

**TPC Benchmark™ App
Full Disclosure Report
for
IBM® @server™ xSeries® 366
using
Microsoft® .NET 1.1**

TPC-App Version 1.1

**Submitted for Review
June 21, 2005**

First Edition - June 2005

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Notes

¹ GHz and MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.

² When referring to hard disk capacity, GB, or gigabyte, means one thousand million bytes. Total user-accessible capacity may be less.

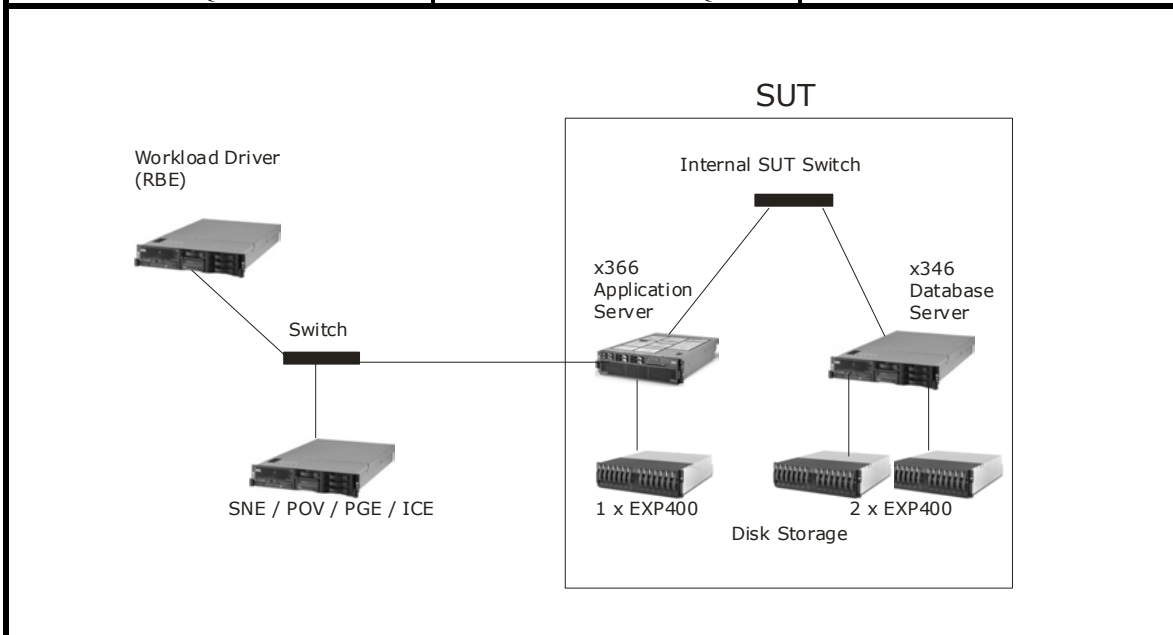


IBM® eServer™ xSeries® 366

TPC-App
Rev. 1.1

Report Date
6/21/05

SIPS per App Server SYSTEM		Total SIPS
174.9 SIPS		174.9 SIPS
Price Performance		Availability Date
\$327.41 USD per SIPS		June 21, 2005
Category	Application Server System	Average Response Time
Non-Clustered	1	.743s
Total Cost	End Users	Application Server
\$57,264	130	Windows Server 2003 w/ Microsoft .NET 1.1
Managed Runtime	Distributed Trans. Mgr.	Web Server
Microsoft .NET 1.1	Microsoft DTC	Microsoft IIS
Database Manager	Message Queuing Product	Other Software
Microsoft SQL Server 2000	Microsoft MSMQ	n/a



Function	System	Num Systems	OS	Processors/ Cores/Threads	Memory
Application Server	IBM eServer xSeries x366 1 x 3.66GHz Xeon MP	1	Microsoft Windows Server 2003 Standard Edition	4/4/8	4GB
Database Server	IBM eServer xSeries x346 1x3.60GHz Xeon DP	1	Microsoft Windows Server 2003 Standard Edition	1/1/2	3GB
Load Balancer	n/a	n/a	n/a	n/a	n/a



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174.9 SIPS	174.9 SIPS
Price Performance	Availability Date
\$327.41 USD per SIPS	June 21, 2005

Description	Part No.	Third Party Brand	Price	Unit Price	Qty	Extended Price	3-Yr. Maint. Price	
Application & Database Server Hardware								
Hardware								
IBM eServer xSeries 366	8863-2RU	IBM		1	9,999	1	9,999	
w1 x 3.66GHz/1MB L2 Cache Xeon Processor MP								
w2 x 1GB ECC SDRAM RDIMMs								
Integrated Dual-Channel Gigabit Ethernet								
xSeries 3.66GHz/1MB L2 Cache Xeon Processor MP	13N0695	IBM		1	1,999	3	5,997	
x346 with 3.60GHz/1MB Xeon DP, 1GB (2x512GB) Memory	8840-41U	IBM		1	3,449	1	3,449	
2GB (2x1GB) PC-3200 DDR2 ECC SDRAM RDIMM	73P2866	IBM		1	749	2	1,498	
ServeRAID-6M Ultra320 SCSI Adapter	32P0033	IBM		1	999	2	1,998	
IBM EXP400 Rack Storage Exp. Enclosure	17331RU	IBM		1	3,099	3	9,297	
73.4GB 15K Ultra320 SCSI Drive	90P1381	IBM		1	499	42	20,958	
Netfinity 4.2M Ultra2 SCSI Cable	03K9310	IBM		1	75	3	225	
IBM S2 42U Standard Rack	93074SX	IBM		1	1,489	1	1,489	
L150p 15-Inch TFT Monitor	90P0717	IBM		1	325	1	325	
UltraNav Keyboard USB	39M7228	IBM		1	98	1	98	
Sleek 2-Button Mouse	90P0740	IBM		1	15	1	15	
ServicePac for 3-Year 24x7x4 Support (x366)	96P2253	IBM		1	1,000	1	1,000	
ServicePac for 3-Year 24x7x4 Support (Monitor)	30L9183	IBM		1	90	1	90	
ServicePac for 3-Year 24x7x4 Support (x346)	96P2250	IBM		1	750	1	750	
ServicePac for 3-Year 24x7x4 Support (EXP400)	41L2768	IBM		1	760	3	2,280	
ServicePac for 3-Year 24x7x4 Support (Rack)	41L2760	IBM		1	300	1	300	
Discount on xSeries Hardware (15%)								
Discount on ServicePacs (20%)						8,302		
					Subtotal	47,046	3,536	
Software								
Microsoft SQL Server 2000 Standard Edition	228-00968	Microsoft		2	4,999	1	4,999	
Microsoft Windows Server 2003 Standard Edition*	P73-00295	Microsoft		2	719	2	1,438	
Microsoft Problem Resolution Services		Microsoft		2	245	1	245	
					Subtotal	6,437	245	
Connectivity								
Dlink DGS-1008TL 8-port Gigabit Switch	DGS-1008TL			3	185	3	555	
					Subtotal			
Discounts based on volume purchase; prices vary if purchased separately.								
All prices are in \$USD.								
						Total	53,483	3,781
For Pricing and Ordering Information: 1 - IBM (1-888-SHOP-IBM, Keycode 7764);						Three-Year Cost of Ownership USD:		\$57,264
2 - Microsoft (*See Quote for Discounts); 3 - www.newegg.com								SIPS:
Audited by Francois Raab, InfoSizing, Inc.								174.9
								\$ USD/SIPS:
								\$327.41

Independently Audited by: Francois Raab InfoSizing, Inc.



IBM® eServer™ xSeries® 366

TPC-App
Rev. 1.1

Report Date
6/21/05

SIPS per App Server SYSTEM	Total SIPS
174.9 SIPS	174.9 SIPS
Price Performance	Availability Date
\$327.41 USD per SIPS	June 21, 2005

Numerical Quantities Summary

Interaction Summary

Interaction Name	Mix %	Interactions Per Second	Count	Minimum Response Time	Average Response Time	Maximum Response Time	90 th Percentile Response Time
New Customer	1.00	1.75	12,564	.015s	1.090s	17.1s	2.1s
Change Payment Method	4.99	8.72	62,813	015s	1.082s	17.1s	2.1s
Create Order	50.00	87.49	629,962	015s	1.277s	17.7s	2.2s
Order Status	5.02	8.79	63,280	015s	.161s	15.2s	.1s
New Products	7.01	12.26	88,293	015s	.041s	15.1s	.1s
Product Detail	29.97	52.44	377,535	015s	.091s	15.3s	.1s
Change Item	2.016	3.53	25,404	015s	.093s	15.2s	.1s

Throughput Summary Graph

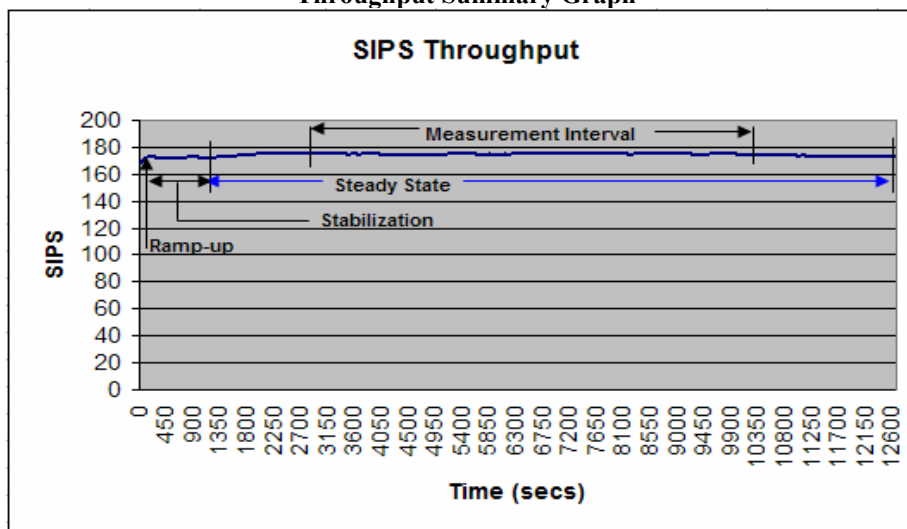


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Preface

TPC Benchmark™ App (TPC-App) is an Application Server and web services benchmark. The workload is performed in a Managed Environment that simulates the activities of a business-to-business transactional Application Server operating in a 24x7 environment (see Clause 1.2.8). TPC-App showcases the performance capabilities of application server SYSTEMs (see Clause 1.2.9). The workload exercises Commercially Available Application Server products, Messaging Products, and databases associated with such environments, which are characterized by:

- Multiple on-line Business Sessions
- Commercially Available application environment
- Use of XML documents and SOAP for data exchange
- Business to business application logic
- Distributed Transaction Management
- Reliable and durable messaging
- Dynamic Web Service Response generation with database access and update
- Simultaneous execution of multiple transaction types that span a breadth of business functions.
- Databases consisting of many tables with a wide variety of sizes, attributes, and relationships
- Transaction integrity (ACID properties)

TPC-App Fundamentals

There are two performance metrics reported by TPC-App. The first is the Web Service Interactions per second (SIPS) per Application Server SYSTEM. The second is the Total SIPS, which is the total number of SIPS for the entire tested configuration (SUT). Multiple Web Service Interactions are used to simulate the business activity of an online supplier, and each interaction is subject to a response time constraint. All references to TPC-App results must include the primary metrics, which are, the SIPS per Application Server SYSTEM, Total SIPS, the associated price per SIPS (e.g., \$USD/SIPS) and the Availability Date of the priced configuration.

TPC-App uses terminology and metrics that are similar to other benchmarks originated by the TPC or others. Such similarity in terminology does not in any way imply that TPC-App results are comparable to other benchmarks. The only benchmark results comparable to TPC-App are other TPC-App results with the appropriate revision.

The managed environments that must be used to implement the application logic are ECMA-335 (.NET) or J2SE 1.4. Extensions to these specifications as well as any follow-on revisions of these specifications are allowed. If this TPC-App specification were to require specific levels of these managed environments, it would quickly become obsolete as new revisions to the managed environments are developed. J2EE is the “gold” standard for JAVA, it is however more restrictive than the J2SE specification. Since the J2SE specification is much more of an analog to the ECMA-335 specification, requiring J2EE with its additional restrictions, would give the ECMA-335 products an unfair advantage.

Despite the fact that this benchmark offers a rich environment that emulates many web service applications, this benchmark does not reflect the entire range of web service or Application Server requirements. In addition, the extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-App approximates the customer application. The relative performance of systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapolations to any other environment are not recommended.

Benchmark results are highly dependent upon workload, specific application requirements, systems design, and implementation. Relative system performance will vary as a result of these and other factors. Therefore, TPC-App should not be used as a substitute for a specific customer application benchmarking when critical capacity planning and/or product evaluation decisions are contemplated.

Benchmark sponsors are permitted several possible system designs, insofar as they adhere to the model described and pictorially illustrated in clause 6. A Full Disclosure Report of the implementation details, as specified in clause 8, must be made available along with the reported results.

Clause 1 – Web Object and Logical Database Design

Database Table Definitions

Listings must be provided for all table definition statements and all other statements used to set up the database. Enough detail must be provided to replicate the database structures. (Clause 8.3.1)

See the .zip file included on the TPC-App website for the “TPC-App_DB_6_19_2005.sql” database build script.

Database Organization

The physical organization of tables and indexes within the database must be disclosed. When logical disk arrays (e.g., RAID) are used, the mapping of database entities (e.g., tables, views) must be specified. Additionally, the mapping of logical units to physical disks must be disclosed. (Clause 8.3.2)

See the .zip file included on the TPC-App website for the “TPC-App_DB_6_19_2005.sql” database build script which contains the database table and index layout. See ‘Table 3’ for the logical to physical disk mappings.

Horizontal/Vertical Partitioning

Any horizontal or vertical partitioning of tables or rows in the TPC-App benchmark must be disclosed (see Clause 1.7.4 and 1.7.5). Replication of tables, if used, must be disclosed (see Clause 1.7.6). (Clause 8.3.3)

No horizontal or vertical partitioning was used.

Location of JPEG Images

The location of the JPEG images used in the benchmark to represent the item images (I_IMAGE) must be disclosed. This information must include on which system and in what logical structure the images are stored (database or file system). (Clause 8.3.4)

The JPEG images are stored on an NTFS directory on the L:\ logical drive of the application server.

Additional or Duplicated Attributes

Additional and/or duplicated attributes in any table must be disclosed along with a statement on the impact on performance. (Clause 8.3.5)

The SHIP_COST data structure is implemented as an additional table to the TPC-App Database. See the .zip file included on the TPC-App website for the files “TPC-App_DB_6_19_2005.sql” and “SHIPCOST.TXT” which contains the SHIP_COST data.

Clause 2 – Service Interactions and Workload

Active and Configured Emulated Browsers (EBs)

The number of Active EBs and Configured EBs must be disclosed. (Clause 8.4.1)

Active EBs: 130
Configured EBs: 140

Implementation of Security

A description of how the security requirements were met as defined in Clause 2.1.1 must be disclosed. (Clause 8.4.2)

Security was implemented using SSL. The SSL certificates were issued via the Microsoft Certificate Authority service (Version: 5.2.3790.1433)

SSL version 3 was used for all secure communications to and from the SUT
The private key uses 1024bit RSA for all certificates
The algorithm used was ‘shaRSA1’
The cipher suite was SSL_RSA_WITH_RC4_128_MD5

Web Service Interaction Example

The response XML for one representative Web Service Interaction for each interaction type must be included in the Full Disclosure. (Clause 8.4.3)

See Appendix B for Details.

Application Program WSDL(s)

The WSDL(s) for the Application Program must be included in the Full Disclosure Report. (Clause 8.4.4)

See Appendix C for the sample WSDLs

Stock Management and Shipping Queue Entry Example

The XML code for one representative entry that is placed on the Stock Management and Shipping queues must be disclosed. (Clause 8.4.5)

See Appendix B for the XML Code used for each messaging transaction.

Languages, IDE and APIs Used to Implement Interactions

A statement must be provided describing the development language(s), IDE and the types of APIs used between commercial components to implement the interactions. This includes, but is not limited to, the interfaces to the Database Server, Web server, commerce package or application, or any other commercial

product used. Changes to the IDE parameters that effect the compilation, linking or execution of the application must be disclosed. (Clause 8.4.6)

Microsoft Visual Studio .NET Enterprise Edition was used to develop the application in C#. Microsoft SQL Server Standard Edition was used to implement the database stored procedures. The interface to MS SQL used ODBC.

WS-I Conformance Test Results

The results of the WS-I conformance test must be disclosed. (Clause 8.4.7)

The WS-I conformance test indicated success on all of the messages for the required tested Web Service Interactions. The actual result file is available upon request.

Method Used to Determine Steady State

The method that the auditor used to determine Steady State must be reported. (Clause 8.4.8)

“After visual examination of the performance levels sustained during the measurement run, I was able to determine that all the necessary requirements were met for steady state to start on 6/19/2005 at 13:17:47 and to end on 6/19/2005 at 16:30:15 for a full duration of 3h12m28s” – Francois Raab, Infosizing

Application Source Code

The source code of the Application Program or programs as defined in Clause 1.2.17 as well as all input for product-generated code must be disclosed. (Clause 8.4.9)

The .zip file containing all the application source code was submitted with the FDR and is available on the TPC Web site:

www.tpc.org/tpc_app

Clause 3 – Transaction and System Properties

ACID Tests

Atomicity Tests

The results of the Atomicity tests described in Clause 3.2.1 must be disclosed along with a description of how the Atomicity requirements were met. (Clause 8.5.1)

The following steps describe atomicity test 1:

- 1. Request and complete a Create Order Web Service Interaction.*
- 2. Request and complete an Order Status Web Service Interaction for the same EB used in Step 1, using a value of 1 for NUM_ORDERS.*
- 3. The information presented in the SOAP response document from Step 2 MUST match the order entered in Step 1.*

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct.

The following steps describe atomicity test 2:

- 1. Request an Order Status for a given EB to view the last order committed for this customer.*
- 2. Disable all SHIPPING processes such that the queuing software is accepting Durable Messages but no Durable Messages are processed.*
- 3. Request a Create Order Web Service Interaction for the EB used in Step 1 with the same C_ID but different input data than Step 1 and rollback the updates after queuing the Durable Message to the Shipping Process but before committing the Distributed Transaction.*
- 4. Request and complete an Order Status Web Service Interaction for the EB used in Step 1.*
- 5. The information presented in the SOAP response document from Step 4 MUST make no mention of the order entered in Step 3.*
- 6. The Durable Message queued in Step 3 MUST NOT reside on any Shipping queue.*

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct, and the message was not present on the queue.

The following steps describe the atomicity test 3:

- 1. Ensure that all Stock Management queues are empty.*
- 2. Request a Create Order Web Service Interaction. The request MUST include one backorder request (I_QTY = 40). Note the O_ID returned in the Web Service Response.*
- 3. The Shipping queue on one Application Server SYSTEM MUST receive and process the new Durable Message. The processing MUST perform the REQUIRED updates on the database and send the backorder request to the Stock Management queue, but rollback the changes before committing the transaction and halt the processing of the shipping queue.*
- 4. View the Stock Management queue associated with the Shipping queue in Step 3. There MUST be no Durable Message on the queue with the O_ID from Step 2.*
- 5. View the SHIPPING queue examined in Step 3. It MUST contain the Shipping Durable Message with the O_ID from Step 2.*
- 6. Verify that the O_PROCESS_DATE for the order in step 2 is set to '1/1/1800'*

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct.

The following steps describe atomicity test 4:

1. *Request a New Customer Web Service Interaction. The request MUST contain customer and address information that is not already in the ADDRESS or CUSTOMER table.*
2. *Insert the customer and address data but rollback the transaction instead of committing.*
3. *Using a database query utility, verify that the database does not contain either the customer or address information inserted in Step 2.*

The interactions were instrumented to perform the tests. The tests were executed as described above, and the database contained the correct information.

Consistency Tests

The results of the Consistency tests described in Clause 3.3.6 must be disclosed along with a description of how the Consistency requirements were met. (Clause 8.5.2)

A consistent state for the TPC-App database is defined to exist when:

- 1. (I_A_ID) is a valid Foreign Key reference to an existing (A_ID)*
- 2. (C_ADDR_ID) is a valid Foreign Key reference to an existing (ADDR_ID)*
- 3. (O_C_ID) is a valid Foreign Key reference to an existing (C_ID)*
- 4. (O_SHIP_ADDR) is a valid Foreign Key reference to an existing (ADDR_ID)*
- 5. (OL_I_ID) is a valid Foreign Key reference to an existing (I_ID)*
- 6. (OL_O_ID) is a valid Foreign Key reference to an existing (O_ID)*
- 7. (ADDR_CO_ID) is a valid Foreign Key reference to an existing (CO_ID)*
- 8. (S_I_ID) is a valid Foreign Key reference to an existing (I_ID)*
- 9. All (O_STATUS) must be set to SHIPPED for all orders in the database. There MUST be no O_STATUS in the database with a value of PENDING or BACK_ORDERED. It is REQUIRED that the Shipping and Stock Management Queues be completely processed prior to executing the test for this condition.*

Consistency queries were executed before and after the test for consistency conditions 1-9.

Isolation Tests

The results of the Isolation tests described in Clause 3.4 must be disclosed along with a description of how the Isolation requirements were met. (Clause 8.5.3)

Isolation Test 1

To verify isolation between two TPC-App update transactions, perform the following steps:

- 1. From EB 1, perform a Product Detail Web Service Interaction for a given I_ID.*
- 2. From EB 1, perform a Change Item Web Service Interaction to modify the I_ID from Step 1.*
- 3. Interrupt the processing of the Change Item Web Service Interaction from EB 1 after updating the I_PUB_DATE, but before committing the update.*
- 4. From EB 2, request a Product Detail for the item from Step 1. Verify that the Product Detail Web Service Interaction either waits for EB 1 to resume or completes. If the Product Detail Web Service Interaction completes verify that the I_PUB_DATE returned is the original date from Step 1, not the date modified from Step 2.*
- 5. Resume the processing of the Change Item Web Service Interaction interrupted in Step 3.*
- 6. Verify that EB 1 receives a Change Item SOAP response containing the item's new I_PUB_DATE.*
- 7. If the Product Detail did not already complete in Step 4, allow EB2 to continue processing. In this case the Product Detail response MUST reflect the new I_PUB_DATE.*

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct.

Isolation Test 2

To verify isolation between a TPC-App update transaction and an arbitrary transaction, perform the following steps:

- 1. Obtain the value of I_PUB_DATE for an item.*
- 2. From an EB, initiate a modified Change Item Web Service Interaction that updates the I_PUB_DATE to '8-8-1988' for the item from Step 1.*
- 3. Interrupt the processing of the Change Item Web Service Interaction after updating the I_PUB_DATE, but before committing the change.*

4. Using a database query and update utility, request a transactional update of the I_PUB_DATE of the item targeted by Step 1, setting it to '1-1-1970'. Commit this update as soon as allowed by the database. The update request MAY hang waiting for the processing of the Change Item Web Service Interaction to complete.
5. Resume the processing of the Change Item Web Service Interaction interrupted in Step 3.
6. If the EB completes successfully verify that the EB receives a SOAP response containing the EB's update to I_PUB_DATE (8-8-1988).
7. If the database query completes successfully, verify that I_PUB_DATE contains 1-1-1970.
8. If both the EB and the database query do not complete successfully, verify I_PUB_DATE contains the original value.

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct and the database query contained 1-1-1970.

Isolation Test 3

To verify isolation between a TPC-App read-only transaction and an arbitrary transaction, perform the following steps:

1. From an EB, request and complete an Order Status Web Service Interaction. Ensure that at least one order is returned.
2. Using a database query and update utility, request a transactional update of the quantity of the first line item of the first order returned in Step 1, but do not commit this update.
3. From the same EB, request and complete another Order Status Web Service Interaction to obtain the same order as in Step 1
4. Verify that the EB's Order Status Web Service Interaction either waits for the update utility to commit or returns an Order Status Web Service Response containing the same information as displayed in Step 1.
5. Using the database query and update utility, commit the pending update to the database.
6. If the EB was waiting in Step 4, verify that it has resumed and that it receives an Order Status SOAP response containing the new quantity for the first line item. If the browser was not waiting in Step 4, request and complete a new Order Status Web Service Interaction to obtain the same order as in Step 1 and verify that the Order Status SOAP response contains the new quantity for the first line item.

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct, and the message was not present on the queue.

Isolation Test 4

This test is only REQUIRED if de-queuing of the Shipping queue is multithreaded.

To verify isolation between Durable Messages removed from the Shipping queue:

1. Ensure all Shipping queues are empty.
2. Disable all Shipping process such that no Durable Messages in the Shipping queue are processed.
3. Modify the Shipping process on the Application Server SYSTEM that will process the Shipping queue being tested such that the messages are removed from the queue and logged to a file by the application, followed by a delay of 120 seconds before the Transaction is committed.
4. Configure or modify the SUT such that the Create Order Web Service Interactions can target a given Application Server SYSTEM and that the Application Server SYSTEM routes all Shipping queue entries to a single Shipping queue.
5. Enable the Shipping process.
6. From an EB, request and complete two successful Create Order Web Service Interactions that are performed on the same Application Server SYSTEM within 60 seconds of each other but no less than 10 seconds of each other.
7. Verify in the Shipping process log that there are no duplicates of the messages from Step 6.

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct, and no duplicate messages were present on the shipping log.

Isolation Test 5

This test is only REQUIRED if de-queuing of the Stock Management queue is multithreaded.

To verify isolation between messages removed from the Stock Management queue:

- 1. Ensure that the Stock Management queue is empty.*
- 2. Disable the Stock Management Process such that no Stock Management queue messages are processed.*
- 3. Modify the Stock process such that the messages are removed from the queue and logged to a file by the application, followed by a delay of 120 seconds before the Transaction is committed.*
- 4. Configure or modify the SUT such that the Create Order Web Service Interactions can target a given Application Server SYSTEM and that the Application Server SYSTEM routes all Stock Management queue entries to a single Stock Management queue.*
- 5. Enable the Stock Management Process. Allow it to remove all items from the queue.*
- 6. From an EB, request and complete two successful Create Order Web Service Interactions targeting the same Application Server SYSTEM, each of which force one BACK_ORDERED item (OL_I_QTY = 40). These Web Service Requests MUST be initiated within 60 seconds of each other but no less than 10 seconds of each other.*
- 7. Verify that there are no duplicates of the messages in the file(s) from Step 3.*

The interactions were instrumented to perform the tests. The tests were executed as described above, and the received SOAP responses were correct, and no duplicate messages were present on the stock log.

Durability Tests

The results of the Durability tests described in Clause 3.5 must be disclosed along with a description of how the Durability requirements were met. (Clause 8.5.4)

Durability Test for SUT Components

For each component susceptible to one of the failure types defined in Clause 3.5.3 perform the following steps:

- 1. Obtain the total number of rows in the ORDERS table to determine the current count of orders (order_count1) in the database.*
- 2. Start the workload of Web Service Interactions using the same number of EBs used for the Test Run.*
- 3. Once all EBs have started requesting Web Service Interactions, run for at least 5 minutes and keep a count of the number of Create Order Web Service Interactions successfully completed by all EBs.*
- 4. Cause the failure selected from the list in Clause 3.5.3.*
- 5. Stop the RBE and collect the total number of Create Order Web Service Interactions successfully completed by all EBs (RBE_order_count).*
- 6. If necessary, stop and restart the system under test using normal recovery procedures, where applicable.*
- 7. Repeat step 1 to determine the current count of orders (order_count2) in the database. Verify that (order_count2 - order_count1) is greater than or equal to the number of successfully completed Create Order Web Service Interactions (RBE-order_count). If there is an inequality, the difference MUST be less than or equal to the number of EBs active during this test.*
- 8. Verify that the Consistency Conditions 3, 4, 6 and 9, as specified in Clause 3.3.2, are met. This consistency test MUST be performed without any other Web Service Interactions in progress.*

The loss of system, power, and memory were combined for the durability tests on both the Application Server SYSTEM, and Database SYSTEM. The loss of medium (disk) was performed separately. All tests were performed as described above and passed successfully. Note, no errors occurred for the loss of medium tests since all system drives are implemented with RAID 5 arrays.

Durability Test for Messaging Product and Distributed Transaction Manager

For each component susceptible to one of the failure types defined in Clause 3.5.3, perform the following steps:

1. Ensure the ICE log(s) is/are empty. Modify the ICE process such that there is a minimum delay of 30 seconds immediately after step 4 in the processing steps for the ICE (see Clause 6.8.3. Modify the Shipping Process such that there is a minimum delay of 5 seconds after the database update but before committing the Distributed Transaction.
2. Ensure the Shipping and Stock Management queues are all empty.
3. Start the workload of Web Service Interactions using the same number of EBs used for the Test Run. Once all EBs have started requesting Web Service Interactions, run for at least 5 minutes.
4. For the system containing the Stock Management and Shipping queues, cause the failure selected from the list in Clause 3.5.3.
5. Stop the workload (shutdown the RBE).
6. Recover the system as necessary from the failure. Allow the Distributed Transaction Manager to recover and resume the Shipping and Stock Management Processes. Allow the Shipping process and Stock Management Process to complete all items remaining on their respective queues, , including the new items that the Shipping process MAY place in the Stock Management queue that arise from processing the Shipping queue.
7. Verify that the Database Server contains no ORDERS with a status of PENDING.
8. Obtain from the ICE log(s) the count of unique O_IDS. Since the ICE is outside the SUT, its log is not affected by the crash. To obtain the correct ICE log count, the ICE log(s) MUST be flushed to disc.
9. Obtain from the RBE the count of all Create Order interactions which returned a response status of BACK_ORDERED.
10. Verify that the counts obtained in Steps 8 and 9 are equivalent. If the counts do not match the difference MUST be no greater than the number of Active EBs and the count from Step 8 MUST be greater than Step 9.
11. Verify that the Consistency Conditions 3, 4, 6 and 9, as specified in Clause 3.3.2 are met. This consistency test MUST be performed without any other Web Service Interactions in progress.

The test was performed as described above and passed.

Clause 4 – Scaling and Database Population

Cardinality Table

The cardinality (e.g., number of rows) of each table, as initially populated (see Clause 4.2 and 4.3), must be disclosed. (Clause 8.6.1)

The following table contains the TPC-App benchmark defined tables and the number of rows for each table as they were initially populated.

Table 1 – Database Tables Cardinality

Table Name	Rows
CUSTOMER	26,880
COUNTRY	92
ADDRESS	37,632
ORDERS	268,800
ORDER_LINE	1,479,523
AUTHOR	25,000
STOCK	100,000
ITEM	100,000

60-Day Space Requirements

The space required to sustain 60 days of the reported throughput as defined in Clause 4.4 must be disclosed. (Clause 8.6.2)

See Appendix F for Space Calculations.

8-Hour Log Space Requirements

The space required for 8 hours of log space as defined in Clause 4.5 must be disclosed. (Clause 8.6.3)

See Appendix F for Space Calculations

Distributed Transaction Manager Log and Message Storage Requirements

The DTC Log size is fixed at a maximum of 50MB. No growth was indicated after the Test Run for this log.

The Message Storage was configured to allow a maximum of 8GB of message storage. The message storage usage indicated the same size at the beginning and the end of the test run (6.15MB). The maximum number of messages in the Shipping queue during the Test Run was 179. The maximum number of messages in the Stock Management queue during the Test Run was 19.

Distribution of Tables and Logs

The method for distributing persistent data and log data across all media must be described. A detailed diagram or a listing of database files indicating the disks or volumes on which they reside must be included. (Clause 8.6.4)

Table 2 – Application Server Storage and Log Distribution

Controller	Drives	Partition	Size	Use	Array Configuration
1	3 x 73.4GB	C:	140GB	OS and HTTP Log	RAID-5 (write-through)
1	7 x 73.4GB	L:	420GB	JPEG Images	RAID-5 (write-through)
1	4 x 73.4	Q:	210GB	MSMQ storage and MSMQ log	RAID-5 (write-through)

Table 3 – Database Server Storage and Log Distribution

Controller	Drives	Partition	Size	Use	Array Configuration
1	14 x 73.4GB	C: L:	50GB 860GB	OS Database log	RAID-5 (write-through)
1	9 x 73.4GB	M:	560GB	Database data	RAID-5 (write-through)
1	5 x 73.4	N:	210GB	DTC log	RAID-5 (write-through)

Database Population Requirements

The method used by the auditor to verify that the database population meets the requirements in Clause 4.7 must be disclosed. (Clause 8.6.5)

The database creation and population program was reviewed for compliance. In addition, a series of SQL queries were executed against the newly populated test database. The results from these queries confirmed that the initial database population met the requirements of the benchmark.

Database Loader Source Code

The source code for the database loader must be disclosed. (Clause 8.6.6)

The .zip file containing all the source code was submitted with the FDR and contains the database loader source code.

Clause 5 – Performance Metrics and Response Times

TPC-App Primary Metrics

The Total SIPS, SIPS per Application Server System, and price per SIPS must be disclosed. (Clause 8.7.1)

SIPS per App Server SYSTEM: 174.9

Total SIPS: 174.9

Price per SIPS: \$327.41 USD

Availability Date: June 21, 2005

These primary metrics can be found in the Executive Summary at the beginning of this report.

Measurement Intervals

The duration of the Ramp-Up, Stabilization, Steady State, and Measurement Interval must be disclosed. Additionally the method used by the auditor to determine the beginning of Steady State must be disclosed (see Clause 5.4.3.1). (Clause 8.7.2)

Ramp-Up: 1 minute, 59 seconds

Stabilization: 17 minutes, 31 seconds

Steady State: 3 hours, 12 minutes, 28 seconds

Web Service Interactions Response Times

The following statistics must be reported for the Web Service Interactions executed during the reported Measurement Interval. They must be displayed in tabular form as in the following example. Percentages must be rounded to 2 decimal places. Response times must be reported in seconds and rounded up to at least 1 significant decimal place (see Clause 5.2.1.2). (Clause 8.7.3)

See the Numerical Quantities Summary in the Executive Summary for the Web Service Interaction Response Times.

Web Service Interactions Mix Statistics

The following statistics must be reported for the Web Service Interactions executed during the reported Measurement Interval. (Clause 8.7.4)

See the Numerical Quantities Summary in the Executive Summary for the Web Service Interaction Mix details. Since there was only one Application Server SYSTEM configured in the SUT, the minimum and maximum mix percentages are the same.

Checkpoints

A list of the start times and durations of all checkpoints that complete between the start of the Test Run and the end of the Measurement Interval must be reported. If the Database Server product in use does not use the checkpoint mechanism, the method used to meet the requirements in Clause 5.5.5.2 must be disclosed. (Clause 8.7.5)

See Appendix F for the database checkpoint times.

Web Service Requests for Change of Address

The percentage of service requests to the Create Order Web Service that contained a change of address as part of the input must be reported. (Clause 8.7.6)

Create Order with an address change 4.96%

Number of Business Sessions

The number of Business Sessions that began within the Measurement Interval must be reported. (Clause 8.7.7)

There were 31,104 Business Sessions in the Measurement Interval.

Shipping Queue Performance

For the Shipping Queue performance during the Measurement Interval:

- *The number of orders that were created during the Measurement Interval must be reported.*
- *The number of orders for which O_DATE is within the Measurement Interval and for which O_PROCESS_DATE is within the Measurement Interval must be reported.*

(Clause 8.7.8)

There were 629,547 Orders Created in the Measurement Interval.

There were 629,536 Orders where O_DATE and O_PROCESS_DATE were within the Measurement Interval.

Requests Logged

The number of requests logged in the ICE log within the Measurement Interval must be reported. Business Sessions that began within the Measurement Interval must be reported. (Clause 8.7.9)

There were 62,898 requests logged in the ICE log in the Measurement Interval.

New Customer Web Service Requests

The percentage of New Customer Web Service Requests that chose "PO" as the payment method within the Measurement Interval must be reported (see Clause 5.5). (Clause 8.7.10)

New Customer Web Service Requests with a payment method of PO: 50.4%

Change Payment Web Service Requests

The percentage of Change Payment Web Service Requests that chose "PO" as the payment method within the Measurement Interval must be reported (see Clause 5.5). (Clause 8.7.11)

Change Payment Web Service Requests with a payment method of PO: 49.9%

Percentage of Order Requests Resulting in a Backorder

The percentage of orders submitted to the Create Order Web Service that resulted in a backorder within the Measurement Interval must be reported (see Clause 5.5). (Clause 8.7.13)

The percentage of orders submitted to the Create Order Web Service that resulted in a backorder: 9.99%

Service Interactions in a Business Session

The average number of Service Interactions in a Business Session within the Measurement Interval must be reported (see Clause 5.5). (Clause 8.7.14)

Average number of Service Interactions in a Business Session within the Measurement Interval: 40.5

Performance Metrics

(Clause 8.7.15)

Monitoring Tools Used during Measurement Interval

The monitoring tools used during the Measurement Interval must be described and the operational methods invoked must be reported. (Clause 8.7.15.1)

Microsoft System Performance Monitor was used to collect all performance counters.

Sampling Technique Used to Obtain Performance Data

If a sampling technique is used to obtain performance data, the sample rate (per second) must be reported. The data collection sampling interval must be configured to be at most 1 second. (Clause 8.7.15.2)

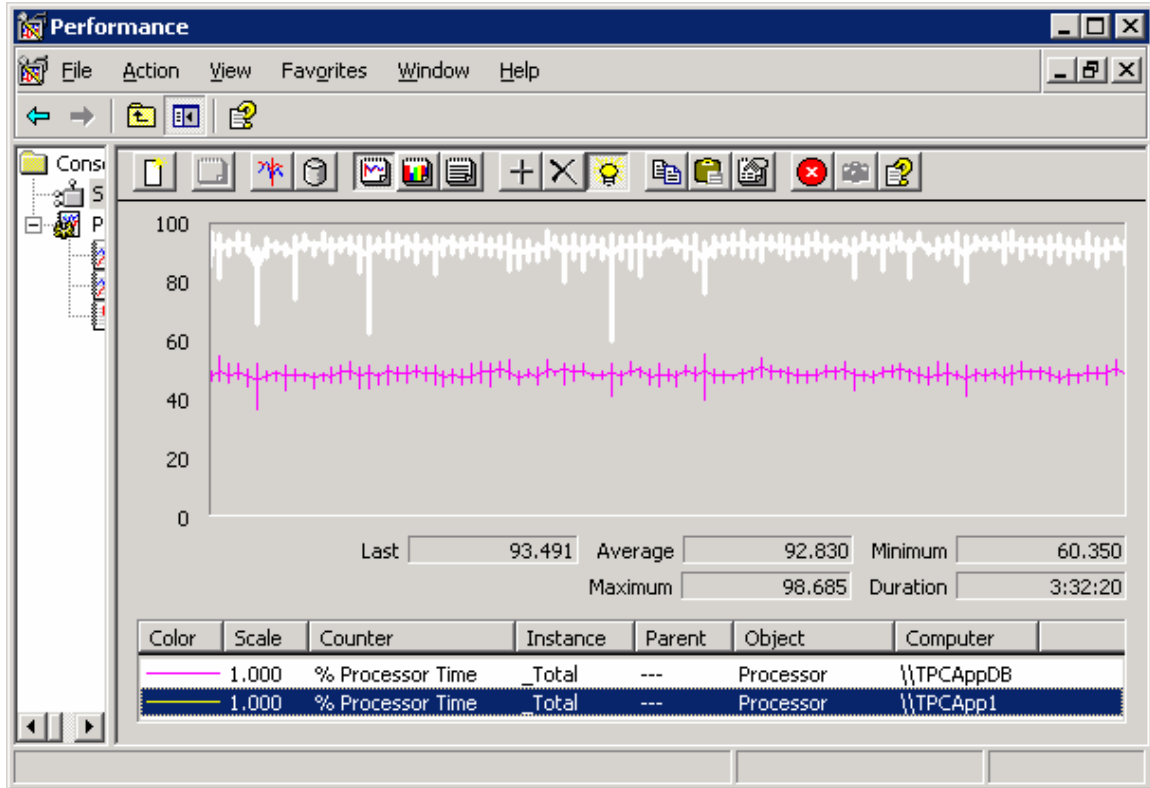
Sampling was not used.

Performance Statistics

The following performance statistics must be collected and reported for both the application server System(s) and the database server System(s): CPU Utilization, Memory Usage, System I/O Activity. (Clause 8.7.15.4)

The following sections present the graphs that provide the required performance statistics. (Clauses 8.7.15.4.1, 8.7.15.4.2, 8.7.15.4.3 and 8.7.15.4.4, including all clauses subordinate to them)

CPU Utilization



TPCApp1 is the Application Server SYSTEM. TPCAppDB is the Database Server SYSTEM.

Monitored Metrics

(Clause 8.7.16)

The monitored metrics must be reported in a table.

Table 4 – Web Service Monitored Metrics

Metric	Application Server SYSTEM			Database Server SYSTEM			
% CPU Busy	93.9			49.3			
Memory in Use (visible to OS)	1293MB			2046MB			
Disk I/O Rate (OS)	C: 23.8K /sec	L: 1.22MB /sec	Q: 2.11MB /sec	C:691KB/sec	L: 243K/sec	M: 324K/sec	N: 1,223K/sec
Average Disk Utilization	C:1.7%	L:57%	Q:15.4%	C:27.1%	L:86.4%	M:5%	N:60.5%
Average Disk I/O Block Size	C:38.4K	L:2K	Q:9.3K	C:38.4K	L:2K	M:9.3K	N:8.7K
Total Logging I/O Rate	HTTP Log: 24K/sec			DBMS Log: 243K/sec DTC Log 734K/sec			
Network I/O	23.4MB/sec			1.44 MB/sec			
TCP/IP connections per second	4.3			ICE/SNE: 1.1	PGE:0	,POV:0	
HTTPS requests per second	174.9			ICE/SNE: 96.2	PGE: 43.5	POV: 5.2	

RETRY_COUNT during Test Run

The sponsor must disclose the maximum `RETRY_COUNT` that occurred during the Test Run. (Clause 8.7.17)

Maximum `RETRY_COUNT`: 0

HTTP Status Information

The sponsor must disclose information on all HTTP status codes for all HTTP requests to the SUT that occurred during the Measurement Interval. (Clause 8.7.18)

Table 5 – HTTP Status Information

HTTP Status	Count
200	1,259,851

Clause 6 – SUT, RBE and Network Definitions

Network Bandwidth

The rated bandwidth of the network(s) component used in the measured configuration MUST be disclosed along with any setting restricting that bandwidth. This includes, but is not limited to, the inter-node connections within the SUT, between the SUT and the RBE, and between the SUT and the PGE, POV, SNE, and ICE. (Clause 8.8.1)

The bandwidth for all SUT network components is 1Gbit.

Operator Intervention

If the configuration REQUIRES operator intervention to meet the REQUIREMENTS of performance levels and uninterrupted operations, the mechanism and the frequency of this intervention MUST be disclosed. (Clause 8.8.2)

The SUT requires no operator intervention.

Retries during Measurement Interval

A count, by interaction type, of the retries that occurred during the Measurement Interval MUST be disclosed (see clause 5.1.2). (Clause 8.8.3)

There were no RETRYs in the Measurement Interval.

RBE Start Seed Generation

The RBE method of generating the start seeds for the EBs MUST be disclosed. It MUST be clear that the start seeds are different for each EB. Additionally it MUST be clear that the start seeds are different from Test Run to Test Run. (Clause 8.8.4)

A registry parameter that contains the last (and highest) seed used in previous runs is maintained in the system registry. The EB reads this highest previous seed value and incrementally assigns new seed values above this.

RBE Random Number Generation

The number of random number generators used for each EB MUST be disclosed along with their purpose(s). Examples of purposes include: choosing the next Web Service Interaction, building random text strings, deciding whether the shipping address is changed, etc... (Clause 8.8.5)

Two (2) pseudo-random number generators are used for each EB. The first is used for selection of the next Web Service Interaction type; the other is used for all other RNG requirements for the EB.

Clause 7 – Pricing

Hardware and Software Components

A detailed list of hardware and software used in the priced system MUST be reported in the Executive Summary. Each separately orderable item MUST have vendor part number, description, and release/revision level, and either general availability status or committed delivery date. If package-pricing is used, vendor part number of the package and a description uniquely identifying each of the components of the package MUST be disclosed. (Clause 8.9.1)

See the Executive Summary for the detailed list of hardware and software used in the priced system.

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 recommended. The basis of all discounts used MUST be disclosed. (Clause 8.9.2)

See the Executive Summary at the beginning of the disclosure.

Availability Dates

The committed delivery date for general availability (Availability Date) of products used in the price calculations MUST be reported. When the priced system includes products with different Availability Dates, the reported Availability Date for the priced system MUST be the date at which all components are committed to be available. This single date MUST be reported on the first page of the Executive Summary. All Availability Dates, whether for individual components or for the SUT as a whole, MUST be disclosed to a precision of one day. (Clause 8.9.3)

The total solution as measured and priced hardware and software is generally available June 21, 2005.

Usage Pricing

For any usage pricing, the sponsor MUST disclose:

- *Usage level at which the component was priced.*
- *A statement of the company policy allowing such pricing. (Clause 8.9.4)*

Clause 9 – Audit-Related Items

The auditor's name, address, phone number and e-mail address MUST be included in the Full Disclosure Report. A copy of the auditor's attestation letter indicating compliance MUST be included in the Full Disclosure Report. (Clause 8.10.1 and Clause 8.10.2)

This implementation of the TPC-App Benchmark was audited by Francois Raab of InfoSizing, Inc.

The Attestation Letter is included in this section.

Availability of the Full Disclosure Report

The Application Program, data generator, database loader program, database creation scripts, and the Application Program WSDL(s) must be included in an accessible zip or tar file. This file must be included with the submission to the TPC for availability on the results page. (Clause 8.11.2)

A .zip file including all of the required code is available on the TPC Web site, along with the Full Disclosure Report and the Executive Summary for this result.

Benchmark Sponsor: Celia Schreiber
 Manager, xSeries Performance
 IBM Systems and Technology Group
 3039 Cornwallis Road
 Research Triangle Park, NC 27709

June 21, 2005

I verified the implementation and the execution of the following TPC Benchmark™ App result:

Configuration:

HW Platform: **IBM eServer xSeries 366**
 Application Server: **Microsoft .NET 1.1**
 Managed Runtime: **Microsoft .NET 1.1**
 Transaction Manager: **Microsoft DTC**
 Message Queuing: **Microsoft MSMQ**
 Web Server: **Microsoft IIS**
 Database Manager: **Microsoft SQL Server 2000**

Performance Results:

SIPS/App Server	Total SIPS	Average SIRT	Active EB's
174.9	174.9	0.74 sec.	130

The detailed configuration was:

CPU's Speed	Memory	Storage	Operating System
Application Server: IBM @server xSeries 366 (Single System with)			
4 x Xeon MP (3.66 GHz)	4 GB Main 1 MB L2-cache/cpu	14 x 73.4 GB	Microsoft Windows Server 2003 Standard Edition
Database Server: IBM @server xSeries 346 (Single System with)			
1 x Xeon DP (3.60 GHz)	3 GB Main 1 MB L2-cache/cpu	28 x 73.4 GB	Microsoft Windows Server 2003 Standard Edition

In my opinion, these performance results were produced in compliance with the TPC's requirements for the benchmark.

The following verification items were given special attention:

- The database records were the proper size
- The database was properly scaled and populated for 140 EB's:

The database creation and population program was reviewed for compliance. In addition, a series of SQL queries were executed against the newly populated test database. The results from these queries confirmed that the initial database population met the requirements of the benchmark.

- The required ACID properties were met
- The web service interactions were correctly implemented
- The RBE generated input data according to the specified percentages
- The reported response times were correctly measured
- All 90% response times were under the specified maximums
- The reported measurement interval was 120 minutes (2 hours)
- The reported measurement interval was representative of steady state conditions:

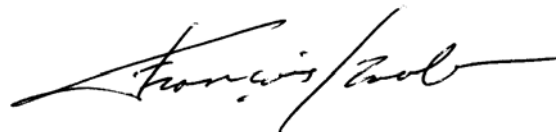
After visual examination of the performance levels sustained during the measurement run, I was able to determine that all the necessary requirements were met for steady state to start on 6/19/2005 at 13:17:47 and to end on 6/19/2005 at 16:30:15 for a full duration of 3h12m28s.

- At least one checkpoint was fully completed before the reported measurement interval and the average checkpoint interval thereafter was under 5 minutes.
- The database and log storage requirements were correctly computed
- The system pricing was verified for major components and maintenance
- Major sections of the Full Disclosure Report were verified for accuracy.

Additional Audit Notes:

None.

Respectfully Yours,

A handwritten signature in black ink, appearing to read "François Raab", with a long horizontal flourish extending to the right.

François Raab
President

Appendix A – Application Tunable Parameters

Application Server SYSTEM Operating System: Windows Server 2003 Standard Edition, with Service Pack 1 v.1433

The application server SYSTEM was configured as an "Application Server" using the Windows 2003 "Configure your server" wizard. The application server components included IIS, Microsoft Distributed Transaction Coordinator (DTC), COM+, FrontPage Server Extensions, Message Queueing, and Network DTC access enabled.

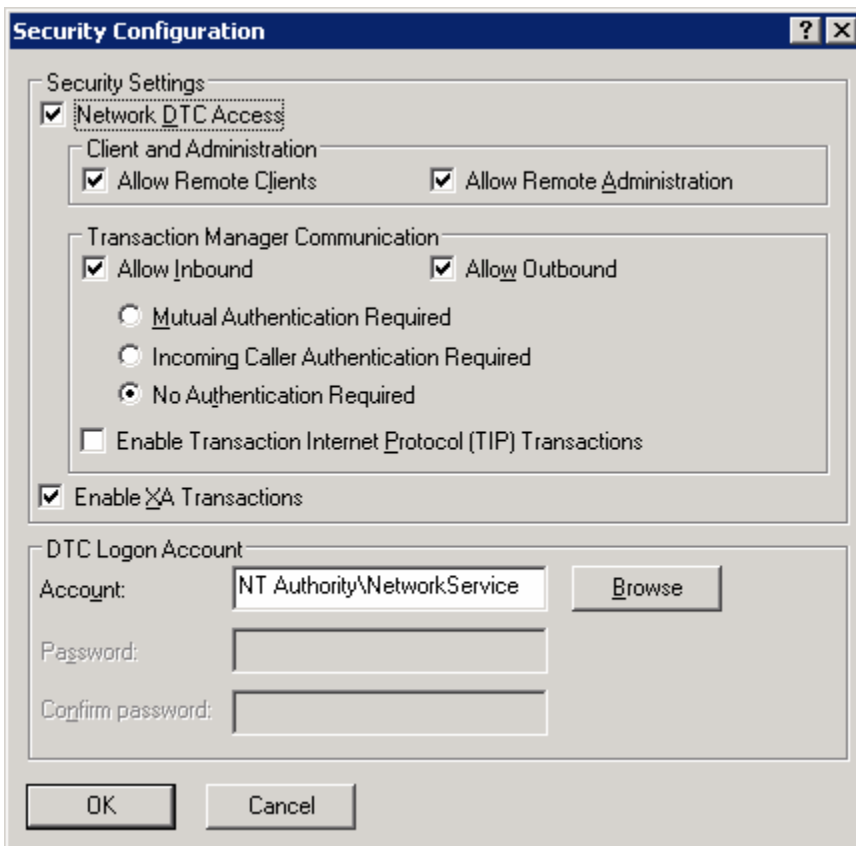
5 instances of the ShippingProcess were executing during the test run.
1 instance of the StockManagement process was executing during the test run.

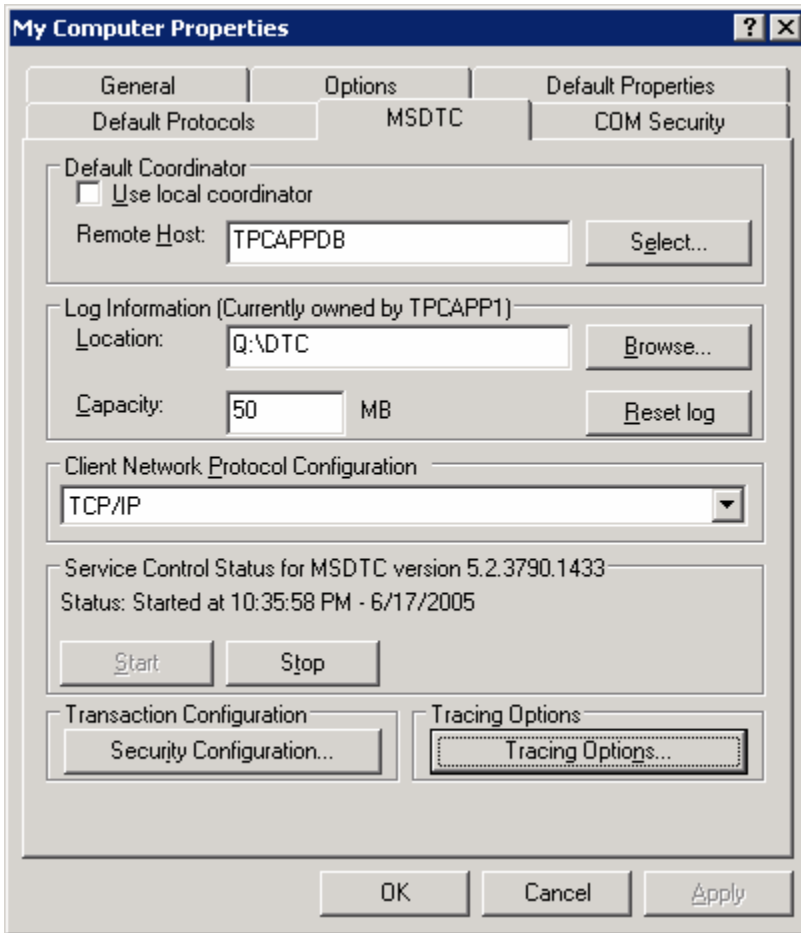
The machine.config file is included in the application source code .zip sent with the FDR result to the TPC website.

The DNS service was disabled on the application server SYSTEM.

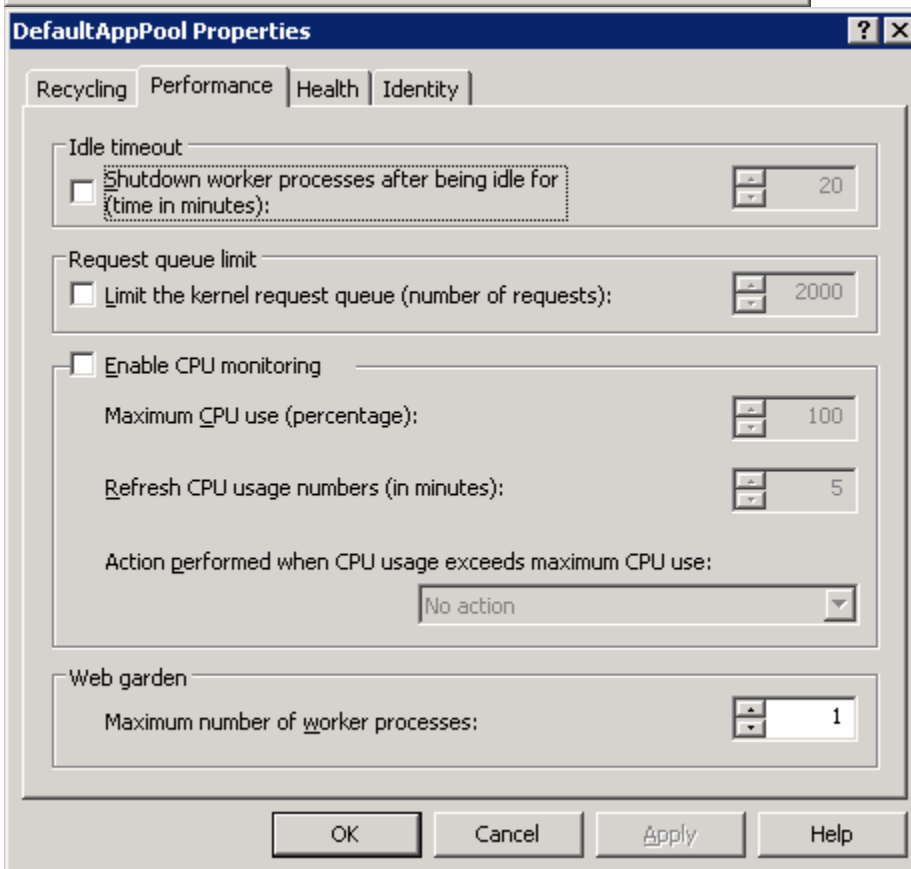
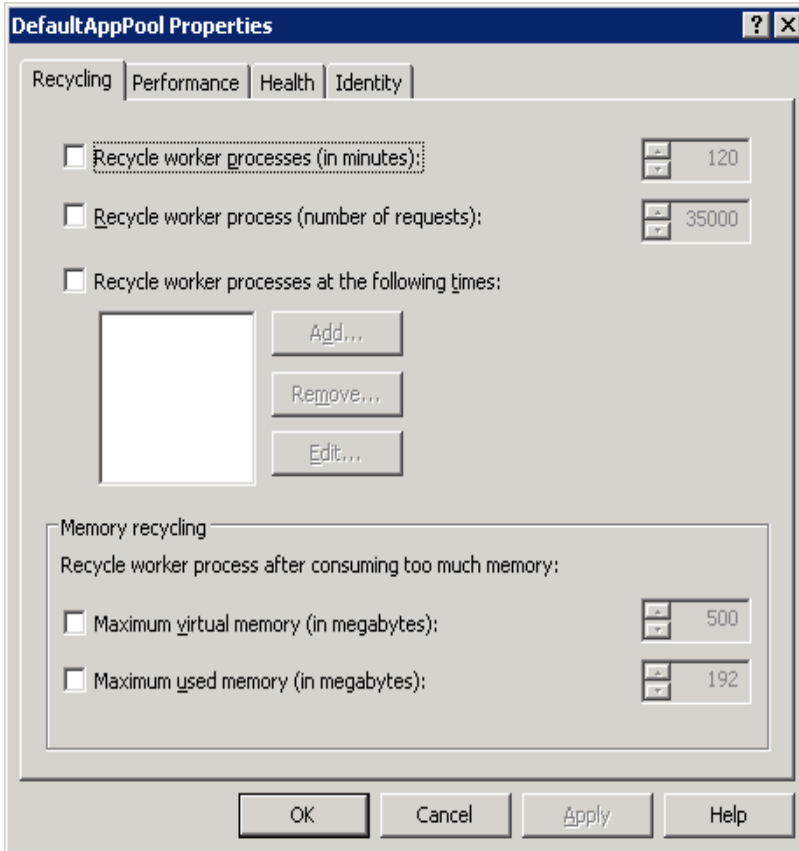
The transaction isolation option under the COM component properties for the OrderCOM.DoOrder and Shipping.ShipTxn components were set to 'Repeatable Read'.

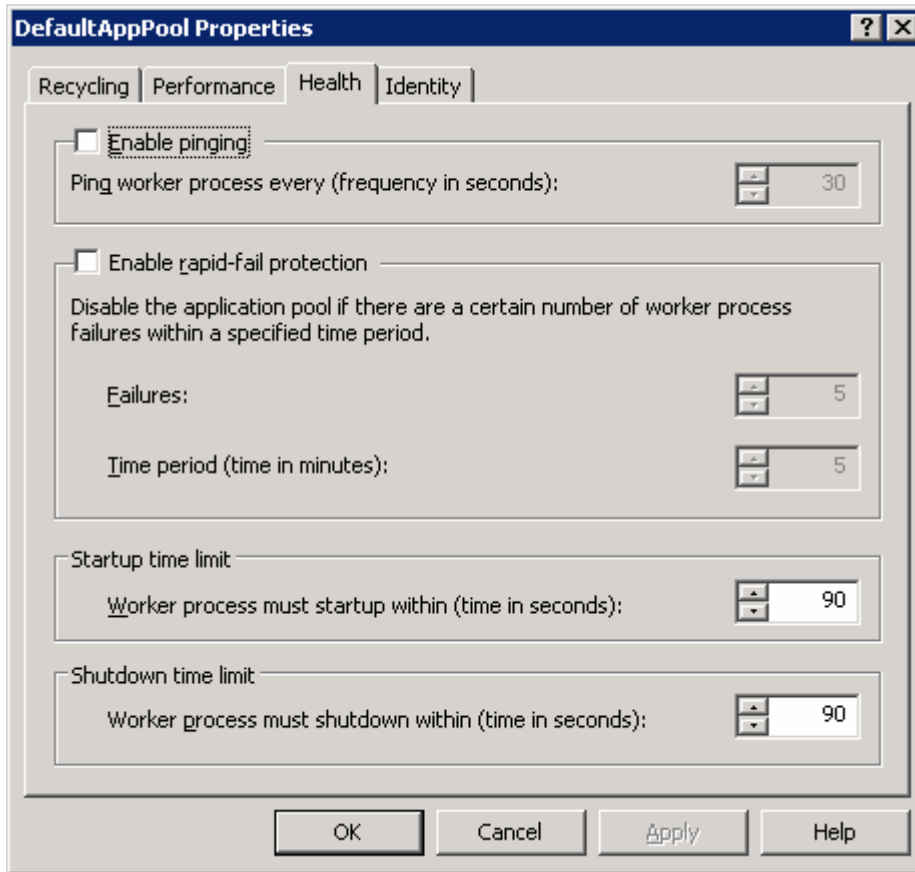
The following depict the settings for the Component Services settings on the application server.





The following screens depict the settings for the IIS Default App Pool settings on the application server.





MSMQ service registry parameters

Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ]

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters]

```
"SetupStatus"=dword:00000000
"MsmqRootPath"="C:\\WINDOWS\\system32\\msmq"
"DsEnvironment"=dword:00000002
"Workgroup"=dword:00000000
"DsSecurityCache"=hex:01,00,04,80,68,04,00,00,84,04,00,00,00,00,00,00,14,00,00,
00,02,00,54,04,05,00,00,00,00,14,00,f7,00,0f,00,01,01,00,00,00,00,01,
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00,ff,4c,08,00,06,1f,3f,4e,0e,b6,a2,46,b5,39,57,9a,1d,15,aa,59,00,00,00,\
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00,00,00,68,20,01,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
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6d,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,47,ed,7f,6d,\
47,ed,7f,6d,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,ce,ed,7f,6d,ce,ed,\
7f,6d,00,\
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,92,f4,7f,6d,92,f4,7f,6d,\
00,\
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,25,ef,7f,6d,25,ef,7f,6d,00,00,\
00,\
00,00,00,00,00,00,00,00,00,00,00,00,00,af,ef,7f,6d,af,ef,7f,6d,00,00,00,\
00,\
00,00,00,00,00,00,00,00,00,00,00,00,00,2e,02,80,6d,2e,02,80,6d,00,00,00,00,\
00,35,00,3a,\
00,86,01,08,04,1c,cd,7b,6d,01,05,00,00,00,00,05,15,00,00,00,25,37,84,73,\
82,de,0a,15,f8,6e,dd,ff,54,04,00,00,01,05,00,00,00,00,05,15,00,00,00,25,\
37,84,73,82,de,0a,15,f8,6e,dd,ff,03,02,00,00

"StoreReliablePath"="Q:\msmq"
"StorePersistentPath"="Q:\msmq"
"StoreJournalPath"="Q:\msmq"
"StoreLogPath"="Q:\msmq"
"StoreXactLogPath"="Q:\msmq"
"LastPrivateQueueId"=dword:00000033
"SeqID"=dword:42b38892
"LogDataCreated"=dword:00000001
"TransactionMode"="DefaultCommit"
"PacketSequentialIdMsmq3Format"=dword:00000001
"CurrentBuild"="5.2.1716"
"MessageID"=dword:08591800
"MessageIdHigh32"=dword:00000000
"Connection State"=dword:00000001
"QMGuidChanged"=dword:00000000
"DSNextSiteListRefreshTime"=hex(b):e8,44,31,3d,e0,75,c5,01
"DSNextEnterpriseListRefreshTime"=hex(b):dd,6c,0b,95,b0,88,c5,01

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\MachineCache]

"MQS"=dword:00000000
"MQS_DsServer"=dword:00000000
"MQS_Routing"=dword:00000000
"MQS_DepClients"=dword:00000000
"QMId"=hex:9d,6f,ca,47,93,8f,e1,41,a1,ef,e1,a4,72,fc,31,44
"EnterpriseId"=hex:58,81,80,8c,fb,41,6d,44,b9,f1,77,e2,fc,d9,3b,a7
"SiteId"=hex:19,7e,24,48,f7,b3,f8,45,86,0d,80,e4,d2,31,74,eb
"MachineQuota"=dword:00800000
"MachineJournalQuota"=dword:ffffff
"LongLiveTime"=dword:00054600

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\OCMsetup]

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\OnHold Queues]

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\security]

"LqsUpdatedSD"=dword:00000001
"MachineAccount"=hex:01,05,00,00,00,00,00,05,15,00,00,00,25,37,84,73,82,de,0a,\
15,f8,6e,dd,ff,54,04,00,00
"EnhContainerFixed"=dword:00000001
"BaseContainerFixed"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\setup]

"OSType"=dword:00000400

```

"MachineDomain"="TPCAPP"
"InetpubWebDir"=dword:00000001
"MachineDN"="CN=TPCAPP1,CN=Computers,DC=tpcapp,DC=net"
"MSMQAddedToCFExceptionList"=dword:00000001
"MachineDomainFQDN"="tpcapp.net"

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace]
"MaxTraceFileSize"=dword:00000004
"UseCircularTraceFileMode"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{1ac9b316-5b4e-4bbd-a2c9-1e70967a6fe1}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{322e0b22-0527-456e-a5ef-e5b591046a63}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{45033c79-ea31-4776-9bcd-94db89af3149}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{485c37b0-9a15-4a2e-82e0-8e8c3a7b8234}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{5dc62c8c-bdf2-45a1-a06f-0c38cd5af627}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{6e2c0612-bcf3-4028-8ff2-c60c288f1af3}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{71625f6d-559a-49c6-ba21-0aeb260db97b}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{7c916009-cf80-408b-9d91-9c2960118be9}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{8753d150-950b-4774-ac14-9c6cbff56a50}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{8fda2bbd-347e-493c-b7d1-6b6fed88ce04}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{90e950bb-6ace-4676-98e0-f6cdc1403670}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{a13ec7bb-d592-4b93-80da-c783f9708bd4}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{da1af236-fad6-4da6-bd94-46395d8a3cf5}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{f707f440-ad58-47f8-93d3-bea2f9e82fd2}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Parameters\Trace\{f8354c74-de9f-48a5-8139-4ed1e9f20a1b}]
"Flags"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Setup]
"msmq_Core"=dword:00000001
"msmq_LocalStorage"=dword:00000001
"msmq_ADIntegrated"=dword:00000001
"InstalledComponents"=dword:fa000000
"msmq_TriggersService"=dword:00000001
"msmq_HTTPSupport"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Triggers]
"InitialThreads"=dword:00000005
"MaxThreads"=dword:00000014
"InitTimeout"=dword:000493e0
"DefaultMsgBodySize"=dword:00000800
"ComplusComplInstalled"=dword:00000001

```

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Triggers\Data]

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Triggers\Data\Rules]

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\MSMQ\Triggers\Data\Triggers]

Microsoft DTC registry parameters

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MSDTC]

"Type"=dword:0000010

"Start"=dword:00000002

"ErrorControl"=dword:00000001

"ImagePath"=hex(2):43,00,3a,00,5c,00,57,00,49,00,4e,00,44,00,4f,00,57,00,53,00,\
5c,00,73,00,79,00,73,00,74,00,65,00,6d,00,33,00,32,00,5c,00,6d,00,73,00,64,\
00,74,00,63,00,2e,00,65,00,78,00,65,00,00,00

"DisplayName"="Distributed Transaction Coordinator"

"Group"="MS Transactions"

"DependOnService"=hex(7):52,00,50,00,43,00,53,00,53,00,00,00,53,00,61,00,6d,00,\
53,00,53,00,00,00,00,00

"DependOnGroup"=hex(7):00,00

"ObjectName"="NT AUTHORITY\NetworkService"

"Description"="Coordinates transactions that span multiple resource managers, such as databases, message queues, and file systems. If this service is stopped, these transactions will not occur. If this service is disabled, any services that explicitly depend on it will fail to start. "

"FailureActions"=hex:1e,00,00,00,00,00,00,00,00,00,04,00,00,00,ff,ff,ff,\
ff,01,00,00,00,e8,03,00,00,01,00,00,00,f8,2a,00,00,01,00,00,00,08,52,00,00,\
00,00,00,00,e8,03,00,00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MSDTC\Performance]

"Library"="msdtcuii.DLL"

"Open"="DtcPerfOpen"

"Collect"="DtcPerfCollect"

"Close"="DtcPerfClose"

"PerfIniFile"="msdtcprf.ini"

"Last Counter"=dword:0000085e

"Last Help"=dword:0000085f

"First Counter"=dword:00000844

"First Help"=dword:00000845

"Object List"="2116"

"WbemAdapFileSignature"=hex:36,e7,98,0d,5a,b4,99,aa,cb,77,58,ef,14,66,cd,e1

"WbemAdapFileTime"=hex:fa,06,0c,0b,ac,33,c5,01

"WbemAdapFileSize"=dword:00028800

"WbemAdapStatus"=dword:00000000

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MSDTC\Security]

"Security"=hex:01,00,14,80,b8,00,00,00,c4,00,00,00,14,00,00,00,30,00,00,02,\
00,1c,00,01,00,00,00,02,80,14,00,ff,01,0f,00,01,01,00,00,00,00,01,00,00,\
00,00,02,00,88,00,05,00,00,00,00,14,00,fd,01,02,00,01,01,00,00,00,00,\
05,12,00,00,00,00,18,00,ff,01,0f,00,01,02,00,00,00,00,05,20,00,00,00,\
20,02,00,00,00,18,00,9d,01,02,00,01,02,00,00,00,00,05,20,00,00,00,23,\
02,00,00,00,14,00,9d,01,02,00,01,01,00,00,00,00,05,0b,00,00,00,00,00,\
14,00,9d,00,02,00,01,01,00,00,00,00,05,14,00,00,00,00,14,00,9f,00,02,\
00,01,01,00,00,00,00,05,14,00,00,00,01,01,00,00,00,00,05,12,00,00,00,\
01,01,00,00,00,00,00,05,12,00,00,00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MSDTC\Enum]

"0"="Root\LEGACY_MSDTC\0000"

"Count"=dword:00000001

"NextInstance"=dword:00000001

Appendix B – Database Tunable Parameters

Database Operating System:

Windows Server 2003 Standard Edition, with Service Pack 1 v.1433

Microsoft SQL Server 2000 - 8.00.760 (Intel X86)

Dec 17 2002 14:22:05

Copyright (c) 1988-2003 Microsoft Corporation

Standard Edition on Windows NT 5.2 (Build 3790: Service Pack 1, v.1433)

name	minimum	maximum	config_value	run_value
affinity mask	-2147483648	2147483647	0	0
allow updates	0	1	0	0
awe enabled	0	1	0	0
c2 audit mode	0	1	0	0
cost threshold for parallelism	0	32767	5	5
Cross DB Ownership Chaining	0	1	0	0
cursor threshold	-1	2147483647	-1	-1
default full-text language	0	2147483647	1033	1033
default language	0	9999	0	0
fill factor (%)	0	100	0	0
index create memory (KB)	704	2147483647	0	0
lightweight pooling	0	1	0	0
locks	5000	2147483647	0	0
max degree of parallelism	0	32	0	0
max server memory (MB)	4	2147483647	2147483647	2147483647
max text repl size (B)	0	2147483647	65536	65536
max worker threads	32	32767	250	250
media retention	0	365	0	0
min memory per query (KB)	512	2147483647	1024	1024
min server memory (MB)	0	2147483647	0	0
nested triggers	0	1	1	1
network packet size (B)	512	65536	4096	4096
open objects	0	2147483647	0	0
priority boost	0	1	0	0
query governor cost limit	0	2147483647	0	0
query wait (s)	-1	2147483647	-1	-1
recovery interval (min)	0	32767	12	12
remote access	0	1	1	1
remote login timeout (s)	0	2147483647	20	20
remote proc trans	0	1	0	0
remote query timeout (s)	0	2147483647	10	10
scan for startup procs	0	1	0	0
set working set size	0	1	0	0
show advanced options	0	1	1	1
two digit year cutoff	1753	9999	2049	2049
user connections	0	32767	0	0
user options	0	32767	0	0

DBMS SYSTEM – DTC Tuning Parameters

The DTC was configured the same as on the Application Server SYSTEM, with the exception that the DBMS DTC was configured to use the local coordinator.

Appendix C – XML Code

Shipping XML Message

```
<?xml version="1.0" encoding="utf-8"?>
<NewShipping xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SHIPPING_O_ID>1792482</SHIPPING_O_ID>
  <SHIPPING_REQUEST_TIME>2005-06-13T20:41:23.3400000-04:00</SHIPPING_REQUEST_TIME>
  <SHIPPING_STATUS>PENDING </SHIPPING_STATUS>
  <SHIPPING_STREET1>oLuSLcr9GCGwMtp4 </SHIPPING_STREET1>
  <SHIPPING_STREET2>AcNCbMjG8KilQD9nYOL0yUzPrjCa0FIA </SHIPPING_STREET2>
  <SHIPPING_CITY>DGeFFKJICovUTPBuD </SHIPPING_CITY>
  <SHIPPING_STATE>ry </SHIPPING_STATE>
  <SHIPPING_ZIP>UD04vwz </SHIPPING_ZIP>
  <SHIPPING_COUNTRY>Cayman Islands </SHIPPING_COUNTRY>
</NewShipping>
```

Stock Management XML Message

```
<?xml version="1.0" encoding="utf-8"?>
<NewStock xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SHIPPING_REQUEST_TIME>2005-06-13T21:01:23.3100000-04:00</SHIPPING_REQUEST_TIME>
  <SHIPPING_O_ID>1792493</SHIPPING_O_ID>
  <REORDER_I_ID>67167</REORDER_I_ID>
  <REORDER_QTY>40</REORDER_QTY>
  <SHIPPING_STREET1>qj9vd7MrrJq5FOlcBd5xZJ1OxfKqQ4MoFFsj </SHIPPING_STREET1>
  <SHIPPING_STREET2>QJQctUrijZuvLbfAQ </SHIPPING_STREET2>
  <SHIPPING_CITY>TrmXOquJIGXGiQ4w9r </SHIPPING_CITY>
  <SHIPPING_STATE>RpFhjFHRIBo8b9X </SHIPPING_STATE>
  <SHIPPING_ZIP>fsQO1J </SHIPPING_ZIP>
  <SHIPPING_COUNTRY>Mauritius </SHIPPING_COUNTRY>
</NewStock>
```

Create Order

```
<?xml version="1.0" encoding="utf-8"?>
<NewOrderResponse xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <ORDER_ID xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">619522</ORDER_ID>
  <ORDER_STATUS xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">PENDING </ORDER_STATUS>
  <ORDER_TOTAL xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">150594.9973</ORDER_TOTAL>
  <ORDER_TAX xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">2281.2332</ORDER_TAX>
  <ORDER_SHIP_COST xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">31327.45</ORDER_SHIP_COST>
  <ORDER_DISCOUNT xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">27.6300</ORDER_DISCOUNT>
  <OrderLine_Detail xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">
    <OrderLineDetail>
      <ITEM_ID>70267</ITEM_ID>
      <ITEM_QTY>6</ITEM_QTY>
      <ITEM_COST>5131.5037</ITEM_COST>
      <ITEM_STATUS>PENDING </ITEM_STATUS>
    </OrderLineDetail>
    <OrderLineDetail>
      <ITEM_ID>82804</ITEM_ID>
      <ITEM_QTY>1</ITEM_QTY>
      <ITEM_COST>4871.4897</ITEM_COST>
      <ITEM_STATUS>PENDING </ITEM_STATUS>
    </OrderLineDetail>
    <OrderLineDetail>
      <ITEM_ID>93452</ITEM_ID>
      <ITEM_QTY>8</ITEM_QTY>
      <ITEM_COST>5464.1950</ITEM_COST>
      <ITEM_STATUS>PENDING </ITEM_STATUS>
    </OrderLineDetail>
  </OrderLine_Detail>
</NewOrderResponse>
```

```

<OrderLineDetail>
  <ITEM_ID>13800</ITEM_ID>
  <ITEM_QTY>1</ITEM_QTY>
  <ITEM_COST>4689.5136</ITEM_COST>
  <ITEM_STATUS>PENDING    </ITEM_STATUS>
</OrderLineDetail>
<OrderLineDetail>
  <ITEM_ID>22665</ITEM_ID>
  <ITEM_QTY>8</ITEM_QTY>
  <ITEM_COST>640.7459</ITEM_COST>
  <ITEM_STATUS>PENDING    </ITEM_STATUS>
</OrderLineDetail>
<OrderLineDetail>
  <ITEM_ID>67459</ITEM_ID>
  <ITEM_QTY>4</ITEM_QTY>
  <ITEM_COST>532.8652</ITEM_COST>
  <ITEM_STATUS>PENDING    </ITEM_STATUS>
</OrderLineDetail>
<OrderLineDetail>
  <ITEM_ID>80187</ITEM_ID>
  <ITEM_QTY>7</ITEM_QTY>
  <ITEM_COST>5575.4260</ITEM_COST>
  <ITEM_STATUS>PENDING    </ITEM_STATUS>
</OrderLineDetail>
<OrderLineDetail>
  <ITEM_ID>71614</ITEM_ID>
  <ITEM_QTY>3</ITEM_QTY>
  <ITEM_COST>3007.3524</ITEM_COST>
  <ITEM_STATUS>PENDING    </ITEM_STATUS>
</OrderLineDetail>
<OrderLineDetail>
  <ITEM_ID>37137</ITEM_ID>
  <ITEM_QTY>3</ITEM_QTY>
  <ITEM_COST>7426.4120</ITEM_COST>
  <ITEM_STATUS>PENDING    </ITEM_STATUS>
</OrderLineDetail>
</OrderLine_Detail>
</NewOrderResponse>

```

Change Item

```

<?xml version="1.0" encoding="utf-8"?>
<ChangeItemResponse xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SYSTEM_IDENTIFIER xmlns="http://tpcapp1.tpcapp.net/TPCApp/ProductService">TPCAPP1</SYSTEM_IDENTIFIER>
  <ITEM_ID xmlns="http://tpcapp1.tpcapp.net/TPCApp/ProductService">
    <int>1404</int>
    <int>44905</int>
  </ITEM_ID>
  <ITEM_PUB_DATE xmlns="http://tpcapp1.tpcapp.net/TPCApp/ProductService">
    <dateTime>2005-06-16T16:31:50.4900000-04:00</dateTime>
    <dateTime>2005-06-16T16:31:50.4900000-04:00</dateTime>
  </ITEM_PUB_DATE>
</ChangeItemResponse>

```

New Products

```

<?xml version="1.0" encoding="utf-8"?>
<NewProductRet xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SYSTEM_IDENTIFIER xmlns="http://tpcapp1.tpcapp.net/TPCApp/ProductService">TPCAPP1</SYSTEM_IDENTIFIER>
  <newProducts xmlns="http://tpcapp1.tpcapp.net/TPCApp/ProductService">
    <NewItem>
      <ITEM_ID>16568</ITEM_ID>
      <ITEM_TITLE>aoliUcRfV0Wgdz2iWfxZtvPa    </ITEM_TITLE>
      <AUTHOR_FNAME>IFaa8JN191jI2Lw    </AUTHOR_FNAME>
      <AUTHOR_LNAME>iDedvWtO6NqJ    </AUTHOR_LNAME>
    </NewItem>
  </newProducts>
</NewProductRet>

```


<ITEM_ID>65425</ITEM_ID>
 <ITEM_TITLE>XmxC9CpCvqJWG2NnbF2Nb9PI1gTN </ITEM_TITLE>
 <AUTHOR_FNAME>NpW5NhPJCTtCuxAATJr9</AUTHOR_FNAME>
 <AUTHOR_LNAME>Jwu6ZP </AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>21040</ITEM_ID>
 <ITEM_TITLE>AzPkQN388k5ZeuKsg2n5DsgW0JbT0pz0oy3T6QMUSyCY0mk98AH </ITEM_TITLE>
 <AUTHOR_FNAME>QBz </AUTHOR_FNAME>
 <AUTHOR_LNAME>3S7QXjicC </AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>28107</ITEM_ID>
 <ITEM_TITLE>HYaHUwZADoI0tsKRntDp0SLZWKmx5RGGyJq53bT4twkkuxlVVxSSGVP </ITEM_TITLE>
 <AUTHOR_FNAME>GNojUPbMQEf </AUTHOR_FNAME>
 <AUTHOR_LNAME>Zfd8SQwyp8 </AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>1844</ITEM_ID>
 <ITEM_TITLE>AVeJBbeSpmajofDZd57O77up0LLhCB3vErXOZ7TEfMOC8D46K </ITEM_TITLE>
 <AUTHOR_FNAME>MuAe1CH </AUTHOR_FNAME>
 <AUTHOR_LNAME>X1v8OCIMYgMSW98RpFVs</AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>40647</ITEM_ID>
 <ITEM_TITLE>JgHtx3sSyDNCng9kWU1M5HISs0PATjOqNZnd44277 </ITEM_TITLE>
 <AUTHOR_FNAME>mqaiFiNZCx7GswvLjhSI</AUTHOR_FNAME>
 <AUTHOR_LNAME>Gt0IHnj </AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>90402</ITEM_ID>
 <ITEM_TITLE>p65KnHLfIiStg2eL2CP </ITEM_TITLE>
 <AUTHOR_FNAME>FSptOWbbP3zbZt </AUTHOR_FNAME>
 <AUTHOR_LNAME>Wt02Tm </AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>1873</ITEM_ID>
 <ITEM_TITLE>p98ZurFc27qqo8QAQI7SINbF5Mg3hGGF7DUulbH0q3 </ITEM_TITLE>
 <AUTHOR_FNAME>BrtTjdaTYEjsJaa41 </AUTHOR_FNAME>
 <AUTHOR_LNAME>OuBbfI4N75WXMt </AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>50289</ITEM_ID>
 <ITEM_TITLE>gGV0MR5f2d7egCCdBoya2tVVPyGkoGk3bmf6RXtad023ETFoEpima7tzk </ITEM_TITLE>
 <AUTHOR_FNAME>KA5UoGOH </AUTHOR_FNAME>
 <AUTHOR_LNAME>eHyHWNwfiyaDogg </AUTHOR_LNAME>
 </NewItem>
 <NewItem>
 <ITEM_ID>58595</ITEM_ID>
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rPoHxR8a6xp2o6BPinTffWu+BfGOI3Fn8HdStfiFrPhrw/4b1lvB/iax1fxDqEMHwp+Amg+N/h
kfGXMaFP4a+Beu+EdW8e+BfgT8RtUhl/4q+LlLS5+Jur/ErVPHl4s8LNLNH8J3/AIF07wx4E8La
zc6HFFF8RPFPhr4NeAPAPjPR/hRo0nxJ+JHxTk1rx38Sj448DX/HkPjb4S/Gr4v/AAX8TeM/CGjt
c6lqGp+J/B/gzUvFvwr1eyi+L13J8aviN8QFAF/8EfhlgVtoN/8AE7Qfhz4TubLRfe/xX8bajYwR
+Ony1C/8KXOp68H8GbjYTxP4Rvfl8CeJbDxpqvzh4g6Z4/wBB/Z3h8b6p4YTjx8BfB3hH4cfBf4i6
74GfCfwp8R+P/EPX8A8Q3PPhm11Xwj4kh8Xav4A0zSPF0fhrX7bSPHk3w80Dx94kpZRj6XD+ZzzL
GZvw/h1TzTj/Aionl+A4moZLg8LxBlksHxDxZw7mEMHmXyYrAU8sx/iBio4vJsqzP8AicyyXoeG
cNwz4LL8pvhz4b4ZyuOW59xXzHMDn2Z5hxnleC8IT4b4dwmLzzNM74cyXM84z3jnjDgutVx2

```

Kh4b5txDjP8AWHHz4gyTNcp4I4Z4AWbYrLM8jgf/2Q==</ITEM_IMAGE>
  </Item>
</ItemDetails>
</PDRet>

```

Change Payment

```

<?xml version="1.0" encoding="utf-8"?>
<ChangePaymentResponse xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance">
  <SYSTEM_IDENTIFIER xmlns="http://tpcapp1.tpcapp.net/TPCApp/CustomerService">TPCAPP1</SYSTEM_IDENTIFIER>
  <CURR_PAYMENT_METHOD
xmlns="http://tpcapp1.tpcapp.net/TPCApp/CustomerService">PO</CURR_PAYMENT_METHOD>
</ChangePaymentResponse>

```

New Customer

```

<?xml version="1.0" encoding="utf-8"?>
<NewCustomerResponse xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance">
  <SYSTEM_IDENTIFIER xmlns="http://tpcapp1.tpcapp.net/TPCApp/CustomerService">TPCAPP1</SYSTEM_IDENTIFIER>
  <CUSTOMER_ID xmlns="http://tpcapp1.tpcapp.net/TPCApp/CustomerService">34054</CUSTOMER_ID>
</NewCustomerResponse>

```

Order Status

```

<?xml version="1.0" encoding="utf-8"?>
<OrderStatusListResponse xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance">
  <SYSTEM_IDENTIFIER xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">.</SYSTEM_IDENTIFIER>
  <CustomerData xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">
    <CONTACT_FNAME>hYQxH2Je1e </CONTACT_FNAME>
    <CONTACT_PHONE>361889395 </CONTACT_PHONE>
    <CONTACT_EMAIL>F2R8ZIxSOq@9s5pnPzckZ5AVu4cm9.com </CONTACT_EMAIL>
    <BILLING_STREET1>y5YwxExBg3TLe3SctW3DB1hBVeK6 </BILLING_STREET1>
    <BILLING_STREET2>jM129n0t42YhbmJEw </BILLING_STREET2>
    <BILLING_CITY>kUzqYK1V0SrSaBXR </BILLING_CITY>
    <BILLING_STATE>EC8uhLjSG3eU1lx </BILLING_STATE>
    <BILLING_ZIP>x9ZIUxah4 </BILLING_ZIP>
    <BILLING_COUNTRY>Egypt </BILLING_COUNTRY>
  </CustomerData>
  <Orders xmlns="http://tpcapp1.tpcapp.net/TPCApp/OrderService">
    <Order>
      <ORDER_ID>619522</ORDER_ID>
      <ORDER_DATE>2005-06-16T16:31:54.5770000-04:00</ORDER_DATE>
      <ORDER_SUBTOTAL>116986.3141</ORDER_SUBTOTAL>
      <ORDER_TAX>2281.2332</ORDER_TAX>
      <ORDER_TOTAL>150594.9973</ORDER_TOTAL>
      <ORDER_SHIP_TYPE>FEDEX </ORDER_SHIP_TYPE>
      <ORDER_PROCESS_DATE>1800-01-01T00:00:00.0000000-05:00</ORDER_PROCESS_DATE>
      <ORDER_STATUS>PENDING </ORDER_STATUS>
      <ORDER_SHIP_COST>31327.4500</ORDER_SHIP_COST>
      <ORDER_DISCOUNT>27.6300</ORDER_DISCOUNT>
      <SHIPPING_STREET1>y5YwxExBg3TLe3SctW3DB1hBVeK6 </SHIPPING_STREET1>
      <SHIPPING_STREET2>jM129n0t42YhbmJEw </SHIPPING_STREET2>
      <SHIPPING_CITY>kUzqYK1V0SrSaBXR </SHIPPING_CITY>
      <SHIPPING_STATE>EC8uhLjSG3eU1lx </SHIPPING_STATE>
      <SHIPPING_ZIP>x9ZIUxah4 </SHIPPING_ZIP>
      <SHIPPING_COUNTRY>Egypt </SHIPPING_COUNTRY>
    </Order>
  </Orders>
  <Lines>
    <Line>
      <ItemId>13800</ItemId>
      <Quantity>1</Quantity>
      <Status>PENDING </Status>
      <Cost>4689.5136</Cost>
    </Line>
  </Lines>

```

```

<Title>z2sWiyiK6dJRU20do67XUoUQPv6w4nsLT18X3r8go3UDHFEnwS </Title>
<Publisher>bcDAIsb85UwFQKkWl44ocrHQ0Irkycar0UjkiCJ43CFNoAhXUp </Publisher>
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<Quantity>6</Quantity>
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<Cost>5131.5037</Cost>
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<Quantity>3</Quantity>
<Status>PENDING </Status>
<Cost>3007.3524</Cost>
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<Publisher>s2WJEhKZ3nrfoUOGaAgTidZhQ0bqKdB0iNkEErM3Zaqt </Publisher>
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<ItemId>80187</ItemId>
<Quantity>7</Quantity>
<Status>PENDING </Status>
<Cost>5575.4260</Cost>
<Title>OXOP1ywO7LsSaBgjrLOCFnMw </Title>
<Publisher>AL9J0HweUyHKCGdNQMD0z1hoLfk58dHVEKDgmiBWJcyhxJj2mze7y </Publisher>
</Line>
<Line>
<ItemId>82804</ItemId>
<Quantity>1</Quantity>
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<Cost>4871.4897</Cost>
<Title>HVJtBKEsc8huZboRPXF </Title>
<Publisher>P9gdwmDMougMftPI1hJH1WTIC1jnywd </Publisher>
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<ItemId>93452</ItemId>
<Quantity>8</Quantity>
<Status>PENDING </Status>
<Cost>5464.1950</Cost>
<Title>fVcKAOAUEVbIOqVzeiz03IZCOVIFWPcv2zjSAz55pqEx4 </Title>
<Publisher>MaEYmVXSak3OxsIViiXTnMM03bZW7BElyLC3n33SE3WkTqibQTsl3EsT6cm </Publisher>
</Line>
</Lines>
</Order>
</Order>

```



```

<ORDER_ID>619521</ORDER_ID>
<ORDER_DATE>2005-06-16T16:31:52.5300000-04:00</ORDER_DATE>
<ORDER_SUBTOTAL>65109.9653</ORDER_SUBTOTAL>
<ORDER_TAX>1269.6443</ORDER_TAX>
<ORDER_TOTAL>97707.0596</ORDER_TOTAL>
<ORDER_SHIP_TYPE>COURIER </ORDER_SHIP_TYPE>
<ORDER_PROCESS_DATE>1800-01-01T00:00:00.0000000-05:00</ORDER_PROCESS_DATE>
<ORDER_STATUS>PENDING </ORDER_STATUS>
<ORDER_SHIP_COST>31327.4500</ORDER_SHIP_COST>
<ORDER_DISCOUNT>27.6300</ORDER_DISCOUNT>
<SHIPPING_STREET1>y5YwxExBg3TLe3SctW3DB1hBVeK6 </SHIPPING_STREET1>
<SHIPPING_STREET2>jM129n0t42YhbmJEw </SHIPPING_STREET2>
<SHIPPING_CITY>kUzqYK1V0SrSaBXR </SHIPPING_CITY>
<SHIPPING_STATE>EC8uhLjSG3eU1Ix </SHIPPING_STATE>
<SHIPPING_ZIP>x9ZIUxah4 </SHIPPING_ZIP>
<SHIPPING_COUNTRY>Egypt </SHIPPING_COUNTRY>
<Lines>
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    <Quantity>4</Quantity>
    <Status>PENDING </Status>
    <Cost>5015.9529</Cost>
    <Title>HaPM0Ivi8k3q1Ko0FVhB3pd3NdFQF2mFsHJXCihdx5IpCEZYEoD0sS2Y8z </Title>
    <Publisher>ul8XBZzHsjnHDVN9tAwOb5uEAqzU </Publisher>
  </Line>
  <Line>
    <ItemId>18733</ItemId>
    <Quantity>1</Quantity>
    <Status>PENDING </Status>
    <Cost>1973.2068</Cost>
    <Title>HUtN05Q5Ld8BISzngXZJvco3mUAAV6UkIqr1FMwF4PCdF0H </Title>
    <Publisher>vPOyKdMwXArx5MLCrtFvJOW </Publisher>
  </Line>
  <Line>
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    <Quantity>5</Quantity>
    <Status>PENDING </Status>
    <Cost>1810.7363</Cost>
    <Title>gls8fdTJOJ9gTu8NuzdnICf10ag0ak06Spb </Title>
    <Publisher>rRD7eFBP0Imp0z5PRev0MMvcWCgrehIQyPgpiFORS </Publisher>
  </Line>
  <Line>
    <ItemId>25241</ItemId>
    <Quantity>8</Quantity>
    <Status>PENDING </Status>
    <Cost>3180.8450</Cost>
    <Title>7ROTDd2NeL0Db9vT </Title>
    <Publisher>wFhcGbE0SCxsEflaT0fSSHAeZpwHx </Publisher>
  </Line>
  <Line>
    <ItemId>44762</ItemId>
    <Quantity>9</Quantity>
    <Status>PENDING </Status>
    <Cost>3082.9920</Cost>
    <Title>vkwBuUMk3JyJXvzi8HuA6UOMcSXEJ5Ryo8izQWNKSbLHIUcyIV </Title>
    <Publisher>M9yhGTjwLY04Fe3XPfuuK3W </Publisher>
  </Line>
  <Line>
    <ItemId>86459</ItemId>
    <Quantity>1</Quantity>
    <Status>PENDING </Status>
    <Cost>5683.7829</Cost>
    <Title>HghYINRuD1vzusBNw </Title>
    <Publisher>lGcZBd3DcCbOPDJ2ERTa5TI0SAhqE </Publisher>
  </Line>
</Lines>
</Order>
</Orders>
</OrderStatusListResponse>

```

Appendix D – Sample WSDLs

Customer Service WSDL

```
<?xml version="1.0" encoding="utf-8"?>
<wsdl:definitions xmlns:http="http://schemas.xmlsoap.org/wsdl/http/" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:s="http://www.w3.org/2001/XMLSchema" xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:tns="http://www.tpc.org/TPCApp/CustomerService" xmlns:tm="http://microsoft.com/wsdl/mime/textMatching/"
  xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/" targetNamespace="http://www.tpc.org/TPCApp/CustomerService"
  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:types>
    <s:schema elementFormDefault="qualified" targetNamespace="http://www.tpc.org/TPCApp/CustomerService">
      <s:element name="AddCustomer">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="newCustomer" type="tns:NewCustomer" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="NewCustomer">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="BUSINESS_NAME" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="BUSINESS_INFO" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="PASSWORD" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="CONTACT_F_NAME" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="CONTACT_L_NAME" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="CONTACT_PHONE" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="CONTACT_EMAIL" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="PAYMENT_METHOD" type="s:string" />
          <s:element minOccurs="1" maxOccurs="1" name="PO_ID" type="s:int" />
          <s:element minOccurs="0" maxOccurs="1" name="CREDIT_INFO" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="BILLING_ADDR1" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="BILLING_ADDR2" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="BILLING_CITY" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="BILLING_STATE" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="BILLING_ZIP" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="BILLING_COUNTRY" type="s:string" />
        </s:sequence>
      </s:complexType>
      <s:element name="AddCustomerResponse">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="AddCustomerResult" type="tns:NewCustomerResponse" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="NewCustomerResponse">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
          <s:element minOccurs="1" maxOccurs="1" name="CUSTOMER_ID" type="s:long" />
        </s:sequence>
      </s:complexType>
      <s:element name="ChangePaymentMethod">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="paymentMethodChangeRequest" type="tns:PaymentMethodChangeRequest" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="PaymentMethodChangeRequest">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="CUSTOMER_ID" type="s:int" />
          <s:element minOccurs="0" maxOccurs="1" name="PAYMENT_METHOD" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="CREDIT_INFO" type="s:string" />
          <s:element minOccurs="1" maxOccurs="1" name="PO_ID" type="s:int" />
        </s:sequence>
      </s:complexType>
    </s:schema>
  </wsdl:types>

```

```

    </s:sequence>
  </s:complexType>
  <s:element name="ChangePaymentMethodResponse">
    <s:complexType>
      <s:sequence>
        <s:element minOccurs="0" maxOccurs="1" name="ChangePaymentMethodResult" type="tns:ChangePaymentResponse" />
      </s:sequence>
    </s:complexType>
  </s:element>
  <s:complexType name="ChangePaymentResponse">
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
      <s:element minOccurs="0" maxOccurs="1" name="CURR_PAYMENT_METHOD" type="s:string" />
    </s:sequence>
  </s:complexType>
</s:schema>
</wsdl:types>
<wsdl:message name="AddCustomerSoapIn">
  <wsdl:part name="parameters" element="tns:AddCustomer" />
</wsdl:message>
<wsdl:message name="AddCustomerSoapOut">
  <wsdl:part name="parameters" element="tns:AddCustomerResponse" />
</wsdl:message>
<wsdl:message name="ChangePaymentMethodSoapIn">
  <wsdl:part name="parameters" element="tns:ChangePaymentMethod" />
</wsdl:message>
<wsdl:message name="ChangePaymentMethodSoapOut">
  <wsdl:part name="parameters" element="tns:ChangePaymentMethodResponse" />
</wsdl:message>
<wsdl:portType name="CustomerServiceSoap">
  <wsdl:operation name="AddCustomer">
    <wsdl:input message="tns:AddCustomerSoapIn" />
    <wsdl:output message="tns:AddCustomerSoapOut" />
  </wsdl:operation>
  <wsdl:operation name="ChangePaymentMethod">
    <wsdl:input message="tns:ChangePaymentMethodSoapIn" />
    <wsdl:output message="tns:ChangePaymentMethodSoapOut" />
  </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="CustomerServiceSoap" type="tns:CustomerServiceSoap">
  <soap:binding transport="http://schemas.xmlsoap.org/soap/http" style="document" />
  <wsdl:operation name="AddCustomer">
    <soap:operation soapAction="http://www.tpc.org/TPCApp/CustomerService/AddCustomer" style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="ChangePaymentMethod">
    <soap:operation soapAction="http://www.tpc.org/TPCApp/CustomerService/ChangePaymentMethod" style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
</wsdl:binding>
<wsdl:service name="CustomerService">
  <wsdl:port name="CustomerServiceSoap" binding="tns:CustomerServiceSoap">
    <soap:address location="https://tpcapp1.tpcapp.net/TPCApp/CustomerService.asmx" />
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>

```

OrderService WSDL

```

<?xml version="1.0" encoding="utf-8"?>
<wsdl:definitions xmlns:http="http://schemas.xmlsoap.org/wsdl/http/" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:s="http://www.w3.org/2001/XMLSchema" xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:tns="http://www.tpc.org/TPCApp/OrderService" xmlns:tm="http://microsoft.com/wsdl/mime/textMatching/"
xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/" targetNamespace="http://www.tpc.org/TPCApp/OrderService"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:types>
    <s:schema elementFormDefault="qualified" targetNamespace="http://www.tpc.org/TPCApp/OrderService">
      <s:element name="CreateOrder">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="newOrder" type="tns:NewOrder" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="NewOrder">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="CUSTOMER_ID" type="s:int" />
          <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_STREET1" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_STREET2" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_CITY" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_STATE" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_ZIP" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_COUNTRY" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="OrderLines" type="tns:ArrayOfNewOrderLine" />
          <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_TYPE" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="CC_TYPE" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="CC_NUMBER" type="s:string" />
          <s:element minOccurs="1" maxOccurs="1" name="CC_EXPIRY" type="s:dateTime" />
          <s:element minOccurs="0" maxOccurs="1" name="CC_NAME" type="s:string" />
        </s:sequence>
      </s:complexType>
      <s:complexType name="ArrayOfNewOrderLine">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded" name="NewOrderLine" nillable="true" type="tns:NewOrderLine" />
        </s:sequence>
      </s:complexType>
      <s:complexType name="NewOrderLine">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="ITEM_ID" type="s:int" />
          <s:element minOccurs="1" maxOccurs="1" name="QTY" type="s:int" />
        </s:sequence>
      </s:complexType>
      <s:element name="CreateOrderResponse">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="CreateOrderResult" type="tns:NewOrderResponse" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="NewOrderResponse">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
          <s:element minOccurs="1" maxOccurs="1" name="ORDER_ID" type="s:long" />
          <s:element minOccurs="0" maxOccurs="1" name="ORDER_STATUS" type="s:string" />
          <s:element minOccurs="1" maxOccurs="1" name="ORDER_TOTAL" type="s:decimal" />
          <s:element minOccurs="1" maxOccurs="1" name="ORDER_TAX" type="s:decimal" />
          <s:element minOccurs="1" maxOccurs="1" name="ORDER_SHIP_COST" type="s:decimal" />
          <s:element minOccurs="1" maxOccurs="1" name="ORDER_DISCOUNT" type="s:decimal" />
          <s:element minOccurs="0" maxOccurs="1" name="OrderLine_Detail" type="tns:ArrayOfOrderLineDetail" />
        </s:sequence>
      </s:complexType>
      <s:complexType name="ArrayOfOrderLineDetail">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded" name="OrderLineDetail" nillable="true" type="tns:OrderLineDetail" />
        </s:sequence>
      </s:complexType>
      <s:complexType name="OrderLineDetail">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="ITEM_ID" type="s:int" />

```

```

    <s:element minOccurs="1" maxOccurs="1" name="ITEM_QTY" type="s:int" />
    <s:element minOccurs="1" maxOccurs="1" name="ITEM_COST" type="s:decimal" />
    <s:element minOccurs="0" maxOccurs="1" name="ITEM_STATUS" type="s:string" />
  </s:sequence>
</s:complexType>
<s:element name="GetOrderStatusList">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="orderStatusListRequest" type="tns:OrderStatusListRequest" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:complexType name="OrderStatusListRequest">
  <s:sequence>
    <s:element minOccurs="1" maxOccurs="1" name="CUSTOMER_ID" type="s:int" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_COUNT" type="s:int" />
    <s:element minOccurs="0" maxOccurs="1" name="BUSINESS_NAME" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="PASSWD" type="s:string" />
  </s:sequence>
</s:complexType>
<s:element name="GetOrderStatusListResponse">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="GetOrderStatusListResult" type="tns:OrderStatusListResponse" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:complexType name="OrderStatusListResponse">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="CustomerData" type="tns:Customer" />
    <s:element minOccurs="0" maxOccurs="1" name="Orders" type="tns:ArrayOfOrder" />
  </s:sequence>
</s:complexType>
<s:complexType name="Customer">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="CONTACT_FNAME" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="CONTACT_LNAME" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="CONTACT_PHONE" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="CONTACT_EMAIL" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="BILLING_STREET1" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="BILLING_STREET2" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="BILLING_CITY" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="BILLING_STATE" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="BILLING_ZIP" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="BILLING_COUNTRY" type="s:string" />
  </s:sequence>
</s:complexType>
<s:complexType name="ArrayOfOrder">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="Order" nillable="true" type="tns:Order" />
  </s:sequence>
</s:complexType>
<s:complexType name="Order">
  <s:sequence>
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_ID" type="s:long" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_DATE" type="s:dateTime" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_SUBTOTAL" type="s:decimal" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_TAX" type="s:decimal" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_TOTAL" type="s:decimal" />
    <s:element minOccurs="0" maxOccurs="1" name="ORDER_SHIP_TYPE" type="s:string" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_PROCESS_DATE" type="s:dateTime" />
    <s:element minOccurs="0" maxOccurs="1" name="ORDER_STATUS" type="s:string" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_SHIP_COST" type="s:decimal" />
    <s:element minOccurs="1" maxOccurs="1" name="ORDER_DISCOUNT" type="s:decimal" />
    <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_STREET1" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_STREET2" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_CITY" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_STATE" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_ZIP" type="s:string" />
  </s:sequence>
</s:complexType>

```

```

    <s:element minOccurs="0" maxOccurs="1" name="SHIPPING_COUNTRY" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="Lines" type="tns:ArrayOfLine" />
  </s:sequence>
</s:complexType>
<s:complexType name="ArrayOfLine">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="Line" nillable="true" type="tns:Line" />
  </s:sequence>
</s:complexType>
<s:complexType name="Line">
  <s:sequence>
    <s:element minOccurs="1" maxOccurs="1" name="ItemId" type="s:int" />
    <s:element minOccurs="1" maxOccurs="1" name="Quantity" type="s:int" />
    <s:element minOccurs="0" maxOccurs="1" name="Status" type="s:string" />
    <s:element minOccurs="1" maxOccurs="1" name="Cost" type="s:decimal" />
    <s:element minOccurs="0" maxOccurs="1" name="Title" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="Publisher" type="s:string" />
  </s:sequence>
</s:complexType>
</s:schema>
</wsdl:types>
<wsdl:message name="CreateOrderSoapIn">
  <wsdl:part name="parameters" element="tns:CreateOrder" />
</wsdl:message>
<wsdl:message name="CreateOrderSoapOut">
  <wsdl:part name="parameters" element="tns:CreateOrderResponse" />
</wsdl:message>
<wsdl:message name="GetOrderStatusListSoapIn">
  <wsdl:part name="parameters" element="tns:GetOrderStatusList" />
</wsdl:message>
<wsdl:message name="GetOrderStatusListSoapOut">
  <wsdl:part name="parameters" element="tns:GetOrderStatusListResponse" />
</wsdl:message>
<wsdl:portType name="OrderServiceSoap">
  <wsdl:operation name="CreateOrder">
    <wsdl:input message="tns:CreateOrderSoapIn" />
    <wsdl:output message="tns:CreateOrderSoapOut" />
  </wsdl:operation>
  <wsdl:operation name="GetOrderStatusList">
    <wsdl:input message="tns:GetOrderStatusListSoapIn" />
    <wsdl:output message="tns:GetOrderStatusListSoapOut" />
  </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="OrderServiceSoap" type="tns:OrderServiceSoap">
  <soap:binding transport="http://schemas.xmlsoap.org/soap/http" style="document" />
  <wsdl:operation name="CreateOrder">
    <soap:operation soapAction="http://www.tpc.org/TPCApp/OrderService/CreateOrder" style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="GetOrderStatusList">
    <soap:operation soapAction="http://www.tpc.org/TPCApp/OrderService/GetOrderStatusList" style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
</wsdl:binding>
<wsdl:service name="OrderService">
  <wsdl:port name="OrderServiceSoap" binding="tns:OrderServiceSoap">
    <soap:address location="https://tpcapp1.tpcapp.net/TPCApp/OrderService.asmx" />
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>

```

Product Service WSDL

```
<?xml version="1.0" encoding="utf-8"?>
<wsdl:definitions xmlns:http="http://schemas.xmlsoap.org/wsdl/http/" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:s="http://www.w3.org/2001/XMLSchema" xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:tns="http://www.tpc.org/TPCApp/ProductService" xmlns:tm="http://microsoft.com/wsdl/mime/textMatching/"
xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/" targetNamespace="http://www.tpc.org/TPCApp/ProductService"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:types>
    <s:schema elementFormDefault="qualified" targetNamespace="http://www.tpc.org/TPCApp/ProductService">
      <s:element name="GetNewItemList">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="newProductRequest" type="tns:NewProductRequest" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="NewProductRequest">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="CUTOFF_DURATION" type="s:int" />
          <s:element minOccurs="0" maxOccurs="1" name="SUBJECT_STRING" type="s:string" />
          <s:element minOccurs="1" maxOccurs="1" name="ITEM_LIMIT" type="s:int" />
        </s:sequence>
      </s:complexType>
      <s:element name="GetNewItemListResponse">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="GetNewItemListResult" type="tns:NewProductRet" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="NewProductRet">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="newProducts" type="tns:ArrayOfNewItem" />
        </s:sequence>
      </s:complexType>
      <s:complexType name="ArrayOfNewItem">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded" name="NewItem" nillable="true" type="tns:NewItem" />
        </s:sequence>
      </s:complexType>
      <s:complexType name="NewItem">
        <s:sequence>
          <s:element minOccurs="1" maxOccurs="1" name="ITEM_ID" type="s:int" />
          <s:element minOccurs="0" maxOccurs="1" name="ITEM_TITLE" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="AUTHOR_FNAME" type="s:string" />
          <s:element minOccurs="0" maxOccurs="1" name="AUTHOR_LNAME" type="s:string" />
        </s:sequence>
      </s:complexType>
      <s:element name="GetItemList">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="ITEM_ID" type="tns:ArrayOfInt" />
          </s:sequence>
        </s:complexType>
      </s:element>
      <s:complexType name="ArrayOfInt">
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="unbounded" name="int" type="s:int" />
        </s:sequence>
      </s:complexType>
      <s:element name="GetItemListResponse">
        <s:complexType>
          <s:sequence>
            <s:element minOccurs="0" maxOccurs="1" name="GetItemListResult" type="tns:PDRet" />
          </s:sequence>
        </s:complexType>
      </s:element>
    </s:schema>
  </wsdl:types>

```

```

</s:complexType>
</s:element>
<s:complexType name="PDRet">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="ItemDetails" type="tns:ArrayOfItem" />
  </s:sequence>
</s:complexType>
<s:complexType name="ArrayOfItem">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="Item" nillable="true" type="tns:Item" />
  </s:sequence>
</s:complexType>
<s:complexType name="Item">
  <s:complexContent mixed="false">
    <s:extension base="tns:NewItem">
      <s:sequence>
        <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
        <s:element minOccurs="1" maxOccurs="1" name="ITEM_PUBDATE" type="s:dateTime" />
        <s:element minOccurs="0" maxOccurs="1" name="ITEM_PUBLISHER" type="s:string" />
        <s:element minOccurs="0" maxOccurs="1" name="ITEM_SUBJECT" type="s:string" />
        <s:element minOccurs="0" maxOccurs="1" name="ITEM_DESC" type="s:string" />
        <s:element minOccurs="1" maxOccurs="1" name="ITEM_COST" type="s:decimal" />
        <s:element minOccurs="1" maxOccurs="1" name="ITEM_SRP" type="s:decimal" />
        <s:element minOccurs="1" maxOccurs="1" name="ITEM_AVAIL" type="s:dateTime" />
        <s:element minOccurs="0" maxOccurs="1" name="ITEM_ISBN" type="s:string" />
        <s:element minOccurs="1" maxOccurs="1" name="ITEM_PAGE" type="s:short" />
        <s:element minOccurs="0" maxOccurs="1" name="ITEM_BACKING" type="s:string" />
        <s:element minOccurs="0" maxOccurs="1" name="ITEM_DIMENSIONS" type="s:string" />
        <s:element minOccurs="0" maxOccurs="1" name="ITEM_IMAGE" type="s:base64Binary" />
      </s:sequence>
    </s:extension>
  </s:complexContent>
</s:complexType>
<s:element name="UpdateItemList">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="ITEM_ID" type="tns:ArrayOfInt" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:element name="UpdateItemListResponse">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="UpdateItemListResult" type="tns:ChangeItemResponse" />
    </s:sequence>
  </s:complexType>
</s:element>
<s:complexType name="ChangeItemResponse">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="1" name="SYSTEM_IDENTIFIER" type="s:string" />
    <s:element minOccurs="0" maxOccurs="1" name="ITEM_ID" type="tns:ArrayOfInt" />
    <s:element minOccurs="0" maxOccurs="1" name="ITEM_PUB_DATE" type="tns:ArrayOfDateTime" />
  </s:sequence>
</s:complexType>
<s:complexType name="ArrayOfDateTime">
  <s:sequence>
    <s:element minOccurs="0" maxOccurs="unbounded" name="dateTime" type="s:dateTime" />
  </s:sequence>
</s:complexType>
</s:schema>
</wsdl:types>
<wsdl:message name="GetNewItemListSoapIn">
  <wsdl:part name="parameters" element="tns:GetNewItemList" />
</wsdl:message>
<wsdl:message name="GetNewItemListSoapOut">
  <wsdl:part name="parameters" element="tns:GetNewItemListResponse" />
</wsdl:message>
<wsdl:message name="GetItemListSoapIn">
  <wsdl:part name="parameters" element="tns:GetItemList" />

```



```

</wsdl:message>
<wsdl:message name="GetItemListSoapOut">
  <wsdl:part name="parameters" element="tns:GetItemListResponse" />
</wsdl:message>
<wsdl:message name="UpdateItemListSoapIn">
  <wsdl:part name="parameters" element="tns:UpdateItemList" />
</wsdl:message>
<wsdl:message name="UpdateItemListSoapOut">
  <wsdl:part name="parameters" element="tns:UpdateItemListResponse" />
</wsdl:message>
<wsdl:portType name="ProductServiceSoap">
  <wsdl:operation name="GetNewItemList">
    <wsdl:input message="tns:GetNewItemListSoapIn" />
    <wsdl:output message="tns:GetNewItemListSoapOut" />
  </wsdl:operation>
  <wsdl:operation name="GetItemList">
    <wsdl:input message="tns:GetItemListSoapIn" />
    <wsdl:output message="tns:GetItemListSoapOut" />
  </wsdl:operation>
  <wsdl:operation name="UpdateItemList">
    <wsdl:input message="tns:UpdateItemListSoapIn" />
    <wsdl:output message="tns:UpdateItemListSoapOut" />
  </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="ProductServiceSoap" type="tns:ProductServiceSoap">
  <soap:binding transport="http://schemas.xmlsoap.org/soap/http" style="document" />
  <wsdl:operation name="GetNewItemList">
    <soap:operation soapAction="http://www.tpc.org/TPCApp/ProductService/GetNewItemList" style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="GetItemList">
    <soap:operation soapAction="http://www.tpc.org/TPCApp/ProductService/GetItemList" style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="UpdateItemList">
    <soap:operation soapAction="http://www.tpc.org/TPCApp/ProductService/UpdateItemList" style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
</wsdl:binding>
<wsdl:service name="ProductService">
  <wsdl:port name="ProductServiceSoap" binding="tns:ProductServiceSoap">
    <soap:address location="https://tpcapp1.tpcapp.net/TPCApp/ProductService.asmx" />
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>

```

Appendix E – Space Calculations

$$60\text{-Day-Space} = \text{Initial Space} + ((G/TI) * \text{Total SIPS} * 3600 * 8 * 60)$$

	Data	Index	Total KB	Total MB
Initial Space	1406976	432176	1839152	1796.047
End Space	1972376	588288	2560664	2500.648

	KB	Bytes
Total Growth (G)	721512	738828288
Total Interactions (TI)	2805869	
Bytes / Interaction (G/TI)	263.315318	

60-Day-Space (bytes)	88453724231	Bytes
60-Day-Space (KB)	86380590.07	KB
60-Day-Space (MB)	84356.04499	MB
60-Day-Space (GB)	82.37895019	GB

$$\text{Database Log Space} = \text{Initial Space} + ((LD/TI) * \text{Total SIPS} * 3600 * 8)$$

Database Log sizes	Total Allocated (MB)	Used %	Used MB
Initial	19999.992	34.025318	6805.06088
End	19999.992	49.010059	9802.00788
LD	2996.947001		
TI	2507718		
DB Log Space (MB) =	12827.59859		

Appendix F – Database Checkpoints

2005-06-19 13:07:22.30 spid7 Ckpt dbid 7 started (80)
2005-06-19 13:07:22.33 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 13:07:47.02 spid7 Ckpt dbid 7 complete
2005-06-19 13:19:46.94 spid7 Ckpt dbid 7 started (80)
2005-06-19 13:19:46.94 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 13:20:11.82 spid7 Ckpt dbid 7 complete
2005-06-19 13:32:11.79 spid7 Ckpt dbid 7 started (80)
2005-06-19 13:32:11.80 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 13:32:36.04 spid7 Ckpt dbid 7 complete
2005-06-19 13:44:36.02 spid7 Ckpt dbid 7 started (80)
2005-06-19 13:44:36.04 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 13:45:01.22 spid7 Ckpt dbid 7 complete
2005-06-19 13:57:01.19 spid7 Ckpt dbid 7 started (80)
2005-06-19 13:57:01.21 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 13:57:26.21 spid7 Ckpt dbid 7 complete
2005-06-19 14:09:26.19 spid7 Ckpt dbid 7 started (80)
2005-06-19 14:09:26.22 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 14:09:50.79 spid7 Ckpt dbid 7 complete
2005-06-19 14:21:50.76 spid7 Ckpt dbid 7 started (80)
2005-06-19 14:21:50.77 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 14:22:15.88 spid7 Ckpt dbid 7 complete
2005-06-19 14:34:16.13 spid7 Ckpt dbid 7 started (80)
2005-06-19 14:34:16.15 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 14:34:41.51 spid7 Ckpt dbid 7 complete
2005-06-19 14:46:41.47 spid7 Ckpt dbid 7 started (80)
2005-06-19 14:46:41.50 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 14:47:07.35 spid7 Ckpt dbid 7 complete
2005-06-19 14:59:07.47 spid7 Ckpt dbid 7 started (80)
2005-06-19 14:59:07.49 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 14:59:33.35 spid7 Ckpt dbid 7 complete
2005-06-19 15:11:33.32 spid7 Ckpt dbid 7 started (80)
2005-06-19 15:11:33.32 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 15:11:59.86 spid7 Ckpt dbid 7 complete
2005-06-19 15:23:59.85 spid7 Ckpt dbid 7 started (80)
2005-06-19 15:23:59.85 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 15:24:26.80 spid7 Ckpt dbid 7 complete
2005-06-19 15:36:26.76 spid7 Ckpt dbid 7 started (80)
2005-06-19 15:36:26.77 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 15:36:53.08 spid7 Ckpt dbid 7 complete
2005-06-19 15:48:53.07 spid7 Ckpt dbid 7 started (80)
2005-06-19 15:48:53.07 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 15:49:19.01 spid7 Ckpt dbid 7 complete
2005-06-19 16:01:18.97 spid7 Ckpt dbid 7 started (80)
2005-06-19 16:01:18.99 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 16:01:45.08 spid7 Ckpt dbid 7 complete
2005-06-19 16:13:45.07 spid7 Ckpt dbid 7 started (80)
2005-06-19 16:13:45.10 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 16:14:11.33 spid7 Ckpt dbid 7 complete
2005-06-19 16:26:11.30 spid7 Ckpt dbid 7 started (80)
2005-06-19 16:26:11.32 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 16:26:38.11 spid7 Ckpt dbid 7 complete
2005-06-19 16:38:38.08 spid7 Ckpt dbid 7 started (80)
2005-06-19 16:38:38.10 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 16:39:04.96 spid7 Ckpt dbid 7 complete
2005-06-19 16:51:04.96 spid7 Ckpt dbid 7 started (80)
2005-06-19 16:51:04.97 spid7 Ckpt dbid 7 phase 1 ended (80)
2005-06-19 16:51:31.33 spid7 Ckpt dbid 7 complete

Appendix G – Price Quotes

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
<http://www.microsoft.com/>

Microsoft

June 14, 2005

IBM Corporation
Chris King
3079 Cornwallis Road
Durham, NC 27709

Ms. King:

Here is the information you requested regarding pricing for several Microsoft products to be used in conjunction with your TPC-App benchmark testing.

All pricing shown is in US Dollars (\$).

Part Number	Description	Unit Price	Quantity	Price
228-01079	SQL Server 2000 Standard Edition <i>Per Processing Licensing</i> <i>Discount Schedule: No Discounts Applied</i>	\$4,999	1	\$4,999
P73-00295	Windows Server 2003, Standard Edition <i>Server License Only - No CALs</i> <i>Discount Schedule: Open Program - No Level</i> <i>Unit Price reflects a 28% discount from the</i> <i>retail unit price of \$999.</i>	\$719	2	\$1,438
	Microsoft Problem Resolution Services <i>Professional Support</i> <i>(1 incident)</i>	\$245	1	\$245

All products are currently orderable through Microsoft's normal distribution channels.

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: PAchki0514060554.

Please include this Reference ID in any correspondence regarding this price quote.



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D-LINK DGS-1008TL 10/100/1000MBPS UNMANAGED GIGABIT SWITCH - RETAIL

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D-Link

\$185.00

[1 reviews]

ADD TO CART

D-Link DGS-1008TL 10/100/1000Mbps Unmanaged Gigabit Switch 8 X RJ-45 Ports 8K MAC Address Table 256KB per device Buffer memory - Retail

Model #: DGS-1008TL
Item #: N82E16817111026

***This item is warranted through the product **manufacturer** only.*

In Stock

\$6.99 FedEx Saver Shipping
(Not available in HI, AK, and PR)

[Detailed Specifications](#)

[Manufacturer's Site](#)

[Brand Store](#)

Image Viewer



CUSTOMER REVIEWS

Average Rating out of 1 voters

[Write a Review »](#)

George Bear, 3/25/2005 7:37:36 PM
Giga Switch & No Little Transformer Worth Extra \$'s

This is a great switch the fan is a little on the loud side. I think this is the best choice for an 8 port Giga switch as I hate little transformers and rear connections. Up front connections allow ... **More »**

Specifications

Model	
Brand	D-Link
Model	DGS-1008TL
Spec	
Standards	IEEE 802.3, 802.3u, 802.3x, 802.3ab
Ports	8 X RJ-45 Ports
Speed	10/100/1000Mbps
MAC Address Table	8K
Buffer memory	256KB per device
Switching Method	Store and Forward
Protocols	CSMA/CD


LEDs	Power per unit, Activity/Link per port
VLAN Support	No
Power	100-240V AC, 50/60Hz internal universal power
Humidity	5%-95%, Non-condensing
Temperature	0°C to 40°C (32°F to 104°F)
Dimensions	11.0" x 7.1" x 1.7"

Features

Features	High Performance Wire-Speed Architecture Operational Simplicity Investment Protection
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Warranty

Manufacturer Warranty	5-Year limited warranty
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