IBM

IBM i

IBM i Memo to Users

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> **Note**
>
> Before using this information and the products it supports, be sure to read the information in "Appendix A. Notices" on page 43.

Contents

About IBM i Memo to Users

This information describes the changes in version 7, release 1, modification 0 (IBM i 7.1) 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 7.1 Memo to Users contains information that is critical for several audiences. This memorandum has four chapters:

- **Read this first** provides information to be considered before you install IBM i 7.1. This chapter 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 chapter 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 chapter 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 chapter 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 saved on an IBM i 7.1. system to be restored on a previous release server. This chapter 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 i Information Center at this Web site:

`http://www.ibm.com/systems/i/infocenter/`

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

For other incompatibility information that was not available when this memorandum was published, see PTF cover letters, Preventive Service Planning - PSP, and Authorized Problem Analysis Reports (APAR) information, on the Support for IBM System i Web site under Technical Databases: `http://www.ibm.com/systems/support/i/databases/index.html`.

Accessibility features for IBM i Memo to Users

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

The IBM i 7.1 Memo to Users is also available as a text file on the Support for IBM System i Web site.

1. Go to Technical databases at: `http://www.ibm.com/systems/support/i/databases/index.html`
2. Click **Preventive Service Planning - PSP > All Preventive Service Planning Documents by Release > 710**.

Installing i 7.1 over V5R4

If you are installing IBM i 7.1 over V5R4, you should also read the *i5/OS Memo to Users* for V6R1. This document contains incompatibility-related information about the new functions and enhancements incorporated into IBM i 6.1. You can order this document by typing the following command:

```
SNDPTFORD SF98016
```

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

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 on the Support for IBM System i Web site:

`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

In addition to ordering previous releases of the *Memorandum to Users* using the SNDPTFORD command, you can also view these documents at the Support for IBM System i Web site:

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

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

Prerequisite and related information

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

Starting in IBM i 7.1, the IBM i Information Center is no longer available on physical media that would allow it to be installed on a System i, Power System, or personal computer. You can access the IBM i Information Center at this Web site:

`http://www.ibm.com/systems/i/infocenter/`

The IBM i Information Center contains advisors and important topics such as Java™, 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 *System i Access for Windows DVD*, SK3T-4098. This DVD contains the IBM i Access for Windows licensed program. IBM i Access Family offers client/server capabilities for connecting personal computers to IBM i computers.

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, fill out the readers' comment form at the back of this memorandum.

- If you prefer to send comments by mail, use the readers' comment form with the address that is printed on the back. If you are mailing a readers' comment form from a country other than the United States, you can give the form to the local IBM branch office or IBM representative for postage-paid mailing.
- If you prefer to send comments by FAX, use either of the following numbers:
  - United States, Canada, and Puerto Rico: 1-800-937-3430
  - Other countries: 1-507-253-5192
- If you prefer to send comments electronically, use one of these e-mail addresses:
  - Comments on books:
      RCHCLERK@us.ibm.com
  - Comments on the IBM i Information Center:
      RCHINFOC@us.ibm.com

Be sure to include this information:

- The name of the book or IBM i Information Center topic.
- The publication number of a book.
- The page number or topic of a book to which your comment applies.

Chapter 1. Read this first

Current customers only — before you install i 7.1

The following publication contains additional information you should read and understand before you install this release. All the sources referenced are on the Internet and can be found through various links at the following Web site:

`http://www.ibm.com/systems/i/infocenter/`

Note: After the release of the IBM i Information Center, updates will be available in the English Internet version. To review these updates, click **Updates since i 7.1 announcement** on the Information Center home page.

Access the Internet version. The instructions refer you to several sources:

- The **Installing, upgrading, or deleting i5/OS and related software** topic in the IBM i Information Center contains software preinstallation information and information about installing or upgrading the operating system release, part of the release, or related licensed programs. You can also order a printed version of this PDF (SC41-5120) with your software upgrade orders or new hardware orders.

- The Preventive Service Planning (PSP) Information provides information about software problems you might encounter as you install the new release. The PSP number for the online IBM i 7.1 Memo to users is SF98036. To access the PSP database:

  1. Go to **Technical databases** at: `http://www.ibm.com/systems/support/i/databases/index.html`.
  2. Click **Preventive Service Planning - PSP**.

  Alternatively, you can obtain PSP from your software service provider. The following items are included in PSP:

  – The PSP identifier for information that pertains to installing i 7.1 is SF98030. Information within the 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 SF98030

  – The PSP identifier for information that pertains to problems discovered since the availability of the current cumulative PTF package is SF98710. Information within this PSP describes all PTFs released since the current cumulative PTF package began shipping. It also contains information about all known high-impact and pervasive problems that are not included in the latest cumulative PTF package. To receive this PSP information by using electronic customer support, type this command on an IBM i command line:

        SNDPTFORD SF98710

  – The PSP identifier for information that pertains to installing i 7.1 hardware and HMC is MF98710. 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, use this command:

        SNDPTFORD MF98710

  – The PSP identifier for information that pertains to system upgrades and data migrations is SF98170. 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 SF98170

1

- 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, do the following:
  1. Go to **Guide to fixes** at: `http://www.ibm.com/systems/support/i/fixes/guide/index.html`.
  2. Click **Server maintenance**.

Process for ordering cumulative PTF packages

You will not receive a cumulative PTF package with your software order. To ensure consistent cumulative PTF packaging and to be able to get the latest PTFs, IBM has established a single delivery source. This single source is Corrective Service.

When you order the Cumulative PTF Package for IBM i 7.1 (SF99710) from Corrective Service, you receive the latest cumulative PTF, plus DB (Database) Group PTFs, HIPER (High Impact Pervasive) Group PTFs, and Security Group PTFs to install with your software upgrade.

If an extended time has elapsed since you received your order, a later cumulative PTF package might be available. You can order cumulative PTF packages either by using the Send Program Temporary Fix Order (SNDPTFORD) command, by using Fix Central, or by contacting your software service provider. You are advised to check to see if you have the latest cumulative PTF package. To view the latest available cumulative PTF package identifier for your software release:

1. Go to **Technical databases** at: `http://www.ibm.com/systems/support/i/databases/index.html`
2. Click **Preventive Service Planning** - PSP

Refer to the software installation Preventive Service Planning (PSP) document, SF98030, for the release of the operating system software that you are installing.

If you do not have the latest cumulative PTF package for your operating system software installation, place an order for the package 7 - 10 working days before you plan to install the software to allow sufficient delivery time. You can view PTF ordering options through the Internet at the Support for IBM System i Web site. Click **Technical Databases > PTF Ordering**. You can download the cumulative PTF package using FTP by specifying that option in Fix Central; this option provides faster turnaround than the 7-10 days required for the physical package to arrive.

Program conversion

There is no program conversion if you are upgrading from 6.1 to IBM i 7.1. If you are upgrading to IBM i 7.1 from i5/OS V5R4 or earlier, read the Program conversion section in the *i5/OS Memo to Users* for V6R1.

DVD installation media for i 7.1

The DVD installation media is consolidated. Previously there were 51 sets of unique language version media. Now there are three sets of multiple language version media. For information about the media, see the **Media labels and their contents** topic in the IBM i Information Center.

Full automatic installation and upgrades from optical media that are changing the primary language during the upgrade or installation need to set the installation language using the QINSTLNG API. For information about the QINSTLNG API, see the Set Install National Language Version (NLV) (QINSTLNG) API.

Ensure that the cluster version is current before installing IBM i 7.1

If you are using clusters or high availability, and the partition that is being installed is a node in the cluster, then ensure that the cluster version is current before installing IBM i 7.1. Clustering supports only one cluster version difference. An i 6.1 cluster must have a cluster version of 6 before you install i 7.1. For more information see the Cluster version topic in the IBM i Information Center.

High availability

In 6.1, 5761-HAS shipped with the name IBM System i High Availability Solutions Manager. Shortly after it shipped, the name was changed in all marketing brochures to IBM PowerHA for i. The product id stayed as 5761-HAS.

In 7.1, 5770-HAS shipped with the name IBM PowerHA for i. At announce time, the name was changed in all marketing brochures to IBM PowerHA SystemMirror for i. The product id stayed as 5770-HAS.

High availability considerations

Before you upgrade your system to IBM i 7.1, if your system currently has High Availability Solutions Manager 5761-HAS installed, you first need to be certain PTF SI39026 has been applied. This PTF fixes a potential issue that may cause the install of PowerHA 5770-HAS to fail. If you have already upgraded the operating system to IBM i 7.1 and have yet to attempt to upgrade to PowerHA 5770-HAS or have attempted an upgrade to 5770-HAS and experienced a failure causing the product to be listed in *ERROR state, perform these steps:

Delete the following files, and then attempt the upgrade to 5770-HAS.
* /QIBM/ProdData/HASM/plugins/tbg/site.xml
* /QIBM/ProdData/HASM/plugins/tbg/help/ugclhelp.zip
* /QIBM/ProdData/HASM/plugins/tbg/plugins/com.ibm.i5OS.webnav.plugin.ClusterServices_1.0.0.jar
* /QIBM/ProdData/HASM/plugins/tbg/features/tbgFeature.jar

Plan for your Operations Console installation or upgrade

If you are upgrading to i 7.1 and you want to replace an existing console with a LAN attached Operations Console, upgrade the system before migrating the console. This prevents any conflict between the existing console and the Operations Console. The exception to this is if the existing console is a direct attached (asynch) Operations Console. If your console is a direct attached Operations Console see "Operations Console directly attached to the system is not supported in i 7.1" on page 5 for upgrade information.

Prerequisite information for LAN attached Operations Console users upgrading to, or installing, i 7.1:

You must comply with the following before upgrading or installing your software (operating system, Licensed Internal Code) to i 7.1:

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

2. It is recommended that you update IBM i Access for Windows to i 7.1 before you upgrade the operating system. For more information, see the **Installing IBM i Access for Windows** topic in the IBM i Information Center.

Note: Failure to comply with the above actions might prevent the console from working correctly during the upgrade or installation.

Important: During a manual IPL of the system, and if no console has been specified before, you will receive two additional 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 will exit and set the console type automatically. The IPL will continue 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 i 7.1; 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.

Migrating to Operations Console before your system model upgrade

If you are going to be using Operations Console on your new IBM i or Power system with IBM operating system (migrating from a different console type), it is important that you configure the new Operations Console PC before the beginning of the upgrade. At the point in the upgrade instructions where console functions are required on the new IBM i or Power system, you can perform any required functions without the need for your current console device. The Operations Console features matching the connectivity you plan to use should be specified as part of the order for your new IBM i or Power system.

New models

If you are using a Power System or an IBM i 5xx system that uses a Hardware Management Console (HMC), you can change from HMC to Operations Console or from Operations Console to HMC. For details on how to change consoles, see the **System i® information > Managing consoles, interfaces, and terminals > Changing consoles, interfaces, and terminals** topic in the **IBM Systems Hardware Information Center**.

For Operations Console (LAN) on systems that are not HMC managed, see the **System i information > Managing consoles, interfaces, and terminals > Managing IBM i consoles > Managing Operations Console > Planning for your configuration > Operation Console hardware requirements** topic in the **IBM Systems Hardware Information Center** for default port information.

Switching console control to another user

If you use Operations Console and run a 5250 emulation console, you can use a new option on the Select Console window, called **Allow console recovery and console can be taken over by another console**. This option allows users of local consoles on a network to take control of the console from another user, if needed.

Recovery

The **Allow console recovery and console can be taken over by another console** option also controls a new recovery function that allows the recovery of the console without the loss of data or the job. For details of what this option does, see the **Operations Console** topic in the IBM i Information Center.

Operations Console directly attached to the system is not supported in i 7.1

An Operations Console directly attached to the system is not supported in i 7.1. If you currently have an Operations Console directly attached to the system, you must change the console before you start to install or upgrade the IBM i software on your system. Failure to do so can cause unpredictable results. For more information about changing consoles, see the **Managing consoles, interfaces, and terminals > Changing consoles, interfaces, and terminals** topic in the **IBM Systems Hardware Information Center**.

Information APARs for software installation

Information APAR II14482

As you plan for your IBM i 7.1 installation or upgrade, ensure that you review Information APAR II14482 for i 7.1 in the Preventive Service Planning information.

If you are upgrading from V5R4, for example, you need to load and apply certain PTFs to be able to accept online software agreements. If you are using image catalogs to upgrade from either V5R4 or 6.1, certain PTFs are required. Both of these preparation steps are included in the Installing, upgrading, or deleting IBM i and related software information center topic.

To review Information APAR II14482:

1. Go to **Technical databases** at: `http://www.ibm.com/systems/support/i/databases/index.html`
2. Click **Authorized Problem Analysis Reports (APARS)**

Upgrade planning

The Systems Management Planning Web page (`http://www.ibm.com/systems/support/i/planning`) provides links to various planning tools and information.

The IBM i, i5/OS and OS/400® Level Mapping Web page (`http://www.ibm.com/systems/support/i/planning/upgrade/osmapping.html`) lists operating system support by model.

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

Prerequisite information

The IBM Prerequisite tool (`https://www-912.ibm.com/e_dir/eserverprereq.nsf`) 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.

Electronic Software Delivery (ESD)

A new API called QVOIFIMG (Fill Image Catalog) has been PTFd into V5R4 and V6R1 that makes it easier to use image catalogs when working with images that have been downloaded through the ESD process. Information APAR for software Installation upgrade to IBM i 7.1 (II14482) includes the specific PTF numbers for each of these releases. For details on where to find Information APAR II14482 see "Information APARs for software installation."

Future Hardware and Software Planning

The Future Planning Information Web page (`http://www.ibm.com/systems/support/i/planning/upgrade/future.html`) provides insight into IBM's current plans, directions, and intent, and is subject to change or withdrawal without notice.

Setting up Ethernet connectivity from IBM i logical partitions to the Hardware Management Console

Follow the installation steps for setting up Ethernet connectivity from IBM i logical partitions (LPARs) to the Hardware Management Console (HMC) for HMC-managed systems. You can set up Ethernet connectivity in the following ways:

* Use an Ethernet adapter that the LPAR owns.
* Use the virtual LPAR-to-LPAR LAN that the Hypervisor provides. The virtual LAN must have a route to a real customer LAN using a bridge or routing partition that owns a LAN adapter.

You must set up Ethernet connectivity between the HMC and IBM i on POWER6® and POWER7 processor-based systems. If IBM i forwards the problem report to HMC over the Ethernet connection, the HMC service function can work on the hardware problem. HMC must be aware of the problem before it can help fix the problem.

For more information, click **Managing the Hardware Management Console (HMC) > Installing the HMC** in the IBM Systems Hardware Information Center.

Tape library (TAPMLB) devices attached using an IOPless adapter

A new resource name is assigned for tape library devices attached using an IOPless adapter when i 7.1 is installed. To continue to use the same tape library device description as before the install, it is necessary to use the Change Device Desc (Media Lib) (CHGDEVMLB) command and change the resource name field to the new resource name assigned to the tape library device during the install.

Tape library devices attached using an IOPless adapter will process tape cartridges with missing or unreadable bar code labels differently than tape library devices attached to an IOP. Tape cartridges with a missing or unreadable bar code label will be assigned a cartridge ID of format U@xxxx or UNKxxx (where xxx/xxxx identifies the physical location). Before the tape cartridge can be used for output operations, it must be re-initialized to change the volume ID to match the assigned cartridge ID.

Fibre Channel (FC) tape library devices attached to a multi-port FC adapter will now require at least one control path drive to be attached to each port.

IBM System Storage DS8000 actions

IBM System Storage™ DS8000® systems that are not running firmware release R4 or later might produce a hardware failure notification if Collection Services is collecting the new external storage metrics (*EXTSTG category data) that has been added in the 7.1 release.

Hardware failure notification will cause the following Product activity log (PAL) entries to be repeatedly generated:

```
PAL Reference Code
2107FFF4
B6005120
B6000266
A6010266
B6005120
A6020266
```

To prevent this failure, you have two options:

1. Ensure IBM System Storage DS8000 has been upgraded to firmware level R4 or greater before you install or upgrade to IBM i 7.1. Or

2. Apply PTF SI38092 immediately after the installation of IBM i 7.1. This PTF is included on the GA cumulative PTF package. This PTF is a delayed PTF.

PTF SI38092 removes the *EXTSTG category from the shipped Collection Services collection profiles which disables the collection of the external storage performance data.

When you have upgraded all your IBM External Storage DS8000 systems to firmware level R4 or greater, the *EXTSTG category can again be added to the shipped Collection Services collection profiles by following these instructions (also included within PTF SI38092).

To put the *EXTSTG data category back into the shipped Collection Services collection profiles, take the following steps. (Note: following these steps restores the default Collection Services configuration. To customize the configuration, execute the CFGPFRCOL command with the wanted configuration settings before restarting Collection Services.)

- End Collection Services - ENDPFRCOL FRCCOLEND(*YES)

- Rename the QYPSCOLDTA user space -

RNMOBJ OBJ(QUSRSYS/QPFRCOLDTA) OBJTYPE(*USRSPC) NEWOBJ(QPFRCOLDT2)

- Recreate a new QYPSCOLDTA user space - CALL QSYS/QYPSCOLDTA PARM('*EXTSTG')

- Restart Collection Services - STRPFRCOL

Note: IBM intends to include the external storage category to the default collection in the release following 7.1.

Option 1 install actions

Several database files which reside within QSYS2 might not be fully updated during a slip install of Option 1 on upgrade to IBM i 7.1.

To circumvent this problem for your primary language, **prior** to upgrading to IBM i 7.1, create a data area using: CRTDTAARA DTAARA(QSYS2/QLPOBJALL) TYPE(*CHAR) LEN(1). When the upgrade is complete, delete the data area using DLTDTAARA DTAARA(QSYS2/QLPOBJALL).

If you have secondary languages installed (QSYS29xx libraries), apply PTF SI38081 **prior** to upgrading the secondary language.

These circumventions will allow all the DB2 for i translatable file objects to be fully installed into QSYS2 and QSYS29xx.

If the circumventions were not followed before the upgrade, the following recovery actions should be taken:

1. DLTF QSYS2/QSQPDMRI

2. DLTF QSYS2/QSQPDTBL

3. DLTF QSYS2/SQL_SIZING

4. DLTF QSYS2/SYSFEATURE

5. RSTOBJ OBJ(QSQPDMRI QSQPDTBL SQL_SIZING SYSFEATURE) SAVLIB(QSYS2) DEV(YourDeviceName) OPTFILE('/Q5770SS1/Q710xx/Q01/Q02') using your installation media. [1]

6. For each secondary language: [1]

    a. DLTF QSYS29xx/QSQPDMRI

    b. DLTF QSYS29xx/QSQPDTBL

c. RSTOBJ OBJ(QSQPDMRI QSQPDTBL) SAVLIB(QSYS2) DEV(YourDeviceName) OPTFILE('/Q5770SS1/Q710xx/Q01/Q02') RSTLIB(QSYS29xx) using your secondary language installation media.

7. If you create distribution media, apply PTF SI38081 before creating your distribution media.

[1] 29xx is the feature code for the secondary language. For example, if your language is English (feature code 2924) the OPTFILE parmameter is '/Q5770SS1/Q71024/Q01/Q02' and the secondary language library is QSYS2924.

Action for upgrades that change the primary language

If your upgrade to IBM i 7.1 is also changing the primary language of your system you need to take the following action on the current release prior to the upgrade: DLTF QSYS2/SYSIXSTAT. If this action is not taken prior to the upgrade, recovery is required to be able to install Option 1 of the operating system. The recovery is to reclaim the cross-reference files using RCLSTG SELECT(*DBXREF) and then continue with the installation of the products.

If you have independent ASPs configured, SYSIXSTAT must be deleted prior to the upgrade from each independent ASP: DLTF QSYS2xxxxx/SYSIXSTAT. Each independent asp has its own version of a QSYS2 library. The name of the library is QSYS2xxxxx, where xxxxx is the number of the independent disk pool. For example, the name of the QSYS2 library for independent disk pool 39 is QSYS200039. If this action is not taken prior to the upgrade, the vary on following the upgrade will fail. The recovery is to reclaim the cross-reference files using RCLSTG SELECT(*DBXREF) ASPDEV(your-asp-device).

Key messages in this document

Each of the topics in this document provides important compatibility information that you should become familiar with before you install the new release. Some of these topics have a larger impact on more customers than others, and you should review these topics carefully. In i 7.1, the following topics are particularly important:

- "Activation group termination changes" on page 9
- "GO SAVE, GO RESTORE, GO LICPGM changes" on page 10
- "Database CPU Utilization changes" on page 14
- "Domain name system (DNS) security changes" on page 19
- "IPv6 changes" on page 21
- "INSWNTSVR command changes" on page 25
- "PASE for i Stack Execution Disable Support" on page 26
- "Changes required for PASE for i programs that call the JNI_CreateJavaVM API" on page 38
- "IBM Developer Kit for Java (5761-JV1)" on page 38
- "IBM i Access for Windows (5770-XE1)" on page 35

Chapter 2. IBM i operating system

This chapter 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

Output file (OUTFILE) changes

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 add new fields to the end of record formats 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, i5/OS, and OS/400.

Security audit record changes

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

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

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

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

Activation group termination changes

New behavior is being introduced in IBM i 7.1, which allows activation groups to end in a secondary thread. In prior releases of IBM i, ending an activation group in a secondary thread would cause the process to terminate. Now an activation group is allowed to end in a secondary thread and the process is not terminated, unless the activation group was active in more than one thread. If the activation group was active in more than one thread then the process will still be terminated to avoid unexpected behavior.

Note: This new behavior also causes the job to end if an activation group in the primary thread ends while it is still active in a secondary thread. The job would not end under these circumstances in prior releases of IBM i.

Also, in prior releases of IBM i the job would end if a high-level language (HLL) end verb, like the exit() and abort() functions in the C Runtime or STOP RUN in COBOL, was called from a secondary thread, regardless of whether an activation group would end as the result of a call to the end verb. Now the job is only ended if the HLL end verb causes an activation group that is active in more than one thread to end. For more information about activation groups see the ILE Concepts topic in the IBM i Information Center. For more information about IBM i threaded programming see the Multithreaded Programming topic in the IBM i Information Center.

AnyNet no longer supported

Starting in i 7.1, AnyNet® (a method used to run SNA communications traffic over IP) is no longer supported. Users of AnyNet are encouraged to migrate to Enterprise Extenders as a replacement. For information about migrating to Enterprise Extenders from AnyNet, see the Migrating from AnyNet to Enterprise Extender topic in the IBM i Information Center.

API changes

Report Software Error (qpdReportSoftwareError) API authority changes

The Report Software Error (qpdReportSoftwareError) API requires *SERVICE special authority be added to the current authorities. This API is used for detecting a software problem that must be fixed.

Sockets API changes

New user exit points have been created for these sockets APIs:

- sockets accept() API - QIBM_QSO_ACCEPT
- sockets connect() API - QIBM_QSO_CONNECT
- sockets listen() API - QIBM_QSO_LISTEN

If a user has registered an exit program for one of the new exit points, it is possible for errno to be set to EPERM on return from the sockets accept(), connect(), or listen() APIs. This could affect existing applications if the application is not designed to handle errno being set to EPERM. For additional information, see the Sockets Exit Points topic in the IBM i Information Center.

Backup and recovery changes

GO SAVE, GO RESTORE, GO LICPGM changes

In IBM i 7.1, the GO SAVE (options 21-23, 40), GO RESTORE (options 21-23, 40), and GO LICPGM (option 40) menus were enhanced to end TCP before ending the subsystems. Commands that are issued as part of these options are:

- End TCP/IP Server (ENDTCPSVR)
- End Host Server (ENDHOSTSVR)
- End TCP/IP (ENDTCP)

To allow time for these commands to process, two Delay Job (DLYJOB) commands are issued. A total of 10 minutes delay is added before the End Subsystem (ENDSBS) command is issued.

SAVLIB and SAVCHGOBJ changes for library QUSRSYS

Whenever library QUSRSYS is saved with the Save Library (SAVLIB) or Save Changed Objects (SAVCHGOBJ) commands, the current system information is retrieved and saved. The system information saved is the same data which is retrieved by the Retrieve System Information (RTVSYSINF) command. If

a system needs to be reloaded from distribution media, the system information can be updated by restoring the user information and then running UPDSYSINF LIB(QUSRSYS). Since the RTVSYSINF command is issued during a SAVLIB or SAVCHGOBJ command, status messages sent by RTVSYSINF are displayed and there will be additional completion messages associated with the RTVSYSINF command appearing in the joblog. Additionally, there might be a slight increase in the time required for the SAVLIB or SAVCHGOBJ commands as a result of retrieving and saving the system information.

C and C++ changes

C language runtime changes

STRCHR() function changes

In releases before IBM i 7.1, the *CLD version of the **strchr()** function did not perform shift-out (SO) and shift-in (SI) processing for mixed-byte locales. Changes to the function in i 7.1 allow mixed-byte strings that contain SO or SI characters to be processed correctly.

Heap Memory Changes for C and C++

In IBM i 7.1, alternate heap managers are provided for use with C and C++ applications. Additional information can be found in the section entitled "Heap Memory" within the ILE C/C++ Runtime Library Functions manual in the IBM i Information Center.

C++ language runtime changes

Changes in the C++ language runtime have been made to better conform with the ISO/IEC 14882:2003 specification.

Additional overloaded versions of the abs() and div() functions were added to both **<stdlib.h>** and **<cstdlib>**.

Additional overloaded versions of the abs(), acos(), asin(), atan(), atan2(), ceil(), cos(), cosh(), exp(), fabs(), floor(), fmod(), frexp(), ldexp(), log(), log10(), modf(), pow(), sin(), sinh(), sqrt(), tan(), and tanh() functions were added to both **<math.h>** and **<cmath>**.

IBM i command changes

APYJRNCHGX command support

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

CHGEXPSCDE command changes

If the Change Expiration Schedule Entry (CHGEXPSCDE) command was used to disable a user profile on the requested expiration date, issuing a Change User Profile (CHGUSRPRF) command with STATUS(*ENABLED) to re-enable the user profile is no longer sufficient. A CPF2251 escape message indicating the expiration date is not valid is sent.

To re-enable the user profile using CHGUSRPRF STATUS(*ENABLED), you must also enter either a new user expiration date (USREXPDATE), a user expiration interval (USREXPITV), or indicate the user profile will not expire (USREXPDATE(*NONE)).

CHGSRVAGTA command change

The AUTOTEST parameter has been removed from the Change Service Agent Attributes (CHGSRVAGTA) command.

This parameter change might require a recompile of any existing CL programs using this command.

CRTCLMOD and CRTBNDCL command changes

The default behavior of the Create CL Module (CRTCLMOD) and Create Bound CL Program (CRTBNDCL) commands now results in the CL source being stored with the object. If a user does not want this default behavior, the command default for CRTCLMOD and CRTBNDCL can be changed to *NO for the ALWRTVSRC parameter, or Declare Processing Options (DCLPRCOPT) can be used to specify *NO for ALWRTVSRC.

CRTCTLAPPC command changes

The default value for the Auto Delete Device (AUTODLTDEV) parameter of the Create Controller APPC (CRTCTLAPPC) command has been changed from a value of 1440 minutes (1 day) to a value of 31660 minutes (22 days). This change impacts the number of days an automatically created device that remains in idle state remains on the system until it is automatically deleted.

CRTNWSD and CHGNWSD command changes

The Create Network Server Desc (CRTNWSD) and Change Network Server Desc (CHGNWSD) TCP/IP port configuration (TCPPORTCFG) parameter, Element 4: Maximum transmission unit (MTU) now only accepts values in the valid range of 68 through 65535 in support of the valid range allowed by RFC 791 for MTU values.

This parameter change might require you to recompile any existing CL programs using these commands.

Network server descriptions (NWSD) that were created before i 7.1 might have a maximum transmission unit (MTU) value configured for the TCP/IP port configuration (TCPPORTCFG) parameter that is not supported and no longer allowed by the Create Network Server Desc (CRTNWSD) and Change Network Server Desc(CHGNWSD) commands. Values that are configured and are out of the supported range are changed to the minimum or maximum supported value automatically by the system on the first use of the object. Any existing value specified that is less than 68 is reset to 68. Any value specified that is greater than 65535 will be reset to 65535.

CRTNWSCFG and CHGNWSCFG command changes

The enable unicast (ENBUNICAST) parameter has been removed from the Create NWS Configuration (CRTNWSCFG) and Change NWS Configuration (CHGNWSCFG) commands.

This parameter change might require you to recompile any existing CL programs using these commands.

iSCSI-attached integrated servers no longer support the multicast discovery method for the remote server service processor. Instead, unicast discovery of the remote server service processor must be used. Existing network server configurations of type *SRVPRC that have Enable unicast (ENBUNICAST) configured to *NO must use the Change NWS Configuration (CHGNWSCFG) command to specify either the service processor name (SPNAME) or SP IP address (SPINTNETA) parameter. iSCSI-attached network server descriptions cannot vary on until the network server configurations of type *SRVPRC with Enable unicast configured to *NO have been changed.

DSPOPT DATA(*VOLATR) command outfile changes

Starting in i 7.1, for DATA(*VOLATR) on the Display Optical (DSPOPT) command if OUTPUT(*OUTFILE) is specified, the generated output file contains fields that have changed in size. The Volume size (OVVSIZ) and Space available (OVSPCA) fields have been increased in size from packed 11

to packed 13. This change only affects the generated output files for data type *VOLATR. It does not affect the generated output files for data types *SAVRST, *FILATR, or *DIRATR.

If you have programs that process the DSPOPT DATA(*VOLATR) outfile records, you will need to change the code to handle the changed fields.

DSPSRVAGT command change

The SYSNAME parameter has been removed from the Display Service Agent (DSPSRVAGT) command. In previous releases the command had a default value of SYSNAME(*LOCAL).

This parameter change might require a recompile of any existing CL programs using this command.

CFGPMLIN and PMLINMON commands removed

The Performance Management Agent commands Configure PM Line (CFGPMLIN) and PM Line Control (PMLINMON) are removed in i 7.1. The commands allowed users to work with communications lines which were used by PM Agent to send data in to IBM. These two commands are no longer used. PM Agent now sends in data by Electronic Customer Support (GO SERVICE).

WRKORDINF command removed

The support for the Work with Order Information (WRKORDINF) command is withdrawn in i 7.1. The WRKORDINF command is used to send system information to IBM support. In V5R3M0, Electronic Service Agent™ (ESA) was introduced as part of the operating system, and since then it has been the strategic tool to deliver service information to IBM support. Any CL program that references the WRKORDINF command might need to be updated.

RQSORDAST and WRKORDRQS commands and QMARQSOA API removed

The support for the Request Order Assistance (RQSORDAST) and Work with Order Requests (WRKORDRQS) commands and Request Order Assistance (QMARQSOA) API are withdrawn in 7.1. The RQSORDAST command and QMARQSOA API were used to send a request to IBM for order assistance. The WRKORDRQS command was used to manage the order log on the system. The RQSORDAST and QMARQSOA method of obtaining order assistance has not been used for several releases. The removal of the RQSORDAST command and the QMARQSOA API make the WRKORDRQS command obsolete. Any programs that reference WRKORDRQS, RQSORDAST or QMARQSOA might need to be updated and the references removed.

CRTLINETH command change

Create Line Desc (Ethernet) (CRTLINETH) command has a parameter change that might require you to update and recompile any existing CL programs using this parameter. In IBM i 7.1, the default value for the Ethernet Standard (ETHSTD) parameter is changed from *ALL to *ETHV2 on the CRTLINETH command.

Any user creating a line description built upon an older 10/100 Ethernet card that needs to use SNA traffic (not including Anynet or Enterprise Extender as these are TCP/IP based) should change the value of the ETHSTD parameter to *ALL.

The vast majority of systems are now shipped with gigabit ethernet cards (5706, 5701, 1819, and so on). These faster gigabit ethernet cards are essentially TCP/IP only and they are incapable of pure SNA traffic. The *ETHV2 ethernet standard directly relates to TCP/IP.

Knowledge base document 26955443[1] has been created for this issue. When this situation occurs it results in:
- Ending the TCP/IP interface

- Ending the line description
- Deleting the line description
- Creating a line description (identical except for ethernet standard set to *ETHV2)
- Restarting of the TCP interface

Systems are no longer being shipped with 10/100 cards capable of pure SNA. The only ethernet standard that the new gigabit cards support is *ETHV2. Switching to the *ETHV2 ethernet standard avoids some fairly uncommon but serious issues that are encountered because of network equipment not acting appropriately to *IEEE8023 negotiations.

[1] To access knowledge base document 26955443, select the 'Technical Databases' link at the Support for IBM System i Web site:

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

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Database CPU Utilization changes

System support is changed in i 7.1 to not collect CPU utilization data specific to database processing. Interfaces that report database CPU utilization data such as WRKSYSACT, now show a zero in the database CPU utilization fields.

Database changes

Database cross-reference file changes

Several database cross-reference file fields changed from variable-length character to Unicode (UTF16) variable-length graphic. Applications that access these files through non-SQL interfaces will receive a level check error (CPF4131) if not recompiled.

Table 1. Changed Database Files and Fields

File	Field name	Previous datatype	Current® datatype
QSYS/QADBXREF [1]	DBXREM	CHAR(2000)	GRAPHIC(2000) CCSID(1200)
QSYS/QADBXREF [1]	DBXDFN	CHAR(10000)	GRAPHIC(5000) CCSID(1200)
QSYS/QADBFCST [2]	DBCCLC	CHAR(2000)	GRAPHIC(2000) CCSID(1200)
QSYS/QADBFCST [2]	DBCCDN	CHAR(2000)	GRAPHIC(2000) CCSID(1200)
QSYS/QADBIFLD	DBITXT	CHAR(50)	GRAPHIC(50) CCSID(1200)
QSYS/QADBIFLD	DBIHDG	CHAR(60)	GRAPHIC(60) CCSID(1200)
QSYS/QADBIFLD	DBIREM	CHAR(2000)	GRAPHIC(2000) CCSID(1200)
QSYS/QADBIFLD	DBIDFT	CHAR(2000)	GRAPHIC(2000) CCSID(1200)

[1] Cross-reference logical files QADBXATR, QADBXDIC, QADBXFIL, QADBXLFI, QADBXLLB, and QADBXLFN also reflect this field change.

[2] Cross-reference logical files QADBRKCL, QADBRKPA, and QADBRKPN also reflect this field change.

SQL Catalog file changes

Several SQL catalog files have fields changed from VARCHAR to VARGRAPHIC Unicode (UTF16). Applications that access these tables through non-SQL interfaces will receive a level check error (CPF4131) if not recompiled.

Table 2. SQL Catalog Files and Fields

File	System Column name	SQL Column name	Previous datatype	Current datatype
QSYS2/ SYSROUTINE[1]	REMARKS	LONG_COMMENT	VARCHAR(2000)	VARGRAPHIC(2000) CCSID(1200)
QSYS2/ SYSROUTINE[1]	LABEL	ROUTINE_TEXT	VARCHAR(50)	VARGRAPHIC(50) CCSID(1200)
QSYS2/SYSPARMS	REMARKS	LONG_COMMENT	VARCHAR(2000)	VARGRAPHIC(2000) CCSID(1200)
QSYS2/SYSSEQOBJ	REMARKS	LONG_COMMENT	VARCHAR(2000)	VARGRAPHIC(2000) CCSID(1200)
QSYS2/SYSSEQOBJ	LABEL	SEQUENCE_TEXT	VARCHAR(50)	VARGRAPHIC(50) CCSID(1200)
QSYS2/SYSTYPES	REMARKS	LONG_COMMENT	VARCHAR(2000)	VARGRAPHIC(2000) CCSID(1200)
QSYS2/SYSTYPES	LABEL	TYPE_TEXT	VARCHAR(50)	VARGRAPHIC(50) CCSID(1200)

[1] New view QSYS2/SYSROUTINES_PREV (system name SYSROUTINP) matches the pre-7.1 definition of SYSROUTINE.

SQL procedure and function changes for parameter and variable names

SQL procedures and functions cannot have a variable name that is the same as a parameter name. This restriction has always been documented but was not enforced. In i 7.1, an SQL0590 is issued and the routine is not created.

NO SQL clause user-defined function changes

In prior releases, no SQL error code was issued when a user-defined function created with the NO SQL clause attempted to run an SQL statement. In i 7.1, user-defined functions that are created with the NO SQL clause specified, now issue SQLCODE -487 (SQL statements not allowed) when called and an attempt is made to run an SQL statement from inside the function.

SQL Query changes in collation of errors might result in a SQL0802

A change was made to not collate errors for SQL queries with ordering, distinct, or aggregation. This was done to avoid providing unpredictable or wrong results when a result in error cannot be included in ordering, aggregation, or distinct result sets. A selection error is now signaled in this scenario, using the SQL0802 message with SQLCODE=-802 and SQLSTATE='22003'. The SQL0802 message will be preceded by CPF5035 and CPD4019 escape messages.

To allow compatibility with previous behavior, a new QAQQINI option, COLLATE_ERRORS, is available.

COLLATE_ERRORS – Specifies how data errors are handled on the GROUP BY and ORDER BY expression during hash or sort processing within queries.

Supported values:

- *DEFAULT - The default is *NO.
- *NO - A value of *NO causes the query to be ended with an error when a grouping or ordering expression results in an error.
- *YES - A value of *YES indicates that the grouping or sort continues.

This support was also available by PTF in V5R4 and V6R1.

SQL Global Variables

The name of a global variable can be the same as the name of a column in a table or view that is referenced in an SQL statement, as well as the name of an SQL variable or an SQL parameter in an SQL routine. When the name is not qualified, or if it is qualified but is still ambiguous, the following rules describe of precedence of resolution:

- The name is checked if it is the name of a column of any existing table or view referenced in the statement at the current server.
- If used in an SQL routine, the name is checked to see if it is the name of an SQL variable, SQL parameter, or transition variable.
- If not found by either of these rules, it is assumed to be a global variable.

In previous releases, when creating SQL procedures and functions, if all the tables referenced in the routine existed, and an unrecognized variable or column name was encountered, the CREATE ROUTINE would fail with SQL0312 - "Variable &1 not defined or not usable." or SQL5001 - " Column qualifier or table &2 undefined." Due to the implementation of SQL Global Variables, in 7.1 the routine is successfully created because the precedence of resolution rules types the identifier as a global variable. The routine might fail later with an SQL0206 - "Column or global variable &1 not found." when it is called or referenced.

User-defined types named XML

Applications created before release i 7.1 can create a user-defined type named XML. Unqualified references to the XML type resolve to the system built-in type XML that is new in i 7.1. Applications need to escape the user-defined references with quotation marks to reference the existing user-defined type.

SQL warnings now reported to applications

In earlier releases of IBM i, warning conditions which were encountered during the processing of query result sets were not always reported back to the application as they should have been. These warnings, which include but are not limited to, SQLSTATE 01003 - 'Null values were eliminated from an argument of an aggregate function', and SQLSTATE 01506 -'An adjustment was made to a DATE or TIMESTAMP value to correct an invalid date resulting from an arithmetic operation', are now returned to the application. As a result of this change, ODBC and CLI applications encountering these warnings receive a SQL_SUCCESS_WITH_INFO return code on the fetch API request rather than a SQL_SUCCESS return code.

SQL programming changes

Teraspace User Default Activation Group considerations for SQL

Teraspace user default activation group support was added in IBM i 7.1. This activation group works seamlessly with the single-level store user default activation group and provides a much larger capacity for automatic storage required by user programs and service programs. Before 7.1, language SQL routines (procedures, functions, and triggers) were built with activation group *CALLER and storage model *SNGLVL. Starting with 7.1, language SQL routines are built with activation group *CALLER and storage model *INHERIT. By making this change, users will be able to get their language SQL routines to run within the teraspace user default activation group by building their application with STGMDL(*TERASPACE). When the application calls the procedure, function or trigger built with STGMDL(*INHERIT), the SQL routine will use the application storage model choice.

When database server jobs (QSQSRVR, QRWTSRVR or QZDASOINIT) are used for application execution, the application does not have direct control over the storage model choice because operating system programs are acting on behalf of client requests. Starting in 7.1, database server jobs are enabled to default a STGMDL(*INHERIT) program to use the teraspace user default activation group if the program uses activation group *CALLER and storage model *INHERIT, and there are no preceding user state programs on the stack. When observing application activity using DSPJOB option 18, *DFTACTGRP with Number = 6 indicates the teraspace user default activation group.

After upgrading to 7.1, SQL procedures, functions, and triggers could be dropped and recreated to completely shift from STGMDL(*SNGLVL) to STGMDL(*INHERIT). An alternative approach to instrumenting application programs and service programs to use STGMDL(*INHERIT) is to use the Change Program and Change Service Program commands.

For Example:
```
CHGPGM PGM(PGMLIB/PGMNAME) STGMDL(*INHERIT)
or
CHGSRVPGM SRVPGM(SRVPGMLIB/SRVPGMNAME) STGMDL(*INHERIT) TERASPACE(*YES)
```

Non-SQL applications can observe an activation failure if their service program linkages have an inconsistent mix of storage model settings with activation group *CALLER. With the advent of the teraspace user default activation group on 7.1 and the default behavior of database server jobs to use teraspace storage model where possible, it is easier to encounter pre-existing application binding inconsistencies. Before 7.1, an application might execute without failure even though its service programs contain a mixture of STGMDL(*INHERIT) and STGMDL(*SNGLVL) with activation group *CALLER. On i 7.1, this type of inconsistency would fail with an CPF426A escape message caused by an MCH4430 exception from QLEAWI. To fix this type of activation failure, either recreate the STGMDL(*SNGLVL) service programs to use STGMDL(*INHERIT) or use the CHGSRVPGM commands to change to the *INHERIT storage model. The CPF426A failure will point to the root service program that failed to activate into the teraspace user default activation group though the inconsistency of STGMDL(*SNGLVL) with activation group *CALLER could exist on one or more service programs it binds to. The offending service program can be found by using DSPSRVPGM SRVPGM(SRVPGMLIB/SRVPGMNAME) DETAIL(*SRVPGM).

Incorrectly initialized SQLVAR could result in an SQL0804
Fields in an occurrence of a base SQLVAR:

Bytes 5 and 6 of the SQLNAME entry identify an XML AS CLOB, XML AS DBCLOB, or XML AS BLOB SQLDA entry when the SQLNAME length is set to 8 and bytes 5 and 6 are set to X'0100', and the SQLDA is used for a FETCH, OPEN, CALL, or an EXECUTE statement. Bytes 5 and 6 were reserved in previous releases, and should have been initialized to zeros for this usage.

In release i 7.1, bytes 5 and 6 are verified for the XML data when the SQLNAME length is set to 8. Bytes 5 and 6 must be set correctly for XML data, or set to zeros if the data is not XML. An SQL0804 - "SQLDA or descriptor area not valid" with error type 2 will be signaled to the application if the bytes are not set correctly.

SQLCA and SQLDA includes added to QSYSINC for C and COBOL
The SQLCA and SQLDA included for C and COBOL have been added to QSYSINC.

If a customer application has added the structure included within the SQLCA or SQLDA to their own source and they also include the SQLCA or SQLDA, the following errors are returned from the compile:
- C: Message ID: CZM0334 Message: Identifier sqlca has already been defined online
- C++: Message ID: CZM0403 Message: "struct sqlca" is already defined
- OPM Cobol: Message ID: LBL1463 Message: <Field> previously defined in program, use cannot be determined. Default item assumed.

- ILE COBOL: Message ID: LNC0915 Message: The name 'SQLCA' is not in a unique set of names.

INSERT or UPDATE into a UDT column might trigger an SQL0301

Before i 7.1, the INSERT and UPDATE statements were not checking if a parameter marker could be promoted to the data type of the table column when the column is a distinct type. Checking has been added to verify that the source data type is compatible to the target column type. Now that the correct checking is done, an SQL0301 failure might be seen on i 7.1, where in the past an implicit conversion was done.

For more information about the promotion of data types when a UDT is used, see the Distinct type assignment and the Promote data type topics in the SQL Reference in the IBM i Information Center.

Truncation on Retrieval assignment changes might result in an SQLSTATE of '01004'

Before i 7.1, truncation on retrieval assignment was not always handled correctly. On assignment, if there was truncation the warning flag in the second warning indicator, SQLWARN(2) was not always set correctly in the SQLCA and the original length of the string was not always returned correctly in the indicator variable if one was provided. Also, the SQL reference indicates that trailing blanks are normally included in the length of the string. Before i 7.1, trailing blanks might have been trimmed off the end of the string during retrieval assignment with no warning.

Truncation processing has been fixed in i 7.1 which might cause applications to have different results when using the FETCH, SELECT INTO, SET variable, and VALUES INTO statements. An SQLSTATE of '01004', which indicates truncation, might be returned where it had not in the past.

Truncation on DATE or TIME value changes during storage assignment might result in an error

Before i 7.1, an INSERT statement that had a DATE or TIME value that was longer than the DATE or TIME column might have had the extra non-blank characters truncated without returning an error. In i 7.1, an SQL0180 or SQL0181 is returned if there are non-blanks past the end of the DATE or TIME value during a storage assignment.

For example, this insert statement returns an SQL0181 in i 7.1:

```
CREATE TABLE QTEMP.T1 (C1 TIME)
INSERT INTO QTEMP.T1 VALUES('00:00:00.001')
```

SQLCODE 802 SQLSTATE 01565 Returned on External Table Functions

An SQL0802 Data conversion or data mapping error is correctly returned in the 7.1 release for External Table functions that are defined with the TABLE(result RETURNS CLOB(length) AS LOCATOR), TABLE(result RETURNS DBCLOB(length) AS LOCATOR), or TABLE(result RETURNS BLOB(length) AS LOCATOR) when the length of the locator exceeds the defined length that was specified on the SQL CREATE FUNCTION statement.

The SQL0802 message is preceded by an MSGCPD5036 error code 28 and MSGCPF5029.

This change only affects functions that were created in the 7.1 release. Existing SYSROUTINES catalog entries are not affected.

In previous releases, all locators for External Table functions were defined with the 2 GB maximum length, instead of the specified length from the SQL CREATE FUNCTION.

DRDA Changes

Before i 7.1, local DRDA® Application Server (AS) connections that were designated as read-only allowed some update operations to occur. In i 7.1, read-only connections no longer allow update operations.

Local DRDA Application Server (AS) connections that are designated as one-phase updatable were treated as two-phase updatable before i 7.1. In i 7.1, this behavior has been corrected. This change might prevent work against additional commitment control resources from being included in the unit of work.

DRDA package bind fails with unsupported functions

In i 7.1, if a DRDA application server (AS) returns a SQL code of 20 that states it does not support the function requested by the package, the bind of the package fails. To force the bind of the package regardless of the DRDA AS SQL code of 20, specify GENLVL(20) or higher on the Create SQL package (CRTSQLPKG) command.

Directory Server (LDAP) Changes

In IBM i 6.1 and prior releases, the password policy configuration of the Tivoli® Directory Server for IBM i (LDAP) was stored in "cn=pwdPolicy", In IBM i 7.1, entry "cn=pwdPolicy" is moved under cn=ibmPolicies. The new DN is "cn=pwdPolicy, cn=ibmPolicies". If an application does an operation on "cn=pwdPolicy" , it must be changed to use the new DN"cn=pwdPolicy, cn=ibmPolicies", otherwise, a "No Such Object" error is returned by command-line tools or LDAP APIs.

Domain name system (DNS) security changes

- **The default behavior has changed for the "allow-query-cache" and "allow-recursion" access control lists (ACLs).**

  If the "allow-query-cache" ACL is not explicitly set in named.conf, the default for host cache access is determined by other ACL configurations as follows:

  1. The "allow-recursion" ACL, if specified.
  2. The "allow-query" ACL, if specified.
  3. If neither "allow-recursion" nor "allow-query" are specified, the default of (localnets; localhost;) is used.

  If the "allow-recursion" ACL is not explicitly set in named.conf, the default for recursive access is determined by other ACL configurations as follows:

  1. The "allow-query-cache" ACL, if specified.
  2. The "allow-query" ACL, if specified.
  3. If neither "allow-query-cache" nor "allow-query" are specified, the default of (localnets; localhost;) is used.

  For example, do the following if you want all clients to be able to query the record recursively:

  1. Stop the DNS server
  2. Open the /QIBM/UserData/OS400/DNS/<DNS_NAME>/named.confile and add the following statements:
     ```
     allow-query
     {
     any
     };
     ```
  3. Start the DNS server

- **If the server on IBM i is a subordinate DNS server which receives dynamic DNS updates from DHCP servers or DNS clients, you need to make this change to your configuration:**

  Specify security-related option "allow-update-forwarding" and add the IP addresses of the DHCP servers or clients that are allowed to make dynamic DNS updates. Note, the special value any can be used to allow updates from any IP address.

  For example, if the IP address of your DHCP server is 10.1.1.1, and the IP address of one client is 10.2.2.2, then you would do the following:

  1. Stop the DNS server

2. Open the /QIBM/UserData/OS400/DNS/<DNS_NAME>/named.confile and add the following statements:

```
allow-update-forwarding
{
10.1.1.1;
10.2.2.2;
};
```

3. Start the DNS server

Dynamic Host Configuration Protocol (DHCP) changes

DHCP has moved from the base OS to option 31

DHCP has moved from the base OS to option 31 and requires that Option 33 is loaded.

Systems Director Navigator for i does not support ISC DHCP server on IBM i 7.1. To configure the ISC DHCP server, you need to manually update the configuration files. For more information about updating the configuration files, see "DHCP GUI changes"

The configuration file is migrated on first touch. The old configuration file /QIBM/UserData/OS400/DHCP/dhcpsd.cfg is migrated to the new configuration file in a different directory with the following name: /QIBM/UserData/OS400/DHCP/etc/dhcpd.conf. The old configuration file is preserved in its existing location. After migration, changes to the IBM i DHCP server configuration will not be reflected in the ISC DHCP server configuration files. When the ISC DHCP server is started, any valid DHCP leases (not expired) are migrated to the lease file on the new server. This migration is only attempted the first time that the ISC server is used. An attempt to update associated DNS records for the expired leases are also made if the old DHCP server was configured to do so.

The ISC server does not provide all the possible configuration capability that was provided by the GUI for the old DHCP server. As a result, some of the configuration information cannot be migrated. During the migration process, message TCP5773 is logged if the server is unable to migrate configuration data. These items should be considered:

- Globally defined reserved addresses are not migrated. Reserved addresses must be defined on a subnet basis.
- The subnet group attributes for "in order" and "balanced" subnets are not migrated. In addition, after the migration it might be necessary to manually group subnets into "shared network" subnet groups. A shared network subnet group informs the DHCP server that the subnets within it are connected to the same network segment.
- It is still possible to turn on logging by manually starting the server and passing the -D option for *SERVER mode or the -K option for *RELAY. The option can be specified on the STRTCPSVR command as follows: STRTCPSVR SERVER(*DHCP) INSTANCE(*DFT '-D').
- The following keywords and any associated data in the dhcpsd.cfg file are not migrated: **appendDomainName, balanced, inOrder, leaseExpireInterval, logFileName, logFileSize, logItem, numLogFiles, releaseDNSA, releaseDNSP, reservedTime, statisticSnapshot, bootStrapServer, and usedIPAddressExpireInterval**.

DHCP GUI changes

IBM Systems Director Navigator for i does not support configuring the ISC DHCP server in i 7.1. To configure the ISC DHCP server, you need to edit the following configuration files manually:

- /QIBM/UserData/OS400/DHCP/ETC/DHCPD.CONF
- /QIBM/UserData/OS400/DHCP/ETC/DHCRELAY.CONF
- /QIBM/UserData/OS400/DHCP/ETC/DHCPD.LEASES

For more detailed instructions, see:

https://www.isc.org/software/dhcp/documentation

IPv6 changes

IPv6 Message text changes

The following messages have had a format change to accommodate the longer IPv6 addresses. Messages printed out in job logs on a previous release, when viewed on i 7.1, no longer shows the IP address in the message text although the data is still defined in the replacement text.

CPDBB0B, CPFBB0B, CPFBB0D, CPFBB13, CPFBB14, CPFBB15, CPFBB22, CPFBB23, CPFBB30, CPFBB51, CPFBBA5, CPFBBA9

Job accounting changes

In IBM i 7.1, Job Accounting was changed from unscaled processor time to scaled processor time to provide more consistent job accounting charges on systems with IBM EnergyScale™ (TM) technology. IBM EnergyScale is available on IBM POWER6 and IBM POWER7 servers. The change to scaled processor time job accounting is intended to improve accounting accuracy and consistency in EnergyScale modes that use variable processor speed, but it also means that accounting results in these modes might not be directly comparable to results from an earlier release where job accounting was based on unscaled processor time. The change has no impact on IBM POWER5™ servers or on servers configured for Nominal Performance mode.

Job startup changes

Console signon error tolerance

Starting in i 7.1, a user with all object (*ALLOBJ) special authority is now able to sign on to the console in the controlling subsystem even if the maximum number of jobs specified for the subsystem, workstation entry, or routing entry has been reached.

Initial library list error tolerance

Starting in 7.1, the way certain errors are handled for the initial library list when starting certain types of jobs has changed to allow the job to start. In prior releases, they would have received an error message and the job would have been prevented from starting. When starting an interactive job, an autostart job, a communications job, a prestart job, or starting a batch job that is on a job queue, if a library is not found it now dropped from the library list. Also for these job types, if a library is specified more than once, only the first reference is kept in the library list. Other interfaces affecting library lists are not changed.

Journal changes

Support for the QDFTJRN data area

Automatic journaling support using the QDFTJRN data area was introduced in V5R3. In 6.1, this function was replaced by the Start Journal Library (STRJRNLIB) command. Support of the QDFTJRN data area will be withdrawn in a future release of IBM i.

Entry not journaled (CPF7003) exception changes

In prior releases, when the deposit of a journal entry for an object-level operation (rename, change owner, and other operations) or the deposit of a journal entry sent by a user was not successful, the journal operation automatically failed with an "Entry not journaled" (CPF7003) exception. Starting in IBM i 7.1,

instead of failing, a CPA7090 inquiry message is sent to the QSYSOPR message queue. The user now has the opportunity to try the operation again or to cancel it. If the user chooses to cancel the operation, it will fail with the CPF7003 exception.

Machine interface (MI) instruction changes

MATJOAT MI instruction

The "queue prefix indicator for journaled messages" field in the MATJOAT instruction has been made obsolete. The 16 byte queue prefix is present in all enqueue message journal entries.

MATMATR MI instruction

Option hex 01F4 of the MATMATR instruction has 8-byte fields added to return the "extended on/off capacity on-demand history of requested processor-days" and "extended on/off capacity on-demand history of unreturned processor-days".

If the "extended on/off capacity on-demand history of requested processor-days" field is blank, then the 4 byte "on/off capacity on-demand history of requested processor-days" value should be used. If the 8 byte field is non-blank, the extended value should be used and the-4 byte value should be ignored.

If the "extended on/off capacity on-demand history of unreturned processor-days" field is blank, then the 4 byte "on/off capacity on-demand history of unreturned processor-days" field should be used. If the 8-byte field is non-blank, the extended value should be used and the 4 byte value should be ignored.

Performance changes

Some performance database files are no longer translated

Database files for performance data collectors, and certain performance tools shipped as template files in QSYS, are no longer translated. Field text and column headings for these files are now always in English. The files affected include Collection Services (QAPM* files), Job Watcher (QAPYJW* files), Disk Watcher (QAPYDW* files), Performance Explorer (QAYPE* files), the output file for the WRKSYSACT command (QAITMON), and the output file for the ANZCMDPFR command (QAPYANZC).

Collection Services changes

Collection Services QAPMJOBMI file changes

Collection Services no longer collects unique data for individual tasks and secondary threads with a lifespan less than 1 second. Consequently, unique records for these entities no longer appear in the QAPMJOBMI and QAPMJOBWT files. Data for short lifespan tasks instead are accumulated by node. Data for short lifespan secondary threads are now accumulated by job. Special records that contain this accumulated data are reported each interval. This action saves significant storage on systems that experience a high volume of this type of activity. If you do not want this default behavior you can override the default short lifespan reporting threshold used during data collection by adding these system environment variables:

- ADDENVVAR ENVVAR(QPM_TASK_SL_THRESHOLD) VALUE(0) LEVEL(*SYS)
- ADDENVVAR ENVVAR(QPM_THREAD_SL_THRESHOLD) VALUE(0) LEVEL(*SYS)

Collection of TCP/IP interface data

In IBM i 7.1, two records could now be added to file QAPMTCPIFC per TCP/IP interface per collection interval. In prior releases, only one record would have been added. If both Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6) data are available for an interface, the primary record

contains the combined data and a secondary record contains the data specific to IPv6. If data is available for only one Internet Protocol version, the primary record contains data specific to that Internet Protocol version and there will not be a secondary record.

Applications that must process only one record per TCP/IP interface per collection interval, can be changed to check a new record type field **TIRTYP**, and then only process primary records. For more information about the collection services changes and new records and fields, go to the following topic in the i 7.1 IBM i Information Center: Click Systems Management>Performance>Reference Information for Performance>Collection Services Data files> Collection Services data files that contain interval data>Collection Services data files: QAPMTCPIFC.

Restore of i 7.1 *MGTCOL object on prior release

If a *MGTCOL object that is generated on i 7.1 is restored on an earlier release system and CRTPFRDTA is run, the response time bucket data fields in the QAPMDISK file for that release will be incorrect. The response time buckets were redefined in i 7.1 and earlier releases cannot support the data. To report zeros in the response time bucket data fields in the QAPMDISK file, the following PTFs are needed on the prior release:
- V6R1M0 - SI37242
- V5R4M0 - SI37286

If after restoring to a previous release, you plan to migrate the data back to i 7.1, you should retain the original *MGTCOL object. By migrating the *MGTCOL object, you can recover and view the data that the files in the prior release could not support.

Performance Explorer changes

In i 7.1, the QRECN (record number) field has been increased from 4 bytes to 8 bytes in these Performance Explorer files:
- QAYPEASM - Auxiliary Storage Management (ASM) Events
- QAYPEBAS - Base Events
- QAYPECMN - Communications Events
- QAYPEDASD - DASD Events
- QAYPEFILSV - File Server Events
- QAYPEHEAP - Heap Events
- QAYPEIAD - Additional Instruction Data
- QAYPEJVA - Java Events
- QAYPELBRKT - LIC Bracketing Events
- QAYPEMBRKT - MI Bracketing Events
- QAYPEMIPTR - MI Pointer Data
- QAYPEMIUSER - MI User Events
- QAYPEPASE - PASE Events
- QAYPEPGFLT - Page Fault Events
- QAYPERMP - Resource Management Process Management Events
- QAYPERMSL - Resource Management Seize Lock Events
- QAYPESAR - SAR Event Data
- QAYPESYNC - Synchronization Events
- QAYPETBRKT - Trace Bracketing Events
- QAYPETIDX - Trace Index File
- QAYPETSKSW - Task Switch Events
- QAYPEUSR - User Defined Events
- QAYPEVIO - VIO Events

Any applications that use these files directly might be affected. Users of the Performance Explorer commands (ADDPEXDFN, CHGPEXDFN, STRPEX, ENDPEX, CRTPFRDTA) are not affected by these changes.

pthread_mutex and pthread_condition changes

Users of the pthread_mutex object might see a behavior change if they are not correctly initializing the pthread_mutex object before trying to use it. The difference is that before i 7.1, an attempt to use an incorrectly initialized pthread_mutex object might have been returned EINVAL. Now the function might return successfully. This follows the POSIX specification that the behavior of functions on uninitialized pthread_mutex objects are undefined.

Likewise, users of the pthread_condition object might see a similar behavior change if they are not correctly initializing the pthread_condition object before trying to use it.

Restore Menu Options 21, 22, 23

The RESTORE menu options 21, 22, and 23 now specify ALWOBJDIF(*COMPATIBLE) instead of ALWOBJDIF(*ALL) for the RSTLIB command, when data is restored to a different system than it was saved from. In most cases, this change will either have no impact or simplify the recovery process. However, some database files might not be restored if they are not compatible with files that already exist on the system.

Chapter 3. Options

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

IBM Eclipse Help System (Option 3)

STRTCPSVR *IBMHELP server in option 3 of IBM i removed

The STRTCPSVR *IBMHELP server is removed in i 7.1. This server was used for online documentation within a product online help system or product information center in the IBM Eclipse Help System.

Users of this tool should start using IBM i Information Center for any documentation or help at this Web site:

http://www.ibm.com/systems/i/infocenter/

OptiConnect (Option 23)

The Work with OptiConnect Activity(WRKOPCACT) command has parameter changes that might require you to recompile any existing CL programs using these parameters.

Work with OptiConnect Activity(WRKOPCACT) no longer supports a print or outfile capability. The parameters OUTPUT and OUTFILE have been removed from the command. The Print OptiConnect Activity (PRTOPCACT) command can be used to print the information using OUTPUT (*PRINT) or to write the information to an outfile using OUTPUT(*OUTFILE). Any outfiles that were created using the WRKOPCACT command are not compatible with PRTOPCACT. The PRTOPCACT command now ends with escape message CPF9860 if you attempt to use an outfile that was created by WRKOPCACT.

Integrated Server Support (Option 29)

INSWNTSVR command changes

The Install Windows® Server (INSWNTSVR) command has a number of parameter changes that might require you to recompile any existing CL programs that use this command.

- The Windows server version (WNTVER) parameter no longer supports install of Windows 2000 Server. Related to this change is the removal of the *TSENABLE special value for element 3 of the License mode (LICMODE) parameter.
- The Windows server version (WNTVER) parameter no longer supports install of Windows Server 2008. To install Windows Server 2008, use the new Install Integrated Server (INSINTSVR) command.
- The Installation type (INSTYPE) parameter is obsolete and has been removed. ServerGuide assisted installs are no longer supported.
- The Install option (OPTION) parameter is obsolete and has been removed. There are no supported upgrades that can be processed using the Install Windows Server (INSWNTSVR) command.
- The Enable unicast (ENBUNICAST) parameter is obsolete and has been removed. Communication with the service processor is configured by specifying a value for Service processor name (SPNAME) or SP internet address (SPINTNETA) parameter.
- The Boot device ID (BOOTDEVID) parameter is obsolete and has been removed.
- The Remote (initiator) interfaces (RMTIFC) parameter, SCSI and LAN Gateway addresses are not supported. The iSCSI attached servers do not support bridged networks requiring the gateway address. These elements have been removed.

INSLNXSVR command removed

The Install Linux® Server (INSLNXSVR) command has been removed in i 7.1. Existing CL programs that use the INSLNXSVR CL command might need to be modified.

Portable Application Solutions Environment for i (Option 33)

PASE for i Stack Execution Disable Support

To improve system security, the default behavior for Portable Application Solutions Environment (PASE) programs now blocks instruction execution from "data" areas (stack and heap). AIX® calls this facility "stack execution disable" support (also known as "data execution protection" or "buffer overflow protection"). Blocking execution from writeable memory defeats many of the most serious buffer-overrun security attacks typically mounted against Internet servers, typically without requiring any server program changes.

PASE for i programs that need to run instructions fetched from stack or heap must be marked by setting bits in the header of the main executable (exec target). A program can be marked to allow execution from data pages by using option -brwexec_must when the binary is linked (ld command or compile command). Existing binaries can be modified using the ldedit command:

```
ldedit  -brwexec_must  program_path_name
```

You can display attributes of an existing binary/file on AIX using the sedmgr command with option -d. The PASE for i version of ldedit displays any non-default attributes (including -brwexec_must) of an executable/file when the command is invoked with no options.

An attempt to "execute data" in a PASE for i program that is not marked -brwexec_must now generates an MCH6801 exception with reason code 5 (new reason code for "execute protection violation") in the joblog, and a PASE for i SIGILL signal is raised to the program.

IBM Technology for Java needs to execute instructions from "data" pages. The PASE for i programs shipped with IBM Technology for Java are marked -brwexec_must, but applications that use APIs to launch Java in an existing process must ensure the PASE for i main program is suitably marked.

Print Services Facility 400 (Option 38)

The Extension Area Format, one of the programming structures declared in the header file for the PSF/400 Mapping Exit Program (EPQMAPXT), has been updated for i 7.1. Two new fields have been added to the format. These two fields must contain specific values as documented in the IBM i Information Center. If these fields are not updated as specified in the IBM i Information Center, PSF places the spooled file on hold and issues message PQT4151 with a reason code value of either 45 or 46, depending on which of the fields is in error. See the PSF/400 Mapping Exit Program topic in the IBM i Information Center for further information.

High Availability Switchable Resources (Option 41)

Clusters GUI withdrawn from Option 41

The Clusters GUI plug-in for System i Navigator has been removed in i 7.1. High availability environments (clusters) can continue to be configured and managed using the IBM PowerHA for i (5770-HAS) product. See the IBM PowerHA for i interfaces topic in the IBM i Information Center for more information.

Chapter 4. Licensed programs

This chapter contains information about individual licensed programs that have been modified or changed for IBM i 7.1.

Backup Recovery and Media Services (5770-BR1)

Media expiration prevention changes

Starting in i 7.1, when tape media or virtual media are marked for duplication or saved items on the media are marked for duplication, the media is no longer allowed to expire. This is to protect the saved data so that it has a chance to be duplicated, especially when using virtual media. In order for the expiration to happen, the user must either duplicate the media or remove the duplication mark. To remove the mark from the media, run WRKMEDBRM and type an option 19 next to the media. To remove the mark from a saved item, run WRKMEDIBRM and type an option 19 next to the saved item that is on that media.

Backup changes for non-BRMS registered volumes

Before i 7.1, when BRMS detected that a backup was started with non-BRMS registered volumes and had a BRMS registered volume loaded, an escape message was signaled and the backup was ended. In i 7.1, an inquiry message is now signaled, allowing the user to recover and continue the backup.

Users backing up with BRMS and using a Tape Media Library, now receive an inquiry message BRM1730. The user can respond to the inquiry message and choose to enter a cartridge ID of a volume NOT enrolled in BRMS, or type a "c" or "C" to Cancel the backup operation.

Users backing up with BRMS and using a stand-alone tape device, now receive an inquiry message BRM1729. The user can respond to the inquiry message and choose to type a "C" or "c" to Cancel the backup operation or load a volume NOT enrolled in BRMS media inventory, and type a "G" or "g" to Continue the backup operation.

PRTMOVBRM command output changes

In i 7.1, the output from the Print Media Movement (PRTMOVBRM) command now includes media that is scheduled to be moved.

BRMS control group *SYSGRP change

For all new installs of BRMS, a QIBMLINK *LNK list entry is added to the shipped control group *SYSGRP. This will backup IBM integrated file system data directories (/QIBM/ProdData and /QOpenSys/QIBM/ProdData). This entry is not added for upgrades. In addition, BRMS is also shipping a new link list called QALLUSRLNK, which saves /*, but omits the IBM integrated file system data directories. This list is not being added to any of the shipped control groups.

BRMS recovery report changes

In i 7.1, the attention block that listed system values, QALWOBJRST, QFRCCVNRST, QINACTIV, QIPLTYPE, QJOBMSGQFL, QJOBMSGQMX, QLMTDEVSSN, QLMTSECOFR, QMAXSIGN, QPFRADJ, QPWDEXPITV, QSCANFSCTL, and QVFYOBJRST has been removed from the "Recover Operating System" recovery step in the BRMS recovery report. For information about what these system values should be set to, can be found in the Recovering your system topic in the IBM i Information Center.

IBM DB2 Extenders Version 9.5 for i (5770-DE1)

Perform the following steps after installing IBM DB2® XML Extender (5770-DE1, option 2):

1. You must install IBM XML Toolkit for i (5733-XT2, option 6) before you can use DB2 XML Extender.
2. After you complete installing DB2 XML Extender over an earlier release of XML Extender, you must complete the following migration step to migrate UDFs. Enter the following command to run the migration:

   ```
   CALL QDBXM/QZXMMIGV
   ```

IBM HTTP Server for i (5770-DG1)

Trigger cache manager removed

Trigger cache manager support (Option 1) has been removed in 7.1.

Web server search engine and Web crawler support removed

Web server search engine and crawler support have been removed in 7.1.

The following commands have been removed:

```
CFGHTTPSCH
STRHTTPPCRL
ENDHTTPPCRL
RSMHTTPPCRL
```

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

Plug-ins and LoadModule directives

These instructions apply to all IBM HTTP servers that have been associated with a WebSphere® Application Server Version 6.1 or Version 7.0 when upgrading to IBM i 7.1.

The Application Server service programs implementing the HTTP plug-ins might need to be updated before starting HTTP servers. See "IBM WebSphere Application Server Version 6.1 (5733-W61) and IBM WebSphere Application Server Version 7.0 (5733-W70)" on page 40 for more information.

The LoadModule directives used by external HTTP servers associated with Application Server Version 6.1 and Application Server Version 7.0 have changed. For HTTP servers that have been associated with a WebSphere Application Server Version 6.1 or Version 7.0, the LoadModule directive must be changed to match the following format:

```
LoadModule was_ap20_module /QSYS.LIB/<prod_lib>.LIB/QSVTAP22.SRVPGM
```

Where <prod_lib> is the product library for the Application Server installation.

The product library for each Application Server installation on the system contains the program and service program objects for the installed product. The product library name for Version 6.1 is QWAS61x (where x is A, B, C, and so on). The product library for the first WebSphere Application Server Version 6.1 product installed on the system is QWAS61A. Similarly, the product library name for Version 7.0 is QWAS7x (where x is A, B, C, and so on). The product library for the first WebSphere Application Server Version 7.0 product installed on the system is QWAS7A.

The product library can be determined by examining file <profile_root>/properties/.instance.properties where <profile_root> is the root directory of the associated WebSphere Application Server profile. In the .instance.properties file, <product_library> is specified by the was.install.library property.

You can update the LoadModule directive from the **IBM Web Administration for i** Web page:

- From the Manage tab, click **HTTP Servers**.
- Select your server from the Server pull down menu.
- Click **Change Configuration file** in the navigation frame.
- Change the LoadModule directive as described previously.
- Click OK to save your changes.

Example 1: **Upgrading from i 5.4 for Application Server V6.1**

If the HTTP server configuration file contains these directives:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V61/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QWAS61B.LIB/QSVTAP20.SRVPGM
```

Change the service program name in the LoadModule directive from QSVTAP20 to QSVTAP22:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V61/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QWAS61B.LIB/QSVTAP22.SRVPGM
```

Example 2: **Upgrading from i 6.1 for Application Server V6.1**

If the HTTP server configuration file contains these directives:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V61/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QHTTPSVR.LIB/QSVTAP20.SRVPGM
```

and "was.install.library=QWAS61C" is specified in file /QIBM/UserData/WebSphere/AppServer/V61/Base/profiles/default/properties/.instance.properties, then change QHTTPSVR to QWAS61C and change QSVTAP20 to QSVTAP22. The result should be as follows:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V61/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QWAS61C.LIB/QSVTAP22.SRVPGM
```

Example 3: **Upgrading from i 5.4 for Application Server V7.0**

If the HTTP server configuration file contains these directives:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V70/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QWAS7B.LIB/QSVTAP20.SRVPGM
```

Change the service program name in the LoadModule directive from QSVTAP20 to QSVTAP22:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V70/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QWAS7B.LIB/QSVTAP22.SRVPGM
```

Example 4: **Upgrading from i 6.1 for Application Server V7.0**

If the HTTP server configuration file contains these directives:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V70/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QHTTPSVR.LIB/QSVT2070.SRVPGM
```

and "was.install.library=QWAS7C" is specified in file /QIBM/UserData/WebSphere/AppServer/V70/
Base/profiles/default/properties/.instance.properties, then change QHTTPSVR to QWAS7C and change
QSVT2070 to QSVTAP22. The result should be as follows:

```
WebSpherePluginConfig /QIBM/UserData/WebSphere/AppServer/V70/Base
/profiles/default/config/cells/MYCELL/nodes/MYNODE/servers
/IHS_MYHTTP/plugin-cfg.xml
LoadModule was_ap20_module /QSYS.LIB/QWAS7C.LIB/QSVTAP22.SRVPGM
```

IBM Content Manager OnDemand for i (5770-RD1)

Command, parameter, and function changes

In IBM i 7.1, new commands, parameters, and System i Navigator functions have been added to replace
program calls for several Content Manager OnDemand for i functions. See the IBM Content Manager
OnDemand for i: Common Server Planning and Installation Guide, Common Server Administration
Guide, and online help for more information.

- QRLMINST program call interface is no longer supported. Use the new Create Instance for OnDemand
  (CRTINSTOND) command instead to create new OnDemand instances. The new command provides
  additional parameters beyond what the QRLMINST program provided, allowing you to specify Port,
  Autostart, Security, and Auxiliary Storage Pool (ASP)-related parameters on the command so that the
  ars.ini and ars.cfg configuration files do not need editing in many cases.
- Use the new Merge Spooled Files (MRGSPLFOND) command instead of the old MRGSPLFOND
  sample command (shipped in previous releases) or calling the QRLMQMRGF program to merge small
  spooled files into one larger one before archiving. The new MRGSPLFOND command shipped with
  7.1, contains new, and enhanced parameters that provide significantly more function than the previous
  sample command. Existing programs that use the previous sample command must be changed to use
  the 7.1 parameters.
- The QRLCSFAMMF program call interface is no longer supported. Use the Migrate Media
  (MGRMEDRDAR) command instead to migrate OnDemand data from one media type to another.
- The QRLCASMCLD program call interface is no longer supported. Use the Change Policy Level Date
  (CHGPLDOND) command instead to change migration policy level dates for archived data.
- Use the INSTANCE parameter of the Start TCP/IP Server (STRTCPSVR) and End TCP/IP Server
  (ENDTCPSVR) commands when specifying *ONDMD (for OnDemand) for the SERVER parameter to
  start and end your OnDemand instances. You can name a specific instance to start, or use one of three
  special values (*DFT, *ALL, *AUTOSTART). Note, calling the QRLMCTL program to start or end an
  instance is still supported, but using the STRTCPSVR and ENDTCPSVR commands is recommended.
- The QRLCASMNFS program call interface is no longer supported. A new System i Navigator function
  has been added for setting up Network File System (NFS) disk pools for use with OnDemand.

First start of an OnDemand instance or OnDemand Archive Storage Management (ASM) process takes longer

The first start of an OnDemand instance or OnDemand Archive Storage Management (ASM) process after
upgrading to i 7.1 will take longer because of file conversions and movement of instance-specific data
and objects from the QUSRRDARS library into the instance libraries.

- Do not end the server job or ASM because you are concerned that it is not progressing.
- Status messages are issued during the file conversions and the data movement from QUSRRDARS to
  the instance library, which you can check to confirm that the job is progressing.

Content Manager OnDemand for i upgrade requirements

If you are upgrading from a previous version of OnDemand, you must be running OnDemand server
version 7.1.2.8 (or higher) before upgrading to Content Manager OnDemand for i 7.1. For instructions on
how to determine your current server version, see the IBM Content Manager OnDemand for i: Common
Server Planning and Installation Guide.

Version 7.1 of Content Manager OnDemand for i does not support OnDemand client software before version 7.1.2.0. This includes, but is not limited to, the OnDemand Windows (end-user) client, ODWEK CGI/Servlet/Java APIs, CICS®, and II4C (eClient).

The OnDemand Administrator client must be at the same version or higher as the OnDemand server. For version 7.1 of Content Manager OnDemand for i, the OnDemand Administrator client must be at version 8.4.1.3 or higher

IBM DB2 Query Manager and SQL Development Kit for i (5770-ST1)

Convert SQL C++ Source (CVTSQLCPP) command

The CVTSQLCPP command will not be supported in future releases. The CVTSQLCPP command is part of licensed program DB2 Query Mgr and SQL DevKit (57xxST1). It is suggested to use the Create SQL ILE C++ Object (CRTSQLCPPI) command, which is also included as part of licensed program 57xxST1.

IBM TCP/IP Connectivity Utilities for i (5770-TC1)

SMTP support for RFC 821 and RFC 822 removed

Starting in i 7.1, Simple Mail Transfer Protocol (SMTP) only supports RFC 2821 and 2822. RFC 2821/2822 deprecate many parts of the 821/822 e-mail standard. Behavior for smtp routes, smtp alias shadowing, and processing mail through Mail Service Framework (msf) are not compatible with the RFC 2821 and RFC 2822 standards, and should be used on an as is basis. The first part of a source route will still be honored from RFC 821, other parts of the source route will not be contacted. The absolute address is the recommended way to send e-mail. Read the RFC standards for more details.

SMTP changes for IPv6 support

IPv6 support was added in i 7.1. At this time, there is no IPv6 standard for real time black holes lists (RBL). The RBL only works for IPv4 addresses. SMTP uses the API getaddrinfo() to look up e-mail DNS records which does not guarantee the address will be looked up first as IPv6 then IPv4 which is different from what Request for Comments (RFC) 3974 recommends. Parts of the DNS resolver were fixed in i 7.1 to be more correct. Some changed behavior might be noticed as a result.

MAILROUTER feature changes

The MAILROUTER feature before i 7.1 would in some instances, forward all mail to the mail router even if the e-mail address could be resolved. In i 7.1, MAILROUTER correctly forwards to the mail router only when the e-mail address does not resolve. The FWDMAILHUB feature was added in i 6.1 that allowed the forwarding of e-mail to a single address. FWDMAILHUB always forwards the e-mail and does not attempt a resolve. MAILROUTER only supports A and AAAA records, while FWDMAILHUB supports MX, CNAME, AAAA, and A.

The resolve path is now:
```
Forwarding Mail hub(if defined)->
   Absolute Address/First part of source route->
      mailrouter(if same domain)->
         mailrouter(different domain) if FIREWALL(*YES).
```

IBM Universal Manageability Enablement for i (5770-UME)

CIM function updates from Licensed Program 5722-UME(V1R2M0) to Licensed Program 5770-UME(V1R3M0)

IBM i Common Information Model Object Manager (CIMOM) server and providers are updated from LP (5722-UME) V1R2M0 to LP (5770-UME)V1R3M0. The 5722-UME CIM server (QUMECIMOM) that shipped with IBM i 6.1 is updated to 5770-UME CIM server (QUMECIMOM) in IBM i 7.1. 5770-UME can be installed on IBM i 6.1 and IBM i 7.1 and is installed by default on i 7.1.

Dependency for CIM server startup:

Users must install these LPs and options before the CIM server can be started without error:
- 5770-SS1 option 33 PASE(Portable Application Solutions Environment)
- 5733-SC1 option 1 (OpenSSL)

Auto-start CIM Server:

5770-UME V1R3M0 CIM server is an auto-start TCP/IP service. The CIM server will auto-start by default after a scratch install of i 7.1, while it will inherit the previous auto-start configuration after a slip install.

CIM commands run in IBM i PASE:

CIM server and providers can run in Portable Application Solutions Environment (IBM i PASE). You need to run the call **qp2term** command before running IBM i PASE commands. Commands (**cimconfig, cimmof** and **cimprovider**) are the same as before in 5722-UME V1R2M0. New commands (**cimtrust, cimcrl, cimsub**) are added in 5770-UME V1R3M0. ILE PGM **QUMESTRSA** is not shipped.

IBM Director 6.1 compatibility:

5770-UME V1R3M0 CIM Server will register platform-agent for IBM Director 6.1. The 5770-UME LP might not work with IBM Director earlier than version 6.1.2. IBM Director 6.1.2 or later, is needed.

Development interfaces:

The CIM server is based on OpenPegasus V2.8.0. Any external products using the restricted IBM i 6.1 or IBM i 7.1 CIM provider interfaces must adapt to the new OpenPegasus Software Development Kit (SDK) V2.8.0 and obtain updated IBM i-specific interface documentation from IBM. The development interfaces remain restricted with 5770-UME, and a limited availability agreement is required for their use. If external products have installed CIM providers in IBM i 6.1 or IBM i 7.1, those CIM providers will not work with 5770-UME until they are updated to run in IBM i PASE and to use updated interfaces.

CIM schema:

5770-UME, V1R3M0, includes the Distributed Management Task Force (DMTF) CIM Schema V2.21.

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

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

SSL Certificate Management:

In 5770-UME V1R3M0, command *ssltrustmgr* is removed and **cimtrust** and **cimcrl** are shipped. The *cimtrust* command provides an interface to manage X509 certificates in a truststore. The *cimcrl* command provides an interface to manage X509 CRLs in a CRL store. The following configuration properties are obsolete in 5770-UME V1R3M0: **exportSSLTrustStore, enableSSLExportClientVerification, tempLocalAuthDir, enableClientCertification**.

Improve Tracing and Logging:

The trace destination can be configured by a new configuration property "**traceFacility**".

The values of this property:
* *File* - The trace messages are written to the file named by the configuration property "traceFilePath".
* *Log* - The trace messages are written to the Pegasus Logger using the log level *TRACE* and the logFileType of *TRACE_LOG*.

Audit Logging:

5770-UME, V1R3M0 provides a record of access, activity, and configuration change for CIM Server. The contents of the audit file include the who, when, and what information of a request.

Separate OOP log:

Separate OOP (Out Of Process) providers log in to their own log files.

Repository migration:

If i 7.1 is upgraded over V5R4, the CIM Server repository is migrated from DMTF CIM Schema V2.9 to DMTF CIM Schema V2.21 during the first startup of CIM server in 5770-UME LP. If i 7.1 is upgraded over IBM i 6.1, the CIM Server repository is migrated from DMTF CIM Schema V2.14 to DMTF CIM Schema V2.21 during the first startup of CIM server in 5770-UME LP. This migration might take a while, depending on the size of the repository, processor speed, and system utilization.

The CIM server will be unavailable to process CIM requests until the repository migration completes. Stopping the server job during migration might result in a loss of data. The following objects in the repository are not migrated:
* CIM Provider Registration on V5R4 is not migrated.
* Static instances of metric definition on V5R4 in the repository. (Providers dynamically collect information and implement the same functions as these metric instances.).

The CIM server log might have the following messages related to the repository migration:
* When migration starts, message PGS10054 is written in the CIM server log. The default location is /QOpenSys/QIBM/UserData/UME/Pegasus/logs.

  ```
   PGS10054: The CIM server is starting to restore and migrate
  repository. This will take several minutes, during which the
  server will not be available. Stopping the server job might
  result in a loss of data.
  ```
* When migration ends without any error, message PGS10055 is written in the CIM server log.

  ```
  PGS10055: The Common Information Model (CIM) migration process
  of repository has been completed successfully.
  ```

Configuration properties:

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

These properties are obsolete: **httpBindAddress, httpsBindAddress, httpAuthType, and passwordFilePath**.

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

The default value for these properties have changed:

- **enableHttpConnection** the default value is set to: *false*
- **enableNamespaceAuthorization** the default value is set to: *false*
- **providerDir** the default value is set to: /QOpenSys/QIBM/ProdData/UME/Pegasus/provider;/QOpenSys/usr/lib
- **shutdownTimeout** the default value is set to: *30*
- **sslTrustStoreUserName** the default value is set to: *QYCMCIMOM*
- **traceLevel** the default value is set to: *1*

The traceLevels configuration property has a new severity:

```
0 Tracing is off
1 Severe and log messages
2 Basic flow trace messages, low data detail
3 Inter-function logic flow, medium data detail
4 High data detail
5 High data detail + Method Enter & Exit
```

These properties are new properties in 5770-UME V1R3M0:

- **enableAuditLog**: Used to enable or disable audit logging at run time. If true, audit logging is enabled. The default value is set to *false*.
- **idleConnectionTimeout**: If set to a positive integer, this value specifies a minimum timeout value for idle client connections. If set to zero, idle client connections do not time out. The default value is set to *0*.
- **providerManagerDir**: Specifies the names of the directory that contains ProviderManager plug-in libraries. The default value is set to/QOpenSys/QIBM/ProdData/UME/Pegasus/lib.
- **socketWriteTimeout**: If the CIM Server receives an EWOULDBLOCK/EAGAIN error on a non-blocking write, socketWriteTimeout defines the number of seconds the CIM Server waits for the socket to get ready and resume writing data. The default value is set to *20* (seconds).
- **traceFacility**: Defines the preferred facility for trace messages. Valid values include: File, Log. The default value is set to *File*.

If i 7.1 is upgraded over IBM i 6.1, the first time the CIMOM is started, the CIM server migrates CIM server configuration data from the previous releases to 5770-UME V1R3M0 PASE CIM server configuration; If i 7.1 is upgraded over V5R4, the first time the CIMOM is started, the CIM server migrates data from base operating system CIM server configuration to 5770-UME V1R3M0 PASE CIM server configuration. Most of the configuration property values are migrated intact. The following are exceptions, and they are not migrated from 5722-UME V1R2M0 to 5770-UME V1R3M0:

- The **enableHttpExportConnection** and **httpExportPort** properties are not migrated.
- If the property **idleSessionTimeout**value is set, then replace it with property **idleConnectionTimeout** with the same value.
- If traceLevel=**4** then modify it to traceLevel=**5**.

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

Director and eServer™ required CIM provider

Because the following CIM providers are specific on IBM i partitions, to differentiate the common and specific CIM provider for different platform, those providers are renamed to use IBMi as the prefix.

Table 3. Provider properties

5722-UME CIM Class Name	5770-UME CIM Class Name
IBM_Memory	IBMi_Memory
IBM_DiskDrive	IBMi_DiskDrive
IBM_Processor	IBMi_Processor
IBM_DVDDrive	IBMi_DVDDrive
IBM_PortController	IBMi_PortController
IBM_PCIController	IBMi_PCIController
IBM_CDROMDrive	IBMi_CDROMDrive
IBM_Chassis	IBMi_Chassis
IBM_BIOSElement	IBMi_BIOSElement
IBM_UserAccount	IBMi_UserAccount
IBM_Group	IBMi_Group

IBM Rational Development Studio for i (5770-WDS)

SEU syntax checking is frozen at the 6.1 level for ILE COBOL and ILE RPG

The Application Development ToolSet components in Rational®® Development Studio for i are stabilized. That means IBM will no longer add any new enhancements to these components. Specifically, SEU syntax checking will not recognize new syntax for COBOL or RPG.

IBM recommends that customers use the IBM Rational Developer for Power Systems Software™.

C++ compiler changes

The C++ compiler for IBM i 7.1 supports the current C++ standard as well as C99. Some existing nonconforming programs that compiled successfully with previous releases might no longer compile successfully. Information about ILE C/C++ on i can be found in the ILE C/C++ Language reference manual in the IBM i Information Center.

IBM i Access for Windows (5770-XE1)

Support for Some Hardware/Software Withdrawn

IBM i Access for Windows 7.1 is withdrawing support for Itanium® hardware, all Windows 2000 editions of the Windows operating system, and Windows XP SP1 and prior.

If you want to upgrade your PC to one of the supported Windows operating systems, you must perform the following steps:

1. Uninstall IBM i Access for Windows.
2. Upgrade the Windows operating system.
3. Install IBM i Access for Windows.

Installation for IBM i Access for Windows requires reboot

Before installing IBM i Access for Windows 7.1, reboot your machine. The reboot ensures there are no IBM i Access for Windows programs resident in memory which might cause issues during install. A reboot of the machine will also be required after the install.

In previous releases of IBM i Access for Windows, at the end of the installation, a popup window would appear informing the user that a reboot was necessary. In IBM i Access for Windows 7.1, that popup window might not appear. However, the last panel of the installation does state, "Restart the machine after you have exited the wizard." Restarting the machine must be done in order for the installation to be complete.

System i Navigator changes

System i Navigator removal of support for memory-resident database monitors

Starting in i 7.1, System i Navigator and IBM Systems Director Navigator for i no longer provide support for memory-resident database monitors. Memory-resident database monitors are identified as type Summary in the SQL Performance Monitors folder.

Note: The memory-resident database monitor APIs are still available.

In prior releases, the main advantage of the memory-resident database monitor over the Detailed monitor (STRDBMON) was its smaller impact on system resources. This was because it maintains the collected information in memory and writes to files only if and when the user requests that it do so. The result was the ability to gather database performance statistics with a minimal impact to the performance of the system as whole, or to the performance of individual SQL statements. However, significant enhancements introduced in V5R4 and 6.1 allow additional filtering on detailed SQL performance monitors, which greatly reduces the system impact of this type of monitor. SQL Plan Cache viewing and snapshot capabilities have also been added to provide access to the "always on" statement information cache. These new and redesigned tools provide great detail while maintaining low system impact. These improvements have eliminated the advantage the memory-resident database monitor once provided.

If you plan to continue working with the memory-resident database monitors, you can directly call the memory-resident database monitor API interfaces.

System i Navigator SQL Assist changes

The SQL Assist function within System i Navigator is no longer supported. SQL Assist is a tool that helps you build up the syntax of an SQL statement. The main access to SQL Assist is from the Edit pull down menu in Run SQL Scripts. You can continue to use the SQL Assist tool, but it will not be updated or maintained.

TCP/IP server changes

The ASF Tomcat server has been removed from the TCP/IP Servers list.

Management Central changes

Business-to-business Monitors Withdrawn

Support for business-to-business activity monitors has been withdrawn in 7.1.

Run Actions... on Inventory Withdrawn

When connected to a Central System with release i 7.1 or later, the "Run Actions..." option under "Inventory" is not displayed. This option was used to send service information to IBM. The IBM Electronic Service Agent is integrated with IBM Systems Director Navigator for i in 7.1.

Extreme Support Configuration Wizard

When connected to a Central System with release i 7.1 or later, the "Configuration..." option under "Extreme Support" is not displayed. This option was used to call the Service Agent Configuration wizard. The IBM Electronic Service Agent is integrated with IBM Systems Director Navigator for i in 7.1.

IBM i Access for Web (5770-XH2)

Before you install IBM i Access for Web:

If you currently have a configured, running version of IBM i Access for Web on your IBM i system, you must run the IBM i Access for Web configuration commands again when you install the new version before you can use the product. Running the command enables the new functionality provided with the new release. When running CFGACCWEB2 for the WebSphere Application Server environments, be aware that the value specified for the WASPRF parameter is case sensitive and must be entered exactly as shown in the /QIBM/UserData/Access/Web2/config/instances.properties file. For detailed instructions on installing and upgrading the product and running the configuration commands, see the i 7.1 IBM i Information Center: Click **Connecting to your system > IBM i Access > IBM i Access for Web**.

Web application servers and WebSphere Portal environments:

If you currently have a configured, running version of IBM i Access for Web on your IBM i system, that web application server environment might no longer be supported by IBM i Access for Web. You need to migrate your IBM i Access for Web configuration to a supported web application server. For additional information, see the i 7.1 IBM i Information Center: Click **Connecting to your system > IBM i Access > IBM i Access for Web**.

i 7.1 IBM i Access for Web does not support the following web application servers:
- WebSphere Application Server V6.0 for OS/400
- WebSphere Application Server - Express® V6.0 for OS/400
- WebSphere Application Server Network Deployment V6.0 for OS/400

i 7.1 IBM i Access for Web does not support the following WebSphere Portal environments:
- WebSphere Portal V5.1
- IBM WebSphere Portal V6.0

i 7.1 IBM i Access for Web can migrate user-generated data from an unsupported web application server environment to a supported web application server environment when new web application servers are configured. You can migrate user-generated data by using the CFGACCWEB2 command and specifying input for the SRCSVRTYPE/SRCSVRINST/SRCAPPSVR/SRCINSDIR/SHRUSRDTA parameters.

i 7.1 IBM i Access for Web also allows you to remove the IBM i Access for Web configuration from the unsupported web application server environment using the RMVACCWEB2 command. Be sure that you have loaded and applied the latest i 7.1 IBM i Access for Web PTFs before attempting to migrate from or remove unsupported web application server environment configurations.

IBM Toolbox for Java shipped with option 3 of IBM i

In IBM i 7.1, the IBM Toolbox for Java is shipped as part of Option 3 of IBM i - Extended Base Directory Support. All functions and features that were available in the original (5761-JC1) product are available and supported in Option 3.

The install process for 5770-SS1 (Option 3) automatically removes 5761-JC1 if it is installed on the system.

IBM Developer Kit for Java (5761-JV1)

JV1 options for Java Developer Kit 1.4, 5.0 and 6 no longer supported

IBM i 7.1, no longer supports the JV1 options for Java Developer Kit 1.4, 5.0 and 6. The options were also referred to as Classic Java; Classic Java has been replaced by the IBM Technology for Java (IT4J) product. In release i 7.1, the default JVM is IBM Technology for Java J2SE 6.0 32 bit.

Customers that were still using Classic Java in &ss1s; 6.1 should refer to the IBM Systems Information Center under Installing and configuring IBM Developer Kit for Java to obtain additional information about using the IBM Technology for Java (IT4J) product.

The following table shows the Classic Java levels and the suggested IBM Technology for Java replacement. Customers should make plans to replace or discontinue use of the Classic Java products before upgrading to i 7.1.

Table 4. Java Developer Kit option replacements

Current Product (Classic Java)	Option	Replacements (IT4J)	Option
Java Developer Kit 1.4 - 5761JV1	6	Java SE 6 32 bit - 5761JV1 [1]	11
		Java SE 6 64 bit - 5761JV1[1]	12
		J2SE 5.0 32 bit - 5761JV1	8
		J2SE 5.0 64 bit - 5761JV1	9
		J2SE 1.4 64 bit - 5761JV1	13
Java Developer Kit 5.0 - 5761JV1	7	Java SE 6 32 bit - 5761JV1[1]	11
		Java SE 6 64 bit - 5761JV1[1]	12
		J2SE 5.0 32 bit - 5761JV1	8
		J2SE 5.0 64 bit - 5761JV1	9
Java Developer Kit 6 - 5761JV1	10	Java SE 6 32 bit - 5761JV1	11
		Java SE 6 64 bit - 5761JV1	12

[1]IBM recommends Java SE 6 when migrating from Java Developer Kit 1.4 or 5.0.

Refer to the IBM Systems Information Center under Installing and configuring IBM Developer Kit for Java for instructions on installing 5761-JV1 options.

Note: For information about the recommended level of Websphere Application servers on IBM i 7.1 see, "IBM WebSphere Application Server Version 6.1 (5733-W61) and IBM WebSphere Application Server Version 7.0 (5733-W70)" on page 40.

Changes required for PASE for i programs that call the JNI_CreateJavaVM API

To improve system security, the default behavior for PASE for i programs has been changed to block instruction execution from "data" areas (stack and heap). IBM Technology for Java JIT generated code is created in "data" areas. A PASE for i program that calls the JNI_CreateJavaVM API needs to follow the instructions in "PASE for i Stack Execution Disable Support" on page 26 to mark the program as needing to allow program execution from data areas.

Ensure that necessary language features are installed

IBM Technology for Java uses support provided by PASE for i (IBM i operating system Option 33). Internationalized Java programs require the installation of the IBM i Option 33 language feature code corresponding to the Java locale you want to use. For a table showing the Option 33 language feature code necessary to support a specific Java locale, see the IBM PASE for i Locales topic in the IBM i Information Center.

Note: Java programs that use language feature code 2996 (Portuguese MNCS) should also install IBM i operating system Option 33 feature code 2922 (Portuguese). Java programs that use language feature code 2938 (English Uppercase DBCS) or 2984 (English Uppercase and Lowercase DBCS) should also install IBM i operating system Option 33 feature code 2924 (English Uppercase and Lowercase).

Create Java Program (CRTJVAPGM) command

IBM i 7.1 is the last release that supports the Create Java Program (CRTJVAPGM) command. The Java program created by this command is ignored by the IBM Technology For Java (IT4J)"

Extended Integrated Server Support for IBM i (5761-LSV)

Extended Integrated Server Support for IBM i (5761-LSV) is no longer supported

Extended Integrated Server Support for IBM i is not available in IBM i 7.1. In i 6.1, (5761-LSV) contained integrated server support for VMware ESX support on iSCSI attached BladeCenter and System x servers, Linux on iSCSI attached BladeCenter and System x servers, and Linux running in IBM i hosted logical partitions.

Support for VMware ESX on iSCSI attached BladeCenter and System x servers is available in IBM i 7.1 in Option 29 - Integrated Server Support.

For Linux on iSCSI attached BladeCenter and System x servers, the following functions are no longer available:

- Linux operating system installation
- Save while active support for virtual disk (storage spaces)
- File level backup of files on the Linux server
- Dynamic linking and unlinking of virtual disks
- Virtual optical and tape support

Suggested Replacement:

For Linux on iSCSI attached BladeCenter® and System x® servers, customers can migrate the Linux server to a virtual machine on VMware ESX using IBM i support for VMware ESX running on iSCSI attached BladeCenter and System x. However, the VMware ESX hosted Linux servers would not support save while active, file level backup, or virtual optical and tape support.

For Linux running in IBM i hosted partitions, save while active and file level backup are no longer supported.

IBM System i Access for Wireless(5722-XP1)

IBM i 6.1 was the last release for IBM System i Access for Wireless(5722-XP1). This product is withdrawn in IBM i 7.1. The IBM Systems Director family of products provides equivalent system management functionality in IBM i 7.1.

Lotus Products

Lotus products supported on IBM i 7.1

Refer to the *Lotus Software for IBM i Compatibility Guide* on the IBM systems Web site at `http://www.ibm.com/systems/resources/releasesupport.pdf` for information about the minimum releases of Lotus® products required to run on IBM i 7.1.

Lotus Domino Document Manager

Lotus Domino® Document Manager has been withdrawn from marketing and is not supported on IBM i 7.1.

Lotus Domino 8.5 for i (5733-L85) uses IBM Technology for Java J2SE 6.0 32 bit

Classic Java has been replaced by the IBM Technology for Java (IT4J) product. The Domino 8.5 for i release supported on IBM i 7.1 uses IBM Technology for Java J2SE 6.0 32 bit. For more information refer to the *Domino 8.5 for i: Unsupported features* Technote on the IBM support Web site at `http://www.ibm.com/support/docview.wss?rs=463&uid=swg21315471`.

Domino for IBM i Single Logon feature is no longer supported

The Domino for IBM i Single Logon feature is no longer supported. Single Logon allowed users to use a single password for logging on to Lotus Notes®, Microsoft® Windows, and IBM i operating system. A suggested replacement is to use the single logon function shipped with Lotus Notes that enables a single password for logging on to Lotus Notes and Microsoft Windows, but not on to an IBM i operating system.

IBM Learning Accelerator

IBM Learning Accelerator has been withdrawn from marketing and is not supported on IBM i 7.1.

IBM Secure Perspective for System i (5724-PS1) (5733-PS1)

Secure Perspective (sold as 5733-PS1 and 5724-PS1), has been withdrawn from marketing and is not supported on IBM i 7.1. However, Secure Perspective for IBM i will be available as a custom offering delivered by the IBM Systems Lab Services and Training Power Services team. Support and enhancements for this tool on future releases of IBM i will be offered as part of the Security Services offering. For more information, please reference the IBM Systems Lab Services and Training Web site: `http://www.ibm.com/systems/services/labservices/platforms/labservices_power.html`

IBM WebSphere Application Server Version 6.1 (5733-W61) and IBM WebSphere Application Server Version 7.0 (5733-W70)

Installation of WebSphere Application Server:

In i 6.1, IBM Web Enablement for IBM i includes IBM WebSphere Application Server - Express V6.0 for OS/400, IBM WebSphere Application Server - Express V6.1 for i5/OS, and IBM WebSphere Application Server - Express V7.0 for IBM i.

In i 7.1, IBM Web Enablement for IBM i includes, Application Server - Express V6.1 and Application Server - Express V7.0. Application Server - Express V6.0 is not included or supported with Web Enablement for i 7.1. Additionally, Application Server V6.0 is not supported and is not operational on i 7.1.

The minimum required level of WebSphere Application Server V6.1 on i 7.1 is 6.1.0.29. The minimum required level of WebSphere Application Server V7.0 on i 7.1 is 7.0.0.7.

Installation:

Installing WebSphere Application Server V6.1 on i 7.1 requires a refreshed installation version of the product. The refreshed installation version of WebSphere Application Server V6.1 is based on fix level 6.1.0.29. For ordering information, please visit the Web site at `http://www.ibm.com/systems/i/software/websphere`.

For WebSphere Application Server V7.0, apply fix pack 7 (7.0.0.7) or later, after completing the installation.

Upgrading to i 7.1:

If you are currently using Application Server V6.0 and upgrading to i 7.1, you need to migrate to the WebSphere Application Server V6.1.0.29 or V7.0.0.7 products. Because migration does not require Application Server V6.0 to be operational, migration can occur before or after upgrading to i 7.1.

1. Before upgrading to i 7.1, ensure that all Application Server installations meet the minimum required fix levels. The version identifier is contained in file <app_server_root>/properties/version/WAS.product. Where <app_server_root> is the root directory of the WebSphere Application Server installation. For WebSphere Application Server V6.1, apply fix pack 29 (6.1.0.29) or later if needed. For WebSphere Application Server V7.0, apply fix pack 7 (7.0.0.7) or later if needed.

2. Before or after upgrading to i 7.1, enable Application Server to use IBM Technology for Java Virtual Machine. The Classic Java virtual machine is not available for i 7.1. If your Application Server installation is enabled to use Classic, it will not be operational until it is enabled to use IBM Technology for Java Virtual Machine. For more information see topic "Enabling use of IBM Technology for Java Virtual Machine" in the Application Server information center.

3. After upgrading to i 7.1, if you upgraded from i 5.4 or earlier then update the Application Server service programs for i 7.1. To update the programs:
   - Start the Qshell interpreter.
   - cd to <app_server_root>/bin
   - Invoke "export OSVER=V7R1M0" to export the OSVER environment variable to the Qshell environment.
   - Invoke the _postfpexit script as follows: _postfpexit <app_sever_root> <product_library>
     Where <product_library> is the product library for the WebSphere Application Server installation as listed in <app_server_root>/properties/product.properties.

4. Update the LoadModule directives. LoadModule directives are used by external HTTP servers associated with Application Server Version 6.1 and Application Server Version 7.0. For information about updating the LoadModule directives, see "Plug-ins and LoadModule directives" on page 28.

Documentation:

See the WebSphere Application Server V6.1 for i5/OS and WebSphere Application Server V7.0 for IBM i documentation at these Web sites for more information:

`http://publib.boulder.ibm.com/infocenter/wasinfo/v6r1/index.jsp`

`http://publib.boulder.ibm.com/infocenter/wasinfo/v7r0/index.jsp`

IBM Facsimile Support for i (5798-FAX)

Command changes

Convert Fax Document (CVTFAXDOC) removed

The command CVTFAXDOC and the corresponding option Convert Fax Documents on the Fax User menu have been removed in i 7.1. As OfficeVision for AS/400® is no longer supported, the command is obsolete. Any existing CL programs that use the CVTFAXDOC command might need to be modified.

Configure Fax Server (CFGFAXSRV) command parameter changes

The ENBLOV400 and DOCPRTDEV parameters have been removed from the CFGFAXSVR command in 7.1. Any existing CL programs that use the CFGFAXSRV command might need to be modified.

Submit Fax (SBMFAX) command parameter changes

*FAXOFCDOC is no longer valid on the Option parameter of the SBMFAX command in 7.1. Any existing CL programs that use the SBMFAX command might need to be modified.

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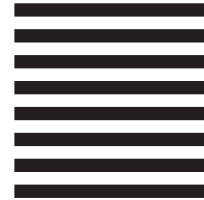
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