IBM i Memo to Users
Version 7.2

*Memo to Users*

IBM

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# Contents

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# About IBM i Memo to Users

This information describes the changes in version 7, release 2, modification 0 (IBM® i 7.2) that could affect your programs or system operations. Use the information in this memorandum to prepare for changes on your current release and to use the new release.

## Who should read this memorandum

The IBM i 7.2 Memo to Users contains information that is critical for several audiences.

This memorandum has four sections:
- Read this first provides information to be considered before you install IBM i 7.2. This section is intended for system and application programmers and for the person responsible for system management.
- Operating system contains new release changes to basic operating system functions. This section includes changes to systems management functions, such as configuration and tailoring the system, and changes that could affect the way things operate or appear in the new release. This section is intended for all users of the IBM i computers.
- Options provides information about new release changes that affect specific program options of the operating system. This section is intended for all users of the IBM i computers.
- Licensed programs contains new release changes that might affect existing applications. These changes might also affect applications that are saved on an IBM i 7.2 system to be restored on a previous release server. This section is intended for application programmers and system programmers who use the IBM i computers and its licensed programs, as well as for businesses with complex networks or application development businesses that have systems at different releases.

## Additional incompatibility information

After the publication of the IBM i Memo to Users, updates to this document will be available in the English Internet version of the IBM Knowledge Center under IBM i 7.2 at this Web site:

http://www.ibm.com/support/knowledgecenter/ssw_ibm_i/welcome

Technical changes to the text are indicated by a vertical line to the left of the change. For other incompatibility information that was not available when this memorandum was published, see PTF cover letters, Preventive Service Planning - PSP, and Authorized Problem Analysis Reports (APAR) information at:

http://www.ibm.com/systems/support/i/databases/index.html

## Accessibility features for IBM i Memo to Users

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

The IBM i 7.2 Memo to Users is also available as a text file:
1. Go to Technical databases at:http://www.ibm.com/systems/support/i/databases/index.html.
2. Click **Preventive Service Planning - PSP** > **All Preventive Service Planning Documents by Release** > **720**.

# Installing IBM i 7.2 over IBM i 6.1

If you are installing IBM i 7.2 over IBM i 6.1, you should also read the *IBM i Memo to Users* for i 7.1. It contains incompatibility-related information about the new functions and enhancements incorporated in IBM i 7.1.

You can order this document by typing the following command: `SNDPTFORD SF98036`

The Memo to Users is also available in the PSP information:
1. Go to Technical databases at: http://www.ibm.com/systems/support/i/databases/index.html
2. Click **Preventative Service Planning -PSP** > **All Preventative Service Planning Documents by Release**.

# Discontinued support for certain software and hardware

It is important that, as a customer, you review and understand all new software release considerations.

This is especially true of discontinued support for selected software and hardware products or features. This information is contained within the IBM i announcement material. To get the most current information about discontinued products or features along with suggested replacements, go to the Planning>Migration and upgrades page at:

http://www.ibm.com/systems/support/i/planning/migrationupgrade.html

# PTF numbers in this memorandum

Program temporary fix (PTF) numbers in this memorandum might have been superseded.

# Memorandums for previous releases

How to access Memorandum to Users from previous releases.

In addition to ordering previous releases of the Memorandum to Users using the SNDPTFORD command, you can also view these documents at:

http://www.ibm.com/systems/support/i/databases/index.html

Click **Preventive Service Planning - PSP** > **All Preventive Service Planning Documents by Release**.

# Prerequisite and related information

Use the IBM Knowledge Center as your starting point for looking up IBM i technical information.

http://www.ibm.com/support/knowledgecenter/#!/ssw_ibm_i/welcome

The IBM Knowledge Center contains information about important topics such as Java(TM), TCP/IP, Web serving, secured networks, logical partitions, high availability, control language (CL) commands, and system application programming interfaces (APIs). It also includes links to related IBM Redbooks® and Internet links to other IBM Web sites such as the IBM home page. With every new hardware order, you receive the IBM i Access Client Solutions CD. IBM i Access Client Solutions replaces its predecessor IBM i Access for Windows. IBM i Access Client Solutions may be used for console connections and is capable of running directly from the CD. See the Getting Started document in the Documentation directory on the IBM i Access Client Solutions CD for more information. The IBM i Access Family offers client/server capabilities for connecting personal computers to IBM i computers.

The IBM Prerequisite tool provides compatibility information for hardware features and helps to plan a successful system upgrade by providing prerequisite information for currently available features and features to be added to the system at a later date.

The IBM Prerequisite tool can be accessed here: http://www.ibm.com/systems/electronic/support/e_dir/eserverprereq.nsf.

## How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this memorandum or any other IBM i documentation, complete the readers' comment form at the back of this memorandum.

Send your comments electronically using one of these email addresses:
* Comments on books:
  – RCHCLERK@us.ibm.com
* Comments on the IBM i content in the IBM Knowledge Center:
  – RCHINFOC@us.ibm.com

Be sure to include this information:
* The name of the book or IBM i topic in the IBM Knowledge Center.
* The publication number of a book.
* The page number or topic of a book to which your comment applies.

# Read this first

Read this section before doing anything else.

## Current customers - read before you install

Read the release planning documents before you install 7.2

The following publication contains additional information that you should read and understand before you install this release. All the sources that are referenced are on the Internet and can be found through various links at the following website: http://www.ibm.com/support/knowledgecenter/#!/ssw_ibm_i/welcome

**Note:** After the release of IBM i 7.2,IBM i Information Center, updates to IBM i topics contained in the IBM Knowledge Center will be available in the English Internet version. To review these updates, click **Information Updates** under IBM i 7.2 in the IBM Knowledge Center.

Access the Internet version. The instructions refer you to several sources:
* The Installing, upgrading, or deleting IBM i and related software topic in the IBM Knowledge Center contains software preinstallation information and information about installing or upgrading the operating system release, part of the release, or related licensed programs. You can also order a printed version of this PDF (SC41-5120) with your software upgrade orders or new hardware orders.
* The Preventive Service Planning (PSP) Information provides information about software problems you might encounter as you install the new release. The PSP number for the online IBM i 7.2 Memo to users is SF98116. To access the PSP database:
  1. Go to **Technical databases** at http://www.ibm.com/systems/support/i/databases/index.html.
  2. Click **Preventive Service Planning - PSP**

Alternatively, you can obtain PSP from your software service provider. The following items are included in PSP:
  - The PSP identifier for information that pertains to installing IBM i 7.2 is SF98180.

    The information within this PSP describes late-breaking installation information, and is grouped by product area. To receive this PSP information by using electronic customer support, type the following command on an IBM i command line:

    `SNDPTFORD SF98180`
  - The PSP identifier for information that pertains to problems discovered since the availability of the current cumulative PTF package is SF98720. Information within this PSP describes all PTFs released since the current cumulative PTF package began shipping. It also contains information about all known high-impact and pervasive problems that are not included in the latest cumulative PTF package. To receive this PSP information by using electronic customer support, type this command on an IBM i command line:

    `SNDPTFORD SF98720`
  - The PSP identifier for information that pertains to installing IBM i 7.2 hardware and HMC is MF98720. Review this PSP information before you install either new IBM i models or hardware devices. To receive this PSP information by using electronic customer support, type this command on an IBM i command line:

    `SNDPTFORD MF98720`
  - The PSP identifier for information that pertains to system upgrades and data migrations is SF98172. Information within this PSP describes upgrade and migration corrections. Review this PSP

information before you upgrade your system model or migrate your data between systems. To receive this PSP information by using electronic customer support, type the following command on an IBM i command line:

`SNDPTFORD SF98172`

- The IBM i PTF maintenance strategy. A PTF maintenance strategy is recommended for all IBM i customers. This might reduce the impact to IBM i operations that result from unplanned outages or program failures. For more information about the IBM i maintenance strategy, follow these steps:
  1. Go to **Guide to fixes** at http://www.ibm.com/systems/support/i/fixes/guide/index.html
  2. Click **Server maintenance**

## Required PTFs before you upgrade to IBM i 7.2

PTFs might be required before you upgrade to 7.2

As you plan for your IBM i 7.2 installation or upgrade, ensure that you review the "Required PTFs for upgrading to IBM i 7.2" topic within the IBM i Technology Updates section of the IBM developerWorks® wiki.

If you are upgrading from IBM i 6.1, for example, you need to load and apply certain PTFs to be able to accept online software agreements. If you are using image catalogs to upgrade from either IBM i 6.1 or IBM i 7.1 certain PTFs are required. Both of these preparation steps are included in the Installing, upgrading, or deleting IBM i and related software IBM Knowledge Center topic.

To review the "Required PTFs for upgrading to IBM i 7.2", go to the wiki using the following link: IBM i and Related Software and select Updates and PTFs.

## Upgrade planning

Documentation resources that you can consult before you upgrade:

The Systems Management Planning web page http://www.ibm.com/systems/support/i/planning/upgrade/index.html provides links to various planning tools and information.

The IBM i mapping web page http://www.ibm.com/support/docview.wss?uid=ssm1platformibmi lists operating system support by model.

The Upgrade Planning web page http://www.ibm.com/systems/support/i/planning/upgrade/index.html, is intended to provide advanced planning information. Use this information to plan future solutions for enhancements, upgrades, or migrations.

## IBM i 7.2 requires POWER6 or newer hardware

IBM i 7.2 will not install on POWER5 hardware. Attempts to install 7.2 on any POWER5 hardware, including the following models, fail with a B6000423 system reference code:
- 515
- 520
- 525
- 550
- 570
- 595

# Tape and optical device types that are not supported on IBM i 7.2

The following tape and optical device types have either reached end of service, were only supported on POWER5 or require an IOP for attachment. They are not supported on IBM i 7.2.

- IBM 3995 Optical Library
- 3570 tape library - all drive types
- 3573 tape library with LVD LTO3 and HH LTO3 tape drives
- 3575 tape library - all drive types
- 3576 tape library with LVD LTO3 drives
- 3490 tape device and library - all models
- 3580-001 HVD tape drive
- 3580-002 HVD tape drive
- 3580-002 LVD tape drive
- 3580-003 LVD tape drive
- 3581 tape library - all drive types
- 3582 tape library - all drive types
- 3583 tape library - all drive types
- 3584 tape library with HVD LTO1 and LTO2 drives
- 3584 tape library with LVD LTO2 drives
- 3590 tape device and library - all models
- 5753 SLR60 tape drive
- 5754 SLR100 tape drive
- 5755 HH LTO2 LVD tape drive
- 6120 VXA2 tape drive
- 6258 DAT72 tape drive
- 6279 VXA3 tape drive
- 6382 SLR5 tape drive
- 6383 MLR1S tape drive
- 6384 SLR60 tape drive
- 6386 MLR3 tape drive
- 6387 SLR100 tape drive
- 7207-122 SLR5 tape drive
- 7207-330 SLR60 tape drive
- 7208 8mm tape drive - all models
- 9348 1/2 inch reel tape drive

# IBM i Installation load source requirements

Load source size increased to 70 GB

Successful installation of IBM i 7.2 requires the following for each server or logical partition:

- The minimum load source disk size for IBM i 7.2 is 70 GB. This size is based on storage with 520-byte sectors. Two cautionary notes :
  - If the IBM i partition is using disks with 512-byte sectors, for example a partition hosted by IBM i or IBM i on storage that is attached by Virtual SCSI, the storage that is allocated for the load source needs to be approximately 80 GB to allow the IBM i partition to see the required 70 GB.

– If you have a 70 GB load source disk that is going to be included in a RAID 5 or RAID 6 configuration, you must upgrade to 7.2 before you configure RAID. After the upgrade, you can start RAID including the load source. Examples of disks that fall into this category are #1884/198B (69.7 GB 15K RPM SAS SFF DISK) or #3676/433B (69.7GB 15K RPM SAS DISK DRIVE) disks.

Before you upgrade, ensure that the server meets disk storage requirements for upgrades. In the IBM Knowledge Center review the "Ensuring the system meets disk storage requirements for upgrades" topic for instructions. Here is a link: http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_72/rzahc/rzahcevaldskstorreq.htm

• In addition, all server models with IBM i 7.1 or earlier releases installed require more reserved storage before IBM i 7.2 can be installed. Your upgrade will stop during the installation if you do not allocate the additional space. In the IBM Knowledge Center consult the "Required: Allocating additional space for Licensed Internal Code" topic for instructions. Here is a link: http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_72/rzahc/allocatespacelic.htm

## Plan for your Operations Console installation or upgrade

The console features matching the connectivity that you plan to use should be specified as part of the order for your new IBM i or Power® system.

**LAN attached Operations Console prerequisite information**

Prerequisite information for LAN attached Operations Console users who are upgrading to, or installing, IBM i 7.2:

If you are upgrading to IBM i 7.2 and you want to replace an existing console with a LAN attached Operations Console, upgrade the system before you migrate the console. This prevents any conflict between the existing console and the Operations Console.

For all upgrades and installations, you need to establish a connection between the system and Operations Console PC using the 11111111 (eight 1's) service tools user ID. The default password for this user ID is 11111111; however, this password might have been changed following a previous installation. This default user ID ensures a successful reauthentication of the client connection to the system. When you receive the operating system release upgrade, the shipped service tools user IDs (except 11111111) are expired. To reauthenticate the client connection to the system, enter the service tools user ID of 11111111 (eight 1's) and either the default password of eight 1's or the password you might have previously created for this user ID. This is especially important for automatic installations.

**Important**: During a manual IPL of the system, if no console has been specified before, you will receive two extra screens to confirm the setting of the console type. The first requires pressing F10 to accept your current console type and the second shows that a value did not previously exist (a zero is present for the old value) and the new value is shown. Pressing Enter exits and sets the console type automatically. The IPL continues to the IPL or Install the System screen. This condition is most likely to occur during the installation of a new partition but might happen on your first manual IPL of IBM i 7.2; for example, the A-mode IPL following the restore of Licensed Internal Code during the upgrade or install when a console value of zero is found.

## High Availability

High availability considerations

Before you upgrade your system to IBM i 7.2, make sure your cluster version is 7. If you have 5770-HAS (IBM PowerHA SystemMirror for i) installed, make sure your HA version is 2.2. The Change Cluster Version (**CHGCLUVER**) command can be used to adjust the current version of the cluster and the PowerHA product.

Support was added to Cluster administrative domain to monitor owner and authority attributes for all monitor resource entries in cluster version 8. So if a user does not want to monitor owner and authority attributes, then they must list all the attributes they are interested in, instead of coding *ALL.

## Hardware considerations before upgrading to IBM i 7.2 on Power6

## IBM i 7.2 will not support RIO/HSL loops or drawers on POWER6

RIO/HSL I/O drawer feature codes include:
- #0595/5095/7311-D20
- #0694
- #0696
- #5790/7311-D11
- #5094/5294/5096/5296
- #5088/0588
- #5791/5794/7040-61D

## IBM i 7.2 on Power6 does not support IOPs or IOP based adapters

IOPless (Smart IOA) options are available for all I/O attachments (except Twinax and IXS) and provide more efficient attachment of I/O. Customers using IOP based I/O must move off IOPs to enable upgrading to IBM i 7.2.

IOP feature codes are:
- #2843
- #2844
- #2847 (SAN Boot)
- #3705

Note that there can be differences in the specific devices supported with or without an IOP by IBM i. For example some older tape libraries such as the 3590 require an IOP-based adapter. Or there may be a functional difference without an IOP, for example SDLC or X.25 on WAN/LAN adapters require an IOP. A partial list of adapters supported on POWER6 servers which require an IOP includes:
- #4746 Twinax Workstation Controller (which means no twinax displays/printers unless an OEM conversion device is used)
- #4812/4813 Integrated xSeries Server (IXS) (use iSCSI alternative)
- #2757/2780/5580/5778 Disk Controllers (use newer disk controllers)
- #2787/5761/5760 Fiber Channel Adapters (use newer Fibre Channel Adapters)
- #2749 HVD SCSI Adapter or Ultra Media

## IBM i 7.2 can be hosted by IBM i 6.1.1 or i 7.1 on POWER6

For customers on POWER6® with RIO/HSL loops, IBM i 7.2 can be hosted by IBM i 7.1 or IBM i 6.1.1 on that hardware. For more information, reference the IBM i hosting IBM i section in the Virtualization chapter in this IBM Redbooks publication:

IBM i 7.1 Technical Overview with Technology Refresh Updates

# IBM i operating system

This section describes changes to the IBM i operating system and its functions. Changes to systems management functions, such as configuring and tailoring the system, are also included.

## Programming Considerations

Release to release programming considerations.

## Output file(OUTFILE) changes

Release to release Output file(OUTFILE) considerations

Applications using LVLCHK(*YES) might be affected by changes to IBM-supplied system output files in this release. IBM commands and APIs that generate database output files might add new fields to the end of record formats, or use all or part of existing reserved fields for additional information returned each release. Adding new fields to the record format, even to the end of the record, changes the level check value for the file. This might cause an application with LVLCHK(*YES) to fail with a level check error. If a level check error does occur, review the application to determine which system file it uses. New fields have been added to IBM-supplied database files in each release of IBM i.

## Output(*PRINT) changes

Release to release Output(*PRINT) considerations

Applications specifying OUTPUT(*PRINT) to generate spooled output from commands must be able to tolerate changes to the record layout in the spooled file. From release to release, commands that support that option can add, change, or remove records from the output. Any application that has a dependency on the record layout for a specific command might have to change.

## Security audit record changes

Release to release Security audit record considerations

Changes made to security auditing for this release might affect applications that read those audit records. Actions that were not audited in previous releases might now be audited. Existing audit records might have been changed by the addition of new fields in a reserved area of the audit record or at the end of the audit record. Existing fields might contain new values. Applications that read the audit records should be changed to tolerate these types of changes.

## Programs that use customized versions of IBM-supplied commands

Release to release considerations for programs that use customized version of IBM-supplied commands

Some IBM i functions that use IBM-supplied control language (CL) commands that are not library-qualified in this release might be changed in a future release to specify a specific library, *NLVLIBL or *SYSTEM, for the library qualifier. Applications that depend on using their own version of commands instead of the IBM-supplied commands might not work as they had on earlier releases. These applications should be changed to use the retrieve command exit point (QIBM_QCA_RTV_COMMAND) or the change command exit point (QIBM_QCA_CHG_COMMAND) that allows your exit program to get control and possibly change the command that is used.

# Changes to system printer files and other IBM-supplied objects

Release to release considerations for possible changes to system printer files and other IBM-supplied objects

The **MAXRCDS** parameter for **QSYSPRT** and **QPSAVOBJ** printer device files has always been 100 000. During an upgrade, the default value has not changed for system printer files. Customization of IBM-supplied printer files is lost on a release upgrade. To preserve those changes, you need to rerun your changes to printer system files each release.

Changes to many types of IBM-supplied objects are lost during an upgrade because the copy of the object in the IBM product library is replaced by the new copy of the object.

## API changes

Release to release API changes

## IBM i License program API changes

IBM i License Program Version/Release/Modification (VRM) format changes in APIs

When dealing with the release information for IBM i Licensed Programs, the 'V', the 'R', and the 'M' represent extraneous information. Each of these values can be implied rather than explicitly stated when stored internally and passed about programmatically. In the current LP architecture, the character 'V' is always in position 1 of the six character **VvRrMm** field. Therefore, explicitly storing or programmatically passing the character 'V' when dealing with an IBM i LP is unnecessary. Its existence can be implied as being part of a **VvRrMm** field. The same statement can be applied to the character 'R' and character 'M' in the **VvRrMm** fields. As such, V1R1M0 could be interpreted as being the same as 010100. The first two characters are always the version, the third and fourth characters are always the release, and the fifth and sixth characters are always the modification.

Licensed Program interfaces will be altered to handle both VRM data in the old format with hardcoded 'V', 'R', and 'M' values and also without the user explicitly including the 'V', the 'R', and the 'M'. This support is only allowed for products that need to use expanded values for their version, release, or modification. Products that do not build to support the expanded VRM fields will still use the old **VvRrMm** format with the documented interfaces.

If a function is manipulating an undetermined product ID, or a function could potentially be handling a varying list of products, the code should be capable of handling a VRM format of **VvRrMm** with the 'V', 'R', and 'M' characters included and a VRM formation of vvrrmm where the 'V', 'R', and 'M' characters are not returned, 100901 (which would represent V10R9M1) for example.

When interrogating the release of one specific product, the VRM information is likely to be of a known format. For example, if a function is looking at information for only 5770WDS, the VRM will be handled as V7R2M0. If a function is retrieving product information for SLIC or the Operating System, the VRM is returned as V7R2M0.

Substringing of the VRM output from the various interfaces might need to be adjusted to handle Licensed Programs that exceed a value of 9 for the version value or release value. It may no longer be safe to assume that the first character is always 'V', the third character is always 'R', and the fifth character is always 'M'.

The following License program APIs are changed for IBM i 7.2:
- QLPACAGR
- QLPLPRDS
- QLPRAGR

- QSZSPTPR
- QSZCRTPD
- QSZCRTPL
- QSZMPRLS
- QSZPKGPO
- QSZRTVPR
- QSZSLTPR
- QLZAADDK
- QLZADDLI
- QLZAGENK
- QLZARLS
- QLZAREQ
- QLZARTV
- QLZARTVK

## PTF API changes

PTF Software Product APIs product version and release field changes

The PTF Software Product APIs will be modified to accept expanded VRM input and/or return expanded VRM output using existing CHAR(6) Release fields. Input Release fields will allow either the old VxRyMz format or the new vvrrmm format where version vv and release rr must be a number from 00 through 35 and modification mm must be a number from 00 through 09 or a letter from 0A through 0Z. The new vvrrmm format is only required on input fields when the product version or release is greater than 9. Output Release fields will return the old VxRyMz format if the product version and release are both less than or equal to 9. The new vvrrmm format will be returned only when the product version or release is greater than 9.

The following PTF Software Product APIs are updated with expanded VRM information:
- Copy Program Temporary Fix to Save File (QPZCPYSV) API
- Create Program Temporary Fix (QPZCRTFX) API
- Create PTF Group (QpzCreatePtfGroup) API
- Generate Program Temporary Fix Name (QPZGENNM) API
- Log Program Temporary Fix Information (QPZLOGFX) API
- List Program Temporary Fixes (QpzListPTF) API
- List PTF Group Details (QpzListPtfGroupDetails) API
- Retrieve Program Temporary Fix Information (QPZRTVFX) API
- Program Temporary Fix Exit Program

## Retrieve User Information API changes

The Retrieve User Information API will now return 8-byte storage values.

The Retrieve User Information (QSYRUSRI) API, format USRI0300, will now return larger 8-byte storage values for maximum storage allowed, storage used, IASP maximum storage allowed, and IASP storage used. The 4-byte storage values will still contain valid information until the value exceeds 2,147,483,647, then the 4-byte storage value will be -2.

## TCP Pascal APIs removed

Applications that use the TCP/UDP Pascal APIs must be converted to use sockets APIs

Support for these APIs was removed in V4R1 when the Pascal compiler was withdrawn from support in V3R7, but existing applications that use these APIs were allowed to function until now.

Users with applications that use the APIs that need to be converted can refer to Appendix H, "Converting from the Pascal API to the Sockets API" PDF document: SC41-5420-00 TCP/IP Configuration & Reference V4R1 PDF

These APIs are removed in IBM i 7.2 :
- BeginTcpIp
- EndTcpIp
- Handle
- Unhandle
- TcpAbort
- TcpClose
- TcpOpen
- TcpFReceive
- TcpFSend
- TcpStatus
- TcpWaitOpen
- TcpWaitReceive
- TcpWaitSend
- UdpClose
- UdpOpen
- UdpReceive
- UdpSend
- UdpStatus

# Work Management API changes

### Work Management API changes for run priority
The work management APIs QUSLJOB, QGYOLJOB, and QWTRTVTA will now return a value for Run priority (job) (key 1802) for the case where the job is on the job queue and a value has been set that will override the class when the job becomes active. If the job is on the job queue and no value has been set, the APIs will return 0.

### QUSLJOB, QUSRJOBI, QGYOLJOB, QWTRTVTA API changes

The QUSLJOB, QUSRJOBI, QGYOLJOB , QWTRTVTA APIs will now return a new special value 0 for *CLS on keys 1302 (Maximum processor time) and 1305 (Maximum temporary storage time allowed, in megabytes). Values will be returned for jobs on job queues, including the special value of -1 for **\*NOMAX**.

# C and C++ language runtime changes

# free() and realloc() function changes

In releases before IBM i 7.2, the free() and reallc() functions did not always generate a message when used to free or reallocate heap storage from a different activation group. This restriction is documented but was not always handled correctly. Extra checking is enabled in 7.2 to correctly diagnose the improper usage and generate a C2M1212 diagnostic message when these functions are used to free or reallocate storage from a different activation group.

# Header File Changes for C and C++

Because the C11 and C++11 standards override the previous C99 standard, in IBM i 7.2, usage of the __STDC_FORMAT_MACROS macro was removed from <inttypes.h> to enable the macros for format specifiers within C++, and usage of the __STDC_LIMIT_MACROS macro and the __STDC_CONSTANT_MACROS macro was removed from <stdint.h> to enable the macros for limits of integer types within C++. As a result, the macros within <inttypes.h> and <stdint.h> are now unconditionally defined for both C and C++.

In releases before 7.2, the erf(), erfc() and hypot() functions were declared within <math.h> only when the LANGLVL(*EXTENDED) compile option was used. Because they are officially part of C99, in 7.2, they were moved out of the condition of EXTENDED language level, and are always available in <math.h>.

## Assert macro diagnostic message change

The diagnostic message that the assert macro writes to stderr is now based on the language level that is used during the compilation. If the default language level is used, the diagnostic message includes the name of the function that contains the assert invocation in addition to the expression, file name, and line number.

## _Ropen() Function Changes

In releases before IBM i 7.2, the _Ropen() function did not check the length of the keyword parameter string. It allowed a string shorter than the correct keyword to be specified. In 7.2, the keyword parameter string must completely conform to the keywords documented for _Ropen(). If an incorrect keyword parameter string is specified, message C2M3015 - `The type variable specified on the open function is not correct` is issued at run time, the value of errno is set to EBADMODE, and the _Ropen() function returns NULL.

## C++ library function changes

Existing C++ library functions have been rewritten to better conform with C++ TR1 specifications.

In IBM i 7.2 changes were made to provide C++ library extensions in support of standards, which were submitted to the C++ standards committee with Draft Technical Report on C++ Library Extensions, ISO/IEC DTR 19768. To read more about the standards, also known as C++ Technical report 1 (TR1), follow the link to: Draft Technical Report on C++ Library Extensions ISO/IEC DTR 19768.

With the introduction of this support in 7.2, it was necessary to rewrite some of the existing library functions to better conform with the C++ TR1 specification. Some of the changes added to the C++ STL header file require compiling with OPTION(*RTTIALL) to work properly on 7.2. Specifically, this includes functions within the header files <locale>, <functional>, and <memory>.

Any source code that uses non-standard facets in C++ locales might be affected and should be examined. The `has_facet` and `use_facet` functions were rewritten to take advantage of each facet's runtime type identification (RTTI) information. The generated C++ program might signal an MCH3601 (Pointer not set) exception within "`std::type_info::operator==(const std::type_info&) const`" if the source code is not compiled with the OPTION(*RTTIALL) C++ compiler option.

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## IBM i command changes

Release to release IBM i command changes

## CHGMOD command changes

Change Module (`CHGMOD`) command behavior changes.

When the Change Module (**CHGMOD**) command is used to remove Intermediate Language data observability (CHGMOD RMVOBS(*ILDTA)) from module objects that are created for release IBM i 7.2 and later, if that module was digitally signed, the signature is removed. Intermediate Language data (IL data) can optionally be stored with modules created by some compilers. For releases before 7.2, if a digital signature was created for a module object that has IL data, that signature did not cover the IL data. However, starting in release 7.2, IL data is covered by the digital signature, so removing the IL data causes the digital signature to be removed as well.

## CRTCLS and CHGCLS command changes

Create Class (**CRTCLS**) and the Change Class (**CHGCLS**) **MAXTMPSTG** parameter changes.

The Create Class (**CRTCLS**) and the Change Class (**CHGCLS**) commands have changed so that the **MAXTMPSTG** parameter is specified in megabytes. Any class object (*CLS) on the system already stores this value in megabytes (or has *NOMAX), so the objects continue to work exactly like they did before. Stored CL command source, however, is affected. If you have a CL command that specifies the value in kilobytes, you need to change the source code to specify the value in megabytes.

## CRTUSRPRF, CHGUSRPRF, and RTVUSRPRF command changes

New **MAXSTGLRG** parameter allows a larger maximum storage value to be specified and retrieved.

The Create User Profile (**CRTUSRPRF**) and the Change User Profile (**CHGUSRPRF**) commands have a new **MAXSTGLRG** parameter that allows a larger maximum storage value to be specified than the **MAXSTG** parameter. You can specify a value for either the **MAXSTGLRG** parameter or the **MAXSTG** parameter but not for both.

The Retrieve User Profile (**RTVUSRPRF**) command allows retrieval of the larger storage values using the new **MAXSTGLRG** and **STGUSEDLRG** parameters. The current **MAXSTG** and **STGUSED** parameters contain valid information until the value exceeds 2,147,483,647. When this value is exceeded, then the returned value is -2 and the new **MAXSTGLRG** or **STGUSEDLRG** parameters need to be used to get the actual value.

## CVTPFRDTA and CVTPFRCOL command changes

The **Convert Performance Data (CVTPFRDTA)** and **Convert Performance Collection (CVTPFRCOL)** commands no longer support in-place file conversions.

The **Convert Performance Data (CVTPFRDTA)** and **Convert Performance Collection (CVTPFRCOL)** commands no longer support in-place file conversions (where the from library and to library are the same). In-place conversions have always been discouraged and are not always possible. Due to the increasing complexity of collections, only conversion to a different library will be supported so that the result can be verified without losing the original data.

Messages CPF2365 (diagnostic) followed by CPF0001 (escape) are signaled when parameters **FROMLIB** and **TOLIB** specify the same library

## RSTOBJ and RSTLIB changes for saved objects with different primary groups

In releases previous to IBM i 7.2, if the primary group on a saved object was different from the primary group on the existing object, and the value that was specified on the ALWOBJDIF parameter allowed the object to be restored, the Restore object (**RSTOBJ**) and Restore library (**RSTLIB**) commands would restore the object and send informational message CPI3811. In 7.2, the object is restored but, in addition to the CPI3811 information message, diagnostic message CPF3848, and escape message CPF3773 are also sent indicating an authority change, and an RZ audit record is logged.

## STRPCCMD command changes

Start PC Command (**STRPCCMD**) behavior changes.

When **STRPCCMD** is used with the 5250 emulator in IBM i Access Client Solutions, the maximum command length that may be specified for the **PCCMD** parameter is now 1023 characters. Other 5250 emulators may truncate the command to their maximum supported length. For example, the 5250 emulator in IBM i Access for Windows and Personal Communications will truncate the command to the existing limit of 123 characters.

## WRKACTJOB command changes

Temporary storage has been added as a column to the Work with active job (**WRKACTJOB**) command output.

The printed output for the Work with active job (**WRKACTJOB**) command is now wider than 132 columns.

## Database changes

Release to release Database changes that should be considered

### New SQL reserved words and schema names

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As the SQL language support for DB2® for i is extended, the lists of reserved words and schema names in Appendix I of the SQL Reference is updated. The new reserved words and schema names are not mentioned in the MTU, but the lists should always be reviewed when moving to a new release.

The lists in Appendix I can be referenced here: http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_72/db2/rbafzresword.htm

### Native database access behavior changes

SQL Query Engine (SQE) versus Classic Query Engine (CQE) behavior differences for native database access

As in previous releases, IBM i 7.2 extends SQE as the default choice for optimization.

With 7.2, some native database access begins to use SQE by default, including:
- Work with Query (**WRKQRY**) command, when one of the run options is used
- Run Query (**RUNQRY**) command
- Open Query File (**OPNQRYF**) command
- Open Data Base File (**OPNDBF**) command or Native database I/O where the target of the open is an SQL view, or a partitioned table and a **MBR(*ALL)** override is being used unless the open is for *OUTPUT only
- Any open of a database file where a Row Permission or Column Mask is defined and enabled, unless the open is for *OUTPUT only

When moving from CQE to SQE, there are some behavioral differences. The two most noteworthy behavior differences are introduced here.

1. SQE implementation might result in a different result set ordering for **WRKQRY**, **RUNQRY**, or **OPNQRYF**. When a query is executed without explicitly specifying that the results be returned in a specific order, both the SQE or CQE optimizer choose whatever plan performs the best. This means that both SQE and CQE might or might not return the results in a keyed file order. Since CQE has far less advanced capability than SQE, it is more likely to return the results in a keyed order and SQE is less likely to

return the results in a keyed order. Hence, if a query is specified with **WRKQRY**, **RUNQRY**, or **OPNQRYF** and the row ordering is important, explicitly specify the Key field(s), and Key field order.

2. Values for fields that are derived from an expression (for example, SUBSTR) that are null or in error might be different when rows are read through a native interface (for example, using RPG READ). When a row is read, CQE evaluates the expression using a default value for all fields that are null or in error. SQE follows the SQL standard and does not evaluate the expression using a default value for all fields that are null or in error. Both CQE and SQE return NULL indicators for fields that are null or in error, however. Applications that are checking the NULL indicators instead of relying on the value in the field will not observe a change in behavior when moving from CQE to SQE.

**Note:** For full details on other minor behavior differences, refer to this resource and search on SQE: Memorandum To Users (MTU) Supplement

Remediation: In 7.2, there is a new QAQQINI control called **SQE_NATIVE_ACCESS** with a default value of *YES. When *YES is used, the SQL Query Engine (SQE) attempts to run the query. If SQE is unable to process the query, the query is run using the Classic Query Engine (CQE). When **SQE_NATIVE_ACCESS** is changed to *NO, CQE is used first and SQE is only used when CQE is unable to run the query.

## QDBRTVFD API changes

Retrieve Database File Description (QDBRTVFD) API might return 0 offsets and lengths for a CREATE TRIGGER statement.

IBM i 7.2 provides support for obfuscated SQL statements, where the details of the CREATE TRIGGER statement that defines an SQL Trigger are not available. The Retrieve Database File Description (QDBRTVFD) API provides offsets into a CREATE TRIGGER statement. If the trigger was created with obfuscation, then field Qdb_Qdbftrg_Stmt_Crt_Trg is unreadable and these offsets and lengths within Qdb_Qdbftrg_Stmt_Area contain a value of 0:

- Qdb_Qdbftrg_Stmt_Onfile_Off
- Qdb_Qdbftrg_Stmt_Onfile_Len
- Qdb_Qdbftrg_Stmt_When_Len
- Qdb_Qdbftrg_Stmt_When_Off
- Qdb_Qdbftrg_Stmt_Body_Len
- Qdb_Qdbftrg_Stmt_Body_Off

## Print SQL Information (`PRTSQLINF`) will not display obfuscated SQL statements

This release provides support for obfuscated SQL statements, where the SQL text used to create a SQL Procedure, SQL Function, or SQL Trigger is obscured from view. Because of this, the **PRTSQLINF** command will no longer display the SQL statements that are used by obfuscated SQL procedures, functions, and triggers.

## Copy file (`CPYF`) command change

When the Copy File command is used with the Create file parameter **CPYF CRTFILE(*YES)**, if the FROMFILE is an SQL Table, SQL Index, or SQL View, the newly created file is an SQL Table. Before 7.2, if **CRTFILE(*YES)** was specified and the FROMFILE was an SQL Table the created table would be an SQL table only if the attributes of the file required it to be an SQL table.

**Note:** If the FROMFILE is an SQL Partitioned Table or SQL Partitioned Index, the TOFILE continues to be a multiple member file.

# CURRENT_USER special register

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The addition of the CURRENT_USER special register on IBM i 7.2 results in changed behavior if CURRENT_USER was used as the column name and SQL statements reference that column name without delimiters. This affects dynamic SQL statements and any programs that are precompiled after moving to 7.2.

To determine whether you have this exposure, query the QSYS2/SYSCOLUMNS table.

Example:
```
SELECT * FROM QSYS2.SYSCOLUMNS
  WHERE
    COLUMN_NAME = 'CURRENT_USER' AND TABLE_OWNER <> 'QSYS'
```

To avoid any change in behavior, use the delimited form of this column name within SQL statements (for example: "CURRENT_USER").

## CURRENT SCHEMA special register changes

The CURRENT SCHEMA special register now returns a name with the delimiters removed. In previous releases, if CURRENT SCHEMA was set to a schema name that required delimiters for usage in an SQL statement, the value that was returned with the CURRENT SCHEMA special register would retain the delimiters. In IBM i 7.2, the delimiters are removed. The statement SET SCHEMA = "Long_Schema_Name"; is a statement that would set the current schema to a name with delimiters. In 7.2, the value that is returned in the CURRENT SCHEMA SQL special register is Long_Schema_Name whereas in previous releases it was "Long_Schema_Name".

## QSYS2.SYSROUTINEDEP column content changes

The values in the OBJECT_SCHEMA and OBJECT_NAME columns in QSYS2.SYSROUTINEDEP are now stored without delimiters. Before IBM i 7.2, when a routine was created, these names were stored in the same format in which they were originally used in the CREATE FUNCTION or CREATE PROCEDURE statement. For example, in the following statement, the column OBJECT_NAME in SYSROUTINEDEP has a value of TABLE1 in 7.2, but the value would be "TABLE1" in previous releases.
```
CREATE PROCEDURE PROC1()
    BEGIN;
          UPDATE LIBRARY."TABLE1" SET COL1=10;
    END;
```

## UPDATE using OVERRIDING USER VALUE

Before IBM i 7.2, an UPDATE statement that set a GENERATED ALWAYS identity or rowid column and specified the OVERRIDING USER VALUE clause would not update the column value. In 7.2, specifying the OVERRIDING USER VALUE clause on an UPDATE statement assigns a new system generated value for a GENERATED ALWAYS identity or rowid column if the identity or rowid column is included in the UPDATE assignment clause.

## Position function argument changes

The form of the POSITION function that uses a comma between the arguments has been changed to interpret the arguments in the opposite order to conform to DB2 SQL family standards.
- In releases before IBM i 7.2, the comma style was interpreted as: POSITION(*source-string*, **search-string**)
- In release IBM i 7.2 and later, the comma style is interpreted as: POSITION(**search-string**, *source-string*)

This behavior change applies to any dynamically executed SQL and to any embedded SQL within a program, view, trigger, or other object that uses the POSITION function that is rebuilt after moving to IBM i 7.2. The result of the POSITION function with the arguments unintentionally reversed returns a value of 0, indicating that the search string was not found in source string. If an object (program, view, trigger) with the POSITION function is unchanged between releases, it works as before and continues to use the form of POSITION in effect when the view or program object was created.

There is a new environment variable, QIBM_SQL_POSITION_LIKE_DB2, that can be used to provide the prior behavior. For example, to use the non-standard, previous behavior across the entire system, execute this CL command: `ADDENVVAR ENVVAR(QIBM_SQL_POSITION_LIKE_DB2) VALUE('N') LEVEL(*SYS)`.

## SQL Array assignment rules

Before IBM i 7.2, array assignments were allowed with any compatible array types. In 7.2, the documented assignment rules are enforced. If the right side of the assignment is an array variable, the TRIM_ARRAY function, or a CAST expression, it must be the same array type as the array variable on the left side of the assignment. If they are not the same array type, an SQL0408 diagnostic message is signalled.

## Timestamp built-in functions in a view

Certain built-in functions in a view might prevent a restore to a previous release.

On IBM i 7.2, the database includes support for timestamp precision between 0 and 12, where previous releases always used timestamps with a precision of 6. Timestamp built-in functions were also enhanced to handle any level of timestamp precision. This improvement to the timestamp built-in functions has an impact on views. When some timestamp built-in functions are used within a view, those views are not eligible to be saved to a previous IBM i release.

When using IBM i 7.2, if a view uses any of the following SQL built-in functions, an attempt to save the object to a save file using a release prior to 7.2 on the Target Release (`TGTRLS`) parameter will fail with CPI3215 informational and CPF3741 diagnostic messages.
- VARCHAR_FORMAT
- TRUNC_TIMESTAMP
- ROUND_TIMESTAMP

## Create Table Like and format level IDs

CREATE TABLE LIKE might generate a different format level ID as compared to previous releases.

Before IBM i 7.2, a CREATE TABLE LIKE of a table with a variable length field would generate a format level ID that was different from the based on table even when the INCLUDING clauses such as INCLUDING COLUMN DEFAULTS and the RCDFMT clause were specified. When the CREATE TABLE LIKE statement is written properly, the expectation is that the format level ID of the new table and the based on table will be the same.

In IBM i 7.2 this problem is fixed. This means that the CREATE TABLE LIKE now generates a format level ID that might be different that what the same CREATE TABLE LIKE statement generated in earlier releases.

## ICU sort table changes

A change in IBM i 7.2 requires newly created indexes to use ICU sort tables that are version 3.4 or greater. This requirement affects indexes that are created on 7.2 only. Indexes that were created before 7.2 do not need to be re-created.

An attempt to try to create an index with an unsupported ICU sort table on 7.2 results in a CPD3264 diagnostic message with a reason code of 2 being signaled. SQL created indexes also see an SQ20268 diagnostic message with a reason code of 5.

## GET DIAGNOSTICS modifies SQLSTATE and SQLCODE variables

Starting in release IBM i 7.2, the SQLSTATE, and SQLCODE variables are modified by GET DIAGNOSTICS statements in SQL routines. If a non-zero SQLSTATE is returned from the GET DIAGNOSTICS statement, the appropriate handler in the routine is invoked.

## RRN, PARTITION, and NODENUMBER functions with Common Table Expression (CTE) argument changes

RRN, PARTITION, and NODENUMBER functions with Common table expressions might trigger a CPD43AD.

Before IBM i 7.2, a stated restriction that an RRN, PARTITION, or NODENUMBER function could not have as an argument a common table expression whose outer fullselect includes an aggregate function, a GROUP BY clause, a HAVING clause, a UNION, INTERSECT, or EXCEPT clause, a DISTINCT clause, a VALUES clause, or a *table-function* was not fully enforced. Starting in IBM i 7.2, the restriction is enforced via SQLCODE = -5001. The joblog will show that the SQL5001 error is preceded by a CPD43AD diagnostic message with reason code 3.

## Fixes to the SQL ILE RPG precompiler might cause SQL5011 messages

Before IBM i 7.2, the SQL ILE RPG precompiler sometimes did not handle mismatches between the RPG compiler date/time format for host variables and the SQL date/time format. In some cases, a mismatch was not detected at compile time, which might result in an RPG runtime error for date, time or timestamp like an RNX0112, RNX0113, or RNX0114. In 7.2, the SQL ILE RPG precompiler properly matches the date/time formats and generates an error message when necessary. This might mean that an SQL5011 message is generated on 7.2 for code that compiled without error messages on previous releases.

## SQL Call Level Interface Changes

### SQLConnect CLI API changes
The SQLConnect API now provides better consistency between server mode and local mode.

In IBM i 7.2, the following changes are enforced when the CLI SQLConnect API is used to connect to the database:
- If a non-NULL userid or password is specified when SQLConnect is used to connect to the database with SQL server mode, both the userid and password must be valid.
- If a non-NULL userid is specified when the SQLConnect API is used to connect to the database in local mode, the userid must be the same as the current user or an SQL7022 error is returned.
- If a NULL userid is specified when the SQLConnect API is used to connect as the current user, then the password must also be NULL.

For example, the following code sample can be used to connect to the database with the current user profile:
```
rc = SQLConnect(hdbc, "*LOCAL", SQL_NTS,
NULL, SQL_NTS,
NULL, SQL_NTS);
```

## CLI API Timestamp changes

Before IBM i 7.2, timestamp types were treated as fixed-length types, with a length of 26 and a precision of 6 fractional seconds. In 7.2 timestamps can now range between 16 and 32 bytes with a corresponding precision of between 0 and 12 digits. Several SQL Call Level Interface (CLI) APIs have been updated to reflect these changes. In previous releases, CLI APIs, which took a buffer length or scale would ignore these values and use 26 and 6 instead. Many existing applications pass values for buffer lengths or scale, which might now be invalid, such as 0. This might result in DB2 for i disregarding any fractional seconds. To maintain compatibility with existing behavior, applications can use a new connection attribute: **SQL_ATTR_TIMESTAMP_PREC**. By setting **SQL_ATTR_TIMESTAMP_PREC** to **SQL_TRUE**, CLI reverts to 7.1 behavior and treats timestamps as fixed-length types. This connection attribute is meant to be used as a transition mechanism until applications can be updated.

These APIs now require a valid buffer length and scale:
- SQLBindParam
- SQLBindParameter

These APIs now require a valid buffer length:
- SQLBindCol
- SQLPutData

These APIs now return more length/precision information:
- SQLColAttributes
- SQLColAttribute
- SQLDescribeCol
- SQLDescribeParam
- SQLGetDescRec

## Restore of logical files over existing files with different file/member level ids

Before IBM i 7.2, a restore of a logical file over an existing file with a different file or member level id with the Restore object (**RSTOBJ**) or Restore library (**RSTLIB**) commands, would fail and messages CPF3283 and CPF3756 would be signaled. In 7.2, if **ALWOBJDIF(*COMPATIBLE)** is specified on the restore, the messages are not signaled and the restore of the logical file is successful.

## DSPOBJD outfile changes

The version values for fields ODCVRM (Compiler version) and ODPVRM (Licensed program version) in the Display Object Description (**DSPOBJD**) outfile (QADSPOBJ) are changed in i 7.2.

The version values for fields ODCVRM (Compiler version) and ODPVRM (Licensed program version) in the Display Object Description (**DSPOBJD**) CL command outfile (QADSPOBJ) is returned in either VxRyMz form (as currently) or in vvrrmm form if either the version or release has a value greater than 9 and the version will not fit into a VxRyMz form. Customers that are processing **DSPOBJD** outfiles must handle version field values that are in these two different forms.

## Display station pass-through changes

Display station pass-through using communication jobs in the QCMN subsystem is disabled in IBM i 7.2.

The ability to run display station pass-through using communication jobs in the QCMN subsystem is disabled in 7.2. By system default, pass-through server jobs running in the QSYSWRK subsystem have been used since V4R1 for display station pass-through. This is configured by the **QPASTHRSVR** system value. Pass-through server jobs are started either by issuing the Start Communications Server (**STRCMNSVR**) command or running the Autostart Job Entry that is configured for the QSYSWRK Subsystem description. On previous releases, display station pass-through could be initiated by using communications jobs when **QPASTHRSVR** was configured as 0 or when pass-through server jobs were ended. This old method invoked the display station pass-through target APPC transaction program to run as a user job in the QCMN (or QBASE if it is active) subsystem. This will no longer work in 7.2. It fails with a CPF1269 sent to QSYSOPR with reason codes 715, 0.

To use display station pass-through, you need to set the **QPASTHRSVR** system value to the recommended/shipped value of *CALC and make sure that the pass-through server jobs are started with the Autostart Job Entry in the QSYSWRK subsystem description. If you have CL programs that end the pass-through servers using the End Communications Server (**ENDCMNSVR**) CL command, you need to use the **STRCMNSVR** CL command to restart the pass-through servers.

```
CHGSYSVAL SYSVAL(QPASTHRSVR) VALUE(*CALC)
```

Note this also gives you a method to disallow display station pass-through from running on your system by setting the **QPASTHRSVR** system value to 0.

# Floating point changes

System support for floating point (both binary floating point and decimal floating point) in IBM i 7.2 is changed to correct defects and improve performance. Some floating point operations produce different results and some raise different exceptions than prior releases. Here are a few examples:

- Conversions between binary floating point and decimal forms (including decimal floating point) are changed to improve accuracy and correctly handle all rounding modes. Floating point results might differ from prior releases by as much as eight units in the last place.
- The modulus operation (used for the SQL MOD function) now produces correct results for all binary floating point input values.
- Several decimal floating point operations now produce an MCH1209 - floating point invalid operation exception instead of the (incorrect) MCH1212 - floating point conversion exception produced in prior releases (for example, a request to compute the logarithm of a negative number).

# IBM i Navigator communication trace analyzer no longer supported

The Communications Trace Analyzer plug-in to IBM i Navigator has been dropped from the IBM i 7.2 release.

An enhancement in the IBM V6R1 release allows a communications trace to be dumped into the Packet Capture (PCAP) format used by other trace analysis tools. It is recommended that you use a tool that can analyze the communications trace data in PCAP format rather than the communications trace analyzer.

# Integrated web application server changes

Support has been withdrawn for the integrated web application server (IAS) version 7.1. During the install of the IBM i 7.2 operating system, all IAS version 7.1 server instances are automatically upgraded to IAS version 8.1. For most IAS instances this upgrade is transparent. However, if your IAS server instance no longer works correctly after the upgrade to version 8.1, please contact IBM support for assistance.

Newly created integrated web application servers will be based on IAS version 8.5, the technology used for the server is the WebSphere Application Server V8.5.5 Liberty Profile. Already deployed servers running IAS 8.1 will continue to function, although it is highly encouraged that customers transition to the new server as soon as they are able to since the old runtime will be removed in a future release. Note that there is no automatic upgrade from IAS version 8.1 to 8.5 since the runtimes are based on totally different technologies.

## Integrated web services server changes

Newly created integrated web services servers are based on IAS version 8.5 and include a new web services engine. Existing web services servers will continue to run if the version of the web services server engine is 1.5. Web services servers that are running with version 1.3 of the web services engine must be upgraded to version 1.5 by using the upgrade wizard that is part of the IBM Web Administration for i GUI. The wizard is shown in the navigation bar if the server is eligible to be upgraded.

It is highly encouraged that customers transition to the new server as soon as they are able to since the old server runtime and web services engine will be removed in a future release.

## Job limit changes

The limit on the number of jobs has increased.

The limit for number of jobs has been increased to 970000. If you change the **QMAXJOB** system value to use the new larger limit, it will cause additional storage use and decreased performance for functions that work with all jobs on the system.

## Job message limit behavior changes

Each job on the system has a limited number of program messages (4,294,967,293) it can create for the lifetime of the job. If the job has multiple threads, then the limit is the number of messages from all threads combined. When this limit is reached, the intent was for the operating system to terminate the entire job. In prior releases, this intent was not satisfied when the limit was reached in a secondary thread. Instead, the operating system ended only the secondary thread that noticed the limit was reached and the rest of the threads in the job continued to run. In IBM i 7.2 the operating system was updated to end the entire job, as was originally intended, when any thread in the job reaches the maximum number of messages allowed.

## Journal changes

Release to release changes for Journal

### APYJRNCHG and APYJRNCHGX behavior changes

Apply Journaled Changes (**APYJRNCHG**) and Apply Journaled Changes Extend (**APYJRNCHGX**) command changes

The **APYJRNCHG** and **APYJRNCHGX** commands will now fail with CPF7044 reason code 7 when applying object level changes if commitment control is currently active in the requesting job. All commitment definitions must be ended or the command must be issued in a different job.

### Journaling behavior when a DFRID is specified on a restore

Journal behavior changes when **DFRID** is specified on the Restore Library (**RSTLIB**), Restore Object (**RSTOBJ**), Restore Deferred Object (**RSTDFROBJ**) commands or **GO RESTORE** Option 21.

If the same **DFRID** parameter is used to both defer the restore of logical files and defer start journaling requests, when the Restore deferred object (**RSTDFROBJ**) command is run for that **DFRID**, an attempt will be made to both restore the deferred logical files and start journaling objects which deferred journaling. In previous releases, only an attempt to restore the logical files was made.

When a deferred start journal request is processed, a journal entry is recorded for the start journal operation, but no journal entries are recorded for the restore object or create object operations. This behavior change would be most noted in the case of a restore of all system and user data with option 21.

If a Defer ID is specified when restoring an object into a journaled library that has a *RESTORE inherit rule defined, the Defer ID takes precedence. That is, if the journal that the object was journaled to when it was saved does not exist, the start journal request will be deferred, and the *RESTORE inherit rule will not be used.

## Remote journal honors "secure connection"

Remote Journaling now honors the 'secure connection' field in a Relational Database (RDB) Directory Entry.

With release IBM i 7.2, remote journaling now honors the 'secure connection' field in a Relational Database (RDB) Directory Entry. If the RDB directory entry indicates that a secure connection is to be used, then a request to activate remote journaling will fail with CPF694F (communications failed with reason code 4) if a Global secure certificate for remote journaling (application ID QIBM_QJO_RMT_JRN_TGT) had not been defined on that target system and imported to the source system. For more information on how to establish secure connections for remote journal, see the Supported communications protocols for remote journals topic in the IBM Knowledge Center: Supported communications protocols for remote journals.

## Change Journal (CHGJRN) on all journals after IBM i 7.2 installed

A one-time **CHGJRN** for journal conversion on installation of i 7.2

When IBM i 7.2 is installed, a Change Journal (**CHGJRN**) command is issued once for all journals on the system. This action supports a conversion, which is required for internal information of the journal and journal receiver objects. Additionally, no Next Receiver (Journal code J, Entry Type NR) journal entries or IPL-related journal entries are deposited for the initial installation IPL.

## Maximum CPU and temporary storage changes

Behavior changes may be seen when limiting maximum CPU or temporary storage usage for jobs.

Any customers that are currently setting a maximum for CPU time or for temporary storage use will see a change in system behavior. Jobs that exceed the maximum CPU time or exceed the maximum temporary storage used will now be held by the system. Previously, these jobs would have been ended by the system. To obtain the old behavior you can set up a message watch and run a program that issues an End Job (ENDJOB) command. For maximum CPU time, set up a message watch for message CPI112D. For maximum temporary storage set up a watch for message CPI112E.

## MI Queue timestamp changes affecting data queues and user queues

MI queue timestamps might no longer be unique.

To avoid potential performance scaling issues, the time an entry is sent to a queue is changing to no longer use the uniqueness bits and the time a queue was last modified is changing to only use uniqueness bits some of the time. The granularity of timestamps are not changing but bits 52-63 of the timestamps might no longer provide uniqueness, in which case they are set to zero. Since the granularity of the timestamps is not changing, users of functions such as the Retrieve Object Description

(QUSROBJD) API, the Display Object Description (**DSPOBJD**) command, and the Retrieve Object Description (**RTVOBJD**) command will see no noticeable change. The change is noticeable in the following places where the timestamp is returned in Standard Time Format:

- Timestamp of enqueue of message field that is returned by the Dequeue (DEQ) MI instruction
- Message enqueue time field that is returned by the Materialize Queue Messages (MATQMSG) MI instruction
- Timestamp of last modification field that is returned by the Materialize System Object (MATSOBJ) MI instruction when a queue is materialized
- Message enqueue date and time field that is returned by the Retrieve Data Queue Message (QMHRDQM) API
- Change date and time field that is returned by the List Objects (QUSLOBJ) API when a data queue or user queue is listed
- Change date and time field that is returned by the Open List of Objects (QGYOLOBJ) API when a data queue or user queue is listed

The above 8-byte timestamps might no longer have the uniqueness bits set. For example, in the Dequeue (DEQ) MI instruction, the Standard Time Format is defined as a 64-bit (8-byte) unsigned binary value as follows:

```
Offset
    Dec  Hex  Field Name                 Data Type and Length
    0    0   Standard Time Format             UBin(8)
    0    0       Time              Bits 0-51
    0    0       Uniqueness bits               Bits 52-63
    8    8   --- End ---
```

The time field is a binary number, which can be interpreted as a time value in units of 1 microsecond. A binary 1 in bit 51 is equal to 1 microsecond.

The uniqueness bits field might contain any combination of binary 1s and 0s. These bits do not provide extra granularity for a time value; they merely allow unique 64-bit values to be returned, such as when the value of the time-of-day (TOD) clock is materialized. When the uniqueness bits all contain binary 0s, then the 64-bit value that is returned is not unique.

The create and last reclaim timestamps that are returned by functions such as the Retrieve Data Queue Description (QMHQRDQD) API and the **MATSOBJ** MI instruction remain unchanged.

## Message timestamps changing

Message timestamps may no longer be unique.

In previous releases, time for messages would be shown in HHMMSS and microsecond fields. If multiple messages were sent within the same microsecond in the past, times would have been non-unique. This is not changing, microsecond granularity will continue to be available. The change will affect the 8-byte time stamp fields returned by various message operations, because bits 52-63 of the time stamp will no longer provide uniqueness (they will be 0). This change will apply to messages sent to a program message queue which make up a job log (queue space). It also applies to messages sent to non-program message queues like QSYSOPR, QHST, user profile message queues, etc. For example, the changed timestamps could be seen by serviceability tools such as trace output, the advanced analysis macro queuespace and watch for event programs called when the watch option setting is *MSGID. This change was made as a performance improvement to avoid potential scaling issues.

## NLV changes for the Croatian and Romanian languages

In IBM i 7.2 5770-SS1, the IBM i operating system and products are no longer translated into the Croatian and Romanian languages.

Starting in IBM i 7.2, the 5770-SS1 IBM i operating system and related products are no longer translated into the Croatia and Romanian languages. The globalization feature codes and settings for Croatia (2912) and Romanian (2992) remain. However, the text is now delivered in English. The system multicultural support for these languages are not affected.

## Operations Console LAN adapter IPv6 support

Operations Console LAN adapter IPv6 support in IBM i 7.2 might cause address conflicts.

Beginning in IBM i 7.2, Internet Protocol version 6 (IPv6) is supported by the Operations Console LAN adapter. If a console adapter is configured, IPv6 support is automatically enabled along with the existing IPv4 support. If both the console adapter and a system line description use the same communication resource (for example CMN01) and an *IP6SAC (IPv6 stateless address auto-configuration) TCP/IP interface is configured on that line description, an address conflict can occur that might prevent IPv6 from being activated on that adapter. Before IBM i 7.2 is installed, the conflict can be prevented by ensuring the *IP6SAC interface is configured with an interface ID other than *LIND. (For example, the command `CHGTCPIFC INTNETADR(*IP6SAC) LIND(ETHLINE) IFCID(1234)` changes the interface ID to 0x1234.) The interface ID is used by an *IP6SAC interface to automatically configure IPv6 addresses for the interface. Changing the interface ID changes the IPv6 addresses that are auto-configured. Alternatively, following the installation, IPv6 can be disabled or a unique interface ID can be configured on the Operations Console LAN adapter through dedicated service tools (DST) or system service tools (SST) to eliminate any conflict.

## Problem reporting/PTF orders over VPN no longer supported

Customers who use VPN for problem reporting or PTF orders need to change to use HTTP or HTTPS.

One or more of the following changes might be needed:
- If the `/QIBM/UserData/OS400/UniversalConnection/eccConnect.properties` was modified to disable the HTTP/HTTPS paths for Electronic Customer Support, the changes need to be removed or the service configuration will need to be deleted and re-created to allow HTTP/HTTPS to work.
- If there is a firewall between the IBM i system and the internet, the firewall configuration might need to be modified to allow the IBM Service IP addresses and ports to make it through.

## PTF process changes

PTF processing has changed so that permanently applied objects will no longer be moved into library QRPLOBJ. Library QRPLOBJ will only contain user data rather than a mixture of user data and IBM data. PTF management will use new IBM libraries QPTFOBJ1 and QPTFOBJ2 for deleting unused permanently applied PTF objects. These libraries will only contain IBM data and cannot be cleared or deleted by the user.

## QFileSvr.400 connection changes

A change was introduced in the APPC support before IBM i 7.2 that prevents QFileSvr.400 to connect with SNA with Enterprise Extender. A CPFA0E2 - System unable to establish a communications connection to a file server is signalled instead. The circumvention is to use a TCP/IP interface for QFileSvr.400.

# Save Storage (SAVSTG) command and restore storage process are no longer provided

The Save Storage (**SAVSTG**) command and restore storage process are no longer provided. To backup and recover your system, it is recommended that you use other save and restore functions or a backup/recovery application. For example, use option 21 on the SAVE and RESTORE menus, or the Backup Recovery and Media Services (BRMS) application.

# SCPF joblog changes

In releases prior to IBM i 7.2, the **SCPF** joblog contained messages from parts of two IPLs. In 7.2 the **SCPF** joblog will be similar to other system joblogs and contain messages for only one IPL.

# Secure sockets layer (SSL) changes

# Secure sockets layer (SSL) default cipher specification list changes

SSL default cipher specification list has changed for System SSL

The System SSL default cipher specification list no longer contains any ciphers that use the MD5 hashing algorithm. The new Elliptic Curve Diffie-Hellman Ephemeral (ECDHE) Elliptic Curve Digital Signature Algorithm (ECDSA) set of Advanced Encryption Standard (AES) ciphers are first in the list. In the subsection of previously existing RSA ciphers, the AES 256-bit cipher is now second in the ordered default cipher specification list, previously it was fourth. The Rivest Cipher 4 (RC4) 128-bit cipher that was second is now in the fourth position. RC4 is not Federal Information Processing Standard (FIPS) approved so it should not be preferred over the AES and Triple Des (3DES) ciphers that are FIPS approved. The new ECDHE RSA AES subset of ciphers appears in the list before the 3DES and RC4 subsets. The ciphers no longer in the default cipher specification list are still supported by System SSL for applications that code to specifically use those ciphers.

Administrators can control the ciphers supported by System SSL using the system values QSSLCSL and QSSLCSLCTL. While the default cipher specification list can not be directly controlled by an administrator, the order of ciphers can be altered indirectly by changing the order of the ciphers contained in the QSSLCSL system value. See the SSL topic in the IBM Knowledge Center for additional information. The System SSL default cipher specification list is now as follows:

- ECDHE_ECDSA_AES_128_CBC_SHA256
- ECDHE_ECDSA_AES_256_CBC_SHA384
- ECDHE_ECDSA_AES_128_GCM_SHA256
- ECDHE_ECDSA_AES_256_GCM_SHA384
- RSA_AES_128_CBC_SHA256
- RSA_AES_128_CBC_SHA
- RSA_AES_256_CBC_SHA256
- RSA_AES_256_CBC_SHA
- RSA_AES_128_GCM_SHA256
- RSA_AES_256_GCM_SHA384
- 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_ECDSA_3DES_EDE_CBC_SHA
- ECDHE_RSA_3DES_EDE_CBC_SHA

- RSA_3DES_EDE_CBC_SHA
- ECDHE_ECDSA_RC4_128_SHA
- ECDHE_RSA_RC4_128_SHA
- RSA_RC4_128_SHA

## SSLv3 protocol has been disabled for System SSL

The Secure Sockets Layer version 3.0 protocol (SSLv3) is now disabled by default for System SSL. System SSL is the IBM i Licensed Internal Code (LIC) implementation of SSL functionality. It is tightly coupled with the operating system and the sockets code specifically providing extra performance and security. System SSL is available to application developers via two different programming interfaces and one JSSE implementation:

- Global Secure Toolkit (GSKit) APIs
  - ILE C APIs accessible from other ILE languages
- Native i5/OS™ SSL_ APIs
  - ILE C APIs accessible from other ILE languages
  - This API set is not recommended, use GSKit
- Integrated IBM i JSSE implementation
  - The IBM i JSSE implementation is available for JDK 1.6, JDK 7, and JDK 8.

SSL applications created by IBM, IBM business partners, independent software vendors (ISV), or customers that use one of these three interfaces to System SSL will be affected. FTP and Telnet are examples of IBM applications that use System SSL.

SSLv3 can be re-enabled by changing the QSSLPCL system value. See the SSL topic in the IBM Knowledge Center for additional information.

## TELNET changes

## CHGTELNA command changes

Change TELNET Attributes (`CHGTELNA`) command is changing the Session keep alive timeout (`TIMMRKTIMO`) range.

The Change TELNET Attributes (`CHGTELNA`) command is changing the Session keep alive timeout (`TIMMRKTIMO`) range. It is changed from 0-2147483647 to 1-2419200 to match the limits allowed on the TCP keep alive (`TCPKEEPALV`) parameter of the Change TCP/IP Attributes (`CHGTCPA`) command and the system implemented limits for socket attributes.

Any value outside the new range is set to the maximum value 2419200, which is equivalent to 28 days. Message TCP1F11 - `'Config file member successfully converted'` is sent to the joblog and to the QSYSOPR message queue if this value was changed to conform with the allowed range.

## Data area QTVNO32785 no longer supported for wide-screen suppression

New `ENBWIDE` parameter on the Change TELNET attributes (`CHGTELNA`) command must be used to configure wide-screen preferences.

Beginning with V5R1, customers who used 3278-5 wide-screen devices used for IBM z systems and then wanted to Telnet to an IBM i system had an option to NOT use the wide-screen support and instead use a 24x80 display. This was documented and configured by creating a QTVNO32785 data area anywhere in the system library list.

Customers were instructed:

To get a 24x80 display, run the command **CRTDTAARA DTAARA(libname/QTVNO32785) TYPE(*CHAR) VALUE('1')**.

This is no longer supported. The change is to use the Enable 3270 wide-screen (**ENBWIDE**) parameter added to the Change TELNET Attributes (**CHGTELNA**) command. Customers who previously used the QTVNO32785 data area must manually configure the Enable 3270 wide-screen (ENBWIDE) parameter. The system does not automatically migrate any pre-existing use of the QTVNO32785 data area and the default value of ENBWIDE(*YES) is used. The value for the **ENBWIDE** parameter must be set to *NO to disable wide-screen emulation.

# Options

This sections describes changes to options of the IBM i operating system.

## System Openness Includes (Option 13)

The ILE RPG header files contained in file QSYSINC/QRPGLESRC have been updated.

Two and four byte binary fields have been converted to two and four byte integer fields, respectively. For example:

Old Header:
```
DQUSM0200         DS
D*                                         Qdb Mbrd0200
D QUSBRTN03              1      4B 0
D*                                         Bytes Returned
D QUSBAVL04              5      8B 0
D*                                         Bytes Available
D QUSDFILN00             9      18
D*                                         Db File Name
```

New Header:
```
DQUSM0200         DS
D*                                         Qdb Mbrd0200
D QUSBRTN03              1      4I 0
D*                                         Bytes Returned
D QUSBAVL04              5      8I 0
D*                                         Bytes Available
D QUSDFILN00             9      18
D*                                         Db File Name
```

These changes might cause an incompatibility to existing code that use the affected headers.

1. An RPG program might fail to compile in cases where RPG requires an exact type match.
   - A parameter that is passed by reference on a prototyped call.
   - A single key field in a fixed form search operation.
2. A recompiled RPG program might behave differently.
   - If the program is using the number of digits in the subfield for some other calculation (the prior binary subfields would have 4 or 9 digits; the new integer fields would have 5 or 10).
   - The edited form of the subfields would have one more byte so it might overflow a character work field.
   - If the program is expecting numeric calculations to truncate the high-order digits (RPG has fixed form arithmetic operations ADD, SUB, MULT, DIV which default to truncating without error).

## Integrated Server Support (Option 29)

Some Microsoft Windows server versions are no longer supported over iSCSI connections.

The following Microsoft Windows server versions are no longer supported on servers that are integrated with IBM i using internet SCSI (iSCSI):
- Microsoft Windows Server 2003 R2
- Microsoft Windows Server 2003

See the Support Matrices chapter of the IBM i iSCSI Solution Guide IBM i iSCSI Solution Guide for the current list of server operating system versions and IBM System x® and BladeCenter® blade server models that can be attached to IBM i systems using internet SCSI (iSCSI) technology.

## Domain name system (Option 31)

In 7.2, Domain Name System (Option 31) uses utilities OpenSSH, OpenSSL, and zlib, which require that IBM Portable Utilities for i (5733-SC1) option 1 be installed.

## Additional Fonts (Option 43)

The names of the fonts and their corresponding file names have changed.

For compatibility with earlier versions, and to eliminate the need to update existing applications, the operating system maps the old font names to the new font names for DDS applications that use the FONTNAME keyword to reference fonts by their full font name. Likewise, the operating system has created symbolic links with both the old and new file names in the /usr/lib/fonts directory for PASE applications that reference fonts by their file names.

If you have applications that access these fonts directly in the product directory /QIBM/ProdData/OS400/ Fonts/TTFonts, you need to change the application to use the new names or create symbolic links that map the old file names to the new ones.

# Licensed programs

This section contains information about individual licensed programs that have been modified or changed for IBM i 7.2.

## Collaboration and Social Products (Formerly Lotus)

## Collaboration and Social Products supported on IBM i 7.2

Refer to the Lotus® Software for IBM i Compatibility Guide on the IBM systems Web site at http://www.ibm.com/systems/resources/systems_power_ibmi_lotus_releasesupport.pdf for information about the minimum releases of Lotus products required to run on IBM i 7.2.

## Lotus Quickr for Domino

Lotus Quickr® for Domino® is not supported on IBM i 7.2. The suggested replacement for your Lotus Quickr environments is IBM Connections Content Manager.

## IBM WebSphere Application Server Versions 8.0 (5733-W80) and 8.5 (5733-W85)

### Installation of WebSphere® Application Server

In IBM i 7.1, IBM Web Enablement for i included IBM WebSphere Application Server - Express® V7.0, IBM WebSphere Application Server - Express V8.0, and IBM WebSphere Application Server - Express V8.5. In IBM i 7.2, IBM Web Enablement for i includes IBM WebSphere Application Server - Express V8.0 and IBM WebSphere Application Server - Express V8.5. Additionally, Application Servers V6.1 and V7.0 are not supported on IBM i 7.2.

The minimum required level of WebSphere Application Server V8.0 on 7.2 is 8.0.0.8. The minimum required level of WebSphere Application Server V8.5 on 7.2 is 8.5.5.2. However, for the WebSphere Application Server Liberty profile, which was introduced with Application Server V8.5 the minimum required level for archive type installations is 8.5.0.0 while the minimum required level for IBM Installation Manager type installations is 8.5.5.0.

### Installation:

If you are currently using Application Server V7.0 and upgrading to IBM i 7.2, you need to migrate to the WebSphere Application Server V8.0.0.8 or V8.5.5.2 products. Because migration does not require Application Server V7.0 to be operational, migration can occur before or after you upgrade to 7.2.

### Upgrading to IBM i 7.2:

If you are currently using Application Server V7.0 and upgrading to 7.2, you need to migrate to the WebSphere Application Server V8.0.0.8 or V8.5.5.2 products. Because migration does not require Application Server V7.0 to be operational, migration can occur before or you upgrade to 7.2.

1. After you upgrade to 7.2, ensure that all Application Server installations meet the minimum required fix levels. The version identifier is contained in file `<app_server_root>/properties/version/WAS.product`, where`<app_server_root>` is the root directory of the WebSphere Application Server installation. For the Liberty profile, the version identifier is contained in `<wlp_root>/lib/versions/WebSphereApplicationServer.properties`, where `<wlp_root>` is the root directory of the Liberty profile.

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2. For WebSphere Application Server V8.0, apply fix pack 8 (8.0.0.8) or later if needed. For WebSphere Application Server V8.5, apply fix pack 2 of version 8.5.5 (8.5.5.2) or later if needed. For Installation Manager type installs of the Liberty profile, update the Liberty profile to version 8.5.5.0 or later.

   **Note:** In WebSphere Application Server Version 8.5.5.0, the Liberty profile was promoted from a feature to an independently installable offering. You cannot make an in-place update of the Version 8.5.0.x Liberty profile feature. For more information, see article "Updating the Liberty profile from Version 8.5.0 to Version 8.5.5" in WebSphere Application Server information center.

3. Skip this step if Liberty profile version 8.5.0.0 or later was installed using the archive type installation, or if Liberty profile version 8.5.5.0 was installed using the Installation Manager. Otherwise, if the Application Server installation was already at the required fix level before the upgrade, then update the Application Server service programs for 7.2.

   To update the programs:
   - Start the Qshell interpreter.
   - cd to <app_server_root>/bin
   - Start the _postfpexit script as follows: _postfpexit <app_server_root>

## Documentation:

For more information, see the WebSphere Application Server Library documentation at this website: http://www.ibm.com/software/webservers/appserv/was/library

# IBM Developer Kit for Java (5770-JV1)

**Documentation**

For more information of J9 on i, see the IBM i Technology Updates website: http://www.ibm.com/developerworks/ibmi/techupdates/java.

## JV1 options support on IBM i 7.2

The JV1 options for IBM Technology for Java(IT4J) 1.4.2 (option 13) and 5.0 (option 8 and 9) are no longer supported on IBM i 7.2. The default JVM on i 7.2 is IBM Technology for Java™ 7.1 32 bit (option 14).

## Classic Java commands and API removed

The Classic Java commands `ANZJVAPGM`, `ANZJVM`, `CHGJVAPGM`, `CRTJVAPGM`, `DMPJVM`, `DSPJVAPGM`, and the Classic Java API QJVARJPI have been removed in IBM i 7.2.

Any programs that reference these commands might need to be updated.

# Backup Recovery and Media Services (5770-BR1)

Backup recovery and media services (5770-BR1) changes

## BRMS recovery report changes

The "Deleted library" attention block in the BRMS recovery report is now ignored.

In releases before IBM i 7.2, if data area QUSRBRM/Q1ANODLTAT existed, the "Deleted library" attention block would not show in the recovery report. In 7.2, parameter `SHWDLTLIB` was added to the Start Recovery using BRMS (`STRRCYBRM`) command. The `SHWDLTLIB` parameter controls including or omitting the attention block and replaces the data area function. The data area QUSRBRM/Q1ANODLTAT is ignored.

## Set time function removed

The set time function has been removed.

The "Set time" option 8 function from the Network Panel (**WRKPCYBRM *SYS** option 4) has been removed. Time management is critical to system operation and since there are other time management products available on the IBM i that work more efficiently, this function has been removed from BRMS in 7.2.

## New parameter UPDHST on some BRM commands

A new parameter **UPDHST** has been added to the Save Library using BRMs (**SAVLIBBRM**), Save Object using BRMs (**SAVOBJBRM**), Save Object List using BRMs (**SAVOBJLBRM**), Save Object using BRMs (**SAVBRM**) commands and control group attributes. This parameter exists on the operating system save commands Save Library (**SAVLIB**), Save Object (**SAVOBJ**), Save Object (**SAV**), and Save Changed Objects (**SAVCHGOBJ**), and if set up with defaults, BRMS would automatically have used the specified defaults. Since we are adding this parameter on BRMS commands, any default that was set before this release on these operating system commands, will no longer be used. You need to specify the value on the new **UPDHST** parameter available through the BRMS commands to get the same behavior.

When specifying **UPDHST(*NO)**, the object save time and date will not get updated. This might cause longer save times when doing an incremental save with BRMS. With **UPDHST(*NO)**, the system's optimization of using **SAVLIB** on the reference date cannot be used.

## WRKPCYBRM TYPE(*MOV) OUTPUT(*PRINT) changes

The spooled output that is generated by running command **WRKPCYBRM TYPE(*MOV) OUTPUT(*PRINT)** (Work with Policies using BRMs) has changed. If you have a program the parses this spooled file, then you will need to evaluate the changes to this report and make the corresponding changes to your parsing program.

## IBM HTTP Server for i (5770-DG1)

IBM HTTP Server for i is now based on Apache HTTP server version 2.4

## Configuration-related changes

Changes in server behavior that might require you to change your configuration or how you use the server so that you can continue to use HTTP Server on IBM i 7.2 as you currently use HTTP Server on IBM i 7.1 and V6R1.

- All load balancing implementations have moved to individual, self-contained mod_proxy sub modules, for example mod_lbmethod_bybusyness. You might need to load any of the load balancing implementations that your configuration uses.
- The DefaultType directive no longer has an effect, other than to emit a warning if it is used with any value other than none. For unknown file extensions, which are not declared in /QIBM/UserData/ HTTPA/conf/mime.types(for example, the .mbr files in QSYS file system), HTTP server does not add a default type(text/plain) in the response anymore. To display these files correctly, you are now responsible to assign media types in IBM i 7.2. For example, "AddType text/html .mbr".
- The default value of directive Options was changed from "All" to "FollowSymlinks".
- Module "mod_disk_cache" is renamed to "mod_cache_disk". You need to replace "LoadModule disk_cache_module /QSYS.LIB/QHTTPSVR.LIB/QZSRCORE.SRVPGM" with "LoadModule cache_disk_module /QSYS.LIB/QHTTPSVR.LIB/QZSRCORE.SRVPGM".
- mod_cache: The second parameter to CacheEnable matches forward proxy content only if it begins with the correct protocol. In IBM i 7.1 and earlier, a parameter of '/' matched all content. Specifying "<protocol>://" for the second parameter caches forward proxy content only from the default port of

that protocol. In IBM i 7.1 and earlier, it caches content from all ports. For example, "CacheEnable disk http://" now caches HTTP forward proxy content only from 80 port. Use "CacheEnable disk **http://\*:**" to cache http forward proxy content from all ports.

- FileETag now defaults to "MTime Size" (without INode).
- mod_log_config: ${cookie}C matches whole cookie names. Previously any substring would match.
- mod_dav_fs: The format of the DavLockDB file is changed for systems with inodes. The old DavLockDB file must be deleted on upgrade.
- KeepAlive accepts only values of On or Off. Previously, any value other than "Off" or "0" was treated as "On".
- mod_filter: FilterProvider syntax is changed and now uses a Boolean expression to determine whether a filter is applied.
- mod_include:
  – The #if expr element now uses the new expression parser. The old syntax can be restored with the new directive SSILegacyExprParser.
  – An SSI\* configuration directive in directory scope no longer causes all other per-directory SSI\* directives to be reset to their default values.
- mod_autoindex: now extracts titles and display descriptions for .xhtml files, which were previously ignored.
- The NameVirtualHost directive no longer has an effect, other than to emit a warning. Any address/port combination which appear in multiple virtual hosts is implicitly treated as a name-based virtual host.
- mod_deflate: now skips compression if it knows that the size increase added by the compression is larger than the data to be compressed.
- Multi-language error documents from previous releases might not work unless they are adjusted to the new syntax of mod_include: #if expr= element or the directive SSILegacyExprParser is enabled for the directory that contains the error documents.
- Directive "Rewritelog" and "Rewriteloglevel" are replaced by the new per-module logging configuration.

## Access control changes

Access control changes on IBM i 7.2

Before IBM i 7.2, access control that is based on client host name, IP address, and other characteristics of client requests was done with the directives Order, Allow, Deny, and Satisfy.

In 7.2, such access control is done in the same way as other authorization checks, by using the new module mod_authz_host. The old access control idioms should be replaced by the new authentication mechanisms, although for compatibility with old configurations, the new module mod_access_compat is provided. Here are some examples of old and new ways to do the same access control:

1. In this example, all requests are denied.

   **Pre 7.2 configuration**:

   ```
   Order deny,allow
   Deny from all
   ```

   **7.2 configuration**:

   ```
   Require all denied
   ```

2. In this example, all requests are allowed:

   **Pre 7.2 configuration**:

   ```
   Order allow,deny
   Allow from all
   ```

   **7.2 configuration**:

```
    Require all granted
```
3.  In the following example, all hosts in the example.org domain are allowed access; all other hosts are denied access.

    **Pre 7.2 configuration**:

    ```
    Order deny,allow
    Deny from all
    Allow from example.org
    ```

    **7.2 configuration**:

    ```
    Require host example.org
    ```

Beginning in IBM i 7.2, customers are encouraged to start to use the new access control directives. New directives are used by default when a new HTTP Server from IBM Web Administration for i is created.

## Third party modules consideration

API changes require third party modules be recompiled.

Due to the API changes in HTTP server for 7.2, in order to get your plug-in modules to work correctly with the new version HTTP server, all third-party (Non IBM) modules are required be recompiled against HTTP server for 7.2 runtime before being used. For detail about the API changes, please refer to API update overview: http://httpd.apache.org/docs/2.4/developer/new_api_2_4.html

## IBM PowerHA SystemMirror for i (5770-HAS)

IBM PowerHA® SystemMirror® for i (5770-HAS)

*   Before you upgrade your system to IBM i 7.2, if you have 5770-HAS (IBM PowerHA SystemMirror for i) installed, make sure that your HA version is 2.2. The Change Cluster Version (**CHGCLUVER**) command can be used to adjust the current version of the PowerHA product.

*   IBM PowerHA SystemMirror for i has been restructured. Standard edition is now option 2 and Express edition has been added which supports HyperSwap® and is option 3.

*   The High Availability Solution Manager GUI and the Cluster Resource Services GUI have been removed from the IBM PowerHA SystemMirror for i product. You can continue to configure and manage your high availability environment using the PowerHA GUI.

## IBM Content Manager OnDemand for i (5770-RD1)

## IBM Content Manager OnDemand for i upgrade requirements

If you are upgrading from a previous version of IBM Content Manager OnDemand, you must be running Content Manager OnDemand server version 8.4.0.3 (or higher) before you upgrade to Content Manager OnDemand for i 7.2. For instructions on how to determine your current server version, see the Content Manager OnDemand for i: Common Server Planning and Installation Guide.

Content Manager OnDemand client software must be upgraded to version 8.4.1.x (or higher) before you upgrade to Content Manager OnDemand for i 7.2. This includes, but is not limited to, the OnDemand Windows (end-user) client and the ODWEK CGI, Servlet, and Java APIs. If you use WEBi or IBM Content Navigator (ICN), see the appropriate documentation for those products to determine minimum software requirements.

The OnDemand Administrator client must be at the same version or higher as the Content Manager OnDemand server. For Content Manager OnDemand for i 7.2, the OnDemand Administrator client must be at version 9.0.0.3 or higher.

# New web-based administration tool

A new web-based Content Manager OnDemand component of IBM Navigator for i is now available. This new administration interface replaces the OnDemand Archive plug-in of System i® Navigator. Customers running Content Manager OnDemand for i at 7.2 must use this new tool to administer storage management objects such as migration policies and various archive media definitions, as well as output queue and directory monitor definitions.

# Command changes

In Content Manager OnDemand for i 7.2, various commands have changed as described below. See the Content Manager OnDemand for i: Common Server Planning and Installation Guide, Common Server Administration Guide, and online help for more information.

- Both the Start Archived Storage Management (**STRASMOND**) command and the Start Disk Storage Management (**STRDSMOND**) command with **STRASMOND(*YES)** now place a copy of the Archived Storage Management reports into the Content Manager OnDemand System Log folder after the ASM process completes. The Content Manager OnDemand server is started for you automatically if the server is not started so that the reports can be loaded.
- Both the Add Report to OnDemand (**ADDRPTOND**) and Start Monitor for OnDemand (**STRMONOND**) commands have a new Password stash file (**STASHFILE**) parameter that, if used, specifies the path and file name of a stream file that contains the user profile and password that is used to run the command. This parameter is optional.
- The Change Policy Level Date (**CHGPLDOND**) command has two new parameters. The new Processing option (**OPTION**) parameter allows you to specify a particular report ID (also known as load ID). This parameter enables you to change the next level date for one particular report ID, rather than the current default, which is to change the policy level date for a date range of documents. If you specify *RPTID for the new **OPTION** parameter, a new Report ID (**RPTID**) parameter is enabled. These parameters are optional.
- Both the Remove Report from OnDemand (**RMVRPTOND**) command and the Start Disk Storage Management (**STRDSMOND**) command have a new Hold threshold (**HLDTHLD**) parameter. When you use the Enhanced Retention Management feature, the new **HLDTHLD** parameter specifies a threshold value that determines if and when you want Content Manager OnDemand to reload data during deletion or expiration processing. This parameter is optional.
- The Remove Report from OnDemand (**RMVRPTOND**) command no longer supports the Error option (**ERROPT**) parameter. Previously, the **ERROPT** parameter allowed you to specify whether you wanted to remove a report that is based on the existence of a record of the report ID in the Content Manager OnDemand System Log. Beginning in 7.2, the **RMVRPTOND** command always removes the report, regardless of whether the report ID is found in the System Log.

# First start of a Content Manager OnDemand instance or the Archive Storage Management (ASM) process takes longer

The first start of a Content Manager OnDemand instance or the Archive Storage Management (ASM) process after an upgrade to Content Manager OnDemand for i 7.2 might take longer because of a number of database changes. The most significant delay occurs if you are upgrading from a release before 7.1 due to the movement of instance-specific data and objects from the QUSRRDARS library into the instance libraries.

- Do not end the server job or the ASM job because you are concerned that it is not progressing.
- Status messages are signaled during the database changes and the data movement from QUSRRDARS to the instance library. You can check these messages to confirm that the job is progressing.

# Product restructuring

The product options for Content Manager OnDemand for i have been restructured to make installation and maintenance easier. The individual product options for 7.2 (which install separately) are as follows:

- *BASE for the Base Support (required for all others)
  - *BASE now includes Common Server (previously option 10) and Web Enablement Kit (ODWEK; previously option 11).
  - This option also includes the IBM Navigator for i - Content Manager OnDemand component (previously named: IBM Navigator for i - OnDemand Administration).
- 12 for PDF Indexer (optional)
- 13 for Advanced Function Presentation Transformations for IBM i (optional)
- 14 for Enhanced Retention Management (optional)

Product options 10 and 11 are now included in *BASE and no longer require installation of a separate option. Important: If product options 10 or 11 exist on your system, they are deleted during the upgrade process.

The System i Navigator - OnDemand Archive plug-in is replaced by the web-based IBM Navigator for i - Content Manager OnDemand component that is included in the *BASE product option. Important: The System i Navigator - OnDemand Archive plug-in is not supported at 7.2 and is deleted during the upgrade process.

Product options 1 through 5 have not been supported since Content Manager OnDemand for iSeries® 5.4 (licensed program number 5722-RD1). Important: If options 1 through 5 of licensed program number 5722-RD1 exist on your system during the upgrade to Content Manager OnDemand for i 7.2, they are deleted during the upgrade process.

The options are:

1. Spool File Archive
2. Object Archive
3. Record Archive
4. AnyStore
5. Server (used with Spool File Archive)

# IBM Universal Manageability Enablement for i (5770-UME)

CIM function updates from Licensed Program IBM Universal Manageability Enablement for i 5770-UME(V1R3M0) to Licensed Program 5770-UME(V1R4M0)

IBM i Common Information Model Object Manager (CIMOM) server and providers are updated from Licensed Program (LP) 5770-UME V1R3M0 to Licensed Program (LP) 5770-UME V1R4M0. 5770-UME V1R4M0 can be installed on IBM i 6.1, IBM i 7.1 and IBM i 7.2 and is installed by default on IBM i 7.2.

**Dependency for CIM server startup**:

Users must install these LPs and options before the CIM server can be started without error:

- 5770-SS1 option 33 PASE (Portable Application Solutions Environment).
- 5733-SC1 option 1 (OpenSSL)

**Auto-start CIM Server:** :

5770-UME V1R4M0 CIM server is defined as an auto-start TCP/IP service. The CIM server will auto start after a scratch installation of the IBM i 7.2, while it will inherit the previous auto-start configuration after a slip installation.

**CIM commands that are run in IBM i PASE**:

CIM server and providers can run in Portable Application Solutions Environment (IBM i PASE). You need to run the call qp2term command before you run IBM i PASE commands. CIM commands (`cimconfig`, `cimmof`, `cimtrust`, `cimcrl`,`cimsub`, and `cimprovider`) are unchanged from 5770-UME V1R3M0. New commands (`cimcli`, `cimreparchive`) are added in 5770-UME V1R4M0.

**IBM Systems Director compatibility**:

5770-UME V1R4M0 CIM Server registers platform-agent for IBM Systems Director. The 5770-UME LP might not work with IBM Systems Director earlier than version 6.1.2.

**Development interfaces**:

The CIM server in 5770-UME V1R4M0 is based on OpenPegasus V2.11.0. Any external products that use the restricted IBM i 6.1, IBM i 7.1 or IBM i 7.2 CIM provider interfaces must adapt to the new OpenPegasus Software Development Kit (SDK) V2.11.0 and obtain updated IBM i-specific interface documentation from IBM. The development interfaces remain restricted with 5770-UME, and a limited availability agreement is required for their use. If external products have installed CIM providers in IBM i 6.1, IBM i 7.1 or IBM i 7.2, those CIM providers will not work with 5770-UME until they are updated to run in IBM i PASE and to use updated interfaces.

**CIM schema**:

5770-UME, V1R4M0, includes the Distributed Management Task Force (DMTF) CIM schema V2.29.

**CIMOM TCP/IP server entry in IBM Navigator for i**:

You can start and end the CIM server as a TCP/IP server. Using IBM Navigator for i, expand **IBM i Management** > **Network** > **Servers** > **User-Defined Servers** to find the "CIMOM" entry. Then, you can use the web page to start or stop **CIMOM**.

**Reliable Indications**:

To enhance the reliability of delivering CIM indication, 5770-UME V1R4M0 introduces two new properties (**maxIndicationDeliveryRetryAttempts**, **minIndicationDeliveryRetryInterval**) to configure the retry mechanism of delivering CIM indications.

**Configurable SSL cipher suite**:

During the period of responding to a CIM request, the CIM server maintains secure SSL-based communication with the client. The secure cipher suite level that CIM server supports is DEFAULT. To enable customers to adjust the security level, 5770-UME V1R4M0 provides a new property (**sslCipherSuite**) to configure CIM server supported cipher suites.

**ICU library changed**:

5770-UME V1R4M0 changes the ICU library from ICU 4.0 to ICU 3.6 due to OpenPegasus V2.11.0 compatibility issues with ICU4.0.

**Support customer provider directory**:

Based on a new feature in OpenPegasus V2.11.0, 5770-UME V1R4M0 defines an extra directory for 3rd-party providers. The directory is `"/QOpenSys/QIBM/ProdData/UME/Pegasus/3rdprovider"`, and customers can put their own providers in this directory. The customer's provider agent is started when a user sends a CIM request to the provider. All of this can be done while the CIM Server is running. The user does not need to restart the CIM Server.

**New command for repository backup**:

New command "cimreparchive" is shipped in 5770-UME V1R4M0. A symbolic link for the command is added in directory `"/QOpenSys/usr/bin"`. It supports an additional mechanism to backup the CIM repository in addition to the IBM i specific SAVE and RESTORE mechanism. Users can run this new command in Portable Application Solutions Environment (IBM i PASE).

**Repository migration**:

If the IBM i 7.2 system is upgraded over V5R4, the CIM Server repository is migrated from DMTF CIM schema V2.9 to DMTF CIM schema V2.29 during the first startup of CIM server in 5770-UME LP. If IBM i 7.2 system is upgraded over IBM i 6.1 or IBM i 7.1, the CIM Server repository is migrated from DMTF CIM schema V2.14 to DMTF CIM schema V2.29 during the first startup of CIM server in 5770-UME LP. This migration takes a while, depending on the size of the repository, processor speed, and system utilization. The CIM server is unavailable to process CIM requests until the repository migration completes. Stopping the server job during migration might result in a loss of data.

The following objects in the repository are not migrated:
• CIM Provider Registration on IBM i 5.4 is not migrated.
• Static instances of metric definition on IBM i 5.4 in the repository (providers dynamically collect information and implement the same functions as these metric instances).

The CIM server log might have the following messages that are related to the repository migration:
• When migration starts, message PGS10080 is written in the CIM server log. The default location is /QOpenSys/QIBM/UserData/UME/Pegasus/logs. PGS10080: The CIM server is starting to check/restore/migrate repository. This takes several minutes, during which the server will not be available. Stopping the server job might result in a loss of data.
• When migration ends without any error, message PGS10081 is written in the CIM server log. PGS10081: The Common Information Model (CIM) check/creation/migration process of repository has been completed successfully.

**Configuration properties**:

The CIM server in 5770-UME LP has some changed configuration properties.

These properties are obsolete: **httpBindAddress**, **httpsBindAddress**, **httpAuthType**, **httpExportPort**, **enableHttpLocalConnection**, **tempLocalAuthDir**, **exportSSLTrustStore**, **enableClientCertification**, **enableSSLExportClientVerification**, **enableHttpExportConnection**, and **passwordFilePath**.

These properties are set to fixed properties: **enableBinaryRepository**, **enableNamespaceAuthorization**, **enableRemotePrivilegedUserAccess**, **home**, **messageDir**, **providerDir**, **providerManagerDir**, **slp**, and **repositoryDir**.

**These properties' default values are changed**:
• The default value for **enableNamespaceAuthorization** is set to: *true*.
• The default value for **enableSubscriptionsForNonprivilegedUsers** is set to: *true*.
• The default value for **providerDir** is set to: /QOpenSys/QIBM/ProdData/UME/Pegasus/provider**;**/ QOpenSys/usr/lib**;**/QOpenSys/QIBM/ProdData/UME/Pegasus/3rdprovider.

- The default value for **shutdownTimeout** is set to: *60*.

These properties are new properties in 5770-UME V1R4M0:

- **maxIndicationDeliveryRetryAttempts**: If set to a positive integer, this value defines the number of times that the indication service tries to deliver an indication to a particular listener destination. This does not affect the original delivery attempt, thus if set to 0, the CIM server tries to deliver the indication only once. The default value is set to *5*.
- **minIndicationDeliveryRetryInterval**: If set to a positive integer, this value defines the minimal time interval in seconds for the indication service to wait before attempting again to deliver an indication to a listener destination that previously failed. The CIM server might take longer due to QoS or other processing. The default value is *480* (seconds).
- **sslCipherSuite**: This property is a String containing the OpenSSL cipher specifications to configure the cipher suite the client is permitted to negotiate with the server during the SSL handshake phase. The default value is *DEFAULT*.

If IBM i 7.2 is upgraded over IBM i 7.1 or IBM i 6.1, the first time the CIMOM is started, the CIM server migrates CIM server configuration data from the previous releases to 5770-UME V1R4M0 PASE CIM server configuration. If IBM i 7.2 is upgraded over V5R4, the first time the CIMOM is started, the CIM server migrates data from base operating system CIM server configuration to 5770-UME V1R4M0 PASE CIM server configuration. Most of the configuration property values are migrated intact. The following are exceptions, and they are not migrated from base operating system CIM server in IBM i V5R4 or 5722-UME V1R2M0 to 5770-UME V1R4M0:

- Obsolete properties are not migrated.
- If the property **idleSessionTimeout** has a value set, then replace it by property **idleConnectionTimeout** with the same value.
- If **traceLevel** =4 then modify it to **traceLevel** =5.

The property values being migrated are not validated. If the CIM server configuration properties from the previous releases are not set to function correctly, this situation might prevent the 5770-UME LP CIM server from starting and working correctly.

# IBM Rational® Development Studio for i (5770-WDS)

## ILE C compiler changes

Changes have been made in the ILE C compiler to more closely conform to the C99 language specification as defined in the International Standard for Information Systems-Programming Language C, ISO/IEC 9899:1999. The ILE C compiler now conforms to the integer constant type rules as defined in the C99 language specification, section 6.4.4.1, Integer Constants. By conforming to the new C99 specification, incompatibilities have been introduced.

- An unsuffixed decimal constant in range $2^{31}$ to $(2^{32})$-1 will have type long long int versus unsigned long int. For example, the constant 2147483700 will now have type long long int.
- A decimal constant suffixed with l or L in range $2^{31}$ to $(2^{32})$-1 will have type long long int versus unsigned long int. For example, the constant 2147483700L will now have type long long int.
- A decimal constant suffixed with ll or LL in range $2^{63}$ to $(2^{64})$-1 will be flagged as an error versus having a type of unsigned long long int. For example, the constant 9223372036854775900LL will now be flagged as an error.
- A mixed case LL suffix (lL or Ll) will be flagged as an error.

The C99 integer constant type rules are used when the **LANGLVL(*EXTENDED)** and **TGTRLS(*CURRENT |
V7R2M0)** compiler options are in effect. Since **\*EXTENDED** is the default language level and **\*CURRENT** is the default target release, the new integer constant type rules are in effect by default.

The compiler services option, CSOPT('-qinfo=c99'), can be specified on the Create C Module (CRTCMOD) or Create Bound C Program (CRTBNDC) commands. This option will cause the ILE C compiler to flag code that behaves differently between C89 and C99 language levels and can be used to detect the differences described above.

## ILE RPG changes

### A non-qualified subfield or format cannot be qualified within a subprocedure

It is not valid to use qualified notation, A.B, for subfields and record formats that are not qualified. Before IBM i 7.2, the compiler did not always detect this error if the reference to the global subfield or record format was in a subprocedure. Starting in 7.2, the compiler detects this error and diagnostic: RNF7591 – An operand of a qualified name expression is not valid is issued at compile time.

### Programs that contain subprocedures that are not prototyped will not compile if DFTACTGRP(*YES) is specified

In releases previous to 7.2, a program that contained a procedure without a prototype definition would successfully compile with DFTACTGRP(*YES) specified. The program object produced was an illegal program that might produce unpredictable results when run.

In release 7.2, the program no longer compiles and diagnostic message RNF1520 – The procedure cannot be defined with DFTACTGRP(*YES) is issued.

### Hexadecimal literals cannot be converted to Graphic or UCS-2

Before release 7.2, the RPG compiler supported the use of MOVE and MOVEL to convert a hexadecimal literal to a graphic or UCS-2 variable, and it supported a hexadecimal literal as a parameter to the %GRAPH and %UCS2 built-in functions.

Starting in 7.2, the RPG compiler no longer supports converting a hexadecimal literal to graphic or UCS-2.

If you are affected by this change, you can concatenate an empty character literal to the hexadecimal literal for the %GRAPH and %UCS2 functions. In all cases, you can define a varying length character field and assign it the hexadecimal literal, then specify that character field in place of the hexadecimal literal.

## IBM i Access for Windows (5770-XE1)

The last release for IBM i Access for Windows (5770-XE1) was 7.1. Most features that are part of 7.1 IBM i Access for Windows are available in newer products. For example, 5250 display and print emulation, Data Transfer, 5250 Console, Virtual Control Panel, and the ability to download spool files to your desktop are available as part of IBM i Access Client Solutions (5733-XJ1). Database drivers and providers such as ODBC, .Net and OLE DB are available as part of IBM i Access Client Solutions - Windows Application Package (5733-XJ1). Most of the features of System i Navigator are available as part of its web based counterpart, IBM Navigator for i (SS1 option 3). For System i Navigator features that are not part of IBM Navigator for i, such as Run SQL Script, Visual Explain, and Management Central, the 7.1 version of System i Navigator is compatible with IBM i release 7.2.

## IBM i Access for Web (5770-XH2)

IBM i Access for Web (5770-XH2) changes

**Before you install IBM i Access for Web**:

If you currently have a configured, running version of IBM i Access for Web on your IBM i system, you must run the IBM i Access for Web configuration commands again when you install the new version before you can use the product. Running the command enables the new function that is provided with the new release. When you run the Configure Access for Web (`CFGACCWEB`) command for the WebSphere Application Server environments, be aware that the value specified for the `WASPRF` parameter is case-sensitive and must be entered exactly as shown in the `/QIBM/UserData/Access/Web2/config/instances.properties` file. For detailed instructions on installing and upgrading the product and running the configuration commands, see the IBM i Access for Web topic in the IBM Knowledge Center: IBM i Access for Web.

**Web application servers and WebSphere Portal environments**:

If you currently have a configured, running version of IBM i Access for Web on your IBM i system, that web application server environment might no longer be supported by IBM i Access for Web. You must migrate your IBM i Access for Web configuration to a supported web application server. For additional information, see the IBM i Access for Web topic in the IBM Knowledge Center: IBM i Access for Web.

7.2 IBM i Access for Web can migrate user-generated data from an unsupported web application server environment to a supported web application server environment when new web application servers are configured. You can migrate user-generated data by using the `CFGACCWEB` command and specifying input for the `SRCSVRTYPE`, `SRCSVRINST`, `SRCAPPSVR`, `SRCINSDIR`, and `SHRUSRDTA` parameters.

7.2 IBM i Access for Web also allows you to remove the IBM i Access for Web configuration from the unsupported web application server environment using the Remove Access for Web (`RMVACCWEB`) command. Be sure that the latest 7.2 IBM i Access for Web PTFs are loaded and applied before attempting to migrate from or remove unsupported web application server environment configurations.

# IBM i Access for Linux (5770-XL1)

The last release for IBM i Access for Linux (5770-XL1) was 7.1. It has been replaced by IBM i Access Client Solutions (5733-XJ1) which offers an updated 5250 display and print emulator and additional features which were not previously available for Linux such as Data Transfer, 5250 Console, Virtual Control Panel, and the ability to download spool files to your desktop. The ODBC driver is available as part of IBM i Access Client Solutions - Linux Application Package (5733-XJ1).

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