



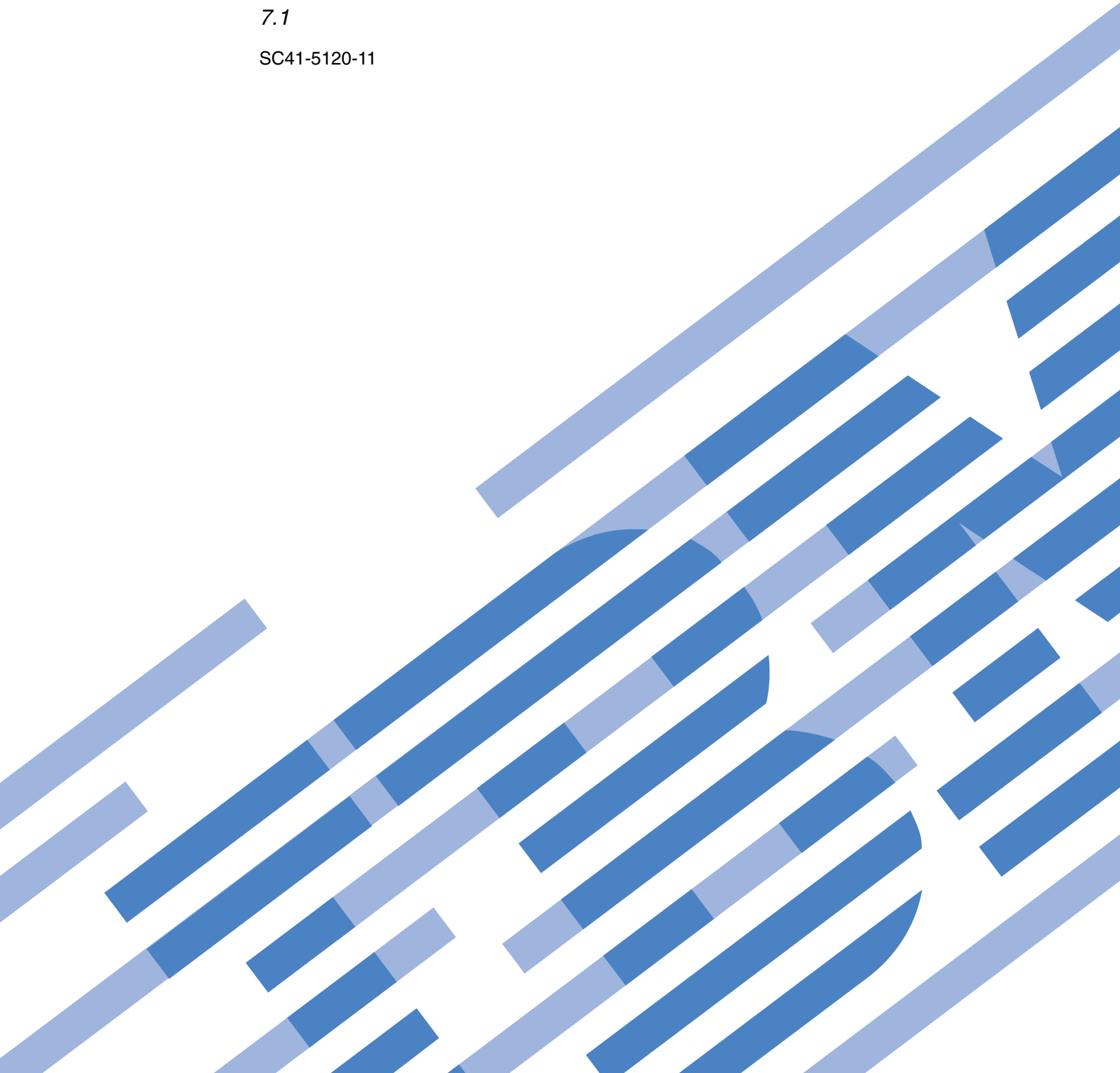
IBM i

IBM i and related software

Installing, upgrading, or deleting IBM i and related software

7.1

SC41-5120-11





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Note

Before using this information and the product it supports, read the information in "Notices," on page 235 and the manual *IBM eServer Safety Information*, G229-9054.

| This edition applies to IBM i 7.1 (product number 5770-SS1) and to all subsequent releases and modifications until
| otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC)
| models nor does it run on CISC models.

| This edition replaces SC41-5120-10.

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What's new for IBM i 7.1

Read about new or changed information for the Installing, upgrading, or deleting IBM® i and related software topic collection.

Operations Console directly attached to the system is not supported

Attention: An Operations Console directly attached to the system is not supported in IBM 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 will cause the installation to fail with unpredictable results. For more information about changing consoles, see Changing consoles in the IBM systems Hardware Information Center.

DVD installation media is consolidated

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 “Media labels and their contents” on page 212.

Automatic installations or upgrades that are using IBM i 7.1 IBM supplied consolidated optical media and 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.

IBM i 7.1 supports POWER5 and later hardware

For more information, see “Releases supported and system model information for IBM i upgrades” on page 16.

Upgrade or replace software with virtual optical storage using the Network File System

You can use virtual optical storage using the Network File System to perform an IBM i software upgrade, to install PTFs (fixes), or to install single licensed programs that you receive on media. For more information, see “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44.

What's new for V5R4-to-IBM i 7.1 upgrades

Program conversions and other object conversions

To adequately prepare your system for your upgrade to the new release, you will need to allow extra time beforehand to analyze your system and possibly readjust your programs for conversions. The length of time required to analyze your system depends on the type, number, and size of your libraries and directories. You also need to plan in advance for possible down times.

Conversions occur during a software upgrade or during normal operations after the upgrade.

Note: If any of these preparations are normally done by a third party, contact your application provider for advice and assistance.

You will need to install planning PTFs for the release from which you are upgrading to assist you in the conversion process. These PTFs do not

convert your objects but rather enable you to run the Analyze Object Conversion (ANZOBJCVN) command to assist you in preparing for the upgrade. After you run the ANZOBJCVN command, you receive information to help you determine the effect that object conversions will have on your system such as identifying potential conversion difficulties, if any, and supplying estimates on the time required for program conversion. For an overview and timeline on how the conversion tasks fit into the overall upgrade process, see “Software installation process” on page 7. Also review the information “Installing PTFs and analyzing your system for object conversions (V5R4 to IBM i 7.1 upgrade)” on page 30 and the topics under “Times for conversions (V5R4 to IBM i 7.1 upgrade)” on page 197 to determine how the conversions might affect your system.

IBM i can now be installed from optical images on the network

An IBM i 6.1 environment on POWER6[®] processor-based server can be upgraded to IBM i 7.1 with an image on the network file server. This function takes advantage of the 632B-003 virtual optical device that supports virtual image files on a remote system in a network. An image directory identifies a network path on the central system that contains the virtual image files that are prepared for use with a target system. For more information, see IBM i Network Install using Network File System.



What's new as of 10 September 2010

Embedded media changer

The 632C-002 client virtual device now supports an embedded media changer. This embedded media changer function extends the automatic media switching capability of virtual optical device types 632B-001 and 632B-003 on IBM i virtual I/O server partitions to client partitions virtual optical device type 632C. One application of this function is the use of image catalogs for unattended installations of client partitions. See “Types of software installation devices” on page 10 for more information on optical device 632C-002.

How to see what's new or changed

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

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

In PDF files, you might see revision bars (|) in the left margin of new and changed information.

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

Chapter 1. Installing, upgrading, or deleting IBM i and related software


This topic collection guides you through the concepts and procedures for installing, upgrading, or deleting IBM i software on your system.

Use this information to install the IBM i release, part of the IBM i release, or licensed programs related to IBM i. This information also describes how to change a primary language, install a secondary language, or delete software that is related to the IBM i operating system.

The Chapter 4, “Checklist: IBM i software upgrade or replacement readiness,” on page 23, the “Checklist: IBM i software replacement” on page 99, or the Chapter 10, “Checklist: IBM i software installation readiness,” on page 105, contain summaries of the major task categories that you need to do before you begin to upgrade or install your software.

Note: The display examples and procedures in this topic collection show the character-based interface. Many topics in the IBM i Information Center assume that you have the graphical user interface (System i® Navigator) running. Most System i Navigator functions, however, have equivalent control language commands in the character-based interface that you can use.

If you are moving your data to another system with a different serial number, see Data migrations. If you are upgrading to a new system without changing the serial number, see the Server upgrades and data migration topic in the IBM Systems Hardware Information Center.

If you are planning to boot to IBM i (perform an initial program load) from the load-source disk unit that is attached via the 2847 I/O processor, ensure you see the IBM Redbooks® publication, *iSeries and TotalStorage: A Guide to Implementing External Disk on eServer™ i5; SG24-7120*  for important planning and implementation considerations.

References to V5R4 in this topic include both V5R4M0 and V5R4M5. Likewise, references to V6R1 include both V6R1M0 and V6R1M1.

Note: By using the code examples, you agree to the terms of the Chapter 17, “Code license and disclaimer information,” on page 233.

Chapter 2. Fast path for software installation, upgrade, and deletion tasks

Use this information as a shortcut to help you determine the group of tasks you need to perform for your particular IBM i installation or upgrade.

Proper planning for hardware is crucial for the successful installation or upgrade of the operating system. Go to the IBM Systems Hardware Information Center (publib.boulder.ibm.com/infocenter/systems/scope/hw/index.jsp) and review the planning, installing, and console information for your system.

Attention: An Operations Console directly attached to the system is not supported in IBM 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 will cause the installation to fail with unpredictable results. For more information about changing consoles, see Changing consoles in the IBM systems Hardware Information Center.

If you requested electronic software delivery, refer to the Electronic software delivery Web site (www.ibm.com/servers/support/software/delivery/en_US/downloadinfo.html).

Task	Steps
Upgrading a release on a system or logical partition (either from V5R4 or V6R1 to IBM i 7.1)	<ol style="list-style-type: none"> Chapter 5, "Preparing to upgrade or replace IBM i software," on page 27 Use one of the following methods to upgrade or replace an IBM i release: <ul style="list-style-type: none"> Chapter 6, "Upgrading or replacing software using automatic installation," on page 63 Chapter 7, "Upgrading or replacing software using manual installation," on page 73 "Installing additional licensed programs" on page 132 "Installing a secondary language" on page 140 Review Chapter 8, "Checklist: Completing the IBM i upgrade or replacement," on page 93
Replacing Licensed Internal Code and IBM i of the same version and release to support new hardware.	Chapter 9, "Replacing Licensed Internal Code and IBM i of the same version and release," on page 99
Installing the IBM i release on a new system or logical partition	<ol style="list-style-type: none"> "Preparing to install the IBM i release" on page 107 Perform the following based on your situation: <ul style="list-style-type: none"> "Installing Licensed Internal Code on a new logical partition" on page 111 "Installing software on a new system or logical partition (without IBM i installed)" on page 118 "Installing software on a new system (with IBM i installed)" on page 128 "Using the Work with Licensed Programs menu to install IBM licensed programs" on page 133 "Installing a secondary language" on page 140 Review "Checklist: Completing the IBM i installation" on page 144

Task	Steps
Installing licensed programs	<ol style="list-style-type: none"> 1. "Installing additional licensed programs" on page 132 2. Review "Checklist: Completing the IBM i installation" on page 144 (certain steps apply)
Installing a secondary language	<ol style="list-style-type: none"> 1. Review "Globalization and IBM i software installation" on page 19 2. "Installing a secondary language" on page 140 3. Review "Checklist: Completing the IBM i installation" on page 144 (certain steps apply)
Changing the primary language using either primary or secondary language media on the same release.	<ol style="list-style-type: none"> 1. Arrange your media in the order shown in "Media labels and their contents" on page 212 2. Chapter 12, "Changing the primary language of your system or logical partition," on page 149 3. Review "Checklist: Completing the IBM i installation" on page 144
Changing your primary language and upgrading a release using primary language media	<ol style="list-style-type: none"> 1. Chapter 5, "Preparing to upgrade or replace IBM i software," on page 27 2. Use one of the following methods to upgrade or replace an IBM i release: <ul style="list-style-type: none"> • Chapter 6, "Upgrading or replacing software using automatic installation," on page 63 • Chapter 7, "Upgrading or replacing software using manual installation," on page 73 3. "Installing additional licensed programs" on page 132 4. "Installing a secondary language" on page 140 5. Review Chapter 8, "Checklist: Completing the IBM i upgrade or replacement," on page 93
Selecting the primary language or changing your primary language and installing software on a new system	<ol style="list-style-type: none"> 1. "Preparing to install the IBM i release" on page 107 2. Perform the following based on your situation: <ul style="list-style-type: none"> • "Installing Licensed Internal Code on a new logical partition" on page 111 • "Installing software on a new system or logical partition (without IBM i installed)" on page 118 • Chapter 12, "Changing the primary language of your system or logical partition," on page 149 3. "Using the Work with Licensed Programs menu to install IBM licensed programs" on page 133 4. "Installing a secondary language" on page 140 5. Review "Checklist: Completing the IBM i installation" on page 144
Adding a new disk unit to an existing system before upgrading or replacing a release	<p>If you are currently using mirrored protection, device parity protection, or auxiliary storage pools, refer to these topics in the topic category Recovering your system in the IBM i Information Center before you begin these tasks.</p> <ol style="list-style-type: none"> 1. Chapter 5, "Preparing to upgrade or replace IBM i software," on page 27 2. Chapter 7, "Upgrading or replacing software using manual installation," on page 73 3. "Installing additional licensed programs" on page 132 4. "Installing a secondary language" on page 140 5. Review Chapter 8, "Checklist: Completing the IBM i upgrade or replacement," on page 93
Installing a cumulative program temporary fix (PTF) package	<ol style="list-style-type: none"> 1. Go to the Support for System i Web site (http://www.ibm.com/systems/support/i) for Internet downloads or PSP information. 2. Review the PTF Shipping Information Letter that you received for instructions on how to install a cumulative PTF package. 3. Optional: Review concept information about how to use and install fixes in the IBM i Information Center.

Task	Steps
Installing a hardware upgrade	Go to the IBM Systems Hardware Information Center (publib.boulder.ibm.com/infocenter/systems/scope/hw/index.jsp) and review the installing and upgrading information for your system.
Deleting software	Use either of the following methods: <ul style="list-style-type: none"> • “Preselecting the licensed programs to install” on page 50. If you have licensed programs that are no longer supported, these can be deleted when you perform other upgrade preparation tasks in this topic. • Chapter 13, “Deleting software related to the IBM i operating system,” on page 159.

Chapter 3. Concepts for software installation

You and IBM together manage the use, documentation, and transfer of IBM i licensed programs.

The following information is a conceptual look at IBM i software installation. This information describes the basics of installing IBM i software: your software order, what to do when you skip a release, software installation scenarios, the types of devices used to install, globalization considerations, and how some conversions could affect your installation time.

Software installation process

The IBM i software installation process involves three phases: preinstallation activities, the main installation, and postinstallation activities.

1. Preinstallation activities:

If you are upgrading to IBM i 7.1 from V5R4, allow adequate time before the upgrade to do the planning and analysis work for program conversions (up to several weeks). The total amount of time that is required for the conversion work could be significant. A few days to a few weeks is adequate for the other preparation activities.

To plan and prepare your system before you install your software, follow the appropriate planning and preparation topics to guide you through the activities that you need to do.

- Upgrading to IBM i 7.1: Chapter 4, “Checklist: IBM i software upgrade or replacement readiness,” on page 23
- Replacing Licensed Internal Code and IBM i of the same version and release to support new hardware: “Checklist: IBM i software replacement” on page 99
- Installing IBM i 7.1 on a new system or logical partition: Chapter 10, “Checklist: IBM i software installation readiness,” on page 105

These activities include verifying your order, checking the amount of available disk space, backing up your system, and cleaning your media device. In a software upgrade or replacement, some of the tasks are required. If you do not perform these required tasks, you will be forced to restart the installation.

2. The installation process:

The installation process begins when you start performing the instructions in one of the procedural topics. For example, to upgrade to the new release, you might have chosen automatic installation. The automatic installation process installs the Licensed Internal Code, the IBM i operating system, and related licensed programs. In the automatic installation method of upgrading, you have minimal interaction with the system except to load the optical distribution media and to monitor the system.

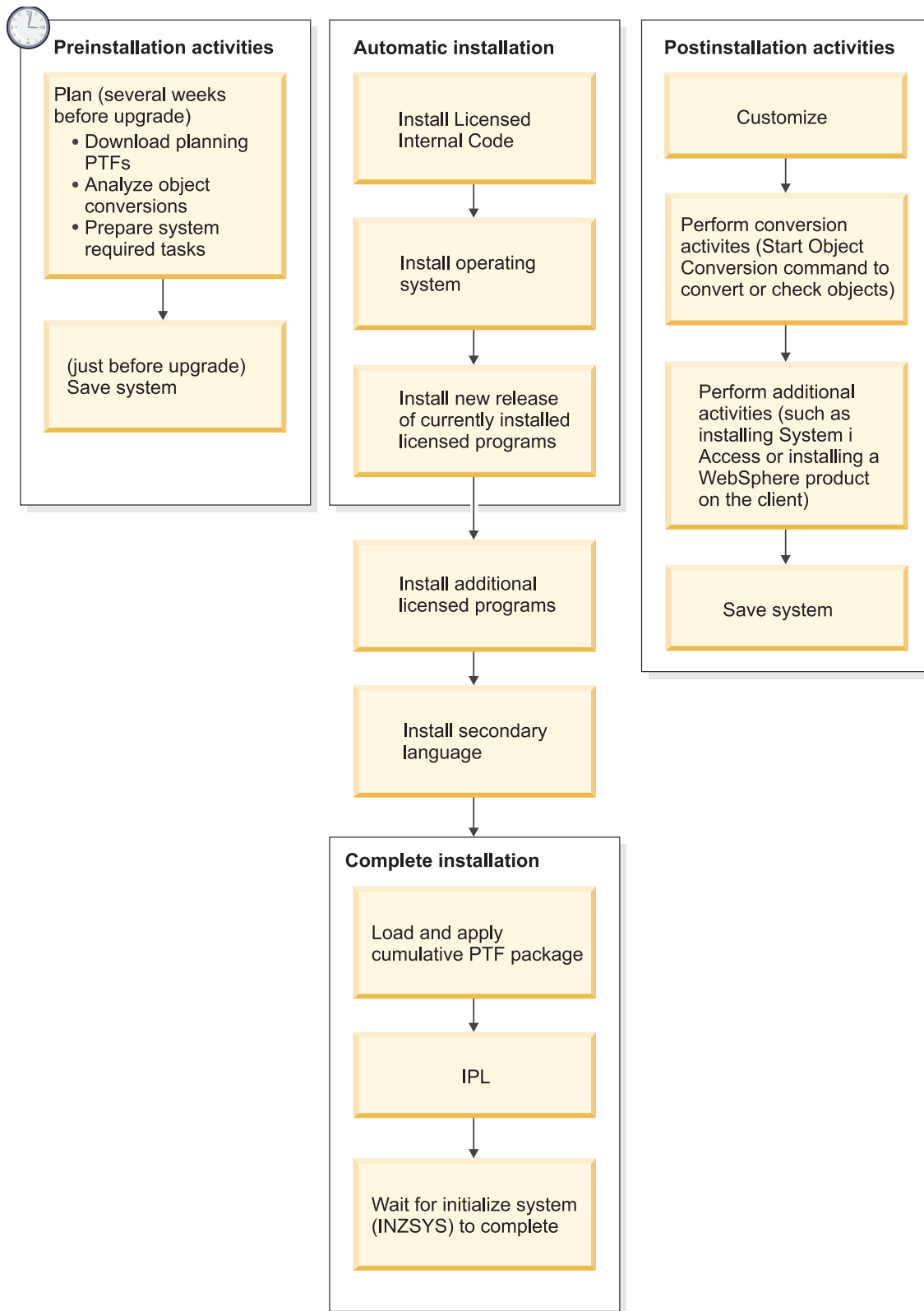
Your only installation activity might be changing the primary language or installing additional licensed programs. Or, perhaps you want to perform these activities after an automatic or manual installation.

3. Postinstallation activities:

The last step of each procedure directs you to use a completion checklist. You might be directed to additional steps, such as saving your system and performing installation activities on workstations for IBM i Access Family

products. Other activities could include customizing your system, or setting usage limits for user-based priced products. Before you begin production work on your system, be sure to adequately protect your system from unauthorized use.

The following figure shows an example of one type of software installation for IBM i 7.1. (Your particular installation might not include all of the topics that are shown in this figure.)



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Figure 1. Overview of the installation process

The procedure that you use for software installation depends on what you plan to install.

Install software on a new system

If you just received a new system, the operating system and other licensed programs might or might not be installed already.

Upgrade or replace existing software

If you are upgrading or replacing your existing IBM i software, use either the automatic installation method or the manual installation method.

Automatic installation

This replaces your existing release with minimal user interaction. The automatic installation process keeps the current environment and system values. The process will add all nonconfigured disk units to the system auxiliary storage pool (ASP) and will retain the ASP configuration of previously configured disk units. The automatic installation process is recommended for use with most systems.

Manual installation

This interactively replaces your existing release by using the Work with Licensed Programs menu. Displays that require responses appear on the console. During a manual installation, you can change installation options. Use the manual installation process if you are doing any of the following installation procedures:

- Adding a disk device to a user auxiliary storage pool.
- Changing the environment (IBM i or System/36), system values, language feature code, or configuration values.
- Planning to use an alternate installation device when you upgrade.
- Creating logical partitions during the installation process.
- Using tapes created with the Save System (SAVSYS) command. (The SAVSYS command creates tapes that are meant for recovery.)

Add licensed programs

When you add additional licensed programs (in addition to those done already in the methods mentioned above) or optional parts of licensed programs, you use the method done through option 11 (Install licensed programs) of the Work with Licensed Programs (LICPGM) menu. Typically you use option 11 when you need to install a new licensed program or to replace a single licensed program.

Add or change globalization support

When you add a secondary language, you add additional language objects for the licensed programs that are installed on your system.

When you change the primary language, you replace the existing language objects. Depending on the procedure that you use, you can also replace program objects.

If a failure occurs during the installation process, Chapter 14, “Troubleshooting software installation problems,” on page 163 contains information that can help you determine the problem and the necessary recovery steps.

Types of software installation devices

These devices can be used to install or upgrade an IBM i release on your system.

Optical devices

The software distribution media that is shipped to customers is optical media (DVD). This media can be used in DVD-ROM, or DVD-RAM devices. Optical media can also be created from files that you download through electronic software delivery.

Optical resources from an IBM i logical partition can be used to perform a software upgrade, to install PTFs (fixes), or to install single licensed programs on another logical partition that is on the same system. Supported devices for sharing optical resources include CD-ROM devices, DVD devices, and virtual optical device types 632B-001 and 632B-003. All these devices are considered a 632C-002 device type to the logical partition that is used to install or upgrade. The 632C-002 device type requires that you manually change the media in the logical partition that owns the device.

PTFs can be applied on the client and server partitions to enable the embedded media changer (automatic media changing). This embedded media changer function extends the automatic media switching capability of virtual optical device types 632B-001 and 632B-003 on IBM i virtual I/O server partitions to client partitions virtual optical device type 632C. This switching capability allows you to manually (and programmatically) switch media in a client virtual optical device without requiring authority to the serving partition. This is accomplished on the client partition with the following commands:

- `WRKIMGCLGE(*DEV) DEV(device_name)` This command allows you to list and mount volumes.
- `LODIMGCLGE IMGCLG(*DEV) IMGCLGIDX (x) OPTION(*LOAD) DEV(device_name)` This command allows you to mount and load volumes.

An application of this function is the use of image catalogs for unattended installations of client partitions. To use this function with an unattended installation, you must create your own media. The PTFs must be applied on the system being used to create the installation media. See Distributing software for information on creating your own media. For a list of PTFs, enablement information, and usage information, review Information APAR II14482 (search for II14482 at www.ibm.com/support).

Virtual optical devices

You can use an image catalog to perform a software upgrade, to install PTFs (fixes), or to install single licensed programs that you receive on media or create from files received through electronic software delivery. Installing with an image catalog has significant advantages when you want to do the following tasks:

- Validate your optical media before you install the release.
- Run the Prepare for install tasks against your virtual optical media and automate the media-handling portion.
- Eliminate the handling of individual media during the installation (unattended installations).
- Upgrade software from an installation image delivered from a network or generated from IBM-supplied optical media.

A special type of virtual optical device (632B; model 003) supports virtual image files on a remote system in a network. An image directory identifies a network path on the central system that contains the virtual image files that are prepared for use with a target system. This virtual optical device

can be used to install licensed internal code, operating system, install additional licensed programs and PTFs. For further details, see IBM i Network Install using Network File System.

Tape devices

There could be times when tape media is used for installation. Examples include distribution media creation or certain backup and recovery scenarios.

Installing with an image catalog has significant advantages when you want to do the following tasks:

- Validate your tape media before you install the release.
- Eliminate the handling of individual media during the installation (unattended installations).
- Upgrade software from an installation image delivered from a network.

Virtual tape devices

You can use a tape image catalog and a virtual tape device to perform an IBM i software upgrade, install PTF fixes, or to install single licensed programs.

Alternate installation devices

You can perform installation and recovery procedures by using the primary installation device along with an alternate installation device that you define. The alternate installation device can be a tape device or an optical device. Some systems, typically those with faster devices attached, might see a performance improvement when using an alternate installation device.

The following table shows the naming conventions for a device that can be used for the alternate IPL (a Type D IPL). The optical drive is the installation device for software distribution media. Examples here use OPT01 for the optical device (optical media class). This is the IBM i normal naming convention. Your system could be set up to use the System/36 naming convention. Use the following table to select the correct device name for your system's installation device or use the name that you have selected.

Table 1. Naming conventions for devices

Media type	System/36 names	IBM i normal names
Optical media (CD, DVD, or virtual optical images)	OPTxx	OPTxx
Cartridge	TC	TAPxx
Reel	T1	TAPxx
Media library device created through automatic configuration		TAPMLBxx

“Preparing the upgrade device and media” on page 39 contains further information on what you need to do with your media before you install a release.

Contents of a software order

Your IBM i software order package includes software licensing documents, the optical media, and other product documentation as appropriate. The optical media can be either physical media or media that is created from files that are downloaded through electronic software delivery.

When you order software from IBM, you receive the optical media distribution set. The software license keys and software entitlements created for your licensed programs are available online.

Software licensing documents

The software licensing documents that you receive with your IBM i software release order can be either printed or online.

These documents contain important information concerning the use, management, and transfer of licensed programs. The licensing documents for IBM licensed programs that you receive could be either printed or online on the system. The Customer Notice that is included in your software order describes how to access the online documents.

To automatically install IBM licensed programs that have online software agreements, you need to accept the agreement through the Prepare for Install menu before you can install the programs. An upgrade of the Licensed Internal Code and the IBM i operating system will stop if the agreements have not been accepted. The topic “Required: Accepting software agreements” on page 54 describes how to accept the agreements.

Ensure that you read and understand all software license agreements and documents before you use the programs.

Store the printed agreements and documents in a secure location. Both printed and online agreements need to be passed to the new owner when you transfer a program.

Proof of Entitlement

The Proof of Entitlement (PoE) is evidence of the owner's authorization to use the program and is the official record on entitlement. It is evidence of eligibility for any version or release updates under software subscription, warranty services, future upgrade program prices (if announced), and potential special or promotional opportunities. A PoE is created for new customer orders or when additional entitlement is purchased.

An electronic PoE for IBM i software upgrade orders is replacing the printed PoE formerly shipped with your software products. For instructions on how to access your electronic PoEs and software license keys, refer to the Customer Notice that is included with your software order. The printed PoEs should be destroyed after you verify the existence and content of the Web-based PoE.

The International Program License Agreement

The International Program License Agreement (IPLA) provides a nonexclusive license to use a software product that has a warranty.

International License Agreement for Non-Warranted Programs

This agreement is similar to the IPLA but is used for IBM licensed programs that have no warranty.


International License Agreement for Evaluation of Programs


The Evaluation of Programs provides a nonexclusive, nontransferable license to use a program only for internal evaluation, testing, or demonstration purposes, on a trial or “try-and-buy” basis.

Licensed Information Document

The Licensed Information Document (LID) contains specific license information and additional restrictions for a product.

Software license keys

For each keyed IBM product or keyed IBM product option that you order, a software license key is created. This applies to both new and upgraded software. You can view, print, or download the software license keys from the Entitled software support  (<http://www.ibm.com/eserver/ess>) Web site. You need to have your customer number and either your order number or system number that is listed on your software packing list available. For further instructions on how to access your online software license keys, refer to the Customer Notice that is included with your software order.

The Entitled software support  Web site also contains more information on managing IBM software license keys.

| For a general description of how software license keys are used, see the topic
| Working with software agreements and licenses in the IBM i Information Center.
| For unique licensing applications regarding logical partitions, see Software
| licensing for IBM licensed programs on logical partitions in the IBM Systems
| Hardware Information Center.

Media distribution set

The software products that you receive in an IBM i release order are grouped into different media sets.

| The licensed programs on the standard set and keyed set are packaged in one of
| three different language groups. If your secondary languages are not included in
| the same language group as your primary language, they are packaged on a
| second set of optical media.

Other licensed programs, which are in addition to the standard set and keyed set, come on their own separate media when ordered. In this case, all supported languages, not just one secondary language, come on this same media.

Standard set

The standard set of products comes with every IBM i software or hardware upgrade order. It contains the hardware and software components to install on your system. This includes Licensed Internal Code (machine code), IBM i, its no-charge options, and no-charge licensed programs and options. The IBM i operating system has all the applications necessary for the basic operations of your system. In addition, it could contain more programs than you want. You can choose not to install some of these programs.

Keyed set

The keyed set of products comes with the standard set. It contains keyed products and program options. You can evaluate these programs for a 70-day trial period. Within 70 days, you must apply license keys to keep the programs operational. Once you purchase the use of a licensed program and load the license key, the licensed program will remain in operation for continual use.

Single products (if ordered)

When specifically ordered, licensed programs that are not part of the standard set and keyed set arrive on separate media with your software

order. You might install these licensed programs using the automatic installation procedure. Some of these licensed programs might come with their own installation instructions, and some might have limited language support.

Secondary languages (if ordered)

Secondary languages may be contained on the same set of optical media as your primary language or they may be contained on a separate set of optical media. You specify the secondary language during the installation procedure.

Individual product documentation

Additional material that contains information unique to the installation of a certain product on your system might be sent with your IBM i software order.

You might have received additional letters to users for individual products. Such material could contain information unique for that product that could affect its installation. Be sure to check these additional sources. When you install a product for the first time, you might need to customize the product or complete additional actions before the product will work. Look for this type of information in your product order.

Skipping a release

If you plan to skip an IBM i release, such as performing an upgrade from V5R4 to IBM i 7.1 and skipping V6R1, you need to be aware of changes from the skipped version and release that could affect your programs and system operations.

If you are skipping a release level of IBM i, you should review the *Memo to Users* for the release that you are skipping. This will ensure that you are aware of software changes that occurred in the skipped release that could also affect your programs and system operations.

More object conversions occur if you are skipping a release. Consider both the conversions in the release that you are skipping and the new release. “Times for conversions (V5R4 to IBM i 7.1 upgrade)” on page 197 contains more information about the V6R1 impacts to your system.

Performance data collection

With any software IBM i release, the support for new functions can cause an incremental change (increase or decrease) in performance for some workloads.

IBM makes a significant effort to minimize negative effects, and in most cases a change in performance is not observed. However, in a skip-release upgrade, there is a higher potential that the compound effect of incremental performance differences will be observed.

To understand the performance characteristics of an upgrade, collect performance data both before and after the upgrade is complete. Following are two recommended performance collections:

- Collect general performance data for one or more days by using Collection Services. “Gathering performance data for benchmark” on page 37 contains information on ways to start Collection Services.

- Collect specific profile data for approximately an hour by running the following program in a batch job during a period of high activity on the system. To call this program, enter the command CALL SYSPROF PARM(PEXDTAVxRy) where *x* and *y* indicate the IBM i version and release numbers.

Note: You cannot store PEX data from two different releases into the same library.

```

SYSPROF: PGM PARM(&LIB)
DCL VAR(&LIB) TYPE(*CHAR) LEN(10) /* Library to store the data */


/* Create a PEX definition to collect profile data.          */
ADDPEXDFN DFN(SYSPROF) TYPE(*TRACE) JOB((*ALL)) +
          TASK(*ALL) MAXSTG(1000000) INTERVAL(5) +
          TRCTYPE(*PRFDTA)

/* If the definition already exists, assume it is ok.        */
MONMSG MSGID(CPFAF10)

STRPEX SSNID(SYSPROFILE) DFN(SYSPROF)
DLYJOB 3600
ENDPEX SSNID(SYSPROFILE) DTALIB(&LIB)
ENDPGM

```

Save this data from both collections for future reference.

For additional information about determining how upgrades might affect your performance workloads, see the Performance management on IBM i  Web site (www.ibm.com/servers/eserver/iseriess/perfmgmt/resource.html).

Mixed-release environment

Licensed programs or their options do not always have the same release as the IBM i operating system.

In addition to licensed programs not always being at the same release, they can be packaged so that the product's options are not at the same release as its base. This is referred to as a mixed-release environment. For these reasons, your IBM i 7.1 media might contain licensed programs and options that are at different releases than IBM i 7.1. Products that do not have any new function for this release are not repackaged, and therefore could have a release previous to IBM i 7.1. “Licensed program releases and sizes” on page 185 contains information about the version, release, and modification level of the standard and keyed set products. You can also look at the product information to determine IBM i releases that are supported.

Software upgrade or replacement

Use this information to understand special considerations of the system and its software when you upgrade or replace an IBM i release.

Releases supported and system model information for IBM i upgrades

Upgrades to current releases require that you be at a certain level of software and hardware. This information shows the supported combinations for source and current target releases for software and also system model information in relation to IBM i.

To be able to upgrade to the IBM i 7.1 release, your current version of the operating system must be either at IBM i 7.1, V6R1, or V5R4.

If your target release is V5R4 or V6R1 use the IBM i software installation information for the version of IBM i that is your target release.

If you plan to use logical partitions and want to understand about supported releases on logical partitions, see Software licensing for IBM licensed programs on logical partitions in the IBM Systems Hardware Information Center.

Table 2 shows the currently supported combinations for source and target releases. Some of the target releases shown in this table might not be available. If your currently installed release is earlier than those listed here, you must first upgrade your system to either V5R4 or V6R1 before you can upgrade to IBM i 7.1.

Table 2. Supported releases for IBM i upgrades

Currently installed (source) release	Valid target releases
IBM i 7.1	IBM i 7.1
V6R1	V6R1 or IBM i 7.1
V5R4	V5R4, V6R1, or IBM i 7.1

For information about the POWER® processor-based models that are available, see the IBM Web site [Browse by processor](http://www.ibm.com/systems/browse/power/index.html) (www.ibm.com/systems/browse/power/index.html).

For information about models that are supported, see the IBM Web site [Upgrade Planning](http://www.ibm.com/systems/support/i/planning/upgrade/osmapping.html) (www.ibm.com/systems/support/i/planning/upgrade/osmapping.html).

For information about planning for system hardware upgrades, see [Planning](http://www.ibm.com/systems/support/i/planning/) (http://www.ibm.com/systems/support/i/planning/). In particular, select **Migration & Upgrades** and then select **Upgrade planning information** to find information about the release cycle and IBM i release level mapping.

Installation and IBM-supplied objects

When you replace your software with a new IBM i release, by default the system keeps changes that you made to some IBM-supplied objects.

Certain job descriptions and subsystem descriptions are restored during the installation process. The installation process creates these libraries (if they do not already exist):

- QINSYS
- QINMEDIA
- QINPRIOR

The system copies your current customized descriptions from library QSYS to library QINSYS. The descriptions are installed from the installation media into library QSYS. The system compares those values with the descriptions in QINSYS. If there are any differences, the system uses your customized value from QINSYS to update the QSYS version. If there are conflicts in certain values, the system uses the value from the installation media, and the conflicting value remains in

QINSYS. QINMEDIA holds the description from the installation media. QINPRIOR holds the descriptions from the prior release level so that you can compare the current and previous release descriptions.

Use the PRTSYSINF command before you upgrade to have a copy of the IBM-supplied objects. After the upgrade you can change these objects back to the previous customization.

IBM-supplied objects that retain customized information

If you have made changes to any of the IBM-supplied descriptions shown in the following table, the default action of the system is to keep your changes.

Job descriptions	Subsystem descriptions
QCTL (Controlling subsystem job description)	QBASE (Basic controlling)
QCTLIJBD (Controlling subsystem ICG job description)	QBATCH (Batch)
QESAUTON (Automatic problem notification)	QCMN (Communications)
QFSIOPWK (File server I/O processor)	QCTL (Controlling subsystem)
QMSF (Used by QPGMF job)	QINTER (Interactive)
QPDAUTOPAR (Used for automatic problem analysis)	QPGMR (Programmer)
QQQTEMPS (DB2 [®] for i job description used by QSYSWRK)	QSNADS (Systems Network Architecture (SNA) Distribution)
QSPLERROR (Spooling error)	QSPL (Spooling subsystem)
QSTRUPJD (Auto start)	QSYSWRK (System subsystem)
QSYSWRK (System subsystem job description)	QUSRWRK (User subsystem)
QTMSNMP (Simple Network Management Protocol (SNMP) job description)	
QZMFEJBD (QSYSWRK autostart job entry)	

Compressed objects and storage space

All of the licensed programs and some objects of the IBM i operating system ship in a compressed form. This requires less storage space on your system. The system decompresses objects according to certain criteria, which could affect the performance of the system.

System jobs (QDCPOBJx, where x is a number) automatically decompress these objects during the installation process if your system has sufficient unused disk storage. If enough storage space is not available, the system decompresses the objects when you use them, which could affect the performance of the system.

The system decompresses objects according to the following criteria:

- Greater than 750 MB available storage
The system submits jobs to decompress all system objects just installed.
- 250-750 MB available storage

The system automatically decompresses only frequently used objects. Object-usage information (the number of days an object has been used and the last-used date) is used to identify frequently used objects. The system decompresses any object that was used within the last 14 days and which also has been used at least five times. The system leaves the remaining low-use objects in compressed form.

- This does not include decompression of objects that are shipped in the operating system and in library QSYS. The system resets usage information for those objects during the installation process. For all other licensed programs, the object usage information is kept during the installation process.
- A call to a system program does not update its usage information; the system does not automatically decompress programs in constrained storage mode. However, high-use programs ship in decompressed form and are not considered able to be compressed.
- Less than 250 MB available storage
The system does not submit the decompression jobs and instead decompresses the objects as they are used.

Note: The QDCPOBJx system jobs might run for some time after the installation process completes.

Files that the system deletes during installation

If you have created logical files over IBM-supplied physical files in QSYS, the logical files will be deleted during the IBM i installation process.

Globalization and IBM i software installation

This information introduces the basic concepts of installing and upgrading national languages on your system.

The **primary language** is the national language that is installed on the system as the default language used to display and print information. The primary language is also used to service the system.

If you are planning to change your primary language only and not upgrade at the same time, use the manual installation process. To determine which installation process will work best for your situation, compare reasons in “Software installation process” on page 7.

If the primary language is uppercase English (2938), you need to type uppercase characters when you respond to system messages.

Secondary languages are one or more additional national languages that can be installed on the system to display and print information.

The IBM i Information Center topic IBM i Globalization contains more information about planning for and using national languages on your system.

Feature codes for your primary or secondary languages are listed in the topic, “Feature codes for language version” on page 216.

Considerations for changing a primary language

This information describes the requirements for changing your IBM i primary language.

You can change the primary language of your system in these two ways:

- By using secondary language media to replace the language objects.
- While replacing a release using the manual installation process.

You cannot change your primary language to a language you currently have installed as a secondary language on your system. You must delete the secondary language before you can change it to your primary language. Use Option 22 from the Work with Licensed Programs menu to delete a secondary language.

If you perform the tasks in Chapter 12, “Changing the primary language of your system or logical partition,” on page 149, the release and modification of your system must be the same as the release and modification of your secondary language media. You need both the media that contains IBM i (B_GROUPx_01) and the media that contains the secondary language.

When changing your primary language from a single-byte character set (SBCS) to a double-byte character set (DBCS) or from a DBCS to SBCS, refer to the topic IBM i globalization in the IBM i Information Center. If you change the character set of your primary language as part of a release upgrade, your installation time could be longer.

Make sure that you configure your console device to support the default code page of the primary language you are going to install. If you plan on using 5250 emulation on the Hardware Management Console, not all languages are supported. Change the console device to one that supports the code page of the new primary language before you install a new release.

Automatic installations or upgrades that are using IBM i 7.1 IBM supplied consolidated optical media and 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.

Considerations for installing additional secondary languages

To be able to install an IBM i secondary language, several requirements must be met.

The process to add a secondary language installs only one secondary language at a time. If you need to add more than one secondary language, you need to perform the procedure to install a secondary language multiple times. “Installing a secondary language” on page 140 contains the following two procedures to install secondary languages:

- “Installing secondary languages for IBM licensed programs” on page 140 shows how to install secondary language objects for IBM i and installed licensed programs. Use this procedure when you are installing a secondary language after installing the new release or when you are adding additional secondary languages to the system.
- “Installing secondary languages for non-IBM licensed programs” on page 143 shows how to restore a secondary language for only one licensed program or optional part. Use this procedure when you want to restore a secondary language for only one licensed program and when you are installing secondary language objects for licensed programs that you installed using the RSTLICPGM command.

Only the secondary language objects for the installed licensed programs are installed. If you add a licensed program or an optional part after the secondary language is installed, you will not have the secondary language objects for licensed programs you add later. To get the new language objects, install the secondary language for the added licensed program.

When you plan to install a secondary language, consider the following:

- Installing secondary languages are only of value when the language being installed has been translated into a language that is different from the primary language. Installing secondary languages that match the primary language take up additional disk space and should either not be installed or deleted if already installed.
- To save storage space, delete secondary languages you no longer need. If you want to delete a secondary language for all of the licensed programs installed on your system, use option 22 on the Work with Licensed Program menu. If you want to delete a secondary language for only one licensed program, use the Delete Licensed Program (DLTLICPGM) command.
- The QSECOFR user profile cannot have a secondary language library at a previous release in its library list when you install a new release. If you have an initial program for the QSECOFR user profile, be sure it does not add a secondary language library to the system library list. (the task, Checking the QSECOFR user profile, ensures that you do this.)
- If you added a secondary language library (QSYS29xx) to the system values QSYSLIBL or QUSRLIBL, use the WRKSYSVAL command to remove the library from the library list before you install a new release. (Performing the steps in the topic, “Changing certain system values (QSYSLIBL, QUSRLIBL, QALWOBJRST, or QVFOBJRST)” on page 32, ensures that you do this.) IBM i globalization also contains more information about secondary language libraries in user profiles.

Object conversions (V5R4 to IBM i 7.1 upgrade)

When you upgrade from V5R4 to IBM i 7.1, you need to plan time for certain object conversions from previous releases.

Object conversions that occur when you install a new release provide improved performance, reliability, and support. The number and type of conversions that occur can have a significant effect on your planning time before the upgrade and during normal operations after the upgrade.

For IBM i 7.1, unique conversions will occur with programs in libraries, Java™ programs in directories, spooled files, and integrated file system names in files systems that are not case-sensitive. Before you upgrade to a new release, it is strongly recommended that you gather information about specific object types on your system.

More conversions occur if you are skipping a release. Consider both the conversions in the release that you are skipping and the new release.

Specific information about how conversions can affect either your installation time or normal operations following an upgrade are described in “Times for conversions (V5R4 to IBM i 7.1 upgrade)” on page 197. You will experience various levels of impacts to your release upgrade in these areas:

- “Program conversions (V5R4 to IBM i 7.1 upgrade)” on page 198 (allow adequate time to analyze your system before you upgrade). This includes these conversions:

- Programs in libraries

- Java programs in directories

- “Spooled file conversions (V5R4 to IBM i 7.1 upgrade)” on page 199 (allow time to analyze your system and convert objects either during or after you upgrade)
- “Integrated file system conversions (V5R4 to IBM i 7.1 upgrade)” on page 201 (requires preparation time but should not affect the overall length of time for an IBM i upgrade)
- “IBM Backup Recovery and Media Services for i conversions (V5R4 to IBM i 7.1 upgrade)” on page 202 (requires product initialization after a software upgrade)

Chapter 4. Checklist: IBM i software upgrade or replacement readiness

Use this checklist to help consolidate and verify that you have completed all the preparation tasks for a software upgrade.

If you plan to navigate through this checklist online, it might help to right-click this topic in the navigation tree to open a new window. This checklist summarizes the major tasks that you need to do before you begin to upgrade or replace your software.

Before you begin

1. Verify that your server model meets the requirements to support the new release. Use the following Web pages.
 - The IBM Prerequisite Web page (www.ibm.com/eserver/series/support/e_dir/eserverprereq.nsf) provides you with operating system compatibility information for hardware features.
 - The Upgrade planning Web page (www.ibm.com/systems/support/i/planning/upgrade/osmapping.html) has a table that indicates which releases of the operating system are supported by each of the server models.
2. Know your current strategy for connecting a console to your system or logical partition. Your current connection strategy influences your planning activities. For more information about consoles, see *Managing IBM i consoles* in the IBM Systems Hardware Information Center.

Attention: An Operations Console directly attached to the system is not supported in IBM 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 will cause the installation to fail with unpredictable results. For more information about changing consoles, see *Changing consoles* in the IBM systems Hardware Information Center.
3. Plan for extra time after the upgrade to perform a server IPL. This is one of the tasks described in the Chapter 8, “Checklist: Completing the IBM i upgrade or replacement,” on page 93.
4. Understand system administration tasks (basic system operations). To perform software installation tasks, you need to be able to restart your system, sign on and off, use the command interface, install fixes, change the system operation mode and initial program load (IPL) source on the system unit control panel, and analyze system problems.
5. Understand the different “Types of software installation devices” on page 10. The installation tasks are different based on the device type and media type that you use.

Software preupgrade or replacement tasks

From the following checklist, perform the tasks that are appropriate for your system. Required steps are noted. If you are viewing this in printed copy, use this checklist as a guide for the steps on the pages that follow.

1. **“Installing PTFs and analyzing your system for object conversions (V5R4 to IBM i 7.1 upgrade)” on page 30.** Review this topic early to allow adequate time to analyze your system and plan for IBM i 7.1 object conversions.
2. “Verifying the contents of your software order” on page 27
 - a. “Identifying and reviewing information resources” on page 27
 - b. “Verifying the correct optical distribution media” on page 28
 - c. “Verifying license keys for keyed products” on page 28
3. “Preparing the system for IBM i software upgrade or replacement” on page 29
 - a. “Verifying firmware requirements for the new release” on page 29
 - b. “Reviewing software PTF (fix) requirements” on page 29
 - 1) “Finding the latest PSP information” on page 29
 - 2) “Analyzing fixes you currently have on your system” on page 30
 - 3) “Permanently applying program temporary fixes (PTFs)” on page 31
 - 4) “Adding fix support for currently installed licensed programs” on page 31
 - c. “Working with critical system values before you install software” on page 32
 - 1) “Recording and printing all system values before you install software” on page 32
 - 2) “Changing certain system values (QSYSLIBL, QUSRLIBL, QALWOBJRST, or QVFYOBJRST)” on page 32
 - 3) “Optionally changing the scan control system value” on page 34
 - 4) “Setting the Year offset value” on page 34
 - d. “Verifying the integrity of user-modified system objects” on page 34
 - 1) “Verifying user profiles and checking cross-reference files” on page 34
 - 2) “Checking the QSECOFR user profile” on page 34
 - 3) “Ensuring that the IBM-supplied product libraries are in the system ASP” on page 35
 - e. “Ensuring two-phase commit integrity” on page 35
 - f. “Minimizing software installation time” on page 36
 - g. “Gathering performance data for benchmark” on page 37
 - 1) “Gathering performance data with Collection Services” on page 37
 - 2) “Analyzing performance data” on page 38
4. “Performing initial upgrade or replacement tasks” on page 39
 - a. “Choosing a software installation method and device” on page 39
 - b. “Preparing for globalization” on page 39
 - c. “Preparing the upgrade device and media” on page 39
 - 1) “Preparing to upgrade or replace software using an image catalog” on page 39
 - a) “Determining storage requirements for image catalog installation” on page 40
 - b) “Freeing up space on the load-source disk unit for an image catalog” on page 40
 - c) “Preparing an optical image catalog to install software” on page 41
 - d) “Preparing a tape image catalog to install software” on page 42
 - 2) “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44

- a) "Requirements for virtual optical storage within a Network File System network" on page 44
- b) "Preparing an optical image catalog to install software" on page 41
- c) Setting up the server to share virtual optical image files with the client system for installing IBM i
- d) "Setting up the virtual optical device on the client system for installing IBM i" on page 49
- e) Using images on the client system
- d. **"Required: Creating a custom list of software to install" on page 50**
 - 1) "Preselecting the licensed programs to install" on page 50
 - 2) "Adding additional licensed programs to the installation list" on page 53
- e. **"Required: Accepting software agreements" on page 54**
- f. "Ensuring the system meets disk storage requirements for upgrades" on page 55
 - 1) "Determining storage space required for a software upgrade" on page 55
 - 2) "Cleaning up disk storage space" on page 56
- g. "Choosing disk configuration" on page 58
- h. "Estimating upgrade or replacement time" on page 58
- i. "Preparing your console for software installation" on page 58
- j. "Stopping the integrated server and other application servers" on page 60
- 5. "Saving the system" on page 60
- 6. "Optional: Running the IBM Pre-Upgrade Verification tool" on page 60

After you finish

After the tasks in the preceding checklist and your upgrade have been completed, consider the following tasks.

1. Develop a strategy for managing and maintaining your software. For information about software fixes (or program temporary fixes, PTFs), and software licenses and license keys, go to the Maintaining and managing IBM i and related software topic in the IBM i Information Center.
2. For information about software distribution of supported products, go to the Distributing software topic in the IBM i Information Center.

Chapter 5. Preparing to upgrade or replace IBM i software

Perform these preparatory tasks, some of which are mandatory, before you schedule your installation.

Careful, complete, and early preparation saves a considerable amount of time and can help make your software release upgrade on your system run smoothly. To do the tasks in this topic, you will need to sign on as security officer (QSECOFR user profile). Allow ample time (several weeks before the installation) to complete these tasks before you perform the actual installation tasks.

If you are setting up logical partitions, you need to plan in advance of your installation and have a basic understanding of logical partitions plus your software and hardware requirements. Read the Planning for logical partitions topic in the IBM Systems Hardware Information Center.

The following topics pertain to the preparation tasks for software upgrades or replacement.

Verifying the contents of your software order

To save you time and avoid frustration, verify that the contents of your IBM i software order are correct before you start the installation.

Identifying and reviewing information resources


Use these documents to help plan your IBM i installation process.

Many of these resources are shipped with the distribution media in your software order. Read the material that applies to your system.

- **Memo to Users** (in the IBM i Information Center)

The *Memo to Users* describes significant changes in the new release that could potentially affect your programs or system operations. Use the *Memo to Users* to prepare for changes on the release and to use the new release. Be sure to read each section that pertains to licensed programs that you currently have installed or plan to install on your system.

In addition to the Memo to Users in the IBM i Information Center, you can



access the Memo to Users from the Support  website (<http://www.ibm.com/systems/support/i>).

On the Web site, follow this path:

1. Technical databases
2. Preventive Service Planning - PSP
3. All Preventive Service Planning Documents by Release
4. R710
5. SF98036: IBM i Memo to Users

The *Memo to Users* is also available to customers who use electronic customer support. You can order this document for IBM i 7.1 by using the Send PTF Order (SNDPTFORD) command and specifying program temporary fix (PTF) number SF98036.

If you are skipping a release level of IBM i, you should also review the Memo to Users for the release that you are skipping. This ensures that you are aware of changes that occurred in the skipped release that could also affect your programs and system operations. The command to order the PTF version of the V6R1 Memorandum to Users is SNDPTFORD SF98026. The same version is also

available on the IBM i Information Center  (www.ibm.com/systems/i/infocenter/) and through the preventive service planning information at the Support  website.

- **IBM i Access for Windows DVD**

With every order that includes Operations Console, you receive *IBM i Access for Windows DVD*, SK3T-4098.

- **PSP information**

To keep informed of the latest information about conditions that could impede your software installation, you need the most recent edition of the preventive service planning information (PSP). For information on preventive service planning, see Preventive service planning information in the IBM i Information Center.

- **PTF shipping information letter**

This letter contains the instructions for installing the cumulative program temporary fix (PTF) package. IBM recommends that you order the cumulative PTF package a minimum of 2 weeks before your IBM i installation if you order by mail and then install the package as part of your completion tasks. For information about the most recent cumulative package, refer to the Ordering fixes topic in the IBM i Information Center).

Verifying the correct optical distribution media

If you are planning for a complete IBM i software release upgrade, ensure you have the correct media for your upcoming tasks.

1. Locate the software distribution media. Verify that the optical media for Licensed Internal Code and the operating system are for IBM i 7.1.

When you receive software for a new release, you should receive optical media for at least Licensed Internal Code, the operating system, and licensed programs.

You could also receive optical media for secondary languages and other types of software products, such as Programming Requests for Price Quotation (PRPQs) and licensed program offerings (LPOs).

“Media labels and their contents” on page 212 lists the names and product identifiers of licensed programs.

2. Verify that the media you received contains the correct primary and secondary languages.

“Feature codes for language version” on page 216 lists the feature codes of the primary or secondary languages.

Note: If the logical partitions on your system have different primary languages, make sure you have media for each primary language.

Verifying license keys for keyed products

For the keyed IBM products or keyed IBM product options that you have ordered, review the software license keys created online for your system.

Refer to the Customer Notice that is included with your software order for information on how to access your software license keys. The online access requires that you do the following:

- Register with IBM.
- Use the customer packing list from your software order to obtain the following numbers:
 - Customer number that was used for your order.
 - Software order number that was used to process your order.

After completing these steps, you can view, print, or download your software license keys to your system. If you have further questions, refer to the information about the Customer Notice for details on how to contact the IBM Software License Key Center.

For general information about licensed keys, refer to the topic Software license keys in the IBM i Information Center.

For a list of products, see “Licensed program releases and sizes” on page 185.


Preparing the system for IBM i software upgrade or replacement

To prepare the system for software installation, review and perform the preparation tasks that pertain to your system.

Verifying firmware requirements for the new release

Before you upgrade to the next release, verify the server firmware level that is supported.

Your server firmware must be at certain minimal level to be able to support IBM i 7.1.


1. Find the firmware level required. For information on the prerequisite information for features that you currently have or plan to add to your system, see the IBM Prerequisite  Web site (www.ibm.com/eserver/iserries/support/e_dir/eserverprereq.nsf).
2. Find the level of firmware for your system. For instructions on how to view firmware levels, see the Viewing existing firmware levels topic in the IBM Systems Hardware Information Center.
3. Verify the level of the server firmware on your system matches the minimum required firmware level as determined in step 2.
4. If you need to update the firmware, see Getting fixes in the IBM Systems Hardware Information Center.

Reviewing software PTF (fix) requirements

Before you begin the IBM i installation process, make sure that your system is ready by reviewing your requirements for program temporary fixes (PTFs).

Finding the latest PSP information

Keep informed on the most recent information about conditions that might impede your IBM i software installation process.

To ensure that your system has the correct PTFs installed for upgrading to IBM i 7.1, review **Information APAR II14482**  (search for II14482 at www.ibm.com/support/).

If you are using image catalogs to upgrade, certain PTFs are required. If you using an image catalog to install a more recent update of the same release of IBM i, for example, you might need to load and apply a certain PTF. This information is part of the steps found in “Preparing to upgrade or replace software using an image catalog” on page 39. Some of these steps need to be performed at least a day before you install the software to ensure that your installation media are ready to use.

For information about how to use preventive service planning, see Preventive service planning information in the IBM i Information Center.

Analyzing fixes you currently have on your system

A fix cross-reference summary list enables you to analyze the program temporary fixes (PTFs) and Licensed Internal Code fixes you currently have installed on your system.

With this information, you can determine which fixes you need to order to maintain the same or higher PTF and Licensed Internal Code fix level as you update to the new level of software. These summaries are updated each working day with the latest information as new PTFs and Licensed Internal Code fixes are released.

To find out how to order a cross-reference summary list, see the topic Fix cross-reference summary lists in the IBM i Information Center.

Installing PTFs and analyzing your system for object conversions (V5R4 to IBM i 7.1 upgrade)

When or after you upgrade your system from V5R4 to IBM i 7.1, conversions occur on program objects in libraries, Java programs in directories, spooled files, and integrated file system names in file systems that are not case-sensitive.

To have adequate time to prepare your system for the upcoming conversions, allow extra time before the upgrade to download planning PTFs for object conversion, analyze your system, and take necessary proactive steps for a successful upgrade. Such steps might include recompiling existing programs or, if programs cannot be converted, acquiring a new version from your software provider. You also might need to plan for possible down times.



Note: If this type of preparation is normally done by a third party, contact your application provider for assistance.

The planning PTFs for object conversion that you download include information and tools to help you prepare for the upgrade. The release level from which you are upgrading determines the PTFs that you use. These PTFs include the Analyze Object Conversion (ANZOBJCVN) command, which is used to collect information about the following objects:

- Programs, modules, service programs, and SQL packages in all specified user libraries. By running the command, you can determine if they can be converted for IBM i 7.1. You also will have an estimate of the time required for these conversions.

- Java programs from all the specified user directories. An estimate of the time required for conversion is given.
- The total number of spooled files on each auxiliary storage pool (ASP) and the time to perform this conversion either during or after the upgrade.
- Objects with names that contain characters affected by new Unicode characters and casing rules in IBM i 7.1. These objects are in directories that exist in file systems that are not case sensitive; for example, “root” (/) and user-defined file systems with CASE(*MONO).

To begin the steps of preparing your systems for V5R4 to IBM i 7.1 object conversions, following these general directions.

1. Review Information APAR II14482 for the commands and function included with the conversion PTFs. This information APAR is in the preventive service planning information about the **Support for System i**  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).
2. Follow the suggestions and directions in the IBM Redpaper publication IBM i Program Conversion: Getting Ready for IBM i V6R1 .
3. Download the planning PTFs that are identified in the Redpaper publication.


Permanently applying program temporary fixes (PTFs)

Temporarily applied PTFs require a considerable amount of disk storage space. Follow these procedures only for IBM i products and temporarily applied PTFs that you have verified on your system.

When a new release is installed, the installation process overwrites the PTFs applied to the previous release. The PTFs for the previous release are no longer applied, but there might be associated objects that remain on the system and take up disk storage space. When you use Operational Assistant and choose to clean up system journals and system logs, PTF save files from previous releases are deleted from your system. However, for systems that have the IBM System Manager for i licensed program installed, the PTF save files are not deleted.

Notes:

- Applying fixes in the IBM i Information Center contains information about applying immediate PTFs temporarily or permanently.
- Do not permanently apply PTFs for those licensed programs that you do not plan to upgrade.
- If you have the IBM System Manager for i (57xx-SM1) licensed program installed on your system, use the instructions in the manual System

Manager Use  for managing PTFs on your system.

Adding fix support for currently installed licensed programs

IBM licensed programs that are installed on your system are not automatically supported after an IBM i upgrade to a new release.

If you want to keep the PTF save files for licensed programs that you have currently installed to continue after you upgrade, add the fix support for these licensed programs before you upgrade.

To add support, see the topic Add fix support for a software product in the IBM i Information Center.

Working with critical system values before you install software

System values are IBM-supplied objects that can be modified from their shipped value to tailor certain aspects of the IBM i operating system to your environment. The software installation program will overlay these objects on your system with values that are supplied on the installation media.

If you have modified any of your system values, record and print these system values before you upgrade. Be sure to check the QSYSLIBL, QUSRLIBL, QALWOBJRST, and QVfyOBJRST system values.

If you are upgrading a system that observes a non-Gregorian calendar, IBM recommends that you set the Year offset value.

Recording and printing all system values before you install software

IBM recommends that you record or print your system values before the IBM i upgrade.

To do this, use the Work with System Value command. On the IBM i command line, type `WRKSYSVAL OUTPUT(*PRINT)`. This helps to ensure that the upgrade process will not fail due to a previous modification of any system value. This will also help you reset the values after you complete the upgrade.

Changing certain system values (QSYSLIBL, QUSRLIBL, QALWOBJRST, or QVfyOBJRST)

To ensure that your IBM i installation runs smoothly, check the system library list (QSYSLIBL), user library list (QUSRLIBL), allow restore of security sensitive objects (QALWOBJRST), and verify object signatures during restore (QVfyOBJRST) system values.

Follow these steps:

1. Type the Work with System Values command, **WRKSYSVAL**, and press Enter. The Work with System Values display appears.
2. Type 2 (Change) in the *Option* column next to the system value you want and press Enter. The Change System Value display appears.
3. Check the system values as described in table that follows.
4. Write down the current values of QALWOBJRST and QVfyOBJRST plus any library names that are shown for QSYSLIBL and QUSRLIBL.

System value	Action to take
System library list (QSYSLIBL) ¹ Current libraries: _____ _____ _____ _____ _____ User library list (QUSRLIBL) ¹ Current libraries: _____ _____ _____ _____ _____	With the exception of QSYS, QGPL, QUSRSYS, QTEMP, or QSYS2, delete all other libraries from the library list.
Allow restore of security sensitive objects (QALWOBJRST) ² Current value: _____	Change the value to *ALL before installing the operating system or licensed programs. If you have previously locked this system value, go to SST and unlock it before you upgrade. Locking and unlocking security-related system values in the IBM i Information Center describes how to do this.
Verify object signatures during restore (QVfyOBJRST) ³ Current value: _____	If this system value is set to either 4 or 5, change this value to 3 before you install the new release. If you have previously locked this system value, go to SST and unlock it before you upgrade. Locking and unlocking security-related system values in the IBM i Information Center describes how to do this.

Notes:

1. Having licensed program libraries or secondary language libraries in these library lists can cause errors when you install or delete software.
2. The Allow restore of security sensitive objects (QALWOBJRST) system value specifies whether objects with security-sensitive attributes can be restored. It is important to set the value to *ALL before performing the following system activities:
 - Installing a new release of the operating system.
 - Installing new licensed programs.
 - Applying program temporary fixes (PTFs).
 - Recovering your system.

These activities can fail if the value of QALWOBJRST is not set to *ALL. To ensure system security, return the QALWOBJRST value to your normal setting after completing the system activity.

3. After you have upgraded the operating system and option 34 (Digital Certificate Manager), you can return the QVfyOBJRST system value to either 4 or 5.

Note that if you want the same values after the installation process is completed, you need to reset the system values. This step is included in the final checklist after you upgrade.

You can also use System i Navigator to set your system values. For more information, see system values in the IBM i Information Center to find out how to use and access the system values from System i Navigator.

Optionally changing the scan control system value

Consider specifying *NOPOSTRST for the scan control (QSCANFCTL) system value.

This helps to minimize future scanning of some objects that are restored during the installation of licensed programs. For more information on scanning and the system value settings, see the topic Scanning support in the IBM i Information Center.

Setting the Year offset value

If you are upgrading a system that observes a non-Gregorian calendar, set the Year offset value before the system is upgraded.

IBM recommends that you set the Year offset value because your time zone can then be set correctly with this year offset as soon as the upgrade is complete. The IBM i Information Center topic Setting the Year offset value before upgrading the operating system includes the steps for creating a user-defined time zone object and creating the QWCYEAROFS data area in the QSYS library.

Verifying the integrity of user-modified system objects

When you replace your software with the new IBM i release, the system keeps changes you made to some IBM-supplied objects.

To ensure a successful installation of all licensed programs and to take advantage of certain new functions, perform these tasks that relate to system objects before you begin.

Verifying user profiles and checking cross-reference files

The IBM i installation process requires that the QSECOFR and QLPINSTALL user profiles exist in the system distribution directory. The process also requires that all database cross-reference files are not in error before the installation process begins.

The following procedure adds the QSECOFR and QLPINSTALL user profiles if you have deleted them from the system distribution directory. It also checks for errors in database cross-reference files on your system.

1. Type GO LICPGM at the IBM i command line and press Enter. The Work with Licensed Programs menu appears.
2. Type 5 (Prepare for Install) and press Enter. The Prepare for Install display appears.
3. Select the option to verify system objects and press Enter. The system verifies the system directory entries and adds the QSECOFR and QLPINSTALL user profiles if necessary. Database cross-reference files are checked for errors.
4. If the database cross-reference files are in error, you see message CPI3DA3. Follow the instructions of this message to resolve the errors before you continue.
5. If the database cross-reference files are not in error, you see a completion message at the bottom of the display. Press F3 (Exit) to return to the Work with Licensed Programs menu.

Checking the QSECOFR user profile

The QSECOFR user profile cannot have a secondary language library (QSYS29xx) at a previous release in its library list when you install a new IBM i release.

If you have an initial program for the QSECOFR user program, be sure that it does not add a secondary language library to the system library list.

Ensuring that the IBM-supplied product libraries are in the system ASP

If you have moved IBM-supplied product libraries to user auxiliary storage pools (user ASPs), the libraries will not be updated when you go through the IBM i installation procedures.

To prevent this problem, ensure that IBM-supplied product libraries are in the system ASP before you start the installation procedures. The product libraries should remain in the system ASP (*SYSBAS). PTFs are not applied to product libraries that are not in the system ASP.

If you have duplicate IBM-supplied product libraries, delete the duplicate libraries before you start the upgrade procedures. The upgrade process fails and the new release does not install until duplicate IBM-supplied libraries are deleted.

Use the Display Object Description (DSPOBJD) command to list the libraries and the ASP in which they reside to an output file. Then use SQL to query the results of the output file:

```
DSPOBJD OBJ(QSYS/Q*)
        OBJTYPE(*LIB)
        ASPDEV(*ALLAVL)
        OUTPUT(*OUTFILE)
        OUTFILE(QGPL/LIBS)
```

Note: SS1 Option 5 (System/36 Environment) has five libraries that do not begin with a Q. They are #CGULIB, #DFULIB, #DSULIB, #SDALIB, and #SEULIB.

Ensuring two-phase commit integrity

Complete or cancel all pending resynchronizations of commitment control definitions before you replace your IBM i software.

You need to perform this task only if both of the following are true:

- Your system is connected in a network.
- Your system runs applications that use two-phase commit support.

Two-phase commit support is used when an application updates database files on more than one system. Two-phase commit support ensures that the databases remained synchronized. If you are not sure whether your system uses two-phase commit support, perform steps 1 on page 36 and 2 on page 36. You might need to continue with the rest of the procedure.

Remember that any actions you take with respect to a pending resynchronization affect the other systems that are participating in the logical unit of work (transaction) with your system. Therefore, you or someone else will also need to handle pending resynchronizations on the connected systems before you begin your upgrade procedure.

If you perform this procedure 1 or 2 days before you install the new release, you should recheck for resynchronizations before starting the installation.

To work with pending resynchronizations on your source system, do the following:

1. To display all commitment definitions that might require resynchronization, type the following Work with Commitment Definitions (WRKCMTDFN) command:
WRKCMTDFN JOB(*ALL) STATUS(*RESYNC)
2. If you see the message, No commitment definitions are active, you can skip the rest of this procedure.
3. On the Work with Commitment Definitions display, type 19 (Cancel Resync) in the Option column for each commitment definition. You see the Cancel Resync display.
4. If the value in the column *Resync Required* is Yes for any remote location listed, then do the following for that location:
 - a. Attempt an action, such as restarting communications, and allow the resynchronization to complete.
 - b. If you cannot allow the resynchronization to complete, specify option 1 (Select) to cancel resynchronization to that remote location.
 You could receive message CPF83E4, which indicates that the logical unit of work is in an undecided state. You will have to make an educated decision to force either a commit operation or a rollback operation before you can successfully cancel resynchronization. These options are available from the Work with Commitment Definitions display.
 By canceling resynchronization, you could cause the databases between the two systems to be in an inconsistent state. You must then take the responsibility for determining the action taken by all the other locations that participated in this Logical Unit of Work (LUW), and resynchronize the database changes.
5. Refresh the display periodically. When resynchronization for a commitment definition completes or cancels successfully, the value in the *Resync in Progress* column will be No.
 The resynchronization or a cancelation of resynchronization might not take place immediately. They are dependent on the state of the other systems that are participating in the logical unit of work.

For more information on commitment control and resynchronization, see the topic When to force commits and rollbacks and when to cancel resynchronization in the IBM i Information Center.

Minimizing software installation time

These actions can minimize the time required to install your IBM i software.

- Use the automatic installation process rather than performing a manual installation process. “Software installation process” on page 7 has information about both methods.
- If you are not using the automatic installation process, be sure to set the QSYSOPR message queue in *BREAK mode before you start the installation process.
- Perform the licensed program installation with all subsystems ended (ENDSBS *ALL). If you are performing an automatic installation, you are operating in the preferred environment. This environment provides maximum system resources to the installation process.
- If you have a large number of spooled files on your system, set the compress job tables IPL attribute to none. To do this, use the Change IPL Attributes command: CHGIPLA CPRJOB TBL(*NONE).

Gathering performance data for benchmark

Establish system benchmarks before you install a new version of the IBM i operating system or make a major system configuration change such as adding a new software application.


Accurate system benchmarks allow you to compare system performance before and after the upgrade. A valid comparison allows you to accurately assess any performance improvement as well as isolate any changes to the system that can prevent optimal performance.

Collection Services can collect sample data for a wide range of system resources. Collection Services stores sample performance data in a collection object (*MGTCOL) on your system. Minimally, benchmarks should include data from current and representative collection objects. This can require that Collection Services run long enough to collect representative data. Representative data should include all periods of activity (both peak and off-peak hours), all applications, and all normal activities performed on a system. Additionally, you might require more detailed benchmark information to identify how critical applications, transactions, and jobs are affected by the system configuration change.

Several tools are available for collecting detailed information about application performance. However, these tools can require specialized skills and could adversely affect system performance. For details about collecting different types of performance data, refer to *Researching a performance problem in the IBM i Information Center*.

Gathering performance data with Collection Services

If you are not running Collection Services or your collection objects are not current, you can start Collection Services in any of these ways to analyze the IBM i operating environment.

- Use the Collection Services function that is available in System i Navigator. Specific information about Collection Services is in the IBM i Information Center at **Systems management > Performance > Applications for performance management > Collection Services**.
- Use either the Start Collector (QYPSSTRC) API or the Start Performance Collection (STRPFRCOL) command. If you do not use the Management Central function in System i Navigator, you can manage your collections with either of the following methods:
 - Performance Management APIs in the IBM i Information Center. These APIs start, end, and cycle collections, and change and retrieve system parameters for the data collected.
 - Performance collection commands: STRPFRCOL, End Performance Collection (ENDPFRCOL), Configure Performance Collection (CFGPFRCOL), and Check Performance Collection (CHKPFRCOL). These commands start, end, and cycle collections for the data collected.
- If you have the Performance Tools licensed program (PT1) installed, use Option 2 from the Performance Tools main menu. Refer to *Performance Tools for iSeries*  for additional information about collecting performance data with this option.
- Activate IBM Performance Management for IBM System i, which automates the start of Collection Services and then creates the database files during collection.

Ensure that Collection Services has been configured to collect the data you require, and that it runs long enough to accurately represent your operating environment.

The following example uses the Collector APIs.

1. Run Collection Services for at least one or two days, and make sure that peak and off-peak workloads are represented. Type this command:

```
CALL PGM(QYPSSTRC) PARM(*PFR ' '*STANDARDP' X'00000000')
```

This command starts Collection Services and uses the **Standard plus protocol** for the collection profile. Once you start Collection Services with this command, it will collect performance data and store it in the collection object until you either explicitly stop it or restart the system. (If collection was run for more than one day, more than one collection object will be produced.) This profile collects all the data categories typically needed by the tools in IBM Performance Tools for i, including communications protocol data. The default configuration also starts a batch job CRTPFRTA, which creates the performance database files.

2. Collection Services stores the data in an object type of *MGTCOL.

You can convert this object into performance database files for later analysis. To retain the object for future use, you can save the objects to tape or to a save file (SAVF). Collection Services can delete collection objects from the system at any time after the retention period has expired. The default retention period is 24 hours. If you do not want Collection Services to delete your collection objects for you, change your retention period to permanent (set a retention period of *PERM) as shown in the example that follows.

Note: The following command example shows the shipped default values with the exception of the retention period value. A retention period of *PERM requires a value of 0. Furthermore, you must make this change before or during the data collection. The change does not affect any collection objects that are already cycled.

To change the retention period by using the Change Collection Services Attributes API, type the following command:

Note: By using the following code example, you agree to the terms of the Chapter 17, “Code license and disclaimer information,” on page 233.

```
CALL PGM(QYPSSCSA) PARM(*PFR ' /* collection */
                          X'00000384' /* interval 900 sec */
                          'QPFRDATA ' /* library */
                          X'00000000' /* retention period is permanent */
                          X'00000000' /* cycle time 00:00:00 */
                          X'00000018' /* cycle interval 24Hrs */
                          X'00000001' /* start CRTPFRTA */
                          '*STANDARDP' /* default profile */
                          X'00000000') /* return code */
```

3. If you want to explicitly stop the collector after the data that you want is obtained, type this command:


```
CALL PGM(QYPSSEND) PARM(*PFR ' X'00000000')
```

Analyzing performance data

To analyze the IBM i performance data, you must either export collection object data into the performance database files (if Collection Services has not already done so) or convert the database files created from the prior release to the current release format.

For more information, refer to Creating database files from Collection Services data in the IBM i Information Center and also the step regarding converting the performance data in Chapter 8, “Checklist: Completing the IBM i upgrade or replacement,” on page 93.

There are several tools you can use to analyze the data from Collection Services. For more information, refer to Applications for performance management in the IBM i Information Center . In particular, the IBM Performance Tools for i licensed program summarizes this data into several reports you can use for detailed analysis.

For additional information on determining how upgrades might affect your performance workloads, see the Performance management for IBM System i  Web site (www.ibm.com/systems/i/solutions/perfmgmt/resource.html).

Performing initial upgrade or replacement tasks

Complete these initial installation tasks, which include saving the system. Several of these initial tasks are required for a successful IBM i software upgrade.

Choosing a software installation method and device

If you are upgrading the IBM i operating system and your licensed programs to the new release, you need to decide which installation method (manual or automatic) and which kind of device you will use to install the new release.

For a general view of the installation methods, see “Software installation process” on page 7.

To help you determine which device you will use, refer to “Types of software installation devices” on page 10. “Installation devices and media” on page 202 contains more detailed information about the devices and media available.

Preparing for globalization

If appropriate, prepare to change the primary language on your system or install additional secondary languages.

If you plan to change the primary language on your system or install additional secondary languages, review the information in “Globalization and IBM i software installation” on page 19.

Preparing the upgrade device and media

You can prepare to install IBM i software from optical media, an image catalog, tape devices or tape libraries, or alternate installation devices.

If you are not sure which installation device to use for your software upgrade, refer to “Types of software installation devices” on page 10. The topic “Installation devices and media” on page 202 contains more detailed information on the devices and media available.

Preparing to upgrade or replace software using an image catalog

You can use an image catalog to perform an IBM i software upgrade, to install PTFs (fixes), or to install single licensed programs that you receive on media.

When you use an image catalog, you preload all your media so that you do not need to handle the physical media when you perform the installation. You do this by copying the images from the physical optical media or from files received through electronic software delivery to a file in the integrated file system and then use these preloaded images to install. The topic Virtual storage in the IBM i Information Center describes further the concepts and uses of virtual tape and virtual optical media. "Image catalog for a virtual device" on page 204 describes the requirements for using image catalogs.

Determining storage requirements for image catalog installation:

IBM i image catalog installation requires additional storage space to contain the installation images. The amount of system disk-unit storage that you need varies based on what you are installing.

To calculate the storage space of the selected install media, do the following:

1. Load your media into an optical device.
2. Enter the Work with Optical Volumes (WRKOPTVOL) command.
3. Select option 5. Use the value for *Volume capacity (bytes)* and add 1 MB to get the approximate size allocated for that optical media.

Freeing up space on the load-source disk unit for an image catalog:

IBM i image catalog installation requires at least 2000 MB of free space on the load-source disk unit of your system.

If you are using an image catalog to install software and have not yet verified how much free space you have available, perform these steps.

1. Enter the Work with Disk Status (WRKDSKSTS) command to determine if your load-source disk unit (unit 1) has at least 1536 MB of free space. If you have enough free space, you do not need to continue with this task.

If you do not have enough free space, go to step 2.

2. Enter the Start ASP Balance (STRASPBAL) command to end the allocation for storage in the load-source disk unit:

```
STRASPBAL TYPE(*ENDALC) UNIT(1)
```

3. Use the Check ASP Balance (CHKASPBAL) command to view the previous end allocations and see these messages:

- Unit 1 is selected for end allocation.
- ASP balancing is not active for ASP 1.

4. Enter the STRASPBAL command to move data off of the load-source disk unit:

```
STRASPBAL TYPE(*MOVDTA) TIMLMT(60)
```

5. Enter the WRKDSKSTS command to monitor when the disk unit has enough free space. If you do not have enough free space, use the CHKASPBAL command (step 3) to determine if the move data function is still active.

After the upgrade has been completed, enter the Start ASP Balance (STRASPBAL) command to resume the allocation of storage for the load-source disk unit. (This task is also included in Chapter 8, "Checklist: Completing the IBM i upgrade or replacement," on page 93.)


```
STRASPBAL TYPE(*RSMALC) UNIT(1)
```

```
STRASPBAL TYPE(*CAPACITY) ASP(1) TIMLMT(*NOMAX)
```

Preparing an optical image catalog to install software:

These steps show how you create an image catalog and an image catalog entry, add an image catalog entry, and load the image catalog in preparation of performing an IBM i software upgrade. The steps use a virtual optical device in the example. The server setup requires an image catalog setup that will then be shared with the client partition.

Before you begin these steps, ensure that you have followed the instructions in Information APAR II14482 in the preventive service planning information from the

Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).

1. Create a virtual optical device.

To create a device description, enter the following:

```
CRTDEVOPT DEVD(virtual-device-name) RSRNAME(*VRT)+  
  ONLINE(*YES) TEXT(text-description)
```

2. Vary on the virtual optical device

Enter the following:

```
VRYCFG CFGOBJ(virtual-device-name) CFGTYPE(*DEV) STATUS(*ON)
```

3. Create an image catalog

Create an image catalog for the licensed programs that you want to install. The Create Image Catalog (CRTIMGCLG) command associates an image catalog with a target directory where the optical image files are loaded.

```
CRTIMGCLG IMGCLG(catalog-name) DIR(catalog-path)  
  CRTDIR(*YES) TEXT(text-description)
```

4. Add an image catalog entry

Add an image catalog entry for each physical media or optical image file that you have. You need to repeat this step for each volume of media. You should add the physical media or optical image files in the same order as if you were going to install from them. Start with the first media in the list and continue until all the media are loaded.

You can add the entries from either an optical device or from an existing optical image file. Select one of the following ways:

From an image file:

- (This is the fastest way.) To add an image entry to an image catalog from an integrated-file-system file that is already in the image catalog directory, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name) FROMFILE(file-name)  
  TOFILE(*fromfile) TEXT(text-description)
```

- To add an image catalog entry to an image catalog from an existing integrated-file-system optical image file from a directory other than the image catalog directory, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name)  
  FROMFILE(/directory-name/directory-name/file-name)  
  TOFILE(file-name or *FROMFILE) TEXT(text-description)
```

From a physical device:

- To add an image catalog entry to an image catalog from a physical optical media using optical device named OPT01, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name) FROMDEV(OPT01)  
  TOFILE(file-name or *GEN) TEXT(text-description)
```

Note: To generate a name for the TOFILE parameter, specify *GEN. To generate a text description from the media, specify *GEN.

5. Load the image catalog

This step associates the virtual optical device to the image catalog. Only one image catalog at a time can be associated with a specific virtual optical device. To load the image catalog, type the following command:

```
LODIMGCLG IMGCLG(catalog-name)  
DEV(virtual-device-name) OPTION(*LOAD)
```

6. Verify that the images are in the correct order

Attention: If you are here because you are performing the steps in “Preselecting the licensed programs to install” on page 50, do not perform this step at this time. You are directed to perform this step later.

If you are preparing for an upgrade, you need to verify that the required media for an upgrade exist and are sorted in the correct sequence. You also need to verify that your software agreements have been accepted, that you have enough storage on the load source, and that you have enough reserved storage for the Licensed Internal Code.

Enter the following command:

```
VFYIMGCLG IMGCLG(catalog-name) TYPE(*UPGRADE) SORT(*YES)
```

To verify that images are added, an additional method would be to enter the following:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

Then press PF7 to prompt for the VFYIMGCLG command. Enter *UPGRADE for the type and *YES for the sort field.

The system puts the images in the correct order. (If you are not successful, refer to “Image catalog recovery” on page 164.) By default, the volume with the lowest index is mounted. Then all the other volumes are loaded. To see the order of the images, use the Work with Image Catalog Entries (WRKIMGCLGE) command:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

After completing these steps, your image catalog is ready for use.

Preparing a tape image catalog to install software:

These steps show how you create an image catalog, add an image catalog entry, and load the image catalog in preparation of performing an IBM i software upgrade. The steps use a virtual tape device in the example.

Note: Virtual tape can be used to upgrade only from V6R1 to V6R1 or newer releases. For an example using a virtual optical device, see “Preparing an optical image catalog to install software” on page 41.

1. Create a virtual tape device.

To create a device description, enter the following:

```
CRTDEVTAP DEVD(virtual-device-name) RSRNAME(*VRT)+  
ONLINE(*YES) TEXT(text-description)
```

2. Vary on the virtual tape device

Enter the following:

```
VRYCFG CFGOBJ(virtual-device-name) CFGTYPE(*DEV) STATUS(*ON)
```

3. Create an image catalog

Create an image catalog for the licensed programs that you want to install. The Create Image Catalog (CRTIMGCLG) command associates an image catalog with a target directory where the optical image files are loaded.

```
CRTIMGCLG IMGCLG(catalog-name) DIR(catalog-path) TYPE(*TAP)
 CRTDIR(*YES) TEXT(text-description)
```

4. Add an image catalog entry

Add an image catalog entry for each tape image file that you have. You need to repeat this step for each image file. You should add the tape image files in the same order as if you were going to install from them.

You can add the entries from an existing tape image file by using one of these ways:

- (This is the fastest way.) To add an image entry to an image catalog from an integrated-file-system file that is already in the image catalog directory, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name) FROMFILE(file-name)
 TOFILE(*fromfile) TEXT(text-description)
```

- To add an image catalog entry to an image catalog from an existing integrated-file-system tape image file from a directory other than the image catalog directory, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name)
 FROMFILE(/directory-name/directory-name/file-name)
 TOFILE(file-name or *FROMFILE) TEXT(text-description)
```

5. Load the image catalog

This step associates the virtual tape device to the image catalog. Only one image catalog at a time can be associated with a specific virtual tape device. To load the image catalog, type the following command:

```
LODIMGCLG IMGCLG(catalog-name)
 DEV(virtual-device-name) OPTION(*LOAD)
```

6. Verify that the images are in the correct order

Attention: If you are here because you are performing the steps in “Preselecting the licensed programs to install” on page 50, do not perform this step at this time. You are directed to perform this step later.

If you are preparing for an upgrade, you need to verify that the required media for an upgrade exist and are sorted in the correct sequence. You also need to verify that your software agreements have been accepted, that you have enough storage on the load source, and that you have enough reserved storage for the Licensed Internal Code.

Enter the following command:

```
VFYIMGCLG IMGCLG(catalog-name) TYPE(*UPGRADE) SORT(*YES)
```

To verify that images are added, an additional method would be to enter the following:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

Then press PF7 to prompt for the VFYIMGCLG command. Enter *UPGRADE for the type and *YES for the sort field.

The system puts the images in the correct order. (If you are not successful, refer to “Image catalog recovery” on page 164.) By default, the volume with the lowest index is mounted. Then all the other volumes are loaded. To see the order of the images, use the Work with Image Catalog Entries (WRKIMGCLGE) command:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

After completing these steps, your image catalog is ready for use.

Preparing to upgrade or replace software with virtual optical storage using the Network File System

You can use virtual optical storage using the Network File System to perform an IBM i software upgrade, to install PTFs (fixes), or to install single licensed programs that you receive on media.

When you use an virtual optical storage using the Network File System, you preload all your media so that you do not need to handle the physical media when you perform the installation. This setup is done on the server being used to serve the optical image files. You do this by copying the images from the physical optical media or from files received through electronic software delivery to a file in the integrated file system and then use these preloaded images to install. The topic Virtual storage describes further the concepts and uses of virtual optical media. An image catalog must be used on the image server. Image catalog for a virtual device describes the requirements for using image catalogs. In the following steps the reference to client system refers to the system being installed.

Requirements for virtual optical storage within a Network File System network:

To share virtual optical images with the Network File System (NFS) network, you need to ensure that the client and server meet specific requirements.

Review Information APAR II14482 for required server and client PTFs to support install from virtual optical images shared over the Network File System (NFS) network. This information APAR is in the preventive service planning information about the Support for IBM System i (www.ibm.com/systems/support/i) Web page. Select the link for technical databases, then select the link for Authorized Problem Analysis Reports (APARs).

Server requirements for sharing virtual optical images

To share virtual optical images through a network, the server must meet the following requirements:

- The image server must be a V6R1 environment or later if performing an install or upgrade.
- The server must be able to share virtual optical images using version 3 or later of the Network File System (NFS).
- A volume list (VOLUME_LIST) file containing the list of images to be loaded in the virtual optical device must exist in the image catalog directory. The VFYIMGCLG command is used to create the volume list file from the image catalog containing the images you want to share. For example:

```
VFYIMGCLG IMGCLG(INSTALL) TYPE(*UPGRADE) NFSSHR(*YES)
```

Note: The image catalog used must have an image catalog path name that is limited to 127 characters. Path name characters are limited to A-Z, a-z, 0-9, and / (slash). Each image file name is limited to 127 characters.

If you choose to create your own volume list, it must have the following characteristics

- Must be called VOLUME_LIST
- Each line is either an image file name or a comment
- ASCII format
- All entries are ended by the end of a line
- All characters following the pound sign (#) are considered comments until the end of the line

- Comments can be added after the pound sign (#) and must be followed by a EOL character
- Provides the order that the image files are processed on the client system
- File names are limited to 127 characters
- Can be created with the Verify Image Catalog Entry (VFYIMGCLG) with the NFSSHR(*YES) parameter or manually by using an ASCII editor
- No tabs or line feeds can be used in the path name

Note: Changes to VOLUME_LIST file are not active until the next time the client device is varied off and on.

Client system requirements for sharing virtual optical images

To share virtual optical images through a network, the client system must meet the following requirements:

- The system to be installed must be a V6R1 environment on a POWER6 processor-based system or later if performing an install or upgrade.
- The 632B-003 optical device is created by using the Create Device Description Optical (CRTDEVOPT) command. The client must meet the following requirements:
 - Either a service tools server or a LAN console connection must be configured
 - The Internet Protocol (IP) must be Version 4


Setting up the server to share virtual optical image files with the client system for installation and upgrade:

The following directions show how to set up the server to share virtual optical image files with the client system for installation and upgrade of IBM i.

You must have previously created an image catalog containing the images that you want to share. The images must contain Licensed Internal Code and base IBM i (which includes libraries QSYS, QGPL, and QUSRSYS). The image catalog used must have an image catalog path name of 127 characters or less. Path name characters are limited to A-Z, a-z, 0-9, and / (slash). Each image file name is limited to 127 characters.

These steps show how you create an image catalog and an image catalog entry, add an image catalog entry, and load the image catalog in preparation of performing an IBM i software upgrade. The steps use a virtual optical device in the example. The server setup requires an image catalog setup that will then be shared with the client partition.

Before you begin these steps, ensure that you have followed the instructions in Information APAR II14482 in the preventive service planning information from the

Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).

1. Create a virtual optical device.

To create a device description, enter the following:

```
CRTDEVOPT DEVD(virtual-device-name) RSRNAME(*VRT)+
  ONLINE(*YES) TEXT(text-description)
```

2. Vary on the virtual optical device

Enter the following:

```
VRVCFG CFGOBJ(virtual-device-name) CFGTYPE(*DEV) STATUS(*ON)
```

3. Create an image catalog

Create an image catalog for the licensed programs that you want to install. The Create Image Catalog (CRTIMGCLG) command associates an image catalog with a target directory where the optical image files are loaded.

```
CRTIMGCLG IMGCLG(catalog-name) DIR(catalog-path)  
CRTDIR(*YES) TEXT(text-description)
```

4. Add an image catalog entry

Add an image catalog entry for each physical media or optical image file that you have. You need to repeat this step for each volume of media. You should add the physical media or optical image files in the same order as if you were going to install from them. Start with the first media in the list and continue until all the media are loaded.

You can add the entries from either an optical device or from an existing optical image file. Select one of the following ways:

From an image file:

- (This is the fastest way.) To add an image entry to an image catalog from an integrated-file-system file that is already in the image catalog directory, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name) FROMFILE(file-name)  
TOFILE(*fromfile) TEXT(text-description)
```

- To add an image catalog entry to an image catalog from an existing integrated-file-system optical image file from a directory other than the image catalog directory, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name)  
FROMFILE(/directory-name/directory-name/file-name)  
TOFILE(file-name or *FROMFILE) TEXT(text-description)
```

From a physical device:

- To add an image catalog entry to an image catalog from a physical optical media using optical device named OPT01, enter the following:

```
ADDIMGCLGE IMGCLG(catalog-name) FROMDEV(OPT01)  
TOFILE(file-name or *GEN) TEXT(text-description)
```

Note: To generate a name for the TOFILE parameter, specify *GEN. To generate a text description from the media, specify *GEN.

5. Load the image catalog

This step associates the virtual optical device to the image catalog. Only one image catalog at a time can be associated with a specific virtual optical device. To load the image catalog, type the following command:

```
LODIMGCLG IMGCLG(catalog-name)  
DEV(virtual-device-name) OPTION(*LOAD)
```

6. Verify that the images are in the correct order

Attention: If you are here because you are performing the steps in “Preselecting the licensed programs to install” on page 50, do not perform this step at this time. You are directed to perform this step later.

If you are preparing for an upgrade, you need to verify that the required media for an upgrade exist and are sorted in the correct sequence. You also need to verify that your software agreements have been accepted, that you have enough storage on the load source, and that you have enough reserved storage for the Licensed Internal Code.

Enter the following command:

```
VFYIMGCLG IMGCLG(catalog-name) TYPE(*UPGRADE) SORT(*YES)
```


To verify that images are added, an additional method would be to enter the following:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

Then press PF7 to prompt for the VFYIMGCLG command. Enter *UPGRADE for the type and *YES for the sort field.

The system puts the images in the correct order. (If you are not successful, refer to “Image catalog recovery” on page 164.) By default, the volume with the lowest index is mounted. Then all the other volumes are loaded. To see the order of the images, use the Work with Image Catalog Entries (WRKIMGCLGE) command:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

After completing these steps, your image catalog is ready for use. The next steps show how to set up the server to share virtual optical image files with the client system for installation and upgrade of IBM i.

7. After the image catalog has been created and loaded, you need to verify the image catalog to create a volume list file (VOLUME_LIST) that will be used by the virtual optical device on the client system. The following command is an example of how to create the volume list file:

- VFYIMGCLG IMGCLG(INSTALL) TYPE(*UPGRADE) NFSHR(*YES)

Note: The VFYIMGCLG command creates the volume list file and adds a new subdirectory called BOOTP in the image catalog directory. The subdirectory contains files required to perform the IBM i install.

The volume list file can also be created by using an ASCII editor. There are specific guidelines that must be met when creating a volume. Refer to Requirements for virtual optical storage within a Network File System network for more information.

8. Ensure that the NFS file servers are running. Enter either one of the following Start Network File System Server (STRNFSSVR) commands:

- Run all these commands on your servers:
 - STRNFSSVR *RPC
 - STRNFSSVR *SVR
 - STRNFSSVR *MNT
- Or start all the servers with this command:

```
STRNFSSVR *ALL
```

9. Export the image catalog directory. This example restricts access by all NFS clients because it is read-only. Ensure that the exported directory is in the public directory and that it is a subdirectory of the NFSROOT path.

- CHGNFSEXP OPTIONS('-i -o ro') DIR(*directory-name*)

10. Specify the level of authority for the user id (UID), group id (GID), or *PUBLIC that owns or manages the image catalog directory and the image files. The minimum authority that is required is the following:

- Execute (*X) data authority for the exported directory and any subdirectories
- Read (*R) data authority for files in the exported directory and any subdirectories.

The following example is for the use of the authority *PUBLIC:

```
CHGAUT OBJ('/catalog_directory') USER(*PUBLIC) DTAUT(*RX) SUBTREE(*ALL)
```

11. Add the /CATALOG_DIR/BOOTP directory as the Trivial File Transfer Protocol (TFTP) alternate source directory by using CHGTFTP command:

- CHGTFTPA AUTOSTART(*YES) ALTSRCDIR('/catalog_directory/BOOTP')
12. Ensure QTFTP has *RX authority to all install files located in the TFTP alternate source directory:
 - CHGAUT OBJ('/catalog_directory/BOOTP') USER(QTFTP) DTAAUT(*RX) SUBTREE(*ALL)
 13. Ensure that the TFTP servers are started and reflect the previous changes made by stopping/starting the servers:
 - ENDTCPFSVR *TFTP
 - STRTCPSVR *TFTP

Note: The fully exported image catalog directory name is limited to 127 characters. The directory path name can only contain characters A-Z, a-z, 0-9, and / (slash).

Refer to the IBM i Network File System Support PDF for additional details.

Configure a service tools server for DST for the virtual optical device to use:

The type of system and configuration determines what type of setup is required to configure the Service Tools Server.

Note: The client system must be at V6R1 or later.

If Operations Console with LAN Connectivity is configured, then there is no additional setup required. If Operations Console with LAN Connectivity is not configured, then a LAN adapter or IOP must be tagged, depending on the model of your system.

One way to help determine whether your client system has a service tools server for DST configured:

1. Log on to SST.
2. Select option 8, Work with service tools user IDs and Devices.
3. Press F5.

A valid internet address needs to be specified. The display should look like the following screen, if a service tools server is configured:

```

                                Display LAN Adapter Configure on Dasd
System:  IBM
Adapter type . . . . . : 5706
Adapter serial number . . . : xx-xxxxxxx

Internet address . . . . . : x.x.xxx.xxx
Gateway router address . . : x.x.xxx.x
Subnet mask . . . . . : xxx.xxx.xxx.x
Host name for service tools : xxxxxxx
Node . . . . . : 000000000000
Duplex . . . . . : AUTO
Network speed . . . . . : AUTO

Ethernet standard . . . . . :

F3=Exit      F12=Cancel
  
```

Note: If you do not see a valid internet address, then the service tools server is not configured. If you do see a valid internet address, this does not always indicate that the server is configured correctly.

To simplify the tagging process, PF13 allows selecting the resource and eliminates the need for having to temporarily configure Operations Console on partitioned 5xx models.

Note: If you use the same port (for example, gigabit adapter) for the Service Tools Server that is used for TCP/IP, ensure that you end TCP/IP (ENDTCP) and vary off the TCP/IP line prior to configuring the Service Tools Server (STS). Only gigabit adapters can be shared. The following steps allow you to select and configure the Service Tools Server (STS):

1. Start System Service Tools (STRSST).
2. Work with service tools user IDs and Devices (Option 8).
3. Select STS LAN adapter (F13) to see available adapters. If there are no available adapters listed and you plan to tag a gigabit adapter, press F21 to show all adapters.
4. Press Enter.
5. Enter the TCP/IP information. Please have your network administrator provide you with a valid TCP/IP address when entering this information.
6. Press F7 (Store).
7. Press F14 (Activate).

Setting up the virtual optical device on the client system for installing IBM i:

After you set up the Network File System server to share images, proceed with these steps to set up a virtual optical device on the client.

To set up the virtual optical device type 632B-003 on the client, follow these steps.

1. If your system uses a LAN console, then proceed to step 2. Configure a service tools server for the virtual optical device to use, see “Configure a service tools server for DST for the virtual optical device to use” on page 48. You can configure the service tools server to be available when your system is powered on to dedicated service tools (DST).
2. Create a device description for the virtual optical device. For example:

```
CRTDEVOPT DEVD(NETOPT) RSRcname(*VRT) LCLINTNETA(*SRVLAN)
RMTINTNETA('X.X.XXX.XXX') NETIMGDIR('/pubs')
```

 - The RMTINTNETA is the remote internet address of the Network File system (NFS) server where this virtual optical device looks for virtual image files.
 - The NETIMGDIR parameter specifies the network path on the Network File System (NFS) server containing the virtual image files that were prepared for use with this device. The path is limited to 127 characters. The character set is limited to A-Z, a-z, 0-9, and / (slash).
3. Vary on the virtual optical device. The `virtual_device_name` specified on the VRYCFG command should be the same as the name specified for DEVD on the CRTDEVOPT command. For example:

```
VRYCFG CFGOBJ(virtual_device_name) CFGTYPE(*DEV) STATUS(*ON)
```

To confirm that the device is working use the following commands on the client system allow you to work with image files:

- The Work with Optical Volumes (WRKOPTVOL) command shows a list of optical volumes that are known to the system. The WRKOPTVOL command only shows the volume that is mounted in the device.

- The Work with Image Catalog Entries (WRKIMGCLGE) command allows you to work with the entries for the specified virtual optical device. The WRKIMGCLGE command shows the mounted and loaded volumes. You must specify IMGCLG(*DEV) and the NFS backed optical device for the DEV parameter. For example:

```
WRKIMGCLGE IMGCLG(*DEV) DEV(target-device-description)
```

Required: Creating a custom list of software to install

Use this Prepare for install option to create a customized installation list and preselect the IBM i licensed programs (including Licensed Internal Code and the IBM i operating system) that you want to install. This step is required to ensure the software agreements for the licensed programs are restored and displayed on the Work with Software Agreements display, which occurs later in the process.

The Prepare for install option compares the programs that are installed on your system with the programs on the media. It then generates a list. This list contains preselected programs that are replaced during the installation. To customize this list, select or deselect programs from this installation list, depending on which programs you want to install or replace. You must verify that what you ordered can be replaced. You must verify that you have all of the necessary upgrades on your installation media to complete the automatic installation. You need to accept the software agreements for these licensed programs later in these preparation tasks.

Some single licensed programs might not appear on this installation list. If a previous release of these licensed programs are currently installed on the system, the new release of these licensed programs is installed during the upgrade. If these licensed programs are new (being installed for the first time), they cannot be added to this customized list. However, you can install them by using the method in “Installing additional licensed programs” on page 132 or by doing the following procedures.

Preselecting the licensed programs to install

Use these procedures to create and customize an installation list from your IBM i distribution media.

Media considerations before you begin

Media type	Special considerations for this task
Virtual optical storage using the Network File System or 632B-003	Ensure that you complete the steps in the topic “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44 before you follow the steps in this procedure. Ensure that the first entry is in mounted status by entering the command <code>LODIMGCLGE IMGCLG(*DEV) IMGCLGIDX(1) OPTION(*MOUNT) DEV(NETWORK_DEVICE)</code> .
Optical image catalog	Ensure that you complete steps 1 on page 41 through 5 on page 42 in the topic “Preparing an optical image catalog to install software” on page 41 before you follow the steps in this procedure. Ensure that the first entry is in mounted status by entering the command <code>LODIMGCLGE IMGCLG(MYCATALOG) IMGCLGIDX(1) OPTION(*MOUNT)</code> .

Media type	Special considerations for this task
Tape image catalog	Ensure that you complete steps 1 on page 42 through 5 on page 43 in the topic “Preparing a tape image catalog to install software” on page 42. Ensure that the first entry is in mounted status by entering the command <code>LODIMGCLGE IMGCLG(MYCATALOG) IMGCLGIDX(1) OPTION(*MOUNT)</code> .
Physical optical media	<p>A message might appear that instructs you to load the next media volume.</p> <ul style="list-style-type: none"> • If you have more volumes to load, type G and press Enter. • If there are no more volumes to load or if you want to end the loading process, type X and press Enter. <p>Continue to load the physical optical media in order (as described in step 2) until the system has read all of the volumes. If the display contains the message, Problem occurred loading volume into device, or if it states that a product was not found on the media, one of these situations occurred:</p> <ul style="list-style-type: none"> • You left the same media in the drive and the system read it again. • The system had problems reading in the new volume that you placed into the drive.

1. Sign on as security officer (QSECOFR user profile). If you are using image catalogs, go to step 3.
2. If you are using physical optical media, arrange the optical media for Licensed Internal Code, the operating system, and licensed programs in the order that is shown in the table “Media labels and their contents” on page 212. The order is important. More specifically, include only the operating system, IBM-supplied libraries, no charge options, no-charge licensed programs, and keyed products. Do not include any other optical media when creating the installation list at this time.
3. Type `CHGMSGQ QSYSOPR *BREAK SEV(95)` to put your message queue in the break mode.
4. A message display could appear. Press Enter.
5. Type `GO LICPGM` and press Enter.
6. Select option 5 (Prepare for install) from the Work with Licensed Programs (LICPGM) menu and press Enter. The Prepare for Install display appears.
7. Select the option to Work with Licensed Programs for Target Release and press Enter. The Work with Licensed Programs for Target Release display appears.
8. Do the following:
 - a. If you are using physical optical media, load the first optical media in the optical device.
 - b. Specify 1 (Distribution media), for the *Generate list from* prompt.
 - c. Specify a value for the media device or virtual media device.
 - d. Specify the target release for the IBM i release. (This is the release of the operating system, not the Licensed Internal Code).
 - e. Press Enter.
9. The Work with Licensed Programs for Target Release display appears. The list you see contains the licensed programs that are on the optical distribution media. Preselected licensed programs indicate that the product on

the distribution media can replace a product that is installed on the system. (Preselected means a 1 appears in the option column.) Although more than one version of Licensed Internal Code might appear on the display, only one can be selected.

Verify that you received all of the licensed programs and priced features that you ordered.

- Use the F11 key to see alternative views that display information about licensed programs in greater detail. Press F11 to toggle through these views:
 - a. Display additional storage
 - b. Display expected release
 - c. Display expected action
 - d. Display product option
- Use option 5 (Display release-to-release mapping) to see what, if any, currently installed product will be replaced by the selected product. You might need to specify option 2 (Merge with additional distribution media) on the Work with Licensed Programs for Target Release display to merge your existing list with information about licensed programs on additional optical media. This task is described later. Continue with the next step.

10. Select additional licensed programs or optional parts of licensed programs to add to your customized list. Type a 1 in the *Option* column to select a licensed program to install. To remove a selected product from the list, blank out or remove the 1 in the *Option* column.

Note: If you deselect an item, the licensed program still will be installed unless you also follow the steps in “Deleting licensed programs during cleanup” on page 56.

When you complete your selections, press Enter. A message at the bottom of the display will prompt you to enter more changes, or press Enter to confirm the changes. The Confirm Target Release Licensed Programs display appears.

11. Press Enter to confirm the list. The Prepare for Install display appears.
12. Select the option to List Licensed Programs Not Found on Media and press Enter. The Licensed Programs Not Found On Media display appears.
13. If no products are listed, you have all the media needed to replace your existing software. Press Enter to return to the Work with Licensed Programs menu. Go to the next step (step 14 on page 53) to create a printed list of the licensed programs you selected. If there are any products listed, do the following:
 - a. Delete the licensed programs that are no longer supported.
 - b. You might need to obtain the others before you begin installing software. Do the following:
 - 1) Check to see whether you accidentally omitted an optical disk when you performed step 8 on page 51.
 - 2) Compare your media labels to the product tables (“Media labels and their contents” on page 212 and “Licensed program releases and sizes” on page 185) to see if the product was shipped. If you did not receive a licensed program that you expected, contact your software provider.
 - 3) When you receive the product or locate the media, use the distribution media and product tables (“Media labels and their contents” on page 212 and “Licensed program releases and sizes” on page 185) to add its contents to the installation list. Use the procedure “Adding additional

licensed programs to the installation list” to create a printed list of the programs that you selected to install.

- 4) If you want to modify the installation list, type 3 (Modify previously generated list) on the Work with Licensed Programs for Target Release display.
14. If you do not need to select any additional licensed programs, do this step now. Otherwise, skip this step and continue with “Adding additional licensed programs to the installation list.”
 - a. From the Prepare for Install display, select the option to Display Licensed Programs for the Target Release and press Enter.
 - b. Specify *PRINT for output on the Display Licensed Programs for Target Release display and press Enter. This creates a spooled file that you can print and use as a reference while performing the installation. You should see the message Task to prepare for install successfully completed appear at the bottom of the display.
 - c. Press F3 to exit.

Adding additional licensed programs to the installation list

After you have created an IBM i installation list, add any additional licensed programs that you have to the list.

Perform this task only when you have already created a custom list of software to install and only when you have additional licensed programs to add to the list.

These additional programs could be a single product on media that came with your order or that were independently shipped. The order in which you load the additional optical media is not important.

Not all products will be included in this list. Among those are Programming Request for Price Quotations (PRPQs), licensed program offerings (LPOs), and single licensed programs. “Installing additional licensed programs” on page 132 describes how to install these products after you have completed your upgrade to the new release.

If you are using image catalogs, ensure that the image catalog entry is in mounted status by entering the following command:

```
LODIMGCLGE IMGCLG(MYCATALOG) IMGCLGIDX(index_number) OPTION(*MOUNT)
```

If you have more than one image, enter the following command:

```
LODIMGCLGE IMGCLG(MYCATALOG) IMGCLGIDX(index_number) OPTION(*LOAD)
```

To add licensed programs from additional optical media to the installation list, follow these steps.

Note: If you are using image catalogs, ignore the steps that refer to loading volumes.

1. Load the installation media that contains the additional licensed programs. Wait for the In Use indicator to go out.
2. Starting from the Work with Licensed Programs (LICPGM) menu, select option 5 (Prepare for install), and press Enter. The Prepare for Install display appears.
3. Select the option to Work with licensed programs for the target release, and press Enter. The Work with Licensed Programs for Target Release display appears.

4. Select option 2 (Merge with additional distribution media) for the **Generate list from** prompt so that optical media contents can be added to the list. The target release value of the existing list appears.
5. Specify a name for the optical device and press Enter.
6. When the Display Messages display appears, load the next media volume.
Type G and press Enter.
After you load each volume, type G and press Enter. If there are no more volumes to load or if you want to end the loading process, type X and press Enter. A list of licensed programs appears.
7. Type 1 next to the additional licensed programs or optional parts that you want to select, and press Enter. The Confirm Licensed Programs for Target Release display appears. Press Enter to confirm the list.
8. You see the Prepare for Install display. Select the option to Display Licensed Programs for the Target Release, and press Enter.
9. Specify *PRINT for output on the Display Licensed Programs for Target Release display, and press Enter. This creates a spooled file that you can print and use as a reference while performing the installation.

Required: Accepting software agreements

As a continuation of using the IBM i Prepare for install option, you must accept the software agreements for licensed programs before they can be installed.

If you are replacing the Licensed Internal Code and IBM i operating system of the same version and release, acceptance of the software agreements for Licensed Internal Code and IBM i is not required. You can skip this topic if you have no licensed programs to install.

Before you upgrade to the new release, it is a system requirement that you accept the online software agreements for the Licensed Internal Code and the IBM i operating system through the Prepare for Install menu. If these software agreements are not accepted, you will not be able to continue with the upgrade of Licensed Internal Code. Any other licensed programs that have software agreements must also be accepted before they are upgraded.

To accept the software agreements for the licensed programs that you plan to upgrade, follow these steps:

1. Ensure that you have performed the steps in the topic “Required: Creating a custom list of software to install” on page 50. To be able to upgrade, the custom list must include, at a minimum, the Licensed Internal Code and the IBM i operating system.
2. Type GO LICPGM and press Enter. The Work with Licensed Programs display appears.
3. From the Work with Licensed Programs (LICPGM) menu, select option 5 (Prepare for install) and press Enter. The Prepare for Install display appears.
4. Select the option to work with software agreements. Press Enter.

On the Work with Software Agreements display that appears, you see all IBM licensed programs that require software agreement acceptance and whether the agreement has been accepted. Only licensed programs that are not yet installed appear on this display.

Attention: You must see at least products 5770999 *BASE and 5770SS1 *BASE (if upgrading from V5R4) or *MCHCOD and 5770SS1 *BASE (if upgrading from V6R1) on this list. If a message appears that no licensed programs need their software agreements to be accepted, do not continue. Ensure that you have completed all the previous steps in “Required: Creating a custom list of software to install” on page 50. If you completed these steps and no licensed programs appear on the list, do not continue. Contact IBM support.

If you have non-IBM licensed programs on optical media that were not inserted when you used the option to work with licensed programs for target release (step 7 on page 51 under “Preselecting the licensed programs to install” on page 50), press F22 (Restore software agreements) to add these licensed programs to the Work with Software Agreements display.

5. Select to display the software agreements for licensed programs that you want to accept and press Enter. Press F14 (Accept) to accept the terms of the software agreement. Press F15 (Accept all) to display a list of all licensed programs that share the same set of terms as the software agreement you are currently reading. Press Enter to accept the software agreements for all of the listed licensed programs.

Ensuring the system meets disk storage requirements for upgrades

You must ensure that you will have adequate disk storage before you start to install or replace IBM i software.

To make more efficient use of your storage, clear your system of items that you no longer require before you estimate how much storage you will need.

Determining storage space required for a software upgrade

Before you schedule a time to install the IBM i release, determine the available storage space and the storage space that is required.

Load-source disk unit requirements

The procedures in this topic might not include all requirements for storage that you have on your system. If you are preparing to upgrade or replace software using an image catalog, ensure that you have reviewed the topic, “Determining storage requirements for image catalog installation” on page 40.

To determine if you have enough storage space for the new release, perform the following steps:

1. Type G0 LICPGM. The Work with Licensed Programs display appears.
2. Choose option 5 (Prepare for Install).
3. Type 1 next to Estimated storage requirements for system ASP. The Estimated Storage Requirements for System ASP display appears.

Enter the total storage that is needed for additional applications. Include storage for single licensed programs that were not included on your customized installation list, and storage for Programming Request for Price Quotations (PRPQs), licensed program offerings (LPOs), or independent software.

Round up to the nearest whole number. Refer to the product documentation to determine how much additional storage is required. The system uses this number to calculate the disk storage that is required to install the target release.

Include independent software only when you intend to store it in the system ASP. Refer to Backup and recovery in the IBM i Information Center for more information about system ASPs.

4. Press Enter to continue to the next display. The second Estimated Storage Requirements for System ASP display appears.
This display shows you information that you will need to determine whether enough disk storage is available to complete the installation.
5. Compare the value for *Storage required to install target release* with the value for *Current supported system capacity*. If the value for *Current supported system capacity* is greater than the value for *Storage required to install target release*, you can continue with the installation process. If the system capacity is less than the storage required, you might need to add additional disk units or install fewer optional programs.
6. Press Enter to return to the Prepare for Install display.

Repeat this process whenever you make any changes to your system that affect the available disk storage space.

Cleaning up disk storage space

Cleaning up your system before you begin to install a new IBM i release makes more storage space available for the installation process.

To keep your system running smoothly, refer to the topic Basic system operations in the IBM i Information Center.

Consider the following tasks that you can do to clean up your system and make more disk space available:

- Use the automatic cleanup option in Operational Assistant to keep your system free of unnecessary clutter.
- Permanently apply program temporary fixes (PTFs) that are temporarily applied on your system if you have not already done so.
- Delete PTF save files and cover letters that are no longer needed. (Use the Delete PTF (DLTPF) command to do this.)
- Delete any software applications that you installed from software sampler media.
- For licensed programs or optional parts that you no longer use, perform the steps in the topic Deleting licensed programs during cleanup. Read the topics on deleting licensed programs in Chapter 13, “Deleting software related to the IBM i operating system,” on page 159 for additional information.
- Have each user perform the tasks in Cleaning up user profiles. Delete any user profiles that you no longer need.

Deleting licensed programs during cleanup:

When you clean up your system before you install a new release of IBM i software, your tasks might include deleting products.

For example, you might no longer need some licensed programs, or you might plan to not replace them. Occasionally, the system can require that you delete an obsolete product before you install a new release. The Work with Licensed Programs (LICPGM) menu option, Prepare for install, provides an easy way for you to identify and delete licensed programs when you are preparing to install a new release of software. Do the following:

1. Select option 5 (Prepare for install) from the Work with Licensed Programs display and press Enter. The Prepare for Install display appears.
2. Ensure that you have a customized installation list of software. If you do not have one, go to “Required: Creating a custom list of software to install” on page 50; then return to this step.

Select the option *Work with Licensed Programs to Delete* and press Enter. The Work with Licensed Programs to Delete display appears.

The display shows a list of installed products that should be deleted from the system. Licensed programs can appear in this list for the following reasons:

- The licensed program should not remain on the system because it is not supported in the target release.
- The licensed program is installed, but no replacement product was found on the optical distribution media.
- A preselected licensed program was removed from the installation list so its associated installed product appears on this display. If the installed product remains on the system, it will be replaced by the licensed program that is on the distribution media.

Press F11 (Display reasons), then press the Help key to display the reason each product is included in the list for deletion. Carefully review the reason for deletion before you take any action.

3. When you are sure of which products to delete, save a copy of the products, using option 1 (Save) in case you might need them again. Then use option 4 (Delete) to delete the products before you install the target release of software. Option 4 immediately deletes the product from your system.

Cleaning up user profiles:

Before you upgrade to a new IBM i release, you should clean up user profiles and the objects that are owned by user profiles.

Attention: Do not delete any IBM-supplied user profiles (profiles that start with the letter Q).

To clean up user profiles, have each user sign on and do the following:

1. On the IBM i command line, type WRKOBJOWN. The Work with Objects by Owner display is shown. It lists all of the objects that are owned by the user. Use option 4 (Delete) to delete objects that are no longer needed.
2. Type WRKSPLF to list all of the spooled files that are owned by the user. Delete spooled files that are no longer needed.

If users cannot do this, you can do clean up of the user profiles as follows:

1. Sign on as security officer (QSECOFR user profile).
2. From the Work with Licensed programs menu (type G0 LICPGM), select option 5 (Prepare for install).
3. Select the option to work with user profiles from the Prepare for Install display. The Work with User Profiles display appears.
4. Use option 12 (Work with objects by owner) to display the objects that are owned by a user profile.

First, use the F21 key (F21=Select Assistance level) to change your assistance level to Intermediate and then do the following:

- For each user profile, delete objects that are no longer needed.

- Use the WRKSPLF SELECT(*ALL) command to delete spooled files that are no longer needed.
5. Delete the user profiles that you no longer need.

Choosing disk configuration

If you are replacing the operating system and want to keep your current disk configuration, follow these steps.

1. Type GO LICPGM and press Enter.
2. From the Work with Licensed Programs (LICPGM) menu, select option 5 (Prepare for install) and press Enter. The Prepare for Install display appears.
3. Select the option to keep the disk configuration and press Enter. The Keep Disk Configuration display appears.
4. At the Keep Disk Configuration prompt, type *YES and Press Enter.

Estimating upgrade or replacement time

You might want to estimate the time that is needed for an IBM i upgrade or replacement of your software.

To calculate an estimate of this time, refer to “Estimates for IBM i software installation time” on page 189.

Preparing your console for software installation

Before you install a new IBM i software release, consider this information about consoles.

Supported hardware and console combinations include:

- POWER5
 - Thin Console
 - Hardware Management Console (HMC)
 - Operations Console (LAN and directly attached)
 - Twinaxial console
- POWER6
 - Hardware Management Console (HMC)
 - Operations Console (LAN and directly attached)
 - Twinaxial console
- POWER7[®]
 - Hardware Management Console (HMC)
 - Operations Console (LAN attached)

Although you can use twinaxial console on older systems, IBM recommends that you use either Operations Console or Hardware Management Console. For requirements on twinaxial console, Operations Console, and PCs, refer to the topic, Connecting to System i in the IBM i Information Center. If you are moving from twinaxial console to Operations Console, use the *IBM i Access for Windows* DVD, SK3T-4098 to install Operations Console before you install the new release.

If you are using twinaxial console, the software installation process expects the system console device to be attached at port 0 and address 0 of the first workstation controller. In most cases, your hardware should be defined in this way. You should verify that the console is attached at port 0 address 0.

If you are planning on migrating your Operations Console, do so either before or after you upgrade. If you are planning on migrating your Hardware Management Console (HMC), do so only after you have completely installed your system. For more information about using the HMC as your IBM i console, see Managing IBM i consoles in the IBM Systems Hardware Information Center.

For all systems, verify that the console mode value is set correctly for your console. In addition, you can specify that an IBM i local area network (LAN) console or Hardware Management Console be taken over by another console in the event your console is disconnected. To verify the console mode value, follow these steps:

1. Access Dedicated Service Tools (DST).
2. Select **Work with DST environment**.
3. Select **System Devices**.
4. Select **Console mode**.


The value of the current console mode is present in the input field. Verify that this is the correct setting. A value of zero means that the console mode has not been set and can interfere with the automatic installation process. The console mode value must be one of the following values.

- | | | |
|--|---|---|
| | 1 | Twinaxial console |
| | 3 | Operations Console (LAN attached) |
| | 4 | Hardware Management Console (HMC) or Thin Console |

During an installation or upgrade, the console type specified by this value is used.

The console mode display also includes the option to allow your 5250 console (does not include twinaxial console) to be taken over by another console. When this option is turned on, the system does not stop with a console failure but continues to run uninterrupted. For more information, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center.

If you use Operations Console, follow these instructions before you install IBM i on your system.

- Review the Operations Console topic in the IBM i Information Center. To review the most recent information about the Operations Console client, go to the Operations Console Web site  (<http://www.ibm.com/systems/i/software/access/windows/console/>)
- IBM recommends that you update IBM i Access for Windows to IBM 7.1 IBM i Access for Windows before you upgrade the IBM i operating system. For more information, see IBM i Access for Windows: Installation and setup in the IBM i Information Center.
- When you receive the IBM i release upgrade, the shipped service tools user IDs (except 1111111) are expired. For all upgrades and installations, you need to establish a connection between the system and Operations Console PC by using 1111111 (eight 1's) for both the service tools user ID and the default password. This ensures a successful authentication of the subsequent connection of the client to the system. This is especially important for automatic installations.

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

Stopping the integrated server and other application servers

If you have IBM i integration with BladeCenter and System x installed, you must vary it off before you begin the IBM i installation process. Other applications servers should also be stopped before you upgrade your software.

If your system has an active integrated server, it can cause the installation process to fail. Stopping the system also stops the operating system and any applications that are running on the system.

As a precaution, record the associated resources for your hardware.

Notify users before you stop the integrated server. The Chapter 8, "Checklist: Completing the IBM i upgrade or replacement," on page 93 contains instructions on starting the server after you have completed your installation.

To stop the integrated server, do the following:

1. Type GO NWSADM on an IBM i control language (CL) command line. The Network Server Administration display appears.
2. Select option 3 (Stop a network server).

Saving the system

Before you upgrade to a new IBM i release, you should have a current backup copy of your system.

You do not need to save your system when you have a current backup copy that can be used to recover if a failure occurs. Be sure to keep this backup copy until you save your entire system again. In the IBM i Information Center, the topic Backing up your system contains information about how to perform your save strategy and also the steps to automatically save your entire system.

1. Before you begin the process for saving the system for a recovery procedure, determine the optical or tape device for the alternate IPL.
2. Save your system by using the alternate IPL device.


Tapes that are created with the Save System (SAVSYS) command cannot be used with the automatic installation process. These tapes also do not provide a complete backup.

Note: After you begin to upgrade the Licensed Internal Code to the next release, the upgrade process must be completed. If you do not complete the upgrade and you want to return to the previous release of the operating system, you need to initialize the disks and reload the system by using the backup tapes that were created by the GO SAVE command (Option 21) just before you began the upgrade.

Optional: Running the IBM Pre-Upgrade Verification tool

The IBM Pre-Upgrade Verification tool for IBM i runs on the Windows client and checks the System i data to ensure that all the necessary requirements are completed before beginning an upgrade. This tool verifies key pre-upgrade steps.

To use the Pre-Upgrade Verification tool, follow these steps:

1. Download and install the Pre-Upgrade Verification tool for IBM i . An IBM userid and password is needed to access the tool.


2. Run the Pre-Upgrade Verification tool to verify that your system is ready to begin the upgrade process.

Chapter 6. Upgrading or replacing software using automatic installation



To use the automatic installation method to replace the Licensed Internal Code, the IBM i operating system, and licensed programs currently installed on your system with the new release, follow these procedures.

Before you begin automatic installation

Before you upgrade to a new IBM i release by using the automatic installation method, verify these points.

1. Verify that this is the correct topic for you to use for your software upgrade. If you are not sure, refer to “Releases supported and system model information for IBM i upgrades” on page 16 to determine which releases are supported for upgrades to IBM i 7.1.
2. If you are changing a primary language, you must be aware of additional considerations before you begin the installation.
 - Be sure to read the topic “Globalization and IBM i software installation” on page 19. You cannot change your primary language to a language you currently have installed as a secondary language on your system. You must delete the secondary language before you can change it to your primary language.
 - When you perform an automatic installation using either physical or virtual media devices and IBM-supplied media, your service tools language will be the same as the service tools language that was previously installed. If you want a different service tools language, refer to Changing the service tools language on your system or logical partition in the IBM i Information Center.
 - When you perform an automatic installation using either physical or virtual media devices and IBM-supplied media, you now need to set the new language. The Set Install National Language Version (NLV) (QINSTLNG) API tells the installation program what language to install. This API is run prior to performing the install. The PTF that contains this API can be determined by reviewing Information APAR II14482 in the preventive service planning information from the Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs). Follow the instructions in the section titled *For upgrading to Version 7 Release 1 using virtual optical storage using the Network File System, the following PTFs must be applied.*
3. If you have not completed the preparation tasks in Chapter 5, “Preparing to upgrade or replace IBM i software,” on page 27, perform these preparation tasks before you upgrade. It is required that you use the Prepare for Install options to accept online software agreements for the Licensed Internal Code and the IBM i operating system for the upgrade to occur.
4. If you plan to use an image catalog (virtual optical device) to install, read the topic “Preparing to upgrade or replace software using an image catalog” on page 39 to create a device, an image catalog, and an image catalog entry.

To upgrade to IBM i 7.1 using an image catalog, follow these steps:

- a. Review Information APAR II14482 in the preventive service planning information from the **Support for System i**  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).
 - b. Follow the instructions in the section entitled *For upgrading to Version 7 Release 1 using virtual media, the following PTFs must be applied.*
 - c. Perform the setup steps in “Preparing to upgrade or replace software using an image catalog” on page 39. Perform step 6 on page 42 at least a day before you do the actual installation. This ensures that your installation media are ready to use.
5. If you plan to use an virtual optical storage using the Network File System to install, read the “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44 topic. This topic explains how to setup and image server and client system for install.
 - a. Review Information APAR II14482 in the preventive service planning information from the **Support for System i**  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).
 - b. Follow the instructions in the section entitled *For upgrading to Version 7 Release 1 using virtual media, the following PTFs must be applied.*
 - c. Perform the setup steps in the “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44 topic.
 6. Verify that your console mode value is set correctly before you upgrade. Verify your console information in the topic “Preparing your console for software installation” on page 58.
 7. If you plan to use or if you are using logical partitions, refer to these topics:
 - Planning for logical partitions. Read the topic Planning for logical partitions in the IBM Systems Hardware Information Center.
 - Reference codes are viewable under the Hardware Management Console or the Integrated Virtualization manager. Refer to Reference codes list for customers in the IBM Systems Hardware Information Center for more information.
 - Alternate IPL device within a logical partition. Refer to the I/O devices topic in the IBM Systems Hardware Information Center.
 8. If you are using an alternate installation device, ensure that the alternate installation device is enabled. See “Using an alternate installation device” on page 204 for information about setting up an alternate installation device. If you are not planning on using an alternate installation device and currently have one configured, you must clear the alternate installation device configuration information from the system before you install the new release.

Replacing software using the automatic installation method

The automatic installation process replaces Licensed Internal Code, the IBM i operating system, and all of the licensed programs that are currently installed and that have been refreshed.

To add new products, either use the Work with Licensed Programs menu (type G0 LICPGM) option 5 (Prepare for Install) before you perform these automatic installation procedures or use LICPGM menu option 11 (Install Licensed Programs)

after the automatic installation. You might need to delete some products that you do not want after the installation has finished.

As you perform these steps, reference codes (also known as system reference codes or SRCs) appear on the data display of the control panel or virtual control panel of the Hardware Management Console (HMC) or Integrated Virtualization Manager. When the system attention light is on and a reference code starting with A6 appears, the system is waiting for you respond to a message or make a device ready. When this information lists a reference code with xx (such as A6xx 6001), it means that any combination of characters can occur where the xx appears. The console can also display reference codes during the installation of Licensed Internal Code. For more details about reference codes, refer to "Reference codes for IBM i software installation" on page 181.

Before you upgrade, it is required that you use the Prepare for Install options to accept online software agreements for those licensed programs (including Licensed Internal Code and the IBM i operating system) that you plan to install. These tasks are described in "Required: Accepting software agreements" on page 54. If these steps are not completed, the upgrade will not be completed.

If you are using image catalogs, then you must complete steps 1 on page 41 through 5 on page 42 in the topic "Preparing an optical image catalog to install software" on page 41. Then return to this topic. Ignore the following steps that refer to loading volumes.

If you are using virtual optical storage using the Network File System, then you must complete the steps in the topic "Preparing to upgrade or replace software with virtual optical storage using the Network File System" on page 44. Then return to this topic. In the following procedure, ignore the steps that refer to loading volumes.

1. If you have not previously performed an IPL to change the disk configuration (optional), you must perform this IPL now. Do this before you power down the system or logical partition in step 8 on page 67.
2. If you are using an image catalog (virtual media device) to upgrade, perform this step at least a day before you do the actual installation. If you are not using an image catalog, go to step 4 on page 66.

To verify the image catalog entries are sorted in the correct sequence and to validate that all your images are in loaded status, enter the following command:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

Ensure your catalog is in ready status and that all image catalog entries are in loaded or mounted status. To sort and verify your image catalog for installation, press PF7 to prompt for the VFYIMGCLG command. Enter *UPGRADE for the type and *YES for the sort field.


Another method to sort and verify your image catalog is to enter the following command to put the images in the correct order. By default, the volume with the lowest index is mounted. Then all the other volumes are loaded.

```
VFYIMGCLG IMGCLG(catalog-name) TYPE(*UPGRADE) SORT(*YES)
```

After you ensure that your images are in loaded status, continue with step 5 on page 66.

3. If you are changing the primary language and you are using IBM supplied optical media, then set the install language. Review Information APAR II14482

in the preventive service planning information from the Support for System i

 Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs). Follow the instructions in the section entitled *For upgrading to Version 7 Release 1 using automatic install and changing the primary language, the following PTFs must be applied*. After you have loaded and applied either of these PTFs, type the following:

```
CALL QINSTLNG ('29xx')
```

For more information see the Set Install National Language Version (NLV) (QINSTLNG) API.

The value 29xx represents the language value. See “Feature codes for language version” on page 216 for information about language values. If the install language is not set, then the current system language is used.

4. If you are using physical media to upgrade, arrange the installation media that you plan to install in the following order (you might not have all of these). Verify that your media contains the correct primary language.
 - a. Licensed Internal Code for IBM i.
 - b. IBM i operating system, IBM-supplied libraries QGPL and QUSRSYS, and all IBM i no-charge options.
 - c. No-charge licensed programs and keyed products.
 - d. Single licensed programs.Keep the following installation media available for later use:
 - a. Secondary Language Media
 - b. Cumulative PTF Package (if ordered, Cydddvrn_01)For descriptions of the optical media, refer to “Media labels and their contents” on page 212.
5. On your console, ensure that you have a connection to the system. If you are working on a logical partition, ensure that power is on for the console of that logical partition.
6. If you are using physical media, load the first volume of installation media that contains Licensed Internal Code into the installation device that is defined for the system. Throughout these procedures, load the next volume when prompted by the system. Wait for the In Use indicator to go out. Also ensure that you have removed other media from devices that are not involved in these procedures.
 - a. If you are using a tape device instead of an optical device, verify that the tape unit is varied on and allocated to your system.
 - b. If you are using a device that is enabled as an alternate installation device, you need to load the Licensed Internal Code media in your primary device and your installation media in your alternate installation device. Your installation will fail if both media do not contain the same release level of Licensed Internal Code. For more information, see “Using an alternate installation device” on page 204.
7. Use the control panel to set the mode to **Normal**.

For logical partitions only


Use the virtual control panel (partition status on systems with HMC or Integrated Virtualization Manager) to set the mode to **Normal**. Also, make sure that you have already selected the alternate IPL device before performing the initial program load (IPL) in step 8.

Notes:

1. If you have not already set up an alternate IPL device for a logical partition, refer to online help information in IBM System i Navigator.
2. If you are using another method to select an alternate IPL device in a logical partition, refer to the topic “Alternate installation device: Overview” on page 204.

8. Power down the system or logical partition to perform the upgrade.


- If you are using an image catalog to do the upgrade, ensure you have reviewed Information APAR II14482 in the preventive service planning

information from the **Support for System i**  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).

After you have loaded and applied either of these PTFs, type the following:

```
PWRDOWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(*IMGCLG)
IMGCLG(catalog-name)
```

- If you are using a virtual optical storage using the Network File System to do the upgrade, ensure you have reviewed Information APAR II14482 in the

preventive service planning information from the Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs). Follow the instructions in the section entitled *For upgrading to Version 7 Release 1 using virtual optical storage using the Network File System, the following PTFs must be applied.*

After you have loaded and applied the appropriate PTFs, type the following:

```
STRNETINS DEV(virtual-device-name) OPTION(*ALL) KEYLCKMOD(*NORMAL)
```

- If you are performing any other upgrade, type the following:

```
PWRDOWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(D)
```

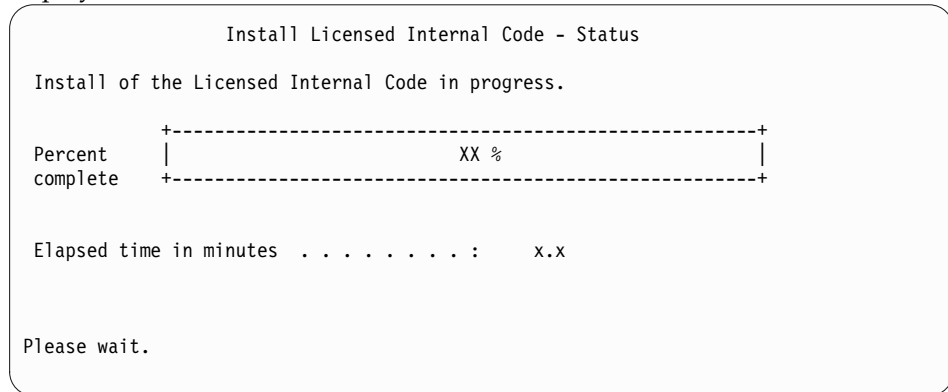
Note: If you have nonconfigured disk units present, performing this step configures disk units automatically by default.

Press Enter. Powering down could take approximately 15 minutes or more for this step. The data display area of the control panel continues to display reference codes.

9. If you did not do the required preparation tasks for accepting software agreements or allocating additional space for Licensed Internal Code, you will see error messages. You need to follow the instructions on the display and then begin the installation again.
10. If the system attention light appears and one of the reference codes listed in “Reference codes for IBM i software installation” on page 181 appears in the data display on the control panel, complete the instructions for that reference code. If you have logical partitions, the reference codes appear in the HMC or Integrated Virtualization Manager.
11. If the Alternate Installation Device Failed display appears, there is an alternate installation device on the system that is enabled. Either it was not disabled before starting the installation, or the device is otherwise not ready. Do one of the following:

- To continue the installation with optical media, press Enter.
- To use the alternate installation device, make a note of the message at the bottom of the display.
Press F12 (Cancel). Reference code B608 1105 appears on the control panel. Use the “Common reference codes for IBM i software installation” on page 181 to determine how to continue.

12. If you are using optical media or tape for the upgrade, the Licensed Internal Code - Status display appears on your console. After 100% complete is reached, the console can appear blank for approximately 5 minutes and the IPL in Progress display might appear. You do not need to respond to these displays.



If you are using an image catalog (virtual media device) for the upgrade, you will see status messages that indicate the progress of the Licensed Internal Code installation:

- a. C6xx41DC is a status reference code that indicates the progress of the Licensed Internal Code decompression. The xx indicates the percent that is decompressed. No action is required.
- b. C6xx41CC is a status reference code that indicates the progress of the Licensed Internal Code installation. The xx indicates the percent of the Licensed Internal Code that is installed. No action is required.

13. If you are using optical media or tape for the upgrade and an error occurs, you might see a display that requires a response. Perform the action necessary as prompted by the display.

If you are using an image catalog for the upgrade and an error occurs, see “Image catalog recovery” on page 164 for the recovery actions.

After a period of time (when the installation process starts to install the operating system), some displays appear on the console. One of the displays is called Licensed Internal Code IPL in Progress. Some of the IPL steps could take a long time (up to two hours or longer), depending on how much data recovery is required for your system. The last message shown on the IPL in Progress display should be Start the Operating System.

14. Load the next volume in sequence when the system prompts you for another volume.

| **Note:** If the system does not prompt you or if you receive a Media command
 | failed message, remove the Licensed Machine Code volume and insert
 | the first volume of the operating system. Select option 1 (Attempt to
 | install the operating system again) to continue with the installation.

You might be prompted for the next volume several times during the installation process.

If you receive a message that refers to device QINDEV, first make the device ready. Then press Enter to continue.

- Status displays appear during the installation process. The installation status display shown here indicates how much of the installation is complete as well as how many stages remain. You do not need to respond to this status screen. The display is blank for a time between stage 4 and stage 5 and also during stage 6.

```

Message ID . . . : CPI2070                                IBM i Installation Status

Stage 6 |-----+-----|
        |                    58%                         |
        +-----+-----+

Installation
Stage      Completed      Objects
2 Restoring programs to library QSYS . . . . . : X      13637
3 Restoring language objects to library QSYS . . : X      01540
4 Updating program table . . . . . : X
5 Installing database files . . . . . : X
>> 6 Installing base directory objects . . . . . :
7 Completing installation . . . . . :
  
```

- Status displays might appear. These displays show the status of the licensed programs and language objects as they install on the system. You do not need to respond to these status displays.

```

Installing Licensed Programs                                System: XXXX

Licensed programs processed . . . . . : 0 of XXX

Licensed program install in progress
  
```

The following display is an example of the display that appears during the installation process.

```

Installing Licensed Programs                                System: XXXX

Licensed programs processed . . . . . : X of XXX

Licensed
Program  Option  Description      Type
5770SS1  2           Online Information  2924
  
```

This display shows which licensed programs and optional parts of licensed programs are being processed. After the *PGM objects and *LNG objects are processed, the display shows the total number of licensed programs processed.

- The following message might appear when the system is ready for the next media volume that contains licensed programs. When you are installing from optical media, wait for the In Use indicator to go out before you respond to the message.

```

                                Display Messages
Queue . . . . . : QSYSOPR           System: XXXX
Library . . . . : QSYS             Program . . . . : *DSPMSG
Severity . . . . : 95              Library . . . . :
                                Delivery . . . . : *BREAK

Type reply (if required), press Enter.
Load a valid volume containing licensed programs in optical device OPT01 (X G).
Reply . . . . G

```

Load the next media volume that contains licensed programs and continue the installation. Occasionally, you will be prompted to load the next volume after a short time has passed. This event typically happens when the licensed programs on the media are at the same level as the licensed programs already installed on your machine.

Type G and press Enter. After you load each volume, type G and press Enter. If there are no more volumes to load that contain licensed programs, or if you want to end the loading process, type X and press Enter.

18. The media has been read, and now the licensed programs are going through the installation process. Even though it might take a long time, wait for the Sign On display to appear. When the installation is successfully completed, the Sign On display appears. (There is no message that indicates automatic installation completed successfully. The Sign On display acts as the confirmation.)

If you receive the message Automatic installation not complete, sign on using QSECOFR for your user ID and go to Chapter 14, "Troubleshooting software installation problems," on page 163 to determine the problem.

Verifying completion of automatic installation

To verify that you have successfully completed an IBM i upgrade by using the automatic installation method, follow these steps.

1. The Sign On display appears on the console after the installation has completed.

```

                                Sign On
                                System. . . . . : XXXX
                                Subsystem . . . . : XXXX
                                Display . . . . . : XXXXXXXX

User. . . . . : QSECOFR
Password . . . . . :
Program/procedure . . . . . : _____
Menu . . . . . : _____
Current library . . . . . : _____

```

Type the following and press Enter:

User: QSECOFR

Password: (Enter password, if required.)

2. The System i Main Menu (or the menu you chose as your initial menu) appears on the console.

Type GO LICPGM and press Enter.

3. The Work with Licensed Programs display appears. Use the page down or roll up key to see the third display of the Work with Licensed Programs menu. The System i Main Menu (or the menu you chose as your initial menu) appears on your console Type 50 and press Enter.
4. The Display Install History display appears. The XX's indicate default values.

```

                Display Install History

Type choices, press enter.

  Start date . . . . .  XX/XX/XX  MM/DD/YY

  Start time . . . . .  XX:XX:XX  HH:MM:SS

  Output . . . . .      *_____  *, *PRINT

```

Press Enter.

5. Look at the messages that appear on the Display History Log Contents display.
 - If you had an installed licensed program that was not renewed by IBM, it might not be replaced. Refer to “Mixed-release environment” on page 16 for more information.
 - If any of the messages on the display indicate a failure or a licensed program that is partially installed, go to Chapter 14, “Troubleshooting software installation problems,” on page 163 to determine the problem.

Otherwise, press F3 (Exit).

6. Verify the installed status values of your licensed programs and check for compatibility. It is important to make sure all of your licensed programs are compatible with the operating system. You can determine a licensed program's compatibility by checking the installed status value.

Use LICPGM menu option 10 (Display licensed programs) to see the release and installed status values of the installed licensed programs. If the installed status value of a licensed program is *COMPATIBLE, it is ready for use. If the installed status value of a licensed program is *BACKLEVEL, the licensed program is installed, but its version, release, and modification is not compatible with the currently installed level of the operating system.

Check the topic “Licensed program releases and sizes” on page 185 to verify the current version, release, and modification of the licensed program. “Installed status values” on page 218 lists the possible installed status value descriptions.

You have completed this task.

1. Do you need to install additional licensed programs?
 - **No.** Go to the next step.
 - **Yes.** Go to “Installing additional licensed programs” on page 132 and complete the instructions.
2. Do you need to install a secondary language?
 - **No.** Go to the next step.
 - **Yes.** Go to “Installing a secondary language” on page 140 and complete the instructions.
3. You must complete the installation process before you put your system into operation. Go to Chapter 8, “Checklist: Completing the IBM i upgrade or replacement,” on page 93 and complete the instructions.

Chapter 7. Upgrading or replacing software using manual installation


Follow these instructions to use the manual installation method to replace the Licensed Internal Code, IBM i operating system, and licensed programs currently installed on your system with the IBM i 7.1 release.


Before you begin manual installation

Verify these points before you upgrade to a new IBM i release using the manual installation method.

1. Verify that this is the correct topic for you to use for your software upgrade. Refer to “Releases supported and system model information for IBM i upgrades” on page 16 to determine which releases are supported for upgrades to IBM i 7.1. Be familiar with the sequence of the steps you use to upgrade or replace a release on a system or logical partition.
2. If you are changing a primary language, you must be aware of additional considerations before you begin the installation.
 - Be sure to read the topic “Globalization and IBM i software installation” on page 19. You cannot change your primary language to a language you currently have installed as a secondary language on your system. You must delete the secondary language before you can change it to your primary language.
 - Your primary language and service tools language can be installed separately. When performing a manual installation using an optical device and IBM-supplied media, the installation steps include the installation of the service tools language.
 - If you are using Save System (SAVSYS) media to upgrade, your primary language and service tools language will be the same language as what was on the SAVSYS media when the upgrade completes.
 - If a virtual media device is used for the upgrade, you might need to update your service tools language after the upgrade. For instructions, see Changing the service tools language on your system or logical partition in the IBM i Information Center.
3. If you have not completed the preparation tasks in Chapter 5, “Preparing to upgrade or replace IBM i software,” on page 27, perform these preparation tasks before you upgrade. It is required that you use the Prepare for Install options to accept online software agreements for the Licensed Internal Code and the IBM i operating system for the upgrade to occur.
4. If you plan to use an image catalog (virtual optical device) to install, read the topic “Preparing to upgrade or replace software using an image catalog” on page 39 to create a device, an image catalog, and an image catalog entry.

To upgrade to IBM i 7.1 using an image catalog, follow these steps:

 - a. Review Information APAR II14482 in the preventive service planning information from the Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).
 - b. Follow the instructions in the section entitled *For upgrading to Version 6 Release 1 using virtual media, the following PTFs must be applied.*

- c. Perform the setup steps in “Preparing to upgrade or replace software using an image catalog” on page 39. Perform step 6 on page 42 at least a day before you do the actual installation. This ensures that your installation media are ready to use.
5. If you plan to use a virtual optical storage using the Network File System to install, read the topic “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44 to set up and image server and client system for install.
To upgrade to IBM i 7.1 using an image catalog, follow these steps:
 - a. Review Information APAR II14482 in the preventive service planning information from the Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).
 - b. Follow the instructions in the section titled *For upgrading to Version 7 Release 1 using virtual optical storage using the Network File System, the following PTFs must be applied.*
 - c. Perform the setup steps in “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44.
 6. Verify that your console mode value is set correctly before you upgrade. Verify your console information in the topic “Preparing your console for software installation” on page 58.
 7. If you plan to use or if you are using logical partitions, refer to these topics:
 - Planning for logical partitions. Read the topic Planning for logical partitions in the IBM Systems Hardware Information Center.
 - Reference codes are viewable under the Hardware Management Console or the Integrated Virtualization Manager. Refer to Reference codes list for customers in the IBM Systems Hardware Information Center for more information.
 - Alternate IPL device within a logical partition. Refer to the I/O devices topic in the IBM Systems Hardware Information Center.
 8. If you are using an alternate installation device, ensure that the alternate installation device is enabled. See “Using an alternate installation device” on page 204 for information about setting up an alternate installation device. If you are not planning on using an alternate installation device and currently have one configured, you must clear the alternate installation device configuration information from the system before you install the new release.

Replacing the Licensed Internal Code

Follow these steps to replace the Licensed Internal Code by using the manual installation method.

As you perform these steps, reference codes appear on the data display of the control panel or the virtual control panel of the Hardware Management Console (HMC) or Integrated Virtualization Manager. When the system attention light is on and a reference code starting with A6 appears, the system is waiting for you to respond to a message or make a device ready. When this information lists a reference code with xx (such as A6xx 6001), it means that any combination of characters can occur where the xx appears. The console can also display reference codes during the installation of Licensed Internal Code. For more details about reference codes, refer to “Reference codes for IBM i software installation” on page 181.

If you are using image catalogs, then you must complete steps 1 on page 41 through step 5 on page 42 in the topic “Preparing to upgrade or replace software using an image catalog” on page 39. Then return to this topic. In the following procedures, ignore the steps that refer to loading volumes.

If you are using virtual optical storage using the Network File System, then you must complete the steps in the topic “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44. Then return to this topic. In the following procedure, ignore the steps that refer to loading volumes.

1. If you have not previously performed an IPL to change the disk configuration (optional), you must do this IPL now before you power down the system or logical partition in step 8 on page 76.
2. If you are using an image catalog (virtual media device) to upgrade, perform this step at least a day before you do the actual installation. If you are not using an image catalog, go to step 3.

To verify the image catalog entries are sorted in the correct sequence and to validate that all your images are in loaded status, enter the following command:

```
WRKIMGCLGE IMGCLG(catalog-name)
```

Ensure your catalog is in ready status and that all image catalog entries are in loaded or mounted status. To sort and verify your image catalog for installation, press PF7 to prompt for the VFYIMGCLG command. Enter *UPGRADE for the type and *YES for the sort field.

Another method to sort and verify your image catalog is to enter the following command to put the images in the correct order. By default, the volume with the lowest index is mounted. Then all the other volumes are loaded.

```
VFYIMGCLG IMGCLG(catalog-name) TYPE(*UPGRADE) SORT(*YES)
```

After you ensure that your images are in loaded status, continue with step 4.

3. If you are using physical media to upgrade, arrange the installation media that you plan to install in the following order (you might not have all of these). Verify that your media contains the correct primary language.
 - a. Licensed Internal Code for IBM i.
 - b. IBM i operating system, IBM-supplied libraries QGPL and QUSRSYS, and all IBM i no-charge options.
 - c. No-charge licensed programs and keyed products.
 - d. Single licensed programs.


Keep the following installation media available for later use:


- a. Secondary Language Media
- b. Cumulative PTF Package (if ordered, Cydddvrn_01)

For descriptions of the optical media, refer to “Media labels and their contents” on page 212.

4. On your console, ensure that you have a connection to the system. If you are working on a logical partition, ensure that power is on for the console of that logical partition.
5. If you are upgrading a logical partition, verify that this partition has an alternate initial program load (IPL) resource assigned. For most cases, this is the optical device that supports the optical media class.

For more information about locating and selecting the alternate IPL resource, see the I/O devices topic in the IBM Systems Hardware Information Center.

6. If you are using physical media, load the first volume of installation media that contains Licensed Internal Code into the installation device that is defined for the system. Throughout these procedures, load the next volume when prompted by the system. Wait for the In Use indicator to go out. Also ensure that you have removed other media from devices that are not involved in these procedures.
 - a. If you are using a tape device instead of an optical device, verify that the tape unit is varied on and allocated to your system.
 - b. If you are using a device that is enabled as an alternate installation device, you need to load the Licensed Internal Code media in your primary device and your installation media in your alternate installation device. Your installation will fail if both media do not contain the same release level of Licensed Internal Code. For more information, see “Using an alternate installation device” on page 204.
7. Use the control panel to set the mode selection to **Manual**. If you are upgrading a logical partition, use the virtual control panel function of your HMC or Integrated Virtualization Manager. Also make sure that you have already selected the alternate IPL device before you perform the initial program load (IPL) in the next step.
8. Power down the system or logical partition:
 - If you are using an image catalog to do the upgrade, ensure you have reviewed Information APAR II14482 in the preventive service planning information from the Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs). Follow the instructions in the section entitled *For upgrading to Version 7 Release 1 using virtual media, the following PTFs must be applied*.
After you have loaded and applied the appropriate PTFs, type the following:

```
PWRDWSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(*IMGCLG)
IMGCLG(catalog-name)
```
 - If you are using a virtual optical storage using the Network File System to do the upgrade, ensure you have reviewed Information APAR II14482 in the preventive service planning information from the Support for System i  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs). Follow the instructions in the section entitled *For upgrading to Version 7 Release 1 using virtual optical storage using the Network File System, the following PTFs must be applied*.
After you have loaded and applied the appropriate PTFs, type the following:

```
STRNETINS DEV(virtual-device-name) OPTION(*ALL) KEYLCKMOD(*MANUAL)
```
 - If you are performing any other upgrade, type the following and press Enter:

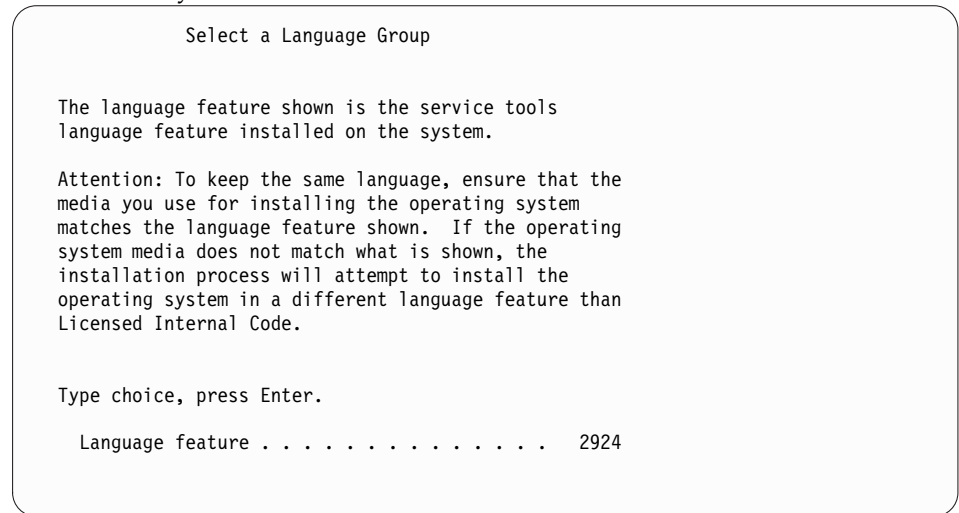
```
PWRDWSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(D)
```

Powering down could take approximately 15 minutes or more for this step. The data display area of the control panel continues to display reference codes.
9. If the system attention light appears and a reference code listed in the topic “Reference codes for IBM i software installation” on page 181 appears in the data display on the control panel, complete the instructions for that reference code.

If you are upgrading a logical partition, the system attention light will not appear. You must monitor the logical partition reference codes from the HMC or Integrated Virtualization Manager. When the State changes to Failed, that is the equivalent of having the attention light on for the logical partition.

10. If you are using an image catalog (virtual media device) to upgrade, go to step 17 on page 80.
11. The Select a Language Group display shows the service tools language that is currently installed on the system.

Note: The installation media for Licensed Internal Code is language-independent. It is important that you complete this step carefully.



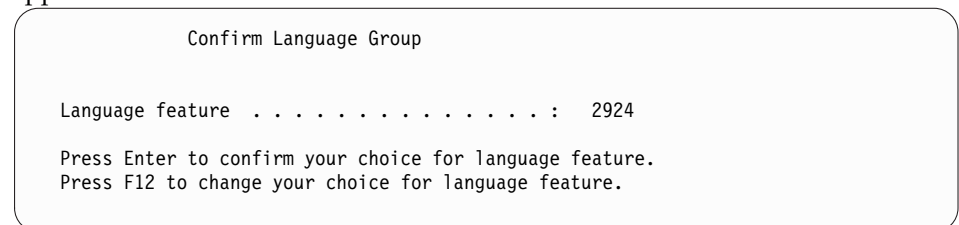
To keep the same service tools language, verify that the displayed language feature matches the service tools language that you want.

Note: The language you select and the language of the operating system typically should match. If they do not match, your service tools language will be different than your primary language.

To change the service tools language to match the primary language, type the language feature of your primary language. Press Enter.

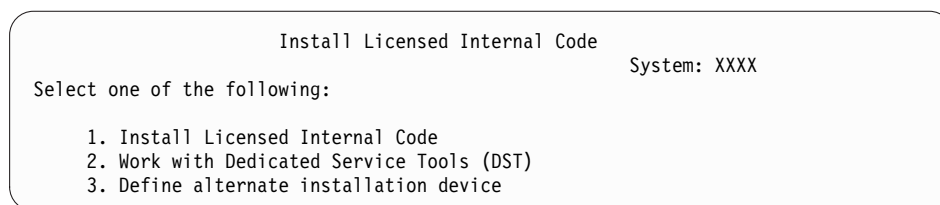
Refer to “Feature codes for language version” on page 216 for a list of the language feature codes.

12. After you enter the language feature, the Confirm Language Group display appears.



Press Enter.

13. The Install Licensed Internal Code display appears.

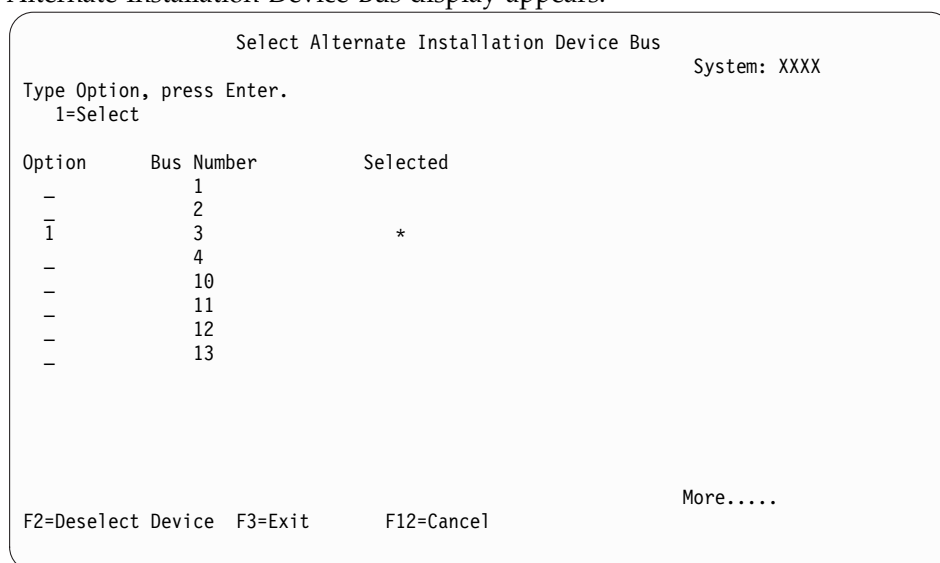


Either select the option to install Licensed Internal Code or the option to define an alternate installation device:

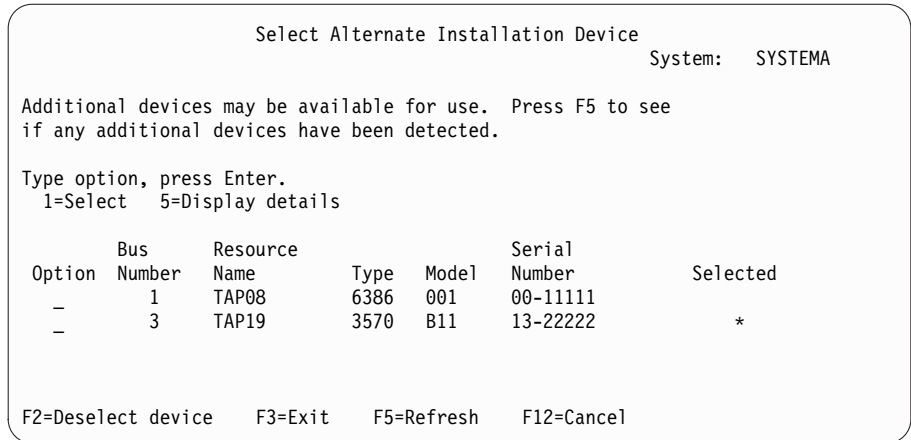
- If you are not using an alternate installation device, type 1 (Install Licensed Internal Code). (The alternate installation device function supports installation from optical or tape media that you have created. The topic “Using an alternate installation device” on page 204 describes when you can use an alternate installation device.) If you are not using an alternate installation device, continue with step 16 on page 79.
- If you have an alternate installation device attached to the system, type 3 to verify its address and determine whether it is enabled or disabled. Continue with the Verifying Alternate Installation Device Subtask in step 14. If you have an alternate installation device configured and do not want to use it, type 3 to clear the alternate installation device configuration information.

Press Enter.

14. **Verifying and selecting alternate installation device subtask:** The Select Alternate Installation Device Bus display appears.



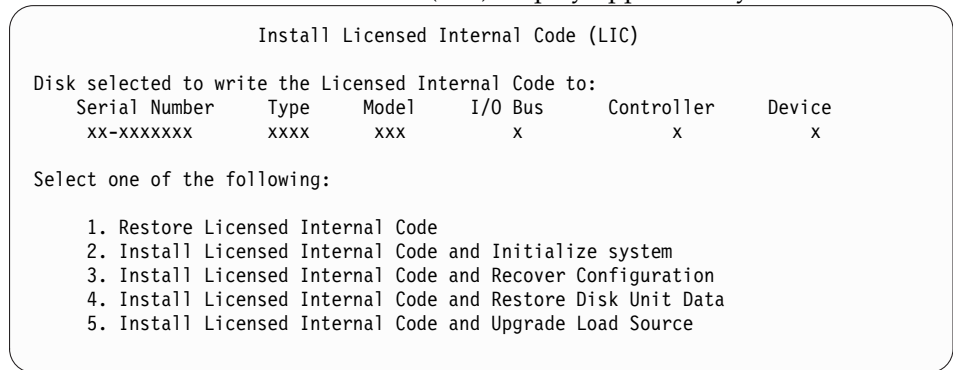
- Verify that the selected device is on the correct system bus. Type 1 in the Options field next to the selected bus, and press Enter to view information about the device that is attached to the bus. This might take several minutes. If you see the message No alternate installation device configured, wait one minute and refresh the display.
- When the Select Media Type display appears, select 1 for tape or 2 for optical media. Press Enter.
- The Select Alternate Installation Device display appears. Use this display to verify the resource name, type, model, and serial number for the device. The following display shows an example of a tape device.



- d. Type 1 and press Enter to select the device to use or press F2 to deselect the currently selected device.
- e. The message Alternate installation device selected appears. Press F3 to return to the Install Licensed Internal Code display.
- f. Type 1 and press Enter to install the Licensed Internal Code.

This completes the subtask for verifying and selecting alternate installation device.

15. If there is an alternate installation device defined and enabled, the Confirm Alternate Installation Device display appears. Perform one of these tasks.
 - To install from the alternate installation device, press Enter.
 - If you do not want to install from the alternate installation device and want to continue using the primary media, press F12 to Cancel. You see the Licensed Internal Code display. Perform step 13 on page 77 and select option 3 (Define alternate installation device). Perform step 14 on page 78 and deselect the alternate installation device.
16. The Install Licensed Internal Code (LIC) display appears on your console.



Attention: Be sure to select option 1. Some options on this display remove all data from your system.

Type 1 (Restore Licensed Internal Code) and press Enter.

If you did not previously accept the software agreement for the Licensed Internal Code, error messages are shown. Follow the instructions in the error messages. More information is in the topic "Required: Accepting software agreements" on page 54.

If the problem Disk unit not formatted for optimal performance appears on this display, do the following:

- Type 5, and press Enter to display the detailed report.
 - Write down the information displayed. After the upgrade is completed, you will need this information to format these disk units to gain optimal performance.
 - Press F12 to cancel and return to the Disk Unit Attention Report.
 - Press F10 to accept the problems and continue the IPL.
20. If the console mode value is zero, the Accept Console display appears. If this display appears, follow these steps:
 - a. Press F10 to accept the current console type. The Accept and Set New Console Type on this IPL display appears. The old value (zero) and the new value to be set (your current console type) are shown.
 - b. Press Enter to set the new value and continue with these instructions.
 21. If your system processor configuration has changed, you could see other displays at this point. After you supply the requested information, the installation continues and the IPL or Install the System display appears. Refer to “System password” on page 217 for more information.
 22. After approximately 10 minutes, the IPL or Install the System display appears. The Licensed Internal Code is now installed. Do not remove the distribution media at this time.
 23. If the partition is not HMC managed and you want to change the console type, or you want to enable Console takeover and recovery follow these steps. For more information about console takeover and recovery, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center.
 - a. At the IPL or Install the system display, select option 3 to access Dedicated Service Tools (DST).
 - b. Sign on as security officer (QSECOFR user profile / QSECOFR password). When prompted, change the password to what you want to use for this partition.
 - c. Select option 5 (Work with DST environment).
 - d. Select option 2 (System devices).
 - e. Select option 6 (Console mode).
 - f. Select the valid console that you have for this partition.

Note: If you are using Operations Console (LAN) as your console type, press Enter on the verify window. You can also press F11 to review your network configuration.
 - g. Select 1 (Yes) or 2 (No) for the option to allow the console to be taken over by another console in the event of a 5250 console failure (does not include twinaxial console). When this option is turned on, the system does not stop with a failure but continues to run uninterrupted.

Press Enter and then press F3 to return to the DST main menu.
 - h. Press F3 to exit DST and return to the IPL or Install the System display.

Replacing the IBM i operating system

Follow these steps to replace the IBM i operating system by using the manual installation method.

1. The IPL or Install the System menu appears on your console.

```
IPL or Install the System                               System: XXXX
Select one of the following:
1. Perform an IPL
2. Install the operating system
3. Use Dedicated Service Tools (DST)
4. Perform automatic installation of the operating system
5. Save Licensed Internal Code
```

Load the first volume of installation media that contains the operating system. Throughout these procedures, load the next volume when prompted by the system. When you are installing from optical media, wait until the In Use indicator goes out before you continue.

Ensure that the installation media that contains the Licensed Internal Code is in the installation device that is defined for the system.

Ensure that you have removed other media from devices that are not involved in this upgrade.

After you install the new release over your previous release, passwords for all service tools user profiles that still use the default password expire automatically. When you try to log on or access service tools using those profiles, you receive a message that the password has expired and must be changed. Follow the prompts or press the appropriate key (F9) to change the password for that user profile.

2. Type 2 (Install the operating system) and press Enter. The Install Device Type Selection display appears.

```
Install Device Type Selection                           System: XXXX
Select the installation device type:
1. Tape
2. Optical
3. Virtual device - preselected image catalog
4. Current alternate selected device                 None
5. Network device
```

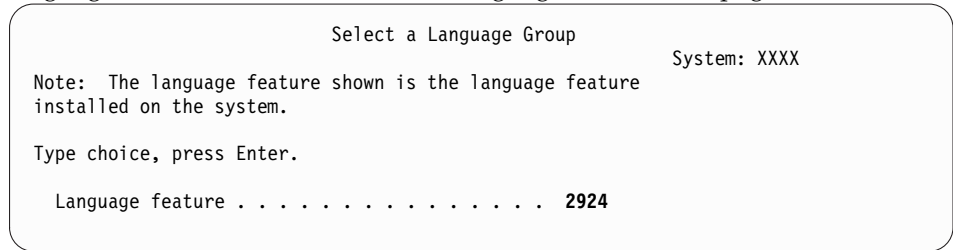
Type the number that corresponds to your device type and press Enter.

3. If you Select option 5, the Network Device – Configuration display appears.

```
Network Device - Configuration                         System: xxxxx
Status      : Currently selected
Server IP   : x.x.x.x
Path Name   : /catalog_diractory
Bus         : 13
Board       : 0
Card        : 36
Port        : 0
Local IP    : x.x.xxx.xxx
Subnet Mask : xxx.xxx.xxx.x
Gateway IP  : x.x.xxx.x
MTU Size    : 1500
```

Confirm the Image server IP address and path name. Press F10 to continue.

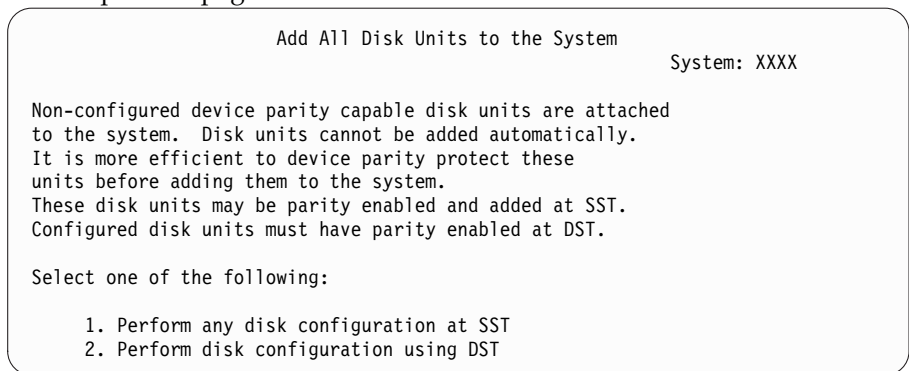
4. The Confirm Install of the Operating System display is shown on your console. Press Enter.
5. The Select a Language Group display appears, which shows the primary language currently installed on the system. The installation media must contain the primary language. To find the appropriate feature code for your language, refer to "Feature codes for language version" on page 216.



If you need to change the feature, type the numbers of the feature code for the language you want.

Press Enter.

6. Either the Confirm Language Feature Selection display or the Confirm Service Tools Language display is shown on your console. Press Enter.
7. If the Add All Disk Units to the System menu does not appear, go to step 9 on page 85.
8. **Adding disk units subtask:**
 - a. If any nonconfigured disk units that are capable of being protected by device parity are currently unprotected, the Add All Disk Units to the System display is shown. If the following display is not shown, continue with step 8b on page 84.



It is much faster to start device parity protection on the disk units at DST before the disk units are added to the auxiliary storage pool configuration.

To start device parity on the eligible disk units, do the following tasks from the Add All Disk Units to the System display:

- 1) Select option 2 to perform disk configuration at DST.
- 2) Sign on at the Dedicated Service Tools Sign-on prompt and return to the Use Dedicated Service Tools (DST) menu.
- 3) Select the option Work with disk units.
- 4) Select the option Work with disk configuration.
- 5) Select the option Work with device parity protection.
- 6) Select the appropriate option for starting device parity protection.

- 7) A list of parity sets that are capable of running device parity protection are shown. Type 1 on each option line for each parity set.
 - 8) You might see a Confirm Continuation display that indicates that the system must perform a directory recovery. Press Enter to continue.
 - 9) The Confirm Starting Device Parity Protection display is shown. This shows the list of disk units that will have device parity protection. Press Enter to continue.
 - 10) An in-progress display that indicates the status of the function is shown.
 - 11) Return to the IPL or Install the System display.
- b. If the Add All Disk Units to the System menu appears, it could look like the following example.

Add All Disk Units to the System System: XXXX

Select one of the following:

1. Keep the current disk configuration
2. Perform disk configuration using DST
3. Add all disk units to the system auxiliary storage pool
4. Add all disk units to the system ASP and balance data

If you do not want device parity protection, mirrored protection, or user ASPs, select option 3 (Add all disk units to the system auxiliary storage pool). By adding disk units before you install the operating system, you improve your overall system performance because the operating system is distributed across all of your disk units.

For logical partitions only

If you will be creating logical partitions later, you do not want to configure all units now. Refer to the validated output from the IBM System Planning Tool (SPT) supplied by IBM for the configuration selection. To access the tool, go to the IBM System Planning Tool Web site (<http://www.ibm.com/systems/support/tools/systemplanningtool/>).

Note: If either the Disk Configuration Error Report display or the Disk Configuration Warning Report display appears, go to “Disk configuration warning and error messages” on page 179 to determine the appropriate action.

- c. You could see the following display if your disk configuration has changed. Type 5 next to the problem and press Enter to display the detailed report.

Problem Report

Note: Some action for the problems listed below may need to be taken. Please select a problem to display more detailed information about the problem and to see what possible action may be taken to correct the problem.

Type option, press Enter.
5=Display Detailed Report

OPT	Problem
-	_____
-	_____

- d. If the following display appears, a disk unit that you selected to add to your disk configuration could already have data on it. If you choose to continue, any data that is on the disk units listed will be removed.

Be certain that you want to configure the disk before you continue. Follow the instructions on the display.

Press Enter to return to the Problem Report display. Press F10 to continue the Add Disk Unit subtask.

Possibly Configured Units

Problem: These non-configured units appear to be configured units of some other disk configuration and may contain valid data. This option will clear the data from these units and destroy the other disk configuration.

Press Enter to continue
Press F12=Cancel to return and change your choices.

Serial Number	Type	Model	Resource Name	Other System Serial Number
_____	___	___	_____	_____
_____	___	___	_____	_____
_____	___	___	_____	_____
_____	___	___	_____	_____
_____	___	___	_____	_____
_____	___	___	_____	_____

More..

F3=Exit F12=Cancel

- e. The following display shows the percentage of disk units added. This display does not require a response.

Function Status

You selected to add units.

___ % Complete

- f. When the process completes, continue the manual installation process with the next step.

This completes the subtask for adding disk units.

9. Status displays are displayed on the console. You do not need to respond to these status displays. Some of the IPL steps might take a long time. The time varies depending on how much data recovery is required for your system.
10. You might see the following display.

```

                                Message
Message ID . . . . . : CPA2055      Type . . . . . : Inquiry
From program . . . . . : ITLOADFO   Severity . . . . . : 99

Message . . . . . : The next volume in the sequence is needed to
                    continue the installation process.

Cause . . . . . : The end of the volume has been reached.

Recovery . . . . . : Load the next volume on the installation device.

Type choice, press Enter.

Reply . . . . . 1          1=Continue, 2=End installing

```

|
|
|
|

If you see this display, load the first volume of installation media that contains the operating system. Throughout the remainder of these procedures, load the next volume when prompted by the system. When you are installing from optical media, wait until the In Use indicator goes out before you continue.

11. The Install the Operating System display appears when the IPL for the Licensed Internal Code completes. The XX's in the following display indicate default date and time values.

```

                                Install the Operating System

Type options, press Enter.

Install
option . . . . . 1          1=Take defaults (No other
                               options are displayed)
                               2=Change install options

Date:
Year . . . . . XX          00-99
Month . . . . . XX         01-12
Day . . . . . XX           01-31

Time:
Hour . . . . . XX          00-23
Minute . . . . . XX        00-59
Second . . . . . XX        00-59

```

Type the following and press Enter:
 Install option 1
 Date: (Use the current year, month, and day.)
 Time: (Use the current time, 24-hour clock.)

12. Status messages are displayed during the installation process. You do not need to respond to these displays. The following is an example of a status display. This display might be present for 2 hours or more. The display is blank for a time between stage 4 and stage 5.


```

Message ID . . . : CPI2070                                IBM i Installation Status

Stage 6 |-----+-----|
        |                    | 58%                    |
        +-----+-----+

Installation
Stage                Completed      Objects
2 Restoring programs to library QSYS . . . . . : X      Restored
  13637
3 Restoring language objects to library QSYS . . : X      01540
4 Updating program table . . . . . : X
5 Installing database files . . . . . : X
>> 6 Installing base directory objects . . . . . :
7 Completing installation . . . . . :

```

13. The Sign On display appears on your console.

```

                                Sign On

                                System. . . . . : XXXX
                                Subsystem . . . . : XXXX
                                Display . . . . . : XXXXXXXX

User. . . . . : QSECOFR
Password . . . . . :
Program/procedure . . . . . : _____
Menu . . . . . : _____
Current library . . . . . : _____

```

Type the following and press Enter:
 User: QSECOFR
 Password: (Enter password, if required.)

14. The IPL Options display appears.

```

                                IPL Options

Type choices, press Enter.

System date . . . . . : XX / XX / XX      MM / DD / YY
System time . . . . . : XX : XX : XX      HH : MM : SS
System time zone . . . . . : Q0000UTC      F4 for list
Clear job queues. . . . . : N              Y=Yes, N=No
Clear output queues . . . . . : N          Y=Yes, N=No
Clear incomplete job logs . . . . . : N    Y=Yes, N=No
Start print writers . . . . . : Y          Y=Yes, N=No
Start system to restricted state . . . . . : N Y=Yes, N=No

Set major system options. . . . . : N      Y=Yes, N=No
Define or change system at IPL. . . . . : N Y=Yes, N=No

Last power-down operation was ABNORMAL

```

- Notes:**
- a. Ignore the message on the bottom of the IPL Options display.

- b. If you need to change system values, you can do so now. One example of a system value that you might change is the value for the security level (QSECURITY) system value.

Another example is the scan control (QSCANFCTL) system value. If you have not already done so, consider specifying *NOPOSTRST for the QSCANFCTL system value to minimize future scanning of some objects that are restored during the installation of licensed programs in the following steps. For more information on scanning and the system value settings, see the topic Scanning support in the IBM i Information Center.

Type Y for the *Define or change the system at IPL* prompt. Follow the instructions on the displays.

Type the following and press Enter:

- System date: (Use the current date.)
- System time: (Use the current time, 24-hour clock.)
- System time zone: (Verify that it is correct or press F4 to select a time zone.)
- Set major system options: N

15. The Edit Rebuild of Access Paths display could be shown. If it is, press Enter to continue.
16. You see the Status display again.

```

Message ID . . . : CPI2070                      IBM i Installation Status

Stage 6 |-----+-----|
        |                    58%                    |
        +-----+-----+

Installation
Stage      Completed      Objects
2 Restoring programs to library QSYS . . . . . : X      13637
3 Restoring language objects to library QSYS . . : X      01540
4 Updating program table . . . . . : X
5 Installing database files . . . . . : X
>> 6 Installing base directory objects . . . . . :
7 Completing installation . . . . . :

```

17. Additional display messages could be shown.
Press Enter after each message to continue.
18. The System i Main Menu (or the menu you chose as an initial menu) appears on your console.

You have completed the installation of the IBM i operating system.

For most upgrades, continue with “Replacing the licensed programs.” If you are replacing software of the same version and release, however, do not replace any other licensed programs. Complete the tasks in “Checklist: Completing the replacement of the same IBM i release” on page 102.

Replacing the licensed programs

Follow these steps to replace licensed programs related to IBM i by using the manual installation method.

1. Begin this task at the System i Main Menu (or the menu you chose as an initial menu).
 - a. Type CHGMSGQ QSYSOPR *BREAK SEV(60) and press Enter.
 - b. A message display could appear. Press Enter.
 - c. Type ENDSBS *ALL *IMMED and press Enter.
 - d. When the following message appears, press Enter to continue:
ENDSBS SBS(*ALL) command being processed
 - e. The message System ended to restricted condition appears. Press Enter to continue.
 - f. Type CHGMSGQ QSYSOPR SEV(95) and press Enter.
 - g. A message display could appear. Press Enter.
2. The System i Main Menu (or the menu you chose as an initial menu) appears on your console.
Type GO LICPGM and press Enter.
3. The Work with Licensed Programs display appears.

```
LICPGM                Work with Licensed Programs                System:  XXXX
Select one of the following:
Manual Install
1. Install all
```

Type 1, and press Enter.

4. The Manual Install display appears.

```
Manual Install                System:  XXXX
Type choices, press Enter.
Install option . . . 1        1=Installed products
                             2=All products
                             3=New products
Installation device  OPT01    Name
Replace if current   N        Y=Yes
                             N=No
Nonaccepted agreement 2      1=Do not install licensed program
                             2=Display software agreement
Automatic IPL . . . N        Y=Yes
                             N=No
```

Type the following and press Enter:

- Install option: 1
- Installation device: OPT01 (See notes that follow.)
- Replace if current: N (See note that follows.)
- Nonaccepted agreement: 2 (See note that follows.)
- Automatic IPL: N

Notes:

- If you created a customized installation list, select install option 4 (Installed and additionally selected products). This option appears only if you followed the instructions to add an additional licensed

program, which is described in step 10 on page 52 in “Preselecting the licensed programs to install” on page 50.

- In this example, the installation device is OPT01. If you are using a different naming convention, use the name you have assigned to the installation device.
 - If you are using your own distribution media, select 2 for the *Install option* field. For the *Replace if current* field, type Y.
 - If you are migrating data from one system to another system using documented backup and recovery procedures, type Y for the *Replace if current* field.
 - If you have not previously accepted software agreements for licensed programs that you plan to install, option 2 displays the software agreements for acceptance as each licensed program is installed. This will increase the length of your installation time. If you want to accept the software agreements now, complete step 6 on page 134 and then return here.
5. Status displays might appear. These displays show the status of the licensed programs and language objects as they install on the system. You do not need to respond to these status displays.

```

Installing Licensed Programs
                                     System: XXXX

Licensed programs processed . . . . . :      0 of XXX

Licensed program install in progress
  
```

The following display is an example of the display that appears during the installation process.

```

Installing Licensed Programs
                                     System: XXXX

Licensed programs processed . . . . . :      X of XXX

Licensed
Program  Option  Description                               Type
5770SS1    2      Online Information                               2924
  
```

This display shows which licensed programs and optional parts of licensed programs are being processed. After the *PGM objects and *LNG objects are processed, the display shows the total number of licensed programs processed.

6. If a message similar to the following appears, load the next media volume that contains licensed program products, and continue the installation. When you are installing from optical media, wait for the In Use indicator to go out before you respond to the message.

```

Display Messages
                                     System: XXXX

Queue . . . . . : QSYSOPR           Program . . . . . : *DSPMSG
Library . . . . . : QSYS             Library . . . . . :
Severity . . . . . : 95              Delivery . . . . . : *BREAK

Type reply (if required), press Enter.
Load the next volume in optical device OPT01 (X G)
Reply . . . . . G
  
```

Type G and press Enter.

After you load each volume, type G and press Enter. If there are no more volumes to load that contain licensed programs, or if you want to end the loading process, type X and press Enter.

7. If a licensed program requires acceptance of a software agreement, the Software Agreements display appears. Do either of the following:
 - Press F14 to accept the agreement and allow the licensed program to continue installing.
 - Press F16 to decline the agreement and end the installation of that licensed program.
8. The Work with Licensed Programs display appears on your console when the installation process is completed. One of the following messages appears on the bottom of the Work with Licensed Programs display:
 - Work with licensed programs function has completed.
 - Work with licensed programs function not complete.

Verifying completion of manual installation

Follow these steps to verify that you have successfully completed the IBM i upgrade by using the manual installation method.

1. The Work with Licensed Programs display appears. Use the page down or roll up key to see the third display of the Work with Licensed Programs menu.
Type 50 and press Enter.
2. The Display Install History display appears. The XX's indicate default values.

```
Display Install History
Type choices, press enter.
Start date . . . . . XX/XX/XX MM/DD/YY
Start time . . . . . XX:XX:XX HH:MM:SS
Output . . . . . *_____ *, *PRINT
```

Press Enter.

3. Look at the messages that appear on the Display History Log Contents display.
 - If you had an installed licensed program that was not renewed by IBM, it might not be replaced. Refer to “Mixed-release environment” on page 16 for more information.
 - If any of the messages on the display indicate a failure or a licensed program that is partially installed, go to Chapter 14, “Troubleshooting software installation problems,” on page 163 to determine the problem.

Otherwise, press F3 (Exit).

4. Verify the installed status values of your licensed programs and check for compatibility. It is important to make sure that all of your licensed programs are compatible with the operating system.

Use LICPGM menu option 10 (Display licensed programs) to see the release and installed status values of the installed licensed programs. If the installed status value of a licensed program is *COMPATIBLE, it is ready for use. If the installed status value of a licensed program is *BACKLEVEL, the licensed program is installed, but its version, release, and modification is not compatible with the currently installed level of the operating system. Check the topic “Licensed program releases and sizes” on page 185 to verify the current

version, release, and modification of the licensed program. “Installed status values” on page 218 lists the possible installed status value descriptions.

You have completed this task.

1. Do you need to install additional licensed programs?
 - **No.** Go to the next step.
 - **Yes.** Go to “Installing additional licensed programs” on page 132 and complete the instructions.
2. Do you need to install a secondary language?
 - **No.** Go to the next step.
 - **Yes.** Go to “Installing a secondary language” on page 140 and complete the instructions.
3. You must complete the installation process before you put your system into operation. Go to Chapter 8, “Checklist: Completing the IBM i upgrade or replacement,” on page 93 and complete the instructions.

Chapter 8. Checklist: Completing the IBM i upgrade or replacement

Use this checklist to complete the IBM i upgrade or replacement processes.

1. If you still have default passwords for your service tools user IDs, change them now. For information about service tools user IDs, see *Changing service tools user IDs and passwords* in the IBM i Information Center.
2. Remove the media volume when the installation is complete. If your media is tape, wait for the tape to rewind completely.
3. If you have any IBM or non-IBM products with special installation instructions, install these products now. Check the product's documentation, and follow any special instructions.
4. Install the most current cumulative PTF package. (This package should have been ordered a week or two before your installation.) Use the instructions in the *PTF Shipping Information Letter*. Then return here and continue with the next step.

Note: If you do not install the cumulative PTF package now, you need to perform an IPL and let the Initialize System (INZSYS) process complete. Before you do, set the IPL type to **B** (or the IPL type you use for everyday operation) and then set the mode selection to **Normal**. "Initialize System (INZSYS) recovery" on page 178 has more information on INZSYS.

5. Apply any PTF groups that you have ordered. For more information on PTF groups, refer to "Reviewing software PTF (fix) requirements" on page 29. To apply PTF groups, refer to the cover letter and instructions for the program temporary fix (PTF). For general information on applying PTFs, go to *Installing fixes* in the IBM i Information Center.
6. If your system is operating as a service partition and your system is not being managed by a Hardware Management Console, you might be required to perform a server IPL. A *server IPL* is an IPL whereby all logical partitions on the system are shut down at the same time. This allows, for example, a new level of the server firmware to be activated on the system.

You might be required to perform a server IPL after you apply or remove a PTF on the service partition if that PTF affects the server firmware.

- To find out if you need to do a server IPL, type DSPFMWSTS on the IBM i control language (CL) command line and press Enter. If a server IPL is required, the **Server IPL required** field is set to Yes.
- To find out if your system is operating as a service partition, type DSPFMWSTS on the CL command line and press Enter. If your system is operating as a service partition, the **Service partition** field is set to Yes.

Note: When shutting down your service partition, reference codes D6xx430B or D6xx430A could be displayed for an extended amount of time. The xx should increment periodically and is a normal part of processing when server firmware code is being updated. Allow the system to complete the processing. Do not interrupt this process.

7. Look for messages in the install history log that indicate the status of the Initialize System (INZSYS) process.
 - a. Type GO LICPGM and press Enter.

- b. Type 50 (Display log) on the Work with Licensed Programs display, and press Enter.
- c. The Display Install History display appears. Press Enter.

The Display History Log Contents display appears. If you do not see either of the following messages on the display, wait a few minutes and select option 50 again. Find the message Initialize System (INZSYS) started. After this message appears, wait for a period of time and look for the Initialize System (INZSYS) processing completed successfully message (CPC37A9). If you do not see message CPC37A9 on the display, go to "Initialize System (INZSYS) recovery" on page 178 to determine the problem.

- 8. If you see the message An unexpected error occurred during an IPsec request in the QSYSOPR message queue, the Internet Protocol filtering rules might have failed to load. To help you determine why the loading of filtering rules failed, review the messages in the QTCPWRK system job log and search for TCP9535 (Failed to apply filtering rules). You will need to load your filter rules again.
- 9. If you used an image catalog to perform your upgrade, you might want to remove all installation images from your system. To delete the catalog and all the optical images (image files), type the following:
DLTIMGCLG IMGCLG(*mycatalog*) KEEP(*NO)
- 10. If you used an image catalog to perform your installation and you used the Start ASP Balance (STRASPBAL) command to end the allocation for storage in the load-source disk unit before you upgraded, enter the Start ASP Balance (STRASPBAL) command to resume the allocation of storage for the load-source disk unit.
STRASPBAL TYPE(*RSMALC) UNIT(1)
STRASPBAL TYPE(*CAPACITY) ASP(1) TIMLMT(*NOMAX)
- 11. If your service tools language is different than your primary language, you might want to verify that the service tools language is the one that you want on the system or logical partition. For details, refer to Changing the service tools language on your system or logical partition in the IBM i Information Center.
- 12. Install software license keys for your IBM i and keyed products. Use the Work with License Information (WRKLICINF) command to display the installed keyed products to add license key data. For specific instructions, go to Adding license key information in the IBM i Information Center.
After updating the license key information, return here and continue with the next step.
- 13. After you complete the installation process and before you make a system or partition available to all users, set the usage limit for the software-license managed products. These products are listed on the Proof of Entitlement (POE), invoice, or other documents that you have received with your software order. For products that have a usage limit, you set the usage limit with the Work with License Information (WRKLICINF) command.
To set your usage limit, do the following:
 - a. Type WRKLICINF and press Enter.
 - b. On the Work with License Information display, press F11 (Display Usage Information). The usage limit number on each product that is listed on the POE, invoice, or other documents must match the usage limit number on the Work with License Information display for the associated product.
 - c. If the usage limit is to be updated, move the cursor to the line that contains the product name whose usage limit is to be updated.


- d. Type 2 (Change) and press Enter.
- e. When the Change License Information display is shown, update the usage limit prompt with the usage limit shown on the POE. In addition, update the threshold prompt with either *CALC or *USGLMT. Do not leave the threshold set to zero.

Note: If message CPA9E1B [Usage limit increase must be authorized. Press help before replying (C G).] is sent, respond by typing G.

- f. If the POE lists more products than the Work with License Information display, set the usage limits after you install those products.
14. If you deleted any licensed program libraries or secondary language libraries from either of the library list system values [system library list (QSYSLIBL) or user library list (QUSRLIBL)], change system values QSYSLIBL or QUSRLIBL to add the libraries back in the library list now.
 15. If you changed the verify object signatures during restore (QVFYOBJRST) system value from 4 or 5 to 3 or had unlocked it before your upgrade, change this back to its normal setting. If you have additional software applications, however, that were included in the upgrade, keep them at 3 until after you restore them. If you changed the allow restore of security sensitive objects (QALWOBJRST) system value to *ALL or had unlocked it before the upgrade, return the value to its normal locked setting.
 16. If you changed the scan control (QSCANFCTL) system value to minimize future scanning of some objects that are restored before you installed your licensed programs, you can now remove the *NOPOSTRST specification from this system value.
 17. If you changed any other system value such as security level (QSECURITY) during your upgrade, change it back now.
 18. Some of the tasks in this topic require that you change the QSYSOPR severity code filter to 95. If you do not want to continue with this level or you want to change the delivery notification, type CHGMSGQ QSYSOPR DLVRY(xx) SEV(yy) where *xx* indicates the delivery notification and *yy* indicates the severity code that you want to use. The system defaults are DLVRY(*HOLD) SEV(0).
 19. If you have installed the product 5722-VI1, Content Manager, you can use the product. However, you must perform post-installation commands. For more information, refer to the Post Installation section in the product document *IBM ImagePlus® VisualInfo for AS/400: Planning and Installation Guide*, GC34-4585.
 20. If you have not already verified the compatibility of your licensed programs with the IBM i operating system, do this now. Use LICPGM menu option 10, Display installed licensed programs. If *COMPATIBLE is not listed next to a licensed program, then go to “Installed status values” on page 218 and determine how to proceed.
 21. Depending on your strategy for object conversion, consider running the Start Object Conversion (STROBJCVN) command to either convert user objects or check which objects still require conversion.
 22. Save your system using your normal save procedures. Refer to the instructions in the Backing up your system topic in the IBM i Information Center. Make sure that the Initialize System (INZSYS) process is complete before you save your system.

Note: Before you start a save operation, use the Work with Active Jobs (WRKACTJOB) command to check the status of QDCPOBJx jobs. These jobs decompress objects. There could be more than one QDCPOBJx job. You can start your save operation if these jobs are in an inactive state. If

you put the system in a restricted state by ending subsystems, the QDCPOBJx jobs become inactive. The jobs will restart when the system is not in a restricted state. For more information about decompressing objects, see “Compressed objects and storage space” on page 18.

23. If you have installed IBM i Access Family products, you might have other tasks that you need to complete. You can find further information about installing IBM i Access Family products in the following sources:
 - IBM i Access for Windows in the IBM i Information Center.
 - The IBM i Access Family  Web site (<http://www.ibm.com/systems/i/software/access/>).
24. You might have installed licensed programs that require additional installation steps on PCs, or you might have programs that should be installed on PCs through an IBM i Access Family function. If you have products such as these, complete your PC installation by using the instructions for the product.
25. If you have a IBM i integration with BladeCenter and System x that you stopped before you began the installation process, restart it now.
 - a. Type G0 NWSADM on a CL command line. The Network Server Administration display appears.
 - b. Select option 2 (Start a network server).
26. If you installed 5770-TC1, TCP/IP Utilities, go to the topic TCP/IP setup in the IBM i Information Center for advanced configuration and setup information.
27. If you have customized an IBM-supplied program (for example, QSTRUP in library QSYS) in a previous release, make sure that you re-create this program to run correctly in the new release.
28. If you have duplicated any IBM-supplied objects, you might want to make new duplicates after you install the release. This enables you to take advantage of functions added in the new release. Examples of objects that you might duplicate include the following:
 - Message text descriptions
 - Commands
 - Command defaults
29. If you use the IBM Performance Management for Power Systems™ function, the Collection Services tool, or the Performance Tools licensed program and you collected data before installing your new release, you need to perform an action to enable the collecting of performance data to continue.

You have the following choices regarding how to handle your performance data from the prior release:

 - Convert the data.

Use the Convert Performance Collection (CVTPFRCOL) command to convert the data in the collection library. This command supports data conversion for Collection Services, PEX, Job Watcher, and Disk Watcher file collections.
 - Automatic data collection support. When Collection Services is started at IPL, a performance library for the prior release files is created. Collection Service database files are moved to that library. This action allows new files to be created and preserves the existing data files from the previous release. You should be aware of the following items:
 - The library name that is created is QPFRDvrmmn, where vrm is the current version, release, and modification and nn is a unique sequence number starting with 01, for example, QPFRD52001.

- | – The library is created with *EXCLUDE public authority. The library is
| owned by the QSYS user profile, and the owner of the original library is
| given *ALL authority.
- | – All QAPMxxxx files are moved.
- | – If you do not want to keep the data from the previous release, you can
| delete the QPFRDvrnmn library with the Delete Library (DLTLIB)
| command (DLTLIB qpfrdvrnmn)

You have completed upgrading to the new release on your system.

Chapter 9. Replacing Licensed Internal Code and IBM i of the same version and release

Use this procedure to install a new modification of Licensed Internal Code and a more recent update (resave) of the IBM i operating system to support new hardware.

This is not a backup and recovery procedure. If you have ordered resave media, follow these tasks to replace the Licensed Internal Code and the operating system.

Checklist: IBM i software replacement

Use this checklist to complete all the tasks for a software replacement of the same IBM i release.

If you plan to navigate through this checklist online, it might help to right-click this topic in the navigation tree to open a new window. The information in this checklist summarizes the major tasks that you need to do before you begin to replace your software.

Before you begin

1. Verify that your server model meets the requirements to support the new release. Use the following Web pages.
 - The IBM Prerequisite Web page (www.ibm.com/eserver/series/support/e_dir/eserverprereq.nsf) provides you with operating system compatibility information for hardware features.
 - The Upgrade planning Web page (www.ibm.com/systems/support/i/planning/upgrade/osmapping.html) has a table that indicates which releases of the operating system are supported by each of the server models.
2. Know your current strategy for connecting a console to your system or logical partition. Your current connection strategy influences your planning activities. For more information about consoles, see *Managing IBM i consoles* in the IBM Systems Hardware Information Center.
3. Plan for extra time after the upgrade to perform a server IPL. This is one of the tasks described in the “Checklist: Completing the replacement of the same IBM i release” on page 102.
4. Understand system administration tasks (basic system operations). To perform software installation tasks, you need to be able to restart your system, sign on and off, use the command interface, install fixes, change the system operation mode and initial program load (IPL) source on the system unit control panel, and analyze system problems.
5. Understand the different “Types of software installation devices” on page 10. The installation tasks are different based on the device type and media type that you use.

From the following checklist, perform the tasks that are appropriate for your system. Required steps are noted. If you are viewing this in printed copy, use this checklist as a guide for the steps on the pages that follow.

Software replacement tasks

1. Verify the contents of your software order. For more information about the optical media you received with your order, see “Media labels and their contents” on page 212.
2. “Reviewing software PTF (fix) requirements” on page 29
 - a. “Finding the latest PSP information” on page 29
 - b. “Analyzing fixes you currently have on your system” on page 30
 - c. “Obtaining a record of PTFs applied” on page 101
 - d. “Permanently applying PTFs for a replacement of the same release” on page 101
3. “Working with critical system values before you install software” on page 32
 - a. “Recording and printing all system values before you install software” on page 32
 - b. “Changing certain system values (QSYSLIBL, QUSRLIBL, QALWOBJRST, or QVFYOBJRST)” on page 32 (Only QALWOBJRST applies to a replacement.)
 - c. “Optionally changing the scan control system value” on page 34
4. “Ensuring two-phase commit integrity” on page 35
5. If you have a large number of spooled files on your system, set the compress job tables IPL attribute to none. To do this, use the Change IPL Attributes command: CHGIPLA CPRJOBTL(*NONE).
6. “Gathering performance data for benchmark” on page 37
7. “Preparing the upgrade device and media” on page 39
8. “Preparing to upgrade or replace software using an image catalog” on page 39.
 - a. “Determining storage requirements for image catalog installation” on page 40
 - b. “Freeing up space on the load-source disk unit for an image catalog” on page 40
 - c. “Preparing an optical image catalog to install software” on page 41
9. “Determining storage space required for a replacement of the same release” on page 101
10. “Preparing your console for software installation” on page 58
11. “Stopping the integrated server and other application servers” on page 60
12. “Saving the system” on page 60
13. “Replacing software of the same release using manual installation” on page 101
14. “Installing PTFs for the Licensed Internal Code and the operating system” on page 102
15. “Checklist: Completing the replacement of the same IBM i release” on page 102

After you finish

After the replacement tasks in this checklist have been completed, consider these tasks.

1. Develop a strategy for managing and maintaining your software. For information about software fixes (or program temporary fixes, PTFs), and software licenses and license keys, go to the topic Maintaining and managing IBM i and related software in the IBM i Information Center.

2. For information about software distribution of supported products, go to the topic Distributing software in the IBM i Information Center.

Obtaining a record of PTFs applied

Obtain a record of the PTFs applied to your system for comparison later to ensure that any corrective fixes you have applied are still present after performing the IBM i upgrade procedures.

If you display the PTFs to an output file (*OUTFILE), the query functions can be used later rather than looking through all the listings to verify that all the current PTFs are applied after the installation of Licensed Internal Code and IBM i.

To determine what PTFs have been applied to Licensed Internal Code, enter the following on the IBM i control language (CL) command line:

```
DSPPTF LICPGM(5770999) to *PRINT or *OUTFILE
```

To determine what PTFs have been applied to the IBM i operating system, enter the following on the CL command line:

```
DSPPTF LICPGM(5770SS1) to *PRINT or *OUTFILE
```

Permanently applying PTFs for a replacement of the same release

Permanently apply Licensed Internal Code and IBM i operating system PTFs by using the following commands as recommended before all installations (the delay option is chosen so you can schedule the IPL).

```
APYPTF LICPGM(5770999) SELECT(*ALL) APY(*PERM) DELAYED(*YES) IPLAPY(*YES)
APYPTF LICPGM(5770SS1) SELECT(*ALL) APY(*PERM) DELAYED(*YES) IPLAPY(*YES)
```

Perform an IPL:

```
PWRDOWNSYS RESTART(*YES)
```

Note: For IBM i 7.1 and V6R1, the default value for the Power Down System (PWRDOWNSYS) command is to display a confirmation. This can be changed by specifying *NO for the Confirm (CONFIRM) parameter: CONFIRM(*NO). The default value for V5R4 is not to display a confirmation.

Determining storage space required for a replacement of the same release

Before you schedule a time to install this release, determine the available storage space and the storage space that is required.

The procedures in this topic might not include all requirements for storage that you have on your system. If you are preparing to upgrade or replace software using an image catalog, ensure that you have reviewed the topic, “Determining storage requirements for image catalog installation” on page 40.

Replacing software of the same release using manual installation

Use the manual installation method to upgrade or replace your software of the same IBM i release.

Complete the tasks in “Replacing the Licensed Internal Code” on page 74 and “Replacing the IBM i operating system” on page 82. After performing these tasks, go to “Installing PTFs for the Licensed Internal Code and the operating system”.

Installing PTFs for the Licensed Internal Code and the operating system

Install PTFs (cumulative, HIPER, group, or individual PTFs) only for the Licensed Internal Code and the IBM i operating system.

1. Mount the PTF media.
2. Type G0 PTF. On option 7, select 5770999 and 5770SS1.
3. After all the media is processed, perform an IPL.

To determine if all the Licensed Internal Code PTFs and the IBM i PTFs that were applied to the partition before the installation exist on the partition now, enter the following on an IBM i control language (CL) command line:

```
DSPPTF LICPGM(5770999) to *PRINT or *OUTFILE  
DSPPTF LICPGM(5770SS1) to *PRINT or *OUTFILE
```

1. Compare the output from the DSPPTF command that you obtained before the upgrade to determine if any PTFs you previously had on your system are missing.
2. Install PTFs that are missing after you upgrade.

Checklist: Completing the replacement of the same IBM i release

Use this checklist to complete any of the IBM i 7.1-to-IBM i 7.1 replacement processes.

1. If you still have default passwords for your service tools user IDs, change them now. For information on service tools user IDs, see Changing service tools user IDs and passwords in the IBM i Information Center.
2. If your system is operating as a service partition and your system is not being managed by a Hardware Management Console, you might be required to perform a server IPL. A *server IPL* is an IPL whereby all logical partitions on the system are shut down at the same time. This allows, for example, a new level of the server firmware to be activated on the system.

You might be required to perform a server IPL after you apply or remove a PTF on the service partition if that PTF affects the server firmware.

- To find out if you need to do a server IPL, type DSPFMWSTS on the IBM i control language (CL) command line and press Enter. If a server IPL is required, the **Server IPL required** field is set to Yes.
- To find out if your system is operating as a service partition, type DSPFMWSTS on the CL command line and press Enter. If your system is operating as a service partition, the **Service partition** field is set to Yes.

Note: When shutting down your service partition, reference codes D6xx430B or D6xx430A could be displayed for an extended amount of time. The xx should increment periodically and is a normal part of processing when server firmware code is being updated. Allow the system to complete the processing. Do not interrupt this process.

3. If you used an image catalog to perform your installation, you might want to remove all installation images from your system. To delete the catalog and all the optical images (image files), type the following:

DLTIMGCLG IMGCLG(*mycatalog*) KEEP(*NO)

4. If you used an image catalog to perform your installation and you used the Start ASP Balance (STRASPBAL) command to end the allocation for storage in the load-source disk unit before you upgraded, enter the Start ASP Balance (STRASPBAL) command to resume the allocation of storage for the load-source disk unit.

```
STRASPBAL TYPE(*RSMALC) UNIT(1)
STRASPBAL TYPE(*CAPACITY) ASP(1) TIMLMT(*NOMAX)
```

5. If your service tools language is different than your primary language, you might want to verify that the service tools language is the one that you want on the system or logical partition. For details, refer to Changing the service tools language on your system or logical partition in the IBM i Information Center.
6. After you complete the installation process and before you make a system or partition available to all users, set the usage limit for the software-license managed products. These products are listed on the Proof of Entitlement (POE), invoice, or other documents that you have received with your software order. For products that have a usage limit, you set the usage limit with the Work with License Information (WRKLCINF) command.

To set your usage limit, do the following:

- a. Type WRKLCINF and press Enter.
 - b. On the Work with License Information display, press F11 (Display Usage Information). The usage limit number on each product that is listed on the POE, invoice, or other documents must match the usage limit number on the Work with License Information display for the associated product.
 - c. If the usage limit is to be updated, move the cursor to the line that contains the product name whose usage limit is to be updated.
 - d. Type 2 (Change) and press Enter.
 - e. When the Change License Information display is shown, update the usage limit prompt with the usage limit shown on the POE. In addition, update the threshold prompt with either *CALC or *USGLMT. Do not leave the threshold set to zero.
- Note:** If message CPA9E1B [Usage limit increase must be authorized. Press help before replying (C G).] is sent, respond by typing G.
- f. If the POE lists more products than the Work with License Information display, set the usage limits after you install those products.

7. If you changed the allow restore of security sensitive objects (QALWOBJRST) system value to *ALL or had unlocked it before the upgrade, return the value to its normal locked setting.
 8. If you changed any other system value such as security level (QSECURITY) during your upgrade, change it back now.
 9. If you changed the scan control (QSCANFCTL) system value to minimize future scanning of some objects that are restored before you installed your licensed programs, remove the *NOPOSTRST specification from this system value.
10. Some of the tasks in this topic require that you change the QSYSOPR severity code filter to 95. If you do not want to continue with this level or you want to change the delivery notification, type CHGMSGQ QSYSOPR DLVRY(xx) SEV(yy) where *xx* indicates the delivery notification and *yy* indicates the severity code that you want to use. The system defaults are DLVRY(*HOLD) SEV(0).

11. Save your system using your normal save procedures. Refer to the instructions in the Backing up your system topic in the IBM i Information Center.

Note: Before you start a save operation, use the Work with Active Jobs (WRKACTJOB) command to check the status of QDCPOBJx jobs. These jobs decompress objects. There could be more than one QDCPOBJx job. You can start your save operation if these jobs are in an inactive state. If you put the system in a restricted state by ending subsystems, the QDCPOBJx jobs become inactive. The jobs will restart when the system is not in a restricted state. For more information about decompressing objects, see “Compressed objects and storage space” on page 18.

12. If you have a IBM i integration with BladeCenter and System x that you stopped before you began the installation process, restart it now.
 - a. Type GO NWSADM on a CL command line. The Network Server Administration display appears.
 - b. Select option 2 (Start a network server).
13. If you have customized an IBM-supplied program (for example, QSTRUP in library QSYS) in a previous release, make sure that you re-create this program to run correctly in the new release.
14. If you have duplicated any IBM-supplied objects, you might want to make new duplicates after you install the release. This enables you to take advantage of functions added in the new release. Examples of objects that you might duplicate include the following:
 - Message text descriptions
 - Commands
 - Command defaults

You have completed the replacement of the same release on your system.

Chapter 10. Checklist: IBM i software installation readiness

Use this checklist to help consolidate and verify that you complete all the preparation tasks for a new IBM i software installation.

If you plan to navigate through this checklist online, it might help to right-click this topic in the navigation tree to open a new window. This information summarizes the major tasks that you need to do before you begin to install your software.

Before you begin

1. Verify that your server model meets the requirements to support the new release. Use the following Web pages.
 - The IBM Prerequisite Web page (www.ibm.com/eserver/series/support/e_dir/eserverprereq.nsf) provides you with operating system compatibility information for hardware features.
 - The Upgrade planning Web page (www.ibm.com/systems/support/i/planning/upgrade/osmapping.html) has a table that indicates which releases of the operating system are supported by each of the server models.
2. Know your current strategy for connecting a console to your system or logical partition. Your current connection strategy influences your planning activities. For more information about consoles, see Managing IBM i consoles in the IBM Systems Hardware Information Center.
3. Understand system administration tasks (basic system operations). To perform software installation tasks, you need to be able to restart your system, sign on and off, use the command interface, install fixes, change the system operation mode and initial program load (IPL) source on the system unit control panel, and analyze system problems.
4. Understand the different “Types of software installation devices” on page 10. The installation tasks are different based on the optical media that you use.

Software preinstallation tasks

Perform the following tasks that are appropriate for your system.

1. “Verifying the contents of your software order” on page 107
 - a. “Identifying and reviewing information resources” on page 107
 - b. “Verifying the correct optical distribution media” on page 108
 - c. “Verifying license keys for keyed products” on page 28
2. “Performing initial installation tasks” on page 108
 - a. “Ensuring you have the latest information” on page 109
 - b. “Determining disk storage space required for a new installation” on page 109
 - c. “Estimating installation time” on page 109
 - d. “Preparing your console for software installation” on page 58
 - e. “Preparing the installation device and media” on page 111

After you finish

After the tasks in the preceding checklist and your installation have been completed, consider the following tasks.

1. Develop a strategy for managing and maintaining your software. For information about software fixes (also known as program temporary fixes or PTFs), software licenses, and license keys, go to the topic [Maintaining and managing IBM i and related software](#) in the IBM i Information Center .
2. For information about software distribution of supported products, go to the [Distributing software](#) in the IBM i Information Center topic.

Chapter 11. Installing IBM i and related software on a new system or logical partition

Follow these procedures to plan and prepare to install the IBM i release, install software on a new system or logical partition, install additional licensed programs, install a secondary language, and complete the final checklist.

This software installation process includes installing the Licensed Internal Code, the IBM i operating system, and other software for the first time.

If you are upgrading software that you currently have installed, go to Chapter 5, "Preparing to upgrade or replace IBM i software," on page 27. If you want to install a new primary language from either a secondary language media set or a primary language media set, go to Chapter 12, "Changing the primary language of your system or logical partition," on page 149.

If you are installing an IBM i client partition on a system that is managed by the Integrated Virtualization Manager, go to IBM i client partition considerations for more details.

Important: You cannot use image catalogs to install IBM i on a new system, because image catalogs require a working system. However, you can use any other media (DVD or tape, for example) to install IBM i on a new system.

Preparing to install the IBM i release

Perform these preparatory tasks before you schedule your IBM i software installation. Allow ample time (a few weeks or days before the installation) to complete these tasks before you perform the actual installation tasks.

Careful, complete, and early preparation saves a considerable amount of time and can help make your software installation on your new system or logical partition run smoothly.

If you are setting up logical partitions, ensure that you plan in advance of your installation and have a basic understanding of logical partitions, your software requirements, and your hardware requirements. See the Planning for logical partitions topic in the IBM Systems Hardware Information Center.

Verifying the contents of your software order

To save you time and avoid frustration, verify that the contents of your IBM i software order are correct before you start the installation.

Identifying and reviewing information resources

Become familiar with the important resources pertaining to the installation of your new IBM i software. Use these documents to plan your installation process.

Many of these resources are shipped with the distribution media in your software order. Read the material that applies to your system

IBM i Access for Windows DVD, SK3T-4098

With every order that includes Operations Console, you receive *IBM i Access for Windows DVD, SK3T-4098*.

PSP information

To keep informed of the latest information about conditions that could impede your software installation, you need the most recent edition of the preventive service planning information (PSP). For information about preventive service planning, see Preventive service planning information in the IBM i Information Center.

PTF shipping information letter

This letter contains the instructions for installing the cumulative program temporary fix (PTF) package. The letter comes with the package. IBM highly recommends that you order the cumulative PTF package a minimum of 2 weeks before your IBM i installation if you order by mail and then install the package as part of your completion tasks. For information about the most recent cumulative package, refer to the Ordering fixes topic in the IBM i Information Center.

Verifying the correct optical distribution media

Ensure that you have the correct media for your upcoming IBM i installation tasks.

1. Verify that the optical media for Licensed Internal Code and the operating system are for IBM i 7.1.
2. Verify that the media you received are in the correct primary and secondary languages.

Verifying license keys for keyed products

For the keyed IBM products or keyed IBM product options that you have ordered, review the software license keys created online for your system.

Refer to the Customer Notice that is included with your software order for information on how to access your software license keys. The online access requires that you do the following:

- Register with IBM.
- Use the customer packing list from your software order to obtain the following numbers:
 - Customer number that was used for your order.
 - Software order number that was used to process your order.

After completing these steps, you can view, print, or download your software license keys to your system. If you have further questions, refer to the information about the Customer Notice for details on how to contact the IBM Software License Key Center.

For general information about licensed keys, refer to the topic Software license keys in the IBM i Information Center.

For a list of products, see “Licensed program releases and sizes” on page 185.

Performing initial installation tasks

Before you install new software on your system, complete these initial installation tasks.

Ensuring you have the latest information

Make sure that your system is ready by ensuring you have the latest information regarding the IBM i installation.

- **Find the latest available PSP information** Keep informed on the most recent information about conditions that might impede your software installation process. Review the most recent edition of the preventive service planning information in the IBM i Information Center.
- **Order current cumulative PTF packages and required group fixes** The cumulative PTF package does not come with your software order. Before your installation, order the most recent cumulative PTF package and also order PTF groups that pertain to your environment. Allow a minimum of 2 weeks by mail. If you do not have much time, order them electronically.

Determining disk storage space required for a new installation

Before you schedule a time to install the new IBM i release, you need to know the storage space that is required.

Load-source disk unit requirements: V6R1 Licensed Internal Code requires that you have a load-source disk unit of 17 GB or larger for each system or logical partition.

Options for upgrading the load-source disk unit are available under the topic Disk management checklist in the IBM i Information Center. Otherwise contact your authorized service provider for assistance.

Estimating installation time

As part of the installation preparation steps, you might want to estimate the time that will be needed to install the IBM i release of software on your system.

If you want to estimate the time it will take to install software on your new system or logical partition, see the information in “Estimates for IBM i software installation time” on page 189. Ignore the tasks that refer to upgrades.

Preparing your console for software installation

Before you install a new IBM i software release, consider this information about consoles.

Supported hardware and console combinations include:

- POWER5
 - Thin Console
 - Hardware Management Console (HMC)
 - Operations Console (LAN and directly attached)
 - Twinaxial console
- POWER6
 - Hardware Management Console (HMC)
 - Operations Console (LAN and directly attached)
 - Twinaxial console
- POWER7
 - Hardware Management Console (HMC)
 - Operations Console (LAN attached)

Although you can use twinaxial console on older systems, IBM recommends that you use either Operations Console or Hardware Management Console. For

requirements on twinaxial console, Operations Console, and PCs, refer to the topic, Connecting to System i in the IBM i Information Center. If you are moving from twinaxial console to Operations Console, use the *IBM i Access for Windows* DVD, SK3T-4098 to install Operations Console before you install the new release.

If you are using twinaxial console, the software installation process expects the system console device to be attached at port 0 and address 0 of the first workstation controller. In most cases, your hardware should be defined in this way. You should verify that the console is attached at port 0 address 0.

If you are planning on migrating your Operations Console, do so either before or after you upgrade. If you are planning on migrating your Hardware Management Console (HMC), do so only after you have completely installed your system. For more information about using the HMC as your IBM i console, see Managing IBM i consoles in the IBM Systems Hardware Information Center.

For all systems, verify that the console mode value is set correctly for your console. In addition, you can specify that an IBM i local area network (LAN) console or Hardware Management Console be taken over by another console in the event your console is disconnected. To verify the console mode value, follow these steps:

1. Access Dedicated Service Tools (DST).
2. Select **Work with DST environment**.
3. Select **System Devices**.
4. Select **Console mode**.


The value of the current console mode is present in the input field. Verify that this is the correct setting. A value of zero means that the console mode has not been set and can interfere with the automatic installation process. The console mode value must be one of the following values.

- | | |
|---|---|
| 1 | Twinaxial console |
| 3 | Operations Console (LAN attached) |
| 4 | Hardware Management Console (HMC) or Thin Console |

During an installation or upgrade, the console type specified by this value is used.

The console mode display also includes the option to allow your 5250 console (does not include twinaxial console) to be taken over by another console. When this option is turned on, the system does not stop with a console failure but continues to run uninterrupted. For more information, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center.

If you use Operations Console, follow these instructions before you install IBM i on your system.

- Review the Operations Console topic in the IBM i Information Center. To review the most recent information about the Operations Console client, go to the Operations Console Web site  (<http://www.ibm.com/systems/i/software/access/windows/console/>)
- IBM recommends that you update IBM i Access for Windows to IBM 7.1 IBM i Access for Windows before you upgrade the IBM i operating system. For more information, see IBM i Access for Windows: Installation and setup in the IBM i Information Center.
- When you receive the IBM i release upgrade, the shipped service tools user IDs (except 1111111) are expired. For all upgrades and installations, you need to

establish a connection between the system and Operations Console PC by using 11111111 (eight 1's) for both the service tools user ID and the default password. This ensures a successful authentication of the subsequent connection of the client to the system. This is especially important for automatic installations.

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

Preparing the installation device and media

Prepare to install IBM i software from optical media, tape devices or tape libraries, or alternate installation devices.

If you are not sure which installation device to use, refer to “Types of software installation devices” on page 10. “Installation devices and media” on page 202 contains more detailed information about the devices and media available.

Installing the IBM i release

Install the IBM i release (the Licensed Internal Code, the operating system, or licensed programs) on a new system or logical partition or perform an IPL for the first time.

Installing Licensed Internal Code on a new logical partition

Perform these tasks to install Licensed Internal Code on a new IBM i logical partition with twinaxial console or Operations Console installed.

After you perform the instructions in this topic, follow the instructions in “Installing software on a new system or logical partition (without IBM i installed)” on page 118 to install the IBM i operating system and licensed programs.

Before you begin to install Licensed Internal Code on a logical partition

Verify these points before you install the Licensed Internal Code on an IBM i logical partition.

1. Ensure you have completed the preparation tasks in the IBM i Information Center topic “Preparing to install the IBM i release” on page 107.
2. Verify your console information in the topic “Preparing your console for software installation” on page 58.
3. If you have not already done so, review the information about planning for logical partitions. Read the Planning for logical partitions topic in the IBM Systems Hardware Information Center.

Attention: This procedure causes existing data on the disk units assigned to this logical partition to be lost. Make sure you really want to perform this procedure.

Reference codes are viewable under the Hardware Management Console (HMC) or the Integrated Virtualization Manager. When a reference code appears with the characters xx (such as B2xx xxxx), xx pertains to the partition identifier and xxxx pertains to a variety of other characters.

The term *system* refers to the logical partition on which you are performing the installation.

When installing on logical partitions, the *control panel* can be found either on the HMC or the Integrated Virtualization Manager.

Until you have completed the installation of the Licensed Internal Code, the information shown about the configuration of logical partitions will be incorrect. Devices attached to the buses of logical partitions are not listed until the installation is complete. Therefore, if you have logical partitions and look at your configuration from the HMC or Integrated Virtualization Manager before you complete the installation, you might see only buses and IOPs, but not the IOA and device details.

Installing Licensed Internal Code on the new logical partition

To install the Licensed Internal Code, follow these procedures.

1. If you are using physical media, load the first volume of installation media that contains the Licensed Internal Code into the installation device that is defined for the system. Throughout these procedures, load the next volume when prompted by the system. Wait for the In Use indicator to go out. Also ensure that you have removed other media from devices that are not involved in the upgrade.

Note: The optical media that you will need later for the operating system and other licensed programs are listed in step 2 on page 119.

2. Make sure you can access either the Hardware Management Console (HMC) or the Integrated Virtualization Manager to control your new logical partition. If power is not on, go to Logical partitioning in the IBM Systems Hardware Information Center for more information and return here when done.
3. Ensure the following for the new logical partition:
 - If you are using a twinaxial console, the device for the new logical partition needs to be powered on.
 - If you are using Operations Console, you need a valid connection configuration for the logical partition after you have run the Operations Console wizard. The console for the logical partition needs to be at **Connecting console**. (To view the status in Operations Console, click the IBM i Access for Windows icon and double-click **Operations Console**.)
4. Verify that this logical partition has an alternate IPL resource (the resource for loading) assigned. For more information about alternate IPL resources, see the I/O devices topic in the IBM Systems Hardware Information Center.
5. Load the installation media volume that contains the Licensed Internal Code into the installation resource defined for this logical partition. Before you go to the next step, be sure that no conditions exist that require your attention.

Note: If you are using a tape device instead of the optical device that is optimized for optical media, verify that the tape unit is loaded and that the tape drive is ready.

6. Use the control panel to verify or to set the mode selection to **Manual** and the IPL source to **D**. These settings indicate that you are controlling the logical partition from the HMC, but the installation is done on the logical partition.
7. Use the control panel to power on or activate this logical partition.
8. Wait for the display to appear that has the language feature to select. (This could take several minutes, but you can monitor the status.)
If you are using Operations Console and it is not detected, review Troubleshooting Operations Console connection in the IBM i Information Center or contact your service provider.

Note: If you are using Operations Console and receive a **Service Device Sign-On** window when doing this step, sign on by using the

appropriate data. It is strongly recommended that you use the userid/password of 11111111/11111111 for this connection. If you do not receive the **Service Device Sign-On** window, the data is supplied by the personal computer from previously entered data.

The installation media for Licensed Internal Code is language-independent. It is important that you complete this step carefully.

The languages on your media for the Licensed Internal Code and the operating system must match. The language that is entered on this display must match the language that is on the media. If they do not match, do not continue with the installation. Stop and call your software provider. Get the correct language feature before continuing.

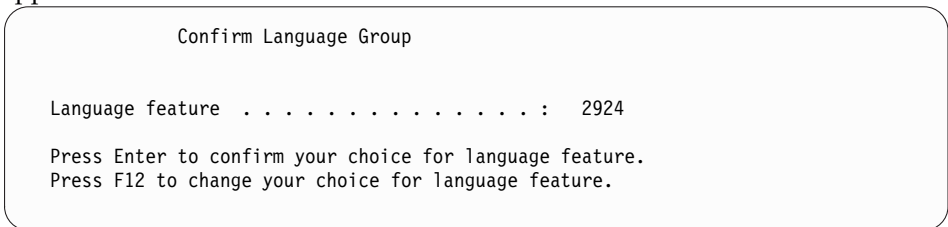
Refer to “Feature codes for language version” on page 216 to locate the appropriate feature code for your language.



The language feature 2924 (English) is the default for this display. If you are installing a language other than 2924, type the correct primary language feature code in place of 2924.

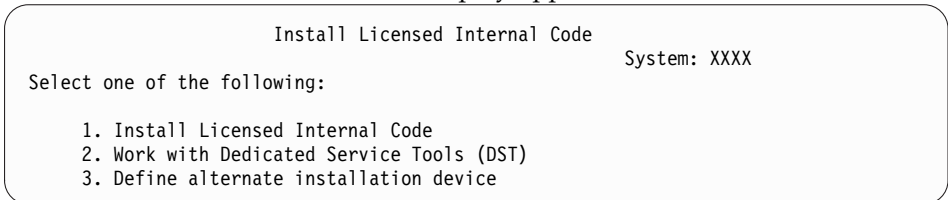
Press Enter.

9. After you enter the language feature, the Confirm Language Group display appears.



Press Enter.

10. The Install Licensed Internal Code display appears.



Attention: Starting with POWER6 models, you can do an IPL-type D from a tape device attached by a Fibre Channel interface only when it is

attached to an adapter without an input-output processor (IOP). For other system models and configurations, a tape device attached by a Fibre Channel interface needs to be set up as an alternate installation device.

If you use an alternate installation device, you need to ensure that you set up the device and that you enable the device. You also need to have the optical media or tape media that contains the Licensed Internal Code and your save media.

Either select the option to install Licensed Internal Code or the option to define an alternate installation device:

- Type 1 (Install Licensed Internal Code) if you are not using an alternate installation device. (The alternate installation device function supports installation from tape media that you have created. “Alternate installation device: Overview” on page 204 describes when you can use an alternate installation device.) If you are not using an alternate installation device, go on to step 14 on page 115.
- If you have an alternate installation device attached to the system, type 3 to verify its address and determine whether it is enabled or disabled. Continue with the Verifying Alternate Installation Device Subtask in step 11. If you have an alternate installation device configured and do not want to use it, type 3 to clear the alternate installation device configuration information.

Press Enter. This step could take some time.

11. Verifying and selecting alternate installation device subtask:

The Select Alternate Installation Device Bus display appears.

```

                                Select Alternate Installation Device Bus
                                System: XXXX
Type Option, press Enter.
  1=Select

Option      Bus Number      Selected
-           1
-           2
1           3                *
-           4
-           10
-           11
-           12
-           13

                                More.....

F2=Deselect Device  F3=Exit      F12=Cancel
```

- a. Verify that the selected device is on the correct system bus. Type 1 in the Options field next to the selected bus and press Enter to view information about the device that is attached to the bus. This might take several minutes. If you see the message No alternate installation device configured, wait one minute and refresh the display.
- b. When the Select Media Type display appears, select 1 for tape or 2 for optical media. Press Enter.

- c. The Select Alternate Installation Device display appears. Use this display to verify the resource name, type, model, and serial number for the device. The following display shows an example of a tape device.

```

Select Alternate Installation Device
System: SYSTEMA

Additional devices may be available for use. Press F5 to see
if any additional devices have been detected.

Type option, press Enter.
1=Select 5=Display details

Option  Bus  Resource
Number Name    Type  Model  Serial
-      1    TAP08  6386  001   00-11111
-      3    TAP19  3570  B11   13-22222
                                         Selected
                                         *

F2=Deselect device  F3=Exit  F5=Refresh  F12=Cancel

```

- d. Type 1 and press Enter to select the device to use or press F2 to deselect the currently selected device.
- e. The message Alternate installation device selected appears. Press F3 to return to the Install Licensed Internal Code display.
- f. Type 1 and press Enter to install the Licensed Internal Code.

End of verifying and selecting alternate installation device subtask.

12. If the system cannot find a load-source disk unit but can find candidate disk units to become the load-source disk unit, the following is an example of the information display that is shown.

```

Select Load Source Device

Type 1 to select, press Enter.

Option  Serial Number  Type  Model  Bus  Card  Adapter  Bus  Ct1  Dev
      21-8DFFC      4326  050   128   0    1    0    0    6
      02-84921      6718  050   128   0    2    0    0    5
      02-73054      6718  050   218   0    1    1    0    0
      21-150197     433B  074    42   0    0    2    0    7

```

To select the correct load-source disk unit, type 1 next to the appropriate device and press Enter. You cannot continue until a current valid load-source device is identified.

13. If there is an alternate installation device defined and enabled, the Confirm Alternate Installation Device display appears. Perform one of these tasks.
- To install from the alternate installation device, press Enter.
 - If you do not want to install from the alternate installation device and want to continue using the primary media, press F12 to Cancel. You see the Licensed Internal Code display. Perform step 10 on page 113 and select option 3 (Define alternate installation device). Perform step 11 on page 114 and deselect the alternate installation device.
14. The Install Licensed Internal Code (LIC) display appears on your console.

```

Install Licensed Internal Code (LIC)

Disk selected to write the Licensed Internal Code to:
Serial Number   Type   Model   I/O Bus   Controller   Device
xx-xxxxxxx    xxxx   xxx     x         x           x

Select one of the following:

1. Restore Licensed Internal Code
2. Install Licensed Internal Code and Initialize system
3. Install Licensed Internal Code and Recover Configuration
4. Install Licensed Internal Code and Restore Disk Unit Data
5. Install Licensed Internal Code and Upgrade Load Source

```

Type 2 (Install Licensed Internal Code and Initialize system) and press Enter.

15. Read the attention notice and reply to the Confirmation display.

Attention: This procedure causes existing data on the disk units assigned to this logical partition to be lost! Make sure you really want to perform this procedure.

The Initialize the Disk - Status display appears while the load source for the logical partition is being initialized.

16. The Install Licensed Internal Code - Status display appears on your console. You do not need to respond to this display. It will remain on your console for approximately 30 minutes. If you are using Operations Console, your display might disappear. To complete the Licensed Internal Code installation, the logical partition is automatically restarted at this time (a manual-mode IPL).

```

Install Licensed Internal Code - Status

Install of the Licensed Internal Code in progress.

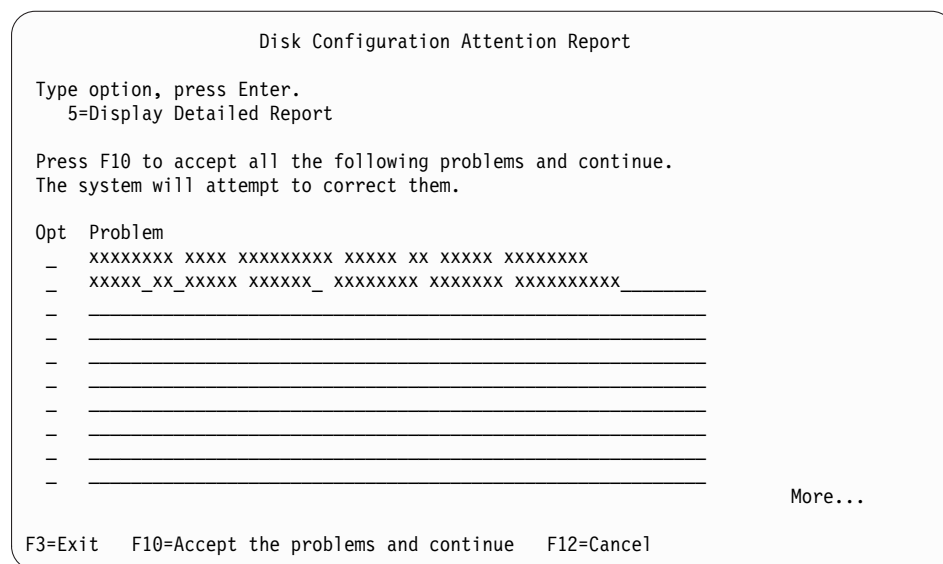
Percent complete |-----XX %-----|
                  +-----+

Elapsed time in minutes . . . . . :   x.x

Please wait.

```

17. If an error occurs, you might see a display that requires a response. Perform the action necessary as prompted by the display. Otherwise, continue with step 20 on page 117.
18. The Disk Configuration Attention Report display might appear. If it does, display the detailed report for each attention notice shown on the display. Press the Help key from the Disk Configuration Attention Report display for more information about your choices. You can also refer to the topic, "Disk configuration warning and error messages" on page 179 for more information.



- Note:** If the attention notice Disk unit not formatted for optimal performance appears on this display, do the following:
- a. Type a 5 and press Enter to display the detailed report.
 - b. Write down the information displayed. After the upgrade is completed, you will need this information to format these disk units to gain optimal performance.
 - c. Press F12 to cancel and return to the Disk Unit Attention Report.
 - d. Press F10 to accept the warnings and continue the IPL.

The Disk Configuration Attention Report display might also appear if a new disk configuration has been found. Press F10 to accept this new configuration.

19. If the console mode value is zero, the Accept Console display appears. If this display appears, follow these steps:
 - a. Press F10 to accept the current console type. The Accept and Set New Console Type on this IPL display appears. The old value (zero) and the new value to be set (your current console type) is shown.
 - b. Press Enter to set the new value and continue with these instructions.
20. After approximately 10 minutes, the IPL or Install the System display appears. The Licensed Internal Code is now installed. Do not remove the distribution media at this time.
21. If the Accept Console display in step 19 did not appear, set the console mode for this partition:
 - a. At the IPL or Install the system display, select option 3 to access Dedicated Service Tools (DST).
 - b. Sign on as security officer (*QSECOFR user profile / QSECOFR password*). When prompted, change the password to what you want to use for this partition.
 - c. Select option 5 (Work with DST environment).
 - d. Select option 2 (System devices).
 - e. Select option 6 (Console mode).
 - f. Select the valid console that you have for this logical partition.

Note: If you are using Operations Console (LAN) as your console type, press Enter on the verify window. You can also press F11 to review your network configuration.

- g. Select 1 (Yes) or 2 (No) for the option to allow the console to be taken over by another console in the event of a 5250 console failure (does not include twinaxial console). When this option is turned on, the system does not stop with a failure but continues to run uninterrupted. For more information, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center.

Press Enter and then press F3 to return to the DST main menu.

- h. Press F3 to exit DST and return to the IPL or Install the System display.

You have completed the installation of Licensed Internal Code on a new logical partition.

You are now ready to install the operating system. The “Installing IBM i on a new system or logical partition” on page 119 procedure will direct you to optionally add disk units or enable disk protection before the operating system is installed.

The optical media that you will need for the operating system and other licensed programs are listed in step 2 on page 119 of “Installing IBM i on a new system or logical partition” on page 119. Continue with step 10 on page 120.

Installing software on a new system or logical partition (without IBM i installed)

Follow these instructions to install the IBM i operating system and licensed programs on your new system or logical partition or to change the primary language when you are installing the operating system.

Refer to the IBM i globalization topic in the IBM i Information Center for any special considerations you might need to know about other languages.


Note:

- If you are installing software on a system, these instructions assume that the IBM i 7.1 release of the Licensed Internal Code is installed and the system is powered off. If you do not know what level of Licensed Internal Code is on your system, sign on to DST. Select option 7 (Start a Service Tool) and then select option 4 (Hardware Service Manager). The release at the top of the display should state V7R1M0.
- If you are installing software on a new logical partition, you need to complete the steps in “Installing Licensed Internal Code on a new logical partition” on page 111 first and then continue with step 10 on page 120 in this topic.

Before you begin to install software on a new system or logical partition

Verify these points before you install IBM i software on a new system or logical partition.

If you have not already done so, complete the tasks in the IBM i Information Center topic “Preparing to install the IBM i release” on page 107.

Do you plan to use logical partitions? Read the Planning for logical partitions topic in the IBM Systems Hardware Information Center. Additionally, refer to the Logical Partitioning  Web site (<http://www.ibm.com/eserver/iseres/lpar>).

For logical partitions only

If you perform these actions on a system with logical partitions, the instructions pertain only to that partition.
--

Installing IBM i on a new system or logical partition

Follow these steps to install the IBM i operating system on a new system or logical partition. You can optionally add disk units or enable disk protection before the operating system is installed.

1. Ensure that the system is powered off before you begin.
2. If you are using physical media, arrange the installation media that you plan to install in the following order (you might not have all of these). Verify that the media contains the correct primary language. See “Feature codes for language version” on page 216 for a description of the language version feature codes.
 - a. Licensed Machine Code.
 - b. IBM i operating system, IBM-supplied libraries QGPL and QUSRSYS, and all IBM i no-charge options.
 - c. No-charge licensed programs and keyed products.
 - d. Single licensed programs.

Keep the following installation media available for later use:

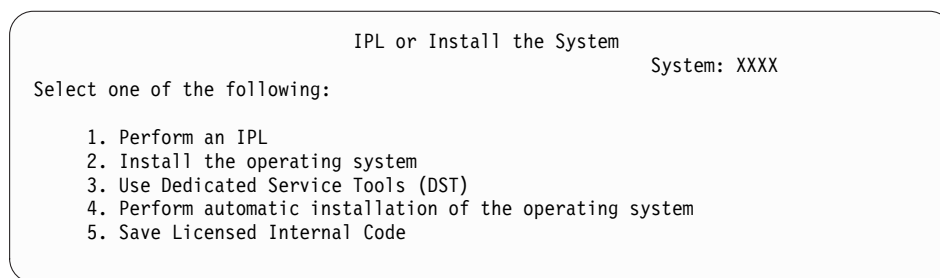
- a. Secondary Language Media (if ordered)
- b. Cumulative PTF Package (Cydddvrn_01, if ordered)

For descriptions of the optical media, see “Media labels and their contents” on page 212.

3. Ensure the following for the system:
 - If you are using a twinaxial console, the console for the system needs to be powered on.
 - If you are using Operations Console, you need a valid connection configuration for the system after you have run the Operations Console wizard. The console for the system needs to be at **Connecting console**. (To view the status in Operations Console, click the IBM i Access for Windows icon and double-click **Operations Console**.)
4. If the installation device has a separate power switch, set it to the On position.
5. Use the control panel to set the IPL type to **A** and set the mode to **Manual**.
6. Press the Enter button on the control panel.
7. Turn the power on for the system by pressing the power button.

Note: If either the Disk Configuration Error Report display or the Disk Configuration Warning Report display appears, go to “Disk configuration warning and error messages” on page 179 to determine the appropriate action.

8. The IPL or Install the System menu appears on your console.



If you have not already done so, set the console mode for your system:

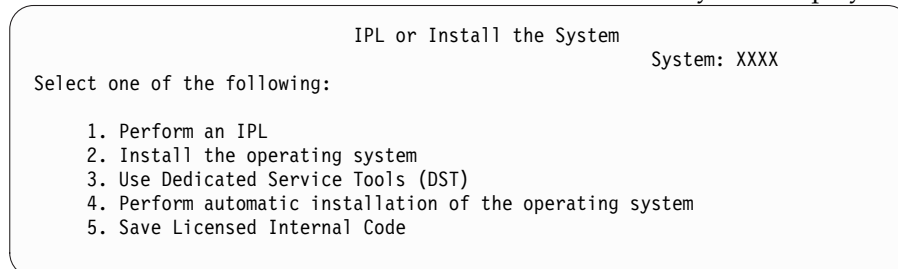
- a. At the IPL or Install the system display, select option 3 to access Dedicated Service Tools (DST).
- b. Sign on as security officer (*QSECOFR user profile / QSECOFR password*). When prompted, change the password to what you want to use for this partition.
- c. Select option 5 (Work with DST environment).
- d. Select option 2 (System devices).
- e. Select option 6 (Console mode).
- f. Select the valid console that you have for this partition.

Note: If you are using Operations Console (LAN) as your console type, press Enter on the verify window. You can also press F11 to review your network configuration.

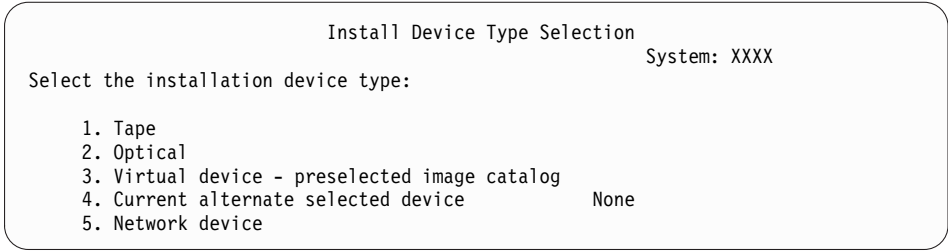
- g. Select 1 (Yes) or 2 (No) for the option to allow the console to be taken over by another console in the event of a 5250 console failure (does not include twinaxial console). When this option is turned on, the system does not stop with a failure but continues to run uninterrupted. For more information, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center.

Press Enter and then press F3 to return to the DST main menu.

- h. Press F3 to exit DST and return to the IPL or Install the System display.

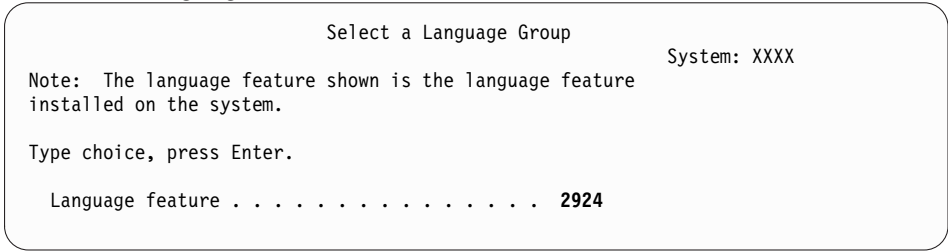


9. If you are using physical media, load the first volume of installation media that contains the operating system. Throughout these procedures, load the next volume when prompted by the system. When you are installing from optical media, wait until the In Use indicator goes out before you continue. Also ensure that you have removed other media from devices that are not involved in the upgrade.
10. On the IPL or Install the System display, type 2 and press Enter. The Install Device Type Selection display appears.



Type the number that corresponds to the correct device type and press Enter.

- 11. The Confirm Install of the Operating System display is shown on your console. Press Enter.
- 12. The Select a Language Group display, which shows the primary language currently on the system, appears. This language must be available on the installation media. Refer to “Feature codes for language version” on page 216 for a list of language feature codes.

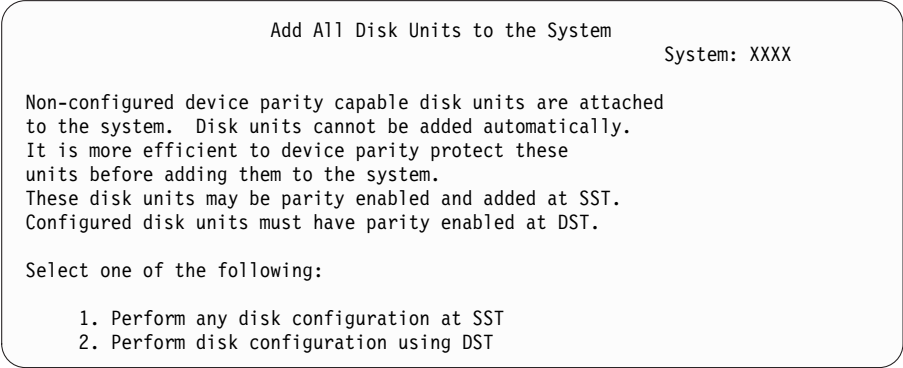


Verify that the displayed value is correct, or type the numbers of the feature code for the language you want. Press Enter.

- 13. After you enter the language feature, the Confirm Language Feature Selection display appears on your console. Press Enter.
- 14. If the Add All Disk Units to the System menu is not shown, go to the IPL Step in Progress display in step 16 on page 123.

Note: If you are installing on a single disk unit, ensure that you have enough storage. The minimum requirements for each system or logical partition are listed in “Determining disk storage space required for a new installation” on page 109.

- 15. Adding disk units subtask:
 - a. If any nonconfigured disk units that are capable of being protected by device parity are currently unprotected, the Add All Disk Units to the System display is shown. If the following display is not shown, go to step 15b on page 122.



It is much faster to start device parity protection on the disk units at DST before the disk units are added to the auxiliary storage pool configuration. To start device parity on the eligible disk units, do the following tasks from the Add All Disk Units to the System display:

- 1) Select option 2 to perform disk configuration at DST.
 - 2) Sign on at the Dedicated Service Tools Sign-on prompt and return to the Use Dedicated Service Tools (DST) menu.
 - 3) Select the option, Work with disk units.
 - 4) Select the option, Work with disk configuration.
 - 5) Section the option, Work with device parity protection.
 - 6) Select the option, Start device parity protection.
 - 7) A list of parity sets that are capable of running device parity protection are shown. Type 1 on each option line for each parity set.
 - 8) You might see a Confirm Continuation display that indicates that the system must perform a directory recovery. Press Enter to continue.
 - 9) The Confirm Starting Device Parity Protection display is shown. This shows the list of disk units that will have device parity protection. Press Enter to continue. An in-progress display that indicates the status of the function is shown.
 - 10) Return to the IPL or Install the System display.
- b. If you see the following display, continue with this step.


Add All Disk Units to the System System: XXXX

Select one of the following:

1. Keep the current disk configuration
2. Perform disk configuration using DST
3. Add all disk units to the system auxiliary storage pool
4. Add all disk units to the system ASP and balance data

If you do not want device parity protection, mirrored protection, or user ASPs, select option 3 (Add all disk units to the system auxiliary storage pool). By adding disk units before you install the operating system, you improve your overall system performance because the operating system is distributed across all of your disk units.

Attention: (For logical partitions only) Before you add disk units to this partition, ensure you have the correct I/O resources assigned. You might not want to configure all disk units now. Refer to the validated output from the System Planning Tool supplied by IBM for the configuration

selection. To access the tool, go to the System Planning Tool  Web site (<http://www.ibm.com/systems/support/tools/systemplanningtool/>).

Type 3 and press Enter.

Note: If either the Disk Configuration Error Report display or the Disk Configuration Warning Report display appears, go to “Disk configuration warning and error messages” on page 179 to determine the appropriate action.

- c. You could see the following display if your disk configuration has changed. Type 5 next to the problem and press Enter to display the detailed report.

```

                                Problem Report

Note: Some action for the problems listed below may need to
be taken. Please select a problem to display more detailed
information about the problem and to see what possible
action may be taken to correct the problem.

Type option, press Enter.
    5=Display Detailed Report

OPT  Problem
-   _____
-   _____

```

- d. If the following display appears, a disk unit that you selected to add to your disk configuration could already have data on it. If you choose to continue, any data that is on the disk units listed will be removed. Be certain that you want to configure the disk before you continue. Follow the instructions on the display. Press Enter to return to the Problem Report display. Press F10 to continue the Add Disk Unit subtask.

```

                                Possibly Configured Units

Problem: These non-configured units appear to be
configured units of some other disk configuration and
may contain valid data. This option will clear the
data from these units and destroy the other disk
configuration.

Press Enter to continue
Press F12=Cancel to return and change your choices.

Serial      Type  Model  Resource      Other System
Number      Type  Model  Name          Serial Number
-----
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
More..

F3=Exit      F12=Cancel

```

- e. The following display shows the percentage of disk units added. This display does not require a response.

```

                                Function Status

You selected to add units.

                                ___ % Complete

```

- f. When the process is completed, continue the software installation process with the next step. This completes the subtask for adding disk units.
16. Status displays appear on the console. You do not need to respond to any of these displays. The following is an example of a status display:

```

Licensed Internal Code IPL in Progress

IPL:
Type . . . . . : Attended
Start date and time . . : xx/xx/xx xx:xx:xx
Previous system end . . : Normal
Current step/total . . . : 1      16
Reference code detail . . : C6004050
IPL step . . . . . : Storage Management Recovery

```

The following list shows some of the IPL steps that are shown on the IPL Step in Progress display.

- Authority Recovery
- Journal Recovery
- Database Recovery
- Journal Synchronization
- Start the Operating System

17. The Install the Operating System display appears.

```

Install the Operating System

Type options, press Enter.

Install
option . . . . . 1      1=Take defaults (No other
                        options are displayed)
                        2=Change install options

Date:
Year . . . . . XX      00-99
Month . . . . . XX     01-12
Day . . . . . XX      01-31

Time:
Hour . . . . . XX     00-23
Minute . . . . . XX   00-59
Second . . . . . XX   00-59

```

Type the following and press Enter:

Install option: 1
Date (Use the current year, month, and day.)
Time (Use the current time, 24-hour clock.)

18. Status messages appear during the installation process. You do not need to respond to any of these status displays. The following is an example of a status display. The display is blank for a time between stage 4 and stage 5.

```

Message ID . . . : CPI2070      IBM i Installation Status

Stage 2  +-----+
         |                 33%                 |
         +-----+

Installation Objects
Stage Completed Restored
1 Creating needed profiles and libraries . . . . . : X

>> 2 Restoring programs to library QSYS . . . . . : 04548

3 Restoring language objects to library QSYS . . . :

4 Updating program table . . . . . :

5 Installing database files . . . . . :

6 Installing base directory objects. . . . . :

```

19. Messages similar to the following might appear:

```

Display Messages

Queue . . . . . : QSYSOPR      System:  XXXX
Library . . . . : QSYS        Program . . . . : *DSPMSG
Severity . . . . : 10         Delivery . . . . : *BREAK

Press Enter to continue.
System operator message queue QSYSOPR created again.
Console values lost.

```

Press Enter.

20. The Sign On display is shown.

```

Sign On

System. . . . : XXX
Subsystem . . : XXXXX
Display . . . : XXXXXXXX

User. . . . . QSECOFR
Program/procedure . . . . . _____
Menu. . . . . _____
Current library . . . . . _____

```

Type QSECOFR for the *User* prompt. Press Enter.

21. The IPL Options display appears.

```

                                IPL Options

Type choices, press Enter.

System date . . . . . XX / XX / XX      MM / DD / YY
System time . . . . . XX : XX : XX      HH : MM : SS
System time zone . . . . . Q0000UTC      F4 for list
Clear job queues. . . . . N              Y=Yes, N=No
Clear output queues . . . . . N          Y=Yes, N=No
Clear incomplete job logs . . . . . N    Y=Yes, N=No
Start print writers . . . . . Y          Y=Yes, N=No
Start system to restricted state . . . . N Y=Yes, N=No

Set major system options. . . . . Y      Y=Yes, N=No
Define or change system at IPL. . . . . N Y=Yes, N=No

Last power-down operation was ABNORMAL

```

Notes:

- Ignore the message on the bottom of the IPL Options display.
 - If you need to change system values, you can do so now. One example of a system value that you might change is the value for the security level (QSECURITY) system value.
Another example is the scan control (QSCANFCTL) system value. If you have not already done so, consider specifying *NOPOSTRST for the QSCANFCTL system value to minimize future scanning of some objects that are restored during the installation of licensed programs in the following steps. For more information on scanning and the system value settings, see the topic Scanning support in the IBM i Information Center.
- Type Y for the *Define or change the system at IPL* prompt. Follow the instructions on the displays.
- Type the following and press Enter.
- System date (Use the current date.)
 - System time (Use the current time, 24-hour clock.)
 - System time zone (Verify that it is correct or press F4 to select a time zone.)
 - Start system to restricted state Y
 - Set major system options Y

22. The Set Major System Options display appears.

```

                                Set Major System Options

Type choices, press Enter.

Enable automatic configuration . . . . . Y      Y=Yes, N=No
Device configuration naming . . . . . *NORMAL  *NORMAL, *S36,
                                                *DEVADR
Default special environment. . . . . *NONE     *NONE, *S36

```

Respond to the prompts on the Set Major System Options display.

- Enable automatic configuration

The value Y (Yes) automatically configures local devices. N (No) indicates no automatic configuration.

- Device configuration naming

Specify *NORMAL to use a naming convention unique to the IBM i operating system. The value *S36 uses a naming convention similar to System/36. Refer to the book *Local Device Configuration, SC41-5121-00*, for information about device configuration naming and *DEVADR.

- Default special environment

The default value *NONE indicates no special environment. *S36 sets up the System/36 environment. Refer to the book, *System/36 Environment Programming, SC41-4730 (V4R5 or earlier)*, for more information about working in the System/36 environment.

Press Enter.

23. Several Display Messages displays could be shown. Press Enter for each message display to continue.

The following display is an example of a message that could be shown:

```

                                Display Messages
                                System:  XXXX
Queue . . . . . : QSYSOPR          Program . . . . . : *DSPMSG
Library . . . . : QSYS             Library . . . . . :
Severity . . . . : 60              Delivery . . . . . : *BREAK

Press Enter to continue.
System object QWCSCPF created again during IPL.

```

24. The Edit Rebuild of Access Paths display could be shown. If it is, press Enter to continue.

25. You see the Status display again.

```

Message ID . . . : CPI2070          IBM i Installation Status

Stage 6 |-----+-----|
        |                    58%                    |
        +-----+-----+

Installation
Stage      Completed      Objects Restored
2 Restoring programs to library QSYS . . . . . : X      13637
3 Restoring language objects to library QSYS . . : X      01540
4 Updating program table . . . . . : X
5 Installing database files . . . . . : X
>> 6 Installing base directory objects . . . . . :
7 Completing installation . . . . . :

```

26. The Sign On display appears on the console after the installation has completed.

```

                                Sign On
                                System. . . . . : XXXX
                                Subsystem . . . . : XXXX
                                Display . . . . . : XXXXXXXX

                                User. . . . . : QSECOFR
                                Password . . . . . :
                                Program/procedure . . . . . : _____
                                Menu . . . . . : _____
                                Current library . . . . . : _____

```

Type the following and press Enter:

User: QSECOFR

Password: (Enter password, if required.)

27. A message Your password has expired might appear. Press Enter. The Change Password display appears. Change the password from QSECOFR to your own choice. First enter the old password, QSECOFR. Then enter the new password of your choice. Enter the new password again as verification.
28. Several Display Messages displays are shown. To continue, press Enter for each message display.

The following display is an example of a message that could be shown:

```

                                Display Messages
                                System:   XXXX
                                Queue . . . . . : QSYSOPR      Program . . . . . : *DSPMSG
                                Library . . . . . : QSYS         Library . . . . . :
                                Severity . . . . . : 10          Delivery . . . . . : *BREAK

                                Press Enter to continue.
                                Library QHLPSYS in SYSVAL QSYSLIBL not found.

```

29. The Work with Software Agreements display appears. Select to display the software agreements for *MCHCOD (which includes Licensed Internal Code) and the IBM i operating system (5770SS1). Read and accept these agreements. If the software agreements are declined, you are given the choice to either power down the system or return and accept the agreements. Press Enter.
30. When the System i Main Menu appears on your console, you have completed the task of installing the operating system.

You have completed this task.

To install additional licensed programs, continue with the tasks in “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 133.

Installing software on a new system (with IBM i installed)

Use these procedures if you already have the IBM i operating system on your new system and want to install other licensed programs.

The following instructions assume that IBM i 7.1 Licensed Internal Code and the operating system are installed, the primary language is correct, the console mode value is correct, and the system is powered off.

If you are not sure whether the operating system is already installed, contact your authorized service provider.

Before you begin to install software on a new system

Verify these points before you install licensed programs that are related to the IBM i operating system on a new system.

If you have not already done so, complete the tasks in the IBM i Information Center topic “Preparing to install the IBM i release” on page 107.

Note: If you have added a new disk unit to your system, you should load the operating system again to use that disk unit. This will improve the performance of your system by distributing the operating system across all of your disk units. Complete “Installing software on a new system or logical partition (without IBM i installed)” on page 118 if you are adding disk units. If you are planning to use device parity protection, auxiliary storage pools, or mirrored protection, refer to the topics under Recovering your system in the IBM i Information Center before you begin.

If you plan to use logical partitions, read the Planning for logical partitions topic in the IBM Systems Hardware Information Center. Additionally, refer to the Logical Partitioning Web site (www.ibm.com/eserver/series/lpar).

For logical partitions only

If you perform these actions on a system with logical partitions, the instructions pertain only to that partition.

Performing the initial program load (IPL)

To prepare the system for IBM i user operations, follow this procedure.

Note: If you already have the System i Main Menu on your console, go to “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 133 to install additional licensed programs.

1. Ensure that the system is powered off before you begin.
2. On your console, establish a connection to the system
3. If the installation device has separate on and off switches, verify that the switch is in the On position.
4. Set the IPL type to **A** and to set the mode to **Manual**.
5. Press the Enter button on the control panel.
6. Turn the system power on by pressing the power button.
7. After some time, the IPL or Install the System display appears.

```
                                IPL or Install the System
                                System: XXXX

Select one of the following:

    1. Perform an IPL
    2. Install the operating system
    3. Use Dedicated Service Tools (DST)
    4. Perform automatic installation of the operating system
    5. Save Licensed Internal Code
```

Type 1 and press Enter.

8. Status displays are shown on the console. You do not need to respond to any of these displays. The following is an example of a status display:

Licensed Internal Code IPL in Progress

```
IPL:
Type . . . . . : Attended
Start date and time . . : xx/xx/xx xx:xx:xx
Previous system end . . : Normal
Current step/total . . . : 1      16
Reference code detail . . : C6004050
IPL step . . . . . : Storage Management Recovery
```

The following list shows some of the IPL steps that are shown on the IPL Step in Progress display.

- Authority Recovery
- Journal Recovery
- Database Recovery
- Journal Synchronization
- Start the Operating System

Some of the IPL steps could take a long time.

9. Several messages might appear on the console. The following is an example of a message that might appear:

```
Display Messages
Queue . . . . . : QSYSOPR      System. . . . . : XXXX
Library . . . . : QSYS        Program . . . . : *DSPMSG
Severity . . . . : 10         Delivery . . . . : *BREAK

Press Enter to continue.
System object xxxxx created again during IPL.
```

To continue, press Enter after each message that you receive.

10. The Sign On display appears.
Note: If you need to change the password for the QSECOFR user profile, record the new password now. Store it in a safe location.
11. The IBM i IPL in Progress display appears.
12. If the Select Products to Work with PTFs display appears, press F3 (Exit).
13. The IPL Options display appears.

```

                                IPL Options

Type choices, press Enter.

System date . . . . . XX / XX / XX      MM / DD / YY
System time . . . . . XX : XX : XX      HH : MM : SS
System time zone . . . . . Q0000UTC      F4 for list
Clear job queues. . . . . N              Y=Yes, N=No
Clear output queues . . . . . N          Y=Yes, N=No
Clear incomplete job logs . . . . . N    Y=Yes, N=No
Start print writers . . . . . Y          Y=Yes, N=No
Start system to restricted state . . . . Y  Y=Yes, N=No

Set major system options. . . . . Y      Y=Yes, N=No
Define or change system at IPL. . . . . N  Y=Yes, N=No

Last power-down operation was ABNORMAL

```

Notes:

- Ignore the message on the bottom of the IPL Options display.
- If you need to change system values, you can do so now. One example of a system value that you might change is the value for the security level (QSECURITY) system value.

Another example is the scan control (QSCANFCTL) system value. If you have not already done so, consider specifying *NOPOSTRST for the QSCANFCTL system value to minimize future scanning of some objects that are restored during the installation of licensed programs in the following steps. For more information on scanning and the system value settings, see the topic Scanning support in the IBM i Information Center.

Type Y for the *Define or change the system at IPL* prompt. Follow the instructions on the displays.

Type the following and press Enter.

- System date (Use the current date.)
- System time (Use the current time, 24-hour clock.)
- System time zone (Verify that it is correct or press F4 to select a time zone.)
- Start system to restricted state Y
- Set major system options Y

14. Additional display messages could be shown. Press Enter after each message to continue.
15. The Set Major System Options display appears.

```

                                Set Major System Options

Type choices, press Enter.

Enable automatic configuration . . . . . Y      Y=Yes, N=No
Device configuration naming . . . . . *NORMAL  *NORMAL, *S36,
                                                *DEVADR
Default special environment. . . . . *NONE     *NONE, *S36

```

Respond to the prompts on the Set Major System Options display.

- Enable automatic configuration
The value Y (Yes) automatically configures local devices. N (No) indicates no automatic configuration.
- Device configuration naming
Specify *NORMAL to use a naming convention unique to the IBM i operating system. The value *S36 uses a naming convention similar to System/36. Refer to the book *Local Device Configuration, SC41-5121-00*, for information about device configuration naming and *DEVADR.
- Default special environment
The default value *NONE indicates no special environment. *S36 sets up the System/36 environment. Refer to the book, *System/36 Environment Programming, SC41-4730 (V4R5 or earlier)*, for more information about working in the System/36 environment.

Press Enter.

16. The Edit Rebuild of Access Paths display could be shown. If it is, press Enter to continue.
17. The Work with Software Agreements display appears. Select to display the software agreements for *MCHCOD (which includes Licensed Internal Code) and the IBM i operating system (5770SS1). Read and accept these agreements. If the software agreements are declined, you are given the choice to either power down the system or return and accept the agreements.
18. Several blank displays and Display Messages displays appear. To continue, press Enter for each message display. Do not respond to blank displays.

The following display is an example of a message that appears:

```
Display Messages
Queue . . . . . : QSYSOPR      System. . . . . : XXXX
Library . . . . : QSYS        Program . . . . : *DSPMSG
Severity . . . . : 10         Library . . . . :
                               Delivery . . . . : *BREAK

Press Enter to continue.
All jobs in system lost. Job and output queues cleared.
```

19. The System i Main Menu appears on your console.

You have completed this task.

To install additional licensed programs, continue with the tasks in “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 133.

Installing additional licensed programs

To install additional licensed programs or optional parts of licensed programs on your system or IBM i logical partition, follow these procedures. (Separately ordered features are installed as a licensed program.)

You can use these procedures to install most software products. However, if you received any other special installation instructions with your order, make sure that you verify these instructions before you install the software product.

Before you begin to install additional licensed programs

Use this information to add additional licensed programs either as part of an IBM i software release upgrade or independently of one.

If you have not already done so, complete the tasks in “Preparing to install the IBM i release” on page 107.

If you install an additional licensed program independently of a software release upgrade, check the following:

- Ensure that you have a recent copy of the cumulative PTF package (SF99710). When you order the cumulative PTF package, you also get the latest PTF HIPER Group CD-ROM (SF99709) and the Database Group CD-ROM (SF99701).
- Use the preventive service planning (PSP) information to determine if any prerequisite PTFs will need to be installed or if any special instructions are included for installing the licensed program.

The PTFs for licensed programs are on a separate media. Use the *PTF Shipping Information Letter* to install the cumulative PTF package after adding additional licensed programs.

If you add additional licensed programs and you have a secondary language installed on your system, you must install the secondary language after you install the licensed programs. Otherwise, the added licensed program will not have secondary language support.

Note: Restricted state required. The system must be in a restricted state to install the following libraries and options of the operating system.

- IBM i libraries QGPL and QUSRSYS
- IBM i option 3 - Extended Base Directory Support
- IBM i option 12 - Host Servers

Some licensed programs and libraries require a restricted state, while others only require a partially restricted system. Other licensed programs might require special actions before saving, restoring, or installing a new copy of the product. However, to avoid installation failures and to get the best performance during your upgrade, put the system in a restricted state.

If you want to install other licensed programs while the system is not in a restricted state, you can skip steps 3a through 3e of “Using the Work with Licensed Programs menu to install IBM licensed programs.”

Do you plan to use or are you using logical partitions? Read the Planning for logical partitions topic in the IBM Systems Hardware Information Center.

Do you plan to use an image catalog (virtual media device) to install? Read the topic “Preparing to upgrade or replace software using an image catalog” on page 39 to create a device, image catalog, and an image catalog entry.

Using the Work with Licensed Programs menu to install IBM licensed programs

If you have logical partitions, you must perform this procedure on each IBM i logical partition to which you want to install the IBM licensed programs.

1. If you are not already signed on to the system as the security officer (QSECOFR user profile), do so now.

Note: The System i Main Menu (or the menu you chose as your initial menu) appears on the console.

2. If you are installing from an image catalog (virtual media device), the setup instructions are in the topic “Preparing to upgrade or replace software using an image catalog” on page 39.
If you are installing from optical media, insert the volume of the licensed program that you want to install into the installation device. If this is a new installation, insert the first volume containing the operating system. For more information about the optical media you received with your order, see “Media labels and their contents” on page 212. Wait until the In Use indicator goes out before you continue.
3. If you are installing from virtual optical storage using the Network File System, the setup instructions are in the topic “Preparing to upgrade or replace software with virtual optical storage using the Network File System” on page 44.
4. Do the following to put the system in a restricted state and filter the messages that appear.
 - a. Type CHGMSGQ QSYSOPR *BREAK SEV(60) and press Enter.
 - b. A message display could appear. Press Enter.
 - c. Type ENDSBS *ALL *IMMED and press Enter.
 - d. When the following message appears, press Enter to continue:
ENDSBS SBS(*ALL) command being processed
 - e. The message System ended to restricted condition appears. Press Enter to continue.
 - f. Type CHGMSGQ QSYSOPR SEV(95) and press Enter.
 - g. A message display could appear. Press Enter.
5. Type GO LICPGM and press Enter.
6. The Work with Licensed Programs display appears.

```
LICPGM                Work with Licensed Programs                System:  XXXX
Select one of the following:

Manual Install
  1. Install all

Preparation
  5. Prepare for install

Licensed Programs
 10. Display installed licensed programs
 11. Install licensed programs
 12. Delete licensed programs
 13. Save licensed programs
```

If you were referred here from step 4 on page 89, complete this step and then return to step 5 on page 90. If you are following the tasks in this topic and want to accept software agreements for your licensed programs individually, continue with step 7 on page 135.

If you have many licensed programs to install, accepting them together is faster than accepting them individually through manual installation. If you want to preaccept your licensed program agreements all at one time, select option 5 (Prepare for install).

- a. Select the option to work with software agreements. If a licensed program that you want to install does not appear on the Work with Software Agreements display, use F22 (Restore software agreements). Otherwise, continue with the next step.
 - b. Type a 5 to display the software agreements for the licensed programs that you want to install and press Enter. Press F14 to accept the software agreements and then return to the Work with Licensed Programs display.
7. On the Work with Licensed Programs display, either type 1 (Install all) or type 11 (Install licensed programs). Read the following note to help you decide.

Note: If you want to install all licensed programs that are on the distribution media, use Manual Install option 1, Install all. This will save time for the installation. If you want most of the licensed programs on the media, then Manual Install option 1 is also the preferred choice. You will have to delete the extra unwanted licensed programs. The Manual Install display appears after selecting Manual Install option 1.

Type the following on this display:

- Install option: 2 (2=all products)
- Installation device: OPT01
- Replace if current: N
- Nonaccepted agreement: 2 (2=Display software agreement)
- Automatic IPL: N

In this example, OPT01 is used for the installation device. If you use a different naming convention, type the name that you have assigned to the installation device.

For more information about using option 1, refer to “Manual installation Option 1. Install all” on page 221.

Press Enter. If you typed 1, continue with step 11 on page 137 of these instructions.

8. If you typed 11, the Install Licensed Programs display appears. Page through the display to find the licensed programs you want. Type a 1 in the Option column next to the licensed programs to be installed.

Install Licensed Programs System: XXXX

Type options, press Enter.
1=Install

Option	Licensed Program	Product Option	Description
—	5770SS1	—	Library QGPL
—	5770SS1	—	Library QUSRSYS
—	5770SS1	1	Extended Base Support
—	5770SS1	2	Online Information
—	5770SS1	3	Extended Base Directory Support
—	5770SS1	5	System/36 Environment
—	5770SS1	6	System/38 Environment
—	5770SS1	7	Example Tools Library
—	5770SS1	8	AFP Compatibility Fonts
—	5770SS1	9	*PRV CL Compiler Support
—	5770SS1	12	Host Servers
—	5770SS1	13	System Openness Includes

More...

F3=Exit F11=Display status/release F12=Cancel F19=Display trademarks

Notes:

- The following items are preselected if you are installing licensed programs as part of a new system installation.

- 5770-SS1 Library QGPL
- 5770-SS1 Library QUSRSYS
- 5770-SS1 option 1, Extended Base Support
- 5770-SS1 option 3, Extended Base Directory Support
- 5770-SS1 option 30, QSHELL
- 5770-SS1 option 33, Portable App Solutions Environment
- 5770-DG1, IBM HTTP Server for i
- 5761-JV1, IBM Developer Kit for Java
- 5761-JV1 option 11, Java SE 6 32 bit

If you are adding additional (new) licensed programs or optional parts, these items would be preselected only if they are in an error state.

- A licensed program you want to install might not be listed on the Install Licensed Programs display. If a licensed program is not listed, it can be added to the list by entering information into the blank fields at the top of the list. After you press Enter, this product then appears on the list with the other products.

- Type 1 in the Option column.
- Type the product identifier in the Licensed Program column.
- Type the product option value in the Product Option column.
- Press Enter.

When you are typing the product option, the system accepts only the following three values: *BASE, option number, or *ALL.

- A value of *BASE installs only the base product of the associated product identifier.
- The product option number installs only the particular option of the associated product identifier. To be able to install options, you must install the base product (*BASE).
- A value of *ALL installs the base product and all options of the associated product identifier that are found on the media.

Keep in mind that licensed programs that you add will appear on the list with only the product identifier and will not give a descriptive name of the product. Also, you should check the documentation that came with the product to see whether there are any special instructions.

If you get a message that the product already appears in the list, scroll down to the product. Make sure that there is a 1 in the Option column. Make sure that it is selected for installation.

Press Enter.

9. The Confirm Install of Licensed Programs display appears on the console. Press Enter to confirm your choices.
10. The Install Options display appears.

```

                                Install Options
                                System:  XXXX
Type choices, press Enter.
Installation device . . . . . OPT01      Name
Objects to install . . . . . 1          1=Programs and language objects
                                       2=Programs
                                       3=Language objects
Nonaccepted agreement. . . . . 2        1=Do not install licensed program
                                       2=Display software agreement
Automatic IPL . . . . . N              Y=Yes
                                       N=No

```

Type the following on this display:

- Installation device: OPT01 (In this example, OPT01 is used for the installation device. If you use a different naming convention, type the name that you have assigned to the installation device.)
 - Objects to install: 1
 - Nonaccepted agreement: 2
 - Automatic IPL: N
11. One or both of the following displays show the status of the licensed programs and language objects as they are being installed on the system. You do not need to respond to these status displays.

```

                                Installing Licensed Programs
                                System:  XXXX
Licensed programs processed . . . . . : 0 of XXX
Licensed program install in progress

```

The following display is an example of the display that appears during the installation process.

```

                                Installing Licensed Programs
                                System:  XXXX
Licensed programs processed . . . . . : X of XXX
Licensed
Program Option Description
5770SS1 12 Host Servers
Type
2924

```

Note: This display shows which licensed programs and optional parts of licensed programs are being installed. After the *PGM objects and *LNG objects for each licensed program or optional part have been installed, the licensed program identifier disappears from the display and the number in the licensed programs processed field changes to show how many are processed.

12. You might see the Display Messages display. If you have another media volume that contains licensed programs to load, you can load it at this time. If you are installing from optical media, wait for the In Use indicator to go out before responding to the message.

```

                                Display Messages
Queue . . . . . : QSYSOPR          System: XXXX
Library . . . . : QSYS            Program . . . . : *DSPMSG
Severity . . . . : 95             Library . . . . :
                                Delivery . . . . : *BREAK

Type reply (if required), press Enter.
Load the next volume in optical device OPT01 (X G)
Reply . . . . G

```

Type G and press Enter. After you load each volume, type G and press Enter. If there are no more volumes to load that contain licensed programs, or if you want to end the loading process, type X and press Enter.

13. If a licensed program requires acceptance of a software agreement, the Software Agreements display appears. Do either of the following:
 - Press F14 to accept the agreement and allow the licensed program to continue installing.
 - Press F16 to decline the agreement and end the installation of that licensed program.
14. The Work with Licensed Programs display appears on your console when the installation process is completed. One of the following messages appears on the bottom of the Work with Licensed Programs display.

Work with licensed programs function not complete. Go to the topic Chapter 14, “Troubleshooting software installation problems,” on page 163 to determine the problem.

Work with licensed programs function has completed. Continue with the next step.
15. Verify the installed status values of your licensed programs and check for compatibility. It is important to make sure all of your licensed programs are compatible with the operating system.

Use LICPGM menu option 10 (Display licensed programs) to see the release and installed status values of the installed licensed programs. If the installed status value of a licensed program is *COMPATIBLE, it is ready for use. If the installed status value of a licensed program is *BACKLEVEL, the licensed program is installed, but its version, release, and modification is not compatible with the currently installed level of the operating system. Check the topic, “Licensed program releases and sizes” on page 185, to verify the current version, release, and modification of the licensed program. “Installed status values” on page 218 lists the possible installed status value descriptions.

You have completed this task.

1. Do you have more licensed programs or optional parts to install, but they did not appear in the list displayed in step 8 on page 135 (or could not be added to the list)?
 - **No.** Go to the next step (step 2).
 - **Yes.** Go to “Using the Restore Licensed Programs command to install IBM or non-IBM licensed programs” on page 139 to install these licensed programs or optional parts.
2. Do you need to install a secondary language?
 - **No.** Go to the next step (step 3 on page 139).
 - **Yes.** Go to “Installing a secondary language” on page 140 and complete the instructions.

3. You must complete the installation process before you put your system into operation. Go to “Checklist: Completing the IBM i installation” on page 144 and complete the instructions.

Using the Restore Licensed Programs command to install IBM or non-IBM licensed programs

To use the IBM i Restore Licensed Programs (RSTLICPGM) command to install licensed programs on a system, follow these procedures.

You might be instructed to use the RSTLICPGM command to install non-IBM licensed programs. All IBM-supplied licensed programs, including Programming Request for Price Quotations (PRPQs), licensed program offerings (LPOs), and single-set licensed programs, should have been installed already by using the LICPGM menu options 1 or 11, or during automatic installation.

Note: If you do not have non-IBM licensed programs, you can skip this task. If you need to install a secondary language, go to “Installing a secondary language” on page 140 and complete the instructions. Otherwise, you must complete the installation process and then go to “Checklist: Completing the IBM i installation” on page 144 and complete the instructions.

1. You might have received special installation instructions with these products. If you did, you should use those instructions.
2. Load the media containing the licensed program or optional part in the installation device.
3. If you have non-IBM software agreements to accept, you can either accept all your licensed program agreements at one time, such as when you install products in a batch process, or you can accept them individually later. To accept all your software agreements now, type G0 LICPGM. Select option 5 (Prepare for install).
 - a. Select the option to work with software agreements. On the Work with Software Agreements display, use F22 (Restore software agreements).
 - b. Type a 5 to display the software agreements for the licensed programs that you want to install and press Enter. Press F14 to accept the software agreements and then return to the Work with Licensed Programs display.
4. In the following steps, OPT01 is used for the installation device. If you are using a different naming convention, use the name you have assigned to the installation device.

To install a new licensed program, type the command:

```
RSTLICPGM LICPGM(xxxxxxx) DEV(OPT01) OPTION(*BASE)
```

where xxxxxx is the product identifier for the licensed program you are installing.

Press Enter. You might see an online software agreement. If you accept the software agreement, you can continue to install and use the program.

5. To install a new optional part, type the command:

```
RSTLICPGM LICPGM(xxxxxxx) DEV(OPT01) OPTION(n)
```

where xxxxxx is the product identifier for the licensed program you are installing and *n* is the option number.

Press Enter. You might see an online software agreement. If you accept the software agreement, you can continue to install and use the option.

6. Repeat steps 4 on page 139 and 5 on page 139 until you have installed all of the new licensed programs and optional parts that could not be installed in “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 133.

You have completed this task.

1. Do you need to install other licensed programs such as Lotus® Domino®, or WebSphere®?
 - **No.** Go to the next step.
 - **Yes.** Go to the IBM i Information Center e-business and Web serving category.
2. Do you need to install a secondary language?
 - **No.** Go to the next step.
 - **Yes.** Go to “Installing a secondary language” and complete the instructions.
3. You must complete the installation process before you put your system into operation. Go to “Checklist: Completing the IBM i installation” on page 144 and complete the instructions.

Installing a secondary language

Follow these instructions to install a new IBM i secondary language on a system or logical partition.

Before you begin to install a secondary language

Verify the following tasks before you install a secondary language for the IBM i operating system.

Complete the tasks in the IBM i Information Center topic: “Preparing to install the IBM i release” on page 107. Pay particular attention to the “Globalization and IBM i software installation” on page 19 topic for more information about installing and using secondary languages.

Installing secondary languages for IBM licensed programs

Follow these steps to install an IBM i secondary language for IBM licensed programs.

1. You must sign on to the system as QSECOFR. If you are not, sign off and then sign on again using QSECOFR.
2. Write down the national language version identifier of the secondary language media. You will need this in step 8 on page 141. _____
To find the appropriate feature code for your language, refer to “Feature codes for language version” on page 216.
3. Load the secondary language media volume in the installation device.
4. Type the following command on any IBM i control language (CL) command line and press Enter:
`CHGMSGQ QSYSOPR *BREAK SEV(95)`
5. A message display could appear. Press F3 (Exit).

Note: Ignore the messages that are shown.

6. Type GO LICPGM on any CL command line and press Enter:

- The Work with Licensed Programs menu appears. Use the page down or rollup key to see the second display of the Work with Licensed Programs menu.

```

LICPGM                Work with Licensed Programs                System: XXXX

Select one of the following:

Secondary Languages
 20. Display installed secondary languages
 21. Install secondary languages
 22. Delete secondary languages
  
```

Type 21 and press Enter.

- The Install Secondary Languages display appears.

```

                                Install Secondary Languages                System:  XXXX

Primary language . . . . . : 2924
Description . . . . . : English

Type options, press Enter.
 1=Install

Option Language Description Library Installed
-      2902 Estonian      QSYS2902 Release
-      2903 Lithuanian    QSYS2903
-      2904 Latvian       QSYS2904
-      2905 Vietnamese    QSYS2905
-      2906 Lao           QSYS2906
-      2909 Belgian English QSYS2909
1     2911 Slovenian     QSYS2911
-      2912 Croatian      QSYS2912
  
```

Use the Page Down key until you see the language that you want to install. Type 1 in the option column next to the language you want to install. You can install only one language at a time. Press Enter.

- After the language feature is entered, the Confirm Install of Secondary Languages display is shown.

```

                                Confirm Install of Secondary Languages        System:  XXX

Press Enter to confirm your choices for 1=Install.
Press F12 to return to change your choices.

Option Language Description Library Installed
 1      2911 Slovenian     QSYS2911 Release
  
```

Press Enter.

- The Install Option for Secondary Languages appears.

```

                                Install Option for Secondary Languages        System:  XXX

Type choice, press Enter.

Installation device . . . OPT01      Name
Replace if Current . . . N           Y=Yes
                                           N=No
  
```

Type the following and press Enter:

Installation device: OPT01 (See note.)
 Replace if Current: N

Note: OPT01 is used for the installation device in this example. If you are using a different naming convention, type the name you have assigned to the installation device.

One or both of the following displays show the status of the language objects as they are installed on the system.

```

Installing Licensed Programs
System: XXXX

Licensed programs processed . . . . . : 0 of XXX

Licensed program install in progress
  
```

The following display is an example of the display that appears during the installation process.

```

Installing Licensed Programs
System: XXXX
Licensed programs processed . . . . . : X of XXX

Licensed
Program  Option  Description          Type
5770WDS  *BASE   Rational Development Studio  2911
  
```

- If you see the following message, load the next volume of the secondary language media and continue the installation.

Note: Be certain that the label on the next volume is for the same secondary language.

```

Display Messages
System: XXXX
Queue . . . . . : QSYSOPR      Program . . . . . : *DSPMSG
Library . . . . : QSYS          Library . . . . . :
Severity . . . . : 95           Delivery . . . . . : *BREAK

Type reply (if required), press Enter.
Load the next volume in optical device OPT01 (X G)
Reply . . . . G
  
```

Type G and press Enter. After you load each volume, type G and press Enter. If there are no more volumes to load that contain licensed programs, or if you want to end the loading process, type X and press Enter.

- The Work with Licensed Programs display appears on your console when the installation process is completed. One of the following messages appears on the bottom of the Work with Licensed Programs display.

Work with licensed programs function not complete. Go to the topic Chapter 14, "Troubleshooting software installation problems," on page 163 to determine the problem.

Work with licensed programs function has completed. Continue with the next step.

Note: Some licensed program options do not have language objects or are not supported for secondary languages. For example, options 6, 7, and 9 of the operating system are not supported. Option 8 of the operating system does not have any language objects. You can use LICPGM menu option 20 to see the products that have secondary languages installed.

You have completed this task.

1. Do you have more secondary languages to install?
 - **No.** Go to the next step.
 - **Yes.** Go back to step 2 on page 140 at the beginning of this topic.
2. Do you need to install secondary languages for licensed programs that are not shown in the list using option 11 of the Work with Licensed Programs menu?
 - **No.** Go to the next step.
 - **Yes.** Go to “Installing secondary languages for non-IBM licensed programs” to install secondary languages for these licensed programs.
3. You must complete the installation process before you put your system into operation. Go to “Checklist: Completing the IBM i installation” on page 144 and complete the instructions.

Installing secondary languages for non-IBM licensed programs

To install a secondary language for non-IBM licensed programs, follow these steps.

You might be instructed to use the IBM i Restore Licensed Program (RSTLICPGM) command to install secondary languages for non-IBM licensed programs. All IBM-supplied licensed programs, including Programming Request for Price Quotations (PRPQs), licensed program offerings (LPOs), and single-set licensed programs, should have had secondary languages installed already by using the LICPGM menu option 21.

Note: If you do not have non-IBM licensed programs, you can skip this task. However, you must complete the installation process. Go to “Checklist: Completing the IBM i installation” on page 144 and complete the instructions.

1. You might have received special installation instructions with independently shipped licensed programs (those that are not on the same media as the software release). If you did, you should use those instructions.
2. Load the media volume containing the secondary language that you want to install.

In the following steps, OPT01 is used for the installation device. If you are using a different naming convention, use the name you have assigned to the installation device.

3. To install a secondary language for a licensed program, type this command and press Enter:

```
RSTLICPGM LICPGM(xxxxxxx) DEV(OPT01)
OPTION(*BASE) RSTOBJ(*LNG) LNG(29xx)
```

where xxxxxx is the product identifier for the licensed program and 29xx is the national language version feature code.

4. To install secondary language for an optional part of a licensed program, type this command and press Enter:

```
RSTLICPGM LICPGM(xxxxxxx) DEV(OPT01)
OPTION(n) RSTOBJ(*LNG) LNG(29xx)
```

where *xxxxxxx* is the product identifier for the licensed program, *n* is the option number, and *29xx* is the national language version feature code.

5. Repeat steps 3 on page 143 and 4 on page 143 until you have installed all of the secondary languages for the licensed programs and optional parts that were independently installed.

You have completed this task.

You must complete the installation process before you put your system into operation. Go to “Checklist: Completing the IBM i installation” and complete the instructions.

Checklist: Completing the IBM i installation

Use this checklist to complete the IBM i installation processes.

1. If you still have default passwords for your service tools user IDs, change them now. For information about service tools user IDs, see Change service tools user IDs and passwords in the IBM i Information Center.
2. Remove the media volume when the installation is complete. If your media is tape, wait for the tape to rewind completely.
3. If you have any IBM or non-IBM products with special installation instructions, install these products now. Check the product's documentation, and follow any special instructions.
4. Install the most current cumulative PTF package and PTF groups that you have ordered. (This package should have been ordered a week or two before your installation.) Use the instructions in the *PTF Shipping Information Letter*.

For more information about PTF groups, refer to “Ensuring you have the latest information” on page 109. To apply PTF groups, refer to the cover letter and instructions for the program temporary fix (PTF). For general information about applying PTFs, go to Install fixes in the IBM i Information Center.

Then return here and continue with the next step.

Note: If you do not install the cumulative PTF package now, you need to perform an IPL and let the Initialize System (INZSYS) process complete. Before you do, set the IPL type to **B** (or the IPL type you use for everyday operation) and then set the mode selection to **Normal**. “Initialize System (INZSYS) recovery” on page 178 has more information about INZSYS.

5. If your system is operating as a service partition and your system is not being managed by a Hardware Management Console, you might be required to perform a server IPL. A *server IPL* is an IPL whereby all logical partitions on the system are shut down at the same time. This allows, for example, a new level of the server firmware to be activated on the system.

You might be required to perform a server IPL after you apply or remove a server firmware PTF on the service partition.

- To find out if you need to do a server IPL, type DSPFMWSTS on the IBM i control language (CL) command line and press Enter. If a server IPL is required, the **Server IPL required** field is set to Yes.

- To find out if your system is operating as a service partition, type DSPMWSTS on the CL command line and press Enter. If your system is operating as a service partition, the **Service partition** field is set to Yes.

Note: When shutting down your service partition, reference codes D6xx430B or D6xx430A could be displayed for an extended amount of time. The xx should increment periodically and is a normal part of processing when server firmware code is being updated. Allow the system to complete the processing. Do not interrupt this process.

6. Look for messages in the install history log that indicate the status of the Initialize System (INZSYS) process:

- a. Type G0 LICPGM and press Enter.
- b. Type 50 (Display log) on the Work with Licensed Programs display, and press Enter.
- c. The Display Install History display appears. Press Enter.

The Display History Log Contents display appears. If you do not see either of the following messages on the display, wait a few minutes and select option 50 again. Find the message Initialize System (INZSYS) started. After this message appears, wait for a period of time and look for the Initialize System (INZSYS) processing completed successfully message (CPC37A9). If you do not see message CPC37A9 on the display, go to “Initialize System (INZSYS) recovery” on page 178 to determine the problem.

7. If you used an image catalog to perform your installation, you might want to remove all installation images from your system. To delete the catalog and all the optical images (image files), type the following:

```
DLTIMGCLG IMGCLG(mycatalog) KEEP(*NO)
```

8. If you used an image catalog to perform your installation and you used the Start ASP Balance (STRASPBAL) command to end the allocation for storage in the load-source disk unit before you upgraded, enter the Start ASP Balance (STRASPBAL) command to resume the allocation of storage for the load-source disk unit.

```
STRASPBAL TYPE(*RSMALC) UNIT(1)
STRASPBAL TYPE(*CAPACITY) ASP(1) TIMLMT(*NOMAX)
```

9. Install software license keys for your operating system and keyed products. Use the Work with License Information (WRKLICINF) command to display the installed keyed products to add license key data. For specific instructions, go to Add license key information in the IBM i Information Center.

After updating the license key information, return here and continue with the next step.

10. After you complete the installation process and before you make the system available to all users, set the usage limit for the software-license managed products. These products are listed on the Proof of Entitlement (POE), invoice, or other documents that you have received with your software order. For products that have a usage limit, you set the usage limit with the Work with License Information (WRKLICINF) command.

To set your usage limit, do the following:


- a. Type WRKLICINF and press Enter.
- b. On the Work with License Information display, press F11 (Display Usage Information). The usage limit number on each product that is listed on the POE, invoice, or other documents must match the usage limit number on the Work with License Information display for the associated product.

- c. Move the cursor to the line that contains the product name whose usage limit is to be updated.
- d. Type 2 (Change) and press Enter.
- e. When the Change License Information display is shown, update the usage limit prompt with the usage limit shown on the POE. In addition, update the threshold prompt with either *CALC or *USGLMT. Do not leave the threshold set to zero.

Note: If message CPA9E1B [Usage limit increase must be authorized. Press help before replying (C G).] is sent, respond by typing G.

- f. If the POE lists more products than the Work with License Information display, set the usage limits after you install those products.
11. If you have installed the product 5722-VI1, Content Manager, you can use the product. However, you must perform post-installation commands. For more information, refer to the Post Installation section in the product document *IBM ImagePlus VisualInfo for AS/400: Planning and Installation Guide, GC34-4585*.
12. If you have not already verified the compatibility of your licensed programs with the operating system, do this now. Use LICPGM menu option 10, Display installed licensed programs. If *COMPATIBLE is not listed next to a licensed program, then go to “Installed status values” on page 218 and determine how to proceed.
13. If you changed any other system value such as for example security level (QSECURITY) during your installation, change it back now.
14. If you changed the scan control (QSCANFCTL) system value to minimize future scanning of some objects that are restored before you installed your licensed programs, remove the *NOPOSTRST specification from this system value.
15. Some of the tasks in this topic require that you change the QSYSOPR severity code filter to 95. If you do not want to continue with this level or you want to change the delivery notification, type CHGMSGQ QSYSOPR DLVRY(xx) SEV(yy) where *xx* indicates the delivery notification and *yy* indicates the severity code that you want to use. The system defaults are DLVRY(*HOLD) SEV(0).
16. Save your system using your normal save procedures. Refer to the instructions in the Backing up your system topic in the IBM i Information Center. Make sure that the Initialize System (INZSYS) process is complete before you save your system.

Note: Before you start a save operation, use the Work with Active Jobs (WRKACTJOB) command to check the status of QDCPOBJx jobs. These jobs decompress objects. There could be more than one QDCPOBJx job. You can start your save operation if these jobs are in an inactive state. If you put the system in a restricted state by ending subsystems, the QDCPOBJx jobs become inactive. The jobs will restart when the system is not in a restricted state. For more information about decompressing objects, see “Compressed objects and storage space” on page 18.

17. If you have installed IBM i Access Family products, you might have other tasks that you need to complete. You can find further information about installing IBM i Access Family products in the following sources:
 - System i Access in the IBM i Information Center.
 - The System i Access Web site  (<http://www.ibm.com/systems/i/software/access>).

18. You might have installed licensed programs that require additional installation steps on PCs, or you might have programs that install on PCs through an IBM i Access Family function. If you have products such as this, complete your PC installation by using the instructions for the product.
19. If you have a IBM i integration with BladeCenter and System x that you stopped before you began the installation process, restart it now.
 - a. Type G0 NWSADM on the CL command line. The Network Server Administration display appears.
 - b. Select option 2, Start a network server.
20. If you installed 5770-TC1, TCP/IP Utilities, go to the topic TCP/IP setup in the IBM i Information Center for advanced configuration and setup information.
21. If you have customized an IBM-supplied program (for example, QSTRUP in library QSYS) in a previous release, make sure that you re-create this program to run correctly in the new release.
22. If you have duplicated any IBM-supplied objects, you might want to make new duplicates after you install the release. This allows you to take advantage of functions added in the new release. Examples of objects that you might duplicate include the following:
 - Message text descriptions
 - Commands
 - Command defaults

You have completed your installation.

Chapter 12. Changing the primary language of your system or logical partition

Use this procedure to install a primary language from either a secondary language media set or a primary language media set.

Follow the directions closely because you use different options based on the type of media.

Note:

- If you have logical partitions, you must perform these instructions for each partition to which you change the primary language.
- Image catalogs (virtual optical and tape devices) do not support the procedures in this topic.

Before you begin to change the primary language

Consider this information before you change the primary language on your system or IBM i logical partition.

Before you begin to change the primary language, read the topic, “Globalization and IBM i software installation” on page 19.

Obtain either of the following media:

- A complete set of the primary language media, which includes the Licensed Internal Code media and the IBM i (5770-SS1) media. Use either the steps in this topic collection (“Changing the primary language”) or, if you want to change your primary language as part of a release upgrade, then refer to Chapter 6, “Upgrading or replacing software using automatic installation,” on page 63 or Chapter 7, “Upgrading or replacing software using manual installation,” on page 73.
- Secondary language media. You need to ensure that the media contains the secondary language. Follow the instructions for using secondary language media in “Changing the primary language.”

The release and modification of your system must be the same as the release and modification of your secondary language media.

If you have not already done so, complete the tasks in “Preparing to install the IBM i release” on page 107.

Changing the primary language

Follow these steps to change the primary language on the system or IBM i logical partition.

Attention:

- You cannot change your primary language to a language you currently have installed as a secondary language on your system. You must delete the secondary language first before you can change

it to your primary language. Go to “Option 22. Delete secondary languages” on page 229 for more information about deleting secondary languages.

- If the primary language and the service tools language do not match, you might need to go to dedicated service tools (DST) and reinstall the correct service tools language. For instructions, see Changing the service tools language on your system or logical partition in the IBM i Information Center.

If you have secondary logical partitions, you must perform these instructions for each partition to which you change the primary language.

1. Begin at the IBM i Main Menu (or the menu you chose as your initial menu). Load the first volume of the media that contains the Licensed Internal Code. Have the operating system (5770-SS1) media available. Also ensure that you have removed other media from devices that are not involved in these procedures.

Note: Do not load your secondary language media at this time.

2. Use the control panel to switch the mode to **Manual**.
3. Type `PWRDWSYS OPTION(*IMMED) RESTART(*YES)` and press Enter.

Note: The default value for the Power Down System (PWRDWSYS) command is to display a confirmation. This can be changed by specifying `*NO` for the Confirm (CONFIRM) parameter: `CONFIRM(*NO)`. The default value for V5R4 is not to display a confirmation.

4. Wait for the IPL or Install the System display to appear on your console.

```
                                IPL or Install the System
                                System: XXXX
Select one of the following:
1. Perform an IPL
2. Install the operating system
3. Use Dedicated Service Tools (DST)
4. Perform automatic installation of the operating system
5. Save Licensed Internal Code
```

Type 2 (Install the operating system) and press Enter.

```
                                Install Device Type Selection
                                System: XXXX
Select the installation device type:
1. Tape
2. Optical
3. Virtual device - preselected image catalog
4. Current alternate selected device      None
5. Network device
```

Type 2 (Optical) and press Enter.

5. The Confirm Install of the Operating System display is shown on your console. Press Enter.
6. The Select a Language Group display shows the primary language currently installed on the system. Change the primary language of your system by specifying the language feature code of the secondary language media on this display.

For example, assume the primary language is English (2924) and you are using secondary language media to change it to Portuguese (2922). This display would appear showing 2924. You would type 2922.

```
                Select a Language Group                System: XXXX
Note: The language feature shown is the language feature
installed on the system.

Type choice, press Enter.

Language feature . . . . . 2924
```

Type the numbers of the feature code for the language you want and press Enter.

7. After the language feature code is entered, either the Confirm Language Feature Selection display or the Confirm Service Tools Language display appears on your console.

```
Confirm Service Tools Language

Language feature . . . . . : 2922

The IBM Licensed Internal Code (I.BASE.01) V7R1M0
media is required.

Press Enter to confirm your choice to install the service
tools language.

Press F5 to bypass installing the service tools language
and continue installing the operating system.

Press F12 to return to change your choice.
```

- . Changing the service tools language and the primary language.

```
                Confirm Language Feature Selection                System:  SYSTEM1
Language feature . . . . . : 2922

Press Enter to confirm your choice for language feature.
Installing the system will continue.
Press F12 to return to change your choice for
language feature.

F3=Exit  F12=Cancel
```

- . Confirm Language Feature Selection display when changing the primary language.

Press Enter.

8. Some status displays appear on the console. You do not need to respond to any of these status displays. The following is an example of a status display:

Licensed Internal Code IPL in Progress

```
IPL:
Type . . . . . : Attended
Start date and time . . : xx/xx/xx xx:xx:xx
Previous system end . . : Normal
Current step/total . . . : 1      16
Reference code detail . . : C6004050
IPL step . . . . . : Storage Management Recovery
```

The following list shows some of the IPL steps that are shown on the IPL Step in Progress display.

- Authority Recovery
- Journal Recovery
- Database Recovery
- Journal Synchronization
- Start the Operating System

Some of the IPL steps could take a long time.

9. You see the following display.

```
Message
Message ID . . . . . : CPA2055      Type . . . . . : Inquiry
From program . . . . . : ITLOADF0    Severity . . . . . : 99

Message . . . . . : The next volume in the sequence is needed to
                    continue the installation process.

Cause . . . . . : The end of the volume has been reached.

Recovery . . . . . : Load the next volume on the installation device.

Type choice, press Enter.

Reply . . . . . 1      1=Continue, 2=End installing
```

Load the first volume of the IBM-supplied installation media that contains the operating system.

10. The Install the Operating System display appears when the IPL is complete.

```

Install the Operating System

Type options, press Enter.

Install
option . . . . . 2          1=Take defaults (No other
                             options are displayed)
                             2=Change install options

Date:
Year . . . . . —          00-99
Month . . . . . —         01-12
Day . . . . . —          01-31

Time:
Hour . . . . . —         00-23
Minute . . . . . —       00-59
Second . . . . . —       00-59

```

Type the following and press Enter.

Install option: 2

Date (Use the current year, month, and day.)

Time (Use the current time, 24-hour clock.)

11. The Installation Status display appears. You do not need to respond to this display.
12. The Specify Install Options display appears.

```

Specify Install Options

Type options, press Enter.

Restore option . . . . . 4      1=Restore programs and language objects
                                from the current media set
                                2=Do not restore programs or
                                language objects
                                3=Restore only language objects
                                from current media set
                                4=Restore only language objects
                                from a different media set using the
                                current install device.

Job and output
queues option . . . . . 2      1=Clear, 2=Keep

Distribute IBM i on
available disk units . . . . 2  1=Yes, 2=No

```

- a. Type either of the following for the restore option:
 - 1) 3 (Restore only language objects from current media set) if you are installing from the primary language media.
 - 2) 4 (Restore only language objects from a different media set using the current install device) if you are installing from the secondary language media.
 - b. Type 2 for the Job and output queues option and press Enter.
13. Based on the type of media you are using, perform either of the following steps:
 - If you are using secondary language media, the Installation Status display appears. You do not need to respond to this display. When the following message appears, load the volume that contains secondary language media.

|
|
|

```

                                Message
Message ID . . . . . : CPA2057      Type . . . . . : Inquiry
From program . . . . . : XXXXXXXX   Severity . . . . : 99

Language ID . . . . . : 2922

Message . . . . . : The installation media containing language objects
                    for the system language is needed to continue the installation
                    process.

Recovery . . . . . : Load the installation media containing language objects
                    for the specified language.

Type choice, press Enter.

Reply . . . . . 1                1=Continue, 2=End installing

```

Type 1 and press Enter.

The system searches through the media and loads the necessary language information. The Installation Status display appears, indicating that the language is being changed (in stage 3). The installation continues through the remaining stages. This display does not require a response.

- If you are using primary language media, insert the correct media when you are prompted.
14. After the base part of the operating system has been changed to the new primary language, the Sign On display appears on your console. Continue with the steps to change the language objects for the licensed programs in “Installing the licensed programs after changing the primary language.”

Installing the licensed programs after changing the primary language

Follow these steps to install the licensed programs after you have changed the IBM i primary language.

If you have secondary logical partitions, you must perform this procedure on each partition to which you want to install the licensed programs.

1. Begin at the Sign On display.

```

                                Sign On
                                System. . . . : XXX
                                Subsystem . . . : XXXXX
                                Display . . . . : XXXXXXXX

User. . . . . QSECOFR
Password. . . . .
Program/procedure . . . . . _____
Menu. . . . . _____
Current library . . . . . _____

```

Type QSECOFR for the *User* prompt, and type your password, if required. Press Enter.

- Several display messages appear. To continue, press Enter on each display. The following is an example of a message that might appear:

```

                                Display Messages
                                System:   XXXX

Queue . . . . . : QSYSOPR          Program . . . . . : *DSPMSG
Library . . . . : QSYS             Library . . . . . :
Severity . . . . : 10              Delivery . . . . . : *BREAK

Press enter to continue.
System object QWCSCPF created again during IPL.

```

- The IPL Options display appears.

```

                                IPL Options

Type choices, press Enter.

System date . . . . . XX / XX / XX   MM / DD / YY
System time . . . . . XX : XX : XX   HH : MM : SS
System time zone . . . . . Q0000UTC   F4 for list
Clear job queues . . . . . N          Y=Yes, N=No
Clear output queues . . . . . N       Y=Yes, N=No
Clear incomplete job logs . . . . . N Y=Yes, N=No
Start print writers . . . . . Y       Y=Yes, N=No
Start system to restricted state . . . Y Y=Yes, N=No

Set major system options . . . . . Y   Y=Yes, N=No
Define or change system at IPL . . . . N Y=Yes, N=No

Last power-down operation was ABNORMAL

```

Note: Ignore the message on the bottom of the IPL Options display.

Type the following and press Enter.

- System date (Use the current date.)
- System time (Use the current time, 24-hour clock.)
- System time zone (Verify that it is correct or press F4 to select a time zone.)
- Start system to restricted state Y
- Set major system options N

- Additional display messages could be shown.

Press Enter after each message to continue.

- The System i Main Menu (or the menu you chose as your initial menu) appears on your console.

Type CHGMSGQ QSYSOPR *BREAK SEV(95) and press Enter.

- A message display could appear. Press Enter.

- The System i Main Menu (or the menu you chose as your initial menu) appears again.

Type GO LICPGM and press Enter.

- The Work with Licensed Programs display appears.

```

LICPGM                      Work with Licensed Programs                      System:  XXXX
Select one of the following:

Manual Install
  1. Install all

Preparation
  5. Prepare for install

Licensed Programs
  10. Display installed licensed programs
  11. Install licensed programs
  12. Delete licensed programs
  13. Save licensed programs

```

If you are using primary language media, type 11, press Enter, and go to step 9.

If you are using secondary language media, type 1, press Enter and go to step 12.

9. The Install Licensed Programs display appears. Type 1 in the option column next to the IBM products and options that have *COMPATIBLE or *INSTALLED as the installed status value and which exist on the media you will use for the installation. Press Enter.
10. The Confirm Install of Licensed Programs display appears. Press Enter to confirm your choices or press F12 to return to the Install Licensed Programs display and change your choices.
11. The Install Options display appears.

```

                                Install Options                      System:  XXXX
Type choices, press Enter.

Installation device . . . OPT01      Name
Objects to install . . . . 3         1=Programs and language objects
                                     2=Programs
                                     3=Language objects

Nonaccepted agreement. . . 2         1=Do not install licensed program
                                     2=Display software agreement

Automatic IPL . . . . . N           Y=Yes
                                     N=No

```

Type the following on this display:

- Installation device: OPT01 (In this example, OPT01 is used for the installation device. If you use a different naming convention, type the name that you have assigned to the installation device.)
- Objects to install: 3
- Nonaccepted agreement: 2

Press Enter and go to step 13 on page 157.

12. The Manual Install display appears.

```

Manual Install
System: XXXX

Type choices, press Enter.

Install option . . . 1          1=Installed products
                                2=All products
                                3=New products

Installation device  OPT01      Name

Replace if current   N          Y=Yes
                                N=No

Nonaccepted agreement 2        1=Do not install licensed program
                                2=Display software agreement

Automatic IPL . . . N          Y=Yes
                                N=No

```

Type the following and press Enter:

- Install option: 1
- Installation device: OPT01
- Replace if current: N
- Nonaccepted agreement: 2
- Automatic IPL: N

13. One or both of the following displays show the status of the licensed programs and language objects as they are being installed on the system. You do not need to respond to these status displays.

```

Installing Licensed Programs
System: XXXX

Licensed programs processed . . . . . : 0 of XXX

Licensed program install in progress

```

The following display is an example of the display that appears during the installation process.

```

Installing Licensed Programs
System: XXXX

Licensed programs processed . . . . . : X

Licensed Program  Option  Description              Type
5770SS1           IBM i - Library QUSRSYS  2922

```

14. If you see the following message, load the next volume of the language media and continue the installation. Be certain that the next volume is for the same language.

```

                                Display Messages
                                System:   XXXX
Queue . . . . . : QSYSOPR           Program . . . . . : *DSPMSG
Library . . . . . : QSYS             Library . . . . . :
Severity . . . . . : 95              Delivery . . . . . : *BREAK

Type reply (if required), press Enter.
Load the next volume in optical device OPT01 (X G)
Reply . . . . . G

```

Type G and press Enter. After you load each volume, type G and press Enter. If there are no more volumes to load that contain licensed programs, or if you want to end the loading process, type X and press Enter.

15. The Work with Licensed Programs display appears on your console when the language objects for all of the licensed programs are installed. One of the following messages appears on the bottom of the Work with Licensed Programs display:

Work with licensed programs function has completed. Press F3 (Exit) to return to the System i Main Menu.

Work with licensed programs function not complete. Go to Chapter 14, "Troubleshooting software installation problems," on page 163 to determine the problem.

You have completed this task.

To complete your installation, go to "Checklist: Completing the IBM i installation" on page 144 and follow the instructions there.

Chapter 13. Deleting software related to the IBM i operating system

Use this information to help you determine if you need to delete an unwanted part of a licensed program. These requirements are not always apparent. You can also use the procedures in this topic to delete the parts of licensed programs you no longer need.

Determining what unused parts of products to delete

You might be able to delete some optional parts of IBM i licensed programs to give you more storage.

Depending on your business needs, you might be able to delete some of the optional parts of the licensed programs that are shown in Table 3. (Table 3 shows IBM i 7.1 product identifiers, but the information in the table applies to deleting unwanted parts either before or after installing the new release of software.) For example, you can delete the licensed programs for any IBM i Access Family clients that you do not use. Deleting unwanted licensed programs or optional parts will give you more storage for your business needs.

Before you delete anything, read the following:

- If you do not have the original or a current copy of IBM i software distribution media, make sure that you first save the affected licensed program. Type GO LICPGM on the IBM i control language (CL) command line and select option 13 (Save licensed programs). You will need extra tapes for this save operation. To save these licensed programs to tape can take several hours. At a later time, if you need any of the licensed programs or deleted optional parts, you can install them from these tapes. To install them, use GO LICPGM and select option 11 (Install licensed programs).
- System backup tapes come with some systems. These backup tapes are not the same as software distribution media. While you can use software distribution media to reinstall individual licensed programs or optional parts, you cannot use system backup tapes. If you cannot locate or your system did not come with the original installation media, you must save the licensed programs and optional parts before you delete them. You will need the saved copy, if you need to restore the licensed programs or optional parts at a future time.

Use the information in “Installation notes about the IBM i release” on page 211 and Table 3 to help you determine which programs or optional parts you might want to delete.

Table 3. Deleting unwanted licensed programs and optional parts after the installation is complete

Licensed program or optionally installable product part	Product option	Deletion information
5770-SS1 IBM i		You cannot delete the entire operating system. You can delete optional parts, but you cannot delete IBM i option 1 or option 3.

Table 3. Deleting unwanted licensed programs and optional parts after the installation is complete (continued)

Licensed program or optionally installable product part	Product option	Deletion information
Extended Base Support	1	You cannot delete the entire operating system. You can delete optional parts, but you cannot delete IBM i option 1 or option 3.
Online Information (Online help information)	2	If you delete this optional part, you must first remove QHLPSYS from the system library list. Refer to "Considerations for deleting licensed programs" on page 161 for more information.
Extended Base Directory Support	3	You cannot delete the entire operating system. You can delete optional parts, but you cannot delete IBM i option 1 or option 3.
System/36 Environment and System/38 Environment	5 and 6	Delete this optional part if you are running only IBM i applications.
Example Tools Library	7	This optional part is needed only by software developers.
AFP Compatibility Fonts	8	Do not delete this optional part if you are using the Print Services Facility™
*PRV CL Compiler Support	9	Delete this part if you do not need to compile CL programs for a previous release.
Host Servers	12	IBM recommends that you do not delete this part. Do not delete if you are using IBM i Access Family products.
System Openness Includes	13	This optional part is needed only by software developers.
GDDM	14	You can delete this if you are not using it.
IBM i optional parts 21, 22, 31, 34, 35, 43, 44, and 45.	21 - 45	You can delete these if you are not using them.
IBM i optional part 30 (Qshell)	30	This option should not be deleted as it is sometimes used by other licensed programs.
IBM i optional part 33 (Portable App Solutions Environment)	33	This option should not be deleted as it is sometimes used by other licensed programs.
International Components for Unicode	39	This optional part is needed if you use Unicode applications.
5770-XE1 IBM i Access for Windows	Base	If you are not using this specific client, you can delete the complete licensed program for that client.

Considerations for deleting licensed programs

Review these notes to determine unique situations that can occur when deleting some licensed programs that are related to the IBM i operating system.

Do not attempt to use the Delete Library (DLTLIB) command to remove a licensed program or optional part of a licensed program from the system. Some licensed programs copy objects into other libraries; the DLTLIB command will not delete the duplicated objects. Using the DLTLIB command to delete a licensed program or optional part could leave the licensed program in a partially installed condition.

If you are unable to delete a licensed program, it might be because the library for the licensed program exists in one of the library lists. Do the following:

1. Use the WRKSYSVAL command to check both the system library and the user library lists.
2. When the Work with System Values display appears, type a 5 next to the QSYSLIBL and QUSRLIBL system values to display the associated libraries.
3. If the library for the licensed program is listed on this display, press Enter to return to the Work with System Values display.
4. Type a 2 to change the system value.
5. When the Change System Value display appears, use the spacebar to remove that licensed program library from the library list.

You will be able to delete your licensed program after your next IPL.

Deleting licensed programs

Follow these instructions to delete a licensed program that is related to the IBM i operating system.

1. Type GO LICPGM and press Enter. The Work with Licensed Programs menu appears.
2. Select option 12 (Delete licensed programs). The Delete Licensed Programs display appears.
3. Type 4 (Delete) in the Option column in front of each licensed program that you want to delete. Page down to display additional licensed programs.
4. Press Enter. You are shown the Confirm Delete of Licensed Programs display.
5. Press Enter if your selections are correct. Press F12 to make corrections.
6. You receive confirmation messages from the system when the licensed programs are deleted.
7. Press F12 to return to the Work with Licensed Programs menu.

If you have difficulty deleting a licensed program following these steps, type ENDSBS *IMMED and press Enter. Then proceed with step 1 again.

Chapter 14. Troubleshooting software installation problems

This information describes common problem scenarios, recovery methods, and ways to get help if you encounter a problem during IBM i software installation.

Error messages and reference codes (also known as system reference codes or SRCs) let you know that an error occurred during the installation process. Use the error messages or reference codes to determine which part of the process failed.

Where to begin recovery

When you determine that you have an IBM i software installation error, first you need to determine what your first step to recovery should be.

When failure occurred	What to do
Saving the system before installation	If a problem occurs while you are saving the system, review your job log to determine what caused the failure. Correct the error and complete your system save procedure. Do not continue to replace the new release until you have a complete backup copy of your system. If you cannot complete installing the new release, you will need this backup copy to restore the system to the previous release.
Installing new release or licensed program	Use the next table on this page to direct you to the recovery information that you need to find the problem, determine what caused it, correct the problem, and then complete installing this release.
Power failure during an installation process	If you have a power failure anytime during the installation process, go to the next table on this page to determine where to start the installation again. You should be able to start with the task where you were when the failure occurred. For example, if you had completed installing the operating system when the power failed, and are now installing licensed programs, start with the task to install licensed programs. If you are using the automatic process, start at the beginning. The system can determine which tasks have not been completed and will resume at the appropriate task.

If the installation process fails and you cannot continue the current installation, refer to Recovering your system in the IBM i Information Center and your system's backup copy to restore the previous release.

In the farthest left column of the following table, locate the installation section you were using when the failure occurred. In the second column, locate which task you were performing in that section. Locate the first task that failed during your installation and then use the information in the last column to determine your recovery starting point.

Installation procedure in use	Task number in use at time of failure	Where to start
Using image catalogs to install		"Image catalog recovery" on page 164

Using Operations Console during installation		"Operations Console recovery" on page 165
Replacing a release using automatic installation	Task 1. Using automatic installation	"Starting point for automatic installation recovery" on page 167
Replacing a release using manual installation	Task 1. Replacing the Licensed Internal Code	"Licensed Internal Code recovery" on page 168
	Task 2. Replacing the operating system	"Operating system recovery" on page 169
	Task 3. Replacing the licensed programs	"Licensed programs, PTFs, and secondary language recovery" on page 172
Installing software on a new system (with the operating system already installed)	Task 1. Doing the initial program load (IPL)	"Operating system recovery" on page 169
Installing software on a new system (without the operating system installed)	Task 1. Installing the operating system	"Operating system recovery" on page 169
Changing your primary language	Task 1. Changing the primary language	"Operating system recovery" on page 169
	Task 2. Installing the licensed programs	"Licensed programs, PTFs, and secondary language recovery" on page 172
Installing additional licensed programs	Task 1. Installing IBM licensed programs	"Licensed programs, PTFs, and secondary language recovery" on page 172
	Task 2. Installing non-IBM licensed programs	Look at the messages for the command
Installing a secondary language	Task 1. Using the Work with Licensed Programs Menu	"Licensed programs, PTFs, and secondary language recovery" on page 172
	Task 2. Using the Restore Licensed Program command	Look at the messages for the command

Image catalog recovery

If you used an image catalog to install IBM i software, follow these procedures to determine where the failure occurred and the appropriate recovery action.

The following table lists the error messages that could occur if you are using an image catalog to install.

Table 4. Image Catalog Verification Recovery

Message	Description
CPF9897 CPDDBD1E	<p>Cause (Reason code 01): The load-source disk unit must have at least 1536 MB of free storage space to be able to install from an image catalog (virtual media device).</p> <p>Recovery:</p> <ol style="list-style-type: none"> To determine if you have enough free space available, see “Freeing up space on the load-source disk unit for an image catalog” on page 40. Perform the procedure for freeing up space on the load-source disk unit and try your request again. The topic, “Cleaning up disk storage space” on page 56, contains the procedure. <p>Cause (Reason code 03): The Licensed Internal Code media is not supported for installation over the current version, release, and modification that is installed or for your system model.</p> <p>Recovery: Try your request again with a supported release.</p>
CPF3DE5	<p>Cause: The Licensed Internal Code and IBM i software agreements have not been accepted.</p> <p>Recovery: Perform the steps “Required: Accepting software agreements” on page 54.</p>
CPD4F23	<p>Cause: The release is not supported on this server model.</p> <p>Recovery: Specify a supported release or server model. Then try the request again.</p>
CPD4F1C	<p>Cause: One or more PTFs on the system are delayed PTFs and require an IPL action. An installation from virtual media cannot be done when delayed PTFs exist.</p> <p>Recovery: Perform an unattended IPL, then retry your request</p>

Operations Console recovery

Following are common problems that can occur when using Operations Console during an IBM i installation or upgrade.

Symptom: No connection between the system and Operations Console PC.

Action: When you receive the release upgrade, the shipped service tools user IDs (except 1111111) are expired. For all upgrades and installations, you need to establish a connection between the system and Operations Console PC by using 11111111 (eight 1's) for both the service tools user ID and the default password. This ensures a successful authentication of the subsequent connection of the client to the system. This is especially important for automatic installations.

Symptom: Reference code A6005008

Use this table if you received reference code A6005008. If an IPL did not find a console and if the console type is set to anything except a 1, the system displays code A6005008.

- If you are attempting to use a twinaxial console the only data relevant in this reference code is word 16. Use the table below to determine the twinaxial

failure. The first 4 characters of this word contain the last 4 characters of the original failure type. For example, if word 16 contained 50010001, the twinaxial-related reference code would be A6005001 and the console type is set to use a twinaxial console. Refer to that reference code.

- If you are attempting to use Operations Console, select the appropriate section in the following table based on this information:
 - Local console on a network uses words 13, 14, and 15.
 - Local console directly attached to the server uses words 17, 18, and 19.

Note: If you just replaced the LAN adapter associated with Operations Console (LAN), you need to wait at least 35 minutes for the system to find and use the new LAN adapter card. Once the system is satisfied, it starts using the new adapter, the console should start, and the reference code disappears.

Table 5. Reference code A6005008: LAN

If Word 13 value is:	Failure	Word 14 means:	Word 15 means:
1	No supported hardware detected or hardware detected is not expected (for example, you replaced the LAN IOA and the serial number is different)		In some cases the serial number of the expected adapter may be shown.
2	LAN IOA failed to report		
3	Hardware error	Common error codes: 53001A80,53002AC0 Network, cable, or the LAN adapter may not be operational. Error code 00000000 indicates the adapter reported but has not been initialized yet. This is not considered an error at this time. The adapter should be activated shortly. For other error codes, contact your service provider.	Card position or serial number of adapter
4	BOOTP status: If the number of attempts are zero, BOOTP is ready when called. If attempts have a value, the PC did not respond	Attempts	Adapter position or serial number of adapter

Table 5. Reference code A6005008: LAN (continued)

If Word 13 value is:	Failure	Word 14 means:	Word 15 means:
5	Server's LAN connection is active but the PC failed to connect. Are the PC and server on the same network? Are they using the same protocol? Can the PC ping the server? (ping serverhostname)	IP address	Card position or serial number of adapter

The twinaxial-related reference code is represented by the first 4 characters of word 16. The console type value is represented by the last 4 characters of word 16 in the form xxxx xxxx.

- 00 indicates not defined by user (old default value)
- 01 indicates twinaxial console
- 03 indicates Operations Console (LAN)
- 04 indicates Hardware Management Console (HMC)

Table 6. Reference code A6005008: Cable

If Word 17 value is:	Failure	Word 18 means:	Word 19 means:
1	Asynchronous adapter not detected		
2	No cables detected	Adapter position	Adapter type
3	Wrong cable detected	Adapter position	Cable ID
4	Port in use	Adapter position	Adapter type
FA	Not configured for direct cable		

Starting point for automatic installation recovery

If you used the automatic installation process (replacing an IBM i release using automatic installation), use the following information to determine where the failure occurred and the appropriate recovery action.

After you have the problem corrected, go to “Starting the automatic installation process again” on page 176.

- To use automatic installation recovery, you must use the same version, release, and modification distribution media that caused the failure.
- If you have a failure during the automatic installation process and sign on to do problem analysis, your system will be running under the QSYSSBSD controlling subsystem. When your system completes an IPL after the installation has completed successfully, your controlling subsystem is active again.

Finding the problem (symptom)	Where to start
Reference code B608 1105	"Licensed Internal Code recovery"
Reference codes other than B900 xxxx	"Licensed Internal Code recovery"
Reference codes starting with B900 3xxx	"Operating system recovery" on page 169
Messages starting with CPZ20xx	"Operating system recovery" on page 169
Message that indicates the Licensed Internal Code and operating system software agreements have not been accepted.	"Licensed Internal Code recovery"
Message that indicates automatic installation is not complete.	"Licensed programs, PTFs, and secondary language recovery" on page 172

Licensed Internal Code recovery

Use this procedure if an error occurred when you installed the Licensed Internal Code.

1. Use the following table to determine the action to take if the Install Licensed Internal Code - Error display shows the following message: An unrecoverable error occurred. The error reason code is listed below. This install cannot be completed. Give the reason code to your authorized service provider. Do not re-IPL the system until your authorized service provider can retrieve any needed information.

Reason code	Action
51 52 53 54	If you are using optical media, clean the media. If you are using tape, clean the tape device. Then retry the installation.
All others	Retry the installation. If the installation fails again with the same reason code, retry the installation with another set of media. If the same failure occurs, contact your authorized service provider.

2. If you received a message that indicates the Licensed Internal Code and operating system software agreements have not been accepted, perform the steps "Required: Accepting software agreements" on page 54.
3. Find the reference code that is shown on the control panel display and take the appropriate recovery action. If the reference code indicates that you have a media error, thoroughly clean the installation device. If you are using optical media, clean the media. If you are using tape, clean the tape head and tape path thoroughly. Then continue with the next step. If you receive another error message that indicates a media error on the same media, get another set of media to complete the installation process.

For a complete list of Licensed Internal Code reference codes, go to Analyzing and handling problems in the IBM i Information Center and follow the instructions.

4. You are trying to do one of the following:
 - Install from optical media when an alternate installation device is enabled.
 - Use an alternate installation device which is not enabled.

Go to "Setting up an alternate installation device" on page 205 or "Disabling an alternate installation device" on page 208 and perform the appropriate procedure.

If you cannot find the address information or the configuration has changed and the address is wrong, you must determine the address by physical inspection. This inspection can be difficult and could vary depending on your

system model and the specific configuration of your IO buses. For this reason, IBM recommends that you call your next support level for help in determining the addresses for the alternate installation device. A service agreement might be required for this type of assistance.

5. Start the installation process again.

If you were using the automatic installation process, go to “Starting the automatic installation process again” on page 176 to start the installation process again. You must load the first volume in the installation device to start the automatic recovery installation process.

If you were using the manual installation process, go to “Starting the manual installation process again” on page 177 to start the installation process again.

The following table lists error messages that could occur during the installation of Licensed Internal Code when using image catalogs.

Message	Description
B60041FD	<p>Cause: This reference code occurs when the decompression of Licensed Internal Code fails when performing an installation using image catalogs. A main storage dump occurs. This should be copied to the auxiliary storage pool (ASP) or media. Words 12 and 13 of the reference code contain reason codes that indicate why the failure occurred. If you plan to contact your authorized service provider, write down the 8 numbers from word 13.</p> <p>Recovery: No Licensed Internal Code has been installed yet. You can either restart the system by using the currently installed Licensed Internal Code (perform a B-side IPL) or by using the physical media to install.</p>
B60041FC	<p>Cause: This reference code occurs when the Licensed Internal Code installation fails when performing an installation using image catalogs. Words 12 and 13 of the reference code contain reason codes that indicate why the failure occurred. If you plan to contact your authorized service provider, write down the 8 numbers from word 13.</p> <p>Recovery: Use physical media to perform the installation.</p>

Operating system recovery

Use this procedure if an error occurred when you installed the IBM i operating system.

1. If a problem occurs when you are replacing or installing the operating system, a reference code appears on the control panel display, or an error message appears on the console. Use the following tables to determine the cause of the problem and take the action indicated. Then continue with the next step in this list.
2. If you were using the automatic installation process, start the process again using the instructions in “Starting the automatic installation process again” on page 176.
3. Start the manual installation again using the following steps.
 - a. Load the first volume into the installation device for the alternate IPL. Prepare the device.
 - b. Use the control panel to set the mode to **Manual** and select function **03**. Press Enter on the control panel.

- c. Return to the task that failed and start the task again at the step where the IPL or Install the System display appears on the console.
- d. After you respond to the Confirm Install of the Operating System display, you should see the Select a Language Group display. Verify that the language feature that is displayed matches the language feature for the IBM i installation media that you are using.

Table 7. Operating system problems

Symptom	Action
B900 3000 through B900 308F	The reference codes in this range are displayed by the installation of the operating system process. Review the information in Analyzing and handling problems in the IBM i Information Center. Take the appropriate recovery action. Then start the installation process again.
B900 3100 through B900 37FF	The reference codes in this range are displayed by the start operating system process. Go to Analyzing and handling problems in the IBM i Information Center. Take the appropriate recovery action.
Other reference codes not listed in this table.	If the reference code is not in the range of reference codes listed in this table, go to Analyzing and handling problems in the IBM i Information Center.

The following table contains some of the error messages that could occur during the installation of the operating system.

Table 8. Error messages

Message	Description
CPA3DE6	<p>Cause: Software agreements were not found on the volume loaded in the alternate IPL device.</p> <p>Recovery: Read the instructions for the message that is displayed on the console. Perform the recovery action described in the message to correct the problem.</p>

Table 8. Error messages (continued)

Message	Description
<p>CPZ2003 CPZ2004 CPZ2005 CPZ2010 CPZ2011</p>	<p>Cause: The installation process received a tape or optical media error code.</p> <p>Note: If you are performing a network installation of the operating system, there is a network problem or slow network performance. Recovery for Error Code Ex10 0019 or Ex10 001A:</p> <ol style="list-style-type: none"> 1. Clean the media. <ul style="list-style-type: none"> • If you are using tape, clean the tape head and tape path thoroughly. • If you are using optical media, clean the media with a clean lint-free cloth. Gently wipe the disc from the center to the outside of the disc. 2. Try the installation process again. <ul style="list-style-type: none"> • If you were using the automatic installation process, go to “Starting the automatic installation process again” on page 176. • If you were using the manual installation process, go to step 3 in “Licensed Internal Code recovery” on page 168 to start the installation process again. <p>If you receive another error message indicating a media error on the same installation media, contact your software provider to get another set of installation media to complete the installation process.</p> <p>Recovery for all other error codes: Contact your authorized service provider.</p>
<p>CPZ2022</p>	<p>Cause: The restore options read from the installation profile are not valid.</p> <p>Note: If you create distribution media and specify *NONE for the installation profile name, the media will contain an empty installation profile. These media cannot be used to perform an automatic installation.</p> <p>Recovery: Record the recovery information for the error message. Try to install the operating system again using the manual installation process. You can also try to use the automatic installation process with a different set of media. If the problem occurs again during an automatic installation process, contact your next level of service.</p>
<p>CPZ2023</p>	<p>Cause: The installation options read from the installation profile are not compatible with the current state of the system.</p> <p>The installation requested by the options read from the installation profile cannot be performed. For example, this condition can occur when an installation is requested that does not load program objects and that results in the QSYS library being damaged.</p> <p>Recovery: Try to install the operating system again using the manual installation process.</p>

Table 8. Error messages (continued)

Message	Description
CPZ20xx	<p>Cause: These termination messages are displayed by the installation of the operating system process. Print the display if possible; otherwise, copy all of the information.</p> <p>Recovery: Read the instructions for the messages that are displayed on the console. Perform the recovery action described in the message to correct the problem and then try the installation process again.</p> <p>Note: A short time after you press Enter, a B900 xxxx reference code is displayed. Analyzing and handling problems in the IBM i Information Center contains additional information.</p>

Licensed programs, PTFs, and secondary language recovery

Use this procedure if an error occurred when you installed an IBM i licensed program, PTF, or secondary language.

1. Type `GO LICPGM` on an IBM i control language (CL) command line.
2. On the Work with Licensed Programs menu, type 50 (Display log for messages). Press Enter.
3. The Display Install History display appears. Press Enter.
4. The Display History Log Contents display appears. Look at the messages to determine the installation status of the licensed programs and PTFs. The messages show what part of the licensed program installation function has failed. Areas where the failure could have occurred include the following:
 - Installing the IBM-supplied libraries
 - Installing the licensed programs
 - Installing PTFs
 - Installing a secondary language
 - Initialization process

If a problem such as a power failure occurs during a process in the preceding list, you could see a message that the process has started. An example of such a message is Licensed program installation process started. However, the failed or completed status message might not be displayed.

5. There should be one or more messages that indicate which IBM-supplied library or licensed program failed. Be sure to look at all of the messages. Use F10 (Display all) to see all messages.
6. To see the online help information, move the cursor to the message and press the Help key. Look at the online help information for the error message to get the message identifier and more information about the cause and recovery for the failure. Go to the error messages table in this topic to review the list of possible messages that you could see.
7. A copy of the job log has been spooled to an output queue.

To locate and display the job log, enter one of the following Work with Spool File (WRKSPLF) commands:

- For automatic installation, type the following command and press Enter:
`WRKSPLF SELECT(QLPAUTO) ASTLVL(*INTERMED)`
- For manual installation, type the following command and press Enter:
`WRKSPLF SELECT(QSECOFR) ASTLVL(*INTERMED)`

- For the PTF process, type the following command and press Enter: WRKSPLF
SELECT(QSYS *ALL *ALL SCPF) ASTLVL(*INTERMED)

If the bottom of the display shows More..., page down (Roll up) until Bottom... appears. Select option 5 (5=Display) on the last entry.

Note: Ignore any error messages listed in the nnnnnn/QSYS/QLPINSTALL job log. These messages are not installation error messages.

Scan the job log for error messages. Determine the cause and recovery for each error message in the job log. Go to the error messages table in this topic for a list of possible messages that you might see. Be sure to scan the entire job log. There could be more than one failure. Scan the job log by using the message ID. Remember that the message ID is case-sensitive.

8. Select option 10 (Display installed licensed programs) on the Work with Licensed Programs display. The Installed Status column indicates which licensed programs and optional parts are installed. The Installed Status column also indicates whether each licensed program installed successfully and whether it is compatible with the installed operating system. Refer to “Installed status values” on page 218 for a description of the installed status values.

You can press the F11 key to see a view of the display that shows the Installed Release column. The version, release, and modification value appears for licensed programs that are either installed compatibly or are installed at a back level. Page down (Roll up) through all of the displays to see the status of your licensed programs.

Check to see if the licensed program that you are installing had a different language feature code than your primary language feature code. If it does, the licensed program either is flagged as *ERROR or the column is blank. The language objects for the licensed program are installed in a secondary language library. Obtain distribution media with the correct primary language feature code. Press the F3 key to return to the Work with Licensed Programs menu.

9. After you determine the cause of the error and complete the recommended recovery action, resume the installation process. If you were using automatic installation, go to “Starting the automatic installation process again” on page 176. If you were using the manual installation process, go to “Starting the manual installation process again” on page 177.

The following table contains some of the error messages with possible causes of the errors. Look at the messages on your system to determine the exact cause and recovery.

Message	Description
CPA3DD2 CPA3DD3	<p>Cause: The system could not identify the last volume loaded in the device.</p> <p>Recovery: Open the device door, verify that correct volume is loaded, and close the device door.</p>
CPA3DDD CPA3DDF	<p>Cause: The installation process is expecting more licensed programs to be loaded.</p> <p>Recovery: If you have more media that contains licensed programs, load the volume and type G to continue the installation process. If you do not have any more volumes that contain licensed programs, type X to indicate that there is no more media to load. When the installation process is completed, use option 50 of the LICPGM menu to verify messages in the installation history log.</p>

Message	Description
CPA3DE1	<p>Cause: The volume that is loaded does not contain licensed programs that are supported through the Work with Licensed Programs (LICPGM) menu.</p> <p>Recovery: Load the optical media that contains licensed programs.</p>
CPDB6DA	<p>Cause: During a manual installation, the software agreement for a licensed program was not accepted and cannot be installed.</p> <p>Recovery: Follow the instructions in “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 133 to accept the software agreement and retry the installation.</p>
CPDB6DB	<p>Cause: During an automatic installation, the software agreement for a licensed program was not accepted and cannot be installed.</p> <p>Recovery: Follow the instructions in “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 133 to accept the software agreement and retry the installation.</p>
CPD4F39	<p>Cause: The volumes located in a network optical device are not in the correct sort order for the program temporary fix (PTF) package application.</p> <p>Recovery: Follow these steps:</p> <ol style="list-style-type: none"> 1. Find the catalog that owns the images loaded in the device. 2. Use the Verify Image Catalog (VFYIMGCLG) command to sort the volume list for the type Program Temporary Fix. 3. Use the Vary Configuration (VFYCFG) command to vary off and vary on the device.
CPF3DC1	<p>Cause: Directory objects for product 5770SS1 option *BASE release V7R1M0 failed to install. The system will not install library QGPL and will not allow licensed programs to be installed until the directory objects have been installed.</p> <p>Recovery: See previous messages in the job log to determine the cause of the failure. Correct the errors</p>
CPF3DC2	<p>Cause: Required user library cannot be installed. The system will not install library QGPL and will not allow licensed programs to be installed because the operating system directory installation was not successful.</p> <p>Recovery:Examine the history log for errors that occurred while operating system directories were being installed. Correct the errors.</p>
CPD32B0 reason code 7 CPF327E reason code 3	<p>Cause: 5770SS1 option 1, Extended Base Support, failed to install.</p> <p>Recovery: Use the Reclaim Storage (RCLSTG) command and try to install option 1 again.</p>

Message	Description
CPD3713	<p>Cause: The licensed program is currently installed on your system and was not found on the distribution media.</p> <p>Recovery: Get another set of distribution media that contains the licensed program. Either install the licensed program again from “Installing additional licensed programs” on page 132 or delete the licensed program from your system if you no longer want it.</p>
CPD3D82 CPF3D8F	<p>Cause: These messages could be shown if you did not end all of the subsystems before you started the installation process.</p> <p>Recovery: End all subsystems and start installing the licensed programs again.</p>
CPF371C CPF3731	<p>Cause: Look at the messages previously listed in the job log to determine the failure.</p> <p>Recovery: Take the recommended recovery action.</p> <p>If you received one of these messages, the installation process ended before you completed installing the licensed programs.</p>
CPF371D CPF371E	<p>Cause: These messages could be shown if the wrong volume is loaded. The online information of the message can help determine the cause.</p> <p>Recovery: Load the correct volume and start the process again.</p>
CPF3D96	<p>Cause: Errors occurred during the restoring process for a licensed program.</p> <p>Recovery: Take the recommended recovery action explained in the online help information.</p> <p>If you received these messages, the installation continued with the other licensed programs if the problem was not too severe. However, problems with the tape or system storage level would have caused the installation to end.</p>
CPF3D81 CPF3D84 CPF3D8B CPF3D8C CPF3D90 CPF3D91	<p>Cause: Errors occurred when restoring a licensed program or PTFs.</p> <p>Recovery: Use the Display Job (DSPJOB) command. Enter DSPJOB nnnnnn/QLPINSTALL/QBCHINST or DSPJOB nnnnnn/QLPINSTALL/QLPINSTALL where nnnnnn is the job number of the job log in the message help of the error message. Select option 4 on the Display Job display to display spooled files. Select option 5 on the Display Job Spooled Files display to determine the cause of the failure. Correct the error and start the installation process again. Ignore error messages in the nnnnnn/QSYS/QLPINSTALL job log. These messages are not installation error messages.</p>
CPF3D82 CPF3D83	<p>Cause: There is not enough auxiliary storage to install the licensed programs that you selected.</p> <p>Recovery: Go to “Licensed program releases and sizes” on page 185 to determine the space requirements for each licensed program that you want to install. Obtain additional auxiliary storage and start the installation process again.</p>

Message	Description
CPF3D85 CPF3D86 CPF3D8E	<p>Cause: An object or PTF is not installed because it requires successful installation of a licensed program. That licensed program might not be installed or might be installed at the wrong release.</p> <p>Recovery: See the previous messages in the job log to determine if the licensed program is installed successfully. Correct any errors or install the required licensed program and start the installation process again.</p>
CPF3DD3	<p>Cause: The device description could not be found or could not be used.</p> <p>Recovery: Create a device description for the installation device (optical or tape). Use the CRTOPTDEV command to create a device description for the optical device that supports the optical media class. Use the CRTDEVTAP command to create a device description for the tape device. Then start the process again.</p>
CPI3D82 CPI3D84 CPI3D85	<p>Cause: A licensed program that is included on the distribution media was not currently installed on the system.</p> <p>Recovery: Use the online information of the message for recovery help. Use the topic "Installing additional licensed programs" on page 132 to install the licensed program.</p>
Media error messages	<p>Cause: A media error occurred during the installation process.</p> <p>Recovery: If you are using optical media, clean the disc, and then follow the recovery actions that are indicated for this message. If you are using tape, clean the tape head and tape path thoroughly. If you receive another error message that indicates a media error on the same tape, get another set of tapes to complete the installation.</p>

Starting the automatic installation process again

If you want to start the IBM i automatic installation process again after recovering from an error, use one of these methods.

Method	Instructions
Method 1: Licensed Internal Code	<p>When to use: This method should be used if the Licensed Internal Code needs to be installed again. If you are sure the Licensed Internal Code has been successfully installed, you do not need to use this method. No message indicates that the Licensed Internal Code has been installed successfully; however, messages do indicate that the operating system has been installed successfully. If the operating system has been installed successfully, so has the Licensed Internal Code.</p> <p>How to use: To start an installation process again, use the instructions in Chapter 6, "Upgrading or replacing software using automatic installation," on page 63.</p>

Method	Instructions
Method 2: Operating System	<p>When to use: If you are sure the Licensed Internal Code has been installed successfully, use Method 2 to install the operating system again. Method 2 is faster than using Method 1 because the Licensed Internal Code does not need to be installed again. No message indicates that the Licensed Internal Code has been installed successfully; however, messages do indicate that the operating system has been installed successfully. If the operating system has been installed successfully, so has the Licensed Internal Code.</p> <p>How to use:</p> <ol style="list-style-type: none"> 1. Use the control panel to set the mode selector to Manual. The function selected should be 03 (Start IPL). If you are upgrading a logical partition, use the virtual control panel function of your HMC. 2. Start the IPL. 3. Load the first volume in the installation device. 4. When the IPL or Install the System display is shown, set the mode selector to Normal. 5. Select option 4 (Perform an automatic install of the operating system) on the IPL or Install the System display. 6. When the Install Device Type Selection display is shown, set the installation device type. 7. Continue with step 14 on page 68 in the “Replacing software using the automatic installation method” on page 64 topic.
Method 3: Licensed Programs	<p>When to use: Use the Work with Licensed Programs display to install only the licensed programs that failed to install. Make sure the Licensed Internal Code and the operating system are successfully installed.</p> <p>How to use: Determine which products failed to install. Use option 11 (Install licensed programs) on the Work with Licensed Programs display. To install the licensed programs from a list, refer to “Installing additional licensed programs” on page 132.</p>

Starting the manual installation process again

If you want to start the IBM i manual installation process again after recovering from an error, use one of these methods.

Method	Instructions
Method 1: Licensed Internal Code	<p>When to use: This method should be used if the Licensed Internal Code needs to be installed again. If you are sure the Licensed Internal Code has been successfully installed, you do not need to use this method. No message indicates that the Licensed Internal Code has been installed successfully; however, messages do indicate that the operating system has been installed successfully. If the operating system has been installed successfully, so has the Licensed Internal Code.</p> <p>How to use: To start an installation process again, use the instructions in Chapter 7, “Upgrading or replacing software using manual installation,” on page 73.</p>

Method	Instructions
Method 2: Operating System	<p>When to use: If you are sure the Licensed Internal Code has been installed successfully, use Method 2 to install the operating system again. Method 2 is faster than using Method 1 because the Licensed Internal Code does not need to be installed again. No message indicates that the Licensed Internal Code has been installed successfully; however, messages do indicate that the operating system has been installed successfully. If the operating system has been installed successfully, so has the Licensed Internal Code.</p> <p>How to use:</p> <ol style="list-style-type: none"> 1. Use the control panel to set the mode selector to Manual. The function selected should be 03 (Start IPL). If you are upgrading a logical partition, use the virtual control panel function of your HMC. 2. Start the IPL. 3. Continue with the “Replacing the IBM i operating system” on page 82 topic.
Method 3: Licensed Programs	<p>When to use: This method should be used if several licensed programs are not installed.</p> <p>How to use: To start an installation process again using method 3, use option 1 (Install all) on the Work with Licensed Programs display. Refer to “Manual installation Option 1. Install all” on page 221.</p>
Method 4: Licensed Programs	<p>When to use: This method should be used if one or more licensed programs are not installed and you want to install only those licensed programs or optional parts that failed.</p> <p>How to use: To start the installation of only those licensed programs or optional parts that failed, use the instructions in “Installing additional licensed programs” on page 132. Complete all of the instructions in that part.</p>
Method 5: PTFs	<p>When to use: This method can be used if only one or two licensed programs had PTFs that failed to install. Consider installing PTFs for only those licensed programs that failed.</p> <p>How to use: To install PTFs for selected licensed programs, use the GO PTF menu and select option 7 (Install a program temporary fix from a list).</p>
Method 6: PTFs	<p>When to use: This method should be used if several licensed programs had PTFs that failed to install. Consider installing the entire cumulative PTF package again.</p> <p>How to use: To install the cumulative PTF package, use the instructions in the <i>System PTF Shipping Information Letter</i>.</p>

Initialize System (INZSYS) recovery

In an IBM i software upgrade, the installation is complete when the licensed program portion of the installation process and the INZSYS process is completed successfully. If the INZSYS process did not complete, follow these procedures.

The installation process must end before the INZSYS process is automatically started. This process is initiated during each IPL after you install the QUSRSYS library until the INZSYS process has successfully completed. The INZSYS process

will not be initiated during the IPL if the system is in the restricted state. If the INZSYS process is initiated during the IPL, it runs in the SCPF system job.

Note: If you perform an IPL before installing a cumulative PTF package, make sure that the INZSYS process has completed before you start to install the PTF package. Using any PTF commands before the INZSYS process is completed causes the INZSYS to fail.

The completion time for INZSYS varies. Allow sufficient time for this process to complete.

When you select option 50 (Display log for messages) on the Work with Licensed Programs menu, you should see the message Initialize System (INZSYS) started. Later, you should see the message Initialize System (INZSYS) processing completed successfully (CPC37A9). If you do not see the completed message, or if the message Initialize System (INZSYS) failed appears, look at the job log to determine the problem. Use the information in the job log to correct the problem. Then start the conversion process again.

To start the conversion process yourself, you can either use a batch job or enter INZSYS on the IBM i control language (CL) command line. If you use a batch job, you can use your workstation while the process is running, but the system cannot be in a restricted state. Batch jobs do not run when the system is in a restricted state. If you enter INZSYS from a CL command line, IBM recommends that the system be in a restricted state. Setting the system to a restricted state reduces the time that is needed for the INZSYS process to complete. Before you use the INZSYS command, set the mode selection to **Normal** and set the IPL type to **B** (or the IPL type that you use for everyday operation).

To set the system to restricted state, do the following:

1. Type CHGMSGQ QSYSOPR *BREAK SEV(60) and press Enter.
2. A message display could be shown. Press Enter. (Ignore the messages that are shown.)
3. Type the End Subsystem (ENDSBS) command: ENDSBS *ALL *IMMED.
The message System ended to restricted condition appears.
Press Enter to continue.

To start the conversion process again, do the following:

1. Type INZSYS and press Enter.
2. Use option 50 (Display log for messages) on the Work with Licensed Programs menu to make sure that the process is completed successfully.

Do not attempt to save your system until the INZSYS process has completed successfully.

Disk configuration warning and error messages

You see a disk configuration warning or an error report on a display when your system detects errors or warning conditions in your disk configuration. You might see this display immediately after the hardware upgrade procedure or while you are installing the IBM i operating system.

Perform the actions necessary if you see a disk configuration warning or an error report. The action you take for each message depends on the upgrade method that

you are using. The following table lists the messages that you might see on the display and the actions that you should take. For each message, you can select option 5 (Display Detailed Report) to see more information about why the message occurred and what possible actions are available.

Attention: Are you using Option 1? When you are installing the Licensed Internal Code by using option 1 from the Install the Licensed Internal Code (LIC) menu, disk configuration warning messages might mean that the system will not be able to recover its ability to access the data on your disk units. **Important:** Do not ignore these messages or attempt to resolve them without consulting the table. An incorrect response will probably require you to reload your data.

Warning messages	Your action: Option 1 (Restore Licensed Internal Code)
Disk unit not formatted for optimal performance	Do the following: <ol style="list-style-type: none"> 1. Type a 5 (Display Detailed Report). 2. Write down the disk units that should be reformatted. 3. Press F12 to return to the warning report display. 4. Press F10 to accept the warning and continue. <p>You cannot reformat the disk units during the upgrade procedure.</p>
Unit possibly configured for PowerPC® AS	Contact software support before you proceed.
Unit possibly configured for IMPI	Contact software support before you proceed.
Missing disk configuration	Contact hardware support before you proceed.
Unknown load source status	Contact hardware support before you proceed.
Load source failure	Contact hardware support before you proceed.
Restore load source	Contact software support before you proceed.
Missing disk units in the configuration	Contact hardware support before you proceed.
Restore in progress	View the online information and take the appropriate recovery action.
Device parity protected units in exposed mode	You have a failed unit in a parity set. You can ignore this message and continue the upgrade procedure. However, you should contact hardware support immediately after the upgrade procedure.
No alternatives available	Contact software support before you proceed.
New disk configuration	Contact software support before you proceed.
Incorrect Licensed Internal Code installed	Contact hardware support before you proceed. The load-source disk unit and its mirrored pair might be configured incorrectly.
Change load source location	Contact hardware support before you proceed. Your load-source disk unit might be configured incorrectly.
Bad load source configuration	Contact hardware support before you proceed. Your load-source disk unit might be configured incorrectly.

Warning messages	Your action: Option 1 (Restore Licensed Internal Code)
Overflowed ASPs	Wait to correct the problem until after the upgrade process is completed. For further instructions, refer to Resetting an overflowed user auxiliary storage pool (ASP) during an initial program load (IPL) in the IBM i Information Center.
Lower level of protection	Ignore during the installation procedure. However, you should analyze your mirrored configuration after the installation procedure.
Unit is missing connection.	Contact hardware support before you proceed.

Starting from a power-off condition

If your system must be powered on, perform these steps.

1. Use the control panel to set the IPL type to **B** and to either one of these modes:
 - **Normal**. On some models, this will appear as **BN**.
 - **Manual**. On some models, this will appear as **BM**
2. Press Enter on the control panel.
3. On your console, ensure that you have a connection to the system.

Reference codes for IBM i software installation

If a reference code appeared during the automatic or manual installation, use these procedures.

This information gives a brief explanation of the common reference codes (also known as system reference codes or SRCs) that you might see while upgrading or replacing a release.

Common reference codes for IBM i software installation

This table identifies the most common reference codes related to an IBM i software installation or upgrade.

Table 9. Common reference codes

Symptom	Action
A1xx 19xx A12x 19xx (x is any character)	<p>These reference codes appear if the installation device for an alternate IPL is not ready. Check the following:</p> <ul style="list-style-type: none"> • Is the correct media volume loaded? • Is the device ready? • Is the device being used for a different purpose than the device was used for during the previous IPL? • Is the installation media loaded in the alternate IPL or alternate installation device allocated for that partition? <p>Any of these situations can cause these reference codes to appear. In the first two examples, ensure that the media volume is loaded correctly and that the device is ready. In the last example, you need to wait while the system finds the new installation device.</p> <p>Then perform the appropriate procedure under “IBM i installation recovery after using reference codes” on page 184.</p>

Table 9. Common reference codes (continued)

Symptom	Action
A600 1103	This reference code appears when Licensed Internal Code is damaged. Use the control panel or virtual control panel (Work with Partition Status display) to set the IPL type to D and to set the mode to Manual . Then use the instructions for Chapter 7, "Upgrading or replacing software using manual installation," on page 73.
A600 1104	This reference code appears if the installation media is not readable. Either the media is dirty or damaged, or there is an error with the optical device. Clean the media or acquire a new set of media. Then perform the appropriate procedure under "IBM i installation recovery after using reference codes" on page 184.
B101 4500	This reference code appears when an error is detected with the IBM i integration with BladeCenter and System x solution. Make sure that you vary off the integrated server before you perform the function that resulted in this reference code. If the reference code still occurs, try the installation again. If the same error occurs again, contact your authorized service provider. Note: IBM i integration with BladeCenter and System x solution is the new name for Integrated xSeries Server for iSeries, , Integrated PC Server (IPCS), or File Server Input/Output Processor (FSIOP).
B1xx 4504 B1xx 1933	This reference code appears when the system cannot locate the device used for the alternate IPL. Check that the installation media is loaded in correct device and, if necessary, make the device ready. Then perform the appropriate procedure under "IBM i installation recovery after using reference codes" on page 184.
B1xx 4505	These reference codes appear if the installation media is dirty or if the wrong media was loaded. Verify that the correct media is loaded. If the problem still remains, clean the optical disk. If you are using tape, clean the tape head and tape path. Then perform the appropriate procedure under "IBM i installation recovery after using reference codes" on page 184.
B1xx 4507	These reference codes appear if the tape device for the alternate IPL was not found or was not ready. Make sure the tape device is powered on and the correct tape is loaded and ready. To make tape devices ready, you might need to open and close the tape device door. Then perform the appropriate procedure under "IBM i installation recovery after using reference codes" on page 184.
B2pp 1310 (pp is the partition ID)	No alternate IPL device IOP was selected. The IPL will attempt to continue, but there might not be enough information to find the correct alternate IPL load source. Configure an alternate IPL device IOP for the logical partition. Then, retry the partition IPL. If it continues to fail, contact your service provider. See Logical partitioning in the IBM Systems Hardware Information Center.

Table 9. Common reference codes (continued)

Symptom	Action
B2pp 1320 (pp is the partition ID)	<p>No default load source IOP was selected for a type A or type B IPL. The IPL will attempt to continue, but there might not be enough information to find the correct load source. Configure a load source IOP for the logical partition. Then retry the partition IPL. If it continues to fail, contact your service provider.</p> <p>See Logical partitioning in the IBM Systems Hardware Information Center.</p>
B2pp 3110 (pp is the partition ID)	<p>The power-on operation for the logical partition failed. Scan the reference code history list of the logical partition for previous B2ppxxx failure reference codes. Resolve each problem found, and then retry the partition IPL. If it continues to fail, contact your service provider.</p>
B2pp 3200 (pp is the partition ID)	<p>The logical partition failed to initialize a program load.</p> <ol style="list-style-type: none"> 1. If you performed a power-on operation from IPL type D, remove the installation media (optical or tape media), clean the device and clean the media if possible. Insert the media again and attempt to power on using IPL type D. 2. Verify that the device is addressed correctly. 3. Verify that the media is in the correct device. 4. Verify that the media in the device is compatible. 5. Verify that the IOP selected as the IPL resource is correct. 6. Retry the partition IPL.
B2xx xxxx	<p>All other reference codes: If you performed a D-mode IPL, clean the device and media, and then retry the same type of power-on operation.</p>
B608 1105	<p>This reference code occurs when you exit from the automatic installation because an alternate installation device that is attached to the system has one of the following problems:</p> <ul style="list-style-type: none"> • The device is enabled, but it is not ready because the tape is not loaded. • The device is not enabled as an alternate installation device. • The device itself has a problem. <p>To use the alternate installation device, do the following:</p> <ol style="list-style-type: none"> 1. Power off the system. 2. If necessary, fix the device. 3. Power on the system. 4. Verify that the alternate installation device is enabled as an alternate installation device. 5. Load the tape media in the alternate installation device and start the installation procedure again.
B900 3121	<p>This reference code occurs when an IPL is attempted after an installation failure. You need to reinstall some or all of the operating system. Start with the media volume containing the base operating system.</p> <p>Then perform the appropriate procedure under “IBM i installation recovery after using reference codes” on page 184.</p>

Table 9. Common reference codes (continued)

Symptom	Action
2644 3136	This reference code appears if the tape device is assigned to another system or partition. Go to the other system or partition and vary off this tape device. Make sure the correct tape is loaded. Then perform the appropriate procedure under "IBM i installation recovery after using reference codes."
Any other reference code	Go to Chapter 14, "Troubleshooting software installation problems," on page 163, and follow the instructions there.

IBM i installation recovery after using reference codes

After taking the corrective action for a reference code, perform one of these procedures to continue the IBM i installation or upgrade. Use the procedure that is appropriate for the installation process that was in use when the reference code appeared.

If you used automatic installation:

1. Set the mode selector or toggle on the control panel to **Manual**.
2. Press the power switch to delayed off, press it again, and wait for the entire system to power off.
3. Set the mode selector or toggle on the control panel to **Normal**.
4. Press the power switch on and make the installation device ready. If the system attention light appears and the same reference code appears again, go to "Licensed Internal Code recovery" on page 168. Otherwise, continue with step 12 on page 68.

If you used manual installation:

1. Make sure that the media is loaded in the installation device for the alternate IPL.
2. Press the power switch to delayed off, press it again, and wait for the entire system to power off.
3. Press the power switch on and make the installation device ready. If the system attention light appears and the same reference code appears again, go to "Licensed Internal Code recovery" on page 168. Otherwise, continue with step 11 on page 77.

Chapter 15. IBM i software reference

This topic contains a collection of supporting information about the concepts and tasks related to upgrading or installing IBM i software.

Licensed program releases and sizes

The following licensed programs are available this release and are compatible with the IBM i operating system.

To help you plan for installing your new release, use this information to find the release and current size of the licensed programs that are listed.

Product	Option	Description	Version	Status	Storage (MB)
5770	9999	Licensed Internal Code	V7R1M0	Refreshed	4080.0
5770-SS1	Base (QGPL, QUSRSYS, QSYS)	IBM i	V7R1M0	Refreshed	2312.6
5770-SS1	1	Extended Base Support	V7R1M0	Refreshed	154.9
5770-SS1	2	Online Information	V7R1M0	Refreshed	43.5
5770-SS1	3	Extended Base Directory Support	V7R1M0	Refreshed	2750.1
5770-SS1	5	System/36 Environment	V7R1M0	Refreshed	17.6
5770-SS1	6	System/38 Environment	V7R1M0	Refreshed	12.0
5770-SS1	7	Example Tools Library	V7R1M0	Refreshed	10.3
5770-SS1	8	AFP Compatibility Fonts	V7R1M0	Refreshed	17.5
5770-SS1	9	*PRV CL Compiler Support	V7R1M0	Refreshed	81.5
5770-SS1	12	Host Servers	V7R1M0	Refreshed	18.8
5770-SS1	13	System Openness Includes	V7R1M0	Refreshed	472.7
5770-SS1	14	GDDM	V7R1M0	Refreshed	14.1
5770-SS1	18	Media and Storage Extensions	V7R1M0	Refreshed	2.3
5770-SS1	21	Extended G11N Support	V7R1M0	Refreshed	120.1
5770-SS1	22	ObjectConnect	V7R1M0	Refreshed	3.1
5770-SS1	23	OptiConnect	V7R1M0	Refreshed	8.2
5770-SS1	26	DB2 Symmetric Multiprocessing	V7R1M0	Refreshed	2.2
5770-SS1	27	DB2 Multisystem	V7R1M0	Refreshed	2.5
5770-SS1	29	Integrated Server Support	V7R1M0	Refreshed	144.6
5770-SS1	30	Qshell	V7R1M0	Refreshed	18.0
5770-SS1	31	Domain Name System and Dynamic Host Configuration	V7R1M0	Refreshed	48.8
5770-SS1	33	Portable App Solutions Environment	V7R1M0	Refreshed	557.9
5770-SS1	34	Digital Certificate Manager	V7R1M0	Refreshed	36.3

5770-SS1	35	CCA Cryptographic Service Provider	V7R1M0	Refreshed	27.3
5770-SS1	36	PSF for IBM i 1-55 IPM Printer Support	V7R1M0	Refreshed	0.2
5770-SS1	37	PSF for IBM i 1-100 IPM Printer Support	V7R1M0	Refreshed	0.2
5770-SS1	38	PSF for IBM i Any Speed Printer Support	V7R1M0	Refreshed	0.2
5770-SS1	39	International Components for Unicode	V7R1M0	Refreshed	755.7
5770-SS1	41	HA Switchable Resources	V7R1M0	Refreshed	0.5
5770-SS1	42	HA Journal Performance	V7R1M0	Refreshed	0.3
5770-SS1	43	Additional Fonts	V7R1M0	Refreshed	689.2
5770-SS1	44	Encrypted Backup Enablement	V7R1M0	Refreshed	0.2
5770-SS1	45	Encrypted ASP Enablement	V7R1M0	Refreshed	0.3
5770-AF1	base	IBM Advanced Function Printing Utilities	V7R1M0	Refreshed	20.2
5761-AP1	base	IBM Advanced DBCS Printer Support for iSeries	V6R1M0	Ship level	15.9
5761-AP1	1	Adv DBCS Printer Support - IPDS	V7R1M0	Refreshed	2.0
5770-BR1	base	IBM Backup Recovery and Media Services for i	V7R1M0	Refreshed	264.72
5770-BR1	1	BRMS - Network Feature	V7R1M0	Refreshed	1.1
5770-BR1	2	BRMS - Advanced Feature	V7R1M0	Refreshed	0.9
5722-BZ1	base	IBM Business Solutions	V5R1M0	Ship level	8.5
5761-CM1	base	IBM Communications Utilities for System i	V6R1M0	Ship level	14.4
5761-DB1	base	IBM System/38 Utilities for System i	V6R1M0	Ship level	82.5
5770-DE1	base	IBM DB2 Extenders™ Version 9.5 for i	V7R1M0	Refreshed	0.3
5770-DE1	1	DB2 Text Extender	V7R1M0	Refreshed	18.4
5770-DE1	2	DB2 XML Extender	V7R1M0	Refreshed	33.2
5770-DE1	3	Text Search Engine	V7R1M0	Refreshed	150.4
5770-DFH	base	IBM CICS® Transaction Server for i	V7R1M0	Refreshed	51.7
5770-DFH	1	CICS - Sample Applications	V7R1M0	Refreshed	8.1
5770-DG1	base	IBM HTTP Server for i	V7R1M0	Refreshed	152.7
5761-DP4	base	IBM DB2 DataPropagator for iSeries, V8.1	V6R1M0	Ship level	21.9
5761-DS2	base	IBM Business Graphics Utility for System i	V6R1M0	Ship level	8.7
5769-FN1	base	IBM Advanced Function Printing DBCS Fonts for AS/400	V4R2M0	Ship level	0.2

	5769-FN1	1	AFP DBCS Fonts - Japanese	V4R2M0	Ship level	76.6
	5769-FN1	2	AFP DBCS Fonts - Korean	V4R2M0	Ship level	25.4
	5769-FN1	3	AFP DBCS Fonts - Traditional Chinese	V4R2M0	Ship level	14.1
	5769-FN1	4	AFP DBCS Fonts - Simplified Chinese	V4R2M0	Ship level	8.3
	5769-FN1	5	AFP DBCS Fonts - Thai	V4R2M0	Ship level	3.5
	5769-FNT	base	IBM Advanced Function Printing Fonts for AS/400	V4R2M0	Ship level	0.2
	5769-FNT	1	AFP Fonts - Sonoran Serif	V4R2M0	Ship level	5.0
	5769-FNT	2	AFP Fonts - Sonoran Serif Headliner	V4R2M0	Ship level	5.1
	5769-FNT	3	AFP Fonts - Sonoran Sans Serif	V4R2M0	Ship level	4.8
	5769-FNT	4	AFP Fonts - Sonoran Sans Serif Headliner	V4R2M0	Ship level	5.0
	5769-FNT	5	AFP Fonts - Sonoran Sans Serif Condensed	V4R2M0	Ship level	3.5
	5769-FNT	6	AFP Fonts - Sonoran Sans Serif Expanded	V4R2M0	Ship level	2.8
	5769-FNT	7	AFP Fonts - Monotype Garamond	V4R2M0	Ship level	3.7
	5769-FNT	8	AFP Fonts - Century Schoolbook	V4R2M0	Ship level	4.0
	5769-FNT	9	AFP Fonts - Pi and Specials	V4R2M0	Ship level	0.9
	5769-FNT	10	AFP Fonts - ITC Souvenir	V4R2M0	Ship level	4.0
	5769-FNT	11	AFP Fonts - ITC Avant Garde Gothic	V4R2M0	Ship level	3.8
	5769-FNT	12	AFP Fonts - Math and Science	V4R2M0	Ship level	3.2
	5769-FNT	13	AFP Fonts - DATA1	V4R2M0	Ship level	0.3
	5769-FNT	14	AFP Fonts - APL2®	V4R2M0	Ship level	0.8
	5769-FNT	15	AFP Fonts - OCR A and OCR B	V4R2M0	Ship level	0.2
	5770-HAS	base	IBM PowerHA® for i	V7R1M0	Refreshed	238.9
	5770-HAS	1	PowerHA for i Enterprise Edition	V7R1M0	New	0.2
	5722-IP1	base	IBM Infoprint Server for iSeries	V5R3M0	Ship level	85.8
	5722-IP1	1	PS to AFP Transform	V5R3M0	Ship level	1.0
	5770-JS1	base	IBM Advanced Job Scheduler for i	V7R1M0	Refreshed	105.4
	5761-JV1	base	IBM Developer Kit for Java	V6R1M0	Ship level	34.7
	5761-JV1	8	J2SE 5.0 32 bit	V6R1M0	Ship level	250.0
	5761-JV1	9	J2SE 5.0 64 bit	V6R1M0	Ship level	256.7
	5761-JV1	11	Java SE 6 32 bit	V6R1M0	Ship level	411.6
	5761-JV1	12	Java SE 6 64 bit	V6R1M0	Ship level	408.5

5761-JV1	13	J2SE 1.4 64 bit	V6R1M0	New	230.6
5770-MG1	base	IBM Managed System Services for i	V7R1M0	Refreshed	38.4
5770-NAE	base	IBM Network Authentication Enablement for i	V7R1M0	Refreshed	173.0
5733-OMF	base	OmniFind Text Search Server for DB2 for i	V1R2M0	Refreshed	242.3
5770-PT1	base	IBM Performance Tools for i	V7R1M0	Refreshed	12.1
5770-PT1	1	Performance Tools - Manager Feature	V7R1M0	Refreshed	11.9
5770-PT1	2	Performance Tools - Agent Feature	V7R1M0	Refreshed	0.7
5770-PT1	3	Performance Tools - Job Watcher	V7R1M0	Refreshed	0.1
5770-PT1	4	Performance Tools - Reserved	V7R1M0	Refreshed	0.1
5770-PT1	5	Performance Tools - Reserved	V7R1M0	Refreshed	0.1
5770-QU1	base	IBM Query for i	V1R1M1	Refreshed	6.2
5733-QU2	base	IBM DB2 Web Query for i	V1R1M1	Ship level	339.0
5733-QU2	1	Active Reports	V1R1M1	Ship level	0.1
5733-QU2	2	OLAP Module	V1R1M1	Ship Level	0.1
5733-QU2	3	IBM DB2 Developer Workbench	V1R1M1	Ship level	582.4
5733-QU2	4	Run Time User Enablement	V1R1M1	Ship level	0.2
5733-QU2	5	Spreadsheet Client	V1R1M1	New	0.2
5733-QU2	6	Adapter for Microsoft SQL Server	V1R1M1	New	0.8
5733-QU3	base	IBM DB2 Web Query Report Broker	V1R1M1	Ship level	0.3
5733-QU4	base	IBM DB2 Web Query Software Development Kit	V1R1M1	Ship level	0.2
5770-RD1	base	IBM DB2 Content Manager OnDemand for i	V7R1M0	Refreshed	40.0
5770-RD1	10	OnDemand Common Server Feature	V7R1M0	Refreshed	106.4
5770-RD1	11	OnDemand Web Enablement Kit	V7R1M0	Refreshed	94.8
5770-RD1	12	OnDemand PDF Indexer Feature	V7R1M0	Refreshed	224.8
5733-SC1	base	IBM Portable Utilities for i	V7R1M0	Refreshed	1.7
5733-SC1	1	OpenSSH, OpenSSL, zlib functions	V7R1M0	Refreshed	73.2
5770-SM1	base	IBM System Manager for i	V7R1M0	Refreshed	20.5
5770-ST1	base	IBM DB2 Query Manager and SQL Development Kit for i	V7R1M0	Refreshed	18.9
5770-TC1	base	IBM TCP/IP Connectivity Utilities for i	V7R1M0	Refreshed	47.1
5770-TS1	base	IBM Transform Services for i	V7R1M0	Refreshed	4.3

5770-TS1	1	Transforms - AFP to PDF Transform	V7R1M0	Refreshed	26.2
5770-UME	base	IBM Universal Manageability Enablement for i	V1R3M0	Refreshed	321.0
5722-VI1	base	IBM Content Manager for i	V5R3M0	Ship level	25.5
5722-VI1	1	Content Manager for iSeries	V5R3M0	Ship level	85.1
5722-VI1	2	Content Manager for iSeries	V5R3M0	Ship level	46.5
5770-WDS	base	IBM Rational® Development Studio for i	V7R1M0	Refreshed	38.6
5770-WDS	21	Application Development ToolSet	V7R1M0	Refreshed	38.7
5770-WDS	31	ILE RPG	V7R1M0	Refreshed	14.5
5770-WDS	32	System/36 Compatible RPG II	V7R1M0	Refreshed	6.4
5770-WDS	33	System/38 Compatible RPG III	V7R1M0	Refreshed	5.3
5770-WDS	34	RPG/400®	V7R1M0	Refreshed	7.3
5770-WDS	35	ILE RPG *PRV Compiler	V7R1M0	Refreshed	24.8
5770-WDS	41	ILE COBOL	V7R1M0	Refreshed	26.1
5770-WDS	42	System/36 Compatible COBOL	V7R1M0	Refreshed	7.2
5770-WDS	43	System/38 Compatible COBOL	V7R1M0	Refreshed	6.0
5770-WDS	44	OPM COBOL	V7R1M0	Refreshed	14.8
5770-WDS	45	ILE COBOL *PRV Compiler	V7R1M0	Refreshed	51.5
5770-WDS	51	ILE C	V7R1M0	Refreshed	13.0
5770-WDS	52	ILE C++	V7R1M0	Refreshed	66.9
5770-WDS	56	IXLC for C/C++	V7R1M0	Refreshed	1.4
5770-WDS	60	Workstation Tools - Base	V7R1M0	Refreshed	5.8
5770-XE1	XE1 base	IBM i Access for Windows	V7R1M0	Refreshed	402.9
5770-XH2	XH2 base	IBM i Access for Web	V7R1M0	Refreshed	387.6
5770-XW1	XW1 base	IBM i Access Family	V7R1M0	Refreshed	1.2
5770-XW1	XW1 option 1	IBM i Access Enablement Support	V7R1M0	Refreshed	4.5

Estimates for IBM i software installation time

It is difficult to accurately estimate the amount of time needed to install a new release of software. Many variables combine to create a unique set of circumstances for each system. Use this information to help you estimate the time it will take to install your new IBM i release.

“Minimizing software installation time” on page 36 can help you make the best use of the time you spend on software installation.

Common methods of estimating IBM i installation time

The most common ways to estimate your total installation time for an upgrade are described in this list. This time includes analyzing your system and other preparation steps before the installation, the actual installation and possible down times, and postinstallation procedures.

- For V5R4 to IBM i 7.1 upgrades, base your estimate on the results of analyzing your system for object conversions before the installation and optionally running conversion tools after the installation. IBM highly recommends that you allow adequate time to prepare your system for the V5R4 to IBM i 7.1 object conversions. To estimate your total time, add your object conversion estimate to one of the other suggested ways to estimate that are included in this list.
- Base your estimate on the installation time of a previous release. If the system configuration and load remain similar, you can use the installation time of a previous release on this system *as the start* of your estimate. If you rely on only the installation time of the previous release, your estimate might not be accurate. This method is not accurate if many data conversions occur during the installation process. If you are skipping a release level, generally the time is longer. Be sure to add information for conversions that occur in the release you are skipping and for the new release.
- Base your estimate on the installation time for a similar system. If your enterprise has multiple systems, you can record the actual time to install the new release on one system. You can use this to estimate the time that is needed to install the new release on a system with a similar configuration and load. Of course, you cannot use this method until you complete the installation on the first system.
- Estimate time using a formula. You can use the information in the following sections to estimate how long it will take to install this release on your system. Keep in mind that the number at which you arrive will vary from your actual installation time because of the variables that affect installation time.
- Combine one or more of the methods that are listed above.

Conditions that affect IBM i installation time

Several major factors can affect installation performance.

The amount of time it takes to install the licensed programs depends on your system configuration and the licensed programs you are installing. That is, the larger models with more system capacity have a shorter installation time than smaller models loading the same licensed programs. The major factors that affect installation performance are:

- Installation device
- Number and type of disk unit I/O processors
- Processing unit capacity
- Disk unit space available
- Main storage available in base pool
- Human interaction
- Licensed programs to be installed
- Number of object conversions and how the conversions are done

IBM i installation processes

The system determines the type of installation process it uses based on available system resources and the types of products being installed.

A *single-process installation* is when licensed programs are installed one at a time (sequentially). A *multiprocess installation* is when the system starts multiple jobs to perform the installation of two or more licensed programs at the same time.

Licensed Internal Code and the base part of the operating system are always installed using single-process installation. Licensed programs (including libraries QGPL and QUSRSYS and optional parts of the operating system) can be installed using either single-process or multiprocess installation.

If you are installing only one licensed program, the system uses single-process installation. If you are installing more than one licensed program, multiprocess installation is used if system resources are available. If system resources are not available, single-process installation is used. A single-process installation is used when a system's main storage or auxiliary storage is limited and when a licensed program exceeds the requirements for multiprocess installation. For any set of licensed programs, if the system must use single-process installation, the installation takes longer.

Multiprocess installation

The operating system determines if your system configuration has enough system capacity to use multiprocess installation to install licensed programs. If your system has the required resources, the licensed programs are installed concurrently by doing the following tasks:

- Loading the licensed program installation files from the media to temporary save files.
- Using multiple batch jobs to concurrently install licensed programs from the save files. The save files are deleted during the installation process when they are no longer needed.

During installation, a status panel indicates the licensed programs that are currently being installed from save files. The display lists the licensed programs and the type of item being installed for each, as follows:

*PGM Program objects

*LNG Language objects

If your system does not have the required resources for a multiprocess installation, the licensed programs are installed sequentially from the installation media (single-process). In single-process installation, the status panel indicates the licensed program that is currently being installed from the media.

Checklist: Estimating IBM i installation time

Follow these directions to help you estimate the approximate installation time of this release.

This information is provided to assist you in estimating the approximate preparation, installation, and postinstallation time of this release on your system. Use the following checklist as a guide. The checklist refers you to other information or work sheets to obtain values.

The checklist assumes that you are not changing the primary language of your system. The estimate you arrive at by using this checklist is based on the assumption that your system must perform a single-process installation. If your system is able to use multiprocess installation, your time will be less.

The checklist and supporting work sheets do not include the amount of time that is spent on loading the next volumes, media errors, or recovery procedures. User data is not included. The time needed for INZSYS to complete is also not included.

To estimate your total installation time, follow these steps:

1. Estimate the amount of time you need to save your system before you install the new release. Time for saving the system depends on how much storage you have and what percentage of the storage you are using. Use the amount of time from the last backup of your system.

Time: _____

2. Estimate the amount of time to replace Licensed Internal Code. Allow 30 minutes for smaller servers. The average time for larger servers is about 15 minutes.

Time: _____

3. Add the estimated amount of time to replace the operating system, which is approximately the same for all systems.

Note: This installation time is based on using optical installation media. If you install from tape (such as a distribution tape created by a central site), these numbers are not valid. The speed of the optical drive is 600 kilobytes per second, which is the same rate as the 6390 tape drive (8mm). The next closest tape speed is 300 kilobytes per second for the 6380 tape drive (1/4 inch).

Time: 80 minutes

4. Use "Times for installing licensed programs" on page 193 to estimate this time. Be sure to include all the licensed programs and optional parts that you intend to install.

Time: _____

5. Add time for planning and analyzing your system for object conversion before the upgrade and a separate amount of time for possible work after the upgrade. Follow the steps in "Times for conversions (V5R4 to IBM i 7.1 upgrade)" on page 197 to determine how much time you need to add for the following conversions:

- "Program conversions (V5R4 to IBM i 7.1 upgrade)" on page 198

Time for analyzing your system and making possible adjustments to your programs before the upgrade: _____

Time for conversion work such as running the Start Object Conversion (STROBJCVN) command after the upgrade: _____


- "Spooled file conversions (V5R4 to IBM i 7.1 upgrade)" on page 199

Time for spooled file conversion: _____

- "IBM Backup Recovery and Media Services for i conversions (V5R4 to IBM i 7.1 upgrade)" on page 202

Time for IBM Backup Recovery and Media Services for i conversion: _____

Some licensed programs such as Lotus Domino and related products (Lotus Sametime®, LEI, Lotus Quickr®, and others) require additional time for conversion and might require the installation of certain PTFs. For additional information about IBM products that are not identified in either step 4 or step 5, see the Memo to users and the IBM Redpaper publication IBM i Program Conversion: Getting Ready for IBM i V6R1. For additional information about

Domino products, see the Lotus Domino for IBM i  Web site (www.ibm.com/servers/eserver/iserries/domino/support/).

6. If your system uses mirroring or an implementation of a RAID 5 or RAID 6 technique on the disk units in the system ASP, add extra time as described in "Data protection mechanisms" on page 202.

Time: _____

7. Consider the time required for your system to perform an IPL. If your system takes more than 20 minutes to perform an IPL, include the amount of time that exceeds 20 minutes. For example, if your system takes 45 minutes to perform an IPL, enter the difference of 25 minutes for the time (45 - 20 = 25).

Time: _____

8. Add time for saving your system after the installation. Be aware that data conversions can occur during the save operation that could increase the time needed for saving your system.

Time: _____

9. Determine the amount of time required to install the cumulative PTF package. Use the timing information in the *PTF Shipping Information Letter*.

Time: _____

10. Add time for any extra clean-up work and to re-customize your system.

Time: _____

The total of these steps is your estimated time for installing your new release.

Estimated time: _____

If you have data protection mechanisms, add the value you obtained from the information in "Data protection mechanisms" on page 202): _____

Total estimated time: _____

Times for installing licensed programs

This information can be used to determine the estimated maximum value (in minutes) for installing your licensed programs that are related to the IBM i operating system.

The following table includes data that was available at the time of publication. Use this data to complete step 4 on page 192.

The estimated values are for individual process times for each licensed program to install. Expect some variation in the values. These values are not accurate if you install from tape, such as for distribution tapes created by a central site.

If you are viewing the following table online, use the information in Interactive calculation of total licensed program installation time to calculate the installation time for your licensed programs.

Note:

1. The values were created by using images that were preloaded into an image catalog.
2. A hyphen indicates that no value can be calculated.

Table 10. Licensed program time information

Product	Option	Description	Value for replacing licensed program (in minutes)	Value for adding licensed program (in minutes)
5770-SS1	1	Extended Base Support	4.0	1.6
5770-SS1	2	Online Information	0.4	0.5
5770-SS1	3	Extended Base Directory Support	31.5	18.8
5770-SS1	5	System/36 Environment	2.3	0.6
5770-SS1	6	System/38 Environment	1.8	0.7
5770-SS1	7	Example Tools Library	0.6	0.2
5770-SS1	8	AFP Compatibility Fonts	2.1	0.8
5770-SS1	9	*PRV CL Compiler Support	12.6	4.6
5770-SS1	12	Host Servers	1.6	0.8
5770-SS1	13	System Openness Includes	21.3	11.9
5770-SS1	14	GDDM	1.8	0.5
5770-SS1	18	Media and Storage Extensions	0.4	0.2
5770-SS1	21	Extended G11N Support	1.9	1.1
5770-SS1	22	ObjectConnect	0.4	0.2
5770-SS1	23	OptiConnect	0.8	0.5
5770-SS1	26	DB2 Symmetric Multiprocessing	0.4	0.2
5770-SS1	27	DB2 Multisystem	0.3	0.2
5770-SS1	29	Integrated Server Support	5.7	4.8
5770-SS1	30	Qshell	1.5	0.6
5770-SS1	31	Domain Name System	1.7	0.9
5770-SS1	33	Portable App Solutions Environment	10.4	7.8
5770-SS1	34	Digital Certificate Manager	1.7	1.3
5770-SS1	35	CCA Cryptographic Service Provider	2.2	0.7
5770-SS1	36	PSF for IBM i 1-55 IPM Printer Support	0.3	0.2
5770-SS1	37	PSF for IBM i 1-100 IPM Printer Support	0.2	0.2
5770-SS1	38	PSF for IBM i Any Speed Printer Support	0.2	0.2
5770-SS1	39	International Components for Unicode	3.8	6.2
5770-SS1	41	HA Switchable Resources	0.3	0.2
5770-SS1	42	HA Journal Performance	0.3	0.2
5770-SS1	43	Additional Fonts	7.9	7.4
5770-SS1	44	Encrypted Backup Enablement	0.2	0.2
5770-SS1	45	Encrypted ASP Enablement	0.2	0.2
5770-AF1	Base	IBM Advanced Function Printing Utilities	1.4	0.5
5761-AP1	Base	IBM Advanced DBCS Printer Support for iSeries	0.5	0.6
5761-AP1	1	Adv DBCS Printer Support - IPDS	0.2	0.2
5770-BR1	base	IBM Backup Recovery and Media Services for i	12.2	5.5
5770-BR1	1	BRMS - Network Feature	0.2	0.2

Table 10. Licensed program time information (continued)

Product	Option	Description	Value for replacing licensed program (in minutes)	Value for adding licensed program (in minutes)
5770-BR1	2	BRMS - Advanced Feature	0.1	0.1
5722-BZ1	base	IBM Business Solutions	0.7	0.6
5761-CM1	base	IBM Communications Utilities for System i	1.4	0.4
5761-DB1	base	IBM System/38 Utilities for System i	2.0	0.7
5770-DE1	base	IBM DB2 Extenders Version 9.5 for i	0.4	0.3
5770-DE1	1	DB2 Text Extender	0.5	0.6
5770-DE1	2	DB2 XML Extender	0.6	0.8
5770-DE1	3	Text Search Engine	1.5	1.1
5770-DFH	base	IBM CICS Transaction Server for i	2.3	0.8
5770-DFH	1	CICS - Sample Applications	0.5	0.2
5770-DG1	base	IBM HTTP Server for i	7.9	5.2
5761-DP4	base	IBM DB2 DataPropagator for iSeries, V8.1	2.6	0.7
5761-DS2	base	IBM Business Graphics Utility for System i	0.3	0.3
5769-FN1	base	IBM Advanced Function Printing DBCS Fonts for AS/400	0.1	0.1
5769-FN1	1	AFP DBCS Fonts - Japanese	0.6	1.5
5769-FN1	2	AFP DBCS Fonts - Korean	0.3	0.7
5769-FN1	3	AFP DBCS Fonts - Traditional Chinese	0.2	0.3
5769-FN1	4	AFP DBCS Fonts - Simplified Chinese	0.2	0.3
5769-FN1	5	AFP DBCS Fonts - Thai	0.2	0.2
5769-FNT	base	IBM Advanced Function Printing Fonts for AS/400	0.1	0.2
5769-FNT	1	AFP Fonts - Sonoran Serif	0.2	0.2
5769-FNT	2	AFP Fonts - Sonoran Serif Headliner	0.2	0.2
5769-FNT	3	AFP Fonts - Sonoran Sans Serif	0.2	0.4
5769-FNT	4	AFP Fonts - Sonoran Sans Serif Headliner	0.2	0.2
5769-FNT	5	AFP Fonts - Sonoran Sans Serif Condensed	0.2	0.3
5769-FNT	6	AFP Fonts - Sonoran Sans Serif Expanded	0.2	0.3
5769-FNT	7	AFP Fonts - Monotype Garamond	0.2	0.3
5769-FNT	8	AFP Fonts - Century Schoolbook	0.2	0.3
5769-FNT	9	AFP Fonts - Pi and Specials	0.2	0.2
5769-FNT	10	AFP Fonts - ITC Souvenir	0.2	0.2
5769-FNT	11	AFP Fonts - ITC Avant Garde Gothic	0.2	0.3
5769-FNT	12	AFP Fonts - Math and Science	0.2	0.2
5769-FNT	13	AFP Fonts - DATA1	0.1	0.1
5769-FNT	14	AFP Fonts - APL2	0.2	0.1
5769-FNT	15	AFP Fonts - OCR A and OCR B	0.1	0.1
5770-HAS	base	IBM PowerHA for i Standard Edition	1.6	2.1

Table 10. Licensed program time information (continued)

Product	Option	Description	Value for replacing licensed program (in minutes)	Value for adding licensed program (in minutes)
5770-HAS	1	IBM PowerHA for i Enterprise Edition	.3	.4
57225722-IP1	base	IBM Infoprint Server for iSeries	6.1	3.1
5722-IP1	1	PS to AFP Transform	0.9	0.4
5770-JS1	base	IBM Advanced Job Scheduler for i	7.1	2.1
5761-JV1	base	IBM Developer Kit for Java	1.0	0.8
5761-JV1	8	J2SE 5.0 32 bit	5.5	2.1
5761-JV1	9	J2SE 5.0 64 bit	2.9	2.0
5761-JV1	11	Java SE 6 32 bit	4.3	4.3
5761-JV1	12	Java SE 6 64 bit	3.7	3.7
5761-JV1	13	J2SE 1.4 64 bit	3.7	2.3
5770-MG1	base	IBM Managed System Services for i	1.2	0.6
5770-NAE	base	IBM Network Authentication Enablement for i	6.7	4.6
5733-OMF	base	OmniFind Text Search Server for DB2 for i	2.0	2.1
5770-PT1	base	IBM Performance Tools for i	1.6	0.7
5770-PT1	1	Performance Tools - Manager Feature	1.3	0.6
5770-PT1	2	Performance Tools - Agent Feature	0.2	0.3
5770-PT1	3	Performance Tools - Job Watcher	0.2	0.2
5770-PT1	4	Performance Tools - Reserved	0.1	0.1
5770-PT1	5	Performance Tools - Reserved	0.1	0.1
5770-QU1	base	IBM Query for i	0.8	0.3
5733-QU2	base	IBM DB2 Web Query for i	15.4	12.9
5733-QU2	1	Active Reports	0.1	0.1
5733-QU2	2	OLAP Module	0.1	0.1
5733-QU2	3	IBM DB2 Developer Workbench	5.6	4.9
5733-QU2	4	Run Time User Enablement	0.1	0.1
5733-QU2	5	Spreadsheet Client	0.3	0.2
5733-QU2	6	Adapter for Microsoft SQL Server	0.2	0.2
5733-QU3	base	IBM DB2 Web Query Report Broker	0.2	0.2
5733-QU4	base	IBM DB2 Web Query Software Development Kit	0.2	0.2
5770-RD1	base	IBM DB2 Content Manager OnDemand for i	1.7	1.0
5770-RD1	10	OnDemand Common Server Feature	2.8	1.8
5770-RD1	11	OnDemand Web Enablement Kit	1.6	1.0
5770-RD1	12	OnDemand PDF Indexer Feature	1.5	1.1
5733-SC1	base	IBM Portable Utilities for i	0.2	0.3
5733-SC1	1	OpenSSH, OpenSSL, zlib functions	3.6	2.3
5770-SM1	base	IBM System Manager for i	2.8	0.4

Table 10. Licensed program time information (continued)

Product	Option	Description	Value for replacing licensed program (in minutes)	Value for adding licensed program (in minutes)
5770-ST1	base	IBM DB2 Query Manager and SQL Development Kit for i	2.5	0.4
5770-TC1	base	IBM TCP/IP Connectivity Utilities for i	2.5	1.4
5770-TS1	base	IBM Transform Services for i	0.4	0.4
5770-TS1	1	Transforms - AFP to PDF Transform	0.7	0.7
5770-UME	base	IBM Universal Manageability Enablement for i	5.3	4.7
5722-VI1	base	IBM Content Manager for i	0.4	0.4
5722-VI1	1	Content Manager for iSeries	0.9	0.9
5722-VI1	2	Content Manager for iSeries	0.2	0.2
5770-WDS	base	IBM Rational Development Studio for i	2.1	0.7
5770-WDS	21	Application Development ToolSet	2.2	0.8
5770-WDS	31	ILE RPG	0.2	0.3
5770-WDS	32	System/36 Compatible RPG II	0.4	0.2
5770-WDS	33	System/38 Compatible RPG III	0.3	0.5
5770-WDS	34	RPG/400	0.4	0.2
5770-WDS	35	ILE RPG *PRV Compiler	0.3	0.3
5770-WDS	41	ILE COBOL	0.5	0.4
5770-WDS	42	System/36 Compatible COBOL	0.5	0.3
5770-WDS	43	System/38 Compatible COBOL	0.5	0.2
5770-WDS	44	OPM COBOL	0.5	0.3
5770-WDS	45	ILE COBOL *PRV Compiler	0.5	0.5
5770-WDS	51	ILE C	0.3	0.4
5770-WDS	52	ILE C++	1.2	1.1
5770-WDS	56	IXLC for C/C++	0.1	0.1
5770-WDS	60	Workstation Tools - Base	0.3	0.3
5770-XE1	base	IBM i Access for Windows	3.2	2.7
5770-XH2	base	IBM i Access for Web	8.3	4.7
5770-XW1	base	IBM i Access Family	0.3	0.4
5770-XW1	1	IBM i Access Enablement Support	0.1	0.1


Total licensed program installation time: _____

Times for conversions (V5R4 to IBM i 7.1 upgrade)


The conversions on your system can have a significant effect on the amount of time required before the upgrade and during normal operations after you upgrade.

For V5R4 to IBM i 7.1 upgrades, unique conversions will occur with programs in libraries, Java programs in directories, spooled files, and integrated file system names in file systems that are not case sensitive.

Some conversions might have a significant performance effect when program objects are not converted until accessing the program for the first time after an upgrade. To make your conversions run as smoothly as possible, follow the recommendations in the IBM Redpaper publication IBM i Program Conversion:

Getting Ready for IBM i V6R1  .

More conversions occur if you are skipping a release level. You need to consider the time for conversions in both the release you are skipping and in the new release. To estimate the additional time that conversions might require, you can gather information about specific object types on your system. To review conversion information from a skipped release, see the software upgrade

information in the IBM i Information Center  (<http://www.ibm.com/systems/i/infocenter/>) for that release.

Program conversions (V5R4 to IBM i 7.1 upgrade):

When you upgrade from V5R4 to IBM i 7.1, the program conversions will refresh programs to take advantage of the latest system enhancements.

Program conversion includes the conversion of programs in libraries and conversion of Java programs in directories. The conversions of Java programs in directories, however, do not affect the actual IBM i upgrade time.


Before you upgrade to IBM i 7.1, it is highly recommended that you allow up to several weeks to analyze your system and plan your strategy for program object conversions. Information APAR II14306 describes the Analyze Object Conversion (ANZOBJCVN) tool for V5R4. This tool helps you identify potential conversion difficulties, if any, and estimates the time required for program conversion.

After you upgrade, program conversion can be accomplished by one of these methods:

- Running the Start Object Conversion (STROBJCVN) command to manually initiate conversion of program objects in libraries.
- During a restore operation.
- On the first call or activation.

The overall analysis and work before the upgrade and the conversion process after the upgrade to IBM i 7.1 could lengthen your total IBM i upgrade time. For example, you might need to make adjustments to some of your application programs before your upgrade.

To begin the steps of preparing your systems for IBM i 7.1 object conversions of programs in libraries, follow these general directions.

1. Review Information APAR II14306 for the commands and function included with the conversion PTFs. This information APAR is in the preventive service planning information about the **Support for System i**  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).
2. Follow the directions in the IBM Redpaper publication IBM i Program

Conversion: Getting Ready for IBM i V6R1  .

All Java programs that reside in directories can be converted in a short amount of time. Additional information about their conversion can also be found in Information APAR II14306 and the IBM Redpaper publication.



Spooled file conversions (V5R4 to IBM i 7.1 upgrade):

|
|
|

When you upgrade from V5R4 to IBM i 7.1, spooled file operations are processed more efficiently than in previous releases due to conversions that can be done either during the release upgrade or after the upgrade.

After the conversion, long-running operations such as displaying a list of all the spooled files on the system, for example, should not affect another job's ability to perform a spooling operation such as creating, deleting, or printing a spooled file.

Before you upgrade to the new release, it is recommended that you analyze your system before you upgrade by following the directions in Information APAR II14306 and the IBM Redpaper publication IBM i Program Conversion: Getting

Ready for IBM i V6R1 . The information APAR is in the preventive service planning information about the **Support for System i**  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).

The planning PTFs for program object conversion that are described in the Redpaper publication include tools to collect and report the number of spooled files on your system and the time to convert them for V6R1. The times can vary depending on the workload of the system, and post-IPL or post-vary-on operation times could be longer than estimated.

Several options for converting your spooled files are available. Table 11 and Table 12 on page 200 compare the possible options.

Note: Only newly created spooled files or spooled files that have been converted can be seen and used after the upgrade. Until the conversion is complete, unconverted spooled files appear to not exist. If a data area is used to direct the conversion, delete the data area after the conversion has occurred.

Table 11. Spooled file conversion options that do not apply to independent auxiliary storage pools (ASPs)

When to convert spooled files	Description
During the upgrade (this is the default option for the options in this table)	<p>Action: Perform a standard upgrade with no unique additional procedures.</p> <p>Result: All spooled files are converted after the upgrade is complete.</p>
After the upgrade when the system is removed from the restricted state	<p>Action: Before the upgrade, create the QSPL/QSPLDRFCVN data area with the type Logical (*LGL) and the value set to 1: CRTDTAARA DTAARA(QSPL/QSPLDFRCVN) TYPE(*LGL) VALUE('1').</p> <p>Result: Spooled files are converted after the upgrade when the system is no longer in a restricted state.</p>

Table 11. Spooled file conversion options that do not apply to independent auxiliary storage pools (ASPs) (continued)

When to convert spooled files	Description
After the upgrade with your control	<p>Action: Before the upgrade, create the QSPL/QSPLDFRCVN data areas with the type Logical (*LGL) and the value set to 0: CRTDTAARA DTAARA(QSPL/QSPLDFRCVN) TYPE(*LGL) VALUE('0').</p> <p>After the upgrade, change the data areas to have a value of 1. When you want the spooled files to be converted, enter the Start Spool Reclaim command: STRSPLRCL OUTQ(*ALL/*ALL).</p> <p>Result: The spooled files are converted by the QSPRC00001 system job. If the command is never called and the data area is never deleted or changed to 1, the spooled files are not converted.</p>
During a subsequent IPL	<p>Action: Before the upgrade, create the QSPL/QSPLDFRCVN data area with the type Logical (*LGL) and the value set to 0: CRTDTAARA DTAARA(QSPL/QSPLDFRCVN) TYPE(*LGL) VALUE('0').</p> <p>Before the IPL during which the spooled files are to be converted, delete the data area.</p> <p>Result: The spooled files are converted during the C900 2AAA step of the next IPL.</p>
After a subsequent IPL	<p>Action: Before the upgrade, create the QSPL/QSPLDFRCVN data area with the type Logical (*LGL) and the value set to 0: CRTDTAARA DTAARA(QSPL/QSPLDFRCVN) TYPE(*LGL) VALUE('0').</p> <p>Before the IPL after which the spooled files are to be converted, change the data area to have a value of 1.</p> <p>Note: If you call STRSPLRCL OUTQ(*ALL/*ALL), the spooled files are converted.</p> <p>Result: The spooled files are converted after the IPL when the system is not in a restricted state. The spooled files are converted by the QSPRC00001 system job.</p>

Table 12. Spooled file conversion options for independent auxiliary storage pools (ASPs)

When to convert spooled files	Description
During a vary-on operation (this is the default option for the options in this table)	<p>Action: No action required.</p> <p>Result: The spooled files are converted during the vary-on operation.</p>

Table 12. Spooled file conversion options for independent auxiliary storage pools (ASPs) (continued)

When to convert spooled files	Description
After a vary-on operation.	<p>Action: Before the installation, create the QSPLxxx/QSPDFRCVN data area in the primary ASP device. The xxx refers to the ASP number of the primary ASP in the ASP group.</p> <p>Result: The spooled files are converted in system job QSPRCxxxxx after the vary-on operation. The xxxxx refers to the independent ASP number of the primary independent ASP.</p>



Spooled files restored to the V6R1 release are automatically converted. It is possible that the time for the spooled file conversion process can be lessened by saving and deleting the spooled files before you upgrade from V5R4 and then restoring them after you have V6R1 installed.

Integrated file system conversions (V5R4 to IBM i 7.1 upgrade):

Integrated file system conversions should not affect the overall length of time for an IBM i upgrade, but it might be advantageous for you to analyze and possibly change certain file names before you upgrade. As of V6R1, file systems that are not case sensitive in the integrated file system support Unicode Standard 4.0 for names stored in directories.

In V5R4, the integrated file system stores all names in Unicode and supported Unicode Standard 2.0. After upgrading from V5R4, an automatic conversion runs to update the integrated file system directories in file systems that are not case-sensitive to support Unicode Standard 4.0. Unicode Standard 4.0 defines additional characters and updated casing rules. The file systems included in this conversion are "root" (/) and user-defined file systems (UDFS). These file systems are in any auxiliary storage pool that is created with the parameter value CASE(*MONO) on the Create User-defined File System (CRTUDFS) command.

Before you upgrade from V5R4, it is recommended that you review Information APAR II14306 and the IBM Redpaper publication IBM i Program Conversion:

Getting Ready for IBM i V6R1 . These resources will help you to analyze your system and to identify objects that are going to be affected by the Unicode conversion. You can then decide if you want to change the names of the affected objects before you upgrade or let the automatic conversion occur. The information APAR is in the preventive service planning information on the **Support for System i**  Web page. Select the link for technical databases; then select the link for Authorized Problem Analysis Reports (APARs).

The conversion of the directories automatically begins for any of the file systems shortly after IBM i 7.1 is installed. This conversion runs in the background during normal operations and should not significantly affect your system activity. For more information about integrated file system directory conversions, see Converting names to support additional characters in the IBM i Information Center.

IBM Backup Recovery and Media Services for i conversions (V5R4 to IBM i 7.1 upgrade):

If you have this licensed program installed, review the following information about product initialization.

If you are upgrading IBM Backup Recovery and Media Services for i (BRMS), 5770-BR1, product initialization is required after a software upgrade before you can use the BRMS functions. BRMS product initialization was removed from the installation time to improve the time required to complete software upgrades that include BRMS.

The Planning for the Installation topic in the IBM i Information Center has more information about BRMS product initialization and methods for determining the estimated product initialization time

Data protection mechanisms

If your system uses mirroring or an implementation of a RAID 5 or RAID 6 technique on the disk units in the system ASP, your IBM i installation time can be longer.

This amount of time will vary depending on your configuration, but if the disk units are protected with RAID 5 or RAID 6, the total installation time (for Licensed Internal Code, the IBM i operating system, and licensed programs) will be approximately 15 percent longer. If the disk units are mirror protected, the total installation time will be approximately 10 percent longer. Mirroring and implementations of the RAID 5 or RAID 6 techniques do not affect the duration of save operations.

Using the percents given, include a time estimate for your system in “Checklist: Estimating IBM i installation time” on page 191.

Installation devices and media

These devices can be used to install the IBM i release.

“Types of software installation devices” on page 10 provides an overview of the devices available and their naming conventions.

Optical media

This topic includes tips for using optical devices and optical media to install an IBM i release, install PTFs (fixes), or install single licensed programs.

The optical device used with the optical media class is considered the alternate IPL device.

Keep optical media in its protective case when not in use. When handling optical media, do not touch the surface. If the media has dust or fingerprints on it, it can be cleaned with a lint free cloth (the tape cleaning cloth can be used). Gently wipe the media from the center to the outside of the disc.

When you install from optical media, it is important to know what each media volume contains so that you do not exit the installation process prematurely. The process of creating a master installation list will help you become familiar with what software is contained on each media volume.

The system must be powered on before you can load optical media in the media drawer. “Starting from a power-off condition” on page 181 describes how to start the system when power is off.

If you are using DVD, verify that you insert the media in the correct media drive.

Tape or tape libraries

This topic includes IBM i requirements for tape devices or tape libraries.

If you use tape for your installation, you need to determine which tape unit to use for the alternate IPL. The tape unit for the alternate IPL can be an internal or an external tape unit. For systems managed by the Hardware Management Console (HMC), or the Integrated Virtualization Manager, the adapter to use for alternate IPL is defined by the partition properties. It is not possible to select a specific device to use for the installation, so there must be install media in only one of the tape units attached to the adapter. If you do not know which tape unit to use, contact your marketing representative or authorized service provider.

Note: You can use a tape image catalog and a virtual tape device to install PTF fixes, to install single licensed programs, or to install or upgrade an IBM i release.

To help prevent media errors, be sure to clean the heads on your alternate IPL tape drive before you begin the installation process. Refer to your tape drive reference guide if you need more information on how to clean the heads. If you receive a media error message during your installation process, see Chapter 14, “Troubleshooting software installation problems,” on page 163 for recovery information.

If you have an alternate installation tape device that you are sharing, make sure other users do not assign or try to use the tape drive during the installation because the installation process might fail.

When you install a release using a tape library device you must make sure that the install media is already mounted in one of the tape devices within the tape library before starting the installation.

Non-IBM tape device

This topic provides recommendations for non-IBM tape device use during an IBM i upgrade.

If you are using a non-IBM tape device, read informational APAR II09685 for more details on installing a release. This informational APAR states that it is for V3R2, V3R6, and V3R7. The instructions, however, are also valid for this release.

If your tape device emulates an IBM tape device, you might experience problems during the IBM i installation process, and receive message CPF5401. If this occurs, contact your vendor to confirm whether your tape drive is compatible with IBM i 7.1.

Virtual optical storage using the Network File System

The virtual optical device support of IBM i provides a method for using virtual optical images from a single image source that can be shared with other systems in a network.

A client with a virtual optical device type 632B model 003 can access images located on a server using the Network File System. In previous releases, it existed in a local system integrated file system directory. This device can be used to install licensed internal code, IBM i, licensed programs, PTFs, and restore user data.

Image catalog for a virtual device

You can use either an optical image catalog or a tape image catalog to perform an IBM i software upgrade, install PTFs (fixes), or install single licensed programs.

An *image catalog* is an object on the system that contains optical images. Each catalog is associated with one user-specified integrated file system directory. The system-recognized identifier for the object type is *IMGCLG.

Image catalog requirements:

- An image catalog upgrade works like a D-mode IPL without a console during the installation of Licensed Internal Code. Reference codes are used to display the status.
- Installations done by using image catalogs require an IBM i control language (CL) command line to initiate the installation.
- An installation cannot be performed if an independent auxiliary storage pool (ASP) is accessible. Image files cannot reside in an independent ASP.
- Virtual media devices do not support the following:
 - Write operations (before V5R3)
 - The LODRUN command using multiple media.
 - Changing a primary language from secondary language media.
- To perform an installation using image catalogs, you must have at least 1536 MB of free storage on the load-source disk unit. “Preparing to upgrade or replace software using an image catalog” on page 39 describes how to calculate storage requirements and free up space in the load-source disk unit for an image catalog. “Cleaning up disk storage space” on page 56 describes other general considerations on how to free up space in the load-source disk unit.

Using an alternate installation device

You can learn how to set up, disable, verify, and select an alternate installation device.

Alternate installation device: Overview

You can perform installation and recovery procedures by using the primary installation device along with an alternate installation device that you define.

The alternate installation device can be a tape device or an optical device. Some systems, typically with faster devices attached, might see a performance improvement when using an alternate installation device. You can use the alternate installation device for any installation or recovery that requires replacing Licensed Internal Code. Some models might require that you set up an alternate installation device.

When you use an alternate installation device, the system might use the primary installation device to load a small portion of the Licensed Internal Code during an IPL-type D and then continues the installation by using the media in the alternate installation device. The media in the alternate installation device can be SAVSYS media or distribution media created by a central site.

Notes:

- Starting with POWER6 models, you can do an IPL-type D from a tape device attached by a Fibre Channel interface only when it is attached to an adapter without an input/output processor (IOP). For other system models and configurations, a tape device attached by a Fibre Channel interface needs to be set up as an alternate installation device.
- If you use an alternate installation device, you need to ensure that you set up the device and that you enable the device. You also need to have the optical media or tape media that contains the Licensed Internal Code and your save media.

Setting up an alternate installation device

Before you use an alternate installation device, you need to ensure that you define it on a bus, and you must enable the device.

You need to record and keep the logical address of the system bus and system card at which the alternate installation device is attached. If you have the device set up on a different bus and you do not have this information available, you will not be able to complete installations or recoveries.

It is helpful to record the tape or optical drive's serial number that you plan to use as the alternate installation device.

If you change the configuration of your system, you need to ensure that this information is correct before you start to use the alternate installation device.

To set the addresses and enable the alternate installation device, perform the following steps:

Note: You need to know the password for dedicated service tools (DST) to perform this procedure.

1. Place the media that contains the current release Licensed Internal Code into the primary installation device.
2. Set the system mode to Manual. Then perform an initial program load (IPL) using this command:

```
PWRDWN SYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)
```

Note: The default value for the Power Down System (PWRDWN SYS) command is to display a confirmation. This can be changed by specifying *NO for the Confirm (CONFIRM) parameter: CONFIRM(*NO).

Alternative: An alternative to this step is to select function 21 (Dedicated service tools). If you use this alternative, the next step is step 4. You will not need to perform step 12.

Logical partition users:

- If you are using Hardware Management Console (HMC), see the Managing the Hardware Management Console (HMC) topic.
3. When the IPL or Install the System display appears, select option 3 (Use dedicated service tools (DST)) and press the Enter key.
 4. The Dedicated Service Tools (DST) Sign On display appears.

```

Dedicated Service Tools (DST) Sign On
System: SYSTEMA
Type choices, press Enter.
Service tools user . . . . . QSECOFR
Service tools password . . . . . _____

```

Sign on using the QSECOFR user profile.

Note: Do not sign on with a profile other than QSECOFR.

5. The Use Dedicated Service Tools (DST) menu appears. From the Use Dedicated Service Tools (DST) menu, perform the following tasks:
 - a. Select option 5 (Work with DST environment).
 - b. Select option 2 (System devices) on the Work with DST Environment display.
 - c. Select option 5 (Alternate installation device) on the Work with System Devices display.
 - d. Select your device type on the Select Media Type display.
6. The Select Alternate Installation Device display lists available devices.

```

Select Alternate Installation Device
System: SYSTEMA

Additional devices may be available for use. Press F5 to see
if any additional devices have been detected.

Type option, press Enter.
1=Select 5=Display details

Option   Bus   Resource   Type  Model  Serial   Selected
         Number Name       Type  Model  Number
         16   TAP22     3592  01A   13-1300283
         16   TAP23     3592  E05   13-1350492
         16   TAP24     3592  01A   13-1300291
         16   TAP25     3592  E05   13-1350477
         16   TAP26     3580  002   00-0110666
         16   TAP27     3590  E1A   13-C1610
         16   TAP28     3590  E1A   13-C1599
         16   TAP29     3590  01A   13-AB733
         16   TAP30     3590  01A   13-AB388
         16   TAP31     3580  003   00-19944

F2=Deselect device  F3=Exit  F5=Refresh  F12=Cancel
More...

```

From this display, type a 5 (Display details) next to the resource you want to view details and press the Enter key.

7. The Display Device Details display appears.


```

                                Display Device Details
                                System:  SYSTEMA

Resource
Name          Type          Model          Serial
TAP23         63A0          001           13-1355555

Location      . . . . . :  UTMP3.C01.01B7A4G-DB3-D41

Logical address:
Bus:
System bus   . . . . . :  16
System board . . . . . :  0
System card  . . . . . :  32

Storage:
I/O bus number . . . . . :  0
Controller   . . . . . :  14
Device address . . . . . :  0

F3=Exit  F12=Cancel

```

You need to have a record of the addresses assigned to the alternate installation device selected for installing a system. Record the following information:

- Type/Model: _____
- System bus: _____
- System card: _____
- Serial number: _____

Notes:

- You might want to repeat this process to record the addresses for all alternate installation devices that appear in step 6. You should store this information in a safe place, such as the location where your recovery information and recovery media are stored.
- If more than one alternate installation device is defined, only one can be enabled.
- You should ensure that only one device contains valid installation media. This prevents you from loading the wrong version of the Licensed Internal Code.

Press the Enter key.

8. The Select Alternate Installation Device display appears. Type 1 (Select) next to the resource you want and press the Enter key.
9. You should see the following message at the bottom of the display:
Alternate installation device selected
10. Press F3 (Exit) to return to the Use Dedicated Service Tools (DST) display.
11. Press F3 (Exit) again. The Exit Dedicated Service Tools (DST) display appears.

```

                                Exit Dedicated Service Tools (DST)
                                System:  SYSTEMA

Select one of the following:

1. Exit DST
2. Resume dedicated service tools

```

Type 1 (Exit Dedicated Service Tools (DST)) and press the Enter key.

12. The next display you see is the IPL or Install the System display. Type 1 (Perform an IPL) and press the Enter key to complete the procedure.

Disabling an alternate installation device

If you need to disable an alternate installation device, follow these steps.

You might need to disable an alternate installation device for one of the following reasons:

- To continue with an installation using the primary installation device.
 - To enable a different device as an alternate installation device.
 - To correct the logical address if hardware has been moved or changed.
1. Use the system or logical partition control panel to set the mode to Manual. Then perform an attended initial program load (IPL) using the command:
`PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B).`

Note: Beginning in V6R1, the default value for the Power Down System (PWRDWNSYS) command is to display a confirmation. This can be changed by specifying *NO for the Confirm (CONFIRM) parameter:
`CONFIRM(*NO).`

Alternative: An alternative to this step is to select function 21 (Dedicated service tools). If you use this alternative, skip steps 2 and 9.

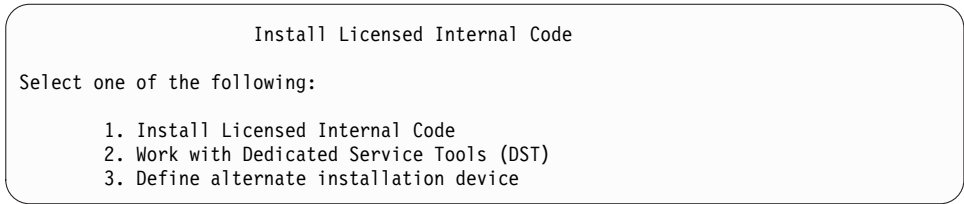
Logical partition users: If you are using Hardware Management Console (HMC), see the Managing the Hardware Management Console (HMC) topic.

2. When the IPL or Install the System display appears, select option 3 (Use dedicated service tools (DST)) and press the Enter key.
3. The Dedicated Service Tools (DST) Sign On display appears. Sign on using the QSECOFR user profile.
4. The Use Dedicated Service Tools (DST) menu appears. From the Use Dedicated Service Tools (DST) menu, perform the following tasks:
 - a. Select option 5 (Work with DST Environment).
 - b. Select option 2 (System devices) on the Work with DST Environment display.
 - c. Select option 5 (Alternate installation device) on the Work with System Devices display.
5. At the Select Alternate Installation Device display, press F2 (Deselect device).
6. You should see the following message at the bottom of the display:
Alternate installation device deselected
7. Press F3 (Exit) to return to the Use Dedicated Service Tools (DST) display.
8. Press F3 (Exit) again. The Exit Dedicated Service Tools (DST) display appears. Type 1 (Exit DST) and press the Enter key.
9. The next display you see is the IPL or Install the System display. Type 1 (Perform an IPL) and press the Enter key to complete the procedure.

Verifying and selecting an alternate installation device during a manual installation

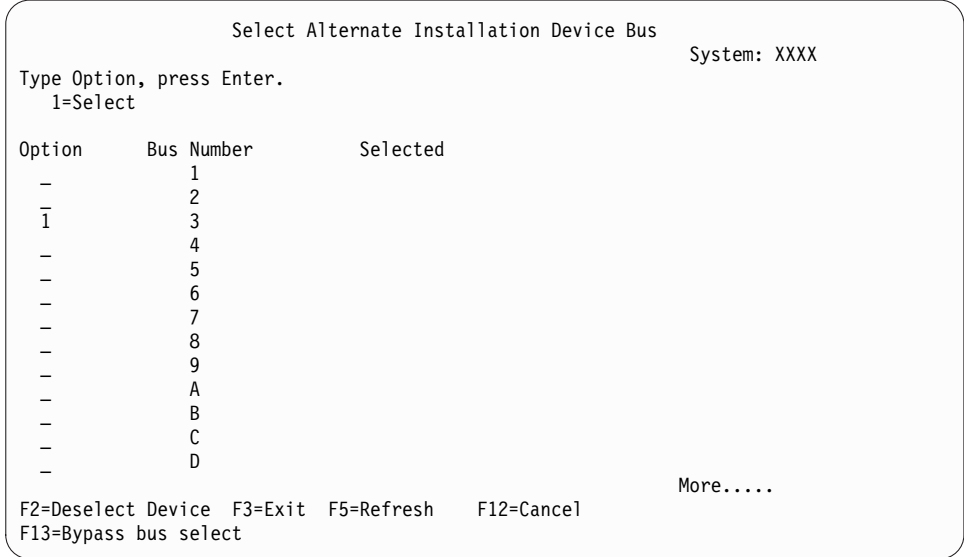
To verify and select an alternate installation device during a manual installation, follow these steps.

1. The Install Licensed Internal Code display appears.



Type 3, and press Enter. This option provides the ability to define an alternative installation device as the install source for the Licensed Internal Code.

- 2. Verifying and selecting alternate installation device: The Select Alternate Installation Device Bus display appears.



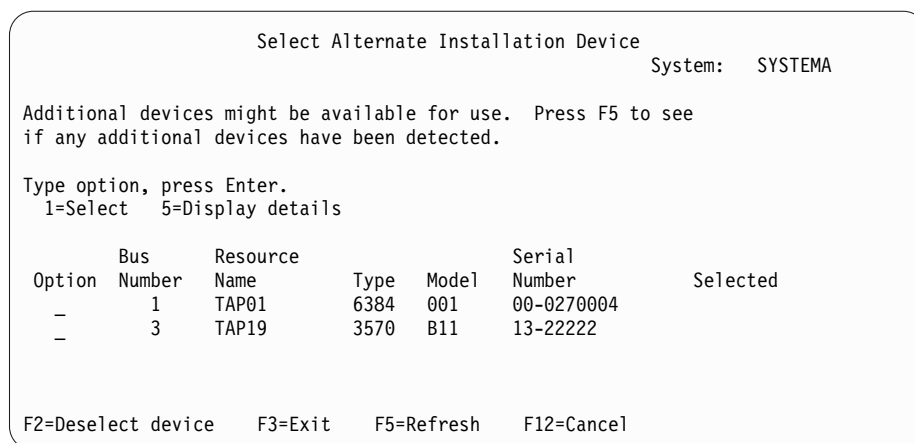
- a. Verify that the selected device is on the correct system bus. Type 1 in the **Options** field next to the selected bus, and press Enter.
- b. Select the media type on the Select Media Type display and press Enter.



This might take several minutes. If you see the message
No alternate installation device configured

, wait one minute and refresh the display.

- c. The Select Alternate Installation Device display appears. Use this display to verify the resource name, type, model, and serial number for the device.



d. Type 1 to select the device.

e. The message

Alternate installation device selected

appears. Press F3 to return to the Install Licensed Internal Code display.

f. Type 1 and press Enter to install the Licensed Internal Code.

End of verifying and selecting alternate installation device.

If you are using an Hardware Management Console (HMC) to perform an IPL of the system from alternate media, complete the following steps:

1. Expand *your management environment in your HMC*.
2. Expand *your system*.
3. Expand **System and Partition**.
4. Click **System Management**.
5. Expand **Partitions**.
6. Select the partition.
7. Right click the partition and select **Properties**.
8. In the Partition Properties window, click the **Settings** tab.
9. Under the Boot category, change the **Keylock position** to Manual and the **IPL source** to D.
10. Click **OK**.
11. Expand the partition.
12. Right-click the partition profile and select **Properties**.
13. Select the **Tagged I/O** tab.
14. Under the Alternate restart device category press **Select**.
15. Expand the unit.
16. Expand the bus.
17. Select the Slot with your input/output processor (IOP).
18. Press **Select**.
19. Press **OK**.
20. If your system is powered off, right-click the partition, and select **Activate**. If your system is running, select **Shut down partition**, and then select **Activate**.

IBM i release interoperability

A system interoperates with another system when you exchange data or when you save and restore objects. Review the supported combinations of IBM i releases.

Interoperability is the ability of one system to exchange data or objects with another system. The exchange can be performed electronically or by physical media (such as tape). Either system can initiate the exchange.

A system also interoperates with another system when it saves and restores objects.

If you have several systems in a network, they must be at compatible releases. This is necessary if objects and data are to be interchanged between systems. You can use option 10 (Display licensed programs) on the Work with Licensed Programs menu (type GO LICPGM) to see the installed release of your licensed programs.

The source system (the system that sends the information) and the target system (the system that receives the information) must be within the supported releases.

To be interoperable, objects must be saved by specifying either a specific release or *PRV for the value of the target release (TGTRLS) parameter.

You can save and restore licensed programs just like other objects as long as the release is compatible with the operating system release. "Licensed program releases and sizes" on page 185 contains more information about compatible releases of licensed programs.

For more information about supported combinations of IBM i releases or saving objects to a system that is running a previous release, see the Release-to-release support topic in the IBM i Information Center.

Installation notes about the IBM i release

This information describes miscellaneous requirements or changes to the IBM i release.

Note: The system must be in a restricted state to install the QGPL and QUSRSYS libraries, and to install Option 12 (Host Servers).


5770-SS1, IBM i Option 1

This option installs automatically when you install the new release of the operating system. You cannot delete this option.

5770-SS1, IBM i Option 3

This option installs automatically when you install the new release of the operating system. This option contains integrated file system directories. You cannot delete this option.

To find other information about what's new or changed this release, see the Memo to Users in the information center. For more information about products or features that might not be supported in future releases of the operating system or on future models, on Product Previews, and on Statements of Directions, see System i

Support Planning  (<http://www.ibm.com/systems/support/i/planning/>).

Media labels and their contents

This information lists the optical media that you receive with your IBM i order.

Refer to the Customer Notices and information Web page (www.ibm.com/systems/support/planning/notices.html) for customer notices, installation information, and read me files related to IBM i and associated products.

Your media for installation needs to be arranged in the order that is listed.

Release identifier for i 7.1 R01M00

Distribution media labels indicate the release and modification level in a format that is different from what appears on displays during installation. The release and modification level are shown in the format R0xM00.

Media type identifiers

Labels on the distribution media that are used for installation have unique identifiers. Media type identifiers are located on the center of the label. These identifiers help you determine when to use each media volume.

When you are ready to install your new software, arrange the media in this order:

1. Licensed Machine Code - I_BASE_01
This language independent Licensed Machine Code (Licensed Internal Code) supports all language versions. The Licensed Machine Code is part of the standard set of media.
2. Multiple language version media - B_GROUP x_{nn}
This media contains the multiple language versions of the operating system, IBM-supplied libraries, no charge options, no-charge licensed programs, and keyed products. For the media identifier string B_GROUP x_{nn} , x indicates the language group and nn indicates a sequence number. See "Feature codes for language version" on page 216 for a list of languages that are in each group.
3. F_MULTI_NLV
This media contains some additional programs, products, single licensed programs, or options.
4. N29 xx _01 Secondary Language Media
This media contains only language objects for the indicated secondary language. For secondary language media, the value for 29 xx is the feature code of the secondary language as used for installation.

Notes:

1. Keep all of your distribution media. You might need them for recovery procedures.
2. You might receive additional media volumes that do not conform to these descriptions. Examples include media that contain PRPQs or media for IBM i Access Family products that are installed on workstations. Also, IBM Business Partners might label the media differently.
3. Julian dates are shown in the form $yddd$. The y is the last digit of the year (0 through 9), and ddd is the day of the year (0 through 366). For example, the Julian date for 6 April 1998 would be shown as 8096 because 06 April is the 96th day of the year 1998.

Table 13. I_BASE_01

Product	Option	Description	Requires a software license key
5770-999	9999	Licensed Machine Code	No

Table 14. B_GROUPx_01

Product	Option	Description	Requires a software license key
5770-SS1	Base (QGPL, QUSRSYS, QSYS)	IBM i	Yes
5770-SS1	1	Extended Base Support	No
5770-SS1	2	Online Information	No

Table 15. B_GROUPx_02

Product	Option	Description	Requires a software license key
5770-SS1	3	Extended Base Directory Support	No
5770-SS1	5	System/36 Environment	No
5770-SS1	6	System/38 Environment	No
5770-SS1	7	Example Tools Library	No
5770-SS1	8	AFP Compatibility Fonts	No
5770-SS1	9	*PRV CL Compiler Support	No
5770-SS1	12	Host Servers	No
5770-SS1	18	Media and Storage Extensions	Yes
5770-SS1	30	Qshell	No

Table 16. B_GROUPx_03

Product	Option	Description	Requires a software license key
5770-SS1	14	GDDM	No
5770-SS1	21	Extended G11N Support	No
5770-SS1	22	ObjectConnect	No
5770-SS1	29	Integrated Server Support	No
5770-SS1	33	Portable App Solutions Environment	No

Table 17. B_GROUPx_04

Product	Option	Description	Requires a software license key
5770-SS1	13	System Openness Includes	No

Table 17. B_GROUPx_04 (continued)

Product	Option	Description	Requires a software license key
5770-SS1	31	Domain Name System and Dynamic Host Configuration	No
5770-SS1	34	Digital Certificate Manager	No
5770-SS1	35	CCA Cryptographic Service Provider	No
5770-SS1	36	PSF for IBM i 1-55 IPM Printer Support	Yes
5770-SS1	37	PSF for IBM i 1-100 IPM Printer Support	Yes
5770-SS1	38	PSF for IBM i Any Speed Printer Support	Yes
5770-SS1	39	International Components for Unicode	No
5770-SS1	41	HA Switchable Resources	Yes
5770-SS1	42	HA Journal Performance	Yes
5770-SS1	43	Additional Fonts	No
5770-AF1	base	IBM Advanced Function Printing Utilities	Yes
5761-AP1	base	IBM Advanced DBCS Printer Support for iSeries (B_GROUP3_04 only)	Yes
5761-AP1	1	Adv DBCS Printer Support - IPDS (B_GROUP3_04 only)	Yes
5770-BR1	base	IBM Backup Recovery and Media Services for i	Yes
5770-BR1	1	BRMS - Network Feature	Yes
5770-BR1	2	BRMS - Advanced Feature	Yes
5761-CM1	base	IBM Communications Utilities for System i	Yes
5770-DE1	base	IBM DB2 Extenders Version 9.5 for i	Yes
5770-DE1	1	DB2 Text Extender	Yes
5770-DE1	2	DB2 XML Extender	Yes
5770-DE1	3	Text Search Engine	Yes
5770-DG1	base	IBM HTTP Server for i	No
5761-DP4	base	IBM DB2 DataPropagator for iSeries, V8.1	Yes
5770-HAS	base	IBM PowerHA for i Standard Edition	Yes
5770-HAS	1	PowerHA for i Enterprise Edition	Yes
5722-IP1	base	IBM Infoprint Server for iSeries	Yes
5770-JS1	base	IBM Advanced Job Scheduler for i	Yes
5770-NAE	base	IBM Network Authentication Enablement for i	No
5770-PT1	base	IBM Performance Tools for i	Yes
5770-PT1	1	Performance Tools - Manager Feature	Yes
5770-PT1	2	Performance Tools - Agent Feature	Yes
5770-PT1	3	Performance Tools - Job Watcher	Yes
5770-QU1	base	IBM Query for i	Yes
5733-SC1	base	IBM Portable Utilities for i	No
5733-SC1	1	OpenSSH, OpenSSL, zlib functions	No

Table 17. B_GROUPx_04 (continued)

Product	Option	Description	Requires a software license key
5770-ST1	base	IBM DB2 Query Manager and SQL Development Kit for i	Yes
5770-TC1	base	IBM TCP/IP Connectivity Utilities for i	No
5770-TS1	base	IBM Transform Services for i	No
5770-TS1	1	Transforms - AFP to PDF Transform	No
5770-XH2	base	IBM i Access for Web	Yes
5770-XW1	base	IBM i Access Family	Yes
5770-XW1	1	IBM i Access Enablement Support	Yes

Table 18. B_GROUPx_05

Product	Option	Description	Requires a software license key
5761-JV1	base	IBM Developer Kit for Java	No
5761-JV1	8	J2SE 5.0 32 bit	No
5761-JV1	9	J2SE 5.0 64 bit	No
5761-JV1	11	Java SE 6 32 bit	No
5761-JV1	12	Java SE 6 64 bit	No
5761-JV1	13	J2SE 1.4 64 bit	No
5770-UME	base	IBM Universal Manageability Enablement for i	No
5770-WDS	base	IBM Rational Development Studio for i	Yes
5770-WDS	21	Application Development ToolSet	Yes
5770-WDS	31	ILE RPG	Yes
5770-WDS	32	System/36 Compatible RPG II	Yes
5770-WDS	33	System/38 Compatible RPG III	Yes
5770-WDS	34	RPG/400	Yes
5770-WDS	35	ILE RPG *PRV Compiler	Yes
5770-WDS	41	ILE COBOL	Yes
5770-WDS	42	System/36 Compatible COBOL	Yes
5770-WDS	43	System/38 Compatible COBOL	Yes
5770-WDS	44	OPM COBOL	Yes
5770-WDS	45	ILE COBOL *PRV Compiler	Yes
5770-WDS	51	ILE C	Yes
5770-WDS	52	ILE C++	Yes
5770-WDS	56	IXLC for C/C++	Yes
5770-WDS	60	Workstation Tools - Base	Yes
5770-XE1	base	IBM i Access for Windows	No

Table 19. F_MULTI_NLV

Product	Option	Description	Requires a software license key
5733-QU2	base	IBM DB2 Web Query for i	Yes
5733-QU2	1	Active Reports	Yes
5733-QU2	2	OLAP Module	Yes
5733-QU2	4	Run Time User Enablement	Yes
5733-QU2	5	Spreadsheet Client	Yes
5733-QU2	6	Adapter for Microsoft SQL Server	Yes
5733-QU2	7	JDE Adapter	Yes
5733-QU3	base	IBM DB2 Web Query Report Broker	Yes
5733-QU4	base	IBM DB2 Web Query Software Development Kit	Yes

Table 20. F_MULTI_NLV

Product	Option	Description	Requires a software license key
5639-ZC1	base	Zend Server Community Edition for i	See note 1

Table 21. 5733-OAR

Product	Option	Description	Requires a software license key
5733-OAR	base	Open Access RPG Edition	Yes. See note 2.

Notes:

1. Refer to the Zend Customer Letter on the Customer Notices and information Web page (www.ibm.com/systems/support/planning/notices.html) for information about Zend Server Community Edition for i.
2. For System i and System p customers, the Entitled Software Support (ESS) web site (www.ibm.com/servers/eserver/ess/OpenServlet.wss) is available for you to access, download, and manage your software programs. Please visit this web site, and under the IBM i Evaluation, Try & Buy and NLV download tab, you can find your trial use software for this product.
3. You might receive other media that contains a single licensed program or option and also has the volume ID of F_MULTI_NLV. The media label lists the licensed program or option contained on the media.

Feature codes for language version

Use this table to locate the appropriate IBM i feature code for your primary or secondary language.

Note: When you install the operating system, the system prompts for the primary language in the form 29xx. When you install the secondary language, you select a feature code, in the form 29xx, from a list of national language feature code identifiers.

For example, if you ordered French for your primary language and Arabic as your secondary language, you would specify 2928 as your primary language when installing the operating system and select 2954 from the list of feature codes when you install the secondary language.

Table 22. Feature codes for language version

Group 1 languages (5817)	Group 2 languages (5818)	Group 3 languages (5819)
2924 English	2924 English	2924 English
2963 Belgian Dutch MNCS	2995 Albanian	2938 English DBCS Uppercase
2909 Belgian English	2954 Arabic	2984 English DBCS Uppercase and Lowercase
2966 Belgian French MNCS	2974 Bulgarian	2930 Japanese Universal
2980 Brazilian Portuguese	2912 Croatian	2962 Japanese Katakana
2981 Canadian French MNCS	2975 Czech	2986 Korean
2926 Danish	2902 Estonian	2906 Laotian
2923 Dutch Netherlands	2998 Farsi	2989 Simplified Chinese
2925 Finnish	2957 Greek	2987 Traditional Chinese
2928 French	2961 Hebrew	2972 Thai
2940 French MNCS	2976 Hungarian	2905 Vietnamese
2929 German	2904 Latvian	
2939 German MNCS	2903 Lithuanian	
2958 Icelandic	2913 Macedonian	
2932 Italian	2978 Polish	
2942 Italian MNCS	2992 Romanian	
2933 Norwegian	2979 Russian	
2922 Portuguese	2914 Serbian	
2996 Portuguese MNCS	2994 Slovakian	
2931 Spanish	2911 Slovenian	
2937 Swedish	2956 Turkish	

Blank displays

During an IBM i installation, you will see blank displays at times.

If the blank displays are predictable, instructions give an approximate amount of time when there appears to be no installation activity. Other blank displays are less predictable because of unique situations on your system. If the processor light is blinking or reference codes are changing, the installation process is active. If the processor light goes out, the attention light turns on, and a reference code appears on the control panel, go to Chapter 14, "Troubleshooting software installation problems," on page 163 and follow the instructions.

System password

The system password identifies all model changes to help maintain the quality and integrity of the system. The system password also ensures the protection of IBM's intellectual property, including IBM Licensed Internal Code and licensed programs.

Support exists to detect processor model changes on all systems through the use of a 16-character system password. New systems from the factory come with the correct system password already installed. A new system password is required for

each model change or for conditions that indicate probable change of ownership. If you do not have the system password at the first IPL, contact your marketing representative to place a system password RPQ (Request for Price Quotation) order. IBM manufacturing receives the RPQ order and sends the system password to you for installation. If the correct system password is not entered, you can select a system-password bypass period to allow you to obtain the correct system password from your marketing representative. If the correct password is not available and the bypass period expires, the system will not complete the next IPL unless the correct password is installed. While in bypass mode, the system uses operator messages to indicate the time that remains until the bypass period expires.

Installed status values

Use these values to determine whether you can use a software product or whether you need to upgrade a licensed program.

Following is a description of the installed status values you might see on the LICPGM displays. You can use these values to determine whether you can use a product or whether you need to upgrade a licensed program. If you do not see a value of *COMPATIBLE, you can check the other installed status values for how to proceed.

*COMPATIBLE

The product is installed. Its version, release, and modification is compatible with the installed level of the operating system. You can use this program with the installed level of the operating system.

*INSTALLED

The product is installed, but might or might not be compatible with the installed level of the operating system.

Note: Licensed programs that are part of the single set will be listed on the display panel as *INSTALLED. You will need to verify that the release level of the licensed program is compatible with the release level of the operating system. For IBM products, either check the current release levels for licensed programs in the topic, "Licensed program releases and sizes" on page 185, or check with your software supplier before you use the licensed program.

*ERROR

Either the product has not installed successfully or the product is only partially installed. For example, a language or a language object for the product is not installed. Use the Check Product Option (CHKPRDOPT) command to determine the cause of the failure. To determine the cause of a missing object, enter GO LICPGM and select options 10 and 50.

Note: The product lists now show many products, such as Programming Request for Price Quotations (PRPQ), licensed program offerings (LPO), and non-IBM products. This *ERROR status might have existed before the upgrade to the current operating system release, but was not detected. Use the CHKPRDOPT command to find out why the product shows an *ERROR, and contact your software provider if you need help correcting the problem.

*BACKLEVEL

The product is installed. Its version, release, and modification is not compatible with the currently installed level of the operating system. To

correct this problem, install a current release of this product. And if you have secondary languages, install a new release of these languages as well, using LICPGM menu option 21.

Note: If you use a licensed program that is listed as *BACKLEVEL, you run the risk of having an information mix up between release levels, or some portions of the licensed program might not work properly. An installed status value of *COMPATIBLE is desired.

***BKLVOPT**

The product is installed. Its version, release, and modification is not compatible with the currently installed level of the base product that is associated with the option. To correct this problem, install a current release of this option.

***BKLVLBASE**

The product is installed, but its associated base product is not compatible with this option. To correct this problem, install a current release of the base product.

Blank (on LICPGM menu, option 11)

If no value is shown, a blank in the installed status column means that the product is not installed.

***NOPRIMARY**

The product is installed, but the language for the product is not the same as the primary language of the operating system. To correct this problem, install the primary language for the product by using the Restore Licensed Program (RSTLICPGM) command or from the LICPGM menu.

Note: If this product is an LPO, PRPQ or non-IBM product, it is possible that the licensed program (from the manufacturer) is not available in the primary language of the operating system.

Options on the Prepare for Install menu

Use this information to understand the different IBM i functions on the Prepare for Install menu.

Highlights of this function include the following:

- Customizing an installation list. Preselecting licensed programs or options to be installed during the automatic installation process.
- Verifying the contents of the media before starting an installation.
- Determining additional storage requirements for the licensed programs that you plan to install.

This function appears as option 5 (Prepare for Install) on the Work with Licensed Programs menu. The Prepare for Install display appears when you select this option.

```

                                Prepare for Install
                                System:  XXXXXXXX

Type option, press Enter.
  1=Select

Opt   Description
-     Work with licensed programs for target release
-     Work with licensed programs to delete
-     List licensed programs not found on media
-     Display licensed programs for target release
-     Work with software agreements
-     Work with user profiles
-     Verify system objects
-     Estimate storage requirements for system ASP
-     Allocate additional space for LIC
-     Keep disk configuration

                                Bottom

F3=Exit  F9=Command line  F10=Display job log  F12=Cancel

```

For the instructions to use Option 5, Prepare for install, see “Required: Creating a custom list of software to install” on page 50.

With the **Work with licensed programs for target release** option, you can work with a list of the licensed programs for the target release. Use this option to verify the contents of the installation media and to create a customized list of licensed programs to install for the target release. The system can use the list you create to allow the installation processes that replace a release of software to also install the selected additional licensed programs. For more information, refer to “Verifying the contents of your software order” on page 27.

Note: This list does not include all products. Among those are programming request for price quotations (PRPQ), licensed program offerings (LPO), and licensed programs on the single set. If you want to install these products for the first time, use the G0 LICPGM menu, options 1 or 11.

With the **Work with licensed programs to delete** option, you can work with a list of installed licensed programs that should not remain on the system because either they are no longer supported or you chose not to replace them. This list also includes products for which no replacement was found on the distribution media. The display indicates the reason why a licensed program is included in this list, as well as provides options to save and delete any of the products listed. For more information, refer to “Cleaning up disk storage space” on page 56.

With the **List licensed programs not found on media** option, you can display a list of licensed programs that could replace existing products but that were not found on the optical distribution media. For more information on licensed program availability, refer to Chapter 15, “IBM i software reference,” on page 185.

With the **Display licensed programs for target release** option, you can display the list of licensed programs that will be installed when you install the target release. For each licensed program in the list, you can display information such as the expected action during the installation process and whether a product option must be separately ordered. Use this option to verify your installation plans.

With the **Work with software agreements** option, you can review and accept software agreements prior to the installation of the target release. The agreements

can be printed or displayed in different languages provided by the software provider. Any software agreement not accepted or specifically declined will result in the licensed program not being installed during the upgrade to the target release. If the Licensed Internal Code and IBM i software agreements are not accepted, the upgrade to the target release is not allowed.

With the **Work with user profiles** option, you can work with a list of user profiles on the system and work with the objects owned by each user profile. Use this option to clean up user profiles that are no longer needed on the system before you install the target release. For more information, refer to “Cleaning up disk storage space” on page 56.

With the **Verify system objects** option, the system verifies that the system directory entries include the user profiles needed by the installation process. The system also checks database cross reference files for errors. If necessary, the QSECOFR and QLPINSTALL user profiles are added to the system distribution directory. For more information, refer to “Verifying user profiles and checking cross-reference files” on page 34.

With the **Estimate storage requirements for system ASP** option, you can determine whether additional storage is needed before you begin the installation process. This option helps you plan for growth in licensed programs that are listed on the Work with Licensed Programs for Target Release display. This option does not consider licensed programs that are not in the standard set or keyed set, Programming Request for Price Quotations (PRPQs), licensed program offerings (LPOs), or system conversion growth such as spooled files. The option also does not consider storage required for temporarily applied program temporary fixes (PTFs).

The **Allocate additional space for LIC** option is one method that can be used to allocate additional space that is needed before upgrading the release.

With the **Keep disk configuration** option, you can change your disk configuration before you upgrade or replace a release.

Options on Work with Licensed Programs menu

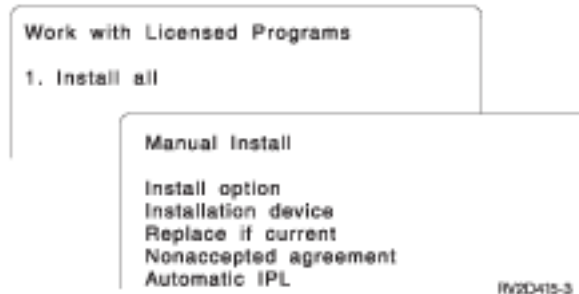
Use this information to determine when and how you can use these options.

For each display, you can use the Help key for more information about the display.

Manual installation Option 1. Install all

Option 1 (Install all) on the Work with Licensed Programs menu enables you to install all of the licensed programs and optional parts of the licensed programs from distribution media.

Secondary languages on distribution media can also be installed with this option.



The Manual Install display allows you to make choices for the prompts in the following list. Use the Help key for more information about each prompt.

1. Install option

This option determines what types of licensed programs and optional parts are installed from the distribution media. You can choose to install only new releases of products that already exist on your system, install all products, install only new products, or install new releases of products that exist on your system plus additionally selected products.

Note:

- a. The *Install option* does not apply to the QGPL and QUSRSYS libraries. QGPL and QUSRSYS libraries are always installed if they are found on the media. For all *Install option* choices, only new objects are installed in the QGPL and QUSRSYS libraries.
- b. To complete the installation successfully, the installation media must contain all renewed products that are currently installed on your system. The installation media might contain products whose version, release, and modification is earlier than that of the new operating system release. (The products did not renew at the same time as the operating system.)

2. Installation device

The examples in this topic use OPT01 for the name of the installation device. For more information about the installation device naming convention, see “Types of software installation devices” on page 10.

3. Replace if current

By specifying *NO, the licensed programs that are currently installed and that are at the same release level on the installation media will not be replaced during an upgrade. You can change the *Replace if Current* parameter to *YES if you want to replace licensed programs that are already installed, including products installed at the same release level as on the installation media. By choosing *YES, you might have to reapply PTFs to some licensed programs that were replaced from the media.

4. Nonaccepted agreement

During the installation of licensed programs, if the software agreement has not been previously accepted, the nonaccepted agreement option determines if you will be prompted to accept or decline the software agreement, or if the installation will continue without installing the licensed program. A value of 1 indicates that you do not want to install the licensed program. A value of 2 indicates that you want to display the licensed program and accept the software agreement.

5. Automatic IPL

This option determines whether the system will automatically IPL when the installation process has completed successfully.

If you are using the Hardware Management Console, refer to *Managing your server using the Hardware Management Console in the IBM Systems Hardware Information Center*.

Automatic installation options

The IBM i Prepare for Install option helps you to create an installation list and select the programs that you want to install during the automatic installation process.

The Prepare for Install option also helps you verify the contents of the installation media and determine the storage requirements, among other necessary tasks in preparation for automatic installation. “Options on the Prepare for Install menu” on page 219 describes Option 5 (Prepare for Install) in more detail.

Option 5. Prepare for Install

“Required: Creating a custom list of software to install” on page 50 provides the instructions for using Option 5 (Prepare for Install).

Options for displaying, installing, deleting, and saving from a list

Licensed programs can be displayed, installed, deleted, or saved from a list through the Work with Licensed Programs menu.

Option 10. Display installed licensed programs:

After an IBM i installation process has completed, it is often necessary to determine if a licensed program is installed successfully on your system. To do this, select option 10 (Display installed licensed programs) on the Work with Licensed Programs menu.

The Display Installed Licensed Programs display shows the licensed programs, optional parts, and IBM-supplied user libraries that are installed on your system.

The Installed Status column indicates whether the licensed program is successfully installed. Refer to “Installed status values” on page 218 for a description of the installed status values.

If a licensed program did not install successfully, use the recovery procedures in Chapter 14, “Troubleshooting software installation problems,” on page 163 to install the licensed program again.

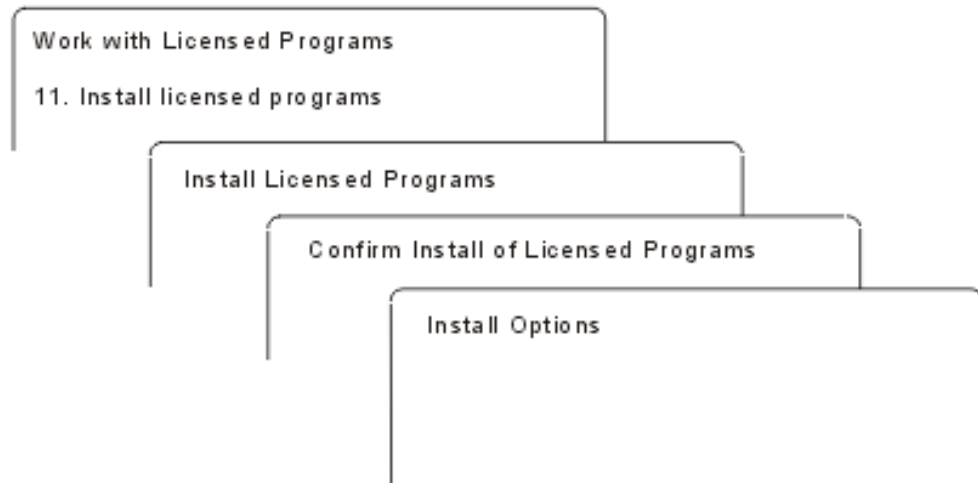
You can use the F11 key to view the Installed Release column. This column shows the release and modification of each installed licensed program. The F11 key has a third view, also, that shows the product option number of each licensed program.

Option 11. Install licensed programs:

Option 11 (Install licensed programs) on the Work with Licensed Programs display shows a list of licensed programs and optional parts of licensed programs that were supported by the LICPGM installation processes at the time your currently installed IBM i operating system became available.

Note: Before you install any licensed programs, be sure to check the product documentation in the IBM i Information Center and also the documentation that comes with the product for any special instructions.

You can use this list to select licensed programs and optional parts to be installed on your system. You can also use this list to install a licensed program that did not successfully install during a previous installation process.



To install one or more licensed programs from the list, type a 1 in the Option column next to the licensed programs and any optional parts that you want to install. For a list of the licensed programs that are on the media, refer to “Licensed program releases and sizes” on page 185.

A licensed program you want to install might not be listed on the Install Licensed Programs display. If a licensed program is not listed, it can be added to the list by entering information into the blank fields at the top of the list. After you press Enter, this product then appears on the list with the other products.

1. Type 1 in the Option column
2. Type the product identifier in the Licensed Program column
3. Type the product option value in the Product Option column
4. Press Enter

When you are typing the product option, the system accepts only the following three values: *BASE, option number, or *ALL.

- A value of *BASE installs only the base product of the associated product identifier.
- The product option number installs only the particular option of the associated product identifier. To be able to install options, you must install the base product (*BASE).
- A value of *ALL installs the base product and all options of the associated product identifier that are found on the media.

Keep in mind that licensed programs that you add will appear on the list with only the product identifier and will not give a descriptive name of the product.

The Confirm Install of Licensed Programs display shows which licensed programs you selected to install. If you do not need to make any changes, press Enter to confirm your choices.

Fill in the following choices on the Install Options display. Use the Help key for more information about each prompt on this display.

1. Installation Device

The examples in this topic use OPT01 for the name of the installation device. For more information about the installation device naming convention, see “Types of software installation devices” on page 10.

2. Objects to install

This option allows you to choose to install both programs and language objects, only programs, or only language objects.

3. Automatic IPL

This option determines if the system automatically IPLs after the installation process has completed successfully.

When the licensed programs are installed, the Work with Licensed Programs menu or the Sign On display appears again. To verify that all of the licensed programs are installed successfully, use option 50 (Display log for messages). (More information about that option is available in “Completion status” on page 229.) If an error occurs, you will see the message Work with licensed program function not complete, on the bottom of the Work with Licensed Programs display. Go to Chapter 14, “Troubleshooting software installation problems,” on page 163 to determine the problem.

If you install a licensed program or optional part again, you must also install the PTFs for that licensed program again.

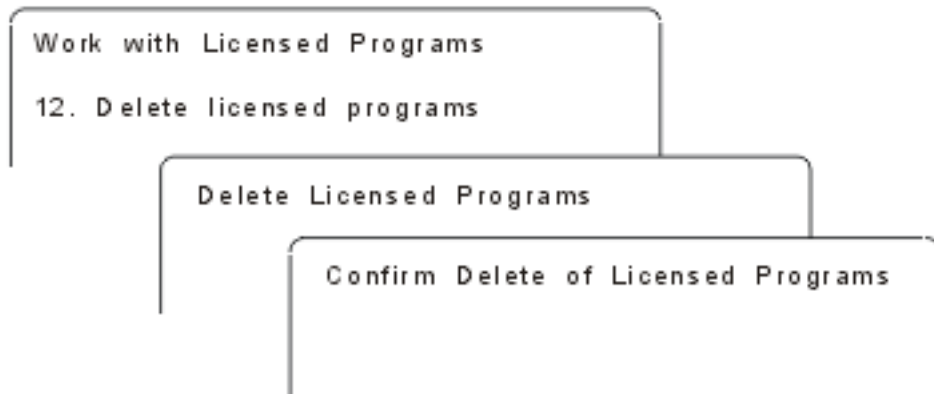
Option 12. Delete licensed programs:

Option 12 on the Work with Licensed Programs menu is used to delete a licensed program or optional part of a licensed program that is installed on a system.

Note: Before you delete a licensed program, review “Considerations for deleting licensed programs” on page 161 and then return here.

When you select this option, the Delete Licensed Programs display appears. The list shows the licensed programs and optional parts that are installed on your system. Use this list to select licensed programs or optional parts to delete.

If you delete a (*BASE) licensed program that has optional parts, the system deletes all of the optional parts for that licensed program. If you delete only an optional part, the base program and other optional parts remain on your system. This option deletes all objects that are associated with the licensed program or optional part you select.



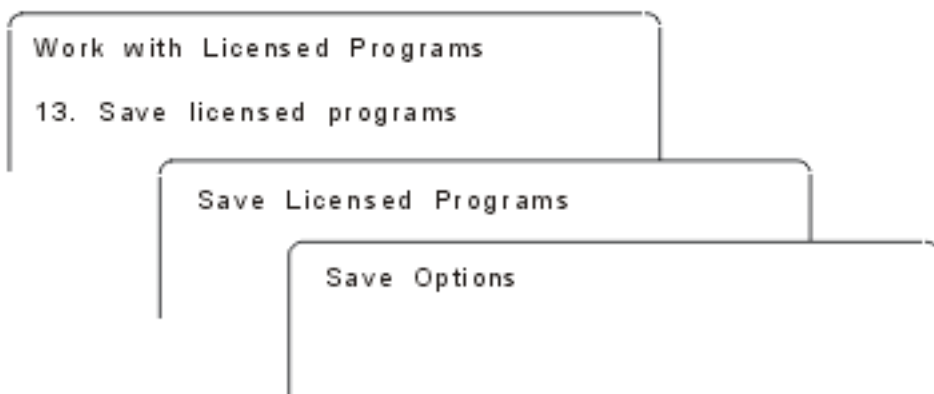
Type a 4 in the Option column next to the licensed program or optional part of a licensed program that you want to delete from your system.

The Confirm Delete of Licensed Programs display shows you which licensed programs or optional parts you selected to delete. Press Enter to delete the licensed programs or optional parts.

Option 13. Save licensed programs:

Option 13 on the Work with Licensed Programs menu is used to save one or more licensed programs for redistribution.

The Save Licensed Programs display lists the licensed programs and optional parts that are installed on your system. Use this list to select licensed programs or optional parts to save. Type a 1 in the option column on the Save Licensed Programs display next to the licensed programs that you want to save.



Fill in the information on the Save Options display by using the following information.

Use the Help key for more information for each of the prompts on the display.

1. **Device**

The examples in this topic use TAP01 for the name of the tape device. For more information about the tape device naming convention, see “Types of software installation devices” on page 10.

2. Sequence number

Use *Default, or enter your choice for the sequence number to be used for the save process.

3. End of media option

Tape: Determines the automatic positioning operation that is done on the tape volume when the save operation is completed. In the case of a multiple-volume save operation, this parameter applies to the last volume only. All other volumes rewind and unload if the tape reaches its end. You can specify these values:

- *REWIND: The tape automatically rewinds after the operation ends, but it does not unload the tape.
- *LEAVE: The tape does not rewind or unload after the operation ends. It remains at the current position on the tape drive.
- *UNLOAD: The tape automatically rewinds and unloads after the operation ends.

Optical: Specifies the operation that is automatically performed on the optical volume after the save operation ends. Optical devices only support the special value *UNLOAD. They ignore *REWIND and *LEAVE. Some optical devices will eject the volume after the operation ends.

Notes:

1. Licensed programs and optional parts that are shipped independently of an operating system release or modification are not displayed. Use the Save Licensed Program (SAVLICPGM) command to save independently shipped IBM licensed programs and optional parts.
2. This option should not be used for backup and recovery. It is only for redistribution. More information about redistribution is available in the Distributing software topic in the IBM i Information Center. For information about saving your system, refer to the Backing up your system topic in the IBM i Information Center.

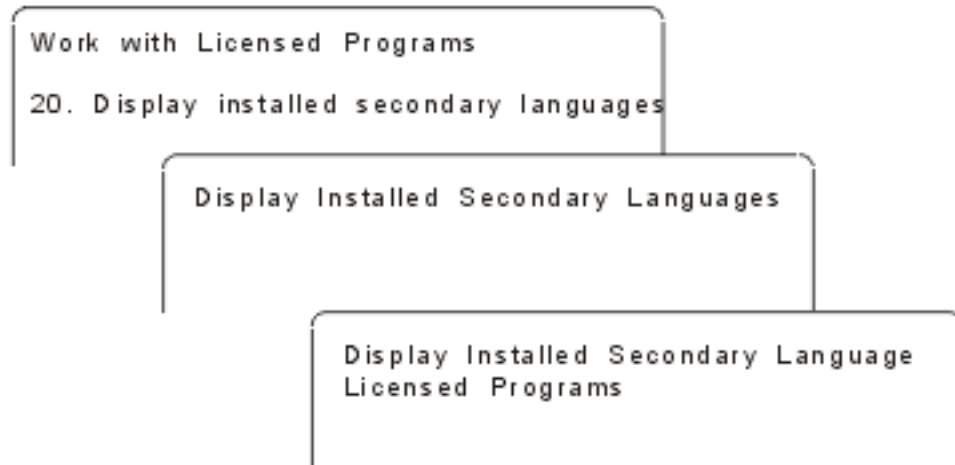
Options for secondary languages

Secondary languages on IBM i can be displayed, installed, or deleted.

Option 20. Display secondary languages:

After an IBM i installation process has completed, it is often necessary to determine if a secondary language is installed successfully on your system. To do this, select option 20 on the Work with Licensed Programs menu.

The Display Installed Secondary Languages display shows the primary and any secondary languages that are installed on your system.

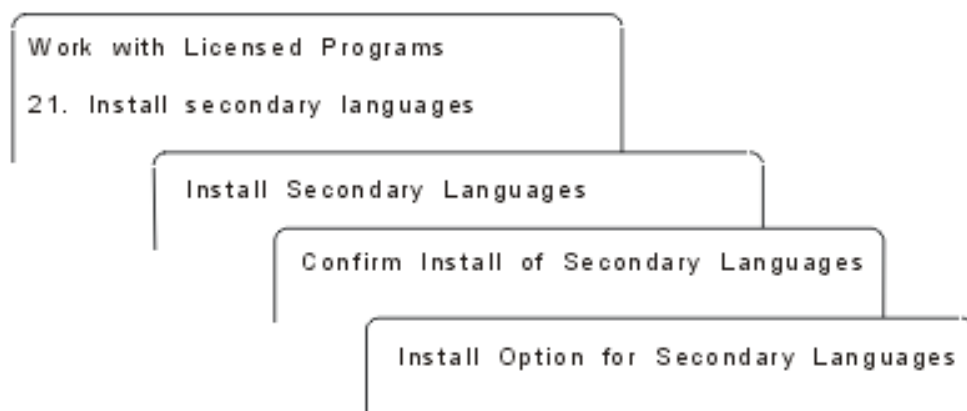


Type 5 in the Option column next to a secondary language, and press Enter to see the licensed programs that are installed with the particular secondary language. This information is shown on the subsequent display, Display Installed Secondary Language Licensed Programs. By pressing the F11 key a few times, you will see this display change information. This display shows the secondary language library, product release, installed status value, or product option.

For a description of the installed status values, refer to “Installed status values” on page 218.

Option 21. Install secondary languages:

Option 21 on the Work with Licensed Programs display is used to selectively install a secondary language for the licensed programs that are installed on a system.



Type 1 by the language you want to install, and press Enter. Only one secondary language can be installed at a time. The Confirm Install of Secondary Language display shows the following:

- The language you selected to install
- The library where it will be installed

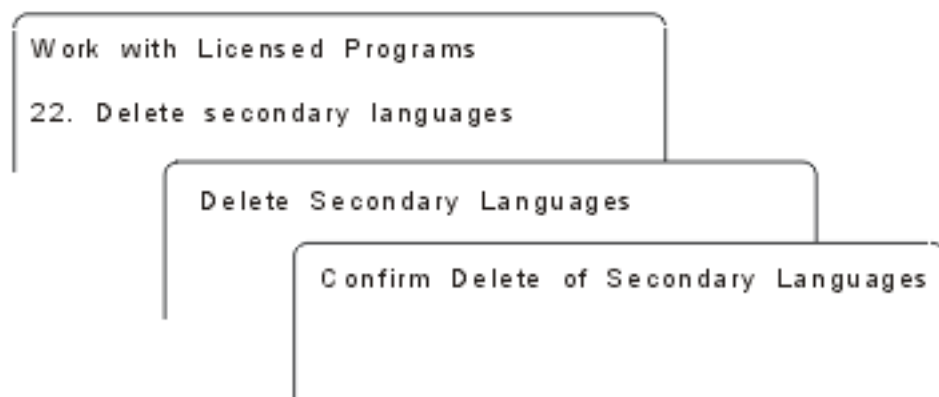
- The release level of the language

On the Install Option for Secondary Languages display, select your installation device and specify yes or no for the Replace if current parameter.

The examples in this topic use OPT01 for the name of the installation device. "Types of software installation devices" on page 10 contains more information about the installation device naming convention. By specifying *NO to the Replace if current parameter, the secondary languages that are currently installed and at the same release as on the installation media are not be replaced during an upgrade. You can change the Replace if current parameter to *YES if you want to replace secondary languages that are already installed, including secondary languages installed at the same release as on the installation media.

Option 22. Delete secondary languages:

Option 22 on the Work with Licensed Programs display is used to delete secondary languages that you no longer want installed on your system.



On the Delete Secondary Languages display, type 4 to select the secondary language that you want to delete. Press Enter. Press Enter again at the confirmation display.

More information about secondary language libraries in user profiles is available in the IBM i Globalization topic in the IBM i Information Center.

Completion status

When you install licensed programs, a secondary language, or PTFs, make sure that the IBM i installation process has successfully completed to avoid problems when you begin using the system.

Option 50. Display log for messages

Selecting option 50 shows the Display Install History display. Press Enter to view the installation start and completion messages on the Display History Log Contents display. This option displays specific messages that are shown in the history log.



Each part of the installation process (such as licensed programs, PTFs, Initialize System (INZSYS)) should have a completion message. If you do not see the message on the display, wait a few minutes and select option 50 again. If you still do not see a completion message, use the recovery procedures in Chapter 14, “Troubleshooting software installation problems,” on page 163 to install any licensed programs or PTFs that were not successfully installed.

Commands related to the Work with Licensed Programs menu

Options 70, 71, and 72 display menus of additional IBM i commands that you can use.

Option 70 shows the Save and Restore Commands display. This display shows a list of related command menus you can use.

Option 71 shows the Program Temporary Fix Commands display. You can use these commands to work with one or more individual PTFs. For ore information about fixes, see Using software fixes in the IBM i Information Center.

Option 72 shows the Licensed Commands display.

More information about the following commands is available in the topic Control language (CL) in the IBM i Information Center.

CPYPTFSAVF

Copy PTF to Save File

CRTPTF

Create Program Temporary Fix

CRTPTFPKG

Create PTF Package

HLDPTF

Hold Program Temporary Fix

ORDSPTPTF

Order Supported Product PTFs

RLSPTF

Release Program Temporary Fix

SNDPTF

Send Program Temporary Fix




Chapter 16. Related information for Installing, upgrading, or deleting IBM i and related software

This list includes related sources of information for IBM i software installation or upgrades.





Manuals

- **Memo to Users** (about 50 pages)
This document provides information about software and hardware changes that might potentially affect your system operations.



IBM Redbooks

- **IBM i Program Conversion: Getting Ready for IBM i V6R1** 
(V5R4 to 7.1 upgrade) This IBM Redpaper publication contains suggestions and instructions for analyzing and converting programs for V6R1.
- **IBM System i Overview: Models 515, 525, 550, 570, 595, and More** 
This IBM Redpaper publication provides a product overview of POWER hardware and software capabilities.
- **iSeries and TotalStorage: A Guide to Implementing External Disk on eServer i5; SG24-7120** 
This book is used for planning and implementation considerations when booting to IBM i from the load-source disk unit that is attached via the 2847 I/O processor.

Web sites

- **Support for IBM i**  (<http://www.ibm.com/systems/support/i>)
This Web site contains tools and resources such as preventive service planning (PSP) information and authorized problem analysis reports (APARs) that help you with your software installation.
- **IBM Planning**  (<http://www.ibm.com/systems/support/i/planning/>)
This Web site provides links to a variety of planning tools and information. The page on Upgrade planning - IBM i and OS/400® level mapping shows which releases of IBM i or OS/400 are supported by each of the RISC models.
- **IBM System i Support Planning: Migration and Upgrades** 
(<http://www.ibm.com/systems/support/i/planning/migrationupgrade.html>)
This Web site provides product previews, Statements of Directions, and information about products or features that might not be supported in future releases of the IBM i operating system or on future System i models.
- **IBM Electronic Service Agent™ for iSeries**  (<http://publib.boulder.ibm.com/isrvagt/sdsadoc.html>)
This Web site provides information on Electronic Service Agent, which is part of the IBM i operating system. Electronic Service Agent provides a hardware

problem reporting function that predicts and prevents hardware errors by early detection of potential problems, downloads, fixes, and automatically calls IBM Service when necessary. Supplemental service information to aid in problem determination is sent and made available to IBM support centers for timely and proactive problem resolution.

- **Entitled software support**  (<http://www.ibm.com/eserver/ess>)
From this Web site you can download licensed programs, manage your software keys, and manage your Proofs of Entitlement. If you have a Software Maintenance Agreement (SWMA), you can order software upgrades.
- **Electronic software delivery** 

(http://www.ibm.com/systems/support/software/delivery/en_US/downloadinfo.html)

This Web site provides additional information on downloading IBM licensed programs and preparing for installation.

Other information in the IBM i Information Center

- **IBM i client partition considerations**
This topic collection contains considerations for setting up and using IBM i client logical partitions on system hardware, such as the IBM BladeCenter blade server. You can use the Hardware Management Console (HMC) or IBM Integrated Virtualization Manager to manage IBM i client logical partitions.
- **Backup and recovery**
This category contains information about how to plan a backup and recovery strategy, how to set up disk protection for your data, how to back up your system, and how to control your system shutdown in the event of a failure. It also includes information about the Backup, Recovery, and Media Services plug-in to System i Navigator.
- **Basic system operations**
This topic collection contains information about IBM i basic operations, concepts, and analyzing and reporting system problems.
- **Distributing software**
The Distributing software topic collection describes how you can distribute some or all of the programs on a system, including the operating system, to another system.
- **Logical partitions**
The Logical partitions topic collection describes how you distribute resources within a single system to make it function as if it were two or more independent systems.
- **Maintaining and managing IBM i and related software**
This topic collection indicates how you can manage and maintain fixes and licensed programs in your network.
- **Storage solutions**
The Storage solutions category steps you through the world of system storage. It helps you make choices about which storage technologies are right for your company now and which technologies might be useful in the future.

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IBM i
IBM i and related software
Installing, upgrading, or deleting IBM i and related software
7.1

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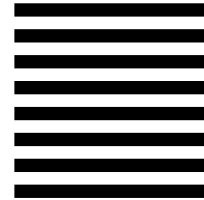
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