



IBM i 7.2 TR3 and IBM i 7.1 TR11 offer performance, usability, and integration enhancements

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At a glance

IBM[®] i 7.2 Technology Refresh 3 (IBM i 7.2 TR3) and IBM i 7.1 Technology Refresh 11 (IBM i 7.1 TR11) deliver new features and capabilities for small, midsized, and large companies:

DB2[®] for i

IBM DB2 for i adds new and enhanced SQL capabilities to enable database application developers and software providers to solve business requirements in an increasingly efficient and productive manner.

IBM i

- Integrated Web Services (IWS) server adds new features and capabilities to meet the needs of the REST- and SOAP- based services for IBM i.
- New IBM i Services deliver SQL alternatives for accessing key IBM i information for mission-critical application development and systems management scenarios.

IBM i program products

- IBM i Access Client Solutions (5733-XJ1) has been enhanced to include the SQL Performance Center and Run SQL Scripts interface, which significantly improves the tools available to the IBM i DB2 engineer.
- Open Source for IBM i (5733-OPS) now includes the industry-standard GCC compiler as well as the tools needed when working in the open source world. These additional features include Git, .zip, .tar, bash, Python 2.7, and many others.

For more information, visit

<http://www-01.ibm.com/support/docview.wss?uid=nas8N1020583>

or

<http://www-01.ibm.com/support/docview.wss?uid=nas8N1020591>

Note: The software is provided "as is," without warranty of any kind, express or implied.

- IBM HTTP Server Power[®] by Apache (5770-DG1) has been updated to Apache level 2.4.12, which includes new features such as support for WebSockets. The Web Admin GUI has been enhanced to include a wizard for configuring SSL for Liberty-based server such as the IBM i Integrated Application Server.
- BRMS modernizes storage tiering support (5770-BR1) (IBM i 7.2 only).

- Zend Server for IBM i (5639-ZC1) has been updated with Zend Server 8.5, which includes the latest PHP engine and many additional features.

Other Power offerings

- PowerVM^(R) supports SR-IOV-optimized, dedicated vNIC, Large Send Offload on Virtual Ethernet, and improvements to HMC and LPM.
- A new release of PowerVC continues to provide better capability and scalability to manage virtualized environments with IBM i.
- DS8870 IASP-based HyperSwap^(R) support is available in IBM PowerHA^(R) SystemMirror^(R) for i through a Technology Preview (IBM i 7.2 only).

Software updates

- Rational^(R) Development Studio (5770-WDS): The restriction that requires free-form RPG to be coded between columns 8 and 80 has been removed. Now, RPG programmers writing free-form code can use the entire source line with no restrictions.
- Rational Developer for i V9.5: The industry-leading development tooling continues to be enhanced and now supports the latest RPG updates including the column restriction removal.
- IBM WebSphere^(R) MQ V7.0.1 as of September 15, 2015, is out of service for IBM i (all releases).
- IBM WebSphere MQ V7.1 and V8.0 have been updated to no longer allow the configuration of SSL cypher keys that have been determined to be weak.

Hardware enhancements

- IBM i supports S822.
- PurePower supports IBM i.
- Support is added for IBM i virtualization configurations with little endian LinuxTM client partitions.
- Automatic fail-over is supported for SAN Multipath Tape configurations (IBM i 7.2 only).
- DUPOPT can now duplicate to different physical media (IBM i 7.2 only).
- Support is added for LTO7 tape offerings.
- New concurrent maintenance functions are supported on systems with POWER8^(R) technology and PCIe I/O drawers.
- RAID Array Start Time has been reduced (IBM i 7.2 only).
- IBM i supports SVC HyperSwap volumes (IBM i 7.2 only).

Overview

DB2 for i

DB2 for i enhancements

With IBM i 7.1 TR11 and IBM i 7.2 TR3, DB2 for i continues to focus on new and advanced SQL capabilities, SQL Query Engine (SQE) performance, and the ability to use SQL to access IBM i operating system detail. Further, IBM DB2 for i continues to improve the IBM Security Guardium^(R) capability on IBM i to meet the ever-growing needs of security and database governance. By moving up to the suggested DB2 PTF Group, you will have a database that enables significant new capabilities for a wide range of users.

IBM i

Application development for IBM i

Integrated Web Services (IWS) Server

IWS Server adds new features and capabilities to meet the needs of the REST- and SOAP- based services for IBM i.

IBM i SQL Services

New IBM i Services provide SQL alternatives for accessing key IBM i information for mission-critical application development and system management scenarios.

IBM i program products

IBM i Access Client Solutions (5733-XJ1)

The IBM i Access Client Solutions product is enhanced to deliver new tools for the database engineer. These tools offer better insight into how DB2 and SQL are working on IBM i. Tools include the new SQL Performance Center and the popular Run SQL Scripts interface.

Open Source for IBM i (5733-OPS)

Open Source for IBM i now includes the industry-standard GCC compiler as well as the tools needed when working in the open source world. These additional features include Git, .zip, .tar, bash, Python 2.7, and many others.

IBM HTTP Server Power by Apache (5770-DG1)

The IBM HTTP Server Power by Apache is updated to Apache level 2.4.12, which includes many new features such as support for WebSockets. The Web Admin GUI has been enhanced to include a wizard for configuring SSL for Liberty-based server such as the IBM i Integrated Application Server.

Backup, Recovery, and Media Services (5770-BR1) (IBM i 7.2 only)

Backup, Recovery, and Media Services (BRMS) modernizes its storage tiering support to now include IFS, IASP, and tiering within an ASP. The migration was originally required to be between ASPs, but now policies can be set up to enable migration of database files between faster and slower disks in the same ASP. Unlike typical Easy Tier[®] functions that move small pieces of data to and from faster storage based on patterns of usage, the BRMS storage tiering function operates at a file or library level to help optimize the value of using SSDs. A system administrator can choose to keep on SSD a file or library that may currently have a lot of low latency pieces of data, because of knowledge that the whole file or library will be needed in the future. This aspect can be useful for month-end or quarter-end processing. The BRMS migration function integrates well with existing BRMS policies that allow low-use files and libraries on slower disk to eventually be automatically archived to tape.

PowerHA SystemMirror for i (5770-HAS) (IBM i 7.2 only)

DS8870 HyperSwap provides near-zero downtime for storage server planned and unplanned outages. In conjunction with PowerHA SystemMirror IASP-based replication, downtime from any planned or unplanned outage can be reduced. A technology preview of this support is available.

Zend Server for IBM i

The Zend Server for IBM i (5639-ZC1) has been updated with Zend Server 8.5, which includes the latest PHP engine and many additional features.

Other Power offerings

PowerVM

PowerVM supports SR-IOV-optimized, dedicated vNIC, Large Send Offload on Virtual Ethernet, and improvements to HMC and LPM.

PowerVC for i enhancements

A new release of PowerVC continues to provide better capability and scalability to manage virtualized environments with IBM i.

Software updates

Rational Development Studio (5770-WDS)

The RPG language continues to be updated as a modern business language. The restriction that requires free-form RPG to be coded between columns 8 and 80 has been removed. Now, RPG programmers writing free-form code can use the entire source line with no restrictions.

Rational Developer for i V9.5

The industry-leading development tooling continues to be enhanced and now supports the latest RPG updates including the column restriction removal and much more.

IBM WebSphere MQ

WebSphere MQ V7.0.1 as of September 15 2015, is out of service for IBM i (all releases).

WebSphere MQ V7.1 and V8.0 have been updated to no longer allow the configuration of SSL cypher keys that have been determined to be weak.

Hardware enhancements

DUOPT of IPL-capable media enhancement (IBM i 7.2 only)

Support is added to duplicate IPL-capable optical media to optical media with different physical characteristics. System administrators and ISVs will find this convenient for duplicating an existing IPL-capable DVD or distributed media image to RDX or Flash media.

SAN Multipath support for devices (IBM i 7.2 only)

Support of SAN tape multipath devices has been extended to now cover automatic fail-over to an active path when a tape operation fails. This will reduce the chances of tape backups failing to complete within the backup window due to a SAN path failure.

IBM i virtualization

Support for IBM i virtualization configurations with little endian Linux enables better integration of Linux workloads with IBM i workloads.

Power Systems™ with POWER8 technology

IBM i continues to provide superior economics and performance on Power Systems with POWER8 technology. IBM i now supports the PurePower System Solution and the IBM Power System S822 server. The Power S822 software tier is P10. For existing POWER8 customers, the addition of concurrent maintenance functions will make it easier to add additional I/O and handle repair actions.

Support for LTO-7 tape

Support for LTO-7 tape technology continues to give you leading-edge tape performance and functionality.

SAS disk enhancement (IBM i 7.2 only)

Those who set up new IBM i partitions with local SAS disk will benefit from support that has been added to the newer SAS Input Output Adapters (IOAs) and IBM i. This support can significantly reduce the time for starting a RAID array for particular configurations.

Key prerequisites

IBM i 7.2 TR3 and IBM i 7.1 TR11 are supported on IBM Power Systems servers with POWER8 processors; IBM Power Systems servers and blades and IBM Flex systems with POWER7^(R) or POWER7+TM processors; IBM Power Systems servers and blades with IBM POWER6^(R) or POWER6+TM processors; and IBM System i^(R) servers with POWER6 processors. IBM i 7.1 TR11 also supports the older IBM System i servers with POWER5 or POWER5+ processors.

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

Planned availability date

November 20, 2015

Description

DB2 for i

DB2 for i enhancements

DB2 for i and SQE are improved to facilitate enhanced query performance.

Database application developers can construct advanced SQL solutions using the following enhancements:

- The SQL Integrated Language Environment^(R) (ILE) RPG precompiler is enhanced to remain in sync with ILE RPG language enhancements.
- New SQL language support enables better database application solutions for mobile and social computing.
- New built-in functions allow for improved ability to achieve data-centric solutions. SQL Global variables can be used in new ways, extending the flexibility and usefulness of SQL views.

These and other enhancements are described in developerWorks^(R). Refer to the developerWorks website later in this section.

Security and compliance officers can use the following enhancements from IBM Guardium software products to enable effective database and operating system security governance:

- The Guardium Vulnerability Assessment (VA) product now works with IBM i. VA with IBM i includes scans of database infrastructures to detect vulnerabilities and suggestions for remedial actions. VA identifies exposures such as missing security and HIPER PTFs, weak passwords, unauthorized changes, misconfigured privileges, and other vulnerabilities.

- The Guardium Database Activity Monitor (DAM) product is enhanced to improve the ability, reliability, and availability of activity monitoring of DB2 for i users. Audit server filtering is enhanced to allow equal and not-equal operators to be used; multiple policy support makes it possible to capture complete activity details without excess auditing noise

IBM i SQL Services

In the tradition of recent technology refreshes, new IBM i Services deliver useful SQL-based alternatives to IBM i commands and APIs:

- Work with Object Locks (WRKOBJLCK) detail enables application developers and system administrators to capture, understand, and resolve sporadic timing issues.
- Work with System Status (WRKSYSSTS) detail provides critical systems management insight.
- Work with Output Queues (WRKOUTQ) detail enables improved systems management solutions.
- Work with TCP/IP Network Status (NETSTAT) provides the critical information about the system network health.
- Work with System Activity (WRKSYSACT) details provide critical system activity insight.
- Work with License Information (WRKLICINF) provide key details on licensing information on the system.
- Work with Media Library Status (WRKMLBSTS) provides details on the media library status on the system.

For these and other IBM i services that are described in developerWorks, visit

<http://ibm.biz/DB2foriServices>

These and other enhancements are delivered with the DB2 PTF Group SF99701 and SF99702. Visit the IBM i Technology Updates wiki on developerWorks to learn more about these and other DB2 for IBM i enhancements.

<http://www.ibm.com/developerworks/ibmi/techupdates/db2>

To see the DB2 for IBM i PTF Group details, visit

<http://www.ibm.com/developerworks/ibmi/techupdates/db2/groupptf>

IBM i

Application development for IBM i

IBM i Integrated Web Services Server

IBM i users can deploy ILE programs and services programs as web services based on the SOAP protocol using the Integrated Web Services (IWS) server support that is part of the operating system. Users can deploy ILE programs and service programs as RESTful web services. The IWS support has been updated to include many new enhancements that eliminate some of the nuances and limitations when deploying an ILE program object as a web service to an IWS server.

Updates include the following:

- Support for nested output arrays
- Improved processing of very large output character fields
- Preserving case sensitivity of identifiers
- Preserving field ordering
- Enabling of RESTful services to return user-defined media types
- New transport metadata values

- Installation of web service script updated for SOAP services
- Enabling Java-based web services

To get the updates, you will need to load the latest HTTP Group PTF.

Details can be found on the Integrated Web Services Product page

<http://www-03.ibm.com/systems/power/software/i/iws/>

New API Retrieve Space User Data

A new API called Retrieve Space User Data (QbnRetrieveSpaceUserData) enhances the usability of the compiler preprocessor APIs. The preprocessor APIs provide a method to store *USERDATA with module, program, and service program objects at compile time. Previously, *USERDATA could only be retrieved from program and service program objects active on the call stack. The new API provides a means to retrieve *USERDATA from objects that are not active in the call stack. ISV tool developers will find this new API useful to access information that can be stored with an object using the existing QbnAddAssociatedSpaceData API. Combining the new API with the existing compiler preprocessor APIs makes it possible to store data with and retrieve data from the object, rather than keeping the data in a separate location. This can be important to satisfy auditing requirements. This API is already available via PTFs for both IBM i 7.2 and IBM i 7.1.

IBM i debugger enhancements

IBM i debugger is enhanced to better support SQL programming and debugging. Also, RPG free format is fully supported, including the removal of the 8 to 80 column restrictions.

IBM i program products

IBM i Access Client Solutions (5733-XJ1)

IBM i Access Client Solutions, the new strategic interface for accessing and managing your IBM i from virtually any end-user device, now includes the SQL Performance Center and Run SQL Scripts interface. These tools offer the database and system administrator the tools they need to quickly review and understand how to ensure DB2 on i is working optimally. This is the first delivery of many new features to come. This new support will be delivered as a service pack update for the Access Client Solutions product. It can easily be downloaded from the FTP website

<ftp://public.dhe.ibm.com/as400/products/clientaccess/solutions/updates/>

You no longer are required to obtain these updates from the ESS website.

Details can be found on the Access Client Solution product page

<http://www-03.ibm.com/systems/power/software/i/access/solutions.html>

or

<http://www.ibm.com/developerworks/ibmi/techupdates/db2>

Open Source for IBM i (5733-OPS)

Open Source for IBM i continues making IBM i fully available to the open source community. Option 3 now offers utilities to enable the download and installation of readily available open source packages from the Internet. These packages include a wide array of useful tools and languages like perl, Python 2.x, git, and the GCC compiler. The GCC compiler is often the standard in the open source ecosystem. These utilities can be run on IBM i in QSH or from a PC. For details visit the IBM i open source developerWorks site

<http://www.ibm.com/developerworks/ibmi/techupdates/opensource>.

For technotes, visit

<http://www-01.ibm.com/support/docview.wss?uid=nas8N1020583>

or

<http://www-01.ibm.com/support/docview.wss?uid=nas8N1020591>

IBM HTTP Server Power by Apache (5770-DG1)

IBM HTTP Server Power by Apache has been updated to the latest levels of support by the Apache Foundation 2.4.12. This ensures that IBM remain compliant. Important updates include the following:

- PCRE regular expression is supported in directives.
- A new module `mod_proxy_wstunnel` enables support for the tunneling of web socket connections to a backend web sockets server.
- A new module `mod_proxy_html` enables an output filter to rewrite HTML links in a proxy situation to ensure the links work for users outside the proxy.
- A new module `mod_macro` enables specify macro in HTTP configurations.
- SNI implementation is optimized.
- Updates in serviceability include adding CGI job information and thread id in log.

The Web Admin GUI shipped with the DG1 product for creating and managing all aspects of your web-based servers delivers a new wizard to enable you to simply update Liberty-based server with SSL. This includes both a user-installed Liberty server and the Integrated Application Server support.

Details can be found on the HTTP Server product web page

<http://www-03.ibm.com/systems/power/software/i/http/>

Backup, Recovery, and Media Services (5770-BR1) (IBM i 7.2 only)

The modernization of storage tiering is implemented as an enhancement to the existing BRMS migration function, which allows libraries to be moved among the user Auxiliary Storage Pools (ASPs) based on policies for frequency of use. By extending the migration function to support Independent ASPs (IASPs) and *LNK lists, and also allowing individual database files to be migrated within an ASP, the system administrator now has increased control to ensure the most frequently accessed files have priority placement on a faster tier of storage. For example, a migration policy can be set up so that once a file has not been viewed for a period of time (for example: a week or a month), it can be automatically migrated to slower storage, and after a period of time (perhaps a couple months) of being dormant, it can automatically be archived out to tape. With dynamic retrieval from archive storage, when the file is needed again, it can be automatically brought back in to disk storage.

Similar to the IBM Storage Easy Tier function, the BRMS storage tiering function within an ASP responds to the presence of Flash or SSD drives in a storage pool that also contains hard disk drives (HDDs). Those drives can be either internal or external disk drives. Unlike IBM Storage implementations of Easy Tier, which move small pieces of data to and from faster storage based on patterns of usage, the BRMS migration function operates at a file or library level to automatically migrate frequently accessed database files in their entirety from HDDs to Flash or SSDs, thus placing such files in a faster tier of storage, and vice versa. A system administrator can choose to move a file or library to SSD even if it does not qualify for fast storage, because of the knowledge that the whole file or library will be needed in the future. This aspect can be useful for month-end or quarter-end processing by moving the necessary files that are only periodically having frequent accesses into faster storage. In this dynamically tiered environment, the file movement is seamless to the application, regardless of the storage tier in which the file resides.

This modernization of BRMS storage tiering is provided with IBM i 7.2 in the December 2015 BRMS PTF Group, scheduled for availability on or before December 15, 2015.

For more information about this and other BRMS enhancements, visit

<https://www.ibm.com/developerworks/community/wikis/home?lang=en#/wiki/IBM%20Backup%2C%20Recovery%20and%20Media%20Services%20%28BRMS%29%20for%20i/page/Enhancements>

Technology preview for IBM PowerHA SystemMirror for i support of DS8870 HyperSwap with IASPs (IBM i 7.2 only)

A technology preview of the new IBM PowerHA SystemMirror for i function, DS8870 HyperSwap support with IASPs is available. Full system HyperSwap was made available in the Express[®] Edition of PowerHA in IBM i 7.2. Now HyperSwap can be combined with IASP replication to minimize downtime for all planned and unplanned outages. Storage server planned and unplanned outages will utilize the HyperSwap technology for a near-zero recovery point objective. Other planned and unplanned outages can use the other technologies available within PowerHA for a minimized downtime.

For more information about PowerHA technology updates and to learn how to participate in the Technology Preview, visit

<http://www.ibm.com/developerworks/ibmi/ha/techupdates>

Zend Server for IBM i

The PHP server distribution media has been updated to the 8.5 version of the Zend Server for IBM i. This updated version of PHP contains many enhancements and improvements over previous versions. For the latest details on Zend and PHP for IBM i visit

<http://www.zend.com/en/solutions/modernize-ibm-i>

Other Power offerings

PowerVM

PowerVM supports SR-IOV-optimized, dedicated vNIC, Large Send Offload on Virtual Ethernet, and improvements to HMC and LPM.

PowerVC for i enhancements

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

<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/IBM%20Power%20Virtualization%20Center%20%28PowerVC%29%20for%20IBM%20i>

Software updates

Rational Development Studio

A significant update has been made to the RPG IV language delivered in 5770-WDS. In the continuing effort to ensure RPG as a modern business language, the restriction that requires free-form RPG to be coded between columns 8 and 80 has been removed. Now, RPG programmers writing free-form code can use the entire source line with no restrictions from column 1 to the end of the line with no regard to any columns when **FREE is specified at the beginning of the first line in the source. Developers trained in other languages will more easily pick up the RPG language for writing modern applications.

This new enhancement will be delivered through PTFs that can be applied to RPG IV V7.1 or V7.2. Full documentation for the enhancement can be found starting from the What's New section of the ILE RPG Reference in the 7.2 Knowledge Center. The 7.1 Knowledge Center will not be updated. This new enhancement will also be documented in the RPG Cafe in developerWorks at

https://www.ibm.com/developerworks/mydeveloperworks/wikis/communitywiki?communityuid=b_542d3ac-0785-4b6f-8e53-f72051460822

Rational Developer for i V9.5

The industry-leading development tooling continues to be enhanced to improve developer productivity and now supports the latest RPG updates.

Updates include:

- Addition of a built-in 5250 emulator
- Removal of the 80-column restriction in the RPG code editor to enable fully free-form RPG
- Addition of snippet support in the Push-to-Client feature
- Enhanced ability to rearrange Remote System Explorer (RSE) filters
- Improvements to free-form RPG formatting (indentation support) in the RPG code editor
- Improved RPG Content Assist
- General improvements to code coverage analysis capabilities, including significantly improved performance; (approximately 20x speed improvement is observable for most programs, but not formally benchmarked)

Rational Developer for i V9.5 + Java™ Edition includes many updates for the Java developer on IBM i. This package offers all the above mentioned updates as well as many Java-centric features including:

- Tools and toleration for Java 8 (example of "tools": editor recognizes syntax for Lambda expressions; example of "toleration": Java profiling will not "choke" on code that uses Lambda expressions)
- Supports and includes the latest WebSphere Application Server Liberty Profile (with support for Java EE 7 Full and Web profile). Full traditional WebSphere Application Server test environments also continue to be supported at version levels 7.0, 8.0, and 8.5.5. Test Environment installable images are included for 8.0 and 8.5.5.
- New and enhanced Liberty Profile tools, such as:
 - Improved Liberty Profile repository integration through proxy
 - Remote debug session support
 - Automatic detection and resolution of feature conflicts
 - Use of on premise Liberty Profile repository
 - Ability to use new configuration drop-ins to customize or override an existing server configuration
- Tools for Java EE 7, such as:
 - Ability to publish Java EE7 enterprise archives (EARs) to WebSphere Application Server Liberty profile server (V8.5.5.6 or later)
 - Support for EJB Lite/Full (with validation) and stand-alone EJB modules (for example, in a JAR)
 - Java Batch tools supporting JSR 352
 - Bean Validation 1.1 tools supporting JSR 349
 - Java API for WebSocket 1.1 tools supporting JSR 356
 - A new deployment descriptor editor for Java EE security permissions
 - CDI tools enhancements that support CDI 1.2 (JSR 346) and JPA 2.1 (EclipseLink)

- New support for JSF 2.2 including ability to create JSF 2.2 portlet projects for Liberty profile. This enables use of Rational Application Developer for WebSphere Software to use new JSF features, such as Faces Flow and Resource Library Contracts, as well as the ability to enable interactivity between HTML5 and JSF. It takes advantage of the new features in HTML5 while maintaining the features and characteristics of a mature and robust web framework.
- A Java EE Specification Upgrade wizard for migrating projects and the modules they contain from older versions to Java EE6 and Java EE7.
- Support for portlets on Liberty profile.
- A new integration with the open source Jasmine framework for JavaScript™ unit testing.
- Currency: updated with latest version of Cordova; support for the latest version of the Liberty profile.

IBM WebSphere MQ

- V7.0.1 as of September 15 2015, is out of service for IBM i (all releases)
- WebSphere MQ V7.1 and 8.0 have been updated to no longer allow the configuration of SSL cypher keys that have been determined to be weak. Changes have been made to the IBM MQ queue manager to disallow the configuration of CipherSpecs that use cryptographic algorithms or protocols that are now considered to be weak:

SSL v3

All CipherSpecs are disabled by default

TLS 1.0

```
LS_RSA_EXPORT_WITH_RC2_40_MD5
TLS_RSA_EXPORT_WITH_RC4_40_MD5
TLS_RSA_WITH_DES_CBC_SHA
TLS_RSA_WITH_NULL_MD5
TLS_RSA_WITH_NULL_SHA
TLS_RSA_WITH_RC4_128_MD5
```

TLS 1.2

```
CDHE_ECDSA_NULL_SHA256
ECDHE_ECDSA_RC4_128_SHA256
ECDHE_RSA_NULL_SHA256
ECDHE_RSA_RC4_128_SHA256
TLS_RSA_WITH_NULL_NULL
TLS_RSA_WITH_NULL_SHA256
TLS_RSA_WITH_RC4_128_SHA256
```

These CipherSpecs are by default not allowed to be specified in a channel definition returning MQRCCF_SSL_CIPHER_SPEC_ERROR in PCF and displaying message AMQ8242: SSLCIPH definition wrong. Channels attempting to start with a deprecated CipherSpec are not allowed to start, returning MQCC_FAILED (2) and a Reason of MQRC_SSL_INITIALIZATION_ERROR (2393) to the client. You can re-enable one or more of the deprecated CipherSpecs for defining channels at runtime on the server by setting an environment variable AMQ_SSL_WEAK_CIPHER_ENABLE. The environment variable accepts a single CipherSpec name, or a comma-separated list of MQ CipherSpec names to re-enable, or alternatively, a special value of ALL, representing all CipherSpecs.

The new set of default CipherSpecs now allow only the following 17 values:

TLS 1.0

```
LS_RSA_WITH_AES_128_CBC_SHA (AES_SHA_US on IBM i)
TLS_RSA_WITH_AES_256_CBC_SHA
TLS_RSA_WITH_3DES_EDE_CBC_SHA
```

TLS 1.2

CDHE_ECDSA_AES_128_CBC_SHA256
ECDHE_ECDSA_AES_256_CBC_SHA384
ECDHE_ECDSA_AES_128_GCM_SHA256
ECDHE_ECDSA_AES_256_GCM_SHA384
ECDHE_ECDSA_3DES_EDE_CBC_SHA256
ECDHE_RSA_AES_128_CBC_SHA256
ECDHE_RSA_AES_256_CBC_SHA384
ECDHE_RSA_AES_128_GCM_SHA256
ECDHE_RSA_AES_256_GCM_SHA384
ECDHE_RSA_3DES_EDE_CBC_SHA256
TLS_RSA_WITH_AES_128_CBC_SHA256
TLS_RSA_WITH_AES_256_CBC_SHA256
TLS_RSA_WITH_AES_128_GCM_SHA256
TLS_RSA_WITH_AES_256_GCM_SHA384

IBM i support for TLS 1.2 CipherSpecs

IBM MQ for IBM i now supports the following CipherSpecs:

TLS_ECDHE_ECDSA_WITH_NULL_SHA
TLS_ECDHE_ECDSA_WITH_RC4_128_SHA
TLS_ECDHE_ECDSA_WITH_3DES_EDE_CBC_SHA
TLS_ECDHE_RSA_WITH_NULL_SHA
TLS_ECDHE_RSA_WITH_RC4_128_SHA
TLS_ECDHE_RSA_WITH_3DES_EDE_CBC_SHA
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384

Hardware enhancements

DUPOPT of IPL capable media enhancement (IBM i 7.2 only)

Support has been added to IBM i 7.2 TR3 to duplicate IPL-capable optical media to optical media with different physical characteristics. Specifying a special value of *BOOT on the DUPOPT To volume identifier (TOVOL) parameter indicates that the boot area and all files from the source media are to be copied to the mounted target media, even if the physical characteristics of the target optical volume do not match the physical characteristics of the source optical volume. This enables duplicating an existing IPL-capable DVD or distributed media image to RDX or flash media. System administrators will find this useful when transitioning to the use of newer media types. ISVs will find this especially convenient for condensing a bootable install image onto a flash drive that can be carried in one's pocket. For more information visit

<http://www.ibm.com/developerworks/ibmi/techupdates/hw>

Automatic fail-over for tape multi-path (IBM i 7.2 only)

In IBM i 7.2 TR2, support was added to enable configuration of multiple paths to certain tape drives attached using Fibre Channel technology. With the new IBM i 7.2 TR3 PTF group, in most situations the system will be able to automatically move the active path when an operation fails, allowing the tape to complete the operation without user intervention. This enhancement increases the number of scenarios where unattended backups can complete in a timely manner, even after a path failure in a SAN configuration.

Support for IBM i virtualization configurations with little endian Linux client partition

Little endian Linux partitions can now be run on Power systems. To better fit Linux workloads with IBM i workloads, a little endian Linux partition can be configured as a client that uses an IBM i partition as an I/O server partition.

IBM Power hardware enhancements

IBM i 7.1 TR11 and IBM i 7.2 TR3 now support the PurePower System Solution and the IBM Power System S822 (8284-22A) server. IBM i support requires VIOS (no native I/O). The Power S822 software tier is P10.

Additional IBM i support for hardware-related enhancements includes:

- Support for LTO7 tape technology
- Systems with POWER8 technology and PCIe I/O drawer enhanced with concurrent maintenance options
- RAID Array Start Time Reduction (IBM i 7.2 only)
- VLAN tag support for network boot and install (IBM i 7.2 only)

IBM Storage (IBM i 7.2 only)

IBM i 7.2 TR3 now supports the HyperSwap function of the IBM SAN Volume Controller (SVC) and IBM Storwize^(R) line of products. The HyperSwap function enables highly available disk volumes accessible through two sites that are located miles apart.

More information

These and other hardware-related enhancements are delivered with the Technology Refresh PTF Group SF99717 or SF99707. For more information about these enhancements visit

<http://www.ibm.com/developerworks/ibmi/techupdates/hw>

Withdrawals

Move up to Power

Effective December 15, 2015, IBM will withdraw from marketing the Move up to Power Offering.

IBM Toolbox for Java V7.1 (5761-JV1)

Effective immediately, IBM will no longer provide fixes for the following IBM Toolbox for Java V7.1 options:

- Option 8 - IBM Technology for Java 5.0 32-bit
- Option 9 - IBM Technology for Java 5.0 64-bit
- Option 13 - IBM Technology for Java 1.4.2 64-bit

Clients can move to one of the following IBM Toolbox for Java options:

- Option 11 - IBM Technology for Java 6 32-bit
- Option 12 - IBM Technology for Java 6 64-bit
- Option 14 - IBM Technology for Java 7 32-bit
- Option 15 - IBM Technology for Java 7 64-bit
- Option 16 - IBM Technology for Java 8 32 bit

- Option 17 - IBM Technology for Java 8 64 bit

Refer to the Java on IBM i web site for the latest options available at

<http://www.ibm.com/developerworks/ibmi/techupdates/java>

Product positioning

IBM i 7.2 is the latest version of the IBM i operating environment. It runs on a Power Systems server 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 delivers a fully integrated and trusted combination of relational database, security, web services, networking, and storage management capabilities that are required to run business applications. 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 that is 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 less staff.

Virtualization and workload management are also built into the IBM i operating environment to enable businesses to consolidate and run multiple applications and components together on the same system, helping to drive up system usage 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 important advantage for IBM i is the underlying architecture of the operating system, which enables simplicity, stability, and security. These are not add-on features, but inherent aspects of the operating system. Here are a few examples:

Simplicity

The relational database in IBM i is an integrated component that is built on a set of integrated storage management 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 IBM i as one long stream of memory that encompasses the system memory and the storage on disks. This architecture makes it critical for the operating system to decide where to store any given piece of data, which removes the user from having to manage data placement. This method makes management of storage and the database objects contained in that storage significantly simpler.

Stability

IBM i 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, and months without unexpected restarting of the operating system.

Several architectural attributes of IBM i have contributed to the stability of the system over the years. First, applications compiled on IBM i are compiled to a set of intermediate code instructions defined as the Technology Independent Machine Interface (TIMI). This enables IBM 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 it allows the movement of software developed and compiled several years to even decades before to run on later generations of the IBM i operating system.

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, it only has a defined set of attributes that 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, and security enhanced by the object-based security associated with all objects. And users who all have a similar role on the system can be grouped for role-based security, again as part of the base architecture of the system.

While the IBM i operating system supports Java, PHP, web services, and other open source programming methods, the underlying architecture offers a level of integration, stability, simplicity, and security that makes it significantly different from comparable operating systems. These aspects deliver excellent business value to its users.

Reference information

For additional information on IBM i, refer to the following Hardware and Software Announcements.

For Power Hardware, PowerVM, and PowerVC:

Multiple enhancements for IBM Power Systems I/O and servers are introduced.

Hardware Announcement [AG15-0100](#), dated October 5, 2015

IBM PowerVM and IBM PowerVC enhancements

Software Announcement [AP15-0257](#), dated October 5, 2015

For Hardware Management Console:

IBM Power Systems Hardware Management Console (HMC) virtual appliance

Software Announcement [AP15-0381](#), dated October 5, 2015

IBM 7042-CR9 Rack-mount Hardware Management Console

Hardware Announcement [AG15-0140](#), dated October 5, 2015

For external storage:

IBM Spectrum Virtualize™ Software V7.5

Software Announcement [AP15-0167](#), dated May 11, 2015

For Power solutions:

Family of IBM Rational Integrated Development Environments V9.5 delivers significant new capabilities and adopts a new Eclipse level

Software Announcement [AP15-0371](#), dated September 1, 2015

AIX^(R) 6, IBM System Director for Power Systems and associated LPs withdrawn from marketing and service

Withdrawal Announcement [WP15-0141](#), dated September 29, 2015

IBM PurePower Enhancements

Hardware Announcement [AG15-0137](#), dated October 5, 2015

Program number

| Program number | VRM | Program name |
|----------------|-----|----------------|
| 5770-SS1 | 7.2 | IBM i 7.2 TR3 |
| 5770-SS1 | 7.1 | IBM i 7.1 TR11 |

Product identification number

| Program PID number | Maintenance 1 year PID number | Maintenance 3 year PID number |
|--------------------|-------------------------------|-------------------------------|
| 5770-SS1 | Not applicable | Not applicable |

Offering Information

Product information is available via the Offering Information website

<http://www.ibm.com/common/ssi>

Publications

No publications are shipped with these programs.

Technical information

Specified operating environment

Hardware requirements

A supported IBM Power or IBM Flex or IBM System i server or blade with POWER8, POWER7+, POWER7, POWER6+, or POWER6 processor is required to run IBM i 7.2 TR3.

A supported IBM Power or IBM Flex or IBM System i server or blade with POWER8, POWER7+, POWER7, POWER6+, POWER6, POWER5+, or POWER5 processor is required to run IBM i 7.1 TR11.

For up-to-date information on all types of code levels needed for support of a particular feature, refer to the IBM Prerequisite website at

https://www-912.ibm.com/e_dir/eServerPrereq.nsf

Software requirements

For specific software requirements, refer to the IBM i Technology Updates wiki on developerWorks at

<http://www.ibm.com/developerworks/ibmi/techupdates/>

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.

Companion products

The MSP Utility Pricing Offer is a program that leverages channel-led discounting for Managed Service providers who purchase a Cloud Hosting Infrastructure built with IBM hardware and software.

User Group requirements

A strong and passionate worldwide user community focuses on all aspects of IBM i running on Power servers. The community includes online groups and face-to-face community gatherings. The COMMON organization has branches around the world, including COMMON North America, iSUC in Japan, COMMON Europe, and Interaction in Australia/New Zealand.

IBM continues to recognize key community leaders through the IBM champion program. The 14 current IBM i Champions have been recognized for their work in the betterment of user groups, social media, and the Academic Initiative. To learn about the IBM Champions program, visit

https://www.ibm.com/developerworks/community/profiles/html/advancedSearch.do?profileTags=power_systems&profileType=champion&lang=en

Security, auditability, and control

These programs use the security and auditability features of the host hardware or software.

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

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License Information number

GC52-0885

The program's License Information will be available for review on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

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Limited warranty

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<http://www.ibm.com/support/handbook>

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Volume orders (IVO)

Yes. Contact your IBM representative.

Passport Advantage applies

No

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<http://www.ibm.com/support/handbook>

Software Subscription and Support does not include assistance for the design and development of applications, your use of programs in other than their specified operating environment, or failures caused by products for which IBM is not responsible under this agreement.

System i Software Maintenance applies

Yes

Variable charges apply

No

Educational allowance available

15% to qualified educational institution customers

Statement of good security practices

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AP distribution

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|----------------------------|-----------|
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| ASEAN * | Yes |
| India/South Asia ** | Yes |
| Australia | Yes |
| Hong Kong | Yes |
| Macao | Yes |
| New Zealand | Yes |
| People's Republic of China | Yes |
| South Korea | Yes |
| Taiwan | Yes |
| Japan IOT | |
| Japan | Yes |

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