public AnsiNulls As Boolean
Public ShowQueryPlan As Boolean
Public ShowStatsTime As Boolean
Public ShowStatsIO As Boolean
Public ParseOdbcMsg As Boolean
Public RowCount As Long
Public TsqBatchSeparator As String
Public QueryTimeOut As Long
Public ServerLanguage As String
Public CharacterTranslation As Boolean
Public RegionalSettings As Boolean

Private mstrConnectionName As String
Private mintOperation As Operation

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnection."

' The cSequence class is used to generate unique
Connection identifiers
Private mConnectionSeq As cSequence

' The StringSM class is used to carry out string
operations
Private mFieldValue As cStringSM

Private Sub AssignParameters(qyExec As
DAO.QueryDef)

```



```

' Assigns values to the parameters in the
querydef object
' The parameter names are cryptic to
differentiate them from the field names.
' When the parameter names are the same
as the field names, parameters in the where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr

For Each prmParam In
qyExec.Parameters
    Select Case prmParam.Name
        Case "[w_id]"
            prmParam.Value = WorkspaceId

        Case "[c_id]"
            prmParam.Value = ConnectionId

        Case "[c_name]"
            prmParam.Value =
mstrConnectionName

        Case "[c_value]"
            prmParam.Value =
ConnectionValue

        Case "[desc]"
            prmParam.Value = Description

        Case "[no_count]"
            prmParam.Value =
NoCountDisplay

        Case "[no_exec]"
            prmParam.Value = NoExecute

        Case "[parse_only]"
            prmParam.Value =
ParseQueryOnly

        Case "[quoted_id]"
            prmParam.Value =
QuotedIdentifiers

        Case "[a_nulls]"
            prmParam.Value = AnsiNulls

        Case "[show_qp]"
            prmParam.Value =
ShowQueryPlan

        Case "[stats_tm]"
            prmParam.Value =
ShowStatsTime

        Case "[stats_io]"
            prmParam.Value = ShowStatsIO

        Case "[parse_odbc]"
            prmParam.Value = ParseOdbcMsg

        Case "[row_cnt]"
            prmParam.Value = RowCount

        Case "[batch_sep]"
            prmParam.Value =
TsqlBatchSeparator

        Case "[qry_tmout]"
            prmParam.Value = QueryTimeout

        Case "[lang]"

```

```

prmParam.Value = ServerLanguage

Case "[char_trans]"
    prmParam.Value =
CharacterTranslation

Case "[reg_settings]"
    prmParam.Value = RegionalSettings

Case Else
    ' Write the parameter name that is
faulty
    WriteError errInvalidParameter,
mstrSource, prmParam.Name
    On Error GoTo 0
    Err.Raise errInvalidParameter,
mstrModuleName & "AssignParameters", _

LoadResString(errInvalidParameter)
    End Select
Next prmParam

Exit Sub

AssignParametersErr:

    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrModuleName & "AssignParameters",
LoadResString(errAssignParametersFailed)

End Sub

Public Function Clone() As cConnection

    ' Creates a copy of a given Connection

    Dim cCloneConn As cConnection

    On Error GoTo CloneErr

    Set cCloneConn = New cConnection

    ' Copy all the Connection properties to the
newly
    ' created Connection
    Set cCloneConn.NodeDB = NodeDB
    cCloneConn.WorkspaceId = WorkspaceId
    cCloneConn.ConnectionId = ConnectionId
    cCloneConn.ConnectionName =
mstrConnectionName
    cCloneConn.ConnectionValue =
ConnectionValue
    cCloneConn.Description = Description
    cCloneConn.IndOperation = mintOperation
    cCloneConn.Position = Position
    cCloneConn.NoCountDisplay =
NoCountDisplay
    cCloneConn.NoExecute = NoExecute
    cCloneConn.ParseQueryOnly =
ParseQueryOnly
    cCloneConn.QuotedIdentifiers =
QuotedIdentifiers
    cCloneConn.AnsiNulls = AnsiNulls
    cCloneConn.ShowQueryPlan =
ShowQueryPlan
    cCloneConn.ShowStatsTime =
ShowStatsTime
    cCloneConn.ShowStatsIO = ShowStatsIO
    cCloneConn.ParseOdbcMsg =
ParseOdbcMsg
    cCloneConn.RowCount = RowCount

```

```

cCloneConn.TsqlBatchSeparator =
TsqlBatchSeparator
cCloneConn.QueryTimeout = QueryTimeout
cCloneConn.ServerLanguage = ServerLanguage
cCloneConn.CharacterTranslation =
CharacterTranslation
cCloneConn.RegionalSettings = RegionalSettings

' And set the return value to the newly created
Connection
Set Clone = cCloneConn
Set cCloneConn = Nothing

Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed,
mstrSource, LoadResString(errCloneFailed)

End Function

Private Sub CheckDupConnectionName()
    ' Check if the Connection name already exists in
the workspace

    Dim rstConnection As Recordset
    Dim strSql As String
    Dim qy As DAO.QueryDef

    On Error GoTo CheckDupConnectionNameErr
    mstrSource = mstrModuleName &
"CheckDupConnectionName"

    ' Create a recordset object to retrieve the count of
all Connections
    ' for the workspace with the same name
    strSql = "Select count(*) as Connection_count "
    & _
        " from workspace_connections " & _
        " where workspace_id = [w_id]" & _
        " and connection_name = [c_name]" & _
        " and connection_id <> [c_id]"

    Set qy =
NodeDB.CreateQueryDef(gstrEmptyString, strSql)
    Call AssignParameters(qy)

    Set rstConnection =
qy.OpenRecordset(dbOpenForwardOnly)

    If rstConnection![Connection_count] > 0 Then
        rstConnection.Close
        qy.Close
        ShowError errDuplicateConnectionName
        On Error GoTo 0
        Err.Raise vbObjectError +
errDuplicateConnectionName, _
mstrSource,
LoadResString(errDuplicateConnectionName)
    End If

    rstConnection.Close
    qy.Close

    Exit Sub

CheckDupConnectionNameErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"CheckDupConnectionName"
    On Error GoTo 0
    Err.Raise vbObjectError + errProgramError, _
mstrSource, LoadResString(errProgramError)

```

```

End Sub
Private Sub CheckDB()
' Check if the database object has been
initialized

If NodeDB Is Nothing Then
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidDB, _
mstrModuleName & "CheckDB",
LoadResString(errInvalidDB)
End If

End Sub
Public Property Let ConnectionName(vdata
As String)

If vdata = gstrEmptyString Then

ShowError
errConnectionNameMandatory
On Error GoTo 0
' Propagate this error back to the caller
Err.Raise vbObjectError +
errConnectionNameMandatory, _
mstrSource,
LoadResString(errConnectionNameMandato
ry)
Else
mstrConnectionName = vdata
End If

End Property

Public Property Let IndOperation(ByVal
vdata As Operation)

' The valid operations are define in the
cOperations
' class. Check if the operation is valid
Select Case vdata
Case QueryOp, InsertOp, UpdateOp,
DeleteOp
mintOperation = vdata

Case Else
BugAssert True
End Select

End Property
Public Sub Validate()
' Each distinct object will have a Validate
method which
' will check if the class properties are
valid. This method
' will be used to check interdependant
properties that
' cannot be validated by the let
procedures.
' It should be called by the add and
modify methods of the class

' Check if the db object is valid
Call CheckDB

' Raise an error if the Connection name
already exists in the workspace
Call CheckDupConnectionName

End Sub
Public Sub Add()

Dim strInsert As String
Dim qy As DAO.QueryDef

```

```

On Error GoTo AddErr

' Validate the record before trying to insert
the record
Call Validate

' Create a temporary querydef object
strInsert = "insert into
workspace_connections " & _
"( workspace_id, connection_id, " & _
"connection_name, connection_value,
" & _
"description, no_count_display, " & _
"no_execute, parse_query_only, " & _
"ANSI_quoted_identifiers,
ANSI_nulls, " & _
"show_query_plan, show_stats_time, "
& _
"show_stats_io,
parse_odbc_msg_prefixes, " & _
"row_count, tsq_batch_separator, " &
_
"query_time_out, server_language, " &
_
"character_translation,
regional_settings )" & _
" values ( [w_id], [c_id], [c_name],
[c_value], " & _
" [desc], [no_count], [no_exec],
[parse_only], " & _
" [quoted_id], [a_nulls], [show_qp],
[stats_tm], " & _
" [stats_io], [parse_odbc], [row_cnt],
[batch_sep], " & _
" [qry_tmout], [lang], [char_trans],
[reg_settings] )"

Set qy =
NodeDB.CreateQueryDef(gstrEmptyString,
strInsert)

' Call a procedure to assign the Connection
values
Call AssignParameters(qy)

qy.Execute dbFailOnError
qy.Close

Exit Sub

AddErr:

Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errInsertFailed, _
mstrModuleName & "Add",
LoadResString(errInsertFailed)

End Sub
Public Sub Delete()

Dim strDelete As String
Dim qy As DAO.QueryDef

On Error GoTo DeleteErr

' Check if the db object is valid
Call CheckDB

strDelete = "delete from
workspace_connections " & _
" where connection_id = [c_id]"

```

```

Set qy =
NodeDB.CreateQueryDef(gstrEmptyString,
strDelete)

Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

Exit Sub

DeleteErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errDeleteFailed, _
mstrModuleName & "Delete",
LoadResString(errDeleteFailed)

End Sub

Public Sub Modify()

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo ModifyErr

' Validate the updated values before trying to
modify the db
Call Validate

' Create a temporary querydef object with the
modify string
strUpdate = "update workspace_connections " &
_
" set workspace_id = [w_id], " & _
"connection_name = [c_name], " & _
"connection_value = [c_value], " & _
"description = [desc], " & _
"no_count_display = [no_count], " & _
"no_execute = [no_exec], " & _
"parse_query_only = [parse_only], " & _
"ANSI_quoted_identifiers = [quoted_id], "
& _
"ANSI_nulls = [a_nulls], " & _
"show_query_plan = [show_qp], " & _
"show_stats_time = [stats_tm], " & _
"show_stats_io = [stats_io], " & _
"parse_odbc_msg_prefixes = [parse_odbc],
" & _
"row_count = [row_cnt], " & _
"tsq_batch_separator = [batch_sep], " & _
"query_time_out = [qry_tmout], " & _
"server_language = [lang], " & _
"character_translation = [char_trans], " & _
"regional_settings = [reg_settings]" & _
" where connection_id = [c_id]"

Set qy =
NodeDB.CreateQueryDef(gstrEmptyString,
strUpdate)

' Call a procedure to assign the Connection values
to the
' querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

Exit Sub

ModifyErr:

Call LogErrors(Errors)
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errModifyFailed, _
    mstrModuleName & "Modify",
LoadResString(errModifyFailed)

End Sub
Public Property Get ConnectionName() As
String

    ConnectionName = mstrConnectionName

End Property

Public Property Get NextIdentifier() As
Long

    Dim lngNextId As Long

    On Error GoTo NextIdentifierErr

    ' First check if the database object is valid
    Call CheckDB

    ' Retrieve the next identifier using the
sequence class
    Set mConnectionSeq = New cSequence
    Set mConnectionSeq.IdDatabase =
NodeDB
    mConnectionSeq.IdentifierColumn =
"connection_id"
    lngNextId = mConnectionSeq.Identifier
    Set mConnectionSeq = Nothing

    NextIdentifier = lngNextId
Exit Property

NextIdentifierErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errIdGetFailed,
-
    mstrModuleName & "NextIdentifier",
LoadResString(errIdGetFailed)

End Property
Public Property Get IndOperation() As
Operation

    IndOperation = mintOperation

End Property

Private Sub Class_Initialize()

    Set mFieldValue = New cStringSM

    ' Initialize the operation indicator variable
to Query
    ' It will be modified later by the collection
class when
    ' inserts, updates or deletes are performed
mintOperation = QueryOp

    ' Initialize connection properties to their
default values
    NoCountDisplay =
DEF_NO_COUNT_DISPLAY
    NoExecute = DEF_NO_EXECUTE
    ParseQueryOnly =
DEF_PARSE_QUERY_ONLY
    QuotedIdentifiers =
DEF_ANSI_QUOTED_IDENTIFIERS
    AnsiNulls = DEF_ANSI_NULLS
    ShowQueryPlan =
DEF_SHOW_QUERY_PLAN

```

```

ShowStatsTime =
DEF_SHOW_STATS_TIME
ShowStatsIO = DEF_SHOW_STATS_IO
ParseOdbcMsg =
DEF_PARSE_ODBC_MSG_PREFIXES
RowCount = DEF_ROW_COUNT
TsqlBatchSeparator =
DEF_TSQL_BATCH_SEPARATOR
QueryTimeOut =
DEF_QUERY_TIME_OUT
ServerLanguage =
DEF_SERVER_LANGUAGE
CharacterTranslation =
DEF_CHARACTER_TRANSLATION
RegionalSettings =
DEF_REGIONAL_SETTINGS

End Sub

Private Sub Class_Terminate()

    Set NodeDB = Nothing
    Set mFieldValue = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cConnections"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConnections.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Implements an array of
cConnection objects.
' Type-safe wrapper around
cNodeCollections.
' Also contains validation functions,
etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcarrConnections As
cNodeCollections

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cConnections."

Public Property Set ConnDb(vdata As
Database)

    Set mcarrConnections.NodeDB = vdata

End Property

Public Sub Modify(cModifiedConn As
cConnection)

    ' First check if the parameter record is valid
    Call CheckDupConnName(cModifiedConn)

    Call
mcarrConnections.Modify(cModifiedConn)

```

```

End Sub
Public Sub Load(ByRef cConnToAdd As
cConnection)

    Call mcarrConnections.Load(cConnToAdd)

End Sub
Public Sub Add(ByRef cConnToAdd As
cConnection)

    Set cConnToAdd.NodeDB =
mcarrConnections.NodeDB

    ' First check if the record is valid
    Call Validate(cConnToAdd)

    ' Retrieve a unique identifier
    cConnToAdd.ConnectionId =
cConnToAdd.NextIdentifier

    Call mcarrConnections.Add(cConnToAdd)

End Sub

Public Sub Unload(lngConnId As Long)

    Dim lngDeleteElement As Long

    lngDeleteElement = QueryIndex(lngConnId)

    Call
mcarrConnections.Unload(lngDeleteElement)

End Sub

Public Sub SaveConnectionsInWsp(ByVal
lngWorkspace As Long)
    ' Call a procedure to save all connection records
for the workspace
    Call mcarrConnections.Save(lngWorkspace)

End Sub
Public Function GetConnection(ByVal
lngWorkspace As Long, _
ByVal strConnectionName As String) As
cConnection
    ' Returns the connection string for the passed in
connection name

    Dim lngIndex As Long

    ' Find all parameters in the array with a matching
workspace id
    For lngIndex = 0 To mcarrConnections.Count - 1
        If mcarrConnections(lngIndex).WorkspaceId =
lngWorkspace And _

mcarrConnections(lngIndex).ConnectionName =
strConnectionName Then

            Set GetConnection =
mcarrConnections(lngIndex)
            Exit For
        End If
    Next lngIndex

    If lngIndex > mcarrConnections.Count - 1 Then
        ' The parameter has not been defined for the
workspace
        ' Raise an error
        On Error GoTo 0
        Err.Raise vbObjectError +
errConnNameInvalid, mstrModuleName &
"GetConnection", _

```

```

LoadResString(errConnNameInvalid)
End If

End Function
Public Sub Delete(IngConnId As Long)
' Delete the passed in parameter

Dim lngDeleteElement As Long

lngDeleteElement =
QueryIndex(IngConnId)
Call
mcarrConnections.Delete(IngDeleteElement
)

End Sub
Private Function QueryIndex(IngConnId As Long) As Long

Dim lngIndex As Long

' Find the matching parameter record in
the array
For lngIndex = 0 To
mcarrConnections.Count - 1
If
mcarrConnections(lngIndex).ConnectionId
= lngConnId And _

mcarrConnections(lngIndex).IndOperation
<> DeleteOp Then
QueryIndex = lngIndex
Exit Function
End If
Next lngIndex

' Raise error that parameter has not been
found
On Error GoTo 0
Err.Raise vbObjectError +
errQueryIndexFailed,
"c ArrParameters.QueryIndex", _
LoadResString(errQueryIndexFailed)

End Function

Public Function
QueryConnection(IngConnId As Long) As
cConnection

Dim lngQueryElement As Long

lngQueryElement =
QueryIndex(IngConnId)

' Return the queried connection object
Set QueryConnection =
mcarrConnections(lngQueryElement)

End Function
Public Property Get Count() As Long

Count = mcarrConnections.Count

End Property
Public Property Get Item(lngIndex As Long)
As cConnection
Attribute Item.VB_UserMemId = 0

Set Item = mcarrConnections(lngIndex)

End Property

Public Sub Validate(ByVal cConnToValidate
As cConnection)
' This procedure is necessary since the class
cannot validate
' all the parameter properties on it's own.
This is 'coz we
' might have created new parameters in the
workspace, but not
' saved them to the database yet - hence the
duplicate check
' has to be repeated in the array

Dim lngIndex As Long
Dim cTempParam As cConnection

' Check if the parameter name already exists
in the workspace
For lngIndex = 0 To
mcarrConnections.Count - 1
Set cTempParam =
mcarrConnections(lngIndex)
If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnectionName =
cConnToValidate.ConnectionName And _
cTempParam.IndOperation <>
DeleteOp Then
On Error GoTo 0
Err.Raise vbObjectError +
errDuplicateConnectionName, _
mstrSource,
LoadResString(errDuplicateConnectionName)
End If
Next lngIndex

End Sub
Public Sub CheckDupConnName(ByVal
cConnToValidate As cConnection)

Dim lngIndex As Long
Dim cTempParam As cConnection

' Check if the parameter name already exists
in the workspace
For lngIndex = 0 To
mcarrConnections.Count - 1
Set cTempParam =
mcarrConnections(lngIndex)
If cTempParam.WorkspaceId =
cConnToValidate.WorkspaceId And _
cTempParam.ConnectionName =
cConnToValidate.ConnectionName And _
cTempParam.ConnectionId <>
cConnToValidate.ConnectionId And _
cTempParam.IndOperation <>
DeleteOp Then
ShowError
errDuplicateConnectionName
On Error GoTo 0
Err.Raise vbObjectError +
errDuplicateConnectionName, _
mstrSource,
LoadResString(errDuplicateConnectionName)
End If
Next lngIndex

End Sub
Private Sub Class_Initialize()

Set mcarrConnections = New
cNodeCollections

End Sub

Private Sub Class_Terminate()

Set mcarrConnections = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cConstraint"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cConstraint.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Encapsulates the properties and
methods of a constraint.
' Contains functions to insert, update and
delete
' step_constraints records from the
database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Module level variables to store the property values
Private mlngConstraintId As Long
Private mlngStepId As Long
Private mstrVersionNo As String
Private mintConstraintType As Integer
Private mlngGlobalStepId As Long
Private mstrGlobalVersionNo As String
Private mintSequenceNo As Integer
Private mdbConstraintDB As Database
Private mlngWorkspaceId As Integer
Private mintOperation As Operation
Private mlngPosition As Long

' The cSequence class is used to generate unique
step identifiers
Private mConstraintSeq As cSequence

Private Const mstrModuleName As String =
"cConstraint."
Private mstrSource As String

Public Enum ConstraintType
gintPreStep = 1
gintPostStep = 2
End Enum

Private Const mstrSQ As String = ""
Public Property Get WorkspaceId() As Long
WorkspaceId = mlngWorkspaceId
End Property
Public Property Let WorkspaceId(ByVal vdata As
Long)
mlngWorkspaceId = vdata
End Property

Public Property Get IndOperation() As Operation

IndOperation = mintOperation

End Property
Public Property Let IndOperation(ByVal vdata As
Operation)

On Error GoTo IndOperationErr

```

```

mstrSource = mstrModuleName &
"IndOperation"

' The valid operations are define in the
cOperations
' class. Check if the operation is valid
Select Case vdata
Case QueryOp, InsertOp, UpdateOp,
DeleteOp
mintOperation = vdata

Case Else
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidOperation, _
mstrSource,
LoadResString(errInvalidOperation)
End Select

Exit Property

IndOperationErr:
LogErrors Errors
mstrSource = mstrModuleName &
"IndOperation"
On Error GoTo 0
Err.Raise vbObjectError +
errLetOperationFailed, _
mstrSource,
LoadResString(errLetOperationFailed)

End Property

Public Function Clone() As cConstraint

' Creates a copy of a given constraint

Dim cConsClone As cConstraint

On Error GoTo CloneErr
mstrSource = mstrModuleName &
"Clone"

Set cConsClone = New cConstraint

' Copy all the workspace properties to the
newly
' created workspace
cConsClone.ConstraintId =
mLngConstraintId
cConsClone.StepId = mLngStepId
cConsClone.VersionNo = mstrVersionNo
cConsClone.ConstraintType =
mintConstraintType
cConsClone.GlobalStepId =
mLngGlobalStepId
cConsClone.GlobalVersionNo =
mstrGlobalVersionNo
cConsClone.SequenceNo =
mintSequenceNo
cConsClone.WorkspaceId =
mLngWorkspaceId
cConsClone.IndOperation =
mintOperation

' And set the return value to the newly
created constraint
Set Clone = cConsClone

Exit Function

CloneErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Clone"

```

```

On Error GoTo 0
Err.Raise vbObjectError + errCloneFailed, _
mstrSource,
LoadResString(errCloneFailed)

End Function

Public Property Get SequenceNo() As Integer

SequenceNo = mintSequenceNo

End Property

Public Property Let SequenceNo(ByVal vdata
As Integer)
mintSequenceNo = vdata
End Property

Public Sub Add()
' Inserts a new step constraint into the
database

Dim strInsert As String
Dim qy As DAO.QueryDef

On Error GoTo AddErr

' First check if the database object is valid
Call CheckDB

' Any record validations
Call Validate

' Create a temporary querydef object
strInsert = "insert into step_constraints " & _
"( constraint_id, step_id, version_no, "
& _
" constraint_type, global_step_id,
global_version_no, sequence_no )" & _
" values ( [cons_id], [s_id], [ver_no], "
& _
" [cons_type], [g_step_id], [g_ver_no],
" & _
" [seq_no] )"

Set qy =
mdbsConstraintDB.CreateQueryDef(gstrEmpt
yString, strInsert)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy)

qy.Execute dbFailOnError
qy.Close

' strInsert = "insert into step_constraints " &
_
"( constraint_id, step_id, version_no, " &
_
" constraint_type, global_step_id,
global_version_no, sequence_no )" & _
' " values (" & _
' Str(mLngConstraintId) & ", " &
Str(mLngStepId) & ", " & _
' mstrSQ & mstrVersionNo & mstrSQ & ",
" & Str(mintConstraintType) & ", " & _
' Str(mLngGlobalStepId) & ", " & mstrSQ
& mstrGlobalVersionNo & mstrSQ & ", " & _
' Str(mintSequenceNo) & ") "

' BugMessage strInsert
' mdbsConstraintDB.Execute strInsert,
dbFailOnError
Exit Sub

```

```

AddErr:
LogErrors Errors
mstrSource = mstrModuleName & "Add"
On Error GoTo 0
Err.Raise vbObjectError +
errAddConstraintFailed, _
mstrSource, _
LoadResString(errAddConstraintFailed)
End Sub

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
' Assigns values to the parameters in the querydef
object
' The parameter names are cryptic to make them
different
' from the field names. When the parameter
names are
' the same as the field names, parameters in the
where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

For Each prmParam In qyExec.Parameters
Select Case prmParam.Name
Case "[cons_id]"
prmParam.Value = mLngConstraintId

Case "[s_id]"
prmParam.Value = mLngStepId

Case "[ver_no]"
prmParam.Value = mstrVersionNo

Case "[cons_type]"
prmParam.Value = mintConstraintType

Case "[g_step_id]"
prmParam.Value = mLngGlobalStepId

Case "[g_ver_no]"
prmParam.Value = mstrGlobalVersionNo

Case "[seq_no]"
prmParam.Value = mintSequenceNo

Case Else
' Write the parameter name that is faulty
WriteError errInvalidParameter,
mstrSource, _
prmParam.Name
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource, _
LoadResString(errInvalidParameter)
End Select
Next prmParam

Exit Sub

AssignParametersErr:

mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrSource,
LoadResString(errAssignParametersFailed)

```

```

End Sub
Public Property Get NextIdentifier() As Long
    Dim lngNextId As Long

    On Error GoTo NextIdentifierErr

    ' First check if the database object is valid
    Call CheckDB

    ' Retrieve the next constraint identifier
    using the
    ' sequence class
    Set mConstraintSeq = New cSequence
    Set mConstraintSeq.IdDatabase =
mdbsConstraintDB
    mConstraintSeq.IdentifierColumn =
"constraint_id"
    lngNextId = mConstraintSeq.Identifier
    Set mConstraintSeq = Nothing

    NextIdentifier = lngNextId
    Exit Property

NextIdentifierErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"NextIdentifier"
    On Error GoTo 0
    Err.Raise vbObjectError +
errStepIdGetFailed, _
        mstrSource,
LoadResString(errStepIdGetFailed)

End Property

Private Sub CheckDB()
    ' Check if the database object has been
    initialized

    If mdbsConstraintDB Is Nothing Then
        ShowError errInvalidDB
        On Error GoTo 0
        Err.Raise vbObjectError +
errInvalidDB, _
            mstrModuleName,
LoadResString(errInvalidDB)
    End If

End Sub

Public Sub Delete()
    ' Deletes the step constraint record from
    the database

    Dim strDelete As String
    Dim qry As DAO.QueryDef

    On Error GoTo DeleteErr
    mstrSource = mstrModuleName &
"Delete"

    ' There can be multiple constraints for a
    step,
    ' meaning that there can be multiple
    constraint records
    ' with the same constraint_id. Only a
    combination
    ' of the step_id, version and constraint_id
    will be
    ' unique
    ' Create a temporary querydef object with
    the modify string
    strUpdate = "Update step_constraints " & _
        " set sequence_no = [seq_no] " & _
        " where constraint_id = [cons_id] " & _
        " and step_id = [s_id] " & _
        " and version_no = [ver_no] "

    Set qry =
mdbsConstraintDB.CreateQueryDef(gstrEmptyString, strUpdate)

    ' Call a procedure to assign the parameter
    values to the
    ' querydef object

```

```

    " where constraint_id = [cons_id] " & _
    " and step_id = [s_id] " & _
    " and version_no = [ver_no] "

    Set qry =
mdbsConstraintDB.CreateQueryDef(gstrEmptyString, strDelete)

    Call AssignParameters(qry)
    qry.Execute dbFailOnError

    qry.Close

    ' strDelete = "Delete from step_constraints "
    & _
    ' " where constraint_id = " &
    Str(mlngConstraintId) & _
    ' " and step_id = " & Str(mlngStepId) &
    _
    ' " and version_no = " & mstrSQ &
    mstrVersionNo & mstrSQ

    ' BugMessage strDelete
    ' mdbsConstraintDB.Execute strDelete,
    dbFailOnError

    Exit Sub

DeleteErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Delete"
    On Error GoTo 0
    Err.Raise vbObjectError +
errDeleteConstraintFailed, _
        mstrSource, _

LoadResString(errDeleteConstraintFailed)
End Sub

Public Sub Modify()
    ' Updates the sequence no of the step
    constraint record
    ' in the database

    Dim strUpdate As String
    Dim qry As QueryDef

    On Error GoTo Modify

    ' First check if the database object is valid
    Call CheckDB

    ' Any record validations
    Call Validate

    ' There can be multiple constraints for a step,
    ' meaning that there can be multiple
    constraint records
    ' with the same constraint_id. Only a
    combination
    ' of the step_id, version and constraint_id
    will be
    ' unique
    ' Create a temporary querydef object with
    the modify string
    strUpdate = "Update step_constraints " & _
        " set sequence_no = [seq_no] " & _
        " where constraint_id = [cons_id] " & _
        " and step_id = [s_id] " & _
        " and version_no = [ver_no] "

    Set qry =
mdbsConstraintDB.CreateQueryDef(gstrEmptyString, strUpdate)

    ' Call a procedure to assign the parameter
    values to the
    ' querydef object

```

```

    Call AssignParameters(qry)
    qry.Execute dbFailOnError

    qry.Close

    ' strUpdate = "Update step_constraints " & _
    ' " set sequence_no = " &
    Str(mintSequenceNo) & _
    ' " where constraint_id = " &
    Str(mlngConstraintId) & _
    ' " and step_id = " & Str(mlngStepId) & _
    ' " and version_no = " & mstrSQ &
    mstrVersionNo & mstrSQ

    ' BugMessage strUpdate
    ' mdbsConstraintDB.Execute strUpdate,
    dbFailOnError
    Exit Sub

Modify:
    LogErrors Errors
    mstrSource = mstrModuleName & "Modify"
    On Error GoTo 0
    Err.Raise vbObjectError +
errUpdateConstraintFailed, _
        mstrSource, _
        LoadResString(errUpdateConstraintFailed)
End Sub

Public Property Get Position() As Long

    Position = mlngPosition

End Property

Public Property Let Position(ByVal RHS As Long)

    mlngPosition = RHS

End Property

Public Sub Validate()
    ' Each distinct object will have a Validate method
    which
    ' will check if the class properties are valid. This
    method
    ' will be used to check interdependant properties
    that
    ' cannot be validated by the let procedures.
    ' It should be called by the add and modify
    methods of the class

    ' No validations are necessary for the constraint
    object

End Sub

Public Property Set NodeDB(vdata As Database)

    Set mdbsConstraintDB = vdata

End Property

Public Property Get NodeDB() As Database

    Set NodeDB = mdbsConstraintDB

End Property

Public Property Get GlobalVersionNo() As String

    GlobalVersionNo = mstrGlobalVersionNo

End Property

Public Property Let GlobalVersionNo(ByVal vdata
As String)

```

```

mstrGlobalVersionNo = vdata
End Property

Public Property Get GlobalStepId() As Long

    GlobalStepId = mlngGlobalStepId
End Property

Public Property Get ConstraintId() As Long

    ConstraintId = mlngConstraintId
End Property

Public Property Get VersionNo() As String

    VersionNo = mstrVersionNo
End Property

Public Property Get StepId() As Long

    StepId = mlngStepId
End Property

Public Property Let VersionNo(ByVal vdata
As String)

    mstrVersionNo = vdata
End Property

Public Property Let StepId(ByVal vdata As
Long)

    mlngStepId = vdata
End Property

Public Property Let ConstraintId(ByVal
vdata As Long)
    On Error GoTo ConstraintIdErr
    mstrSource = mstrModuleName &
"ConstraintId"

    If (vdata > 0) Then
        mlngConstraintId = vdata
    Else
        ' Propagate this error back to the caller
        On Error GoTo 0
        Err.Raise vbObjectError +
errConstraintIdInvalid, _
        mstrSource,
LoadResString(errConstraintIdInvalid)
    End If

    Exit Property

ConstraintIdErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"ConstraintId"
    On Error GoTo 0
    Err.Raise vbObjectError +
errConstraintIdSetFailed, _
    mstrSource,
LoadResString(errConstraintIdSetFailed)
End Property

```

```

Public Property Let GlobalStepId(ByVal vdata
As Long)

    On Error GoTo GlobalStepIdErr
    mstrSource = mstrModuleName &
"GlobalStepId"

    If (vdata > 0) Then
        mlngGlobalStepId = vdata
    Else
        ' Propagate this error back to the caller
        On Error GoTo 0
        Err.Raise vbObjectError +
errGlobalStepIdInvalid, _
        mstrSource,
LoadResString(errGlobalStepIdInvalid)
    End If

    Exit Property

GlobalStepIdErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"GlobalStepId"
    On Error GoTo 0
    Err.Raise vbObjectError +
errGlobalStepIdSetFailed, _
    mstrSource,
LoadResString(errGlobalStepIdSetFailed)
End Property

Public Property Let ConstraintType(ByVal
vdata As ConstraintType)

    On Error GoTo ConstraintTypeErr

    ' A global step can be either a pre- or a post-
execution step.
    ' These constants have been defined in the
enumeration,
    ' ConstraintType, which is exposed
    Select Case vdata
        Case gintPreStep, gintPostStep
            mintConstraintType = vdata

        Case Else
            On Error GoTo 0
            Err.Raise vbObjectError +
errConstraintTypeInvalid, _
            mstrSource,
LoadResString(errConstraintTypeInvalid)
    End Select

    Exit Property

ConstraintTypeErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"ConstraintType"
    On Error GoTo 0
    Err.Raise vbObjectError +
errConstraintTypeLetFailed, _
    mstrSource,
LoadResString(errConstraintTypeLetFailed)
End Property

Public Property Get ConstraintType() As
ConstraintType

    ConstraintType = mintConstraintType
End Property

```

```

Private Sub Class_Initialize()

    ' Initialize the operation indicator variable to
Query
    ' It will be modified later by the collection class
when
    ' inserts, updates or deletes are performed
    mintOperation = QueryOp
End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cFailedStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cFailedStep.cls
'
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  Properties of a step execution
failure.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Public InstanceId As Long
Public StepId As Long
Public ParentStepId As Long
Public ContCriteria As ContinuationCriteria
Public EndTime As Currency
Public AskResponse As Long
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cFailedSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cFailedSteps.cls
'
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  This module encapsulates a
collection of failed steps. It
'    also determines whether sub-steps of a
passed in step need
'    to be skipped due to a failure.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcFailedSteps As cVector
Public Function ExecuteSubStep(IParentStepId As
Long) As Boolean
    ' Returns False if there is any condition that
prevents sub-steps of the passed
' in instance from being executed
    Dim IIndex As Long

    ExecuteSubStep = True

```

```

For IIndex = 0 To Count() - 1
    If mcFailedSteps(IIndex).ContCriteria = gintOnFailureCompleteSiblings And _
        IParentStepId <>
mcFailedSteps(IIndex).ParentStepId Then
    ExecuteSubStep = False
    Exit For
End If

    If mcFailedSteps(IIndex).ContCriteria = gintOnFailureAbortSiblings And _
        IParentStepId =
mcFailedSteps(IIndex).ParentStepId Then
    ExecuteSubStep = False
    Exit For
End If

    If mcFailedSteps(IIndex).ContCriteria = gintOnFailureSkipSiblings And _
        IParentStepId =
mcFailedSteps(IIndex).ParentStepId Then
    ExecuteSubStep = False
    Exit For
End If

    If mcFailedSteps(IIndex).ContCriteria = gintOnFailureAbort Then
        ExecuteSubStep = False
        Exit For
    End If

Next IIndex

End Function
Public Sub Add(ByVal objItem As cFailedStep)

    mcFailedSteps.Add objItem

End Sub
Public Function Delete(ByVal IPosition As Long) As cFailedStep

    Set Delete =
mcFailedSteps.Delete(IPosition)

End Function

Public Sub Clear()

    mcFailedSteps.Clear

End Sub
Public Function Count() As Long

    Count = mcFailedSteps.Count

End Function
Public Property Get Item(ByVal Position As Long) As cFailedStep
Attribute Item.VB_UserMemId = 0

    Set Item = mcFailedSteps.Item(Position)

End Property

Public Function StepFailed(IStepId As Long) As Boolean

    ' Returns True if a failure record already exists for the passed in step
    Dim IIndex As Long

    StepFailed = False

```

```

For IIndex = 0 To Count() - 1
    If mcFailedSteps(IIndex).StepId = IStepId
Then
        StepFailed = True
        Exit For
    End If
Next IIndex

End Function

Private Sub Class_Initialize()

    Set mcFailedSteps = New cVector

End Sub

Private Sub Class_Terminate()

    Set mcFailedSteps = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cFileInfo"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_ExtKey =
' FILE:    cFileInfo.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
' PURPOSE:  File Properties viz. name, handle, etc.
' Contact:  Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private mstrFileName As String
Private mintFileHandle As Integer
Private mdbNodeDb As Database ' Since it is used to form a cNodeCollection
Private mlngPosition As Long ' Since it is used to form a cNodeCollection
Public Property Get FileName() As String

    FileName = mstrFileName

End Property
Public Property Let FileName(ByVal vdata As String)

    mstrFileName = vdata

End Property
Public Property Let FileHandle(ByVal vdata As Integer)

    mintFileHandle = vdata

End Property
Public Property Set NodeDB(vdata As Database)

    Set mdbNodeDb = vdata

End Property
Public Property Get NodeDB() As Database

```

```

Set NodeDB = mdbNodeDb

End Property
Public Property Get Position() As Long

    Position = mlngPosition

End Property
Public Property Let Position(ByVal vdata As Long)

    mlngPosition = vdata

End Property
Public Property Get FileHandle() As Integer

    FileHandle = mintFileHandle

End Property
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cFileSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_ExtKey =
"SavedWithClassBuilder", "Yes"
Attribute VB_ExtKey = "Top_Level", "Yes"
' FILE:    cFileSM.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
' PURPOSE:  Encapsulates functions to open a file and write to it.
' Contact:  Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this class
Private Const mstrModuleName As String = "cFileSM."
Private mstrSource As String

Private mstrFileName As String
Private mintHFile As Integer
Private mstrFileHeader As String
Private mstrProjectName As String

Public Sub CloseFile()

    ' Close the file
    If mintHFile > 0 Then
        Call CloseFileSM(mstrFileName)
        mintHFile = 0
    End If

End Sub

Public Property Let ProjectName(ByVal vdata As String)

    ' An optional field - will be appended to the file
    ' header string if specified

    Const strProjectHdr As String = "Project Name:"

    mstrProjectName = vdata

```



```

mstrFileHeader = mstrFileHeader & _
    Space$(1) & strProjectHdr &
Space$(1) & _
    gstrSQ & vdata & gstrSQ

End Property
Public Property Get ProjectName() As
String

    ProjectName = mstrProjectName

End Property
Public Property Get FileName() As String

    FileName = mstrFileName

End Property
Public Property Let FileName(ByVal vdata
As String)

    mstrFileName = vdata

End Property
Public Sub WriteLine(strMsg As String)

    ' Writes the passed in string to the file
    Call WriteToFile(strMsg, False)

End Sub

Public Sub WriteField(strMsg As String)

    ' Writes the passed in string to the file
    Call WriteToFile(strMsg, True)

End Sub

Private Sub WriteToFile(strMsg As String, _
    blnContinue As Boolean)
    ' Writes the passed in string to the file -
the
    ' Continue flag indicates whether the next
line will
    ' be continued on the same line or printed
on a new one

    On Error GoTo WriteToFileErr

    ' Open the file if it hasn't been already
    If mintHFile = 0 Then

        ' If the filename has not been
initialized, do not
        ' attempt to open it
        If mstrFileName <> gstrEmptyString
Then
            mintHFile =
OpenFileSM(mstrFileName)

            If mintHFile = 0 Then
                ' The Open File command failed
for some reason
                ' No point in trying to write the
file header
                Else
                    ' Print a file header, if a header
string has been
                    ' initialized
                    If mstrFileHeader <>
gstrEmptyString Then
                        Print #mintHFile,
                        Print #mintHFile,
mstrFileHeader
                        Print #mintHFile,

```

```

        End If
        End If
        End If
    End If

    If mintHFile <> 0 Then
        If strMsg = gstrEmptyString Then
            Print #mintHFile,
        Else
            If blnContinue Then
                ' Write the message to the file -
continue
                ' all subsequent characters on the
same line
                Print #mintHFile, strMsg;
            Else
                ' Write the message to the file
                Print #mintHFile, strMsg
            End If
        End If
    Else
        ' Display the string to the user instead of
' trying to write it to the file
        ' This could be the project error log that
we were
        ' trying to open! Play it safe and display
errors - do
        ' not try to log them.
        MsgBox strMsg, vbOKOnly
    End If

    Exit Sub

WriteToFileErr:
    ' Log the error code raised by Visual Basic
    Call DisplayErrors(Errors)

    ' Display the string to the user instead of
' trying to write it to the file
    MsgBox strMsg, vbOKOnly

End Sub
Public Property Let FileHeader(ByVal vdata
As String)

    mstrFileHeader = vdata

End Property
Public Property Get FileHeader() As String

    FileHeader = mstrFileHeader

End Property

Private Sub Class_Terminate()

    ' Close the file opened by this instance
    Call CloseFile

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cGlobalStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cGlobalStep.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

```

```

'
'
' PURPOSE: Encapsulates the properties and
methods of a global step.
' Implements the cStep class - carries out
initializations
' and validations that are specific to global
steps.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Implements cStep

' Object variable to keep the reference in
Private mcStep As cStep

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cGlobalStep."

Private Sub cStep_AddAllIterators()

    Call mcStep.AddAllIterators

End Sub

Private Sub cStep_AddIterator(cItRecord As
cIterator)

    Call mcStep.AddIterator(cItRecord)

End Sub

Private Property Let cStep_ArchivedFlag(ByVal
RHS As Boolean)

    mcStep.ArchivedFlag = RHS

End Property

Private Property Get cStep_ArchivedFlag() As
Boolean

    cStep_ArchivedFlag = mcStep.ArchivedFlag

End Property

Private Sub Class_Initialize()

    ' Create the object
    Set mcStep = New cStep

    ' Initialize the object with valid values for a
global step
    ' The global flag should be the first field to be
initialized
    ' since subsequent validations might try to check
if the
    ' step being created is global
    mcStep.GlobalFlag = True
    mcStep.StepType = gintGlobalStep

    ' A global step cannot have any sub-steps
associated with it
    ' Hence, it will always be at Step Level 0
    mcStep.ParentStepId = 0
    mcStep.ParentVersionNo = gstrMinVersion
    mcStep.StepLevel = 0

```

```

' The enabled flag must be False for all
global steps
' Global steps can be of two types
' a. Those that are run globally within a
workspace either
' before every step, after every step or
during the entire
' run, depending on the global run
method
' b. Those that are not run globally, but
qualify to be either
' pre or post-execution steps for other
steps in the workspace.
' Whether or not such a step will be
executed depends on
' whether the step for which it is defined
as a pre/post
' step will be executed
mcStep.EnabledFlag = False

mcStep.ContinuationCriteria =
gintNoOption
mcStep.DegreeParallelism =
gstrGlobalParallelism

End Sub
Private Sub Class_Terminate()

' Remove the step object
Set mcStep = Nothing

End Sub

Private Sub cStep_Add()

' Call a private procedure to see if the step
text has been
' entered - since a global step actually
executes a step, entry
' of the text is mandatory
Call StepTextOrFileEntered

' Call the Add method of the step class to
carry out the insert
mcStep.Add

End Sub

Private Function cStep_Clone(Optional
cCloneStep As cStep) As cStep

Dim cNewGlobal As cGlobalStep

Set cNewGlobal = New cGlobalStep
Set cStep_Clone =
mcStep.Clone(cNewGlobal)

End Function

Private Property Get
cStep_ContinuationCriteria() As
ContinuationCriteria

cStep_ContinuationCriteria =
mcStep.ContinuationCriteria

End Property

Private Property Let
cStep_ContinuationCriteria(ByVal RHS As
ContinuationCriteria)

' The continuation criteria field will
always be empty for a

```

```

' global step
mcStep.ContinuationCriteria = 0

End Property

Private Property Let
cStep_DegreeParallelism(ByVal RHS As
String)

' Will always be zero for a global step
mcStep.DegreeParallelism =
gstrGlobalParallelism

End Property

Private Property Get
cStep_DegreeParallelism() As String

cStep_DegreeParallelism =
mcStep.DegreeParallelism

End Property

Private Sub cStep_DeleteIterator(cItRecord As
cIterator)

Call mcStep.DeleteIterator(cItRecord)

End Sub

Private Sub cStep_Delete()

mcStep.Delete

End Sub

Private Property Get cStep_EnabledFlag() As
Boolean

cStep_EnabledFlag = mcStep.EnabledFlag

End Property

Private Property Let
cStep_EnabledFlag(ByVal RHS As Boolean)

' The enabled flag must be False for all
global steps
' Global steps can be of two types
' a. Those that are run globally within a
workspace either
' before every step, after every step or
during the entire
' run, depending on the global run method
' b. Those that are not run globally, but
qualify to be either
' pre or post-execution steps for other steps
in the workspace.
' Whether or not such a step will be
executed depends on
' whether the step for which it is defined as
a pre/post
' step will be executed
mcStep.EnabledFlag = False

End Property

Private Property Let cStep_ErrorFile(ByVal
RHS As String)

mcStep.ErrorFile = RHS

End Property

```

```

Private Property Get cStep_ErrorFile() As String

cStep_ErrorFile = mcStep.ErrorFile

End Property

Private Property Let
cStep_ExecutionMechanism(ByVal RHS As
ExecutionMethod)

' Whether or not the Execution Mechanism is
valid will be
' checked by the Step class
mcStep.ExecutionMechanism = RHS

End Property

Private Property Get cStep_ExecutionMechanism()
As ExecutionMethod

cStep_ExecutionMechanism =
mcStep.ExecutionMechanism

End Property

Private Property Let cStep_FailureDetails(ByVal
RHS As String)

' Whether or not the Failure Details are valid for
the
' selected failure criteria will be checked by the
Step class
mcStep.FailureDetails = RHS

End Property

Private Property Get cStep_FailureDetails() As
String

cStep_FailureDetails = mcStep.FailureDetails

End Property

Private Property Get cStep_GlobalFlag() As
Boolean

cStep_GlobalFlag = mcStep.GlobalFlag

End Property

Private Property Let cStep_GlobalFlag(ByVal RHS
As Boolean)

' Set the global flag to true
mcStep.GlobalFlag = True

End Property

Private Function cStep_IncVersionX() As String

cStep_IncVersionX = mcStep.IncVersionX

End Function

Private Function cStep_IncVersionY() As String

cStep_IncVersionY = mcStep.IncVersionY

End Function

Private Property Let
cStep_GlobalRunMethod(ByVal RHS As Integer)
'

```

```

' Whether or not the Global Run Method
is valid for the step
' will be checked by the Step class
' mcStep.GlobalRunMethod = RHS
'
End Property
'
Private Property Get
cStep_GlobalRunMethod() As Integer
'
' cStep_GlobalRunMethod =
mcStep.GlobalRunMethod
'
End Property
'
Private Property Get cStep_IndOperation()
As Operation
'
' cStep_IndOperation =
mcStep.IndOperation
'
End Property
'
Private Property Let
cStep_IndOperation(ByVal RHS As
Operation)
'
' mcStep.IndOperation = RHS
'
End Property
'
Private Sub cStep_InsertIterator(cItRecord
As cIterator)
'
' Call mcStep.InsertIterator(cItRecord)
'
End Sub
'
Private Function cStep_IsNewVersion() As
Boolean
'
' cStep_IsNewVersion =
mcStep.IsNewVersion
'
End Function
'
Private Function cStep_IteratorCount() As
Long
'
' cStep_IteratorCount =
mcStep.IteratorCount
'
End Function
'
Private Property Let
cStep_IteratorName(ByVal RHS As String)
'
' mcStep.IteratorName = RHS
'
End Property
'
Private Property Get cStep_IteratorName()
As String
'
' cStep_IteratorName =
mcStep.IteratorName
'
End Property
'
Private Function cStep_Iterators() As
Variant
'
' cStep_Iterators = mcStep.Iterators
'
End Function

```

```

Private Sub cStep_LoadIterator(cItRecord As
cIterator)
'
' Call mcStep.LoadIterator(cItRecord)
'
End Sub
'
Private Property Let cStep_LogFile(ByVal
RHS As String)
'
' mcStep.LogFile = RHS
'
End Property
'
Private Property Get cStep_LogFile() As
String
'
' cStep_LogFile = mcStep.LogFile
'
End Property
'
Private Sub cStep_ModifyIterator(cItRecord
As cIterator)
'
' Call mcStep.ModifyIterator(cItRecord)
'
End Sub
'
Private Sub cStep_Modify()
'
' Call a private procedure to see if the step
text has been
' entered - since a global step actually
executes a step,
' entry of the text is mandatory
' Call StepTextOrFileEntered
'
' Call the Modify method of the step class to
carry out the update
' mcStep.Modify
'
End Sub
'
Private Property Get cStep_NextStepId() As
Long
'
' cStep_NextStepId = mcStep.NextStepId
'
End Property
'
Private Property Set cStep_NodeDB(RHS As
DAO.Database)
'
' Set mcStep.NodeDB = RHS
'
End Property
'
Private Property Get cStep_NodeDB() As
DAO.Database
'
' Set cStep_NodeDB = mcStep.NodeDB
'
End Property
'
Private Function cStep_OldVersionNo() As
String
'
' cStep_OldVersionNo =
mcStep.OldVersionNo
'
End Function
'
Private Property Let cStep_OutputFile(ByVal
RHS As String)
'
' mcStep.OutputFile = RHS
'

```

```

End Property
'
Private Property Get cStep_OutputFile() As
String
'
' cStep_OutputFile = mcStep.OutputFile
'
End Property
'
Private Property Let cStep_ParentStepId(ByVal
RHS As Long)
'
' A global step cannot have any sub-steps
associated with it
' Hence, the parent step id and parent version
number will be zero
' mcStep.ParentStepId = 0
'
End Property
'
Private Property Get cStep_ParentStepId() As
Long
'
' cStep_ParentStepId = mcStep.ParentStepId
'
End Property
'
Private Property Let cStep_ParentVersionNo(ByVal
RHS As String)
'
' A global step cannot have any sub-steps
associated with it
' Hence, the parent step id and parent version
number will be zero
' mcStep.ParentVersionNo = gstrMinVersion
'
End Property
'
Private Property Get cStep_ParentVersionNo()
As String
'
' cStep_ParentVersionNo =
mcStep.ParentVersionNo
'
End Property
'
Private Property Let cStep_Position(ByVal
RHS As Long)
'
' mcStep.Position = RHS
'
End Property
'
Private Property Get cStep_Position() As Long
'
' cStep_Position = mcStep.Position
'
End Property
'
Private Sub cStep_RemoveIterator(cItRecord As
cIterator)
'
' Call mcStep.RemoveIterator(cItRecord)
'
End Sub
'
Private Sub cStep_SaveIterators()
'
' Call mcStep.SaveIterators
'
End Sub
'
Private Property Let cStep_SequenceNo(ByVal
RHS As Integer)
'
' mcStep.SequenceNo = RHS
'

```

```

End Property

Private Property Get cStep_SequenceNo()
As Integer

    cStep_SequenceNo =
mcStep.SequenceNo

End Property

Private Property Let cStep_StepId(ByVal
RHS As Long)

    mcStep.StepId = RHS

End Property

Private Property Get cStep_StepId() As
Long

    cStep_StepId = mcStep.StepId

End Property

Private Property Let
cStep_StepLabel(ByVal RHS As String)

    mcStep.StepLabel = RHS

End Property

Private Property Get cStep_StepLabel() As
String

    cStep_StepLabel = mcStep.StepLabel

End Property

Private Property Let cStep_StartDir(ByVal
RHS As String)

    mcStep.StartDir = RHS

End Property

Private Property Get cStep_StartDir() As
String

    cStep_StartDir = mcStep.StartDir

End Property

Private Property Let
cStep_StepLevel(ByVal RHS As Integer)

    ' A global step cannot have any sub-steps
associated with it
    ' Hence, it will always be at step level 0
    mcStep.StepLevel = 0

End Property

Private Property Get cStep_StepLevel() As
Integer

    cStep_StepLevel = mcStep.StepLevel

End Property

Private Property Let cStep_StepText(ByVal
RHS As String)

    mcStep.StepText = RHS

End Property

```

```

Private Property Get cStep_StepText() As
String

    cStep_StepText = mcStep.StepText

End Property

Private Property Let
cStep_StepTextFile(ByVal RHS As String)

    mcStep.StepTextFile = RHS

End Property

Private Property Get cStep_StepTextFile() As
String

    cStep_StepTextFile = mcStep.StepTextFile

End Property

Private Property Let cStep_StepType(RHS As
gintStepType)

    mcStep.StepType = gintGlobalStep

End Property

Private Property Get cStep_StepType() As
gintStepType

    cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_UnloadIterators()

    Call mcStep.UnloadIterators

End Sub

Private Sub cStep_UpdateIterator(cItrRecord
As cIterator)

    Call mcStep.UpdateIterator(cItrRecord)

End Sub

Private Sub cStep_UpdateIteratorVersion()

    Call mcStep.UpdateIteratorVersion

End Sub

Private Sub cStep_Validate()

    ' The validate routines for each of the steps
will
    ' carry out the specific validations for the
type and
    ' call the generic validation routine

    On Error GoTo cStep_ValidateErr
mstrSource = mstrModuleName &
"cStep_Validate"

    ' Validations specific to global steps

    ' Check if the step text or a file name has
been
    ' specified
    Call StepTextOrFileEntered

    ' The step level must be zero for all globals
    If mcStep.StepLevel <> 0 Then

```

```

ShowError errStepLevelZeroForGlobal
On Error GoTo 0
Err.Raise vbObjectError + errValidateFailed, _
gstrSource, _
LoadResString(errValidateFailed)
End If

If mcStep.EnabledFlag Then
ShowError errEnabledFlagFalseForGlobal
On Error GoTo 0
Err.Raise vbObjectError + errValidateFailed, _
gstrSource, _
LoadResString(errValidateFailed)
End If

If mcStep.DegreeParallelism > 0 Then
ShowError errDegParallelismNullForGlobal
On Error GoTo 0
Err.Raise vbObjectError + errValidateFailed, _
gstrSource, _
LoadResString(errValidateFailed)
End If

If mcStep.ContinuationCriteria > 0 Then
ShowError errContCriteriaNullForGlobal
On Error GoTo 0
Err.Raise vbObjectError + errValidateFailed, _
gstrSource, _
LoadResString(errValidateFailed)
End If

mcStep.Validate

Exit Sub

cStep_ValidateErr:
LogErrors Errors
mstrSource = mstrModuleName &
"cStep_Validate"
On Error GoTo 0
Err.Raise vbObjectError + errValidateFailed, _
mstrSource, _
LoadResString(errValidateFailed)
End Sub

Private Sub StepTextOrFileEntered()

    ' Checks if either the step text or the name of the
file containing
    ' the text has been entered
    ' If both of them are null or both of them are not
null,
    ' the global step is invalid and an error is raised

    If StringEmpty(mcStep.StepText) And
StringEmpty(mcStep.StepTextFile) Then
ShowError errStepTextAndFileNull
On Error GoTo 0
Err.Raise vbObjectError +
errStepTextAndFileNull, _
mstrSource,
LoadResString(errStepTextAndFileNull)
ElseIf Not StringEmpty(mcStep.StepText) And
Not StringEmpty(mcStep.StepTextFile) Then
ShowError errStepTextOrFile
On Error GoTo 0
Err.Raise vbObjectError + errStepTextOrFile,
_
mstrSource,
LoadResString(errStepTextOrFile)
End If

End Sub

Private Property Let cStep_VersionNo(ByVal RHS
As String)

```

```

mcStep.VersionNo = RHS
End Property

Private Property Get cStep_VersionNo() As String
    cStep_VersionNo = mcStep.VersionNo
End Property

Private Property Let
cStep_WorkspaceId(ByVal RHS As Long)
    mcStep.WorkspaceId = RHS
End Property

Private Property Get cStep_WorkspaceId()
As Long
    cStep_WorkspaceId =
mcStep.WorkspaceId
End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cInstance"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cInstance.cls
'          Microsoft TPC-H Kit Ver. 1.00
'          Copyright Microsoft, 1999
'          All Rights Reserved
'
' PURPOSE: Encapsulates the properties
and methods of an instance.
'          An instance is created when a step
is executed for a
'          particular iterator value (if
applicable) at 'run' time.
'          Contains functions to determine if
an instance is running,
'          complete, and so on.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cInstance."
Private mstrSource As String

Private mcStep As cStep
Public Key As String ' Node key for the step
being executed
Public InstanceId As Long
Public ParentInstanceId As Long ' The
parent instance
Private mblnNoMoreToStart As Boolean
Private mblnComplete As Boolean
Public StartTime As Currency
Public EndTime As Currency
Public ElapsedTime As Currency
Private mintStatus As InstanceStatus
Public DegreeParallelism As Integer
Private mclIterators As cRunCollt

```

```

' A collection of all the sub-steps for this step
Private mcSubSteps As cSubSteps
Public Sub UpdateStartTime(lStepId As Long,
Optional ByVal StartTm As Currency =
gdtmEmpty, _
    Optional ByVal EndTm As Currency =
gdtmEmpty, _
    Optional ByVal Elapsed As Currency = 0)
' We do not maintain start and end
timestamps for the constraint
' of a step. Hence we check if the process
that just started/
' terminated is the worker step that is being
executed. If so,
' we update the start/end time and status on
the instance record.

    BugAssert (StartTm <> gdtmEmpty) Or
(EndTm <> gdtmEmpty), "Mandatory
parameter missing."

' Make sure that we are executing the actual
step and not
' a pre or post-execution constraint
If mcStep.StepId = lStepId Then
    If StartTm <> 0 Then
        StartTime = StartTm
        mintStatus = gintRunning
    Else
        EndTime = EndTm
        ElapsedTime = Elapsed
        mintStatus = gintComplete
    End If
End If

End Sub
Public Function
ValidForIteration(cParentInstance As
cInstance, _
    ByVal intConsType As ConstraintType)
As Boolean
' Returns true if the instance passed in is the
first or
' last iteration for the step, depending on the
constraint type

    Dim cSubStepRec As cSubStep
    Dim vntIterators As Variant

    On Error GoTo ValidForIterationErr

    If cParentInstance Is Nothing Then
' This will only be true for the dummy
instance, which
' cannot have any iterators defined for it
        ValidForIteration = True
        Exit Function
    End If

    vntIterators = mcStep.Iterators

    If Not StringEmpty(mcStep.IteratorName)
And Not IsEmpty(vntIterators) Then

        Set cSubStepRec =
cParentInstance.QuerySubStep(mcStep.StepId)

        If intConsType = gintPreStep Then
' Pre-execution constraints will only be
executed
' before the first iteration
            If
cSubStepRec.LastIterator.IteratorType =
gintValue Then

```

```

        ValidForIteration =
(cSubStepRec.LastIterator.Sequence = _
gintMinIteratorSequence)
        Else
            ValidForIteration =
(cSubStepRec.LastIterator.Value = _
cSubStepRec.LastIterator.RangeFrom)
        End If
    Else
' Post-execution constraints will only be
executed
' after the last iteration - check if there are
any
' pending iterations
        ValidForIteration =
cSubStepRec.NextIteration(mcStep) Is Nothing
    End If
    Else
        ValidForIteration = True
    End If

Exit Function

ValidForIterationErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"ValidForIteration"
Err.Raise vbObjectError +
errExecInstanceFailed, _
    mstrSource,
LoadResString(errExecInstanceFailed)

End Function

Public Sub CreateSubStep(cSubStepDtls As cStep,
RunParams As cArrParameters)

    Dim cNewSubStep As cSubStep

    On Error GoTo CreateSubStepErr

    Set cNewSubStep = New cSubStep

    cNewSubStep.StepId = cSubStepDtls.StepId
    cNewSubStep.TasksComplete = 0
    cNewSubStep.TasksRunning = 0

' Initialize the iterator for the instance
Set cNewSubStep.LastIterator = New
cRunItDetails
    Call cNewSubStep.InitializeIt(cSubStepDtls,
RunParams)

' Add add the substep to the collection
mcSubSteps.Add cNewSubStep

    Set cNewSubStep = Nothing

Exit Sub

CreateSubStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"CreateSubStep"
Err.Raise vbObjectError + errProgramError,
mstrSource, _
    LoadResString(errProgramError)

End Sub

```

```

Public Function QuerySubStep(ByVal
SubStepId As Long) As cSubStep
' Retrieves the sub-step record for the
passed in sub-step id

Dim lngIndex As Long

On Error GoTo QuerySubStepErr

' Find the sub-step node with the matching
step id
For lngIndex = 0 To mcSubSteps.Count -
1
If mcSubSteps(lngIndex).StepId =
SubStepId Then
Set QuerySubStep =
mcSubSteps(lngIndex)
Exit For
End If
Next lngIndex

Exit Function

QuerySubStepErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"QuerySubStep"
Err.Raise vbObjectError +
errNavInstancesFailed, _
mstrSource,
LoadResString(errNavInstancesFailed)

End Function
Public Property Let AllStarted(ByVal vdata
As Boolean)

'bugmessage "Set All Started to " & vData
& " for : " & _
mstrKey

mblnNoMoreToStart = vdata

End Property
Public Property Get AllStarted() As Boolean

AllStarted = mblnNoMoreToStart

End Property
Public Property Let AllComplete(ByVal
vdata As Boolean)

'bugmessage "Set All Complete to " &
vData & " for : " & _
mstrKey

mblnComplete = vdata

End Property

Public Property Get AllComplete() As
Boolean

AllComplete = mblnComplete

End Property

Public Sub ChildExecuted(mlngStepId As
Long)
' This procedure is called when a sub-step
executes.

Dim lngIndex As Long

```

```

On Error GoTo ChildExecutedErr

BugAssert mcStep.StepType =
gintManagerStep

For lngIndex = 0 To mcSubSteps.Count - 1
If mcSubSteps(lngIndex).StepId =
mlngStepId Then
mcSubSteps(lngIndex).TasksRunning =
-
mcSubSteps(lngIndex).TasksRunning + 1
' BugMessage "Tasks Running for Step
Id : " & _
CStr(mcSubSteps(lngIndex).StepId) & _
' " Instance Id: " & InstanceId & _
' " = " &
mcSubSteps(lngIndex).TasksRunning
Exit For
End If
Next lngIndex

If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an
error
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidChild, mstrModuleName, _
LoadResString(errInvalidChild)
End If

Exit Sub

ChildExecutedErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errInstanceOpFailed, mstrModuleName &
"ChildExecuted", _
LoadResString(errInstanceOpFailed)

End Sub
Public Sub ChildTerminated(mlngStepId As
Long)
' This procedure is called when any sub-step
process
' terminates. Note: The TasksComplete field
will be
' updated only when all the instances for a
sub-step
' complete execution.
Dim lngIndex As Long

On Error GoTo ChildTerminatedErr

BugAssert mcStep.StepType =
gintManagerStep

For lngIndex = 0 To mcSubSteps.Count - 1

If mcSubSteps(lngIndex).StepId =
mlngStepId Then
mcSubSteps(lngIndex).TasksRunning =
-
mcSubSteps(lngIndex).TasksRunning - 1
' BugMessage "Tasks Running for Step
Id : " & _
CStr(mcSubSteps(lngIndex).StepId) & _
' " Instance Id: " & InstanceId & _

```

```

' " = " &
mcSubSteps(lngIndex).TasksRunning

BugAssert
mcSubSteps(lngIndex).TasksRunning >= 0, _
"Tasks running for " &
CStr(mlngStepId) & _
" Instance Id " & InstanceId & " is less
than 0."
Exit For
End If
Next lngIndex

If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an error
On Error GoTo 0
Err.Raise errInvalidChild, mstrModuleName &
"ChildTerminated", _
LoadResString(errInvalidChild)
End If

Exit Sub

ChildTerminatedErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"ChildTerminated"
Err.Raise vbObjectError + errInstanceOpFailed,
mstrSource, _
LoadResString(errInstanceOpFailed)

End Sub
Public Sub ChildCompleted(mlngStepId As Long)
' This procedure is called when any a sub-step
completes
' execution. Note: The TasksComplete field will
be
' incremented.
Dim lngIndex As Long

On Error GoTo ChildCompletedErr

BugAssert mcStep.StepType = gintManagerStep

For lngIndex = 0 To mcSubSteps.Count - 1
BugAssert
mcSubSteps(lngIndex).TasksComplete >= 0, _
"Tasks complete for " &
CStr(mcSubSteps(lngIndex).StepId) & _
" Instance Id " & InstanceId & " is less
than 0."

If mcSubSteps(lngIndex).StepId = mlngStepId
Then
mcSubSteps(lngIndex).TasksComplete = _
mcSubSteps(lngIndex).TasksComplete
+ 1
' BugMessage "Tasks Complete for Step Id :
" & _
' CStr(mcSubSteps(lngIndex).StepId) &
' " Instance Id: " & InstanceId & _
' " = " &
mcSubSteps(lngIndex).TasksComplete
Exit For
End If
Next lngIndex

If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an error
On Error GoTo 0
Err.Raise errInvalidChild, mstrModuleName, _
LoadResString(errInvalidChild)

```

```

End If
Exit Sub
ChildCompletedErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errInstanceOpFailed, mstrModuleName &
"ChildCompleted", _
LoadResString(errInstanceOpFailed)
End Sub
Public Sub ChildDeleted(mInngStepId As
Long)
' This procedure is called when a sub-step
needs to be re-executed
' Note: The TasksComplete field is
decremented. We needn't worry about
' the TasksRunning field since no steps
are currently running.
Dim lngIndex As Long
On Error GoTo ChildDeletedErr
BugAssert mcStep.StepType =
gintManagerStep
For lngIndex = 0 To mcSubSteps.Count -
1
If mcSubSteps(lngIndex).StepId =
mInngStepId Then
mcSubSteps(lngIndex).TasksRunning = _
mcSubSteps(lngIndex).TasksRunning - 1
BugAssert
mcSubSteps(lngIndex).TasksRunning >= 0,
_
"Tasks running for " &
CStr(mcSubSteps(lngIndex).StepId) & _
" Instance Id " & InstanceId & "
is less than 0."
Exit For
End If
Next lngIndex
If lngIndex > mcSubSteps.Count - 1 Then
' The child step wasn't found - raise an
error
On Error GoTo 0
Err.Raise errInvalidChild,
mstrModuleName, _
LoadResString(errInvalidChild)
End If
Exit Sub
ChildDeletedErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errInstanceOpFailed, mstrModuleName &
"ChildDeleted", _
LoadResString(errInstanceOpFailed)
End Sub
Private Sub RaiseErrForWorker()

```

```

If mcStep.StepType <> gintManagerStep
Then
On Error GoTo 0
mstrSource = mstrModuleName &
"RaiseErrForWorker"
Err.Raise vbObjectError +
errInvalidForWorker, _
mstrSource, _
LoadResString(errInvalidForWorker)
End If
End Sub
Public Property Get Step() As cStep
Set Step = mcStep
End Property
Public Property Get Iterators() As cRunCollt
Set Iterators = mcIterators
End Property
Public Property Get SubSteps() As cSubSteps
Call RaiseErrForWorker
Set SubSteps = mcSubSteps
End Property
Public Property Set Step(cRunStep As cStep)
Set mcStep = cRunStep
End Property
Public Property Set Iterators(cIts As
cRunCollt)
Set mcIterators = cIts
End Property
Public Property Get IsPending() As Boolean
' Returns true if the step has any substeps
that need
' execution
Dim lngIndex As Long
Dim lngRunning As Long
Call RaiseErrForWorker
If Not mblnComplete And Not
mblnNoMoreToStart Then
' Get a count of all the substeps that are
already being
' executed
lngRunning = 0
For lngIndex = 0 To mcSubSteps.Count -
1
lngRunning = lngRunning +
mcSubSteps(lngIndex).TasksRunning
Next lngIndex
IsPending = (lngRunning <
DegreeParallelism)
Else
' This should be sufficient to prove that
there r no
' more sub-steps to be executed.
' mblnComplete: Handles the case where
all steps have
' been executed
' mblnNoMoreToStart: Handles the case
where the step

```

```

' has a degree of parallelism greater than the
total
' number of sub-steps available to execute
IsPending = False
End If
End Property
Public Property Get IsRunning() As Boolean
' Returns true if the any one of the substeps is still
' executing
Dim lngIndex As Long
Call RaiseErrForWorker
IsRunning = False
' If a substep has no currently executing tasks and
' the tasks completed is greater than zero, then we
can
' assume that it has completed execution
(otherwise we
' would've run a new task the moment one
completed!)
For lngIndex = 0 To mcSubSteps.Count - 1
If mcSubSteps(lngIndex).TasksRunning > 0
Then
IsRunning = True
Exit For
End If
Next lngIndex
End Property
Public Property Get TotalRunning() As Long
' Returns the total number of substeps that are
executing
Dim lngTotalProcesses As Long
Dim lngIndex As Long
Call RaiseErrForWorker
lngTotalProcesses = 0
For lngIndex = 0 To mcSubSteps.Count - 1
BugAssert
mcSubSteps(lngIndex).TasksRunning >= 0, _
"Tasks running for " &
CStr(mcSubSteps(lngIndex).StepId) & _
" is less than 0."
lngTotalProcesses = lngTotalProcesses +
mcSubSteps(lngIndex).TasksRunning
Next lngIndex
TotalRunning = lngTotalProcesses
End Property
Public Property Get RunningForStep(lngSubStepId
As Long) As Long
' Returns the total number of instances of the
substep
' that are executing
Dim lngIndex As Long
Call RaiseErrForWorker
For lngIndex = 0 To mcSubSteps.Count - 1
BugAssert
mcSubSteps(lngIndex).TasksRunning >= 0, _
"Tasks running for " &
CStr(mcSubSteps(lngIndex).StepId) & _
" is less than 0."
If mcSubSteps(lngIndex).StepId =
lngSubStepId Then
RunningForStep =
mcSubSteps(lngIndex).TasksRunning
Exit For
End If

```

```

Next lngIndex

If lngIndex > mcSubSteps.Count - 1 Then
    ' The child step wasn't found - raise an
error
    On Error GoTo 0
    Err.Raise errInvalidChild, mstrSource,
-
    LoadResString(errInvalidChild)
End If

End Property

Public Property Let Status(ByVal vdata As
InstanceStatus)

    mintStatus = vdata

End Property

Public Property Get Status() As
InstanceStatus

    Status = mintStatus

End Property
Private Sub Class_Initialize()

    Set mcSubSteps = New cSubSteps

    mblnNoMoreToStart = False
    mblnComplete = False
    StartTime = gdtmEmpty
    EndTime = gdtmEmpty

End Sub

Private Sub Class_Terminate()

    mcSubSteps.Clear
    Set mcSubSteps = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cInstances"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cInstances.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Implements a collection of
cInstance objects.
' Type-safe wrapper around cVector.
' Also contains additional functions
to query an instance, etc.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cInstance."
Private mstrSource As String

```

```

Private mcInstances As cVector

Public Function QueryInstance(ByVal
InstanceId As Long) As cInstance
    ' Retrieves the record for the passed in
instance from
    ' the collection

    Dim lngIndex As Long

    On Error GoTo QueryInstanceErr

    ' Check for valid values of the instance id
    If InstanceId > 0 Then
        ' Find the run node with the matching step
id
        For lngIndex = 0 To Count() - 1
            If mcInstances(lngIndex).InstanceId =
InstanceId Then
                Set QueryInstance =
mcInstances(lngIndex)
                Exit For
            End If
        Next lngIndex

        If lngIndex > mcInstances.Count - 1 Then
            On Error GoTo 0
            Err.Raise vbObjectError +
errQueryFailed, mstrSource, _
                LoadResString(errQueryFailed)
        End If
    Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errQueryFailed, mstrSource, _
                LoadResString(errQueryFailed)
    End If

    Exit Function

QueryInstanceErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
"QueryInstance"
    Err.Raise vbObjectError + errQueryFailed, _
mstrSource,
LoadResString(errQueryFailed)

End Function

Public Function QueryPendingInstance(ByVal
ParentInstanceId As Long, _
ByVal lngSubStepId As Long) As
cInstance
    ' Retrieves a pending instance for the passed in
substep
    ' and the given parent instance id.

    Dim lngIndex As Long

    On Error GoTo QueryPendingInstanceErr

    ' Find the run node with the matching step id
    For lngIndex = 0 To Count() - 1
        If mcInstances(lngIndex).ParentInstanceId =
ParentInstanceId And _
            mcInstances(lngIndex).Step.StepId =
lngSubStepId Then
            ' Put in a separate if condition since the
IsPending
            ' property is valid only for manager
steps. If the

```

```

        ' calling procedure does not pass a manager
step
        ' identifier, the procedure will error out.
        If mcInstances(lngIndex).IsPending Then
            Set QueryPendingInstance =
mcInstances(lngIndex)
            Exit For
        End If
    End If
Next lngIndex

Exit Function

QueryPendingInstanceErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
"QueryPendingInstance"
    Err.Raise vbObjectError + errQueryFailed, _
mstrSource, LoadResString(errQueryFailed)

End Function
Public Function InstanceAborted(cSubStepRec As
cSubStep) As Boolean

    Dim lIndex As Long

    InstanceAborted = False

    For lIndex = 0 To Count() - 1
        If mcInstances(lIndex).Step.StepId =
cSubStepRec.StepId And _
            mcInstances(lIndex).Status = gintAborted
Then
            InstanceAborted = True
            Exit For
        End If
    Next lIndex

End Function
Public Function
CompletedInstanceExists(IParentInstance As Long,
_
cSubStepDtls As cStep) As Boolean
    ' Checks if there is a completed instance of the
passed in step

    Dim lngIndex As Long

    CompletedInstanceExists = False

    If cSubStepDtls.StepType = gintManagerStep
Then
        ' Find the run node with the matching step id
        For lngIndex = 0 To Count() - 1
            If mcInstances(lngIndex).ParentInstanceId =
IParentInstance And _
                mcInstances(lngIndex).Step.StepId =
cSubStepDtls.StepId Then
                ' Put in a separate if condition since the
IsPending
                ' property is valid only for manager steps.
                BugAssert (Not
mcInstances(lngIndex).IsPending), "Pending
instance exists!"

                CompletedInstanceExists = True
                Exit Function
            End If
        Next lngIndex
    End If

End Function
Public Sub Add(ByVal objItem As cInstance)

```



```

mcInstances.Add objItem
End Sub

Public Sub Clear()
    mcInstances.Clear
End Sub

Public Function Count() As Long
    Count = mcInstances.Count
End Function

Public Function Delete(ByVal lngDelete As Long) As cInstance
    Set Delete = mcInstances.Delete(lngDelete)
End Function

Public Property Set Item(Optional ByVal Position As Long, _
    RHS As cInstance)
    If Position = -1 Then
        Position = 0
    End If
    Set mcInstances(Position) = RHS
End Property

Public Property Get Item(Optional ByVal Position As Long = -1) _
    As cInstance
    Attribute Item.VB_UserMemId = 0
    If Position = -1 Then
        Position = 0
    End If
    Set Item = mcInstances.Item(Position)
End Property

Private Sub Class_Initialize()
    Set mcInstances = New cVector
End Sub

Private Sub Class_Terminate()
    Set mcInstances = Nothing
End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cIterator"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False

' FILE:      cIterator.cls
'            Microsoft TPC-H Kit Ver. 1.00
'            Copyright Microsoft, 1999
'            All Rights Reserved
'
'
' PURPOSE:   Encapsulates the properties
and methods of an iterator.
'           Contains functions to insert, update
and delete
'           iterator_values records from the
database.
' Contact:   Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Implements cNode

' Module level variables to store the property
values
Private mintType As Integer
Private mintSequenceNo As Integer
Private mstrValue As String
Private mdbIteratorDB As Database
Private mintOperation As Integer
Private mlngPosition As Long

Private Const mstrModuleName As String =
"cIterator."
Private mstrSource As String

Public Enum ValueType
    gintFrom = 1
    gintTo
    gintStep
    gintValue
End Enum
Public Property Get Value() As String
    Value = mstrValue
End Property
Public Property Let Value(ByVal vdata As String)
    mstrValue = vdata
End Property

Public Property Get IndOperation() As Operation
    IndOperation = mintOperation
End Property
Public Property Let IndOperation(ByVal vdata As Operation)
    On Error GoTo IndOperationErr
    mstrSource = mstrModuleName &
"IndOperation"
' The valid operations are define in the
cOperations
' class. Check if the operation is valid
Select Case vdata
    Case QueryOp, InsertOp, UpdateOp,
DeleteOp
        mintOperation = vdata
    Case Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errInvalidOperation, _
mstrSource,
LoadResString(errInvalidOperation)
End Select

Exit Property

IndOperationErr:
LogErrors Errors
mstrSource = mstrModuleName &
"IndOperation"
On Error GoTo 0
Err.Raise vbObjectError +
errLetOperationFailed, _
mstrSource,
LoadResString(errLetOperationFailed)
End Property

Public Function Clone() As cIterator
' Creates a copy of a given Iterator

Dim cItClone As cIterator

On Error GoTo CloneErr

Set cItClone = New cIterator

' Copy all the iterator properties to the newly
' created object
cItClone.IteratorType = mintType
cItClone.SequenceNo = mintSequenceNo
cItClone.IndOperation = mintOperation
cItClone.Value = mstrValue

' And set the return value to the newly created
Iterator
Set Clone = cItClone

Exit Function

CloneErr:
LogErrors Errors
mstrSource = mstrModuleName & "Clone"
On Error GoTo 0
Err.Raise vbObjectError + errCloneFailed, _
mstrSource, LoadResString(errCloneFailed)
End Function

Public Property Get SequenceNo() As Integer
    SequenceNo = mintSequenceNo
End Property

Public Property Let SequenceNo(ByVal vdata As Integer)
    mintSequenceNo = vdata
End Property

Public Sub Add(ByVal lngStepId As Long, _
    strVersion As String)
' Inserts a new iterator values record into the
database

Dim strInsert As String
Dim qry As DAO.QueryDef

On Error GoTo AddIteratorErr

' First check if the database object is valid
Call CheckDB

' Create a temporary querydef object
strInsert = "insert into iterator_values " & _

```

```

    "(" step_id, version_no, type, " & _
    " iterator_value, sequence_no )" & _
    " values ( [st_id], [ver_no], [it_typ],
" & _
    " [it_val], [seq_no] )"
    Set qy =
mdbsIteratorDB.CreateQueryDef(gstrEmpty
String, strInsert)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy, lngStepId,
strVersion)

qy.Execute dbFailOnError
qy.Close

Exit Sub

AddIteratorErr:
LogErrors Errors
mstrSource = mstrModuleName &
"AddIterator"
On Error GoTo 0
Err.Raise vbObjectError +
errInsertIteratorFailed, _
mstrSource, _

LoadResString(errInsertIteratorFailed)
End Sub

Private Sub AssignParameters(qyExec As
DAO.QueryDef, _
ByVal lngStepId As Long, _
strVersion As String)
' Assigns values to the parameters in the
querydef object
' The parameter names are cryptic to make
them different
' from the field names. When the
parameter names are
' the same as the field names, parameters
in the where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

For Each prmParam In
qyExec.Parameters
Select Case prmParam.Name
Case "[st_id]"
prmParam.Value = lngStepId

Case "[ver_no]"
prmParam.Value = strVersion

Case "[it_typ]"
prmParam.Value = mintType

Case "[it_val]"
prmParam.Value = mstrValue

Case "[seq_no]"
prmParam.Value =
mintSequenceNo

Case Else
' Write the parameter name that is
faulty
WriteError errInvalidParameter,
mstrSource, _

```

```

prmParam.Name
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource, _

LoadResString(errInvalidParameter)
End Select
Next prmParam

Exit Sub

AssignParametersErr:
mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrSource,
LoadResString(errAssignParametersFailed)

End Sub
Private Sub CheckDB()
' Check if the database object has been
initialized

If mdbsIteratorDB Is Nothing Then
ShowError errInvalidDB
On Error GoTo 0
Err.Raise vbObjectError + errInvalidDB,
_
mstrModuleName,
LoadResString(errInvalidDB)
End If

End Sub

Public Sub Delete(ByVal lngStepId As Long, _
strVersion As String)
' Deletes the step iterator record from the
database

Dim strDelete As String
Dim qy As DAO.QueryDef

On Error GoTo DeleteIteratorErr
mstrSource = mstrModuleName &
"DeleteIterator"

' There can be multiple iterators for a step.
' However the values that an iterator for a
step can
' assume will be unique, meaning that a
combination of
' the iterator_id and value will be unique.
strDelete = "delete from iterator_values " &
_
" where step_id = [st_id]" & _
" and version_no = [ver_no]" & _
" and iterator_value = [it_val] "

Set qy =
mdbsIteratorDB.CreateQueryDef(gstrEmptyStr
ing, strDelete)

Call AssignParameters(qy, lngStepId,
strVersion)
qy.Execute dbFailOnError

qy.Close

Exit Sub

DeleteIteratorErr:
LogErrors Errors

```

```

mstrSource = mstrModuleName &
"DeleteIterator"
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteIteratorFailed, _
mstrSource, _
LoadResString(errDeleteIteratorFailed)
End Sub

Public Sub Update(ByVal lngStepId As Long,
strVersion As String)
' Updates the sequence no of the step iterator
record
' in the database

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo UpdateErr

' First check if the database object is valid
Call CheckDB

If mintType = gintValue Then
' If the iterator is of type value, only the
sequence of the values can get updated
strUpdate = "Update iterator_values " & _
" set sequence_no = [seq_no]" & _
" where step_id = [st_id]" & _
" and version_no = [ver_no]" & _
" and iterator_value = [it_val] "
Else
' If the iterator is of type range, only the values
can get updated
strUpdate = "Update iterator_values " & _
" set iterator_value = [it_val]" & _
" where step_id = [st_id]" & _
" and version_no = [ver_no]" & _
" and type = [it_typ] "
End If

Set qy =
mdbsIteratorDB.CreateQueryDef(gstrEmptyString,
strUpdate)

' Call a procedure to assign the parameter values
to the
' querydef object
Call AssignParameters(qy, lngStepId, strVersion)
qy.Execute dbFailOnError

qy.Close

Exit Sub

UpdateErr:
LogErrors Errors
mstrSource = mstrModuleName & "Update"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateConstraintFailed, _
mstrSource, _
LoadResString(errUpdateConstraintFailed)

End Sub
Public Property Set NodeDB(vdata As Database)

Set mdbsIteratorDB = vdata

End Property

Public Property Get NodeDB() As Database

Set NodeDB = mdbsIteratorDB

End Property

```

```

Public Property Get Position() As Long
    Position = mlngPosition
End Property
Public Property Let Position(ByVal vdata
As Long)
    mlngPosition = vdata
End Property
Public Property Let IteratorType(ByVal
vdata As ValueType)
    On Error GoTo TypeErr
    mstrSource = mstrModuleName &
"Type"
    ' These constants have been defined in the
enumeration,
    ' Type, which is exposed
    Select Case vdata
        Case gintFrom, gintTo, gintStep,
gintValue
            mintType = vdata
        Case Else
            On Error GoTo 0
            Err.Raise vbObjectError +
errTypeInvalid, _
                mstrSource,
LoadResString(errTypeInvalid)
            End Select
    Exit Property
TypeErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"Type"
    On Error GoTo 0
    Err.Raise vbObjectError +
errTypeInvalid, _
        mstrSource,
LoadResString(errTypeInvalid)
End Property
Public Property Get IteratorType() As
ValueType
    IteratorType = mintType
End Property
Public Sub Validate()
    ' No validations necessary for the iterator
class
End Sub
Private Sub Class_Initialize()
    ' Initialize the operation indicator variable
to Query
    ' It will be modified later by the collection
class when
    ' inserts, updates or deletes are performed
    mintOperation = QueryOp
End Sub

```

```

Private Property Let
cNode_IndOperation(ByVal vdata As
Operation)
    On Error GoTo IndOperationErr
    mstrSource = mstrModuleName &
"IndOperation"
    ' The valid operations are define in the
cOperations
    ' class. Check if the operation is valid
    Select Case vdata
        Case QueryOp, InsertOp, UpdateOp,
DeleteOp
            mintOperation = vdata
        Case Else
            On Error GoTo 0
            Err.Raise vbObjectError +
errInvalidOperation, _
                mstrSource,
LoadResString(errInvalidOperation)
            End Select
    Exit Property
IndOperationErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"IndOperation"
    On Error GoTo 0
    Err.Raise vbObjectError +
errLetOperationFailed, _
        mstrSource,
LoadResString(errLetOperationFailed)
End Property
Private Property Get cNode_IndOperation() As
Operation
    IndOperation = mintOperation
End Property
Private Property Set cNode_NodeDB(RHS As
DAO.Database)
    Set mdbIteratorDB = RHS
End Property
Private Property Get cNode_NodeDB() As
DAO.Database
    Set cNode_NodeDB = mdbIteratorDB
End Property
Private Property Let cNode_Position(ByVal
vdata As Long)
    mlngPosition = vdata
End Property
Private Property Get cNode_Position() As
Long
    cNode_Position = mlngPosition
End Property

```

```

Private Sub cNode_Validate()
    ' No validations necessary for the iterator class
End Sub
Private Property Let cNode_Value(ByVal vdata As
String)
    mstrValue = vdata
End Property
Private Property Get cNode_Value() As String
    Value = mstrValue
End Property
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 ' True
END
Attribute VB_Name = "cManager"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cManager.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
' PURPOSE:  Encapsulates the properties and
methods of a manager step.
'           Implements the cStep class - carries out
initializations
'           and validations that are specific to
manager steps.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
Implements cStep
' Object variable to keep the step reference in
Private mcStep As cStep
' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cManager."
Private Sub cStep_AddAllIterators()
    Call mcStep.AddAllIterators
End Sub
Private Property Let cStep_StartDir(ByVal RHS As
String)
    mcStep.StartDir = RHS
End Property
Private Property Get cStep_StartDir() As String
    cStep_StartDir = mcStep.StartDir
End Property

```

```

Private Sub cStep_Delete()
    Call mcStep.Delete
End Sub

Private Property Set cStep_NodeDB(RHS
As DAO.Database)
    Set mcStep.NodeDB = RHS
End Property

Private Function cStep_IncVersionY() As
String
    cStep_IncVersionY =
mcStep.IncVersionY
End Function

Private Function cStep_IsNewVersion() As
Boolean
    cStep_IsNewVersion =
mcStep.IsNewVersion
End Function

Private Function cStep_OldVersionNo() As
String
    cStep_OldVersionNo =
mcStep.OldVersionNo
End Function

Private Function cStep_IncVersionX() As
String
    cStep_IncVersionX =
mcStep.IncVersionX
End Function

Private Sub cStep_UpdateIteratorVersion()
    Call mcStep.UpdateIteratorVersion
End Sub

Private Function cStep_IteratorCount() As
Long
    cStep_IteratorCount =
mcStep.IteratorCount
End Function

Private Sub cStep_UnloadIterators()
    Call mcStep.UnloadIterators
End Sub

Private Sub cStep_DeleteIterator(cItRecord
As cIterator)
    Call mcStep.DeleteIterator(cItRecord)
End Sub

Private Property Get cStep_IteratorName()
As String
    cStep_IteratorName =
mcStep.IteratorName
End Property

Private Property Let
cStep_IteratorName(ByVal RHS As String)
    mcStep.IteratorName = RHS

```

```

End Property

Private Sub cStep_SaveIterators()
    Call mcStep.SaveIterators
End Sub

Private Sub cStep_LoadIterator(cItRecord As
cIterator)
    Call mcStep.LoadIterator(cItRecord)
End Sub

Private Property Let cStep_Position(ByVal
RHS As Long)
    mcStep.Position = RHS
End Property

Private Sub cStep_InsertIterator(cItRecord As
cIterator)
    Call mcStep.InsertIterator(cItRecord)
End Sub

Private Function cStep_Iterators() As Variant
    cStep_Iterators = mcStep.Iterators
End Function

Private Sub cStep_ModifyIterator(cItRecord
As cIterator)
    Call mcStep.ModifyIterator(cItRecord)
End Sub

Private Sub cStep_RemoveIterator(cItRecord
As cIterator)
    Call mcStep.RemoveIterator(cItRecord)
End Sub

Private Sub cStep_UpdateIterator(cItRecord
As cIterator)
    Call mcStep.UpdateIterator(cItRecord)
End Sub

Private Sub cStep_AddIterator(cItRecord As
cIterator)
    Call mcStep.AddIterator(cItRecord)
End Sub

Private Property Get cStep_Position() As Long
    cStep_Position = mcStep.Position
End Property

Private Function cStep_Clone(Optional
cCloneStep As cStep) As cStep
    Dim cNewManager As cManager
    Set cNewManager = New cManager
    Set cStep_Clone =
mcStep.Clone(cNewManager)
End Function

```

```

Private Property Get cStep_IndOperation() As
Operation
    cStep_IndOperation = mcStep.IndOperation
End Property

Private Property Let cStep_IndOperation(ByVal
RHS As Operation)
    mcStep.IndOperation = RHS
End Property

Private Property Get cStep_NextStepId() As Long
    cStep_NextStepId = mcStep.NextStepId
End Property

Private Property Let cStep_OutputFile(ByVal
RHS As String)
    mcStep.OutputFile = RHS
End Property

Private Property Get cStep_OutputFile() As String
    cStep_OutputFile = mcStep.OutputFile
End Property

Private Property Let cStep_ErrorFile(ByVal
RHS As String)
    mcStep.ErrorFile = RHS
End Property

Private Property Get cStep_ErrorFile() As String
    cStep_ErrorFile = mcStep.ErrorFile
End Property

Private Property Let cStep_LogFile(ByVal
RHS As String)
    '
    ' mcStep.LogFile = RHS
    '
End Property

Private Property Get cStep_LogFile() As String
    '
    ' cStep_LogFile = mcStep.LogFile
    '
End Property

Private Property Let cStep_ArchivedFlag(ByVal
RHS As Boolean)
    mcStep.ArchivedFlag = RHS
End Property

Private Property Get cStep_ArchivedFlag() As
Boolean
    cStep_ArchivedFlag = mcStep.ArchivedFlag
End Property

Private Property Get cStep_NodeDB() As
DAO.Database

```

```

Set cStep_NodeDB = mcStep.NodeDB
End Property

Private Sub Class_Initialize()
    ' Create the object
    Set mcStep = New cStep

    ' Initialize the object with valid values for
    a manager step
    ' The global flag should be the first field
    to be initialized
    ' since subsequent validations might try to
    check if the
    ' step being created is global
    mcStep.GlobalFlag = False
    ' mcStep.GlobalRunMethod =
    gintNoOption
    mcStep.StepType = gintManagerStep

    ' Since the manager step does not take any
    action, the step
    ' text and file name will always be empty
    mcStep.StepText = gstrEmptyString
    mcStep.StepTextFile = gstrEmptyString

    ' Since the manager step does not take any
    action, execution
    ' properties for the step will be empty
    mcStep.ExecutionMechanism =
    gintNoOption
    mcStep.FailureDetails = gstrEmptyString
    mcStep.ContinuationCriteria =
    gintNoOption

End Sub
Private Sub Class_Terminate()

    ' Remove the step object
    Set mcStep = Nothing

End Sub
Private Sub cStep_Add()

    ' Call the Add method of the step class to
    carry out the insert
    mcStep.Add

End Sub
Private Property Get
cStep_ContinuationCriteria() As
ContinuationCriteria

    cStep_ContinuationCriteria =
mcStep.ContinuationCriteria

End Property

Private Property Let
cStep_ContinuationCriteria(ByVal RHS As
ContinuationCriteria)

    ' Since a manager step cannot take any
    action, the continuation
    ' criteria property does not apply to it
    mcStep.ContinuationCriteria =
    gintNoOption

End Property

Private Property Let
cStep_DegreeParallelism(ByVal RHS As
String)

```

```

mcStep.DegreeParallelism = RHS
End Property

Private Property Get
cStep_DegreeParallelism() As String

    cStep_DegreeParallelism =
mcStep.DegreeParallelism

End Property

Private Sub cStep_DeleteStep()

    On Error GoTo cStep_DeleteStepErr
    mstrSource = mstrModuleName &
"cStep_DeleteStep"

    mcStep.Delete
    Exit Sub

cStep_DeleteStepErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"cStep_DeleteStep"
    On Error GoTo 0
    Err.Raise vbObjectError +
errDeleteStepFailed, _
    mstrSource, _
    LoadResString(errDeleteStepFailed)

End Sub

Private Property Get cStep_EnabledFlag() As
Boolean

    cStep_EnabledFlag = mcStep.EnabledFlag

End Property

Private Property Let
cStep_EnabledFlag(ByVal RHS As Boolean)

    mcStep.EnabledFlag = RHS

End Property

Private Property Let
cStep_ExecutionMechanism(ByVal RHS As
ExecutionMethod)

    ' Since a manager step cannot take any
    action, the Execution
    ' Mechanism property does not apply to it
    mcStep.ExecutionMechanism =
    gintNoOption

End Property

Private Property Get
cStep_ExecutionMechanism() As
ExecutionMethod

    cStep_ExecutionMechanism =
mcStep.ExecutionMechanism

End Property

Private Property Let
cStep_FailureDetails(ByVal RHS As String)

    ' Since a manager step cannot take any
    action, the Failure
    ' Details property does not apply to it
    mcStep.FailureDetails = gstrEmptyString

```

```

End Property

Private Property Get cStep_FailureDetails() As
String

    cStep_FailureDetails = mcStep.FailureDetails

End Property

Private Property Get cStep_GlobalFlag() As
Boolean

    cStep_GlobalFlag = mcStep.GlobalFlag

End Property

Private Property Let cStep_GlobalFlag(ByVal RHS
As Boolean)

    ' Set the global flag to false - this flag is
    initialized when
    ' an instance of the class is created. Just making
    sure that
    ' nobody changes the value inadvertently
    mcStep.GlobalFlag = False

End Property
Private Sub cStep_Modify()

    ' Call the Modify method of the step class to
    carry out the update
    mcStep.Modify

End Sub

Private Property Let cStep_ParentStepId(ByVal
RHS As Long)

    mcStep.ParentStepId = RHS

End Property

Private Property Get cStep_ParentStepId() As Long

    cStep_ParentStepId = mcStep.ParentStepId

End Property

Private Property Let cStep_ParentVersionNo(ByVal
RHS As String)

    mcStep.ParentVersionNo = RHS

End Property

Private Property Get cStep_ParentVersionNo() As
String

    cStep_ParentVersionNo =
mcStep.ParentVersionNo

End Property

Private Property Let cStep_SequenceNo(ByVal
RHS As Integer)

    mcStep.SequenceNo = RHS

End Property

Private Property Get cStep_SequenceNo() As
Integer

    cStep_SequenceNo = mcStep.SequenceNo

```

```

End Property

Private Property Let cStep_StepId(ByVal
RHS As Long)

    mcStep.StepId = RHS

End Property

Private Property Get cStep_StepId() As
Long

    cStep_StepId = mcStep.StepId

End Property

Private Property Let
cStep_StepLabel(ByVal RHS As String)

    mcStep.StepLabel = RHS

End Property

Private Property Get cStep_StepLabel() As
String

    cStep_StepLabel = mcStep.StepLabel

End Property

Private Property Let
cStep_StepLevel(ByVal RHS As Integer)

    mcStep.StepLevel = RHS

End Property

Private Property Get cStep_StepLevel() As
Integer

    cStep_StepLevel = mcStep.StepLevel

End Property

Private Property Let cStep_StepText(ByVal
RHS As String)

    ' Since the manager step does not take any
    ' action, the step
    ' text and file name will always be empty
    mcStep.StepText = gstrEmptyString

End Property

Private Property Get cStep_StepText() As
String

    cStep_StepText = mcStep.StepText

End Property

Private Property Let
cStep_StepTextFile(ByVal RHS As String)

    ' Since the manager step does not take any
    ' action, the step
    ' text and file name will always be empty
    mcStep.StepTextFile = gstrEmptyString

End Property

Private Property Get cStep_StepTextFile() As
String

    cStep_StepTextFile = mcStep.StepTextFile

End Property

Private Property Let cStep_StepType(RHS As
gintStepType)

    mcStep.StepType = gintManagerStep

End Property

Private Property Get cStep_StepType() As
gintStepType

    cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_Validate()
    ' The validate routines for each of the steps
    ' will
    ' carry out the specific validations for the
    ' type and
    ' call the generic validation routine

    On Error GoTo cStep_ValidateErr
    mstrSource = mstrModuleName &
"cStep_Validate"

    ' Validations specific to manager steps

    ' Check if the step text or a file name has
    ' been
    ' specified
    If Not StringEmpty(mcStep.StepText) Or
Not StringEmpty(mcStep.StepTextFile) Then
        ShowError
        errTextAndFileNullForManager
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.ExecutionMechanism <>
gintNoOption Then
        ShowError
        errExecutionMechanismInvalid
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.FailureDetails <>
gstrEmptyString Then
        ShowError errFailureDetailsNullForMgr
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    If mcStep.ContinuationCriteria <>
gintNoOption Then
        ShowError errContCriteriaInvalid
        On Error GoTo 0
        Err.Raise vbObjectError +
errValidateFailed, _
            gstrSource, _
            LoadResString(errValidateFailed)
    End If

    gstrSource, _
    LoadResString(errValidateFailed)
End If

End Sub

Private Property Let cStep_VersionNo(ByVal RHS
As String)

    mcStep.VersionNo = RHS

End Property

Private Property Get cStep_VersionNo() As String

    cStep_VersionNo = mcStep.VersionNo

End Property

Private Property Let cStep_WorkspaceId(ByVal
RHS As Long)

    mcStep.WorkspaceId = RHS

End Property

Private Property Get cStep_WorkspaceId() As Long

    cStep_WorkspaceId = mcStep.WorkspaceId

End Property

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 ' True
END
Attribute VB_Name = "cNode"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cNode.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
' PURPOSE:  Defines the properties that an
object has to implement.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Public Property Get IndOperation() As Operation
End Property
Public Property Let IndOperation(ByVal vdata As
Operation)
End Property
Public Sub Validate()
End Sub
Public Property Get Value() As String
End Property
Public Property Let Value(ByVal vdata As String)

```

```

End Property

Public Property Get NodeDB() As Database
End Property
Public Property Set NodeDB(vdata As Database)
End Property

Public Property Get Position() As Long
End Property
Public Property Let Position(ByVal vdata As Long)
End Property

VERSION 1.0 CLASS
BEGIN
  MultiUse = -1 True
END
Attribute VB_Name = "cNodeCollections"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cNodeCollections.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Implements an array of objects.
' Contact: Reshma Tharamal (reshmat@microsoft.com)
Option Explicit

' Node counter
Private mlngNodeCount As Long
Private mdbsNodeDb As Database
Private mcarrNodes() As Object

' Used to indicate the source module name when errors are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String = "cNodeCollections."

Public Property Set Item(ByVal Position As Long, _
  ByVal objNode As Object)

  ' Returns the element at the passed in position in the array
  If Position >= 0 And Position < mlngNodeCount Then
    Set mcarrNodes(Position) = objNode
  Else
    On Error GoTo 0
    Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
LoadResString(errItemDoesNotExist)
  End If

End Property
Public Property Get Item(ByVal Position As Long) As Object
Attribute Item.VB_UserMemId = 0

' Returns the element at the passed in position in the array
If Position >= 0 And Position < mlngNodeCount Then
  Set Item = mcarrNodes(Position)

```

```

Else
  On Error GoTo 0
  Err.Raise vbObjectError + errItemDoesNotExist, mstrSource, _
LoadResString(errItemDoesNotExist)
End If

End Property

Public Sub Commit(ByVal cSaveObj As Object, _
  ByVal lngIndex As Long)
  ' This procedure checks if any changes have been made to the
  ' passed in object. If so, it calls the corresponding method
  ' to commit the changes.

  On Error GoTo CommitErr
  mstrSource = mstrModuleName & "Commit"

  Select Case cSaveObj.IndOperation
    Case QueryOp
      ' No changes were made to the queried parameter.
      ' Do nothing

    Case InsertOp
      cSaveObj.Add
      cSaveObj.IndOperation = QueryOp

    Case UpdateOp
      cSaveObj.Modify
      cSaveObj.IndOperation = QueryOp

    Case DeleteOp
      cSaveObj.Delete
      ' Now we can remove the record from the array
      Call Unload(lngIndex)

  End Select

Exit Sub

CommitErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Commit"
  On Error GoTo 0
  Err.Raise vbObjectError + errCommitFailed, _
  mstrSource, _
LoadResString(errCommitFailed)

End Sub
Public Sub Save(ByVal lngWorkspace As Long)
  ' Calls a procedure to commit all changes for the passed
  ' in workspace.

  Dim lngIndex As Long

  On Error GoTo SaveErr

  ' Find all parameters in the array with a matching workspace id
  ' It is important to step backwards through the array, since
  ' we delete parameter records as we go along!
  For lngIndex = mlngNodeCount - 1 To 0 Step -1

```

```

  If mcarrNodes(lngIndex).WorkspaceId = lngWorkspace Then
    ' Call a procedure to commit all changes to the
    ' parameter record, if any
    Call Commit(mcarrNodes(lngIndex), lngIndex)

  End If
Next lngIndex

Exit Sub

SaveErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Save"
  On Error GoTo 0
  Err.Raise vbObjectError + errSaveFailed, _
  mstrSource, _
LoadResString(errSaveFailed)

End Sub
Public Property Get Count() As Long

  Count = mlngNodeCount

End Property

Public Property Get NodeDB() As Database

  Set NodeDB = mdbsNodeDb

End Property
Public Property Set NodeDB(vdata As Database)

  Set mdbsNodeDb = vdata

End Property

Public Sub Load(cNodeToLoad As Object)
  ' Adds the passed in object to the array

  On Error GoTo LoadErr

  ' If this procedure is called by the add to array procedure,
  ' the database object has already been initialized
  If cNodeToLoad.NodeDB Is Nothing Then

    ' All the Nodes will be initialized with the database
    ' objects before being added to the array
    Set cNodeToLoad.NodeDB = mdbsNodeDb

  End If

  ReDim Preserve mcarrNodes(mlngNodeCount)

  ' Set the newly added element in the array to the passed in Node
  cNodeToLoad.Position = mlngNodeCount
  Set mcarrNodes(mlngNodeCount) = cNodeToLoad

  mlngNodeCount = mlngNodeCount + 1

Exit Sub

LoadErr:
  LogErrors Errors
  On Error GoTo 0
  Err.Raise vbObjectError + errLoadFailed, mstrModuleName & "Load", _
LoadResString(errLoadFailed)

```

```

End Sub
Public Sub Unload(IngDeletePosition As Long)
    ' Unloads the passed in object from the array

    On Error GoTo UnloadErr

    If IngDeletePosition < (mLngNodeCount - 1) Then

        ' Set the Node at the position being deleted to
        ' the last Node in the Node array
        Set mcarrNodes(IngDeletePosition) = mcarrNodes(mLngNodeCount - 1)

    mcarrNodes(IngDeletePosition).Position = IngDeletePosition
    End If

    ' Delete the last Node from the array
    mLngNodeCount = mLngNodeCount - 1
    If mLngNodeCount > 0 Then
        ReDim Preserve mcarrNodes(0 To mLngNodeCount - 1)
    Else
        ReDim mcarrNodes(0)
    End If

    Exit Sub

UnloadErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Unload"
    On Error GoTo 0
    Err.Raise vbObjectError + errUnloadFailed, _
        mstrSource, _
        LoadResString(errUnloadFailed)

End Sub
Public Sub Delete(IngDeletePosition As Long)
    ' Deletes the object at the specified position in the
    ' array

    Dim cDeleteObj As Object

    On Error GoTo DeleteErr
    mstrSource = mstrModuleName & "Delete"

    Set cDeleteObj = mcarrNodes(IngDeletePosition)

    If cDeleteObj.IndOperation = InsertOp Then
        ' If we are deleting a record that has just been inserted,
        ' blow it away
        Call Unload(IngDeletePosition)
    Else
        ' Set the operation for the deleted object to indicate a
        ' delete - we actually delete the element only at the time
        ' of a save operation
        cDeleteObj.IndOperation = DeleteOp
    End If

    Exit Sub

```

```

DeleteErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Delete"
    On Error GoTo 0
    Err.Raise vbObjectError + errDeleteFailed, _
        mstrSource, _
        LoadResString(errDeleteFailed)

End Sub
Public Sub Modify(cModifiedNode As Object)
    ' Sets the object at the passed in position to the
    ' modified object passed in

    On Error GoTo ModifyErr

    ' First check if the record is valid - all objects that
    ' use this collection class must have a Validate routine
    cModifiedNode.Validate

    ' If we are updating a record that hasn't yet been inserted,
    ' do not change the operation indicator - or we try to update
    ' a non-existent record
    If cModifiedNode.IndOperation <> InsertOp Then
        ' Set the operations to indicate an update
        cModifiedNode.IndOperation = UpdateOp
    End If

    ' Modify the object at the queried position - the Position
    ' will be maintained by this class
    Set mcarrNodes(cModifiedNode.Position) = cModifiedNode

    Exit Sub

ModifyErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Modify"
    On Error GoTo 0
    Err.Raise vbObjectError + errModifyFailed, _
        mstrSource, _
        LoadResString(errModifyFailed)

End Sub
Public Sub Add(cNodeToAdd As Object)

    On Error GoTo AddErr

    Set cNodeToAdd.NodeDB = mdbNodeDb

    ' First check if the record is valid
    cNodeToAdd.Validate

    ' Set the operation to indicate an insert
    cNodeToAdd.IndOperation = InsertOp

    ' Call a procedure to load the record in the array
    Call Load(cNodeToAdd)

    Exit Sub

AddErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Add"
    On Error GoTo 0

```

```

    Err.Raise vbObjectError + errAddFailed, _
        mstrSource, _
        LoadResString(errAddFailed)

End Sub

Private Sub Class_Terminate()

    ReDim mcarrNodes(0)
    mLngNodeCount = 0

End Sub

Attribute VB_Name = "Common"
' FILE: Common.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Module containing common functionality throughout
' StepMaster
' Contact: Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

Private Const mstrModuleName As String = "Common."

' Used to separate the variable data from the constant error
' message being raised when a context-sensitive error is displayed
Private Const mintDelimiter As String = " : "
Private Const mstrFormatString = "mmdddy"

' Identifiers for the different labels that need to be loaded
' into the tree view for each workspace
Public Const mstrWorkspacePrefix = "W"
Public Const mstrParameterPrefix = "P"
Public Const mstrParamConnectionPrefix = "C"
Public Const mstrConnectionDtlPrefix = "N"
Public Const mstrParamExtensionPrefix = "E"
Public Const mstrParamBuiltInPrefix = "B"
Public Const gstrGlobalStepPrefix = "G"
Public Const gstrManagerStepPrefix = "M"
Public Const gstrWorkerStepPrefix = "S"
Public Const gstrDummyPrefix = "D"
Public Const mstrLabelPrefix = "L"
Public Const mstrInstancePrefix = "I"
Public Function LabelStep(IngWorkspaceIdentifier As Long) As String
    ' Returns the step label for the workspace identifier passed in
    ' Basically this is a wrapper around the MakeKeyValid function

    LabelStep = MakeKeyValid(gintStepLabel, gintStepLabel, IngWorkspaceIdentifier)

End Function

Public Function JulianDateToString(dt64Bit As Currency) As String

    Dim IYear As Long
    Dim IMonth As Long
    Dim IDay As Long
    Dim IHour As Long
    Dim IMin As Long

```



```

Dim lSec As Long
Dim lMs As Long

Call JulianToTime(dt64Bit, lYear,
lMonth, lDay, lHour, lMin, lSec, lMs)
JulianDateToString = Format$(lYear,
gsYearFormat) & gsDateSeparator & _
Format$(lMonth, gsDtFormat) &
gsDateSeparator & _
Format$(lDay, gsDtFormat) &
gsStrBlank & _
Format$(lHour, gsTmFormat) &
gsTimeSeparator & _
Format$(lMin, gsTmFormat) &
gsTimeSeparator & _
Format$(lSec, gsTmFormat) &
gsMsSeparator & _
Format$(lMs, gsMSecondFormat)

End Function
Public Sub DeleteFile(strFile As String,
Optional ByVal bCheckIfEmpty As Boolean
= False)

' Ensure that there is only a single file of
the name before delete, since
' Kill supports wildcards and can
potentially delete a number of files
Dim strTemp As String

If CheckFileExists(strFile) Then
If bCheckIfEmpty Then
If FileLen(strFile) = 0 Then
Kill strFile
End If
Else
Kill strFile
End If
End If

End Sub
Public Function CheckFileExists(strFile As
String) As Boolean

' Returns true if the passed in file exists
' Raises an error if multiple files are found
(filename contains a wildcard)
CheckFileExists = False

If Not StringEmpty(Dir(strFile)) Then
If Not StringEmpty(Dir()) Then
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteSingleFile, _
mstrModuleName & "DeleteFile",
LoadResString(errDeleteSingleFile)
End If

CheckFileExists = True
End If

End Function

Public Function GetVersionString() As
String
GetVersionString = "Version " & gsVersion
End Function

Function IsLabel(strKey As String) As
Boolean

' The tree view control on frmMain can
contain two types of
' nodes -

```

```

' 1. Nodes that contain data for the
workspace - this could
' be data for the different types of steps or
parameters
' 2. Nodes that display static data - these kind
of nodes
' are referred to as label nodes e.g. "Global
Steps" is a
' label node
' This function returns True if the passed in
key corresponds
' to a label node

IsLabel = InStr(strKey, mstrLabelPrefix) > 0

End Function

Function MakeKeyValid(IngIdentifier As
Long, _
intTypeOfNode As Integer, _
Optional ByVal WorkspaceId As Long = 0,
_
Optional ByVal InstanceId As Long = 0) As
String

' We use a numbering scheme while loading
the tree view with
' all node data, since it needs a unique key
and we want to
' use the key to identify the data it contains.
' Moreover, add a character to the beginning
of the identifier
' so that the tree view control accepts it as a
valid string,
' viz. "456" doesn't work, so change it to
"W456"
' The general scheme is to concatenate a
Label with the Identifier
' e.g A Global Step Node will have the
Label, G and the Step Id
' concatenated to form the unique key
' The list of all such node types is given
below
' 1. "W" + Workspace_Id for Workspace
nodes
' 2. "P" + Parameter_Id for Parameter nodes
' 3. "M" + Step_Id for Manager Step nodes
' 4. "S" + Step_Id for Worker Step nodes
' 5. "G" + Step_Id for Global Step nodes
' 6. Instance_id + "I" + Step_Id for Instance
nodes
' 7. Workspace_id + "L" + the label
identifier = node type for all Label nodes
' Since the manager, worker and global steps
are stored in the
' same table and the step identifiers will
always be unique, we
' can use the same character as the prefix, but
this is a
' convenient way to know the type of step
being processed.
' The workspace id is appended to the label
identifier to make
' it unique, since multiple workspaces may
be open during a session
' Strip the prefix characters off while saving
the Ids to the db

Dim strPrefixChar As String

On Error GoTo MakeKeyValidErr
gstrSource = mstrModuleName &
"MakeKeyValid"

Select Case intTypeOfNode

```

```

Case gintWorkspace
strPrefixChar = mstrWorkspacePrefix
Case gintGlobalStep
strPrefixChar = gstrGlobalStepPrefix
Case gintManagerStep
strPrefixChar = gstrManagerStepPrefix
Case gintWorkerStep
strPrefixChar = gstrWorkerStepPrefix
Case gintRunManager, gintRunWorker
If InstanceId = 0 Then
On Error GoTo 0
Err.Raise vbObjectError +
errMandatoryParameterMissing, _
gstrSource, _

LoadResString(errMandatoryParameterMissing)
End If
' Concatenate the instance identifier and the
step
' identifier to form a unique key
strPrefixChar = Trim$(Str$(InstanceId)) &
mstrInstancePrefix
Case gintParameter
strPrefixChar = mstrParameterPrefix
Case gintNodeParamConnection
strPrefixChar = mstrParamConnectionPrefix
Case gintConnectionDtl
strPrefixChar = mstrConnectionDtlPrefix
Case gintNodeParamExtension
strPrefixChar = mstrParamExtensionPrefix
Case gintNodeParamBuiltIn
strPrefixChar = mstrParamBuiltInPrefix
Case gintGlobalsLabel, gintParameterLabel,
gintParamConnectionLabel, _
gintConnDtlLabel, _
gintParamExtensionLabel,
gintParamBuiltInLabel, gintGlobalStepLabel, _
gintStepLabel
If WorkspaceId = 0 Then
' The Workspace Id has to be specified for
a label node
' Otherwise it will not be possible to
generate unique label
' identifiers if multiple workspaces are
open
On Error GoTo 0
Err.Raise vbObjectError +
errWorkspaceIdMandatory, _
gstrSource, _

LoadResString(errWorkspaceIdMandatory)
End If
' For all labels, the workspace identifier and
the
' label prefix are concatenated to form the
key
strPrefixChar = Trim$(Str$(WorkspaceId))
& mstrLabelPrefix
Case Else
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidNodeType, _
gstrSource, _
LoadResString(errInvalidNodeType)
End Select

MakeKeyValid = strPrefixChar &
Trim$(Str$(IngIdentifier))

Exit Function

MakeKeyValidErr:
Call LogErrors(Errors)
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errMakeKeyValidFailed, _
    gstrSource, _

LoadResString(errMakeKeyValidFailed)

End Function

Function MakeIdentifierValid(strKey As
String) As Long

    ' Returns the Identifier corresponding to
the passed in key
    ' (Reverse of what was done in
MakeKeyValid)

    On Error GoTo MakeIdentifierValidErr

    If IsLabel(strKey) Then
        ' If the key corresponds to a label node,
the identifier
        ' appears to the right of the label prefix
        MakeIdentifierValid = Val(Mid(strKey,
InStr(strKey, mstrLabelPrefix) + 1))
        ElseIf InStr(strKey, mstrInstancePrefix) =
0 Then
            ' For all other nodes, stripping the first
character off
            ' returns a valid Id
            MakeIdentifierValid = Val(Mid(strKey,
2))
        Else
            ' Instance node - strip of all characters
till the
            ' instance prefix
            MakeIdentifierValid = Val(Mid(strKey,
InStr(strKey, mstrInstancePrefix) + 1))
        End If

    Exit Function

MakeIdentifierValidErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errMakeIdentifierValidFailed, _
        mstrModuleName &
"MakeIdentifierValid", _

LoadResString(errMakeIdentifierValidFaile
d)

End Function
Public Function IsInstanceNode(strNodeKey
As String) As Boolean

    ' Returns true if the passed in node key
corresponds to a step instance
    IsInstanceNode = InStr(strNodeKey,
mstrInstancePrefix) > 0

End Function
Public Function IsBuiltInLabel(strNodeKey
As String) As Boolean

    ' Returns true if the passed in node key
corresponds to a step instance
    IsBuiltInLabel = (IsLabel(strNodeKey)
And _
        (MakeIdentifierValid(strNodeKey) =
gintParamBuiltInLabel))

End Function

Public Sub ShowBusy()

```

```

    ' Modifies the mousepointer to indicate that
the
    ' application is busy

    On Error Resume Next

    Screen.MousePointer = vbHourglass

End Sub
Public Sub ShowFree()
    ' Modifies the mousepointer to indicate that
the
    ' application has finished processing and is
ready
    ' to accept user input

    On Error Resume Next

    Screen.MousePointer = vbDefault

End Sub

Public Function InstrR(strMain As String, _
strSearch As String) As Integer
    ' Finds the last occurrence of the passed in
string

    Dim intPos As Integer
    Dim intPrev As Integer

    On Error GoTo InstrRErr

    intPrev = intPos
    intPos = InStr(1, strMain, strSearch)

    Do While intPos > 0
        intPrev = intPos
        intPos = InStr(intPos + 1, strMain,
strSearch)
    Loop
    InstrR = intPrev

Exit Function

InstrRErr:
    Call LogErrors(Errors)
    gstrSource = mstrModuleName & "InstrR"
    On Error GoTo 0
    Err.Raise vbObjectError + errInstrRFailed, _
        gstrSource, _
        LoadResString(errInstrRFailed)

End Function

Public Function GetDefaultDir(lWspId As
Long, WspParameters As cArrParameters) As
String

    Dim sDir As String
    sDir = SubstituteParameters(_
        gstrEnvVarSeparator &
PARAM_DEFAULT_DIR &
gstrEnvVarSeparator, _
        lWspId,
WspParameters:=WspParameters)
    MakePathValid (sDir & gstrFileSeparator &
"a.txt")
    GetDefaultDir = GetShortName(sDir)
    If StringEmpty(GetDefaultDir) Then
        GetDefaultDir = App.Path
    End If

End Function

```

```

Public Sub AddArrayElement(ByRef arrNodes() As
Object, _
    ByVal objToAdd As Object, _
    ByRef lngCount As Long)
    ' Adds the passed in object to the array

    On Error GoTo AddArrayElementErr

    ' Increase the array dimension and add the object
to it
    ReDim Preserve arrNodes(lngCount)
    Set arrNodes(lngCount) = objToAdd
    lngCount = lngCount + 1

Exit Sub

AddArrayElementErr:
    LogErrors Errors
    gstrSource = mstrModuleName &
"AddArrayElement"
    On Error GoTo 0
    Err.Raise vbObjectError +
errAddArrayElementFailed, _
        gstrSource, _
        LoadResString(errAddArrayElementFailed)

End Sub

Public Function CheckForNullField(rstRecords As
Recordset, strFieldName As String) As String

    ' Returns an empty string if a given field is null
    On Error GoTo CheckForNullFieldErr

    If IsNull(rstRecords.Fields(strFieldName)) Then
        CheckForNullField = gstrEmptyString
    Else
        CheckForNullField =
rstRecords.Fields(strFieldName)
    End If

Exit Function

CheckForNullFieldErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errCheckForNullFieldFailed, _
        mstrModuleName & "CheckForNullField",
        _

LoadResString(errCheckForNullFieldFailed)

End Function

Public Function ErrorOnNullField(rstRecords As
Recordset, strFieldName As String) As Variant

    ' If a given field is null, raises an error
    ' Else, returns the field value in a variant
    ' The calling function must convert the return
value to the
    ' appropriate type
    On Error GoTo ErrorOnNullFieldErr
    gstrSource = mstrModuleName &
"ErrorOnNullField"

    If IsNull(rstRecords.Fields(strFieldName)) Then
        On Error GoTo 0
        Err.Raise vbObjectError +
errMandatoryFieldNull, _
            gstrSource, _
            strFieldName & mintDelimiter &
LoadResString(errMandatoryFieldNull)
    Else

```

```

ErrorOnNullField =
rstRecords.Fields(strFieldName)
End If
Exit Function

ErrorOnNullFieldErr:
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errUnableToCheckNull, _
    gstrSource, _
    strFieldName & mintDelimiter &
LoadResString(errUnableToCheckNull)

End Function
Public Function
StringEmpty(strCheckString As String) As
Boolean

StringEmpty = (strCheckString =
gstrEmptyString)

End Function
Public Function
GetIteratorValue(cStepIterators As
cRunCollt, _
    ByVal strItName As String)

Dim lngIndex As Long
Dim strValue As String

On Error GoTo GetIteratorValueErr
gstrSource = mstrModuleName &
"GetIteratorValue"

' Find the iterator in the Iterators
collection
For lngIndex = 0 To cStepIterators.Count
- 1
    If
cStepIterators(lngIndex).IteratorName =
strItName Then
        strValue =
cStepIterators(lngIndex).Value
        Exit For
    End If
Next lngIndex

If lngIndex > cStepIterators.Count - 1
Then
    ' The iterator has not been defined for
the branch
    ' Raise an error
    On Error GoTo 0
    Err.Raise vbObjectError +
errParamNameInvalid, _
        gstrSource, _

LoadResString(errParamNameInvalid)
End If

GetIteratorValue = strValue
Exit Function

GetIteratorValueErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
gstrSource = mstrModuleName &
"GetIteratorValue"
On Error GoTo 0
Err.Raise vbObjectError +
errGetParamValueFailed, _
    gstrSource, _

```

```

LoadResString(errGetParamValueFailed)

End Function
Public Function SubstituteParameters(ByVal
strComString As String, _
    ByVal lngWorkspaceId As Long, _
    Optional StepIterators As cRunCollt =
Nothing, _
    Optional WspParameters As
cArrParameters = Nothing) As String
' This function substitutes all parameter
names and
' environment variables in the passed in
string with
' their values. It also substitutes the value for
the
' iterators, if any.
' Since the syntax is to enclose parameter
names and
' environment variables in "%", we check if
a given
' variable is a parameter - if so, we substitute
the
' parameter value - else we try to get the
value from
' the environment

Dim intPos As Integer
Dim intEndPos As Integer
Dim strEnvVariable As String
Dim strValue As String
Dim strCommand As String
Dim cTempStr As cStringSM

' Initialize the return value of the function to
the
' passed in command
strCommand = strComString

If WspParameters Is Nothing Then Set
WspParameters = gcParameters

Set cTempStr = New cStringSM

intPos = InStr(strCommand,
gstrEnvVarSeparator)
Do While intPos <> 0
    If Mid(strCommand, intPos + 1, 1) =
gstrEnvVarSeparator Then
        ' Wildcard character - to be substituted
by a single % - later!
        intPos = intPos + 2
        If intPos > Len(strCommand) Then
Exit Do
        Else
            ' Extract the environment variable from
the passed
            ' in string
            intEndPos = InStr(intPos + 1,
strCommand, gstrEnvVarSeparator)

            If intEndPos > 0 Then
                strEnvVariable = Mid(strCommand,
intPos + 1, intEndPos - intPos - 1)
            Else
                On Error GoTo 0
                Err.Raise vbObjectError +
errParamSeparatorMissing, _
                    gstrSource, _

LoadResString(errParamSeparatorMissing)
End If
strValue = gstrEmptyString

```

```

' Get the value of the variable and call a
function
' to replace the variable with it's value
strValue = GetValue(strEnvVariable,
lngWorkspaceId, StepIterators, WspParameters)
' The function raises an error if the variable
is
' not found
strCommand =
cTempStr.ReplaceSubString(strCommand, _
    gstrEnvVarSeparator & strEnvVariable
& gstrEnvVarSeparator, _
    strValue)
End If

intPos = InStr(intPos, strCommand,
gstrEnvVarSeparator)
Loop

strCommand =
cTempStr.ReplaceSubString(strCommand, _
    gstrEnvVarSeparator &
gstrEnvVarSeparator, gstrEnvVarSeparator)

Set cTempStr = Nothing
SubstituteParameters = strCommand

End Function
Private Function GetValue(ByVal strParameter As
String, _
    ByVal lngWorkspaceId As Long, _
    cStepIterators As cRunCollt, _
    WspParameters As cArrParameters) As String
' This function returns the value for the passed in
' parameter - it may be a workspace parameter, an
' environment variable or an iterator

Dim intPos As Integer
Dim intEndPos As Integer
Dim strVariable As String
Dim strValue As String
Dim cParamRec As cParameter

On Error GoTo GetValueErr

' Initialize the return value of the function to the
' empty
strValue = gstrEmptyString

intPos = InStr(strParameter,
gstrEnvVarSeparator)
If intPos > 0 Then
    ' Extract the variable from the passed in string
intEndPos = InStr(intPos + 1, strParameter,
gstrEnvVarSeparator)
    If intEndPos = 0 Then
        intEndPos = Len(strParameter)
    End If

    strVariable = Mid(strParameter, intPos + 1,
intEndPos - intPos - 1)
    Else
        ' The separator character has not been passed
in -
        ' try to find the value of the passed in
parameter
        strVariable = strParameter
    End If

If Not StringEmpty(strVariable) Then
    ' Check if this is the timestamp parameter first
If strVariable = gstrTimeStamp Then
        strValue = Format$(Now, mstrFormatString,
_

```

```

vbUseSystemDayOfWeek,
vbUseSystem)
Else
' Try to find a parameter for the
workspace with
' the same name
Set cParamRec =
WspParameters.GetParameterValue(IngWor
kspacelD, _
strVariable)
If cParamRec Is Nothing Then
If Not cStepIterators Is Nothing
Then
' If the string is not a parameter,
then check
' if it is an iterator
strValue =
GetIteratorValue(cStepIterators, strVariable)
End If

If StringEmpty(strValue) Then
' Neither - Check if it is an
environment variable
strValue =
Environ$(strVariable)
If StringEmpty(strValue) Then
On Error GoTo 0
WriteError
errSubValuesFailed, _
OptArgs:="Invalid
parameter: " & gstrSQ & strVariable &
gstrSQ
Err.Raise vbObjectError +
errSubValuesFailed, _
mstrModuleName &
"GetValue", _

LoadResString(errSubValuesFailed) &
"Invalid parameter: " & gstrSQ &
strVariable & gstrSQ
End If
End If
Else
strValue =
cParamRec.ParameterValue
End If
End If
End If

GetValue = strValue

Exit Function

GetValueErr:
If Err.Number = vbObjectError +
errParamNameInvalid Then
' If the parameter has not been defined
for the
' workspace then check if it is an
environment
' variable
Resume Next
End If

' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
gstrSource = mstrModuleName &
"GetValue"
WriteError errSubValuesFailed,
gstrSource, "Parameter: " & gstrSQ &
strVariable & gstrSQ
On Error GoTo 0
Err.Raise vbObjectError +
errSubValuesFailed, _

```

```

gstrSource, _
LoadResString(errSubValuesFailed) &
"Parameter: " & gstrSQ & strVariable &
gstrSQ

End Function
Public Function SQLFixup(strField As String)
As String
' Returns a string that can be executed by
SQL Server

Dim cMyStr As New cStringSM
Dim strTemp As String

On Error GoTo SQLFixupErr

strTemp = strField
SQLFixup = strTemp

' Single-quotes have to be replaced by two
single-quotes,
' since a single-quote is the identifier
delimiter
' character - call a procedure to do the
replace
' SQLFixup =
cMyStr.ReplaceSubString(strTemp, gstrDQ,
\" & gstrDQ)

' Replace pipe characters with the
corresponding chr function
' SQLFixup =
cMyStr.ReplaceSubString(strTemp, gstrDQ,
gstrDQ & gstrDQ)

Exit Function

SQLFixupErr:
gstrSource = mstrModuleName &
"SQLFixup"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errMakeFieldValidFailed, _
gstrSource,
LoadResString(errMakeFieldValidFailed)

End Function
Public Function TranslateStepLabel(sLabel As
String) As String
' Translates the passed in step label to a valid
file name
' All characters in the label that are invalid
for filenames (viz. \ / : * ? " < > |)
' and spaces are substituted with underscores
- also ensure that the resulting filename
' is not greater than 255 characters
Dim cTempStr As New cStringSM
TranslateStepLabel =
cTempStr.ReplaceSubString(sLabel,
gstrFileSeparator, "_")
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, "?", gstrUnderscore)
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, ":", gstrUnderscore)
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, "*", gstrUnderscore)
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLab
el, "?", gstrUnderscore)

```

```

TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLabel,
gstrDQ, gstrUnderscore)
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLabel,
"<", gstrUnderscore)
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLabel,
">", gstrUnderscore)
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLabel,
"|", gstrUnderscore)
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLabel,
gstrBlank, gstrUnderscore)

' Commas are substituted with underscores since
the command shell uses a comma to
' delimit commands
TranslateStepLabel =
cTempStr.ReplaceSubString(TranslateStepLabel,
",", gstrUnderscore)

If Len(TranslateStepLabel) > MAX_PATH Then
TranslateStepLabel = Mid(TranslateStepLabel,
1, MAX_PATH)
End If

End Function

Public Function TypeOfObject(ByVal objNode As
Object) As Integer
' Determines the type of object that is passed in

On Error GoTo TypeOfObjectErr
gstrSource = mstrModuleName &
"TypeOfObject"

Select Case TypeName(objNode)
Case "cWorkspace"
TypeOfObject = gintWorkspace

Case "cParameter"
TypeOfObject = gintParameter

Case "cConnection"
TypeOfObject = gintParameterConnect

Case "cConnDtl"
TypeOfObject = gintConnectionDtl

Case "cGlobalStep"
TypeOfObject = gintGlobalStep

Case "cManager"
TypeOfObject = gintManagerStep

Case "cWorker"
TypeOfObject = gintWorkerStep

Case "cStep"
' If a step record is passed in, call a function
' to determine the type of step
TypeOfObject =
TypeOfStep(StepClass:=objNode)

Case Else
WriteError errTypeOfObjectFailed,
gstrSource, _
TypeName(objNode)
On Error GoTo 0
Err.Raise vbObjectError +
errTypeOfObjectFailed, _
gstrSource, _

```

```

LoadResString(errTypeOfObjectFailed)
  End Select

  Exit Function

TypeOfObjectErr:
  ' Log the error code raised by Visual
  Basic
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError +
errTypeOfObjectFailed, _
  gstrSource, _

LoadResString(errTypeOfObjectFailed)

End Function
Attribute VB_Name = "ConnDtlCommon"
' FILE:   ConnDtlCommon.bas
'   Microsoft TPC-H Kit Ver. 1.00
'   Copyright Microsoft, 1999
'   All Rights Reserved
'
'
' PURPOSE:  Contains functionality
common across StepMaster and
SMRunOnly, pertaining to
connections
'   Specifically, functions to load
connections in an array
'   and so on.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"ConnDtlCommon."

Public Sub
LoadRSInConnDtlArray(rstConns As
Recordset, cConns As cConnDtls)

  Dim cNewConnDtl As cConnDtl

  On Error GoTo
LoadRSInConnDtlArrayErr

  If rstConns.RecordCount = 0 Then
  Exit Sub
  End If

  rstConns.MoveFirst
  While Not rstConns.EOF

    Set cNewConnDtl = New cConnDtl

    ' Initialize ConnDtl values
    ' Call a procedure to raise an error if
    mandatory fields are null.
    cNewConnDtl.ConnNameId =
ErrorOnNullField(rstConns,
FLD_ID_CONN_NAME)
    cNewConnDtl.WorkspaceId =
ErrorOnNullField(rstConns,
FLD_ID_WORKSPACE)
    cNewConnDtl.ConnName =
CStr(ErrorOnNullField(rstConns,
FLD_CONN_DTL_CONNECTION_NAM
E))

    cNewConnDtl.ConnectionString =
CheckForNullField(rstConns,
FLD_CONN_DTL_CONNECTION_STRING
)

    cNewConnDtl.ConnType =
CheckForNullField(rstConns,
FLD_CONN_DTL_CONNECTION_TYPE)

    cConns.Load cNewConnDtl

    Set cNewConnDtl = Nothing
    rstConns.MoveNext
  Wend

  Exit Sub

LoadRSInConnDtlArrayErr:
  LogErrors Errors
  gstrSource = mstrModuleName &
"LoadRSInConnDtlArray"
  On Error GoTo 0
  Err.Raise vbObjectError +
errLoadRSInArrayFailed, gstrSource, _

LoadResString(errLoadRSInArrayFailed)
End Sub
Attribute VB_Name = "ConnectionCommon"
' FILE:   ConnectionCommon.bas
'   Microsoft TPC-H Kit Ver. 1.00
'   Copyright Microsoft, 1999
'   All Rights Reserved
'
'
' PURPOSE:  Contains functionality common
across StepMaster and
SMRunOnly, pertaining to connection
strings
'   Specifically, functions to load
connections strings
'   in an array and so on.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"ConnectionCommon."

Public Sub
LoadRecordsetInConnectionArray(rstConns
As Recordset, cConns As cConnections)

  Dim cNewConnection As cConnection

  On Error GoTo
LoadRecordsetInConnectionArrayErr

  If rstConns.RecordCount = 0 Then
  Exit Sub
  End If

  rstConns.MoveFirst
  While Not rstConns.EOF

    Set cNewConnection = New cConnection

    ' Initialize Connection values
    ' Call a procedure to raise an error if
    mandatory fields are null.
    cNewConnection.ConnectionId =
ErrorOnNullField(rstConns, "connection_id")

    cNewConnection.WorkspaceId =
CStr(ErrorOnNullField(rstConns,
FLD_ID_WORKSPACE))
    cNewConnection.ConnectionName =
CStr(ErrorOnNullField(rstConns,
"connection_name"))
    cNewConnection.ConnectionValue =
CheckForNullField(rstConns, "connection_value")
    cNewConnection.Description =
CheckForNullField(rstConns, "description")

    cNewConnection.NoCountDisplay =
CheckForNullField(rstConns, "no_count_display")
    cNewConnection.NoExecute =
CheckForNullField(rstConns, "no_execute")
    cNewConnection.ParseQueryOnly =
CheckForNullField(rstConns, "parse_query_only")
    cNewConnection.QuotedIdentifiers =
CheckForNullField(rstConns,
"ANSI_quoted_identifiers")
    cNewConnection.AnsiNulls =
CheckForNullField(rstConns, "ANSI_nulls")
    cNewConnection.ShowQueryPlan =
CheckForNullField(rstConns, "show_query_plan")
    cNewConnection.ShowStatsTime =
CheckForNullField(rstConns, "show_stats_time")
    cNewConnection.ShowStatsIO =
CheckForNullField(rstConns, "show_stats_io")
    cNewConnection.ParseOdbcMsg =
CheckForNullField(rstConns,
"parse_odbc_msg_prefixes")
    cNewConnection.RowCount =
CheckForNullField(rstConns, "row_count")
    cNewConnection.TsqlBatchSeparator =
CheckForNullField(rstConns,
"tsql_batch_separator")
    cNewConnection.QueryTimeOut =
CheckForNullField(rstConns, "query_time_out")
    cNewConnection.ServerLanguage =
CheckForNullField(rstConns, "server_language")
    cNewConnection.CharacterTranslation =
CheckForNullField(rstConns,
"character_translation")
    cNewConnection.RegionalSettings =
CheckForNullField(rstConns, "regional_settings")

    cConns.Load cNewConnection

    Set cNewConnection = Nothing
    rstConns.MoveNext
  Wend

  Exit Sub

LoadRecordsetInConnectionArrayErr:
  LogErrors Errors
  gstrSource = mstrModuleName &
"LoadRecordsetInConnectionArray"
  On Error GoTo 0
  Err.Raise vbObjectError +
errLoadRSInArrayFailed, gstrSource, _
  LoadResString(errLoadRSInArrayFailed)
End Sub
VERSION 1.0 CLASS
BEGIN
  MultiUse = -1 True
END
Attribute VB_Name = "cParameter"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:   cParameter.cls
'   Microsoft TPC-H Kit Ver. 1.00
'   Copyright Microsoft, 1999

```

```

' All Rights Reserved
'
' PURPOSE: Encapsulates the properties
and methods of a parameter.
' Contains functions to insert,
update and delete
workspace_parameters records
from the database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
Option Base 0

' Local variable(s) to hold property value(s)
Private mlngWorkspaceId As Long
Private mlngParameterId As Long
Private mstrParameterName As String
Private mstrParameterValue As String
Private mstrDescription As String
Private mintParameterType As Integer
Private mdbStepMaster As Database
Private mintOperation As Operation
Private mlngPosition As Long

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cParameter."

' The cSequence class is used to generate
unique parameter identifiers
Private mParameterSeq As cSequence

' The StringSM class is used to carry out
string operations
Private mFieldValue As cStringSM

' Parameter types
Public Enum ParameterType
gintParameterGeneric = 0
gintParameterConnect
gintParameterApplication
gintParameterBuiltIn
End Enum

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
' Assigns values to the parameters in the
querydef object
' The parameter names are cryptic to make
them different
' from the field names. When the
parameter names are
' the same as the field names, parameters
in the where
' clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr

For Each prmParam In
qyExec.Parameters
Select Case prmParam.Name
Case "[w_id]"
mlngWorkspaceId =
prmParam.Value =
mlngWorkspaceId

Case "[p_id]"

```

```

prmParam.Value = mlngParameterId

Case "[p_name]"
prmParam.Value =
mstrParameterName

Case "[p_value]"
prmParam.Value =
mstrParameterValue

Case "[desc]"
prmParam.Value = mstrDescription

Case "[p_type]"
prmParam.Value =
mintParameterType

Case Else
' Write the parameter name that is
faulty
WriteError errInvalidParameter,
mstrSource, _
prmParam.Name
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrModuleName & "AssignParameters", _

LoadResString(errInvalidParameter)
End Select
Next prmParam

' qyExec.Parameters("w_id").Value =
mlngWorkspaceId
' qyExec.Parameters("p_id").Value =
mlngParameterId
' qyExec.Parameters("p_name").Value =
mstrParameterName
' qyExec.Parameters("p_value").Value =
mstrParameterValue

Exit Sub

AssignParametersErr:
mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrSource,
LoadResString(errAssignParametersFailed)

End Sub

Public Property Let Position(ByVal RHS As
Long)

mlngPosition = RHS

End Property

Public Property Get Position() As Long

Position = mlngPosition

End Property

Public Function Clone() As cParameter

' Creates a copy of a given parameter

Dim cCloneParam As cParameter

```

```

On Error GoTo CloneErr
mstrSource = mstrModuleName & "Clone"

Set cCloneParam = New cParameter

' Copy all the parameter properties to the newly
' created parameter
Set cCloneParam.NodeDB = mdbStepMaster
cCloneParam.WorkspaceId = mlngWorkspaceId
cCloneParam.ParameterId = mlngParameterId
cCloneParam.ParameterName =
mstrParameterName
cCloneParam.ParameterValue =
mstrParameterValue
cCloneParam.Description = mstrDescription
cCloneParam.ParameterType =
mintParameterType
cCloneParam.IndOperation = mintOperation
cCloneParam.Position = mlngPosition

' And set the return value to the newly created
parameter
Set Clone = cCloneParam
Set cCloneParam = Nothing

Exit Function

CloneErr:
LogErrors Errors
mstrSource = mstrModuleName & "Clone"
On Error GoTo 0
Err.Raise vbObjectError + errCloneFailed, _
mstrSource, LoadResString(errCloneFailed)

End Function
Public Property Set NodeDB(vdata As Database)

Set mdbStepMaster = vdata

End Property
Public Property Get NodeDB() As Database

Set NodeDB = mdbStepMaster

End Property

Private Sub CheckDupParameterName()
' Check if the parameter name already exists in
the workspace

Dim rstParameter As Recordset
Dim strSql As String
Dim qy As DAO.QueryDef

On Error GoTo CheckDupParameterNameErr
mstrSource = mstrModuleName &
"CheckDupParameterName"

' Create a recordset object to retrieve the count of
all parameters
' for the workspace with the same name
strSql = "Select count(*) as parameter_count " &
- " from workspace_parameters " & _
" where workspace_id = [w_id]" & _
" and parameter_name = [p_name]" & _
" and parameter_id <> [p_id]"

Set qy =
mdbStepMaster.CreateQueryDef(gstrEmptyString,
strSql)
Call AssignParameters(qy)

Set rstParameter =
qy.OpenRecordset(dbOpenForwardOnly)

```

```

If rstParameter![parameter_count] > 0
Then
  rstParameter.Close
  qy.Close
  ShowError
errDuplicateParameterName
  On Error GoTo 0
  Err.Raise vbObjectError +
errDuplicateParameterName, _
  mstrSource,
LoadResString(errDuplicateParameterName
)
  End If

  rstParameter.Close
  qy.Close

Exit Sub

CheckDupParameterNameErr:
  LogErrors Errors
  mstrSource = mstrModuleName &
"CheckDupParameterName"
  On Error GoTo 0
  Err.Raise vbObjectError +
errCheckDupParameterNameFailed, _
  mstrSource,
LoadResString(errCheckDupParameterName
eFailed)

End Sub
Private Sub CheckDB()
  ' Check if the database object has been
initialized

  If mdbStepMaster Is Nothing Then
    On Error GoTo 0
    Err.Raise vbObjectError +
errInvalidDB, _
    mstrModuleName & "CheckDB",
LoadResString(errInvalidDB)
  End If

End Sub
Public Property Let ParameterValue(vdata
As String)

  mstrParameterValue = vdata

End Property
Public Property Let Description(vdata As
String)

  mstrDescription = vdata

End Property
Public Property Let ParameterType(vdata
As ParameterType)

  mintParameterType = vdata

End Property

Public Property Let ParameterName(vdata
As String)

  If vdata = gstrEmptyString Then

    ShowError
errParameterNameMandatory
    On Error GoTo 0
    ' Propogate this error back to the caller
    Err.Raise vbObjectError +
errParameterNameMandatory, _

```

```

  mstrSource,
LoadResString(errParameterNameMandatory)
  Else
    mstrParameterName = vdata
  End If

End Property

Public Property Let ParameterId(vdata As
Long)
  mlngParameterId = vdata
End Property

Public Property Let IndOperation(ByVal vdata
As Operation)

  ' The valid operations are define in the
cOperations
  ' class. Check if the operation is valid
  Select Case vdata
    Case QueryOp, InsertOp, UpdateOp,
DeleteOp
      mintOperation = vdata

    Case Else
      On Error GoTo 0
      Err.Raise vbObjectError +
errInvalidOperation, _
      mstrSource,
LoadResString(errInvalidOperation)
  End Select

End Property
Public Sub Validate()
  ' Each distinct object will have a Validate
method which
  ' will check if the class properties are valid.
This method
  ' will be used to check interdependant
properties that
  ' cannot be validated by the let procedures.
  ' It should be called by the add and modify
methods of the class

  On Error GoTo ValidateErr

  ' Check if the db object is valid
  Call CheckDB

  ' Call procedure to raise an error if the
parameter name
  ' already exists in the workspace -
  ' if there are duplicates, we don't know what
value for the
  ' parameter to use at runtime
  Call CheckDupParameterName

Exit Sub

ValidateErr:

  mstrSource = mstrModuleName &
"Validate"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError +
errValidateFailed, _
  mstrSource,
LoadResString(errValidateFailed)

End Sub
Public Property Let WorkspaceId(vdata As
Long)

  mlngWorkspaceId = vdata

```

```

End Property

Public Sub Add()

  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo AddErr

  ' Validate the record before trying to insert the
record
  Call Validate

  ' Create a temporary querydef object
  strInsert = "insert into workspace_parameters " &
_
  "( workspace_id, parameter_id, " & _
  " parameter_name, parameter_value, " & _
  " description, parameter_type ) " & _
  " values ( [w_id], [p_id], [p_name],
[p_value], [desc], [p_type] )"
  Set qy =
mdbStepMaster.CreateQueryDef(gstrEmptyString,
strInsert)

  ' Call a procedure to assign the parameter values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

  ' strInsert = "insert into workspace_parameters "
& _
  "( workspace_id, parameter_id, " & _
  " parameter_name, parameter_value )" & _
  " values ( " & _
  " Str(mlngWorkspaceId) & ", " &
Str(mlngParameterId) & _
  ", " &
mField.Value.MakeStringFieldValid(mstrParameter
Name) & _
  ", " &
mField.Value.MakeStringFieldValid(mstrParameter
Value) & " )"
  ' mdbStepMaster.Execute strInsert,
dbFailOnError + dbSQLPassThrough

Exit Sub

AddErr:

  mstrSource = mstrModuleName & "Add"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError +
errParameterInsertFailed, _
  mstrSource,
LoadResString(errParameterInsertFailed)

End Sub
Public Sub Delete()

  Dim strDelete As String
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteErr

  ' Check if the db object is valid
  Call CheckDB

  strDelete = "delete from workspace_parameters "
& _
  " where parameter_id = [p_id]"

```

```

Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString, strDelete)

Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

Exit Sub

DeleteErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Delete"
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteParameterFailed, _
mstrSource, _

LoadResString(errDeleteParameterFailed)

End Sub

Public Sub Modify()

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo ModifyErr

' Validate the updated values before trying
to modify the db
Call Validate

' Create a temporary querydef object with
the modify string
strUpdate = "update
workspace_parameters " & _
" set workspace_id = [w_id], " & _
"parameter_name = [p_name], " & _
"parameter_value = [p_value], " & _
"description = [desc], " & _
"parameter_type = [p_type] " & _
" where parameter_id = [p_id]"

Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString, strUpdate)

' Call a procedure to assign the parameter
values to the
' querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

' mdbsStepMaster.Execute strUpdate,
dbFailOnError

Exit Sub

ModifyErr:

mstrSource = mstrModuleName &
"Modify"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errParameterUpdateFailed, _
mstrSource,
LoadResString(errParameterUpdateFailed)

End Sub

```

```

Public Property Get ParameterName() As
String

ParameterName = mstrParameterName

End Property

Public Property Get ParameterId() As Long

ParameterId = mlngParameterId

End Property

Public Property Get NextIdentifier() As Long

Dim lngNextId As Long

On Error GoTo NextIdentifierErr

' First check if the database object is valid
Call CheckDB

' Retrieve the next identifier using the
sequence class
Set mParameterSeq = New cSequence
Set mParameterSeq.IdDatabase =
mdbsStepMaster
mParameterSeq.IdentifierColumn =
FLD_ID_PARAMETER
lngNextId = mParameterSeq.Identifier
Set mParameterSeq = Nothing

NextIdentifier = lngNextId
Exit Property

NextIdentifierErr:
LogErrors Errors
mstrSource = mstrModuleName &
"NextIdentifier"
On Error GoTo 0
Err.Raise vbObjectError + errIdGetFailed, _
mstrSource,
LoadResString(errIdGetFailed)

End Property

Public Property Get IndOperation() As
Operation

IndOperation = mintOperation

End Property

Public Property Get WorkspaceId() As Long

WorkspaceId = mlngWorkspaceId

End Property

Public Property Get ParameterValue() As
String

ParameterValue = mstrParameterValue

End Property

Public Property Get Description() As String

Description = mstrDescription

End Property

Public Property Get ParameterType() As
ParameterType

ParameterType = mintParameterType

End Property

```

```

Private Sub Class_Initialize()

Set mFieldValue = New cStringSM

' Initialize the operation indicator variable to
Query
' It will be modified later by the collection class
when
' inserts, updates or deletes are performed
mintOperation = QueryOp

End Sub

Private Sub Class_Terminate()

Set mdbsStepMaster = Nothing
Set mFieldValue = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cRunCollt"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunCollt.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module implements a stack of
Iterator nodes.
' Ensures that only cRunItNode objects are
stored in the stack.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private Const mstrModuleName As String =
"cRunCollt."
Private mstrSource As String

Private mcIterators As cStack
Public Sub Clear()

mcIterators.Clear

End Sub

Private Sub Class_Initialize()

Set mcIterators = New cStack

End Sub

Private Sub Class_Terminate()

Set mcIterators = Nothing

End Sub

Public Function Value(strITName As String) As
String

Dim lngIndex As Long

```



```

For lngIndex = 0 To mcIterators.Count - 1
    If mcIterators(lngIndex).IteratorName = strName Then
        Value = mcIterators(lngIndex).Value
        Exit For
    End If
Next lngIndex

End Function

Public Property Get Item(ByVal Position As Long) As cRunItNode
Attribute Item.VB_UserMemId = 0

    Set Item = mcIterators(Position)

End Property

Public Function Count() As Long

    Count = mcIterators.Count

End Function

Public Function Pop() As cRunItNode

    Set Pop = mcIterators.Pop

End Function

Public Sub Push(objToPush As cRunItNode)

    Call mcIterators.Push(objToPush)

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
    Persistable = 0 'NotPersistable
    DataBindingBehavior = 0 'vbNone
    DataSourceBehavior = 0 'vbNone
    MTSTransactionMode = 0
'NotAnMTSObject
END
Attribute VB_Name = "cRunInst"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunCollt.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module controls the
run processing. It runs a branch
at a time and raises events when
each step completes execution.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String = "cRunInst."
Private mstrSource As String

```

```

' Local variable(s) to hold property value(s)
Private mstrRootKey As String
Public WspId As Long
Private mcParameters As cArrParameters
Private mcRunSteps As cArrSteps
Private mcRunConstraints As cArrConstraints
Public RunConnDtIs As cConnDtIs
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mcNavSteps As cStepTree

Private mcInstances As cInstances
Private mcFreeSteps As cVectorLng
Private mcFailures As cFailedSteps
Private mblnAsk As Boolean ' Set to True
when the a step with continuation criteria=Ask
fails
Private mblnAbort As Boolean ' Set to True
when the run is aborted
Private msAbortDtIs As String
Private mbarrFree() As Byte
Private WithEvents mcTermSteps As
cTermSteps
Attribute mcTermSteps.VB_VarHelpID = -1
Public RunId As Long
Public CreateInputFiles As Boolean
Private Enum WspLogEvents
    mintRunStart
    mintRunComplete
    mintStepStart
    mintStepComplete
End Enum

Private mcWspLog As cFileSM
Private mstrCurBranchRoot As String
Private mcDummyRootInstance As cInstance
' Key for the dummy root instance - Should be
a key that is invalid for an actual step record
Private Const mstrDummyRootKey As String = "D"
' Public events to notify the calling function of
the
' start and end time for each step
Public Event RunStart(dtmStartTime As
Currency, strWspLog As String)
Public Event RunComplete(dtmEndTime As
Currency)
Public Event StepStart(cStepRecord As cStep,
dtmStartTime As Currency, _
lngInstanceId As Long, lParentInstanceId
As Long, sPath As String, _
sIt As String, sItValue As String)
Public Event StepComplete(cStepRecord As
cStep, dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)
Public Event ProcessStart(cStepRecord As
cStep, strCommand As String, _
dtmStartTime As Currency, lngInstanceId
As Long, lParentInstanceId As Long, _
sItValue As String)
Public Event ProcessComplete(cStepRecord
As cStep, dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)
' The class that will execute each step - we trap
the events
' that are raised by it when a step
starts/completes
' execution
Private WithEvents cExecStep1 As cRunStep
Attribute cExecStep1.VB_VarHelpID = -1
Private WithEvents cExecStep2 As cRunStep
Attribute cExecStep2.VB_VarHelpID = -1
Private WithEvents cExecStep3 As cRunStep

```

```

Attribute cExecStep3.VB_VarHelpID = -1
Private WithEvents cExecStep4 As cRunStep
Attribute cExecStep4.VB_VarHelpID = -1
Private WithEvents cExecStep5 As cRunStep
Attribute cExecStep5.VB_VarHelpID = -1
Private WithEvents cExecStep6 As cRunStep
Attribute cExecStep6.VB_VarHelpID = -1
Private WithEvents cExecStep7 As cRunStep
Attribute cExecStep7.VB_VarHelpID = -1
Private WithEvents cExecStep8 As cRunStep
Attribute cExecStep8.VB_VarHelpID = -1
Private WithEvents cExecStep9 As cRunStep
Attribute cExecStep9.VB_VarHelpID = -1

Private WithEvents cExecStep10 As cRunStep
Attribute cExecStep10.VB_VarHelpID = -1
Private WithEvents cExecStep11 As cRunStep
Attribute cExecStep11.VB_VarHelpID = -1
Private WithEvents cExecStep12 As cRunStep
Attribute cExecStep12.VB_VarHelpID = -1
Private WithEvents cExecStep13 As cRunStep
Attribute cExecStep13.VB_VarHelpID = -1
Private WithEvents cExecStep14 As cRunStep
Attribute cExecStep14.VB_VarHelpID = -1
Private WithEvents cExecStep15 As cRunStep
Attribute cExecStep15.VB_VarHelpID = -1
Private WithEvents cExecStep16 As cRunStep
Attribute cExecStep16.VB_VarHelpID = -1
Private WithEvents cExecStep17 As cRunStep
Attribute cExecStep17.VB_VarHelpID = -1
Private WithEvents cExecStep18 As cRunStep
Attribute cExecStep18.VB_VarHelpID = -1
Private WithEvents cExecStep19 As cRunStep
Attribute cExecStep19.VB_VarHelpID = -1

Private WithEvents cExecStep20 As cRunStep
Attribute cExecStep20.VB_VarHelpID = -1
Private WithEvents cExecStep21 As cRunStep
Attribute cExecStep21.VB_VarHelpID = -1
Private WithEvents cExecStep22 As cRunStep
Attribute cExecStep22.VB_VarHelpID = -1
Private WithEvents cExecStep23 As cRunStep
Attribute cExecStep23.VB_VarHelpID = -1
Private WithEvents cExecStep24 As cRunStep
Attribute cExecStep24.VB_VarHelpID = -1
Private WithEvents cExecStep25 As cRunStep
Attribute cExecStep25.VB_VarHelpID = -1
Private WithEvents cExecStep26 As cRunStep
Attribute cExecStep26.VB_VarHelpID = -1
Private WithEvents cExecStep27 As cRunStep
Attribute cExecStep27.VB_VarHelpID = -1
Private WithEvents cExecStep28 As cRunStep
Attribute cExecStep28.VB_VarHelpID = -1
Private WithEvents cExecStep29 As cRunStep
Attribute cExecStep29.VB_VarHelpID = -1

Private WithEvents cExecStep30 As cRunStep
Attribute cExecStep30.VB_VarHelpID = -1
Private WithEvents cExecStep31 As cRunStep
Attribute cExecStep31.VB_VarHelpID = -1
Private WithEvents cExecStep32 As cRunStep
Attribute cExecStep32.VB_VarHelpID = -1
Private WithEvents cExecStep33 As cRunStep
Attribute cExecStep33.VB_VarHelpID = -1
Private WithEvents cExecStep34 As cRunStep
Attribute cExecStep34.VB_VarHelpID = -1
Private WithEvents cExecStep35 As cRunStep
Attribute cExecStep35.VB_VarHelpID = -1
Private WithEvents cExecStep36 As cRunStep
Attribute cExecStep36.VB_VarHelpID = -1
Private WithEvents cExecStep37 As cRunStep
Attribute cExecStep37.VB_VarHelpID = -1
Private WithEvents cExecStep38 As cRunStep
Attribute cExecStep38.VB_VarHelpID = -1
Private WithEvents cExecStep39 As cRunStep

```



```

cExecStep93 Is Nothing And cExecStep94
Is Nothing And cExecStep95 Is Nothing
And cExecStep96 Is Nothing And
cExecStep97 Is Nothing And cExecStep98
Is Nothing And cExecStep99 Is Nothing
Then
  ' Then...
  WriteToWspLog (mintRunComplete)
  RaiseEvent
RunComplete(Determine64BitTime())
Else
  ' Abort each of the steps that is
currently executing.
  If Not cExecStep1 Is Nothing Then
    cExecStep1.Abort
  End If
  If Not cExecStep2 Is Nothing Then
    cExecStep2.Abort
  End If
  If Not cExecStep3 Is Nothing Then
    cExecStep3.Abort
  End If
  If Not cExecStep4 Is Nothing Then
    cExecStep4.Abort
  End If
  If Not cExecStep5 Is Nothing Then
    cExecStep5.Abort
  End If
  If Not cExecStep6 Is Nothing Then
    cExecStep6.Abort
  End If
  If Not cExecStep7 Is Nothing Then
    cExecStep7.Abort
  End If
  If Not cExecStep8 Is Nothing Then
    cExecStep8.Abort
  End If
  If Not cExecStep9 Is Nothing Then
    cExecStep9.Abort
  End If
  If Not cExecStep10 Is Nothing Then
    cExecStep10.Abort
  End If
  If Not cExecStep11 Is Nothing Then
    cExecStep11.Abort
  End If
  If Not cExecStep12 Is Nothing Then
    cExecStep12.Abort
  End If
  If Not cExecStep13 Is Nothing Then
    cExecStep13.Abort
  End If

  If Not cExecStep14 Is Nothing Then
    cExecStep14.Abort
  End If

  If Not cExecStep15 Is Nothing Then
    cExecStep15.Abort
  End If

  If Not cExecStep16 Is Nothing Then
    cExecStep16.Abort
  End If

  If Not cExecStep17 Is Nothing Then
    cExecStep17.Abort
  End If

  If Not cExecStep18 Is Nothing Then
    cExecStep18.Abort
  End If

  If Not cExecStep19 Is Nothing Then
    cExecStep19.Abort

```

```

End If

If Not cExecStep20 Is Nothing Then
  cExecStep20.Abort
End If

If Not cExecStep21 Is Nothing Then
  cExecStep21.Abort
End If

If Not cExecStep22 Is Nothing Then
  cExecStep22.Abort
End If

If Not cExecStep23 Is Nothing Then
  cExecStep23.Abort
End If

If Not cExecStep24 Is Nothing Then
  cExecStep24.Abort
End If

If Not cExecStep25 Is Nothing Then
  cExecStep25.Abort
End If

If Not cExecStep26 Is Nothing Then
  cExecStep26.Abort
End If

If Not cExecStep27 Is Nothing Then
  cExecStep27.Abort
End If

If Not cExecStep28 Is Nothing Then
  cExecStep28.Abort
End If

If Not cExecStep29 Is Nothing Then
  cExecStep29.Abort
End If

' ===== 30 - 39
=====
If Not cExecStep30 Is Nothing Then
  cExecStep30.Abort
End If

If Not cExecStep31 Is Nothing Then
  cExecStep31.Abort
End If

If Not cExecStep32 Is Nothing Then
  cExecStep32.Abort
End If

If Not cExecStep33 Is Nothing Then
  cExecStep33.Abort
End If

If Not cExecStep34 Is Nothing Then
  cExecStep34.Abort
End If

If Not cExecStep35 Is Nothing Then
  cExecStep35.Abort
End If

If Not cExecStep36 Is Nothing Then
  cExecStep36.Abort
End If

If Not cExecStep37 Is Nothing Then
  cExecStep37.Abort
End If

```

```

If Not cExecStep38 Is Nothing Then
  cExecStep38.Abort
End If

If Not cExecStep39 Is Nothing Then
  cExecStep39.Abort
End If

' ===== 40 - 49
=====
If Not cExecStep40 Is Nothing Then
  cExecStep40.Abort
End If

If Not cExecStep41 Is Nothing Then
  cExecStep41.Abort
End If

If Not cExecStep42 Is Nothing Then
  cExecStep42.Abort
End If

If Not cExecStep43 Is Nothing Then
  cExecStep43.Abort
End If

If Not cExecStep44 Is Nothing Then
  cExecStep44.Abort
End If

If Not cExecStep45 Is Nothing Then
  cExecStep45.Abort
End If

If Not cExecStep46 Is Nothing Then
  cExecStep46.Abort
End If

If Not cExecStep47 Is Nothing Then
  cExecStep47.Abort
End If

If Not cExecStep48 Is Nothing Then
  cExecStep48.Abort
End If

If Not cExecStep49 Is Nothing Then
  cExecStep49.Abort
End If

' ===== 50 - 59
=====
If Not cExecStep50 Is Nothing Then
  cExecStep50.Abort
End If

If Not cExecStep51 Is Nothing Then
  cExecStep51.Abort
End If

If Not cExecStep52 Is Nothing Then
  cExecStep52.Abort
End If

If Not cExecStep53 Is Nothing Then
  cExecStep53.Abort
End If

If Not cExecStep54 Is Nothing Then
  cExecStep54.Abort
End If

If Not cExecStep55 Is Nothing Then
  cExecStep55.Abort

```

```

End If

If Not cExecStep56 Is Nothing Then
  cExecStep56.Abort
End If

If Not cExecStep57 Is Nothing Then
  cExecStep57.Abort
End If

If Not cExecStep58 Is Nothing Then
  cExecStep58.Abort
End If

If Not cExecStep59 Is Nothing Then
  cExecStep59.Abort
End If

' ===== 60 - 69
=====
If Not cExecStep60 Is Nothing Then
  cExecStep60.Abort
End If

If Not cExecStep61 Is Nothing Then
  cExecStep61.Abort
End If

If Not cExecStep62 Is Nothing Then
  cExecStep62.Abort
End If

If Not cExecStep63 Is Nothing Then
  cExecStep63.Abort
End If

If Not cExecStep64 Is Nothing Then
  cExecStep64.Abort
End If

If Not cExecStep65 Is Nothing Then
  cExecStep65.Abort
End If

If Not cExecStep66 Is Nothing Then
  cExecStep66.Abort
End If

If Not cExecStep67 Is Nothing Then
  cExecStep67.Abort
End If

If Not cExecStep68 Is Nothing Then
  cExecStep68.Abort
End If

If Not cExecStep69 Is Nothing Then
  cExecStep69.Abort
End If

' ===== 70 - 79
=====
If Not cExecStep70 Is Nothing Then
  cExecStep70.Abort
End If

If Not cExecStep71 Is Nothing Then
  cExecStep71.Abort
End If

If Not cExecStep72 Is Nothing Then
  cExecStep72.Abort
End If

If Not cExecStep73 Is Nothing Then

```

```

  cExecStep73.Abort
End If

If Not cExecStep74 Is Nothing Then
  cExecStep74.Abort
End If

If Not cExecStep75 Is Nothing Then
  cExecStep75.Abort
End If

If Not cExecStep76 Is Nothing Then
  cExecStep76.Abort
End If

If Not cExecStep77 Is Nothing Then
  cExecStep77.Abort
End If

If Not cExecStep78 Is Nothing Then
  cExecStep78.Abort
End If

If Not cExecStep79 Is Nothing Then
  cExecStep79.Abort
End If

' ===== 80 - 89
=====
If Not cExecStep80 Is Nothing Then
  cExecStep80.Abort
End If

If Not cExecStep81 Is Nothing Then
  cExecStep81.Abort
End If

If Not cExecStep82 Is Nothing Then
  cExecStep82.Abort
End If

If Not cExecStep83 Is Nothing Then
  cExecStep83.Abort
End If

If Not cExecStep84 Is Nothing Then
  cExecStep84.Abort
End If

If Not cExecStep85 Is Nothing Then
  cExecStep85.Abort
End If

If Not cExecStep86 Is Nothing Then
  cExecStep86.Abort
End If

If Not cExecStep87 Is Nothing Then
  cExecStep87.Abort
End If

If Not cExecStep88 Is Nothing Then
  cExecStep88.Abort
End If

If Not cExecStep89 Is Nothing Then
  cExecStep89.Abort
End If

' ===== 90 - 99
=====
If Not cExecStep90 Is Nothing Then
  cExecStep90.Abort
End If

```

```

If Not cExecStep91 Is Nothing Then
  cExecStep91.Abort
End If

If Not cExecStep92 Is Nothing Then
  cExecStep92.Abort
End If

If Not cExecStep93 Is Nothing Then
  cExecStep93.Abort
End If

If Not cExecStep94 Is Nothing Then
  cExecStep94.Abort
End If

If Not cExecStep95 Is Nothing Then
  cExecStep95.Abort
End If

If Not cExecStep96 Is Nothing Then
  cExecStep96.Abort
End If

If Not cExecStep97 Is Nothing Then
  cExecStep97.Abort
End If

If Not cExecStep98 Is Nothing Then
  cExecStep98.Abort
End If

If Not cExecStep99 Is Nothing Then
  cExecStep99.Abort
End If

End If

Exit Sub

AbortErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  ShowError errAbortFailed
  ' Try to abort the remaining steps, if any
  Resume Next

End Sub
Public Sub AbortSiblings(cTermInstance As cInstance)

  On Error GoTo AbortSiblingsErr

  ' Abort each of the steps that is currently
  executing.
  If Not cExecStep1 Is Nothing Then
    If cExecStep1.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep1.Abort
    End If
  End If

  If Not cExecStep2 Is Nothing Then
    If cExecStep2.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep2.Abort
    End If
  End If

  If Not cExecStep3 Is Nothing Then
    If cExecStep3.ExecuteStep.ParentStepId =
    cTermInstance.Step.ParentStepId Then
      cExecStep3.Abort
    End If
  End If

```



```

End If

If Not cExecStep95 Is Nothing Then
  If
cExecStep95.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
    cExecStep95.Abort
  End If
End If

If Not cExecStep96 Is Nothing Then
  If
cExecStep96.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
    cExecStep96.Abort
  End If
End If

If Not cExecStep97 Is Nothing Then
  If
cExecStep97.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
    cExecStep97.Abort
  End If
End If

If Not cExecStep98 Is Nothing Then
  If
cExecStep98.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
    cExecStep98.Abort
  End If
End If

If Not cExecStep99 Is Nothing Then
  If
cExecStep99.ExecuteStep.ParentStepId =
cTermInstance.Step.ParentStepId Then
    cExecStep99.Abort
  End If
End If

Exit Sub

AbortSiblingsErr:
  Call LogErrors(Errors)
  On Error GoTo 0
  ShowError errAbortFailed
  ' Try to abort the remaining steps, if any
  Resume Next

End Sub
Private Sub ExecutionFailed(cTermStep As
cRunStep)
  ' Called when execution of a step fails for
any reason - ensure that execution
  ' continues

  On Error GoTo ExecutionFailedErr

  Call AddFreeProcess(cTermStep.Index)

  Call RunBranch(mstrCurBranchRoot)

Exit Sub

ExecutionFailedErr:
  ' Log the error code raised by Visual
Basic - do not raise an error here!
  Call LogErrors(Errors)

End Sub
Private Sub FreeExecStep(lngIndex As
Long)

```

```

' Frees an instance of a cExecuteSM object
depending on the index
On Error GoTo FreeExecStepErr

Select Case lngIndex + 1
  Case 1
    Set cExecStep1 = Nothing
  Case 2
    Set cExecStep2 = Nothing
  Case 3
    Set cExecStep3 = Nothing
  Case 4
    Set cExecStep4 = Nothing
  Case 5
    Set cExecStep5 = Nothing
  Case 6
    Set cExecStep6 = Nothing
  Case 7
    Set cExecStep7 = Nothing
  Case 8
    Set cExecStep8 = Nothing
  Case 9
    Set cExecStep9 = Nothing
  Case 10
    Set cExecStep10 = Nothing
  Case 11
    Set cExecStep11 = Nothing
  Case 12
    Set cExecStep12 = Nothing
  Case 13
    Set cExecStep13 = Nothing
  Case 14
    Set cExecStep14 = Nothing
  Case 15
    Set cExecStep15 = Nothing
  Case 16
    Set cExecStep16 = Nothing
  Case 17
    Set cExecStep17 = Nothing
  Case 18
    Set cExecStep18 = Nothing
  Case 19
    Set cExecStep19 = Nothing
  Case 20
    Set cExecStep20 = Nothing
  Case 21
    Set cExecStep21 = Nothing
  Case 22
    Set cExecStep22 = Nothing
  Case 23
    Set cExecStep23 = Nothing
  Case 24
    Set cExecStep24 = Nothing
  Case 25
    Set cExecStep25 = Nothing
  Case 26
    Set cExecStep26 = Nothing
  Case 27
    Set cExecStep27 = Nothing
  Case 28
    Set cExecStep28 = Nothing
  Case 29
    Set cExecStep29 = Nothing
  Case 30
    Set cExecStep30 = Nothing
  Case 31
    Set cExecStep31 = Nothing
  Case 32
    Set cExecStep32 = Nothing
  Case 33
    Set cExecStep33 = Nothing
  Case 34
    Set cExecStep34 = Nothing
  Case 35
    Set cExecStep35 = Nothing

```

```

Case 36
  Set cExecStep36 = Nothing
Case 37
  Set cExecStep37 = Nothing
Case 38
  Set cExecStep38 = Nothing
Case 39
  Set cExecStep39 = Nothing
Case 40
  Set cExecStep40 = Nothing
Case 41
  Set cExecStep41 = Nothing
Case 42
  Set cExecStep42 = Nothing
Case 43
  Set cExecStep43 = Nothing
Case 44
  Set cExecStep44 = Nothing
Case 45
  Set cExecStep45 = Nothing
Case 46
  Set cExecStep46 = Nothing
Case 47
  Set cExecStep47 = Nothing
Case 48
  Set cExecStep48 = Nothing
Case 49
  Set cExecStep49 = Nothing
Case 50
  Set cExecStep50 = Nothing
Case 51
  Set cExecStep51 = Nothing
Case 52
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Case 53
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Case 54
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Case 55
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Case 56
  Set cExecStep56 = Nothing
Case 57
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Case 58
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Case 59
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Case 60
  Set cExecStep60 = Nothing
Case 61
  Set cExecStep61 = Nothing
Case 62
  Set cExecStep62 = Nothing
Case 63
  Set cExecStep63 = Nothing
Case 64
  Set cExecStep64 = Nothing
Case 65
  Set cExecStep65 = Nothing
Case 66
  Set cExecStep66 = Nothing
Case 67
  Set cExecStep67 = Nothing
Case 68
  Set cExecStep68 = Nothing
Case 69
  Set cExecStep69 = Nothing
Case 70
  Set cExecStep70 = Nothing
Case 71
  Set cExecStep71 = Nothing
Case 72
  Set cExecStep72 = Nothing
Case 73

```



```

Set cExecStep73 = Nothing
Case 74
Set cExecStep74 = Nothing
Case 75
Set cExecStep75 = Nothing
Case 76
Set cExecStep76 = Nothing
Case 77
Set cExecStep77 = Nothing
Case 78
Set cExecStep78 = Nothing
Case 79
Set cExecStep79 = Nothing
Case 80
Set cExecStep80 = Nothing
Case 81
Set cExecStep81 = Nothing
Case 82
Set cExecStep82 = Nothing
Case 83
Set cExecStep83 = Nothing
Case 84
Set cExecStep84 = Nothing
Case 85
Set cExecStep85 = Nothing
Case 86
Set cExecStep86 = Nothing
Case 87
Set cExecStep87 = Nothing
Case 88
Set cExecStep88 = Nothing
Case 89
Set cExecStep89 = Nothing
Case 90
Set cExecStep90 = Nothing
Case 91
Set cExecStep91 = Nothing
Case 92
Set cExecStep92 = Nothing
Case 93
Set cExecStep93 = Nothing
Case 94
Set cExecStep94 = Nothing
Case 95
Set cExecStep95 = Nothing
Case 96
Set cExecStep96 = Nothing
Case 97
Set cExecStep97 = Nothing
Case 98
Set cExecStep98 = Nothing
Case 99
Set cExecStep99 = Nothing
Case Else
BugAssert False, "FreeExecStep:
Invalid index value!"
End Select

Exit Sub

FreeExecStepErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)

End Sub
Private Sub ProcessAskFailures()
' This procedure is called when a step
with a continuation criteria = Ask has failed.
' Wait for all running processes to
complete before displaying an
Abort/Retry/Fail
' message to the user. We process every
Ask step that has failed and use a simple
' algorithm to determine what to do next.

```

```

' 1. An abort response to any failure results
in an immediate abort of the run
' 2. A continue means the run continues - this
failure is popped off the failure list.
' 3. A retry means that the execution details
for the instance are cleared and the
' step is re-executed.
Dim IIndex As Long
Dim cStepRec As cStep
Dim cNextInst As cInstance
Dim cFailureRec As cFailedStep

On Error GoTo ProcessAskFailuresErr

' Display a popup message for all steps that
have failed with a continuation
' criteria of Ask
For IIndex = mcFailures.Count - 1 To 0 Step
-1

Set cFailureRec = mcFailures(IIndex)

If cFailureRec.ContCriteria =
gintOnFailureAsk Then
Set cStepRec =
mcRunSteps.QueryStep(cFailureRec.StepId)
' Ask the user whether to
abort/retry/continue
#If RUN_ONLY Then
cFailureRec.AskResponse =
ShowMessageBox(0, _
"Step " &
GetStepNodeText(cStepRec) & " failed. " & _
"Select Abort to abort run and
Ignore to continue. " & _
"Select Retry to re-execute the
failed step.", _
"Step Failure", _
MB_ABORTRETRYIGNORE
+ MB_APPLMODAL +
MB_ICONEXCLAMATION)
#Else
cFailureRec.AskResponse =
ShowMessageBox(frmRunning.hWnd, _
"Step " &
GetStepNodeText(cStepRec) & " failed. " & _
"Select Abort to abort run and
Ignore to continue. " & _
"Select Retry to re-execute the
failed step.", _
"Step Failure", _
MB_ABORTRETRYIGNORE
+ MB_APPLMODAL +
MB_ICONEXCLAMATION)
#End If

' Process an abort response immediately
If cFailureRec.AskResponse =
IDABORT Then
mblnAbort = True
Set cNextInst =
mcInstances.QueryInstance(cFailureRec.Instan
ceId)
Call RunPendingSiblings(cNextInst,
cFailureRec.EndTime)
Exit For
End If
End If

Next IIndex

' Process all failed steps for which we have
Ignore and Retry responses.
If Not mblnAbort Then

```

```

' Navigate in reverse order since we'll be
deleting items from the collection
For IIndex = mcFailures.Count - 1 To 0 Step -1
If mcFailures(IIndex).ContCriteria =
gintOnFailureAsk Then
mblnAsk = False
Set cFailureRec =
mcFailures.Delete(IIndex)

Select Case cFailureRec.AskResponse
Case IDABORT
BugAssert True

Case IDRETRY
' Delete all instances for the failed
step and re-try
' Returns a parent instance reference
Set cNextInst =
ProcessRetryStep(cFailureRec)
Call
RunPendingStepInBranch(mstrCurBranchRoot,
cNextInst)

Case IDIGNORE
Set cNextInst =
mcInstances.QueryInstance(cFailureRec.InstanceId)
Call RunPendingSiblings(cNextInst,
cFailureRec.EndTime)

End Select
End If
Next IIndex
End If

Exit Sub

ProcessAskFailuresErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrModuleName, _
LoadResString(errExecuteBranchFailed)

End Sub
Private Function ProcessRetryStep(cFailureRec As
cFailedStep) As cInstance
' This procedure is called when a step with a
continuation criteria = Ask has failed
' and the user wants to re-execute the step.
' We delete all existing instances for the step and
reset the iterator, if
' any on the parent instance - this way we ensure
that the step will be executed
' in the next pass.
Dim IIndex As Long
Dim cParentInstance As cInstance
Dim cSubStepRec As cSubStep
Dim cStepRec As cStep

On Error GoTo ProcessRetryStepErr

' Navigate in reverse order since we'll be deleting
items from the collection
For IIndex = mcInstances.Count - 1 To 0 Step -1

If mcInstances(IIndex).Step.StepId =
cFailureRec.StepId Then
Set cParentInstance =
mcInstances.QueryInstance(mcInstances(IIndex).Pa
rentInstanceId)
Set cSubStepRec =
cParentInstance.QuerySubStep(cFailureRec.StepId)
Set cStepRec =
mcRunSteps.QueryStep(cFailureRec.StepId)

```

```

    ' Decrement the child count on the
parent instance and reset the
    ' step iterators on the sub-step record,
if any -
    ' all the iterations of the step will be
re-executed.
    cParentInstance.ChildDeleted
cFailureRec.StepId
    cParentInstance.AllComplete = False
    cParentInstance.AllStarted = False

    cSubStepRec.InitializeIt cStepRec,
mcParameters

    ' Now delete the current instance
Set ProcessRetryStep =
mcInstances.Delete(IIndex)
End If
Next IIndex

Exit Function

ProcessRetryStepErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrModuleName,
-
LoadResString(errExecuteBranchFailed)

End Function

Private Sub RunNextStep(ByVal
dtmCompleteTime As Currency, ByVal
lngIndex As Long, _
ByVal InstanceId As Long, ByVal
ExecutionStatus As InstanceStatus)
' Checks if there are any steps remaining
to be
' executed in the current branch. If so, it
executes
' the step.
Dim cTermInstance As cInstance
Dim cFailure As cFailedStep

On Error GoTo RunNextStepErr

BugMessage "RunNextStep: cExecStep"
& CStr(lngIndex + 1) & " has completed."

Call mcTermSteps.Delete
Call FreeExecStep(lngIndex)

' Call a procedure to add the freed up
object to the list
Call AddFreeProcess(lngIndex)

Set cTermInstance =
mcInstances.QueryInstance(InstanceId)
cTermInstance.Status = ExecutionStatus

If ExecutionStatus = gintFailed Then
If
cTermInstance.Step.ContinuationCriteria =
gintOnFailureAbortSiblings Then
Call AbortSiblings(cTermInstance)
End If

If Not
mcFailures.StepFailed(cTermInstance.Step.
StepId) Then
Set cFailure = New cFailedStep

```

```

    cFailure.InstanceId =
cTermInstance.InstanceId
    cFailure.StepId =
cTermInstance.Step.StepId
    cFailure.ParentStepId =
cTermInstance.Step.ParentStepId
    cFailure.ContCriteria =
cTermInstance.Step.ContinuationCriteria
    cFailure.EndTime = dtmCompleteTime
    mcFailures.Add cFailure
Set cFailure = Nothing
End If
End If

If ExecutionStatus = gintFailed And
cTermInstance.Step.ContinuationCriteria =
gintOnFailureAbort Then
If StringEmpty(msAbortDtls) Then
' Initialize the abort message
msAbortDtls = "Step " &
GetStepNodeText(cTermInstance.Step) & "
failed." & _
"Aborting execution. Please check
the error file for details."
End If
Call Abort
ElseIf ExecutionStatus = gintFailed And
cTermInstance.Step.ContinuationCriteria =
gintOnFailureAsk Then
mblnAsk = True

' If the step failed due to a Cancel
operation (Abort), abort the run
If mblnAbort Then
Call
RunPendingSiblings(cTermInstance,
dtmCompleteTime)
End If
Else
Call RunPendingSiblings(cTermInstance,
dtmCompleteTime)
End If

If mblnAbort Then
If Not AnyStepRunning(mcFreeSteps,
mbarrFree) And Not
StringEmpty(msAbortDtls) Then
' Display an error only if the abort is
due to a failure
' We had to abort since a step failed -
since no other steps are currently
' running, we can display a message to
the user saying that we had to abort
#If RUN_ONLY Then
Call ShowMessageBox(0,
msAbortDtls, "Run Aborted", _
MB_APPLMODAL + MB_OK
+ MB_ICONEXCLAMATION)
#Else
Call
ShowMessageBox(frmRunning.hWnd,
msAbortDtls, "Run Aborted", _
MB_APPLMODAL + MB_OK
+ MB_ICONEXCLAMATION)
#End If
' MsgBox msAbortDtls, vbOKOnly,
"Run Aborted"
End If
ElseIf mblnAsk Then
If Not AnyStepRunning(mcFreeSteps,
mbarrFree) Then
' Ask the user whether to
abort/retry/ignore failed steps
Call ProcessAskFailures
End If

```

```

End If

Exit Sub

RunNextStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errExecuteBranchFailed, mstrSource
Call ResetForm(lngIndex)

End Sub
Public Sub StopRun()

' Setting the Abort flag to True will ensure that
we
' don't execute any more steps
mblnAbort = True

End Sub

Private Sub CreateDummyInstance(strRootKey As
String)

Dim cNewInstance As cInstance
Dim cSubStepDtls As cStep
Dim lngSubStepId As Long

On Error GoTo CreateDummyInstanceErr

' Create a new instance of the step
' initialize substeps for the step
Set cNewInstance = New cInstance

' There can be multiple iterations of the top level
nodes
' running at the same time, but only one branch at
any
' time - so enforce a degree of parallelism of 1 on
this
' node!
Set cNewInstance.Step = New cStep
cNewInstance.DegreeParallelism = 1
cNewInstance.Key = mstrDummyRootKey

cNewInstance.InstanceId = NewInstanceId
cNewInstance.ParentInstanceId = 0

lngSubStepId =
MakeIdentifierValid(strRootKey)

Set cSubStepDtls =
mcRunSteps.QueryStep(lngSubStepId)
If cSubStepDtls.EnabledFlag Then
' Create a child node for the step corresponding
to
' the root node of the branch being currently
executed,
' only if it has been enabled
Call
cNewInstance.CreateSubStep(cSubStepDtls,
mcParameters)
End If

mcInstances.Add cNewInstance
Set cNewInstance.Iterators =
DetermineIterators(cNewInstance)

' Set a reference to the newly created dummy
instance
Set mcDummyRootInstance = cNewInstance

Set cNewInstance = Nothing

Exit Sub

```

```

CreateDummyInstanceErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"CreateDummyInstance"
Err.Raise vbObjectError +
errCreateInstanceFailed, _
mstrSource,
LoadResString(errCreateInstanceFailed)

End Sub
Private Function CreateInstance(cExecStep
As cStep, _
cParentInstance As cInstance) As
cInstance
' Creates a new instance of the passed in
step. Returns
' a reference to the newly created instance
object.

Dim cNewInstance As cInstance
Dim nodChild As cStep
Dim lngSubStepId As Long

On Error GoTo CreateInstanceErr

' Create a new instance of the step
' initialize substeps for the step
Set cNewInstance = New cInstance
Set cNewInstance.Step = cExecStep
cNewInstance.Key =
MakeKeyValid(cExecStep.StepId,
cExecStep.StepType)
cNewInstance.ParentInstanceId =
cParentInstance.InstanceId
cNewInstance.InstanceId =
NewInstanceId
' Validate the degree of parallelism field
before assigning it to the instance -
' (the parameter value might have been set
to an invalid value at runtime)
Call
ValidateParallelism(cExecStep.DegreeParall
elism, _
cExecStep.WorkspaceId,
ParamsInWsp:=mcParameters)
cNewInstance.DegreeParallelism =
SubstituteParameters(cExecStep.DegreePara
llemism, _
cExecStep.WorkspaceId,
WspParameters:=mcParameters)

If
mcNavSteps.HasChild(StepKey:=cNewInsta
nce.Key) Then
Set nodChild =
mcNavSteps.ChildStep(StepKey:=cNewInst
ance.Key)
Do
If nodChild.EnabledFlag Then
' Create nodes for all it's substeps
only
' if the substeps have been enabled
Call
cNewInstance.CreateSubStep(nodChild,
mcParameters)
End If

Set nodChild =
mcNavSteps.NextStep(StepId:=nodChild.St
epId)
Loop While (Not nodChild Is Nothing)
End If

```

```

mcInstances.Add cNewInstance
Set cNewInstance.Iterators =
DetermineIterators(cNewInstance)

' Increment the number of executing steps on
the parent
cParentInstance.ChildExecuted
(cExecStep.StepId)

Set CreateInstance = cNewInstance

Exit Function

CreateInstanceErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"CreateInstance"
Err.Raise vbObjectError +
errCreateInstanceFailed, _
mstrSource,
LoadResString(errCreateInstanceFailed)

End Function
Private Function
DetermineIterators(cInstanceRec As cInstance)
As cRunCollt
' Returns a collection of all the iterator
values for this
' instance - since an iterator that is defined at
a
' particular level can be used in all it's
substeps, we
' need to navigate the step tree all the way to
the root

Dim cRunIts As cRunCollt
Dim cRunIt As cRunItNode
Dim cStepIt As cIterator
Dim cParentInst As cInstance
Dim cSubStepRec As cSubStep
Dim cSubStepDtls As cStep
Dim lngSubStepId As Long
Dim lngIndex As Long

On Error GoTo DetermineIteratorsErr

Set cRunIts = New cRunCollt

If cInstanceRec.ParentInstanceId > 0 Then
' The last iterator for an instance of a step
is stored
' on it's parent! So navigate up before
beginning the
' search for iterator values.
Set cParentInst =
mcInstances.QueryInstance(cInstanceRec.Pare
ntInstanceId)

' Get the sub-step record for the current
step
' on it's parent's instance!
lngSubStepId = cInstanceRec.Step.StepId
Set cSubStepRec =
cParentInst.QuerySubStep(lngSubStepId)
Set cSubStepDtls =
mcRunSteps.QueryStep(lngSubStepId)

' And determine the next iteration value
for the
' substep in this instance
Set cStepIt =
cSubStepRec.NewIteration(cSubStepDtls)

```

```

If Not cStepIt Is Nothing Then
' Add the iterator details to the collection
since
' an iterator has been defined for the step
Set cRunIt = New cRunItNode
cRunIt.IteratorName =
cSubStepDtls.IteratorName
cRunIt.Value =
SubstituteParameters(cStepIt.Value,
cSubStepDtls.WorkspaceId,
WspParameters:=mcParameters)
cRunIt.StepId = cSubStepRec.StepId
cRunIts.Push cRunIt
End If

' Since the parent instance has all the iterators
upto
' that level, read them and push them on to the
stack for
' this instance
For lngIndex = 0 To
cParentInst.Iterators.Count - 1
Set cRunIt = cParentInst.Iterators(lngIndex)
cRunIts.Push cRunIt
Next lngIndex
End If

Set DetermineIterators = cRunIts

Exit Function

DetermineIteratorsErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"DetermineIterators"
Err.Raise vbObjectError +
errExecInstanceFailed, _
mstrSource,
LoadResString(errExecInstanceFailed)

End Function
Private Function
DetermineConstraints(cInstanceRec As cInstance, _
intConsType As ConstraintType) As Variant
' Returns a collection of all the constraints for this
' instance of the passed in type - all the
constraints defined
' for the manager are executed first, followed by
those defined
' for the step. If a step has an iterator defined for
it, each
' constraint is executed only once.

Dim cParentInst As cInstance
Dim cTempInst As cInstance
Dim vntConstraints As Variant
Dim vntTempCons As Variant
Dim cColConstraints() As Variant
Dim lngConsCount As Long

On Error GoTo DetermineConstraintsErr

Set cTempInst = cInstanceRec
lngConsCount = 0

' Go all the way to the root
Do
If cTempInst.ParentInstanceId > 0 Then
Set cParentInst =
mcInstances.QueryInstance(cTempInst.ParentInstan
ceId)
Else

```

```

        Set cParentInst = Nothing
    End If

    ' Check if the step has an iterator
    defined for it
    If
    cTempInst.ValidForIteration(cParentInst,
    intConsType) Then
        vntTempCons =
    mcRunConstraints.ConstraintsForStep(_
        cTempInst.Step.StepId,
    cTempInst.Step.VersionNo, _
        intConsType, blnSort:=True, _
        blnGlobal:=False,
    blnGlobalConstraintsOnly:=False)

        If Not IsEmpty(vntTempCons) Then
            ReDim Preserve
    cColConstraints(IngConsCount)
            cColConstraints(IngConsCount) =
    vntTempCons
            IngConsCount = IngConsCount +
    1
        End If
    End If

    Set cTempInst = cParentInst

    Loop While Not cTempInst Is Nothing

    If IngConsCount > 0 Then
        vntTempCons =
    OrderConstraints(cColConstraints,
    intConsType)
    End If

    DetermineConstraints = vntTempCons

    Exit Function

DetermineConstraintsErr:
    ' Log the error code raised by Visual
    Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
    "DetermineConstraints"
    Err.Raise vbObjectError +
    errExecInstanceFailed, _
        mstrSource,
    LoadResString(errExecInstanceFailed)

    End Function
    Private Function
    GetInstanceToExecute(cParentNode As
    cInstance, _
        cSubStepRec As cSubStep, _
        cSubStepDtIs As cStep) As cInstance

        Dim cSubStepInst As cInstance

        On Error GoTo GetInstanceToExecuteErr

        BugAssert Not (cParentNode Is Nothing
    Or _
        cSubStepRec Is Nothing Or _
        cSubStepDtIs Is Nothing), _
            "GetInstanceToExecute: Input
    invalid"

        ' Check if it has iterators
        If cSubStepDtIs.IteratorCount = 0 Then
            ' Check if the step has been executed
            If cSubStepRec.TasksRunning = 0 And
    cSubStepRec.TasksComplete = 0 And _

```

```

        Not
    mcInstances.CompletedInstanceExists(cParent
    Node.InstanceId, cSubStepDtIs) Then
        ' The sub-step hasn't been executed yet.
        ' Create an instance for it and exit
        Set cSubStepInst =
    CreateInstance(cSubStepDtIs, cParentNode)
        Else
            Set cSubStepInst = Nothing
        End If
        Else
            ' Check if there are pending iterations for
    the sub-step
            If Not
    cSubStepRec.NextIteration(cSubStepDtIs) Is
    Nothing Then
                ' Pending iterations exist - create an
    instance for the sub-step and exit
                Set cSubStepInst =
    CreateInstance(cSubStepDtIs, cParentNode)
            Else
                ' No more iterations - continue with the
    next substep
                Set cSubStepInst = Nothing
            End If
        End If

        Set GetInstanceToExecute = cSubStepInst
        Exit Function

GetInstanceToExecuteErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
    "GetInstanceToExecute"
    Err.Raise vbObjectError +
    errNavInstancesFailed, _
        mstrSource,
    LoadResString(errNavInstancesFailed)

    End Function

Public Function InstancesForStep(IngStepId
    As Long, ByRef StepStatus As InstanceStatus)
    As cInstances
    ' Returns an array of all the instances for a
    step
    Dim lngIndex As Long
    Dim cTempInst As cInstance
    Dim cStepInstances As cInstances
    Dim cStepRec As cStep

    On Error GoTo InstancesForStepErr

    Set cStepInstances = New cInstances

    For lngIndex = 0 To mcInstances.Count - 1
        Set cTempInst = mcInstances(lngIndex)

        If cTempInst.Step.StepId = IngStepId
    Then
            cStepInstances.Add cTempInst
        End If
    Next lngIndex

    If cStepInstances.Count = 0 Then
        Set cStepRec =
    mcRunSteps.QueryStep(IngStepId)
        If Not
    mcFailures.ExecuteSubStep(cStepRec.ParentSt
    epld) Then
            StepStatus = gintAborted
        End If
        Set cStepRec = Nothing
    End Function

```

```

    End If

    ' Set the return value of the function to the array
    of
    ' constraints that has been built above
    Set InstancesForStep = cStepInstances

    Set cStepInstances = Nothing
    Exit Function

InstancesForStepErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
    "InstancesForStep"
    Err.Raise vbObjectError +
    errNavInstancesFailed, mstrSource, _
        LoadResString(errNavInstancesFailed)

    End Function
    Private Sub
    RemoveFreeProcess(IngRunningProcess As Long)
        ' Removes the passed in element from the
    collection of
        ' free objects

        ' Confirm that the last element in the array is the
    one
        ' we need to delete
        If mcFreeSteps(mcFreeSteps.Count - 1) =
    IngRunningProcess Then
            mcFreeSteps.Delete
    Position:=mcFreeSteps.Count - 1
        Else
            ' Ask the class to find the element and delete it
            mcFreeSteps.Delete Item:=IngRunningProcess
        End If

    End Sub
    Private Sub AddFreeProcess(IngTerminatedProcess
    As Long)
        ' Adds the passed in element to the collection of
        ' free objects

        mcFreeSteps.Add IngTerminatedProcess

    End Sub
    Private Sub ResetForm(Optional ByVal lngIndex
    As Long)

        Dim lngTemp As Long

        On Error GoTo ResetFormErr

        ' Check if there are any running instances to wait
    for
        If mcFreeSteps.Count <>
    glngNumConcurrentProcesses Then

            For lngTemp = 0 To mcFreeSteps.Count - 1
                If mcFreeSteps(lngTemp) = lngIndex Then
                    Exit For
                End If
            Next lngTemp

            If lngTemp <= mcFreeSteps.Count - 1 Then
                ' This process that just completed did not
    exist in the list of
                ' free processes
                Call AddFreeProcess(lngIndex)
            End If
        End Function

```

```

    If Not AnyStepRunning(mcFreeSteps,
mbarFree) Then
        WriteToWspLog
(mintRunComplete)
        ' All steps are complete
        RaiseEvent
RunComplete(Determine64BitTime())
    End If
    Else
        WriteToWspLog (mintRunComplete)
        RaiseEvent
RunComplete(Determine64BitTime())
    End If

    Exit Sub

ResetFormErr:

End Sub
Private Function NewInstanceId() As Long
    ' Will return new instance id's - uses a
static counter
    ' that it increments each time
    Static lngInstance As Long

    lngInstance = lngInstance + 1
    NewInstanceId = lngInstance

End Function

Private Function
RunPendingStepInBranch(strCurBranchRo
t As String, _
    Optional cExecInstance As cInstance =
Nothing) As cInstance
    ' Runs a worker step in the branch being
executed, if
    ' there are any pending execution
    ' This function is also called when a step
has just completed
    ' execution - in which case the terminated
instance is
    ' passed in as the optional parameter.
When that happens,
    ' we first try to execute the siblings of the
terminated
    ' step if any are pending execution.
    ' If the terminated instance has not been
passed in, we
    ' start with the dummy root instance and
navigate down,
    ' trying to find a pending worker step.

    Dim cExecSubStep As cStep
    Dim cParentInstance As cInstance
    Dim cNextInst As cInstance

    On Error GoTo
RunPendingStepInBranchErr

    If Not cExecInstance Is Nothing Then
        ' Called when an instance has
terminated
        ' When a worker step terminates, then
we need to
        ' decrement the number of running
steps on it's
        ' manager
        Set cParentInstance = _

mcInstances.QueryInstance(cExecInstance.P
arentInstanceId)

    Else

```

```

    If StringEmpty(strCurBranchRoot) Or
mcDummyRootInstance Is Nothing Then
        ' Run complete - event raised by Run
method
        Set RunPendingStepInBranch =
Nothing
        Exit Function
    End If

    ' If there are no pending steps on the root
instance,
    ' then there are no steps within the branch
that need
    ' to be executed
    If mcDummyRootInstance.AllComplete
Or mcDummyRootInstance.AllStarted Then
        Set RunPendingStepInBranch =
Nothing
        Exit Function
    End If

    Set cParentInstance =
mcDummyRootInstance
    End If

    Do
        Set cNextInst =
GetSubStepToExecute(cParentInstance)
        If cNextInst Is Nothing Then
            ' There are no steps within the branch
that can
            ' be executed - If we are at the dummy
instance,
            ' this branch has completed executing
            If cParentInstance.Key =
mstrDummyRootKey Then
                Set cNextInst = Nothing
                Exit Do
            Else
                ' Go to the parent instance and try to
find
                ' some other sibling is pending
execution
                Set cNextInst =
mcInstances.QueryInstance(cParentInstance.Pa
rentInstanceId)

                If cParentInstance.SubSteps.Count =
0 Then
                    cNextInst.ChildTerminated
cParentInstance.Step.StepId
                End If
            End If
        End If

        BugAssert Not cNextInst Is Nothing
        Set cParentInstance = cNextInst

        Loop While cNextInst.Step.StepType <>
gintWorkerStep

    If Not cNextInst Is Nothing Then
        Call ExecuteStep(cNextInst)
    End If

    Set RunPendingStepInBranch = cNextInst

    Exit Function

RunPendingStepInBranchErr:
    ' Log the error code raised by Visual Basic
Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errNavInstancesFailed, _

```

```

        mstrModuleName &
"RunPendingStepInBranch",
LoadResString(errNavInstancesFailed)

End Function
Private Function
RunPendingSibling(cTermInstance As cInstance, _
    dtmCompleteTime As Currency) As cInstance
    ' This process is called when a step terminates.
Tries to
    ' run a sibling of the terminated step, if one is
pending
    ' execution.

    Dim cParentInstance As cInstance
    Dim cNextInst As cInstance

    On Error GoTo RunPendingSiblingErr

    If StringEmpty(mstrCurBranchRoot) Or
mcDummyRootInstance Is Nothing Then
        ' Run complete - event raised by Run method
        Set RunPendingSibling = Nothing
        Exit Function
    End If

    BugAssert cTermInstance.ParentInstanceId > 0,
"Orphaned instance in array!"

    ' When a worker step terminates, then we need to
decrement the number of running steps on it's
manager
    Set cParentInstance =
mcInstances.QueryInstance(cTermInstance.ParentI
nstanceId)

    ' Decrement the number of running processes on
the
    ' parent by 1
    Call
cParentInstance.ChildTerminated(cTermInstance.St
ep.StepId)

    ' The first step that terminates has to be a worker
    ' If it is complete, update the completed steps on
the
    ' parent by 1.
    Call
cParentInstance.ChildCompleted(cTermInstance.St
ep.StepId)
    cParentInstance.AllStarted = False

    Do
        Set cNextInst =
GetSubStepToExecute(cParentInstance,
dtmCompleteTime)
        If cNextInst Is Nothing Then
            If cParentInstance.Key =
mstrDummyRootKey Then
                Set cNextInst = Nothing
                Exit Do
            Else
                ' Go to the parent instance and try to find
                ' some other sibling is pending execution
                Set cNextInst =
mcInstances.QueryInstance(cParentInstance.ParentI
nstanceId)
                If cParentInstance.IsRunning Then
                    cNextInst.AllStarted = True
                Else
                    ' No more sub-steps to execute
                    Call
cNextInst.ChildCompleted(cParentInstance.Step.St
epId)

```

```

    Call
cNextInst.ChildTerminated(cParentInstance.
Step.StepId)
    cNextInst.AllStarted = False
    End If
    End If
    End If

    BugAssert Not cNextInst Is Nothing
    Set cParentInstance = cNextInst

    Loop While cNextInst.Step.StepType <>
gintWorkerStep

    If Not cNextInst Is Nothing Then
    Call ExecuteStep(cNextInst)
    End If

    Set RunPendingSibling = cNextInst

    Exit Function

RunPendingSiblingErr:
' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
"RunPendingSibling"
    Err.Raise vbObjectError +
errNavInstancesFailed, mstrSource, _
    LoadResString(errNavInstancesFailed)

End Function
Private Sub
RunPendingSiblings(cTermInstance As
cInstance, _
    dtmCompleteTime As Currency)
' This process is called when a step
terminates. Tries to
' run siblings of the terminated step, if
they are pending
' execution.

    Dim cExecInst As cInstance

    On Error GoTo RunPendingSiblingsErr
    BugMessage "In RunPendingSiblings"

' Call a procedure to run the sibling of the
terminated
' step, if any. This procedure will also
update the
' number of complete/running tasks on the
manager steps.
    Set cExecInst =
RunPendingSibling(cTermInstance,
dtmCompleteTime)

    If Not cExecInst Is Nothing Then
    Do
' Execute any other pending steps in
the branch.
' The step that has just terminated
might be
' the last one that was executing in a
sub-branch.
' That would mean that we can
execute another
' sub-branch that might involve more
than 1 step.
' Pass the just executed step as a
parameter.

```

```

    Set cExecInst =
RunPendingStepInBranch(mstrCurBranchRoot
, cExecInst)
    Loop While Not cExecInst Is Nothing
    Else
    If Not mcDummyRootInstance.IsRunning
Then
' All steps have been executed in the
branch - run
' a new branch
    Call RunNewBranch
    Else
' There are no more steps to execute in
the current
' branch but we have running processes.
    End If
    End If

    Exit Sub

RunPendingSiblingsErr:
' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    mstrSource = mstrModuleName &
"RunPendingSiblings"
    Err.Raise vbObjectError +
errNavInstancesFailed, _
    mstrSource,
LoadResString(errNavInstancesFailed)

End Sub

Private Sub
NoSubStepsToExecute(cMgrInstance As
cInstance, Optional dtmCompleteTime As
Currency = gdtmEmpty)
' Called when we cannot find any more
substeps to run for
' manager step - set the allcomplete or
allstarted
' properties to true

    If cMgrInstance.IsRunning() Then
    cMgrInstance.AllStarted = True
    Else
    cMgrInstance.AllComplete = True
    If dtmCompleteTime <> gdtmEmpty
Then
' Update the end time on the manager
step
    Call
TimeCompleteUpdateForStep(cMgrInstance,
dtmCompleteTime)
    End If
    End If

End Sub

Private Function
GetSubStepToExecute(cParentNode As
cInstance, _
    Optional dtmCompleteTime As Currency
= 0) As cInstance
' Returns the child of the passed in node that
is to be
' executed next. Checks if we are in the
middle of an instance
' being executed in which case it returns the
pending
' instance. Creates a new instance if there are
pending
' instances for a sub-step.

    Dim lngIndex As Long

```

```

    Dim cSubStepRec As cSubStep
    Dim cSubStepDtIs As cStep
    Dim cSubStepInst As cInstance

    On Error GoTo GetSubStepToExecuteErr

' There are a number of cases that need to be
accounted
' for here.
' 1. While traversing through all enabled nodes
for the
' first time - instance records may not exist for the
' substeps.
' 2. Instance records exist, and there are processes
' that need to be executed for a sub-step
' 3. There are no more processes that need to be
currently
' executed (till a process completes)
' 4. There are no more processes that need to be
executed
' (All substeps have completed execution)

' This is the only point where we check the Abort
flag -
' since this is the heart of the navigation routine
that
' selects processes to execute. Also, when a step
terminates
' selection of the next process goes through here.
If mblnAbort Then
    Set GetSubStepToExecute = Nothing
    cParentNode.Status = gintAborted
    Exit Function
End If

If mblnAsk Then
    Set GetSubStepToExecute = Nothing
    Exit Function
End If

If Not
mcFailures.ExecuteSubStep(cParentNode.Step.Step
Id) Then
    Set GetSubStepToExecute = Nothing
    cParentNode.Status = gintAborted
    Exit Function
End If

' First check if there are pending steps for the
parent!
If cParentNode.IsPending Then
' Loop through all the sub-steps for the parent
node
    For lngIndex = 0 To
cParentNode.SubSteps.Count - 1
        Set cSubStepRec =
cParentNode.SubSteps(lngIndex)
        Set cSubStepDtIs =
mcRunSteps.QueryStep(cSubStepRec.StepId)
        If Not
mcInstances.InstanceAborted(cSubStepRec) Then
' Check if the sub-step is a worker
            If cSubStepDtIs.StepType =
gintWorkerStep Then
' Find/create an instance to execute
                Set cSubStepInst =
GetInstanceToExecute(_
                    cParentNode, cSubStepRec,
cSubStepDtIs)
                If Not cSubStepInst Is Nothing Then
                    Exit For
                Else
' Continue w/ the next sub-step
                    End If
                Else

```

```

' The sub-step is a manager step
instances for
' Check if there are any pending
' the manager
Set cSubStepInst =
mcInstances.QueryPendingInstance( _
cParentNode.InstanceId,
cSubStepRec.StepId)
If cSubStepInst Is Nothing Then
' Find/create an instance to
execute
Set cSubStepInst =
GetInstanceToExecute( _
cParentNode,
cSubStepRec, cSubStepDtIs)
If Not cSubStepInst Is
Nothing Then
Exit For
Else
' Continue w/ the next sub-
step
End If
Else
' We have found a pending
instance for the
' sub-step (manager) - exit the
loop
Exit For
End If
End If
End If
Next lngIndex

If lngIndex >
cParentNode.SubSteps.Count - 1 Or
cParentNode.SubSteps.Count = 0 Then
' If we could not find any sub-steps
to execute,
' mark the parent node as
complete/all started
Call
NoSubStepsToExecute(cParentNode,
dtmCompleteTime)
Set cSubStepInst = Nothing
End If
End If

Set GetSubStepToExecute = cSubStepInst
Exit Function

GetSubStepToExecuteErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"GetSubStepToExecute"
Err.Raise vbObjectError +
errNavInstancesFailed, mstrSource, _
LoadResString(errNavInstancesFailed)

End Function

Private Sub
TimeCompleteUpdateForStep(cMgrInstance
As cInstance, ByVal endTime As Currency)

' Called when there are no more sub-steps
to execute for
' the manager step. It updates the end time
and status on
' the manager.
Dim lElapsed As Long

```

```

On Error GoTo
TimeCompleteUpdateForStepErr

If cMgrInstance.Key <>
mstrDummyRootKey Then
cMgrInstance.EndTime = endTime
cMgrInstance.Status = gintComplete
lElapsed = (endTime -
cMgrInstance.StartTime) * 10000
cMgrInstance.ElapsedTime = lElapsed
RaiseEvent
StepComplete(cMgrInstance.Step, endTime,
cMgrInstance.InstanceId, lElapsed)
End If

Exit Sub

TimeCompleteUpdateForStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errUpdateDisplayFailed,
mstrModuleName &
"TimeCompleteUpdateForStep"

End Sub

Private Function GetFreeObject() As Long

' Check the array of free objects and retrieve
the first one
If mcFreeSteps.Count > 0 Then
GetFreeObject =
mcFreeSteps(mcFreeSteps.Count - 1)
Else
mstrSource = mstrModuleName &
"GetFreeObject"
ShowError errMaxProcessesExceeded
On Error GoTo 0
Err.Raise vbObjectError +
errMaxProcessesExceeded, _
mstrSource, _

LoadResString(errMaxProcessesExceeded)
End If

End Function

Private Function
StepTerminated(cCompleteStep As cStep,
ByVal dtmCompleteTime As Currency, _
ByVal lngIndex As Long, ByVal
InstanceId As Long, ByVal ExecutionStatus
As InstanceStatus) As cStep
' This procedure is called whenever a step
terminates.
Dim cTermRec As cTermStep
Dim cInstRec As cInstance
Dim cStartInst As cInstance
Dim lElapsed As Long
Dim sLogLabel As String
Dim LogLabels As New cVectorStr
Dim iItIndex As Long

On Error GoTo StepTerminatedErr

Set cInstRec =
mcInstances.QueryInstance(InstanceId)
If dtmCompleteTime <> 0 And
cInstRec.StartTime <> 0 Then
' Convert to milliseconds since that is the
default precision
lElapsed = (dtmCompleteTime -
cInstRec.StartTime) * 10000
Else
lElapsed = 0
End If

```

```

Set cStartInst = cInstRec
iItIndex = 0
Do While cInstRec.Key <> mstrDummyRootKey
sLogLabel = gstrSQ &
cInstRec.Step.StepLabel & gstrSQ

If iItIndex < cInstRec.Iterators.Count Then
If cStartInst.Iterators(iItIndex).StepId =
cInstRec.Step.StepId Then
sLogLabel = sLogLabel & msIt & gstrSQ
& cStartInst.Iterators(iItIndex).IteratorName &
gstrSQ & _
msItValue & gstrSQ &
cStartInst.Iterators(iItIndex).Value & gstrSQ
iItIndex = iItIndex + 1
End If
End If

If cInstRec.Key = cStartInst.Key Then
' Append the execution status
sLogLabel = sLogLabel & " Status: " &
gstrSQ & gsExecutionStatus(ExecutionStatus) &
gstrSQ
If ExecutionStatus = gintFailed Then
' Append the continuation criteria for the
step since it failed
sLogLabel = sLogLabel & " Continuation
Criteria: " & gstrSQ &
gsContCriteria(cInstRec.Step.ContinuationCriteria)
& gstrSQ
End If
End If
LogLabels.Add sLogLabel

Set cInstRec =
mcInstances.QueryInstance(cInstRec.ParentInstanc
eld)
Loop

Call WriteToWspLog(mintStepComplete,
LogLabels, dtmCompleteTime)
Set LogLabels = Nothing

' Adds the terminated step details to a queue.
Set cTermRec = New cTermStep
cTermRec.ExecutionStatus = ExecutionStatus
cTermRec.Index = lngIndex
cTermRec.InstanceId = InstanceId
cTermRec.TimeComplete = dtmCompleteTime
Call mcTermSteps.Add(cTermRec)
Set cTermRec = Nothing

RaiseEvent StepComplete(cCompleteStep,
dtmCompleteTime, InstanceId, lElapsed)

Exit Function

StepTerminatedErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errExecuteBranchFailed, mstrSource
Call ResetForm(lngIndex)

End Function
Public Property Let RootKey(ByVal vdata As
String)

mstrRootKey = vdata

End Property

Public Property Get RootKey() As String
RootKey = mstrRootKey
End Property

```

```

Private Function InitExecStep() As
cRunStep
' Since arrays of objects cannot be
declared as WithEvents,
' we use a limited number of objects and
set a maximum
' on the number of steps that can run in
parallel
' This is a wrapper that will create an
instance of
' a cExecuteSM object depending on the
index
Dim lngIndex As Long

On Error GoTo InitExecStepErr

lngIndex = GetFreeObject

Select Case lngIndex + 1
Case 1
Set cExecStep1 = New cRunStep
Set InitExecStep = cExecStep1
Case 2
Set cExecStep2 = New cRunStep
Set InitExecStep = cExecStep2
Case 3
Set cExecStep3 = New cRunStep
Set InitExecStep = cExecStep3
Case 4
Set cExecStep4 = New cRunStep
Set InitExecStep = cExecStep4
Case 5
Set cExecStep5 = New cRunStep
Set InitExecStep = cExecStep5
Case 6
Set cExecStep6 = New cRunStep
Set InitExecStep = cExecStep6
Case 7
Set cExecStep7 = New cRunStep
Set InitExecStep = cExecStep7
Case 8
Set cExecStep8 = New cRunStep
Set InitExecStep = cExecStep8
Case 9
Set cExecStep9 = New cRunStep
Set InitExecStep = cExecStep9
Case 10
Set cExecStep10 = New cRunStep
Set InitExecStep = cExecStep10
Case 11
Set cExecStep11 = New cRunStep
Set InitExecStep = cExecStep11
Case 12
Set cExecStep12 = New cRunStep
Set InitExecStep = cExecStep12
Case 13
Set cExecStep13 = New cRunStep
Set InitExecStep = cExecStep13
Case 14
Set cExecStep14 = New cRunStep
Set InitExecStep = cExecStep14
Case 15
Set cExecStep15 = New cRunStep
Set InitExecStep = cExecStep15
Case 16
Set cExecStep16 = New cRunStep
Set InitExecStep = cExecStep16
Case 17
Set cExecStep17 = New cRunStep
Set InitExecStep = cExecStep17
Case 18
Set cExecStep18 = New cRunStep
Set InitExecStep = cExecStep18
Case 19

```

```

Set cExecStep19 = New cRunStep
Set InitExecStep = cExecStep19
Case 20
Set cExecStep20 = New cRunStep
Set InitExecStep = cExecStep20
Case 21
Set cExecStep21 = New cRunStep
Set InitExecStep = cExecStep21
Case 22
Set cExecStep22 = New cRunStep
Set InitExecStep = cExecStep22
Case 23
Set cExecStep23 = New cRunStep
Set InitExecStep = cExecStep23
Case 24
Set cExecStep24 = New cRunStep
Set InitExecStep = cExecStep24
Case 25
Set cExecStep25 = New cRunStep
Set InitExecStep = cExecStep25
Case 26
Set cExecStep26 = New cRunStep
Set InitExecStep = cExecStep26
Case 27
Set cExecStep27 = New cRunStep
Set InitExecStep = cExecStep27
Case 28
Set cExecStep28 = New cRunStep
Set InitExecStep = cExecStep28
Case 29
Set cExecStep29 = New cRunStep
Set InitExecStep = cExecStep29
Case 30
Set cExecStep30 = New cRunStep
Set InitExecStep = cExecStep30
Case 31
Set cExecStep31 = New cRunStep
Set InitExecStep = cExecStep31
Case 32
Set cExecStep32 = New cRunStep
Set InitExecStep = cExecStep32
Case 33
Set cExecStep33 = New cRunStep
Set InitExecStep = cExecStep33
Case 34
Set cExecStep34 = New cRunStep
Set InitExecStep = cExecStep34
Case 35
Set cExecStep35 = New cRunStep
Set InitExecStep = cExecStep35
Case 36
Set cExecStep36 = New cRunStep
Set InitExecStep = cExecStep36
Case 37
Set cExecStep37 = New cRunStep
Set InitExecStep = cExecStep37
Case 38
Set cExecStep38 = New cRunStep
Set InitExecStep = cExecStep38
Case 39
Set cExecStep39 = New cRunStep
Set InitExecStep = cExecStep39
Case 40
Set cExecStep40 = New cRunStep
Set InitExecStep = cExecStep40
Case 41
Set cExecStep41 = New cRunStep
Set InitExecStep = cExecStep41
Case 42
Set cExecStep42 = New cRunStep
Set InitExecStep = cExecStep42
Case 43
Set cExecStep43 = New cRunStep
Set InitExecStep = cExecStep43
Case 44

```

```

Set cExecStep44 = New cRunStep
Set InitExecStep = cExecStep44
Case 45
Set cExecStep45 = New cRunStep
Set InitExecStep = cExecStep45
Case 46
Set cExecStep46 = New cRunStep
Set InitExecStep = cExecStep46
Case 47
Set cExecStep47 = New cRunStep
Set InitExecStep = cExecStep47
Case 48
Set cExecStep48 = New cRunStep
Set InitExecStep = cExecStep48
Case 49
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Set InitExecStep = cExecStep60
Case 61
Set cExecStep61 = New cRunStep
Set InitExecStep = cExecStep61
Case 62
Set cExecStep62 = New cRunStep
Set InitExecStep = cExecStep62
Case 63
Set cExecStep63 = New cRunStep
Set InitExecStep = cExecStep63
Case 64
Set cExecStep64 = New cRunStep
Set InitExecStep = cExecStep64
Case 65
Set cExecStep65 = New cRunStep
Set InitExecStep = cExecStep65
Case 66
Set cExecStep66 = New cRunStep
Set InitExecStep = cExecStep66
Case 67
Set cExecStep67 = New cRunStep
Set InitExecStep = cExecStep67
Case 68
Set cExecStep68 = New cRunStep
Set InitExecStep = cExecStep68
Case 69

```



```

Set cExecStep69 = New cRunStep
Set InitExecStep = cExecStep69
Case 70
Set cExecStep70 = New cRunStep
Set InitExecStep = cExecStep70
Case 71
Set cExecStep71 = New cRunStep
Set InitExecStep = cExecStep71
Case 72
Set cExecStep72 = New cRunStep
Set InitExecStep = cExecStep72
Case 73
Set cExecStep73 = New cRunStep
Set InitExecStep = cExecStep73
Case 74
Set cExecStep74 = New cRunStep
Set InitExecStep = cExecStep74
Case 75
Set cExecStep75 = New cRunStep
Set InitExecStep = cExecStep75
Case 76
Set cExecStep76 = New cRunStep
Set InitExecStep = cExecStep76
Case 77
Set cExecStep77 = New cRunStep
Set InitExecStep = cExecStep77
Case 78
Set cExecStep78 = New cRunStep
Set InitExecStep = cExecStep78
Case 79
Set cExecStep79 = New cRunStep
Set InitExecStep = cExecStep79
Case 80
Set cExecStep80 = New cRunStep
Set InitExecStep = cExecStep80
Case 81
Set cExecStep81 = New cRunStep
Set InitExecStep = cExecStep81
Case 82
Set cExecStep82 = New cRunStep
Set InitExecStep = cExecStep82
Case 83
Set cExecStep83 = New cRunStep
Set InitExecStep = cExecStep83
Case 84
Set cExecStep84 = New cRunStep
Set InitExecStep = cExecStep84
Case 85
Set cExecStep85 = New cRunStep
Set InitExecStep = cExecStep85
Case 86
Set cExecStep86 = New cRunStep
Set InitExecStep = cExecStep86
Case 87
Set cExecStep87 = New cRunStep
Set InitExecStep = cExecStep87
Case 88
Set cExecStep88 = New cRunStep
Set InitExecStep = cExecStep88
Case 89
Set cExecStep89 = New cRunStep
Set InitExecStep = cExecStep89
Case 90
Set cExecStep90 = New cRunStep
Set InitExecStep = cExecStep90
Case 91
Set cExecStep91 = New cRunStep
Set InitExecStep = cExecStep91
Case 92
Set cExecStep92 = New cRunStep
Set InitExecStep = cExecStep92
Case 93
Set cExecStep93 = New cRunStep
Set InitExecStep = cExecStep93
Case 94

```

```

Set cExecStep94 = New cRunStep
Set InitExecStep = cExecStep94
Case 95
Set cExecStep95 = New cRunStep
Set InitExecStep = cExecStep95
Case 96
Set cExecStep96 = New cRunStep
Set InitExecStep = cExecStep96
Case 97
Set cExecStep97 = New cRunStep
Set InitExecStep = cExecStep97
Case 98
Set cExecStep98 = New cRunStep
Set InitExecStep = cExecStep98
Case 99
Set cExecStep99 = New cRunStep
Set InitExecStep = cExecStep99
Case Else
Set InitExecStep = Nothing
End Select

BugMessage "Sending cExecStep" &
(IngIndex + 1) & "!"

If Not InitExecStep Is Nothing Then
InitExecStep.Index = IngIndex

' Remove this element from the collection
of free objects
Call RemoveFreeProcess(IngIndex)
End If

Exit Function

InitExecStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
Set InitExecStep = Nothing

End Function
Public Sub Run()
' Calls procedures to build a list of all the
steps that
' need to be executed and to execute them
' Determines whether the run has
started/terminated and
' raises the Run Start and Complete events.
Dim cTempStep As cStep

On Error GoTo RunErr

If StringEmpty(mstrRootKey) Then
Call ShowError(errExecuteBranchFailed)
On Error GoTo 0
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrModuleName &
"Run", _

LoadResString(errExecuteBranchFailed)
Else
' Execute the first branch
WriteToWspLog (mintRunStart)
RaiseEvent
RunStart(Determine64BitTime(),
mcWspLog.FileName)

If
mcNavSteps.HasChild(StepKey:=mstrRootKe
y) Then
Set cTempStep =
mcNavSteps.ChildStep(StepKey:=mstrRootKe
y)
mstrCurBranchRoot =
MakeKeyValid(cTempStep.StepId,
cTempStep.StepType)

```

```

Call
CreateDummyInstance(mstrCurBranchRoot)

' Run all pending steps in the branch
If Not RunBranch(mstrCurBranchRoot)

Then
' Execute a new branch if there aren't any
steps to run
Call RunNewBranch
End If
Else
WriteToWspLog (mintRunComplete)
' No children to execute - the run is complete
RaiseEvent
RunComplete(Determine64BitTime())
End If
End If

Exit Sub

RunErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
Call ShowError(errExecuteBranchFailed,
OptArgs:=mstrCurBranchRoot)
Call ResetForm

End Sub
Private Sub RunNewBranch()
' We will build a tree of all instances that occur
and
' the count of the sub-steps that are running will
be
' stored at each node in the tree (maintained
internally
' as an array). Since there can be multiple
iterations
' of the top level nodes running at the same time,
we
' create a dummy node at the root that keeps a
record of
' the instances of the top level node.

' Determines whether the run has
started/terminated and
' raises the Run Start and Complete events.
Dim cNextStep As cStep
Dim bRunComplete As Boolean

On Error GoTo RunNewBranchErr

bRunComplete = False

Do
If StringEmpty(mstrCurBranchRoot) Then
Exit Do
On Error GoTo 0
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrSource, _
LoadResString(errExecuteBranchFailed)
Else
Set cNextStep =
mcNavSteps.NextStep(StepKey:=mstrCurBranchRo
ot)

If cNextStep Is Nothing Then
mstrCurBranchRoot = gstrEmptyString
bRunComplete = True
Exit Do
Else
' Starting execution of a new branch -
initialize the
' module-level variable

```

```

        mstrCurBranchRoot =
MakeKeyValid(cNextStep.StepId,
cNextStep.StepType)
        Call
CreateDummyInstance(mstrCurBranchRoot)
        End If
        End If
        Debug.Print "Running new branch: " &
mstrCurBranchRoot

' Loop until we find a branch that has
steps to execute
Loop While Not
RunBranch(mstrCurBranchRoot)

If bRunComplete Then
    WriteToWspLog (mintRunComplete)
    ' Run is complete
    RaiseEvent
RunComplete(Determine64BitTime())
End If

Exit Sub

RunNewBranchErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
Call ShowError(errExecuteBranchFailed,
OptArgs:=mstrCurBranchRoot)
On Error GoTo 0
mstrSource = mstrModuleName &
"RunNewBranch"
Err.Raise vbObjectError +
errExecuteBranchFailed, mstrSource, _

LoadResString(errExecuteBranchFailed)

End Sub
Private Function RunBranch(strRootNode
As String) As Boolean
' This procedure is called to run all the
necessary steps
' in a branch. It can also be called when a
step terminates,
' in which case the terminated step is
passed in as the
' optional parameter. When a step
terminates, we need to
' either wait for some other steps to
terminate before
' we execute more steps or run as many
steps as necessary
' Returns True if there are steps currently
executing
' in the branch, else returns False
Dim cRunning As cInstance

On Error GoTo RunBranchErr

If Not StringEmpty(strRootNode) Then
    ' Call a procedure to execute all the
enabled steps
    ' in the branch - will return the step
node that is
    ' being executed - nothing means 'No
more steps to
    ' execute in the branch'.
    Do
        Set cRunning =
RunPendingStepInBranch(strRootNode,
cRunning)

        Loop While Not cRunning Is Nothing

```

```

        RunBranch =
mcDummyRootInstance.IsRunning
        End If

Exit Function

RunBranchErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"RunBranch"
Err.Raise vbObjectError +
errExecuteBranchFailed, _
mstrSource,
LoadResString(errExecuteBranchFailed)

End Function
Private Sub
TimeUpdateForProcess(StepRecord As cStep,
_
ByVal InstanceId As Long, _
Optional ByVal StartTime As Currency =
0, _
Optional ByVal EndTime As Currency =
0, _
Optional ByVal ElapsedTime As Long =
0, _
Optional Command As String)
' We do not maintain start and end
timestamps for the constraint
' of a step. Hence we check if the process
that just started/
' terminated is the worker step that is being
executed. If so,
' we update the start/end time and status on
the instance record.

Dim cInstanceRec As cInstance
Dim sItVal As String

On Error GoTo TimeUpdateForProcessErr

Set cInstanceRec =
mcInstances.QueryInstance(InstanceId)

If StartTime = 0 Then
    RaiseEvent ProcessComplete(StepRecord,
EndTime, InstanceId, ElapsedTime)
Else
    sItVal =
GetInstanceItValue(cInstanceRec)
    RaiseEvent ProcessStart(StepRecord,
Command, StartTime, InstanceId, _
cInstanceRec.ParentInstanceId,
sItVal)
End If

Call
cInstanceRec.UpdateStartTime(StepRecord.Ste
pId, StartTime, EndTime, ElapsedTime)

Exit Sub

TimeUpdateForProcessErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
WriteError errUpdateDisplayFailed,
mstrModuleName & "TimeUpdateForProcess"

End Sub
Private Sub
TimeStartUpdateForStep(StepRecord As
cStep, _
ByVal InstanceId As Long, _

```

```

        ByVal StartTime As Currency)

' Called when a step starts execution. Checks if
this is the
' first enabled child of the manager step. If so,
updates
' the start time and status on the manager.
' Also raises the Step Start event for the
completed step.

Dim cStartInst As cInstance
Dim cInstanceRec As cInstance
Dim LogLabels As New cVectorStr
Dim iItIndex As Long
Dim sLogLabel As String
Dim sPath As String
Dim sIt As String
Dim sItVal As String

On Error GoTo TimeStartUpdateForStepErr

Set cStartInst =
mcInstances.QueryInstance(InstanceId)

' Determine the step path and iterator values for
the step and raise a step start event
Set cInstanceRec = cStartInst
Do While cInstanceRec.Key <>
mstrDummyRootKey
    If Not StringEmpty(sPath) Then
        sPath = sPath & gstrFileSeparator
    End If
    sPath = sPath & gstrSQ &
cInstanceRec.Step.StepLabel & gstrSQ
    Set cInstanceRec =
mcInstances.QueryInstance(cInstanceRec.ParentIns
tanceId)
    Loop

For iItIndex = cStartInst.Iterators.Count - 1 To 0
Step - 1
    If Not StringEmpty(sIt) Then
        sIt = sIt & gstrFileSeparator
    End If
    sIt = sIt & gstrSQ &
cStartInst.Iterators(iItIndex).Value & gstrSQ
    Next iItIndex

    sItVal = GetInstanceItValue(cStartInst)
    RaiseEvent StepStart(StepRecord, StartTime,
InstanceId, cStartInst.ParentInstanceId, _
sPath, sIt, sItVal)

    iItIndex = 0
    Set cInstanceRec = cStartInst
    ' Raise a StepStart event for the manager step, if
this is it's first sub-step being executed
    Do While cInstanceRec.Key <>
mstrDummyRootKey

        sLogLabel = gstrSQ &
cInstanceRec.Step.StepLabel & gstrSQ
        If iItIndex < cStartInst.Iterators.Count Then
            If cStartInst.Iterators(iItIndex).StepId =
cInstanceRec.Step.StepId Then
                sLogLabel = sLogLabel & msIt & gstrSQ
                & cStartInst.Iterators(iItIndex).IteratorName &
gstrSQ & _
                msItValue & gstrSQ &
cStartInst.Iterators(iItIndex).Value & gstrSQ
                iItIndex = iItIndex + 1
            End If
        End If
        LogLabels.Add sLogLabel

```

```

    If cInstanceRec.Key <> cStartInst.Key
    And cInstanceRec.StartTime = 0 Then
        cInstanceRec.StartTime = StartTime
        cInstanceRec.Status = gintRunning
        sItVal =
    GetInstanceItValue(cInstanceRec)
        ' The step path and iterator values are
    not needed for manager steps, since
        ' they are primarily used by the run
    status form
        RaiseEvent
    StepStart(cInstanceRec.Step, StartTime,
    cInstanceRec.InstanceId, _
        cInstanceRec.ParentInstanceId,
    gstrEmptyString, gstrEmptyString, _
        sItVal)
    End If

    Set cInstanceRec =
    mcInstances.QueryInstance(cInstanceRec.Pa
    rentInstanceId)
    Loop

    Call WriteToWspLog(mintStepStart,
    LogLabels, StartTime)
    Set LogLabels = Nothing

    Exit Sub

    TimeStartUpdateForStepErr:
        ' Log the error code raised by Visual
    Basic
        Call LogErrors(Errors)
        WriteError errUpdateDisplayFailed,
    mstrModuleName &
    "TimeStartUpdateForStep"

    End Sub
    Private Sub WriteToWspLog(iLogEvent As
    WspLogEvents, Optional StepDtIs As
    cVectorStr, _
        Optional dtStamp As Currency =
    gdtmEmpty)

        ' Writes to the workspace log that is
    generated for the run. The last three
        ' parameters are valid only for Step Start
    and Step Complete events.
        Static bError As Boolean
        Dim sLabel As String
        Dim IIndex As Long
        Dim bHdr As Boolean
        Dim cTempConn As cConnection

        On Error GoTo WriteToWspLogErr

        Select Case iLogEvent
            Case mintRunStart
                Set mcWspLog = New cFileSM
                mcWspLog.FileName =
    GetDefaultDir(WspId, mcParameters) &
    gstrFileSeparator & _
                Trim(Str(RunId)) &
    gstrFileSeparator & "SMLog-" &
    Format(Now, FMT_WSP_LOG_FILE) &
    gstrLogFileSuffix
                mcWspLog.WriteLine
    (JulianDateToString(Determine64BitTime()
    ) & " Start Run: " & vbTab & gstrSQ &
    GetWorkspaceDetails(WorkspaceId:=WspId
    )) & gstrSQ

                ' Write all current parameter values
    to the log
                bHdr = False

```

```

        For IIndex = 0 To
    mcParameters.ParameterCount - 1
            If
    mcParameters(IIndex).ParameterType <>
    gintParameterApplication Then
                If Not bHdr Then
                    mcWspLog.WriteField
    JulianDateToString(Determine64BitTime()) &
    " Parameters: "
                    bHdr = True
                Else
                    mcWspLog.WriteField vbTab
    & vbTab & vbTab
                    End If
                    mcWspLog.WriteLine vbTab &
    gstrSQ &
    mcParameters(IIndex).ParameterName &
    gstrSQ & vbTab & vbTab & gstrSQ &
    mcParameters(IIndex).ParameterValue &
    gstrSQ
                End If
            Next IIndex

        ' Write all connection properties to the
    log
        For IIndex = 0 To
    RunConnections.Count - 1
            Set cTempConn =
    RunConnections(IIndex)
            If IIndex = 0 Then
                mcWspLog.WriteField
    JulianDateToString(Determine64BitTime()) &
    " Connections: "
            Else
                mcWspLog.WriteField vbTab &
    vbTab & vbTab
                End If
                mcWspLog.WriteLine vbTab &
    gstrSQ & cTempConn.ConnectionName &
    gstrSQ & _
                    vbTab & vbTab & gstrSQ &
    cTempConn.ConnectionValue & gstrSQ & _
                    vbTab & "No Count: " &
    gstrSQ & cTempConn.NoCountDisplay &
    gstrSQ & gstrBlank & _
                    "No Execute: " & gstrSQ &
    cTempConn.NoExecute & gstrSQ & gstrBlank
    & _
                    "Parse Query Only: " & gstrSQ
    & cTempConn.ParseQueryOnly & gstrSQ &
    gstrBlank & _
                    "Quoted Identifiers: " & gstrSQ
    & cTempConn.QuotedIdentifiers & gstrSQ &
    gstrBlank & _
                    "ANSI Nulls: " & gstrSQ &
    cTempConn.AnsiNulls & gstrSQ & gstrBlank
    & _
                    "Show Query Plan: " & gstrSQ
    & cTempConn.ShowQueryPlan & gstrSQ &
    gstrBlank & _
                    "Show Stats Time: " & gstrSQ
    & cTempConn.ShowStatsTime & gstrSQ &
    gstrBlank & _
                    "Show Stats IO: " & gstrSQ &
    cTempConn.ShowStatsIO & gstrSQ &
    gstrBlank & _
                    "Row Count" & gstrSQ &
    cTempConn.RowCount & gstrSQ & gstrBlank
    & _
                    "Query Timeout" & gstrSQ &
    cTempConn.QueryTimeout & gstrSQ
                Next IIndex

        Case mintRunComplete
            BugAssert Not mcWspLog Is Nothing

```

```

        mcWspLog.WriteLine
    (JulianDateToString(Determine64BitTime()) &
    " Comp. Run: " & vbTab & gstrSQ &
    GetWorkspaceDetails(WorkspaceId:=WspId)) &
    gstrSQ
        Set mcWspLog = Nothing

        Case mintStepStart
            For IIndex = StepDtIs.Count - 1 To 0 Step -1
                sLabel = StepDtIs(IIndex)
                If IIndex = StepDtIs.Count - 1 Then
                    mcWspLog.WriteLine
    JulianDateToString(dtStamp) & " Start Step: " &
    vbTab & sLabel
                Else
                    mcWspLog.WriteLine vbTab & vbTab
    & vbTab & vbTab & sLabel
                End If
            Next IIndex

        Case mintStepComplete
            For IIndex = StepDtIs.Count - 1 To 0 Step -1
                sLabel = StepDtIs(IIndex)
                If IIndex = StepDtIs.Count - 1 Then
                    mcWspLog.WriteLine
    JulianDateToString(dtStamp) & " Comp. Step: " &
    vbTab & sLabel
                Else
                    mcWspLog.WriteLine vbTab & vbTab
    & vbTab & vbTab & sLabel
                End If
            Next IIndex

        End Select

    Exit Sub

    WriteToWspLogErr:
        If Not bError Then
            bError = True
        End If

    End Sub
    Private Sub WriteToWspLog(iLogEvent As
    WspLogEvents, Optional StepDtIs As cVectorStr, _
        Optional dtStamp As Date = gdtmEmpty)

        ' This function uses the LogWriter dll - memory
    corruption problems since the vb exe
        ' and the vc Execute Dll both use the same dll to
    write.
        ' ' Writes to the workspace log that is generated
    for the run. The last three
        ' ' parameters are valid only for StepStart and
    StepComplete events.
        ' Static bError As Boolean
        ' Static sFile As String
        ' Dim sLabel As String
        ' Dim IIndex As Long
        ' Dim bHdr As Boolean

        On Error GoTo WriteToWspLogErr

        Select Case iLogEvent
            Case mintRunStart
                Set mcWspLog = New
    LOGWRITERLib.SMLog
                sFile = App.Path & "\" & "SMLog-" &
    Format(Now, FMT_WSP_LOG_FILE) &
    gstrLogFileSuffix
                mcWspLog.FileName = sFile
                mcWspLog.Init
                mcWspLog.WriteLine (Format(Now,
    FMT_WSP_LOG_DATE) & " Start Run: " &
    vbTab & gstrSQ &

```

```

GetWorkspaceDetails(WorkspaceId:=WspId
)) & gstrSQ
'
' Write all current parameter values
to the log
' bHdr = False
' For IIndex = 0 To
mcParameters.ParameterCount - 1
' If
mcParameters(IIndex).ParameterType <>
gintParameterApplication Then
' If Not bHdr Then
' mcWspLog.WriteLine
Format(Now, FMT_WSP_LOG_DATE) &
" Parameters: " & vbTab & gstrSQ &
mcParameters(IIndex).ParameterName &
gstrSQ & vbTab & vbTab & gstrSQ &
mcParameters(IIndex).ParameterValue &
gstrSQ
' bHdr = True
' Else
' mcWspLog.WriteLine
vbTab & vbTab & vbTab & vbTab &
gstrSQ &
mcParameters(IIndex).ParameterName &
gstrSQ & vbTab & vbTab & gstrSQ &
mcParameters(IIndex).ParameterValue &
gstrSQ
' End If
' End If
' Next IIndex
'
' Case mintRunComplete
' BugAssert Not mcWspLog Is
Nothing
' mcWspLog.WriteLine
Format(Now, FMT_WSP_LOG_DATE) &
" Comp. Run: " & vbTab & gstrSQ &
GetWorkspaceDetails(WorkspaceId:=WspId
)) & gstrSQ
' Set mcWspLog = Nothing
'
' Case mintStepStart
' For IIndex = StepDtls.Count - 1 To
0 Step -1
' sLabel = StepDtls(IIndex)
' If IIndex = StepDtls.Count - 1
Then
' mcWspLog.WriteLine
Format(dtStamp, FMT_WSP_LOG_DATE)
& " Start Step: " & vbTab & sLabel
' Else
' mcWspLog.WriteLine vbTab
& vbTab & vbTab & vbTab & sLabel
' End If
' Next IIndex
'
' Case mintStepComplete
' For IIndex = StepDtls.Count - 1 To
0 Step -1
' sLabel = StepDtls(IIndex)
' If IIndex = StepDtls.Count - 1
Then
' mcWspLog.WriteLine
Format(dtStamp, FMT_WSP_LOG_DATE)
& " Comp. Step: " & vbTab & sLabel
' Else
' mcWspLog.WriteLine vbTab
& vbTab & vbTab & vbTab & sLabel
' End If
' Next IIndex
'
' End Select
'
' Exit Sub

```

```

'
' WriteToWspLogErr:
' If Not bError Then
' bError = True
' End If
'
' End Sub
'
Public Property Get WspPreExecution() As
Variant
' WspPreExecution = mcvntWspPreCons
End Property
Public Property Let WspPreExecution(ByVal
vdata As Variant)
' mcvntWspPreCons = vdata
End Property
'
Public Property Get WspPostExecution() As
Variant
' WspPostExecution = mcvntWspPostCons
End Property
Public Property Let WspPostExecution(ByVal
vdata As Variant)
' mcvntWspPostCons = vdata
End Property
'
Private Sub ExecuteStep(cCurStep As
cInstance)
' Initializes a cRunStep object with all the
properties
' corresponding to the step to be executed
and calls it's
' execute method to execute the step
'
Dim cExecStep As cRunStep
'
On Error GoTo ExecuteStepErr
mstrSource = mstrModuleName &
"ExecuteStep"
'
' Confirm that the step is a worker
If cCurStep.Step.StepType <>
gintWorkerStep Then
On Error GoTo 0
Err.Raise vbObjectError +
errExecInstanceFailed, mstrSource, _
LoadResString(errExecInstanceFailed)
End If
'
Set cExecStep = InitExecStep()
' Exceeded the number of processes that we
can run simultaneously
If cExecStep Is Nothing Then
' Raise an error
On Error GoTo 0
Err.Raise vbObjectError +
errProgramError, mstrSource, _
LoadResString(errProgramError)
End If
' Initialize the instance id - not needed for
step execution
' but necessary to identify later which
instance completed
cExecStep.InstanceId = cCurStep.InstanceId
'
Set cExecStep.ExecuteStep = cCurStep.Step
Set cExecStep.Iterators = cCurStep.Iterators
Set cExecStep.Globals = mcRunSteps
Set cExecStep.WspParameters =
mcParameters
Set cExecStep.WspConnections =
RunConnections
Set cExecStep.WspConnDtls =
RunConnDtls

```

```

' Initialize all the pre and post-execution
constraints that
' have been defined globally for the workspace
cExecStep.WspPreCons = mcvntWspPreCons
cExecStep.WspPostCons = mcvntWspPostCons
'
' Initialize all the pre and post-execution
constraints for
' the step being executed
cExecStep.PreCons =
DetermineConstraints(cCurStep, gintPreStep)
cExecStep.PostCons =
DetermineConstraints(cCurStep, gintPostStep)
'
cExecStep.RunId = RunId
cExecStep.CreateInputFiles = CreateInputFiles
' Call the execute method to execute the step
cExecStep.Execute
'
Set cExecStep = Nothing
'
Exit Sub
'
ExecuteStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Call ExecutionFailed(cExecStep)
'
End Sub
'
Public Property Set Steps(cRunSteps As cArrSteps)
'
Set mcRunSteps = cRunSteps
Set mcNavSteps.StepRecords = cRunSteps
'
End Property
Public Property Set Parameters(cParameters As
cArrParameters)
' A reference to the parameter array - we use it to
' substitute parameter values in the step text
'
Set mcParameters = cParameters
'
End Property
Public Property Get Steps() As cArrSteps
'
Set Steps = mcRunSteps
'
End Property
Public Property Get Constraints() As
cArrConstraints
'
Set Constraints = mcRunConstraints
'
End Property
Public Property Set Constraints(vdata As
cArrConstraints)
'
Set mcRunConstraints = vdata
'
End Property
'
Private Sub
cExecStep1_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)
'
Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

```

End Sub

Private Sub

cExecStep1_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep1_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep1.Index, lngInstanceId, Status)

End Sub

Private Sub

cExecStep1_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, lngInstanceId As Long)

Call
TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep9_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep9_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep9_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep9.Index, lngInstanceId, Status)

End Sub

Private Sub

cExecStep9_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, lngInstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep10_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep10_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep10_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep10.Index, lngInstanceId, Status)

End Sub

Private Sub

cExecStep10_StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, lngInstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep11_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep11_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep11_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep11.Index, lngInstanceId, Status)

End Sub

Private Sub cExecStep11_StepStart(cStepRecord

As cStep, _
dtmStartTime As Currency, lngInstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep12_ProcessComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep12_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep12_StepComplete(cStepRecord As cStep, _
dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep12.Index, lngInstanceId, Status)

End Sub


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End Sub

Private Sub
cExecStep17_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep17.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep17_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep18_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep18_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep18_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep18.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep18_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep19_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep19_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep19_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep19.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep19_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep20_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep20_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep20_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep20.Index, InstanceId, Status)

End Sub

Private Sub cExecStep20_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep21_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep21_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep21_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep21.Index, InstanceId, Status)

End Sub

Private Sub cExecStep21_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep22_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

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Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep22_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep22_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep22.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep22_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep23_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, !Elapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep23_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep23_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

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Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep23.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep23_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep24_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, !Elapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep24_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep24_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep24.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep24_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep25_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, !Elapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

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End Sub

Private Sub
cExecStep25_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep25_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep25.Index, InstanceId, Status)

End Sub

Private Sub cExecStep25_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep26_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, !Elapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep26_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep26_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep26.Index, InstanceId, Status)

End Sub

Private Sub cExecStep26_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

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End Sub

Private Sub
cExecStep27_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep27_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep27_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep27.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep27_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep28_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep28_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

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lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep28_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep28.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep28_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep29_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep29_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep29_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep29.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep29_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

```

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Private Sub
cExecStep30_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep30_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep30_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep30.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep30_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep31_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep31_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep31_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep31.Index, InstanceId, Status)

```

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End Sub

Private Sub
cExecStep31_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep32_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep32_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep32_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep32.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep32_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep33_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

```

End Sub

Private Sub
cExecStep33_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep33_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep33.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep33_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep34_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep34_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep34_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep34.Index, InstanceId,
Status)

End Sub

```

```

Private Sub cExecStep34_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep35_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep35_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep35_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep35.Index, InstanceId, Status)

End Sub

Private Sub cExecStep35_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep36_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep36_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

```

End Sub

Private Sub
cExecStep36_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep36.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep36_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep37_ProcessComplete(cStepReco
rd As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep37_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep37_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep37.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep37_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep38_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep38_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep38_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep38.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep38_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep39_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep39_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep39_StepComplete(cStepRecord As
cStep, _

dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep39.Index, InstanceId, Status)

End Sub

Private Sub cExecStep39_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep40_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep40_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep40_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep40.Index, InstanceId, Status)

End Sub

Private Sub cExecStep40_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep41_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

Private Sub
cExecStep41_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep41_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep41.Index, lngInstanceId, Status)

End Sub

Private Sub
cExecStep41_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep42_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep42_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep42_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep42.Index, lngInstanceId, Status)

End Sub

```

```

Private Sub
cExecStep42_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep43_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep43_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep43_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep43.Index, lngInstanceId, Status)

End Sub

Private Sub
cExecStep43_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep44_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep44_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

```

```

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep44_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep44.Index, lngInstanceId, Status)

End Sub

Private Sub cExecStep44_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep45_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep45_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep45_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep45.Index, lngInstanceId, Status)

End Sub

Private Sub cExecStep45_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep46_ProcessComplete(cStepRecord As cStep, _

```

```
    dtmEndTime As Currency,  
    lngInstanceId As Long, lElapsed As Long)  
  
    Call  
    TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, EndTime:=dtmEndTime,  
    ElapsedTime:=lElapsed)  
  
End Sub
```

```
Private Sub  
cExecStep46_ProcessStart(cStepRecord As  
cStep, _  
    strCommand As String, dtmStartTime  
As Currency, lngInstanceId As Long)
```

```
    Call  
    TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, StartTime:=dtmStartTime,  
    Command:=strCommand)  
  
End Sub
```

```
Private Sub  
cExecStep46_StepComplete(cStepRecord  
As cStep, _  
    dtmEndTime As Currency, InstanceId  
As Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord,  
    dtmEndTime, cExecStep46.Index,  
    InstanceId, Status)
```

```
End Sub
```

```
Private Sub  
cExecStep46_StepStart(cStepRecord As  
cStep, _  
    dtmStartTime As Currency, InstanceId  
As Long)
```

```
    Call  
    TimeStartUpdateForStep(cStepRecord,  
    InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep47_ProcessComplete(cStepReco  
rd As cStep, _  
    dtmEndTime As Currency,  
    lngInstanceId As Long, lElapsed As Long)
```

```
    Call  
    TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, EndTime:=dtmEndTime,  
    ElapsedTime:=lElapsed)  
  
End Sub
```

```
End Sub
```

```
Private Sub  
cExecStep47_ProcessStart(cStepRecord As  
cStep, _  
    strCommand As String, dtmStartTime  
As Currency, lngInstanceId As Long)
```

```
    Call  
    TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, StartTime:=dtmStartTime,  
    Command:=strCommand)  
  
End Sub
```

```
End Sub
```

```
Private Sub  
cExecStep47_StepComplete(cStepRecord As  
cStep, _  
    dtmEndTime As Currency, InstanceId As  
Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord,  
    dtmEndTime, cExecStep47.Index, InstanceId,  
    Status)
```

```
End Sub
```

```
Private Sub  
cExecStep47_StepStart(cStepRecord As cStep,  
_  
    dtmStartTime As Currency, InstanceId As  
Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord,  
    InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep48_ProcessComplete(cStepRecord  
As cStep, _  
    dtmEndTime As Currency, lngInstanceId  
As Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, EndTime:=dtmEndTime,  
    ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub  
cExecStep48_ProcessStart(cStepRecord As  
cStep, _  
    strCommand As String, dtmStartTime As  
Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, StartTime:=dtmStartTime,  
    Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep48_StepComplete(cStepRecord As  
cStep, _  
    dtmEndTime As Currency, InstanceId As  
Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord,  
    dtmEndTime, cExecStep48.Index, InstanceId,  
    Status)
```

```
End Sub
```

```
Private Sub  
cExecStep48_StepStart(cStepRecord As cStep,  
_  
    dtmStartTime As Currency, InstanceId As  
Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord,  
    InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep49_ProcessComplete(cStepRecord  
As cStep, _  
    dtmEndTime As Currency, lngInstanceId  
As Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, EndTime:=dtmEndTime,  
    ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub  
cExecStep49_ProcessStart(cStepRecord As cStep, _  
    strCommand As String, dtmStartTime As  
Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, StartTime:=dtmStartTime,  
    Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep49_StepComplete(cStepRecord As cStep,  
_  
    dtmEndTime As Currency, InstanceId As  
Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime,  
    cExecStep49.Index, InstanceId, Status)
```

```
End Sub
```

```
Private Sub cExecStep49_StepStart(cStepRecord  
As cStep, _  
    dtmStartTime As Currency, InstanceId As  
Long)
```

```
    Call TimeStartUpdateForStep(cStepRecord,  
    InstanceId, dtmStartTime)
```

```
End Sub
```

```
Private Sub  
cExecStep50_ProcessComplete(cStepRecord As  
cStep, _  
    dtmEndTime As Currency, lngInstanceId As  
Long, lElapsed As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, EndTime:=dtmEndTime,  
    ElapsedTime:=lElapsed)
```

```
End Sub
```

```
Private Sub  
cExecStep50_ProcessStart(cStepRecord As cStep, _  
    strCommand As String, dtmStartTime As  
Currency, lngInstanceId As Long)
```

```
    Call TimeUpdateForProcess(cStepRecord,  
    lngInstanceId, StartTime:=dtmStartTime,  
    Command:=strCommand)
```

```
End Sub
```

```
Private Sub  
cExecStep50_StepComplete(cStepRecord As cStep,  
_  
    dtmEndTime As Currency, InstanceId As  
Long, Status As InstanceStatus)
```

```
    Call StepTerminated(cStepRecord, dtmEndTime,  
    cExecStep50.Index, InstanceId, Status)
```

```
End Sub
```

```
Private Sub cExecStep50_StepStart(cStepRecord  
As cStep, _
```

```

    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep51_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep51_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep51_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep51.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep51_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep52_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep52_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

```

```

    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep52_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep52.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep52_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep53_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep53_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep53_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep53.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep53_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

```

```

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep54_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep54_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep54_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep54.Index, InstanceId, Status)

End Sub

Private Sub cExecStep54_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep55_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep55_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep55_StepComplete(cStepRecord As cStep,
_

```

```

    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep55.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep55_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep56_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep56_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep56_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep56.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep56_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep57_ProcessComplete(cStepRecor
d As cStep, _

```

```

    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep57_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep57_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep57.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep57_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep58_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep58_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep58_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

```

```

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep58.Index, InstanceId, Status)

End Sub

Private Sub cExecStep58_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep59_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep59_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep59_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep59.Index, InstanceId, Status)

End Sub

Private Sub cExecStep59_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep60_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep60_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

```

```

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep60_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep60.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep60_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep61_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep61_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep61_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep61.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep61_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

```

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Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep62_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep62_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep62_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep62.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep62_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep63_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep63_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

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End Sub

Private Sub
cExecStep63_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep63.Index, InstanceId, Status)

End Sub

Private Sub cExecStep63_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep64_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep64_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep64_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep64.Index, InstanceId, Status)

End Sub

Private Sub cExecStep64_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep65_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

```



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Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep65_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep65_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep65.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep65_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep66_ProcessComplete(cStepRecor
d As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep66_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep66_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep66_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep66.Index,
InstanceId, Status)

End Sub

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Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep66.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep66_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep67_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep67_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep67_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep67.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep67_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep68_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

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```

End Sub

Private Sub
cExecStep68_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep68_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep68.Index, InstanceId, Status)

End Sub

Private Sub cExecStep68_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep69_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=!Elapsed)

End Sub

Private Sub
cExecStep69_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep69_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep69.Index, InstanceId, Status)

End Sub

Private Sub cExecStep69_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

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End Sub

Private Sub
cExecStep70_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep70_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep70_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep70.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep70_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep71_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep71_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

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lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep71_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep71.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep71_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep72_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep72_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep72_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep72.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep72_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

```

```

Private Sub
cExecStep73_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep73_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep73_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call
    StepTerminated(cStepRecord, dtmEndTime, cExecStep73.Index, InstanceId, Status)

End Sub

Private Sub
cExecStep73_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, InstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep74_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmEndTime, lElapsed)

End Sub

Private Sub
cExecStep74_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep74_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

    Call
    StepTerminated(cStepRecord, dtmEndTime, cExecStep74.Index, InstanceId, Status)

```

```

End Sub

Private Sub
cExecStep74_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep75_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep75_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep75_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep75.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep75_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep76_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

    Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

```

End Sub

Private Sub
cExecStep76_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep76_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep76.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep76_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId
As Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep77_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep77_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep77_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep77.Index, InstanceId,
Status)

End Sub

```

```

Private Sub cExecStep77_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep78_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep78_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep78_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep78.Index, InstanceId, Status)

End Sub

Private Sub cExecStep78_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep79_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep79_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

```

End Sub

Private Sub
cExecStep79_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep79.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep79_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep80_ProcessComplete(cStepReco
rd As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep80_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep80_StepComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep80.Index,
InstanceId, Status)

End Sub

Private Sub
cExecStep80_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep81_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep81_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep81_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep81.Index, InstanceId,
Status)

End Sub

Private Sub
cExecStep81_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep82_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep82_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep82_StepComplete(cStepRecord As
cStep, _

dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep82.Index, InstanceId, Status)

End Sub

Private Sub cExecStep82_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep83_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep83_ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep83_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep83.Index, InstanceId, Status)

End Sub

Private Sub cExecStep83_StepStart(cStepRecord
As cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep84_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId As
Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

Private Sub
cExecStep84_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep84_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep84.Index, lngInstanceId, Status)

End Sub

Private Sub
cExecStep84_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep85_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep85_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep85_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep85.Index, lngInstanceId, Status)

End Sub

```

```

Private Sub
cExecStep85_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep86_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep86_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep86_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep86.Index, lngInstanceId, Status)

End Sub

Private Sub
cExecStep86_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep87_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep87_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

```

```

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep87_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep87.Index, lngInstanceId, Status)

End Sub

Private Sub cExecStep87_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep88_ProcessComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep88_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub
cExecStep88_StepComplete(cStepRecord As cStep, _
    dtmEndTime As Currency, lngInstanceId As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime, cExecStep88.Index, lngInstanceId, Status)

End Sub

Private Sub cExecStep88_StepStart(cStepRecord As cStep, _
    dtmStartTime As Currency, lngInstanceId As Long)

    Call TimeStartUpdateForStep(cStepRecord, lngInstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep89_ProcessComplete(cStepRecord As cStep, _

```

```

    dtmEndTime As Currency,
    lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep89_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep89_StepComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep89.Index,
    InstanceId, Status)

End Sub

Private Sub
cExecStep89_StepStart(cStepRecord As
cStep, _
    dtmStartTime As Currency, InstanceId
As Long)

    Call
    TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep90_ProcessComplete(cStepRecor
d As cStep, _
    dtmEndTime As Currency,
    lngInstanceId As Long, lElapsed As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep90_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

    Call
    TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

```

```

Private Sub
cExecStep90_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep90.Index, InstanceId,
    Status)

End Sub

Private Sub
cExecStep90_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
    Long)

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep91_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep91_ProcessStart(cStepRecord As
cStep, _
    strCommand As String, dtmStartTime As
    Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep91_StepComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord,
    dtmEndTime, cExecStep91.Index, InstanceId,
    Status)

End Sub

Private Sub
cExecStep91_StepStart(cStepRecord As cStep,
_
    dtmStartTime As Currency, InstanceId As
    Long)

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep92_ProcessComplete(cStepRecord
As cStep, _
    dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

```

```

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep92_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
    Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep92_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
    cExecStep92.Index, InstanceId, Status)

End Sub

Private Sub cExecStep92_StepStart(cStepRecord
As cStep, _
    dtmStartTime As Currency, InstanceId As
    Long)

    Call TimeStartUpdateForStep(cStepRecord,
    InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep93_ProcessComplete(cStepRecord As
cStep, _
    dtmEndTime As Currency, lngInstanceId As
    Long, lElapsed As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, EndTime:=dtmEndTime,
    ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep93_ProcessStart(cStepRecord As cStep, _
    strCommand As String, dtmStartTime As
    Currency, lngInstanceId As Long)

    Call TimeUpdateForProcess(cStepRecord,
    lngInstanceId, StartTime:=dtmStartTime,
    Command:=strCommand)

End Sub

Private Sub
cExecStep93_StepComplete(cStepRecord As cStep,
_
    dtmEndTime As Currency, InstanceId As
    Long, Status As InstanceStatus)

    Call StepTerminated(cStepRecord, dtmEndTime,
    cExecStep93.Index, InstanceId, Status)

End Sub

Private Sub cExecStep93_StepStart(cStepRecord
As cStep, _

```


dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep98.Index, InstanceId, Status)

End Sub

Private Sub

cExecStep98_StepStart(cStepRecord As cStep, _ dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep99_ProcessComplete(cStepRecord As cStep, _ dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep99_ProcessStart(cStepRecord As cStep, _ strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep99_StepComplete(cStepRecord As cStep, _ dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep99.Index, InstanceId, Status)

End Sub

Private Sub

cExecStep99_StepStart(cStepRecord As cStep, _ dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep2_ProcessComplete(cStepRecord As cStep, _

dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep2_ProcessStart(cStepRecord As cStep, _ strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep2_StepComplete(cStepRecord As cStep, _ dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep2.Index, _ InstanceId, Status)

End Sub

Private Sub

cExecStep2_StepStart(cStepRecord As cStep, _ dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep3_ProcessComplete(cStepRecord As cStep, _ dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep3_ProcessStart(cStepRecord As cStep, _ strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep3_StepComplete(cStepRecord As cStep, _

dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep3.Index, _ InstanceId, Status)

End Sub

Private Sub

cExecStep3_StepStart(cStepRecord As cStep, _ dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep4_ProcessComplete(cStepRecord As cStep, _ dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)

End Sub

Private Sub

cExecStep4_ProcessStart(cStepRecord As cStep, _ strCommand As String, dtmStartTime As Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, StartTime:=dtmStartTime, Command:=strCommand)

End Sub

Private Sub

cExecStep4_StepComplete(cStepRecord As cStep, _ dtmEndTime As Currency, InstanceId As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime, cExecStep4.Index, _ InstanceId, Status)

End Sub

Private Sub

cExecStep4_StepStart(cStepRecord As cStep, _ dtmStartTime As Currency, InstanceId As Long)

Call TimeStartUpdateForStep(cStepRecord, InstanceId, dtmStartTime)

End Sub

Private Sub

cExecStep5_ProcessComplete(cStepRecord As cStep, _ dtmEndTime As Currency, lngInstanceId As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord, lngInstanceId, EndTime:=dtmEndTime, ElapsedTime:=lElapsed)


```

End Sub

Private Sub
cExecStep5_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep5_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep5.Index, _
InstanceId, Status)

End Sub

Private Sub
cExecStep5_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId
As Long)

Call
TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep6_ProcessComplete(cStepRecord
As cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep6_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long)

Call
TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep6_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId
As Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep6.Index, _
InstanceId, Status)

```

```

End Sub

Private Sub
cExecStep6_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep7_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

Private Sub
cExecStep7_ProcessStart(cStepRecord As
cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep7_StepComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord,
dtmEndTime, cExecStep7.Index, _
InstanceId, Status)

End Sub

Private Sub
cExecStep7_StepStart(cStepRecord As cStep,
_
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub
cExecStep8_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, EndTime:=dtmEndTime,
ElapsedTime:=lElapsed)

End Sub

```

```

Private Sub cExecStep8_ProcessStart(cStepRecord
As cStep, _
strCommand As String, dtmStartTime As
Currency, lngInstanceId As Long)

Call TimeUpdateForProcess(cStepRecord,
lngInstanceId, StartTime:=dtmStartTime,
Command:=strCommand)

End Sub

Private Sub
cExecStep8_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)

Call StepTerminated(cStepRecord, dtmEndTime,
cExecStep8.Index, _
InstanceId, Status)

End Sub

Private Sub cExecStep8_StepStart(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId As
Long)

Call TimeStartUpdateForStep(cStepRecord,
InstanceId, dtmStartTime)

End Sub

Private Sub Class_Initialize()

Dim lngCount As Long
Dim lngTemp As Long

On Error GoTo InitializeErr

Set mcFreeSteps = New cVectorLng
' Initialize the array of free objects with all
elements
' for now
For lngCount = 0 To
glngNumConcurrentProcesses - 1 Step 1
mcFreeSteps.Add lngCount
Next lngCount

' Initialize a byte array with the number of free
processes. It will
' be used later to determine if any step is running
' Each element in the array can represent 8 steps,
1 for each bit
ReDim mbarrFree(glngNumConcurrentProcesses
\ gintBitsPerByte)

' Initialize each element in the byte array w/ all
1's
' (upto glngNumConcurrentProcesses)
For lngCount = LBound(mbarrFree) To
UBound(mbarrFree) Step 1
lngTemp = IIf(_
glngNumConcurrentProcesses -
(gintBitsPerByte * lngCount) > gintBitsPerByte, _
gintBitsPerByte, _
glngNumConcurrentProcesses -
(gintBitsPerByte * lngCount))

mbarrFree(lngCount) = (2 ^ lngTemp) - 1
Next lngCount

Set mcInstances = New cInstances
Set mcFailures = New cFailedSteps
Set mcNavSteps = New cStepTree

```

```

Set mcTermSteps = New cTermSteps

' Initialize the Abort flag to False
mblnAbort = False
mblnAsk = False

Exit Sub

InitializeErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errInitializeFailed, mstrModuleName &
"Initialize", _
LoadResString(errInitializeFailed)

End Sub
Private Sub Class_Terminate()

On Error GoTo Class_TerminateErr

mcFreeSteps.Clear
Set mcFreeSteps = Nothing
ReDim mbarrFree(0)

mcInstances.Clear
Set mcInstances = Nothing

Set mcFailures = Nothing
Set mcNavSteps = Nothing
Set mcTermSteps = Nothing

Exit Sub

Class_TerminateErr:
Call LogErrors(Errors)

End Sub

Private Sub
mcTermSteps_TermStepExists(cStepDetails
As cTermStep)

Call
RunNextStep(cStepDetails.TimeComplete,
cStepDetails.Index, _
cStepDetails.InstanceId,
cStepDetails.ExecutionStatus)

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cRunItDetails"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunItDetails.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module encapsulates
the properties of iterator values
that are used by the step being
executed at runtime.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'

```

```

Option Explicit

' Used to indicate the source module name
when errors
are raised by this class
Private Const mstrModuleName As String =
"cRunItDetails."
Private mstrSource As String

Private mstrIteratorName As String
Private mintType As ValueType
Private mlngSequence As Long
Private mlngFrom As Long
Private mlngTo As Long
Private mlngStep As Long
Private mstrValue As String

Public Property Get RangeTo() As Long

RangeTo = mlngTo

End Property
Public Property Let RangeTo(ByVal vdata As
Long)

mlngTo = vdata

End Property

Public Property Get RangeFrom() As Long

RangeFrom = mlngFrom

End Property
Public Property Get Sequence() As Long

Sequence = mlngSequence

End Property

Public Property Get RangeStep() As Long

RangeStep = mlngStep

End Property
Public Property Let RangeStep(vdata As Long)

mlngStep = vdata

End Property

Public Property Let RangeFrom(ByVal vdata
As Long)

mlngFrom = vdata

End Property
Public Property Let Sequence(ByVal vdata As
Long)

mlngSequence = vdata

End Property

Public Property Get IteratorType() As
ValueType

IteratorType = mintType

End Property
Public Property Let IteratorType(ByVal vdata
As ValueType)

On Error GoTo TypeErr

```

```

mstrSource = mstrModuleName & "Type"

' These constants have been defined in the
enumeration,
' Type, which is exposed
Select Case vdata
Case gintFrom, gintTo, gintStep, gintValue
mintType = vdata

Case Else
On Error GoTo 0
Err.Raise vbObjectError + errTypeInvalid, _
mstrSource,
LoadResString(errTypeInvalid)
End Select

Exit Property

TypeErr:
LogErrors Errors
mstrSource = mstrModuleName & "Type"
On Error GoTo 0
Err.Raise vbObjectError + errTypeInvalid, _
mstrSource, LoadResString(errTypeInvalid)

End Property
Private Sub IsList()

If mintType <> gintValue Then
On Error GoTo 0
Err.Raise vbObjectError + errInvalidProperty,
mstrSource, _
LoadResString(errInvalidProperty)
End If

End Sub
Private Sub IsRange()

If mintType = gintValue Then
On Error GoTo 0
Err.Raise vbObjectError + errInvalidProperty,
mstrSource, _
LoadResString(errInvalidProperty)
End If

End Sub

Public Property Get Value() As String

Value = mstrValue

End Property
Public Property Let Value(vdata As String)

mstrValue = vdata

End Property

Public Property Get IteratorName() As String

IteratorName = mstrIteratorName

End Property
Public Property Let IteratorName(ByVal vdata As
String)

mstrIteratorName = vdata

End Property

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END

```

```

Attribute VB_Name = "cRunItNode"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' An iterator class containing the properties
that are used
' by the stpe being executed.
' These iterators might actually come from
steps that are at
' a higher level than the step actually being
executed (viz.
' direct ascendants of the step at any level).

Option Explicit

Public IteratorName As String
Public Value As String
Public StepId As Long

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cRunOnly"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Option Explicit

Public Event Done()
Private WithEvents mcRunWsp As
cRunWorkspace
Attribute mcRunWsp.VB_VarHelpID = -1

Public WspName As String
Public WorkspaceId As Long
Public WspLog As String

Public Sub RunWsp()

On Error GoTo RunWspErr

Set mcRunWsp = New cRunWorkspace
Set mcRunWsp.LoadDb = dbsAttTool
mcRunWsp.WorkspaceId = WorkspaceId
mcRunWsp.CreateInputFiles = True
mcRunWsp.RunWorkspace

Exit Sub

RunWspErr:
' Log the VB error code
LogErrors Errors

End Sub

Private Sub
mcRunWsp_RunComplete(dtmEndTime As
Currency)

MsgBox "Completed executing
workspace: " & gstrSQ & WspName &
gstrSQ & " at " & _
JulianDateToString(dtmEndTime) &
"." & vbCrLf & vbCrLf & _
"The log file for the run is: " &
gstrSQ & WspLog & gstrSQ & "."
RaiseEvent Done

End Sub

Private Sub
mcRunWsp_RunStart(dtmStartTime As

```

```

Currency, strWspLog As String, lRunId As
Long)
WspLog = strWspLog
End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cRunStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cRunStep.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This class executes the step
that is assigned to the
' ExecuteStep property. It executes the
pre-execution constraints
' in sequence and then the step itself.
At the end it executes
' the post-execution constraints. Since
these steps should always
' be executed in sequence, each step is
only fired on the
' completion of the previous step.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cRunStep."
Private mstrSource As String

' Local variable(s) to hold property value(s)
Private mcStep As cStep
Private mcGlobals As cArrSteps
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mcvntPreCons As Variant
Private mcvntPostCons As Variant
Private mcIterators As cRunCollt
Private mlngInstanceId As Long ' Identifier for
the current instance
Private mlngIndex As Long ' Index value for
the current instance
Private mstrCommand As String ' The
command string
Private msRunStepDtl As String ' Step text/file
name that will go into the run_step_details
table
Private mblnAbort As Boolean ' Set to True
when the user aborts the run
Private msOutputFile As String
Private msErrorFile As String
Private miStatus As InstanceStatus
Private mcVbErr As cVbErrorsSM
Public WspParameters As cArrParameters
Public WspConnections As cConnections
Public WspConnDtls As cConnDtls

Private WithEvents mcTermProcess As
cTermProcess
Attribute mcTermProcess.VB_VarHelpID = -1
Public RunId As Long

```

```

Public CreateInputFiles As Boolean
Private msOutputDir As String

' Object that will execute the step
Private WithEvents mcExecObj As
EXECUTEDLLLib.Execute
Attribute mcExecObj.VB_VarHelpID = -1

' Holds the step that is currently being executed
(constraint or
' worker step)
Private mcExecStep As cStep

Private Const msCompareExe As String =
"diff.exe"

Private Enum NextNodeType
mintWspPreConstraint = 1
mintPreConstraint
mintStep
mintWspPostConstraint
mintPostConstraint
End Enum

' Public events to notify the calling function of the
' start and end time for each step
Public Event StepStart(cStepRecord As cStep, _
dtmStartTime As Currency, InstanceId As
Long)
Public Event StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, InstanceId As
Long, Status As InstanceStatus)
Public Event ProcessStart(cStepRecord As cStep, _
strCommand As String, dtmStartTime As
Currency, _
InstanceId As Long)
Public Event ProcessComplete(cStepRecord As
cStep, _
dtmStartTime As Currency, InstanceId As
Long, lElapsed As Long)

Private Function AppendDiffErrors(sDiffFile As
String)
' The file containing the errors generated by the
diff utility is passed in
' These errors are appended to the error file for
the step

Dim sTemp As String
Dim InputFile As Integer

If Not StringEmpty(sDiffFile) Then

InputFile = FreeFile
Open sDiffFile For Input Access Read As
InputFile

Do While Not EOF(InputFile) ' Loop
until end of file.
Line Input #InputFile, sTemp ' Read line
into variable.
mcVbErr.LogMessage sTemp
Loop

Close InputFile
End If

End Function

Private Sub CreateStepTextFile()
' Creates a file containing the step text being
executed
On Error GoTo CreateStepTextFileErr

```

```

Dim sInputFile As String

If mcExecStep.ExecutionMechanism =
gintExecuteShell Then
    sInputFile =
GetOutputFile(gsCmdFileSuffix)
Else
    sInputFile =
GetOutputFile(gsSqlFileSuffix)
End If

' Generate a file containing the step text
being executed
If Not
StringEmpty(mcExecStep.StepTextFile) Or
mcExecStep.ExecutionMechanism =
gintExecuteShell Then
    FileCopy mstrCommand, sInputFile
Else
    Call
WriteCommandToFile(mstrCommand,
sInputFile)
End If

Exit Sub

CreateStepTextFileErr:

    mcVBEr.LogError

End Sub
Private Function GetOutputFile(strFileExt
As String) As String
' This function generates the output file
name for the step currently being executed
' The value of the built-in parameter
'DefaultDir' is appended with the run
identifier
' for the file location
' The step label is used for the file name
and a combination of all iterator values
' for the step is used to make the output
files unique for each instance
Dim sFile As String
Dim sIt As String
Dim lIt As Long

On Error GoTo GetOutputFileErr

sFile =
SubstituteParametersIfPossible(mcExecStep
.StepLabel)

sFile = TranslateStepLabel(sFile)

If mcExecStep Is mcStep Then
' Use iterators that have been defined
for the worker or any of its managers
' to make the error/log file unique for
this instance
For lIt = mcIterators.Count - 1 To 0
Step -1
    sIt = sIt & gsExtSeparator &
mcIterators(lIt).Value
Next lIt
End If
sIt = sIt & strFileExt

' Ensure that the length of the complete
path does not exceed 255 characters
If Len(msOutputDir) + Len(sFile) +
Len(sIt) > MAX_PATH Then
    sFile = Mid(sFile, 1, MAX_PATH -
Len(sIt) - Len(msOutputDir))
End If

```

```

GetOutputFile = msOutputDir & sFile & sIt
Exit Function

GetOutputFileErr:

' Does not make sense to log error to the
error file yet. Write to the project
' log and return the step label as default
GetOutputFile = mcExecStep.StepLabel &
gsExtSeparator & strFileExt

End Function

Private Sub HandleExecutionError()

On Error GoTo HandleExecutionError

' Log the error code raised by Visual Basic
miStatus = gintFailed
mcVBEr.LogError
Call
mcVBEr.WriteError(errExecuteStepFailed, _
OptArgs:="Continuation criteria for the
step is: " &
gsContCriteria(mcStep.ContinuationCriteria))

HandleExecutionError:

' Logging failed - return

End Sub

Public Property Get Index() As Long

Index = mlngIndex

End Property
Public Property Let Index(ByVal vdata As
Long)

mlngIndex = vdata

End Property
Private Function InitializeExecStatus() As
InstanceStatus
Dim sCompareFile As String

On Error GoTo InitializeExecStatusErr

InitializeExecStatus =
mcExecObj.StepStatus

If InitializeExecStatus = gintComplete Then
If Not
StringEmpty(mcExecStep.FailureDetails) Then
' Compare output to determine whether
the step failed
sCompareFile =
GetShortName(SubstituteParameters(_
mcExecStep.FailureDetails,
mcExecStep.WorkspaceId, mcIterators, _
WspParameters))
InitializeExecStatus =
IIf(CompareOutput(sCompareFile,
msOutputFile), gintComplete, gintFailed)
End If
End If

Exit Function

InitializeExecStatusErr:
mcVBEr.LogError
' Call LogErrors(Errors)

```

```

InitializeExecStatus = mcExecObj.StepStatus

End Function
Private Function CompareOutput(sCompareFile As
String, sOutputFile As String) As Boolean

Dim sCmpOutput As String
Dim sDiffOutput As String

On Error GoTo CompareOutputErr

' Create temporary files to store the file compare
output and
' the errors generated by the compare function
sCmpOutput = CreateTempFile()
sDiffOutput = CreateTempFile()

' Run the compare utility and redirect it's output
and errors
SyncShell ("cmd /c " & _
GetShortName(App.Path &
msCompareExe) & gstrBlank & _
sCompareFile & gstrBlank & sOutputFile &
_
">" & sCmpOutput & ">>" &
sDiffOutput)

If FileLen(sDiffOutput) > 0 Then
' The compare generated errors - append error
msgs to the error file
Call AppendDiffErrors(sDiffOutput)
CompareOutput = False
Else
    CompareOutput = (FileLen(sCmpOutput) = 0)
End If

If Not CompareOutput Then
    mcVBEr.WriteError errDiffFailed
End If

' Delete the temporary files used to store the
output of the compare and
' the errors generated by the compare
Kill sDiffOutput
Kill sCmpOutput

Exit Function

CompareOutputErr:
mcVBEr.LogError
CompareOutput = False

End Function
Public Property Get InstanceId() As Long

InstanceId = mlngInstanceId

End Property
Public Property Let InstanceId(ByVal vdata As
Long)

mlngInstanceId = vdata

End Property

Private Function ExecuteConstraint(vntConstraints
As Variant, _
ByRef intLoopIndex As Integer) As Boolean

' Returns True if there is a constraint in the
passed in
' array that remains to be executed

If IsArray(vntConstraints) And Not
IsEmpty(vntConstraints) Then

```

```

ExecuteConstraint =
(LBound(vntConstraints) <= intLoopIndex)
And (intLoopIndex <=
UBound(vntConstraints))
Else
ExecuteConstraint = False
End If
End Function
Private Function NextStep() As cStep

' Determines which is the next step to be
executed - it could
' be either a pre-execution step, the
worker step itself
' or a post-execution step

Dim cConsRec As cConstraint
Dim cNextStepRec As cStep
Dim vntStepConstraints As Variant

' Static variable to remember exactly
where we are in the
' processing
Static intIndex As Integer
Static intNextStepType As
NextNodeType

On Error GoTo NextStepErr

If mblnAbort = True Then
' The user has aborted the run - do not
run any more
' processes for the step
Set NextStep = Nothing
Exit Function
End If

If intNextStepType = 0 Then
' First time through this function - set
the Index and
' node type to initial values
intNextStepType =
mintWspPreConstraint
intIndex = 0
RaiseEvent StepStart(mcStep,
Determine64BitTime(), mlngInstanceId)
End If

Do
Select Case intNextStepType
Case mintWspPreConstraint
vntStepConstraints =
mcvntWspPreCons

Case mintPreConstraint
vntStepConstraints =
mcvntPreCons

Case mintStep
' CONS:
If mcStep.StepType =
gintWorkerStep Then
Set cNextStepRec = mcStep
End If

Case mintWspPostConstraint
vntStepConstraints =
mcvntWspPostCons

Case mintPostConstraint
vntStepConstraints =
mcvntPostCons

End Select

```

```

If intNextStepType <> mintStep Then
' Check if there is a constraint to be
executed
If
ExecuteConstraint(vntStepConstraints,
intIndex) Then
' Get the corresponding step record to
be executed
' Query the global step record for the
current
' constraint
Set cConsRec =
vntStepConstraints(intIndex)

Set cNextStepRec =
mcGlobals.QueryStep(cConsRec.GlobalStepId
)
intIndex = intIndex + 1
Else
If intNextStepType =
mintPostConstraint Then
' No more stuff to be executed for
the step
' Raise a Done event
Set cNextStepRec = Nothing

' Set the next step type to an
invalid value
intNextStepType = -1
Else
Call NextType(intNextStepType,
intIndex)
End If
Else
' Increment the step type so we look at
the post-
' execution steps the next time through
Call NextType(intNextStepType,
intIndex)
End If

Loop Until (Not cNextStepRec Is Nothing)
Or _
intNextStepType = -1

Set NextStep = cNextStepRec

Exit Function

NextStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
mstrSource = mstrModuleName &
"NextStep"
Err.Raise vbObjectError +
errNextStepFailed, mstrSource, _
LoadResString(errNextStepFailed)

End Function
Public Sub Execute()
' This procedure is the method that executes
the step that
' is assigned to the ExecuteStep property. It
call a procedure
' to determine the next step to be executed.
' Then it initializes all the properties of the
cExecuteSM object
' and calls it's run method to execute it.
Dim cConn As cConnection
Dim cRunConnDtl As cConnDtl

On Error GoTo ExecuteErr

```

```

' If this procedure is called after a step has
completed,
' we would have to check if we created any
temporary files
' while executing that step
If Not mcExecStep Is Nothing Then
If Not StringEmpty(mcExecStep.StepTextFile)
Or mcExecStep.ExecutionMechanism =
gintExecuteShell Then
' Remove the temporary file that we created
while
' running this command
Kill mstrCommand
End If

Call StepCompleted

' The VB errors class stores a reference to the
Execute class since it uses
' a method of the class to write errors to the
error log. Hence,
' release all references to the Execute object
before destroying it.
Set mcVBErr.ErrorFile = Nothing
Set mcExecObj = Nothing

' Delete empty output and error files (generated
by shell commands)
' (Can be done only after cleaning up
cExecObj)
Call DeleteEmptyOutputFiles
Else
' First time through - initialize the location of
output files
msOutputDir =
GetDefaultDir(mcStep.WorkspaceId,
WspParameters)
msOutputDir = msOutputDir &
gstrFileSeparator & Trim(Str(RunId)) &
gstrFileSeparator
' Dummy file since the function expects a file
name
MakePathValid (msOutputDir & "a.txt")
End If

' Call a procedure to determine the next step to be
executed
' - could be a constraint or the step itself
' Initialize a module-level variable to the step
being
' executed
Set mcExecStep = NextStep
If mcExecStep Is Nothing Then
RaiseEvent StepComplete(mcStep,
Determine64BitTime(), mlngInstanceId, miStatus)
' No more stuff to execute
Exit Sub
End If

Dim sStartDir As String

Set mcExecObj = New
EXECUTEDLLLib.Execute

' The VB errors class uses the WriteError method
of the Execute class to write
' all VB errors to the error file for the step (this
prevents a clash when the
' VB errors and Execution errors have to be
written to the same log). Hence, store
' a reference to the Execute object in mcVBErr
msErrorFile = GetOutputFile(gsErrorFileSuffix)
mcExecObj.ErrorFile = msErrorFile

```

```

    Call DeleteFile(msErrorFile,
bCheckIfEmpty:=False)
    Set mcVBErr.ErrorFile = mcExecObj

    If mcExecStep.ExecutionMechanism =
gintExecuteShell Then
        sStartDir =
Trim$(GetShortName(SubstituteParameters(
-
        mcExecStep.StartDir,
mcExecStep.WorkspaceId, mcIterators,
WspParameters:=WspParameters)))
        ' Dummy connection object
        Set cConn = New cConnection
        Set cRunConnDtl = New cConnDtl
    Else
        ' Find the connection string value and
substitute parameter values in it
        Set cRunConnDtl =
WspConnDtls.GetConnectionDtl(mcExecSt
ep.WorkspaceId, mcExecStep.StartDir)
        Set cConn =
WspConnections.GetConnection(mcExecSte
p.WorkspaceId,
cRunConnDtl.ConnectionString)
        sStartDir =
Trim$(SubstituteParameters(cConn.Connec
tionValue, _
        mcExecStep.WorkspaceId,
mcIterators,
WspParameters:=WspParameters))
    End If

    msOutputFile =
GetOutputFile(gsOutputFileSuffix)
    Call DeleteFile(msOutputFile,
bCheckIfEmpty:=False)
    mcExecObj.OutputFile = msOutputFile
    ' mcExecObj.LogFile =
GetShortName(SubstituteParameters(_
    ' mcExecStep.LogFile,
mcExecStep.WorkspaceId, mcIterators,
WspParameters:=WspParameters))
    If mcExecStep.ExecutionMechanism =
gintExecuteODBC And _
        cRunConnDtl.ConnType =
ConnTypeDynamic Then
        Call
mcExecObj.DoExecute(BuildCommandStri
ng(), sStartDir,
mcExecStep.ExecutionMechanism, _
        cConn.NoCountDisplay,
cConn.NoExecute, cConn.ParseQueryOnly,
cConn.QuotedIdentifiers, _
        cConn.AnsiNulls,
cConn.ShowQueryPlan,
cConn.ShowStatsTime,
cConn.ShowStatsIO, _
        cConn.RowCount,
cConn.QueryTimeOut, gstrEmptyString)
    Else
        Call
mcExecObj.DoExecute(BuildCommandStri
ng(), sStartDir,
mcExecStep.ExecutionMechanism, _
        cConn.NoCountDisplay,
cConn.NoExecute, cConn.ParseQueryOnly,
cConn.QuotedIdentifiers, _
        cConn.AnsiNulls,
cConn.ShowQueryPlan,
cConn.ShowStatsTime,
cConn.ShowStatsIO, _
        cConn.RowCount,
cConn.QueryTimeOut,
mcExecStep.StartDir)

```

```

    End If
    Exit Sub

ExecuteErr:
    Call HandleExecutionError

    ' We can assume that if we are in this
function, a StepStart event has been triggered
already.
    RaiseEvent StepComplete(mcStep,
Determine64BitTime(), mlngInstanceId,
miStatus)

End Sub
Private Function BuildCommandString() As
String
    ' Process text to be executed - either from the
text
    ' field or read it from a file.
    ' This function will always return the
command text for ODBC commands
    ' and a file name for Shell commands
    Dim sFile As String
    Dim sCommand As String
    Dim sTemp As String

    On Error GoTo BuildCommandStringErr

    If Not
StringEmpty(mcExecStep.StepTextFile) Then
        ' Substitute parameter values and
environment variables
        ' in the filename
        msRunStepDtl =
SubstituteParameters(mcExecStep.StepTextFil
e, _
        mcExecStep.WorkspaceId,
mcIterators, WspParameters:=WspParameters)

        sFile = GetShortName(msRunStepDtl)

        mstrCommand =
SubstituteParametersInText(sFile,
mcExecStep.WorkspaceId)

        If mcExecStep.ExecutionMechanism =
gintExecuteODBC Then
            ' Read the contents of the file and pass
it to ODBC
            BuildCommandString =
ReadCommandFromFile(mstrCommand)
        Else
            BuildCommandString = mstrCommand
        End If
    Else
        ' Substitute parameter values and
environment variables
        ' in the step text
        msRunStepDtl =
SubstituteParameters(mcExecStep.StepText, _
        mcExecStep.WorkspaceId,
mcIterators, WspParameters:=WspParameters)
        mstrCommand = msRunStepDtl

        If mcExecStep.ExecutionMechanism =
gintExecuteShell Then
            ' Write the command to a temp file
(enables us to execute multiple
            ' commands via the command
interpreter)
            mstrCommand =
WriteCommandToFile(msRunStepDtl)
            BuildCommandString = mstrCommand
        Else

```

```

        BuildCommandString =
SQLFixup(msRunStepDtl)
    End If
End If

If CreateInputFiles Then
    Call CreateStepTextFile
End If

Exit Function

BuildCommandStringErr:
    ' Log the error code raised by the Execute
procedure
    ' Call LogErrors(Errors)
    mcVBErr.LogVBErrors

    On Error GoTo 0
    mstrSource = mstrModuleName & "Execute"
    Err.Raise vbObjectError + errExecuteStepFailed,
mstrSource, _
        LoadResString(errExecuteStepFailed) &
mstrCommand

End Function
Public Sub Abort()

    On Error GoTo AbortErr

    ' Setting the Abort flag to True will ensure that
we
    ' don't execute any more processes for this step
    mblnAbort = True

    If Not mcExecObj Is Nothing Then
        mcExecObj.Abort
    Else
        ' We are not in the middle of execution yet
    End If

    Exit Sub

AbortErr:
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError + errProgramError, _
mstrModuleName & "Abort", _
        LoadResString(errProgramError)

End Sub
Private Sub NextType(ByRef StepType As
NextNodeType, _
    ByRef Position As Integer)

    StepType = StepType + 1
    Position = 0

End Sub
Private Sub StepCompleted()

    On Error GoTo StepCompletedErr

    If Not mcExecStep Is Nothing Then
        If mcExecStep Is mcStep Then
            miStatus = InitializeExecStatus
            If miStatus = gintFailed Then
                ' Create input files if the step failed
execution and one hasn't been created already
                If Not CreateInputFiles Then
                    CreateStepTextFile
                    Call
mcVBErr.WriteError(errExecuteStepFailed, _
                    OptArgs:="Continuation criteria for
the step is: " &
                    gsContCriteria(mcStep.ContinuationCriteria))

```

```

    End If
  End If
End If

Exit Sub

StepCompletedErr:
' Log the error code raised by Visual
Basic
miStatus = gintFailed
mcVBErr.LogVBErrors
Call
mcVBErr.WriteError(errExecuteStepFailed,
-
    OptArgs:="Continuation criteria for
the step is: " &
gsContCriteria(mcStep.ContinuationCriteria
))
End Sub
Private Sub DeleteEmptyOutputFiles()

    On Error GoTo
DeleteEmptyOutputFilesErr

    ' Delete empty output and error files
If Not mcExecStep Is Nothing Then
    Call DeleteFile(msErrorFile,
bCheckIfEmpty:=True)
    Call DeleteFile(msOutputFile,
bCheckIfEmpty:=True)
End If

Exit Sub

DeleteEmptyOutputFilesErr:
' Not a critical error - continue

End Sub
Private Function
ReadCommandFromFile(strFileName As
String) As String

' Returns the contents of the passed in file

Dim sCommand As String
Dim sTemp As String
Dim InputFile As Integer

On Error GoTo
ReadCommandFromFileErr

If Not StringEmpty(strFileName) Then

    InputFile = FreeFile
    Open strFileName For Input Access
Read As InputFile

    Line Input #InputFile, sCommand '
Read line into variable.

    Do While Not EOF(InputFile) ' Loop
until end of file.
        Line Input #InputFile, sTemp ' Read
line into variable.
        sCommand = sCommand & vbCrLf
& sTemp
    Loop

    Close InputFile
End If

ReadCommandFromFile = sCommand

Exit Function

```

```

ReadCommandFromFileErr:

' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ReadCommandFromFile"
On Error GoTo 0
Err.Raise vbObjectError +
errSubValuesFailed, _
    gstrSource, _
    LoadResString(errSubValuesFailed)

End Function
Private Function
SubstituteParametersIfPossible(strLabel As
String)

    On Error GoTo
SubstituteParametersIfPossibleErr

    SubstituteParametersIfPossible =
SubstituteParameters(strLabel, _
    mcExecStep.WorkspaceId, mcIterators,
WspParameters:=WspParameters)
Exit Function

SubstituteParametersIfPossibleErr:
    SubstituteParametersIfPossible = strLabel

End Function
Private Function
SubstituteParametersInText(strFileName As
String, _
    lngWorkspace As Long) As String

' Reads each line in the passed in file,
substitutes parameter
' values in the line and writes out the
modified line to a
' temporary file that we create. The
temporary file will be
' removed once the step completes
execution.
' Returns the name of the newly created
temporary file.

Dim strTempFile As String
Dim strTemp As String
Dim strOutput As String
Dim InputFile As Integer
Dim OutputFile As Integer

On Error GoTo
SubstituteParametersInTextErr

strTempFile = CreateTempFile()

If Not StringEmpty(strFileName) Then

    InputFile = FreeFile
    Open strFileName For Input Access Read
As InputFile

    OutputFile = FreeFile
    Open strTempFile For Output Access
Write As OutputFile

    Do While Not EOF(InputFile) ' Loop until
end of file.
        Line Input #InputFile, strTemp ' Read
line into variable.
        strOutput =
SubstituteParameters(strTemp, lngWorkspace,
mcIterators, WspParameters:=WspParameters)

```

```

    If mcExecStep.ExecutionMechanism =
gintExecuteODBC Then strOutput =
SQLFixup(strOutput)

    Print #OutputFile, strOutput
    BugMessage strOutput
    Loop

End If

Close InputFile
Close OutputFile

SubstituteParametersInText = strTempFile

Exit Function

SubstituteParametersInTextErr:

' Log the error code raised by Visual Basic
' Call LogErrors(Errors)
mcVBErr.LogVBErrors
mstrSource = mstrModuleName &
"SubstituteParametersInText"
On Error GoTo 0
Err.Raise vbObjectError + errSubValuesFailed, _
    gstrSource, _
    LoadResString(errSubValuesFailed)

End Function

Private Function WriteCommandToFile(sCommand
As String, Optional sFile As String =
gstrEmptyString) As String

' Writes the command text to a temporary file
' Returns the name of the temporary file

Dim OutputFile As Integer

On Error GoTo WriteCommandToFileErr

If StringEmpty(sFile) Then
    sFile = CreateTempFile()
End If

OutputFile = FreeFile
Open sFile For Output Access Write As
OutputFile

Print #OutputFile, sCommand

Close OutputFile

WriteCommandToFile = sFile

Exit Function

WriteCommandToFileErr:

' Log the error code raised by Visual Basic
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"WriteCommandToFile"
On Error GoTo 0
Err.Raise vbObjectError + errSubValuesFailed, _
    gstrSource, _
    LoadResString(errSubValuesFailed)

End Function

Public Property Get WspPreCons() As Variant
WspPreCons = mcvntWspPreCons

```

```

End Property
Public Property Let WspPreCons(ByVal
vdata As Variant)
    mcvntWspPreCons = vdata
End Property

Public Property Get WspPostCons() As
Variant
    WspPostCons = mcvntWspPostCons
End Property
Public Property Let WspPostCons(ByVal
vdata As Variant)
    mcvntWspPostCons = vdata
End Property

Public Property Get PreCons() As Variant
    PreCons = mcvntPreCons
End Property
Public Property Let PreCons(ByVal vdata
As Variant)
    mcvntPreCons = vdata
End Property

Public Property Get PostCons() As Variant
    PostCons = mcvntPostCons
End Property
Public Property Let PostCons(ByVal vdata
As Variant)
    mcvntPostCons = vdata
End Property

Public Property Set Globals(cRunSteps As
cArrSteps)

    Set mcGlobals = cRunSteps

End Property
Public Property Set ExecuteStep(cRunStep
As cStep)

    Set mcStep = cRunStep

End Property
Public Property Get Globals() As cArrSteps

    Set Globals = mcGlobals

End Property
Public Property Get ExecuteStep() As cStep

    Set ExecuteStep = mcStep

End Property
Public Property Set Iterators(vdata As
cRunCollt)

    Set mcIterators = vdata

End Property
Private Sub Class_Initialize()

    ' Initialize the Abort flag to False
    mblnAbort = False
    Set mcVBErr = New cVBErrorsSM
    Set mcTermProcess = New cTermProcess

End Sub

Private Sub Class_Terminate()

    On Error GoTo Class_TerminateErr

    Set mcExecObj = Nothing
    Set mcVBErr = Nothing
    Set mcTermProcess = Nothing

```

```

Exit Sub

Class_TerminateErr:
    Call LogErrors(Errors)

End Sub

Private Sub mcExecObj_Start(ByVal
StartTime As Currency)
    ' Raise an event indicating that the step has
    begun execution
    RaiseEvent ProcessStart(mcExecStep,
msRunStepDtl, StartTime, mlngInstanceId)
End Sub

Private Sub mcExecObj_Complete(ByVal
EndTime As Currency, ByVal Elapsed As
Long)

    On Error GoTo mcExecObj_CompleteErr

    Debug.Print Elapsed
    RaiseEvent ProcessComplete(mcExecStep,
EndTime, mlngInstanceId, Elapsed)
    mcTermProcess.ProcessTerminated

Exit Sub

mcExecObj_CompleteErr:
    Call LogErrors(Errors)

End Sub

Private Sub
mcTermProcess_TermProcessExists()

    On Error GoTo TermProcessExistsErr

    ' Call a procedure to execute the next step, if
    any
    Call Execute

Exit Sub

TermProcessExistsErr:
    ' Log the error code raised by the Execute
    procedure
    Call LogErrors(Errors)

End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cRunWorkspace"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cRunWorkspace.cls
'
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE:  This class loads all the
information necessary to
'           execute a workspace and calls
cRunInst to execute the workspace.
'           It also propagates Step start and
complete and
'           Run start and complete events.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)

```

```

Option Explicit

' Used to indicate the source module name when
errors
' are raised by this module
Private Const mstrModuleName As String =
"cRunWorkspace."
Private mstrSource As String

Private mcRunSteps As cArrSteps
Private mcRunParams As cArrParameters
Private mcRunConstraints As cArrConstraints
Private mcRunConnections As cConnections
Private mcRunConnDtls As cConnDtls
Private mcvntWspPreCons As Variant
Private mcvntWspPostCons As Variant
Private mdbLoadDb As Database
Private mlngRunId As Long
Private mlngWorkspaceId As Long
Private mField As cStringSM
Public CreateInputFiles As Boolean

Private WithEvents mcRun As cRunInst
Attribute mcRun.VB_VarHelpID = -1

Public Event RunStart(dtmStartTime As Currency,
strWspLog As String, IRunId As Long)
Public Event RunComplete(dtmEndTime As
Currency)
Public Event StepStart(cStepRecord As cStep,
dtmStartTime As Currency, lngInstanceId As Long,
_
    sPath As String, sIts As String)
Public Event StepComplete(cStepRecord As cStep,
dtmEndTime As Currency, lngInstanceId As Long)
Public Event ProcessStart(cStepRecord As cStep,
strCommand As String, _
    dtmStartTime As Currency, lngInstanceId As
Long)
Public Event ProcessComplete(cStepRecord As
cStep, dtmEndTime As Currency, lngInstanceId As
Long)
Public Function InstancesForStep(lngStepId As
Long, iStatus As InstanceStatus) As cInstances
    ' Returns an array of all the instances for a step

    If mcRun Is Nothing Then
        Set InstancesForStep = Nothing
    Else
        Set InstancesForStep =
mcRun.InstancesForStep(lngStepId, iStatus)
    End If

End Function
Private Sub InsertRunDetail(cStepRecord As cStep,
_
    strCommand As String, dtmStartTime As
Currency, _
    lngInstanceId As Long, lParentInstanceId As
Long, sltValue As String)
    ' Inserts a new run detail record into the database

    Dim strInsert As String
    Dim qy As QueryDef

    On Error GoTo InsertRunDetailErr
    mstrSource = mstrModuleName &
"InsertRunDetail"

    strInsert = "insert into run_step_details " & _
        "( run_id, step_id, version_no, instance_id,
parent_instance_id, " & _
        " command, start_time, iterator_value ) " &
_

```



```

" values ( "
#If USE_JET Then

    strInsert = strInsert & " [r_id], [s_id],
[ver_no], [i_id], [p_i_id], " & _
    " [com], [s_date], [it_val] )"

    Set qy = mdbLoadDb.CreateQueryDef( _
        gstrEmptyString, strInsert)

' Call a procedure to assign the Querydef
parameters
Call AssignParameters(qy,
StartTime:=dtmStartTime, _
StepId:=cStepRecord.StepId, _
Version:=cStepRecord.VersionNo, _
InstanceId:=lngInstanceId, _
Command:=strCommand)

qy.Execute dbFailOnError
qy.Close

#Else

    strInsert = strInsert & Str(mlngRunId) _
    & ", " & Str(cStepRecord.StepId) _
    & ", " &
mField.MakeStringFieldValid(cStepRecord.
VersionNo) _
    & ", " & Str(lngInstanceId) _
    & ", " & Str(lParentInstanceId) _
    & ", " &
mField.MakeStringFieldValid(strCommand)
    _
    & ", " & Str(dtmStartTime) _
    & ", " &
mField.MakeStringFieldValid(sItValue)

    strInsert = strInsert & " ) "

    mdbLoadDb.Execute strInsert,
dbFailOnError

#End If

Exit Sub

InsertRunDetailErr:
LogErrors Errors
mstrSource = mstrModuleName &
"InsertRunDetail"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _

LoadResString(errUpdateRunDataFailed)

End Sub
Private Sub UpdateRunDetail(cStepRecord
As cStep, _
    dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)
' Updates the run detail record in the
database

Dim strUpdate As String
Dim qy As QueryDef

On Error GoTo UpdateRunDetailErr

strUpdate = "update run_step_details " &
_

```

```

" set end_time = [e_date], elapsed_time
= [elapsed] " & _
" where run_id = [r_id] " & _
" and step_id = [s_id] " & _
" and version_no = [ver_no] " & _
" and instance_id = [i_id] "

Set qy = mdbLoadDb.CreateQueryDef( _
    gstrEmptyString, strUpdate)

' Call a procedure to assign the Querydef
parameters
Call AssignParameters(qy,
EndTime:=dtmEndTime, _
StepId:=cStepRecord.StepId, _
Version:=cStepRecord.VersionNo, _
InstanceId:=lngInstanceId,
Elapsed:=lElapsed)

qy.Execute dbFailOnError
qy.Close

Exit Sub

UpdateRunDetailErr:
LogErrors Errors
mstrSource = mstrModuleName &
"UpdateRunDetail"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _

LoadResString(errUpdateRunDataFailed)

End Sub
Private Function
InsertRunHeader(dtmStartTime As Currency)
As Long
' Inserts a new run header record into the
database
' and returns the id for the run

Dim strInsert As String
Dim qy As QueryDef

On Error GoTo InsertRunHeaderErr

strInsert = "insert into run_header " & _
    "( run_id, workspace_id, start_time ) " &
_
    " values ( " & _
    " [r_id], [w_id], [s_date] )"

Set qy = mdbLoadDb.CreateQueryDef( _
    gstrEmptyString, strInsert)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy,
StartTime:=dtmStartTime)

qy.Execute dbFailOnError
qy.Close

InsertRunHeader = mlngRunId
Exit Function

InsertRunHeaderErr:
LogErrors Errors
mstrSource = mstrModuleName &
"InsertRunHeader"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _

```

```

mstrSource, _
LoadResString(errUpdateRunDataFailed)

End Function
Private Sub InsertRunParameters(dtmStartTime As
Currency)
' Inserts a new run header record into the database
' and returns the id for the run

Dim strInsert As String
Dim qy As QueryDef
Dim cParamRec As cParameter
Dim lngIndex As Long

On Error GoTo InsertRunParametersErr

strInsert = "insert into run_parameters " & _
    "( run_id, parameter_name, parameter_value )
" & _
    " values ( " & _
    " [r_id], [p_name], [p_value] )"

Set qy = mdbLoadDb.CreateQueryDef( _
    gstrEmptyString, strInsert)
qy.Parameters("r_id").Value = mlngRunId

For lngIndex = 0 To
mcRunParams.ParameterCount - 1
Set cParamRec = mcRunParams(lngIndex)

qy.Parameters("p_name").Value =
cParamRec.ParameterName
qy.Parameters("p_value").Value =
cParamRec.ParameterValue
qy.Execute dbFailOnError

Next lngIndex

qy.Close

Exit Sub

InsertRunParametersErr:
LogErrors Errors
mstrSource = mstrModuleName &
"InsertRunParameters"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _
LoadResString(errUpdateRunDataFailed)

End Sub
Private Sub AssignParameters(qyExec As
DAO.QueryDef, _
    Optional StartTime As Currency = 0, _
    Optional EndTime As Currency = 0, _
    Optional StepId As Long = 0, _
    Optional Version As String = gstrEmptyString,
_
    Optional InstanceId As Long = 0, _
    Optional ParentInstanceId As Long = 0, _
    Optional Command As String =
gstrEmptyString, _
    Optional Elapsed As Long = 0, _
    Optional ItValue As String = gstrEmptyString)
' Assigns values to the parameters in the querydef
object

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

```

```

For Each prmParam In
  qyExec.Parameters
  Select Case prmParam.Name
    Case "[w_id]"
      prmParam.Value =
  mIngWorkspaceld

    Case "[r_id]"
      prmParam.Value = mIngRunId

    Case "[s_id]"
      BugAssert StepId <> 0
      prmParam.Value = StepId

    Case "[ver_no]"
      BugAssert Not
StringEmpty(Version)
      prmParam.Value = Version

    Case "[i_id]"
      BugAssert InstanceId <> 0
      prmParam.Value = InstanceId

    Case "[p_i_id]"
      prmParam.Value =
ParentInstanceId

    Case "[com]"
      BugAssert Not
StringEmpty(Command)
      prmParam.Value = Command

    Case "[s_date]"
      BugAssert StartTime <> 0
      prmParam.Value = StartTime

    Case "[e_date]"
      BugAssert EndTime <> 0
      prmParam.Value = EndTime

    Case "[elapsed]"
      prmParam.Value = Elapsed

    Case "[it_val]"
      prmParam.Value = ItValue

    Case Else
      ' Write the parameter name that is
  faulty
      WriteError errInvalidParameter,
  mstrSource, _
      prmParam.Name
      On Error GoTo 0
      Err.Raise vbObjectError +
  errAssignParametersFailed, _
  mstrSource,
  LoadResString(errInvalidParameter)
  End Select
  Next prmParam

  Exit Sub

AssignParametersErr:
  mstrSource = mstrModuleName &
  "AssignParameters"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError +
  errAssignParametersFailed, _
  mstrSource,
  LoadResString(errAssignParametersFailed)

  End Sub

```

```

Private Sub RunStartProcessing(dtmStartTime
  As Currency)

  On Error GoTo RunStartProcessingErr

  ' Insert the run header into the database
  Call InsertRunHeader(dtmStartTime)

  ' Insert the run parameters into the database
  Call InsertRunParameters(dtmStartTime)

  Exit Sub

RunStartProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName &
  "RunStartProcessing"
  ShowError errUpdateRunDataFailed
  WriteError errUpdateRunDataFailed,
  mstrSource

  End Sub

Private Sub
  ProcessStartProcessing(cStepRecord As cStep,
  _
  strCommand As String, dtmStartTime As
  Currency, lngInstanceId As Long, _
  lParentInstanceId As Long, sltValue As
  String)

  On Error GoTo ProcessStartProcessingErr

  ' Insert the run detail into the database
  Call InsertRunDetail(cStepRecord,
  strCommand, dtmStartTime, lngInstanceId, _
  lParentInstanceId, sltValue)

  Exit Sub

ProcessStartProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName &
  "ProcessStartProcessing"
  ShowError errUpdateRunDataFailed
  WriteError errUpdateRunDataFailed,
  mstrSource

  End Sub

Private Sub StepStartProcessing(cStepRecord
  As cStep, dtmStartTime As Currency, _
  lngInstanceId As Long, lParentInstanceId
  As Long, sltValue As String)

  On Error GoTo StepStartProcessingErr

  ' Since ProcessStart events won't be
  triggered for manager steps
  If cStepRecord.StepType = gintManagerStep
  Then
    ' Insert the run detail into the database
    Call InsertRunDetail(cStepRecord,
  cStepRecord.StepLabel, _
  dtmStartTime, lngInstanceId,
  lParentInstanceId, sltValue)
  End If

  Exit Sub

StepStartProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName &
  "StepStartProcessing"

```

```

  ShowError errUpdateRunDataFailed

  End Sub

Private Sub
  ProcessCompleteProcessing(cStepRecord As cStep,
  _
  dtmStartTime As Currency, lngInstanceId As
  Long, lElapsed As Long)

  On Error GoTo ProcessCompleteProcessingErr

  ' Insert the run detail into the database
  Call UpdateRunDetail(cStepRecord,
  dtmStartTime, lngInstanceId, lElapsed)

  Exit Sub

ProcessCompleteProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  mstrSource = mstrModuleName &
  "ProcessCompleteProcessing"
  ShowError errUpdateRunDataFailed

  End Sub

Private Sub StepCompleteProcessing(cStepRecord
  As cStep, _
  dtmEndTime As Currency, lngInstanceId As
  Long, lElapsed As Long)

  On Error GoTo StepCompleteProcessingErr

  ' Since ProcessComplete events won't be
  triggered for manager steps
  If cStepRecord.StepType = gintManagerStep
  Then
    ' Update the run detail in the database
    Call UpdateRunDetail(cStepRecord,
  dtmEndTime, lngInstanceId, lElapsed)
  End If

  Exit Sub

StepCompleteProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ShowError errUpdateRunDataFailed

  End Sub

Private Sub RunCompleteProcessing(dtmEndTime
  As Currency)

  On Error GoTo RunCompleteProcessingErr

  ' Update the header record with the end time for
  the run
  Call UpdateRunHeader(dtmEndTime)

  Exit Sub

RunCompleteProcessingErr:
  ' Log the error code raised by Visual Basic
  Call LogErrors(Errors)
  ShowError errUpdateRunDataFailed

  End Sub

Private Sub UpdateRunHeader(ByVal dtmEndTime
  As Currency)
  ' Updates the run header record with the end date

  Dim strUpdate As String
  Dim qy As QueryDef

  On Error GoTo UpdateRunHeaderErr

```

```

strUpdate = "update run_header " & _
" set end_time = [e_date]" & _
" where run_id = [r_id]"

Set qy = mdbaLoadDb.CreateQueryDef( _
gstrEmptyString, strUpdate)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy,
EndTime:=dtmEndTime)

qy.Execute dbFailOnError
qy.Close

Exit Sub

UpdateRunHeaderErr:
LogErrors Errors
mstrSource = mstrModuleName &
"UpdateRunHeader"
On Error GoTo 0
Err.Raise vbObjectError +
errUpdateRunDataFailed, _
mstrSource, _

LoadResString(errUpdateRunDataFailed)

End Sub

Public Property Let WorkspaceId(ByVal
vdata As Long)
mIngWorkspaceId = vdata
End Property
Public Property Get WorkspaceId() As Long
WorkspaceId = mIngWorkspaceId
End Property
Public Sub RunWorkspace()

Dim cRunSeq As cSequence

On Error GoTo RunWorkspaceErr

' Call a procedure to load the module-
level structures
' with all the step and parameter data for
the run
If LoadRunData = False Then
' Error handled by the function already
Exit Sub
End If

' Retrieve the next run identifier using the
sequence class
Set cRunSeq = New cSequence
Set cRunSeq.IdDatabase = dbsAttTool
cRunSeq.IdentifierColumn = "run_id"
mIngRunId = cRunSeq.Identifier
Set cRunSeq = Nothing

Call
mcRunParams.InitBuiltInsForRun(mIngWor
kspaceId, mIngRunId)

Set mcRun.Constraints =
mcRunConstraints
mcRun.WspPreExecution =
mcvntWspPreCons
mcRun.WspPostExecution =
mcvntWspPostCons

Set mcRun.Steps = mcRunSteps
Set mcRun.Parameters = mcRunParams

Set mcRun.RunConnections =
mcRunConnections
Set mcRun.RunConnDtls = mcRunConnDtls

mcRun.WspId = mIngWorkspaceId
mcRun.RootKey =
LabelStep(mIngWorkspaceId)
mcRun.RunId = mIngRunId
mcRun.CreateInputFiles = CreateInputFiles

mcRun.Run

Exit Sub

RunWorkspaceErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)

End Sub
Public Property Get LoadDb() As Database

Set LoadDb = mdbaLoadDb

End Property
Public Property Set LoadDb(vdata As
Database)

Set mdbaLoadDb = vdata

End Property
Private Function LoadRunData() As Boolean

' Loads the step, parameter and constraint
arrays
' with all the data for the workspace. Returns
False
' if a failure occurs

Dim strWorkspaceName As String
Dim recWspSteps As Recordset
Dim qySteps As DAO.QueryDef
Dim recWspParams As Recordset
Dim qyParams As DAO.QueryDef
Dim recWspConns As Recordset
Dim qyConns As DAO.QueryDef
Dim recWspConnDtls As Recordset
Dim qyConnDtls As DAO.QueryDef

On Error GoTo LoadRunDataErr

Set mcRunSteps.StepDB = mdbaLoadDb
Set mcRunParams.ParamDatabase =
mdbaLoadDb
Set mcRunConstraints.ConstraintDB =
mdbaLoadDb
Set mcRunConnections.ConnDb =
mdbaLoadDb
Set mcRunConnDtls.ConnDb =
mdbaLoadDb

' Read all the step and parameter data for the
workspace
Call
ReadWorkspaceData(mIngWorkspaceId,
mcRunSteps, _
mcRunParams, mcRunConstraints,
mcRunConnections, mcRunConnDtls, _
recWspSteps, qySteps, recWspParams,
qyParams, recWspConns, qyConns, _
recWspConnDtls, qyConnDtls)

' Load all the pre- and post-execution
constraints that
' have been defined for the workspace

```

```

mcvntWspPreCons =
mcRunConstraints.ConstraintsForWsp( _
mIngWorkspaceId, _
gintPreStep, _
blnSort:=True, _
blnGlobalConstraintsOnly:=True)
mcvntWspPostCons =
mcRunConstraints.ConstraintsForWsp( _
mIngWorkspaceId, _
gintPostStep, _
blnSort:=True, _
blnGlobalConstraintsOnly:=True)

On Error Resume Next
recWspSteps.Close
qySteps.Close
recWspParams.Close
qyParams.Close
recWspConns.Close
qyConns.Close

LoadRunData = True

Exit Function

LoadRunDataErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
ShowError errLoadRunDataFailed
LoadRunData = False

End Function
Public Sub StopRun()

On Error GoTo StopRunErr

If mcRun Is Nothing Then
' We haven't been the run yet, so do nothing
Else
mcRun.StopRun
End If

Exit Sub

StopRunErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
' Errors would have been displayed by the called
process

End Sub
Public Sub AbortRun()

On Error GoTo AbortRunErr

If mcRun Is Nothing Then
' We haven't been the run yet, so do nothing
Else
mcRun.Abort
End If

Exit Sub

AbortRunErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
' Errors would have been displayed by the called
process

End Sub

Private Sub Class_Initialize()

' Create instances of the step, parameter and
constraint arrays

```

```

Set mcRunSteps = New cArrSteps
Set mcRunParams = New cArrParameters
Set mcRunConstraints = New
cArrConstraints
Set mcRunConnections = New
cConnections
Set mcRunConnDtls = New cConnDtls
Set mcRun = New cRunInst
Set mField = New cStringSM

End Sub
Private Sub Class_Terminate()

On Error GoTo UnLoadRunDataErr

' Clears the step, parameter and constraint
arrays
Set mcRunSteps = Nothing
Set mcRunParams = Nothing
Set mcRunConstraints = Nothing
Set mcRunConnections = Nothing
Set mcRunConnDtls = Nothing

Set mcRun = Nothing
Set mdbLoadDb = Nothing
Set mField = Nothing

Exit Sub

UnLoadRunDataErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
' Not a critical error - continue
Resume Next

End Sub

Private Sub
mcRun_ProcessComplete(cStepRecord As
cStep, _
dtmEndTime As Currency,
lngInstanceId As Long, lElapsed As Long)

RaiseEvent
ProcessComplete(cStepRecord,
dtmEndTime, lngInstanceId)
Call
ProcessCompleteProcessing(cStepRecord,
dtmEndTime, lngInstanceId, lElapsed)

End Sub

Private Sub
mcRun_ProcessStart(cStepRecord As cStep,
_
strCommand As String, dtmStartTime
As Currency, lngInstanceId As Long, _
IParentInstanceId As Long, sltValue As
String)

RaiseEvent ProcessStart(cStepRecord,
strCommand, dtmStartTime, lngInstanceId)
Call ProcessStartProcessing(cStepRecord,
strCommand, dtmStartTime, lngInstanceId,
_
IParentInstanceId, sltValue)

End Sub

Private Sub
mcRun_RunComplete(dtmEndTime As
Currency)

```

```

Debug.Print "Run ended at: " &
CStr(dtmEndTime)
Call RunCompleteProcessing(dtmEndTime)

RaiseEvent RunComplete(dtmEndTime)

End Sub
Private Sub mcRun_RunStart(dtmStartTime
As Currency, strWspLog As String)

RaiseEvent RunStart(dtmStartTime,
strWspLog, mlngRunId)
Debug.Print "Run started at: " &
CStr(dtmStartTime)

Call RunStartProcessing(dtmStartTime)

End Sub
Private Sub
mcRun_StepComplete(cStepRecord As cStep,
_
dtmEndTime As Currency, lngInstanceId
As Long, lElapsed As Long)

RaiseEvent StepComplete(cStepRecord,
dtmEndTime, lngInstanceId)
' BugMessage "Step: " &
cStepRecord.StepLabel & " has completed!"

Call StepCompleteProcessing(cStepRecord,
dtmEndTime, lngInstanceId, lElapsed)

End Sub
Private Sub mcRun_StepStart(cStepRecord As
cStep, dtmStartTime As Currency, _
lngInstanceId As Long, lParentInstanceId
As Long, sPath As String, slts As String,
sltValue As String)

RaiseEvent StepStart(cStepRecord,
dtmStartTime, lngInstanceId, sPath, slts)
'bugmessage "Step: " &
cStepRecord.StepLabel & " has started."

Call StepStartProcessing(cStepRecord,
dtmStartTime, lngInstanceId,
lParentInstanceId, sltValue)

End Sub

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 True
END
Attribute VB_Name = "cSequence"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cSequence.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This class uses the
att_identifiers table to generate unique
identifiers.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'

Option Explicit

Private mlngIdentifier As Long
Private mstrIdentifierColumn As String

```

```

Private mrecIdentifiers As Recordset
Private mdbDatabase As Database

Private Const mstrEmptyString = ""

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cSequence."

Private Sub CreateIdRecord()
' Creates a record with all identifiers having an
initial value of 1

Dim sSql As String
Dim pId As DAO.Parameter
Dim qyId As DAO.QueryDef

sSql = "insert into att_identifiers (" & _
" workspace_id, parameter_id, step_id, " &
_
" constraint_id, run_id, connection_id " & _
", " & FLD_ID_CONN_NAME & _
" ) values (" & _
"[w_id], [p_id], [s_id], [c_id], [r_id],
[conn_id], [conn_dtl_id] )"
Set qyId =
mdbDatabase.CreateQueryDef(gstrEmptyString,
sSql)
For Each pId In qyId.Parameters
pId.Value = glMinId
Next pId
qyId.Execute dbFailOnError
qyId.Close

End Sub
Private Sub CreateIdRecordset()

Dim strSql As String

' Initialize the recordset with all identifiers
strSql = "select * from att_identifiers"
Set mrecIdentifiers =
mdbDatabase.OpenRecordset(strSql,
dbOpenForwardOnly)

If mrecIdentifiers.RecordCount = 0 Then
CreateIdRecord
Set mrecIdentifiers =
mdbDatabase.OpenRecordset(strSql,
dbOpenForwardOnly)
End If

BugAssert mrecIdentifiers.RecordCount <> 0

End Sub

Public Property Set IdDatabase(vdata As Database)

Set mdbDatabase = vdata

End Property

Public Property Let IdentifierColumn(vdata As
String)

Dim intIndex As Integer

On Error GoTo IdentifierColumnErr

' Initialize the return value to an empty string
mstrIdentifierColumn = mstrEmptyString
Call CreateIdRecordset

```

```

For intIndex = 0 To
mrecIdentifiers.Fields.Count - 1

    If
LCASE(Trim(mrecIdentifiers.Fields(intIndex
).Name)) = _
        LCASE(Trim(vdata)) Then

        ' Valid column name
        mstrIdentifierColumn = vdata
        Exit Property
    End If

Next intIndex

BugAssert True, "Invalid column name!"

Exit Property

IdentifierColumnErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"IdentifierColumn"
    On Error GoTo 0
    Err.Raise vbObjectError +
errIdentifierColumnFailed, _
        mstrSource, _

LoadResString(errIdentifierColumnFailed)

End Property
Public Property Get Identifier() As Long
    Dim strSql As String

    On Error GoTo GetIdentifierErr

    BugAssert mstrIdentifierColumn <>
mstrEmptyString

    ' Increment the identifier column by 1
    strSql = "update att_identifiers " & _
        " set " & mstrIdentifierColumn & _
        " = " & mstrIdentifierColumn & " + 1"
    mdbDatabase.Execute strSql,
dbFailOnError

    ' Refresh the recordset with identifier
values
    Call CreateIdRecordset

    mlngIdentifier =
mrecIdentifiers.Fields(mstrIdentifierColumn
).Value

    Identifier = mlngIdentifier

Exit Property

GetIdentifierErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"Identifier"
    On Error GoTo 0
    Err.Raise vbObjectError +
errGetIdentifierFailed, _
        mstrSource, _

LoadResString(errGetIdentifierFailed)

End Property
Private Sub Class_Terminate()

mrecIdentifiers.Close

```

```

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cStack"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cStack.cls
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  This class implements a stack
of objects.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cStack."
Private mstrSource As String

Private mcVector As cVector
Private mlngCount As Long
Public Property Get Item(ByVal Position As
Long) As Object
    Attribute Item.VB_UserMemId = 0

    Set Item = mcVector(Position)

End Property

Public Sub Push(objToPush As Object)

    mcVector.Add objToPush

End Sub
Public Sub Clear()

    mcVector.Clear

End Sub

Public Function Pop() As Object

    If mcVector.Count > 0 Then
        Set Pop =
mcVector.Delete(mcVector.Count - 1)
    Else
        Set Pop = Nothing
    End If

End Function
Public Function Count() As Long

    Count = mcVector.Count

End Function

Private Sub Class_Initialize()

    Set mcVector = New cVector

End Sub

```

```

Private Sub Class_Terminate()

    Set mcVector = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY =
"SaveWithClassBuilder", "Yes"
Attribute VB_Ext_KEY = "Top_Level", "Yes"
' FILE:    cStep.cls
'    Microsoft TPC-H Kit Ver. 1.00
'    Copyright Microsoft, 1999
'    All Rights Reserved
'
' PURPOSE:  Encapsulates the properties and
methods of a step.
'    Contains functions to insert, update and
delete
'    att_steps records from the database.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Local variable(s) to hold property value(s)
Private mlngStepId As Long
Private mstrVersionNo As String
Private mstrStepLabel As String
Private mstrStepTextFile As String
Private mstrStepText As String
Private mstrStartDir As String
Private mlngWorkspaceId As Integer
Private mlngParentStepId As Integer
Private mstrParentVersionNo As String
Private mintSequenceNo As Integer
Private mintStepLevel As Integer
Private mblnEnabledFlag As Boolean
Private mstrDegreeParallelism As String
Private mintExecutionMechanism As Integer
Private mstrFailureDetails As String
Private mintContinuationCriteria As Integer
Private mblnGlobalFlag As Boolean
Private mblnArchivedFlag As Boolean
Private mstrOutputFile As String
'Private mstrLogFile As String
Private mstrErrorFile As String
Private mdbDatabase As Database
Private mintStepType As Integer
Private mintOperation As Operation
Private mlngPosition As Long
Private mstrIteratorName As String
Private mcIterators As cNodeCollections
Private mblsNewVersion As Boolean
Private msOldVersion As String

' The following constants are used throughout the
project to
' indicate the different options selected by the user
' The options are presented to the user as control
arrays of
' option buttons. These constants have to be in sync
with the
' indexes of the option buttons.

```

```

' All the control arrays have an lbound of 1.
The value 0 is
' used to indicate that the property being
represented by the
' control array is not valid for the step
' Public enums are used since we cannot
expose public constants
' in class modules. gintNoOption is
applicable to all enums,
' but declared in the Execution method
enum, since we cannot
' declare it more than once.

' Is here as a comment
' Has been defined in public.bas with the
other object types
Public Enum gintStepType
    gintGlobalStep = 3
    gintManagerStep
    gintWorkerStep
End Enum

' Execution Method options
Public Enum ExecutionMethod
    gintNoOption = 0
    gintExecuteODBC
    gintExecuteShell
End Enum

' Failure criteria options
Public Enum FailureCriteria
    gintFailureODBC = 1
    gintFailureTextCompare
End Enum

' Continuation criteria options
' Note: Update the initialization of
gsContCriteria in Initialize() if the
' continuation criteria are modified
Public Enum ContinuationCriteria
    gintOnFailureAbort = 1
    gintOnFailureContinue
    gintOnFailureCompleteSiblings
    gintOnFailureAbortSiblings
    gintOnFailureSkipSiblings
    gintOnFailureAsk
End Enum

' The initial version #
Private Const mstrMinVersion As String =
"0.0"

' End of constants for option button control
arrays
' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cStep."

' The cSequence class is used to generate
unique step identifiers
Private mStepSeq As cSequence

' The StringSM class is used to carry out
string operations
Private mFieldValue As cStringSM
Private Sub NewVersion()

    mbIsNewVersion = True
    msOldVersion = mstrVersionNo

End Sub
Public Function IsNewVersion() As Boolean

```

```

    IsNewVersion = mbIsNewVersion
End Function

Public Function OldVersionNo() As String
    OldVersionNo = msOldVersion
End Function

Public Sub SaveIterators()
    ' This procedure checks if any changes have
been made
    ' to the iterators for the step. If so, it calls the
' methods of the iterator class to commit the
changes
    Dim cItRec As cIterator
    Dim lngIndex As Long

    On Error GoTo SaveIteratorsErr

    For lngIndex = 0 To mcIterators.Count - 1
        Set cItRec = mcIterators(lngIndex)

        Select Case cItRec.IndOperation
            Case QueryOp
                ' No changes were made to the
queried Step.
                ' Do nothing

            Case InsertOp
                cItRec.Add mlngStepId,
mstrVersionNo
                cItRec.IndOperation = QueryOp

            Case UpdateOp
                cItRec.Update mlngStepId,
mstrVersionNo
                cItRec.IndOperation = QueryOp

            Case DeleteOp
                cItRec.Delete mlngStepId,
mstrVersionNo
                ' Remove the record from the
collection
                mcIterators.Delete lngIndex

        End Select
    Next lngIndex

Exit Sub

SaveIteratorsErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"Save Iterators"
    On Error GoTo 0
    Err.Raise vbObjectError + errSaveFailed, _
mstrSource, _
LoadResString(errSaveFailed)

End Sub
Public Property Get IndOperation() As
Operation

    IndOperation = mintOperation

End Property
Public Property Let IndOperation(ByVal vdata
As Operation)

    BugAssert vdata = QueryOp Or vdata =
InsertOp Or vdata = UpdateOp Or vdata =
DeleteOp, "Invalid operation"
    mintOperation = vdata

End Property

```

```

Public Function Iterators() As Variant
    ' Returns a variant containing all the iterators that
' have been defined for the step

    Dim cStepIterators() As cIterator
    Dim cTemplt As cIterator
    Dim lngIndex As Long
    Dim lngItCount As Long

    On Error GoTo IteratorsErr

    lngItCount = 0
    For lngIndex = 0 To mcIterators.Count - 1
        ' Increase the array dimension and add the
constraint
        ' to it
        Set cTemplt = mcIterators(lngIndex)

        If cTemplt.IndOperation <> DeleteOp Then
            ReDim Preserve cStepIterators(lngItCount)
            Set cStepIterators(lngItCount) = cTemplt
            lngItCount = lngItCount + 1
        End If

    Next lngIndex

    If lngItCount = 0 Then
        Iterators = Empty
    Else
        Iterators = cStepIterators()
    End If

    Call QuickSort(Iterators)

Exit Function

IteratorsErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errIteratorsFailed, _
mstrModuleName & "Iterators", _
LoadResString(errIteratorsFailed)

End Function
Public Function IteratorCount() As Long
    ' Returns a count of all the iterators for the step

    Dim lngItCount As Long
    Dim lngIndex As Long
    Dim cTemplt As cIterator

    On Error GoTo IteratorsErr

    lngItCount = 0
    For lngIndex = 0 To mcIterators.Count - 1

        If mcIterators(lngIndex).IndOperation <>
DeleteOp Then
            lngItCount = lngItCount + 1
        End If

    Next lngIndex

    IteratorCount = lngItCount

Exit Function

IteratorsErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError + errIteratorsFailed, _
mstrSource, _
LoadResString(errIteratorsFailed)

End Function

```

```

Public Sub Validate()
    ' Each distinct object will have a Validate
    method which
    ' will check if the class properties are
    valid. This method
    ' will be used to check interdependent
    properties that
    ' cannot be validated by the let
    procedures.
    ' It should be called by the add and
    modify methods of the class

    ' Check if the step label has been specified
    If StringEmpty(mstrStepLabel) Then
        ShowError errStepLabelMandatory
        On Error GoTo 0
        Err.Raise vbObjectError +
        errValidateFailed, _
        "Validate",
    LoadResString(errValidateFailed)
    End If

    If Not IsStringEmpty(mstrStepText) And
    Not IsStringEmpty(mstrStepTextFile) Then
        ShowError errStepTextOrFile
        On Error GoTo 0
        Err.Raise vbObjectError +
        errStepTextOrFile, _
        "Validate",
    LoadResString(errStepTextOrFile)
    End If

End Sub

Public Function IncVersionY() As String
    ' The version number for a step is stored
    in the x.y
    ' format where x is the parent component
    and y is the
    ' child component of the step. This
    function will increment
    ' the y component of the step by 1

    On Error GoTo IncVersionYErr

    ' Store the old version number for the step
    Call NewVersion

    mstrVersionNo =
    Trim$(Str$(GetX(mstrVersionNo))) &
    gstrVerSeparator & _
    Trim$(Str$(GetY(mstrVersionNo) +
    1))
    IncVersionY = mstrVersionNo

    Exit Function

IncVersionYErr:
    ' Log the error code raised by Visual
    Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
    "IncVersionY"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errIncVersionYFailed, _
    gstrSource, _

    LoadResString(errIncVersionYFailed)

End Function

Public Function IncVersionX() As String
    ' The version number for a step is stored
    in the x.y

```

```

    ' format where x is the parent component and
    y is the
    ' child component of the step. This function
    will increment
    ' the y component of the step by 1 and reset
    the x component
    ' to 0

    On Error GoTo IncVersionXErr

    ' Store the old version number for the step
    Call NewVersion

    mstrVersionNo =
    Trim$(Str$(GetX(mstrVersionNo) + 1)) &
    gstrVerSeparator & "0"
    IncVersionX = mstrVersionNo

    Exit Function

IncVersionXErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
    "IncVersionX"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errIncVersionXFailed, _
    gstrSource, _
    LoadResString(errIncVersionXFailed)

End Function

Private Function GetY(strVersion As String)
    As Long
    ' The version number for a step is stored in
    the x.y
    ' format where x is the parent component and
    y is the
    ' child component of the step. Given an
    argument of type
    ' x.y, it returns y

    ' Truncate the fractional part to get the parent
    component
    ' of the version number (x.y)
    GetY = Val(Mid(strVersion,
    InStr(strVersion, gstrVerSeparator) + 1))

End Function

Private Function GetX(strVersion As String)
    As Long
    ' The version number for a step is stored in
    the x.y
    ' format where x is the parent component and
    y is the
    ' child component of the step. Given an
    argument of type
    ' x.y, it returns x

    ' Truncate the fractional part to get the parent
    component
    ' of the version number (x.y)
    GetX = Val(Left(strVersion,
    InStr(strVersion, gstrVerSeparator) - 1))

End Function

Public Function Clone(Optional cCloneStep As
    cStep) As cStep

    ' Creates a copy of a given step

    Dim lngIndex As Long

```

```

    Dim cItRec As cIterator
    Dim cItClone As cIterator

    On Error GoTo CloneErr

    If cCloneStep Is Nothing Then
        Set cCloneStep = New cStep
    End If

    ' Copy all the step properties to the newly created
    step
    ' Initialize the global flag first since subsequent
    ' validations might depend on it
    cCloneStep.GlobalFlag = mblnGlobalFlag
    ' cCloneStep.GlobalRunMethod =
    mintGlobalRunMethod

    cCloneStep.StepType = mintStepType
    cCloneStep.StepId = mlngStepId
    cCloneStep.VersionNo = mstrVersionNo
    cCloneStep.StepLabel = mstrStepLabel
    cCloneStep.StepTextFile = mstrStepTextFile
    cCloneStep.StepText = mstrStepText
    cCloneStep.StartDir = mstrStartDir
    cCloneStep.WorkspaceId = mlngWorkspaceId
    cCloneStep.ParentStepId = mlngParentStepId
    cCloneStep.ParentVersionNo =
    mstrParentVersionNo
    cCloneStep.StepLevel = mintStepLevel
    cCloneStep.SequenceNo = mintSequenceNo
    cCloneStep.EnabledFlag = mblnEnabledFlag
    cCloneStep.DegreeParallelism =
    mstrDegreeParallelism
    cCloneStep.ExecutionMechanism =
    mintExecutionMechanism
    cCloneStep.FailureDetails = mstrFailureDetails
    cCloneStep.ContinuationCriteria =
    mintContinuationCriteria
    cCloneStep.ArchivedFlag = mblnArchivedFlag
    cCloneStep.OutputFile = mstrOutputFile
    ' cCloneStep.LogFile = mstrLogFile
    cCloneStep.ErrorFile = mstrErrorFile
    cCloneStep.IteratorName = mstrIteratorName

    cCloneStep.IndOperation = mintOperation
    cCloneStep.Position = mlngPosition

    Set cCloneStep.NodeDB = mdbmsDatabase

    ' Clone all the iterators for the step
    For lngIndex = 0 To mclIterators.Count - 1
        Set cItRec = mclIterators(lngIndex)
        Set cItClone = cItRec.Clone
        cCloneStep.LoadIterator cItClone
    Next lngIndex

    ' And set the return value to the newly created
    step
    Set Clone = cCloneStep

    Exit Function

CloneErr:
    LogErrors Errors
    mstrSource = mstrModuleName & "Clone"
    On Error GoTo 0
    Err.Raise vbObjectError + errCloneFailed, _
    mstrSource, LoadResString(errCloneFailed)

End Function

' End Sub

Public Property Let OutputFile(ByVal vData As
    String)

```

```

mstrOutputFile = vdata
End Property
Public Property Get OutputFile() As String
    OutputFile = mstrOutputFile
End Property
'Public Property Let LogFile(ByVal vdata
As String)
'
' mstrLogFile = vdata
'
'End Property
'Public Property Get LogFile() As String
'
' LogFile = mstrLogFile
'
'End Property
Public Property Let ErrorFile(ByVal vdata
As String)
    mstrErrorFile = vdata
End Property
Public Property Let IteratorName(ByVal
vdata As String)
    mstrIteratorName = vdata
End Property
Public Property Get ErrorFile() As String
    ErrorFile = mstrErrorFile
End Property
Public Property Get IteratorName() As
String
    IteratorName = mstrIteratorName
End Property
Public Property Set NodeDB(vdata As
Database)
    Set mdbsDatabase = vdata
    Set mcIterators.NodeDB = vdata
End Property
Public Property Get NodeDB() As Database
    Set NodeDB = mdbsDatabase
End Property
Private Function IsStringEmpty(strToCheck
As String) As Boolean
    IsStringEmpty = (strToCheck =
gstrEmptyString)
End Function
Public Property Let EnabledFlag(ByVal
vdata As Boolean)
    ' The enabled flag must be False for all
global steps.

```

```

' This check must be made by the global step
class. Only
' generic step validations will be carried out
by this
' class
mblnEnabledFlag = vdata
End Property
Public Property Let GlobalFlag(ByVal vdata
As Boolean)
    mblnGlobalFlag = vdata
End Property
Public Property Get EnabledFlag() As Boolean
    EnabledFlag = mblnEnabledFlag
End Property
Public Property Let ArchivedFlag(ByVal vdata
As Boolean)
    mblnArchivedFlag = vdata
End Property
Public Property Get ArchivedFlag() As
Boolean
    ArchivedFlag = mblnArchivedFlag
End Property
Public Property Get GlobalFlag() As Boolean
    GlobalFlag = mblnGlobalFlag
End Property
Public Sub Add()
    ' Inserts a step record into the database - it
initializes
    ' the necessary properties for the step and
calls InsertStepRec
    ' to do the database work
    On Error GoTo AddErr
    ' A new record would have the deleted_flag
turned off!
    mblnArchivedFlag = False
    Call InsertStepRec
    ' If a new version of a step has been created,
reset the old version info, since
    ' it's already been saved to the db
    If IsNewVersion() Then
        mblnNewVersion = False
        msOldVersion = gstrEmptyString
    End If
    Exit Sub
AddErr:
    LogErrors Errors
    On Error GoTo 0
    Err.Raise vbObjectError +
errAddStepFailed, _
        mstrModuleName & "Add",
LoadResString(errAddStepFailed)
End Sub
Private Sub InsertStepRec()

```

```

' Inserts a step record into the database
' It first generates the insert statement using the
different
' step properties and then executes it
Dim strInsert As String
Dim qy As DAO.QueryDef
On Error GoTo InsertStepRecErr
' First check if the database object is valid
Call CheckDB
' Check if the step record is valid
Call Validate
If IsNewVersion() Then
    Call UpdOldVersionsArchFlg
End If
' Create a temporary querydef object
strInsert = "insert into att_steps " & _
    "( workspace_id, step_id, version_no, " & _
    " step_label, step_file_name, step_text,
start_directory, " & _
    " parent_step_id, parent_version_no,
sequence_no, " & _
    " enabled_flag, step_level, " & _
    " degree_parallelism, execution_mechanism, "
& _
    " failure_details, " & _
    " continuation_criteria, global_flag, " & _
    " archived_flag, " & _
    " output_file_name, error_file_name, " & _
    " iterator_name ) values ( "
' log_file_name,
#If USE_JET Then
    strInsert = strInsert & " [w_id], [s_id], [ver_no], "
& _
    " [s_label], [s_file_name], [s_text],
[s_start_dir], " & _
    " [p_step_id], [p_version_no], [seq_no], " & _
    " [enabled], [s_level], [deg_parallelism], " & _
    " [exec_mechanism], [fail_dtls], " & _
    " [cont_criteria], [global], [archived], " & _
    " [output_file], [error_file], " & _
    " [it_name] )"
' [log_file],
Set qy =
mdbsDatabase.CreateQueryDef(gstrEmptyString,
strInsert)
' Call a procedure to execute the Querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError
qy.Close
#Else
    strInsert = strInsert & Str(mlngWorkspaceId)
& ", " & Str(mlngStepId) & _
    ", " &
mFieldValue.MakeStringFieldValid(mstrVersionNo
)
' For fields that may be null, call a function to
determine
' the string to be appended to the insert statement
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStepLabel)

```



```

strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStepTextFile)
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStepText)
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrStartDir)

strInsert = strInsert & ", " &
Str(mInjParentStepId) & _
", " &
mFieldValue.MakeStringFieldValid(mstrParentVersionNo) & _
", " & Str(mIntSequenceNo) & _
", " & Str(mblnEnabledFlag) & ", " &
Str(mIntStepLevel)

strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrDegreeParallelism)
strInsert = strInsert & ", " &
Str(mIntExecutionMechanism)

strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrFailureDetails) & _
", " & Str(mIntContinuationCriteria) & _
", " & Str(mblnGlobalFlag) & _
", " & Str(mblnArchivedFlag)

strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrOutputFile)
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrLogFile)
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrErrorFile)
strInsert = strInsert & ", " &
mFieldValue.MakeStringFieldValid(mstrIteratorName)

strInsert = strInsert & " ) "

BugMessage strInsert
mdbContext.Database.Execute strInsert,
dbFailOnError
#End If

Exit Sub

InsertStepRecErr:
mstrSource = mstrModuleName &
"InsertStepRec"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errInsertStepFailed, _
mstrSource,
LoadResString(errInsertStepFailed)
End Sub
Private Sub UpdOldVersionsArchFlg()
' Updates the archived flag on all old
version for the step to True

Dim sUpdate As String
Dim qy As DAO.QueryDef

On Error GoTo
UpdOldVersionsArchFlgErr

```

```

mstrSource = mstrModuleName &
"UpdOldVersionsArchFlg"

#If USE_JET Then

sUpdate = "update att_steps " & _
" set archived_flag = True "

' Append the Where clause
sUpdate = sUpdate & " where step_id =
[s_id]" & _
" and version_no <> [ver_no]"

Set qy =
mdbContext.Database.CreateQueryDef(gstrEmptyString, sUpdate)

' Call a procedure to execute the Querydef
object
Call AssignParameters(qy)
qy.Execute dbFailOnError

If qy.RecordsAffected = 0 Then
On Error GoTo 0
Err.Raise vbObjectError +
errModifyStepFailed, _
mstrSource,
LoadResString(errModifyStepFailed)
End If

qy.Close

#Else

sUpdate = "update att_steps " & _
" set archived_flag = True "

sUpdate = sUpdate & " where step_id = " &
Str(mInjStepId) & _
" and version_no <> " &
mFieldValue.MakeStringFieldValid(mstrVersionNo)

BugMessage sUpdate
mdbContext.Database.Execute sUpdate,
dbFailOnError
#End If

Exit Sub

UpdOldVersionsArchFlgErr:
mstrSource = mstrModuleName &
"UpdOldVersionsArchFlg"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errModifyStepFailed, _
mstrSource,
LoadResString(errModifyStepFailed)
End Sub
Public Sub InsertIterator(cItRecord As
cIterator)
' Inserts the iterator record into the database

Call cItRecord.Add(mInjStepId,
mstrVersionNo)

End Sub
Public Sub UpdateIterator(cItRecord As
cIterator)
' Updates the iterator record in the database

Call cItRecord.Update(mInjStepId,
mstrVersionNo)

```

```

End Sub
Public Sub UpdateIteratorVersion()
' Updates the iterator record in the database

Dim lngIndex As Long
Dim cTemplt As cIterator

On Error GoTo UpdateIteratorVersionErr

For lngIndex = 0 To mcIterators.Count - 1
' Increase the array dimension and add the
constraint
' to it
Set cTemplt = mcIterators(lngIndex)

If cTemplt.IndOperation <> DeleteOp Then
' Set the operation to indicate an insert
cTemplt.IndOperation = InsertOp
End If

Next lngIndex

Exit Sub

UpdateIteratorVersionErr:
mstrSource = mstrModuleName &
"UpdateIteratorVersion"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError + errUpdateFailed, _
mstrSource,
LoadResString(errUpdateFailed)

End Sub
Public Sub AddIterator(cItRecord As cIterator)
' Adds the iterator record to the collection of
iterators
' for the step

Call mcIterators.Add(cItRecord)

End Sub
Public Sub AddAllIterators()
' Sets the indicator variable for all iterators to
insert

Dim lngIndex As Long

For lngIndex = 0 To mcIterators.Count - 1
mcIterators(lngIndex).Validate
mcIterators(lngIndex).IndOperation = InsertOp
Next lngIndex

End Sub
Public Sub LoadIterator(cItRecord As cIterator)
' Adds the iterator record to the collection of
iterators
' for the step

Call mcIterators.Load(cItRecord)

End Sub
Public Sub UnloadIterators()
' Unloads all iterator records for the step

Dim lngIndex As Long

For lngIndex = mcIterators.Count - 1 To 0 Step -
1
' Calls the collection method to unload the
node
' from the array
mcIterators.Unload lngIndex
Next lngIndex

```

```

End Sub
Public Sub ModifyIterator(cItRecord As
cIterator)
' Modifies the iterator record in the
collection

Call mcIterators.Modify(cItRecord)

End Sub
Public Sub DeleteIterator(cItRecord As
cIterator)
' Deletes the iterator record from the
database

Call cItRecord.Delete(mInStepId,
mstrVersionNo)

End Sub
Public Sub RemoveIterator(cItRecord As
cIterator)
' Marks the iterator record in the
collection to
' indicate a delete

Call
mcIterators.Delete(cItRecord.Position)

End Sub

Private Sub AssignParameters(qyExec As
DAO.QueryDef)
' Assigns values to the parameters in the
querydef object
' The parameter names are cryptic to make
them different
' from the actual field names. When the
parameter names
' are the same as the field names,
parameters in the
' where clause do not get created.

Dim prmParam As DAO.Parameter

On Error GoTo AssignParametersErr
mstrSource = mstrModuleName &
"AssignParameters"

For Each prmParam In
qyExec.Parameters
Select Case prmParam.Name
Case "[w_id]"
prmParam.Value =
mIngWorkspaceId
Case "[s_id]"
prmParam.Value = mInStepId
Case "[ver_no]"
prmParam.Value =
mstrVersionNo
Case "[s_label]"
prmParam.Value = mstrStepLabel
Case "[s_file_name]"
prmParam.Value =
mstrStepTextFile
Case "[s_text]"
prmParam.Value = mstrStepText
Case "[s_start_dir]"
prmParam.Value = mstrStartDir
Case "[p_step_id]"
prmParam.Value =
mIngParentStepId
Case "[p_version_no]"
prmParam.Value =
mstrParentVersionNo

```

```

Case "[seq_no]"
prmParam.Value = mintSequenceNo
Case "[enabled]"
prmParam.Value = mblnEnabledFlag
Case "[s_level]"
prmParam.Value = mintStepLevel
Case "[deg_parallelism]"
prmParam.Value =
mstrDegreeParallelism
Case "[exec_mechanism]"
prmParam.Value =
mintExecutionMechanism
Case "[fail_dtls]"
prmParam.Value =
mstrFailureDetails
Case "[cont_criteria]"
prmParam.Value =
mintContinuationCriteria
Case "[global]"
prmParam.Value = mblnGlobalFlag
Case "[archived]"
prmParam.Value =
mblnArchivedFlag
Case "[output_file]"
prmParam.Value = mstrOutputFile
Case "[log_file]"
prmParam.Value = mstrLogFile
Case "[error_file]"
prmParam.Value = mstrErrorFile
Case "[it_name]"
prmParam.Value = mstrIteratorName
Case Else
' Write the parameter name that is
faulty
WriteError errInvalidParameter,
mstrSource, _
prmParam.Name
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource, _

LoadResString(errInvalidParameter)
End Select
Next prmParam

If qyExec.Parameters("s_id") = 0 Or
StringEmpty(qyExec.Parameters("ver_no"))
Then
WriteError errInvalidParameter,
mstrSource
On Error GoTo 0
Err.Raise errInvalidParameter,
mstrSource,
LoadResString(errInvalidParameter)
End If

Exit Sub

AssignParametersErr:
mstrSource = mstrModuleName &
"AssignParameters"
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errAssignParametersFailed, _
mstrSource,
LoadResString(errAssignParametersFailed)

End Sub

Public Sub Modify()

Dim strUpdate As String
Dim qy As QueryDef

```

```

On Error GoTo ModifyErr
mstrSource = mstrModuleName & "Modify"

' Check if the database object is valid
Call CheckDB

' Check if the step record is valid
Call Validate

' The step_id and version_no will never be
updated -
' whenever a step is modified a copy of the old
step will
' be created with an incremented version_no

#If USE_JET Then

strUpdate = "update att_steps " & _
" set step_label = [s_label] " & _
" , step_file_name = [s_file_name] " & _
" , step_text = [s_text] " & _
" , start_directory = [s_start_dir] " & _
" , workspace_id = [w_id] " & _
" , parent_step_id = [p_step_id] " & _
" , parent_version_no = [p_version_no] " & _
" , sequence_no = [seq_no] " & _
" , step_level = [s_level] " & _
" , enabled_flag = [enabled] " & _
" , degree_parallelism = [deg_parallelism] " &
_
" , execution_mechanism = [exec_mechanism]
" & _
" , failure_details = [fail_dtls] " & _
" , continuation_criteria = [cont_criteria] " & _
" , global_flag = [global] " & _
" , archived_flag = [archived] " & _
" , output_file_name = [output_file] " & _
" , error_file_name = [error_file] " & _
" , iterator_name = [it_name] "

' " , log_file_name = [log_file] " & _

' Append the Where clause
strUpdate = strUpdate & " where step_id = [s_id]
" & _
" and version_no = [ver_no]"

Set qy =
mdbsDatabase.CreateQueryDef(gstrEmptyString,
strUpdate)

' Call a procedure to execute the Querydef object
Call AssignParameters(qy)
qy.Execute dbFailOnError

If qy.RecordsAffected = 0 Then
On Error GoTo 0
Err.Raise vbObjectError +
errModifyStepFailed, _
mstrSource,
LoadResString(errModifyStepFailed)
End If

qy.Close

#Else

strUpdate = "update att_steps " & _
" set step_label = "

' For fields that may be null, call a function to
determine
' the string to be appended to the update statement

```

```

strUpdate = strUpdate &
mFieldValue.MakeStringFieldValid(mstrStepLabel)

strUpdate = strUpdate & ",
step_file_name = " &
mFieldValue.MakeStringFieldValid(mstrStepTextFile)
strUpdate = strUpdate & ", step_text = "
&
mFieldValue.MakeStringFieldValid(mstrStepText)
strUpdate = strUpdate & ",
start_directory = " &
mFieldValue.MakeStringFieldValid(mstrStartDir)

strUpdate = strUpdate & ", workspace_id
= " & Str(mlngWorkspaceId) & _
", parent_step_id = " &
Str(mlngParentStepId) & _
", parent_version_no = " &
mFieldValue.MakeStringFieldValid(mstrParentVersionNo) & _
", sequence_no = " &
Str(mintSequenceNo) & _
", step_level = " & Str(mintStepLevel)
& _
", enabled_flag = " &
Str(mblnEnabledFlag) & _
", degree_parallelism = " &
mFieldValue.MakeStringFieldValid(mstrDegreeParallelism) & _
", execution_mechanism = " &
Str(mintExecutionMechanism) & _
", failure_details = " &
mFieldValue.MakeStringFieldValid(mstrFailureDetails) & _
", continuation_criteria = " &
Str(mintContinuationCriteria) & _
", global_flag = " &
Str(mblnGlobalFlag) & _
", archived_flag = " &
Str(mblnArchivedFlag) & _
", output_file_name = " &
mFieldValue.MakeStringFieldValid(mstrOutputFile) & _
", error_file_name = " &
mFieldValue.MakeStringFieldValid(mstrErrorFile) & _
", iterator_name = " &
mFieldValue.MakeStringFieldValid(mstrIteratorName)

' ", log_file_name = " &
mFieldValue.MakeStringFieldValid(mstrLogFile) & _

strUpdate = strUpdate & " where step_id
= " & Str(mlngStepId) & _
" and version_no = " &
mFieldValue.MakeStringFieldValid(mstrVersionNo)

BugMessage strUpdate
mdbsDatabase.Execute strUpdate,
dbFailOnError
#End If

Exit Sub

ModifyErr:
LogErrors Errors
mstrSource = mstrModuleName &
"Modify"

```

```

On Error GoTo 0
Err.Raise vbObjectError +
errModifyStepFailed, _
mstrSource,
LoadResString(errModifyStepFailed)
End Sub
Private Sub CheckDB()
' Check if the database object has been
initialized

If mdbsDatabase Is Nothing Then
ShowError errInvalidDB
On Error GoTo 0
Err.Raise vbObjectError + errInvalidDB,
_
mstrModuleName,
LoadResString(errInvalidDB)
End If

End Sub

Public Sub Delete()

Dim strDelete As String
Dim qy As DAO.QueryDef

On Error GoTo DeleteErr

Call CheckDB

strDelete = "delete from att_steps " & _
" where step_id = [s_id] " & _
" and version_no = [ver_no] "
' mdbsDatabase.Execute strDelete,
dbFailOnError

Set qy =
mdbsDatabase.CreateQueryDef(gstrEmptyString, strDelete)

Call AssignParameters(qy)
qy.Execute dbFailOnError

qy.Close

Exit Sub

DeleteErr:
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteStepFailed, _
mstrModuleName & "Delete",
LoadResString(errDeleteStepFailed)
End Sub

Public Property Get DegreeParallelism() As
String

DegreeParallelism = mstrDegreeParallelism

End Property

Public Property Get Position() As Long

Position = mlngPosition

End Property

Public Property Let DegreeParallelism(ByVal
vdata As String)

' The degree of parallelism must be zero for
all global steps
' This check must be made by the global step
class. Only
' generic step validations will be carried out
by this

```

```

' class
mstrDegreeParallelism = vdata

End Property

Public Property Let ExecutionMechanism(ByVal
vdata As ExecutionMethod)

BugAssert vdata = gintExecuteODBC Or vdata =
gintExecuteShell Or vdata = gintNoOption, _
"Execution mechanism invalid"
mintExecutionMechanism = vdata

End Property

Public Property Let FailureDetails(ByVal vdata As
String)

mstrFailureDetails = vdata

End Property

Public Property Let SequenceNo(ByVal vdata As
Integer)

mintSequenceNo = vdata
End Property

Public Property Let Position(ByVal vdata As Long)

mlngPosition = vdata
End Property

Public Property Let ParentStepId(ByVal vdata As
Long)

mlngParentStepId = vdata
End Property

Public Property Get SequenceNo() As Integer

SequenceNo = mintSequenceNo

End Property

Public Property Get StepLevel() As Integer

StepLevel = mintStepLevel
End Property

Public Property Get ParentVersionNo() As String

ParentVersionNo = mstrParentVersionNo
End Property

Public Property Let ParentVersionNo(ByVal vdata
As String)

mstrParentVersionNo = vdata
End Property

Public Property Get ParentStepId() As Long

ParentStepId = mlngParentStepId
End Property

Public Property Let WorkspaceId(ByVal vdata As
Long)

mlngWorkspaceId = vdata
End Property

Public Property Let VersionNo(ByVal vdata As
String)

' The version number of a step is stored in the x.y
format where
' x represents a change to the step as a result of
modifications
' to any of the step properties
' y represents a change to the step as a result of
modifications
' to the sub-steps associated with it. Hence the y-
component

```

```

' of the version will be incremented when
a sub-step is added,
' modified or deleted
' x will be referred to throughout this code
as the parent
' component of the version and y will be
referred to as the
' child component of the version
' The version information for a step is
maintained by the
' calling function

mstrVersionNo = vdata

End Property

Public Property Get StepType() As
gintStepType

    On Error GoTo StepTypeErr

    If mintStepType = 0 Then
        ' The step type variable has not been
        initialized -
        If mblnGlobalFlag Then
            mintStepType = gintGlobalStep
        ElseIf IsStringEmpty(mstrStepText)
            And _
            IsStringEmpty(mstrStepTextFile)
        Then
            mintStepType = gintManagerStep
        Else
            mintStepType = gintWorkerStep
        End If
    End If

    StepType = mintStepType

    Exit Property

StepTypeErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"StepType"
    On Error GoTo 0
    Err.Raise vbObjectError +
errGetStepTypeFailed, _
        mstrSource, _

LoadResString(errGetStepTypeFailed)

End Property

Public Property Let StepType(vdata As
gintStepType)

    On Error GoTo StepTypeErr

    Select Case vdata
        Case gintGlobalStep, gintManagerStep,
gintWorkerStep
            mintStepType = vdata

        Case Else
            On Error GoTo 0
            Err.Raise vbObjectError +
errStepTypeInvalid, _
                mstrModuleName &
"StepType",
                LoadResString(errStepTypeInvalid)
            End Select
    Exit Property

StepTypeErr:
    LogErrors Errors

```

```

mstrSource = mstrModuleName &
"StepType"
    On Error GoTo 0
    Err.Raise vbObjectError +
errLetStepTypeFailed, _
        mstrSource, _
        LoadResString(errLetStepTypeFailed)

End Property

Public Property Get WorkspaceId() As Long
    WorkspaceId = mlngWorkspaceId
End Property

Public Property Get ContinuationCriteria() As
ContinuationCriteria

    ContinuationCriteria =
mintContinuationCriteria

End Property

Public Property Let
ContinuationCriteria(ByVal vdata As
ContinuationCriteria)

    ' The Continuation criteria must be null for
all global steps
    ' and non-null for all manager and worker
steps
    ' These checks will have to be made by the
corresponding
    ' classes - only generic step validations will
be made
    ' by this class
    BugAssert vdata =
gintOnFailureAbortSiblings Or vdata =
gintOnFailureCompleteSiblings _
        Or vdata =
gintOnFailureSkipSiblings Or vdata =
gintOnFailureAbort _
        Or vdata = gintOnFailureContinue
Or vdata = gintOnFailureAsk _
        Or vdata = gintNoOption, _
        "Invalid continuation criteria"
    mintContinuationCriteria = vdata

End Property

Public Property Get ExecutionMechanism() As
ExecutionMethod

    ExecutionMechanism =
mintExecutionMechanism

End Property

Public Property Get FailureDetails() As String

    FailureDetails = mstrFailureDetails

End Property

Public Property Let StepText(ByVal vdata As
String)

    ' Has to be null for manager steps
    ' The check will have to be made by the user
interface or
    ' by the manager step class
    mstrStepText = vdata

End Property

Public Property Let StepLevel(ByVal vdata As
Integer)

```

```

' The step level must be zero for all global steps
' This check must be made in the global step class
mintStepLevel = vdata

End Property

Public Property Get StepText() As String
    StepText = mstrStepText
End Property

Public Property Let StepTextFile(ByVal vdata As
String)

    ' Has to be null for manager steps
    ' The check will have to be made by the user
interface and
    ' by the manager step class
    mstrStepTextFile = vdata

End Property

Public Property Get StepTextFile() As String
    StepTextFile = mstrStepTextFile
End Property

Public Property Let StepLabel(ByVal vdata As
String)

    ' Cannot be null for manager steps
    ' But this check cannot be made here since we do
not know
    ' at this point if the step being created is a
manager
    ' or a worker step
    ' The check will have to be made by the user
interface and
    ' by the manager step class
    mstrStepLabel = vdata

End Property

Public Property Get StepLabel() As String
    StepLabel = mstrStepLabel
End Property

Public Property Let StartDir(ByVal vdata As
String)

    mstrStartDir = vdata

End Property

Public Property Get StartDir() As String
    StartDir = mstrStartDir
End Property

Public Property Get VersionNo() As String

    ' The version number of a step is stored in the x.y
format where
    ' x represents a change to the step as a result of
modifications
    ' to any of the step properties
    ' y represents a change to the step as a result of
modifications
    ' to the sub-steps associated with it. Hence the y-
component
    ' of the version will be incremented when a sub-
step is added,
    ' modified or deleted
    ' x will be referred to throughout this code as the
parent
    ' component of the version and y will be referred
to as the
    ' child component of the version
    ' The version information for a step is maintained
by the
    ' calling function

    VersionNo = mstrVersionNo

End Property

```

```

Public Property Get StepId() As Long
    StepId = mlngStepId
End Property
Public Property Get NextStepId() As Long
    Dim lngNextId As Long
    On Error GoTo NextStepIdErr
    ' First check if the database object is valid
    Call CheckDB
    ' Retrieve the next identifier using the
    sequence class
    Set mStepSeq = New cSequence
    Set mStepSeq.IdDatabase =
mbsDatabase
    mStepSeq.IdentifierColumn = "step_id"
    lngNextId = mStepSeq.Identifier
    Set mStepSeq = Nothing
    NextStepId = lngNextId
Exit Property
NextStepIdErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"NextStepId"
    On Error GoTo 0
    Err.Raise vbObjectError +
errStepIdGetFailed, _
    mstrSource,
LoadResString(errStepIdGetFailed)
End Property
Public Property Let StepId(ByVal vdata As
Long)
    mlngStepId = vdata
End Property
Private Sub Class_Initialize()
    ' Initialize the operation indicator variable
to Query
    ' It will be modified later by the collection
class when
    ' inserts, updates or deletes are performed
    mintOperation = QueryOp
    mbIsNewVersion = False
    msOldVersion = gstrEmptyString
    Set mFieldValue = New cStringSM
    Set mclIterators = New cNodeCollections
End Sub
Private Sub Class_Terminate()
    Set mFieldValue = Nothing
    Set mclIterators = Nothing
End Sub
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cStepTree"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True

```

```

Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cStepTree.cls
'          Microsoft TPC-H Kit Ver. 1.00
'          Copyright Microsoft, 1999
'          All Rights Reserved
'
'
' PURPOSE:  Implements step navigation
functions such as determining
            the child of a step and so on.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"cStepTree."
Private mstrSource As String
Public StepRecords As cArrSteps
Public Property Get HasChild(Optional ByVal
StepKey As String, _
Optional ByVal StepId As Long = 0) As
Boolean
    Dim lTemp As Long
    HasChild = False
    StepId = GetStepId(StepKey, StepId)
    For lTemp = 0 To StepRecords.StepCount -
1
        If StepRecords(lTemp).StepType <>
gintGlobalStep And
StepRecords(lTemp).ParentStepId = StepId
Then
            HasChild = True
            Exit For
        End If
    Next lTemp
End Property
Public Property Get ChildStep(Optional ByVal
StepKey As String, _
Optional ByVal StepId As Long = 0) As
cStep
    Dim lTemp As Long
    Set ChildStep = Nothing
    StepId = GetStepId(StepKey, StepId)
    For lTemp = 0 To StepRecords.StepCount -
1
        If StepRecords(lTemp).StepType <>
gintGlobalStep And
StepRecords(lTemp).ParentStepId = StepId
And _
StepRecords(lTemp).SequenceNo =
gintMinSequenceNo Then
            Set ChildStep = StepRecords(lTemp)
            Exit For
        End If
    Next lTemp
End Property
Public Property Get NextStep(Optional ByVal
StepKey As String, _
Optional ByVal StepId As Long = 0) As
cStep

```

```

Dim lTemp As Long
Dim cChildStep As cStep
Set NextStep = Nothing
StepId = GetStepId(StepKey, StepId)
Set cChildStep = StepRecords.QueryStep(StepId)
For lTemp = 0 To StepRecords.StepCount - 1
    If StepRecords(lTemp).StepType <>
gintGlobalStep And _
StepRecords(lTemp).ParentStepId =
cChildStep.ParentStepId And _
StepRecords(lTemp).SequenceNo =
cChildStep.SequenceNo + 1 Then
        Set NextStep = StepRecords(lTemp)
        Exit For
    End If
Next lTemp
End Property
Private Function GetStepId(Optional ByVal
StepKey As String, _
Optional ByVal StepId As Long = 0) As Long
    If StepId = 0 Then
        If StringEmpty(StepKey) Then
            Err.Raise vbObjectError +
errMandatoryParameterMissing, _
mstrModuleName & "GetStepId",
LoadResString(errMandatoryParameterMissing)
        Else
            GetStepId = IIf(IsLabel(StepKey), 0,
MakeIdentifierValid(StepKey))
        End If
    Else
        GetStepId = StepId
    End If
End Function
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cStringSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cStringSM.cls
'          Microsoft TPC-H Kit Ver. 1.00
'          Copyright Microsoft, 1999
'          All Rights Reserved
'
'
' PURPOSE:  This module contains common
procedures that can be used
            to manipulate strings
            It is called StringSM, since String is a
Visual Basic keyword
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cStringSM."
Private mstrText As String
Private Const mstrNullValue = "null"
Private Const mstrSQ = ""
Private Const mstrEnvVarSeparator = "%"
Public Function InsertEnvVariables(_

```

```

Optional ByVal strComString As
String) As String
' This function replaces all environment
variables in
' the passed in string with their values -
they are
' enclosed by "%"

Dim intPos As Integer
Dim intEndPos As Integer
Dim strEnvVariable As String
Dim strValue As String
Dim strCommand As String

On Error GoTo InsertEnvVariablesErr
mstrSource = mstrModuleName &
"InsertEnvVariables"

' Initialize the return value of the function
to the
' passed in command
If IsStringEmpty(strComString) Then
strCommand = mstrText
Else
strCommand = strComString
End If

intPos = InStr(strCommand,
mstrEnvVarSeparator)
Do While intPos <> 0
' Extract the environment variable from
the passed
' in string
intEndPos = InStr(intPos + 1,
strCommand, mstrEnvVarSeparator)
strEnvVariable = Mid(strCommand,
intPos + 1, intEndPos - intPos - 1)

' Get the value of the variable and call a
function
' to replace the variable with it's value
strValue = Environ$(strEnvVariable)
strCommand =
ReplaceSubString(strCommand, _
mstrEnvVarSeparator &
strEnvVariable & mstrEnvVarSeparator, _
strValue)

intPos = InStr(strCommand,
mstrEnvVarSeparator)
Loop

InsertEnvVariables = strCommand
Exit Function

InsertEnvVariablesErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
' Return an empty string
InsertEnvVariables = gstrEmptyString

End Function
Public Function MakeStringFieldValid( _
Optional strField As String =
gstrEmptyString) As String
' Returns a string that can be appended to
any insert
' or modify (sql) statement
' If an argument is not passed to this
function, the
' default text property is used

Dim strTemp As String

```

```

On Error GoTo MakeStringFieldValidErr

If IsStringEmpty(strField) Then
strTemp = mstrText
Else
strTemp = strField
End If

' It checks whether the text is empty
' If so, it returns the string, "null"
If IsStringEmpty(strTemp) Then
MakeStringFieldValid = mstrNullValue
Else
' Single-quotes have to be replaced by two
single-quotes,
' since a single-quote is the identifier
delimiter
' character - call a procedure to do the
replace
strTemp = ReplaceSubString(strTemp,
mstrSQ, mstrSQ & mstrSQ)

' Replace pipe characters with the
corresponding chr function
strTemp = ReplaceSubString(strTemp, "|",
" & Chr(124) & ")

' Enclose the string in single quotes
MakeStringFieldValid = mstrSQ &
strTemp & mstrSQ

End If

Exit Function

MakeStringFieldValidErr:
mstrSource = mstrModuleName &
"MakeStringFieldValid"
LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errMakeFieldValidFailed, _
mstrSource,
LoadResString(errMakeFieldValidFailed)

End Function
Public Function MakeDateFieldValid( _
Optional dtmField As Date = gdtmEmpty)
As String
' Returns a string that can be appended to
any insert
' or modify (sql) statement

' Enclose the date in single quotes
MakeDateFieldValid = mstrSQ & dtmField
& mstrSQ

End Function

Private Function IsStringEmpty(strToCheck
As String) As Boolean

If strToCheck = gstrEmptyString Then
IsStringEmpty = True
Else
IsStringEmpty = False
End If

End Function
Public Function ReplaceSubString(ByVal
MainString As String, _
ByVal ReplaceString As String, _
ByVal ReplaceWith As String) As String

```

```

' Replaces all occurrences of ReplaceString in
MainString with ReplaceWith

Dim intPos As Integer
Dim strTemp As String

On Error GoTo ReplaceSubStringErr

strTemp = MainString

intPos = InStr(strTemp, ReplaceString)
Do While intPos <> 0
strTemp = Left(strTemp, intPos - 1) &
ReplaceWith & _
Mid(strTemp, intPos +
Len(ReplaceString))
intPos = InStr(intPos + Len(ReplaceString) +
1, strTemp, ReplaceString)
Loop
ReplaceSubString = strTemp

Exit Function

ReplaceSubStringErr:
Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ReplaceSubString"
On Error GoTo 0
Err.Raise vbObjectError + errParseStringFailed,
_
mstrSource, _
LoadResString(errParseStringFailed)

End Function

Public Property Get Text() As String
Attribute Text.VB_UserMemId = 0
Text = mstrText
End Property

Public Property Let Text(ByVal vdata As String)
mstrText = vdata
End Property

VERSION 1.0 CLASS
BEGIN
MultiUse = -1 'True
END
Attribute VB_Name = "cSubStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cSubStep.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module encapsulates the
properties of sub-steps
' that are used during the execution of a
workspace.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private Const mstrModuleName As String =
"cSubStep"

Private mlngStepId As Long

```

```

Private mintRunning As Integer ' Number of
running tasks
Private mintComplete As Integer ' Number
of completed tasks
' The last iterator for this sub-step
Private mcLastIterator As cRunItDetails

Public Function NewIteration(cStepRec As
cStep) As cIterator
' Calls a procedure to determine the next
iterator value
' for the passed in step - returns the value
to be used
' in the iteration.
' It updates the instance node with the new
iteration
' for the step.

Dim cItRec As cIterator

On Error GoTo NewIterationErr

' Call a function that will populate an
iterator record
' with the iterator values
Set cItRec = NextIteration(cStepRec)

' Initialize the run node with the new
iterator
' values
If Not mcLastIterator Is Nothing Then
If cItRec Is Nothing Then
mcLastIterator.Value =
gstrEmptyString
Else
mcLastIterator.Value = cItRec.Value

' And if the iterator is a list of values,
then update
' the sequence number as well
If mcLastIterator.IteratorType =
gintValue Then
mcLastIterator.Sequence =
cItRec.SequenceNo
End If
End If
End If

Set NewIteration = cItRec
Set cItRec = Nothing

Exit Function

NewIterationErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errIterateFailed, mstrModuleName, _
LoadResString(errIterateFailed)

End Function
Public Function NextIteration(cStepRec As
cStep) As cIterator

' Retrieves the next iterator value for the
passed in step -
' returns an iterator record with the new
iterator values

Dim cItRec As cIterator
Dim vntIterators As Variant
Dim lngValue As String

```

```

On Error GoTo NextIterationErr

vntIterators = cStepRec.Iterators

If Not mcLastIterator Is Nothing Then
' The run node contains the iterator details
' Get the next value for the iterator
If mcLastIterator.IteratorType = gintValue
Then
' Find the next iterator that appears in
the list of
' iterator values
Set cItRec =
NextInSequence(vntIterators,
mcLastIterator.Sequence)
Else
lngValue =
CLng(Trim$(mcLastIterator.Value))
' Determine whether the new iterator
value falls in the
' range between From and To
If (mcLastIterator.RangeStep > 0 And _
(mcLastIterator.RangeFrom <=
mcLastIterator.RangeTo) And _
(mcLastIterator.RangeStep +
lngValue) <= mcLastIterator.RangeTo) Or _
(mcLastIterator.RangeStep < 0
And _
(mcLastIterator.RangeFrom >=
mcLastIterator.RangeTo) And _
(mcLastIterator.RangeStep +
lngValue) >= mcLastIterator.RangeTo) Then
Set cItRec = New cIterator
cItRec.Value =
Trim$(CStr(mcLastIterator.RangeStep +
lngValue))
Else
Set cItRec = Nothing
End If
End If
Else
Set cItRec = Nothing
End If

Set NextIteration = cItRec
Exit Function

NextIterationErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errIterateFailed,
mstrModuleName, _
LoadResString(errIterateFailed)

End Function
Public Sub InitializeIt(cPendingStep As cStep,
_
ColParameters As cArrParameters, _
Optional vntIterators As Variant)

' Initializes the LastIteration structure with
the iterator details for the
' passed in step

On Error GoTo InitializeItErr

If IsMissing(vntIterators) Then
vntIterators = cPendingStep.Iterators
End If

If IsArray(vntIterators) And Not
IsEmpty(vntIterators) Then
mcLastIterator.IteratorName =
cPendingStep.IteratorName

```

```

If
vntIterators(LBound(vntIterators)).IteratorType = _
gintValue Then
mcLastIterator.IteratorType = gintValue
' Since the sequence numbers begin at 0
mcLastIterator.Sequence =
gintMinIteratorSequence - 1
Else
mcLastIterator.IteratorType = gintFrom
Call InitializeItRange(vntIterators,
cPendingStep.WorkspaceId, _
ColParameters)
End If
Else
Set mcLastIterator = Nothing
End If

Exit Sub

InitializeItErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errIterateFailed,
mstrModuleName, _
LoadResString(errIterateFailed)

End Sub

Private Sub InitializeItRange(vntIterators As
Variant, ByVal IWorkspace As Long, _
ColParameters As cArrParameters)

' Initializes the LastIteration structure for range
iterators from the
' passed in variant containing the iterator records

Dim lngIndex As Long
Dim cItRec As cIterator

On Error GoTo InitializeItRangeErr

If IsArray(vntIterators) And Not
IsEmpty(vntIterators) Then

' Check if the iterator range has been
completely initialized
RangeComplete (vntIterators)

' Initialize the Run node with the values for the
From,
' To and Step boundaries
For lngIndex = LBound(vntIterators) To
UBound(vntIterators)
Set cItRec = vntIterators(lngIndex)
Select Case cItRec.IteratorType
Case gintFrom
mcLastIterator.RangeFrom =
SubstituteParameters(cItRec.Value, IWorkspace,
WspParameters:=ColParameters)
Case gintTo
mcLastIterator.RangeTo =
SubstituteParameters(cItRec.Value, IWorkspace,
WspParameters:=ColParameters)
Case gintStep
mcLastIterator.RangeStep =
SubstituteParameters(cItRec.Value, IWorkspace,
WspParameters:=ColParameters)
Case Else
On Error GoTo 0
Err.Raise vbObjectError +
errTypeInvalid, mstrModuleName, _
LoadResString(errTypeInvalid)
End Select
Next lngIndex

```

```

        mcLastIterator.Value =
Trim$(CStr(mcLastIterator.RangeFrom -
mcLastIterator.RangeStep))
    End If

    Exit Sub

InitializeItRangeErr:
    ' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errIterateFailed, mstrModuleName, _
        LoadResString(errIterateFailed)

End Sub
Private Function
NextInSequence(vntIterators As Variant, _
    lngOldSequence As Long) As cIterator

    Dim lngIndex As Long
    Dim cItRec As cIterator

    On Error GoTo NextInSequenceErr

    If IsArray(vntIterators) And Not
IsEmpty(vntIterators) Then
        For lngIndex = LBound(vntIterators)
To UBound(vntIterators)
            Set cItRec = vntIterators(lngIndex)
            If cItRec.IteratorType <> gintValue
Then
                On Error GoTo 0
                Err.Raise vbObjectError +
errTypeInvalid, mstrModuleName, _

LoadResString(errTypeInvalid)
            End If
            If cItRec.SequenceNo =
lngOldSequence + 1 Then
                Exit For
            End If

            Next lngIndex

            If cItRec.SequenceNo <>
lngOldSequence + 1 Then
                Set cItRec = Nothing
            End If
        Else
            Set cItRec = Nothing
        End If

        Set NextInSequence = cItRec

    Exit Function

NextInSequenceErr:
    ' Log the error code raised by Visual
Basic
    Call LogErrors(Errors)
    On Error GoTo 0
    Err.Raise vbObjectError +
errIterateFailed, mstrModuleName, _
        LoadResString(errIterateFailed)

End Function

Public Property Get LastIterator() As
cRunItDetails

    Set LastIterator = mcLastIterator

```

```

End Property
Public Property Set LastIterator(vdata As
cRunItDetails)

    Set mcLastIterator = vdata

End Property

Public Property Get TasksRunning() As
Integer

    TasksRunning = mintRunning

End Property

Public Property Let TasksRunning(ByVal
vdata As Integer)

    mintRunning = vdata

End Property

Public Property Get TasksComplete() As
Integer

    TasksComplete = mintComplete

End Property

Public Property Let TasksComplete(ByVal
vdata As Integer)

    mintComplete = vdata

End Property

Public Property Get StepId() As Long

    StepId = mlngStepId

End Property

Public Property Let StepId(ByVal vdata As
Long)

    mlngStepId = vdata

End Property
VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cSubSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cSubSteps.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
'
' PURPOSE:  This module provides a type-
safe wrapper around cVector to
'           implement a collection of cSubStep
objects.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private mcSubSteps As cVector

Public Sub Add(ByVal objItem As cSubStep)

    mcSubSteps.Add objItem

```

```

End Sub

Public Sub Clear()

    mcSubSteps.Clear

End Sub

Public Function Count() As Long

    Count = mcSubSteps.Count

End Function

Public Function Delete(ByVal lngDelete As Long)
As cSubStep

    Set Delete = mcSubSteps.Delete(lngDelete)

End Function

Public Property Get Item(ByVal Position As Long)
As cSubStep
Attribute Item.VB_UserMemId = 0

    Set Item = mcSubSteps.Item(Position)

End Property

Private Sub Class_Initialize()

    Set mcSubSteps = New cVector

End Sub

Private Sub Class_Terminate()

    Set mcSubSteps = Nothing

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTermProcess"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cTermProcess.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
'
' PURPOSE:  This module raises an event if a
completed step exists.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Private bTermProcessExists As Boolean
Public Event TermProcessExists()

Public Sub ProcessTerminated()

```



```

bTermProcessExists = True
moTimer.Enabled = True

End Sub

Private Sub Class_Initialize()

    bTermProcessExists = False

    Set moTimer = New cTimerSM
    moTimer.Enabled = False

End Sub

Private Sub Class_Terminate()

    Set moTimer = Nothing

End Sub

Private Sub moTimer_Timer()

    On Error GoTo moTimer_TimerErr

    If bTermProcessExists Then
        RaiseEvent TermProcessExists
    End If

    moTimer.Enabled = False
    bTermProcessExists = False

    Exit Sub

moTimer_TimerErr:
    LogErrors Errors

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTermStep"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cTermStep.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
' PURPOSE:  This module encapsulates
the properties of steps that
'           have completed execution such as
status and time of completion.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'

Option Explicit

Public TimeComplete As Currency
Public Index As Long
Public InstanceId As Long
Public ExecutionStatus As InstanceStatus

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTermSteps"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False

```

```

Attribute VB_Exposed = False
' FILE:    cTermSteps.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
' PURPOSE:  This module provides a type-
safe wrapper around cVector to
'           implement a collection of cTermStep
objects. Raises an
'           event if a step that has completed
execution exists.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'

Option Explicit

Private mcTermSteps As cVector
Private WithEvents moTimer As cTimerSM
Attribute moTimer.VB_VarHelpID = -1
Public Event TermStepExists(cStepDetails As
cTermStep)

Public Sub Add(ByVal citem As cTermStep)

    Call mcTermSteps.Add(citem)
    moTimer.Enabled = True

End Sub

Public Sub Clear()

    mcTermSteps.Clear

End Sub

Public Function Delete()

    Call mcTermSteps.Delete(0)
' Disable the timer if there are no more
pending events
    If mcTermSteps.Count = 0 Then
        moTimer.Enabled = False
    End If

End Function

Public Property Get Item(ByVal Position As
Long) As cTermStep

    Set Item = mcTermSteps(Position)

End Property

Public Function Count() As Long

    Count = mcTermSteps.Count

End Function

Private Sub Class_Initialize()

    Set mcTermSteps = New cVector

    Set moTimer = New cTimerSM
    moTimer.Enabled = False

End Sub

Private Sub Class_Terminate()

    Set mcTermSteps = Nothing
    Set moTimer = Nothing

End Sub

```

```

Private Sub moTimer_Timer()

    On Error GoTo moTimer_TimerErr

    If mcTermSteps.Count > 0 Then
' Since items are appended to the end of the
array
        RaiseEvent TermStepExists(mcTermSteps(0))
    Else
        moTimer.Enabled = False
    End If
    Exit Sub

moTimer_TimerErr:
    LogErrors Errors

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cTimerSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cTimer.cls
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved
'
' PURPOSE:  This module implements a timer.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'

Option Explicit

Public Event Timer()

Private Const mnDefaultInterval As Long = 1

Private mnTimerID As Long
Private mnInterval As Long
Private mfEnabled As Boolean

Public Property Get Interval() As Long
    Interval = mnInterval
End Property
Public Property Let Interval(Value As Long)
    If mnInterval <> Value Then
        mnInterval = Value
        If mfEnabled Then
            SetInterval mnInterval, mnTimerID
        End If
    End If
End Property

Public Property Get Enabled() As Boolean
    Enabled = mfEnabled
End Property
Public Property Let Enabled(Value As Boolean)
    If mfEnabled <> Value Then
        If Value Then
            mnTimerID = StartTimer(mnInterval)
            If mnTimerID <> 0 Then
                mfEnabled = True
                'Storing Me in the global would add a
reference to Me, which
                ' would prevent Me from being released,
which in turn would
                ' prevent my Class_Terminate code from
running. To prevent

```

```

' this, I store a "soft reference" -
the collection holds a
' pointer to me without
incrementing my reference count.
gcTimerObjects.Add ObjPtr(Me),
Str$(mnTimerID)
End If
Else
StopTimer mnTimerID
mfEnabled = False
gcTimerObjects.Remove
Str$(mnTimerID)
End If
End Property

Private Sub Class_Initialize()
If gcTimerObjects Is Nothing Then Set
gcTimerObjects = New Collection
mnInterval = mnDefaultInterval
End Sub

Private Sub Class_Terminate()
Enabled = False
End Sub

Friend Sub Tick()
RaiseEvent Timer
End Sub
VERSION 1.0 CLASS
BEGIN
MultiUse = -1 'True
END
Attribute VB_Name = "cVBErrorsSM"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
Attribute VB_Ext_KEY =
"SaveWithClassBuilder", "Yes"
Attribute VB_Ext_KEY = "Top_Level"
, "Yes"
' FILE: cVBErrors.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module encapsulates
the handling of Visual Basic errors.
' This module does not do any error
handling - any error handler
' will erase the errors object!
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' The Execute class exposes a method,
WriteError through which we can write to
the
' error log that is currently being used by the
Execute object. Store a reference to
' Execute object locally.
Private mcExecObjRef As
EXECUTEDLLLib.Execute
Public Sub WriteError(ByVal ErrorCode As
errErrorConstants, _
Optional ByVal ErrorSource As String
= gstrEmptyString, _
Optional ByVal OptArgs As String =
gstrEmptyString)

Dim sError As String

```

```

sError = "StepMaster Error:" & ErrorCode
& vbCrLf & LoadResString(ErrorCode) &
vbCrLf

If Not StringEmpty(ErrorSource) Then
sError = sError & "(Source: " &
ErrorSource & ")" & vbCrLf
End If
sError = sError & OptArgs

Call LogMessage(sError)

End Sub
Private Function InitErrorString() As String
' Initializes a string with all the properties of
the
' Err object

Dim strError As String
Dim errCode As Long

If Err.Number = 0 Then
InitErrorString = gstrEmptyString
Else
With Err
If Err.Number > vbObjectError And
Err.Number < (vbObjectError + 65536) Then
errCode = .Number - vbObjectError
Else
errCode = .Number
End If
strError = "Error #: " & errCode &
vbCrLf
strError = strError & "Description: " &
.Description & vbCrLf
strError = strError & "Source: " &
Err.Source & vbCrLf
End With

Debug.Print strError
InitErrorString = strError
End If

End Function
Public Sub LogVBErrors()

Dim strErr As String

strErr = InitErrorString

On Error GoTo LogVBErrorsErr

If Not StringEmpty(strErr) Then
' Write an error using the WriteError
method of the Execute object.
If Not mcExecObjRef Is Nothing Then
mcExecObjRef.WriteError strErr
Else
WriteMessage strErr
End If
End If

Err.Clear

Exit Sub

LogVBErrorsErr:
Call LogErrors(Errors)
' Since write to the error file for the step has
failed, write to the project log
Call WriteMessage(strErr)

End Sub
Public Sub DisplayErrors()

```

```

Dim strErr As String

strErr = InitErrorString

If Not StringEmpty(strErr) Then
' Display the error message
MsgBox strErr
End If

Err.Clear

End Sub
Public Sub LogMessage(strMsg As String)

On Error GoTo LogMessageErr

' Write an error using the WriteError method of
the Execute object.
If Not mcExecObjRef Is Nothing Then
mcExecObjRef.WriteError strMsg
Else
WriteMessage strMsg
End If

Exit Sub

LogMessageErr:
Call LogErrors(Errors)
' Since write to the error file for the step has
failed, write to the project log
Call WriteMessage(strMsg)

End Sub
Public Property Set ErrorFile(vdata As
EXECUTEDLLLib.Execute)

Set mcExecObjRef = vdata

End Property
Private Sub Class_Terminate()

Set mcExecObjRef = Nothing

End Sub
VERSION 1.0 CLASS
BEGIN
MultiUse = -1 'True
END
Attribute VB_Name = "cVector"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cVector.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This class implements an array of
objects.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cVector."

' Array counter
Private mlngCount As Long

```

```

Private mcarrItems() As Object

Public Sub Add(ByVal objItem As Object)
    ' Adds the passed in Object variable to the
    array

    On Error GoTo AddErr

    ReDim Preserve mcarrItems(mlngCount)

    ' Set the newly added element in the array
    to the
    ' passed in variable
    Set mcarrItems(mlngCount) = objItem
    mlngCount = mlngCount + 1

    Exit Sub

AddErr:
    LogErrors Errors
    gstrSource = mstrModuleName & "Add"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errLoadInArrayFailed, _
    mstrSource, _

LoadResString(errLoadInArrayFailed)

End Sub
Public Sub Clear()

    ' Clear the array
    ReDim mcarrItems(0)
    mlngCount = 0

End Sub

Public Function Delete(ByVal lngDelete As
Long) As Object

    Dim lngIndex As Long

    On Error GoTo DeleteErr

    If lngDelete < (mlngCount - 1) Then

        ' We want to maintain the order of all
        items in the
        ' array - so move all remaining
        elements in the array
        ' up by 1
        For lngIndex = lngDelete To
mlngCount - 2
            MoveDown lngIndex
        Next lngIndex

    End If

    ' Return the deleted node
    Set Delete = mcarrItems(mlngCount - 1)

    ' Delete the last Node from the array
    mlngCount = mlngCount - 1
    If mlngCount > 0 Then
        ReDim Preserve mcarrItems(0 To
mlngCount - 1)
    Else
        ReDim mcarrItems(0)
    End If

    Exit Function

DeleteErr:
    LogErrors Errors

```

```

    mstrSource = mstrModuleName & "Delete"
    On Error GoTo 0
    Err.Raise vbObjectError +
    errDeleteArrayElementFailed, _
    mstrSource, _

LoadResString(errDeleteArrayElementFailed)

End Function
Public Property Get Item(ByVal Position As
Long) As Object
    Attribute Item.VB_UserMemId = 0

    ' Returns the element at the passed in
    position in the array
    If Position >= 0 And Position < mlngCount
    Then
        Set Item = mcarrItems(Position)
    Else
        On Error GoTo 0
        Err.Raise vbObjectError +
        errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
    End If

End Property
Public Property Set Item(ByVal Position As
Long, _
    ByVal Value As Object)

    ' Returns the element at the passed in
    position in the array
    If Position >= 0 Then
        ' If the passed in position is outside the
        array
        ' bounds, then resize the array
        If Position >= mlngCount Then
            ReDim Preserve mcarrItems(Position)
            mlngCount = Position + 1
        End If

        ' Set the newly added element in the array
        to the
        ' passed in variable
        Set mcarrItems(Position) = Value
    Else
        On Error GoTo 0
        Err.Raise vbObjectError +
        errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
    End If

End Property
Public Sub MoveUp(ByVal Position As Long)
    ' Moves the element at the passed in position
    up by 1

    Dim cTemp As Object

    If Position > 0 And Position < mlngCount
    Then
        Set cTemp = mcarrItems(Position)

        Set mcarrItems(Position) =
mcarrItems(Position - 1)
        Set mcarrItems(Position - 1) = cTemp
    End If

End Sub
Public Sub MoveDown(ByVal Position As
Long)
    ' Moves the element at the passed in position
    down by 1

    Dim cTemp As Object

```

```

    If Position >= 0 And Position < mlngCount - 1
    Then
        Set cTemp = mcarrItems(Position)

        Set mcarrItems(Position) =
mcarrItems(Position + 1)
        Set mcarrItems(Position + 1) = cTemp
    End If

End Sub

Public Function Count() As Long

    Count = mlngCount

End Function

Private Sub Class_Initialize()

    mlngCount = 0

End Sub

Private Sub Class_Terminate()

    Call Clear

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cVectorLng"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cVectorLng.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This class implements an array of
longs.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cVectorLng."

' Array counter
Private mlngCount As Long
Private mcarrItems() As Long

Public Sub Add(ByVal lngItem As Long)
    ' Adds the passed in long variable to the array

    On Error GoTo AddErr

    ReDim Preserve mcarrItems(mlngCount)

    ' Set the newly added element in the array to the
    ' passed in variable
    mcarrItems(mlngCount) = lngItem

```

```

mInGCount = mInGCount + 1

Exit Sub

AddErr:
LogErrors Errors
gstrSource = mstrModuleName & "Add"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadInArrayFailed, _
    mstrSource, _

LoadResString(errLoadInArrayFailed)

End Sub
Public Sub Clear()

    ' Clear the array
    ReDim mcarrItems(0)

End Sub

Public Sub Delete(Optional ByVal Position
As Long = -1, _
    Optional ByVal Item As Long = -1)
    ' The user can opt to delete either a
    specific item in
    ' the list or the item at a specified position.
    If no
    ' parameters are passed in, we delete the
    element at
    ' position 0!

    Dim lngDelete As Long
    Dim lngIndex As Long

    On Error GoTo DeleteErr

    If Position = -1 Then
        ' Since we can never store an element at
        position -1,
        ' we can be sure that the user is trying
        to delete
        ' a given item
        lngDelete = Find(Item)
    Else
        lngDelete = Position
    End If

    If lngDelete < (mInGCount - 1) Then

        ' We want to maintain the order of all
        items in the
        ' array - so move all remaining
        elements in the array
        ' up by 1
        For lngIndex = lngDelete To
mInGCount - 2
            MoveDown lngIndex
        Next lngIndex

    End If

    ' Delete the last Node from the array
    mInGCount = mInGCount - 1
    If mInGCount > 0 Then
        ReDim Preserve mcarrItems(0 To
mInGCount - 1)
    Else
        ReDim mcarrItems(0)
    End If

End Sub

DeleteErr:

```

```

LogErrors Errors
mstrSource = mstrModuleName & "Delete"
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteArrayElementFailed, _
    mstrSource, _

LoadResString(errDeleteArrayElementFailed)

End Sub
Public Function Find(ByVal Item As Long) As
Long

    ' Returns the position at which the passed in
    value occurs
    ' in the array

    Dim lngIndex As Long

    On Error GoTo FindErr

    ' Find the element in the array to be deleted
    For lngIndex = 0 To mInGCount - 1

        If mcarrItems(lngIndex) = Item Then
            Find = lngIndex
            Exit Function
        End If

    Next lngIndex

    Find = -1

    Exit Function

FindErr:
LogErrors Errors
mstrSource = mstrModuleName & "Find"
On Error GoTo 0
Err.Raise vbObjectError +
errItemNotFound, mstrSource, _
    LoadResString(errItemNotFound)

End Function
Public Property Get Item(ByVal Position As
Long) As Long
Attribute Item.VB_UserMemId = 0

    ' Returns the element at the passed in
    position in the array
    If Position >= 0 And Position < mInGCount
    Then
        Item = mcarrItems(Position)
    Else
        On Error GoTo 0
        Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
            LoadResString(errItemDoesNotExist)
    End If

End Property
Public Property Let Item(ByVal Position As
Long, _
    ByVal Value As Long)

    ' Returns the element at the passed in
    position in the array
    If Position >= 0 Then
        ' If the passed in position is outside the
        array
        ' bounds, then resize the array
        If Position >= mInGCount Then
            ReDim Preserve mcarrItems(Position)
            mInGCount = Position + 1
        End If
    End If

```

```

    ' Set the newly added element in the array to
    the
    ' passed in variable
    mcarrItems(Position) = Value
Else
    On Error GoTo 0
    Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
        LoadResString(errItemDoesNotExist)
End If

End Property
Public Sub MoveUp(ByVal Position As Long)
    ' Moves the element at the passed in position up
    by 1

    Dim lngTemp As Long

    If Position > 0 And Position < mInGCount Then
        lngTemp = mcarrItems(Position)

        mcarrItems(Position) = mcarrItems(Position -
1)
        mcarrItems(Position - 1) = lngTemp
    End If

End Sub
Public Sub MoveDown(ByVal Position As Long)
    ' Moves the element at the passed in position
    down by 1

    Dim lngTemp As Long

    If Position >= 0 And Position < mInGCount - 1
    Then
        lngTemp = mcarrItems(Position)

        mcarrItems(Position) = mcarrItems(Position +
1)
        mcarrItems(Position + 1) = lngTemp
    End If

End Sub
Public Function Count() As Long

    Count = mInGCount

End Function

Private Sub Class_Initialize()

    mInGCount = 0

End Sub

Private Sub Class_Terminate()

    Call Clear

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 True
END
Attribute VB_Name = "cVectorStr"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cVectorStr.cls

```

```

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PURPOSE: This class implements an
array of strings.
Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

'Used to indicate the source module name
when errors
'are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"VectorStr."

' Array counter
Private mlngCount As Long
Private mcarrItems() As String

Public Sub Add(ByVal strItem As String)
' Adds the passed in string variable to the
array

On Error GoTo AddErr

ReDim Preserve mcarrItems(mlngCount)

' Set the newly added element in the array
to the
' passed in variable
mcarrItems(mlngCount) = strItem
mlngCount = mlngCount + 1

Exit Sub

AddErr:
Call LogErrors(Errors)
gstrSource = mstrModuleName & "Add"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadInArrayFailed, _
mstrSource, _

LoadResString(errLoadInArrayFailed)

End Sub
Public Sub Clear()

' Clear the array
ReDim mcarrItems(0)

End Sub

Public Sub Delete(Optional ByVal Position
As Long = -1, _
Optional ByVal Item As String = -1)
' The user can opt to delete either a
specific item in
' the list or the item at a specified position.
If no
' parameters are passed in, we delete the
element at
' position 0!

Dim lngDelete As Long
Dim lngIndex As Long

On Error GoTo DeleteErr
mstrSource = mstrModuleName &
"Delete"

```

```

If Position = -1 Then
' Since we can never store an element at
position -1,
' we can be sure that the user is trying to
delete
' a given item
lngDelete = Find(Item)
Else
lngDelete = Position
End If

If lngDelete < (mlngCount - 1) Then

' We want to maintain the order of all
items in the
' array - so move all remaining elements in
the array
' up by 1
For lngIndex = lngDelete To mlngCount -
2
MoveDown lngIndex
Next lngIndex

End If

' Delete the last Node from the array
mlngCount = mlngCount - 1
If mlngCount > 0 Then
ReDim Preserve mcarrItems(0 To
mlngCount - 1)
Else
ReDim mcarrItems(0)
End If

Exit Sub

DeleteErr:
Call LogErrors(Errors)
mstrSource = mstrModuleName & "Delete"
On Error GoTo 0
Err.Raise vbObjectError +
errDeleteArrayElementFailed, _
mstrSource, _

LoadResString(errDeleteArrayElementFailed)

End Sub
Public Function Find(ByVal Item As String)
As Long

' Returns the position at which the passed in
value occurs
' in the array

Dim lngIndex As Long

On Error GoTo FindErr
mstrSource = mstrModuleName & "Find"

' Find the element in the array to be deleted
For lngIndex = 0 To mlngCount - 1

If mcarrItems(lngIndex) = Item Then
Find = lngIndex
Exit Function
End If

Next lngIndex

Find = -1

Exit Function

FindErr:
Call LogErrors(Errors)

```

```

mstrSource = mstrModuleName & "Find"
On Error GoTo 0
Err.Raise vbObjectError + errItemNotFound,
mstrSource, _
LoadResString(errItemNotFound)

End Function
Public Property Get Item(ByVal Position As Long)
As String
Attribute Item.VB_UserMemId = 0

' Returns the element at the passed in position in
the array
If Position >= 0 And Position < mlngCount Then
Item = mcarrItems(Position)
Else
On Error GoTo 0
Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
LoadResString(errItemDoesNotExist)
End If

End Property
Public Property Let Item(ByVal Position As Long,
_
ByVal Value As String)

' Returns the element at the passed in position in
the array
If Position >= 0 Then
' If the passed in position is outside the array
' bounds, then resize the array
If Position >= mlngCount Then
ReDim Preserve mcarrItems(Position)
mlngCount = Position + 1
End If

' Set the newly added element in the array to
the
' passed in variable
mcarrItems(Position) = Value
Else
On Error GoTo 0
Err.Raise vbObjectError +
errItemDoesNotExist, mstrSource, _
LoadResString(errItemDoesNotExist)
End If

End Property
Public Sub MoveUp(ByVal Position As Long)
' Moves the element at the passed in position up
by 1

Dim strTemp As String

If Position > 0 And Position < mlngCount Then
strTemp = mcarrItems(Position)

mcarrItems(Position) = mcarrItems(Position -
1)
mcarrItems(Position - 1) = strTemp
End If

End Sub
Public Sub MoveDown(ByVal Position As Long)
' Moves the element at the passed in position
down by 1

Dim strTemp As String

If Position >= 0 And Position < mlngCount - 1
Then
strTemp = mcarrItems(Position)

```

```

    mcarrItems(Position) =
mcarrItems(Position + 1)
mcarrItems(Position + 1) = strTemp
End If

End Sub

Public Function Count() As Long

    Count = mlngCount

End Function

Private Sub Class_Initialize()

    mlngCount = 0

End Sub
Private Sub Class_Terminate()

    Call Clear

End Sub

VERSION 1.0 CLASS
BEGIN
    MultiUse = -1 'True
END
Attribute VB_Name = "cWorker"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:    cWorker.cls
'
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
'
' PURPOSE:  Encapsulates the properties
and methods of a worker step.
'           Implements the cStep class -
carries out initializations
'           and validations that are specific to
worker steps.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Implements cStep

' Object variable to keep the step reference
in
Private mcStep As cStep

' Used to indicate the source module name
when errors
' are raised by this class
Private mstrSource As String
Private Const mstrModuleName As String =
"cWorker."
Private Sub cStep_AddAllIterators()

    Call mcStep.AddAllIterators

End Sub

Private Property Let cStep_StartDir(ByVal
RHS As String)

    mcStep.StartDir = RHS

```

```

End Property

Private Property Get cStep_StartDir() As
String

    cStep_StartDir = mcStep.StartDir

End Property

Private Property Set cStep_NodeDB(RHS As
DAO.Database)

    Set mcStep.NodeDB = RHS

End Property

Private Property Get cStep_NodeDB() As
DAO.Database

    Set cStep_NodeDB = mcStep.NodeDB

End Property

Private Function cStep_IncVersionY() As
String

    cStep_IncVersionY = mcStep.IncVersionY

End Function
Private Function cStep_IsNewVersion() As
Boolean

    cStep_IsNewVersion =
mcStep.IsNewVersion
End Function
Private Function cStep_OldVersionNo() As
String

    cStep_OldVersionNo =
mcStep.OldVersionNo
End Function

Private Function cStep_IncVersionX() As
String

    cStep_IncVersionX = mcStep.IncVersionX

End Function
Private Sub cStep_UpdateIteratorVersion()

    Call mcStep.UpdateIteratorVersion

End Sub

Private Function cStep_IteratorCount() As
Long

    cStep_IteratorCount = mcStep.IteratorCount

End Function

Private Sub cStep_UnloadIterators()

    Call mcStep.UnloadIterators

End Sub

Private Sub cStep_SaveIterators()

    Call mcStep.SaveIterators

End Sub

Private Property Get cStep_IteratorName() As
String

    cStep_IteratorName = mcStep.IteratorName

```

```

End Property

Private Property Let cStep_IteratorName(ByVal
RHS As String)

    mcStep.IteratorName = RHS

End Property

Private Sub cStep_LoadIterator(cItRecord As
cIterator)

    Call mcStep.LoadIterator(cItRecord)

End Sub
Private Sub cStep_DeleteIterator(cItRecord As
cIterator)

    Call mcStep.DeleteIterator(cItRecord)

End Sub

Private Sub cStep_InsertIterator(cItRecord As
cIterator)

    Call mcStep.InsertIterator(cItRecord)

End Sub
Private Function cStep_Iterators() As Variant

    cStep_Iterators = mcStep.Iterators

End Function
Private Sub cStep_ModifyIterator(cItRecord As
cIterator)

    Call mcStep.ModifyIterator(cItRecord)

End Sub
Private Sub cStep_RemoveIterator(cItRecord As
cIterator)

    Call mcStep.RemoveIterator(cItRecord)

End Sub
Private Sub cStep_UpdateIterator(cItRecord As
cIterator)

    Call mcStep.UpdateIterator(cItRecord)

End Sub
Private Sub cStep_AddIterator(cItRecord As
cIterator)

    Call mcStep.AddIterator(cItRecord)

End Sub

Private Property Let cStep_Position(ByVal RHS As
Long)

    mcStep.Position = RHS

End Property

Private Property Get cStep_Position() As Long

    cStep_Position = mcStep.Position

End Property

Private Function cStep_Clone(Optional cCloneStep
As cStep) As cStep

    Dim cNewWorker As cWorker

```

```

Set cNewWorker = New cWorker
Set cStep_Clone =
mcStep.Clone(cNewWorker)

End Function

Private Sub StepTextOrFileEntered()
' Checks if either the step text or the name
of the file containing
' the text has been entered
' If both of them are null or both of them
are not null,
' the worker step is invalid and an error is
raised
If StringEmpty(mcStep.StepText) And
StringEmpty(mcStep.StepTextFile) Then
ShowError errStepTextAndFileNull
On Error GoTo 0
Err.Raise vbObjectError +
errStepTextAndFileNull, _
mstrSource,
LoadResString(errStepTextAndFileNull)
End If

End Sub

Private Property Get cStep_IndOperation()
As Operation

cStep_IndOperation =
mcStep.IndOperation

End Property

Private Property Let
cStep_IndOperation(ByVal RHS As
Operation)

mcStep.IndOperation = RHS

End Property

Private Property Get cStep_NextStepId() As
Long

cStep_NextStepId = mcStep.NextStepId

End Property

Private Property Let
cStep_OutputFile(ByVal RHS As String)

mcStep.OutputFile = RHS

End Property

Private Property Get cStep_OutputFile() As
String

cStep_OutputFile = mcStep.OutputFile

End Property

Private Property Let cStep_ErrorFile(ByVal
RHS As String)

mcStep.ErrorFile = RHS

End Property

Private Property Get cStep_ErrorFile() As
String

cStep_ErrorFile = mcStep.ErrorFile

```

```

End Property

Private Property Let cStep_LogFile(ByVal
RHS As String)

' mcStep.LogFile = RHS

End Property

Private Property Get cStep_LogFile() As
String

' cStep_LogFile = mcStep.LogFile

End Property

Private Property Let
cStep_ArchivedFlag(ByVal RHS As Boolean)

mcStep.ArchivedFlag = RHS

End Property

Private Property Get cStep_ArchivedFlag() As
Boolean

cStep_ArchivedFlag = mcStep.ArchivedFlag

End Property

Private Sub Class_Initialize()

' Create the object
Set mcStep = New cStep

' Initialize the object with valid values for a
Worker step
' The global flag should be the first field to
be initialized
' since subsequent validations might try to
check if the
' step being created is global
mcStep.GlobalFlag = False
' mcStep.GlobalRunMethod = gintNoOption
mcStep.StepType = gintWorkerStep

End Sub

Private Sub Class_Terminate()

' Remove the step object
Set mcStep = Nothing

End Sub

Private Sub cStep_Add()

' Call a private procedure to see if the step
text has been
' entered - since a worker step actually
executes a step, entry
' of the text is mandatory
Call StepTextOrFileEntered

' Call the Add method of the step class to
carry out the insert
mcStep.Add

End Sub

Private Property Get
cStep_ContinuationCriteria() As
ContinuationCriteria

cStep_ContinuationCriteria =
mcStep.ContinuationCriteria

End Property

```

```

Private Property Let
cStep_ContinuationCriteria(ByVal RHS As
ContinuationCriteria)

' The Continuation criteria must be non-null for
all worker steps.
' Check if the Continuation Criteria is valid
Select Case RHS
Case gintOnFailureAbortSiblings,
gintOnFailureCompleteSiblings, _
gintOnFailureSkipSiblings,
gintOnFailureAbort, _
gintOnFailureContinue,
gintOnFailureAsk
mcStep.ContinuationCriteria = RHS

Case Else
On Error GoTo 0
Err.Raise vbObjectError +
errContCriteriaInvalid, _
mstrModuleName,
LoadResString(errContCriteriaInvalid)
End Select

End Property

Private Property Let
cStep_DegreeParallelism(ByVal RHS As String)

mcStep.DegreeParallelism = RHS

End Property

Private Property Get cStep_DegreeParallelism() As
String

cStep_DegreeParallelism =
mcStep.DegreeParallelism

End Property

Private Sub cStep_Delete()

mcStep.Delete

End Sub

Private Property Get cStep_EnabledFlag() As
Boolean

cStep_EnabledFlag = mcStep.EnabledFlag

End Property

Private Property Let cStep_EnabledFlag(ByVal
RHS As Boolean)

mcStep.EnabledFlag = RHS

End Property

Private Property Let
cStep_ExecutionMechanism(ByVal RHS As
ExecutionMethod)

On Error GoTo ExecutionMechanismErr
mstrSource = mstrModuleName &
"cStep_ExecutionMechanism"

Select Case RHS
Case gintExecuteShell, gintExecuteODBC
mcStep.ExecutionMechanism = RHS

Case Else

```

```

    On Error GoTo 0
    Err.Raise vbObjectError +
errExecutionMechanismInvalid, _
        mstrSource,
LoadResString(errExecutionMechanismInva
lid)
    End Select

    Exit Property

ExecutionMechanismErr:
    LogErrors Errors
    mstrSource = mstrModuleName &
"cStep_ExecutionMechanism"
    On Error GoTo 0
    Err.Raise vbObjectError +
errExecutionMechanismLetFailed, _
        mstrSource,
LoadResString(errExecutionMechanismLet
Failed)

End Property

Private Property Get
cStep_ExecutionMechanism() As
ExecutionMethod

    cStep_ExecutionMechanism =
mcStep.ExecutionMechanism

End Property

Private Property Let
cStep_FailureDetails(ByVal RHS As String)

    mcStep.FailureDetails = RHS

End Property

Private Property Get cStep_FailureDetails()
As String

    cStep_FailureDetails =
mcStep.FailureDetails

End Property

Private Property Get cStep_GlobalFlag() As
Boolean

    cStep_GlobalFlag = mcStep.GlobalFlag

End Property

Private Property Let
cStep_GlobalFlag(ByVal RHS As Boolean)

    ' Set the global flag to false - this flag is
initialized when
    ' an instance of the class is created. Just
making sure that
    ' nobody changes the value inadvertently
mcStep.GlobalFlag = False

End Property
Private Sub cStep_Modify()

    ' Call a private procedure to see if the step
text has been
    ' entered - since a worker step actually
executes a step, entry
    ' of the text is mandatory
    Call StepTextOrFileEntered

```

```

    ' Call the Modify method of the step class to
carry out the update
    mcStep.Modify

End Sub

Private Property Let
cStep_ParentStepId(ByVal RHS As Long)

    mcStep.ParentStepId = RHS

End Property

Private Property Get cStep_ParentStepId() As
Long

    cStep_ParentStepId = mcStep.ParentStepId

End Property

Private Property Let
cStep_ParentVersionNo(ByVal RHS As
String)

    mcStep.ParentVersionNo = RHS

End Property

Private Property Get cStep_ParentVersionNo()
As String

    cStep_ParentVersionNo =
mcStep.ParentVersionNo

End Property

Private Property Let
cStep_SequenceNo(ByVal RHS As Integer)

    mcStep.SequenceNo = RHS

End Property

Private Property Get cStep_SequenceNo() As
Integer

    cStep_SequenceNo = mcStep.SequenceNo

End Property

Private Property Let cStep_StepId(ByVal RHS
As Long)

    mcStep.StepId = RHS

End Property

Private Property Get cStep_StepId() As Long

    cStep_StepId = mcStep.StepId

End Property

Private Property Let cStep_StepLabel(ByVal
RHS As String)

    mcStep.StepLabel = RHS

End Property

Private Property Get cStep_StepLabel() As
String

    cStep_StepLabel = mcStep.StepLabel

```

```

End Property

Private Property Let cStep_StepLevel(ByVal RHS
As Integer)

    mcStep.StepLevel = RHS

End Property

Private Property Get cStep_StepLevel() As Integer

    cStep_StepLevel = mcStep.StepLevel

End Property

Private Property Let cStep_StepText(ByVal RHS
As String)

    mcStep.StepText = RHS

End Property

Private Property Get cStep_StepText() As String

    cStep_StepText = mcStep.StepText

End Property

Private Property Let cStep_StepTextFile(ByVal
RHS As String)

    mcStep.StepTextFile = RHS

End Property

Private Property Get cStep_StepTextFile() As
String

    cStep_StepTextFile = mcStep.StepTextFile

End Property

Private Property Let cStep_StepType(RHS As
gintStepType)

    mcStep.StepType = gintWorkerStep

End Property

Private Property Get cStep_StepType() As
gintStepType

    cStep_StepType = mcStep.StepType

End Property

Private Sub cStep_Validate()
    ' The validate routines for each of the steps will
    ' carry out the specific validations for the type
and
    ' call the generic validation routine

    On Error GoTo cStep_ValidateErr

    ' Validations specific to worker steps

    ' Check if the step text or a file name has been
    ' specified
    Call StepTextOrFileEntered

    mcStep.Validate

Exit Sub

```



```

cStep_ValidateErr:
  LogErrors Errors
  mstrSource = mstrModuleName &
"cStep_Validate"
  On Error GoTo 0
  Err.Raise vbObjectError +
errValidateFailed, _
  mstrSource, _
  LoadResString(errValidateFailed)
End Sub

Private Property Let
cStep_VersionNo(ByVal RHS As String)

  mcStep.VersionNo = RHS

End Property

Private Property Get cStep_VersionNo() As
String

  cStep_VersionNo = mcStep.VersionNo

End Property

Private Property Let
cStep_WorkspaceId(ByVal RHS As Long)

  mcStep.WorkspaceId = RHS

End Property

Private Property Get cStep_WorkspaceId()
As Long

  cStep_WorkspaceId =
mcStep.WorkspaceId

End Property

VERSION 1.0 CLASS
BEGIN
  MultiUse = -1 'True
END
Attribute VB_Name = "cWorkspace"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE: cWorkspace.cls
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Encapsulates the properties
and methods of a workspace.
' Contains functions to insert,
update and delete
' att_workspaces records from the
database.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Local variable(s) to hold property value(s)
Private mlngWorkspaceld As Long
Private mstrWorkspaceName As String
Private mblnArchivedFlag As Boolean
Private mdbStepMaster As Database

' Used to indicate the source module name
when errors
' are raised by this class

```

```

Private mstrSource As String
Private Const mstrModuleName As String =
"cWorkspace."

' The cSequence class is used to generate
unique workspace identifiers
Private mWorkspaceSeq As cSequence

' The StringSM class is used to carry out string
operations
Private mFieldValue As cStringSM

Public Function Clone() As cWorkspace

  ' Creates a copy of a given workspace

  Dim cCloneWsp As cWorkspace

  On Error GoTo CloneErr

  Set cCloneWsp = New cWorkspace

  ' Copy all the workspace properties to the
newly
  ' created workspace
  cCloneWsp.WorkspaceId =
mlngWorkspaceld
  cCloneWsp.WorkspaceName =
mstrWorkspaceName
  cCloneWsp.ArchivedFlag =
mblnArchivedFlag

  ' And set the return value to the newly
created workspace
  Set Clone = cCloneWsp

Exit Function

CloneErr:
  LogErrors Errors
  mstrSource = mstrModuleName & "Clone"
  On Error GoTo 0
  Err.Raise vbObjectError + errCloneFailed, _
  mstrSource,
  LoadResString(errCloneFailed)

End Function

Public Property Let ArchivedFlag(ByVal vdata
As Boolean)

  mblnArchivedFlag = vdata

End Property

Public Property Get ArchivedFlag() As
Boolean

  ArchivedFlag = mblnArchivedFlag

End Property

Public Property Set WorkDatabase(vdata As
Database)

  Set mdbStepMaster = vdata

End Property

Private Sub WorkspaceNameDuplicate()
  ' Check if the workspace name already exists
in the workspace

  Dim rstWorkspace As Recordset
  Dim strSql As String

```

```

Dim qy As DAO.QueryDef

  On Error GoTo WorkspaceNameDuplicateErr
  mstrSource = mstrModuleName &
"WorkspaceNameDuplicate"

  ' Create a recordset to retrieve the count of
records
  ' having the same workspace name
  strSql = "Select count(*) as workspace_count "
& _
  " from att_workspaces " & _
  " where workspace_name = [w_name] " & _
  " and workspace_id <> [w_id] "
  Set qy =
mdbStepMaster.CreateQueryDef(gstrEmptyString,
strSql)

  ' Call a procedure to assign the parameter values
Call AssignParameters(qy)

  Set rstWorkspace =
qy.OpenRecordset(dbOpenForwardOnly)

  ' mFieldValue.MakeStringFieldValid
(mstrWorkspaceName) & _
  ' " and workspace_id <> " & _
  ' Str(mlngWorkspaceld)
  '
  ' Set rstWorkspace =
mdbStepMaster.OpenRecordset(_
  strSql, dbOpenForwardOnly)

  If rstWorkspace![workspace_count] > 0 Then
rstWorkspace.Close
qy.Close
  ShowError errDuplicateWorkspaceName
  On Error GoTo 0
  Err.Raise vbObjectError +
errDuplicateWorkspaceName, _
  mstrSource,
  LoadResString(errDuplicateWorkspaceName)
  End If
  rstWorkspace.Close
  qy.Close

Exit Sub

WorkspaceNameDuplicateErr:
  Call LogErrors(Errors)
  mstrSource = mstrModuleName &
"WorkspaceNameDuplicate"
  On Error GoTo 0
  Err.Raise vbObjectError +
errWorkspaceNameDuplicateFailed, _
  mstrSource,
  LoadResString(errWorkspaceNameDuplicateFailed
)

End Sub

Public Property Let WorkspaceName(vdata As
String)

  On Error GoTo WorkspaceNameErr
  mstrSource = mstrModuleName &
"WorkspaceName"

  If vdata = gstrEmptyString Then

  On Error GoTo 0
  ' Propagate this error back to the caller
  Err.Raise vbObjectError +
errWorkspaceNameMandatory, _
  mstrSource,
  LoadResString(errWorkspaceNameMandatory)

```

```

Else
  mstrWorkspaceName = vdata
End If
Exit Property

WorkspaceNameErr:
  LogErrors Errors
  mstrSource = mstrModuleName &
"WorkspaceName"
  On Error GoTo 0
  Err.Raise vbObjectError +
errWorkspaceNameSetFailed, _
  mstrSource,
LoadResString(errWorkspaceNameSetFailed)

End Property

Public Property Let WorkspaceId(vdata As Long)

  On Error GoTo WorkspaceIdErr
  mstrSource = mstrModuleName &
"WorkspaceId"

  If (vdata > 0) Then
    mlngWorkspaceId = vdata
  Else
    ' Propagate this error back to the caller
    On Error GoTo 0
    Err.Raise vbObjectError +
errWorkspaceIdInvalid, _
    mstrSource,
LoadResString(errWorkspaceIdInvalid)
  End If

  Exit Property

WorkspaceIdErr:
  LogErrors Errors
  mstrSource = mstrModuleName &
"WorkspaceId"
  On Error GoTo 0
  Err.Raise vbObjectError +
errWorkspaceIdSetFailed, _
  mstrSource,
LoadResString(errWorkspaceIdSetFailed)

End Property

Public Sub AddWorkspace()

  Dim strInsert As String
  Dim qy As DAO.QueryDef

  On Error GoTo AddWorkspaceErr

  ' Retrieve the next identifier using the
sequence class
  Set mWorkspaceSeq = New cSequence
  Set mWorkspaceSeq.IdDatabase =
mdbsStepMaster
  mWorkspaceSeq.IdentifierColumn =
FLD_ID_WORKSPACE
  mlngWorkspaceId =
mWorkspaceSeq.Identifier
  Set mWorkspaceSeq = Nothing

  ' Call procedure to raise an error if the
Workspace name
  ' already exists in the db
  Call WorkspaceNameDuplicate

  ' A new record will have the
archived_flag turned off

```

```

  mblnArchivedFlag = False

  ' Create a temporary querydef object
  strInsert = "insert into att_workspaces " & _
    "( workspace_id, workspace_name, " & _
    " archived_flag )" & _
    " values ( [w_id], [w_name], [archived]
) "
  Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString, strInsert)

  ' Call a procedure to assign the parameter
values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

  ' strInsert = "insert into att_workspaces " & _
  ' "( workspace_id, workspace_name, " & _
  ' " archived_flag )" & _
  ' " values ( " & _
  ' Str(mlngWorkspaceId) & _
  ' ", " & _
  ' mFieldValue.MakeStringFieldValid(mstrWorkspaceName) & _
  ' ", " & Str(mblnArchivedFlag) & _
  ' ") "
  ' mdbsStepMaster.Execute strInsert,
dbFailOnError

  Exit Sub

AddWorkspaceErr:

  Call LogErrors(Errors)
  mstrSource = mstrModuleName &
"AddWorkspace"
  On Error GoTo 0
  Err.Raise vbObjectError +
errWorkspaceInsertFailed, _
  mstrSource,
LoadResString(errWorkspaceInsertFailed)

End Sub

Private Sub AssignParameters(qyExec As DAO.QueryDef)
  ' Assigns values to the parameters in the
querydef object
  ' The parameter names are cryptic to make
them different
  ' from the field names. When the parameter
names are
  ' the same as the field names, parameters in
the where
  ' clause do not get created.

  Dim prmParam As DAO.Parameter

  On Error GoTo AssignParametersErr
  mstrSource = mstrModuleName &
"AssignParameters"

  For Each prmParam In qyExec.Parameters
    Select Case prmParam.Name
      Case "[w_id]"
        prmParam.Value =
mlngWorkspaceId

      Case "[w_name]"
        prmParam.Value =
mstrWorkspaceName

```

```

      Case "[archived]"
        prmParam.Value = mblnArchivedFlag

    Case Else
      ' Write the parameter name that is faulty
      WriteError errInvalidParameter,
mstrSource, _
        prmParam.Name
      On Error GoTo 0
      Err.Raise errInvalidParameter,
mstrSource, _
        LoadResString(errInvalidParameter)
    End Select
  Next prmParam

  Exit Sub

AssignParametersErr:

  mstrSource = mstrModuleName &
"AssignParameters"
  Call LogErrors(Errors)
  On Error GoTo 0
  Err.Raise vbObjectError +
errAssignParametersFailed, _
  mstrSource,
LoadResString(errAssignParametersFailed)

End Sub

Public Sub DeleteWorkspace()

  Dim strDelete As String
  Dim qy As DAO.QueryDef

  On Error GoTo DeleteWorkspaceErr

  strDelete = "delete from att_workspaces " & _
    " where workspace_id = [w_id]"
  Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmptyString, strDelete)

  ' Call a procedure to assign the parameter values
  Call AssignParameters(qy)

  qy.Execute dbFailOnError
  qy.Close

  ' mdbsStepMaster.Execute strDelete,
dbFailOnError
  ' " where workspace_id = " & _
  ' Str(mlngWorkspaceId)

  Exit Sub

DeleteWorkspaceErr:
  Call LogErrors(Errors)
  mstrSource = mstrModuleName &
"DeleteWorkspace"
  On Error GoTo 0
  Err.Raise vbObjectError +
errWorkspaceDeleteFailed, _
  mstrSource,
LoadResString(errWorkspaceDeleteFailed)
End Sub

Public Sub ModifyWorkspace()

  Dim strUpdate As String
  Dim qy As DAO.QueryDef

  On Error GoTo ModifyWorkspaceErr

```

```

' Call procedure to raise an error if the
Workspace name
' already exists in the db
Call WorkspaceNameDuplicate

strUpdate = "update att_workspaces " & _
" set workspace_name = [w_name] " & _
" , archived_flag = [archived] " & _
" where workspace_id = [w_id] "
Set qy =
mdbsStepMaster.CreateQueryDef(gstrEmpt
yString, strUpdate)

' Call a procedure to assign the parameter
values
Call AssignParameters(qy)

qy.Execute dbFailOnError
qy.Close

' strUpdate = "update att_workspaces " &
" set workspace_name = " & _
mFieldValue.MakeStringFieldValid(mstrW
orkspaceName) & _
" , archived_flag = " & _
Str(mblnArchivedFlag) & _
" where workspace_id = " & _
Str(mlngWorkspaceId)

' mdbsStepMaster.Execute strUpdate,
dbFailOnError

Exit Sub

ModifyWorkspaceErr:

Call LogErrors(Errors)
mstrSource = mstrModuleName &
"ModifyWorkspace"
On Error GoTo 0
Err.Raise vbObjectError +
errWorkspaceUpdateFailed, _
mstrSource,
LoadResString(errWorkspaceUpdateFailed)

End Sub
Public Property Get WorkspaceName() As
String

WorkspaceName = mstrWorkspaceName

End Property

Public Property Get WorkspaceId() As Long

WorkspaceId = mlngWorkspaceId

End Property

Private Sub Class_Initialize()

' Each function will append it's own name
to this
' variable
mstrSource = "cWorkspace."

Set mFieldValue = New cStringSM

End Sub

Private Sub Class_Terminate()

```

```

Set mdbsStepMaster = Nothing
Set mFieldValue = Nothing

End Sub

Attribute VB_Name = "DatabaseSM"
' FILE: DatabaseSM.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved

' PURPOSE: Contains all the database
initialization/cleanup
procedures for the project. Also
contains upgrade
database upgrade functions.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

' This module is called DatabaseSM, since
Database is a standard
Visual Basic object and we want to avoid any
confusion with it.

Option Explicit

Public wrkJet As Workspace
Public dbsAttTool As Database
Public gblnDbOpen As Boolean
Public gRunEngine As rdoEngine

' Used to indicate the source module name
when errors
are raised by this module
Private Const mstrModuleName As String =
"DatabaseSM."
Public Const gsDefDBFileExt As String =
".stp"
Private Const msDefDBFile As String =
"\SMDData" & gsDefDBFileExt

Private Const merrFileNotFound As Integer =
3024
Private Const merrDaoTableMissing As
Integer = 3078

Private Const
STEPMASTER_SETTINGS_VAL_NAME_D
BFILE As String = "WorkspaceFile"

Public Const DEF_NO_COUNT_DISPLAY
As Boolean = False
Public Const DEF_NO_EXECUTE
As Boolean = False
Public Const DEF_PARSE_QUERY_ONLY
As Boolean = False
Public Const
DEF_ANSI_QUOTED_IDENTIFIERS As
Boolean = False
Public Const DEF_ANSI_NULLS As
Boolean = True
Public Const DEF_SHOW_QUERY_PLAN
As Boolean = False
Public Const DEF_SHOW_STATS_TIME
As Boolean = False
Public Const DEF_SHOW_STATS_IO
As Boolean = False
Public Const
DEF_PARSE_ODBC_MSG_PREFIXES As
Boolean = True
Public Const DEF_ROW_COUNT
As Long = 0
Public Const
DEF_TSQL_BATCH_SEPARATOR As
String = "GO"

```

```

Public Const DEF_QUERY_TIME_OUT As
Long = 0
Public Const DEF_SERVER_LANGUAGE
As String = "(Default)"
Public Const
DEF_CHARACTER_TRANSLATION As
Boolean = True
Public Const DEF_REGIONAL_SETTINGS
As Boolean = False

Public Const PARAM_DEFAULT_DIR As
String = "DEFAULT_DIR"
Public Const PARAM_DEFAULT_DIR_DESC
As String = "Default destination directory " & _
"for all output and error files. If it is
blank, the StepMaster installation directory will be
used."

Public Const PARAM_RUN_ID As
String = "RUN_ID"
Public Const PARAM_RUN_ID_DESC As
String = "The run identifier for a run. " & _
"Any modifications will be overwritten
before each run."

Public Const PARAM_OUTPUT_DIR As
String = "OUTPUT_DIR"
Public Const PARAM_OUTPUT_DIR_DESC
As String = "The output directory for a run. " & _
"Any modifications will be overwritten
before each run."

Public Const
CONNECTION_STRINGS_TO_NAME_SUFFIX
As String = "_NAME"

Private Const TBL_RUN_STEP_HDR As String =
"run_header"
Private Const TBL_RUN_STEP_DTLS As String =
"run_step_details"
Public Const TBL_CONNECTION_DTLS As
String = "connection_dtls"
Public Const TBL_CONNECTION_STRINGS As
String = "workspace_connections"
Public Const TBL_STEPS As String = "att_steps"

Public Const FLD_ID_CONN_NAME As String =
"connection_name_id"
Public Const FLD_ID_WORKSPACE As String =
"workspace_id"
Public Const FLD_ID_STEP As String = "step_id"
Public Const FLD_ID_PARAMETER As String =
"parameter_id"

Public Const
FLD_CONN_DTL_CONNECTION_NAME As
String = "connection_name"
Public Const
FLD_CONN_DTL_CONNECTION_STRING As
String = "connection_string_name"
Public Const
FLD_CONN_DTL_CONNECTION_TYPE As
String = "connection_type"

Public Const
FLD_CONN_STR_CONNECTION_NAME As
String = "connection_name"

Public Const FLD_STEPS_EXEC_MECHANISM
As String = "execution_mechanism"
Public Const FLD_STEPS_EXEC_DTL As String =
"start_directory"
Public Const FLD_STEPS_VERSION_NO As
String = "version_no"

```

```

Public Const DATA_TYPE_CURRENCY
As String = "CURRENCY"
Public Const DATA_TYPE_LONG As
String = "Long"
Public Const DATA_TYPE_INTEGER As
String = "INTEGER"
Public Const DATA_TYPE_TEXT255 As
String = "Text(255)"

Private Sub InsertBuiltInParameter(dbFile
As Database, sParamName As String, _
sParamValue As String, sParamDesc
As String)

Dim sBuf As String
Dim cTempStr As New cStringSM
Dim lld As Long
Dim rTemp As DAO.Recordset
Dim rParam As DAO.Recordset
Dim cTempSeq As cSequence

' Create the passed in built-in parameter,
for each workspace in the db
Set cTempSeq = New cSequence
Set cTempSeq.IdDatabase = dbFile
cTempSeq.IdentifierColumn =
FLD_ID_PARAMETER

sBuf = "select * from att_workspaces "
Set rTemp = dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)
If rTemp.RecordCount <> 0 Then
rTemp.MoveFirst

While Not rTemp.EOF
sBuf = "select * from
workspace_parameters " & _
" where workspace_id = " &
Str(rTemp!workspace_id) & _
" and parameter_name = " &
cTempStr.MakeStringFieldValid(sParamName)
Set rParam =
dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)
If rParam.RecordCount <> 0 Then
rParam.MoveFirst
' Since the parameter already
exists, change it to a built-in type
sBuf = "update
workspace_parameters " & _
" set parameter_type = " &
CStr(gintParameterBuiltIn) & _
", description = " &
cTempStr.MakeStringFieldValid(sParamDesc) & _
" where workspace_id = " &
Str(rTemp!workspace_id) & _
" and parameter_id = " &
Str(rParam!parameter_id)
Else
' Else, insert a parameter record
lld = cTempSeq.Identifier
sBuf = "insert into
workspace_parameters " & _
"(\ workspace_id,
parameter_id, " & _
" parameter_name,
parameter_value, " & _
" description, parameter_type
) " & _
" values ( " & _
Str(rTemp!workspace_id) &
", " & Str(lld) & ", " & _

```

```

cTempStr.MakeStringFieldValid(sParamName)
) & ", " & _

cTempStr.MakeStringFieldValid(sParamValue)
) & ", " & _

cTempStr.MakeStringFieldValid(sParamDesc)
& ", " & _
CStr(gintParameterBuiltIn) & _
" ) "
End If
dbFile.Execute sBuf, dbFailOnError
rParam.Close

rTemp.MoveNext
Wend
End If
rTemp.Close

End Sub
Public Sub InitRunEngine()

Set gRunEngine = New rdoEngine
gRunEngine.rdoDefaultCursorDriver =
rdUseServer

End Sub

Public Function DefaultDBFile() As String
DefaultDBFile = GetSetting(App.Title,
"Settings",
STEPMASER_SETTINGS_VAL_NAME_D
BFILE, App.Path & msDefDBFile)
End Function

Public Sub CloseDatabase()

Dim dbsInstance As Database
Dim recInstance As Recordset

On Error GoTo CloseDatabaseErr

' Close all open recordsets and databases in
the workspace
For Each dbsInstance In wrkJet.Databases

For Each recInstance In
dbsAttTool.Recordsets
recInstance.Close
Next recInstance
dbsInstance.Close

Next dbsInstance

Set dbsAttTool = Nothing

gblnDbOpen = False
wrkJet.Close

Exit Sub

CloseDatabaseErr:

Call LogErrors(Errors)
Resume Next

End Sub

Private Function NoDbChanges(sVerTo As
String, sVerFrom As String) As Boolean

If sVerTo = gsVersion242 And sVerFrom =
gsVersion241 Then
NoDbChanges = True

```

```

Elseif sVerTo = gsVersion242 And sVerFrom =
gsVersion24 Then
NoDbChanges = True
Elseif sVerTo = gsVersion253 And sVerFrom =
gsVersion251 Then
NoDbChanges = True
Elseif sVerTo = gsVersion255 And sVerFrom =
gsVersion251 Then
NoDbChanges = True
Else
NoDbChanges = False
End If

End Function

Public Function SMOpenDatabase(Optional
strDbName As String = gstrEmptyString) As
Boolean
Dim sVersion As String
Dim bOpeningDb As Boolean ' This flag is used
to check if OpenDatabase failed

On Error GoTo OpenDatabaseErr

bOpeningDb = False
SMOpenDatabase = False

' Create Microsoft Jet Workspace object.
If Not gblnDbOpen Then
Set wrkJet =
CreateWorkspace("att_tool_workspace_setup",
"admin", gstrEmptyString, dbUseJet)
End If

' Prompt the user for the database file if it is not
passed in
If StringEmpty(strDbName) Then
strDbName = BrowseDBFile
If StringEmpty(strDbName) Then
Exit Function
End If
End If

Do
If gblnDbOpen Then
#If Not RUN_ONLY Then
CloseOpenWorkspaces
#End If
Set wrkJet =
CreateWorkspace("att_tool_workspace_setup",
"admin", gstrEmptyString, dbUseJet)
End If

' Toggle the bOpeningDb flag around the
OpenDatabase method - the value
' of this flag will be checked by the error
handler to determine if it is
' the OpenDatabase that failed.
BugMessage "DB File: " & strDbName

bOpeningDb = True
' Open the database for exclusive use
Set dbsAttTool =
wrkJet.OpenDatabase(strDbName, Options:=True)
bOpeningDb = False

If dbsAttTool Is Nothing Then
' If the file is not present in the directory,
display
' an error and ask the user to enter a new
path
Call ShowError(errOpenDbFailed,
OptArgs:=strDbName)

strDbName = BrowseDBFile

```

```

Else
  sVersion = DBVersion(dbsAttTool)

  ' Make sure the application and db
  version numbers match
  If sVersion = gsVersion Then
    Call InitializeData(strDbName)
    gblnDbOpen = True
    SMOpenDatabase = True
  Else
    If UpgradeDb(wrkJet, dbsAttTool,
gsVersion, sVersion) Then
      Call InitializeData(strDbName)
      gblnDbOpen = True
      SMOpenDatabase = True
    Else
      dbsAttTool.Close
      Set dbsAttTool = Nothing

      ShowError
errVersionMismatch, _
      OptArgs:=" Please install
Version " & gsVersion & " of the
workspace definition file."
      strDbName = BrowseDBFile
    End If
  End If
  End If
  Loop While gblnDbOpen = False And
Not StringEmpty(strDbName)

Exit Function

OpenDatabaseErr:
  Call DisplayErrors(Errors)

  ' If the OpenDatabase failed, continue
  If bOpeningDb Then
    Resume Next
  End If

  Call ShowError(errOpenDbFailed,
OptArgs:=strDbName)

End Function
Private Sub InitializeData(sDb As String)

  Set gcParameters = New cArrParameters
  Set gcParameters.ParamDatabase =
dbsAttTool

  Set gcSteps = New cArrSteps
  Set gcSteps.StepDB = dbsAttTool

  Set gcConstraints = New cArrConstraints
  Set gcConstraints.ConstraintDB =
dbsAttTool

  Set gcConnections = New cConnections
  Set gcConnections.ConnDb = dbsAttTool

  Set gcConnDtls = New cConnDtls
  Set gcConnDtls.ConnDb = dbsAttTool

  ' Disable the error handler since this is not
  a critical step
  On Error GoTo 0
  SaveSetting App.Title, "Settings",
STEPMASTER_SETTINGS_VAL_NAME
_DBFILE, sDb
End Sub
Private Sub
UpdateContinuationCriteria(dbFile As
DAO.Database)

```

```

Dim qyTemp As DAO.QueryDef
Dim sBuf As String

On Error GoTo
UpdateContinuationCriteriaErr

  sBuf = "Since this version of the executable
incorporates failure processing, " & _
  "the upgrade will update the On Failure
field for each of the steps " & _
  "to 'Continue' to be compatible with the
existing behaviour. " & _
  "Proceed?"

  If Not Confirm(Buttons:=vbYesNo,
strMessage:=sBuf, strTitle:="Upgrade
database") Then
    Exit Sub
  End If

  ' Create a recordset object to retrieve all
  steps for
  ' the given workspace
  sBuf = " update att_steps a " & _
  " set continuation_criteria = " &
CStr(gintOnFailureContinue) & _
  " where archived_flag = [archived] "

  ' Find the highest X-component of the
  version number
  sBuf = sBuf & " AND cint( mid(
version_no, 1, instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") - 1 )) = " &
-
  " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") - 1 )) ) " & _
  " from att_steps AS d " & _
  " WHERE a.step_id = d.step_id ) "

  ' Find the highest Y-component of the
  version number for the highest X-component
  sBuf = sBuf & " AND cint( mid(
version_no, instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") + 1 )) = " &
-
  " ( select max( cint( mid( version_no,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") + 1 )) ) " &
-
  " from att_steps AS b " & _
  " Where a.step_id = b.step_id " & _
  " AND cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & ") - 1 )) = " & _
  " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & ") - 1 )) ) " & _
  " from att_steps AS c " & _
  " WHERE a.step_id = c.step_id ) ) "

  ' Create a temporary Querydef object
  Set qyTemp =
dbFile.CreateQueryDef(gstrEmptyString,
sBuf)
  qyTemp.Parameters("archived").Value =
False

  qyTemp.Execute dbFailOnError
  qyTemp.Close

Exit Sub

UpdateContinuationCriteriaErr:
  Call LogErrors(Errors)

```

```

Err.Raise vbObjectError + errModifyStepFailed,
mstrModuleName, _
  LoadResString(errModifyStepFailed)

End Sub

Private Sub UpdateDbDtls(dbFile As Database,
sNewVersion As String)

  Dim sSql As String
  Dim cTemp As New cStringSM

  On Error GoTo UpdatedDbDtlsErr

  sSql = "update db_details " & _
  " set db_version = " &
cTemp.MakeStringFieldValid(sNewVersion)

  dbFile.Execute sSql, dbFailOnError

Exit Sub

UpdatedDbDtlsErr:
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
  LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade10to21(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

  Dim sSql As String

  On Error GoTo Upgrade10to21Err

  Call UpdateDbDtls(dbFile, sVersion)

  Call UpdateContinuationCriteria(dbFile)

Exit Sub

Upgrade10to21Err:
  UpgradeWsp.Rollback
  Call LogErrors(Errors)
  Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
  LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade21to23(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

  Dim sBuf As String
  Dim cTempStr As New cStringSM

  On Error GoTo Upgrade21to23Err

  ' Add a parameter type field and a description
  field to the parameter table
  sBuf = "alter table workspace_parameters " & _
  " add column description TEXT(255) "
  dbFile.Execute sBuf, dbFailOnError

  sBuf = "alter table workspace_parameters " & _
  " add column parameter_type INTEGER "
  dbFile.Execute sBuf, dbFailOnError

  ' Initialize the parameter type on all parameters to
  indicate generic parameters
  sBuf = "update workspace_parameters " & _

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```

" set parameter_type = " &
CStr(gintParameterGeneric)
dbFile.Execute sBuf, dbFailOnError

sBuf = "Release 2.3 onwards, connection
string parameters will be " & _
" displayed in a separate node. After
this upgrade, all connection " & _
" string parameters will appear under
the Globals/Connection Strings " & _
" node in the workspace. "
Call MsgBox(sBuf, vbOKOnly +
vbApplicationModal, "Upgrade database")

' Update the parameter type on all
parameters that look like db connection
strings
sBuf = "update workspace_parameters "
& _
" set parameter_type = " &
CStr(gintParameterConnect) & _
" where UCASE(parameter_value)
like '*DRIVER*' " & _
" or UCASE(parameter_value) like
'*DSN*'"
dbFile.Execute sBuf, dbFailOnError

' Add an elapsed time field to the
run_step_details table - this field is
' needed to store the elapsed time in
milliseconds.
sBuf = "alter table run_step_details " & _
" add column elapsed_time LONG "
dbFile.Execute sBuf, dbFailOnError

' The failure_details field has some data
for the case when an ODBC failure
' threshold was specified. Since that's no
longer relevant, update the failure_details
' field for records with failure_criteria =
gintFailureODBC to empty.
' failure_criteria = gintFailureODBC = 1
sBuf = "update att_steps " & _
" set failure_details = " &
cTempStr.MakeStringFieldValid(gstrEmpty
String) & _
" where failure_criteria = 1'"
dbFile.Execute sBuf, dbFailOnError

Call UpdateDbDtls(dbFile, sVersion)

UpgradeWsp.CommitTrans

On Error GoTo DropColumnErr

UpgradeWsp.BeginTrans

' This ddl cannot be in the same
transaction as the failure_details update
' But we can do this in a separate
transaction since we do not expect this
' statement to fail - AND, it doesn't matter
if this transaction fails
' Drop the failure_criteria column from
the att_steps table
sBuf = "alter table att_steps " & _
" drop column failure_criteria "
dbFile.Execute sBuf, dbFailOnError

Exit Sub

DropColumnErr:
Call LogErrors(Errors)
ShowError errDeleteColumnFailed
Exit Sub

```

```

Upgrade21to23Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade23to24(UpgradeWsp As
DAO.Workspace, dbFile As Database,
sVersion As String)

Dim sBuf As String
Dim lld As Long
Dim rTemp As DAO.Recordset
Dim cTempStr As New cStringSM

On Error GoTo Upgrade23to24Err

' Add a new table for connection properties
sBuf = CreateConnectionsTableScript()
' TODO: Not sure of column sizes for row
count, tsqL_batch_separator and
server_language
dbFile.Execute sBuf, dbFailOnError

' Move all connection parameters from the
parameter table to the connections tables
' Insert default values for the newly added
connection properties
sBuf = "select * from workspace_parameters
" & _
" where parameter_type = " &
CStr(gintParameterConnect)
Set rTemp = dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)
lld = 1
If rTemp.RecordCount <> 0 Then
rTemp.MoveFirst

While Not rTemp.EOF
sBuf = "insert into
workspace_connections " & _
" (workspace_id, connection_id, " & _
" connection_name, connection_value,
" & _
" description, no_count_display, " & _
" no_execute, parse_query_only, " & _
" ANSI_quoted_identifiers,
ANSI_nulls, " & _
" show_query_plan, show_stats_time, "
& _
" show_stats_io,
parse_odbc_msg_prefixes, " & _
" row_count, tsqL_batch_separator, " &
_
" query_time_out, server_language, " &
_
" character_translation,
regional_settings ) " & _
" values (" & _
Str(rTemp!workspace_id) & ", " &
Str(lld) & ", " & _
cTempStr.MakeStringFieldValid("'" &
rTemp!parameter_name) & ", " & _
cTempStr.MakeStringFieldValid("'" &
rTemp!parameter_value) & ", " & _
cTempStr.MakeStringFieldValid("'" &
rTemp!Description) & ", " & _
Str(DEF_NO_COUNT_DISPLAY) &
", " & _
Str(DEF_NO_EXECUTE) & ", " &
Str(DEF_PARSE_QUERY_ONLY) & ", " & _

```

```

Str(DEF_ANSI_QUOTED_IDENTIFIERS)
& ", " & Str(DEF_ANSI_NULLS) & ", " & _
Str(DEF_SHOW_QUERY_PLAN) & ", " &
Str(DEF_SHOW_STATS_TIME) & ", " & _
Str(DEF_SHOW_STATS_IO) & ", " &
Str(DEF_PARSE_ODBC_MSG_PREFIXES) & ",
" & _
Str(DEF_ROW_COUNT) & ", " &
cTempStr.MakeStringFieldValid(DEF_TSQL_BAT
CH_SEPARATOR) & ", " & _
Str(DEF_QUERY_TIME_OUT) & ", " &
cTempStr.MakeStringFieldValid(DEF_SERVER_L
ANGUAGE) & ", " & _
Str(DEF_CHARACTER_TRANSLATION)
& ", " & Str(DEF_REGIONAL_SETTINGS) & _
" ) "
dbFile.Execute sBuf, dbFailOnError

lld = lld + 1
rTemp.MoveNext
Wend
End If
rTemp.Close

' Add an identifier column for the connection_id
field
sBuf = "alter table att_identifiers " & _
" add column connection_id long "
dbFile.Execute sBuf, dbFailOnError

' Initialize the value of the connection identifier,
initialized above
sBuf = "update att_identifiers " & _
" set connection_id = " & Str(lld)
dbFile.Execute sBuf, dbFailOnError

' Delete all connection strings from the parameter
table
sBuf = "delete from workspace_parameters " & _
" where parameter_type = " &
CStr(gintParameterConnect)
dbFile.Execute sBuf, dbFailOnError

' Create the built-in parameter, default directory,
for each workspace in the db
Call InsertBuiltInParameter(dbFile,
PARAM_DEFAULT_DIR, gstrEmptyString,
PARAM_DEFAULT_DIR_DESC)

Call UpdateDbDtls(dbFile, sVersion)

Exit Sub

Upgrade23to24Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade24to25(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

Dim sBuf As String
Dim qy As DAO.QueryDef
Dim rTemp As DAO.Recordset
Dim lld As Long
Dim cTempStr As New cStringSM

On Error GoTo Upgrade24to25Err

sBuf = "Release " & gsVersion25 & " onwards,
new 'Connections' must be created for all " & _

```

```

"connection strings. " & vbCrLf &
vbCrLf & _
"Connections will appear under the
Globals/Connections " & _
"node in the workspace. " & vbCrLf
& _
"A list of all 'Connections' (instead
of 'Connection Strings') " & _
"in the workspace will be displayed
in the 'Connections' field for " & _
"ODBC steps on the Step definition
screen. " & vbCrLf & vbCrLf & _
"Each Connection can be marked as
static or dynamic. " & vbCrLf & _
"Dynamic connections will be
created when a step starts execution and " &
_
"closed once the step completes. " &
vbCrLf & _
"Static connections will be kept open
till the run completes." & vbCrLf & vbCrLf
& _
"Currently dynamic 'Connections'
have been created for all existing
'Connection Strings' " & _
"with the suffix " &
CONNECTION_STRINGS_TO_NAME_S
UFFIX
Call MsgBox(sBuf, vbOKOnly +
vbApplicationModal, "Upgrade database")

' Add a new table for the connection name
entity
' This table has been added in order to
satisfy the TPC-H requirement that
' all the queries in a stream need to be
executed on a single connection.
sBuf =
CreateConnectionDtlsTableScript()
dbFile.Execute sBuf, dbFailOnError

' Add an identifier column for the
connection_name_id field
sBuf = "alter table att_identifiers " & _
" add column " &
FLD_ID_CONN_NAME & " long "
dbFile.Execute sBuf, dbFailOnError

Call UpdateDbDtls(dbFile, sVersion)

' insert connection_dtl records for each of
the connection strings
sBuf = "select * from " &
TBL_CONNECTION_STRINGS
Set rTemp = dbFile.OpenRecordset(sBuf,
dbOpenSnapshot)

sBuf = "insert into " &
TBL_CONNECTION_DTLS & _
"( " & FLD_ID_WORKSPACE & _
", " & FLD_ID_CONN_NAME & _
", " &
FLD_CONN_DTL_CONNECTION_NAM
E & _
", " &
FLD_CONN_DTL_CONNECTION_STRIN
G & _
", " &
FLD_CONN_DTL_CONNECTION_TYPE
& ") " & _
" values ( [w_id], [c_id], [c_name],
[c_str], [c_type] ) "
Set qy = dbFile.CreateQueryDef("", sBuf)

Ild = glMinId

```

```

If rTemp.RecordCount <> 0 Then
rTemp.MoveFirst

While Not rTemp.EOF
qy.Parameters("w_id").Value =
rTemp.Fields(FLD_ID_WORKSPACE)
qy.Parameters("c_id").Value = Ild
qy.Parameters("c_name").Value =
rTemp.Fields(FLD_CONN_STR_CONNECTI
ON_NAME) &
CONNECTION_STRINGS_TO_NAME_SUF
FIX
qy.Parameters("c_str").Value =
rTemp.Fields(FLD_CONN_STR_CONNECTI
ON_NAME)
ConnTypeDynamic
qy.Parameters("c_type").Value =

qy.Execute dbFailOnError

Ild = Ild + 1
rTemp.MoveNext
Wend
End If
qy.Close
rTemp.Close

' Initialize the value of the
connection_name_id
sBuf = "update att_identifiers " & _
" set " & FLD_ID_CONN_NAME & "
= " & Str(Ild)
dbFile.Execute sBuf, dbFailOnError

' Update the start_directory field in att_steps
to point to the newly
' created connections
Call ReadStepsInWorkspace(rTemp, qy,
glInvalidId, dbLoad:=dbFile, _
bSelectArchivedRecords:=False)

sBuf = "update " & TBL_STEPS & _
" set " & FLD_STEPS_EXEC_DTL & " =
[c_name] " & _
" where " & FLD_ID_STEP & " = [s_id] "
& _
" and " & FLD_STEPS_VERSION_NO
& " = [ver_no] "
Set qy = dbFile.CreateQueryDef("", sBuf)

If rTemp.RecordCount <> 0 Then
rTemp.MoveFirst

While Not rTemp.EOF
If
rTemp.Fields(FLD_STEPS_EXEC_MECHAN
ISM).Value = gintExecuteODBC Then
If Not (StringEmpty("") &
rTemp.Fields(FLD_STEPS_EXEC_DTL)))
Then
sBuf =
rTemp.Fields(FLD_STEPS_EXEC_DTL)
' Strip the enclosing "%"
characters
sBuf = Mid(sBuf, 2, Len(sBuf) -
2) &
CONNECTION_STRINGS_TO_NAME_SUF
FIX
qy.Parameters("c_name").Value =
sBuf
qy.Parameters("s_id").Value =
rTemp.Fields(FLD_ID_STEP)
qy.Parameters("ver_no").Value =
rTemp.Fields(FLD_STEPS_VERSION_NO)

```

```

qy.Execute dbFailOnError
End If
End If
rTemp.MoveNext
Wend
End If

qy.Close
rTemp.Close

Exit Sub

Upgrade243to25Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub
Private Sub Upgrade25to251(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

On Error GoTo Upgrade25to251Err

' Create the built-in parameters, run_id and
output_dir, for each workspace in the db
Call InsertBuiltInParameter(dbFile,
PARAM_RUN_ID, gstrEmptyString,
PARAM_RUN_ID_DESC)
Call InsertBuiltInParameter(dbFile,
PARAM_OUTPUT_DIR, gstrEmptyString,
PARAM_OUTPUT_DIR_DESC)

Call UpdateDbDtls(dbFile, sVersion)

Exit Sub

Upgrade25to251Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError + errUpgradeFailed,
mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub

Private Sub Upgrade242to243(UpgradeWsp As
DAO.Workspace, dbFile As Database, sVersion As
String)

Dim sBuf As String
Dim cTempStr As New cStringSM
Dim iResponse As Integer

On Error GoTo DeleteHistoryErr

Call DeleteRunHistory(dbFile)

On Error GoTo Upgrade242to243Err

UpgradeWsp.CommitTrans

UpgradeWsp.BeginTrans

' Add a parameter type field and a description
field to the parameter table
sBuf = "alter table run_step_details " & _
" add column parent_instance_id LONG "
dbFile.Execute sBuf, dbFailOnError

sBuf = "alter table run_step_details " & _

```

```

" add column iterator_value
TEXT(255) "

dbFile.Execute sBuf, dbFailOnError

Call AlterFieldType(dbFile,
TBL_RUN_STEP_DTLS, "start_time",
DATA_TYPE_CURRENCY)
Call AlterFieldType(dbFile,
TBL_RUN_STEP_DTLS, "end_time",
DATA_TYPE_CURRENCY)
Call AlterFieldType(dbFile,
TBL_RUN_STEP_HDR, "start_time",
DATA_TYPE_CURRENCY)
Call AlterFieldType(dbFile,
TBL_RUN_STEP_HDR, "end_time",
DATA_TYPE_CURRENCY)

Call UpdateDbDtls(dbFile, sVersion)

Exit Sub

DeleteHistoryErr:
' This is not a critical error - continue with
upgrade
Call LogErrors(Errors)
Resume Next

Upgrade242to243Err:
UpgradeWsp.Rollback
Call LogErrors(Errors)
Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub
*****
*****
' The AlterFieldType Sub procedure requires
three string
' parameters. The first string specifies the
name of the table
' containing the field to be changed. The
second string specifies
' the name of the field to be changed. The
third string specifies
' the new data type for the field.
*****
*****

Private Sub AlterFieldType(dbFile As
Database, TblName As String, FieldName
As String, _
NewDataType As String)
Dim qdf As DAO.QueryDef
Dim sSql As String

' Add a temporary field to the table.
sSql = "ALTER TABLE [" & TblName &
_
"] ADD COLUMN AlterTempField
" & NewDataType
Set qdf = dbFile.CreateQueryDef("",
sSql)
qdf.Execute

' Copy the data from old field into the new
field.
qdf.SQL = "UPDATE DISTINCTROW
[" & TblName & "] SET AlterTempField =
[" & FieldName & "]"
qdf.Execute

' Delete the old field.

```

```

qdf.SQL = "ALTER TABLE [" & TblName
& "] DROP COLUMN [" & FieldName & "]"
qdf.Execute

' Rename the temporary field to the old
field's name.
dbFile.TableDefs("[" & TblName &
"]").Fields("AlterTempField").Name =
FieldName
dbFile.TableDefs.Refresh

' Clean up.
End Sub
Private Sub Upgrade01to21(UpgradeWsp As
DAO.Workspace, dbFile As DAO.Database,
sVersion As String)
Dim sSql As String

On Error GoTo Upgrade01to21Err

sSql = "Create table db_details (" & _
"db_version          Text(50) " & _
");"

dbFile.Execute sSql, dbFailOnError

sSql = "insert into db_details " & _
"( db_version ) values (" & sVersion
& " ) "

dbFile.Execute sSql, dbFailOnError

Call UpdateContinuationCriteria(dbFile)

Exit Sub

Upgrade01to21Err:
Call LogErrors(Errors)
UpgradeWsp.Rollback
Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
LoadResString(errUpgradeFailed)

End Sub
Private Function UpgradeDb(UpgradeWsp As
DAO.Workspace, dbFile As Database, _
sVerTo As String, sVerFrom As String)
As Boolean

Dim sMsg As String

On Error GoTo UpgradeDbErr

UpgradeDb = False
If Not ValidUpgrade(sVerTo, sVerFrom)
Then Exit Function

If NoDbChanges(sVerTo, sVerFrom) Then
UpgradeDb = True
Exit Function
End If

sMsg = "The database needs to be upgraded
from Version " & sVerFrom & _
" to Version " & sVerTo & "." &
vbCrLf & _
"Proceed?"
If Not Confirm(Buttons:=vbYesNo,
strMessage:=sMsg, strTitle:="Upgrade
database") Then
Exit Function
End If

UpgradeWsp.BeginTrans

```

```

Select Case sVerFrom
Case gsVersion25
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion243
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion24, gsVersion241,
gsVersion242
sMsg = "After this upgrade, the run history
for previous runs will no longer be available. " & _
"Continue?"
If Not Confirm(Buttons:=vbYesNo,
strMessage:=sMsg, strTitle:="Upgrade database")
Then
UpgradeWsp.CommitTrans
Exit Function
End If
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion243)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion23
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion21
Call Upgrade21to23(UpgradeWsp, dbFile,
gsVersion23)
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion10
Call Upgrade10to21(UpgradeWsp, dbFile,
gsVersion21)
Call Upgrade21to23(UpgradeWsp, dbFile,
gsVersion23)
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)
Call Upgrade243to25(UpgradeWsp, dbFile,
gsVersion25)
Call Upgrade25to251(UpgradeWsp, dbFile,
gsVersion251)

Case gsVersion01
Call Upgrade01to21(UpgradeWsp, dbFile,
gsVersion21)
Call Upgrade21to23(UpgradeWsp, dbFile,
gsVersion23)
Call Upgrade23to24(UpgradeWsp, dbFile,
gsVersion24)
Call Upgrade242to243(UpgradeWsp,
dbFile, gsVersion242)

```



```

    Call Upgrade24to25(UpgradeWsp,
dbFile, gsVersion25)
    Call Upgrade25to251(UpgradeWsp,
dbFile, gsVersion251)

    End Select

    UpgradeWsp.CommitTrans

    UpgradeDb = True
    Exit Function

UpgradeDbErr:
    Call LogErrors(Errors)
    ShowError errUpgradeFailed

End Function
Private Function DBVersion(TestDb As
Database) As String
    ' Retrieves the database version
    Dim rVersion As Recordset

    On Error GoTo DBVersionErr

    Set rVersion =
TestDb.OpenRecordset("Select db_version
from db_details ", _
    dbOpenForwardOnly)

    BugAssert rVersion.RecordCount <> 0
    DBVersion = rVersion!db_version

    rVersion.Close
    Exit Function

DBVersionErr:
    If Err.Number = merrDaoTableMissing
Then
        DBVersion = gsVersion01
    Else
        LogErrors Errors
        Err.Raise vbObjectError +
errUpgradeFailed, mstrModuleName, _
            LoadResString(errUpgradeFailed)
    End If

End Function

Private Function ValidUpgrade(sVerTo As
String, sVerFrom As String) As Boolean

    If sVerTo = gsVersion And sVerFrom =
gsVersion251 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion25 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion243 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion242 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion241 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion24 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion23 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And
sVerFrom = gsVersion21 Then
        ValidUpgrade = True

```

```

    ElseIf sVerTo = gsVersion And sVerFrom =
gsVersion10 Then
        ValidUpgrade = True
    ElseIf sVerTo = gsVersion And sVerFrom =
gsVersion01 Then
        ValidUpgrade = True
    Else
        ValidUpgrade = False
    End If

End Function

Attribute VB_Name = "DebugSM"
' FILE:   DebugSM.bas
'       Microsoft TPC-H Kit Ver. 1.00
'       Copyright Microsoft, 1999
'       All Rights Reserved
'
' PURPOSE:  Contains all the functions that
carry out error/debug
'           processing for the project.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)
'
' Most of the functions in this module that
manipulate the
' error object do not have an On Error GoTo
statement - this
' is because it will clear the passed in error
object - let
' the calling functions handle the errors raised
by this
' module, if any
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"DebugSM."

Private mcLogFile As cFileSM
Private mcErrorFile As cFileSM

Private Const
FORMAT_MESSAGE_FROM_SYSTEM =
&H1000
Private Const
FORMAT_MESSAGE_IGNORE_INSERTS =
&H200
Private Const pNull = 0

Declare Function FormatMessage Lib
"kernel32" Alias "FormatMessageA" (ByVal
dwFlags As Long, lpSource As Any, ByVal
dwMessageId As Long, ByVal dwLanguageId
As Long, ByVal lpbuffer As String, ByVal
nSize As Long, Arguments As Long) As Long
Public Function Confirm(Optional
lngMessageCode As conConfirmMsgCodes, _
Optional lngTitleCode As
conConfirmMsgTitleCodes, _
Optional TitleParameter As String, _
Optional ByVal Buttons As Integer = -1, _
Optional strMessage As String =
gstrEmptyString, _
Optional strTitle As String =
gstrEmptyString) _
As Boolean
    ' Displays a confirmation message
corresponding to the
    ' passed in message code. Returns True if the
user says
    ' Ok and False otherwise

```

```

Dim intResponse As Integer
Dim intButtonStyle As Integer

On Error GoTo ConfirmErr

Confirm = False

' If the buttons style hasn't been specified, set the
' default style to display OK and Cancel buttons
If Buttons = -1 Then
    intButtonStyle = vbOKCancel
Else
    intButtonStyle = Buttons
End If

' Find the message string for the passed in code
If StringEmpty(strMessage) Then
    strMessage =
Trim$(LoadResString(lngMessageCode))
End If

If StringEmpty(strTitle) Then
    strTitle =
Trim$(LoadResString(lngTitleCode))
End If

If Not StringEmpty(TitleParameter) Then
    strTitle = strTitle & Chr$(vbKeySpace) & _
        gstrSQ & TitleParameter & gstrSQ
End If

' Display the confirmation message with the
Cancel button
' set to the default - assume that we are
confirming
' potentially dangerous operations!
intResponse = MsgBox(strMessage, _
    intButtonStyle + vbQuestion +
vbApplicationModal, _
    strTitle)

' Translate the user response into a True/False
return code
If intButtonStyle = vbOKCancel Then
    If intResponse = vbOK Then
        Confirm = True
    Else
        Confirm = False
    End If
Else
    If intResponse = vbYes Then
        Confirm = True
    Else
        Confirm = False
    End If
End If

Exit Function

ConfirmErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
gstrSource = mstrModuleName & "Confirm"
Err.Raise vbObjectError + errConfirmFailed, _
    gstrSource, _
    LoadResString(errConfirmFailed)

End Function
Public Sub LogSystemError()
    Dim eErrCode As Long

    eErrCode = GetLastError()
    If eErrCode <> 0 Then

```

```

WriteToFile "System Error: " &
eErrCode & vbCrLf & ApiError(eErrCode),
-
    blnError:=True
End If

End Sub
Public Function ApiError(ByVal e As Long)
As String

    Dim s As String
    Dim c As Long

    s = String(256, 0)
    c =
FormatMessage(FORMAT_MESSAGE_FR
OM_SYSTEM Or _
FORMAT_MESSAGE_IGNORE_INSERT
S, _
    pNull, e, 0&, s, Len(s), ByVal pNull)
    If c Then ApiError = e & ": " & Left$(s,
c)

End Function

' Output flags determine output destination
of BugAsserts and messages
#Const afLogFile = 1
#Const afMsgBox = 2
#Const afDebugWin = 4
#Const afAppLog = 8

' Display appropriate error message, and
then stop
' program. These errors should NOT be
possible in
' shipping product.
Sub BugAssert(ByVal fExpression As
Boolean, _
    Optional sExpression As String)
#If afDebug Then
    If fExpression Then Exit Sub
    BugMessage "BugAssert failed: " &
sExpression
    Stop
#End If
End Sub

Sub BugMessage(sMsg As String)

#If afDebug And afLogFile Then
    ' Since we are writing log messages, the
error flag is turned off
    Call WriteToFile(sMsg, False)
#End If
#If afDebug And afMsgBox Then
    MsgBox sMsg
#End If
#If afDebug And afDebugWin Then
    Debug.Print sMsg
#End If
#If afDebug And afAppLog Then
    App.LogEvent sMsg
#End If

End Sub
Public Function ProjectLogFile() As String

    ProjectLogFile = mcLogFile.FileName

End Function
Public Function ProjectErrorFile() As String

    ProjectErrorFile = mcErrorFile.FileName

```

```

End Function

Private Sub WriteToFile(sMsg As String,
Optional ByVal blnError As Boolean)

' Calls procedures to write the passed in
message to the log -
' The blnError flag is used to indicate that
the message
' should be logged to the error file - by
default the log
' file is used

    Dim mcFileObj As cFileSM
    Dim strFileName As String
    Dim strFileHdr As String

    On Error GoTo WriteToFileErr

    If blnError Then
        If mcErrorFile Is Nothing Then
            Set mcErrorFile = New cFileSM
        End If
        Set mcFileObj = mcErrorFile
    Else
        If mcLogFile Is Nothing Then
            Set mcLogFile = New cFileSM
        End If
        Set mcFileObj = mcLogFile
    End If

    If StringEmpty(mcFileObj.FileName) Then
        If blnError Then
            strFileName = gstrProjectPath & "\ " &
App.EXENAME & ".ERR"
            strFileHdr = "Stepmaster Errors"
        Else
            strFileName = gstrProjectPath & "\ " &
App.EXENAME & ".DBG"
            strFileHdr = "Stepmaster Log"
        End If

        mcFileObj.FileName = strFileName
        mcFileObj.WriteLine strFileHdr
        mcFileObj.WriteLine "Log start time : "
& Now
    End If

    mcFileObj.WriteLine sMsg

    Exit Sub

WriteToFileErr:
' Display the error code raised by Visual
Basic
    Call DisplayErrors(Errors)
' An error message would've been displayed
by the called
' procedures

End Sub
Public Sub WriteMessage(sMsg As String)

    Call WriteToFile(sMsg, True)

End Sub

Sub BugTerm()
#If afDebug And afLogFile Then
    ' Close log file
    mcLogFile.CloseFile
#End If
End Sub

```

```

Public Sub ShowError(ByVal ErrorCode As
errErrorConstants, _
    Optional ByVal ErrorSource As String =
gstrEmptyString, _
    Optional ByVal OptArgs As String =
gstrEmptyString, _
    Optional ByVal DoWriteError As Boolean =
True)

    If DoWriteError Then
        ' Call a procedure to write the error to a log file
        Call WriteError(ErrorCode, ErrorSource,
OptArgs)
    End If

' Re-initialize the values of the Error object
before
' displaying the error to the user
    Call InitErrObject(ErrorCode, ErrorSource,
OptArgs)

    Call DisplayErrors(Errors)

    Err.Clear

End Sub
Public Sub WriteError(ByVal ErrorCode As
errErrorConstants, _
    Optional ByVal ErrorSource As String =
gstrEmptyString, _
    Optional ByVal OptArgs As String =
gstrEmptyString)

' Initialize the values of the Error object before
' calling the log function
    Call InitErrObject(ErrorCode, ErrorSource,
OptArgs)

    Call LogErrors(Errors)

    Err.Clear

End Sub
Private Sub InitErrObject(ByVal ErrorCode As
errErrorConstants, _
    Optional ByVal ErrorSource As String =
gstrEmptyString, _
    Optional ByVal OptArgs As String =
gstrEmptyString)

    Dim lngError As Long

    lngError = IIf(ErrorCode > vbObjectError And
ErrorCode < vbObjectError + 65535, _
        ErrorCode - vbObjectError, ErrorCode)
    Err.Number = lngError + vbObjectError
    Err.Description = LoadResString(lngError) &
OptArgs
    Err.Source = App.EXENAME & ErrorSource

End Sub
Public Sub ShowMessage(ByVal MessageCode As
errErrorConstants, _
    Optional ByVal OptArgs As String)

    Dim strMessage As String

    On Error GoTo ShowMessageErr

    strMessage = LoadResString(MessageCode) &
OptArgs

' Write the error to a log file
    BugMessage strMessage

```

```

MsgBox strMessage, vbOKOnly

Exit Sub

ShowMessageErr:
' Log the error and exit
Call DisplayErrors(Errors)

End Sub
Public Sub ShowMessageStr(sMessage As String)

' Write the error to a log file
BugMessage sMessage

MsgBox sMessage, vbOKOnly

End Sub

Public Sub DisplayErrors(myErrCollection As Errors)
Dim strError As String
Dim errLoop As Error
Dim errCode As Long

' Enumerate Errors collection and display properties of
' each Error object.
If Err.Number <> 0 Then
If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
errCode = Err.Number - vbObjectError
Else
errCode = Err.Number
End If
strError = "Error # " & Str(errCode) & " was generated by " _
& Err.Source & Chr(13) & Err.Description
MsgBox strError, , "Error", Err.HelpFile, Err.HelpContext
Else
For Each errLoop In myErrCollection
With errLoop
If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
errCode = .Number - vbObjectError
Else
errCode = .Number
End If
strError = "Error #" & errCode & vbCrLf
strError = strError & " " & .Description & vbCrLf
strError = strError & _
" (Source: " & .Source & ")"
& vbCrLf
strError = strError & _
"Press F1 to see topic " & .HelpContext & vbCrLf
strError = strError & _
" in the file " & .HelpFile & ".:"
End With
MsgBox strError
Next
End If
End Sub

```

```

Public Sub LogErrors(myErrCollection As Errors)
Dim cColErrors As cVectorStr
Dim strError As String
Dim errLoop As Error
Dim errCode As Long
Dim lngIndex As Long

Set cColErrors = New cVectorStr

' Enumerate Errors collection and display properties of
' each Error object.
If Err.Number <> 0 Then
If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
errCode = Err.Number - vbObjectError
Else
errCode = Err.Number
End If
strError = "Error # " & Str(errCode) & " was generated by " _
& Err.Source & vbCrLf & Err.Description

cColErrors.Add strError
End If

' Log all database errors, if any
For Each errLoop In myErrCollection
With errLoop
If Err.Number > vbObjectError And Err.Number < (vbObjectError + 65536) Then
errCode = .Number - vbObjectError
Else
errCode = .Number
End If
strError = "Error #" & errCode & vbCrLf
strError = strError & " " & .Description & vbCrLf
strError = strError & _
" (Source: " & .Source & ")" & vbCrLf
End With

cColErrors.Add strError
Next

' We can have a error handler now that we have stored all
' errors away safely! - having an error handler before
' enumerating all the errors would have cleared the error
' collection
On Error GoTo LogErrorsErr
gstrSource = mstrModuleName & "LogErrors"

For lngIndex = 0 To cColErrors.Count - 1
strError = cColErrors(lngIndex)
Debug.Print strError
Call WriteToFile(strError, True)
Next lngIndex

Set cColErrors = Nothing

Exit Sub

LogErrorsErr:
' Display the error code raised by Visual Basic
DisplayErrors Errors
On Error GoTo 0

```

```

ShowError errUnableToWriteError, DoWriteError:=False

End Sub
Attribute VB_Name = "FileCommon"
' FILE: FileCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains common functionality to display
' the File Open dialog.
' Contact: Reshma Tharamal (reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when errors
' are raised by this module
Private Const mstrModuleName As String = "FileCommon."

Private Enum EOpenFile
OFN_OVERWRITEPROMPT = &H2
OFN_HIDEREADONLY = &H4
OFN_FILEMUSTEXIST = &H1000
OFN_EXPLORER = &H8000
End Enum

' The locations for the different output files are presented to
' the user in a list box. These constants are used while loading the
' data and while reading the data from the list box.
' These constants also represent the different file types that are
' displayed to the user in File Open dialogs
Public Enum gFileType
gintOutputFile = 0
gintLogFile = 1
gintErrorFile
gintStepTextFile
gintOutputCompareFile
gintDBFile
gintDBFileNew
gintImportFile
gintExportFile
End Enum

Public Const gsSqlFileSuffix = ".sql"
Public Const gsCmdFileSuffix = ".cmd"

Public Const gsOutputFileSuffix = ".out"
Public Const gstrLogFileSuffix = ".log"
Public Const gsErrorFileSuffix = ".err"
Public Function BrowseDBFile() As String
' Prompts the user for a database file with the workspace information
' Call CallFileDialog to display the open file dialog
BrowseDBFile = CallFileDialog(gintDBFile)

End Function
Public Function CallFileDialog(intFileType As Integer, _
Optional ByVal strDefaultFile As String = gstrEmptyString) As String
' This function initializes the values of the filter property,
' the dialog title and flags for the File Open dialog depending
' on the FileType passed in

```

```

' It then calls ShowFileOpenDialog to set
these properties and
' display the File Open dialog to the user

' All the properties used by the File Open
dialog are defined
' as constants in this function and passed
to ShowFileOpenDialog
' as parameters. So if any of the dialog
properties need to be
' modified, these constants are what need
to be changed
Const s_DLG_TITLE_OPEN = "Open"
Const s_DLG_TITLE_NEW = "New"
Const s_DLG_TITLE_IMPORT =
"Import From"
Const s_DLG_TITLE_EXPORT =
"Export To"

Const mlng_FILE_STEP_TEXT_FLAGS
= OFN_EXPLORER Or
OFN_FILEMUSTEXIST Or
OFN_HIDEREADONLY
Const
mlng_FILE_OUTPUT_COMPARE_FLAG
S = mlng_FILE_STEP_TEXT_FLAGS
Const mlng_FILE_DB_FLAGS =
mlng_FILE_STEP_TEXT_FLAGS
Const mlng_FILE_OUTPUT_FLAGS =
OFN_EXPLORER Or
OFN_HIDEREADONLY Or
OFN_OVERWRITEPROMPT
Const mlng_FILE_LOG_FLAGS =
mlng_FILE_OUTPUT_FLAGS
Const mlng_FILE_ERROR_FLAGS =
mlng_FILE_OUTPUT_FLAGS
Const mlng_FILE_DB_NEW_FLAGS =
mlng_FILE_OUTPUT_FLAGS

Const mstr_FILE_ALL_FILTER = "|All
Files (*.*)|*.*"
Const mstr_FILE_STEP_TEXT_FILTER
= "Query Files (*.*) & gsSqlFileSuffix & _
*)" & gsSqlFileSuffix &
"|Command Script Files (*.*) &
gsCmdFileSuffix & _
*)" & gsCmdFileSuffix
Const
mstr_FILE_OUTPUT_COMPARE_FILTER
= "Text Files (*.txt)|*.txt"
Const mstr_FILE_OUTPUT_FILTER =
"Output Files (*.out)|*.out"
Const mstr_FILE_LOG_FILTER = "Log
Files (*.log)|*.log"
Const mstr_FILE_ERROR_FILTER =
"Error Files (*.err)|*.err"
Const mstr_FILE_DB_FILTER =
"Stepmaster Workspace Files (*.*) &
gsDefDBFileExt & *)|*" & gsDefDBFileExt

Dim strFileName As String

On Error GoTo CallFileDialogErr

Select Case intFileType
Case gintStepTextFile
strFileName =
ShowFileOpenDialog( _
mstr_FILE_STEP_TEXT_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_STEP_TEXT_FLAGS, _
strDefaultFile)

```

```

Case gintOutputCompareFile
strFileName = ShowFileOpenDialog( _
mstr_FILE_OUTPUT_COMPARE_FILTER
& mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_OUTPUT_COMPARE_FLAGS, _
strDefaultFile)

Case gintOutputFile
strFileName = ShowFileOpenDialog( _
mstr_FILE_OUTPUT_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_OUTPUT_FLAGS, _
strDefaultFile)

' Case gintLogFile
' strFileName = ShowFileOpenDialog( _
' mstr_FILE_LOG_FILTER &
' mstr_FILE_ALL_FILTER, _
' s_DLG_TITLE_OPEN, _
' mlng_FILE_LOG_FLAGS, _
' strDefaultFile)

Case gintErrorFile
strFileName = ShowFileOpenDialog( _
mstr_FILE_ERROR_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_ERROR_FLAGS, _
strDefaultFile)

Case gintDBFile
strFileName = ShowFileOpenDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_DB_FLAGS, _
strDefaultFile)

Case gintDBFileNew
strFileName = ShowFileOpenDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_NEW, _
mlng_FILE_DB_NEW_FLAGS, _
strDefaultFile)

Case gintImportFile
strFileName = ShowFileOpenDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_IMPORT, _
mlng_FILE_DB_FLAGS, _
strDefaultFile)

Case gintExportFile
strFileName = ShowFileOpenDialog( _
mstr_FILE_DB_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_EXPORT, _
mlng_FILE_DB_FLAGS, _
strDefaultFile)

Case Else
BugAssert True, "Incorrect file type
passed in."
' Default processing will be for the
output file
strFileName = ShowFileOpenDialog( _

```

```

mstr_FILE_OUTPUT_FILTER &
mstr_FILE_ALL_FILTER, _
s_DLG_TITLE_OPEN, _
mlng_FILE_OUTPUT_FLAGS, _
strDefaultFile)

End Select
CallFileDialog = strFileName

Exit Function

CallFileDialogErr:
CallFileDialog = gstrEmptyString
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
gstrSource = mstrModuleName &
"CallFileDialog"
Call ShowError(errBrowseFailed)

End Function

VERSION 5.00
Begin VB.Form frmSplash
BorderStyle = 3 'Fixed Dialog
ClientHeight = 4710
ClientLeft = 45
ClientTop = 45
ClientWidth = 7455
ControlBox = 0 'False
Icon = "frmSplash.frx":0000
LinkTopic = "Form1"
LockControls = -1 'True
MaxButton = 0 'False
MinButton = 0 'False
ScaleHeight = 4710
ScaleWidth = 7455
ShowInTaskbar = 0 'False
StartUpPosition = 2 'CenterScreen
Visible = 0 'False
Begin VB.Frame fraMainFrame
Height = 4590
Left = 45
TabIndex = 0
Top = -15
Width = 7380
Begin VB.PictureBox picLogo
Height = 2385
Left = 510
Picture = "frmSplash.frx":0442
ScaleHeight = 2325
ScaleWidth = 1755
TabIndex = 1
Top = 855
Width = 1815
End
Begin VB.Label lblReserved
AutoSize = -1 'True
Caption = "All Rights Reserved."
Height = 195
Left = 5520
TabIndex = 8
Top = 4080
Width = 1440
End
Begin VB.Label lblCopyright
AutoSize = -1 'True
Caption = "Copyright © 1998"
BeginProperty Font
Name = "Arial"
Size = 8.25
Charset = 0
Weight = 400
Underline = 0 'False
Italic = 0 'False
Strikethrough = 0 'False

```

```

EndProperty
Height = 210
Left = 5550
TabIndex = 7
Tag = "Copyright"
Top = 3850
Width = 1380
WordWrap = -1 'True
End
Begin VB.Label lblCompany
AutoSize = -1 'True
Caption = "Microsoft
Corporation"
BeginProperty Font
Name = "Arial"
Size = 8.25
Charset = 0
Weight = 400
Underline = 0 'False
Italic = 0 'False
Strikethrough = 0 'False
EndProperty
Height = 210
Left = 5460
TabIndex = 6
Tag = "Company"
Top = 3640
Width = 1560
End
Begin VB.Label lblRestrictions
AutoSize = -1 'True
Caption = "See License
Agreement for Restrictions"
Height = 195
Left = 460
TabIndex = 5
Top = 4080
Width = 2790
End
Begin VB.Label lblProductName
AutoSize = -1 'True
Caption = "StepMaster"
BeginProperty Font
Name = "Arial"
Size = 32.25
Charset = 0
Weight = 700
Underline = 0 'False
Italic = 0 'False
Strikethrough = 0 'False
EndProperty
Height = 765
Left = 2670
TabIndex = 4
Tag = "Product"
Top = 1200
Width = 3495
End
Begin VB.Label lblVersion
Alignment = 1 'Right Justify
AutoSize = -1 'True
Caption = "Version 2.4"
BeginProperty Font
Name = "Arial"
Size = 12
Charset = 0
Weight = 700
Underline = 0 'False
Italic = 0 'False
Strikethrough = 0 'False
EndProperty
Height = 285
Left = 4800
TabIndex = 3
Tag = "Version"

```

```

Top = 2040
Width = 1275
End
Begin VB.Label lblWarning
AutoSize = -1 'True
Caption = "Do Not Redistribute"
BeginProperty Font
Name = "Arial"
Size = 8.25
Charset = 0
Weight = 400
Underline = 0 'False
Italic = 0 'False
Strikethrough = 0 'False
EndProperty
Height = 210
Left = 480
TabIndex = 2
Tag = "Warning"
Top = 3850
Width = 1380
End
End
Attribute VB_Name = "frmSplash"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
' FILE: frmSplash.frm
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Splash screen for StepMaster
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Private Sub Form_Load()
' lblVersion.Caption = "Version " &
App.Major & "." & App.Minor & "." &
App.Revision
lblProductName.Caption = App.Title
lblVersion.Caption = GetVersionString
End Sub

VERSION 5.00
Begin VB.Form frmWorkspaceOpen
BorderStyle = 3 'Fixed Dialog
Caption = "Open Workspace"
ClientHeight = 2550
ClientLeft = 45
ClientTop = 330
ClientWidth = 4695
LinkTopic = "Form1"
LockControls = -1 'True
MaxButton = 0 'False
MinButton = 0 'False
ScaleHeight = 2550
ScaleWidth = 4695
ShowInTaskbar = 0 'False
StartupPosition = 1 'CenterOwner
Begin VB.CommandButton cmdOK
Caption = "OK"
Default = -1 'True
Height = 375
Left = 2160
TabIndex = 2

```

```

Top = 2040
Width = 1095
End
Begin VB.CommandButton cmdCancel
Cancel = -1 'True
Caption = "Cancel"
Height = 375
Left = 3360
TabIndex = 3
Top = 2040
Width = 1095
End
Begin VB.ListBox lstWorkspaces
Height = 1425
ItemData =
"frmWorkspaceOpen.frm":0000
Left = 240
List = "frmWorkspaceOpen.frm":0002
MultiSelect = 2 'Extended
TabIndex = 1
Top = 480
Width = 4215
End
Begin VB.Label lblWorkspaces
AutoSize = -1 'True
Caption = "Workspace"
Height = 195
Left = 240
TabIndex = 0
Top = 120
Width = 825
End
Attribute VB_Name = "frmWorkspaceOpen"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
' FILE: frmWorkspaceOpen.frm
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Used to display a list of all
workspaces in a
' workspace definition file for Open, Import,
Export
' and Run (in SMRunOnly) workspace
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
#If RUN_ONLY Then
Private WithEvents cRunOnlyInst As cRunOnly
Attribute cRunOnlyInst.VB_VarHelpID = -1

Private Sub cRunOnlyInst_Done()
ShowFree
End Sub

Private Sub Run()
Dim iIndex As Integer

Set cRunOnlyInst = New cRunOnly

For iIndex = 0 To Me.lstWorkspaces.ListCount -
1
If Me.lstWorkspaces.Selected(iIndex) Then
ShowBusy
cRunOnlyInst.WorkspaceId =
Me.lstWorkspaces.ItemData(Me.lstWorkspaces.List
Index)

```

```

cRunOnlyInst.WspName =
Me.lstWorkspaces.List(Me.lstWorkspaces.L
istIndex)
cRunOnlyInst.RunWsp
End If
Next iIndex

End Sub

#End If

Private Sub cmdCancel_Click()

Unload Me

End Sub

Private Sub cmdOK_Click()

#If RUN_ONLY Then
Call Run
#Else
Call WorkspaceOpenOk
#End If

End Sub

Private Sub lstWorkspaces_DblClick()

' A double click on the workspaces list
box is considered
' equivalent to selecting an item in the list
and then selecting
' the OK command
Call cmdOK_Click

End Sub

Attribute VB_Name = "IteratorCommon"
' FILE: IteratorCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Contains functionality
common across StepMaster and
SMRunOnly, pertaining to iterators
Specifically, functions to read
iterators records
in the workspace, load them in an
array and so on.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"IteratorCommon."

Public Const gintMinIteratorSequence As
Integer = 0

Public Sub RangeComplete(vntIterators As
Variant)
' This is a debug procedure
' Checks if the from, to and step values
are present in
' the array

Dim bReset As Byte

```

```

Dim bShift As Byte
Dim lngIndex As Long

' Set the three lowest order bits to 1
bReset = 7

BugAssert IsArray(vntIterators) And Not
IsEmpty(vntIterators), _
"Iterators not specified!"

For lngIndex = LBound(vntIterators) To _
UBound(vntIterators)
bShift = 1
bShift = bShift * (2 ^
(vntIterators(lngIndex).IteratorType - 1))

bReset = bReset Xor bShift
Next lngIndex

' Assert that all the elements are present
BugAssert bReset = 0, "Range not
completely specified!"

End Sub

Public Sub LoadIteratorsForWsp(cStepsCol As
cArrSteps, _
ByVal lngWorkspaceId As Long,
rstStepsInWsp As Recordset)
' Initializes the step records in with all the
iterator
' values for each step

Dim recIterators As Recordset

On Error GoTo LoadIteratorsForWspErr

#If QUERY_ALL Then
Dim dtStart As Date

dtStart = Now
Set recIterators =
ReadWspIterators(lngWorkspaceId)

Call LoadIteratorsArray(cStepsCol,
recIterators)

recIterators.Close

BugMessage "QueryAll Read + load took: "
& CStr(DateDiff("s", dtStart, Now))

#Else
Dim dtStart As Date
Dim qryIt As DAO.QueryDef
Dim strSql As String

dtStart = Now
If rstStepsInWsp.RecordCount = 0 Then
Exit Sub
End If

' This method has the advantage that if the
steps are queried right, everything else follows
strSql = "Select step_id, version_no, type,
iterator_value, " & _
" sequence_no " & _
" from iterator_values " & _
" where step_id = [s_id] " & _
" and version_no = [ver_no] "

' Order the iterators by sequence within a
step
strSql = strSql & " order by sequence_no "

```

```

Set qryIt =
dbsAttTool.CreateQueryDef(gstrEmptyString, strSql)
rstStepsInWsp.MoveFirst

While Not rstStepsInWsp.EOF

qryIt.Parameters("s_id").Value =
rstStepsInWsp!step_id
qryIt.Parameters("ver_no").Value =
rstStepsInWsp!version_no

Set recIterators =
qryIt.OpenRecordset(dbOpenSnapshot)

Call LoadIteratorsArray(cStepsCol,
recIterators)
recIterators.Close

rstStepsInWsp.MoveNext
Wend

qryIt.Close

BugMessage "Query step at a time Read + load
took: " & CStr(DateDiff("s", dtStart, Now))

#End If

Exit Sub

LoadIteratorsForWspErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadIteratorsForWsp"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadRsInArrayFailed, _
gstrSource, _
LoadResString(errLoadRsInArrayFailed)

End Sub

Private Function ReadWspIterators(ByVal
lngWorkspaceId As Long) As Recordset

' This function will return a recordset that is
populated
' with the iterators for all the steps in a given
workspace

Dim recIterators As Recordset
Dim qryIt As DAO.QueryDef
Dim strSql As String

On Error GoTo ReadWspIteratorsErr
gstrSource = mstrModuleName &
"ReadWspIterators"

strSql = "Select i.step_id, i.version_no, " & _
" i.type, i.iterator_value, " & _
" i.sequence_no " & _
" from iterator_values i, att_steps a " & _
" where i.step_id = a.step_id " & _
" and i.version_no = a.version_no " & _
" and a.workspace_id = [w_id] " & _
" and a.archived_flag = [archived] "

' Find the highest X-component of the version
number
strSql = strSql & " AND cint( mid( a.version_no,
1, instr( a.version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) = " & _
" ( select max( cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) ) " & _
" from att_steps AS d " & _

```

```

" WHERE a.step_id = d.step_id )"

' Find the highest Y-component of the
version number for the highest X-
component
strSql = strSql & " AND cint( mid(
a.version_no, instr( a.version_no, " &
gstrDQ & gstrVerSeparator & gstrDQ & " )
+ 1 )) = " & _
" ( select max( cint( mid( version_no,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) + 1 )) ) "
& _
" from att_steps AS b " & _
" Where a.step_id = b.step_id " & _
" AND cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator
& gstrDQ & " ) - 1 )) = " & _
" ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 )) ) "
& _
" from att_steps AS c " & _
" WHERE a.step_id = c.step_id )"

' Order the iterators by sequence within a
step
strSql = strSql & " order by i.step_id,
i.sequence_no "

Set qyIt =
dbsAttTool.CreateQueryDef(gstrEmptyStrin
g, strSql)
qyIt.Parameters("w_id").Value =
lngWorkspceld
qyIt.Parameters("archived").Value =
False

Set recIterators =
qyIt.OpenRecordset(dbOpenSnapshot)

qyIt.Close
Set ReadWspIterators = recIterators

Exit Function

ReadWspIteratorsErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errReadDataFailed, _
gstrSource,
LoadResString(errReadDataFailed)

End Function
Private Sub LoadIteratorsArray(cStepsCol
As cArrSteps, _
recIterators As Recordset)
' Initializes the step records with the
iterators for
' the step

Dim cNewIt As cIterator
Dim cStepRec As cStep
Dim lngStepId As Long

On Error GoTo LoadIteratorsArrayErr
gstrSource = mstrModuleName &
"LoadIteratorsArray"

If recIterators.RecordCount = 0 Then
Exit Sub

```

```

End If

recIterators.MoveFirst
While Not recIterators.EOF
Set cNewIt = New cIterator

lngStepId =
CLng(ErrorOnNullField(recIterators,
"step_id"))
If Not cStepRec Is Nothing Then
If cStepRec.StepId <> lngStepId Then
Set cStepRec =
cStepsCol.QueryStep(lngStepId)
End If
Else
Set cStepRec =
cStepsCol.QueryStep(lngStepId)
End If

' Initialize iterator values
cNewIt.IteratorType =
CInt(ErrorOnNullField(recIterators, "type"))
cNewIt.Value =
CStr(ErrorOnNullField(recIterators,
"iterator_value"))
cNewIt.SequenceNo =
CInt(ErrorOnNullField(recIterators,
"sequence_no"))

' Add this record to the array of iterators
cStepRec.LoadIterator cNewIt

Set cNewIt = Nothing
recIterators.MoveNext
Wend

Exit Sub

LoadIteratorsArrayErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadIteratorsArray"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadRsInArrayFailed, _
gstrSource, _

LoadResString(errLoadRsInArrayFailed)

End Sub

Attribute VB_Name = "MsgConfirm"
' FILE: MsgConfirm.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
'
' PURPOSE: Contains constants for
confirmation messages that
' will be displayed by StepMaster
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' A public enum containing the codes for all the
confirmation
' messages that will be used by the project -
each of the codes
' has the prefix, con
Public Enum conConfirmMsgCodes
conWspDelete = 2000
conSave

```

```

conStopRun
conSaveConnect
conSaveDB
End Enum

' A public enum containing the titles for all the
confirmation
' messages that will be used by the project - each of
the codes
' has the prefix, cont - most confirmation message
codes will
' have a corresponding title code in here
Public Enum conConfirmMsgTitleCodes
contWspDelete = 3000
contSave
contStopRun
contSaveConnect
contSaveDB
End Enum

Attribute VB_Name = "OpenFiles"
' FILE: OpenFiles.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
'
' PURPOSE: This module holds a list of all files
that have been
' opened by the project. This module is
needed since there
' is no way to share static data between
different instances
' of a class.
' Many procedure in this module do not do
any error handling -
' this is 'coz it is also used by procedures
that log error
' messages and any error handler will erase
the collection
' of errors!
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class
Private Const mstrModuleName As String =
".OpenFiles."

Private mOpenFiles As cNodeCollections

Private Const mstrTempDir As String = "\Temp"

' The maximum number of temporary files that we
can create in a
' session
Private Const mlngMaxFileIndex As Long =
999999
Private Const mstrFileIndexFormat As String =
"000000"
Private Const mstrTempFilePrefix As String =
"SM"
Private Const mstrTempFileSuffix As String =
".cmd"

Private Const merrFileNotFound As Long = 76
Private Function GetFileHandle(strFileName) As
cFileInfo

Dim lngIndex As Long

```

```

Dim blnFileOpen As Boolean

If Not mOpenFiles Is Nothing Then

    blnFileOpen = False
    For lngIndex = 0 To mOpenFiles.Count - 1
        If mOpenFiles(lngIndex).FileName = strFileName Then
            blnFileOpen = True
            Exit For
        End If
    Next lngIndex

    If blnFileOpen Then
        Set GetFileHandle = mOpenFiles(lngIndex)
    Else
        Set GetFileHandle = Nothing
    End If
Else
    Set GetFileHandle = Nothing
End If

End Function

Private Function GetTempFileDir() As String

    Dim strTempFileDir As String

    On Error GoTo GetTempFileDirErr

    strTempFileDir = gstrProjectPath & mstrTempDir

    If StringEmpty(Dir$(strTempFileDir, vbDirectory)) Then
        MkDir strTempFileDir
    End If

    GetTempFileDir = strTempFileDir

Exit Function

GetTempFileDirErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName & "GetTempFileDir"
    On Error GoTo 0
    Err.Raise vbObjectError + errProgramError, gstrSource, _
        LoadResString(errProgramError)

End Function

Public Function
MakePathValid(strFileName As String) As String
    ' Checks if the passed in file path is valid

    Dim strFileDir As String
    Dim strTempDir As String
    Dim strTempFile As String
    Dim intPos As Integer
    Dim intStart As Integer

    On Error GoTo MakePathValidErr
    gstrSource = mstrModuleName & "MakePathValid"

    strTempFile = strFileName
    intPos = Instr(strFileName, gstrFileSeparator)

```

```

    If intPos > 0 Then
        strFileDir = Left$(strTempFile, intPos - 1)
        If StringEmpty(Dir$(strFileDir, vbDirectory)) Then
            ' Loop through the entire path starting at the root
            ' since Mkdir can create only one level of sub-directory
            ' at a time
            intStart = Instr(strFileDir, gstrFileSeparator)

            Do While strTempDir <> strFileDir

                If intStart > 0 Then
                    strTempDir = Left$(strFileDir, intStart - 1)
                Else
                    strTempDir = strFileDir
                End If

                If StringEmpty(Dir$(strTempDir, vbDirectory)) Then
                    ' If the specified directory doesn't exist, try to
                    ' create it.
                    MkDir strTempDir
                Else
                    ' The directory exists - go to it's sub-directory
                End If
                intStart = Instr(intStart + 1, strFileDir, gstrFileSeparator)
            Loop

            ' Sanity check
            If StringEmpty(Dir$(strFileDir, vbDirectory)) Then
                ' We were unable to create the file directory
                ShowError errCreateDirectoryFailed, gstrSource, _
                    strFileDir, DoWriteError:=False
                MakePathValid = gstrEmptyString
            Else
                MakePathValid = strTempFile
            End If
        Else
            ' The specified directory exists - we should be able
            ' to create the output file in it
            MakePathValid = strTempFile
        End If
    Else
        ' The user has only specified a filename - VB will try
        ' to create it in the current directory
        MakePathValid = strTempFile
    End If

Exit Function

MakePathValidErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    gstrSource = mstrModuleName & "MakePathValid"
    ' Log the filename for debug
    Call WriteError(errInvalidFile, gstrSource, strTempFile)
    On Error GoTo 0
    Err.Raise vbObjectError + errProgramError, gstrSource, _
        LoadResString(errProgramError)

```

```

End Function

Public Function OpenFileSM(strFileName As String) As Integer
    Dim intHFile As Integer
    Dim NewFileInfo As cFileInfo

    On Error GoTo OpenFileSMErr
    gstrSource = mstrModuleName & "OpenFileSM"

    If StringEmpty(strFileName) Then
        On Error GoTo 0
        Err.Raise vbObjectError + errInvalidFile, gstrSource, _
            LoadResString(errInvalidFile)
    End If

    If mOpenFiles Is Nothing Then
        Set mOpenFiles = New cNodeCollections
    End If

    Set NewFileInfo = GetFileHandle(strFileName)

    If NewFileInfo Is Nothing Then
        ' The file has not been opened yet

        ' If the filename has not been initialized, do not attempt to open it
        strFileName = MakePathValid(strFileName)

        If strFileName <> gstrEmptyString Then
            intHFile = FreeFile
            Open strFileName For Output Shared As intHFile

            Set NewFileInfo = New cFileInfo
            NewFileInfo.FileHandle = intHFile
            NewFileInfo.FileName = strFileName
            mOpenFiles.Load NewFileInfo
        Else
            ' Either the directory was invalid or s'thing failed
            ' Display the error to the user instead of trying
            ' to log to the file
            ShowError errInvalidFile, gstrSource, strFileName, _
                DoWriteError:=False
            intHFile = 0
        End If
    Else
        intHFile = NewFileInfo.FileHandle
    End If

    OpenFileSM = intHFile

Exit Function

OpenFileSMErr:
    ' Log the error code raised by Visual Basic
    Call LogErrors(Errors)
    ' The Open command failed for some reason - write an error
    ' and let the calling function handle the error
    ShowError errInvalidFile, gstrSource, strFileName, _
        DoWriteError:=False
    OpenFileSM = 0

End Function

Public Function CreateTempFile() As String

    Dim strTempFileDir As String
    Dim strTempFileName As String

```



```

Static lngLastFileIndex As Long

On Error GoTo CreateTempFileErr

strTempFileDir = GetTempFileDir()

Do
    If lngLastFileIndex =
mInglMaxFileIndex Then
        On Error GoTo 0
        Err.Raise vbObjectError +
errMaxTempFiles, gstrSource, _

LoadResString(errMaxTempFiles)
    End If

    lngLastFileIndex = lngLastFileIndex +
1

    strTempFileName =
mstrTempFilePrefix & _
        Format$(lngLastFileIndex,
mstrFileIndexFormat) & _
        mstrTempFileSuffix

    If Not
StringEmpty(Dir$(strTempFileDir &
strTempFileName)) Then
        ' Remove any files left over from a
previous run,
        ' if they still exist
        Kill strTempFileDir &
strTempFileName
    End If

    ' Looping in case the file delete doesn't go
through for
    ' some reason
    Loop While Not
StringEmpty(Dir$(strTempFileDir &
strTempFileName))

    CreateTempFile =
GetShortName(strTempFileDir)
    CreateTempFile = CreateTempFile &
strTempFileName

Exit Function

CreateTempFileErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
gstrSource = gstrSource &
"CreateTempFile"
On Error GoTo 0
Err.Raise vbObjectError +
errProgramError, gstrSource, _
LoadResString(errProgramError)

End Function
Public Sub CloseFileSM(strFileName As
String)
    Dim FileToClose As cFileInfo

    If Not mOpenFiles Is Nothing Then

        ' Get the handle to the open file, if it
exists
        Set FileToClose =
GetFileHandle(strFileName)

        If Not FileToClose Is Nothing Then
            Close FileToClose.FileHandle

```

```

' Remove the file info from the
collection of open files
mOpenFiles.Unload
FileToClose.Position
    End If
End If

End Sub
Public Sub CloseOpenFiles()
    Dim IIndex As Long

    If Not mOpenFiles Is Nothing Then
        For IIndex = mOpenFiles.Count - 1 To 0
            CloseFileSM
(mOpenFiles(IIndex).FileName)
        Next IIndex
    End If

End Sub

Attribute VB_Name = "ParameterCommon"
' FILE:   ParameterCommon.bas
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved

'
'
' PURPOSE:  Contains functionality common
across StepMaster and
'           SMRunOnly, pertaining to parameters
'           Specifically, functions to load
parameter records
'           in an array.
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"ParameterCommon."

Public Sub
LoadRecordsetInParameterArray(rstWorkSpac
eParameters As Recordset, _
cParamCol As cArrParameters)

    Dim cNewParameter As cParameter

    On Error GoTo
LoadRecordsetInParameterArrayErr

    If rstWorkSpaceParameters.RecordCount =
0 Then
        Exit Sub
    End If

    rstWorkSpaceParameters.MoveFirst
    While Not rstWorkSpaceParameters.EOF

        Set cNewParameter = New cParameter

        ' Initialize parameter values
        cNewParameter.ParameterId =
rstWorkSpaceParameters.Fields(0)

        ' Call a procedure to raise an error if
mandatory fields are
        ' null.
        cNewParameter.ParameterName = CStr(_
ErrorOnNullField(rstWorkSpaceParameters,
"parameter_name"))

```

```

cNewParameter.ParameterValue =
CheckForNullField(_
rstWorkSpaceParameters,
"parameter_value")
cNewParameter.WorkspaceId = CStr(_

ErrorOnNullField(rstWorkSpaceParameters,
FLD_ID_WORKSPACE))
cNewParameter.ParameterType = CStr(_

ErrorOnNullField(rstWorkSpaceParameters,
"parameter_type"))
cNewParameter.Description =
CheckForNullField(_
rstWorkSpaceParameters, "description")

cParamCol.Load cNewParameter

Set cNewParameter = Nothing
rstWorkSpaceParameters.MoveNext
Wend

Exit Sub

LoadRecordsetInParameterArrayErr:
LogErrors Errors
gstrSource = mstrModuleName &
"LoadRecordsetInParameterArray"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadRsInArrayFailed, gstrSource, _
LoadResString(errLoadRsInArrayFailed)

End Sub
Attribute VB_Name = "Public"
' FILE:   Public.bas
'         Microsoft TPC-H Kit Ver. 1.00
'         Copyright Microsoft, 1999
'         All Rights Reserved

'
'
' PURPOSE:  This module contains all the public
constants for this project
' Contact:  Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Public Const gsVersion01 As String = "0.1"
Public Const gsVersion10 As String = "1.0"
Public Const gsVersion21 As String = "2.1"
Public Const gsVersion23 As String = "2.3"
Public Const gsVersion24 As String = "2.4"
Public Const gsVersion241 As String = "2.4.1"
Public Const gsVersion242 As String = "2.4.2"
Public Const gsVersion243 As String = "2.4.3"
Public Const gsVersion25 As String = "2.5"
Public Const gsVersion251 As String = "2.5.1"
Public Const gsVersion253 As String = "2.5.3"
Public Const gsVersion254 As String = "2.5.4"
Public Const gsVersion255 As String = "2.5.5"
Public Const gsVersion As String = gsVersion255

' The same form is used for the creation of new
nodes and
' updates to existing nodes (where each node can be
a parameter,
' global step, etc.) A tag is set on each flag is used to
indicate
' whether it is being called in the insert or update
mode. The
' constants for these modes are defined below
Public Const gstrInsertMode = "Insert"
Public Const gstrUpdateMode = "Update"
Public Const gstrPropertiesMode = "View"

```

```

Public Const gstrEmptyString = ""
Public Const gstrSQ = """"
Public Const gstrDQ = """"""
Public Const gstrVerSeparator = "."
Public Const gstrBlank = " "

' Constants used to indicate type of node
being processed
' The constants for the different objects
correspond to the
' indexes in the menu control arrays (for
both the main and popup
' menus) that are used to create new objects.
That way we can
' use the index passed in by the click event
to determine the
' type of node being processed
Public Const gintWorkspace = 1

' Decided to leave it here after some debate
over whether it
' actually belongs in the cStep class
definition
Public Enum gintStepType
    gintGlobalStep = 3
    gintManagerStep
    gintWorkerStep
End Enum

Public Const gintRunManager = 6
Public Const gintRunWorker = 7

Public Enum gintParameterNodeType
    gintParameter = 8
    gintNodeParamConnection
    gintNodeParamExtension
    gintNodeParamBuiltIn
End Enum

' Leave some constants free for newer types
of parameters (?)
Public Const gintConnectionDtl = 15

Public Enum gintLabelNodeType
    gintGlobalsLabel = 21
    gintParameterLabel
    gintParamConnectionLabel
    gintParamExtensionLabel
    gintParamBuiltInLabel
    gintConnDtlLabel
    gintGlobalStepLabel
    gintStepLabel
End Enum

Public Enum ConnectionType
    ConnTypeStatic = 1
    ConnTypeDynamic
End Enum

Public Const giDefaultConnType As Integer
= ConnTypeStatic

' The constants defined below are used to
identify the different
' tabs. If any more step properties and
thereby tabs are added
' to the tabbed dialog on the Step Properties
form, they should
' be defined here and accessed in the code
only using these
' pre-defined constants
' Note: These constants will mainly be used
by the functions that
' initialize, customize and display the Step
Properties form

```

```

Public Const gintDefinition = 0
Public Const gintExecution = 1
Public Const gintMgrDefinition = 2
Public Const gintPreExecutionSteps = 3
Public Const gintPostExecutionSteps = 4
Public Const gintFileLocations = 5

' These constants correspond to the index
values in the imagelist
' associated with the tree view control. The
imagelist contains
' the icons that will be displayed for each node.
Public Enum TreeImages
    gintImageWorkspaceClosed = 1
    gintImageWorkspaceOpen
    gintImageLabelClosed
    gintImageLabelOpen
    gintImageManagerClosedDis
    gintImageManagerClosedEn
    gintImageManagerOpenDis
    gintImageManagerOpenEn
    gintImageWorkerDis
    gintImageWorkerEn
    gintImageGlobalClosed
    gintImageGlobalOpen
    gintImageParameter
    gintImageRun
    gintImagePending
    gintImageStop
    gintImageDisabled
    gintImageAborted
    gintImageFailed
End Enum

' Public variable used to indicate the name of
the function
' that raises an error
Public gstrSource As String

' Public instances of the different collections
Public gcParameters As cArrParameters
Public gcSteps As cArrSteps
Public gcConstraints As cArrConstraints
Public gcConnections As cConnections
Public gcConnDtls As cConnDtls

' Public constants for the index values of the
different toolbar
' options. Will be used while dynamically
enabling/disabling
' these options.
Public Const tbNew = 1
Public Const tbOpen = 2
Public Const tbSave = 3

Public Const tbCut = 5
Public Const tbCopy = 6
Public Const tbPaste = 7
Public Const tbDelete = 8

Public Const tbProperties = 10
Public Const tbRun = 11
Public Const tbStop = 12

' The initial version #
Public Const gstrMinVersion As String = "0.0"
Public Const gstrGlobalParallelism As String =
"0"
Public Const gintMinParallelism As Integer =
1
Public Const gintMaxParallelism As Integer =
100

' Constant for the minimum identifier, used for
all identifier, viz.

```

```

' step, workspace, etc.
Public Const glMinId As Long = 1
Public Const glInvalidId As Long = -1

' A parameter that has a special meaning to
Stepmaster
' The system time will be substituted wherever it
occurs
' (typically as a part of the error, log ... file names
Public Const gstrTimeStamp As String =
"TIMESTAMP"
Public Const gstrEnvVarSeparator = "%"
Public Const gstrFileSeparator = "\"
Public Const gstrUnderscore = "_"

' Constants used by date and time formatting
functions
Public Const gsTimeSeparator = ":"
Public Const gsDateSeparator = "-"
Public Const gsMsSeparator = "."
Public Const gsDtFormat = "00"
Public Const gsYearFormat = "0000"
Public Const gsTmFormat = "00"
Public Const gsMSecondFormat = "000"

' Default nothing value for a date variable
Public Const gdtmEmpty As Currency = 0

Public Const FMT_WSP_LOG_FILE As String =
"yyyymmdd-hhnnss"

Public gsContCriteria() As String
' Note: Update the initialization of
gsExecutionStatus in Initialize() if the
' InstanceStatus values are modified - also the
boundary checks
Public gsExecutionStatus() As String

Public Const gsConnTypeStatic As String =
"Static"
Public Const gsConnTypeDynamic As String =
"Dynamic"

#If RUN_ONLY Then
Public Const gsCaptionRunWsp As String = "Run
Workspace"
#End If

' Valid operations on a cNode object
Public Enum Operation
    QueryOp = 1
    InsertOp = 2
    UpdateOp = 3
    DeleteOp = 4
End Enum

Attribute VB_Name = "RunCommon"
' FILE: RunCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Contains common functions that are
used during the execution
' of a workspace.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name when
errors
' are raised by this class

```

```

Private Const mstrModuleName As String =
".RunCommon."

Public Function
GetInstanceItValue(cInstanceRec As
cInstance) As String

' Returns the iterator value for the
instance, if an
' iterator has been defined for it
Dim cStepIt As cRunCollt
Dim cRunIterator As cRunItNode

On Error GoTo GetInstanceItValueErr

' Since we create a dummy instance for
Disabled and Pending steps,
' doesn't make sense to look at their
iterators
If cInstanceRec.Status <> gintDisabled
And cInstanceRec.Status <> gintPending
Then
Set cStepIt = cInstanceRec.Iterators

If Not
StringEmpty(cInstanceRec.Step.IteratorNam
e) Then
If cStepIt.Count > 0 Then
Set cRunIterator = cStepIt(0)
BugAssert
cRunIterator.IteratorName =
cInstanceRec.Step.IteratorName, _
"The first iterator in the
collection is the " & _
"one that has been defined for
the step."
If cRunIterator.IteratorName =
cInstanceRec.Step.IteratorName Then
GetInstanceItValue =
cRunIterator.Value
Else
GetInstanceItValue =
gstrEmptyString
End If
Else
GetInstanceItValue =
gstrEmptyString
End If
Else
GetInstanceItValue = gstrEmptyString
End If

Exit Function

GetInstanceItValueErr:
' Log the error code raised by Visual
Basic
Call LogErrors(Errors)
On Error GoTo 0
gstrSource = mstrModuleName &
"GetInstanceItValue"
Err.Raise vbObjectError +
errProgramError, gstrSource, _
LoadResString(errProgramError)

End Function

Attribute VB_Name = "RunInstHelper"
' FILE: RunInstHelper.bas

```

```

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'
'
' PURPOSE: This module contains helper
procedures that are called by
cRunInst.cls
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Used to indicate the source module name
when errors
' are raised by this class
Private Const mstrModuleName As String =
"RunInstHelper."

' Should be equal to the number of steps
defined in cRunInst.cls
Public Const glngNumConcurrentProcesses As
Long = 99
Public Const gintBitsPerByte = 8
Public Function AnyStepRunning(cFreeSteps
As cVectorLng, arrFree() As Byte) As Boolean

Dim lngIndex As Long
Dim intPosInByte As Integer
Dim lngTemp As Long

' Check if there are any running instances to
wait for
If cFreeSteps.Count <>
glngNumConcurrentProcesses Then

' For every free step, reset the
corresponding element
' in the byte array to 0
For lngIndex = 0 To cFreeSteps.Count - 1

lngTemp = cFreeSteps(lngIndex) \
gintBitsPerByte
intPosInByte = cFreeSteps(lngIndex)
Mod gintBitsPerByte

arrFree(lngTemp) = arrFree(lngTemp)
Xor 2 ^ intPosInByte
Next lngIndex

AnyStepRunning = False

' Check if we have a non-zero bit in the
byte array
For lngIndex = LBound(arrFree) To
UBound(arrFree) Step 1
If arrFree(lngIndex) <> 0 Then
' We are waiting for a step to
complete
AnyStepRunning = True
Exit For
End If
Next lngIndex

Else
AnyStepRunning = False
End If

End Function

Public Function
OrderConstraints(vntTempCons() As Variant,
_

```

```

intConsType As ConstraintType) As Variant
' Returns a variant containing all the constraint
records in the order
' in which they should be executed

Dim vntTemp As Variant
Dim lngOuter As Long
Dim lngInner As Long
Dim cTempConstraint As cConstraint
Dim cConstraints() As cConstraint
Dim lngConsCount As Long
Dim lngLbound As Long
Dim lngUbound As Long
Dim lngStep As Long

On Error GoTo OrderConstraintsErr

If intConsType = gintPreStep Then
' Since we are travelling up and we need to
execute the constraints
' for the top-level steps first, reverse the order
that they
' have been stored in the array
lngLbound = UBound(vntTempCons)
lngUbound = LBound(vntTempCons)
lngStep = -1
Else
lngLbound = LBound(vntTempCons)
lngUbound = UBound(vntTempCons)
lngStep = 1
End If

lngConsCount = 0

For lngOuter = lngLbound To lngUbound Step
lngStep
vntTemp = vntTempCons(lngOuter)

If Not IsEmpty(vntTemp) Then
' Each of the elements is an array
For lngInner = LBound(vntTemp) To
UBound(vntTemp) Step 1
If Not IsEmpty(vntTemp(lngInner)) Then
Set cTempConstraint =
vntTemp(lngInner)

If Not cTempConstraint Is Nothing
Then
ReDim Preserve
cConstraints(lngConsCount)
Set cConstraints(lngConsCount) =
cTempConstraint
lngConsCount = lngConsCount + 1
End If
End If
Next lngInner

' Set the return value of the function to the array
of
' constraints that has been built above
If lngConsCount = 0 Then
OrderConstraints = Empty
Else
OrderConstraints = cConstraints()
End If

Exit Function

OrderConstraintsErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0

```

```

Err.Raise vbObjectError +
errExecInstanceFailed, _
    mstrModuleName,
LoadResString(errExecInstanceFailed)

End Function
Attribute VB_Name = "ShellSM"
' FILE: ShellSM.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains a
function that creates a process and
waits for it to complete.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Public Function SyncShell(CommandLine
As String, Optional Timeout As Long, _
Optional WaitForInputIdle As Boolean)
As Boolean

Dim proc As
PROCESS_INFORMATION
Dim Start As STARTUPINFO
Dim ret As Long
Dim nMilliseconds As Long

BugMessage "Executing: " &
CommandLine
If Timeout > 0 Then
nMilliseconds = Timeout
Else
nMilliseconds = INFINITE
End If

'Initialize the STARTUPINFO structure:
Start.cb = Len(Start)
Start.dwFlags =
STARTF_USESHOWWINDOW
Start.wShowWindow =
SW_SHOWMINNOACTIVE

'Start the shelled application:
CreateProcessA 0&, CommandLine, 0&,
0&, 1&, _
NORMAL_PRIORITY_CLASS, 0&,
0&, Start, proc

If WaitForInputIdle Then
'Wait for the shelled application to
finish setting up its UI:
ret = InputIdle(proc.hProcess,
nMilliseconds)
Else
'Wait for the shelled application to
terminate:
ret =
WaitForSingleObject(proc.hProcess,
nMilliseconds)
End If

CloseHandle proc.hProcess

'Return True if the application finished.
Otherwise it timed out or erred.
SyncShell = (ret = WAIT_OBJECT_0)
End Function

VERSION 1.0 CLASS
BEGIN

```

```

MultiUse = -1 True
END
Attribute VB_Name = "cArrConstraints"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = True
Attribute VB_PredeclaredId = False
Attribute VB_Exposed = False
' FILE:Attribute VB_Name = "SMErr"
' FILE: SMErr.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains error
code for all the errors that are
raised by StepMaster.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

' A public enum containing the codes for all the
error
messages that will be displayed by the project
- each
of the codes has the prefix, err
Public Enum errErrorConstants
errParameterIdInvalid = 1000
errParameterNameMandatory
errParameterInsertFailed
errStepLabelOrTextOrFileRequired
errMandatoryNodeTextMissing
errParameterUpdateFailed
errDupConnDtlName
errDummy14
errContCriteriaMandatory
errContCriteriaNullForGlobal
errContCriteriaInvalid = 1010
errParamSeparatorMissing
errStepTextOrTextFileMandatory
errStepTextOrFile
errEnabledFlagFalseForGlobal
errEnabledFlagLetFailed
errDegParallelismNullForGlobal
errInvalidDegParallelism
errExecutionMechanismInvalid
errExecutionMechanismLetFailed
errStepLevelNull = 1020
errStepLevelZeroForGlobal
errStepLevelLetFailed
errRowCountNumeric
errConnNameInvalid
errTimeoutNumeric
errResetConnPropertiesFailed
errFailureThresholdNumeric
errConnectionUpdateFailed
errGlobalRunMethodMandatory
errGlobalRunMethodNull = 1030
errGlobalRunMethodInvalid
errGlobalRunMethodLetFailed
errNoTrueOption
errGetOptionFailed
errSetEnabled
errStepLabelTextAndFileNull
errInvalidNodeType
errSetOptionFailed
errQueryParameterFailed
errParamNotFound = 1040
errQueryStepFailed
errStepNotFound
errReadFromScreenFailed
errCopyPropertiesToFormFailed
errMandatoryFieldNull
errUnableToCheckNull

```

```

errUpgradeFailed
errFindStepSequenceFailed
errFindParentStepIdFailed
errCircularReference = 1050
errAddStepFailed
errModifyStepFailed
errDeleteColumnFailed
errFindPositionFailed
errDeleteStepFailed
errRunExistsForStepFailed
errCreateNewParentFailed
errInsertNewStepVersionFailed
errCreateNewStepFailed
errDuplicateParameterName = 1060
errCheckDupParameterNameFailed
errConstraintTypeInvalid
errConstraintTypeLetFailed
errAddConstraintFailed
errWorkspaceIdMandatory
errInvalidWorkspaceData
errGetWorkspaceDetailsFailed
errNoWorkspaceLoaded
errWorkspaceAlreadyOpen
errDuplicateWorkspaceName = 1070
errWorkspaceNameMandatory
errWorkspaceNameSetFailed
errWorkspaceIdInvalid
errWorkspaceIdSetFailed
errWorkspaceInsertFailed
errWorkspaceDeleteFailed
errWorkspaceUpdateFailed
errInvalidFile
errCheckWorkspaceOpenFailed
errWriteFailed = 1080
errDeleteParameterRecordFailed
errUnableToLogOutput
errDeleteDBRecordFailed
errRunExistsForWorkspaceFailed
errClearHistoryFailed
errCreateDBFailed
errImportWspFailed
errStepModifyFailed
errStepDeleteFailed
errDummy3 = 1090
errUnableToGetWorkspace
errInvalidNode
errUnableToRemoveSubtree
errSetFileNameFailed
errStepTypeInvalid
errObjectMandatory
errBuiltInUpdateOnly
errInvalidStep
errTypeOfStepFailed
errGetParentKeyFailed = 1100
errLabelTextAndFileCheckFailed
errStepTextAndFileNull
errTextOrFileCheckFailed
errParentStepManager
errDeleteSubStepsFailed
errWorkspaceNameDuplicateFailed
errNewConstraintVersionFailed
errDeleteStepConstraintsFailed
errOldVersionMandatory
errLoadConstraintsInListFailed = 1110
errLoadGlobalStepsFailed
errDeleteConstraintFailed
errUpdateConstraintFailed
errConstraintIdInvalid
errConstraintIdSetFailed
errGlobalStepIdInvalid
errGlobalStepIdSetFailed
errUpdateVersionFailed
errQueryAdjacentConsFailed
errConstraintNotFound = 1120
errQueryConstraintFailed

```

errSetDBBeforeLoad
errLoadDataFailed
errLoadRsInArrayFailed
errConstraintsForStepFailed
errPreConstraintsForStepFailed
errPostConstraintsForStepFailed
errExecuteConstraintMethodFailed
errIdOrKeyMandatory
errInListFailed = 1130
errUnableToWriteChanges
errQuickSortFailed
errCheckParentValidFailed
errLogErrorFailed
errCopyListFailed
errConnected
errVersionMismatch
errStepNodeFailed
errWorkspaceSelectedFailed
errIdentifierSelectedFailed = 1140
errCheckForNullFieldFailed
errInstanceInUse
errSetVisiblePropertyFailed
errExportWspFailed
errMakeKeyValidFailed
errDummy16
errRunApplicationFailed
errStepLabelUnique
errDeleteSingleFile
errMakeIdentifierValidFailed = 1150
errTypeOfNodeFailed
errConstraintCommandFailed
errOpenDbFailed
errInsertNewConstraintsFailed
errLoadPostExecutionStepsFailed
errLoadPreExecutionStepsFailed
errCreateNewNodeFailed
errDeleteNodeFailed
errDisplayPopupFailed
errDisplayPropertiesFailed = 1160
errUnableToCreateNewObject
errDiffFailed
errLoadWorkspaceFailed
errTerminateProcessFailed
errCompareFailed
errCreateConnectionFailed
errShowFormFailed
errAbortFailed
errDeleteParameterFailed
errUpdateViewFailed = 1170
errParameterNewFailed
errCopyNodeFailed
errCutNodeFailed
errCheckObjectValidFailed
errDeleteViewNodeFailed
errMainFailed
errNewStepFailed
errProcessStepModifyFailed
errCustomizeStepFormFailed
errInitializeStepFormFailed = 1180
errInsertStepFailed
errIncVersionYFailed
errIncVersionXFailed
errShowCreateStepFormFailed
errShowStepFormFailed
errStepNewFailed
errUnableToApplyChanges
errUnableToCommitChanges
errGetStepNodeTextFailed
errSelectGlobalRunMethodFailed = 1190
errConnectionNameMandatory
errUpdateStepFailed
errBrowseFailed
errDummy4
errDummy1
errDummy2

errDummy
errUnableToPreviewFile
errCopyWorkspaceFailed
errCopyParameterFailed = 1200
errGetStepTypeAndPositionFailed
errCopyStepFailed
errMandatoryParameterMissing
errDeleteWorkspaceRecordsFailed
errCreateDirectoryFailed
errConfirmDeleteOrMoveFailed
errCreateWorkspaceFailed
errTypeOfObjectFailed
errCreateNodeFailed
errCreateParameterFailed = 1210
errInsertParameterFailed
errCreateStepFailed
errNoConstraintsCreated
errCopyFailed
errCloneFailed
errCloneGlobalFailed
errCloneWorkerFailed
errCloneManagerFailed
errLetStepTypeFailed
errUnableToCloseWorkspace = 1220
errUnableToModifyWorkspace
errUnableToCreateWorkspace
errAddArrayElementFailed
errUpdateSequenceFailed
errCannotCopySubSteps
errSubStepsFailed
errModifyInArrayFailed
errUpdateParentVersionFailed
errGetNodeTextFailed
errAddToArrayFailed = 1230
errDeleteFromArrayFailed
errQueryIndexFailed
errCreateNewConstraintVersionFailed
errGetRootNodeFailed
errPopulateWspDetailsFailed
errLoadRsInTreeFailed
errAddNodeToTreeFailed
errMaxTempFiles
errMoveFailed
errRootNodeKeyInvalid = 1240
errNextNodeFailed
errBranchWillMove
errMoveBranchInvalid
errCreateIdRecordsetFailed
errIdentifierColumnFailed
errGetIdentifierFailed
errGetStepTypeFailed
errUpdateConstraintSeqFailed
errDelParamsInWspFailed
errDuplicateConnectionName = 1250
errOpenWorkspaceFailed
errShowWorkspaceNewFailed
errShowWorkspaceModifyFailed
errPopulateListFailed
errExploreNodeFailed
errInitializeListNodeFailed
errMakeListColumnsFailed
errRefreshViewFailed
errExploreFailed
errCollapseNodeFailed = 1260
errUnableToProcessListViewClick
errSetEnabledForStepFailed
errDisplayStepFormFailed
errSetEnabledPropertyFailed
errInvalidDB
errDeleteConnectionFailed
errInvalidOperation
errLetOperationFailed
errIdGetFailed
errCommitFailed = 1270
errSaveParametersInWspFailed

errDeleteArrayElementFailed
errSaveWorkspaceFailed
errInitializeFailed
errLoadInArrayFailed
errSaveStepsInWspFailed
errCommitStepFailed
errStepIdGetFailed
errUnloadFromArrayFailed
errValidateFailed = 1280
errTextEnteredFailed
errStepLabelMandatory
errTextAndFileNullForManager
errFailureDetailsNullForMgr
errSetTabOrderFailed
errSaveWspConstraintsFailed
errCommitConstraintFailed
errUnloadStepConstraintsFailed
errUnableToModifyMenu
errConfirmFailed = 1290
errInitSubItemsFailed
errUpdateListNodeFailed
errAddNodeFailed
errLoadListNodeFailed
errAddListNodeFailed
errExecutionFailed
errSetListViewStyleFailed
errSetCheckedFailed
errGetCheckedFailed
errUnableToProcessListViewDbClick = 1300
errDefaultPosition
errShellFailed
errOpenFileFailed
errSetTBar97Failed
errConnectFailed
errApiFailed
errRegEntryInvalid
errParseStringFailed
errConstraintsForWspFailed
errPostConstraintsForWspFailed = 1310
errPreConstraintsForWspFailed
errLoadWspPostExecStepsFailed
errLoadWspPreExecStepsFailed
errLoadConstraintsOnFormFailed
errQueryFailed
errPasteNodeFailed
errShowAllWorkspacesFailed
errMakeFieldValidFailed
errInitializeTree
errRootNodeFailed = 1320
errDirectionInvalid
errUnableToDetListProperty
errUnableToGetListData
errItemNotFound
errItemDoesNotExist
errParamNameInvalid
errGetParamValueFailed
errSubValuesFailed
errStringOpFailed
errReadWorkspaceDataFailed = 1330
errUpdateRunDataFailed
errProgramError
errUnableToOpenFile
errLoadRunDataFailed
errExecuteODBCCommandFailed
errRunWorkspaceFailed
errExecuteStepFailed
errUnableToWriteError
errRunStepFailed
errSaveChanges = 1340
errDragDropFailed
errInvalidParameter
errAssignParametersFailed
errLoadLabelsInTreeFailed
errInstrRFailed
errInsertIteratorFailed

```

errDeleteIteratorFailed
errTypeInvalid
errLoadFailed
errDeleteFailed = 1350
errModifyFailed
errIteratorsFailed
errInsertFailed
errUpdateFailed
errDuplicateIterator
errSaveFailed
errReadDataFailed
errUnloadFailed
errAddFailed
errExecuteBranchFailed = 1360
errRangeNumeric
errRangeInvalid
errNextStepFailed
errUpdateDisplayFailed
errDateToStringFailed
errGetElapsedTimeFailed
errMaxProcessesExceeded
errInvalidProperty
errInvalidChild
errCreateInstanceFailed = 1370
errInvalidForWorker
errInstanceOpFailed
errNavInstancesFailed
errIterateFailed
errExecInstanceFailed
errDuplIterator
End Enum
Attribute VB_Name = "SortSM"
' FILE: SortSM.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains an
implementation of QuickSort.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

' Comment out for case-sensitive sorts
Option Compare Text

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"SortSM."

Private Function Compare(ByVal
vntToCompare1 As Variant, _
ByVal vntToCompare2 As Variant) As
Integer

On Error GoTo CompareErr

Compare = 0

If vntToCompare1.SequenceNo <
vntToCompare2.SequenceNo Then
Compare = -1
ElseIf vntToCompare1.SequenceNo >
vntToCompare2.SequenceNo Then
Compare = 1
End If

Exit Function

CompareErr:

```

```

' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errCompareFailed, _
gstrSource, _
LoadResString(errCompareFailed)

End Function

Private Sub Swap(ByRef vntToSwap1 As
Variant, _
ByRef vntToSwap2 As Variant)

Dim vntTemp As Variant

On Error GoTo SwapErr

If IsObject(vntToSwap1) And
IsObject(vntToSwap2) Then
Set vntTemp = vntToSwap1
Set vntToSwap1 = vntToSwap2
Set vntToSwap2 = vntTemp
Else
vntTemp = vntToSwap1
vntToSwap1 = vntToSwap2
vntToSwap2 = vntTemp
End If

Exit Sub

SwapErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errQuickSortFailed, mstrModuleName &
"Swap", _
LoadResString(errQuickSortFailed)

End Sub

Public Sub QuickSort(vntArray As Variant, _
Optional ByVal intLBound As Integer, _
Optional ByVal intUBound As Integer)
' Sorts a variant array using Quicksort

Dim i As Integer
Dim j As Integer
Dim vntMid As Variant

On Error GoTo QuickSortErr

If IsEmpty(vntArray) Or _
Not IsArray(vntArray) Then
Exit Sub
End If

' Set default boundary values for first time
through
If intLBound = 0 And intUBound = 0 Then
intLBound = LBound(vntArray)
intUBound = UBound(vntArray)
End If

' BugMessage "Sorting elements " &
Str(intLBound) & " and " & Str(intUBound)

If intLBound > intUBound Then
Exit Sub
End If

' Only two elements in this subdivision;
exchange if they
' are out of order and end recursive calls

```

```

If (intUBound - intLBound) = 1 Then
If Compare(vntArray(intLBound),
vntArray(intUBound)) > 0 Then
Call Swap(vntArray(intLBound),
vntArray(intUBound))
End If
Exit Sub
End If

' Set the pivot point
Set vntMid = vntArray(intUBound)
i = intLBound
j = intUBound

Do
' Move in from both sides towards pivot
element
Do While (i < j) And Compare(vntArray(i),
vntMid) <= 0
i = i + 1
Loop

Do While (j > i) And Compare(vntArray(j),
vntMid) >= 0
j = j - 1
Loop

If i < j Then
Call Swap(vntArray(i), vntArray(j))
End If
Loop While i < j

' Since i has been adjusted, swap element i with
element,
' intUBound
Call Swap(vntArray(i), vntArray(intUBound))

' Recursively call sort array - pass smaller
subdivision
' first to conserve stack space
If (i - intLBound) < (intUBound - 1) Then
' Recursively sort with adjusted values for
upper and
' lower bounds
Call QuickSort(vntArray, intLBound, i - 1)
Call QuickSort(vntArray, i + 1, intUBound)
Else
Call QuickSort(vntArray, i + 1, intUBound)
Call QuickSort(vntArray, intLBound, i - 1)
End If
Exit Sub

QuickSortErr:
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errQuickSortFailed,
mstrModuleName & "QuickSort", _
LoadResString(errQuickSortFailed)

End Sub
Attribute VB_Name = "Startup"
' FILE: Startup.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains startup and
cleanup functions for the project.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit

Public Const LISTVIEW_BUTTON = 14

```

<pre> Public gstrProjectPath As String ' Used to indicate the source module name when errors ' are raised by this module Private Const mstrModuleName As String = "Startup." Private Sub Initialize() On Error GoTo InitializeErr ReDim gsContCriteria(gintOnFailureAbort To gintOnFailureAsk) As String gsContCriteria(gintOnFailureAbort) = "Abort" gsContCriteria(gintOnFailureContinue) = "Continue" gsContCriteria(gintOnFailureCompleteSibli ngs) = "Execute sibling steps and stop" gsContCriteria(gintOnFailureAbortSiblings) = "Abort sibling steps and execute next parent" gsContCriteria(gintOnFailureSkipSiblings) = "Skip sibling steps and execute next parent" gsContCriteria(gintOnFailureAsk) = "Ask" ReDim gsExecutionStatus(gintDisabled To gintAborted) As String gsExecutionStatus(gintDisabled) = "Disabled" gsExecutionStatus(gintPending) = "Pending" gsExecutionStatus(gintRunning) = "Running" gsExecutionStatus(gintComplete) = "Complete" gsExecutionStatus(gintFailed) = "Failed" gsExecutionStatus(gintAborted) = "Stopped" #If Not RUN_ONLY Then ' Call a procedure to change the style of the toolbar ' on the Step Properties form Call SetTBar97(frmSteps.tblConstraintCommand s) #End If Call InitRunEngine Exit Sub InitializeErr: ' Log the error code raised by Visual Basic Call LogErrors(Errors) gstrSource = mstrModuleName & "Initialize" Call ShowError(errInitializeFailed) End Sub Sub Main() On Error GoTo MainErr </pre>	<pre> ' Mousepointer should indicate busy Call ShowBusy ' Display the Splash screen while we carry out some initialization frmSplash.Show frmSplash.Refresh gstrProjectPath = App.Path ' Open the database If OpenDBFile() = False Then Unload frmSplash Exit Sub End If #If Not RUN_ONLY Then Load frmMain ' Enable the Stop Run menu options only when a workspace is ' actually running Call EnableStop(False) ' Clear all application extension menu items Call ClearToolsMenu #End If Call Initialize ' Mousepointer - ready to accept user input Call ShowFree ' Unload the Splash screen and display the main form Unload frmSplash #If RUN_ONLY Then frmWorkspaceOpen.Caption = gCaptionRunWsp Call ShowWorkspacesInDb(dbsAttTool) #else frmMain.Show #End If Exit Sub MainErr: ' Log the error code raised by Visual Basic Call LogErrors(Errors) Call ShowFree Call ShowError(errMainFailed) End Sub Private Function OpenDBFile() As Boolean Dim sDb As String On Error GoTo OpenDBFileErr #If RUN_ONLY Then ' Always use the registry setting for the run_only mode sDb = DefaultDBFile() #else ' Check if the user has specified the workspace defn. file to open on the command line ' Else, use the registry setting sDb = If(StringEmpty(Command), DefaultDBFile(), Command) If Len(sDb) > 0 Then ' Trim off the enclosing double-quotes if any </pre>	<pre> If Mid(sDb, 1, 1) = gstrDQ Then If Len(sDb) > 1 Then sDb = Mid(sDb, 2) Else sDb = gstrEmptyString End If End If End If If Len(sDb) > 0 Then If Mid(sDb, Len(sDb), 1) = gstrDQ Then If Len(sDb) > 1 Then sDb = Mid(sDb, 1, Len(sDb) - 1) Else sDb = gstrEmptyString End If End If End If #End If ' Open the database OpenDBFile = SMOpenDatabase(sDb) Exit Function OpenDBFileErr: Call LogErrors(Errors) OpenDBFile = False End Function Public Sub Cleanup() On Error GoTo CleanupErr ' Set the mousepointer to indicate Busy Call ShowBusy #If Not RUN_ONLY Then ' Close all open workspaces - will also prompt for unsaved ' changes Call CloseOpenWorkspaces #End If ' Close all open files Call CloseOpenFiles ' Reset the mousepointer Call ShowFree Exit Sub CleanupErr: ' Log the error code raised by Visual Basic Call LogErrors(Errors) Resume Next End Sub Attribute VB_Name = "StepCommon" ' FILE: StepCommon.bas ' Microsoft TPC-H Kit Ver. 1.00 ' Copyright Microsoft, 1999 ' All Rights Reserved ' ' PURPOSE: Contains functionality common across StepMaster and ' SMRunOnly, pertaining to steps ' Specifically, functions to load iterators records ' in an array, determine the type of step, etc. ' Contact: Reshma Tharamal (reshmat@microsoft.com) ' Option Explicit </pre>
---	--	--

```

' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"StepCommon."

' Step property constants
Private Const mintMinFailureThreshold As
Integer = 1
Public Const gintMinSequenceNo As
Integer = 1
Public Const gintMinLevel As Integer = 0
Public Function
ValidateParallelism(sParallelism As String,
IWorkspace As Long, _
Optional ParamsInWsp As
cArrParameters = Nothing) As String
' Returns the degree of parallelism for the
step if the user input is valid
Dim sTemp As String

On Error GoTo ValidateParallelismErr
gstrSource = mstrModuleName &
"ValidateParallelism"

sTemp =
SubstituteParameters(Trim$(sParallelism),
IWorkspace,
WspParameters:=ParamsInWsp)

If Not IsNumeric(sTemp) Then
ShowError errInvalidDegParallelism
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidDegParallelism, gstrSource, _

LoadResString(errInvalidDegParallelism)
Else
If (CInt(sTemp) < gintMinParallelism)
Or (CInt(sTemp) > gintMaxParallelism)
Then
ShowError errInvalidDegParallelism
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidDegParallelism, gstrSource, _

LoadResString(errInvalidDegParallelism)
Else
ValidateParallelism =
Trim$(sParallelism)
End If
End If

Exit Function

ValidateParallelismErr:
' Log the error code raised by Visual
Basic
gstrSource = mstrModuleName &
"ValidateParallelism"
If Err.Number = vbObjectError +
errSubValuesFailed Then
ShowError errInvalidDegParallelism
End If

Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errInvalidDegParallelism, gstrSource, _

LoadResString(errInvalidDegParallelism)

End Function

```

```

Public Function IsGlobal(_
Optional ByVal StepClass As cStep =
Nothing, _
Optional ByVal StepRecord As Recordset
= Nothing, _
Optional ByVal StepKey As String =
gstrEmptyString, _
Optional ByVal StepId As Long = 0, _
Optional StepForm As Form = Nothing)
As Boolean

' This function contains all the possible
checks for whether
' a step is global - The check that will be
made depends on
' the parameter passed in

Dim cStepRecord As cStep

If Not StepClass Is Nothing Then
IsGlobal = StepClass.GlobalFlag
Exit Function
End If

If Not StepRecord Is Nothing Then
IsGlobal = StepRecord![global_flag]
Exit Function
End If

If Not StringEmpty(StepKey) Then
IsGlobal = InStr(StepKey,
gstrGlobalStepPrefix) > 0
Exit Function
End If

If StepId <> 0 Then
Set cStepRecord =
gcSteps.QueryStep(StepId)
IsGlobal = cStepRecord.GlobalFlag
Set cStepRecord = Nothing
Exit Function
End If

If Not StepForm Is Nothing Then
IsGlobal =
(StepForm.lblStepType.Caption =
Str(gintGlobalStep))
Exit Function
End If

' Not a single object was passed in! - raise an
error
On Error GoTo 0
Err.Raise vbObjectError +
errObjectMandatory, _
mstrModuleName & "IsGlobal", _
LoadResString(errObjectMandatory)

End Function

Public Function TypeOfStep(Optional ByVal
StepClass As cStep = Nothing, _
Optional ByVal StepRecord As Recordset
= Nothing, _
Optional ByVal StepKey As String =
gstrEmptyString, _
Optional ByVal StepId As Long = 0, _
Optional StepForm As Form = Nothing)
As Integer
' Calls functions to determine the type of
step
' The check that will be made depends on the
parameter passed in

On Error GoTo TypeOfStepErr

```

```

' Make the check whether a step is global first -
both
' worker and global steps have the step text or file
name
' not null - but only the global step will have the
global
' flag set
If IsGlobal(StepClass, StepRecord, StepKey,
StepId, StepForm) Then
TypeOfStep = gintGlobalStep
ElseIf IsManager(StepClass, StepRecord,
StepKey, StepId, StepForm) Then
TypeOfStep = gintManagerStep
ElseIf IsWorker(StepClass, StepRecord,
StepKey, StepId, StepForm) Then
TypeOfStep = gintWorkerStep
Else
On Error GoTo 0
Err.Raise vbObjectError + errInvalidStep, _
mstrModuleName & "TypeOfStep", _
LoadResString(errInvalidStep)
End If

Exit Function

TypeOfStepErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError + errTypeOfStepFailed,
_
mstrModuleName & "TypeOfStep", _
LoadResString(errTypeOfStepFailed)

End Function

Public Function IsStep(intNodeType As Integer) As
Boolean
' Returns true if the node type corresponds to a
global, manager
' or worker step
IsStep = (intNodeType = gintGlobalStep) Or
(intNodeType = gintManagerStep) Or _
(intNodeType = gintWorkerStep)

End Function

Public Function IsManager(Optional ByVal
StepClass As cStep = Nothing, _
Optional ByVal StepRecord As Recordset =
Nothing, _
Optional ByVal StepKey As String =
gstrEmptyString, _
Optional ByVal StepId As Long = 0, _
Optional StepForm As Form = Nothing) As
Boolean

' This function contains all the possible checks
for whether
' a step is a manager step - The check that will be
made depends
' on the parameter passed in

Dim cStepRecord As cStep

If Not StepClass Is Nothing Then
IsManager = (StepClass.StepType =
gintManagerStep)
Exit Function
End If

If Not StepRecord Is Nothing Then
IsManager = (IsNull(StepRecord![step_text])
And IsNull(StepRecord![step_file_name]))
Exit Function

```



```

End If

If Not StringEmpty(StepKey) Then
    IsManager = (InStr(StepKey,
gstrManagerStepPrefix) > 0)
    Exit Function
End If

If StepId <> 0 Then
    Set cStepRecord =
gcSteps.QueryStep(StepId)
    IsManager = (cStepRecord.StepType =
gintManagerStep)
    Set cStepRecord = Nothing
    Exit Function
End If

If Not StepForm Is Nothing Then
    IsManager =
(StepForm.lblStepType.Caption =
Str(gintManagerStep))
    Exit Function
End If

' Not a single object was passed in! - raise
an error
On Error GoTo 0
Err.Raise vbObjectError +
errObjectMandatory, _
    "Step.IsManager", _
    LoadResString(errObjectMandatory)

End Function
Public Function IsWorker( _
    Optional ByVal StepClass As cStep =
Nothing, _
    Optional ByVal StepRecord As
Recordset = Nothing, _
    Optional ByVal StepKey As String =
gstrEmptyString, _
    Optional ByVal StepId As Long = 0, _
    Optional StepForm As Form =
Nothing) As Boolean

' This function contains all the possible
checks for whether
' a step is a Worker step - The check that
will be made depends
' on the parameter passed in

Dim cStepRecord As cStep

If Not StepClass Is Nothing Then
    IsWorker = (StepClass.StepType =
gintWorkerStep)
    Exit Function
End If

If Not StepRecord Is Nothing Then
    IsWorker = (Not
StepRecord![global_flag] And _
        (Not
IsNull(StepRecord![step_text]) Or Not
IsNull(StepRecord![step_file_name])))
    Exit Function
End If

If Not StringEmpty(StepKey) Then
    IsWorker = InStr(StepKey,
gstrWorkerStepPrefix) > 0
    Exit Function
End If

If StepId <> 0 Then

```

```

Set cStepRecord =
gcSteps.QueryStep(StepId)
    IsWorker = (cStepRecord.StepType =
gintWorkerStep)
    Set cStepRecord = Nothing
    Exit Function
End If

If Not StepForm Is Nothing Then
    IsWorker =
(StepForm.lblStepType.Caption =
Str(gintWorkerStep))
    Exit Function
End If

' Not a single object was passed in! - raise an
error
On Error GoTo 0
Err.Raise vbObjectError +
errObjectMandatory, _
    "Step.IsWorker", _
    LoadResString(errObjectMandatory)

End Function
Public Function GetStepNodeText(ByVal
cStepNode As cStep) As String

On Error GoTo GetStepNodeTextErr

' Returns the string that will be displayed as
the text
' in the tree view node to the user
If StringEmpty(cStepNode.StepLabel) Then

    If StringEmpty(cStepNode.StepTextFile)
Then

        If StringEmpty(cStepNode.StepText)
Then

            ' This should never happen
            On Error GoTo 0
            Err.Raise vbObjectError +
errStepLabelTextAndFileNull, _
                gstrSource, _
                LoadResString(errStepLabelTextAndFileNull)
        Else
            GetStepNodeText =
cStepNode.StepText
        End If
    Else
        GetStepNodeText =
cStepNode.StepTextFile
    End If
Else
    GetStepNodeText = cStepNode.StepLabel
End If

Exit Function

GetStepNodeTextErr:
' Log the error code raised by Visual Basic
Call LogErrors(Errors)
On Error GoTo 0
Err.Raise vbObjectError +
errGetStepNodeTextFailed, _
    gstrSource, _
    LoadResString(errGetStepNodeTextFailed)

End Function

Public Function
LoadRecordsetInStepsArray(rstSteps As
Recordset, _

```

```

cStepCol As cArrSteps) As Boolean

Dim cNewStep As cStep
Dim cNewGlobal As cGlobalStep
Dim cNewManager As cManager
Dim cNewWorker As cWorker

On Error GoTo LoadRecordsetInStepsArrayErr

If rstSteps.RecordCount = 0 Then
    Exit Function
End If

rstSteps.MoveFirst
While Not rstSteps.EOF
' For fields that should not be null, a procedure
is first
' called to raise an error if the field is null

Set cNewStep = New cStep

cNewStep.StepType =
TypeOfStep(StepRecord:=rstSteps)

If cNewStep.StepType = gintGlobalStep Then
    Set cNewGlobal = New cGlobalStep
    Set cNewStep = cNewGlobal
ElseIf cNewStep.StepType = gintManagerStep
Then
    Set cNewManager = New cManager
    Set cNewStep = cNewManager
Else
    Set cNewWorker = New cWorker
    Set cNewStep = cNewWorker
End If

' Initialize the global flag first, since
subsequent
' validations might depend on whether the step
is global
cNewStep.GlobalFlag =
CBool(ErrorOnNullField(rstSteps, "global_flag"))

' Initialize step values
cNewStep.StepId =
CLng(ErrorOnNullField(rstSteps, "step_id"))
cNewStep.VersionNo =
CStr(ErrorOnNullField(rstSteps, "version_no"))

cNewStep.StepLabel =
CheckForNullField(rstSteps, "step_label")
cNewStep.StepTextFile =
CheckForNullField(rstSteps, "step_file_name")
cNewStep.StepText =
CheckForNullField(rstSteps, "step_text")
cNewStep.StartDir =
CheckForNullField(rstSteps, "start_directory")

cNewStep.WorkspaceId =
CLng(ErrorOnNullField(rstSteps,
FLD_ID_WORKSPACE))
cNewStep.ParentStepId =
CLng(ErrorOnNullField(rstSteps,
"parent_step_id"))
cNewStep.ParentVersionNo =
CStr(ErrorOnNullField(rstSteps,
"parent_version_no"))

cNewStep.SequenceNo =
CInt(ErrorOnNullField(rstSteps, "sequence_no"))
cNewStep.StepLevel =
CInt(ErrorOnNullField(rstSteps, "step_level"))
cNewStep.EnabledFlag =
CBool(ErrorOnNullField(rstSteps, "enabled_flag"))

```

```

' Initialize the execution details for the
step
cNewStep.DegreeParallelism =
CheckForNullField(rstSteps,
"degree_parallelism")
cNewStep.ExecutionMechanism =
CInt(ErrorOnNullField(rstSteps,
"execution_mechanism"))
cNewStep.FailureDetails =
CheckForNullField(rstSteps,
"failure_details")
cNewStep.ContinuationCriteria =
CInt(ErrorOnNullField(rstSteps,
"continuation_criteria"))

' Initialize the output file locations for
the step
cNewStep.OutputFile =
CheckForNullField(rstSteps,
"output_file_name")
cNewStep.LogFile =
CheckForNullField(rstSteps,
"log_file_name")
cNewStep.ErrorFile =
CheckForNullField(rstSteps,
"error_file_name")

' Initialize the iterator name for the
step, if any
cNewStep.IteratorName =
CheckForNullField(rstSteps,
"iterator_name")

' Add this record to the array of steps
cStepCol.Load cNewStep

Set cNewStep = Nothing
rstSteps.MoveNext
Wend

Exit Function

LoadRecordsetInStepsArrayErr:

LogErrors Errors
gstrSource = mstrModuleName &
"LoadRecordsetInStepsArray"
On Error GoTo 0
Err.Raise vbObjectError +
errLoadRsInArrayFailed, gstrSource, _

LoadResString(errLoadRsInArrayFailed)

End Function

Attribute VB_Name = "TimerSM"
' FILE: TimerSM.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains
wrapper functions for Timer APIs.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Private Declare Function SetTimer Lib
"user32" (ByVal hWnd As Long, _
ByVal nIDEvent As Long, ByVal uElapsed
As Long, ByVal lpTimerFunc As Long) _

```

```

As Long
Private Declare Function KillTimer Lib
"user32" (ByVal hWnd As Long, _
ByVal nIDEvent As Long) As Long
Private Declare Sub CopyMemory Lib
"kernel32" Alias "RtlMoveMemory" (_
pDest As Any, pSource As Any, ByVal
ByteLen As Long)

Public gcTimerObjects As Collection

Private Sub TimerProc(ByVal lHwnd As Long,
ByVal lMsg As Long, _
ByVal lTimerID As Long, ByVal lTime As
Long)

Dim nPtr As Long
Dim oTimerObject As cTimerSM

'Create a Timer object from the pointer
nPtr = gcTimerObjects.Item(Str$(lTimerID))
CopyMemory oTimerObject, nPtr, 4
'Call a method which will fire the Timer
event
oTimerObject.Tick
'Get rid of the Timer object so that VB will
not try to release it
CopyMemory oTimerObject, 0&, 4
End Sub

Public Function StartTimer(lInterval As Long)
As Long
StartTimer = SetTimer(0, 0, lInterval,
AddressOf TimerProc)
End Function

Public Sub StopTimer(lTimerID As Long)
KillTimer 0, lTimerID
End Sub

Public Sub SetInterval(lInterval As Long,
lTimerID As Long)
SetTimer 0, lTimerID, lInterval, AddressOf
TimerProc
End Sub
Attribute VB_Name = "ToolsCommon"
' FILE: ToolsCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: Contains functions to remove
run history and initialize
' table creation scripts
' Contact: Reshma Tharamal
(reshmat@microsoft.com)

Option Explicit

Public sCreateTables() As String

Public Const gsExtSeparator As String = "."

Public Sub DeleteRunHistory(dbFile As
DAO.Database)
' Delete all run history records from the
database, viz. the records in
' run_header, run_step_details and
run_parameters

Dim sDelete As String

On Error GoTo DeleteRunHistoryErr

```

```

sDelete = "delete from run_header "
dbFile.Execute sDelete, dbFailOnError

sDelete = "delete from run_step_details "
dbFile.Execute sDelete, dbFailOnError

sDelete = "delete from run_parameters "
dbFile.Execute sDelete, dbFailOnError

sDelete = "update att_identifiers " & _
"set run_id = " & CStr(glMinId)
dbFile.Execute sDelete, dbFailOnError

Exit Sub

DeleteRunHistoryErr:
LogErrors Errors
Err.Raise vbObjectError +
errDeleteDBRecordFailed, "DeleteRunHistory", _
LoadResString(errDeleteDBRecordFailed)

End Sub

Public Function CreateConnectionsTableScript() As
String
' Returns the table creation script for the
workspace_connections table

Call InitCreateSQLArray
CreateConnectionsTableScript =
sCreateTables(10)
ReDim sCreateTables(0)

End Function

Public Function CreateConnectionDtlsTableScript()
As String
' Returns the table creation script for the
connection_dtls table

Call InitCreateSQLArray
CreateConnectionDtlsTableScript =
sCreateTables(11)
ReDim sCreateTables(0)

End Function

Public Sub InitCreateSQLArray()

ReDim sCreateTables(0 To 11)

sCreateTables(0) = "Create table att_identifiers (" &
_
"workspace_id Long, " & _
"parameter_id Long, " & _
"step_id Long, " & _
"constraint_id Long, " & _
"run_id Long, " & _
"connection_id Long " & _
", " & FLD_ID_CONN_NAME & gstrBlank
& DATA_TYPE_LONG & _
");"

sCreateTables(1) = "Create table att_steps (step_id
Long, " & _
"version_no Text(255), " & _
"step_label Text(255), " & _
"step_file_name Text(255), " & _
"step_text Memo, " & _
"start_directory Text(255), " & _
"workspace_id Long, " & _
"parent_step_id Long, " & _
"parent_version_no Text(255), " & _
"step_level Long, " & _
"sequence_no Integer, " & _
"enabled_flag Bit, " & _

```

```

"degree_parallelism Text(255), "
& _
"execution_mechanism Text(50),
" & _
"failure_details Text(255), " &
-
"continuation_criteria Text(50), " &
-
"global_flag Long, " & _
"archived_flag Bit, " & _
"output_file_name Text(255), "
& _
"error_file_name Text(255), "
& _
"iterator_name Text(255), " &
-
"CONSTRAINT pk_steps PRIMARY
KEY (step_id, version_no) " & _
");"
'
"log_file_name Text(255), "
& _
sCreateTables(2) = "Create table
att_workspaces (" & _
"workspace_id Long, " & _
"workspace_name Text(255), "
& _
"archived_flag Bit, " & _
"CONSTRAINT pk_workspaces
PRIMARY KEY (workspace_id) " & _
");"
sCreateTables(3) = "Create table
iterator_values (" & _
"step_id Long, " & _
"version_no Text(255), " &
-
"type Integer, " & _
"iterator_value Text(255), " &
-
"sequence_no Integer " & _
");"
sCreateTables(4) = "Create table run_header
(" & _
"run_id Long, " & _
"workspace_id Long, " & _
"start_time Currency, " & _
"end_time Currency, " & _
"CONSTRAINT pk_run_header
PRIMARY KEY (run_id) " & _
");"
sCreateTables(5) = "Create table
run_parameters (" & _
"run_id Long, " & _
"parameter_name Text(255), "
& _
"parameter_value Text(255) "
& _
");"
sCreateTables(6) = "Create table
run_step_details (" & _
"run_id Long, " & _
"step_id Long, " & _
"version_no Text(255), " &
-
"instance_id Long, " & _
"parent_instance_id Long, " & _
"command Memo, " & _
"iterator_value Text(255), " &
-
"start_time Currency, " & _
"end_time Currency, " & _
"elapsed_time Long " & _
");"
sCreateTables(7) = "Create table
step_constraints (" & _
"constraint_id Long, " & _
"step_id Long, " & _
"version_no Text(255), " & _
"constraint_type Integer, " & _
"global_step_id Long, " & _
"global_version_no Text(255), " &
-
"sequence_no Integer " & _
");"
sCreateTables(8) = "Create table
workspace_parameters (" & _
"workspace_id Long, " & _
"parameter_id Long, " & _
"parameter_name Text(255), " &
-
"parameter_value Text(255), " & _
"description Text(255), " & _
"parameter_type Integer, " & _
"CONSTRAINT pk_parameters
PRIMARY KEY (parameter_id) " & _
");"
sCreateTables(9) = "Create table db_details ("
& _
"db_version Text(50) " & _
");"
sCreateTables(10) = "Create table " &
TBL_CONNECTION_STRINGS & " (" & _
"workspace_id Long, " & _
"connection_id Long, " & _
"connection_name Text(255), " &
-
"connection_value Text(255), " & _
"description Text(255), " & _
"no_count_display Bit, " & _
"no_execute Bit, " & _
"parse_query_only Bit, " & _
"ANSI_quoted_identifiers Bit, " & _
"ANSI_nulls Bit, " & _
"show_query_plan Bit, " & _
"show_stats_time Bit, " & _
"show_stats_io Bit, " & _
"parse_odbc_msg_prefixes Bit, " & _
"row_count long, " & _
"tsql_batch_separator Text(255), " &
-
"query_time_out long, " & _
"server_language Text(255), " & _
"character_translation Bit, " & _
"regional_settings Bit, " & _
"CONSTRAINT pk_connections
PRIMARY KEY (connection_id) " & _
");"
' This table has been added in order to satisfy
the TPC-H requirement that
' all the queries in a stream need to be executed
on a single connection.
' Specify a connection for each odbc step. If the
connection is of type,
' static, it should be kept open till the step
execution is complete.
sCreateTables(11) = "Create table " &
TBL_CONNECTION_DTLS & " (" & _
FLD_ID_WORKSPACE & gstrBlank &
DATA_TYPE_LONG & ", " & _
FLD_ID_CONN_NAME & gstrBlank &
DATA_TYPE_LONG & ", " & _
FLD_CONN_DTL_CONNECTION_NAME
& gstrBlank & DATA_TYPE_TEXT255 & ", " & _
FLD_CONN_DTL_CONNECTION_STRING &
gstrBlank & DATA_TYPE_TEXT255 & ", " & _
FLD_CONN_DTL_CONNECTION_TYPE &
gstrBlank & DATA_TYPE_INTEGER & ", " & _
"CONSTRAINT pk_connection_name
PRIMARY KEY (" & FLD_ID_CONN_NAME &
") " & _
");"
End Sub
Attribute VB_Name = "WindowsApiCommon"
' FILE: WindowsApiCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
' PURPOSE: This module contains functions that
are wrappers around the
' Windows API and are used by both
StepMaster and SMRunOnly.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
' Used to indicate the source module name when
errors
' are raised by this module
Private Const mstrModuleName As String =
"WindowsApiCommon."
Public Type PROCESS_INFORMATION
hProcess As Long
hThread As Long
dwProcessID As Long
dwThreadId As Long
End Type
' Used by GetShortName to return the short file
name for a given file
Private Declare Function GetShortPathName Lib
"kernel32" _
Alias "GetShortPathNameA" (ByVal
lpszLongPath As String, _
ByVal lpszShortPath As String, ByVal
cchBuffer As Long) As Long
Public Declare Function GetExitCodeProcess Lib
"kernel32" (_
ByVal hProcess As Long, lpExitCode As Long)
As Long
Public Declare Function TerminateProcess Lib
"kernel32" (_
hProcess As Long, uExitCode As Long) As
Long
Public Declare Function CloseHandle Lib
"kernel32" (_
ByVal hObject As Long) As Long
Public Const NORMAL_PRIORITY_CLASS
As Long = &H20&
Public Const INFINITE As Long = -1&
Public Const STATUS_WAIT_0 As Long
= &H0
Public Const STATUS_ABANDONED_WAIT_0
As Long = &H80
Public Const STATUS_USER_APC As
Long = &HC0

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Public Const STATUS_TIMEOUT
As Long = &H102
Public Const STATUS_PENDING
As Long = &H103

Public Const WAIT_FAILED As
Long = &HFFFFFF
Public Const WAIT_OBJECT_0 As
Long = STATUS_WAIT_0
Public Const WAIT_TIMEOUT As
Long = STATUS_TIMEOUT

Public Const WAIT_ABANDONED
As Long =
STATUS_ABANDONED_WAIT_0
Public Const WAIT_ABANDONED_0
As Long =
STATUS_ABANDONED_WAIT_0

Public Const WAIT_IO_COMPLETION
As Long = STATUS_USER_APC
Public Const STILL_ACTIVE As
Long = STATUS_PENDING

Public Const
PROCESS_QUERY_INFORMATION As
Long = &H400
Public Const
STANDARD_RIGHTS_REQUIRED As
Long = &HF0000

'-----
'Declarations for shelling:

Public Type STARTUPINFO
cb As Long
lpReserved As String
lpDesktop As String
lpTitle As String
dwX As Long
dwY As Long
dwXSize As Long
dwYSize As Long
dwXCountChars As Long
dwYCountChars As Long
dwFillAttribute As Long
dwFlags As Long
wShowWindow As Integer
cbReserved2 As Integer
lpReserved2 As Long
hStdInput As Long
hStdOutput As Long
hStdError As Long
End Type

Public Declare Function
WaitForSingleObject Lib "kernel32" ( _
ByVal hProcess As Long, ByVal
dwMilliseconds As Long) As Long

Public Declare Function InputIdle Lib
"user32" Alias "WaitForInputIdle" ( _
ByVal hProcess As Long, ByVal
dwMilliseconds As Long) As Long

Public Declare Function CreateProcessA Lib
"kernel32" ( _
ByVal lpApplicationName As Long,
ByVal lpCommandLine As String, _
ByVal lpProcessAttributes As Long,
ByVal lpThreadAttributes As Long, _
ByVal bInheritHandles As Long, ByVal
dwCreationFlags As Long, _

```

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ByVal lpEnvironment As Long, ByVal
lpCurrentDirectory As Long, _
lpStartupInfo As STARTUPINFO,
lpProcessInformation As _
PROCESS_INFORMATION) As Long

Public Declare Function GetLastError Lib
"kernel32" () As Long

Private Type OPENFILENAME
lStructSize As Long
hwndOwner As Long
hInstance As Long
lpstrFilter As String
lpstrCustomFilter As String
nMaxCustFilter As Long
nFilterIndex As Long
lpstrFile As String
nMaxFile As Long
lpstrFileName As String
nMaxFileName As Long
lpstrInitialDir As String
lpstrTitle As String
Flags As Long
nFileOffset As Integer
nFileExtension As Integer
lpstrDefExt As String
lCustData As Long
lpfnHook As Long
lpTemplateName As Long
End Type

Private Declare Function GetOpenFileName
Lib "COMDLG32" _
Alias "GetOpenFileNameA" (file As
OPENFILENAME) As Long

Private Declare Function lstrlen Lib "kernel32"
(lpsz As String) As Long

Public Const MAX_PATH = 255

' Used when creating a process
Public Const SW_SHOWMINNOACTIVE = 7
Public Const STARTF_USESHOWWINDOW
= &H1

Public Const MB_YESNOCANCEL = &H3&
Public Const MB_ABORTRETRYIGNORE =
&H2&
Public Const MB_OK = &H0&

Public Const MB_APPLMODAL = &H0&

Public Const MB_ICONQUESTION =
&H20&
Public Const MB_ICONEXCLAMATION =
&H30&

Public Const IDABORT = 3
Public Const IDRETRY = 4
Public Const IDIGNORE = 5
Public Const IDYES = 6
Public Const IDNO = 7
Public Const IDCANCEL = 2

Private Declare Function MessageBox Lib
"user32" Alias "MessageBoxA" ( _
ByVal hWnd As Long, ByVal lpText As
String, _
ByVal lpCaption As String, ByVal wType
As Long) As Long

Private Type SYSTEMTIME
wYear As Integer

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wMonth As Integer
wDayOfWeek As Integer
wDay As Integer
wHour As Integer
wMinute As Integer
wSecond As Integer
wMilliseconds As Integer
End Type

Private Declare Function Get64BitTime Lib
"smtime.dll" ( _
ByVal lpInitTime As Any) As Currency

Public Function ShowMessageBox(hWnd As Long,
strText As String, _
strTitle As String, wType As Integer) As Long
' Using the Windows MessageBox Api since the
VB MsgBox function suppresses
' all events
ShowMessageBox = MessageBox(hWnd, ByVal
strText, ByVal strTitle, wType)

If ShowMessageBox = 0 Then
LogSystemError
Err.Raise vbObjectError + errConfirmFailed,
App.EXENAME, _
LoadResString(errConfirmFailed)
End If

End Function

Public Function ShowFileDialog(ByVal
strFilter As String, _
ByVal strDialogTitle As String, ByVal
lngFlags As Long, _
Optional ByVal strOldFile As String =
gstrEmptyString) As String
' Returns the file name selected by the user
Dim strInitDir As String
Dim intPos As Integer
Dim opfile As OPENFILENAME
Dim sFile As String

On Error GoTo ShowFileDialogErr

If Not StringEmpty(strOldFile) Then
intPos = InstrR(strOldFile, gstrFileSeparator)
If intPos > 0 Then
strInitDir = Left$(strOldFile, intPos - 1)
End If
End If

With opfile
.lStructSize = Len(opfile)
.Flags = lngFlags
.lpstrInitialDir = strInitDir
.lpstrTitle = strDialogTitle
.lpstrFilter = MakeWindowsFilter(strFilter)
sFile = strOldFile & String$(MAX_PATH -
Len(strOldFile), 0)
.lpstrFile = sFile
.nMaxFile = MAX_PATH
End With

If GetOpenFileName(opfile) Then
ShowFileDialog = Left$(opfile.lpstrFile,
InStr(opfile.lpstrFile, vbNullChar) - 1)
Else
ShowFileDialog = strOldFile
End If

Exit Function

ShowFileDialogErr:
Call LogErrors(Errors)
' Reset the selection to the passed in file, if any

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ShowFileOpenDialog = strOldFile

End Function

Private Function
MakeWindowsFilter(sFilter As String) As
String
    Dim s As String, ch As String, iTemp As
Integer
    On Error GoTo MakeWindowsFilterErr
    ' To make Windows-style filter, replace |
and : with nulls
    For iTemp = 1 To Len(sFilter)
        ch = Mid$(sFilter, iTemp, 1)
        If ch = "|" Then
            s = s & vbNullChar
        Else
            s = s & ch
        End If
    Next iTemp
    ' Put double null at end
    s = s & vbNullChar & vbNullChar
    MakeWindowsFilter = s
Exit Function
MakeWindowsFilterErr:
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
"MakeWindowsFilter"
    On Error GoTo 0
    Err.Raise vbObjectError + errApiFailed,
gstrSource, _
        LoadResString(errApiFailed)
End Function

Public Function GetShortName(ByVal
sLongFileName As String) As String
    ' Returns the short name for the passed in
file - will only work
    ' if the passed in path/file exists
    Dim iRetVal As Long, sShortPathName
As String, iLen As Integer
    Dim sLongFile As String
    Dim sDir As String
    Dim sFile As String
    Dim intPos As Integer
    On Error GoTo GetShortNameErr
    sFile = gstrEmptyString
    sLongFile =
MakePathValid(sLongFileName)
    If StringEmpty(Dir$(sLongFile,
vbNormal + vbDirectory)) Then
        ' The passed in path is a file that does
not exist - since
        ' the GetShortPathName api does not
work on non-existent files
        ' on Win2K, use the directory as an
argument to the api and
        ' then append the file
        intPos = InstrR(sLongFile,
gstrFileSeparator)
        sDir = Mid$(sLongFile, 1, intPos - 1)
        sFile = Right(sLongFile,
Len(sLongFile) - intPos + 1)
        sLongFile = sDir

```

```

End If
' Set up buffer area for API function call
return
sShortPathName = Space(MAX_PATH)
iLen = Len(sShortPathName)
' Call the function
iRetVal = GetShortPathName(sLongFile,
sShortPathName, iLen)
If iRetVal = 0 Then
    Call LogSystemError
End If
GetShortName = IIf(iRetVal = 0, sLongFile,
Left(sShortPathName, iRetVal))
If Not StringEmpty(sFile) Then
    GetShortName = GetShortName & sFile
End If
Exit Function
GetShortNameErr:
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
"GetShortName"
    On Error GoTo 0
    Err.Raise vbObjectError + errApiFailed,
gstrSource, _
        LoadResString(errApiFailed)
End Function
Public Function Determine64BitTime() As
Currency
    Determine64BitTime =
Get64BitTime(ByVal 0&)
End Function
Attribute VB_Name = "WorkspaceCommon"
' FILE: WorkspaceCommon.bas
' Microsoft TPC-H Kit Ver. 1.00
' Copyright Microsoft, 1999
' All Rights Reserved
'
'
' PURPOSE: Contains functionality common
across StepMaster and
' SMRunOnly, pertaining to
workspaces
' Specifically, functions to read
workspace records from
' the database and so on.
' Contact: Reshma Tharamal
(reshmat@microsoft.com)
'
Option Explicit
' Used to indicate the source module name
when errors
' are raised by this module
Private Const mstrModuleName As String =
"WorkspaceCommon."
Public Function GetWorkspaceDetails( _
Optional ByVal WorkspaceId As Long, _
Optional WorkspaceName As String =
gstrEmptyString _
) As Variant
    ' Depending on the passed in parameter, it
returns

```

```

' either the workspace name or the workspace
identifier
' in a variant. The calling function must convert
the
' return value to the appropriate type
Dim rstWorkspace As Recordset
Dim qyWsp As DAO.QueryDef
Dim strSql As String
Dim cTempStr As cStringSM
On Error GoTo GetWorkspaceDetailsErr
gstrSource = mstrModuleName &
"GetWorkspaceDetails"
If WorkspaceId = 0 And _
WorkspaceName = gstrEmptyString Then
    On Error GoTo 0
    Err.Raise vbObjectError +
errMandatoryParameterMissing, _
        gstrSource, _
LoadResString(errMandatoryParameterMissing)
End If
Set cTempStr = New cStringSM
If WorkspaceId = 0 Then
    strSql = "Select workspace_id from
att_workspaces " & _
        " where workspace_name = [w_name] "
    Set qyWsp =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strSql)
    qyWsp.Parameters("w_name").Value =
WorkspaceName
Else
    strSql = "Select workspace_name from
att_workspaces " & _
        " where workspace_id = [w_id] "
    Set qyWsp =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strSql)
    qyWsp.Parameters("w_id").Value =
WorkspaceId
End If
Set cTempStr = Nothing
Set rstWorkspace =
qyWsp.OpenRecordset(dbOpenForwardOnly)
If rstWorkspace.RecordCount <> 0 Then
    GetWorkspaceDetails =
rstWorkspace.Fields(0)
Else
    rstWorkspace.Close
    qyWsp.Close
    On Error GoTo 0
    Err.Raise vbObjectError +
errInvalidWorkspaceData, _
        gstrSource, _
LoadResString(errInvalidWorkspaceData)
End If
rstWorkspace.Close
qyWsp.Close
Exit Function
GetWorkspaceDetailsErr:
    Call LogErrors(Errors)
    gstrSource = mstrModuleName &
"GetWorkspaceDetails"
    On Error GoTo 0

```

```

Err.Raise vbObjectError +
errGetWorkspaceDetailsFailed, _
    gstrSource, _

LoadResString(errGetWorkspaceDetailsFail
ed)

End Function

Public Sub
ReadStepsInWorkspace(rstStepsInWorkSpa
ce As Recordset, _
    qySteps As DAO.QueryDef, _
    Optional lngWorkspaceId As Long =
gInvalidId, _
    Optional dbLoad As DAO.Database =
Nothing, _
    Optional ByVal
bSelectArchivedRecords As Boolean =
False)

' This function will populate the passed in
recordset with
' all the steps for a given workspace (if
one is passed in, else all workspaces)

    Dim strSql As String

    On Error GoTo
ReadStepsInWorkspaceErr

' Create a recordset object to retrieve all
steps for
' the given workspace
    strSql = "Select step_id, step_label,
step_file_name, step_text, " & _
        " start_directory, version_no,
workspace_id, " & _
        " parent_step_id, parent_version_no, "
& _
        " sequence_no, step_level, " & _
        " enabled_flag, degree_parallelism, " &
_
        " execution_mechanism, " & _
        " failure_details, continuation_criteria,
" & _
        " global_flag, archived_flag, " & _
        " output_file_name, " & _
        " error_file_name, iterator_name " & _
        " from att_steps a " & _
        " where "

' log_file_name,

If lngWorkspaceId <> gInvalidId Then
    strSql = strSql & " workspace_id =
[w_id] AND "
    End If

If Not bSelectArchivedRecords Then
    strSql = strSql & " archived_flag =
[archived] AND "
    End If

' Find the highest X-component of the
version number
    strSql = strSql & " cint( mid( version_no,
1, instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) = "
& _
        " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) ) "
& _
        " from att_steps AS d " & _

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" WHERE a.step_id = d.step_id ) "

' Find the highest Y-component of the
version number for the highest X-component
    strSql = strSql & " AND cint( mid(
version_no, instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) + 1 ) ) = " &
_
        " ( select max( cint( mid( version_no,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) + 1 ) ) ) " &
_
        " from att_steps AS b " & _
        " Where a.step_id = b.step_id " & _
        " AND cint( mid( version_no, 1, instr(
version_no, " & gstrDQ & gstrVerSeparator &
gstrDQ & " ) - 1 ) ) = " & _
        " ( select max( cint( mid( version_no, 1,
instr( version_no, " & gstrDQ &
gstrVerSeparator & gstrDQ & " ) - 1 ) ) ) " & _
        " from att_steps AS c " & _
        " WHERE a.step_id = c.step_id ) ) "

' Append the order clause as follows
' First, separate all global/non-global steps
' Order the worker and manager steps by
step_level to
' ensure that the parent steps are populated
before
' any sub-steps within it
' Further ordering by parent_step_id and
sequence_no
' ensures that all the children within a parent
are
' selected in the necessary order
    strSql = strSql & " order by global_flag,
step_level, " & _
        " parent_step_id, sequence_no "

If dbLoad Is Nothing Then Set dbLoad =
dbsAttTool

' Create a temporary Querydef object
Set qySteps =
dbLoad.CreateQueryDef(gstrEmptyString,
strSql)

' Initialize the parameter values
If lngWorkspaceId <> gInvalidId Then
    qySteps.Parameters("w_id").Value =
lngWorkspaceId
End If

If Not bSelectArchivedRecords Then
    qySteps.Parameters("archived").Value =
False
End If

Set rstStepsInWorkSpace =
qySteps.OpenRecordset(dbOpenSnapshot)

Exit Sub

ReadStepsInWorkspaceErr:

LogErrors Errors
gstrSource = mstrModuleName &
"ReadStepsInWorkspace"
On Error GoTo 0
Err.Raise vbObjectError +
errReadWorkspaceDataFailed, _
    gstrSource, _

LoadResString(errReadWorkspaceDataFailed)

```

```

End Sub

Public Sub ReadWorkspaces(dbLoad As Database,
rstWsp As Recordset, _
    qyWsp As DAO.QueryDef, _
    Optional ByVal bSelectArchivedRecords As
Boolean = False)

' This function will populate the passed in
recordset with all workspace records

    Dim strSql As String

    On Error GoTo ReadWorkspacesErr

' Create a recordset object containing all the
workspaces
' (that haven't been archived) in the database
    strSql = "Select workspace_id,
workspace_name, archived_flag " & _
        " from att_workspaces "

If Not bSelectArchivedRecords Then
    strSql = strSql & " where archived_flag =
[archived]"
End If
    strSql = strSql & " order by workspace_name"

Set qyWsp =
dbLoad.CreateQueryDef(gstrEmptyString, strSql)
If Not bSelectArchivedRecords Then
    qyWsp.Parameters("archived").Value = False
End If

Set rstWsp =
qyWsp.OpenRecordset(dbOpenForwardOnly)

Exit Sub

ReadWorkspacesErr:

LogErrors Errors
gstrSource = mstrModuleName &
"ReadWorkspaces"
On Error GoTo 0
Err.Raise vbObjectError +
errReadWorkspaceDataFailed, _
    gstrSource, _

LoadResString(errReadWorkspaceDataFailed)

End Sub

Public Sub ShowWorkspacesInDb(dbLoad As
Database)

    Dim recWorkspaces As Recordset
    Dim qryAllWsp As QueryDef

    On Error GoTo ShowWorkspacesInDbErr

' Set the mousepointer to indicate Busy
Call ShowBusy

Load frmWorkspaceOpen

Call ReadWorkspaces(dbLoad, recWorkspaces,
qryAllWsp)

    frmWorkspaceOpen.lstWorkspaces.Clear

' Load all the workspaces into the listbox
If recWorkspaces.RecordCount <> 0 Then
    Do
        ' Add the workspace name to the list and
store

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' the corresponding workspace id as
the ItemData
' property of the item.
' The workspace id will be used for
all further
' processing of the workspace

frmWorkspaceOpen.lstWorkspaces.AddItem
recWorkspaces![workspace_name]

frmWorkspaceOpen.lstWorkspaces.ItemData(frmWorkspaceOpen.lstWorkspaces.NewIndex) = _
recWorkspaces![workspace_id]
recWorkspaces.MoveNext

Loop Until recWorkspaces.EOF
End If
recWorkspaces.Close
qryAllWsp.Close

' Reset the mousepointer
ShowFree

#If RUN_ONLY Then
frmWorkspaceOpen.Show vbModal
#Else
frmWorkspaceOpen.Show vbModal,
frmMain
#End If

Exit Sub

ShowWorkspacesInDbErr:
LogErrors Errors
Call ShowFree
Err.Raise vbObjectError +
errProgramError, mstrModuleName &
"ShowWorkspacesInDb", _
LoadResString(errProgramError)

End Sub
Private Sub
ReadWorkspaceParameters lngWorkspaceId
As Long, _
rstWorkSpaceParameters As Recordset, _
qyWspParams As DAO.QueryDef

' Will populate the recordset with all the
parameters for
' a given workspace

Dim strSql As String

On Error GoTo
ReadWorkspaceParametersErr

strSql = "Select parameter_id,
parameter_name, " & _
" parameter_value, workspace_id,
parameter_type, description " & _
" from workspace_parameters " & _
" where workspace_id = [w_id] " & _
" order by parameter_name,
parameter_value "

' Create a temporary Querydef object and
initialize
' it's parameter values
Set qyWspParams =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strSql)
qyWspParams.Parameters("w_id").Value =
lngWorkspaceId

```

```

Set rstWorkSpaceParameters =
qyWspParams.OpenRecordset(dbOpenSnapshot)

Exit Sub

ReadWorkspaceParametersErr:

LogErrors Errors
gstrSource = mstrModuleName &
"ReadWorkspaceParameters"
On Error GoTo 0
Err.Raise vbObjectError +
errReadWorkspaceDataFailed, _
gstrSource, _

LoadResString(errReadWorkspaceDataFailed)

End Sub
Private Sub ReadConnections lngWorkspaceId
As Long, rstConns As Recordset, _
qyConns As DAO.QueryDef

' Will populate the recordset with all the
parameters for
' a given workspace

Dim strSql As String

On Error GoTo
ReadWorkspaceParametersErr

strSql = "Select connection_id, " & _
" connection_name, connection_value,
workspace_id, description, " & _
" no_count_display, no_execute,
parse_query_only, ANSI_quoted_identifiers, " & _
" ANSI_nulls, show_query_plan,
show_stats_time, show_stats_io, " & _
" parse_odbc_msg_prefixes,
row_count, tsq_batch_separator,
query_time_out, " & _
" server_language,
character_translation, regional_settings " & _
" from workspace_connections " & _
" where workspace_id = [w_id] " & _
" order by connection_name,
connection_value "

' Create a temporary Querydef object and
initialize
' it's parameter values
Set qyConns =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strSql)
qyConns.Parameters("w_id").Value =
lngWorkspaceId

Set rstConns =
qyConns.OpenRecordset(dbOpenSnapshot)

Exit Sub

ReadWorkspaceParametersErr:

LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errReadWorkspaceDataFailed, _
mstrModuleName & "ReadConnections",
LoadResString(errReadWorkspaceDataFailed)

```

```

End Sub
Private Sub ReadConnectionDtls lngWorkspaceId
As Long, rstConns As Recordset, _
qyConns As DAO.QueryDef

' Will populate the recordset with all the
connection_dtls records for
' a given workspace

Dim strSql As String

On Error GoTo ReadWorkspaceParametersErr

strSql = "Select " & FLD_ID_CONN_NAME &
", " & _
FLD_CONN_DTL_CONNECTION_NAME & ", " & _
FLD_CONN_DTL_CONNECTION_STRING & ",
" & _
FLD_ID_WORKSPACE & ", " & _
FLD_CONN_DTL_CONNECTION_TYPE
& _
" from " & TBL_CONNECTION_DTLS &
" where " & FLD_ID_WORKSPACE & " =
[w_id] " & _
" order by " &
FLD_CONN_DTL_CONNECTION_NAME

' Create a temporary Querydef object and
initialize
' it's parameter values
Set qyConns =
dbsAttTool.CreateQueryDef(gstrEmptyString,
strSql)
qyConns.Parameters("w_id").Value =
lngWorkspaceId
Set rstConns =
qyConns.OpenRecordset(dbOpenSnapshot)

Exit Sub

ReadWorkspaceParametersErr:

LogErrors Errors
On Error GoTo 0
Err.Raise vbObjectError +
errReadWorkspaceDataFailed, _
mstrModuleName & "ReadConnectionDtls",
LoadResString(errReadWorkspaceDataFailed)

End Sub

Public Sub ReadWorkspaceData lngWorkspaceId
As Long, _
cStepsCol As cArrSteps, _
cParamsCol As cArrParameters, _
cConsCol As cArrConstraints, _
cConns As cConnections, _
cConnDetails As cConnDtls, _
rstStepsInWsp As Recordset, _
qyStepsInWsp As DAO.QueryDef, _
rstParamsInWsp As Recordset, _
qyParamsInWsp As DAO.QueryDef, _
rstConns As Recordset, _
qyConns As DAO.QueryDef, _
rstConnDtls As Recordset, _
qyConnDtls As DAO.QueryDef

' Loads the passed in structures with all the data
for
' the workspace. It also initializes the recordsets
' with the step and parameter records for the
workspace.

```

```

On Error GoTo ReadWorkspaceDataErr

ShowBusy

Call
ReadStepsInWorkspace(rstStepsInWsp,
qyStepsInWsp, lngWorkspaceId)

' Load all the steps in the array
LoadRecordsetInStepsArray
rstStepsInWsp, cStepsCol

' Initialize the steps with all the iterator
' records for each step
Call LoadIteratorsForWsp(cStepsCol,
lngWorkspaceId, rstStepsInWsp)
ReadWorkspaceParameters
lngWorkspaceId, rstParamsInWsp,
qyParamsInWsp

```

```

' Load all the workspace parameters in the
array
LoadRecordsetInParameterArray
rstParamsInWsp, cParamsCol
' Read and load connection strings
ReadConnections lngWorkspaceId,
rstConns, qyConns
LoadRecordsetInConnectionArray rstConns,
cConns
' Read and load connection information
ReadConnectionDtls lngWorkspaceId,
rstConnDtls, qyConnDtls
LoadRSInConnDtlArray rstConnDtls,
cConnDetails
' Finally, load the step constraints collection
class with
' all the constraints for the steps in the
workspace
cConsCol.LoadConstraints lngWorkspaceId,
rstStepsInWsp

```

```

ShowFree
Exit Sub

ReadWorkspaceDataErr:
' Log the error code raised by Visual Basic
ShowFree
Call LogErrors(Errors)
On Error GoTo 0
gstrSource = mstrModuleName &
"ReadWorkspaceData"
Err.Raise vbObjectError +
errReadWorkspaceDataFailed, _
gstrSource, _

LoadResString(errReadWorkspaceDataFailed)

End Sub

```


<pre>// FILE: LogWriter.cpp // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // PURPOSE: Implementation of DLL Exports. // Contact: Reshma Tharamal (reshmat@microsoft.com) // // LogWriter.cpp : Implementation of DLL Exports. // Note: Proxy/Stub Information // To build a separate proxy/stub DLL, // run nmake -f LogWriterps.mk in the project directory. #include "stdafx.h" #include "resource.h" #include <initguid.h> #include "LogWriter.h" #include "LogWriter_i.c" #include "SMLog.h" CComModule _Module; BEGIN_OBJECT_MAP(ObjectMap) OBJECT_ENTRY(CLSID_SMLog, CSMLog) END_OBJECT_MAP() // DLL Entry Point extern "C" BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD dwReason, LPVOID /*lpReserved*/) { if (dwReason == DLL_PROCESS_ATTACH) { _Module.Init(ObjectMap, hInstance, &LIBID_LOGWRITERLib); DisableThreadLibraryCalls(hInstance); } else if (dwReason == DLL_PROCESS_DETACH) _Module.Term(); return TRUE; // ok } // Used to determine whether the DLL can be unloaded by OLE STDAPI DllCanUnloadNow(void) { return (_Module.GetLockCount()==0) ? S_OK : S_FALSE; } // Returns a class factory to create an object of the requested type STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid, LPVOID* ppv) { return _Module.GetClassObject(rclsid, riid, ppv); } // DllRegisterServer - Adds entries to the system registry STDAPI DllRegisterServer(void) { // registers object, typelib and all interfaces in typelib return _Module.RegisterServer(TRUE); }</pre>	<pre>//////////////////////////////////// // DllUnregisterServer - Removes entries from the system registry STDAPI DllUnregisterServer(void) { return _Module.UnregisterServer(TRUE); } /* this ALWAYS GENERATED file contains the definitions for the interfaces */ /* File created by MIDL compiler version 5.01.0164 */ /* at Thu Sep 19 17:49:50 2002 */ /* Compiler settings for C:\charles\Stepmaster\LogWriter\LogWriter.idl: Oicf (OptLev=i2), W1, Zp8, env=Win32, ms_ext, c_ext error checks: allocation ref bounds_check enum stub_data */ //@@@MIDL_FILE_HEADING() /* verify that the <rpcndr.h> version is high enough to compile this file*/ #ifndef __REQUIRED_RPCNDR_H_VERSION__ #define __REQUIRED_RPCNDR_H_VERSION__ 440 #endif #include "rpc.h" #include "rpcndr.h" #ifndef __RPCNDR_H_VERSION__ #error this stub requires an updated version of <rpcndr.h> #endif // __RPCNDR_H_VERSION__ #ifndef COM_NO_WINDOWS_H #include "windows.h" #include "ole2.h" #endif /*COM_NO_WINDOWS_H*/ #ifndef __LogWriter_h__ #define __LogWriter_h__ #ifndef __cplusplus extern "C" { #endif /* Forward Declarations */ #ifndef __ISMLog_FWD_DEFINED__ #define __ISMLog_FWD_DEFINED__ typedef interface ISMLog ISMLog; #endif /* __ISMLog_FWD_DEFINED__ */ #ifndef __ISMLogEvents_FWD_DEFINED__ #define __ISMLogEvents_FWD_DEFINED__ typedef interface _ISMLogEvents _ISMLogEvents; #endif /* __ISMLogEvents_FWD_DEFINED__ */ #ifndef __SMLog_FWD_DEFINED__ #define __SMLog_FWD_DEFINED__</pre>
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<pre> #ifdef __cplusplus typedef class SMLog SMLog; #else typedef struct SMLog SMLog; #endif /* __cplusplus */ #endif /* __SMLog_FWD_DEFINED__ */ /* header files for imported files */ #include "oaidl.h" #include "ocidl.h" void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t); void __RPC_USER MIDL_user_free(void __RPC_FAR *); #ifdef __ISMLog_INTERFACE_DEFINED__ #define __ISMLog_INTERFACE_DEFINED__ /* interface ISMLog */ /* [unique][helpstring][dual][uuid][object] */ EXTERN_C const IID IID_ISMLog; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("5AC75DAD-1936-11D3-BC2D-00A0C90D2CA5") ISMLog : public IDispatch { public: virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_FileHeader(/* [in] */ BSTR newVal) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE WriteLine(BSTR szMsg) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE WriteField(BSTR szMsg) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_FileName(/* [in] */ BSTR newVal) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_Append(/* [in] */ BOOL newVal) = 0; }; #else /* C style interface */ typedef struct ISMLogVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE) *QueryInterface(ISMLog __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE) *AddRef(ISMLog __RPC_FAR * This); </pre>	<pre> ULONG (STDMETHODCALLTYPE) __RPC_FAR *Release(ISMLog __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE) __RPC_FAR *GetTypeInfoCount(ISMLog __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE) __RPC_FAR *GetTypeInfo(ISMLog __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE) __RPC_FAR *GetIDsOfNames(ISMLog __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE) __RPC_FAR *Invoke(ISMLog __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE) __RPC_FAR *put_FileHeader(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE) __RPC_FAR *WriteLine(ISMLog __RPC_FAR * This, BSTR szMsg); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE) __RPC_FAR *WriteField(ISMLog __RPC_FAR * This, BSTR szMsg); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE) __RPC_FAR *put_FileName(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE) __RPC_FAR *put_Append(ISMLog __RPC_FAR * This, /* [in] */ BOOL newVal); END_INTERFACE } ISMLogVtbl; </pre>
--	--

<pre> interface ISMLog { CONST_VTBL struct ISMLogVtbl __RPC_FAR *lpVtbl; }; #ifdef COBJMACROS #define ISMLog_QueryInterface(This,riid,ppvObject) \ (This->lpVtbl -> QueryInterface(This,riid,ppvObject)) #define ISMLog_AddRef(This) \ (This->lpVtbl -> AddRef(This)) #define ISMLog_Release(This) \ (This->lpVtbl -> Release(This)) #define ISMLog_GetTypeInfoCount(This,pctinfo) \ (This->lpVtbl -> GetTypeInfoCount(This,pctinfo)) #define ISMLog_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This->lpVtbl -> GetTypeInfo(This,iTInfo,lcid,ppTInfo)) #define ISMLog_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDis ispId) \ (This->lpVtbl -> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId)) #define ISMLog_Invoke(This,dispIdMember,riid,lcid,wFlags,pDispPara ms,pVarResult,pExcepInfo,puArgErr) \ (This->lpVtbl -> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR esult,pExcepInfo,puArgErr)) #define ISMLog_put_FileHeader(This,newVal) \ (This->lpVtbl -> put_FileHeader(This,newVal)) #define ISMLog_WriteLine(This,szMsg) \ (This->lpVtbl -> WriteLine(This,szMsg)) #define ISMLog_WriteField(This,szMsg) \ (This->lpVtbl -> WriteField(This,szMsg)) #define ISMLog_put_FileName(This,newVal) \ (This->lpVtbl -> put_FileName(This,newVal)) #define ISMLog_put_Append(This,newVal)\ (This->lpVtbl -> put_Append(This,newVal)) #endif /* COBJMACROS */ #endif /* C style interface */ /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE ISMLog_put_FileHeader_Proxy(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); </pre>	<pre> void __RPC_STUB ISMLog_put_FileHeader_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMLog_WriteLine_Proxy(ISMLog __RPC_FAR * This, BSTR szMsg); void __RPC_STUB ISMLog_WriteLine_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMLog_WriteField_Proxy(ISMLog __RPC_FAR * This, BSTR szMsg); void __RPC_STUB ISMLog_WriteField_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE ISMLog_put_FileName_Proxy(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); void __RPC_STUB ISMLog_put_FileName_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE ISMLog_put_Append_Proxy(ISMLog __RPC_FAR * This, /* [in] */ BOOL newVal); void __RPC_STUB ISMLog_put_Append_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); #endif /* __ISMLog_INTERFACE_DEFINED__ */ #ifdef __LOGWRITERLib_LIBRARY_DEFINED__ #define __LOGWRITERLib_LIBRARY_DEFINED__ EXTERN_C const IID LIBID_LOGWRITERLib; #ifdef __ISMLogEvents_DISPINTERFACE_DEFINED__ #define __ISMLogEvents_DISPINTERFACE_DEFINED__ </pre>
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<pre> EXTERN_C const IID IID __ISMLogEvents; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("5AC75DB1-1936-11D3-BC2D-00A0C90D2CA5") __ISMLogEvents : public IDispatch { }; #else /* C style interface */ typedef struct __ISMLogEventsVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(__ISMLogEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(__ISMLogEvents __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(__ISMLogEvents __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(__ISMLogEvents __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(__ISMLogEvents __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(__ISMLogEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(__ISMLogEvents __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); </pre>	<pre> END_INTERFACE } __ISMLogEventsVtbl; interface __ISMLogEvents { CONST_VTBL struct __ISMLogEventsVtbl __RPC_FAR *lpVtbl; }; #ifdef COBJMACROS #define __ISMLogEvents_QueryInterface(This,riid,ppvObject) \ (This)->lpVtbl -> QueryInterface(This,riid,ppvObject) #define __ISMLogEvents_AddRef(This) \ (This)->lpVtbl -> AddRef(This) #define __ISMLogEvents_Release(This) \ (This)->lpVtbl -> Release(This) #define __ISMLogEvents_GetTypeInfoCount(This,pctinfo) \ (This)->lpVtbl -> GetTypeInfoCount(This,pctinfo) #define __ISMLogEvents_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This)->lpVtbl -> GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define __ISMLogEvents_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId)\ (This)->lpVtbl -> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define __ISMLogEvents_Invoke(This,dispIdMember,riid,lcid,wFlags,pD ispParams,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl -> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR esult,pExcepInfo,puArgErr) #endif /* COBJMACROS */ #endif /* C style interface */ #endif /* __ISMLogEvents_DISPINTERFACE_DEFINED */ EXTERN_C const CLSID CLSID_SMLog; #ifdef __cplusplus class DECLSPEC_UUID("5AC75DB0-1936-11D3-BC2D-00A0C90D2CA5") SMLog; #endif #endif /* __LOGWRITERLib_LIBRARY_DEFINED */ /* Additional Prototypes for ALL interfaces */ </pre>
--	---

```

unsigned long __RPC_USER BSTR_UserSize(unsigned long
__RPC_FAR *, unsigned long , BSTR __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER
BSTR_UserMarshal(unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, BSTR __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER
BSTR_UserUnmarshal(unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, BSTR __RPC_FAR * );
void __RPC_USER BSTR_UserFree( unsigned long
__RPC_FAR *, BSTR __RPC_FAR * );

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
// FILE: LogWriter.cpp
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
// PURPOSE: Implementation of DLL Exports.
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// LogWriter.cpp : Implementation of DLL Exports.

// Note: Proxy/Stub Information
// To build a separate proxy/stub DLL,
// run nmake -f LogWriterps.mk in the project directory.

#include "stdafx.h"
#include "resource.h"
#include <initguid.h>
#include "LogWriter.h"

#include "LogWriter_i.c"
#include "SMLog.h"

CComModule _Module;

BEGIN_OBJECT_MAP(ObjectMap)
OBJECT_ENTRY(CLSID_SMLog, CSMLog)
END_OBJECT_MAP()

////////////////////////////////////
// DLL Entry Point

extern "C"
BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD
dwReason, LPVOID /*IpReserved*/)
{
    if (dwReason == DLL_PROCESS_ATTACH)
    {
        _Module.Init(ObjectMap, hInstance,
&LIBID_LOGWRITERLib);
        DisableThreadLibraryCalls(hInstance);
    }
    else if (dwReason == DLL_PROCESS_DETACH)
        _Module.Term();
    return TRUE; // ok
}

////////////////////////////////////
// Used to determine whether the DLL can be unloaded by OLE

STDAPI DllCanUnloadNow(void)
{
    return (_Module.GetLockCount()==0) ? S_OK : S_FALSE;
}

////////////////////////////////////
// Returns a class factory to create an object of the requested type

STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid,
LPVOID* ppv)
{
    return _Module.GetClassObject(rclsid, riid, ppv);
}

////////////////////////////////////
// DllRegisterServer - Adds entries to the system registry

STDAPI DllRegisterServer(void)
{
    // registers object, typelib and all interfaces in typelib
    return _Module.RegisterServer(TRUE);
}

////////////////////////////////////
// DllUnregisterServer - Removes entries from the system
registry

STDAPI DllUnregisterServer(void)
{
    return _Module.UnregisterServer(TRUE);
}

/* this ALWAYS GENERATED file contains the definitions for
the interfaces */

/* File created by MIDL compiler version 5.01.0164 */
/* at Thu Sep 19 17:49:50 2002
*/
/*
*/
/* Compiler settings for
C:\charles\Stepmaster\LogWriter\LogWriter.idl:
Oicf (OptLev=i2), W1, Zp8, env=Win32, ms_ext, c_ext
error checks: allocation ref bounds_check enum stub_data
*/
//@@@MIDL_FILE_HEADING( )

/* verify that the <rpcndr.h> version is high enough to compile
this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
#include "rpcndr.h"

#ifndef __RPCNDR_H_VERSION__
#error this stub requires an updated version of <rpcndr.h>
#endif // __RPCNDR_H_VERSION__
#ifndef COM_NO_WINDOWS_H
#include "windows.h"
#include "ole2.h"
#endif /*COM_NO_WINDOWS_H*/

```

<pre> #ifndef __LogWriter_h__ #define __LogWriter_h__ #ifdef __cplusplus extern "C"{ #endif /* Forward Declarations */ #ifndef __ISMLog_FWD_DEFINED__ #define __ISMLog_FWD_DEFINED__ typedef interface ISMLog ISMLog; #endif /* __ISMLog_FWD_DEFINED__ */ #ifndef __ISMLogEvents_FWD_DEFINED__ #define __ISMLogEvents_FWD_DEFINED__ typedef interface _ISMLogEvents _ISMLogEvents; #endif /* __ISMLogEvents_FWD_DEFINED__ */ #ifndef __SMLog_FWD_DEFINED__ #define __SMLog_FWD_DEFINED__ #ifdef __cplusplus typedef class SMLog SMLog; #else typedef struct SMLog SMLog; #endif /* __cplusplus */ #endif /* __SMLog_FWD_DEFINED__ */ /* header files for imported files */ #include "oaidl.h" #include "ocidl.h" void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t); void __RPC_USER MIDL_user_free(void __RPC_FAR *); #ifndef __ISMLog_INTERFACE_DEFINED__ #define __ISMLog_INTERFACE_DEFINED__ /* interface ISMLog */ /* [unique][helpstring][dual][uuid][object] */ EXTERN_C const IID IID_ISMLog; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("5AC75DAD-1936-11D3-BC2D-00A0C90D2CA5") ISMLog : public IDispatch { public: virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_FileHeader(/* [in] */ BSTR newVal) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE WriteLine(BSTR szMsg) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE WriteField(BSTR szMsg) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_FileName(/* [in] */ BSTR newVal) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_Append(/* [in] */ BOOL newVal) = 0; }; #else /* C style interface */ </pre>	<pre> typedef struct ISMLogVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(ISMLog __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(ISMLog __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(ISMLog __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(ISMLog __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(ISMLog __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(ISMLog __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(ISMLog __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *put_FileHeader)(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *WriteLine)(ISMLog __RPC_FAR * This, BSTR szMsg); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *WriteField)(ISMLog __RPC_FAR * This, BSTR szMsg); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *put_FileName)(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *put_Append)(ISMLog __RPC_FAR * This, /* [in] */ BOOL newVal); END_INTERFACE } ISMLogVtbl; </pre>
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<pre> interface ISMLog { CONST_VTBL struct ISMLogVtbl __RPC_FAR *lpVtbl; }; #ifdef COBJMACROS #define ISMLog_QueryInterface(This,riid,ppvObject) \ (This)->lpVtbl->QueryInterface(This,riid,ppvObject) #define ISMLog_AddRef(This) \ (This)->lpVtbl->AddRef(This) #define ISMLog_Release(This) \ (This)->lpVtbl->Release(This) #define ISMLog_GetTypeInfoCount(This,pctinfo) \ (This)->lpVtbl->GetTypeInfoCount(This,pctinfo) #define ISMLog_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This)->lpVtbl->GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define ISMLog_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDis ispId) \ (This)->lpVtbl-> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define ISMLog_Invoke(This,dispIdMember,riid,lcid,wFlags,pDispPara ms,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl-> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR esult,pExcepInfo,puArgErr) #define ISMLog_put_FileHeader(This,newVal) \ (This)->lpVtbl->put_FileHeader(This,newVal) #define ISMLog_WriteLine(This,szMsg) \ (This)->lpVtbl->WriteLine(This,szMsg) #define ISMLog_WriteField(This,szMsg) \ (This)->lpVtbl->WriteField(This,szMsg) #define ISMLog_put_FileName(This,newVal) \ (This)->lpVtbl->put_FileName(This,newVal) #define ISMLog_put_Append(This,newVal)\ (This)->lpVtbl->put_Append(This,newVal) #endif /* COBJMACROS */ #endif /* C style interface */ /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE ISMLog_put_FileHeader_Proxy(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); </pre>	<pre> void __RPC_STUB ISMLog_put_FileHeader_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMLog_WriteLine_Proxy(ISMLog __RPC_FAR * This, BSTR szMsg); void __RPC_STUB ISMLog_WriteLine_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMLog_WriteField_Proxy(ISMLog __RPC_FAR * This, BSTR szMsg); void __RPC_STUB ISMLog_WriteField_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE ISMLog_put_FileName_Proxy(ISMLog __RPC_FAR * This, /* [in] */ BSTR newVal); void __RPC_STUB ISMLog_put_FileName_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE ISMLog_put_Append_Proxy(ISMLog __RPC_FAR * This, /* [in] */ BOOL newVal); void __RPC_STUB ISMLog_put_Append_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); #endif /* __ISMLog_INTERFACE_DEFINED__ */ #ifdef __LOGWRITERLib_LIBRARY_DEFINED__ #define __LOGWRITERLib_LIBRARY_DEFINED__ </pre>
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<pre> /* library LOGWRITERLib */ /* [helpstring][version][uuid] */ EXTERN_C const IID LIBID_LOGWRITERLib; #ifdef __ISMLogEvents_DISPINTERFACE_DEFINED__ #define __ISMLogEvents_DISPINTERFACE_DEFINED__ /* dispinterface _ISMLogEvents */ /* [helpstring][uuid] */ EXTERN_C const IID DIID__ISMLogEvents; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("5AC75DB1-1936-11D3-BC2D-00A0C90D2CA5") _ISMLogEvents : public IDispatch { }; #else /* C style interface */ typedef struct _ISMLogEventsVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(_ISMLogEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(_ISMLogEvents __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(_ISMLogEvents __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(_ISMLogEvents __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *TypeInfo)(_ISMLogEvents __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(_ISMLogEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); </pre>	<pre> /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(_ISMLogEvents __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); END_INTERFACE } _ISMLogEventsVtbl; interface _ISMLogEvents { CONST_VTBL struct _ISMLogEventsVtbl __RPC_FAR *lpVtbl; }; #ifdef COBJMACROS #define _ISMLogEvents_QueryInterface(This,riid,ppvObject) \ (This)->lpVtbl->QueryInterface(This,riid,ppvObject) #define _ISMLogEvents_AddRef(This) \ (This)->lpVtbl->AddRef(This) #define _ISMLogEvents_Release(This) \ (This)->lpVtbl->Release(This) #define _ISMLogEvents_GetTypeInfoCount(This,pctinfo) \ (This)->lpVtbl->GetTypeInfoCount(This,pctinfo) #define _ISMLogEvents_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This)->lpVtbl->GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define _ISMLogEvents_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) \ (This)->lpVtbl->GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define _ISMLogEvents_Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl->Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarResult,pExcepInfo,puArgErr) #endif /* COBJMACROS */ #endif /* C style interface */ #endif /* __ISMLogEvents_DISPINTERFACE_DEFINED__ */ </pre>
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```

EXTERN_C const CLSID CLSID_SMLog;

#ifdef __cplusplus
class DECLSPEC_UUID("5AC75DB0-1936-11D3-BC2D-00A0C90D2CA5")
SMLog;
#endif
#endif /* __LOGWRITERLib_LIBRARY_DEFINED */

unsigned long __RPC_USER BSTR_UserSize(unsigned long
__RPC_FAR *,
unsigned long , BSTR __RPC_FAR *);
unsigned char __RPC_FAR * __RPC_USER
BSTR_UserMarshal( unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, BSTR __RPC_FAR *);
unsigned char __RPC_FAR * __RPC_USER
BSTR_UserUnmarshal(unsigned long __RPC_FAR *,
unsigned char __RPC_FAR *, BSTR __RPC_FAR *);
void __RPC_USER BSTR_UserFree( unsigned long
__RPC_FAR *, BSTR __RPC_FAR *);

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif
#endif
// FILE: LogWriter.cpp
/// FILE: LogWriterCP.h
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
// PURPOSE: Connection point implementation
// Contact: Reshma Tharamal (reshmat@microsoft.com)
#ifndef _LOGWRITERCP_H_
#define _LOGWRITERCP_H_

template <class T>
class CProxy_ISMLogEvents : public IConnectionPointImpl<T,
&DIID_ISMLogEvents, CComDynamicUnkArray>
{
    //Warning this class may be recreated by the wizard.
public:
};
#endif
// FILE: resource.h
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
// PURPOSE: Resource file
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by LogWriter.rc
//
#define IDS_PROJNAME 100
#define IDR_SMLOG 101
// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE 201
#define _APS_NEXT_COMMAND_VALUE 32768
#define _APS_NEXT_CONTROL_VALUE 201
#define _APS_NEXT_SYMED_VALUE 102
#endif
#endif

```

```

// FILE: SMLog.cpp
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
// PURPOSE: Implementation of CSMLog
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// SMLog.cpp : Implementation of CSMLog
#include "stdafx.h"
#include <stdio.h>
#include "LogWriter.h"
#include "SMLog.h"

////////////////////////////////////
// CSMLog

STDMETHODIMP
CSMLog::InterfaceSupportsErrorInfo(REFIID riid)
{
    static const IID* arr[] =
    {
        &IID_ISMLog
    };
    for (int i=0; i < sizeof(arr) / sizeof(arr[0]); i++)
    {
        if (InlineIsEqualGUID(*arr[i],riid))
            return S_OK;
    }
    return S_FALSE;
}

STDMETHODIMP CSMLog::WriteToFile(BSTR szMsg)
{
    // Writes the passed in string to the file
    _bstr_t szTempMsg(szMsg);
    return(Write((PBYTE)(LPSTR)szTempMsg,
SysStringLen(szMsg)));
}

HRESULT CSMLog::Init()
{
    char szDrive[256];
    char szDir[256];
    char szLogDir[256];
    HANDLE hLogThread;
    DWORD dwThreadID;
    _bstr_t szFile(m_szFile);
    DWORD IDisposition;

    //create transaction log directory
    _splitpath((LPCTSTR)szFile, szDrive, szDir, NULL, NULL);
    _makepath(szLogDir, szDrive, szDir, NULL, NULL);
    CreateDirectory(szLogDir, NULL);
    iBufferSize = WRITE_BUFFER_SIZE;
    iBytesFreeInBuffer = iBufferSize;

    // use VirtualAlloc to get page aligned buffers //
    for (int i=0;i<MAX_NUM_BUFFERS;i++)
    {
        // use VirtualAlloc to get page aligned buffers //
        pBuffer[i] = (BYTE *)VirtualAlloc(NULL, iBufferSize,
MEM_COMMIT, PAGE_READWRITE );
        if (pBuffer[i] == NULL)
            return RaiseSystemError();
    }
}

```

<pre> iActiveBuffer = 0; pCurrent = pBuffer[iActiveBuffer]; IDisposition = m_bAppend ? OPEN_ALWAYS : CREATE_ALWAYS; m_hTxnFile = CreateFile(LPCTSTR)szFile, GENERIC_WRITE, FILE_SHARE_READ, NULL, IDisposition, FILE_ATTRIBUTE_NORMAL, NULL); if (m_hTxnFile == INVALID_HANDLE_VALUE) return (RaiseSystemError()); if (m_bAppend) if (SetFilePointer(m_hTxnFile, 0, NULL, FILE_END) == ERR_SET_FILE_POINTER) return (RaiseSystemError()); hIoComplete = CreateEvent(NULL, TRUE, TRUE, NULL); if (hIoComplete == NULL) return RaiseSystemError(); hLogFileIo = CreateEvent(NULL, FALSE, FALSE, NULL); if (hLogFileIo == NULL) return RaiseSystemError(); hLogThread = CreateThread(NULL, 0, (LPTHREAD_START_ROUTINE)LogFileIO, this, 0, &dwThreadId); if (hLogThread == NULL) return RaiseSystemError(); if (m_szHeader != NULL) WriteLine(m_szHeader); return S_OK; } void CSMLog::LogFileIO(void *ptr) { unsigned long BytesWritten; CSMLog *p=(CSMLog *)ptr; while(TRUE) { WaitForSingleObject(p->hLogFileIo, INFINITE); if (p->m_hTxnFile == INVALID_HANDLE_VALUE) break; // do synchronous (blocking) write to log file if (!WriteFile(p->m_hTxnFile, p->pBuffer[p->iIoBuffer],p- >iWriteSize,&BytesWritten,NULL)) { // set error code in this thread, but don't throw an exception // because no one will catch it. p->dwError = GetLastError(); } SetEvent(p->hIoComplete); } SetEvent(p->hIoComplete); } </pre>	<pre> HRESULT CSMLog::Write(BYTE *ptr, DWORD iSize) { int StartPos, Remainder; int dwErrorLocal = 0; if (!m_bInitialized) { HRESULT hr = Init(); m_bInitialized = TRUE; if (FAILED(hr)) return hr; } if (m_hTxnFile == INVALID_HANDLE_VALUE) return S_OK; if (iBytesFreeInBuffer >= iSize) { memcpy(pCurrent, ptr, iSize); pCurrent += iSize; iBytesFreeInBuffer -= iSize; } else { // We don't expect to ever have to wait here, but just in case... WaitForSingleObject(hIoComplete, INFINITE); // check for an error from the log writer thread if (dwError != 0) { SetLastError(dwError); return RaiseSystemError(); } assert(iSize <= iBufferSize); memcpy(pCurrent, ptr, iBytesFreeInBuffer); StartPos = iBytesFreeInBuffer; Remainder = iSize - iBytesFreeInBuffer; // trigger an IO on the current buffer and roll to the next buffer iIoBuffer = iActiveBuffer; iWriteSize = iBufferSize; ResetEvent(hIoComplete); SetEvent(hLogFileIo); // wake up IO writer iActiveBuffer = (iActiveBuffer+1) % MAX_NUM_BUFFERS; pCurrent = pBuffer[iActiveBuffer]; memcpy(pCurrent, ((BYTE *)ptr+StartPos), Remainder); pCurrent += Remainder; iBytesFreeInBuffer = iBufferSize - Remainder; } return S_OK; } </pre>
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<pre> void CSMLog::CloseLogFile(void) { if (m_hTxnFile != INVALID_HANDLE_VALUE) { if (iBytesFreeInBuffer < iBufferSize) { WaitForSingleObject(hIoComplete, INFINITE); ResetEvent(hIoComplete); // check for an error from the log writer thread if (dwError != 0) { SetLastError(dwError); goto exit_SpinLock; } //zero fill remainder of buffer ZeroMemory(pCurrent, iBytesFreeInBuffer); iIoBuffer = iActiveBuffer; iWriteSize = iBufferSize - iBytesFreeInBuffer; SetEvent(hLogFileIo); // wake up IO writer } WaitForSingleObject(hIoComplete, INFINITE); // check for an error from the log writer thread if (dwError != 0) goto exit_SpinLock; pCurrent = pBuffer[iActiveBuffer]; ZeroMemory(pCurrent, iBufferSize); iIoBuffer = iActiveBuffer; CloseHandle(m_hTxnFile); m_hTxnFile = INVALID_HANDLE_VALUE; //handle to open transaction log file // wake up IO writer one more time for it to terminate ResetEvent(hIoComplete); SetEvent(hLogFileIo); // wake up IO writer WaitForSingleObject(hIoComplete, INFINITE); } exit_SpinLock: if (dwError != 0) { if (m_hTxnFile != INVALID_HANDLE_VALUE) { CloseHandle(m_hTxnFile); m_hTxnFile = INVALID_HANDLE_VALUE; } SetLastError(dwError); // TODO: Don't know yet what to do with an error on the file close, since this function is called by the destructor (which does not return a value) //throw new CSystemErr(CSystemErr::eWriteFile, "CTxnLog::CloseTransactionLogFile"); } } </pre>	<pre> // Wrapper function that raises an error if a Windows Api fails STDMETHODIMP CSMLog::RaiseSystemError(void) { char s[ERR_BUFFER_SIZE]; long c; DWORD e; e = GetLastError(); c = sprintf(s, "Error code: %ld. ", e); c = FormatMessage(FORMAT_MESSAGE_FROM_SYSTEM FORMAT_MESSAGE_IGNORE_INSERTS, NULL, e, 0, s + c, sizeof(s) - c, NULL); return Error(s, 0, NULL, GUID_NULL); } //DEL STDMETHODIMP CSMLog::get_FileName(BSTR *pVal) //DEL { //DEL *pVal = m_szFile; //DEL return S_OK; //DEL } STDMETHODIMP CSMLog::put_FileName(BSTR newVal) { m_szFile = SysAllocString(newVal); return S_OK; } //DEL STDMETHODIMP CSMLog::get_FileHeader(BSTR *pVal) //DEL { //DEL *pVal = m_szHeader; //DEL return S_OK; //DEL } STDMETHODIMP CSMLog::put_FileHeader(BSTR newVal) { m_szHeader = SysAllocString(newVal); return S_OK; } STDMETHODIMP CSMLog::WriteLine(BSTR szMsg) { _bstr_t szTmp(szMsg); szTmp += "\r"; szTmp += "\n"; return(WriteToFile(szTmp)); } STDMETHODIMP CSMLog::WriteField(BSTR szMsg) { return(WriteToFile(szMsg)); } //DEL STDMETHODIMP CSMLog::get_Append(BOOL *pVal) //DEL { //DEL *pVal = m_bAppend; //DEL return S_OK; //DEL } </pre>
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<pre> STDMETHODIMP CSMLog::put_Append(BOOL newVal) { m_bAppend = newVal; return S_OK; } // FILE: SMEExecute.h // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // PURPOSE: Declaration of the CSMLog // Contact: Reshma Tharamal (reshmat@microsoft.com) // // SMLog.h : Declaration of the CSMLog #ifndef __SMLOG_H_ #define __SMLOG_H_ #include "resource.h" // main symbols #include "assert.h" #include "comdef.h" #include "LogWriterCP.h" #define WRITE_BUFFER_SIZE 8*1024 #define MAX_NUM_BUFFERS 2 #define ERR_BUFFER_SIZE 512 #define ERR_SET_FILE_POINTER 0xFFFFFFFF //////////////////////////////////// // CSMLog class ATL_NO_VTABLE CSMLog : public CComObjectRootEx<CComSingleThreadModel>, public CComCoClass<CSMLog, &CLSID_SMLog>, public ISupportErrorInfo, public IConnectionPointContainerImpl<CSMLog>, public IDispatchImpl<ISMLog, &IID_ISMLog, &LIBID_LOGWRITERLib>, public CProxy_ISMLogEvents< CSMLog > { public: CSMLog() { m_bAppend = FALSE; m_bInitialized = FALSE; m_hTxnFile = INVALID_HANDLE_VALUE; hIoComplete = NULL; hLogFileIo = NULL; for (int i=0;i<MAX_NUM_BUFFERS;i++) pBuffer[i] = NULL; pCurrent = NULL; m_szFile = NULL; m_szHeader = NULL; dwError = 0; } private: BOOL m_bAppend; BOOL m_bInitialized; HANDLE m_hTxnFile; //handle to log file HANDLE hIoComplete; //event to signify that there are no pending IOs HANDLE hLogFileIo; //event to signal the IO thread to write the inactive buffer BYTE *pBuffer[MAX_NUM_BUFFERS]; BYTE *pCurrent; //ptr to current buffer int iActiveBuffer; //indicates which buffer is active: 0 or 1 int iIoBuffer; //buffer for any pending IO operation DWORD dwError; DWORD iBufferSize; //buffer allocated size </pre>	<pre> DWORD iBytesFreeInBuffer; // bytes available for use in buffer DWORD iWriteSize; //bytes to write to file BSTR m_szFile; //name of the file to write to BSTR m_szHeader; //header to be printed to the file (optional) private: static void LogFileIO(void *p); HRESULT Write(BYTE *ptr, DWORD iSize); STDMETHODIMP WriteToFile(BSTR szMsg); void CloseLogFile(void); STDMETHODIMP RaiseSystemError(void); }; #endif // __SMLOG_H_ // FILE: stdafx.cpp // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // PURPOSE: source file that includes just the standard // includes // Contact: Reshma Tharamal (reshmat@microsoft.com) // stdafx.cpp : source file that includes just the standard includes // stdafx.pch will be the pre-compiled header // stdafx.obj will contain the pre-compiled type information #include "stdafx.h" #ifdef _ATL_STATIC_REGISTRY #include <statreg.h> #include <statreg.cpp> #endif #include <atlimpl.cpp> // FILE: stdafx.h // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // PURPOSE: include file for standard system include files, // or project specific include files that are used frequently, // but are changed infrequently // Contact: Reshma Tharamal (reshmat@microsoft.com) // // if // !defined(AFX_STDAFX_H_5AC75DA4_1936_11D3_BC2D_ // 00A0C90D2CA5_INCLUDED_) // #define // AFX_STDAFX_H_5AC75DA4_1936_11D3_BC2D_00A0C90 // D2CA5_INCLUDED_ // // if _MSC_VER > 1000 // #pragma once // #endif // _MSC_VER > 1000 // // #define STRICT // #ifndef _WIN32_WINNT // #define _WIN32_WINNT 0x0400 // #endif // #define _ATL_APARTMENT_THREADED // // #include <atbase.h> // //You may derive a class from CComModule and use it if you // //want to override something, but do not change the name of // // _Module extern CComModule _Module; // #include <atlcom.h> // //{{AFX_INSERT_LOCATION}} // // Microsoft Visual C++ will insert additional declarations // immediately before the previous line. // #endif // // #defined(AFX_STDAFX_H_5AC75DA4_1936_11D3_BC2D_ // 00A0C90D2CA5_INCLUDED_) </pre>
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<pre> // FILE: Execute.cpp // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // PURPOSE: Implementation of CExecute. // Contact: Reshma Tharamal (reshmat@microsoft.com) // #include "stdafx.h" #include "ExecuteDll.h" #include "SMExecute.h" #include "Execute.h" extern SQLHENV henv; extern SM_Connection_Info *p_Connections; // Pointer to open connections extern int iConnectionCount; // Number of open connections extern CRITICAL_SECTION hConnections; // Critical section to serialize // access to available connections #ifdef TPCH_AUDIT extern FILE *pLogFile; // Log file containing timestamps extern CRITICAL_SECTION hLogFileWrite; // Handle to critical section #endif //////////////////////////////////// // CExecute char * g_szOdbcOps[] = { "SQLAllocHandle", "SQLDriverConnect", "SQLExecDirect", "SQLSetStmtAttr", "SQLCancel", "SQLNumResultCols", "SQLDescribeCol", "SQLColAttribute", "SQLFetch", "SQLGetData", "SQLRowCount", "SQLMoreResults", "SQLBindCol" }; char * CExecError::m_szExecErrorDesc[] = { "Connection is already in use." }; STDMETHODIMP CEXecute::InterfaceSupportsErrorInfo(REFIID riid) { static const IID* arr[] = { &IID_IExecute }; for (int i=0; i < sizeof(arr) / sizeof(arr[0]); i++) { if (InlineIsEqualGUID(*arr[i],riid)) return S_OK; } return S_FALSE; } </pre>	<pre> STDMETHODIMP CExecute::put_OutputFile(BSTR newVal) { assert(m_pOutputFile); m_OutputFile = newVal; HRESULT hr = m_pOutputFile->put_FileName(newVal); if FAILED(hr) { m_pOutputFile->Release(); m_pOutputFile = NULL; } return hr; } //DEL STDMETHODIMP CExecute::put_LogFile(BSTR newVal) //DEL { //DEL assert(m_pLogFile); //DEL //DEL m_pLogFile->put_FileName(newVal); //DEL return S_OK; //DEL } STDMETHODIMP CExecute::put_ErrorFile(BSTR newVal) { assert(m_pErrorFile); m_ErrorFile = newVal; HRESULT hr = m_pErrorFile->put_FileName(newVal); if FAILED(hr) { m_pErrorFile->Release(); m_pErrorFile = NULL; } return hr; } STDMETHODIMP CExecute::DoExecute(BSTR szCommand, BSTR szExecutionDtls, ExecutionType ExecMethod, \ BOOL bNoCount, BOOL bNoExecute, BOOL bParseOnly, \ BOOL bQuotedIds, \ BOOL bAnsiNulls, BOOL bShowQP, BOOL bStatsTime, BOOL bStatsIO, \ long IRowCount, long IQueryTmout, BSTR szConnection) { HANDLE hThrd; DWORD tid; _CrtSetReportFile(_CRT_WARN, _CRTDBG_FILE_STDOUT); m_szCommand = szCommand; m_szExecDtls = szExecutionDtls; m_ExecMthd = ExecMethod; if (m_ExecMthd == execODBC) { m_bNoCount = bNoCount; m_bNoExecute = bNoExecute; m_bParseOnly = bParseOnly; m_bQuotedIds = bQuotedIds; m_bAnsiNulls = bAnsiNulls; m_bShowQP = bShowQP; m_bStatsTime = bStatsTime; m_bStatsIO = bStatsIO; m_IRowCount = IRowCount; m_IQueryTmout = IQueryTmout; m_szConnection = szConnection; } } </pre>
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<pre> if((hThrd = CreateThread(0, 0, (LPTHREAD_START_ROUTINE)ExecutionThread, this, 0, &tid)) == NULL) return(RaiseSystemError()); CloseHandle(hThrd); return S_OK; } STDMETHODIMP CExecute::Abort() { if (m_ExecMthd == execShell) return(AbortShell()); else return(AbortODBC()); } void ExecutionThread(LPVOID lpParameter) { CExecute *MyExecute = (CExecute*)lpParameter; MyExecute->m_tElapsedTime = 0; GetLocalTime(&MyExecute->m_tStartTime); MyExecute->PostMessage(WM_TASK_START, 0, 0); #ifdef _TPCH_AUDIT char szBuffer[MAXLOGCMDBUF]; char szFmt[MAXBUFLLEN]; sprintf(szFmt, "Start Step: '%%.%ds' at '%d/%d/%d %d:%d:%d:%d'\n", MAXLOGCMDLEN, MyExecute->m_tStartTime.wMonth, MyExecute- >m_tStartTime.wDay, MyExecute->m_tStartTime.wYear, MyExecute- >m_tStartTime.wHour, MyExecute->m_tStartTime.wMinute, MyExecute- >m_tStartTime.wSecond, MyExecute->m_tStartTime.wMilliseconds); if (MyExecute->m_ExecMthd == execShell) WriteFileToTpchLog((LPSTR)MyExecute- >m_szCommand, szFmt); else { sprintf(szBuffer, szFmt, (LPSTR)MyExecute->m_szCommand); WriteToTpchLog(szBuffer); } #endif // Initialize the run status for the step to running. The completion status for // the step will be initialized by the Shell and ODBC execution functions. MyExecute->m_StepStatus = gintRunning; if (MyExecute->m_ExecMthd == execShell) MyExecute->m_tElapsedTime = MyExecute->ExecuteShell(); else MyExecute->m_tElapsedTime = MyExecute->ExecuteODBC(); // Close the output, log and error files if (MyExecute->m_pOutputFile) MyExecute->m_pOutputFile->Release(); MyExecute->m_pOutputFile = NULL; MyExecute->m_ExecTime = NULL; GetLocalTime(&MyExecute->m_tEndTime); </pre>	<pre> #ifdef _TPCH_AUDIT sprintf(szFmt, "Complete Step: '%%.%ds' at '%d/%d/%d %d:%d:%d:%d'\n", MAXLOGCMDLEN, MyExecute->m_tEndTime.wMonth, MyExecute- >m_tEndTime.wDay, MyExecute->m_tEndTime.wYear, MyExecute- >m_tEndTime.wHour, MyExecute->m_tEndTime.wMinute, MyExecute- >m_tEndTime.wSecond, MyExecute->m_tEndTime.wMilliseconds); if (MyExecute->m_ExecMthd == execShell) WriteFileToTpchLog((LPSTR)MyExecute- >m_szCommand, szFmt); else { sprintf(szBuffer, szFmt, (LPSTR)MyExecute- >m_szCommand); WriteToTpchLog(szBuffer); } #endif MyExecute->PostMessage(WM_TASK_FINISH, 0, 0); return; } #ifdef _TPCH_AUDIT void WriteFileToTpchLog(LPSTR szFile, LPSTR szFmt) { // Reads a maximum of MAXLOGCMDBUF characters from the command file and writes it to the log FILE *fpCmd; int iRead; char szBuf[MAXLOGCMDBUF]; char szCmd[MAXLOGCMDLEN]; if (pfLogFile != NULL) { if ((fpCmd = fopen(szFile, FILE_ACCESS_READ)) != NULL) { iRead = fread(szCmd, sizeof(char), sizeof(szCmd) / sizeof(char), fpCmd); if (iRead < MAXLOGCMDLEN) szCmd[iRead] = '\0'; else szCmd[MAXLOGCMDLEN - 1] = '\0'; sprintf(szBuf, szFmt, szCmd); WriteToTpchLog(szBuf); fclose(fpCmd); } } } void WriteToTpchLog(char *szMsg) { if (pfLogFile != NULL) { EnterCriticalSection(&hLogFileWrite); fprintf(pfLogFile, szMsg); LeaveCriticalSection(&hLogFileWrite); } return; } #endif </pre>
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<pre> TC_TIME CExecute::ExecuteShell() { STARTUPINFO Start; PROCESS_INFORMATION proc; DWORD exitCode; TC_TIME tElapsed = 0; _bstr_t szCommand("cmd /c "); LPSTR szStartDir; CURRENCY Elapsed; szCommand += m_szCommand; // Redirect output and error information szCommand += " > " + m_OutputFile + " 2> " + m_ErrorFile; // Initialize the STARTUPINFO structure: memset(&Start, 0, sizeof(STARTUPINFO)); Start.cb = sizeof(Start); Start.dwFlags = STARTF_USESHOWWINDOW; Start.wShowWindow = SW_SHOWMINNOACTIVE; memset(&proc, 0, sizeof(PROCESS_INFORMATION)); szStartDir = strcmp((LPCTSTR)m_szExecDtls, "") == 0 ? NULL : (LPSTR)m_szExecDtls; m_ExecTime->Start(); // Start the shelled application: if (!CreateProcessA(NULL, (LPSTR)szCommand, NULL, NULL, FALSE, NORMAL_PRIORITY_CLASS, NULL, szStartDir, &Start, &proc)) { m_StepStatus = gintFailed; LogSystemError(m_pErrorFile); m_ExecTime->Stop(&Elapsed); return((TC_TIME)Elapsed.int64); } m_hHandle = proc.hProcess; // Give the process time to execute and finish WaitForSingleObject(m_hHandle, INFINITE); m_ExecTime->Stop(&Elapsed); if (!GetExitCodeProcess(m_hHandle, &exitCode)) { m_StepStatus = gintFailed; LogSystemError(m_pErrorFile); } else m_StepStatus = gintComplete; // Close all open handles to the shelled process CloseHandle(m_hHandle); return((TC_TIME)Elapsed.int64); } </pre>	<pre> STDMETHODIMP CExecute::AbortShell() { if (m_hHandle != SQL_NULL_HSTMT) if (!TerminateProcess(m_hHandle, 0)) return(RaiseSystemError()); return(S_OK); } TC_TIME CExecute::ExecuteODBC() { TC_TIME tElapsed = 0; HDBC m_hdbc; SQLRETURN rc; LPSTR szCmd; CURRENCY Elapsed; BOOL bDoConnect = FALSE; // ODBC specific initialization m_hdbc = SQL_NULL_HDBC; try { // Allocate a new connection if we are creating a dynamic connection or if // the named connection doesn't exist InitializeConnection(&m_hdbc, &bDoConnect); // Ensure that the connection is valid. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDriverConnect.\n"); #endif if (bDoConnect) { // Allocate connection handle, open a connection and set connection attributes. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDriverConnect.\n"); #endif if (m_bAbort) return(tElapsed); // Connect to the server using the passed in connection string rc = SQLDriverConnect(m_hdbc, NULL, (unsigned char *) (LPSTR)m_szExecDtls, SQL_NTS, NULL, 0, NULL, SQL_DRIVER_NOPROMPT); HandleODBCError(rc, SQL_HANDLE_DBC, m_hdbc, SMSQLDriverConnect); } ReConnectDeadConnection(&m_hdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLAllocHandle for hdbc.\n"); #endif } } </pre>
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<pre> if (!m_bAbort && (rc = SQLAllocHandle(SQL_HANDLE_STMT, m_hdbc, &m_hHandle)) != SQL_SUCCESS) HandleODBCError(rc, SQL_HANDLE_DBC, m_hdbc, SMSQLAllocHandle); // Set connection attributes if any have been modified from the default values if (m_IRowCount > 0) { char szConnOptions[512]; sprintf(szConnOptions, "SET ROWCOUNT %d ", m_IRowCount); SetConnectionOption(szConnOptions, &m_hdbc); } if (m_bQuotedIds) SetConnectionOption("SET QUOTED_IDENTIFIER ON ", &m_hdbc); if (!m_bAnsiNulls) SetConnectionOption("SET ANSI_NULL_DFLT_OFF ON ", &m_hdbc); if (!m_bAbort && m_IQueryTmout > 0) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLSetStmtAttr.\n"); #endif // Set the query timeout on the statement handle rc = SQLSetStmtAttr(m_hHandle, SQL_ATTR_QUERY_TIMEOUT, &m_IQueryTmout, SQL_IS_UIINTEGER); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLSetStmtAttr); } if (m_bNoExecute) SetConnectionOption("SET NOEXEC ON ", &m_hdbc); else if (m_bParseOnly) SetConnectionOption("SET PARSEONLY ON ", &m_hdbc); else if (m_bShowQP) // Important to ensure that this is the last connection attributes being set - otherwise showplans are generated for all remaining SET statements SetConnectionOption("SET SHOWPLAN_TEXT ON ", &m_hdbc); else { if (m_bNoCount) SetConnectionOption("SET NOCOUNT ON ", &m_hdbc); if (m_bStatsIO) SetConnectionOption("SET STATISTICS IO ON ", &m_hdbc); // Important to ensure that this is the last connection attributes being set - // otherwise timing statistics are generated for all remaining SET statements if (m_bStatsTime) SetConnectionOption("SET STATISTICS TIME ON ", &m_hdbc); } m_szCmd = (LPSTR)m_szCommand; m_ExecTime->Start(); while ((szCmd = NextCmdInBatch((LPSTR)m_szCommand)) != NULL && !m_bAbort) { </pre>	<pre> #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLExecDirect.\n"); #endif // Execute the ODBC command rc = SQLExecDirect(m_hHandle, (unsigned char *)szCmd, SQL_NTS); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLExecDirect); free(szCmd); // Call a procedure to log the results to the output file ProcessResultsets(); } m_ExecTime->Stop(&Elapsed); ResetConnectionProperties(&m_hdbc); } catch(COdbcError *pErr) { m_StepStatus = gintFailed; delete pErr; } catch(CExecError *pErr) { m_StepStatus = gintFailed; pErr->LogErrors(this); delete pErr; } ODBCCleanup(&m_hdbc, &m_hHandle); if (m_StepStatus != gintFailed) m_StepStatus = gintComplete; return((DWORD)Elapsed.int64); } void CExecute::InitializeConnection(HDBC *phdbc, BOOL *pbDoConnect) { SQLRETURN rc; *pbDoConnect = TRUE; if (IsDynamicConnection()) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLAllocHandle for m_hdbc.\n"); #endif rc = SQLAllocHandle(SQL_HANDLE_DBC, henv, phdbc); HandleODBCError(rc, SQL_HANDLE_ENV, henv, SMSQLAllocHandle); return; } } </pre>
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<pre> EnterCriticalSection(&hConnections); // Returns the connection handle if the connection, m_szConnection, exists for (m_iConnectionIndex = iConnectionCount - 1; m_iConnectionIndex >= 0; m_iConnectionIndex--) { if (!strcmp((p_Connections + m_iConnectionIndex)- >szConnectionName, (LPSTR)m_szConnection)) { if (!(p_Connections + m_iConnectionIndex)- >bInUse) { *phdbc = (p_Connections + m_iConnectionIndex)->hdbc; (p_Connections + m_iConnectionIndex)- >bInUse = TRUE; *pbDoConnect = FALSE; break; } else { LeaveCriticalSection(&hConnections); throw new CExecError(CExecError::SM_ERR_CONN_IN_USE); } } if (m_iConnectionIndex < 0) { // Connection was not found. Allocate connection handle and add it to list of // available connections. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLAllocHandle for m_hdbc.\n"); #endif rc = SQLAllocHandle(SQL_HANDLE_DBC, henv, phdbc); HandleODBCError(rc, SQL_HANDLE_ENV, henv, SMSQLAllocHandle); m_iConnectionIndex = iConnectionCount++; p_Connections = (SM_Connection_Info *)realloc(p_Connections, iConnectionCount * sizeof(SM_Connection_Info)); strcpy((p_Connections + m_iConnectionIndex)- >szConnectionName, (LPSTR)m_szConnection); (p_Connections + m_iConnectionIndex)->hdbc = *phdbc; (p_Connections + m_iConnectionIndex)->bInUse = TRUE; } LeaveCriticalSection(&hConnections); return; } </pre>	<pre> void CExecute::ReConnectDeadConnection(HDBC *phdbc) { SQLRETURN rc; SQLINTEGER uConnDead; // Connect to the server using the passed in connection string rc = SQLGetConnectAttr(*phdbc, SQL_ATTR_CONNECTION_DEAD, &uConnDead, SQL_IS_INTEGER, NULL); HandleODBCError(rc, SQL_HANDLE_DBC, *phdbc, SMSQLDriverConnect); if (uConnDead == SQL_CD_TRUE) { // Cleanup the old connection and re-connect. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDisconnect.\n"); #endif rc = SQLDisconnect(*phdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hdbc.\n"); #endif SQLFreeHandle(SQL_HANDLE_DBC, *phdbc); *phdbc = SQL_NULL_HDBC; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDriverConnect.\n"); #endif rc = SQLAllocHandle(SQL_HANDLE_DBC, henv, phdbc); HandleODBCError(rc, SQL_HANDLE_ENV, henv, SMSQLAllocHandle); // Connect to the server using the passed in connection string rc = SQLDriverConnect(*phdbc, NULL, (unsigned char *) (LPSTR)m_szExecDtls, SQL_NTS, NULL, 0, NULL, SQL_DRIVER_NOPROMPT); HandleODBCError(rc, SQL_HANDLE_DBC, *phdbc, SMSQLDriverConnect); } return; } void CExecute::ResetConnectionUsage() { if (m_iConnectionIndex >= 0 && m_iConnectionIndex < iConnectionCount) { EnterCriticalSection(&hConnections); (p_Connections + m_iConnectionIndex)->bInUse = FALSE; LeaveCriticalSection(&hConnections); } return; } </pre>
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<pre> void CExecute::ResetConnectionProperties(HDBC *p_hdbc) { SQLRETURN rc; // Reset connection attributes if any have been modified from the // default values if (m_bNoExecute) SetConnectionOption("SET NOEXEC OFF ", p_hdbc); else if (m_bParseOnly) SetConnectionOption("SET PARSEONLY OFF ", p_hdbc); else if (m_bShowQP) // Reset connection attributes in reverse order SetConnectionOption("SET SHOWPLAN_TEXT OFF ", p_hdbc); else { // Reset connection attributes in reverse order if (m_bStatsTime) SetConnectionOption("SET STATISTICS TIME OFF ", p_hdbc); if (m_bNoCount) SetConnectionOption("SET NOCOUNT OFF ", p_hdbc); if (m_bStatsIO) SetConnectionOption("SET STATISTICS IO OFF ", p_hdbc); } if (m_lRowCount > 0) { char szConnOptions[512]; sprintf(szConnOptions, "SET ROWCOUNT 0 "); SetConnectionOption(szConnOptions, p_hdbc); } if (m_bQuotedIds) SetConnectionOption("SET QUOTED_IDENTIFIER OFF ", p_hdbc); if (!m_bAnsiNulls) SetConnectionOption("SET ANSI_NULL_DFLT_OFF OFF ", p_hdbc); if (m_lQueryTmout > 0) { SQLINTEGER lQueryTmout = 0; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLSetStmtAttr.\n"); #endif // Set the query timeout on the statement handle rc = SQLSetStmtAttr(m_hHandle, SQL_ATTR_QUERY_TIMEOUT, &lQueryTmout, SQL_IS_INTEGER); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLSetStmtAttr); } return; } </pre>	<pre> LPSTR CExecute::NextCmdInBatch(LPSTR szBatch) { LPSTR szCmd, szSeparator, szStart; char szNext; szStart = m_szCmd; while ((szSeparator = strstr(szStart, CMD_SEPARATOR)) != NULL) { szNext = *(szSeparator + strlen(CMD_SEPARATOR)); if (szNext == '\n' szNext == '\r' szNext == '\0') break; else szStart = szSeparator + strlen(CMD_SEPARATOR); } if (!szSeparator) { // No more GO's if (strlen(m_szCmd) > 0) { szCmd = (LPSTR)malloc(strlen(m_szCmd) + 1); strcpy(szCmd, m_szCmd); m_szCmd += strlen(m_szCmd); } else szCmd = NULL; } else if (szSeparator - m_szCmd > 0) { // Strip the succeeding newline szCmd = (LPSTR)malloc(szSeparator - m_szCmd); strncpy(szCmd, m_szCmd, szSeparator - m_szCmd - 1); *(szCmd + (szSeparator - m_szCmd - 1)) = '\0'; m_szCmd += szSeparator - m_szCmd + strlen(CMD_SEPARATOR); if (szNext == '\n' szNext == '\r') m_szCmd += 1; } else szCmd = NULL; return(szCmd); } void CExecute::SetConnectionOption(LPSTR szConn, HDBC *pHdbc) { // Executes the passed in connection options 'set' statement. Returns True if it succeeded char szConnOptions[512]; SQLRETURN rc; sprintf(szConnOptions, szConn); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLExecDirect for connection option.\n"); #endif } </pre>
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<pre> if (m_bAbort) return; rc = SQLExecDirect(m_hHandle, (unsigned char *)szConnOptions, SQL_NTS); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLExecDirect); return; } STDMETHODIMP CExecute::AbortODBC() { m_bAbort = TRUE; try { if (m_hHandle != SQL_NULL_HSTMT) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLCancel.\n"); #endif SQLRETURN rc = SQLCancel(m_hHandle); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLError); } } catch(CODBCError *pErr) { delete pErr; } return(S_OK); } void CExecute::ProcessResultsets() { SQLSMALLINT *CTypeArray, *CScaleArray; SQLINTEGER *ColLenArray, *DispLenArray, *OffsetArray; SQLSMALLINT iColNameLen, SQLType, iColNull, i, NumCols = 0; SQLINTEGER iDispLen, iRowCount; SQLRETURN rc; char szColName[MAX_DATA_LEN + 1]; void *DataPtr; SQLINTEGER iLenOrInd = ALIGNBUF(sizeof(SQLINTEGER)); SQLINTEGER iRowArraySize, iArrayElementSize; // SQLINTEGER NumRowsFetched; // SQLUSMALLINT *RowStatusArray; if (!m_pOutputFile m_bAbort) return; do { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLNumResultCols.\n"); #endif </pre>	<pre> // Determine the number of result set columns. rc = SQLNumResultCols(m_hHandle, &NumCols); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLError); if (NumCols > 0) { // Allocate arrays to hold the C type, scale, column and display length of the data CTypeArray = (SQLSMALLINT *) malloc(NumCols * sizeof(SQLSMALLINT)); CScaleArray = (SQLSMALLINT *) malloc(NumCols * sizeof(SQLSMALLINT)); ColLenArray = (SQLINTEGER *) malloc(NumCols * sizeof(SQLINTEGER)); DispLenArray = (SQLINTEGER *) malloc(NumCols * sizeof(SQLINTEGER)); OffsetArray = (SQLINTEGER *) malloc(NumCols * sizeof(SQLINTEGER)); OffsetArray[0] = 0; for (i = 0; i < NumCols && !m_bAbort; i++) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDescribeCol.\n"); #endif // Get the column description, include the SQL type // Determine the column's byte length. Calculate the offset in the //buffer to the data as the offset to the previous column, plus the //byte length of the previous column, plus the byte length of the //previous column's length/indicator buffer. // Note that the byte length of the column and the length/indicator //buffer are increased so that, assuming they start on an alignment //boundary, they will end on the byte before the next alignment //boundary. Although this might leave some holes in the buffer, it //is a relatively inexpensive way to guarantee alignment. rc = SQLDescribeCol(m_hHandle, ((SQLUSMALLINT) i)+1, (unsigned char *)szColName, sizeof(szColName), &iColNameLen, &SQLType, (unsigned long *)&ColLenArray[i], &CScaleArray[i], &iColNull); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLError); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLColAttribute.\n"); #endif if (m_bAbort) return; rc = SQLColAttribute(m_hHandle, ((SQLUSMALLINT) i)+1, SQL_DESC_DISPLAY_SIZE, NULL, 0, NULL, &iDispLen); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLError); </pre>
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// GetDefaultCType contains a switch statement that returns the
//default C type for each SQL type.
CTypeArray[i] = GetDefaultCType(SQLType);
if ( (CTypeArray[i] == SQL_C_CHAR || CTypeArray[i] ==
SQL_C_BINARY) && ColLenArray[i] > MAX_DATA_LEN)
{
    ColLenArray[i] = MAX_DATA_LEN;
    iDispLen = MAX_DATA_LEN;
}

DispLenArray[i] = max(iColNameLen, iDispLen);
DispLenArray[i] = max(DispLenArray[i], sizeof(S_NULL));
// Print the column names in the header
PrintData(szColName, SQL_C_CHAR, DispLenArray[i], 0,
m_pOutputFile);
// Add a byte for the null-termination character
ColLenArray[i] += 1;
ColLenArray[i] = ALIGNBUF(ColLenArray[i]);
// Calculate the offset in the buffer to the data as the offset to the
previous column,
// plus the byte length of the previous column, plus the byte
//length of the previous column's length/indicator buffer.
if (i) OffsetArray[i] = OffsetArray[i-1] + ColLenArray[i-1] +
iLenOrInd;
}
m_pOutputFile->WriteLine(NULL);
iArrayElementSize = OffsetArray[NumCols-1] +
ColLenArray[NumCols-1] + iLenOrInd;
iRowArraySize = 1;
// Allocate the data buffer. The size of the buffer is equal to the
//offset to the data buffer for the final column, plus the byte
//length o f the data buffer and length/indicator
// buffer for the last column.
DataPtr = malloc(iRowArraySize * iArrayElementSize);
// Specify the size of the structure with the
SQL_ATTR_ROW_BIND_TYPE
// statement attribute. This also declares that row-wise
binding will
// be used. Declare the rowset size with the
SQL_ATTR_ROW_ARRAY_SIZE
// statement attribute. Set the
SQL_ATTR_ROW_STATUS_PTR statement
// attribute to point to the row status array. Set the
// SQL_ATTR_ROWS_FETCHED_PTR statement
attribute to point to
// NumRowsFetched.
/*
    RowStatusArray = (SQLUSMALLINT
*)malloc(iRowArraySize * sizeof(SQLUSMALLINT));

    SQLSetStmtAttr(m_hHandle,
SQL_ATTR_ROW_BIND_TYPE, &iArrayElementSize,
SQL_IS_INTEGER);
    SQLSetStmtAttr(m_hHandle,
SQL_ATTR_ROW_ARRAY_SIZE, &iRowArraySize,
SQL_IS_INTEGER);
    SQLSetStmtAttr(m_hHandle,
SQL_ATTR_ROW_STATUS_PTR, RowStatusArray,
SQL_IS_POINTER);
    SQLSetStmtAttr(m_hHandle,
SQL_ATTR_ROWS_FETCHED_PTR, &NumRowsFetched,
SQL_IS_POINTER);
*/

// For each column, bind the address in the buffer at the start of
the memory allocated
// for that column's data and the address at the start of the
memory allocated for that
// column's length/indicator buffer.
for (i = 0; i < NumCols; i++)
{
    SQLBindCol(m_hHandle, i + 1, CTypeArray[i],
(SQLPOINTER)((SQLCHAR *)DataPtr + OffsetArray[i]),
ColLenArray[i], (SQLINTEGER *)((SQLCHAR
*)DataPtr + OffsetArray[i] + ColLenArray[i]));
    HandleODBCError(rc, SQL_HANDLE_STMT,
m_hHandle, SMSQLBindCol);

    // Underline each column name
    memset(szColName, '-', DispLenArray[i]);
    *(szColName + DispLenArray[i]) = '\0';
    PrintData(szColName, SQL_C_CHAR,
DispLenArray[i], 0, m_pOutputFile);
}
m_pOutputFile->WriteLine(NULL);

#ifdef _DEBUG
    _CrtDbgReport(_CRT_WARN, NULL, 0, NULL,
"Executing SQLFetch.\n");
#endif
while (!m_bAbort && (rc = SQLFetch(m_hHandle)) !=
SQL_NO_DATA)
{
    HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle,
SMSQLFetch);
    /*
    for (i = 0; i < NumRowsFetched; i++)
    {
        if (RowStatusArray[i] == SQL_ROW_SUCCESS||
RowStatusArray[i] == SQL_ROW_SUCCESS_WITH_INFO)
        {
            /*
            for (i = 0; i < NumCols; i++)
            {
                // Retrieve and print each row. PrintData accepts a pointer to the
data, its C type, and its byte length/indicator.
                if ( *((SQLINTEGER *)((SQLCHAR *)DataPtr + OffsetArray[i]
+ ColLenArray[i])) == SQL_NULL_DATA)
                    PrintData(S_NULL, SQL_C_CHAR, DispLenArray[i], 0,
m_pOutputFile);
                else
                    PrintData((LPVOID)((SQLCHAR *)DataPtr + OffsetArray[i]),
CTypeArray[i],
DispLenArray[i], CScaleArray[i], m_pOutputFile);
            }

            m_pOutputFile->WriteLine(NULL);
        }
        m_pOutputFile->WriteLine(NULL);
        free(DataPtr);
        free(CTypeArray);
        free(CScaleArray);
        free(ColLenArray);
        free(DispLenArray);
    }
    // Write io statistics, if applicable
    LogODBCErrors(rc, SQL_HANDLE_STMT, m_hHandle,
SMSQLFetch);
#ifdef _DEBUG
    _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing
SQLRowCount.\n");
#endif
*/
}

```

<pre> if (m_bAbort) break; // action (insert, update, delete) query rc = SQLRowCount(m_hHandle, &iRowCount); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLRowCount); if (!m_bNoCount && iRowCount != -1) { sprintf(szColName, "(%d row(s) affected)", iRowCount); _bstr_t temp(szColName); m_pOutputFile->WriteLine((BSTR)temp); m_pOutputFile->WriteLine(NULL); } #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeStmt.\n"); #endif if (m_bAbort) break; SQLFreeStmt(m_hHandle, SQL_UNBIND); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLMoreResults.\n"); #endif if (m_bAbort) break; // Process the next resultset. This function returns 'success with info' even // if there is no other resultset and there are statistics messages to be printed. // Hence the check for -1 rows before printing. rc=SQLMoreResults(m_hHandle); if (rc != SQL_NO_DATA) HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLMoreResults); } while (rc != SQL_NO_DATA); return; } void CExecute::PrintData(void *vData, SQLSMALLINT CType, SQLINTEGER IndPtr, SQLSMALLINT iScale, ISMLog *pOutput) { // PrintData accepts a pointer to the data, its C type, // and its byte length/indicator. It contains a switch statement that casts and prints // the data according to its type. char *s; char fmt[MAXBUFLen]; int j = 0; SQLINTEGER iColLen = IndPtr + 1; assert(iColLen); s = (LPSTR)m_malloc(iColLen + 1); if (s) </pre>	<pre> { if (vData) { switch(CType) { case SQL_C_CHAR: case SQL_C_WCHAR: case SQL_C_TYPE_DATE: case SQL_C_TYPE_TIME: case SQL_C_TYPE_TIMESTAMP: case SQL_C_INTERVAL_YEAR: case SQL_C_INTERVAL_MONTH: case SQL_C_INTERVAL_YEAR_TO_MONTH: case SQL_C_INTERVAL_DAY: case SQL_C_INTERVAL_HOUR: case SQL_C_INTERVAL_MINUTE: case SQL_C_INTERVAL_SECOND: case SQL_C_INTERVAL_DAY_TO_HOUR: case SQL_C_INTERVAL_DAY_TO_MINUTE: case SQL_C_INTERVAL_DAY_TO_SECOND: case SQL_C_INTERVAL_HOUR_TO_MINUTE: case SQL_C_INTERVAL_HOUR_TO_SECOND: case SQL_C_INTERVAL_MINUTE_TO_SECOND: case SQL_C_BINARY: sprintf(fmt, "%%.%ds", iColLen); j = sprintf(s, fmt, (char *)vData); break; case SQL_C_SHORT: j = sprintf(s, "%d", *(short *)vData); break; case SQL_C_LONG: j = sprintf(s, "%ld", *(long *)vData); break; case SQL_C_UBIGINT: j = sprintf(s, "%I64d", *(__int64 *)vData); break; case SQL_C_FLOAT: j = sprintf(s, "%f", *(float *)vData); break; case SQL_C_DOUBLE: j = sprintf(s, "%f", *(double *)vData); break; case SQL_C_NUMERIC: sprintf(fmt, "%%.0%df", iScale); j = sprintf(s, fmt, *(double *)vData); break; default: j = sprintf(s, "%s", vData); break; } } if (iColLen - j > 0) memset(s + j, '\0', iColLen - j); *(s + iColLen) = '\0'; // Write the field to the output file _bstr_t temp(s); pOutput->WriteField((BSTR)temp); free(s); } return; } </pre>
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<pre> SQLSMALLINT CExecute::GetDefaultCType(SQLINTEGER SQLType) { // GetDefaultCType returns the C type for the passed in SQL datatype. switch(SQLType) { case SQL_CHAR: case SQL_VARCHAR: case SQL_LONGVARCHAR: case SQL_WCHAR: case SQL_WVARCHAR: case SQL_WLONGVARCHAR: return(SQL_C_CHAR); case SQL_TINYINT: return(SQL_C_CHAR); case SQL_SMALLINT: return(SQL_C_SHORT); case SQL_INTEGER: return(SQL_C_LONG); case SQL_BIGINT: return(SQL_C_UBIGINT); case SQL_REAL: return(SQL_C_FLOAT); case SQL_FLOAT: case SQL_DOUBLE: // case SQL_DECIMAL: return(SQL_C_DOUBLE); case SQL_DECIMAL: return(SQL_C_CHAR); case SQL_BIT: return(SQL_C_CHAR); case SQL_BINARY: case SQL_VARBINARY: case SQL_LONGVARBINARY: return(SQL_C_CHAR); // return(SQL_C_BINARY); case SQL_TYPE_DATE: return(SQL_C_CHAR); // return(SQL_C_TYPE_DATE); case SQL_TYPE_TIME: return(SQL_C_CHAR); // return(SQL_C_TYPE_TIME); case SQL_TYPE_TIMESTAMP: return(SQL_C_CHAR); // return(SQL_C_TYPE_TIMESTAMP); case SQL_NUMERIC: return(SQL_C_FLOAT); </pre>	<pre> case SQL_INTERVAL_YEAR: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_YEAR); case SQL_INTERVAL_MONTH: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_MONTH); case SQL_INTERVAL_YEAR_TO_MONTH: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_YEAR_TO_MONTH); case SQL_INTERVAL_DAY: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY); case SQL_INTERVAL_HOUR: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_HOUR); case SQL_INTERVAL_MINUTE: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_MINUTE); case SQL_INTERVAL_SECOND: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_SECOND); case SQL_INTERVAL_DAY_TO_HOUR: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY_TO_HOUR); case SQL_INTERVAL_DAY_TO_MINUTE: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY_TO_MINUTE); case SQL_INTERVAL_DAY_TO_SECOND: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY_TO_SECOND); case SQL_INTERVAL_HOUR_TO_MINUTE: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_HOUR_TO_MINUTE); case SQL_INTERVAL_HOUR_TO_SECOND: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_HOUR_TO_SECOND); case SQL_INTERVAL_MINUTE_TO_SECOND: return(SQL_C_CHAR); // r eturn(SQL_C_INTERVAL_MINUTE_TO_SECOND); default: assert(TRUE); return(SQL_C_CHAR); break; } } </pre>
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<pre> /* FUNCTION: LogODBCErrors(SQLRETURN rc, SWORD fHandleType, SQLHANDLE handle) COMMENTS: Formats ODBC errors or warnings and logs them. Also initializes the completion status for the step to failure, if an ODBC error has occurred. */ void CExecute::LogODBCErrors(SQLRETURN nResult, SWORD fHandleType, SQLHANDLE handle, OdbcOperations FailedOp) { // Messages returned by the server (e.g. Print statements) will be logged to the output file // ODBC warnings will be logged to the log file // All other ODBC errors will be logged to the error file. UCHAR szErrState[SQL_SQLSTATE_SIZE+1]; // SQL Error State string UCHAR szErrText[SQL_MAX_MESSAGE_LENGTH+1]; // SQL Error Text string char szBuffer[SQL_SQLSTATE_SIZE+SQL_MAX_MESSAGE _LENGTH+MAXBUFLen+1] = ""; // formatted Error text Buffer SWORD wErrMsgLen; // Error message length SQLINTEGER dwErrCode; // Native Error code SQLRETURN nErrResult; // Return Code from SQLGetDiagRec SWORD sMsgNum = 1; // Error sequence number _bstr_t temp; if (IsErrorReturn(nResult)) { sprintf(szBuffer, "ODBC Operation: '%s' returned error code: %d", g_szOdbcOps[FailedOp], nResult); temp = szBuffer; m_pErrorFile->WriteLine((BSTR) temp); m_StepStatus = gintFailed; } if (handle == SQL_NULL_HSTMT) return; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLGetDiagRec.\n"); #endif </pre>	<pre> // call SQLGetDiagRec function with proper ODBC handles, repeatedly until // function returns SQL_NO_DATA. while (!m_bAbort && (nErrResult = SQLGetDiagRec(fHandleType, handle, sMsgNum++, szErrState, &dwErrCode, szErrText, SQL_MAX_MESSAGE_LENGTH-1, &wErrMsgLen)) != SQL_NO_DATA) { if (!SQL_SUCCEEDED(nErrResult)) break; if (m_pOutputFile && IsServerMessage(dwErrCode, szErrText)) { wsprintf(szBuffer, SM_SQLMSG_FORMAT, (LPSTR)szErrText); temp = szBuffer; m_pOutputFile->WriteLine((BSTR) temp); } else if (IsODBCWarning(szErrState) && dwErrCode != SM_SQL_ERR_CHANGED_DB && dwErrCode != SM_SQL_ERR_CHANGED_LANG) { // Suppress warnings - 'Changed database context to...' and 'Changed language setting to...' wsprintf(szBuffer, SM_SQLMSG_FORMAT, ParseOdbcMsgPrefixes((LPCSTR)szErrText)); temp = szBuffer; m_pOutputFile->WriteLine((BSTR) temp); } else if (m_pErrorFile && !IsODBCWarning(szErrState)) { wsprintf(szBuffer, SM_SQLERR_FORMAT, (LPSTR)szErrState, dwErrCode, (LPSTR)szErrText); temp = szBuffer; m_pErrorFile->WriteLine((BSTR) temp); } } } /* FUNCTION: LogErrors(SQLRETURN rc, SWORD fHandleType, SQLHANDLE handle) COMMENTS: Writes the error message to the error log */ void CExecError::LogErrors(CExecute *p) { _bstr_t temp(m_szExecErrorDesc[m_iErrCode]); if (p->m_pErrorFile) p->m_pErrorFile->WriteLine((BSTR)temp); return; } </pre>
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<pre> /* FUNCTION: ODBCcleanup(HDBC *hdbc, HSTMT *hstmt) COMMENTS: Cleanup of all ODBC structures */ void CExecute::ODBCcleanup(HDBC *hdbc, HSTMT *hstmt) { SQLRETURN IReturn; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing ODBCcleanup.\n"); #endif if (*hstmt != SQL_NULL_HSTMT) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLCloseCursor.\n"); #endif SQLCloseCursor(hstmt); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hstmt.\n"); #endif SQLFreeHandle(SQL_HANDLE_STMT, hstmt); *hstmt = SQL_NULL_HSTMT; } // Cleanup connection if it is a dynamic connection if (IsDynamicConnection()) { if (*hdbc != SQL_NULL_HDBC) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDisconnect.\n"); #endif IReturn = SQLDisconnect(*hdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hdbc.\n"); #endif SQLFreeHandle(SQL_HANDLE_DBC, hdbc); *hdbc = SQL_NULL_HDBC; } } else ResetConnectionUsage(); return; } // Wrapper function that raises an error if a Windows Api fails STDMETHODIMP CExecute::RaiseSystemError(void) { char s[MAXBUFLEN]; GetSystemError(s); return Error(s, 0, NULL, GUID_NULL); } </pre>	<pre> // Wrapper function that logs the error raised by an Api function to the passed in file void CExecute::LogSystemError(ISMLog *pFile) { if (pFile) { char s[MAXBUFLEN]; GetSystemError(s); _bstr_t temp(s); pFile->WriteLine((BSTR)temp); } } // Populates the passed in string with the last Windows Api error that occurred void CExecute::GetSystemError(LPSTR s) { long c; DWORD e; e = GetLastError(); c = sprintf(s, "Error code: %ld. ", e); c = FormatMessage(FORMAT_MESSAGE_FROM_SYSTEM FORMAT_MESSAGE_IGNORE_INSERTS, NULL, e, 0, s + c, MAXBUFLEN - c, NULL); return; } STDMETHODIMP CExecute::get_StepStatus(InstanceStatus *pVal) { *pVal = m_StepStatus; return S_OK; } STDMETHODIMP CExecute::WriteError(BSTR szMsg) { if (m_pErrorFile) return(m_pErrorFile->WriteLine(szMsg)); return S_OK; } </pre>
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```

// FILE: Execute.h
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
//
// PURPOSE: Declaration of the CExecute
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// Execute.h : Declaration of the CExecute

#ifndef __EXECUTE_H_
#define __EXECUTE_H_

#include <atlwin.h>
#include <comdef.h>
#include <stdio.h>
#include "resource.h" // main symbols
#include "ExecuteDllCP.h"
#include "..\LogWriter\LogWriter.h"
#include "..\LogWriter\SMLog.h"
#include "..\common\SMTime\SMTime.h"
#include "..\common\SMTime\SMTimer.h"

// ODBC-specific includes
#define DBNTWIN32
#include <sqltypes.h>
#include <sql.h>
#include <sqlext.h>

/////////////////////////////////////////////////////////////////
// CExecute

#define WM_TASK_START (WM_USER + 101)
#define WM_TASK_FINISH (WM_USER + 102)

#define SM_SQLERR_FORMAT "SQL Error State:%s,
Native Error Code: %ld\r\nODBC Error: %s"
// format for ODBC error messages
#define SM_SQLWARN_FORMAT SM_SQLERR_FORMAT
// format for ODBC warnings
#define SM_SQLMSG_FORMAT "%s" // format for messages
from the server

#define SM_SQL_STATE_WARNING "01000"
#define SM_MSG_SERVER "[Microsoft][ODBC SQL Server
Driver][SQL Server]"

#define SM_SQL_ERR_CHANGED_DB 5701
#define SM_SQL_ERR_CHANGED_LANG 5703

#define SM_STEPMASTER_ERROR "StepMaster Error: "

#define CMD_SEPARATOR "\nGO"
#define INV_ARRAY_INDEX -1 // invalid index
into an array
#define MAXBUFLLEN 256 // display buffer size
#define MAXLOGCMDLEN 256 // maximum
characters in command that will be // printed to log
#define MAXLOGCMDDBUF 512 // maximum
characters in command that will be // printed to log
#define MAX_DATA_LEN 4000 // maximum buffer
size for variable-length data types // viz. character and binary
fields
#define FILE_ACCESS_READ "r" // Open file for read access
#define S_NULL "NULL"

// Define a macro to increase the size of a buffer so it is a
multiple of teh alignment size.
// Thus, if a buffer starts on an alignment boundary, it will end
just before the next
// alignment boundary. Here, an alignment size of 4 is used
because this is the size of the
// largest data type used in the application's buffer - the size of an
SDWORD and of the largest
// default C data type are both 4. If a larger data type (such as
__int64) is used, it will be
// necessary to align for that size.
#define ALIGNSIZE 4
#define ALIGNBUF(Len) ((Len) % ALIGNSIZE) ? \
((Len) + ALIGNSIZE - ((Len) % ALIGNSIZE)) :
(Len)

#define MAX_BUFFER_SIZE 64000

typedef enum OdbcOperations
{
SMSQLAllocHandle,
SMSQLDriverConnect,
SMSQLExecDirect,
SMSQLSetStmtAttr,
SMSQLCancel,
SMSQLNumResultCols,
SMSQLDescribeCol,
SMSQLColAttribute,
SMSQLFetch,
SMSQLGetData,
SMSQLRowCount,
SMSQLMoreResults,
SMSQLBindCol,
};

class CODBCError
{
public:
CODBCError(SQLRETURN nResult, SWORD
fHandleType, SQLHANDLE handle, OdbcOperations FailedOp)
{
m_fHandleType = fHandleType;
m_handle = handle;
m_FailedOp = FailedOp;
m_nResult = nResult;
};

private:
SWORD m_fHandleType;
SQLHANDLE m_handle;
OdbcOperations m_FailedOp;
SQLRETURN m_nResult;

private:
inline BOOL IsServerMessage(SQLINTEGER lNativeError,
UCHAR *szErr){
return( (strstr(LPCTSTR)szErr, SM_MSG_SERVER) !=
NULL) ? (lNativeError == 0) : FALSE; }
inline BOOL IsODBCWarning(UCHAR *szSqlState){
return(strcmp((LPCSTR)szSqlState,
SM_SQL_STATE_WARNING) == 0);}
inline LPCSTR ParseOdbcMsgPrefixes(LPCSTR szMsg){ char
*pDest;
return( (pDest = strstr(szMsg, SM_MSG_SERVER)) ==
NULL ? szMsg : pDest + strlen(SM_MSG_SERVER));}
};

```

<pre> class ATL_NO_VTABLE CExecute : public CWindowImpl<CExecute>, public CComObjectRootEx<CComSingleThreadModel>, public CComCoClass<CExecute, &CLSID_Execute>, public IConnectionPointContainerImpl<CExecute>, public ISupportErrorInfo, public IDispatchImpl<IExecute, &IID_IExecute, &LIBID_EXECUTEDLLLib>, public CProxy_IExecuteEvents<CExecute > { public: CExecute() { m_pErrorFile = NULL; //m_pLogFile = NULL; m_pOutputFile = NULL; // Initialize the elapsed time for the step m_tElapsedTime = 0; // Initialize the run status for the step m_StepStatus = gintPending; m_hHandle = SQL_NULL_HSTMT; m_bAbort = FALSE; m_iConnectionIndex = INV_ARRAY_INDEX; } ~CExecute() { } friend class CExecError; public: DECLARE_WND_CLASS("Execute") BEGIN_MSG_MAP(CExecute) MESSAGE_HANDLER(WM_TASK_FINISH, OnTaskFinished) MESSAGE_HANDLER(WM_TASK_START, OnTaskStarted) END_MSG_MAP() public: HRESULT OnTaskStarted(UINT uMsg, WPARAM wParam, LPARAM lParam, BOOL& bHandled) { CURRENCY CStartTime = Get64BitTime(&m_tStartTime); Fire_Start(CStartTime); return 0; } </pre>	<pre> HRESULT OnTaskFinished(UINT uMsg, WPARAM wParam, LPARAM lParam, BOOL& bHandled) { CURRENCY CEndTime = Get64BitTime(&m_tEndTime); Fire_Complete(CEndTime, (long)m_tElapsedTime); return 0; } HRESULT FinalConstruct() { HRESULT hr; RECT rect; rect.left=0; rect.right=100; rect.top=0; rect.bottom=100; HWND hwnd = Create(NULL, rect, "ExecuteWindow", WS_POPUP); if (!hwnd) return HRESULT_FROM_WIN32(GetLastError()); hr = CoCreateInstance(CLSID_SMLog, NULL, CLSCTX_INPROC, IID_ISMLog, (void **)&m_pErrorFile); if FAILED(hr) return(hr); m_pErrorFile->put_Append(TRUE); //hr = CoCreateInstance(CLSID_SMLog, NULL, CLSCTX_INPROC, IID_ISMLog, (void **)&m_pLogFile); //if FAILED(hr) // return(hr); hr = CoCreateInstance(CLSID_SMLog, NULL, CLSCTX_INPROC, IID_ISMLog, (void **)&m_pOutputFile); if FAILED(hr) return(hr); m_pOutputFile->put_Append(TRUE); hr = CoCreateInstance(CLSID_SMTimer, NULL, CLSCTX_INPROC, IID_ISMTimer, (void **)&m_ExecTime); if FAILED(hr) return(hr); return S_OK; } </pre>
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<pre> void FinalRelease() { if (m_hWnd != NULL) DestroyWindow(); // Close the log and error files if (m_pErrorFile) m_pErrorFile->Release(); m_pErrorFile = NULL; if (m_ExecTime) m_ExecTime->Release(); m_ExecTime = NULL; } DECLARE_REGISTRY_RESOURCEID(IDR_EXECUTE) DECLARE_PROTECT_FINAL_CONSTRUCT() BEGIN_COM_MAP(CExecute) COM_INTERFACE_ENTRY(IExecute) COM_INTERFACE_ENTRY(ISupportErrorInfo) COM_INTERFACE_ENTRY(IDispatch) COM_INTERFACE_ENTRY(IConnectionPointContainer) COM_INTERFACE_ENTRY_IMPL(IConnectionPointContainer) END_COM_MAP() BEGIN_CONNECTION_POINT_MAP(CExecute) CONNECTION_POINT_ENTRY(DIID_IExecuteEvents) END_CONNECTION_POINT_MAP() // ISupportsErrorInfo STDMETHOD(InterfaceSupportsErrorInfo)(REFIID riid); // IExecute public: STDMETHOD(put_ErrorFile)(/*[in]*/ BSTR newVal); STDMETHOD(put_OutputFile)(/*[in]*/ BSTR newVal); STDMETHOD(WriteError)(BSTR szMsg); STDMETHOD(Abort)(); STDMETHOD(get_StepStatus)(/*[out, retval]*/ InstanceStatus *pVal); STDMETHOD(DoExecute)(/*[in]*/ BSTR szCommand, /*[in]*/ BSTR szExecutionDtls, /*[in]*/ ExecutionType ExecMethod, /*[in]*/ BOOL bNoCount, /*[in]*/ BOOL bNoExecute, /*[in]*/ BOOL bParseOnly, /*[in]*/ BOOL bQuotedIds, /*[in]*/ BOOL bAnsiNulls, /*[in]*/ BOOL bShowQP, /*[in]*/ BOOL bStatsTime, /*[in]*/ BOOL bStatsIO, /*[in]*/ long lRowCount, /*[in]*/ long lQueryTmout, /*[in]*/ BSTR szConnection); TC_TIME ExecuteShell(); TC_TIME ExecuteODBC(); STDMETHODIMP AbortShell(); STDMETHODIMP AbortODBC(); _bstr_t m_szCommand; _bstr_t m_szExecDtls; _bstr_t m_szConnection; DWORD m_lMode; SYSTEMTIME m_tStartTime; SYSTEMTIME m_tEndTime; TC_TIME m_tElapsedTime; ISMLog *m_pErrorFile; //ILog *m_pLogFile; ISMLog *m_pOutputFile; ISMTimer *m_ExecTime; ExecutionType m_ExecMthd; InstanceStatus m_StepStatus; HANDLE m_hHandle; // Process handle for shell commands and //Statement handle for ODBC commands LPSTRm_szCmd; </pre>	<pre> private: LPSTR NextCmdInBatch(LPSTR szBatch); void ProcessResultsets(); SQLSMALLINT GetDefaultCType(SQLINTEGER SQLType); void PrintData(void *vData, SQLSMALLINT CType, SQLINTEGER IndPtr, SQLSMALLINT iScale, ISMLog *pOutput); void LogODBCErrors(SQLRETURN nResult, SWORD fHandleType, SQLHANDLE handle, OdbcOperations FailedOp); void ODBCcleanup(HDBC *hdbc, HSTMT *hstmt); STDMETHODIMP RaiseSystemError(void); void LogSystemError(ISMLog *pFile); void GetSystemError(LPSTR s); void SetConnectionOption(LPSTR szConn, HDBC *pHdbc); void ResetConnectionProperties(HDBC *p_hdbc); void InitializeConnection(HDBC *phdbc, BOOL *pbDoConnect); void ReConnectDeadConnection(HDBC *phdbc); void ResetConnectionUsage(); int m_iConnectionIndex; BOOL m_bNoCount, m_bNoExecute, m_bParseOnly, m_bQuotedIds, m_bAnsiNulls, \ m_bShowQP, m_bStatsTime, m_bStatsIO; long m_lRowCount; SQLINTEGER m_lQueryTmout; _bstr_t m_ErrorFile, m_OutputFile; BOOL m_bAbort; </pre>
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<pre> private: inline BOOL IsServerMessage(SQLINTEGER INativeError, UCHAR *szErr){ return((strstr((LPCTSTR)szErr, SM_MSG_SERVER) != NULL) ? (INativeError == 0) : FALSE); } inline BOOL IsODBCWarning(UCHAR *szSqlState){ return(strcmp((LPCSTR)szSqlState, SM_SQL_STATE_WARNING) == 0);} inline BOOL IsErrorReturn(SQLRETURN iRetCode){ return((!SQL_SUCCEEDED(iRetCode)) && (iRetCode != SQL_NO_DATA));} inline LPCSTR ParseOdbcMsgPrefixes(LPCSTR szMsg){ char *pDest; return((pDest = strstr(szMsg, SM_MSG_SERVER)) == NULL ? szMsg : pDest + strlen(SM_MSG_SERVER));} inline BOOL IsDynamicConnection(){ return(!strcmp((LPCTSTR)m_szConnection, ""));} inline void HandleODBCError(SQLRETURN rc, SWORD fHandleType, SQLHANDLE handle, OdbcOperations OdbcOp) { if (rc != SQL_SUCCESS) { LogODBCErrors(rc, fHandleType, handle, OdbcOp); if (IsErrorReturn(rc)) throw new CODBCError(rc, fHandleType, handle, OdbcOp); } return; } }; class CExecError { public: typedef enum ExecErrorCodes { SM_ERR_CONN_IN_USE, }; CExecError(int iError) { m_iErrCode = iError; }; void LogErrors(CExecute *p); private: int m_iErrCode; static char *m_szExecErrorDesc[]; }; void ExecutionThread(LPVOID lpParameter); #ifdef _TPCH_AUDIT void WriteFileToTpchLog(LPCTSTR szFile, LPCTSTR szFmt); void WriteToTpchLog(char *szMsg); #endif </pre>	<pre> #endif // _EXECUTE_H // FILE: ExecuteDll.cpp // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // PURPOSE: Implementation of DLL Exports. // Contact: Reshma Tharamal (reshmat@microsoft.com) // // Note: Proxy/Stub Information // To build a separate proxy/stub DLL, // run nmake -f ExecuteDlls.mk in the project directory. #include "stdafx.h" #include "resource.h" #include <initguid.h> #include "..\LogWriter\LogWriter.h" #include "..\LogWriter\LogWriter_i.c" #include "..\common\SMTime\SMTime.h" #include "..\common\SMTime\SMTime_i.c" #include "ExecuteDll.h" #include "SMExecute.h" #include "ExecuteDll_i.c" #include "Execute.h" CComModule _Module; BEGIN_OBJECT_MAP(ObjectMap) OBJECT_ENTRY(CLSID_Execute, CExecute) END_OBJECT_MAP() SQLHENV henv = NULL; // ODBC environment handle static char szCaption[] = "StepMaster"; // Message box caption CRITICAL_SECTION hConnections; // Critical section to serialize access to available connections SM_Connection_Info *p_Connections = NULL; // Pointer to open connections int iConnectionCount = 0; // Number of open connections #ifdef _TPCH_AUDIT FILE *pfLogFile = NULL; // Log file containing timestamps CRITICAL_SECTION hLogFileWrite; // Critical section to serialize writes to log static char szFileOpenModeAppend[] = "a+"; // Log file open mode static char szEnvVarLogFile[] = "TPCH_LOG_FILE";// Environment variable - initialized to // log file name if timing information // is to be logged #endif void ShowODBCErrors(SWORD fHandleType, SQLHANDLE handle); void CloseOpenConnections(); </pre>
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<pre> //////////////////////////////////// // DLL Entry Point extern "C" BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD dwReason, LPVOID /*!lpReserved*/) { if (dwReason == DLL_PROCESS_ATTACH) { _Module.Init(ObjectMap, hInstance, &LIBID_EXECUTEDLLLib); DisableThreadLibraryCalls(hInstance); #ifdef _TPCH_AUDIT char szMsg[MAXBUFLen]; LPSTR szLogFileName = getenv(szEnvVarLogFile); if (szLogFileName == NULL) { sprintf(szMsg, "The environment variable '%s' does not exist. " "The step timing information will not be written to a log.", szEnvVarLogFile); MessageBox(NULL, szMsg, szCaption, MB_OK); } else { if ((pfLogFile = fopen(szLogFileName, szFileOpenModeAppend)) == NULL) { sprintf(szMsg, "The file '%s' does not exist. " "The step timing information will not be written to log.", szLogFileName); MessageBox(NULL, szMsg, szCaption, MB_OK); } else InitializeCriticalSection(&hLogFileWrite); } #endif InitializeCriticalSection(&hConnections); p_Connections = NULL; iConnectionCount = 0; if (!SQL_SUCCEEDED(SQLSetEnvAttr(NULL, SQL_ATTR_CONNECTION_POOLING, (SQLPOINTER)SQL_CP_ONE_PER_HENV, 0))) ShowODBCErrors(SQL_HANDLE_ENV, henv); if (!SQL_SUCCEEDED(SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv))) { ShowODBCErrors(SQL_HANDLE_ENV, henv); return FALSE; } if (!SQL_SUCCEEDED(SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (LPVOID)SQL_OV_ODBC3, 0))) ShowODBCErrors(SQL_HANDLE_ENV, henv); SQLINTEGER CpMatch; if (!SQL_SUCCEEDED(SQLGetEnvAttr(henv, SQL_ATTR_CP_MATCH, &CpMatch, 0, NULL))) ShowODBCErrors(SQL_HANDLE_ENV, henv); if (!SQL_SUCCEEDED(SQLSetEnvAttr(henv, SQL_ATTR_CP_MATCH, (SQLPOINTER)SQL_CP_STRICT_MATCH, SQL_IS_INTEGER))) ShowODBCErrors(SQL_HANDLE_ENV, henv); } } </pre>	<pre> else if (dwReason == DLL_PROCESS_DETACH) { #ifdef _TPCH_AUDIT if (pfLogFile != NULL) { fclose(pfLogFile); DeleteCriticalSection(&hLogFileWrite); } #endif CloseOpenConnections(); if (henv != NULL) SQLFreeEnv(henv); DeleteCriticalSection(&hConnections); _Module.Term(); } return TRUE; // ok } void ShowODBCErrors(SWORD fHandleType, SQLHANDLE handle) { UCHAR szErrState[SQL_SQLSTATE_SIZE+1]; // SQL Error State string UCHAR szErrMsg[SQL_MAX_MESSAGE_LENGTH+1]; // SQL Error Text string char szBuffer[SQL_SQLSTATE_SIZE+SQL_MAX_MESSAGE _LENGTH+MAXBUFLen+1] = ""; // formatted Error text Buffer SWORD wErrMsgLen; // Error message length SQLINTEGER dwErrCode; // Native Error code SQLRETURN nErrResult; // Return Code from SQLGetDiagRec SWORD sMsgNum = 1; // Error sequence number // call SQLGetDiagRec function with proper ODBC handles, repeatedly until // function returns SQL_NO_DATA. while ((nErrResult = SQLGetDiagRec(fHandleType, handle, sMsgNum++, szErrState, &dwErrCode, szErrMsg, SQL_MAX_MESSAGE_LENGTH-1, &wErrMsgLen)) != SQL_NO_DATA) { if (!SQL_SUCCEEDED(nErrResult)) break; wsprintf(szBuffer, SM_SQLERR_FORMAT, (LPSTR)szErrState, dwErrCode, (LPSTR)szErrMsg); MessageBox(NULL, szBuffer, szCaption, MB_OK); } } </pre>
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<pre> void CloseOpenConnections() { // Closes all open connections if (p_Connections) { for (int iConnIndex = iConnectionCount - 1; iConnIndex >= 0; iConnIndex--) { if ((p_Connections + iConnIndex)->hdbc != SQL_NULL_HDBC) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDisconnect.\n"); #endif SQLDisconnect((p_Connections + iConnIndex)- >hdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hdbc.\n"); #endif SQLFreeHandle(SQL_HANDLE_DBC, (p_Connections + iConnIndex)->hdbc); (p_Connections + iConnIndex)->hdbc = SQL_NULL_HDBC; } free(p_Connections); } p_Connections = NULL; return; } ////////////////////////////////////// // Used to determine whether the DLL can be unloaded by OLE STDAPI DllCanUnloadNow(void) { return (_Module.GetLockCount()==0) ? S_OK : S_FALSE; } ////////////////////////////////////// // Returns a class factory to create an object of the requested type STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid, LPVOID* ppv) { return _Module.GetClassObject(rclsid, riid, ppv); } ////////////////////////////////////// // DllRegisterServer - Adds entries to the system registry STDAPI DllRegisterServer(void) { // registers object, typelib and all interfaces in typelib return _Module.RegisterServer(TRUE); } </pre>	<pre> //////////////////////////////////// // DllUnregisterServer - Removes entries from the system registry STDAPI DllUnregisterServer(void) { return _Module.UnregisterServer(TRUE); } /* this ALWAYS GENERATED file contains the definitions for the interfaces */ /* File created by MIDL compiler version 5.01.0164 */ /* at Mon Jun 09 19:33:03 2003 */ /* /* Compiler settings for C:\charles\Stepmaster\ExecuteDll\ExecuteDll.idl: Oicf (OptLev=i2), W1, Zp8, env=Win32, ms_ext, c_ext error checks: allocation ref bounds_check enum stub_data */ //@@@MIDL_FILE_HEADING() /* verify that the <rpcndr.h> version is high enough to compile this file*/ #ifndef __REQUIRED_RPCNDR_H_VERSION__ #define __REQUIRED_RPCNDR_H_VERSION__ 440 #endif #include "rpc.h" #include "rpcndr.h" #ifndef __ExecuteDll_h__ #define __ExecuteDll_h__ #ifdef __cplusplus extern "C"{ #endif /* Forward Declarations */ #ifndef __IExecuteEvents_FWD_DEFINED__ #define __IExecuteEvents_FWD_DEFINED__ typedef interface _IExecuteEvents _IExecuteEvents; #endif /* __IExecuteEvents_FWD_DEFINED__ */ #ifndef __IExecute_FWD_DEFINED__ #define __IExecute_FWD_DEFINED__ typedef interface IExecute IExecute; #endif /* __IExecute_FWD_DEFINED__ */ #ifndef __Execute_FWD_DEFINED__ #define __Execute_FWD_DEFINED__ #ifdef __cplusplus typedef class Execute Execute; #else typedef struct Execute Execute; #endif /* __cplusplus */ #endif /* __Execute_FWD_DEFINED__ */ </pre>
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<pre> /* header files for imported files */ #include "oaidl.h" #include "ocidl.h" void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t); void __RPC_USER MIDL_user_free(void __RPC_FAR *); /* interface __MIDL_itf_ExecuteDII_0000 */ /* [local] */ typedef /* [helpstring][uuid] */ enum ExecutionType { execODBC = 0x1, execShell = 0x2 } ExecutionType; typedef /* [helpstring][uuid] */ enum InstanceStatus { gintDisabled = 0x1, gintPending = 0x2, gintRunning = 0x3, gintComplete = 0x4, gintFailed = 0x5, gintAborted = 0x6 } InstanceStatus; extern RPC_IF_HANDLE __MIDL_itf_ExecuteDII_0000_v0_0_c_ifspec; extern RPC_IF_HANDLE __MIDL_itf_ExecuteDII_0000_v0_0_s_ifspec; #ifdef __EXECUTEDLLlib_LIBRARY_DEFINED__ #define __EXECUTEDLLlib_LIBRARY_DEFINED__ /* library EXECUTEDLLlib */ /* [helpstring][version][uuid] */ EXTERN_C const IID LIBID_EXECUTEDLLlib; #ifdef __IExecuteEvents_DISPINTERFACE_DEFINED__ #define __IExecuteEvents_DISPINTERFACE_DEFINED__ /* dispinterface IExecuteEvents */ /* [helpstring][uuid] */ EXTERN_C const IID DIID_IExecuteEvents; #ifdef __cplusplus && !defined(CINTERFACE) MIDL_INTERFACE("551AC532-AB1C-11D2-BC0C-00A0C90D2CA5") _IExecuteEvents : public IDispatch { }; #else /* C style interface */ typedef struct _IExecuteEventsVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(_IExecuteEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); </pre>	<pre> ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(_IExecuteEvents __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(_IExecuteEvents __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(_IExecuteEvents __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(_IExecuteEvents __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(_IExecuteEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(_IExecuteEvents __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); END_INTERFACE } _IExecuteEventsVtbl; interface _IExecuteEvents { CONST_VTBL struct _IExecuteEventsVtbl __RPC_FAR *lpVtbl; }; #ifdef COBJMACROS #define _IExecuteEvents_QueryInterface(This,riid,ppvObject)\ (This->lpVtbl->QueryInterface(This,riid,ppvObject)) #define _IExecuteEvents_AddRef(This)\ (This->lpVtbl->AddRef(This)) </pre>
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<pre> #define _IExecuteEvents_Release(This)\ (This)->lpVtbl -> Release(This) #define _IExecuteEvents_GetTypeInfoCount(This,pctinfo) \ (This)->lpVtbl -> GetTypeInfoCount(This,pctinfo) #define _IExecuteEvents_GetTypeInfo(This,iTInfo,lcid,ppTInfo)\ (This)->lpVtbl -> GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define _IExecuteEvents_GetIDsOfNames(This,riid,rgszNames,cNames,\ lcid,rgDispId) \ (This)->lpVtbl ->\ GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define _IExecuteEvents_Invoke(This,dispIdMember,riid,lcid,wFlags,pD\ ispParams,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl ->\ Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR\ esult,pExcepInfo,puArgErr) #endif /* COBJMACROS */ #endif /* C style interface */ #endif /* __IExecuteEvents_DISPINTERFACE_DEFINED__ */ #ifndef _IExecute_INTERFACE_DEFINED_ #define _IExecute_INTERFACE_DEFINED_ /* interface IExecute */ /* [unique][helpstring][dual][uuid][object] */ EXTERN_C const IID IID_IExecute; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("551AC531-AB1C-11D2-BC0C-00A0C90D2CA5") IExecute : public IDispatch { public: virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE DoExecute(/* [in] */ BSTR szCommand, /* [in] */ BSTR szExecutionDtls, /* [in] */ ExecutionType ExecMethod, /* [in] */ BOOL bNoCount, /* [in] */ BOOL bNoExecute, /* [in] */ BOOL bParseOnly, /* [in] */ BOOL bQuotedIds, /* [in] */ BOOL bAnsiNulls, /* [in] */ BOOL bShowQP, /* [in] */ BOOL bStatsTime, /* [in] */ BOOL bStatsIO, /* [in] */ long lRowCount, /* [in] */ long lQueryTmout, /* [in] */ BSTR szConnection) = 0; virtual /* [helpstring][id][propget] */ HRESULT STDMETHODCALLTYPE get_StepStatus(/* [retval][out] */ InstanceStatus __RPC_FAR *pVal) = 0; </pre>	<pre> virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE Abort(void) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE WriteError(BSTR szMsg) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_OutputFile(/* [in] */ BSTR newVal) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_ErrorFile(/* [in] */ BSTR newVal) = 0; }; #else /* C style interface */ typedef struct IExecuteVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(IExecute __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(IExecute __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(IExecute __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(IExecute __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(IExecute __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(IExecute __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(IExecute __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); </pre>
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<pre> /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *DoExecute)(IExecute __RPC_FAR * This, /* [in] */ BSTR szCommand, /* [in] */ BSTR szExecutionDtls, /* [in] */ ExecutionType ExecMethod, /* [in] */ BOOL bNoCount, /* [in] */ BOOL bNoExecute, /* [in] */ BOOL bParseOnly, /* [in] */ BOOL bQuotedIds, /* [in] */ BOOL bAnsiNulls, /* [in] */ BOOL bShowQP, /* [in] */ BOOL bStatsTime, /* [in] */ BOOL bStatsIO, /* [in] */ long lRowCount, /* [in] */ long lQueryTmout, /* [in] */ BSTR szConnection); /* [helpstring][id][propget] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *get_StepStatus)(IExecute __RPC_FAR * This, /* [retval][out] */ InstanceStatus __RPC_FAR *pVal); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Abort)(IExecute __RPC_FAR * This); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *WriteError)(IExecute __RPC_FAR * This, BSTR szMsg); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *put_OutputFile)(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *put_ErrorFile)(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); END_INTERFACE } IExecuteVtbl; interface IExecute { CONST_VTBL struct IExecuteVtbl __RPC_FAR *lpVtbl; }; #ifdef COBJMACROS #define IExecute_QueryInterface(This,riid,ppvObject) \ (This)->lpVtbl -> QueryInterface(This,riid,ppvObject) #define IExecute_AddRef(This) \ (This)->lpVtbl -> AddRef(This) #define IExecute_Release(This) \ (This)->lpVtbl -> Release(This) #define IExecute_GetTypeInfoCount(This,pcinfo) \ (This)->lpVtbl -> GetTypeInfoCount(This,pcinfo) #define IExecute_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This)->lpVtbl -> GetTypeInfo(This,iTInfo,lcid,ppTInfo) </pre>	<pre> #define IExecute_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) \ (This)->lpVtbl -> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define IExecute_Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl -> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarResult,pExcepInfo,puArgErr) #define IExecute_DoExecute(This,szCommand,szExecutionDtls,ExecMethod,bNoCount, bNoExecute,bParseOnly,bQuotedIds,bAnsiNulls,bShowQP, bStatsTime,bStatsIO,lRowCount,lQueryTmout,szConnection)\ (This)->lpVtbl -> DoExecute(This,szCommand,szExecutionDtls,ExecMethod,bNoCount,bNoExecute,bParseOnly,bQuotedIds, bAnsiNulls,bShowQP,bStatsTime,bStatsIO,lRowCount,lQueryTmout,szConnection) #define IExecute_get_StepStatus(This,pVal) \ (This)->lpVtbl -> get_StepStatus(This,pVal) #define IExecute_Abort(This) \ (This)->lpVtbl -> Abort(This) #define IExecute_WriteError(This,szMsg) \ (This)->lpVtbl -> WriteError(This,szMsg) #define IExecute_put_OutputFile(This,newVal) \ (This)->lpVtbl -> put_OutputFile(This,newVal) #define IExecute_put_ErrorFile(This,newVal) \ (This)->lpVtbl -> put_ErrorFile(This,newVal) #endif /* COBJMACROS */ #endif /* C style interface */ /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE IExecute_DoExecute_Proxy(IExecute __RPC_FAR * This, /* [in] */ BSTR szCommand, /* [in] */ BSTR szExecutionDtls, /* [in] */ ExecutionType ExecMethod, /* [in] */ BOOL bNoCount, /* [in] */ BOOL bNoExecute, /* [in] */ BOOL bParseOnly, /* [in] */ BOOL bQuotedIds, /* [in] */ BOOL bAnsiNulls, /* [in] */ BOOL bShowQP, /* [in] */ BOOL bStatsTime, /* [in] */ BOOL bStatsIO, /* [in] */ long lRowCount, /* [in] */ long lQueryTmout, /* [in] */ BSTR szConnection); void __RPC_STUB IExecute_DoExecute_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); </pre>
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<pre> /* [helpstring][id][proppget] */ HRESULT STDMETHODCALLTYPE IExecute_get_StepStatus_Proxy(IExecute __RPC_FAR * This, /* [retval][out] */ InstanceStatus __RPC_FAR *pVal); void __RPC_STUB IExecute_get_StepStatus_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE IExecute_Abort_Proxy(IExecute __RPC_FAR * This); void __RPC_STUB IExecute_Abort_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE IExecute_WriteError_Proxy(IExecute __RPC_FAR * This, BSTR szMsg); void __RPC_STUB IExecute_WriteError_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE IExecute_put_OutputFile_Proxy(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); void __RPC_STUB IExecute_put_OutputFile_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE IExecute_put_ErrorFile_Proxy(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); void __RPC_STUB IExecute_put_ErrorFile_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *_pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); #endif /* __IExecute_INTERFACE_DEFINED__ */ EXTERN_C const CLSID CLSID_Execute; #ifdef __cplusplus class DECLSPEC_UUID("2EFC198E-AA8D-11D2-BC0C-00A0C90D2CA5") Execute; #endif #ifdef __EXECUTEDLLlib_LIBRARY_DEFINED__ /* Additional Prototypes for ALL interfaces */ /* end of Additional Prototypes */ #ifdef __cplusplus } #endif #endif </pre>	<pre> // FILE: Execute.cpp // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // // PURPOSE: Implementation of CExecute. // Contact: Reshma Tharamal (reshmat@microsoft.com) // #include "stdafx.h" #include "ExecuteDll.h" #include "SMExecute.h" #include "Execute.h" extern SQLHENV henv; extern SM_Connection_Info *_p_Connections; // Pointer to open connections extern int iConnectionCount; // Number of open connections extern CRITICAL_SECTION hConnections; // Critical section to serialize // access to available connections #ifdef _TPCH_AUDIT extern FILE *pfLogFile; // Log file containing timestamps extern CRITICAL_SECTION hLogFileWrite; // Handle to critical section #endif //////////////////////////////////// // CExecute char * g_szOdbcOps[] = { "SQLAllocHandle", "SQLDriverConnect", "SQLExecDirect", "SQLSetStmtAttr", "SQLCancel", "SQLNumResultCols", "SQLDescribeCol", "SQLColAttribute", "SQLFetch", "SQLGetData", "SQLRowCount", "SQLMoreResults", "SQLBindCol" }; char * CExecError::m_szExecErrorDesc[] = { "Connection is already in use." }; STDMETHODIMP CEExecute::InterfaceSupportsErrorInfo(REFIID riid) { static const IID* arr[] = { &IID_IExecute }; for (int i=0; i < sizeof(arr) / sizeof(arr[0]); i++) { if (InlineIsEqualGUID(*arr[i],riid)) return S_OK; } return S_FALSE; } </pre>
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<pre> STDMETHODIMP CExecute::put_OutputFile(BSTR newVal) { assert(m_pOutputFile); m_OutputFile = newVal; HRESULT hr = m_pOutputFile->put_FileName(newVal); if FAILED(hr) { m_pOutputFile->Release(); m_pOutputFile = NULL; } return hr; } //DEL STDMETHODIMP CExecute::put_LogFile(BSTR newVal) //DEL { //DEL assert(m_pLogFile); //DEL //DEL m_pLogFile->put_FileName(newVal); //DEL return S_OK; //DEL } STDMETHODIMP CExecute::put_ErrorFile(BSTR newVal) { assert(m_pErrorFile); m_ErrorFile = newVal; HRESULT hr = m_pErrorFile->put_FileName(newVal); if FAILED(hr) { m_pErrorFile->Release(); m_pErrorFile = NULL; } return hr; } STDMETHODIMP CExecute::DoExecute(BSTR szCommand, BSTR szExecutionDtIs, ExecutionType ExecMethod, \ BOOL bNoCount, BOOL bNoExecute, BOOL bParseOnly, BOOL bQuotedIds, \ BOOL bAnsiNulls, BOOL bShowQP, BOOL bStatsTime, BOOL bStatsIO, \ long lRowCount, long lQueryTmout, BSTR szConnection) { HANDLE hThrd; DWORD tid; _CrtSetReportFile(_CRT_WARN, _CRTDBG_FILE_STDOUT); m_szCommand = szCommand; m_szExecDtIs = szExecutionDtIs; m_ExecMthd = ExecMethod; if (m_ExecMthd == execODBC) { m_bNoCount = bNoCount; m_bNoExecute = bNoExecute; m_bParseOnly = bParseOnly; m_bQuotedIds = bQuotedIds; m_bAnsiNulls = bAnsiNulls; m_bShowQP = bShowQP; m_bStatsTime = bStatsTime; m_bStatsIO = bStatsIO; m_lRowCount = lRowCount; m_lQueryTmout = lQueryTmout; m_szConnection = szConnection; } } </pre>	<pre> if((hThrd = CreateThread(0, 0, (LPTHREAD_START_ROUTINE)ExecutionThread, this, 0, &tid)) == NULL) return(RaiseSystemError()); CloseHandle(hThrd); return S_OK; } STDMETHODIMP CExecute::Abort() { if (m_ExecMthd == execShell) return(AbortShell()); else return(AbortODBC()); } void ExecutionThread(LPVOID lpParameter) { CExecute *MyExecute = (CExecute*)lpParameter; MyExecute->m_tElapsedTime = 0; GetLocalTime(&MyExecute->m_tStartTime); MyExecute->PostMessage(WM_TASK_START, 0, 0); #ifdef _TPCH_AUDIT char szBuffer[MAXLOGCMDBUF]; char szFmt[MAXBUFLLEN]; sprintf(szFmt, "Start Step: '%%.%.ds' at '%d/%d/%d %d:%d:%d:%d'\n", MAXLOGCMDLEN, MyExecute->m_tStartTime.wMonth, MyExecute- >m_tStartTime.wDay, MyExecute->m_tStartTime.wYear, MyExecute- >m_tStartTime.wHour, MyExecute->m_tStartTime.wMinute, MyExecute- >m_tStartTime.wSecond, MyExecute->m_tStartTime.wMilliseconds); if (MyExecute->m_ExecMthd == execShell) WriteFileToTpchLog((LPSTR)MyExecute- >m_szCommand, szFmt); else { sprintf(szBuffer, szFmt, (LPSTR)MyExecute- >m_szCommand); WriteToTpchLog(szBuffer); } } #endif </pre>
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<pre>// Initialize the run status for the step to running. The completion status for the step will be initialized by the Shell and ODBC //execution functions. MyExecute->m_StepStatus = gintRunning; if (MyExecute->m_ExecMthd == execShell) MyExecute->m_tElapsedTime = MyExecute- >ExecuteShell(); else MyExecute->m_tElapsedTime = MyExecute- >ExecuteODBC(); // Close the output, log and error files if (MyExecute->m_pOutputFile) MyExecute->m_pOutputFile->Release(); MyExecute->m_pOutputFile = NULL; MyExecute->m_ExecTime = NULL; GetLocalTime(&MyExecute->m_tEndTime); #ifdef _TPCH_AUDIT sprintf(szFmt, "Complete Step: '%'.%'ds' at '%d/%d/%d %d:%d:%d:%d'\n", MAXLOGCMDLEN, MyExecute->m_tEndTime.wMonth, MyExecute- >m_tEndTime.wDay, MyExecute->m_tEndTime.wYear, MyExecute- >m_tEndTime.wHour, MyExecute->m_tEndTime.wMinute, MyExecute- >m_tEndTime.wSecond, MyExecute->m_tEndTime.wMilliseconds); if (MyExecute->m_ExecMthd == execShell) WriteFileToTpchLog((LPSTR)MyExecute- >m_szCommand, szFmt); else { sprintf(szBuffer, szFmt, (LPSTR)MyExecute- >m_szCommand); WriteToTpchLog(szBuffer); } #endif MyExecute->PostMessage(WM_TASK_FINISH, 0, 0); return; } #ifdef _TPCH_AUDIT void WriteFileToTpchLog(LPSTR szFile, LPSTR szFmt) { // Reads a maximum of MAXLOGCMDBUF characters from the command file and writes it to the log FILE *fpCmd; int iRead; charszBuf[MAXLOGCMDBUF]; charszCmd[MAXLOGCMDLEN]; if (pfLogFile != NULL) { if ((fpCmd = fopen(szFile,</pre>	<pre>FILE_ACCESS_READ)) != NULL) { iRead = fread(szCmd, sizeof(char), sizeof(szCmd) / sizeof(char), fpCmd); if (iRead < MAXLOGCMDLEN) szCmd[iRead] = '\0'; else szCmd[MAXLOGCMDLEN - 1] = '\0'; sprintf(szBuf, szFmt, szCmd); WriteToTpchLog(szBuf); fclose(fpCmd); } } void WriteToTpchLog(char *szMsg) { if (pfLogFile != NULL) { EnterCriticalSection(&hLogFileWrite); fprintf(pfLogFile, szMsg); LeaveCriticalSection(&hLogFileWrite); } return; } #endif TC_TIME CExecute::ExecuteShell() { STARTUPINFOA Start; PROCESS_INFORMATION proc; DWORD exitCode; TC_TIME tElapsed = 0; _bstr_t szCommand("cmd /c "); LPSTR szStartDir; CURRENC Elapsed; szCommand += m_szCommand; // Redirect output and error information szCommand += " > " + m_OutputFile + " 2> " + m_ErrorFile; // Initialize the STARTUPINFO structure: memset(&Start, 0, sizeof(STARTUPINFOA)); Start.cb = sizeof(Start); Start.dwFlags = STARTF_USESHOWWINDOW; Start.wShowWindow = SW_SHOWMINNOACTIVE; memset(&proc, 0, sizeof(PROCESS_INFORMATION)); szStartDir = strcmp((LPCTSTR)m_szExecDtls, "") == 0 ? NULL : (LPSTR)m_szExecDtls; m_ExecTime->Start(); // Start the shelled application: if (!CreateProcessA(NULL, (LPSTR)szCommand, NULL, NULL, FALSE, NORMAL_PRIORITY_CLASS, NULL, szStartDir, &Start, &proc)) { m_StepStatus = gintFailed; LogSystemError(m_pErrorFile); m_ExecTime->Stop(&Elapsed); return((TC_TIME)Elapsed.int64); } }</pre>
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<pre> m_hHandle = proc.hProcess; // Give the process time to execute and finish WaitForSingleObject(m_hHandle, INFINITE); m_ExecTime->Stop(&Elapsed); if (!GetExitCodeProcess(m_hHandle, &exitCode)) { m_StepStatus = gintFailed; LogSystemError(m_pErrorFile); } else m_StepStatus = gintComplete; // Close all open handles to the shelled process CloseHandle(m_hHandle); return((TC_TIME)Elapsed.int64); } STDMETHODIMP CExecute::AbortShell() { if (m_hHandle != SQL_NULL_HSTMT) if (!TerminateProcess(m_hHandle, 0)) return(RaiseSystemError()); return(S_OK); } TC_TIME CExecute::ExecuteODBC() { TC_TIME tElapsed = 0; HDBC m_hdbc; SQLRETURN rc; LPSTR szCmd; CURRENCY Elapsed; BOOL bDoConnect = FALSE; // ODBC specific initialization m_hdbc = SQL_NULL_HDBC; try { // Allocate a new connection if we are creating a // dynamic connection or if // the named connection doesn't exist InitializeConnection(&m_hdbc, &bDoConnect); // Ensure that the connection is valid. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDriverConnect.\n"); #endif if (bDoConnect) { // Allocate connection handle, open a connection // and set connection attributes. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDriverConnect.\n"); #endif </pre>	<pre> if (m_bAbort) return(tElapsed); // Connect to the server using the passed in connection string rc = SQLDriverConnect(m_hdbc, NULL, (unsigned char *) (LPSTR)m_szExecDtls, SQL_NTS, NULL, 0, NULL, SQL_DRIVER_NOPROMPT); HandleODBCError(rc, SQL_HANDLE_DBC, m_hdbc, SMSQLDriverConnect); } ReConnectDeadConnection(&m_hdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLAllocHandle for hdbc.\n"); #endif if (!m_bAbort && (rc = SQLAllocHandle(SQL_HANDLE_STMT, m_hdbc, &m_hHandle)) != SQL_SUCCESS) HandleODBCError(rc, SQL_HANDLE_DBC, m_hdbc, SMSQLAllocHandle); // Set connection attributes if any have been modified from the // default values if (m_lRowCount > 0) { char szConnOptions[512]; sprintf(szConnOptions, "SET ROWCOUNT %d ", m_lRowCount); SetConnectionOption(szConnOptions, &m_hdbc); } if (m_bQuotedIds) SetConnectionOption("SET QUOTED_IDENTIFIER ON ", &m_hdbc); if (!m_bAnsiNulls) SetConnectionOption("SET ANSI_NULL_DFLT_OFF ON ", &m_hdbc); if (!m_bAbort && m_lQueryTmout > 0) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLSetStmtAttr.\n"); #endif // Set the query timeout on the statement handle rc = SQLSetStmtAttr(m_hHandle, SQL_ATTR_QUERY_TIMEOUT, &m_lQueryTmout, SQL_IS_INTEGER); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLSetStmtAttr); } if (m_bNoExecute) SetConnectionOption("SET NOEXEC ON ", &m_hdbc); else if (m_bParseOnly) SetConnectionOption("SET PARSEONLY ON ", &m_hdbc); else if (m_bShowQP) // Important to ensure that this is the last connection // attributes being set - // otherwise showplans are generated for all remaining SET // statements SetConnectionOption("SET SHOWPLAN_TEXT ON ", &m_hdbc); else { </pre>
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<pre> if (m_bNoCount) SetConnectionOption("SET NOCOUNT ON ", &m_hdbc); if (m_bStatsIO) SetConnectionOption("SET STATISTICS IO ON ", &m_hdbc); // Important to ensure that this is the last connection attributes being set - // otherwise timing statistics are generated for all remaining SET statements if (m_bStatsTime) SetConnectionOption("SET STATISTICS TIME ON ", &m_hdbc); } m_szCmd = (LPSTR)m_szCommand; m_ExecTime->Start(); while ((szCmd = NextCmdInBatch((LPSTR)m_szCommand)) != NULL && !m_bAbort) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLExecDirect.\n"); #endif // Execute the ODBC command rc = SQLExecDirect(m_hHandle, (unsigned char *)szCmd, SQL_NTS); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLExecDirect); free(szCmd); // Call a procedure to log the results to the output file ProcessResultsets(); } m_ExecTime->Stop(&Elapsed); ResetConnectionProperties(&m_hdbc); } catch(CODBCError *pErr) { m_StepStatus = gintFailed; delete pErr; } catch(CExecError *pErr) { m_StepStatus = gintFailed; pErr->LogErrors(this); delete pErr; } ODBCCleanup(&m_hdbc, &m_hHandle); if (m_StepStatus != gintFailed) m_StepStatus = gintComplete; return((DWORD)Elapsed.int64); } </pre>	<pre> void CExecute::InitializeConnection(HDBC *phdbc, BOOL *pbDoConnect) { SQLRETURN rc; *pbDoConnect = TRUE; if (IsDynamicConnection()) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLAllocHandle for m_hdbc.\n"); #endif rc = SQLAllocHandle(SQL_HANDLE_DBC, henv, phdbc); HandleODBCError(rc, SQL_HANDLE_ENV, henv, SMSQLEAllocHandle); return; } EnterCriticalSection(&hConnections); // Returns the connection handle if the connection, m_szConnection, exists for (m_iConnectionIndex = iConnectionCount - 1; m_iConnectionIndex >= 0; m_iConnectionIndex--) { if (!strcmp((p_Connections + m_iConnectionIndex)- >szConnectionName, (LPSTR)m_szConnection)) { if (!(p_Connections + m_iConnectionIndex)- >bInUse) { *phdbc = (p_Connections + m_iConnectionIndex)->hdbc; (p_Connections + m_iConnectionIndex)- >bInUse = TRUE; *pbDoConnect = FALSE; break; } else { LeaveCriticalSection(&hConnections); throw new CExecError(CExecError::SM_ERR_CONN_IN_USE); } } } if (m_iConnectionIndex < 0) { // Connection was not found. Allocate connection handle and add it to list of // available connections. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLAllocHandle for m_hdbc.\n"); #endif } } </pre>
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<pre> rc = SQLAllocHandle(SQL_HANDLE_DBC, henv, phdbc); HandleODBCError(rc, SQL_HANDLE_ENV, henv, SMSQLAllocHandle); m_iConnectionIndex = iConnectionCount++; p_Connections = (SM_Connection_Info *)realloc(p_Connections, iConnectionCount * sizeof(SM_Connection_Info)); strcpy((p_Connections + m_iConnectionIndex)- >szConnectionName, (LPSTR)m_szConnection); (p_Connections + m_iConnectionIndex)->hdbc = *phdbc; (p_Connections + m_iConnectionIndex)->bInUse = TRUE; } LeaveCriticalSection(&hConnections); return; } void CExecute::ReConnectDeadConnection(HDBC *phdbc) { SQLRETURN rc; SQLINTEGER uConnDead; // Connect to the server using the passed in connection string rc = SQLGetConnectAttr(*phdbc, SQL_ATTR_CONNECTION_DEAD, &uConnDead, SQL_IS_INTEGER, NULL); HandleODBCError(rc, SQL_HANDLE_DBC, *phdbc, SMSQLDriverConnect); if (uConnDead == SQL_CD_TRUE) { // Cleanup the old connection and re-connect. #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDisconnect.\n"); #endif rc = SQLDisconnect(*phdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hdbc.\n"); #endif SQLFreeHandle(SQL_HANDLE_DBC, *phdbc); *phdbc = SQL_NULL_HDBC; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDriverConnect.\n"); #endif } } </pre>	<pre> rc = SQLAllocHandle(SQL_HANDLE_DBC, henv, phdbc); HandleODBCError(rc, SQL_HANDLE_ENV, henv, SMSQLAllocHandle); // Connect to the server using the passed in connection string rc = SQLDriverConnect(*phdbc, NULL, (unsigned char *) (LPSTR)m_szExecDtIs, SQL_NTS, NULL, 0, NULL, SQL_DRIVER_NOPROMPT); HandleODBCError(rc, SQL_HANDLE_DBC, *phdbc, SMSQLDriverConnect); } return; } void CExecute::ResetConnectionUsage() { if(m_iConnectionIndex >= 0 && m_iConnectionIndex < iConnectionCount) { EnterCriticalSection(&hConnections); (p_Connections + m_iConnectionIndex)->bInUse = FALSE; LeaveCriticalSection(&hConnections); } return; } void CExecute::ResetConnectionProperties(HDBC *p_hdbc) { SQLRETURN rc; // Reset connection attributes if any have been modified from the default values if (m_bNoExecute) SetConnectionOption("SET NOEXEC OFF ", p_hdbc); else if (m_bParseOnly) SetConnectionOption("SET PARSEONLY OFF ", p_hdbc); else if (m_bShowQP) // Reset connection attributes in reverse order SetConnectionOption("SET SHOWPLAN_TEXT OFF ", p_hdbc); else { // Reset connection attributes in reverse order if (m_bStatsTime) SetConnectionOption("SET STATISTICS TIME OFF ", p_hdbc); if (m_bNoCount) SetConnectionOption("SET NOCOUNT OFF ", p_hdbc); if (m_bStatsIO) SetConnectionOption("SET STATISTICS IO OFF ", p_hdbc); } } </pre>
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<pre> if (m_lRowCount > 0) { char szConnOptions[512]; sprintf(szConnOptions, "SET ROWCOUNT 0 "); SetConnectionOption(szConnOptions, p_hdbc); } if (m_bQuotedIds) SetConnectionOption("SET QUOTED_IDENTIFIER OFF ", p_hdbc); if (!m_bAnsiNulls) SetConnectionOption("SET ANSI_NULL_DFLT_OFF OFF ", p_hdbc); if (m_lQueryTmout > 0) { SQLINTEGER lQueryTmout = 0; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLSetStmtAttr.\n"); #endif // Set the query timeout on the statement handle rc = SQLSetStmtAttr(m_hHandle, SQL_ATTR_QUERY_TIMEOUT, &lQueryTmout, SQL_IS_INTEGER); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLSetStmtAttr); } return; } LPSTR CExecute::NextCmdInBatch(LPSTR szBatch) { LPSTR szCmd, szSeparator, szStart; char szNext; szStart = m_szCmd; while ((szSeparator = strstr(szStart, CMD_SEPARATOR)) != NULL) { szNext = *(szSeparator + strlen(CMD_SEPARATOR)); if (szNext == '\n' szNext == '\r' szNext == '\0') break; else szStart = szSeparator + strlen(CMD_SEPARATOR); } </pre>	<pre> if (!szSeparator) { // No more GO's if (strlen(m_szCmd) > 0) { szCmd = (LPSTR)malloc(strlen(m_szCmd) + 1); strcpy(szCmd, m_szCmd); m_szCmd += strlen(m_szCmd); } else szCmd = NULL; } else if (szSeparator - m_szCmd > 0) { // Strip the succeeding newline szCmd = (LPSTR)malloc(szSeparator - m_szCmd); strncpy(szCmd, m_szCmd, szSeparator - m_szCmd - 1); *(szCmd + (szSeparator - m_szCmd - 1)) = '\0'; m_szCmd += szSeparator - m_szCmd + strlen(CMD_SEPARATOR); if (szNext == '\n' szNext == '\r') m_szCmd += 1; } else szCmd = NULL; return(szCmd); } void CExecute::SetConnectionOption(LPSTR szConn, HDBC *pHdbc) { // Executes the passed in connection options 'set' statement. Returns True if it succeeded char szConnOptions[512]; SQLRETURN rc; sprintf(szConnOptions, szConn); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLExecDirect for connection option.\n"); #endif if (m_bAbort) return; rc = SQLExecDirect(m_hHandle, (unsigned char *)szConnOptions, SQL_NTS); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLExecDirect); return; } </pre>
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<pre> STDMETHODIMP CExecute::AbortODBC() { m_bAbort = TRUE; try { if (m_hHandle != SQL_NULL_HSTMT) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLCancel.\n"); #endif SQLRETURN rc = SQLCancel(m_hHandle); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLCancel); } } catch(CODBCError *pErr) { delete pErr; } return(S_OK); } void CExecute::ProcessResultsets() { SQLSMALLINT *CTypeArray, *CScaleArray; SQLINTEGER *ColLenArray, *DispLenArray, *OffsetArray; SQLSMALLINT iColNameLen, SQLType, iColNull, i, NumCols = 0; SQLINTEGER iDispLen, iRowCount; SQLRETURN rc; char szColName[MAX_DATA_LEN + 1]; void *DataPtr; SQLINTEGER iLenOrInd = ALIGNBUF(sizeof(SQLINTEGER)); SQLINTEGER iRowArraySize, iArrayElementSize; // SQLINTEGER NumRowsFetched; // SQLUSMALLINT *RowStatusArray; if (!m_pOutputFile m_bAbort) return; do { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLNumResultCols.\n"); #endif // Determine the number of result set columns. rc = SQLNumResultCols(m_hHandle, &NumCols); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLNumResultCols); </pre>	<pre> if (NumCols > 0) { // Allocate arrays to hold the C type, scale, column and display length of the data CTypeArray = (SQLSMALLINT *) malloc(NumCols * sizeof(SQLSMALLINT)); CScaleArray = (SQLSMALLINT *) malloc(NumCols * sizeof(SQLSMALLINT)); ColLenArray = (SQLINTEGER *) malloc(NumCols * sizeof(SQLINTEGER)); DispLenArray = (SQLINTEGER *) malloc(NumCols * sizeof(SQLINTEGER)); OffsetArray = (SQLINTEGER *) malloc(NumCols * sizeof(SQLINTEGER)); OffsetArray[0] = 0; for (i = 0; i < NumCols && !m_bAbort; i++) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDescribeCol.\n"); #endif // Get the column description, include the SQL type // Determine the column's byte length. Calculate the offset in the buffer to the // data as the offset to the previous column, plus the byte length of the previous // column, plus the byte length of the previous column's length/indicator buffer. // Note that the byte length of the column and the length/indicator buffer are increased // so that, assuming they start on an alignment boundary, they will end on the byte // before the next alignment boundary. Although this might leave some holes in the // buffer, it is a relatively inexpensive way to guarantee alignment. rc = SQLDescribeCol(m_hHandle, ((SQLUSMALLINT) i)+1, (unsigned char *)szColName, sizeof(szColName), &iColNameLen, &SQLType, (unsigned long *)&ColLenArray[i], &CScaleArray[i], &iColNull); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLDescribeCol); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLColAttribute.\n"); #endif if (m_bAbort) return; rc = SQLColAttribute(m_hHandle, ((SQLUSMALLINT) i)+1, SQL_DESC_DISPLAY_SIZE, NULL, 0, NULL, &iDispLen); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLColAttribute); </pre>
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<pre> // GetDefaultCType contains a switch statement that returns the default C type // for each SQL type. CTypeArray[i] = GetDefaultCType(SQLType); if ((CTypeArray[i] == SQL_C_CHAR CTypeArray[i] == SQL_C_BINARY) && ColLenArray[i] > MAX_DATA_LEN) { ColLenArray[i] = MAX_DATA_LEN; iDispLen = MAX_DATA_LEN; } DispLenArray[i] = max(iColNameLen, iDispLen); DispLenArray[i] = max(DispLenArray[i], sizeof(S_NULL)); // Print the column names in the header PrintData(szColName, SQL_C_CHAR, DispLenArray[i], 0, m_pOutputFile); // Add a byte for the null-termination character ColLenArray[i] += 1; ColLenArray[i] = ALIGNBUF(ColLenArray[i]); // Calculate the offset in the buffer to the data as the offset to the previous column, // plus the byte length of the previous column, plus the byte length of the previous // column's length/indicator buffer. if (i) OffsetArray[i] = OffsetArray[i-1] + ColLenArray[i-1] + iLenOrInd; } m_pOutputFile->WriteLine(NULL); iArrayElementSize = OffsetArray[NumCols-1] + ColLenArray[NumCols-1] + iLenOrInd; iRowArraySize = 1; // Allocate the data buffer. The size of the buffer is equal to the offset to the data // buffer for the final column, plus the byte length of the data buffer and length/indicator // buffer for the last column. DataPtr = malloc(iRowArraySize * iArrayElementSize); // Specify the size of the structure with the SQL_ATTR_ROW_BIND_TYPE // statement attribute. This also declares that row-wise binding will // be used. Declare the rowset size with the SQL_ATTR_ROW_ARRAY_SIZE // statement attribute. Set the SQL_ATTR_ROW_STATUS_PTR statement // attribute to point to the row status array. Set the // SQL_ATTR_ROWS_FETCHED_PTR statement attribute to point to // NumRowsFetched. /* RowStatusArray = (SQLUSMALLINT *)malloc(iRowArraySize * sizeof(SQLUSMALLINT)); </pre>	<pre> SQLSetStmtAttr(m_hHandle, SQL_ATTR_ROW_BIND_TYPE, &iArrayElementSize, SQL_IS_INTEGER); SQLSetStmtAttr(m_hHandle, SQL_ATTR_ROW_ARRAY_SIZE, &iRowArraySize, SQL_IS_INTEGER); SQLSetStmtAttr(m_hHandle, SQL_ATTR_ROW_STATUS_PTR, RowStatusArray, SQL_IS_POINTER); SQLSetStmtAttr(m_hHandle, SQL_ATTR_ROWS_FETCHED_PTR, &NumRowsFetched, SQL_IS_POINTER); */ // For each column, bind the address in the buffer at the start of the memory allocated // for that column's data and the address at the start of the memory allocated for that // column's length/indicator buffer. for (i = 0; i < NumCols; i++) { SQLBindCol(m_hHandle, i + 1, CTypeArray[i], (SQLPOINTER)((SQLCHAR *)DataPtr + OffsetArray[i]), ColLenArray[i], (SQLINTEGER *)((SQLCHAR *)DataPtr + OffsetArray[i] + ColLenArray[i])); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLBindCol); // Underline each column name memset(szColName, '-', DispLenArray[i]); *(szColName + DispLenArray[i]) = '\0'; PrintData(szColName, SQL_C_CHAR, DispLenArray[i], 0, m_pOutputFile); } m_pOutputFile->WriteLine(NULL); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFetch.\n"); #endif while (!m_bAbort && (rc = SQLFetch(m_hHandle)) != SQL_NO_DATA) { HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLFetch); /* for (i = 0; i < NumRowsFetched; i++) { if (RowStatusArray[i] == SQL_ROW_SUCCESS RowStatusArray[i] == SQL_ROW_SUCCESS_WITH_INFO) { /* for (i = 0; i < NumCols; i++) { // Retrieve and print each row. PrintData accepts a pointer to the data, its C type, // and its byte length/indicator. if (*(SQLINTEGER *)((SQLCHAR *)DataPtr + OffsetArray[i] + ColLenArray[i])) == SQL_NULL_DATA) PrintData(S_NULL, SQL_C_CHAR, DispLenArray[i], 0, m_pOutputFile); else PrintData((LPVOID)((SQLCHAR *)DataPtr + OffsetArray[i]), CTypeArray[i], DispLenArray[i], CScaleArray[i], m_pOutputFile); } } m_pOutputFile->WriteLine(NULL); </pre>
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<pre> } m_pOutputFile->WriteLine(NULL); /* free(RowStatusArray); */ free(DataPtr); free(CTypeArray); free(CScaleArray); free(ColLenArray); free(DispLenArray); } // Write io statistics, if applicable LogODBCErrors(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLFetch); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLRowCount.\n"); #endif if (m_bAbort) break; // action (insert, update, delete) query rc = SQLRowCount(m_hHandle, &iRowCount); HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLRowCount); if (!m_bNoCount && iRowCount != -1) { sprintf(szColName, "(%d row(s) affected)", iRowCount); _bstr_t temp(szColName); m_pOutputFile->WriteLine((BSTR)temp); m_pOutputFile->WriteLine(NULL); } #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeStmt.\n"); #endif if (m_bAbort) break; SQLFreeStmt(m_hHandle, SQL_UNBIND); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLMoreResults.\n"); #endif if (m_bAbort) break; // Process the next resultset. This function returns 'success with //info' even if there is no other resultset and there are statistics //messages to be printed. Hence the check for -1 rows before //printing. rc=SQLMoreResults(m_hHandle); if (rc != SQL_NO_DATA) HandleODBCError(rc, SQL_HANDLE_STMT, m_hHandle, SMSQLMoreResults); } while (rc != SQL_NO_DATA); return; } </pre>	<pre> void CExecute::PrintData(void *vData, SQLSMALLINT CType, SQLINTEGER IndPtr, SQLSMALLINT iScale, ISMLog *pOutput) { // PrintData accepts a pointer to the data, its C type, // and its byte length/indicator. It contains a switch statement that casts and prints // the data according to its type. char *s; char fmt[MAXBUFLen]; int j = 0; SQLINTEGER iColLen = IndPtr + 1; assert(iColLen); s = (LPSTR)m_malloc(iColLen + 1); if (s) { if (vData) { switch(CType) { case SQL_C_CHAR: case SQL_C_WCHAR: case SQL_C_TYPE_DATE: case SQL_C_TYPE_TIME: case SQL_C_TYPE_TIMESTAMP: case SQL_C_INTERVAL_YEAR: case SQL_C_INTERVAL_MONTH: case SQL_C_INTERVAL_YEAR_TO_MONTH: case SQL_C_INTERVAL_DAY: case SQL_C_INTERVAL_HOUR: case SQL_C_INTERVAL_MINUTE: case SQL_C_INTERVAL_SECOND: case SQL_C_INTERVAL_DAY_TO_HOUR: case SQL_C_INTERVAL_DAY_TO_MINUTE: case SQL_C_INTERVAL_DAY_TO_SECOND: case SQL_C_INTERVAL_HOUR_TO_MINUTE: case SQL_C_INTERVAL_HOUR_TO_SECOND: case SQL_C_INTERVAL_MINUTE_TO_SECOND: case SQL_C_BINARY: sprintf(fmt, "%%.%ds", iColLen); j = sprintf(s, fmt, (char *)vData); break; case SQL_C_SHORT: j = sprintf(s, "%d", *(short *)vData); break; case SQL_C_LONG: j = sprintf(s, "%ld", *(long *)vData); break; case SQL_C_UBIGINT: j = sprintf(s, "%I64d", *(__int64 *)vData); break; } } } } </pre>
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<pre> case SQL_C_FLOAT: j = sprintf(s, "%f", *(float *)vData); break; case SQL_C_DOUBLE: j = sprintf(s, "%f", *(double *)vData); break; case SQL_C_NUMERIC: sprintf(fmt, "%.0%df", iScale); j = sprintf(s, fmt, *(double *)vData); break; default: j = sprintf(s, "%s", vData); break; } } // Strip off terminating null character and pad the string with blanks if (iColLen - j > 0) memset(s + j, ' ', iColLen - j); *(s + iColLen) = '\0'; // Write the field to the output file _bstr_t temp(s); pOutput->WriteField((BSTR)temp); free(s); } return; } SQLSMALLINT CExecute::GetDefaultCType(SQLINTEGER SQLType) { // GetDefaultCType returns the C type for the passed in SQL datatype. switch(SQLType) { case SQL_CHAR: case SQL_VARCHAR: case SQL_LONGVARCHAR: case SQL_WCHAR: case SQL_WVARCHAR: case SQL_WLONGVARCHAR: return(SQL_C_CHAR); case SQL_TINYINT: return(SQL_C_CHAR); case SQL_SMALLINT: return(SQL_C_SHORT); case SQL_INTEGER: return(SQL_C_LONG); case SQL_BIGINT: return(SQL_C_UBIGINT); case SQL_REAL: return(SQL_C_FLOAT); </pre>	<pre> case SQL_FLOAT: case SQL_DOUBLE: // case SQL_DECIMAL: return(SQL_C_DOUBLE); case SQL_DECIMAL: return(SQL_C_CHAR); case SQL_BIT: return(SQL_C_CHAR); case SQL_BINARY: case SQL_VARBINARY: case SQL_LONGVARBINARY: return(SQL_C_CHAR); // return(SQL_C_BINARY); case SQL_TYPE_DATE: return(SQL_C_CHAR); // return(SQL_C_TYPE_DATE); case SQL_TYPE_TIME: return(SQL_C_CHAR); // return(SQL_C_TYPE_TIME); case SQL_TYPE_TIMESTAMP: return(SQL_C_CHAR); // return(SQL_C_TYPE_TIMESTAMP); case SQL_NUMERIC: return(SQL_C_FLOAT); case SQL_INTERVAL_YEAR: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_YEAR); case SQL_INTERVAL_MONTH: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_MONTH); case SQL_INTERVAL_YEAR_TO_MONTH: return(SQL_C_CHAR); // // return(SQL_C_INTERVAL_YEAR_TO_MONTH); case SQL_INTERVAL_DAY: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY); case SQL_INTERVAL_HOUR: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_HOUR); case SQL_INTERVAL_MINUTE: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_MINUTE); case SQL_INTERVAL_SECOND: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_SECOND); </pre>
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<pre> case SQL_INTERVAL_DAY_TO_HOUR: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY_TO_HOUR); case SQL_INTERVAL_DAY_TO_MINUTE: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY_TO_MINUTE); case SQL_INTERVAL_DAY_TO_SECOND: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_DAY_TO_SECOND); case SQL_INTERVAL_HOUR_TO_MINUTE: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_HOUR_TO_MINUTE); case SQL_INTERVAL_HOUR_TO_SECOND: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_HOUR_TO_SECOND); case SQL_INTERVAL_MINUTE_TO_SECOND: return(SQL_C_CHAR); // return(SQL_C_INTERVAL_MINUTE_TO_SECOND); default: assert(TRUE); return(SQL_C_CHAR); break; } } /* FUNCTION: LogODBCErrors(SQLRETURN rc, SWORD fHandleType, SQLHANDLE handle) COMMENTS: Formats ODBC errors or warnings and logs them. Also initializes the completion status for the step to failure, if an ODBC error has occurred. */ void CExecute::LogODBCErrors(SQLRETURN nResult, SWORD fHandleType, SQLHANDLE handle, OdbcOperations FailedOp) { // Messages returned by the server (e.g. Print statements) will be logged to the output file // ODBC warnings will be logged to the log file // All other ODBC errors will be logged to the error file. UCHAR szErrState[SQL_SQLSTATE_SIZE+1]; // SQL Error State string UCHAR szErrMsg[SQL_MAX_MESSAGE_LENGTH+1]; // SQL Error Text string char szBuffer[SQL_SQLSTATE_SIZE+SQL_MAX_MESSAGE _LENGTH+MAXBUFLen+1] = ""; // formatted Error text Buffer </pre>	<pre> SWORD wErrMsgLen; // Error message length SQLINTEGER dwErrCode; // Native Error code SQLRETURN nErrResult; // Return Code from SQLGetDiagRec SWORD sMsgNum = 1; // Error sequence number _bstr_t temp; if (IsErrorReturn(nResult)) { sprintf(szBuffer, "ODBC Operation: '%s' returned error code: %d", g_szOdbcOps[FailedOp], nResult); temp = szBuffer; m_pErrorFile->WriteLine((BSTR) temp); m_StepStatus = gintFailed; } if (handle == SQL_NULL_HSTMT) return; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLGetDiagRec.\n"); #endif // call SQLGetDiagRec function with proper ODBC handles, repeatedly until // function returns SQL_NO_DATA. while (!m_bAbort && (nErrResult = SQLGetDiagRec(fHandleType, handle, sMsgNum++, szErrState, &dwErrCode, szErrMsg, SQL_MAX_MESSAGE_LENGTH-1, &wErrMsgLen)) != SQL_NO_DATA) { if (!SQL_SUCCEEDED(nErrResult)) break; if (m_pOutputFile && IsServerMessage(dwErrCode, szErrMsg)) { wsprintf(szBuffer, SM_SQLMSG_FORMAT, (LPSTR)szErrMsg); temp = szBuffer; m_pOutputFile->WriteLine((BSTR) temp); } else if (IsODBCWarning(szErrState) && dwErrCode != SM_SQL_ERR_CHANGED_DB && dwErrCode != SM_SQL_ERR_CHANGED_LANG) { // Suppress warnings - 'Changed database context to...' and 'Changed language setting to...' wsprintf(szBuffer, SM_SQLMSG_FORMAT, ParseOdbcMsgPrefixes((LPCSTR)szErrMsg)); temp = szBuffer; m_pOutputFile->WriteLine((BSTR) temp); } else if (m_pErrorFile && !IsODBCWarning(szErrState)) { wsprintf(szBuffer, SM_SQLERR_FORMAT, (LPSTR)szErrState, dwErrCode, (LPSTR)szErrMsg); temp = szBuffer; m_pErrorFile->WriteLine((BSTR) temp); } } } </pre>
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<pre> /* FUNCTION: LogErrors(SQLRETURN rc, SWORD fHandleType, SQLHANDLE handle) COMMENTS: Writes the error message to the error log */ void CExecError::LogErrors(CExecute *p) { _bstr_t temp(m_szExecErrorDesc[m_iErrCode]); if (p->m_pErrorFile) p->m_pErrorFile->WriteLine((BSTR)temp); return; } /* FUNCTION: ODBCcleanup(HDBC *hdbc, HSTMT *hstmt) COMMENTS: Cleanup of all ODBC structures */ void CExecute::ODBCcleanup(HDBC *hdbc, HSTMT *hstmt) { SQLRETURN IReturn; #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing ODBCcleanup.\n"); #endif if (*hstmt != SQL_NULL_HSTMT) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLCloseCursor.\n"); #endif SQLCloseCursor(hstmt); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hstmt.\n"); #endif SQLFreeHandle(SQL_HANDLE_STMT, hstmt); *hstmt = SQL_NULL_HSTMT; } // Cleanup connection if it is a dynamic connection if (IsDynamicConnection()) { if (*hdbc != SQL_NULL_HDBC) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDisconnect.\n"); #endif IReturn = SQLDisconnect(*hdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hdbc.\n"); #endif SQLFreeHandle(SQL_HANDLE_DBC, hdbc); *hdbc = SQL_NULL_HDBC; } } else ResetConnectionUsage(); return; } </pre>	<pre> // Wrapper function that raises an error if a Windows Api fails STDMETHODIMP CExecute::RaiseSystemError(void) { char s[MAXBUFLLEN]; GetSystemError(s); return Error(s, 0, NULL, GUID_NULL); } // Wrapper function that logs the error raised by an Api function to the passed in file void CExecute::LogSystemError(ISMLog *pFile) { if (pFile) { char s[MAXBUFLLEN]; GetSystemError(s); _bstr_t temp(s); pFile->WriteLine((BSTR)temp); } } // Populates the passed in string with the last Windows Api error that occurred void CExecute::GetSystemError(LPSTR s) { long c; DWORD e; e = GetLastError(); c = sprintf(s, "Error code: %ld. ", e); c = FormatMessage(FORMAT_MESSAGE_FROM_SYSTEM FORMAT_MESSAGE_IGNORE_INSERTS, NULL, e, 0, s + c, MAXBUFLLEN - c, NULL); return; } STDMETHODIMP CExecute::get_StepStatus(InstanceStatus *pVal) { *pVal = m_StepStatus; return S_OK; } STDMETHODIMP CExecute::WriteError(BSTR szMsg) { if (m_pErrorFile) return(m_pErrorFile->WriteLine(szMsg)); return S_OK; } </pre>
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// FILE: Execute.h
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
//
// PURPOSE: Declaration of the CExecute
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// Execute.h : Declaration of the CExecute

#ifndef __EXECUTE_H_
#define __EXECUTE_H_

#include <atlwin.h>
#include <comdef.h>
#include <stdio.h>
#include "resource.h" // main symbols
#include "ExecuteDIICP.h"
#include "..\LogWriter\LogWriter.h"
#include "..\LogWriter\SMLog.h"
#include "..\common\SMTime\SMTime.h"
#include "..\common\SMTime\SMTimer.h"

// ODBC-specific includes
#define DBNTWIN32
#include <sqltypes.h>
#include <sql.h>
#include <sqlext.h>

/////////////////////////////////////////////////////////////////
// CExecute

#define WM_TASK_START (WM_USER + 101)
#define WM_TASK_FINISH (WM_USER + 102)

#define SM_SQLERR_FORMAT "SQL Error State:%s, Native
Error Code: %ld\r\nODBC Error: %s"
// format for ODBC error
messages
#define SM_SQLWARN_FORMAT SM_SQLERR_FORMAT //
format for ODBC warnings
#define SM_SQLMSG_FORMAT "%s" // format
for messages from the server

#define SM_SQL_STATE_WARNING "01000"
#define SM_MSG_SERVER "[Microsoft][ODBC
SQL Server Driver][SQL Server]"
#define SM_SQL_ERR_CHANGED_DB 5701
#define SM_SQL_ERR_CHANGED_LANG 5703
#define SM_STEPMASTER_ERROR "StepMaster Error: "
#define CMD_SEPARATOR "\nGO"
#define INV_ARRAY_INDEX -1 // invalid index into an
array
#define MAXBUFLen 256 // display buffer size
#define MAXLOGCMDLEN 256 // maximum
//characters in command that will be printed to log
#define MAXLOGCMDMBUF 512 // maximum
//characters in command that will be printed to log
#define MAX_DATA_LEN 4000 // maximum buffer
//size for variable-length data types // viz. character and binary
//fields
#define FILE_ACCESS_READ "r" // Open file for read access
#define S_NULL "NULL"

// Define a macro to increase the size of a buffer so it is a
multiple of teh alignment size.
// Thus, if a buffer starts on an alignment boundary, it will end
just before the next
// alignment boundary. Here, an alignment size of 4 is used
because this is the size of the
// largest data type used in the application's buffer - the size of an
SDWORD and of the largest
// default C data type are both 4. If a larger data type (such as
__int64) is used, it will be
// necessary to align for that size.
#define ALIGNSIZE 4
#define ALIGNBUF(Length) ((Length) % ALIGNSIZE) ? \
((Length) + ALIGNSIZE - ((Length) % ALIGNSIZE)) :
(Length)

#define MAX_BUFFER_SIZE 64000

typedef enum OdbcOperations
{
SMSQLAllocHandle,
SMSQLDriverConnect,
SMSQLExecDirect,
SMSQLSetStmtAttr,
SMSQLCancel,
SMSQLNumResultCols,
SMSQLDescribeCol,
SMSQLColAttribute,
SMSQLFetch,
SMSQLGetData,
SMSQLRowCount,
SMSQLMoreResults,
SMSQLBindCol,
};

class CODBCError
{
public:
CODBCError(SQLRETURN nResult, SWORD
fHandleType, SQLHANDLE handle, OdbcOperations
FailedOp)
{
m_fHandleType = fHandleType;
m_handle = handle;
m_FailedOp = FailedOp;
m_nResult = nResult;
};

private:
SWORD m_fHandleType;
SQLHANDLE m_handle;
OdbcOperations m_FailedOp;
SQLRETURN m_nResult;

private:
inline BOOL IsServerMessage(SQLINTEGER INativeError,
UCHAR *szErr){
return( (strchr(LPCTSTR)szErr, SM_MSG_SERVER) !=
NULL) ? (INativeError == 0) : FALSE; }
inline BOOL IsODBCWarning(UCHAR *szSqlState){
return(strcmp(LPCTSTR)szSqlState,
SM_SQL_STATE_WARNING) == 0;}
inline LPCSTR ParseOdbcMsgPrefixes(LPCSTR szMsg){ char
*pDest;
return( (pDest = strchr(szMsg, SM_MSG_SERVER)) ==
NULL ? szMsg : pDest + strlen(SM_MSG_SERVER)); }
};

```

<pre> class ATL_NO_VTABLE CExecute : public CWindowImpl<CExecute>, public CComObjectRootEx<CComSingleThreadModel>, public CComCoClass<CExecute, &CLSID_Execute>, public IConnectionPointContainerImpl<CExecute>, public ISupportErrorInfo, public IDispatchImpl<IExecute, &IID_IExecute, &LIBID_EXECUTEDLLLib>, public CProxy_IExecuteEvents<CExecute > { public: CExecute() { m_pErrorFile = NULL; //m_pLogFile = NULL; m_pOutputFile = NULL; // Initialize the elapsed time for the step m_tElapsedTime = 0; // Initialize the run status for the step m_StepStatus = gintPending; m_hHandle = SQL_NULL_HSTMT; m_bAbort = FALSE; m_iConnectionIndex = INV_ARRAY_INDEX; } ~CExecute() { } friend class CExecError; public: DECLARE_WND_CLASS("Execute") BEGIN_MSG_MAP(CExecute) MESSAGE_HANDLER(WM_TASK_FINISH, OnTaskFinished) MESSAGE_HANDLER(WM_TASK_START, OnTaskStarted) END_MSG_MAP() public: HRESULT OnTaskStarted(UINT uMsg, WPARAM wParam, LPARAM lParam, BOOL& bHandled) { CURRENCY CStartTime = Get64BitTime(&m_tStartTime); Fire_Start(CStartTime); return 0; } </pre>	<pre> HRESULT OnTaskFinished(UINT uMsg, WPARAM wParam, LPARAM lParam, BOOL& bHandled) { CURRENCY CEndTime = Get64BitTime(&m_tEndTime); Fire_Complete(CEndTime, (long)m_tElapsedTime); return 0; } HRESULT FinalConstruct() { HRESULT hr; RECT rect; rect.left=0; rect.right=100; rect.top=0; rect.bottom=100; HWND hwnd = Create(NULL, rect, "ExecuteWindow", WS_POPUP); if (!hwnd) return HRESULT_FROM_WIN32(GetLastError()); hr = CoCreateInstance(CLSID_SMLog, NULL, CLSCTX_INPROC, IID_ISMLog, (void **)&m_pErrorFile); if FAILED(hr) return(hr); m_pErrorFile->put_Append(TRUE); //hr = CoCreateInstance(CLSID_SMLog, NULL, CLSCTX_INPROC, // IID_ISMLog, (void **)&m_pLogFile); //if FAILED(hr) // return(hr); hr = CoCreateInstance(CLSID_SMLog, NULL, CLSCTX_INPROC, IID_ISMLog, (void **)&m_pOutputFile); if FAILED(hr) return(hr); m_pOutputFile->put_Append(TRUE); hr = CoCreateInstance(CLSID_SMTimer, NULL, CLSCTX_INPROC, IID_ISMTimer, (void **)&m_ExecTime); if FAILED(hr) return(hr); return S_OK; } </pre>
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<pre> void FinalRelease() { if (m_hWnd != NULL) DestroyWindow(); // Close the log and error files if (m_pErrorFile) m_pErrorFile->Release(); m_pErrorFile = NULL; //if (m_pLogFile) // m_pLogFile->Release(); //m_pLogFile = NULL; if (m_ExecTime) m_ExecTime->Release(); m_ExecTime = NULL; } DECLARE_REGISTRY_RESOURCEID(IDR_EXECUTE) DECLARE_PROTECT_FINAL_CONSTRUCT() BEGIN_COM_MAP(CExecute) COM_INTERFACE_ENTRY(IExecute) COM_INTERFACE_ENTRY(ISupportErrorInfo) COM_INTERFACE_ENTRY(IDispatch) COM_INTERFACE_ENTRY(IConnectionPointContainer) COM_INTERFACE_ENTRY_IMPL(IConnectionPointContainer) END_COM_MAP() BEGIN_CONNECTION_POINT_MAP(CExecute) CONNECTION_POINT_ENTRY(DIID_IExecuteEvents) END_CONNECTION_POINT_MAP() // ISupportsErrorInfo STDMETHOD(InterfaceSupportsErrorInfo)(REFIID riid); // IExecute public: STDMETHOD(put_ErrorFile)(/*[in]*/ BSTR newVal); STDMETHOD(put_OutputFile)(/*[in]*/ BSTR newVal); STDMETHOD(WriteError)(BSTR szMsg); STDMETHOD(Abort()); STDMETHOD(get_StepStatus)(/*out, retval*/ InstanceStatus *pVal); STDMETHOD(DoExecute)(/*[in]*/ BSTR szCommand, /*[in]*/ BSTR szExecutionDtls, /*[in]*/ ExecutionType ExecMethod, /*[in]*/ BOOL bNoCount, /*[in]*/ BOOL bNoExecute, /*[in]*/ BOOL bParseOnly, /*[in]*/ BOOL bQuotedIds, /*[in]*/ BOOL bAnsiNulls, /*[in]*/ BOOL bShowQP, /*[in]*/ BOOL bStatsTime, /*[in]*/ BOOL bStatsIO, /*[in]*/ long lRowCount, /*[in]*/ long lQueryTmout, /*[in]*/ BSTR szConnection); TC_TIME ExecuteShell(); TC_TIME ExecuteODBC(); STDMETHODIMP AbortShell(); STDMETHODIMP AbortODBC(); _bstr_t m_szCommand; _bstr_t m_szExecDtls; _bstr_t m_szConnection; </pre>	<pre> DWORD m_lMode; //DATE m_CurTime; SYSTEMTIME m_tStartTime; SYSTEMTIME m_tEndTime; TC_TIME m_tElapsedTime; ISMLog *m_pErrorFile; //ILog *m_pLogFile; ISMLog *m_pOutputFile; ISMTimer *m_ExecTime; ExecutionType m_ExecMthd; InstanceStatus m_StepStatus; HANDLE m_hHandle; // Process handle for shell commands and // Statement handle for ODBC commands LPSTR m_szCmd; private: LPSTR NextCmdInBatch(LPSTR szBatch); void ProcessResultsets(); SQLSMALLINT GetDefaultCType(SQLINTEGER SQLType); void PrintData(void *vData, SQLSMALLINT CType, SQLINTEGER IndPtr, SQLSMALLINT iScale, ISMLog *pOutput); void LogODBCErrors(SQLRETURN nResult, SWORD fHandleType, SQLHANDLE handle, OdbcOperations FailedOp); void ODBCcleanup(HDBC *hdbc, HSTMT *hstmt); STDMETHODIMP RaiseSystemError(void); void LogSystemError(ISMLog *pFile); void GetSystemError(LPSTR s); void SetConnectionOption(LPSTR szConn, HDBC *pHdbc); void ResetConnectionProperties(HDBC *p_hdbc); void InitializeConnection(HDBC *phdbc, BOOL *pbDoConnect); void ReConnectDeadConnection(HDBC *phdbc); void ResetConnectionUsage(); int m_iConnectionIndex; BOOL m_bNoCount, m_bNoExecute, m_bParseOnly, m_bQuotedIds, m_bAnsiNulls, \ m_bShowQP, m_bStatsTime, m_bStatsIO; long m_lRowCount; SQLINTEGER m_lQueryTmout; _bstr_t m_ErrorFile, m_OutputFile; BOOL m_bAbort; </pre>
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<pre> private: inline BOOL IsServerMessage(SQLINTEGER INativeError, UCHAR *szErr){ return((strstr(LPCTSTR)szErr, SM_MSG_SERVER) != NULL) ? (INativeError == 0) : FALSE; } inline BOOL IsODBCWarning(UCHAR *szSqlState){ return(strcmp(LPCTSTR)szSqlState, SM_SQL_STATE_WARNING) == 0);} inline BOOL IsErrorReturn(SQLRETURN iRetCode){ return((!SQL_SUCCEEDED(iRetCode)) && (iRetCode != SQL_NO_DATA));} inline LPCSTR ParseOdbcMsgPrefixes(LPCSTR szMsg){ char *pDest; return((pDest = strstr(szMsg, SM_MSG_SERVER)) == NULL ? szMsg : pDest + strlen(SM_MSG_SERVER));} inline BOOL IsDynamicConnection(){ return(!strcmp(LPCTSTR)m_szConnection, ""));} inline void HandleODBCError(SQLRETURN rc, SWORD fHandleType, SQLHANDLE handle, OdbcOperations OdbcOp) { if (rc != SQL_SUCCESS) { LogODBCErrors(rc, fHandleType, handle, OdbcOp); if (IsErrorReturn(rc)) throw new CODBCError(rc, fHandleType, handle, OdbcOp); } return; } }; class CExecError { public: typedef enum ExecErrorCodes { SM_ERR_CONN_IN_USE, }; CExecError(int iError) { m_iErrCode = iError; }; void LogErrors(CExecute *p); private: int m_iErrCode; static char *m_szExecErrorDesc[]; }; void ExecutionThread(LPVOID lpParameter); #ifdef _TPCH_AUDIT void WriteFileToTpchLog(LPCTSTR szFile, LPCTSTR szFmt); void WriteToTpchLog(char *szMsg); #endif </pre>	<pre> #endif // _EXECUTE_H // FILE: ExecuteDll.cpp // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // PURPOSE: Implementation of DLL Exports. // Contact: Reshma Tharamal (reshmat@microsoft.com) // // Note: Proxy/Stub Information // To build a separate proxy/stub DLL, // run nmake -f ExecuteDlls.mk in the project directory. #include "stdafx.h" #include "resource.h" #include <initguid.h> #include "..\LogWriter\LogWriter.h" #include "..\LogWriter\LogWriter_i.c" #include "..\common\SMTime\SMTime.h" #include "..\common\SMTime\SMTime_i.c" #include "ExecuteDll.h" #include "SMExecute.h" #include "ExecuteDll_i.c" #include "Execute.h" CComModule _Module; BEGIN_OBJECT_MAP(ObjectMap) OBJECT_ENTRY(CLSID_Execute, CExecute) END_OBJECT_MAP() SQLHENV henv = NULL; // ODBC environment handle static char szCaption[] = "StepMaster"; // Message box caption CRITICAL_SECTION hConnections; // Critical section to serialize access // to available connections SM_Connection_Info *p_Connections = NULL; // Pointer to open connections int iConnectionCount = 0; // Number of open connections #ifdef _TPCH_AUDIT FILE *pfLogFile = NULL; // Log file containing timestamps CRITICAL_SECTION hLogFileWrite; // Critical section to serialize writes to log static char szFileOpenModeAppend[] = "a+"; // Log file open mode static char szEnvVarLogFile[] = "TPCH_LOG_FILE"; // Environment variable - initialized to // log file name if timing information // is to be logged #endif </pre>
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<pre> void ShowODBCErrors(SWORD fHandleType, SQLHANDLE handle); void CloseOpenConnections(); // // DLL Entry Point extern "C" BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD dwReason, LPVOID /*IpReserved*/) { if (dwReason == DLL_PROCESS_ATTACH) { _Module.Init(ObjectMap, hInstance, &LIBID_EXECUTEDLLLib); DisableThreadLibraryCalls(hInstance); #ifdef _TPCH_AUDIT char szMsg[MAXBUFLen]; LPSTR szLogFileName = getenv(szEnvVarLogFile); if (szLogFileName == NULL) { sprintf(szMsg, "The environment variable '%s' does not exist. " "Step timing information will not be written to a log.", szEnvVarLogFile); MessageBox(NULL, szMsg, szCaption, MB_OK); } else { if ((pfLogFile = fopen(szLogFileName, szFileOpenModeAppend)) == NULL) { sprintf(szMsg, "The file '%s' does not exist. " "Step timing information will not be written to log.", szLogFileName); MessageBox(NULL, szMsg, szCaption, MB_OK); } else { InitializeCriticalSection(&hLogFileWrite); } } #endif InitializeCriticalSection(&hConnections); p_Connections = NULL; iConnectionCount = 0; if (!SQL_SUCCEEDED(SQLSetEnvAttr(NULL, SQL_ATTR_CONNECTION_POOLING, (SQLPOINTER)SQL_CP_ONE_PER_HENV , 0))) ShowODBCErrors(SQL_HANDLE_ENV, henv); if (!SQL_SUCCEEDED(SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv))) { ShowODBCErrors(SQL_HANDLE_ENV, henv); return FALSE; } if (!SQL_SUCCEEDED(SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (LPVOID)SQL_OV_ODBC3, 0))) ShowODBCErrors(SQL_HANDLE_ENV, henv); </pre>	<pre> SQLINTEGER CpMatch; if (!SQL_SUCCEEDED(SQLGetEnvAttr(henv, SQL_ATTR_CP_MATCH, &CpMatch, 0, NULL))) ShowODBCErrors(SQL_HANDLE_ENV, henv); if (!SQL_SUCCEEDED(SQLSetEnvAttr(henv, SQL_ATTR_CP_MATCH, (SQLPOINTER)SQL_CP_STRICT_MATCH, SQL_IS_INTEGER))) ShowODBCErrors(SQL_HANDLE_ENV, henv); } else if (dwReason == DLL_PROCESS_DETACH) { #ifdef _TPCH_AUDIT if (pfLogFile != NULL) { fclose(pfLogFile); DeleteCriticalSection(&hLogFileWrite); } #endif CloseOpenConnections(); if (henv != NULL) SQLFreeEnv(henv); DeleteCriticalSection(&hConnections); _Module.Term(); } return TRUE; // ok } void ShowODBCErrors(SWORD fHandleType, SQLHANDLE handle) { UCHAR szErrState[SQL_SQLSTATE_SIZE+1]; // SQL Error State string UCHAR szErrMsg[SQL_MAX_MESSAGE_LENGTH+1]; // SQL Error Text string char szBuffer[SQL_SQLSTATE_SIZE+SQL_MAX_MESSAGE _LENGTH+MAXBUFLen+1] = ""; // formatted Error text Buffer SWORD wErrMsgLen; // Error message length SQLINTEGER dwErrCode; // Native Error code SQLRETURN nErrMsg; // Return Code from SQLGetDiagRec SWORD sMsgNum = 1; // Error sequence number // call SQLGetDiagRec function with proper ODBC handles, repeatedly until // function returns SQL_NO_DATA. while ((nErrMsg = SQLGetDiagRec(fHandleType, handle, sMsgNum++, szErrState, &dwErrCode, szErrMsg, SQL_MAX_MESSAGE_LENGTH-1, &wErrMsgLen)) != SQL_NO_DATA) { if (!SQL_SUCCEEDED(nErrMsg)) break; wsprintf(szBuffer, SM_SQLERR_FORMAT, (LPSTR)szErrState, dwErrCode, (LPSTR)szErrMsg); MessageBox(NULL, szBuffer, szCaption, MB_OK); } } </pre>
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<pre> void CloseOpenConnections() { // Closes all open connections if (p_Connections) { for (int iConnIndex = iConnectionCount - 1; iConnIndex >= 0; iConnIndex--) { if ((p_Connections + iConnIndex)->hdbc != SQL_NULL_HDBC) { #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLDisconnect.\n"); #endif SQLDisconnect((p_Connections + iConnIndex)- >hdbc); #ifdef _DEBUG _CrtDbgReport(_CRT_WARN, NULL, 0, NULL, "Executing SQLFreeHandle for hdbc.\n"); #endif SQLFreeHandle(SQL_HANDLE_DBC, (p_Connections + iConnIndex)->hdbc = SQL_NULL_HDBC); } free(p_Connections); } p_Connections = NULL; } return; } //////////////////////////////////// // Used to determine whether the DLL can be unloaded by OLE STDAPI DllCanUnloadNow(void) { return (_Module.GetLockCount()==0) ? S_OK : S_FALSE; } //////////////////////////////////// // Returns a class factory to create an object of the requested type STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid, LPVOID* ppv) { return _Module.GetClassObject(rclsid, riid, ppv); } //////////////////////////////////// // DllRegisterServer - Adds entries to the system registry STDAPI DllRegisterServer(void) { // registers object, typelib and all interfaces in typelib return _Module.RegisterServer(TRUE); } </pre>	<pre> //////////////////////////////////// // DllUnregisterServer - Removes entries from the system registry STDAPI DllUnregisterServer(void) { return _Module.UnregisterServer(TRUE); } /* this ALWAYS GENERATED file contains the definitions for the interfaces */ /* File created by MIDL compiler version 5.01.0164 */ /* at Mon Jun 09 19:33:03 2003 */ /* Compiler settings for C:\charles\Stepmaster\ExecuteDll\ExecuteDll.idl: Oicf (OptLev=i2), W1, Zp8, env=Win32, ms_ext, c_ext error checks: allocation ref bounds_check enum stub_data */ //@@@MIDL_FILE_HEADING() /* verify that the <rpcndr.h> version is high enough to compile this file*/ #ifndef __REQUIRED_RPCNDR_H_VERSION__ #define __REQUIRED_RPCNDR_H_VERSION__ 440 #endif #include "rpc.h" #include "rpcndr.h" #ifndef __ExecuteDll_h__ #define __ExecuteDll_h__ #ifdef __cplusplus extern "C"{ #endif /* Forward Declarations */ #ifndef __IExecuteEvents_FWD_DEFINED__ #define __IExecuteEvents_FWD_DEFINED__ typedef interface IExecuteEvents IExecuteEvents; #endif /* __IExecuteEvents_FWD_DEFINED__ */ #ifndef __IExecute_FWD_DEFINED__ #define __IExecute_FWD_DEFINED__ typedef interface IExecute IExecute; #endif /* __IExecute_FWD_DEFINED__ */ #ifndef __Execute_FWD_DEFINED__ #define __Execute_FWD_DEFINED__ #ifdef __cplusplus typedef class Execute Execute; #else typedef struct Execute Execute; #endif /* __cplusplus */ #endif /* __Execute_FWD_DEFINED__ */ #endif /* __Execute_FWD_DEFINED__ */ </pre>
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<pre> /* header files for imported files */ #include "oaidl.h" #include "ocidl.h" void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t); void __RPC_USER MIDL_user_free(void __RPC_FAR *); /* interface __MIDL_itf_ExecuteDII_0000 */ /* [local] */ typedef /* [helpstring][uuid] */ enum ExecutionType { execODBC = 0x1, execShell = 0x2 } ExecutionType; typedef /* [helpstring][uuid] */ enum InstanceStatus { gintDisabled = 0x1, gintPending = 0x2, gintRunning = 0x3, gintComplete = 0x4, gintFailed = 0x5, gintAborted = 0x6 } InstanceStatus; extern RPC_IF_HANDLE __MIDL_itf_ExecuteDII_0000_v0_0_c_ifspec; extern RPC_IF_HANDLE __MIDL_itf_ExecuteDII_0000_v0_0_s_ifspec; #ifndef EXECUTEDLLlib_LIBRARY_DEFINED #define EXECUTEDLLlib_LIBRARY_DEFINED /* library EXECUTEDLLlib */ /* [helpstring][version][uuid] */ EXTERN_C const IID LIBID_EXECUTEEDLLlib; #ifndef IExecuteEvents_DISPINTERFACE_DEFINED #define IExecuteEvents_DISPINTERFACE_DEFINED /* dispinterface IExecuteEvents */ /* [helpstring][uuid] */ EXTERN_C const IID DIID_IExecuteEvents; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("551AC532-AB1C-11D2-BC0C-00A0C90D2CA5") _IExecuteEvents : public IDispatch { }; </pre>	<pre> #else /* C style interface */ typedef struct _IExecuteEventsVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(_IExecuteEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(_IExecuteEvents __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(_IExecuteEvents __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(_IExecuteEvents __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(_IExecuteEvents __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(_IExecuteEvents __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(_IExecuteEvents __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); END_INTERFACE } _IExecuteEventsVtbl; interface _IExecuteEvents { CONST_VTBL struct _IExecuteEventsVtbl __RPC_FAR *lpVtbl; }; </pre>
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<pre> #ifdef COBJMACROS #define _IExecuteEvents_QueryInterface(This,riid,ppvObject)\ (This)->lpVtbl -> QueryInterface(This,riid,ppvObject) #define _IExecuteEvents_AddRef(This)\ (This)->lpVtbl -> AddRef(This) #define _IExecuteEvents_Release(This)\ (This)->lpVtbl -> Release(This) #define _IExecuteEvents_GetTypeInfoCount(This,pctinfo) \ (This)->lpVtbl -> GetTypeInfoCount(This,pctinfo) #define _IExecuteEvents_GetTypeInfo(This,iTInfo,lcid,ppTInfo)\ (This)->lpVtbl -> GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define _IExecuteEvents_GetIDsOfNames(This,riid,rgszNames,cNames, lcid,rgDispId) \ (This)->lpVtbl -> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define _IExecuteEvents_Invoke(This,dispIdMember,riid,lcid,wFlags,pD ispParams,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl -> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR esult,pExcepInfo,puArgErr) #endif /* COBJMACROS */ #endif /* C style interface */ #endif /* _IExecuteEvents_DISPINTERFACE_DEFINED */ #ifndef _IExecute_INTERFACE_DEFINED_ #define _IExecute_INTERFACE_DEFINED_ /* interface IExecute */ /* [unique][helpstring][dual][uuid][object] */ EXTERN_C const IID IID_IExecute; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("551AC531-AB1C-11D2-BC0C- 00A0C90D2CA5") IExecute : public IDispatch { public: virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE DoExecute(/* [in] */ BSTR szCommand, /* [in] */ BSTR szExecutionDtls, /* [in] */ ExecutionType ExecMethod, /* [in] */ BOOL bNoCount, /* [in] */ BOOL bNoExecute, /* [in] */ BOOL bParseOnly, /* [in] */ BOOL bQuotedIds, /* [in] */ BOOL bAnsiNulls, /* [in] */ BOOL bShowQP, /* [in] */ BOOL bStatsTime, /* [in] */ BOOL bStatsIO, /* [in] */ long lRowCount, /* [in] */ long lQueryTmout, /* [in] */ BSTR szConnection) = 0; </pre>	<pre> virtual /* [helpstring][id][propget] */ HRESULT STDMETHODCALLTYPE get_StepStatus(/* [retval][out] */ InstanceStatus __RPC_FAR *pVal) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE Abort(void) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE WriteError(BSTR szMsg) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_OutputFile(/* [in] */ BSTR newVal) = 0; virtual /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE put_ErrorFile(/* [in] */ BSTR newVal) = 0; }; #else /* C style interface */ typedef struct IExecuteVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(IExecute __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(IExecute __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(IExecute __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(IExecute __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(IExecute __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(IExecute __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); </pre>
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<pre> /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(IExecute __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *DoExecute)(IExecute __RPC_FAR * This, /* [in] */ BSTR szCommand, /* [in] */ BSTR szExecutionDtls, /* [in] */ ExecutionType ExecMethod, /* [in] */ BOOL bNoCount, /* [in] */ BOOL bNoExecute, /* [in] */ BOOL bParseOnly, /* [in] */ BOOL bQuotedIds, /* [in] */ BOOL bAnsiNulls, /* [in] */ BOOL bShowQP, /* [in] */ BOOL bStatsTime, /* [in] */ BOOL bStatsIO, /* [in] */ long lRowCount, /* [in] */ long lQueryTmout, /* [in] */ BSTR szConnection); /* [helpstring][id][propget] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *get_StepStatus)(IExecute __RPC_FAR * This, /* [retval][out] */ InstanceStatus __RPC_FAR *pVal); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Abort)(IExecute __RPC_FAR * This); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *WriteError)(IExecute __RPC_FAR * This, BSTR szMsg); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *put_OutputFile)(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); /* [helpstring][id][propput] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *put_ErrorFile)(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); END_INTERFACE } IExecuteVtbl; interface IExecute { CONST_VTBL struct IExecuteVtbl __RPC_FAR *lpVtbl; }; </pre>	<pre> #ifndef COBJMACROS #define IExecute_QueryInterface(This,riid,ppvObject) \ (This)->lpVtbl->QueryInterface(This,riid,ppvObject) #define IExecute_AddRef(This) \ (This)->lpVtbl->AddRef(This) #define IExecute_Release(This) \ (This)->lpVtbl->Release(This) #define IExecute_GetTypeInfoCount(This,pctinfo) \ (This)->lpVtbl->GetTypeInfoCount(This,pctinfo) #define IExecute_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This)->lpVtbl->GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define IExecute_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgD ispId) \ (This)->lpVtbl-> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define IExecute_Invoke(This,dispIdMember,riid,lcid,wFlags,pDispPara ms,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl-> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR esult,pExcepInfo,puArgErr) #define IExecute_DoExecute(This,szCommand,szExecutionDtls,ExecMe thod,bNoCount,bNoExecute, bParseOnly,bQuotedIds,bAnsiNulls,bShowQP,bStatsTime,b StatsIO,lRowCount,lQueryTmout,szConnection)\ (This)->lpVtbl-> DoExecute(This,szCommand,szExecutionDtls,ExecMethod,bNo Count,bNoExecute,bParseOnly, bQuotedIds,bAnsiNulls,bShowQP,bStatsTime,bStatsIO,lR wCount,lQueryTmout,szConnection) #define IExecute_get_StepStatus(This,pVal) \ (This)->lpVtbl->get_StepStatus(This,pVal) #define IExecute_Abort(This) \ (This)->lpVtbl->Abort(This) #define IExecute_WriteError(This,szMsg) \ (This)->lpVtbl->WriteError(This,szMsg) #define IExecute_put_OutputFile(This,newVal) \ (This)->lpVtbl->put_OutputFile(This,newVal) #define IExecute_put_ErrorFile(This,newVal) \ (This)->lpVtbl->put_ErrorFile(This,newVal) #endif /* COBJMACROS */ #endif /* C style interface */ </pre>
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<pre> /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE IExecute_DoExecute_Proxy(IExecute __RPC_FAR * This, /* [in] */ BSTR szCommand, /* [in] */ BSTR szExecutionDtls, /* [in] */ ExecutionType ExecMethod, /* [in] */ BOOL bNoCount, /* [in] */ BOOL bNoExecute, /* [in] */ BOOL bParseOnly, /* [in] */ BOOL bQuotedIds, /* [in] */ BOOL bAnsiNulls, /* [in] */ BOOL bShowQP, /* [in] */ BOOL bStatsTime, /* [in] */ BOOL bStatsIO, /* [in] */ long lRowCount, /* [in] */ long lQueryTimeout, /* [in] */ BSTR szConnection); void __RPC_STUB IExecute_DoExecute_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *pRpcChannelBuffer, PRPC_MESSAGE pRpcMessage, DWORD *pdwStubPhase); /* [helpstring][id][propget] */ HRESULT STDMETHODCALLTYPE IExecute_get_StepStatus_Proxy(IExecute __RPC_FAR * This, /* [retval][out] */ InstanceStatus __RPC_FAR *pVal); void __RPC_STUB IExecute_get_StepStatus_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *pRpcChannelBuffer, PRPC_MESSAGE pRpcMessage, DWORD *pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE IExecute_Abort_Proxy(IExecute __RPC_FAR * This); void __RPC_STUB IExecute_Abort_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *pRpcChannelBuffer, PRPC_MESSAGE pRpcMessage, DWORD *pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE IExecute_WriteError_Proxy(IExecute __RPC_FAR * This, BSTR szMsg); void __RPC_STUB IExecute_WriteError_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *pRpcChannelBuffer, PRPC_MESSAGE pRpcMessage, DWORD *pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE IExecute_put_OutputFile_Proxy(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); </pre>	<pre> void __RPC_STUB IExecute_put_OutputFile_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *pRpcChannelBuffer, PRPC_MESSAGE pRpcMessage, DWORD *pdwStubPhase); /* [helpstring][id][propput] */ HRESULT STDMETHODCALLTYPE IExecute_put_ErrorFile_Proxy(IExecute __RPC_FAR * This, /* [in] */ BSTR newVal); void __RPC_STUB IExecute_put_ErrorFile_Stub(IRpcStubBuffer *This, IRpcChannelBuffer *pRpcChannelBuffer, PRPC_MESSAGE pRpcMessage, DWORD *pdwStubPhase); #endif /* __IExecute_INTERFACE_DEFINED__ */ EXTERN_C const CLSID CLSID_Execute; #ifdef __cplusplus class DECLSPEC_UUID("2EFC198E-AA8D-11D2-BC0C-00A0C90D2CA5") Execute; #endif #endif /* __EXECUTEDLLLib_LIBRARY_DEFINED__ */ /* Additional Prototypes for ALL interfaces */ /* end of Additional Prototypes */ #ifdef __cplusplus } #endif #endif // FILE: Execute.cpp // // FILE: ExecuteDllCP.h // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // // PURPOSE: Connection point implementation // Contact: Reshma Tharamal (reshmat@microsoft.com) // #ifdef _EXECUTEDLLCP_H_ #define _EXECUTEDLLCP_H_ </pre>
--	--

<pre> template <class T> class CProxy_IExecuteEvents : public IConnectionPointImpl<T, &DIID_IExecuteEvents, CComDynamicUnkArray> { //Warning this class may be recreated by the wizard. public: VOID Fire_Start(CY StartTime) { T* pT = static_cast<T*>(this); int nConnectionIndex; CComVariant* pvars = new CComVariant[1]; int nConnections = m_vec.GetSize(); for (nConnectionIndex = 0; nConnectionIndex < nConnections; nConnectionIndex++) { pT->Lock(); CComPtr<IUnknown> sp = m_vec.GetAt(nConnectionIndex); pT->Unlock(); IDispatch* pDispatch = reinterpret_cast<IDispatch*>(sp.p); if (pDispatch != NULL) { pvars[0] = StartTime; DISPPARAMS disp = { pvars, NULL, 1, 0 }; pDispatch->Invoke(0x1, IID_NULL, LOCALE_USER_DEFAULT, DISPATCH_METHOD, &disp, NULL, NULL, NULL); } } delete[] pvars; } VOID Fire_Complete(CY EndTime, LONG Elapsed) { T* pT = static_cast<T*>(this); int nConnectionIndex; CComVariant* pvars = new CComVariant[2]; int nConnections = m_vec.GetSize(); for (nConnectionIndex = 0; nConnectionIndex < nConnections; nConnectionIndex++) { pT->Lock(); CComPtr<IUnknown> sp = m_vec.GetAt(nConnectionIndex); pT->Unlock(); IDispatch* pDispatch = reinterpret_cast<IDispatch*>(sp.p); if (pDispatch != NULL) { pvars[1] = EndTime; pvars[0] = Elapsed; DISPPARAMS disp = { pvars, NULL, 2, 0 }; pDispatch->Invoke(0x2, IID_NULL, LOCALE_USER_DEFAULT, DISPATCH_METHOD, &disp, NULL, NULL, NULL); } } delete[] pvars; } }; </pre>	<pre> #endif// FILE: resource.h // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // // PURPOSE: Resource file // Contact: Reshma Tharamal (reshmat@microsoft.com) // //{NO_DEPENDENCIES} // Microsoft Developer Studio generated include file. // Used by ExecuteDll.rc // #define IDS_PROJNAME 100 #define IDR_EXECUTE 101 #define IDR_LOG 102 #define IDR_EXECUTEHELL 103 #define SM_SYSTEM_ERROR 0x0201 // Next default values for new objects // #ifndef APSTUDIO_INVOKED #ifndef APSTUDIO_READONLY_SYMBOLS #define _APS_NEXT_RESOURCE_VALUE 201 #define _APS_NEXT_COMMAND_VALUE 32768 #define _APS_NEXT_CONTROL_VALUE 201 #define _APS_NEXT_SYMED_VALUE 104 #endif #endif // FILE: SMExecute.h // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // PURPOSE: Common include file for Execute.cpp and ExecuteDll.cpp // Contact: Reshma Tharamal (reshmat@microsoft.com) // #pragma once // ODBC-specific includes #define DBNTWIN32 #include <sqltypes.h> #include <sql.h> #include <sqlext.h> #define CONNECTION_NAME_LEN 256 // connection name length typedef struct _SM_Connection_Info { charszConnectionName[CONNECTION_NAME_LEN]; HDBC hdbc; BOOL bInUse; } SM_Connection_Info; </pre>
--	--

```

// FILE:   stdafx.cpp
//        Microsoft TPC-H Kit Ver. 1.00
//        Copyright Microsoft, 1999
//        All Rights Reserved
//
//
// PURPOSE: source file that includes just the standard
includes
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// stdafx.cpp : source file that includes just the standard includes
// stdafx.pch will be the pre-compiled header
// stdafx.obj will contain the pre-compiled type information

#include "stdafx.h"

#ifdef _ATL_STATIC_REGISTRY
#include <statreg.h>
#include <statreg.cpp>
#endif

#include <atimpl.cpp>
// FILE:   stdafx.h
//        Microsoft TPC-H Kit Ver. 1.00
//        Copyright Microsoft, 1999
//        All Rights Reserved
//
//
// PURPOSE: include file for standard system include files,
// or project specific include files that are used frequently,
// but are changed infrequently
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
//
#if
!defined(AFX_STDAFX_H__551AC528_AB1C_11D2_BC0C_
00A0C90D2CA5__INCLUDED_)
#define
AFX_STDAFX_H__551AC528_AB1C_11D2_BC0C_00A0C90
D2CA5__INCLUDED_

#if _MSC_VER > 1000
#pragma once
#endif // _MSC_VER > 1000

#define STRICT
#ifdef _WIN32_WINNT
#define _WIN32_WINNT 0x0400
#endif
#define _ATL_APARTMENT_THREADED

#include <atlbase.h>
//You may derive a class from CComModule and use it if you
want to override
//something, but do not change the name of _Module
extern CComModule _Module;
#include <atlcom.h>

//{{AFX_INSERT_LOCATION}}
// Microsoft Visual C++ will insert additional declarations
immediately before the previous line.

#endif //
!defined(AFX_STDAFX_H__551AC528_AB1C_11D2_BC0C_
00A0C90D2CA5__INCLUDED)

```

```

// FILE: resource.h
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
// PURPOSE: Resource file
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by SMTimer.rc
//
#define IDS_PROJNAME 100
#define IDR_SMTIMER 102

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifdef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE 201
#define _APS_NEXT_COMMAND_VALUE 32768
#define _APS_NEXT_CONTROL_VALUE 201
#define _APS_NEXT_SYMED_VALUE 103
#endif
#endif
// FILE: SMTimer.cpp
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
// PURPOSE: Implementation of DLL Exports.
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// SMTimer.cpp : Implementation of DLL Exports.

// Note: Proxy/Stub Information
// To build a separate proxy/stub DLL,
// run nmake -f SMTimers.mk in the project directory.

#include "stdafx.h"
#include "resource.h"
#include <initguid.h>
#include "SMTimer.h"

#include "SMTimer_i.c"
#include "SMTimer.h"

CComModule _Module;

BEGIN_OBJECT_MAP(ObjectMap)
OBJECT_ENTRY(CLSID_SMTimer, CSMTimer)
END_OBJECT_MAP()

////////////////////////////////////
// DLL Entry Point
extern "C"
BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD
dwReason, LPVOID /*IpReserved*/)
{
if (dwReason == DLL_PROCESS_ATTACH)
{
_Module.Init(ObjectMap, hInstance,
&LIBID_SMTIMELib);
DisableThreadLibraryCalls(hInstance);
}
else if (dwReason == DLL_PROCESS_DETACH)
_Module.Term();
return TRUE; // ok
}

////////////////////////////////////
// Used to determine whether the DLL can be unloaded by OLE

STDAPI DllCanUnloadNow(void)
{
return (_Module.GetLockCount()==0) ? S_OK : S_FALSE;
}

////////////////////////////////////
// Returns a class factory to create an object of the requested type

STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid,
LPVOID* ppv)
{
return _Module.GetClassObject(rclsid, riid, ppv);
}

////////////////////////////////////
// DllRegisterServer - Adds entries to the system registry

STDAPI DllRegisterServer(void)
{
// registers object, typelib and all interfaces in typelib
return _Module.RegisterServer(TRUE);
}

////////////////////////////////////
// DllUnregisterServer - Removes entries from the system
registry

STDAPI DllUnregisterServer(void)
{
return _Module.UnregisterServer(TRUE);
}

/* this ALWAYS GENERATED file contains the definitions for
the interfaces */

/* File created by MIDL compiler version 5.01.0164 */
/* at Thu Sep 19 17:49:55 2002
*/
/* Compiler settings for
C:\charles\Stepmaster\COMMON\SMTimer\SMTimer.idl:
Oicf (OptLev=i2), W1, Zp8, env=Win32, ms_ext, c_ext
error checks: allocation ref bounds_check enum stub_data
*/
//@@MIDL_FILE_HEADING( )

```

<pre> /* verify that the <rpcndr.h> version is high enough to compile this file*/ #ifndef __REQUIRED_RPCNDR_H_VERSION__ #define __REQUIRED_RPCNDR_H_VERSION__ 440 #endif #include "rpc.h" #include "rpcndr.h" #ifndef __RPCNDR_H_VERSION__ #error this stub requires an updated version of <rpcndr.h> #endif // __RPCNDR_H_VERSION__ #ifndef COM_NO_WINDOWS_H #include "windows.h" #include "ole2.h" #endif /*COM_NO_WINDOWS_H*/ #ifndef __SMTTime_h__ #define __SMTTime_h__ #ifdef __cplusplus extern "C"{ #endif /* Forward Declarations */ #ifndef __ISMTimer_FWD_DEFINED__ #define __ISMTimer_FWD_DEFINED__ typedef interface ISMTimer ISMTimer; #endif /* __ISMTimer_FWD_DEFINED__ */ #ifndef __SMTimer_FWD_DEFINED__ #define __SMTimer_FWD_DEFINED__ #ifdef __cplusplus typedef class SMTimer SMTimer; #else typedef struct SMTimer SMTimer; #endif /* __cplusplus */ #endif /* __SMTimer_FWD_DEFINED__ */ /* header files for imported files */ #include "oaidl.h" #include "ocidl.h" void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t); void __RPC_USER MIDL_user_free(void __RPC_FAR *); #ifndef __ISMTimer_INTERFACE_DEFINED__ #define __ISMTimer_INTERFACE_DEFINED__ /* interface ISMTimer */ /* [unique][helpstring][dual][uuid][object] */ EXTERN_C const IID IID_ISMTimer; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("1A6D0AE4-8528-453B-B8E3-8DAD1F0561B7") ISMTimer : public IDispatch { public: </pre>	<pre> virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE Start(void) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE Stop(CURRENCY __RPC_FAR *pElapsedTime) = 0; virtual /* [helpstring][id][propget] */ HRESULT STDMETHODCALLTYPE get_Running(/* [retval][out] */ BOOL __RPC_FAR *pVal) = 0; }; #else /* C style interface */ typedef struct ISMTimerVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(ISMTimer __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(ISMTimer __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(ISMTimer __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(ISMTimer __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(ISMTimer __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(ISMTimer __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(ISMTimer __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); </pre>
---	--

<pre> /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Start)(ISMTimer __RPC_FAR * This); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Stop)(ISMTimer __RPC_FAR * This, CURRENCY __RPC_FAR *pElapsedTime); /* [helpstring][id][propget] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *get_Running)(ISMTimer __RPC_FAR * This, /* [retval][out] */ BOOL __RPC_FAR *pVal); END_INTERFACE } ISMTimerVtbl; interface ISMTimer { CONST_VTBL struct ISMTimerVtbl __RPC_FAR *lpVtbl; }; #ifdef COBJMACROS #define ISMTimer_QueryInterface(This,riid,ppvObject) \ (This->lpVtbl->QueryInterface(This,riid,ppvObject) #define ISMTimer_AddRef(This) \ (This->lpVtbl->AddRef(This) #define ISMTimer_Release(This) \ (This->lpVtbl->Release(This) #define ISMTimer_GetTypeInfoCount(This,ptinfo) \ (This->lpVtbl->GetTypeInfoCount(This,ptinfo) #define ISMTimer_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This->lpVtbl->GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define ISMTimer_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rg DispId) \ (This->lpVtbl-> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define ISMTimer_Invoke(This,dispIdMember,riid,lcid,wFlags,pDispPar ams,pVarResult,pExcepInfo,puArgErr) \ (This->lpVtbl-> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR esult,pExcepInfo,puArgErr) #define ISMTimer_Start(This) \ (This->lpVtbl->Start(This) #define ISMTimer_Stop(This,pElapsedTime) \ (This->lpVtbl->Stop(This,pElapsedTime) #define ISMTimer_get_Running(This,pVal) \ (This->lpVtbl->get_Running(This,pVal) #endif /* COBJMACROS */ #endif /* C style interface */ </pre>	<pre> /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMTimer_Start_Proxy(ISMTimer __RPC_FAR * This); void __RPC_STUB ISMTimer_Start_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMTimer_Stop_Proxy(ISMTimer __RPC_FAR * This, CURRENCY __RPC_FAR *pElapsedTime); void __RPC_STUB ISMTimer_Stop_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id][propget] */ HRESULT STDMETHODCALLTYPE ISMTimer_get_Running_Proxy(ISMTimer __RPC_FAR * This, /* [retval][out] */ BOOL __RPC_FAR *pVal); void __RPC_STUB ISMTimer_get_Running_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); #endif /* __ISMTimer_INTERFACE_DEFINED__ */ #ifndef __SMTIMELib_LIBRARY_DEFINED__ #define __SMTIMELib_LIBRARY_DEFINED__ /* library SMTIMELib */ /* [helpstring][version][uuid] */ EXTERN_C const IID LIBID_SMTIMELib; #ifndef __StepMasterTimeFunctions_MODULE_DEFINED__ #define __StepMasterTimeFunctions_MODULE_DEFINED__ /* module StepMasterTimeFunctions */ /* [dllname][version][helpstring] */ /* [entry][helpstring] */ CURRENCY __stdcall Get64BitTime(/* [in] */ LPSYSTEMTIME lpInitTime); /* [entry][helpstring] */ void __stdcall JulianToTime(/* [in] */ CURRENCY julianTS, /* [out][in] */ int __RPC_FAR *yr, /* [out][in] */ int __RPC_FAR *mm, /* [out][in] */ int __RPC_FAR *dd, /* [out][in] */ int __RPC_FAR *hh, /* [out][in] */ int __RPC_FAR *mi, /* [out][in] */ int __RPC_FAR *ss, /* [out][in] */ int __RPC_FAR *ms); </pre>
---	--

```

#endif /* __StepMasterTimeFunctions_MODULE_DEFINED__
*/

EXTERN_C const CLSID CLSID_SMTimer;

#ifdef __cplusplus

class DECLSPEC_UUID("27BAB71B-89E1-4A78-8854-
FDFFBDC8037E")
SMTimer;
#endif
#endif /* __SMTIMELib_LIBRARY_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif
// FILE: resource.h
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
//
// PURPOSE: Resource file
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by SMTimer.rc
//
#define IDS_PROJNAME 100
#define IDR_SMTIMER 102

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifdef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE 201
#define _APS_NEXT_COMMAND_VALUE 32768
#define _APS_NEXT_CONTROL_VALUE 201
#define _APS_NEXT_SYMED_VALUE 103
#endif
#endif

// FILE: SMTimer.cpp
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
// PURPOSE: Implementation of DLL Exports.
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// SMTimer.cpp : Implementation of DLL Exports.
//
// Note: Proxy/Stub Information
// To build a separate proxy/stub DLL,
// run nmake -f SMTimers.mk in the project directory.

#include "stdafx.h"
#include "resource.h"
#include <initguid.h>
#include "SMTimer.h"

#include "SMTimer_i.c"
#include "SMTimer.h"

CComModule _Module;

BEGIN_OBJECT_MAP(ObjectMap)
OBJECT_ENTRY(CLSID_SMTimer, CSMTimer)
END_OBJECT_MAP()

////////////////////////////////////
// DLL Entry Point
extern "C"
BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD
dwReason, LPVOID /*lpReserved*/)
{
if (dwReason == DLL_PROCESS_ATTACH)
{
_Module.Init(ObjectMap, hInstance,
&LIBID_SMTIMELib);
DisableThreadLibraryCalls(hInstance);
}
else if (dwReason == DLL_PROCESS_DETACH)
_Module.Term();
return TRUE; // ok
}

////////////////////////////////////
// Used to determine whether the DLL can be unloaded by OLE

STDAPI DllCanUnloadNow(void)
{
return (_Module.GetLockCount()==0) ? S_OK : S_FALSE;
}

////////////////////////////////////
// Returns a class factory to create an object of the requested type

STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid,
LPVOID* ppv)
{
return _Module.GetClassObject(rclsid, riid, ppv);
}

```

<pre> //////////////////////////////////// // DllRegisterServer - Adds entries to the system registry STDAPI DllRegisterServer(void) { // registers object, typelib and all interfaces in typelib return _Module.RegisterServer(TRUE); } //////////////////////////////////// // DllUnregisterServer - Removes entries from the system registry STDAPI DllUnregisterServer(void) { return _Module.UnregisterServer(TRUE); } /* this ALWAYS GENERATED file contains the definitions for the interfaces */ /* File created by MIDL compiler version 5.01.0164 */ /* at Thu Sep 19 17:49:55 2002 */ /* Compiler settings for C:\charles\Stepmaster\COMMON\SMTime\SMTime.idl: Oicf (OptLev=i2), W1, Zp8, env=Win32, ms_ext, c_ext error checks: allocation ref bounds_check enum stub_data */ @@@MIDL_FILE_HEADING() /* verify that the <rpcndr.h> version is high enough to compile this file*/ #ifndef __REQUIRED_RPCNDR_H_VERSION__ #define __REQUIRED_RPCNDR_H_VERSION__ 440 #endif #include "rpc.h" #include "rpcndr.h" #ifndef __RPCNDR_H_VERSION__ #error this stub requires an updated version of <rpcndr.h> #endif // __RPCNDR_H_VERSION__ #ifndef COM_NO_WINDOWS_H #include "windows.h" #include "ole2.h" #endif /*COM_NO_WINDOWS_H*/ #ifndef __SMTime_h__ #define __SMTime_h__ #ifdef __cplusplus extern "C"{ #endif </pre>	<pre> /* Forward Declarations */ #ifndef __ISMTimer_FWD_DEFINED__ #define __ISMTimer_FWD_DEFINED__ typedef interface ISMTimer ISMTimer; #endif /* __ISMTimer_FWD_DEFINED__ */ #ifndef __SMTimer_FWD_DEFINED__ #define __SMTimer_FWD_DEFINED__ #ifdef __cplusplus typedef class SMTimer SMTimer; #else typedef struct SMTimer SMTimer; #endif /* __cplusplus */ #endif /* __SMTimer_FWD_DEFINED__ */ /* header files for imported files */ #include "oaidl.h" #include "ocidl.h" void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t); void __RPC_USER MIDL_user_free(void __RPC_FAR *); #ifndef __ISMTimer_INTERFACE_DEFINED__ #define __ISMTimer_INTERFACE_DEFINED__ /* interface ISMTimer */ /* [unique][helpstring][dual][uuid][object] */ EXTERN_C const IID IID_ISMTimer; #if defined(__cplusplus) && !defined(CINTERFACE) MIDL_INTERFACE("1A6D0AE4-8528-453B-B8E3-8DAD1F0561B7") ISMTimer : public IDispatch { public: virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE Start(void) = 0; virtual /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE Stop(CURRENCY __RPC_FAR *pElapsedTime) = 0; virtual /* [helpstring][id][propget] */ HRESULT STDMETHODCALLTYPE get_Running(/* [retval][out] */ BOOL __RPC_FAR *pVal) = 0; }; #else /* C style interface */ typedef struct ISMTimerVtbl { BEGIN_INTERFACE HRESULT (STDMETHODCALLTYPE __RPC_FAR *QueryInterface)(ISMTimer __RPC_FAR * This, /* [in] */ REFIID riid, /* [iid_is][out] */ void __RPC_FAR * __RPC_FAR </pre>
--	---

<pre> *ppvObject); ULONG (STDMETHODCALLTYPE __RPC_FAR *AddRef)(ISMTimer __RPC_FAR * This); ULONG (STDMETHODCALLTYPE __RPC_FAR *Release)(ISMTimer __RPC_FAR * This); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfoCount)(ISMTimer __RPC_FAR * This, /* [out] */ UINT __RPC_FAR *pctinfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetTypeInfo)(ISMTimer __RPC_FAR * This, /* [in] */ UINT iTInfo, /* [in] */ LCID lcid, /* [out] */ ITypeInfo __RPC_FAR * __RPC_FAR *ppTInfo); HRESULT (STDMETHODCALLTYPE __RPC_FAR *GetIDsOfNames)(ISMTimer __RPC_FAR * This, /* [in] */ REFIID riid, /* [size_is][in] */ LPOLESTR __RPC_FAR *rgszNames, /* [in] */ UINT cNames, /* [in] */ LCID lcid, /* [size_is][out] */ DISPID __RPC_FAR *rgDispId); /* [local] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Invoke)(ISMTimer __RPC_FAR * This, /* [in] */ DISPID dispIdMember, /* [in] */ REFIID riid, /* [in] */ LCID lcid, /* [in] */ WORD wFlags, /* [out][in] */ DISPPARAMS __RPC_FAR *pDispParams, /* [out] */ VARIANT __RPC_FAR *pVarResult, /* [out] */ EXCEPINFO __RPC_FAR *pExcepInfo, /* [out] */ UINT __RPC_FAR *puArgErr); END_INTERFACE } ISMTimerVtbl; interface ISMTimer { CONST_VTBL struct ISMTimerVtbl __RPC_FAR *lpVtbl; }; /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Start)(ISMTimer __RPC_FAR * This); /* [helpstring][id] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *Stop)(ISMTimer __RPC_FAR * This, CURRENCY __RPC_FAR *pElapsedTime); /* [helpstring][id][propget] */ HRESULT (STDMETHODCALLTYPE __RPC_FAR *get_Running)(ISMTimer __RPC_FAR * This, /* [retval][out] */ BOOL __RPC_FAR *pVal); #ifndef COBJMACROS #define ISMTimer_QueryInterface(This,riid,ppvObject) \ (This)->lpVtbl->QueryInterface(This,riid,ppvObject) #define ISMTimer_AddRef(This) \ (This)->lpVtbl->AddRef(This) </pre>	<pre> #define ISMTimer_Release(This) \ (This)->lpVtbl->Release(This) #define ISMTimer_GetTypeInfoCount(This,pctinfo) \ (This)->lpVtbl->GetTypeInfoCount(This,pctinfo) #define ISMTimer_GetTypeInfo(This,iTInfo,lcid,ppTInfo) \ (This)->lpVtbl->GetTypeInfo(This,iTInfo,lcid,ppTInfo) #define ISMTimer_GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rg DispId) \ (This)->lpVtbl-> GetIDsOfNames(This,riid,rgszNames,cNames,lcid,rgDispId) #define ISMTimer_Invoke(This,dispIdMember,riid,lcid,wFlags,pDispPar ams,pVarResult,pExcepInfo,puArgErr) \ (This)->lpVtbl-> Invoke(This,dispIdMember,riid,lcid,wFlags,pDispParams,pVarR esult,pExcepInfo,puArgErr) #define ISMTimer_Start(This) \ (This)->lpVtbl->Start(This) #define ISMTimer_Stop(This,pElapsedTime) \ (This)->lpVtbl->Stop(This,pElapsedTime) #define ISMTimer_get_Running(This,pVal) \ (This)->lpVtbl->get_Running(This,pVal) #endif /* COBJMACROS */ #endif /* C style interface */ /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMTimer_Start_Proxy(ISMTimer __RPC_FAR * This); void __RPC_STUB ISMTimer_Start_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); /* [helpstring][id] */ HRESULT STDMETHODCALLTYPE ISMTimer_Stop_Proxy(ISMTimer __RPC_FAR * This, CURRENCY __RPC_FAR *pElapsedTime); void __RPC_STUB ISMTimer_Stop_Stub(IRpcStubBuffer *This, IRpcChannelBuffer * _pRpcChannelBuffer, PRPC_MESSAGE _pRpcMessage, DWORD *_pdwStubPhase); </pre>
--	---


```

/* [helpstring][iid][propget] */ HRESULT
STDMETHODCALLTYPE ISMTimer_get_Running_Proxy(
    ISMTimer __RPC_FAR * This,
    /* [retval][out] */ BOOL __RPC_FAR *pVal);

void __RPC_STUB ISMTimer_get_Running_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);

#endif /* __ISMTimer_INTERFACE_DEFINED__ */

#ifndef __SMTIMELib_LIBRARY_DEFINED__
#define __SMTIMELib_LIBRARY_DEFINED__

/* library SMTIMELib */
/* [helpstring][version][uuid] */

EXTERN_C const IID LIBID_SMTIMELib;

#ifndef __StepMasterTimeFunctions_MODULE_DEFINED__
#define __StepMasterTimeFunctions_MODULE_DEFINED__

/* module StepMasterTimeFunctions */
/* [dllname][version][helpstring] */

/* [entry][helpstring] */ CURRENCY __stdcall Get64BitTime(
    /* [in] */ LPSYSTEMTIME lpInitTime);

/* [entry][helpstring] */ void __stdcall JulianToTime(
    /* [in] */ CURRENCY julianTS,
    /* [out][in] */ int __RPC_FAR *yr,
    /* [out][in] */ int __RPC_FAR *mm,
    /* [out][in] */ int __RPC_FAR *dd,
    /* [out][in] */ int __RPC_FAR *hh,
    /* [out][in] */ int __RPC_FAR *mi,
    /* [out][in] */ int __RPC_FAR *ss,
    /* [out][in] */ int __RPC_FAR *ms);

#endif /* __StepMasterTimeFunctions_MODULE_DEFINED__ */

EXTERN_C const CLSID CLSID_SMTimer;

#ifdef __cplusplus

class DECLSPEC_UUID("27BAB71B-89E1-4A78-8854-
FDFBDC8037E")
SMTimer;
#endif
#endif /* __SMTIMELib_LIBRARY_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

```

```

// FILE: resource.h
// FILE: SMTimer.cpp
// Microsoft TPC-H Kit Ver. 1.00
// Copyright Microsoft, 1999
// All Rights Reserved
//
// PURPOSE: Implementation of CSMTimer
// Contact: Reshma Tharamal (reshmat@microsoft.com)
//
// SMTimer.cpp : Implementation of CSMTimer
#include "stdafx.h"
#include "SMTTime.h"
#include "SMTimer.h"

////////////////////////////////////
// CSMTimer

////////////////////////////////////
// Construction/Destruction
////////////////////////////////////

CSMTimer::~CSMTimer()
{
}

STDMETHODIMP CSMTimer::Start()
{
    // Starts the timer
    assert(!m_bInProcess);
    m_bInProcess = TRUE;

    m_lStartTime = MyTickCount();

    return S_OK;
}

STDMETHODIMP CSMTimer::Stop(CURRENCY
*pElapsedTime)
{
    TC_TIME lEndTime = MyTickCount();

    // Stops the timer and returns the elapsed time
    assert(m_bInProcess);
    m_bInProcess = FALSE;

    pElapsedTime->int64 = lEndTime - m_lStartTime;

    return S_OK;
}

```

<pre> TC_TIME CSMTimer::MyTickCount(void) { TC_TIME currentTC; LARGE_INTEGER l; __int64 count; //The purpose of this function is to prevent the 49 day wrapping effect of the //system API GetTickCount(). This function essentially provides a monotonically //increasing timer value which is milliseconds from class instantiation. if (m_bCountUnavailable) { count = (__int64)GetTickCount(); currentTC = (TC_TIME)(count-m_baseTC); } else { QueryPerformanceCounter(&l); count = (__int64)l.HighPart << 32 (__int64)l.LowPart; currentTC = (TC_TIME)((count-m_baseTC) * 1000) / m_Timerfreq); } return currentTC; } STDMETHODIMP CSMTimer::get_Running(BOOL *pVal) { *pVal = m_bInProcess; return S_OK; } CURRENCY __stdcall Get64BitTime(LPSYSTEMTIME lpInitTime) { __int64 ms_day, ms_hour, ms_minute, ms_seconds, ms_milliseconds, ms_total; int day; SYSTEMTIME tim; CURRENCY tmReturn; if (lpInitTime) memcpy(&tim, lpInitTime, sizeof(SYSTEMTIME)); else GetLocalTime(&tim); day = JulianDay((int)tim.wYear, (int)tim.wMonth, (int)tim.wDay); ms_day = (__int64)day * (__int64)(24 * 1000 * 60 * 60); ms_hour = (__int64)tim.wHour * (__int64)(1000 * 3600); ms_minute = (__int64)tim.wMinute * (1000 * 60); ms_seconds = (__int64)(tim.wSecond * 1000); ms_milliseconds = (__int64)tim.wMilliseconds; ms_total = ms_day + ms_hour + ms_minute + ms_seconds + ms_milliseconds; tmReturn.int64 = ms_total; return tmReturn; } </pre>	<pre> // JulianDay computes the number of days since Jan 1, 1900. // This function is valid for dates from 1-Jan-1900 to 1-Jan-2100. // 1-Jan-1900 = 0 int JulianDay(int yr, int mm, int dd) { // MonthArray contains cumulative days for months in a non leap-year int MonthArray[12] = { 0, 31, 59, 90, 120, 151, 181, 212, 243, 273, 304, 334}; int j1, j2; // compute day of year (j1) j1 = MonthArray[mm-1] + dd - 1; // adjust day of year if this is a leap year and it is after February if ((yr % 4)==0 && (yr != 1900) && (mm > 2)) j1++; // compute number of days from 1/1/1900 to beginning of present year j2 = (yr-1900)*365 + (yr-1901)/4; return j1+j2; } // Breaks up the Julian Time into it's sub-components void __stdcall SMTTime_JulianToTime(CURRENCY CurJulian, int* yr, int* mm, int* dd, int *hh, int *mi, int *ss, int *ms) { int julianDay, msLeft; JULIAN_TIME julianTS = CurJulian.int64; *ms = julianTS % 1000; julianTS /= 1000; julianDay = (int)(julianTS / (60 * 60 * 24)); JulianToCalendar(julianDay, yr, mm, dd); msLeft = (int)(julianTS - (julianDay * (__int64)(60 * 60 * 24))); *hh = msLeft / (60 * 60); msLeft = msLeft - *hh * 3600; *mi = msLeft / (60); *ss = msLeft % 60; } // JulianToCalendar converts a day index (from the JulianDay function) to // its corresponding calendar value (mm/dd/yr). The valid range for days // is { 0 .. 73049 } for dates from 1-Jan-1900 to 1-Jan-2100. void JulianToCalendar(int day, int* yr, int* mm, int* dd) { int y, m, d; // month array contains days of months for months in a non leap-year int month[12] = { 31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31 }; </pre>
---	--

<pre> // compute year from days if (day < 365) y = 1900; else y = 1901 + ((day-365)/1461)*4 + (4*((day- 365)% 1461)+3)/1461; // adjust February if this year is a leap year if ((y % 4)==0 && (y != 1900)) month[1] = 29; else month[1] = 28; d = day - JulianDay(y, 1, 1) + 1; m = 1; while (d > month[m-1]) { d = d - month[m-1]; m++; } *yr = y; *mm = m; *dd = d; }// FILE: SMTimer.h // Microsoft TPC-H Kit Ver. 1.00 // Copyright Microsoft, 1999 // All Rights Reserved // // // PURPOSE: Declaration of the CSMTimer // Contact: Reshma Tharamal (reshmat@microsoft.com) // // SMTimer.h : Declaration of the CSMTimer #ifndef __SMTIMER_H_ #define __SMTIMER_H_ #include "resource.h" // main symbols #include "assert.h" #define MAX_JULIAN_TIME 0x7FFFFFFFFFFFFFFF #define JULIAN_TIME __int64 #define TC_TIME DWORD #ifdef SMTIMER #define DLL_LINK __declspec(dllexport) #else #define DLL_LINK __declspec(dllimport) #endif #ifdef _cplusplus extern "C" { #endif //DLL_LINKCURRENCY __stdcall SMTTime_Get64BitTime(LPSYSTEMTIME lpInitTime); int JulianDay(int yr, int mm, int dd); void JulianToCalendar(int day, int* yr, int* mm, int* dd); #ifdef _cplusplus } #endif </pre>	<pre> //////////////////////////////////// // CSMTimer class ATL_NO_VTABLE CSMTimer : public CComObjectRootEx<CComSingleThreadModel>, public CComCoClass<CSMTimer, &CLSID_SMTimer>, public IDispatchImpl<ISMTimer, &IID_ISMTimer, &LIBID_SMTIMELib> { public: CSMTimer() { LARGE_INTEGER l; if (!QueryPerformanceFrequency(&l)) { m_baseTC = (__int64)GetTickCount(); m_bCountUnavailable = TRUE; } else { m_bCountUnavailable = FALSE; m_Timerfreq = (__int64)l.HighPart << 32 (__int64)l.LowPart; QueryPerformanceCounter(&l); m_baseTC = (__int64)l.HighPart << 32 (__int64)l.LowPart; } m_bInProcess = FALSE; } DECLARE_REGISTRY_RESOURCEID(IDR_SMTIMER) DECLARE_PROTECT_FINAL_CONSTRUCT() BEGIN_COM_MAP(CSMTimer) COM_INTERFACE_ENTRY(ISMTimer) COM_INTERFACE_ENTRY(IDispatch) // COM_INTERFACE_ENTRY2(IDispatch, ISMTimer) END_COM_MAP() // ISMTimer public: STDMETHOD(get_Running)(/*[out, retval]*/ BOOL *pVal); STDMETHOD(Stop)(CURRENCY *pElapsedTime); STDMETHOD(Start)(); virtual ~CSMTimer(); private: __int64 m_baseTC; __int64 m_Timerfreq; BOOL m_bCountUnavailable; TC_TIME m_lStartTime; BOOL m_bInProcess; TC_TIME MyTickCount(void); }; </pre>
--	--

```

#endif//_SMTIMER_H_
// stdafx.cpp : source file that includes just the standard includes
// stdafx.pch will be the pre-compiled header
// stdafx.obj will contain the pre-compiled type information

#include "stdafx.h"

#ifdef _ATL_STATIC_REGISTRY
#include <statreg.h>
#include <statreg.cpp>
#endif

#include <atimpl.cpp>
// FILE:      stdafx.h
//      Microsoft TPC-H Kit Ver. 1.00
//      Copyright Microsoft, 1999
//      All Rights Reserved
//
//
// PURPOSE:  include file for standard system include files,
//           or project specific include files that are used frequently,
//           but are changed infrequently
// Contact:  Reshma Tharamal (reshmat@microsoft.com)
//
#if
!defined(AFX_STDAFX_H__4CDF88F4_EE9C_4F29_8212_61
557F251BDD__INCLUDED_)
#define
AFX_STDAFX_H__4CDF88F4_EE9C_4F29_8212_61557F251
BDD__INCLUDED_

#if _MSC_VER > 1000
#pragma once
#endif // _MSC_VER > 1000

#define STRICT
#ifdef _WIN32_WINNT
#define _WIN32_WINNT 0x0400
#endif
#define _ATL_APARTMENT_THREADED

#include <atbase.h>
//You may derive a class from CComModule and use it if you
want to override
//something, but do not change the name of _Module
extern CComModule _Module;
#include <atlcom.h>

//{{AFX_INSERT_LOCATION}}
// Microsoft Visual C++ will insert additional declarations
immediately before the previous line.

#endif//
!defined(AFX_STDAFX_H__4CDF88F4_EE9C_4F29_8212_61
557F251BDD__INCLUDED)

```

Semaphore.cpp

```
#define _WIN32_WINNT 0x0400
#include <windows.h>
#include <string.h>
#include <iostream.h>
#include <stdlib.h>
#include <stdio.h>
#include <assert.h>
void main(int argc, char **argv)
{
typedef enum { eUnknown, eWait, eSignal, eRelease, eWaitList,
eWaitGroup } OPERATION;
OPERATION eOP = eUnknown;
int iCount;
int i;
HANDLE hSemaphore;
HANDLE *pHandles;
SYSTEMTIME Time;
if (argc < 3)
goto usage;
if (_stricmp(argv[1], "-wait") == 0)
eOP = eWait;
else if (_stricmp(argv[1], "-signal") == 0)
eOP = eSignal;
else if (_stricmp(argv[1], "-release") == 0)
eOP = eRelease;
else if (_stricmp(argv[1], "-waitlist") == 0)
eOP = eWaitList;
else if (_stricmp(argv[1], "-waitgroup") == 0)
eOP = eWaitGroup;
else goto usage;
if ((eOP == eWait) || (eOP == eRelease))
{
// argv[2] is the semaphore name
// if -count option specified, then there must be exactly 5 args
if ((argc == 5) && (_stricmp(argv[3], "-count") == 0))
{
iCount = atoi(argv[4]);
if (iCount < 1)
goto usage;
}
// check that
else if (argc != 3)
goto usage;
else
iCount = 1;
}
else if (eOP == eWaitGroup)
{
if ((argc != 5) || (_stricmp(argv[3], "-count") != 0))
goto usage;
iCount = atoi(argv[4]);
if (iCount < 1)
goto usage;
}
else
// eWaitList or eSignal
iCount = argc - 2;
if (eOP == eWait)
{
printf( "semaphore name = %s\n", argv[2] );
printf( "semaphore count = %d\n", iCount );
hSemaphore = CreateSemaphore( NULL, 0, 2000000000, argv[2] );
if (hSemaphore == NULL)
{
DWORD dwError = GetLastError();
cout << "**ERROR* CreateSemaphore returned " << dwError << endl;
exit(EXIT_FAILURE);
}
}
for (i=0; i<iCount; i++)
{
WaitForSingleObject( hSemaphore, INFINITE );
GetLocalTime( &Time );
printf( "%4.4d-%2.2d-%2.2d %2.2d:%2.2d:%2.2d - released \n",
Time.wYear, Time.wMonth, Time.wDay, Time.wHour, Time.wMinute,
Time.wSecond );
}
CloseHandle( hSemaphore );
}
else if ((eOP == eWaitGroup) || (eOP == eWaitList))
{
char **szEventNames;
szEventNames = new char*[iCount];
char szTmp[128];
printf( "event-list = " );
for (i=0; i<iCount; i++)
{
if (eOP == eWaitGroup)
{
wsprintf( szTmp, "%s.%d", argv[2], i+1 );
szEventNames[i] = new char[strlen(szTmp)+1];
strcpy( szEventNames[i], szTmp );
}
else
{
szEventNames[i] = new char[strlen(argv[i+2])+1];
strcpy( szEventNames[i], argv[i+2] );
}
printf( " %s", szEventNames[i] );
}
printf( "\n" );
pHandles = new HANDLE[iCount-1];
for (i=0; i<iCount; i++)
{
pHandles[i] = CreateEvent( NULL, TRUE /* manual reset */, FALSE /*
initially non-signaled */, szEventNames[i] );
if (pHandles[i] == NULL)
{
DWORD dwError = GetLastError();
cout << "**ERROR* CreateEvent returned " << dwError << endl;
exit(EXIT_FAILURE);
}
}
for (i=iCount; i>0;i--)
{
int idx = WaitForMultipleObjects( i, pHandles, FALSE /* wait for all */,
INFINITE ) - WAIT_OBJECT_0;
GetLocalTime( &Time );
printf( "%4.4d-%2.2d-%2.2d %2.2d:%2.2d:%2.2d - signaled: %s \n",
Time.wYear, Time.wMonth, Time.wDay, Time.wHour, Time.wMinute,
Time.wSecond, szEventNames[idx] );
HANDLE hTmp = pHandles[idx];
pHandles[idx] = pHandles[i-1];
pHandles[i-1] = hTmp;
char* szTmp = szEventNames[idx];
szEventNames[idx] = szEventNames[i-1];
szEventNames[i-1] = szTmp;
}
for (i=0; i<iCount; i++)
CloseHandle( pHandles[i] );
}
else if (eOP == eRelease)
{
hSemaphore = OpenSemaphore( SEMAPHORE_MODIFY_STATE,
FALSE, argv[2] );
if (hSemaphore == NULL)
{

```

```

DWORD dwError = GetLastError();
cout << "**ERROR* OpenSemaphore returned " << dwError << endl;
exit(EXIT_FAILURE);
}
if (!ReleaseSemaphore( hSemaphore, iCount, NULL ))
{
DWORD dwError = GetLastError();
cout << "**ERROR* ReleaseSemaphore returned " << dwError <<
endl;
exit(EXIT_FAILURE);
}
CloseHandle( hSemaphore );
}
else if (eOP == eSignal)
{
for (i=0; i<iCount; i++)
{
HANDLE hHandle = OpenEvent( EVENT_MODIFY_STATE, FALSE,
argv[i+2] );
if (hHandle == NULL)
{
DWORD dwError = GetLastError();
cout << "**ERROR* OpenEvent returned " << dwError << endl;
exit(EXIT_FAILURE);
}
SetEvent( hHandle );
CloseHandle( hHandle );
}
}
exit(EXIT_SUCCESS);
// syntax was bad; show usage and quit
usage:
printf(
"Semaphore Utility - Ver. 1.2 - 26-Jul-99 \n"
"Copyright (C) Microsoft Corp 1999. All rights reserved.\n\n"
"usage: \n"
" semaphore { -wait | -release } <semaphore-name> [ -count <count>
] \n"
" semaphore { -waitlist | -signal } <event-list> \n"
" semaphore -waitgroup <event-prefix> -count <count>\n"
"\n"
"<semaphore-name> == alpha-numeric identifier \n"
"<count> == integer > 0; default value = 1 \n"
"<event-list> == { <event-name> ... } \n"
"<event-name> == alpha-numeric identifier \n"
"<event-prefix> == alpha-numeric identifier \n"
"\n"
"There are two modes to choose from: a semaphore or a list of
events. \n"
"\n"
"Semaphore mode: \n"
"A semaphore is a single identifier with an associated count. Each
time \n"
"the semaphore is released, the count is decremented by one (or the
amount \n"
"specified). When the count reaches zero, the waiter completes. If
there \n"
"are multiple waiters on the same semaphore, each release releases
only \n"
"the number of waiters specified in count.\n"
"\n"

```

```

>List of Events: \n"
"A list of events (alpha-numeric tags) is specified for the waiter. The
\n"
"waiter doesn't complete until all of the events have been signaled. A
\n"
"given event may be signaled more than once. There are two ways to
define \n"
"the list of events, either explicitly (-waitlist) by naming all of them or
\n"
"implicitly (-waitgroup) with a prefix and a count. Using the -waitgroup
\n"
"option, you provide an alpha-numeric tag which is used as the prefix
for a \n"
"group of events. The event names are generated by concatenating
the prefix \n"
"with \".<n>\", where <n> is 1 to the specified count. \n"
);
exit(EXIT_FAILURE);
}

```

Appendix G: Price Quotations

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
<http://www.microsoft.com/>

Microsoft

July 7, 2006

Hewlett-Packard Company
Gunter Zink
One Microsoft Way
Redmond, WA 98052

Mr. Zink:

Here is the information you requested regarding pricing for several Microsoft products to be used in conjunction with your TPC-H benchmark testing.

All pricing shown is in US Dollars (\$).

Part Number	Description	Unit Price	Quantity	Price
810-04779	SQL Server 2005 Enterprise x64 Edition Server License with 25 CALs Discount Schedule: Open Program - Level C Unit Price reflects a 40% discount from the retail unit price of \$13,969.	\$8,318	1	\$8,318
359-01911	SQL Server 2005 Client License Discount Schedule: Open Program - No Level Unit Price reflects a 4% discount from the retail unit price of \$163.	\$156	45	\$7,020
254-00170	Microsoft Visual C++ .Net Standard 2003 No Discounts Applied	\$109	1	\$109
046-00856	Microsoft Visual Basic .Net Standard 2003 No Discounts Applied	\$109	1	\$109
N/A	Microsoft Problem Resolution Services Professional Support (1 Incident)	\$245	1	\$245

All products are currently orderable through Microsoft's normal distribution channels. A list of Microsoft's authorized resellers can be found at:
<http://www.microsoft.com/products/info/render.aspx?view=22&type=mpn&content=22/licensing>.

Defect support is included in the purchase price. Additional support is available from Microsoft PSS on an incident by incident basis at \$245 per call.

This quote is valid for the next 90 days.

If we can be of any further assistance, please contact Jamie Reding at (425) 703-0510 or jamiere@microsoft.com.

Reference ID: PHgepu0604051336.

Please include this Reference ID in any correspondence regarding this price quote.



HP Integrity rx8640

Report Date: July 18 2006

Description	Part Number	Unit Price	Qty	Extended Price	3 Yr Maint Price
rx8640 16-way SMP Base System, incl (4) cell boards, (1) core IO, (6) power supplies, 16x1.6GHz/24MB cache DC Itanium II processors	AB446A #003	\$450,108	1	\$450,108	
3 Year Support Price (Hardware and Software)	HA1103A	\$170,019	1		\$170,019
HP Integrity rx8640 I/O Backplane	AD160A	\$7,700	2	\$15,400	
HP 4GB HD SyncDRAM Midrange Memory	AB454A	\$8,000	32	\$256,000	
HP Integrity rx8640 Sys. Expansion Unit	AB301A	\$35,785	1	\$35,785	
36GB, 15K hard disk for rx76/86	AD146A	\$1,800	2	\$3,600	
DVD+RW Drive for rx76/86	AB351B	\$850	1	\$850	
HP Smart Array Controller 6402	A9890A	\$1,669	32	\$53,408	
HP Rack Kit for rx86xx Server	J1528B	\$582	1	\$582	
HP Rack Kit for SEU Server	J1530C	\$709	1	\$709	
HP Storageworks MSA 30 SB Storage	302969-B21	\$2,829	32	\$90,528	
HP Storageworks MSA 30 SB Storage 10% Spares	302969-B21	\$2,829	3	\$8,487	
36GB, 15krpm Ultra320 Pluggable Hard Drive	286776-B22	\$269	320	\$86,080	
36GB, 15krpm Ultra320 Pluggable Hard Drive 10% Spares	286776-B22	\$269	32	\$8,608	
146GB, 10krpm U320 Pluggable Hard drive	286716-B22	\$409	2	\$818	
146GB, 10krpm U320 Pluggable Hard drive 10% Spares	286716-B22	\$409	2	\$818	
HP Universal Rack 10642 G2	AF003A	\$1,489	3	\$4,467	
HP 16A High Voltage Modular PDU	252663-B24	\$299	4	\$1,196	
ML110 G3 SATA / 17" Monitor	www.hp.com	\$1,076	1	\$1,076	
Server Subtotal				\$1,018,520	\$170,019
Microsoft Windows Server 2003, Datacenter edition (64-bit)	T2372A opt016	\$32,000	1	\$32,000	
Server Software Subtotal				\$32,000	\$0
Total Extended Price				\$1,220,539	
Total Discounts				\$332,432	
HP's Large Configuration Discount *					
* All discounts are based on US list prices and for similar quantities and configurations. A 27.23 % discount was based on the overall specific components from vendor 1 in this single quotation. Discounts for similarly sized configurations will be similar to those quoted here, but may vary based on the components in the configuration.	3 year cost of ownership:				USD \$888,107

Sales contact Vendor 1: HP Sales Development, 19111 Pruneridge Ave., Cupertino, CA 95014 (408) 447 2320