

IBM i Memo to Users
7.4

Memo to Users



Note

Before using this information and the product it supports, read the information in [“Notices” on page 41.](#)

This edition applies to version IBM i 7.4 (product number 5770-SS1) and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

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PDF file for Memorandum to Users

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Saving PDF files

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3. Navigate to the directory in which you want to save the PDF.
4. Click **Save**.

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About IBM i Memo to Users

This information describes the changes in version 7, release 4, modification 0 (IBM® i 7.4) 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 7.4 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 7.4. 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 7.4 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 7.4 at this Web site:

https://www.ibm.com/support/knowledgecenter/ssw_ibm_i

Technical changes to the text are indicated by a vertical line to the left of the change.

For Preventive Service Planning - PSP information go to :

1. <http://www.ibm.com/support/docview.wss?uid=nas8N1021657>
2. Click **IBM i 740 PSPs**.

What's new

The following information was added or updated in this release of the information:

What's new



The following revisions or additions have been made to the Memorandum to Users documentation since the first IBM i 7.4 publication:

- **April 2021 update**
 - [“SYSDISKSTAT extended to return each disk path” on page 24](#) was added.
 - [“Updated EBCDIC Unicode maps for CCSIDs 1377 and 1388 ” on page 31](#) was added.
 - [“Native JDBC driver can fail with SQL0191 \(Mixed data or UTF-8 data not properly formed\)” on page 28](#) was added.

- [“OBJECT_STATISTICS\(\) table function changes for *USRPRF objects” on page 24](#) was added.
 - [“IBM Navigator for i requires 64-bit Java SE 8” on page 27](#) was added.
 - [“Calls to SQLSetConnectAttr API may now return -1 with Message ID SQ99999” on page 25](#) was added.
 - [“Open Source Package Management Interface Proxy Support ” on page 38](#) was added.
 - [“Queries that compare a numeric value with blanks or an empty string will fail with SQLSTATE/SQLCODE ‘22023’/-302 or ‘53045’/-678” on page 25](#) was added.
 - [“Change to authority required for registering Query Governor exit programs” on page 25](#) was added.
- **October 2020 update**
 - [“Open Source Package Management Interface Proxy Support ” on page 38](#) was added.
 - [“TLSv1.3 enablement may require changes to GSKit client to prevent GSK_WOULDBLOCK or EWOULDBLOCK advisory condition” on page 30](#) was added.
 - [Service Monitor autostart job entry removed from QUSRWRK subsystem description](#) was added.
 - [“An RPG file defined with USAGE\(*UPDATE\) is no longer opened delete-capable” on page 37](#) was added.
 - [“XML-SAX with "ccsid=1200" or "ccsid=13488", when the default UCS-2 CCSID for the module is a different CCSID” on page 31](#) was added.
 - [“%TIMESTAMP now returns a timestamp with microsecond precision” on page 38](#) was added.
 - Links were updated in the following sections:
 1. [“IBM Developer Kit for Java \(5770-JV1\)” on page 36](#)
 2. [“Discontinued support for certain software and hardware” on page 5](#)
 3. [“Upgrade planning ” on page 8](#)
 4. [“Required PTFs before you upgrade to IBM 7.4” on page 8](#)
 - **April 2020 update**
 - [“Changes to CL commands sending messages to *EXT” on page 12](#) was added.
 - [“QSYS2 SQL catalog files no longer restored with restore commands” on page 23](#) was added.
 - [Plan for your Operations Console installation or upgrade](#) was updated.
 - **May 2019 update**
 - [“Mitigating Spectre and Meltdown vulnerabilities in new and existing programs” on page 30](#) was added.
 - [“Percent of Permanent Addresses Used Calculation” on page 31](#) was updated.
 - **April 2019 update**
 - [“Upgrade planning ” on page 8](#) was updated.
 - [“QSYS2.ASP_INFO view change” on page 23](#) was added.
 - [“SQE_NATIVE_ACCESS QAQQINI control is deprecated” on page 23](#) was added.
 - [“IBM WebSphere Application Server 8.5 \(5733-W85\) and 9.0 \(5733-W90\)” on page 35](#) was updated.

How to see what's new or changed

To help you see where technical changes have been made, this information uses:

- The  image to mark where new or changed information begins.
- The  image to mark where new or changed information ends.

To find other information about what's new or changed this release, see the [Memo to users](#).

Installing IBM i 7.4 over IBM i 7.2

If you are installing IBM i 7.4 over IBM i 7.2, you should also read the *IBM i Memo to Users* for IBM i 7.3. It contains incompatibility-related information about the new functions and enhancements incorporated in IBM i 7.3.

You can also view the IBM i 7.3 *IBM i Memo to Users* in the IBM Knowledge Center under the IBM i 7.3 release :

https://www.ibm.com/support/knowledgecenter/ssw_ibm_i

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 "Planning to Upgrade to IBM i 7.4" at:

<https://www.ibm.com/support/pages/node/880105>

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.

You can view these documents in the IBM Knowledge Center under the IBM i release needed:

https://www.ibm.com/support/knowledgecenter/ssw_ibm_i

Prerequisite and related information

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

https://www.ibm.com/support/knowledgecenter/ssw_ibm_i

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: <https://www14.software.ibm.com/support/customer/ipt/home>

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.

For comments on books or IBM i content in the IBM Knowledge Center, use the comment feature in the topic of interest within IBM Knowledge Center.

Read this first

Read this section before doing anything else.

Current customers - read before you install

Read the release planning documents before you install IBM i 7.4

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/

Note: After the release of IBM i 7.4, 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 7.4 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 pre-installation 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. To access the PSP database:
 1. Go to <http://www.ibm.com/support/docview.wss?uid=nas8N1021657>.
 2. Click **IBM i 740 PSPs**

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 7.4 is SF98200.

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 SF98200

- The PSP identifier for information that pertains to problems discovered since the availability of the current cumulative PTF package is SF98740. Information within this PSP describes 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 SF98740

- The PSP identifier for information that pertains to installing IBM i 7.4 hardware and HMC is MF98740. 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 MF98740

- The PSP identifier for information that pertains to system upgrades and data migrations is SF98206. 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 SF98206

- 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.

Required PTFs before you upgrade to IBM 7.4

PTFs might be required before you upgrade to IBM i 7.4

To review the "Required PTFs for upgrading to IBM i 7.4", go to the support pages using the following link: <https://www.ibm.com/support/pages/node/3032649>. Also select "Updates and PTFs" on that page for more information.

Upgrade planning

Documentation resources important to consult before you upgrade:

- The Systems Management Planning web page: <https://www.ibm.com/support/pages/node/668131> provides links to various planning tools and information.
- The IBM i mapping web page: lists operating system support by model.
- On the Planning web page <https://www.ibm.com/support/pages/node/668155>, select Upgrade Planning and then Future Software/Hardware. Follow the link to Software for advanced planning information including BOSS option, LPP and LPP option availability changes.. Check this information and use it to plan future solutions for enhancements, upgrades, or migrations.

Minimum partition memory required for IBM i 7.4

The minimum memory size for an IBM i 7.4 partition is 2 GB. However, at least 4 GB of memory is recommended for most partitions.

IBM i 7.4 is not supported on POWER7 systems

POWER7® systems will not support IBM i 7.4:

- POWER7 BladeCenter models (8406-70Y, 8406-71Y, 7891-73X, 7891-74X)
- POWER7 710, 720, 730, 740, 750, 760, 770, 780, 795, (8202-E4B, 8202-E4C, 8202-E4D, 8205-E6B, 8205-E6C, 8205-E6D, 8231-E1D, 8231-E2B, 8233-E8B, 8408-E8D, 9109-RMD, 9117-MMB, 9117-MMC, 9117-MMD, 9119-FHB, 9179-MHB, 9179-MHC, 9179-MHD)

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 7.4:

The service tool server which includes LAN console is removing support for SSL V3 ciphers which means the LAN console feature in the IBM i 7.1 Access for Windows client is no longer supported in IBM i 7.4. IBM i Access Client Solutions is now required for LAN console in IBM i 7.4. IBM i Access Client Solutions, which is shipped with the system, should be installed on your PC before installing the License Internal Code (LIC) on the IBM i. The LAN console feature in IBM i Access Client Solutions can connect to any supported IBM i release.

Note: The LAN console feature in the IBM i Access for Windows client will work for a D-mode install because SSL ciphers aren't used during the D-mode IPL but on the following A-mode IPL the IBM i Access for Windows LAN console will fail to connect. The IBM i Access for Windows client does not need to be

removed from the PC but be aware the IBM i Access for Windows console will not continue working if the system is upgraded to IBM i 7.4.

If you are upgrading to IBM i 7.4 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 the 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 re-authentication of the client connection to the system. When you receive the operating system release upgrade, the shipped service tools user IDs are expired. To re-authenticate 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 7.4; 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.

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.

Command Output cautions

Release to release Command Output considerations

Applications that specify OUTPUT(*PRINT) or OUTPUT(*) must be able to tolerate changes to the record layout in either the spooled file or the screen output. From release to release, commands 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 defaulted to 100000. 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.

Changes to CL commands sending messages to *EXT

IBM i CL commands document Escape messages that occur, but other messages issued are not documented.

Diagnostic messages may accompany these messages to provide additional information. Messages reflecting run-time activities or status are also occasionally issued.

These information, status, and diagnostic messages are not documented and can be issued to the joblog, QSYSOPR, QHST, and *EXT. The type and location of these messages occasionally change to support new function at a release boundary or via PTF.

Customer programs written to retrieve the info, status, or diagnostic messages issued by CL commands may be required to be modified when the CL commands are changed. Unless the changes are related to Escape messages that are normally documented for the CL command, the changes are not always documented specifically by an update to the Memo to Users (MTU) or in a PTF cover letter.

Removal of support of adapters and configurations in release IBM i 7.4

Removal of commands supporting native SNA adapters:

Software support for these adapters has been removed. Hardware support for these adapters was withdrawn in prior releases. Software alternatives, such as Enterprise Extender for SNA, do not support these configurations. Affected configurations include SNA FAX, Finance, Retail and Remote workstation configurations.

Removal of support for DDI, Token-Ring, Wireless, Frame Relay, SDLC, TDLC, and X.25 protocols:

Software support for these protocols has been removed. Hardware support for these protocols was withdrawn in prior releases.

Removal of Network Interfaces configurations:

Software support for these adapters has been removed. Hardware support for these adapters was withdrawn in prior releases.

Removal of AnyNet configurations:

AnyNet® has not been supported since prior to IBM i 7.1. Users should start to move to Enterprise Extender before upgrading to the new release.

For information on moving from AnyNet to Enterprise Extenders view the topic in the Knowledge Center: http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_74/rzajt/rzajtanytoee.htm

IBM i command changes

Release to release IBM i command changes

ADDTCPIFC and CHGTCPIFC command changes

The Add TCP/IP Interface (**ADDTCPIFC**) and Change TCP/IP Interface (**CHGTCPIFC**) commands have changed.

The following parameters have been removed :

- PVC logical channel identifier (**PVCLGLCHLI**)
- X.25 idle circuit timeout (**IDLVCTTIMO**)
- X.25 maximum virtual circuits (**MAXSVC**)
- X.25 DDN interface (**DDN**)
- TRLAN bit sequencing (**BITSEQ**)

Interfaces will no longer be allowed for Line description (LIND) that are DDI, Frame relay, SDLC, TDLC, Token-Ring, Wireless or X.25.

Any existing CL programs that use these commands might need to be modified.

Existing TCP/IP Interfaces for line descriptions types that are no longer supported (DDI, Frame relay, SDLC, TDLC, Token-Ring, Wireless or X.25) should be removed using the Remove TCP/IP Interface (**RMVTCPIFC**) command.

ADDUSRSNMP command changes

On the Add User for SNMP (**ADDUSRSNMP**) command, the default value of the Key type (**KEYTYPE**) parameter has been changed from *LOCALIZED to *NONLOCALIZED. Having a non-localized key allows the user to be available for incoming SNMPv3 trap messages in addition to already being available for incoming get, get next, or set requests.

APYJRNCHGX command

The Apply Journalized Changes Extended (**APYJRNCHGX**) command will be removed in a future release.

The support for the Apply Journalized Change Extended (**APYJRNCHGX**) command will be removed in a future release. The (**APYJRNCHGX**) command was first delivered in i5/OS V5R2 and provided additional functions that the Apply Journalized Changes (**APYJRNCHG**) command did not have. In IBM i 7.1 and subsequent releases, the **APYJRNCHG** command and other CL commands provide the functions that were provided by the **APYJRNCHGX** command.

CHGASPACT and CHGCLURCY command authority changes

The public authority of the Change Cluster Recovery (**CHGCLURCY**) command and the Change ASP Activity (**CHGASPACT**) command have changed from *USE to *EXCLUDE.

CHGCTLAPPC and CRTCTLAPPC command changes

The Create Ctl Desc (APPC) (**CRTCTLAPPC**) and Change Ctl Desc (APPC) (**CHGCTLAPPC**) have changed.

The Link type (**LINKTYPE**) parameter special values *ANYNW, *FAX, *FR, *ILAN, *LAN, *SDLC, *TDLC, *X25 are no longer supported.

These protocol parameters have been removed :

- Short hold mode (**SHM**)
- Switched network backup (**SNBU**)
- Activate swt network backup (**ACTSNBU**)

- APPN-capable (**APPN**)
- Controller type (**TYPE**)
- Attached nonswitched line (**LINE**)
- Switched line list (**SWTLINLST**)
- Connection number (**CNNNBR**)
- Answer number (**ANSNBR**)
- Outgoing connection list (**CNNLSTOUT**)
- Connection list entry (**CNNLSTOUTE**)
- IDLC window size (**IDLCWDWSIZ**)
- IDLC frame retry (**IDLCFRMRTY**)
- IDLC response timer (**IDLCRSPTMR**)
- IDLC connect retry (**IDLCCNNRTY**)
- Predial delay (**PREDIALDLY**)
- Redial delay (**REDIALDLY**)
- Dial retry (**DIALRTY**)
- SHM disconnect limit (**SHMDSCLMT**)
- SHM disconnect timer (**SHMDSCTMR**)
- Station address (**STNADR**)
- SDLC poll priority (**POLLPTY**)
- SDLC poll limit (**POLLMT**)
- SDLC out limit (**OUTLMT**)
- SDLC connect poll retry (**CNNPOLLRTY**)
- SDLC NDM poll timer (**NDMPOLLTMR**)
- LAN remote adapter address (**ADPTADR**)
- LAN frame retry (**LANFRMRTY**)
- LAN connection retry (**LANCNNRTY**)
- LAN response timer (**LANRSPTMR**)
- LAN connection timer (**LANCNTMR**)
- LAN acknowledgment timer (**LANACKTMR**)
- LAN inactivity timer (**LANINACTMR**)
- LAN acknowledgment frequency (**LANACKFRQ**)
- LAN max outstanding frames (**LANMAXOUT**)
- LAN access priority (**LANACCPTY**)
- LAN window step (**LANWDWSTP**)
- X.25 network level (**NETLVL**)
- X.25 link level protocol (**LINKPCL**)
- X.25 connection password (**CNNPWD**)
- X.25 switched line selection (**SWTLINSLCT**)
- X.25 default packet size (**DFTPKTSIZE**)
- X.25 default window size (**DFTWDWSIZE**)
- X.25 user group identifier (**USRGRPID**)
- X.25 reverse charging (**RVSCRG**)
- X.25 frame retry (**X25FRMRTY**)

- X.25 connection retry (**X25CNNRTY**)
- X.25 response timer (**X25RSPTMR**)
- X.25 connection timer (**X25CNNTMR**)
- X.25 delayed connection timer (**X25DLYTMR**)
- X.25 acknowledgment timer (**X25ACKTMR**)
- X.25 inactivity timer (**X25INACTMR**)
- User facilities (**USRFCL**)
- APPN/HPR capable (**HPR**)
- Model controller description (**MDLCTL**)
- Connection network ID (**CNNNETID**)
- Connection network CP (**CNNCPNAME**)

Any existing CL programs that use these commands might need to be modified.

Existing APPC Controller Descriptions configured with a Link type (**LINKTYPE**) *ANYNW, *FAX, *FR, *IDLC, *ILAN, *LAN, *SDLC, *TDLC, *X25 should be removed using the Delete Controller Description (**DLTCTLD**) CL command.

CHGCTLASC and CRTCTLASC command changes

The Create Ctl Desc (Async) (**CRTCTLASC**) and Change Ctl Desc (Async) (**CHGCTLASC**) commands have changed.

The Link type (**LINKTYPE**) parameter special value *X25 is no longer supported .

These protocol parameters have been removed :

- Answer number (**ANSNBR**)
- X.25 logical channel ID (**LGLCHLID**)
- Remote verify (**RMTVIFY**)
- PAD Emulation (**PADEML**)
- X.25 switched line selection (**SWTLINSLCT**)
- X.25 default packet size (**DFTPKTSIZE**)
- X.25 default window size (**DFTWDWSIZE**)
- X.25 user group identifier (**USRGRPID**)
- X.25 reverse charging (**RVSCRG**)
- User facilities (**USRFCL**)

Any existing CL programs that use these commands might need to be modified.

Existing Async Controller Descriptions configured for X.25 should be removed using the Delete Controller Description (**DLTCTLD**) CL command.

CHGCTLHOST and CRTCTLHOST command changes

The Create Ctl Desc (SNA Host) (**CRTCTLHOST**) and Change Ctl Desc (SNA Host) (**CHGCTLHOST**) commands have changed.

The special values *FR, *LAN, *SDLC, *X25 for the Link type (**LINKTYPE**) parameter are no longer supported.

These protocol parameters have been removed :

- Short hold mode (**SHM**)
- Switched network backup (**SNBU**)
- Activate swt network backup (**ACTSNBU**)

- Attached nonswitched line (**LINE**)
- Switched line list (**SWTLINLST**)
- Maximum frame size (**MAXFRAME**)
- Remote network identifier (**RMTNETID**)
- Remote control point (**RMTCPNAME**)
- Adjacent link station (**ADJLNKSTN**)
- Connection number (**CNNNBR**)
- Answer number (**ANSNBR**)
- Outgoing connection list (**CNNLSTOUT**)
- Connection list entry (**CNNLSTOUTE**)
- Station address (**STNADR**)
- LAN remote adapter address (**ADPTADR**)
- X.25 network level (**NETLVL**)
- X.25 link level protocol (**LINKPCL**)
- X.25 logical channel ID (**LGLCHLID**)
- X.25 connection password (**CNNPWD**)
- APPN CP session support (**CPSSN**)
- Remote APPN node type (**NODETYPE**)
- Branch extender role (**BEXROLE**)
- APPN/HPR capable (**HPR**)
- HPR path switching (**HPRPTHSWT**)
- APPN transmission group number (**TMSGRPNBR**)
- Autocreate device (**AUTOCRTDEV**)
- Autodelete device (**AUTODLTDEV**)
- User-defined 1 (**USRDFN1**)
- User-defined 2 (**USRDFN2**)
- User-defined 3 (**USRDFN3**)
- Recontact on vary off (**RECONTACT**)
- IDLC window size (**IDLCWDWSIZ**)
- IDLC frame retry (**IDLCFRMRTY**)
- IDLC response timer (**IDLCRSPTMR**)
- IDLC connect retry (**IDLCCNNRTY**)
- Predial delay (**PREDIALDLY**)
- Redial delay (**REDIALDLY**)
- Dial retry (**DIALRTY**)
- LAN DSAP (**DSAP**)
- LAN SSAP (**SSAP**)
- LAN frame retry (**LANFRMRTY**)
- LAN connection retry (**LANCNNRTY**)
- LAN response timer (**LANRSPTMR**)
- LAN connection timer (**LANCNNTMR**)
- LAN acknowledgment timer (**LANACKTMR**)
- LAN inactivity timer (**LANINACTMR**)

- LAN acknowledgement frequency (**LANACKFRQ**)
- LAN max outstanding frames (**LANMAXOUT**)
- LAN access priority (**LANACCPY**)
- LAN window step (**LANWDWSTP**)
- X.25 switched line selection (**SWTLINSLCT**)
- X.25 default packet size (**DFTPKTSIZE**)
- X.25 default window size (**DFTWDWSIZE**)
- X.25 user group identifier (**USRGRPID**)
- X.25 reverse charging (**RVSCRG**)
- X.25 frame retry (**X25FRMRTY**)
- X.25 response timer (**X25RSPTMR**)
- X.25 acknowledgment timer (**X25ACKTMR**)
- X.25 inactivity timer (**X25INACTMR**)
- User facilities (**USRFCL**)

Any existing CL programs that use these commands might need to be modified.

Existing SNA Host Controller Descriptions configured with a Link type (**LINKTYPE**) *FR, *IDLC, *LAN, *SDLC, *X25 should be removed using the Delete Controller Description (**DLTCTLD**) CL command.

CHGDEVDS and CRTDEVDS command changes

The Create Device Desc (Display) (**CRTDEVDS**) and Change Device Desc (Display) (**CHGDEVDS**) commands have changed.

The Maximum length of request unit (**MAXLENRU**) parameter has been removed.

Any existing CL programs that use these commands might need to be modified.

CHGDEVHOST and CRTDEVHOST command changes

The Create Device Desc (SNA Host) (**CRTDEVHOST**) and Change Device Desc (SNA Host) (**CHGDEVHOST**) commands have changed.

The Maximum length of request unit (**MAXLENRU**) parameter no longer supports the X.25 values 241, 247, 497, 503, 1009, and 1015.

Any existing CL programs that use these commands might need to be modified.

CHGDEVPRT and CRTDEVPRT command changes

The Create Device Desc (Printer) (**CRTDEVPRT**) and Change Device Desc (Printer) (**CHGDEVPRT**) commands have changed.

The Maximum length of request unit (**MAXLENRU**) parameter has been removed.

Any existing CL programs that use this command might need to be modified.

CHGSNMPA command changes

Specifying the value *SYSGEN for the System description (**SYSD**) parameter of the Change SNMP Attributes (**CHGSNMPA**) command will no longer generate a textual description of the system at the time the command is run. If you have previously specified *SYSGEN and then prompt the **CHGSNMPA** command, it will show the value *SYSGEN instead of generated text. This does not affect the information returned by the IBM i SNMP agent when processing a get, get next, or get bulk request for the system description (sysDescr).

CRTLINETH and CHGLINETH command changes

The Create Line Desc (Ethernet) (**CRTLINETH**) and Change Line Desc (Ethernet) (**CHGLINETH**) commands have changed.

The Resource name (**RSRCNAME**) parameter special value *NWID is no longer supported.

The following parameters have been removed :

- Attached NWI (**NWI**)
- NWI type (**NWITYPE**)
- DLC identifier (**NWIDLCI**)
- Exchange identifier (**EXCHID**)
- ATM access type (**ACCTYPE**)
- PVC identifiers (**PVCID**)
- Use LECS address (**USELECSADR**)
- LES ATM address (**LESATMADR**)
- Emulated LAN name (**EMLLANNAME**)
- LEC disconnect time out (**LECDSCTIMO**)
- Error threshold level (**THRESHOLD**)
- Generate test frame (**GENTSTFRM**)
- Link speed (**LINKSPEED**)
- Cost/connect time (**COSTCNN**)
- Cost/byte (**COSTBYTE**)
- Security for line (**SECURITY**)
- Propagation delay (**PRPDLY**)
- User-defined 1 (**USRDFN1**)
- User-defined 2 (**USRDFN2**)
- User-defined 3 (**USRDFN3**)
- Autocreate controller (**AUTOCRTCTL**)
- Autodelete controller (**AUTODLTCTL**)

Any existing CL programs that use these commands might need to be modified.

Existing configuration objects for these types cannot be used and should be removed using the Delete Line Description (**DLTLIND**) command.

CHGNETA command changes

Parameter changes for the Change Network Attributes (**CHGNETA**) command

Default ISDN connection list (**DFTCNNLST**) parameter has been removed.

The Allow AnyNet support (**ALWANYNET**) parameter has been removed. It will be treated as *NO and AnyNet will no longer be started or useable. Customers currently using AnyNet should convert to Enterprise Extender before installing IBM i 7.4.

RTVCFGSRC command changes and output

Parameter changes for the Retrieve configuration source (**RTVCFGSRC**) command

The (**CFGTYPE**) parameter no longer supports :

- *NWID - Network Interface Descriptions
- *CNNL - Connection Lists

Configuration object that have had the create commands removed will no longer be retrieved, even when the objects still exist. Message CPF26B0 will be signaled to identify which objects were not retrieved and a comment will be included in the retrieved source file.

- Create Ctl Desc (Finance) (**CRTCTLFNC**)
- Create Ctl Desc (Retail) (**CRTCTLRTL**)
- Create Ctl Desc (Remote WS) (**CRTCTLRWS**)
- Create Device Desc (Finance) (**CRTDEVFNC**)
- Create Device Desc (Retail) (**CRTDEVRTL**)
- Create Line Desc (DDI) (**CRTLINDDI**)
- Create Line Desc (Fax) (**CRTLINFAX**)
- Create Line Desc (Frame Relay) (**CRTLINFR**)
- Create Line Desc (SDLC) (**CRTLINS DLC**)
- Create Line Desc (TDLC) (**CRTLINTDLC**)
- Create Line Desc (Token-Ring) (**CRTLINTRN**)
- Create Line Desc (Wireless) (**CRTLINWLS**)
- Create Line Desc (X.25) (**CRTLINX25**)
- Create Network Interface (FR) (**CRTNWIFR**)

Configuration objects with configuration parameters that are no longer supported will no longer be retrieved, even when the objects still exist. Message CPF26B0 will be generated to identify which objects were not retrieved and a comment will be included in the retrieved source file.

- Create Ctl Desc (APPC) (**CRTCTLAPPC**) with Link type (**LINKTYPE**) parameter values: *ANYNW, *FR, *ILAN, *LAN, *SDLC, *TDLC and *X25
- Create Ctl Desc (SNA Host) (**CRTCTLHOST**) with Link type (**LINKTYPE**) for *FR, *LAN, *SDLC and *X25
- Create Line Desc (Ethernet) (**CRTLINETH**) with Resource name (**RSRCNAME**) of *NWID

A CL config source file retrieved using **RTVCFGSRC** in a prior release and saved in a file may not be useable due to the parameters and values that have been removed. If that retrieved config file is edited using SEU, and the CL command(s) are prompted, those parameters that are no longer valid will be reported in error and removed. Invalid parameter values will also be flagged in error and may need to be changed or removed. Once the CL command has been corrected and is valid for the new IBM i 7.4 syntax, it can then be saved in the file for use at the current release.

STRTRPMGR command default change

Controlling the Local Trap Manager using the SNMP Attributes

The default for the Start Trap Manager (**STRTRPMGR**) command parameter Forward traps (**FWDTRP**) is changing from *NO to *SNMPA. This will allow the local trap manager to be configured and controlled with the Change SNMP Attributes **CHGSNMPA** command using the new Local trap manager (**LCLTRPMGR**) parameter. With the new **LCLTRPMGR** parameter, programs such as the system start-up program could be changed to remove any invocation of the **STRTRPMGR**. Likewise, programs using the End Trap Manager (**ENDTRPMGR**) command can be changed to remove any invocation of **ENDTRPMGR**.

TRCCNN command changes

The Trace Connection (**TRCCNN**) command has allowed multiple values to be specified for the Trace type (**TRCTYPE**) parameter since its introduction in OS/400® V4R5. The command is never used in this manner. The option to specify multiple **TRCTYPE** values has been eliminated.

The **TRCTYPE** parameter is replacing the *SSL value with *TLS to accurately reflect that Secure Sockets Layer (SSL) has been replaced by Transport Layer Security (TLS).

The TCP/IP data (**TCPDTA**) parameter, Protocol element *ARP has been removed.

CL programs that use the **TRCCNN** command may need to be updated and recompiled to accommodate these changes.

VRYCFG command changes

Parameter changes for the Vary configuration **VRYCFG** command

The (**CFGTYPE**) parameter no longer supports the *NWI - Network Interface Descriptions value.

The (**CFGOBJ**) parameter no longer supports the *ANYNW - All controller descriptions that specify a link type of *ANYNW value.

Removal of commands requiring native adapters

Software support for these adapters is formally being removed. Hardware support for these adapters was withdrawn in prior releases. Software alternatives, such as Enterprise Extender for SNA, do not support these configurations.

These CL configuration commands to create and change controllers or devices that require native SNA adapters have been removed in IBM i 7.4:

- Create Ctl Desc (Finance) (**CRTCTLFNC**)
- Create Ctl Desc (Retail) (**CRTCTLRTL**)
- Create Ctl Desc (Remote WS) (**CRTCTLRWS**)
- Change Ctl Desc (Finance) (**CHGCTLFNC**)
- Change Ctl Desc (Retail) (**CHGCTLRTL**)
- Change Ctl Desc (Remote WS) (**CHGCTLRWS**)
- Create Device Desc (Finance) (**CRTDEVFNC**)
- Create Device Desc (Retail) (**CRTDEVRTL**)
- Change Device Desc (Finance) (**CHGDEVFNC**)
- Change Device Desc (Retail) (**CHGDEVRTL**)
- Create Line Description (Fax) (**CRTLINFAX**)
- Change Line Description (Fax) (**CHGLINFAX**)

Existing configuration objects for these types cannot be used and should be removed using the corresponding Delete description CL command.

- Delete Controller Description (**DLTCTLD**)
- Delete Device Description (**DLTDEV**)
- Delete Line Description (**DLTLIND**)

Removal of commands and support for DDI, Token-Ring, Wireless, Frame Relay, SDLC, TDLC, and X.25 protocols

Software support for DDI, Token-Ring, Wireless, Frame Relay, SDLC, TDLC, and X.25 protocols is formally being removed. Hardware support for these protocols was withdrawn in prior releases.

These CL configuration commands to create and change line descriptions for DDI, FAX, Token-Ring, Wireless, Frame Relay, SDLC, TDLC and X.25 protocols have been removed in IBM i 7.4:

- Create Line Desc (DDI) (**CRTLINDDI**)
- Create Line Desc (Frame Relay) (**CRTLINFR**)
- Create Line Desc (SDLC) (**CRTLINS DLC**)
- Create Line Desc (TDL) (**CRTLINTDL**)
- Create Line Desc (Token-Ring) (**CRTLINTRN**)

- Create Line Desc (Wireless) (**CRTLINWLS**)
- Create Line Desc (X.25) (**CRTLINX25**)
- Change Line Desc (DDI) (**CHGLINDDI**)
- Change Line Desc (Frame Relay) (**CHGLINFR**)
- Change Line Desc (SDLC) (**CHGLINSDLC**)
- Change Line Desc (TDLC) (**CHGLINTDLC**)
- Change Line Desc (Token-Ring) (**CHGLINTRN**)
- Change Line Desc (X.25) (**CHGLINX25**)

Any existing CL programs that use these commands might need to be modified.

Existing configuration objects for these types cannot be used and should be removed using the corresponding Delete description CL command.

- Delete Controller Description (**DLTCTLD**)
- Delete Device Description (**DLTDEV**)
- Delete Line Description (**DLTLIND**)

Removal of IP over SNA commands

These IP over SNA commands used by AnyNet have been removed in IBM i 7.4:

- Add IP over SNA Interface (**ADDIPSIFCI**)
- Add IP over SNA Location (**ADDIPSLOC**)
- Add IP over SNA Route (**ADDIPSRTE**)
- Change IP over SNA Interface (**CHGIPSIFC**)
- Change IP over SNA Location (**CHGIPSLOC**)
- Change IP over SNA TOS (**CHGIPSTOS**)
- Convert IP Address (**CVTIPSIFC**)
- Convert Network ID / Location (**CVTIPSLOC**)
- End IP over SNA Interface (**ENDIPSIFC**)
- Print IP over SNA (**PRTIPSCFG**)
- Remove IP over SNA Interface (**RMVIPSIFC**)
- Remove IP over SNA Location (**RMVIPSLOC**)
- Remove IP over SNA Route (**RMVIPSRTE**)
- Start IP over SNA Interface (**STRIPSIFC**)

Any existing CL programs that use these commands might need to be modified.

Removal of commands for Network Interfaces

Software support for these adapters is formally being removed. Hardware support for these adapters was withdrawn in prior releases. These CL configuration commands for Network Interfaces that require adapters have been removed in IBM i 7.4:

- Create Network Interface (FR) (**CRTNWIFRI**)
- Change Network Interface (FR) (**CHGNWIFR**)
- End Network Interface Recovery (**ENDNWIRCY**)
- Resume NWI Recovery (**RSMNWIRCY**)

Any existing CL programs that use these commands might need to be modified.

Existing configuration objects for these types cannot be used and should be removed using the Delete Network Interface Desc (**DLTNWID**) command.

Database changes

Release to release Database changes that should be considered

New SQL reserved words and schema names

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_74/db2/rbafzresword.htm

SQE MAXTMPSTG query processing

In prior releases, support for the Maximum temporary storage (**MAXTMPSTG**), configured in class descriptions, for executing SQE queries was predicated on the amount of free space in SYSBAS falling below the configured Auxiliary storage lower limit (**QSTGLOWLMT**) system value.

Starting in IBM i 7.4, the **MAXTMPSTG** enforcement will no longer be dependent on the **QSTGLOWLMT** system value. Therefore, if the **MAXTMPSTG** value for a class description is changed to any value other than *NOMAX, the maximum amount of temporary storage used by queries executed in the associated job(s) needs to be taken into consideration. This IBM Developer article provides some guidance in choosing a value: <https://developer.ibm.com/articles/i-temp-storage-3/>.

HASH scalar function change

In IBM i 7.4, the HASH function has been renamed to HASH_VALUES. Any use of the HASH function as defined prior to IBM i 7.4 must be changed to use the renamed version of this function, HASH_VALUES.

This change was required to allow the introduction of a new Db2® standard function named HASH.

A reference to the prior HASH function is likely to encounter several errors since the input parameters and result data type of the new HASH function are different. Some common SQLCODEs are: SQL0303 when attempting to assign the result of HASH to a variable, SQL0171 if the data type of the second argument is not correct, and SQL0170 if more than 2 arguments are specified.

To identify static statements in embedded SQL programs and service programs that use a function named HASH, run the following SQL statement.

```
WITH program_statements(naming_mode, dec_point, string_delim, stmt_text,
  program_library, program_name, program_type)
AS (SELECT a.naming, a.decimal_point, a.sql_string_delimiter, b.statement_text,
  a.program_schema, a.program_name, a.program_type
  FROM qsys2.sysprogramstat a INNER JOIN
  qsys2.sysprogramstmtstat b ON a.program_schema = b.program_schema AND
  a.program_name = b.program_name AND
  a.module_name = b.module_name
  WHERE a.number_statements > 0)
SELECT program_library, program_name, program_type, stmt_text
FROM program_statements,
TABLE(qsys2.parse_statement(stmt_text, naming_mode, dec_point, string_delim)) c
WHERE c.name_type = 'FUNCTION' and c.name = 'HASH'
ORDER BY 1, 2;
```

QSYS2.PARSE_STATEMENT table function returns warnings

The QSYS2.PARSE_STATEMENT table function has changed to return SQLCODE = +462 and SQLSTATE = '01H52' when:

- The SQL statement fails to parse
- The SQL statement parameter value is a blank string or NULL

QSYS2.ASP_INFO view change

IBM i 7.4 contains support for a new value returned from the ASP_STATE column within the QSYS2.ASP_INFO view. The new value returned is FAILURE which indicates "The status of the ASP is failed."

SQE_NATIVE_ACCESS QAQQINI control is deprecated

In IBM i 7.4, the **SQE_NATIVE_ACCESS QAQQINI** control is deprecated. Its use will be tolerated in the **QAQQINI** control file, but the use will have no effect and an SQE implementation will be attempted for all queries.

SQL precompiler changes

sql_source() pragma not generated if target release IBM i 7.4 specified

The **CRTSQLCI** and **CRTSQLCPPI** commands invoke the SQL precompiler. In prior releases, when the precompiler ran, it generated an `sql_source()` pragma in the intermediate file that was fed to the C/C++ compiler. In IBM i 7.4, the precompiler will no longer generate this pragma if the target release of the compile is 7.4

Source compiled at release IBM i 7.4 will fail at compile on release N-x with message CPF5D2B

In prior releases, if the SQL precompiler was run on release N using the **SRCSTMF** parameter and the output was sent to a specific file with the **TOSRCFILE** parameter, attempts to compile the source in the output file on an N-x machine, using the **CRTxMOD** command, would fail to create with diagnostic message CPD5CF1- A preprocessor release of &2 is more recent than the specified compiler target release of &1. On IBM i 7.4, if release N is 7.4 and the **TGTRLS** N-x is not specified, the attempt to compile on release N-x will now fail with message CPF5D2B - Tag found in user storage area is not valid.

QSYS2 SQL catalog files no longer restored with restore commands

In IBM i 7.4 with PTF SI71741, certain files in the QSYS2 library are not restored if they already exist. The following physical files in the QSYS2 library (in *SYSBAS or on an independent ASP) represent SQL catalog tables and are not restored if they already exist:

<i>Table 1. SQL catalog files not restored with restore commands</i>	
SQL Table Name	System File Name
SYSJARCONTENTS	SYSJARCONT
SYSJAROBJECTS	SYSJAROBJ
SYSPARMS	SYSPARMS
SYSROUTDEP	SYSROUTDEP
SYSROUTINES	SYSROUTINE
SYSSEQOBJECTS	SYSSEQOBJ
SYSTYPES	SYSTYPES

<i>Table 1. SQL catalog files not restored with restore commands (continued)</i>	
SQL Table Name	System File Name
SYSVARIABLEDEP	SYSVARDEP
SYSVARIABLES	SYSVARS
XSRANNOTATIONINFO	XSRANNOTAT
XSROBJECTCOMPONENTS	XSROBJCOMP
XSROBJECTHIERARCHIES	XSROBJHIER
XSROBJECTS	XSROBJECTS

These physical files and any other logical files dependent on these physical files are not restored if the file already exists in the target library. The files are excluded from the restore. If one of these files must be restored from the save media, the target file must be deleted prior to the restore.

Prior to the application of the PTF, the QSYS2 SQL catalog tables would be restored which often caused SQL catalog problems.

OBJECT_STATISTICS() table function changes for *USRPRF objects

In IBM i 7.4 with PTF SI74690, the QSYS2/OBJECT_STATISTICS() table function has been modified to only return result rows for user profiles to which the user has some authority (authority other than *EXCLUDE).

With this change, any views which use the QSYS2/OBJECT_STATISTICS() table function to list user profiles may have different results than it would have had before this change. This includes the following views:

- QSYS2.AUTHORITY_COLLECTION
- QSYS2.AUTHORITY_COLLECTION_LIBRARIES
- QSYS2.AUTHORITY_COLLECTION_OBJECT
- QSYS2.AUTHORIZATIONS
- QSYS2.GROUP_PROFILE_ENTRIES
- QSYS2.OBJECT_LOCK_INFO
- QSYS2.OBJECT_OWNERSHIP
- QSYS2.OBJECT_PRIVILEGES
- SYSIBM.AUTHORIZATIONS

This is not a complete list, but is representative of the types of views that may change behavior.

If it is desired for result rows to be returned for all user profiles, the QSYS2/OBJECT_STATISTICS() table function should be called by a user with *ALLOBJ special authority or a user which is authorized to the Database Security Administrator function of IBM i (QIBM_DB_SECADM).

SYSDISKSTAT extended to return each disk path

In IBM i 7.4 with Db2 for i PTF Group SF99704 Level 10 and IBM i 7.3 with Db2 for i PTF Group SF99703 Level 22, the QSYS2.SYSDISKSTAT IBM i Service was extended to return each disk path. If a disk unit has multiple resource names and *MULTIPLE_PATH_UNIT* is set to **YES**, a SQL query could return results that appear to be duplicate rows. These rows for one disk unit will have the same *UNIT_NUMBER*.

To avoid seeing the additional disk paths, use the **DISTINCT** clause.

To determine the unique path to each disk unit, include *RESOURCE_NAME* in the query .

Calls to SQLSetConnectAttr API may now return -1 with Message ID SQ99999

A call to SQLSetConnectAttr API with a null or missing required parameter was not flagged as an error until a subsequent call to SQLConnect. Now with IBM i 7.3 PTF SI75162 or IBM i 7.4 PTF SI75163, an error for an invalid parameter on the SQLSetConnectAttr API will be flagged on that call.

Parameter validation will be done to flag empty mandatory fields on the call to SQLSetConnectAttr. The new error shown for an invalid parameter on the SQLSetConnectAttr API is SQ99999 with error code 9: "Argument value not valid"

The previous error that would be issued from the SQLConnect call was SQL0104: Token <END-OF-STATEMENT> was not valid. Valid tokens: ? : USER CURRENT DEFAULT SYSTEM_USER.

Queries that compare a numeric value with blanks or an empty string will fail with SQLSTATE/SQLCODE '22023'/-302 or '53045'/-678

Previous to PTF SI76030 on IBM i 7.4 and PTF SI76035 on IBM i 7.3, a query that included an invalid comparison between a numeric value and blank(s) or a numeric value and an empty string would not result in an SQL failure.

Blank characters and empty strings are both incompatible with numeric values. Any such queries will now fail with SQLSTATE: '22023'/-302 or '53045'/-678.

Change to authority required for registering Query Governor exit programs

In order to provide consistency with the Query Supervisor feature, the authority required to register programs for the Query Governor exit point has been changed with PTF SI75763 on IBM i 7.4 and with PTF SI75767 on IBM i 7.3.

To add or remove exit programs to the registration facility for the QIBM_QQQ_QUERY_GOVR exit point, ***ALLOBJ** special authority or **QIBM_DB_SQLADM** function usage is now required. Previously, both *ALLOBJ and *SECADM special authorities were required.

For more information about the Query Governor Exit Program, please see https://www.ibm.com/docs/en/i/7.3?topic=ssw_ibm_i_73/apis/xqrygovr.htm

Exit point and QPWDVLDPGM system value behavior changes

When running in a system job, subsystem job or the SCPF job, exit programs will not be called for the program specified for the **QPWDVLDPGM** system value or for exit points:

- QIBM_QSY_VLD_PASSWRD
- QIBM_QSY_CHK_PASSWRD
- QIBM_QSY_RST_PROFILE
- QIBM_QSY_CHG_PROFILE
- QIBM_QSY_DLT_PROFILE
- QIBM_QSY_CRT_PROFILE

Support for the QDFTJRN data area removed

Automatic journaling support using the QDFTJRN data area was introduced in i5/OS V5R3. In IBM i 6.1, this function was replaced by the Start Journal Library (**STRJRNLIB**) command. In IBM i 7.4, the QDFTJRN data area is no longer supported and if it exists it will be ignored.

Integrated web application server changes

Java™ 7 is no longer supported by the integrated web application server. The default JVM on IBM i 7.4 is IBM Technology for Java 8.0 64bit (option 17). You can update the Java version for a server by using the IBM Web Administration GUI for i. Select the server, then click on the Server->Properties link and you will be able to select a Java version from a selection list. If you do not see a suitable version, you will need to install the licensed product that contains the Java version you desire. More information may be found in the following support document link: <https://www.ibm.com/support/docview.wss?uid=nas8N1022189>.

Integrated web services server changes

Java 7 is no longer supported by the integrated web services server. The default JVM on IBM i 7.4 is IBM Technology for Java 8.0 64bit (option 17). The Java runtime version for the integrated web services (IWS) server will automatically be changed to run on a supported version. To ensure IWS servers start successfully, ensure that Java 8 64bit is installed. More information may be found in the following support document link: <https://www.ibm.com/support/docview.wss?uid=nas8N1022189>.

Create Index (CRTINX) MI change

The Create Independent Index (**CRTINX**) MI instruction will fail with an MCH5601 - Template value not valid for instruction exception when invoked with a non-zero value for the reserved field at offset 115 in the longer template.

Changes to instructions that materialize the Wait time-out pending interrupt

Wait Time-Out Interrupt pending removed

Wait time-out processing has been simplified to improve system performance and scaling. Wait time-out will no longer be observable in instructions that materialize pending interrupts for a thread. This includes:

- **TESTINTR**- In pending thread interrupts, the Wait time-out bit is retired; 0 is returned.
- **MATTHIF** Hex 10 - In pending thread interrupts, the Wait time-out bit is retired; 0 is returned.
- **MATPRATR** Hex 20 - In pending thread interrupts, the Wait time-out bit is retired; 0 is returned.
- **MATPRATR** Hex 24 - In pending thread interrupts, the Wait time-out bit is retired; 0 is returned.
- **MATPRATR** Hex 37 - In pending thread interrupts, the Wait time-out bit is retired; 0 is returned.

Modify Space Attributes (MODS) MI change

The underlying algorithm used by the machine for space allocation has changed. The amount of space allocated or truncated on create, extend, or truncate may not be the same as in previous releases. Rather than calling the Materialize Space Attributes (**MATS**) MI instruction after the Modify Space Attributes (**MODS**) MI instruction to find the new size of the space, you may now request MODS return the new size. The MODS MI instruction was updated to include a new field, *return size of space*. When this field is set to one, the size of the space after modification is returned in a new field in the template, *size of space after modification*.

The **MODS** MI instruction was also updated to verify that the reserved fields at the end of the modification selection field in operand two are zero. If the reserved fields are not zero, an MCH5601 Template value not valid for instruction exception will be signaled.

IBM Navigator for i Changes

Release to release Navigator for i changes that should be considered

Integrated Server GUI

The Integrated Server GUI support for IBM Navigator for i is removed in IBM i 7.4. This includes the following components:

- Network Server Host Adapters
- Remote Systems, Service Processors
- Connection Security
- Launch Web Console
- Synchronize Software

The main navigation node name "Integrated Server Administration" has been changed to "Guest Partition Administration".

IBM Navigator for i requires 64-bit Java SE 8

The Admin2 HTTP server now requires 64-bit Java™ SE 8. Formerly the requirement was for 64-bit Java SE 7. IBM® Navigator for i web application depends on the Admin2 server. In order for the Admin2 server and IBM Navigator for i to function properly, 64-bit Java SE 8 needs to be installed. This is product 5770JV1 option 17.

Java Changes

Release to release Java changes that should be considered

Default Java file.encoding and default charset changed to UTF-8

When the IBM Java Virtual Machine starts up, it selects a file.encoding value based on the PASE CCSID. Starting with IBM i 7.4, the PASE CCSID defaults to 1208, which means that the default Java file.encoding is now UTF-8. Refer to : [PASE CCSID and Locale changed to UTF-8](#) for more information on the PASE CCSID change.

The file.encoding value influences the default charset used by the JVM among other things. This impacts reading and writing data in files, the String(byte[] bytes) constructor, and more. For more information about how file.encoding affects Java applications, refer to : [JAVA character encodings](#)

Applications wanting to use the prior behavior can set the environment variable PASE_DEFAULT_UTF8 to N in their job before starting a Java application. Refer to : [Default file.encoding values](#) for which file.encoding and default charset is used in that case.

Additionally, Java applications can explicitly set their preferred file.encoding in numerous ways, including :

- Using the -D option to the java shell command, for example : `java -Dfile.encoding=ISO8859_1 myProgram`
- Using the PROP option of the RUNJVA command, for example : `RUNJVA CLASS(myProgram) PROP(file.encoding ISO8859_1)`
- Set the property in the QIBM_RPG_JAVA_PROPERTIES environment variable. See : [Controlling how the JAVA virtual machine is set up](#) for more information.
- Add the property to the SystemDefault.properties: See : [SystemDefault.properties file](#) for more information.

Native JDBC driver can fail with SQL0191 (Mixed data or UTF-8 data not properly formed)

The Native JDBC driver on IBM i 7.3 and earlier uses PASE translation routines for most CCSIDs. The PASE mapping was incomplete for some code points in certain mixed CCSIDs. This means that some characters could be lost during translation for the following CCSIDs (on IBM i 7.3 and earlier):

930, 933, 935, 939, 1122, 1132, 1388, 1399, 5026, 5035

On IBM i 7.4 and later, the Native JDBC driver was changed to avoid the problem of losing characters during character translation by binding the data as UTF-16, thus forcing the database to do the translation. If invalid or uninitialized mixed CCSID data is sent to the database engine for translation, the translation will fail with **SQL0191**. The error message: "Mixed data or UTF-8 data not properly formed" is sent from the database engine when it tries to convert invalid data to UTF-16.

Default PASE CCSID and Locale Changed to UTF-8

When a PASE application is started using the QP2TERM and QSH shell environments or QP2SHELL and QP2SHELL2 APIs, a matching PASE CCSID and PASE locale are selected based on the current job's LANGID and CNTRYID. For most LANGID/CNTRYID pairs, in IBM i 7.3 and prior releases, a single byte encoding such as ISO-8859-1 (819) was used and a matching single byte PASE locale was selected. For any LANGID/CNTRYID pair which did not have a corresponding PASE locale, the POSIX locale was used with CCSID 819.

In IBM i 7.4, the default is now UTF-8 (1208) for all locales. If a valid PASE locale is not found for the current LANGID/CNTRYID, the POSIX locale is still used, but the CCSID is set to 1208.

Setting the environment variable PASE_DEFAULT_UTF8 to "N" in the current job will allow the prior behavior to be used. Any active QP2TERM or QSH sessions will have to be ended and restarted to take effect.

PASE applications started by Qp2RunPase or fork/exec are not affected by this change.

These LANGID/CNTRYID pairs are also not affected by this change as they only support UTF-8:

- CHS, CN
- CHT, TW
- EST, EE
- JPN, JP
- KOR, KR
- LTU, LT
- LVA, LV
- VIE, VN

PASE environment variable change

In IBM i 7.4, the default value of the PASE environment variable - PASE_USRGRP_LIMITED has been changed from 'Y' to 'N'. This could have an effect on certain APIs such as getpwuid and getgrpid.

Secure sockets layer (SSL) and Transport Layer Security (TLS) changes

TLS enabled and default cipher specification lists have changed for System TLS

The System TLS enabled cipher specification list no longer contains Triple Des (3DES), Cipher Block Chaining (CBC), or RSA key exchange ciphers when the **QSSLCSLCTL** system value is *OPSYS.

If one of those ciphers is needed, the administrator must add it to system value **QSSLCSL**. Administrators control the ciphers enabled for System TLS using the system values **QSSLCSL** and **QSSLCSLCTL**.

The System TLS shipped eligible default cipher specification list no longer contains Triple Des (3DES), Cipher Block Chaining (CBC), or RSA key exchange ciphers.

If one of these ciphers must be added to the default protocol list after it has been added to the enabled list, use the System Service tools Advanced Analysis command **TLSCONFIG** option `eligibleDefaultCipherSuites` to add the value.

See the System TLS topic in the IBM Knowledge Center for additional information.

The System TLS default cipher specification list is now:

- AES_128_GCM_SHA256
- AES_256_GCM_SHA384
- CHACHA20_POLY1305_SHA256
- ECDHE_ECDSA_AES_128_GCM_SHA256
- ECDHE_ECDSA_AES_256_GCM_SHA384
- ECDHE_RSA_AES_128_GCM_SHA256
- ECDHE_RSA_AES_256_GCM_SHA384

System TLS support for SSLv2 has been removed

The Secure Sockets Layer version 2.0 protocol (SSLv2) can not be turned on for System TLS. *SSLv2 can not be added to the **QSSLPCL** system value. If present, *SSLv2 will be removed from CHGSYSVAL list for the **QSSLPCL** system value.

TLSv1.3 protocol has been enabled for System TLS

The Transport Layer Security version 1.3 protocol (TLSv1.3) is now enabled and used by default for System TLS. TLSv1.3 can be disabled by changing the **QSSLPCL** system value. If TLSv1.3 must be removed from the default protocol list, use System Service tools Advanced Analysis command **TLSCONFIG** option `eligibleDefaultProtocols` to remove the value.

See the System TLS topic in the IBM Knowledge Center for additional information.

TLSv1.1 and TLSv1.0 protocols have been disabled for System TLS

The Transport Layer Security version 1.1 protocol (TLSv1.1) and Transport Layer Security version 1.0 protocol (TLSv1.0) are now disabled by default for System TLS.

TLSv1.1 or TLSv1.0 can be re-enabled by changing the **QSSLPCL** system value. If TLSv1.1 or TLSv1.0 must be added to the default protocol list, use System Service tools Advanced Analysis command **TLSCONFIG** option `eligibleDefaultProtocols` to add the value.

See the System TLS topic in the information center for additional information.

TLS default signature algorithm certificate list has changed for System TLS

The System TLS default signature algorithm certificate list no longer contains ECDSA_SHA224, ECDSA_SHA1, RSA_SHA224, RSA_SHA1, or RSA_MD5 signature algorithms. The enabled signature algorithm certificate list still contains those values.

For applications using the default list, certificates with those signatures will not be allowed. Applications can explicitly set the list if the default list is too restrictive. The most limited way to accomplish this is to use Digital Certificate Manager to change the explicit list for only the specific Application Definition requiring these algorithms.

If one of these algorithms must be added to the default signature algorithm certificate list, use System Service tools Advanced Analysis command **TLSCONFIG** option `defaultSignatureAlgorithmCertificateList` to add the value.

For additional information about the signature algorithm certificate list, see [Certificate selection](#).

TLsv1.3 enablement may require changes to GSKit client to prevent GSK_WOULD_BLOCK or EWOULDBLOCK advisory condition

The enablement of TLsv1.3 altered the code path in System TLS, resulting in latency and response time improvements for some operations. This has exposed secure non-blocking sockets applications that do not handle a blocking condition. Based on timing, some invocations of the `gsk_secure_soc_read()` or `SSL_Read()` API reach a block condition before the remote data is available from the wire. This results in `GSK_WOULD_BLOCK` returned for `gsk_secure_soc_read()` API or `SSL_ERROR_IO` with `errno` set to `EWOULDBLOCK` for the `SSL_Read()` API. These advisory return codes notify the application to retry the read operation. However, some applications treat the return codes as fatal.

TLS reads will fail during the read operation resulting in a TLS read error. The symptom of this situation is that `gsk_secure_soc_read()` or `SSL_Read()` API completes and no data is returned.

To resolve this issue, switch your GSKit client application to implement retry logic or use blocking sockets and set the `GSK_IBMI_READ_TIMEOUT` attribute to the number of seconds you wish to block before timing out the secure connection. This would be set by the `gsk_attribute_set_numeric_value()` API after the `gsk_environment_open()` API is called. You would set this attribute along with any other GSKit attributes being set before the `gsk_environment_init()` API is called.

For more information on this and detailed instructions, see the IBM Support page here: <https://www.ibm.com/support/pages/node/6237392>

QMAXACTLVL system value

QMAXACTLVL system value is no longer used

The **QMAXACTLVL** system value is no longer used by the operating system. In previous releases, it could be used to limit the total of all threads in all pools running concurrently within a partition. In IBM i 7.4 and future releases, regardless of what you set the **QMAXACTLVL** value to, the operating system will perform as if the value were set to *NOMAX. You can still set the activity level at the pool level (See the 'Max Active' column on the Work Shared Storage Pool (**WRKSHRPOOL**) or Work System Status (**WRKSYSSTS**) commands, or the 'Activity level' parameter on the Change Shared Storage Pool (**CHGSHRPOOL**) or Change Subsystem Description (**CHGSBSD**) commands).

Mitigating Spectre and Meltdown vulnerabilities in new and existing programs

The ability to mitigate program objects for Spectre and Meltdown vulnerabilities was introduced via PTF for releases IBM i 7.1, 7.2, and 7.3. If you are upgrading your system from one of those releases, the mitigation setting will be carried forward. If you are installing on a new system or logical partition, or are installing Licensed Internal Code using an option that removes all data from your system, you should

evaluate whether or not to enable mitigations for program objects. For information about program mitigation, see the Mitigating Spectre and Meltdown vulnerabilities in new and existing programs topic in the Knowledge Center: http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_74/rzamv/rzamvmitigatingSpectreMeltdown.htm

Percent of Permanent Addresses Used Calculation

Systems that have used Independent Auxiliary Storage Pools (IASPs) will see an increase of 12.5% in the percentage of permanent addresses used when upgrading to IBM i 7.4 release. This is due to a change in how this number is calculated when IASPs are involved.

ILE RPG Runtime Changes

Release to release ILE RPG runtime changes that should be considered

XML-SAX with "ccsid=1200" or "ccsid=13488", when the default UCS-2 CCSID for the module is a different CCSID

In prior releases, when option "**ccsid=1200**" was specified for the XML-SAX operation, and keyword **CCSID(*UCS2:1200)** was not specified in the control statements, the RPG runtime did not pass the correct parameters for string events. The length parameter was the number of characters, while it should have been the number of bytes in the string. For the *XML_PREDEF_REF and *XML_ATTR_PREDEF_REF events, the value was passed as a UTF-8 value, and the length parameter had a value of 1, while it should have been passed as a UCS-2 value with a length of 2.

Similar problems occurred when option "**ccsid=13488**" was specified for the XML-SAX operation, and keyword **CCSID(*UCS2:1200)** was specified in the control statements.

Starting in IBM i 7.4, the RPG runtime now handles string events correctly when option "**ccsid=1200**" or "**ccsid=13488**" is specified. The length parameter for string events represents the number of bytes in the string. For the *XML_PREDEF_REF and *XML_ATTR_PREDEF_REF events, the string is a UCS-2 value and the length is 2.

If you wrote your XML-SAX handler procedure to expect the *XML_PREDEF_REF and *XML_ATTR_PREDEF_REF events to be a **UTF-8** value instead of the documented **UCS-2** value, the handler procedure must be changed to expect a **UCS-2** value for these events.

This change affects all ILE RPG programs running on IBM i 7.4, even programs compiled for an earlier target release.

Service Monitor autostart job entry removed from QUSRWRK subsystem description

The QPDETSSN autostart job entry has been removed from the QUSRWRK subsystem description in IBM i 7.4 because it is not used by the Service Monitor.

The autostart job was added to the QUSRWRK subsystem description in previous releases with the following command:

```
ADDAJE SBSDB(QSYS/QUSRWRK) JOB(QPDETSSN) JOBD(QSYS/QPDETSSN)
```

Updated EBCDIC Unicode maps for CCSIDs 1377 and 1388

The IBM i CCSID conversion support to and from Unicode has been updated for data stored in EBCDIC **CCSIDs 1377 and 1388** (normally used for Chinese data). This new support reflects some new Unicode assignments for existing CCSID 1377 or 1388 characters.

The conversion to the new Unicode mapping will occur automatically with no intervention. If your CCSID 1377 or 1388 data is converted from Unicode, the old codepoints will convert to the same 1388 or 1377 codepoint. But when converted back to Unicode, the new Unicode codepoint will be used.

If you need to preserve the current mapping, two new CCSIDs have been provided to allow the old conversions. The new CCSIDs to use are:

- **CCSID 13676** instead of 1388
- **CCSID 5473** instead of 1377

These new CCSIDs provide the old codepoint mappings for 1377 and 1388 without the new characters.

See KnowledgeCenter for the list of changed characters.

IBM i 7.4 PTFs for changes to CCSIDS 1377 and 1388 are:

- SI71938
- SI71937
- SI71982
- MF67073
- SI72073
- MF67039
- MF66935

IBM i 7.4 PTFs for new CCSIDs 13676 and 5473 are (these supersede the PTFs for changes to CCSIDs 1377 and 1388):

- MF67843
- SI74349
- SI74352
- SI74356
- SI74414

Note: These PTFs are being withheld from CUM packages and resaves. Unless the PTFs are specifically ordered, the CCSID maps will not be updated.

Options

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

Integrated Server Support (5770-SS1 Option 29)

Integrated Server Support removal

The IBM i Integrated Server Support (5770-SS1 Option 29) is no longer supported and the option has been removed in IBM i 7.4.

For alternative solutions, refer to the iSCSI External Web Page : <https://www.ibm.com/support/pages/node/1119645>

Licensed programs

This section contains information about individual licensed programs that have been modified or changed for IBM i 7.4.

Collaboration software (formerly Lotus®) supported on IBM i 7.4

Refer to the Collaboration Software for IBM i Compatibility Guide at https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0074918&sys_kb_id=f7cecd35dbe8ec14a45ad9fcd39619d2 for information about the minimum releases of Collaboration products required to run on IBM i 7.4.

IBM WebSphere Application Server 8.5 (5733-W85) and 9.0 (5733-W90)

Migration requirements if you have IBM WebSphere Application Server V8.0 or an earlier version

IBM WebSphere® Application Server V8.0 and earlier versions are not supported and will not function on IBM i 7.4.

- If you currently have the IBM WebSphere Application Server (WAS) version 8.0 or earlier product installed and are upgrading to IBM i 7.4, you will need to migrate your traditional WAS Classic Profile installation and profiles to either IBM WebSphere Application Server V8.5 at the 8.5.5.15 product fix pack level or higher or to V9.0 at the 9.0.0.11 product fix pack level or higher.
- Java SE 8 32 bit (5770-JV1 option 16), Java SE 8 64 bit (5770-JV1 option 17) are required to be installed on IBM i 7.4.

Refer to the URL: <https://www-01.ibm.com/support/docview.wss?uid=nas8N1020692> for information on how to install IBM Java SE 8.

- IBM Installation Manager (IM) V1.8.9.4 or newer is required to be installed.

Refer to the URL: <http://www-01.ibm.com/support/docview.wss?uid=nas8N1022458> for information on how to display the current IM version and how to upgrade it to a newer version if required.

- For additional information on the support of WebSphere Application Server at IBM i 7.4, review the URL: <http://www-01.ibm.com/support/docview.wss?uid=nas8N1020185>

Existing WAS Installations

Minimum required IBM WebSphere® Application Server (WAS) versions

- The minimum recommended version of WAS 8.5 is 8.5.5.15 or later. The minimum required version is 8.5.5.9. The WAS default SDK and all WAS profiles must be configured to use JDK 8.0. You have 2 options to consider:
 1. **Before IBM i 7.4 upgrade (recommended).** Refer to URL: <https://www.ibm.com/support/docview.wss?uid=ibm10795736> for instructions.
 2. **After IBM i 7.4 upgrade.** Refer to URL: <https://www.ibm.com/support/docview.wss?uid=ibm10796142> for instructions.
- The minimum required version of WAS V9.0 is 9.0.0.0 which is the first release. No additional steps are required.

New WAS Installations

A new install of WebSphere Application Server version 8.5 requires V8.5.5.15 or newer media. This media can be downloaded using ESS. Instructions for ESS WAS downloads are located here : <http://www.ibm.com/support/docview.wss?uid=nas8N1010905>. A new install of WebSphere Application Server version 9.0 requires V9.0.0.0 or newer media. It is recommended to install WAS version V9.0.

For WAS V8.5, you have two options to consider depending on when WAS V8.5.5.15 is installed:

1. **After IBM i 7.4 upgrade.** No other steps are required.
2. **Before IBM i 7.4 upgrade.** The WAS default SDK and all WAS profiles and default SDK must be configured to use JDK 8.0.

Refer to URL: <https://www.ibm.com/support/docview.wss?uid=ibm10795736> for instructions.

For WAS V9.0, no additional steps are required.

Liberty Profile Installation Migration (Installation Manager and Archive Type Installations)

The minimum required version of Liberty profile is 17.0.0.3.

All WAS Liberty Profiles will need to be configured to use JDK 8.0 or newer to function correctly at IBM i 7.4.

Refer to <http://www.ibm.com/support/docview.wss?uid=nas8N1021106> for detailed information on how to configure your IBM WebSphere Application Server Liberty Profile installation and application servers to use IBM JDK V8.0 or newer.

IBM Db2 Web Query for i (5733-WQX) changes

IBM Db2 Web Query for i V2.2.0 and earlier versions are not supported and will not function on IBM i 7.4. Upgrade to Web Query version 2.2.1 or later. If Web Query 2.2.1 is installed on IBM i 7.4, you will need to apply the Web Query group PTF SF99653 before starting Web Query the first time. IBM Technology for Java SE 8 32 bit (5770-JV1 option 16) is also required for Web Query on IBM i 7.4.

For more information on Db2 Web Query for i, refer to the product wiki at <http://ibm.co/db2wqwiki>.

IBM Developer Kit for Java (5770-JV1)

The JV1 options for IBM Technology for Java(IT4J) 7.0 and 7.1 (option 14 and 15) are no longer supported on IBM i 7.4. The default JVM on IBM i 7.4 is IBM Technology for Java 8.0 64bit (option 17).

For more information about J9 on IBM i, see the IBM i Technology Updates page for Java.

Backup Recovery and Media Services (5770-BR1)

Prior to upgrading BRMS

It is important to ensure no user created dependencies exist on BRMS files in QUSRBRM before upgrading BRMS. Use DSPDBR on all physical and logical files in QUSRBRM to ensure only IBM BRMS files are listed. If any other non-IBM dependencies exists, they need to be removed before starting an upgrade.

SQL can be used to potentially find user created files in QUSRBRM:

```
select * from table(qsys2.object_statistics('QUSRBRM', 'FILE')) x
where OBJOWNER <> 'QBRMS';
```

If using OUTPUT(*OUTFILE) on any BRMS commands, it is recommended that the current outfiles be deleted prior to upgrading or after upgrading to a new release. Changes to files may have occurred and new fields added or changed.

SAVLIBBRM and SAVOBJBRM command changes

The Save Library using BRM (**SAVLIBBRM**) and Save Library using BRM (**SAVOBJBRM**) command default for the Journalized objects (**OBJJRN**) parameter has changed to *YES.

Backup Policy change

The Work with Policies using BRM (**WRKPCYBRM**) **TYPE (*BKU)** default value for Save Journalized Objects when saving changed objects has changed to *YES.

IBM Content Manager OnDemand for i (5770-RD1)

Document command changes

The default function of the Report ID (RPTID) parameter on the Print Document (**PRTDOCOND**), Query Document (**QRYDOCOND**), and Retrieve Document (**RTVDOCOND**) commands has changed. Previously, when documents were selected by using a Report ID, documents were returned in the order in which they were loaded, but any documents with updated index values were not returned. In Content Manager OnDemand for i 7.4, the default function has changed. When documents are selected by using a Report ID, all documents are returned, including documents with updated index values, but they might not be returned in the order in which they were originally loaded. Customers wanting to continue to use the previous functionality should specify the new Retrieve in load order (RTVLORD) parameter with a value of *YES.

PDF Indexer requirements

Product IBM Portable Utilities for i (5733-SC1) is now required for customers using the PDF indexer. Product options *BASE and option 1 are both required.

IBM Rational Development Studio for i (5770-WDS)

ILE COBOL Reserved words

The ILE COBOL language has added ALLOCATE, DEFAULT, and FREE to the list of reserved words. Reserved words can only be used as specified in the COBOL language defined formats. Use of these words as a user-defined word will not be allowed by the compiler and the user-defined word must be changed.

The ILE COBOL Reserved Word List has been updated to include a number of other words that are not currently used by the compiler. These words will receive a low severity diagnostic message by the compiler and it is recommended that these words not be used as user-defined words. See the ILE COBOL Reserved Word List appendix in the ILE COBOL Reference guide for a complete list of reserved words.

An RPG file defined with USAGE(*UPDATE) is no longer opened delete-capable

Prior to release IBM i 7.4, a file defined in a free-form definition with **USAGE (*UPDATE)** was opened to be delete-capable.

For programs compiled with **TGTRLS (V7R4M0)** and higher, a file defined in a free-form definition will no longer be opened delete-capable unless ***DELETE** is specified in the **USAGE** keyword.

With this change, if the file is shared, and a second program attempts to open the file to be delete-capable, the second **OPEN** operation will receive diagnostic message CPF4123:

Open options ignored for shared open

If the second program attempts to delete a record, the DELETE operation will fail with CPF5149 :
Operation for program device or member E69714A140, file is not valid

%TIMESTAMP now returns a timestamp with microsecond precision

%TIMESTAMP now returns a timestamp with microsecond precision unless you enable an environment variable on the system where the program is compiled.

In prior releases, **%TIMESTAMP** returned a timestamp with only millisecond precision. The final three digits of the microseconds portion of the timestamp were always zero. To obtain a timestamp with only milliseconds, specify **%TIMESTAMP(3)**.

Starting in IBM i 7.4 with PTFs SI73191 and SI73192 or SI73193, **%TIMESTAMP** returns a timestamp with microsecond precision. All the digits of the microsecond portion of the timestamp may have a non-zero value.

When a program is compiled on IBM i 7.4 with PTF SI73192 or SI73193 and the program is restored on another system, the other system must have PTF SI73191 applied when the program is restored. If PTF SI73191 is not applied, the program will fail with MCH4437 :

```
Program import not found
```

Note: The microsecond precision change to **%TIMESTAMP**, can be prevented by adding the environment variable **QIBM_RPG_DISABLE_TIMESTAMP_MICROSEC 'Y'** on the system where the program is compiled. When a program is compiled with this environment variable set, no PTFs related to this change will be needed on other systems where the program is restored. The millisecond precision will be used when this environment variable is set as shown.

```
====> ADDENVVAR QIBM_RPG_DISABLE_TIMESTAMP_MICROSEC VALUE('Y')
```

IBM i Access for Windows (5770-XE1)

IBM i Access for Windows is out of Service as of April 30, 2019. The suggested replacement is IBM i Access Client Solutions (5733-XJ1). For information about IBM i Access Client Solutions visit : <https://www.ibm.com/support/docview.wss?uid=isg3T1026805>

IBM i Access Client Solutions (5733-XJ1)

Open Source Package Management Interface Proxy Support

Proxy support was added for the Open Source Package Management Interface that is part of IBM i Access Client Solutions (ACS). This proxy support allows an IBM i system that does not have any access to the internet to use a Windows or Mac OS system as the proxy host to access the RPM repository hosted by IBM.

Two new function usage IDs have been added to provide specific authority for this proxy support. These need to be set in order to have access to this support.

The function usage IDs are:

- **QIBM_ACS_HTTP_PROXY**
- **QIBM_ACS_HTTP_PROXY_OSPM**

Use **CHGFCNUSG** to set:

```
> CHGFCNUSG FCNID(QIBM_ACS_HTTP_PROXY) USER(usrprofile) USAGE(*ALLOWED)
```

```
> CHGFCNUSG FCNID(QIBM_ACS_HTTP_PROXY_OSPM) USER(usrprofile) USAGE(*ALLOWED)
```

Without the function usage IDs set appropriately, if you try to launch HTTPProxy and connect to your machine you could get the following error:

Application Administration settings prevent this feature from running or completing. To change this restriction, see your system administrator.
(QIBM_ACS_HTTP_PROXY)

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