

IBM i Memo to Users
Version 7.4

Memo to Users



Note

Before using this information and the product it supports, read the information in [“Notices” on page 33.](#)

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.

This document may contain references to Licensed Internal Code. Licensed Internal Code is Machine Code and is licensed to you under the terms of the IBM License Agreement for Machine Code.

© **Copyright International Business Machines Corporation 1998, 2019.**

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Chapter 1. PDF file for Memorandum to Users.....	1
Chapter 2. About IBM i Memo to Users.....	3
Who should read this memorandum.....	3
Additional incompatibility information.....	3
What's new.....	3
Installing IBM i 7.4 over IBM i 7.2.....	4
Discontinued support for certain software and hardware.....	4
PTF numbers in this memorandum.....	4
Memorandums for previous releases.....	4
Prerequisite and related information.....	4
How to send your comments.....	5
Chapter 3. Read this first.....	7
Current customers - read before you install.....	7
Required PTFs before you upgrade to IBM 7.4.....	8
Upgrade planning	8
Minimum partition memory required for IBM i 7.4.....	8
IBM i 7.4 is not supported on POWER7 systems	8
Plan for your Operations Console installation or upgrade.....	8
Chapter 4. IBM i operating system.....	11
Programming Considerations.....	11
Output file(OUTFILE) changes.....	11
Command Output cautions.....	11
Security audit record changes.....	11
Programs that use customized versions of IBM-supplied commands.....	11
Changes to system printer files and other IBM-supplied objects.....	11
Removal of support of adapters and configurations in release IBM i 7.4.....	12
IBM i command changes.....	12
ADDTCPIFC and CHGTCPIFC command changes.....	12
ADDUSRSNMP command changes.....	13
APYJRNCHGX command	13
CHGASPACT and CHGCLURCY command authority changes.....	13
CHGCTLAPPC and CRTCTLAPPC command changes.....	13
CHGCTLASC and CRTCTLASC command changes.....	14
CHGCTLHOST and CRTCTLHOST command changes.....	15
CHGDEVDSP and CRTDEVDSP command changes.....	16
CHGDEVHOST and CRTDEVHOST command changes.....	17
CHGDEVPRT and CRTDEVPRT command changes.....	17
CHGSNMPA command changes.....	17
CRTLINETH and CHGLINETH command changes.....	17
CHGNETA command changes.....	18
RTVCFGSRG command changes and output.....	18
STRTRPMGR command default change.....	19
TRCCNN command changes.....	19
VRYCFG command changes.....	19
Removal of commands requiring native adapters.....	19
Removal of commands and support for DDI, Token-Ring, Wireless, Frame Relay, SDLC, TDLC, and X.25 protocols.....	20

Removal of IP over SNA commands.....	20
Removal of commands for Network Interfaces.....	21
Database changes.....	21
New SQL reserved words and schema names.....	21
SQE MAXTMPSTG query processing.....	21
HASH scalar function change.....	21
QSYS2.PARSE_STATEMENT table function returns warnings.....	22
QSYS2.ASP_INFO view change.....	22
SQL_NATIVE_ACCESS QAQQINI control is deprecated.....	22
SQL precompiler changes.....	22
Exit point and QPWDVLDPGM system value behavior changes.....	23
Support for the QDFTJRN data area removed.....	23
Integrated web application server changes.....	23
Integrated web services server changes.....	23
Create Index (CRTINX) MI change.....	23
Changes to instructions that materialize the Wait time-out pending interrupt.....	23
Modify Space Attributes (MODS) MI change.....	24
IBM Navigator for i.....	24
PASE environment variable change.....	24
Secure sockets layer (SSL) and Transport Layer Security (TLS) changes.....	24
TLS enabled and default cipher specification lists have changed for System TLS.....	24
System TLS support for SSLv2 has been removed	25
TLSv1.3 protocol has been enabled for System TLS	25
TLSv1.1 and TLSv1.0 protocols have been disabled for System TLS.....	25
QMAXACTLVL system value.....	25
Mitigating Spectre and Meltdown vulnerabilities in new and existing programs.....	26
Chapter 5. Options.....	27
Integrated Server Support (5770-SS1 Option 29).....	27
Chapter 6. Licensed programs.....	29
Collaboration software (formerly Lotus®) supported on IBM i 7.4.....	29
IBM WebSphere Application Server 8.5 (5733-W85) and 9.0 (5733-W90).....	29
IBM Db2 Web Query for i (5733-WQX) changes.....	30
IBM Developer Kit for Java (5770-JV1).....	30
Backup Recovery and Media Services (5770-BR1).....	30
IBM Content Manager OnDemand for i (5770-RD1).....	31
Document command changes.....	31
PDF Indexer requirements.....	31
IBM Rational Development Studio for i (5770-WDS).....	31
ILE COBOL Reserved words.....	31
IBM i Access for Windows (5770-XE1).....	31
Notices.....	33
Trademarks.....	34
Terms and conditions.....	35

Chapter 1. PDF file for Memorandum to Users

You can view and print a PDF file of this information.


To view or download the PDF version of this document, select [Memorandum to Users](#).

Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF link in your browser.
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.
4. Click **Save**.

Downloading Adobe Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free copy from the [Adobe Web site \(www.adobe.com/reader/\)](http://www.adobe.com/reader/) .

Chapter 2. 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 7.4 publication:

- **April 2019 update**
 - “[Upgrade planning](#)” on page 8 was updated.
 - “[QSYS2.ASP_INFO view change](#)” on page 22 was added.



- “SQE_NATIVE_ACCESS QAQQINI control is deprecated” on page 22 was added.
- “IBM WebSphere Application Server 8.5 (5733-W85) and 9.0 (5733-W90)” on page 29 was updated.

- **May 2019 update**

- “Mitigating Spectre and Meltdown vulnerabilities in new and existing programs” on page 26 was added.

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 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.

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/customerare/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.

Chapter 3. 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:

SDPTFORD 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:

SDPTFORD 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:

SDPTFORD 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:

SDPTFORD SF98206

- 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 7.4

PTFs might be required before you upgrade to 7.4

As you plan for your IBM 7.4 installation or upgrade, ensure that you review the "Required PTFs for upgrading to IBM 7.4" topic within the IBM i and Related Software section of the IBM Developer wiki.

To review the "Required PTFs for upgrading to IBM i 7.4", go to the wiki using the following link: <http://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20and%20Related%20Software> and select Updates and PTFs.

Upgrade planning

Documentation resources important to 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.

On the Planning web page <http://www.ibm.com/systems/support/i/planning/upgrade/index.html>, 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 (except 11111111) 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.

Chapter 4. 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.

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 (**LANCNNTMR**)
- 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 (**HPRPHSWT**)

- 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 (**LANACCPTY**)
- LAN window step (**LANWDWSTP**)
- X.25 switched line selection (**SWTLINSLCT**)
- X.25 default packet size (**DFTPCKTSIZE**)
- 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.

CHGDEVDSP and CRTDEVDSP command changes

The Create Device Desc (Display) (**CRTDEVDSP**) and Change Device Desc (Display) (**CHGDEVDSP**) 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 (**LECDSTIMO**)
- 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 objects 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) (**CRTCLRWS**)
- Change Ctl Desc (Finance) (**CHGCTLFNC**)
- Change Ctl Desc (Retail) (**CHGCTLRTL**)
- Change Ctl Desc (Remote WS) (**CHGCLRWS**)
- 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 (**DLTDEVD**)
- 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) (**CHGLINS DLC**)
- Change Line Desc (TDL) (**CHGLINTDL**)
- 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 (**DLTDEVD**)
- 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 (**ADDIPSIFI**)
- Add IP over SNA Location (**ADDIPSLOC**)
- Add IP over SNA Route (**ADDIPSRTE**)
- Change IP over SNA Interface (**CHGIPSIFI**)
- Change IP over SNA Location (**CHGIPSLOC**)
- Change IP over SNA TOS (**CHGIPSTOS**)
- Convert IP Address (**CVTIPSIFI**)
- 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 (**RMVIPS RTE**)
- 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, c.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.

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

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".

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.

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 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

Chapter 5. 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/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/Integration%20with%20BladeCenter%20and%20System%20x>

Chapter 6. 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://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=41013141USEN&> 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 of J9 on IBM i, see the IBM i Technology Updates website: <http://www.ibm.com/developerworks/ibmi/techupdates/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 Journalled objects (**OBJJRN**) parameter has changed to *YES.

Backup Policy change

The Work with Policies using BRM (**WRKPCYBRM**) **TYPE(*BKU)** default value for Save Journalled 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 (RTVLODORD) 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.

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>

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
1623-14, Shimotsuruma, Yamato-shi
Kanagawa 242-8502 Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Software Interoperability Coordinator, Department YBWA
3605 Highway 52 N
Rochester, MN 55901
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs.

© Copyright IBM Corp. _enter the year or years_.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "[Copyright and trademark information](http://www.ibm.com/legal/copytrade.shtml)" at www.ibm.com/legal/copytrade.shtml.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks of Oracle, Inc. in the United States, other countries, or both.

Other product and service names might be trademarks of IBM or other companies.

Terms and conditions

Permissions for the use of these publications is granted subject to the following terms and conditions.

Personal Use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative works of these publications, or any portion thereof, without the express consent of IBM.

Commercial Use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

