



IBM i 7.3 can deliver significant client value for database and security, and support for industry-leading workloads like analytics and mobile computing

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At a glance

IBM^(R) i 7.3 adds functions and features to almost all components of the operating system and to many of the associated products from IBM Power^(R) Software and IBM Software. Additionally, new hardware I/O components are supported with the 7.3 release. The new functions include:

- DB2^(R) for i now includes the long-awaited, highly requested temporal support and enhanced OLAP function. These new capabilities can help you to perform more advanced analytics on your data, to plan and forecast, to define gaps, and to build new strategies for business.
- IBM i 7.3 adds a new Security Authority Collection that tracks how applications and application users use an object. Inquiries against that collection provide advice on securing critical business data and applications from intrusion by identifying who needs to have access to data and in what context. This major enhancement to security management, unique to IBM i, was driven by client requests for better insight and management to secure their systems.
- IBM PowerHA^(R) SystemMirror^(R) for i 7.2 HyperSwap^(R) Cluster allows clients to reduce planned and unplanned storage server outages to near zero by enabling a configuration whereby the servers in a DS8000^(R) two-site Metro Mirror cluster will have continuous access to the data on one of the DS8000 servers should the other DS8000 server be unavailable.
- As with previous releases, IBM i 7.3 continues to extend both the traditional application development environment with new features and functions in RPG IV, but is also extending the open source environments that are available by adding Git and Orion. These environments give you more choices for selecting business solutions for your business challenges.
- A new version of the popular data analytics tool IBM DB2 Web Query for i, V2.2.0 has improved ease of use and numerous enhancements, providing richer environments for report development, data access, and output capabilities.
- As with each IBM i release, many other enhancements support client requirements, industry standards, and the latest technologies.

Overview

IBM i 7.3 can offer significant client value in the areas of database and security and support for industry-leading workloads like analytics and mobile computing.

In addition to all the features and functions from previous releases, it also includes enhancements through the Technology Refreshes applied to IBM i 7.2.

Some of the enhancements and extensions include:

- System-period temporal support allows historical data to be seen as it was in the past, while also allowing updating of these past values, even from the future. For example, companies can view which products were predicted to be the best sellers in the next year from a meeting 10 years ago. Temporal capabilities support a multifaceted view of time that more closely mirrors real life and answers real-life questions. Clients in all industries can benefit from temporal capabilities that are built into DB2 for i.
- With OLAP now included in the base DB2 for i, clients that run analytics and queries over their data should see a performance improvement. OLAP is a key capability upon which data analytics and data warehousing are based.
- Generated columns are supported for auditing detail related to data changes at the row level. This row auditing solution can be used within either an SQL table or DDS-created file.
- Improved capabilities can help database engineers effectively manage the data center. New support for locally partitioned data allows database engineers to use SQL to detach and attach partitions. This new capability adds to the unique value of using DB2 Multisystem as part of a client's large database strategy.
- With so many data security breaches being reported, many clients are reviewing their security policies. A new security feature that is called *authority collection* assists security administrators and application providers with providing enhanced security for objects in an application with the lowest level of authority that is required, while allowing the application to run successfully. Applications and data are locked so as to not over complicate the solution.
- IBM i 7.3 includes all the i services that are delivered with Technology Refreshes and includes the enhanced QSYS2.OBJECT_STATISTICS() user-defined table function (UDTF). This UDTF is extended to have many new result columns, extending the possibility of questions that can be answered using SQL on i.
- Collection services are enhanced in many areas, including named memory pools, timestamp modernization, system historical performance data, and others features.
- Network security auditing is enhanced by adding new values to the QAUDLVL and QAUDLVL2 system values and by improving the information written to the security audit journal.
- Network auditing capabilities are expanded to include more than TCP connections. Network or security administrators can now also analyze audit records for UDP traffic, System SSL/TLS, VPN, and IPsec protocols to determine if communications are secure enough.
- As with previous releases, select system limits are raised.
- The Integrated Web Services (IWS) client for ILE is enhanced to allow the sending of user-defined payloads, allowing users to invoke REST web services from their native RPG and COBOL programs.
- The SAVSYS, SAVSECDTA, RSTUSRPRF, and RSTAUT functions are to preserve the links between authorization lists and objects in the library QSYS during a disaster recovery.
- The time to vary on an independent auxiliary storage pool (IASP) is reduced.
- The IBM i Open Source Solutions product includes Node.js V4, Python 2.7, Git, development tools, and Orion.
- IBM HTTP Server for i, which is powered by Apache, is at the latest level of Apache 2.4.12.
- IBM Web Administration GUI now easily configures and manages SSL server configuration for integrated application servers based on Liberty and stand-alone Liberty servers.
- The IBM i graphical system debugger is added to IBM i Access Client Solutions.
- IBM i Access for Web-Mobile solutions has a dashboard capability so users can easily see key performance metrics in real time.
- IBM Navigator for i is improved, providing system administrators and database engineers with many new features, including performance and usability updates.

- IBM PowerHA SystemMirror for i 7.2 HyperSwap Cluster allows clients to reduce planned and unplanned storage server outages to near zero by enabling a configuration whereby the servers in a DS8000 two-site Metro Mirror cluster will have continuous access to the data on one of the DS8000 servers should the other DS8000 server be unavailable.
- IBM Rational[®] Development Studio for i expands RPG free-format capabilities and includes new user-requested functions for the RPG and COBOL compiler.
- A new release of Power Virtualization Center (PowerVC) contains multiple capabilities and enhancements for i to help users to manage the cloud and virtualized environments.
- DB2 Web Query for i 2.2.0 is a new release of the popular Web Query product. This new version includes the features of previous releases and adds new features and functions to both the Express[®] and Standard Editions for the product. DB2 Web Query for i 2.2.0 has improved ease of use and numerous enhancements that provide richer environments for report development, data access, and output capabilities.
- Numerous enhancements have been made to other areas of the operating system.

New support for hardware configurations includes:

- A higher performance PCIe3 SAS RAID adapter
- Fourth-generation Enterprise Multi-Level Cell (eMLC4) 1.8-inch and 2.5-inch SAS SSD
- 1.9 TB Read Intensive 2.5-inch SSD
- Support for the PCIe 4-Port Async EIA-232 Adapter
- Support for the PCIe2 8Gb 2-Port Fibre Channel Adapter with VIOS configurations
- Support for Live Partition Mobility with multipath capable tape devices

Key prerequisites

IBM i 7.3 is supported on the following systems:

IBM i 7.3 is supported on selected IBM Power Systems and PurePower Systems servers with POWER7, POWER7+, or POWER8 processors.

Clients using Blades or PureFlex systems, and those using servers with POWER6 or POWER6+ or earlier processors, need to move to newer systems to take advantage of the new features in IBM i 7.3.

For up-to-date information on all types of code levels needed for support of a particular feature, see the [IBM Prerequisite](#) website.

Prerequisites for PowerHA SystemMirror for i 7.2 HyperSwap Cluster are PowerHA 7.2 Enterprise Edition; IBM i 7.3, or IBM i 7.2 with TR4; either POWER7[®] or POWER8[®] servers; and either DS8800, DS8870, or DS8880.

Refer to the [Technical information](#) section for specific hardware and software prerequisites.

Planned availability date

April 15, 2016

Description

DB2 for i enhancements

DB2 for i supports system-period temporal tables, which is a data-centric solution where DB2 maintains the history of data. Going well beyond simple maintenance of row changes, SQL on i has robust support for leveraging the SQL query engine (SQE) to ask historical questions in the form of an SQL query. The temporal table can be either an SQL table or a DDS-created physical file. This means that even if clients have not yet modernized their database files to use SQL Data Definition Language (DDL), they can use DB2 for i temporal table support.

A new addition to DB2 for i is generated columns for auditing changes to rows within a database file. When generated columns are added to a database file, DB2 for i automatically maintains information about the user, client TCP/IP address, qualified job name, and other environmental details related to row change. This data-centric solution for row auditing provides a new, powerful, and easily enabled technology to help enhance data insight and security. Similar to temporal table support, the new generated columns can be used within either an SQL table or DDS-created physical file.

A wide array of new OLAP capabilities in SQL on i is available to SQL programmers. The new OLAP built-in and aggregate functions can be used to satisfy requirements to extract insight into the ever-changing and more complex data artifacts found in today's data center.

Improved capabilities can help database engineers to effectively manage the data center. New support for locally partitioned data helps the database engineer to use SQL to detach and attach partitions. This new capability adds to the unique value of using DB2 Multisystem as part of a client's large database strategy.

These and other enhancements are delivered in DB2 PTF Group SF99703. Go to the [DB2 for i - Technology Updates](#) wiki on developerWorks^(R) to learn more about these and other DB2 for IBM i enhancements.

To see the DB2 for IBM i PTF Group details, go to the [DB2 for IBM i 2016 Group PTF Schedule](#) wiki.

IBM i services

In the tradition of recent Technology Refreshes, new IBM i services provide useful SQL-based alternatives to i commands and APIs:

- Work with Environment Variables (WRKENVVAR) detail provides easy access to the job level, system level, and PASE environment variables. The ability to know "where used" information about an environment variable is part of the SQL programmer's kit of information.
- Existing and popular services such as GET_JOB_INFO() and all four NETSTAT services are enhanced to return more columns of information, making it possible to solve more business requirements by using SQL.
- The QSYS2.OBJECT STATISTICS() user-defined table function (UDTF) is enhanced in IBM i 7.3 to return many more result columns. Because this UDTF is widely used to find objects of any type, the additional return columns widen the aperture of problems that can be solved by using SQL in i. This is a significant update to this service and only available in version 7.3.

These and other IBM i services are described in developerWorks. These and other enhancements are delivered in DB2 PTF Group SF99703. To learn more about these and other DB2 for IBM i enhancement, go to the [DB2 for i - Technology Updates](#) wiki.

IBM i Security Authority Collection

New security support that is called *authority collection* is available in the IBM i 7.3 release. Authority collection is a capability that is provided as part of the base operating system. At a high level, authority collection captures data that is associated with the runtime authority checking that is built into the i system. This data is logged to a repository provided by the system, and interfaces are available to display and analyze the data. The intent of this support is to assist the security

administrator and application provider in securing the objects in the application with the lowest level of authority that is required to allow the application to run successfully. The result is to help increase the security of the objects within the application. For complete details on the new authority collection support, see chapter 10 of the IBM i Security Reference PDF in IBM Knowledge Center.

New interfaces are provided to allow a system administrator to collect and analyze data that is associated with the authority checking support of i. These interfaces support the ability to start authority collection for a specific user of the system. When this user runs a job on the system (interactive, batch, communication, and so on) and accesses objects within the application, authority collection data is gathered and written to the authority collection repository for the user.

Authority collection interfaces

The following interfaces are available for the authority collection support:

- Start Authority Collection (STRAUTCOL) command.
- End Authority Collection (ENDAUTCOL) command.
- Delete Authority Collection (DLTAUTCOL) command.
- DSPUSRPRF *BASIC display, printed output, and outfile (QADSPUPB) have the authority collection active indicator and authority collection repository exists indicator available.
- DSPUSRPRF *BASIC display and printed output have the STRAUTCOL parameters from the most recent use of STRAUTCOL. These values are only shown if an authority collection repository currently exists for the user.
- DMPUSRPRF command has the authority collection active indicator.
- RTVUSRPRF command has the authority collection active indicator and authority collection repository exists indicator.
- Retrieve User Information (QSYRUSRI) API has the authority collection active indicator, authority collection repository exists indicator, and the Start Authority Collection (STRAUTCOL) command parameters.
- IBM Navigator for i Authority Collection support provides all the necessary interfaces to start, stop, and analyze the authority collection data.

Displaying and analyzing authority collection data

Authority collection captures a significant amount of information that is associated with the authority checking of an object. The SQL view QSYS2.AUTHORITY_COLLECTION is used to display and analyze this information.

IBM Navigator for i shows the authority collection information for a specific user but not in a form that can be queried.

Use the SQL view QSYS2.AUTHORITY_COLLECTION to display and analyze the authority collection data. The Run SQL Scripts function that is provided in Access Client Solution can be started to or from Navigator for i and can be used to query the QSYS2.AUTHORITY_COLLECTION view.

Updated security audit records

New QAUDLVL and QAUDLVL2 system values are *NETSECURE, *NETTELSVR, and *NETUDP.

The QAUDLVL and QAUDLVL2 value *NETCMN is changed to now write security audit journal entries for a subset of the *NETSCK value functions.

The CP (User Profile Changes) security audit journal entry contains fields for all the Create User Profile (CRTUSRPRF) command parameters except TEXT and AUT and all the Change User Profile (CHGUSRPRF) command parameters except the TEXT parameter.

Other miscellaneous updates were made to audit journal entries.

Network auditing

Network auditing capabilities are expanded in several ways.

Socket connection auditing gives users the ability to log socket connections that flow in to and out of IBM i partitions. Security auditing can audit a wide variety of network connections and traffic with sockets connection (SK) journal entries.

Security auditing includes the ability to audit TCP sockets in addition to UDP traffic by using a combination of audit level simultaneously.

Telnet server connections are audited by using a special Telnet audit level to allow the user to audit Telnet server connections separately from other TCP connections. The high number of clients that can connect to the Telnet server and the quick reconnect rates of some Telnet clients would result in a high rate of audit record generation on a system.

Users can audit secure traffic with a secure socket connection audit level. System SSL/TLS connections can be audited to determine what protocols and cipher suites are being used on the system. One use of auditing secure connections is to identify vulnerable algorithms and ensure that the correct levels of security are being used on the system to protect socket connections. Secure and nonsecure TCP connections can be audited at the same time to determine which connections are secure by referencing the IP addresses and ports in the audit records generated.

The secure socket connection audit function also includes auditing VPN Internet Key Exchange (IKE) negotiations and IP Security (IPSec) connections. Secure UDP traffic is audited as well using the secure socket connection audit level.

The many options for socket connection auditing give users the ability to gain a thorough understanding of network traffic and security on their systems. As security requirements continue to increase, auditing is a useful tool to analyze potential exposures and determine what security is being used to protect network traffic.

For more information about the new network auditing capabilities, see the [Socket connection auditing](#) topic in IBM Knowledge Center.

Collection Services

- Named memory pools: The main storage pool name is now stored in files QAPMPOOLB and QAPMSMPOL.
- Time stamp modernization: An SQL time stamp format of the sample interval date and time was added to the database files. An SQL time stamp format of the Coordinated Universal Time of the sample interval date and time was also added. The time zone name and time zone offset from Coordinated Universal Time is stored in file QAPMCONF.
- HTTP System monitor metrics: A new file QAPMSMHTP contains summarized data metrics from IBM HTTP Server, powered by Apache, that is used in support of system monitoring.
- Many other existing files have changes and new fields. For more information, see the Collection Services data files topic in IBM Knowledge Center.
- Collection Services can be configured to create and maintain a historical performance data collection. The Performance > Graph History task in IBM Navigator for i can be used to analyze the historical performance data in chart or table form. An historical performance data collection contains data that is collected by Collection Services. The data is reduced and summarized with the intent of providing data to be kept for a long time. The data is intended to be just a subset of all the original Collection Services collected data, providing a summarized rolling collection.

Digital Certificate Manager

New support is added to the Digital Certificate Manager to support certificates with expiration dates beyond year 2037.

New MOVPPRCOL command

The Move Performance Collection (MOVPPRCOL) command moves a performance collection from one library to another.

IBM i Integrated Web Services

In October 2014, with IBM i 7.2 TR1 and 7.1 TR9, the integrated Web Services Server was extended to include both SOAP and REST based services for ILE RPG, ILE COBOL, and Java™ programs running on IBM i.

In IBM i 7.3, the Integrated Web Services client for ILE is enhanced to allow the sending of user-defined payloads, enabling users to invoke REST web services from native RPG and COBOL programs.

Users can use the new transport APIs to send the payload, such as an XML document or JSON information. The transport APIs allow the setting of HTTP headers and the HTTP method. The data is converted to UTF-8 and is converted to the CCSID of the job.

It is the responsibility of the client application to construct and send the payload and to parse the response.

For additional details, go to the [Integrated Web Services for IBM i](#) website.

Save/Restore enhancements

The SAVSYS, SAVSECDTA, RSTUSRPRF, and RSTAUT functions are enhanced to preserve the links between authorization lists and objects in library QSYS during a disaster recovery. If an object does not exist on a partition, the link between an authorization list and the object is restored when you restore the object. However, objects in library QSYS are installed before the user profiles and the authorization lists. Therefore, the links between authorization lists and objects in library QSYS are not restored when the objects are installed. With this enhancement, you can now restore the authorization list links for objects in QSYS if you saved security data from IBM i 7.3 or later releases. To restore these links, do one of the following:

- Run RSTUSRPRF USRPRF(*ALL) and then run RSTAUT. These steps are part of the typical recovery process.
- Run RSTUSRPRF USRPRF(*NEW) and then run RSTAUT. These steps do not require the system to be in a restricted state and you can run them even if you are not performing a complete system recovery.

To restore individual objects as quickly as possible, see the [Restoring objects](#) topic in IBM Knowledge Center.

The information that you need to specify has not changed, but the objects can now be located much more quickly with fewer tape operations.

Options 21, 22, and 23 on the SAVE menu now have a Start date prompt to help you to schedule backup operations up to seven days in advance. These options also remount file systems at the end of the backup operation if you choose to unmount file systems during the operation. For more information, see the [Performing a complete save using the GO SAVE checklist](#) topic in IBM Knowledge Center.

Reduction in time for vary on IASP

The time that it takes to vary on an IASP is reduced for a number of configurations and workloads. This directly reduces the overall time to perform an abnormal IPL and the time it takes to switch over to the target system in a PowerHA configuration. Installing the new IBM i 7.3 release and then staying current with IBM i Cumulative PTF packages keeps you current with the latest time reductions.

IBM i Open Source Solutions

The IBM i Open Source Solution is expanded to significantly advance open source on IBM i. The following new languages, features, tools, and environments are added:

- Option 2 - Python V3.0. This Python option now includes version 3 of Python, including the ability to leverage Django.
- Option 4 - Python V2.7. The popular Python V2.7 is now integrated into the IBM i Open Source ecosystem. Additionally, the Django framework is also supported.
- Option 5 - Git. The widely used Git source control environment is now being provided for use with IBM i. Git on i supports most open source based source code (like node.js, Python, and PHP) and native RPG source stored in the Integrated File System (IFS). This now supports running your Git repository and Git server on IBM i. This greatly simplifies your source control management for both new open source languages and modern RPG.
- Option 6 - Tools. This option contains the popular tools .Zip, .UnZip, and bash. This set of tools will continue to expand in future releases based on input from the IBM i open source community.
- Option 7 - Orion. Orion provides the IBM i developer with an Eclipse-based web code development environment. This is an integrated solution for writing node.JS, Python, or even modern RPG where the source is stored in the IFS.

For details, see the IBM i [Open Source Technologies](#) wiki in developerWorks.

IBM HTTP Server for i

IBM HTTP Server for i, which is powered by Apache, is updated to the latest level of Apache 2.4.12. This ensures a robust and security-enhanced foundation for web serving and includes many new features, including WebSockets.

IBM Web Administration GUI (see the interface at **<http://hostname:2001/HTTPAdmin>**, a case-sensitive link, where "hostname" is replaced with the actual system name) is updated to easily configure and manage SSL server configuration and new server types: IBM Web Administration for i SSL configuration wizard is enhanced to support stand-alone WebSphere^(R) Application Server Liberty profile and the Integrated Application Server (built on Liberty). Keystore types JKS, JCEKS, PKCS12, CMS, and Digital Certificate Manager (DCM) *SYSTEM store are supported to create a new self-signed certificate or selecting existing certificates from the store for an application server. Additionally, several easy-to-use SSL tools are provided on the GUI, keystore management, view certificate, and so on.

Details can be found on the [HTTP Server for i](#) website.

IBM Navigator for i

The strategic web-based Navigator interface continues to be enhanced to help system administrators and database engineers. In addition to performance and usability updates, many new features are added in IBM i 7.3:

- Historical system data perspective: This new feature helps to solve the problem of system administrators being able to view Collection Services data by using only one collection at a time. Performance data can now be condensed to provide a view of system performance data over a longer timeframe. Using the graphical viewer, trends and peaks in performance are easy to identify
- Visualization of monitor data: The data that is collected by the monitors of the Web Navigator for i can be seen through the graphical interface. By creating a monitor and using the visualization through the graphical interface, system administrators can watch and monitor the values over time
- Updates to the IPV6 support in the networking support
- Additional tape options
- Enhancements to the SMTPA interface
- Intrusion detection updates
- Updates to Crypto Services interface
- System Values updates

- Peak temporary storage that is used in the processor resources interface
- PTF management updates
- Support for additional browsers, including Safari and the latest versions of Microsoft™ Internet Explorer
- Support to turn on and manage temporal tables
- Dashboard: A new dashboard interface is added to allow the system administrator to view real-time performance details for several key metrics

For more information about Navigator, see the [Navigator](#) wiki.

IBM Navigator for i performance interface

The performance interface includes Performance Data Investigator (PDI), Collection Manager, Batch Model, Performance Reports, System Monitor, and web-based GUI interfaces for Collection Services, Job Watcher, and Disk Watcher. New functions for Graph History and System Monitor are described here.

The new Performance > Graph History task provides a graphical view of the historical performance data collection created by Collection Services. You can view historical performance data by using the Graph History task in IBM Navigator for i. To view the historical data, you must use Collection Services to collect data and enable historical data creation in the Collection Services configuration.

IBM Navigator for i Monitors

New performance metrics can now be monitored with IBM Navigator for i system monitors. Disk read response time, disk write response time, and various new IBM HTTP Server (powered by Apache) server metrics can now be monitored.

To view all monitor metrics in one place, a new Visualize Monitor Data action from the System Monitor function of IBM Navigator for i was added.

Additional enhancements for IBM i

- The limit for number of objects in a library is increased from roughly 360,000 objects to roughly 1,000,000 objects in release 7.3. This is an approximate number rather than an exact limit because all external objects do not have the same amount of object description data.
- The number of documents and folders in a user ASP (libraries QDOC0002 to QDOC0032) is increased from 349,000 - 1,000,000 objects. The object limit that is used for sending warning messages about the QDOC library is increased to 1,000,000 objects.
- Display Object Description enhancement: Two new special values *NAME and *TEXTATR were added to the DETAIL parameter on the DSPOBJD (Display Object Description) command. These values are allowed only when OUTPUT(*OUTFILE) is specified. When *NAME or *TEXTATR is specified, only a subset of the object attributes is returned, which can improve performance.
- The limit for the maximum number of jobs that can be active at the same time in a subsystem (MAXJOBS(*NOMAX)) is increased. *NOMAX is no longer limited to 32,767. The new limit can vary, depending on the size and performance of your system.
- Workload groups: A new parameter is added to the CRTSBSD and CHGSBSD CL commands. This parameter replaces the data area support previously required to associate a workload group with a subsystem. The data area had a limit of 100 subsystem/workload group pairs. Now you can set a workload group on all your subsystem descriptions (there is no longer a limit).
- Environment variables: New support is added to CL commands DSPJOB and WRKJOB option 22 (new option) to display the environment variables for another job.
- Inactivity Timer Change: New inactivity timer support is available in order to work with QSHELL jobs. Use the new *DSP option on the TYPE parameter of CRTDTAQ command to indicate that you are using the data queue specified with the DTAQ parameter on CRTDSPF.

- Display Job Log change: The CL command DSPJOBLOG has a new option on the MSGF(*LIBL) parameter. This new option, *LIBL, helps you to see most operating system messages in another job's joblog, in your own language on a multilingual system. The default is *MSG, which means you would see another job's messages in the language used in the other job.
- IBM Portable Utilities for i is updated to include the latest version of OpenSSL V1.0.2.
- Binder source files can now be in IFS.

IBM i Licensed Program Products

DB2 Web Query for i

DB2 Web Query for i delivers the new version 2.2.0 to coincide with the release of IBM i 7.3. Both the Express (5733-WQE) and Standard (5733-WQS) editions as well as the companion product DataMigrator ETL Extension (5733-WQM) are at release 2.2.0. The new Web Query release runs on IBM i 7.1, 7.2, and 7.3. Note that DB2 Web Query 2.2.0 or later are required for IBM i 7.3, therefore clients upgrading to IBM i 7.3 will need to upgrade Web Query to at least release 2.2.0 at the same time.

In addition to having all the capabilities of the previous release of the product, including those capabilities added with "Hot Fixes," the new 2.2.0 release of the popular Web Query product includes many extra features:

- The first noticeable change is a clean, simple look of the sign on screen and the BI Portal, the main interface into Web Query.
- New output options are available for reports, including Excel .xlsx and additional HTML5 charts.
- The Info Assist report developer has additional features, such as the group function, that provide a quick way to group elements of a column together.
- Clients who use Web Query's Developer Workbench tool should appreciate the enhanced tools in 2.2.0. The canvas can be tailored to make it easier to develop reports and HTML intended for mobile devices. In addition, testing against different browsers is greatly simplified by using the browser target capability. HTML-based reports can now be created to be autosizing, making for even more flexible reports.
- Additional data adapters are now available with Web Query Standard Edition to extend the data reach of the product. Adapter slots are now available for MySQL/MariaDB, Postgres, and for a generic Type 4 JDBC driver. Incorporating data into reports from other databases is as easy as adding the appropriate JDBC driver from that database. Because of its underlying integration with Web Query, these adapters are also available for the DataMigrator ETL Extension. This capability means that pulling data from other databases into DB2 for i is easy too.
- A revised set of simpler parameter functions are now available for date/time and character manipulations.
- The companion product DataMigrator ETL Extension now supports running data flows directly from CL, which means running and scheduling of data flows can be integrated with existing business processes. Various improvements to the CDC (journal read) portion of product, such as direct joins, were also added.

Web Query 2.2.0 also supports migration from all older releases of Web Query.

For more details, go to the [IBM DB2 Web Query for i](#) website or the [product overview](#) site.

IBM PowerHA SystemMirror for i 7.2 HyperSwap Cluster

IBM PowerHA SystemMirror for i 7.2 Enterprise Edition is enhanced to enable a DS8800, DS8870, or DS8880 HyperSwap configuration within a PowerHA cluster topology. As opposed to a two-site Metro Mirror cluster that has a primary and secondary storage server, a HyperSwap cluster cross-couples the storage servers so that both the primary and secondary Power Systems™ servers can seamlessly assume ownership of either the remote or local storage server. The primary storage server has the IASP and the SYSBAS for the primary as well as the SYSBAS for

the secondary server. The same case applies for the secondary storage server. If one of the storage servers fails or goes offline, the other storage server seamlessly assumes ownership of the cluster workload. When the failed storage server returns, the data is automatically synchronized. After a cluster role-swap operation PowerHA automatically changes affinity so that the new production node updates to the local storage server. Prerequisites are PowerHA 7.2 Enterprise Edition; IBM i 7.3 or IBM i 7.2 with TR4; either POWER7 or POWER8 servers; and either DS8800, DS8870, or DS8880 storage server.

This capability is only for a local two-system cluster. For more information see the [IBM PowerHA SystemMirror for i](#) website.

IBM i Access Client Solutions

IBM i Access Client Solutions, the strategic solution for access and management of IBM i, provides support for many user devices. In IBM i 7.3, IBM i Access Client Solutions is enhanced to include the IBM i graphical system debugger. For the IBM i 7.3 release, if you use LAN Console for your system console connection, you must use IBM i Access Client Solutions as it is the only supported interface. This new support is delivered as a service pack and can be easily downloaded from the [FTP site](#) or from the Entitled System Support (ESS) website. The ESS website is used for clients to retrieve entitled IBM i software.

Details can be found on the [IBM i Access](#) product page.

IBM i Access for Web Mobile solutions

In this release, the mobile interface now includes a dashboard. The dashboard provides a high-level, graphical real-time view of system metrics (CPU, page faults, disk I/O, disk capacity, messages, and jobs) and the capability to customize various thresholds. Drill down into the capability to look at further detail. This function allows administrators to quickly and easily monitor various system statistics.

Additional information can be found at the [IBM i Access](#) website.

IBM Rational Development Studio for i

The Development Studio continues to be updated to transform the development languages of IBM i to meet the ever-changing world of modern development. The RPG language continues to transform to a modern business language. Additionally, COBOL continues to be enhanced to meet the industry updates. Many updates are included in IBM i 7.3 for RPG and COBOL.

RPG

- Support for fully free-form source: RPG source with the special directive `**FREE` in the first line contains only free-form code. The code can begin in column 1 and extend to the end of the line. The length of a source line has no practical limit in fully free-form source. Fixed-form code is not allowed in fully free-form source, but column-limited source that uses only columns 6-80 can be included by using the `/COPY` or `/INCLUDE` directive.
- New and enhanced built-in functions to improve string processing: The `%SCAN` built-in function is enhanced to have a length parameter, allowing more control over the string to be scanned. The `%SCANR` built-in function is similar to the `%SCAN` built-in function, but it finds the last occurrence of the search argument rather than the first occurrence.
- Use `ALIAS` names for all externally described files: The `ALIAS` keyword can now be specified for any externally described file, allowing RPG programmers to use the alternative names of the fields everywhere in their source.
- Relaxed rules for data structures for I/O operations: RPG programmers can now define a single data structure that can be used as the result field for any I/O operation to an externally described file.
 - An externally described data structure or `LIKEREC` data structure that is defined with type `*ALL` can be used as the result data structure for any I/O operation.

- A data structure that is defined with LIKERECE with no second parameter can be used for input, output, and update operations.
- Enhancements that are related to null-capable fields: When a data structure is defined with the EXTNAME or LIKERECE keyword, *NULL can be coded as an extra extract type, specifying that the subfields are all indicators. If the external file is a database file, the resulting data structure matches the null byte map for the file. Use the NULLIND keyword to:
 - Define a field as null-capable
 - Define an indicator field to be the null-indicator for a field
 - Define an indicator data structure, which is defined with EXTNAME(*NULL) or LIKERECE(*NULL), to be the null-indicators for another data structure
- PCML enhancements: The usability of the generated PCML is improved by allowing the names to be generated in mixed case. Specify the *DCLCASE parameter for the PGMINFO Control specification keyword to have the names in the program interface information that is generated in the same case as the names are defined in the RPG source file. Now, RPG programmers can specify which procedures they want to have PCML generated for. Specify PGMINFO(*YES) in the Procedure specification keywords for the procedure that should be included in the program interface information when a module is being created, or specify PGMINFO(*NO) for the procedures that should not be included.
- The maximum number of parameters for a bound call is increased from 399 - 16,382.

COBOL

- New intrinsic function PARMS: The new intrinsic function PARMS returns the number of parameters that were passed to the program or procedure in which the PARMS intrinsic function is used.
- CALL PROCEDURE parameters increased: The maximum number of CALL PROCEDURE parameters is increased from 400 - 16,382.
- NATIONAL support in the class condition test: NATIONAL is now a supported class in the class condition test. It is possible to test whether an item with usage NATIONAL is NATIONAL, ALPHABETIC, ALPHABETIC-LOWER, ALPHABETIC-UPPER, or NUMERIC.
- National-edited data type support: National-edited data type is now supported. National-edited data items are similar to alphanumeric-edited data items but encoded in Unicode. The allowed picture string characters are B, P, V, Z, 9, 0, slash (/), comma (,), period(.), CR, DB, asterisk (*),cs, and have USAGE NATIONAL. For example, 01 B pic NN/NN/NN usage national.
- National numeric-edited data type support: National numeric-edited data type is now supported. National numeric-edited data items contain numeric-edited data but are encoded in Unicode. The allowed picture string characters are B, P, V, Z, 9, 0, slash (/), comma (,), period(.), CR, DB, asterisk (*), cs, and have USAGE NATIONAL. For example, 01 C pic Z(9)9V99 usage national.

Other Power Software offerings

PowerVC for i enhancements

A new release of PowerVC contains multiple capabilities and enhancements for IBM i to help users to manage the cloud and virtualized environments. For more information, go to the [IBM Power Virtualization Center for IBM i](#) wiki.

IBM Software offerings

IBM MQ

The recently announced IBM MQ V8.0, formerly known as IBM WebSphere MQ, is supported on IBM i 7.3. Highlights of IBM MQ V8.0 include performance improvement when connecting large numbers of clients.

For more information about IBM MQ V8.0, go to the [IBM MQ](#) website.

IBM Content Manager OnDemand

IBM Content Manager OnDemand for i, V7.3 is a high-performance solution for managing electronic report capture, distribution, and customer self-service bill presentment. It incorporates features that are designed to help companies gain potentially significant return on investment by transforming costly high-volume print output to electronic information capture in support of customer service.

IBM Content Manager OnDemand for i, V7.3 includes the following key enhancements:

- **Report distribution:** The new Content Manager OnDemand Distribution Facility (ODF) product option provides a simple method for distributing reports to users and notifying users when reports or individual documents are ready for them. The OnDemand Monitor client is also supported, which allows checking the status of distributions that are submitted for processing and to monitor ODF activity.
- **Document loading through Content Manager OnDemand Web Enablement Kit (ODWEK):** Documents can now be loaded through a new ODWEK Java API. Documents loaded by using the new ODWEK Java API are loaded by using a method similar to the existing batch loading process of Content Manager OnDemand.
- **XML support:** XML support enables businesses that have report data or transactional information in XML format to store the data natively as XML data. The XML indexer is provided to index and load XML data into Content Manager OnDemand.
- **Enhancements to OS/400^(R) indexer:** The OS/400 indexer now supports regular expressions to locate triggers and fields, column ranges for locating triggers, and a new BREAKYES parameter. A regular expression is a pattern that is used to match characters in a string in order to locate triggers and fields in the data. BREAKYES is used when multiple break conditions exist to determine whether the break conditions are logically connected by using AND or OR operators.
- **New commands to query, retrieve, and print archived documents:** Three new commands are available as user-friendly interfaces to the QUERY, GET, and PRINT functions of the ARSDOC API. The commands are Query Document (QRYDOCOND), Retrieve Document (RTVDOCOND), and Print Document (PRTDOCOND).
- **Simplified management of your Content Manager OnDemand environment.**
- **New option to run the storage management process in a limited period:** The Start Archived Storage Mgmt (STRASMOND) command has a new parameter named *Force ASM to end* (ENDASM) that specifies whether to force the Archive Storage Manager (ASM) process to end, and, if so, when it should end. It is possible to force ASM to end after a specified number of hours or at a specified time. If a limited window of time is available to run the storage management process, this new capability gives total control of the length of time that the process runs.
- **New option to run ASM even if Disk Storage Management (DSM) does not complete successfully:** The Start Disk Storage Management (STRDSMOND) command has a new option called *FORCE on the Run ASM (STRASMOND) parameter. Specifying STRASMOND(*FORCE) will force the Archived Storage Management (ASM) process to run after the Disk Storage Management (DSM) process ends, even if DSM ends with an error.
- **Quick and easy start of a Content Manager OnDemand instance:** A Start current instance button has been added to the main panel of the Content Manager OnDemand component of IBM Navigator for i to allow the starting of the server for the Content Manager OnDemand instance from the panel that is being viewed.
- **Increased flexibility for output queue and directory monitors:** Output queue and directory monitors are used to periodically check specified output queues or IFS directories for the presence of a new file to be processed by Content Manager OnDemand. The following enhancements are now available for monitors:
 - A Check interval parameter was added to the Directory Monitor definition panel of the Content Manager OnDemand component of IBM Navigator for i and to

- the Start Monitor (STRMONOND) command. It specifies, in seconds, how long the monitor waits before it checks the monitored directory for a file to process.
- Two options are now available for the output queue and directory monitor user exit:
 - The attribute-specific monitor exit, available since the first Common Server release.
 - The Universal monitor exit, introduced at Content Manager OnDemand server version 9.5.0.3.
 - The attribute-specific monitor exit calls a program with the same name as a specified attribute of the input file: In this case, different input files usually require different exit programs. The universal monitor exit calls a single program for all input files, and the program determines what to do based on the parameters passed to the program. Sample Command Language (CL) programs are provided to help with writing the user exit programs.
 - New program to delete a Content Manager OnDemand instance: A new program that is called QRLCDLTINS is available to simplify the process of deleting a Content Manager OnDemand instance if it is no longer needed. Previously, deleting a Content Manager OnDemand instance required a number of steps to be performed individually. The new QRLCDLTINS program automates the running of all of the necessary steps to delete a Content Manager OnDemand instance.

More usability enhancements and new software prerequisite information can be found in the [Read This First document for Content Manager OnDemand for i and i5/OS™](#).

Hardware enhancements

IBM i support for Power hardware

IBM i 7.3 is supported on selected IBM Power Systems servers with POWER8, POWER7, and POWER7+™ processor technology. The operating system and most applications for i are built on a technology-independent machine interface (TIMI) that isolates programs from differences in processor architectures and allows the system to automatically capitalize on many new Power Architecture[®] features without changes to existing programs. The new IBM i 7.3 release continues the tradition, providing a high degree of integration, security, and ease-of-use across multiple generations of Power Systems and processors, including the current POWER8 processor. A selection of processor support features is highlighted below.

Multicore and multithread

The maximum numbers of cores varies by system model. Also, the operating system support of multicore and multithread technology varies by operating system and release. The maximum number of processor cores and simultaneous multithreading (SMT) levels that are supported by a single IBM i logical partition by processor mode is as follows:

- For IBM i 7.3:
 - POWER8: 48 cores/SMT8
 - POWER7: 32 cores/SMT4

Clients who require more capacity beyond the IBM i maximum can contact IBM to request support for additional processor cores. IBM Systems Lab Services works with clients to assess the requirements and to provide IBM i support for the client workload in a partition with a larger number of cores.

IBM Power hardware announcements

Recent Power hardware announcements that benefit IBM i customers include the following:

- A new higher performance PCIe3 SAS RAID adapter (#EJ14) is introduced, which can run more solid-state drives (SSDs) and provide more write IOPs.

- New fourth-generation Enterprise Multi-Level Cell (eMLC4) 2.5-inch SAS SSDs, now with up to 1.55 TB capacity.
- 1.9 TB Read Intensive 2.5-inch SSD offers new price performance options for workloads with modest write requirements for POWER8 servers.
- New eMLC4 1.8-inch SSDs, now up to 775 GB in capacity, offer capacity and price/performance enhancements to POWER8 system units.
- Support for the PCIe 4-Port Async EIA-232 Adapter (#5785/#5277), providing twice the async ports per PCIe slot.
- Support for PCIe2 8Gb 2-Port Fibre Channel Adapter with VIOS configurations.
- Support for Live Partition Mobility with multipath-capable tape devices.
- IBM i 7.3 also incorporates all the new technology introduced with IBM i 7.2 Technology Refreshes, including these highlights:
 - Support for Power Systems with POWER8 technology with industry-leading RAS and throughput.
 - FlashSystems attach to allow external storage configurations as an alternative to internal SAS SSD.
 - SAN Multipath support for tape to allow redundancy of tape configurations and automatic recovery from I/O path failures which can be especially useful for those doing unattended backups.
 - DUPOPT of IPL-capable media to allow transition to use of newer media types and to condense a bootable install image onto a flash drive that can be carried in one's pocket.
 - 10 Gb Ethernet to allow Native, Native SR-IOV, and VIOS SR and LR configurations with more bandwidth for sharing across multiple partitions.
 - Live Partition Mobility support with Native SR-IOV configurations to allow benefits of SR-IOV configurations including improved bandwidth control and at the same time have mobility for the partition.
 - Capability for Little Endian Linux™ client partitions with IBM i as a server partition to allow easier integration and management of Linux workloads.
 - Support of the HyperSwap function of IBM SAN Volume Controller (SVC) and IBM Storwize® products to enable highly available disk volumes accessible through two storage controllers.
 - And many more expansions in configuration options that allow IBM i customers to meet growing IT demands and integration with newer technologies. For more information see the [Hardware and Firmware](#) website.

IBM i Relocation offering

For the IBM i Relocation offering, when Service Providers are hosting multiple clients on a machine with relocated Eligible Programs, if more than one client is using a Licensed Program Product (LPP), or IBM i optional feature, on the Service Provider machine, the Service Provider must acquire the entitlement for the LPP and IBM i optional feature. The effective date for this policy is May 15, 2016. For more information on the IBM i Relocation offering, including Eligible Programs, visit the [IBM i Support: Customer notices and information](#) website, in the section entitled "Client Entitlement Relocation to Service Providers."

Software progression

The following table is used to show the updates for various products.

Program updates

V4R5	V5R1	V5R2	V5R3	V5R4	i 6.1	i 7.1	i 7.2	i 7.3
5769-SS1	5722-SS1	5722-SS1	5722-SS1	5722-SS1	5761-SS1	5770-SS1	5770-SS1	5770-SS1
*	*	*	*	*	5733-ARE	*	*	*
5733-A38	*	*	PN	PN	NA	NA	NA	NA
*	*	*	*	*	5761-AMT	5761-AMT	5770-AMT	*

V4R5	V5R1	V5R2	V5R3	V5R4	i 6.1	i 7.1	i 7.2	i 7.3
*	5722-AC2	NA	NA	NA	NA	NA	NA	NA
*	5722-AC3	5722-AC3	5722-AC3	NA	NA	NA	NA	NA
*	5722-AF1	5722-AF1	*	*	5761-AF1	5770-AF1	5770-AF1	NA
5769-AP1	5722-AP1	5722-AP1	5722-AP1	*	5761-AP1	*	*	*
*	5722-BR1	5722-BR1	5722-BR1	5722-BR1	5761-BR1	5770-BR1	5770-BR1	5770-BR1
*	5722-CE2	NA	NA	NA	NA	NA	NA	NA
*	5722-CE3	5722-CE3	5722-CE3	NA	NA	NA	NA	NA
*	5722-CM1	5722-CM1	5722-CM1	5722-CM1	5761-CM1	*	*	*
*	5722-CR1	5722-CR1	*	*	NA	NA	NA	NA
NA	NA	5733-CO2	*	NA	NA	NA	NA	NA
NA	NA	NA	5733-CY1	5733-CY1	5733-CY2	5733-CY3	5733-CY3	5733-CY3
*	5722-DB1	5722-DB1	5722-DB1	5722-DB1	5761-DB1	*	*	*
NA	NA	NA	5733-DIR	5733-DIR	NA	NA	NA	NA
NA	NA	NA	5733-DR1	5733-DR1	NA	NA	NA	NA
NA	5722-DE1	5722-DE1	5722-DE1	5722-DE1	5761-DE1	5770-DE1	NA	NA
*	5722-DFH	5722-DFH	5722-DFH	5722-DFH	5761-DFH	5770-DFH	5770-DFH	*
5769-DL1	*	*	NA	NA	NA	NA	NA	NA
5769-DP3	*	5722-DP4	*	*	5761-DP4	5761-DP4	5761-DP4	NA
*	5722-DS1	5722-DS1	5722-DS1	5722-DS1	5761-DS2	*	*	*
NA	NA	NA	5648-E77	5648-E77	5648-E77	*	*	*
NA	NA	NA	5733-EWA	5733-EWA	NA	NA	NA	NA
NA	NA	NA	5733-EWM	5733-EWM	NA	NA	NA	NA
NA	5733-FXD	*	*	*	*	5733-FXD	NA	NA
NA	5733-ID1	*	*	*	*	*	*	NA
NA	5722-IP1	5722-IP1	5722-IP1	*	*	*	*	*
NA	NA	NA	NA	NA	5761-HAS	5770-HAS	5770-HAS	*
5733-ITL	5733-ITL	5733-ITL	5733-ITL	5733-ITL	5733-ITL	5733-ITL	5733-ITL	5733-ITL
5769-JS1	5722-JS1	5722-JS1	5722-JS1	5722-JS1	5761-JS1	5770-JS1	5770-JS1	*
*	5722-MG1	5722-MG1	5722-MG1	5722-MG1	5761-MG1	5770-MG1	5770-MG1	5770-MG1
NA	NA	NA	NA	5722-NLV	5761-NLV	5770-NLV	5770-NLV	NA
NA	NA	NA	NA	NA	5733-OMF	5733-OMF	5733-OMF	5733-OMF

V4R5	V5R1	V5R2	V5R3	V5R4	i 6.1	i 7.1	i 7.2	i 7.3
*	5722-PD1	*	*	NA	NA	NA	NA	NA
NA	NA	NA	NA	5733-PS1	5733-PS1	NA	NA	NA
5769-PT1	5722-PT1	5722-PT1	5722-PT1	5722-PT1	5761-PT1	5770-PT1	5770-PT1	5770-PT1
5769-QU1	5722-QU1	5722-QU1	5722-QU1	5722-QU1	5761-QU1	5770-QU1	5770-QU1	5770-QU1
NA	NA	NA	NA	5733-QU2	5733-WQX	*	*	5733-WQX
NA	NA	NA	NA	5733-QU3	5733-WQX	*	*	
NA	NA	NA	NA	5733-QU4	5733-WQX	*	*	
5769-RD1	5722-RD1	5722-RD1	PN	PN	PN	PN	PN	PN
5769-WDS	5722-WDS	5722-WDS	5722-WDS	5722-WDS	5761-WDS	5770-WDS	5770-WDS	5770-WDS
NA	NA	NA	NA	NA	5733-RDI	5733-RDP	NA	NA
NA	NA	NA	NA	NA	5733-RDP	5733-RDG	NA	NA
NA	NA	NA	NA	NA	5733-RDW	5733-RDW	NA	NA
NA	NA	NA	5733-SC1	#	#	#	#	#
5769-SM1	5722-SM1	5722-SM1	5722-SM1	5722-SM1	5761-SM1	5770-SM1	5770-SM1	5770-SM1
5769-ST1	5722-ST1	5722-ST1	5722-ST1	5722-ST1	5761-ST1	5770-ST1	5770-ST1	5770-ST1
5769-VG1	*	*	*	NA	NA	NA	NA	NA
5769-VI1	5722-VI1	5722-VI1	PN	PN	PN	PN	PN	NA
NA	NA	NA	5722-WE1	NA	NA	NA	NA	NA
NA	NA	NA	5722-WE2	*	*	*	*	*
5769-XW1	5722-XW1	5722-XW1	5722-XW1	5722-XW1	5761-XW1	5770-XW1	5770-XW1	5770-WX1
*	5798-FAX	5798-FAX	*	*	*	*	5798-FAX	*
NA	NA	5733-XT1	5733-XT1	5733-XT1	NA	NA	NA	NA
NA	NA	NA	NA	5733-XT2	5733-XT2	5733-XT2	*	*

* Indicates which products are not being refreshed for this release.

Indicates product was orderable but has become a bonus program with the operating system.

PN indicates product has moved to Passport Advantage^(R) ordering.

NA indicates product is no longer orderable with the operating system.

Additional technical information

To make it easy for clients to find the supporting technical detail for the topics that are found in this announcement letter, the [IBM i 7.3 - Base Enhancements](#) wiki contains links to IBM i 7.3 enhancements.

Changes in IBM i ordering structure and delivery beginning with version 7.3

- 5770-SS1 Option 44 Encrypted Backup Enablement and Option 45 Encrypted ASP Enablement, previously ordered as chargeable features, now ship automatically as no-charge features of the IBM i base operating system.
- 5770-NLV National Language Versions at 7.3 has changed its delivery method to Electronic only, regardless of shipping preference selected at order time. Physical media is no longer available. Clients can download any secondary languages from the [My Entitled Systems Support](#) website under IBM i Evaluation and NLV Download.
- 5770-NLV National Language Versions remain available to order backup media for the selected primary language or media for an additional language group. The base IBM i operating system media, keyed products, and no-charge programs will ship.
- For DB2 Web Query for i clients, IBM i 7.3 requires DB2 Web Query for i, V2.2.0, or later. Therefore, clients who upgrade to IBM i 7.3 and are not at DB2 Web Query V2.2.0 will need to upgrade to this version at the same time.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at the [IBM Human Ability and Accessibility Center](#) website.

Product positioning

IBM i 7.3 is the latest version of the IBM i operating environment. IBM i runs on Power Systems™ servers or on PurePower servers and offers a highly scalable and virus-resistant architecture with a proven reputation for exceptional business resiliency. Companies that run applications on IBM i running on a Power server are able to focus on innovation and delivering new value to their business, not on managing their data center operations.

IBM i integrates a trusted combination of a DB2 relational database, industry-leading security, standards-based Internet technology, networking, and storage management capabilities. For example, IBM installs and integrates the SQL standards-based DB2 database for IBM i with advanced database management utilities, plus additional middleware components such as multiple file system options, directory capability, an HTTP web server powered by Apache, a web application server, and a web-services environment.

IBM develops, fully tests, and preloads these core middleware components of IBM i together. The preintegration and testing of IBM i is a key factor in enabling companies to realize lower operations costs by deploying applications faster and maintaining them with fewer staff.

Virtualization and workload management are also built into the i operating environment to enable businesses to consolidate and run multiple applications and components together on the same system, driving up system utilization and delivering a better return on IT investments. This broad and highly stable database and middleware foundation is ideal for efficiently deploying business processing applications.

Architecture for simplicity, stability, and security

Another key differentiator for IBM i is the underlying architecture of the operating system, which provides for simplicity, stability, and security. These are not add-on features, but inherent aspects of the operating system. For detailed information regarding the advantages of IBM i running on Power servers, refer to the "IBM i Strategy and Whitepaper," which is available from your IBM representative. This section describes a few examples.

Simplicity

As mentioned above, the relational database in IBM i is an integrated component, and it is built on integrated storage management capabilities unique to IBM i and its predecessors. This storage management is based on the "single-level storage" architecture that treats all of the storage managed by i as if it were one long stream of memory that encompasses the system memory and the storage on disks. This architecture makes it critical that the operating system decide where to store any given piece of data, and that, in turn, removes the necessity of the user to manage data placement. This makes management of storage and the database objects contained in that storage, significantly simpler.

Stability

IBM i also architecturally separates the address spaces of user applications and the operating system so it is difficult for poorly written or malicious software to intrude upon the underlying operating system support. This is one of several attributes that can help keep IBM i running for days, weeks, or months without unexpected restarting of the operating system.

Several architectural attributes of IBM i contribute to the stability of the system over the years. First, applications compiled on i are compiled to a set of intermediate code instructions defined as the TIMI. This allows i to fundamentally change the implementation of underlying hardware, firmware, and virtualization features, without requiring rewriting, changing, or even recompiling the applications written by users. This sort of forward compatibility is a tremendous business advantage and has allowed the movement of software developed and compiled several years to even decades previously to run on later generations of i.

Security

IBM i and its predecessors have an object-based architecture. Each entity on the system is an object, which has a set of prescribed operations that can be performed on it, and connections from the object to those other objects that are allowed to perform various operations. An object that does not have a legal "edit" operation cannot be edited. It cannot be renamed to another kind of object. If the object does have an "edit" operation (known as "change" for most objects), only a defined set of attributes can be edited, and then only by users who have authority to do that editing.

Objects can easily be "hidden" from other users by use of the library list objects, secured by the object-based security associated with all objects. And users who all have a similar role on the system can be grouped together for role-based security, again as part of the base architecture of the system.

While the i operating system supports open programming methods such as Java™, PHP, web services, and so on, the underlying architecture provides a level of integration, stability, simplicity, and security that is a significant differentiator, and these aspects provide excellent business value to its users.

Statement of general direction

IBM PowerHA SystemMirror for i Planning Insights

IBM plans to introduce the capability to add a third system connected to the PowerHA for i HyperSwap pair via either a Metro Mirror or Global Mirror link.

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing

of any future features or functionality described for our products remain at our sole discretion.

Reference information

For additional information on IBM i, refer to the following hardware and software announcements for Power hardware, PowerVM^(R), and PowerVC:

- For information regarding IBM Power Systems enhancements for Power E850 memory and for Power Systems I/O, see Hardware Announcement [AG16-0033](#), dated April 12, 2016.
- For information regarding new SSD options for IBM Power Systems that provide enhanced performance at a lower cost, see Hardware Announcement [AG16-0040](#), dated April 12, 2016.
- For information regarding enhancements for PowerVM NovaLink, PowerVC, and HMC, see Software Announcement [AP16-0141](#), dated April 12, 2016.
- For information regarding IBM i 7.2 TR4, see Software Announcement [AP16-0038](#), dated April 12, 2016.
- For information regarding IBM PurePower System™ Solution improvements for Private Cloud and Analytics Workloads, see Hardware announcement [AG16-0036](#), dated April 12, 2016.

Program number

Program number	Version	Program name
5733-B45	3.1 SS	IBM AFP Font Collection for workstations and OS/400
5648-E77	1.1 SS	IBM Infoprint Fonts for Multiplatforms
5722-WE2	5.3 SS	IBM Web Enablement for i5/OS
5722-IP1	5.3 SS	IBM Infoprint Server for iSeries
5733-ARE	1.1 SS	IBM Application Runtime Expert for i
5733-CY3	7.3	IBM Cryptographic Device Manager for i
5733-ITL	1.1 SS	IBM Software Temporary License for i
5733-NKY	5.2 SS	Remove Keys/ePOEs for Transferred Software
5733-OMF	1.4	Omnifind ^(R) Text Search Server for DB2 for i
5733-RDW	9.5 SS	IBMRational Developer for i
5733-WQX	2.2	IBMDB2 Web Query for i
5733-XT2	1.2 SS	IBM XML Toolkit for i
5761-AP1	6.1 SS	IBM Advanced DBCS Printer Support for iSeries
5761-CM1	6.1 SS	IBM Communications Utilities for System i
5761-DB1	6.1 SS	IBM System/38 Utilities for System i
5761-DS2	6.1 SS	IBM Business Graphics Utility for System i
5769-FN1	4.2 SS	IBM Advanced Function Printing DBCS Fonts for AS/400
5769-FNT	4.2 SS	IBM Advanced Function Printing Fonts for AS/400
5770-AMT	7.2 SS	IBMRational Application Management Tool Set for i
5770-BR1	7.3	IBM Backup, Recovery and Media Services for i
5770-DFH	7.2 SS	IBMCICS ^(R) Transaction Server for i
5770-HAS	7.2 SS	IBMPowerHASystemMirror for i
5770-JS1	7.2 SS	IBM Advanced Job Scheduler for i
5770-MG1	7.3	IBM Managed System Services for i
5770-NLV	7.3	IBM National Languages for i
5770-PT1	7.3	IBM Performance Tools for i
5770-QU1	7.3	IBM Query for i
5770-SM1	7.3	IBM System Manager for i
5770-SS1	7.3	IBM i
5770-ST1	7.3	IBMDB2 Query Manager and SQL Development Kit for i
5770-WDS	7.3	IBMRational Development Studio for i
5770-XW1	7.3	IBM i Access Family
5798-FAX	5.8 SS	IBM i Facsimile for i

Note: Products marked "SS" are not refreshed in this release.

Additional products

The following products are shipped with the IBM i operating system (5770-SS1):

- IBM HTTP Server for i (5770-DG1)
- IBM Developer Kit for Java (5770-JV1)
- IBM Network Authentication Enablement for i (5770-NAE)
- IBM Portable Utilities for i (5733-SC1)
- IBM TC/IP Connectivity Utilities for i (5770-TC1)
- IBM Transform Services for i (5770-TS1)
- IBM Universal Manageability Enablement for i (5770-UME)
- IBM i Open Source Solutions (5733-OPS)
- Zend Server Community Edition for i (5639-ZC1)
- IBM i Access Client Solutions (5733-XJ1)¹
- IBM i Access for Windows™ (5770-XE1)¹
- IBM i Access for Web (5770-XH2)¹

¹ Some of the functions of these products require an entitlement for IBM i Access Family (5770-XW1).

Product identification number

Program PID number	Maintenance 1-year PID number	Maintenance 3-year PID number
5770-SS1	5733-SPP	5733-SP3/5733-SPE

Offering Information

Product information is available on the [IBM Offering Information](#) website.

Publications

No publications are shipped with this program.

To access the IBM Publications Center portal, go to the IBM [Publications Center](#) website.

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. A large number of publications are available online in various file formats, and they can all be downloaded by all countries.

Technical information

Specified operating environment

Hardware requirements

IBM i 7.3 is supported on selected IBM Power Systems and PurePower Systems servers with POWER7, POWER7+™, or POWER8 processors. Clients using Blades or PureFlex™ systems, and those using servers with POWER6^(R) or POWER6+™ or earlier processors, need to move to newer systems to take advantage of the new features in IBM i 7.3.

For up-to-date information on all types of code levels needed for support of a particular feature, refer to the [IBM Prerequisite](#) website.

Software requirements

For specific software requirements, see the Memo to Users at [IBM Knowledge Center](#) website.

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a readme file, or other information published by IBM, such as an announcement letter. Documentation and other program content may be supplied only in the English language.

Compatibility

Not applicable

Limitations

For additional information, refer to the [Usage restrictions](#) section of this announcement or to the License Information document that is available on the [IBM Software License Agreement](#) website.

IBM Electronic Support

The IBM Support Portal is your gateway to technical support. This includes IBM Electronic Support tools and resources, for software and hardware, to help save time and simplify support. The Electronic Support tools can help you find answers to questions, download fixes, troubleshoot, automate data collection, submit and track problems through the Service Request online tool, and build skills. All these tools are made available through your IBM support agreement. Read about the Electronic Support portfolio of tools on the [IBM Support Portal](#) website.

You can also access the [IBM Support Portal](#) page and the online [Service requests and PMRs](#) tool for more support.

Planning information

Planning statements provide insight into IBM's current plans, directions, and intent, and are subject to change or withdrawal without notice. Any reliance on these planning statements is at the relying party's sole risk and will not create liability or obligation for IBM.

For additional planning information for IBM i 7.3, refer to the [IBM i Support: Upgrade planning](#) website.

Customer responsibilities

None

Installability

Not applicable

Packaging

This offering is delivered electronically. Alternatively, one can order physical media.

Security, auditability, and control

IBM i uses the security and auditability features of IBM i.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering information

No-charge features

Cryptographic Device Manager for i (5733-CY3)

SUPPLY FEATURES	Feature number
Cryptographic Device Manager for i	5829

IBM Software Temporary License for i (5733-ITL)

SUPPLY FEATURES	Feature number
Asset Registration features i 7.3	5073

OmniFind[®] Text Search Server for DB2 for i (5733-OMF)

SUPPLY FEATURES	Feature number
OmniFind Text Search Server for DB2 for i	5849

DB2 Web Query for i 2.2.0 (5733-WQX)

SUPPLY FEATURES	Feature number
Express	5879
Standard	5889
DataMigrator ETL Extension	5899

Backup Recovery and Media Services for i (5770-BR1)

SUPPLY FEATURES	Feature number
Language Group 1	5837
Language Group 2	5838
Language Group 3	5839
- Network Feature	
Language Group 1	5957
Language Group 2	5958
Language Group 3	5959
- Advanced Feature	
Language Group 1	5977
Language Group 2	5978
Language Group 3	5979

Managed System Services for i (5770-MG1)

SUPPLY FEATURES	Feature number
Managed System Services for i	5829

IBM National Languages for i (5770-NLV)

IBM National Languages for i Feature
(5770-NLV) number

SUPPLY FEATURES

i 7.3 Lang Grp 1 Supply	5837
i 7.3 Lang Grp 2 Supply	5838
i 7.3 Lang Grp 3 Supply	5839
i 7.3 Licensed Machine Code	5873

Estonian Secondary Language	5702
Lithuanian Secondary Language	5703
Latvian Secondary Language	5704
Vietnamese Secondary Language	5705
Lao Secondary Language	5706
Belgian English Secondary	5709
Slovenian Secondary Language	5711
Croatian Secondary Language	5712
Macedonian Secondary Language	5713
Serbian Secondary Language	5714
Portuguese Secondary Language	5722
Dutch Secondary Language	5723
English U/L SBCS Secondary	5724
Finnish Secondary Language	5725
Danish Secondary Language	5726
French Secondary Language	5728
German Secondary Language	5729
Japanese Universal Secondary	5730
Spanish Secondary Language	5731
Italian Secondary Language	5732
Norwegian Secondary Language	5733
Swedish Secondary Language	5737
English U/C DBCS Secondary	5738
German MNCS Secondary Language	5739
French MNCS Secondary Language	5740
Italian MNCS Secondary Language	5742
Arabic Secondary Language	5754
Turkish Secondary Language	5756
Greek Secondary Language	5757
Icelandic Secondary Language	5758
Hebrew Secondary Language	5761
Japanese DBCS Secondary	5762
Belgian Dutch Secondary Lang	5763
Belgian French Secondary Lang	5766
Thai DBCS Secondary Language	5772
Bulgarian Secondary Language	5774
Czech Secondary Language	5775
Hungarian Secondary Language	5776
Polish Secondary Language	5778
Russian Secondary Language	5779
Braz Portuguese Secondary Lang	5780
Canadian French Secondary Lang	5781
English U/L DBCS Secondary	5784
Korean DBCS Secondary Language	5786
Trad Chinese DBCS Secondary	5787
Simp Chinese DBCS Secondary	5789
Romanian Secondary Language	5792
Slovakian Secondary Language	5794
Albanian Secondary Language	5795
Portuguese MNCS Secondary	5796
Farsi Secondary Language	5798

Performance Tools for i (5770-PT1)

SUPPLY FEATURES	Feature number
Language Group 1	5837
Language Group 2	5838
Language Group 3	5839

- Manager Feature
 - Language Group 1 5957
 - Language Group 2 5958
 - Language Group 3 5959
- Agent Feature
 - Language Group 1 5977
 - Language Group 2 5978
 - Language Group 3 5979
- Job Watcher Feature
 - Language Group 1 5989
 - Language Group 2 5990
 - Language Group 3 5991

Query for i (5770-QU1)

SUPPLY FEATURES	Feature number
Language Group 1	5837
Language Group 2	5838
Language Group 3	5839

System Manager for i (5770-SM1)

SUPPLY FEATURES	Feature number
System Manager for i	5829

IBM i (5770-SS1)

IBM i 7.3 (5770-SS1)

SUPPLY FEATURES	Feature number
i 7.3 Machine Code	5873
i 7.3 Lang Grp 1 Supply	5837
i 7.3 Lang Grp 2 Supply	5838
i 7.3 Lang Grp 3 Supply	5839

Media and Storage Extensions
(5770-SS1 - Option 18)

SUPPLY FEATURES	Feature number
i 7.3 M&S Extensions Supply	5931

PSF for IBM i 1-55 IPM Printer
Support (5770-SS1 - Option 36)

SUPPLY FEATURES	Feature number
i 7.3 PSF/400 1-55 IPM Supply	5936

PSF for IBM i 1-100 IPM Prtr
Supp (5770-SS1 - Option 37)

SUPPLY FEATURES	Feature number
i 7.3 PSF 1-100 IPM Prtr Supp	5937

PSF for IBM i AnySpeed Printer
Support (5770-SS1 - Option 38)

Feature

SUPPLY FEATURES	number
i 7.3 PSF Any Speed Supply	5948
HA Switchable Resources (5770-SS1 - Option 41)	
SUPPLY FEATURES	Feature number
i 7.3 HA Switch Res Supply	5949
HA Journal Performance (5770-SS1 - Option 42)	
SUPPLY FEATURES	Feature number
i 7.3 HA Journal Perf Supply	5950
OptiConnect (5770-SS1 - Option 23)	
SUPPLY FEATURES	Feature number
i 7.3 OptiConnect Supply	5932
DB2 Symmetric Multiprocessing (5770-SS1 - Option 26)	
SUPPLY FEATURES	Feature number
i 7.3 DB2 Symm Multi Supply	5933
DB2 Multisystem (5770-SS1 - Option 27)	
SUPPLY FEATURES	Feature number
i 7.3 DB2 Multisystem Supply	5944

DB2 Query Mgr and SQL Dev Kit for i (5770-ST1)

SUPPLY FEATURES	Feature number
Language Group 1	5837
Language Group 2	5838
Language Group 3	5839

Rational Development Studio (5770-WDS)

SUPPLY FEATURES	Feature number
Language Group 1	5837
Language Group 2	5838
Language Group 3	5839
- ILE Compilers	
Language Group 1	5957
Language Group 2	5958
Language Group 3	5959
- Heritage Compilers	
Language Group 1	5977
Language Group 2	5978
Language Group 3	5979

- Application Development ToolSet
- Language Group 1 5989
- Language Group 2 5990
- Language Group 3 5991

IBM i Access Family (5770-XW1)

SUPPLY FEATURES	Feature number
- Processor Based	
Language Group 1	5837
Language Group 2	5838
Language Group 3	5839
- User Based	
Language Group 1	5737
Language Group 2	5738
Language Group 3	5739

This software license includes Software Maintenance, previously referred to as Software Subscription and Technical Support.

Extending coverage for a total of three years from the date of acquisition may be elected. Order the program number, feature number, and quantity to extend coverage for your software licenses. If maintenance has expired, specify the after license feature number.

Charge metric

Program name	Part number or PID number	Charge metric
IBM i	5770-SS1	Per Processor and Per Server
Additional IBM i Processors	5770-SSA	Per Processor
IBM i Application Server	5770-SSB	Per Processor
IBM i Users	5770-SSC	Per User

Concurrent User

Concurrent User is a unit of measure by which the program can be licensed. A *Concurrent User* is a person who is accessing the program at any particular point in time. Regardless of whether the person is simultaneously accessing the program multiple times, the person counts only as a single Concurrent User. The program may be installed on any number of computers or servers, but licensee must obtain entitlements for the maximum number of Concurrent Users simultaneously accessing the program. Licensee must obtain an entitlement for each simultaneous Concurrent User accessing the program in any manner directly or indirectly (for example, through a multiplexing program, device, or application server) through any means.

Note: Some programs may be licensed where devices are considered users. In that case, the following applies. Any computing device that requests the execution of or receives for execution a set of commands, procedures, or applications from the program or that is otherwise managed by the program is considered a separate user of the program and requires an entitlement as if that device were a person.

Processor Value Unit (PVU)

PVU is a unit of measure by which the program can be licensed. The number of PVU entitlements required is based on the processor technology (defined within the PVU table by processor value, brand, type, and model number at the website below) and the number of processors made available to the program. IBM continues to define a processor, for the purpose of PVU-based licensing, to be

each processor core on a chip (socket). A dual-core processor chip, for example, has two processor cores. The PVU table can be found on the [PVU licensing for Distributed Software](#) page. Licensee can deploy the program using either full capacity licensing or virtualization capacity (sub-capacity) licensing according to the Passport Advantage[®] Sub-Capacity Licensing Terms found on the [Virtualization Capacity License Counting Rules](#) page. If using full capacity licensing, licensee must obtain PVU entitlements sufficient to cover all activated processor cores² in the physical hardware environment made available to or managed by the program, except for those servers from which the program has been permanently removed. If using virtualization capacity licensing, licensee must obtain entitlements sufficient to cover all activated processor cores made available to or managed by the program, as defined according to the Virtualization Capacity License Counting Rules that can be found on the [Virtualization Capacity License Counting Rules](#) page.

² An activated processor core is a processor core that is available for use in a physical or virtual server, regardless of whether the capacity of the processor core can be or is limited through virtualization technologies, operating system commands, BIOS settings, or similar restrictions.

Notes:

- Some programs may require licenses for the program and what is being managed. In that case, the following applies. In addition to the entitlements required for the program directly, licensee must obtain PVU entitlements for this program sufficient to cover the processor cores managed by the program.
- Some programs may be licensed on a managed basis only. In that case, the following applies. Instead of the entitlements required for the program directly, licensee must obtain PVU entitlements for this program sufficient to cover the processor cores managed by the program.
- A few programs on an exception basis may be licensed on a referenced basis. In that case, the following applies. Rather than obtaining entitlements for the activated processor cores available to the program, licensee must obtain PVU entitlements for this program sufficient to cover the environment made available to the referenced program as if the program itself were executing everywhere the referenced program was executing, independent of the basis on which the referenced program is licensed.

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License Information number

Z125-3301

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Limited warranty applies

Yes

Limited warranty

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Volume orders (IVO)

Yes. Contact your IBM representative.

Passport Advantage applies

No

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For more information about the Passport Advantage Agreement, visit the <http://www.ibm.com/software/passportadvantage> website .

System i Software Maintenance applies

Yes

Variable charges apply

No

Educational allowance available

15% to qualified educational institution customers.

Statement of good security practices

IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, or misappropriated or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a lawful, comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective.

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Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM. The Electronic Service Agent tool is designed to securely transmit either through the Internet (HTTPS or VPN) or modem to provide organizations a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into an organization's system.

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More accurate reporting: Because system information and error logs are automatically uploaded to the IBM Support Center in conjunction with the service request, you are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

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AP distribution

Country/Region	Announced
AP IOT	
ASEAN *	Yes
India/South Asia **	Yes
Australia	Yes
Hong Kong	Yes
Macao SAR of the PRC	Yes
Mongolia	Yes
New Zealand	Yes
People's Republic of China	Yes
South Korea	Yes
Taiwan	Yes
Japan IOT	
Japan	Yes

* Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Timor-Leste Vietnam

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Corrections

(Corrected on April 15, 2016)

The Key prerequisites section was revised.