System i

i5/OS and related software
Installing, upgrading, or deleting i5/OS and related software

Version 5 Release 4

SC41-5120-09

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SC41-5120-09

Note

Before using this information and the product it supports, read the information in “Notices,” on page 237.

Fourth Edition (September 2007)

This edition applies to version 5, release 4, modification 0 of IBM i5/OS (product number 5722-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 SC41-5120-08.

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What's new for V5R4

This topic highlights V5R4 changes for the upgrade, installation, and deletion information for i5/OS® and related software.

Server firmware requirements before you install V5R4

To determine the minimum firmware requirements for your system, you need to understand both the hardware and software requirements. The IBM Prerequisite Web page provides the prerequisite information for features that you currently have or plan to add to your system. If you have an IBM® System i5®, System p5®, or IBM eServer™ i5 or p5 system that is managed by Hardware Management Console (HMC), your server firmware must be at the SF235_160 level at a minimum to be able to support V5R4 on logical partitions that are in full-production mode. A server firmware level of SF230_145 is sufficient for logical partitions that are in test mode and do not contain any hardware that requires a more current level of firmware. For systems that do not have logical partitions, the V5R4 Licensed Internal Code contains the minimum level of firmware that is required.

Requirements before you install V5R4 Licensed Internal Code

The V5R4 Licensed Internal Code requires more storage space on the load-source disk unit than V5R2M0 or V5R3M0 Licensed Internal Code. (Your load-source disk unit has enough storage if you have V5R3M5 Licensed Internal Code installed.) To upgrade to the V5R4 Licensed Internal Code, you must have a load-source disk unit of 17 GB or larger. Steps for determining if you have enough storage space are included in Chapter 5, “Preparing to upgrade or replace i5/OS software,” on page 23.

In addition, all systems with V5R2 or V5R3 installed require up to approximately 4 gigabytes of system ASP free space before V5R4 can be installed. Your upgrade will stop during the installation of Licensed Internal Code if you do not have this space. Steps for determining storage space are included within the topic “Determining storage space required” on page 46.

Information on conversions

The number and type of conversions that occur either during a software upgrade or during normal operations after an upgrade are now shown together under a single topic, “Times for conversions” on page 197. Review this information to determine the affects that conversions might have on your system. Topics include “Integrated file system conversions” on page 197, “Conversion of objects that contain SQL statements” on page 197, “Database file conversions” on page 198, and “IBM Backup Recovery and Media Services for i5/OS conversions” on page 198.

Electronic software delivery

You can receive IBM i5/OS software online through electronic software delivery. The IBM i5/OS operating system and most related licensed programs support this new delivery method.

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When you order i5/OS licensed programs, you can select electronic software delivery as the method of delivery. If you select electronic software delivery, you receive information on how to access your ordered licensed programs from the Entitled software support Web site. Associated publications and other documentation are also available from the same Web site.

Instructions on how to download and prepare to install your software are available at the Electronic software delivery Web site

(www.ibm.com/servers/eserver/support/software/delivery/en_US/downloadinfo.html).

Software keys available online

You can view, print, or download the software license keys from the Entitled software support (http://www.ibm.com/eserver/ess) Web site. Printed copies of software keys are no longer sent with your i5/OS order. 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.

Procedures for replacing Licensed Internal Code and i5/OS of the same version and release

If you order feature code 2693, use this procedure to install a new modification of Licensed Internal Code and a more recent update of i5/OS to support new hardware. Procedures are in the topic Chapter 9, “Replacing Licensed Internal Code and i5/OS of the same version and release,” on page 93.

What's new for V5R2-to-V5R4 upgrades

Licensed programs require the acceptance of their software agreements before you install

If you are upgrading from V5R2 to the V5R4 release, the information regarding software agreements is new to you. For IBM licensed programs that have an online software agreement for V5R4, you will need to accept the agreement through the Prepare for Install menu before you can upgrade the programs. You must install a PTF (steps to do this are included in the topic “Required: Installing the Prepare for Install PTFs for V5R2 and V5R3” on page 27) to be able to accept the software agreements for Licensed Internal Code and the i5/OS operating system. You will not be allowed to continue the i5/OS upgrade if you do not accept these software agreements.

If you do not accept the agreements for any other licensed program, these licensed programs will not be installed automatically during the upgrade. You can also accept new licensed programs before an upgrade. “Required: Accepting software agreements” on page 45 describes how to accept the agreements for an upgrade.

The topic Maintaining and managing i5/OS and related software in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software**) describes how to use, manage, and generate software agreements.

Allocating additional space for Licensed Internal Code

All systems with V5R2 Licensed Internal Code require additional reserved storage before the V5R4 Licensed Internal Code can be installed. Your upgrade will stop during the installation of Licensed Internal Code if you do not allocate the additional space.

It is required that you use the Allocate Licensed Internal Code Space (QLPALCSP) API rather than the Prepare for install menu option to give you a complete analysis of your storage space and to enforce the handling of potential error situations. With the QLPALCSP API, you can find out if enough reserved storage is available, allocate the additional space when necessary, and correct other possible errors. The Prepare for install option does not allocate enough space for the V5R4 Licensed Internal Code. The steps for using the QLPALCSP API are discussed in "Required: Allocating additional space for Licensed Internal Code" on page 49.

Cumulative PTF package is not included in software orders

The cumulative PTF package does not come with your software order. About a week or two before you upgrade, order the most recent cumulative PTF package and also order PTF groups that pertain to your environment. These tasks are discussed in "Reviewing software PTF (fix) requirements" on page 26.

Console mode value and console takeover options

Because the console mode value is honored for V5R3 or later installations, you need to check that it is set correctly before you upgrade. A value of zero means that the console mode has not been set and might interfere with the automatic installation process. In addition, you can choose to allow an i5/OS LAN console or Hardware Management Console to be taken over by another console in the event your console is disconnected. When this option is turned on, the system does not stop with a failure but continues to run uninterrupted. Steps for verifying the console mode value are included in the upgrade and installation tasks. For more information on the console takeover option, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center (**Managing consoles, interfaces, and terminals → Managing i5/OS consoles → Planning for your configuration → General Operations Console considerations → Console takeover and recovery**).

Additional primary languages can be ordered

For V5R4, you can order additional primary language media (feature code 82xx) and receive the standard set and keyed set for each of those languages. Secondary languages, if ordered, come on separate optical media.

Server firmware

IBM System i5, System p5, and IBM eServer i5 and p5 systems, the level of the server firmware needs to be managed. *Server firmware* is the code that resides in system flash memory, and includes a number of subcomponents, including power control code and the logical partition firmware that is loaded into AIX® or Linux® logical partitions. The server firmware is installed on your system as part of the Licensed Internal Code. If your system is defined as the service partition and it is not managed by a Hardware Management Console (HMC), the level of the server firmware that is on the service partition is used. A *service partition* is one partition on a system that must be set up to report hardware status and software errors to

IBM. Installing a new level of the Licensed Internal Code might change the level of the server firmware and require a server IPL to be performed. A *server IPL* is an initial program load where all logical partitions on a system are shut down at the same time and then restarted.

If your system is managed by an HMC, the level of the server firmware that is part of the Licensed Internal Code on the service partition is not used. The level of the server firmware is managed by the HMC. For more information about fixes and the HMC, refer to the topic Fixes and upgrades in the IBM Systems Hardware Information Center (**Customer service, support, and troubleshooting → Fixes and upgrades**).

What's new as of 14 September 2007

"Using D-mode IPL to refresh the vital product data" on page 216
This information is to be used if you just installed or upgraded to a POWER6® system and are directed to this topic. Instructions are given for starting the system for the first time and for locating the load-source disk unit.

What's new as of 24 July 2007

Chapter 8, "Checklist: Completing the i5/OS upgrade or replacement," on page 87 and "Checklist: Completing the replacement of the same i5/OS release" on page 97
The steps regarding a server IPL were updated.

Miscellaneous changes throughout the procedures
The primary language and service tools language can now be installed separately and can have different language feature codes.

What's new as of 30 November 2006

"Analyzing fixes you currently have on your system" on page 27
A link was updated.

"Preparing your console for software installation" on page 51
Miscellaneous technical updates were made.

What's new as of 30 April 2006

"Standard set products" on page 210
Miscellaneous changes have been made to the media listings in this topic.

"Replacing the licensed programs" on page 80
A note was added that refers to migrating data from one system to another system using documented backup and recovery procedures.

What's new as of 31 January 2006

"Finding the latest PSP information" on page 26
Information APAR II14131 contains a summary of PTFs that are required to upgrade to V5R4.

"Required: Allocating additional space for Licensed Internal Code" on page 49
Miscellaneous updates have been added to this topic.

"Media labels and their contents" on page 208
Miscellaneous changes have been made to the media listings in this topic.

Server firmware requirements
For specific requirements, see the information at the beginning of this section on server firmware requirements before you install V5R4.

Chapter 1, "Installing, upgrading, or deleting i5/OS and related software," on page 1 Links and navigation paths have been updated throughout the topic.

How to see what's new or changed

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

Chapter 1. Installing, upgrading, or deleting i5/OS and related software

This topic collection guides you through the concepts and procedures for installing, upgrading, or deleting i5/OS software on your system.

Use this information to install the i5/OS release, part of the i5/OS release, or licensed programs related to i5/OS in IBM eServer and IBM Systems i5 and p5 models. If you are installing software as part of an iSeries® hardware upgrade, first go to the topic Upgrading your iSeries server in the i5/OS Information Center (**Migration → Upgrading your iSeries server**). If you are upgrading to other hardware models, see the Upgrades topic in the IBM Systems Hardware Information Center (**Migrating or upgrading your servers → iSeries servers → Upgrades**). If you are viewing this in printed copy, references to other topics such as this one in the information center are shown with a navigation path.

If you are planning to boot to i5/OS from the load-source disk unit that is attached via the 2847 I/O processor, ensure you see the IBM Redbook, iSeries and

TotalStorage: A Guide to Implementing External Disk on eServer i5; SG24-7120
for important planning and implementation considerations.

Note: By using the code examples, you agree to the terms of the Chapter 17, "Code license and disclaimer information," on page 235.

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Chapter 2. Fastpath 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 i5/OS installation or upgrade.

About this task

Task	Steps
Upgrading a release on a system or logical partition (either from V5R2 or V5R3 to V5R4)	1. Chapter 5, "Preparing to upgrade or replace i5/OS software," on page 23 2. Use one of the following methods to upgrade or replace an i5/OS release: • Chapter 6, "Upgrading or replacing software using automatic installation," on page 55 • Chapter 7, "Upgrading or replacing software using manual installation," on page 65 3. "Installing additional licensed programs" on page 130 4. "Installing a secondary language" on page 137 5. Review Chapter 8, "Checklist: Completing the i5/OS upgrade or replacement," on page 87
Replacing Licensed Internal Code and i5/OS of the same version and release to support new hardware.	Chapter 9, "Replacing Licensed Internal Code and i5/OS of the same version and release," on page 93
Installing the i5/OS release on a new system or logical partition	1. "Preparing to install the i5/OS release" on page 103 2. Perform the following based on your situation: • "Installing Licensed Internal Code on a new logical partition" on page 108 • "Installing software on a new system or logical partition (without i5/OS installed)" on page 115 • "Installing software on a new system (with i5/OS installed)" on page 126 3. "Using the Work with Licensed Programs menu to install IBM licensed programs" on page 131 4. "Installing a secondary language" on page 137 5. Review "Checklist: Completing the i5/OS installation" on page 141
Installing licensed programs	1. "Installing additional licensed programs" on page 130 2. Review "Checklist: Completing the i5/OS installation" on page 141 (certain steps apply)
Installing a secondary language	1. Review "Globalization and i5/OS software installation" on page 16 2. "Installing a secondary language" on page 137 3. Review "Checklist: Completing the i5/OS installation" on page 141 (certain steps apply)
Changing the primary language using either primary or secondary language media on the same release.	1. Arrange your media in the order shown in "Media labels and their contents" on page 208 2. Chapter 12, "Changing the primary language of your system or logical partition," on page 147 3. Review "Checklist: Completing the i5/OS installation" on page 141

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Task	Steps
Changing your primary language and upgrading a release using primary language media	1. Chapter 5, “Preparing to upgrade or replace i5/OS software,” on page 23 2. Use one of the following methods to upgrade or replace an i5/OS release: • Chapter 6, “Upgrading or replacing software using automatic installation,” on page 55 • Chapter 7, “Upgrading or replacing software using manual installation,” on page 65 3. “Installing additional licensed programs” on page 130 4. “Installing a secondary language” on page 137 5. Review Chapter 8, “Checklist: Completing the i5/OS upgrade or replacement,” on page 87
Selecting the primary language or changing your primary language and installing software on a new system	1. “Preparing to install the i5/OS release” on page 103 2. Perform the following based on your situation: • “Installing Licensed Internal Code on a new logical partition” on page 108 • “Installing software on a new system or logical partition (without i5/OS installed)” on page 115 • Chapter 12, “Changing the primary language of your system or logical partition,” on page 147 3. “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 131 4. “Installing a secondary language” on page 137 5. Review “Checklist: Completing the i5/OS installation” on page 141
Adding a new disk unit to an existing system before upgrading or replacing a release	If you are currently using mirrored protection, device parity protection, or auxiliary storage pools, refer to the information on working with auxiliary storage pools in the Backup and Recovery manual before you begin these tasks. 1. Chapter 5, “Preparing to upgrade or replace i5/OS software,” on page 23 2. Chapter 7, “Upgrading or replacing software using manual installation,” on page 65 3. “Installing additional licensed programs” on page 130 4. “Installing a secondary language” on page 137 5. Review Chapter 8, “Checklist: Completing the i5/OS upgrade or replacement,” on page 87
Installing a cumulative program temporary fix (PTF) package	1. Go to the Support for IBM System i® Web site (http://www/systems/support/i) for Internet downloads or PSP information. 2. Review the iSeries 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 (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Fixes concepts and terms**) in the i5/OS Information Center.
Installing a hardware upgrade	For IBM System i5, System p5, and IBM eServer i5 and p5 systems, perform the tasks in the Upgrades topic in the IBM Systems Hardware Information Center (**Migrating or upgrading your server → iSeries servers → Upgrades**). For System i 8xx and earlier models, see Upgrading your iSeries server in the i5/OS Information Center (**Migration → Upgrading your iSeries server**).
Deleting software	Use either of the following methods: • “Preselecting the licensed programs to install” on page 42. 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 i5/OS operating system,” on page 157.

Chapter 3. Concepts for software installation

You and IBM together manage the use, documentation, and transfer of i5/OS licensed programs.

Find out the basics of installing i5/OS 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. Following is a conceptual look at i5/OS software installation.

Software installation process

The i5/OS software installation process has three phases: preinstallation activities, the main installation, and postinstallation activities.

1. **Preinstallation activities:**

   You can do these activities days or even a few weeks in advance. To plan and prepare your system before you install your software, use the appropriate planning and preparation topics to guide you through the activities that you need to do.

   - Upgrading to V5R4 from either V5R2 or V5R3: Chapter 4, “Checklist: i5/OS software upgrade or replacement readiness,” on page 19
   - Replacing Licensed Internal Code and i5/OS of the same version and release to support new hardware: “Checklist: i5/OS software replacement” on page 93
   - Installing V5R4 on a new system or logical partition: Chapter 10, “Checklist: i5/OS software installation readiness,” on page 101

   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 operating system (i5/OS), and licensed programs. You would 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 eServer iSeries 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.

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

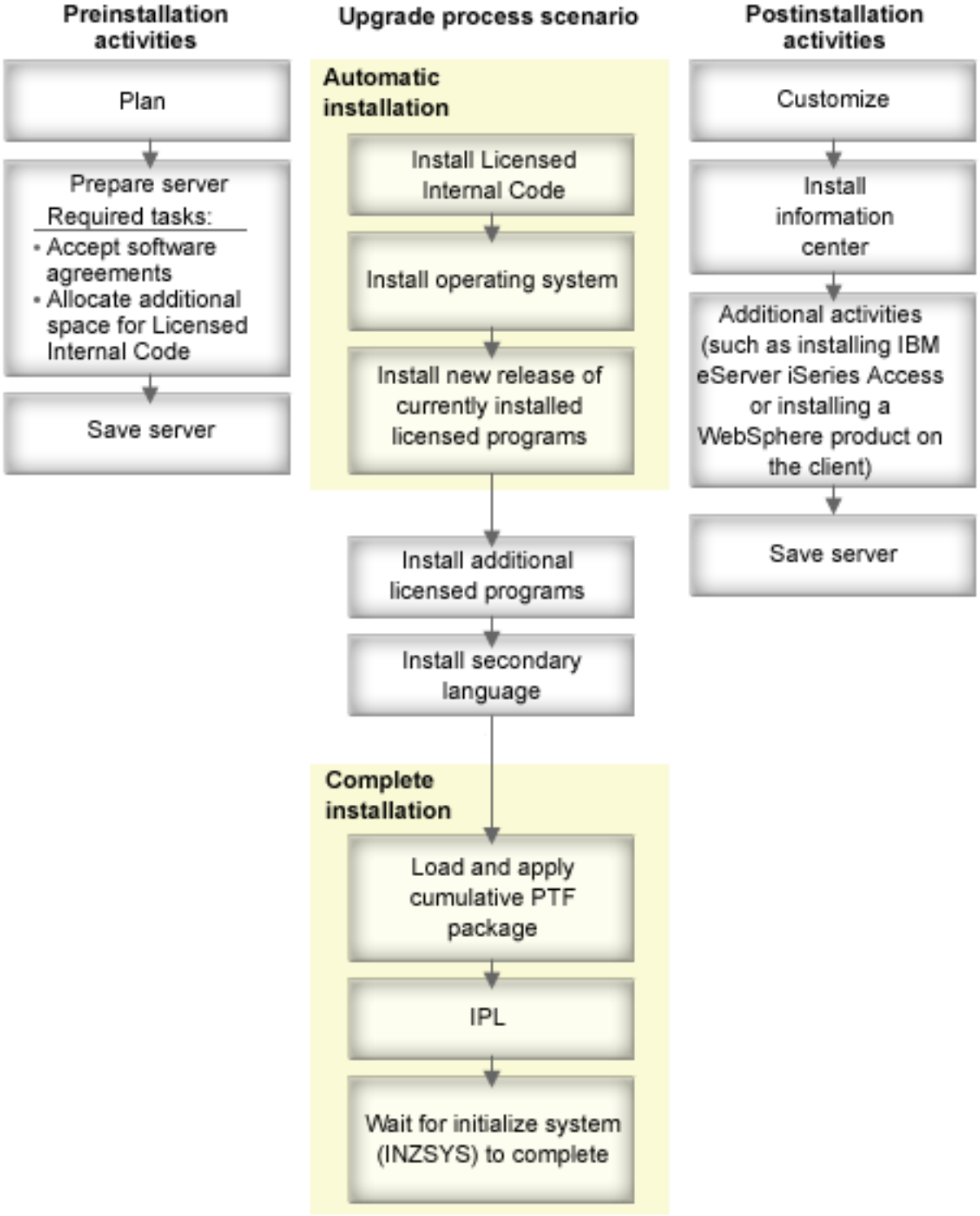

Figure 1. Overview of the installation process

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 OS/400® or i5/OS software, use either the automatic installation method or the manual installation method.

Automatic installation

This replaces your existing release with minimal user interaction. The language feature code on the distribution media is installed as the primary language on the system. The automatic installation process keeps the current environment and system values. The process can add all nonconfigured disk units to the system auxiliary storage pool (ASP) and 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 using mirrored protection, device parity protection, or user auxiliary storage pools.
- Changing the environment (i5/OS 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 161 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 i5/OS release on your system.

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

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 CD-ROM media.

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

Virtual tape devices
You can use a tape image catalog and a virtual tape device to install PTF fixes or to install single licensed programs.

Note: You cannot use a tape image catalog to install or upgrade an i5/OS release.

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 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 i5/OS 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	i5/OS normal names
Optical media (CD, DVD, or virtual optical images)	OPTxx	OPTxx

Table 1. Naming conventions for devices (continued)

Media type	System/36 names	i5/OS normal names
Cartridge	TC	TAPxx
Reel	T1	TAPxx
Media library device created through automatic configuration		TAPMLBxx

"Preparing the upgrade device and media" on page 37 contains further information on what you need to do with your media before you install a release.

Contents of a software order

Your i5/OS software order package includes software licensing documents, the CD-ROM media, and other product documentation as appropriate.

When you order software from IBM, you receive the CD-ROM 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 i5/OS 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 i5/OS operating system will stop if the agreements have not been accepted. The topic "Required: Accepting software agreements" on page 45 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 i5/OS 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 i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Working with software agreements and licenses**). For unique licensing applications regarding logical partitions on 8xx or earlier models, see the topic Software licensing and licensed programs for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Logical partition concepts → Software licensing and licensed programs for logical partitions**). For IBM System i5, System p5, and IBM eServer i5 and p5 systems, see Considerations for i5/OS license agreements in the IBM Systems Hardware Information Center (**Partitioning the server → Concepts for partitioning the server → Physical and virtual hardware resources → Processors → Shared processors → Considerations for i5/OS license agreements**).

Media distribution set

The software products that you receive in an i5/OS release order are grouped into different media sets.

The licensed programs on the standard set and keyed set come in your primary language. If you order additional primary languages (feature code 80xx), you will receive the standard set and keyed set for those languages. Secondary languages, if ordered, come on separate 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 system software or upgrade order. It contains the hardware and software components to install on your system. This includes Licensed Internal Code, i5/OS, its no-charge options, and no-charge licensed programs and options. The i5/OS 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)
You can order secondary languages separately from the primary language. Each language comes on separate optical media or as a set of optical media. You specify the secondary language during the installation procedure.

Informational set
IBM provides technical and setup information on optical media with your software order. This information includes the i5/OS Information Center and the PDF versions of i5/OS manuals.

Individual product documentation

Additional material that contains information unique to the installation of a certain product on your system might be sent with your i5/OS 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 i5/OS release, such as performing an upgrade from V5R2 to V5R4 and skipping V5R3, 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 i5/OS, 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" on page 197 contains more information on the V5R4 impacts to your system.

Performance data collection

With any software i5/OS 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 34 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 i5/OS 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.

Mixed-release environment

Licensed programs or their options do not always have the same release as the i5/OS 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 V5R4 media might contain licensed programs and options that are at different releases than V5R4. Products that do not have any new function for this release are not repackaged, and therefore could have a release previous to V5R4. "Licensed program releases and sizes" on page 185 contains information on the version, release, and modification level of the standard and keyed set products. You can also look at the product information to determine OS/400 and i5/OS 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 i5/OS release.

Supported releases and nonsupported models for i5/OS (OS/400) upgrades

Upgrades to current releases require that you be at a certain level of software. This information shows the supported combinations for source and current target releases.

To be able to upgrade to or replace the V5R4 i5/OS release, your current version of the operating system must be either at V5R4, V5R3, or V5R2. If your target release is V5R3 or V5R2, use the OS/400 software installation information for the version of OS/400 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 and licensed programs for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Logical partition concepts → Software licensing and licensed programs for logical partitions**) for System i 8xx and earlier models. For IBM System i5, System p5, and IBM eServer i5 and p5 systems, see Considerations for i5/OS license agreements in the IBM Systems Hardware Information Center (**Partitioning the server → Concepts for partitioning the server → Physical and virtual hardware resources → Processors → Shared processors → Considerations for i5/OS license agreements**).

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 V5R3 or V5R2 before you can upgrade to V5R4.

Table 2. Supported releases for OS/400 (i5/OS) upgrades

Currently installed (source) release	**Valid target releases**
V5R4	V5R4
V5R3	V5R3 or V5R4
V5R2	V5R2, V5R3, or V5R4

You will not be able to install V5R4 on the following AS/400® or iSeries models:

Table 3. Nonsupported models for OS/400 (i5/OS) upgrades

150	170	250	400	40S
436	53S	500	510 (AS/400)	530
50S	600	620	640	650
720	730	740	S10	S20
S30	S40	SB1		

For information on planning for system hardware upgrades, see System i Support Planning (http://www.ibm.com/systems/support/i/planning/).

Installation and IBM-supplied objects

When you replace your software with a new i5/OS 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 system optionally keeps 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)

Job descriptions	Subsystem descriptions
QPDAUTOPAR (Used for automatic problem analysis)	**QPGMR** (Programmer)
QQQTEMPS (DB2® UDB for iSeries 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 i5/OS 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 (QDCPOBJ*x*, 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 decompresses only frequently used objects automatically. 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 at least five times when the last use was within the last 14 days. 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 QDCPOBJ*x* 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 i5/OS installation process.

Globalization and i5/OS 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 5.

If the primary language is uppercase English (2938 or 2950), 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.

For V5R4, you can order additional primary language media (feature code 82xx) and receive the standard set and keyed set for each of those languages. Secondary languages, if ordered, come on separate optical media.

The i5/OS Information Center topic i5/OS Globalization (**Programming → i5/OS 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 national language version" on page 214.

Considerations for changing a primary language

This information describes the requirements for changing your i5/OS 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 147, 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 i5/OS (B29xx_01) and the media that contains the secondary language (N29xx).

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 i5/OS globalization in the i5/OS 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.

Considerations for installing additional secondary languages

To be able to install an i5/OS 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 137 contains the following two procedures to install secondary languages:

- "Installing secondary languages for IBM licensed programs" on page 137 shows how to install secondary language objects for i5/OS 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 140 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:

- 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 QVFYOBJRST)" on page 30, ensures that you do this.) i5/OS globalization also contains more information about secondary language libraries in user profiles.

Object conversions

When you install the i5/OS operating system, you need to plan time for certain object conversions from previous releases. The amount of time that is required could be significant depending on the number and size of the object types that you have on your system.

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 installation time and storage requirements. Before you install a new release, you might need to 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 on how conversions can affect either your installation time or normal operations following an upgrade are described in "Times for conversions" on page 197. You might see an impact in these areas:

- "Integrated file system conversions" on page 197
- "Conversion of objects that contain SQL statements" on page 197
- "Database file conversions" on page 198
- "IBM Backup Recovery and Media Services for i5/OS conversions" on page 198

Chapter 4. Checklist: i5/OS 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.

Following is a summary of the major task categories 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. This information is found in the IBM System i5 Handbook at the following Web site: `http://publib-b.boulder.ibm.com/cgi-bin/searchsite.cgi?query=iseries+AND+handbook`. Use this Web page to search for the correct version.
2. Know your current strategy for connecting a console to your system or logical partition. Your current connection strategy influences your planning activities. For information about twinaxial consoles and Operations Console, refer to the Connecting to iSeries topic in the i5/OS Information Center. For information about managing your systems with Hardware Management Console, refer to the topic Managing your server using the Hardware Management Console in the IBM Systems Hardware Information Center (**Managing your server and devices → Managing your server using the Hardware Management Console**).
3. For IBM System i5, System p5, and IBM eServer i5 and p5 systems, 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 i5/OS upgrade or replacement," on page 87.
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 8. 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. "Verifying the contents of your software order" on page 23
   a. "Identifying and reviewing information resources" on page 23
   b. "Verifying the correct optical distribution media" on page 24
   c. "Verifying license keys for keyed products" on page 25
2. "Preparing the system for i5/OS software upgrade or replacement" on page 26
   a. "Reviewing software PTF (fix) requirements" on page 26
      1) "Finding the latest PSP information" on page 26

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2) "Analyzing fixes you currently have on your system" on page 27
3) **"Required: Installing the Prepare for Install PTFs for V5R2 and V5R3" on page 27**
4) "Installing optional i5/OS PTF to choose disk configuration" on page 28
5) "Permanently applying program temporary fixes (PTFs)" on page 28
6) "Adding fix support for currently installed licensed programs" on page 29

b. "Working with critical system values before you install software" on page 29
1) "Recording and printing all system values before you install software" on page 29
2) "Changing certain system values (QSYSLIBL, QUSRLIBL, QALWOBJRST, or QVFYOBJRST)" on page 30
3) "Optionally changing the scan control system value" on page 31
4) "Creating a data area to specify the system time zone" on page 31

c. "Verifying the integrity of user-modified system objects" on page 32
1) "Verifying user profiles and checking cross-reference files" on page 32
2) "Checking the QSECOFR user profile" on page 32
3) "Ensuring that the IBM-supplied product libraries are in the system ASP" on page 32

d. "Ensuring two-phase commit integrity" on page 33
e. "Minimizing software installation time" on page 34
f. "Gathering performance data for benchmark" on page 34
1) "Gathering performance data with Collection Services" on page 35
2) "Analyzing performance data" on page 36

3. "Performing initial upgrade or replacement tasks" on page 37
a. "Choosing a software installation method and device" on page 37
b. "Preparing for globalization" on page 37
c. "Preparing the upgrade device and media" on page 37
1) "Preparing to upgrade or replace software using an image catalog" on page 38
a) "Determining storage requirements for image catalog installation" on page 38
b) "Freeing up space on the load-source disk unit for an image catalog" on page 39
c) "Scenario: Preparing to upgrade or replace software using an image catalog" on page 39

d. **"Required: Creating a custom list of software to install" on page 41**
1) "Preselecting the licensed programs to install" on page 42
2) "Adding additional licensed programs to the installation list" on page 44

e. **"Required: Accepting software agreements" on page 45**
f. "Ensuring the system meets disk storage requirements for upgrades" on page 46
1) "Determining storage space required" on page 46
2) "Cleaning up disk storage space" on page 47

g. **"Required: Allocating additional space for Licensed Internal Code" on page 49**
h. "Choosing disk configuration" on page 50

i. "Estimating upgrade or replacement time" on page 51

j. "Preparing your console for software installation" on page 51

k. "Stopping the integrated server and other application servers" on page 53

4. "Saving the system" on page 54

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 Maintain and manage i5/OS and related software (**i5/OS and related software → Maintain and manage i5/OS and related software**) topic in the iSeries Information Center.
2. For information about software distribution of supported products, go to the Distribute software (**i5/OS and related software → Distribute software**) topic.

Chapter 5. Preparing to upgrade or replace i5/OS 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 (a few weeks or days 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. For System i 8xx or earlier models, refer to Planning for logical partitions in the i5/OS Information Center (**Systems management** → **Logical partitions** → **Partitioning with an iSeries server** → **Plan for logical partitions**). For all other models, refer to Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning** → **Solution Planning** → **Planning for logical partitions**). You can also have different release levels on different partitions. For directions on how to do these correctly, see Logical partition release support in the i5/OS Information Center (**Systems management** → **Logical partitions** → **Partitioning with an iSeries server** → **Logical partition concepts** → **Software licensing and licensed programs for logical partitions** → **Logical partition release support**) for System i 8xx or earlier models.

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 i5/OS software order are correct before you start the installation.

Identifying and reviewing information resources

Use these documents to help plan your i5/OS installation process.

About this task

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 i5/OS 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 i5/OS Information Center, you can access the Memo to Users from the Support for IBM System i Web site (http://www.ibm.com/systems/support/i).

  On the Web site, follow this path:

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1. Technical databases
2. Preventive Service Planning - PSP
3. All Preventive Service Planning Documents by Release
4. R540
5. SF98016: iSeries Memorandum to Users

The *Memo to Users* is also available to customers who use electronic customer support. You can order this document for V5R4 by using the Send PTF Order (SNDPTFORD) command and specifying program temporary fix (PTF) number `SF98016`.

If you are skipping a release level of i5/OS, 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 V5R3 Memorandum to Users is SNDPTFORD SF98086. The same version is also available on the V5R3 iSeries Information Center (www.ibm.com/eserver/iseries/infocenter) and through the preventive service planning information at the Support for IBM System i Web site.

- **Setup and Operations CD-ROM**

  With every order that includes Operations Console, you receive *iSeries Setup and Operations*, SK3T-4098. This CD-ROM contains IBM eServer iSeries Access for Windows® and the EZ-Setup wizard.

- **Information Center CD-ROM**

  This CD-ROM, *iSeries Information Center*, SK3T-4091, ships with your i5/OS software upgrade order.

- **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 i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Fixes concepts and terms → Where to find information about fixes → Preventive service planning information**).

- **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 about a week or two before your i5/OS installation 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 thei5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Ordering fixes**).

Verifying the correct optical distribution media

If you are planning for a complete i5/OS software release upgrade, ensure you have the correct media for your upcoming tasks.

About this task

Procedure

1. Locate the software distribution media. Verify that the optical media for Licensed Internal Code and the operating system are for V5R4 and that their identifiers (located on the left side of the CD-ROM label) match each other.

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.

Note: If you are replacing software with the same version and release, you need only three CD-ROMs: I_BASE_01, B29xx_01, and B29xx_02. The identifiers for the B29xx_01 and B29xx_02 media (for example, `RS 540-xx` for V5R4) must match. Verify also that B29xx_01 and B29xx_02 are in the correct primary language.

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).

The product tables (Standard set products, Keyed set products, and Licensed program releases and sizes) in Chapter 15, "i5/OS software reference," on page 185 list the names and product identifiers of licensed programs that you ordered.

2. Verify that the media you received is in the correct primary and secondary languages. Do the following to determine the feature number for the national language version (NLV) for your system's primary language and any installed secondary languages:
   a. From the Work with Licensed Programs command menu (type `GO LICPGM` and press Enter). Select option 20 (Display secondary languages).
   b. The Display Installed Secondary Languages display appears. This display identifies the primary language of the system and any installed secondary languages.

      Compare the i5/OS media label with the primary language of your system. If the system uses secondary languages, compare the secondary language media that you have received with the secondary languages listed on your system.
   c. Press the F3 (Exit) key twice.

Results

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.

About this task

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 on the Customer Notice for details on how to contact the IBM Software License Key Center.

For general information on licensed keys, refer to the topic Software license keys in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Working with software agreements and licenses → Software agreements and licensing concepts → Software license keys**).

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

Preparing the system for i5/OS software upgrade or replacement

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

Reviewing software PTF (fix) requirements

Before you begin the i5/OS installation process, make sure that your system is ready by reviewing your requirements for program temporary fixes (PTFs).

For this release, for example, a PTF for accepting online software agreements for Licensed Internal Code and the i5/OS operating system is required to be temporarily applied before you upgrade. If you are upgrading to V5R4, a PTF to allocate additional space for the Licensed Internal Code before you upgrade might also be required.

Finding the latest PSP information

Keep informed on the most recent information about conditions that could impede your i5/OS software installation process.

About this task

To verify that you have the PTFs on your system that are required to upgrade to V5R4, review Information APAR II14131 in the preventative service planning information from the **Support for IBM System i** Web page. Select the link for technical databases. These PTFs will be loaded and applied in the steps within "Required: Installing the Prepare for Install PTFs for V5R2 and V5R3" on page 27.

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 i5/OS, 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 38. 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.

What to do next

For information on how to use preventive service planning, see Preventive service planning information in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Fixes concepts and terms → Where to find information about fixes → Preventive service planning information**).

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.

About this task

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.

What to do next

To find out how to order a cross-reference summary list, see the topic Fix cross-reference summary lists in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Fixes concepts and terms → Where to find information about fixes → Fix cross-reference summary lists**).

Required: Installing the Prepare for Install PTFs for V5R2 and V5R3

Situations can arise that require specific program temporary fixes (PTFs) before you can install a new i5/OS release.

About this task

Before you can install V5R4, you must temporarily apply PTFs from the *Prepare for install PTFs for V5R1, V5R2, and V5R3*, SK3T-8163, CD-ROM to be able to accept online software agreements for V5R4 licensed programs and to allocate additional space needed for V5R4.

Important: You need to accept the licensed agreements for Licensed Internal Code and the operating system before you can upgrade. If you do not accept the agreements, the installation of Licensed Internal Code will not be allowed to continue.

The *Prepare for install PTFs for V5R1, V5R2, and V5R3* CD-ROM is included with your V5R4 software media. You need to temporarily apply the appropriate PTF to the current release before you upgrade.

To install the prepare for install PTFs for V5R2 and V5R3, follow these steps:

Procedure

1. Locate the CD-ROM labeled *Prepare for install PTFs for V5R1, V5R2, and V5R3*.
2. Load the CD-ROM in the optical device.
3. Type the following command and press Enter:

   ```
   INSPTF LICPGM(*ALL) DEV(OPTxx) INSTYP(*IMMDLY)
   ```

Results

For V5R2, the system applies 5722999 MF33218, MF38059, MF36329, and MF36330; 5722SS1 SI18930 and its associated PTF for the installed national languages for your current release.

For V5R3, the system applies 5722999 MF33150, MF38060, and MF36280; 5722SS1 SI19058 and SI14190 along with its associated PTF for the installed national languages for your current release.

Steps for using the functions of the PTF are included in the preparation process under “Required: Accepting software agreements” on page 45 and “Required: Allocating additional space for Licensed Internal Code” on page 49.

Note: You might need to perform an initial program load (IPL) of the system after you install PTFs MF36351 or MF36276. Check the status of these PTFs to verify whether you need to perform an IPL.

Installing optional i5/OS PTF to choose disk configuration

Today, as part of the automatic installation process, all nonconfigured disk units are added to the system auxiliary storage pool (ASP). If you are using automatic installation to upgrade the operating system from V5R2 to V5R4 and do not want nonconfigured disk units added, a PTF is available.

About this task

This PTF allows you to set your disk configuration option. If you are upgrading from V5R2, an additional IPL is required for this to occur.

If you want to change your current disk configuration and you are upgrading from V5R2, follow the instructions to download and apply PTF SI08897. Prerequisite PTFs for Licensed Internal Code are included. The instructions also include how to change the disk configuration. You must be signed on as security officer (QSECOFR user profile) to use these PTFs to change the disk configuration option.

If you are currently on a V5R3 or V5R4 system, have already installed either of the disk configuration PTFs before you upgraded to V5R3, and are replacing the operating system, follow the instructions in “Choosing disk configuration” on page 50.

Permanently applying program temporary fixes (PTFs)

Temporarily applied PTFs require a considerable amount of disk storage space. Follow these procedures only for i5/OS products and temporarily applied PTFs that you have verified on your system.

About this task

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 System Manager for iSeries licensed program installed, the PTF save files are not deleted.

Notes:

- Applying fixes in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Install fixes → Advanced procedures for fix installation → Applying fixes**) contains information on 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 System Manager for iSeries licensed program (57xx-SM1) installed on your system, use the instructions in the book 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 i5/OS upgrade to a new release.

About this task

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.

What to do next

To add support, see the topic Add fix support for a software product in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Install fixes → Step 3. Choosing your fix installation scenario → Distributing fixes to multiple systems with iSeries Navigator → Sending and installing fixes → Adding fix support for a software product**).

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 i5/OS 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.

IBM also recommends that you first create a data area to specify your system time zone before you upgrade to V5R4. This data area is used when you upgrade to set the time zone system value. By doing this, the time zone used on the system is set immediately.

Recording and printing all system values before you install software

IBM recommends that you record or print your system values prior to the i5/OS upgrade.

About this task

To do this, use the Work with System Value command. On the i5/OS 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 i5/OS 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.

About this task

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: _____ _____ _____ _____ _____	If you have any of the following libraries, use the spacebar to delete the library from the library list. • Remove any licensed program libraries. • Remove any secondary language libraries (QSYS29xx). **Note:** Do not remove QSYS, QGPL, QUSRSYS, QTEMP, or QSYS2.
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 i5/OS Information Center (**Systems management → System values → Managing system values → Locking and unlocking security-related system values**) 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 i5/OS Information Center (**Systems management → System values → Managing system values → Locking and unlocking security-related system values**) describes how to do this.

System value	Action to take
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 or not 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, 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 iSeries Navigator to set your system values. For more information, see system values in the i5/OS Information Center (**Systems management → System values**) to find out how to use and access the system values from iSeries Navigator.

Optionally changing the scan control system value

If you currently have i5/OS V5R3 or later installed on your system, consider specifying *NOPOSTRST for the scan control (QSCANFSCTL) system value.

About this task

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 i5/OS Information Center (**Files and file systems → Integrated file system → Integrated file system concepts → Scanning support**).

Creating a data area to specify the system time zone

IBM recommends that you specify the system time zone before you upgrade to a new i5/OS release. This ensures that your system time is set properly as soon as the upgrade is complete.

About this task

Time management allows you to manage time on your system. Within the time management component of iSeries Navigator, you can work with the time zone and time adjustment functions. You can set the time zone on your system either before you upgrade, during an attended IPL, or after an IPL. The i5/OS Information Center topic Setting the time zone before upgrading (**Systems management → Time management → Setting up time management → Setting the time zone (QTIMZON) system value → Setting the time zone before upgrading**) includes instructions for creating the data area before you upgrade.

Verifying the integrity of user-modified system objects

When you replace your software with the new i5/OS release, the system keeps changes you made to some IBM-supplied objects.

About this task

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 i5/OS 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.

About this task

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.

Procedure

1. Type `GO LICPGM` at the i5/OS 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 i5/OS release.

About this task

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 i5/OS installation procedures.

About this task

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. 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.

Ensuring two-phase commit integrity

Complete or cancel all pending resynchronizations of commitment control definitions before you replace your i5/OS software.

About this task

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 and 2. 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:

Procedure

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.

Results

For more information on commitment control and resynchronization, see the topic When to force commits and rollbacks and when to cancel resynchronization (**Database → Commitment control → Troubleshooting transactions and commitment control → When to force commits and rollbacks and when to cancel resynchronization**) in the i5/OS Information Center.

Minimizing software installation time

These actions can minimize the time required to install your i5/OS software.

About this task

- Use the automatic installation process rather than performing a manual installation process. “Software installation process” on page 5 has information on 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 and eliminates certain functions.
- 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 CPRJOBTBL(*NONE).

Gathering performance data for benchmark

Establish system benchmarks before you install a new version of the i5/OS operating system or make a major system configuration change such as adding a new software application.

About this task

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 Research a performance problem (**Systems management → Performance → Managing system performance → Researching a performance problem**) in the i5/OS 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 i5/OS operating environment.

Before you begin

About this task

- Use the Collection Services function that is available in iSeries Navigator. Specific information on Collection Services is in the i5/OS 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 iSeries Navigator, you can manage your collections with either of the following methods:
  - Performance Management APIs in the i5/OS Information Center (**Programming → APIs → APIs by category → Performance Management**). 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 (CHKPRFCOL). 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 on collecting performance data with this option.
- Activate IBM Performance Management for eServer iSeries, 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.

Procedure

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 Performance Tools for iSeries, including communications protocol data. The default configuration also starts a batch job CRTPFRDTA, 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 235.

   ```
   CALL PGM(QYPSCSCA) 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 CRTPFRDTA */
                           '*STANDARDP' /* default profile */
                           X'00000000') /* return code  */
   ```
3. If you want to explicitly stop the collector after the desired data is obtained, type this command:

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

Analyzing performance data

To analyze the i5/OS 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.

About this task

For more information, refer to Creating database files from Collection Services data in the i5/OS Information Center (**Systems management → Performance → Applications for performance management → Collection Services → Creating database files from Collection Services data**) and also the step regarding converting the performance data in Chapter 8, "Checklist: Completing the i5/OS upgrade or replacement," on page 87.

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 i5/OS Information Center (**Systems management → Performance → Applications for performance management**). In particular, the Performance Tools for iSeries licensed program summarizes this data into several reports you can use for detailed analysis.

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 i5/OS software upgrade.

Choosing a software installation method and device

If you are upgrading the i5/OS 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.

About this task

For a general view of the installation methods, see "Software installation process" on page 5.

To help you determine which device you will use, refer to "Types of software installation devices" on page 8. "Installation devices and media" on page 199 contains more detailed information on the devices and media available.

Preparing for globalization

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

About this task

If you plan to change the primary language on your system or install additional secondary languages, review the information in "Globalization and i5/OS software installation" on page 16.

Preparing the upgrade device and media

You can prepare to install i5/OS 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 8. The topic "Installation devices and media" on page 199 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 i5/OS software upgrade, to install PTFs (fixes), or to install single licensed programs that you receive on media.

About this task

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 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 optical storage in the i5/OS Information Center (**Storage solutions → Virtual storage → Virtual optical storage**) describes further the concepts and uses of virtual optical media. "Image catalog for a virtual optical device" on page 199 describes the requirements for using image catalogs.

Note: You cannot use a virtual tape image catalog to install or upgrade an i5/OS release.

Determining storage requirements for image catalog installation:

i5/OS 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.

About this task

The IBM-supplied media set uses the following storage.

Table 4. Storage sizes for IBM-supplied media

Media	Allocated size (in megabytes)[1]
I_Base_01	578
B29xx_01	570
B29xx_02	513
B29MM_03	661
B29MM_04	660
D29xx_01	395
D29xx_02	547
D29xx_03	214
D29xx_04	649
D29xx_05	430
D29xx_06	323
L29xx_01	444
L29xx_02	563
Total	6452
[1]Media and sizes at the time of publication.	

To calculate the size of any media not listed in this table, do the following:

Procedure

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:

i5/OS image catalog installation requires at least 1074 MB of free space on the load-source disk unit of your system. If you are using an image catalog to install software, perform the following steps to verify how much free space you have available.

Procedure

1. Enter the Work with Disk Status (WRKDSKSTS) command to determine if your load-source disk unit (unit 1) has at least 1074 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, continue with 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 1074 MB of 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.

Results

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.

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

Scenario: Preparing to upgrade or replace software using an image catalog:

The following is a scenario of 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 i5/OS software upgrade.

Before you begin

To perform a V5R2-to-V5R4 software upgrade from an image catalog, load and apply V5R2 PTF SI19886. *To perform a V5R3-to-V5R4 software upgrade* from an image catalog, load and apply V5R3 PTF SI19888. After either of these PTFs have been applied, follow these steps.

Note: For a V5R4 replacement, ensure that the IBM-supplied media B29xx_01 and B29xx_02 have matching identifiers. The identifier on the CD-ROM label begins with the letters *RS* and is followed by a series of numbers.

Procedure

1. **Create a virtual optical device.**

   To create a device description, enter the following:

   ```
   CRTDEVOPT DEVD(virtual-device-name) RSRCNAME(*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 42, 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 162.) 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)
   ```

Results

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

Required: Creating a custom list of software to install

Use this Prepare for install option to create a customized installation list and preselect the i5/OS licensed programs that you want to install.

Before you do these tasks, you must perform the steps in the topic "Required: Installing the Prepare for Install PTFs for V5R2 and V5R3" on page 27.

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 130 or by doing the following procedures.

Preselecting the licensed programs to install

Use these procedures to create and customize an installation list from your i5/OS distribution media.

About this task

Note: If you are using image catalogs, go to "Preparing to upgrade or replace software using an image catalog" on page 38 and complete steps 1 on page 40 through 5 on page 40 in the topic "Scenario: Preparing to upgrade or replace software using an image catalog" on page 39. Then return to this topic. If you are upgrading from V5R3 to V5R4, ensure that the first entry is in mounted status by entering the following command:

```
LODIMGCLGE IMGCLG(MYCATALOG) IMGCLGIDX(1) OPTION(*MOUNT)
```

If you are upgrading from V5R2 to V5R4, ensure that the first entry is in mounted status by doing the following steps:

1. Enter the command WRKIMGCLGE IMGCLG (*image-catalog-name*).
2. If a volume other than the first volume is in mounted status, change it to loaded status first by selecting option 8 (Load).
3. Specify option 6 (Mount) for the first volume.

Ignore the following steps that refer to loading volumes.

Procedure

1. Sign on as security officer (QSECOFR user profile). If you are using image catalogs, go to step 3.
2. 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 208. The order is important. More specifically, include only the I_BASE_01, B29xx_nn, B29MM_nn, D29xx_nn, L29xx_nn, and F29xx_nn optical media. 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. 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 optical device or virtual optical device.
   d. Specify the target release for the i5/OS release.
   e. Press Enter.
9. When the Display Messages display appears, load the next media volume. Type `G` and press Enter.

   Note:

a. After you load each volume, type `G` and press Enter.
b. If there are no more volumes to load or if you want to end the loading process, type `X` and press Enter.

10. Continue to load the optical media in order (as in the step above) 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:

    - 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.

11. After the system reads all the optical media and the message `Load next volume in optical device (X G)` appears, type an `X` and press Enter. 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.

12. 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 48.

    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.

13. Press Enter to confirm the list. The Prepare for Install display appears.
14. Select the option to List Licensed Programs Not Found on Media and press Enter. The Licensed Programs Not Found On Media display appears.
15. 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 16) 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 42.

   2) Compare your media labels to the product tables (“Standard set products” on page 210, “Keyed set products” 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 208 “Standard set products” on page 210, “Keyed set products” 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.

16. 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 i5/OS installation list, add any additional licensed programs that you have to the list.

About this task

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 130 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.

Procedure

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 i5/OS Prepare for install option, you must accept the software agreements for licensed programs before they can be installed.

About this task

Before you upgrade to V5R4, it is a system requirement that you accept the online software agreements for the Licensed Internal Code and the i5/OS 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 V5R4.

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

Procedure

1. Ensure that you have performed the steps in the topics “Required: Installing the Prepare for Install PTFs for V5R2 and V5R3” on page 27 and “Required: Creating a custom list of software to install” on page 41. To be able to upgrade, the custom list must include, at a minimum, the Licensed Internal Code and the i5/OS 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: If you are upgrading from V5R2 or V5R3, you must see at least products 5722999 *BASE and 5722SS1 *BASE 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 41. 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 CD-ROM that were not inserted when you used the option to work with licensed programs for target release (step 7 on page 42 under “Preselecting the licensed programs to install” on page 42), 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 i5/OS 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

Before you schedule a time to install the i5/OS release, determine the available storage space and the storage space that is required.

Before you begin

Load-source disk unit requirements

- To upgrade to the V5R4 Licensed Internal Code, you must have a load-source disk unit of 17 GB or larger for each system or logical partition.
- 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 38.

About this task

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

Procedure

1. Type `GO 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 third-party 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 third-party software only when you intend to store it in the system ASP. Refer to the Backup and Recovery manual or Backup and recovery in the i5/OS Information Center (**Systems management → Backup and recovery**) 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.

Results

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 i5/OS release makes more storage space available for the installation process.

About this task

To keep your system running smoothly, refer to the topic Basic system operations in the i5/OS Information Center (**Systems management → Basic system operations**).

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 (DLTPTF) command to do this.)
- Delete any software applications that you installed from software sampler CD-ROMs.
- Perform the steps in "Deleting licensed programs during cleanup" for licensed programs or optional parts that you no longer use. Read the topics on deleting licensed programs in Chapter 13, "Deleting software related to the i5/OS operating system," on page 157 for additional information.
- Have each user perform the tasks in "Cleaning up user profiles" on page 49. 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 i5/OS software, your tasks might include deleting products.

About this task

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:

Procedure

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 41; 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 i5/OS release, you should clean up user profiles and the objects that are owned by user profiles.

About this task

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 i5/OS 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 the user profiles as follows:

Procedure

1. Sign on as security officer (QSECOFR user profile).
2. From the Work with Licensed programs menu (type `GO 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.

Required: Allocating additional space for Licensed Internal Code

The V5R4 Licensed Internal Code requires more storage space than in previous i5/OS releases.

About this task

Note: If your system has V5R3M5 Licensed Internal Code currently installed, you have enough storage space and can skip this topic.

The exact amount of this additional storage depends on which release is currently installed and which release is to be installed. If your system or logical partition does not have the additional space, the upgrade will stop during the installation of the Licensed Internal Code.

Use the Allocate Licensed Internal Code Space API (QLPALCSP) to find out if enough reserved storage is available, to allocate the additional space when necessary, and to correct any other possible errors. Enter the following text (where `VxRxMx` refers to the version, release, and modification of the Licensed Internal Code to which you are planning to upgrade).

```
CALL PGM(QLPALCSP) PARM('VxRxMx' 's')
```

The valid values for *s* (the **Start space allocation** parameter) are 0 or 1:

- For the value 0, an indicator is set for the Licensed Internal Code to allocate all of the additional space required for the specified release during the next IPL (not an installation IPL). This value also causes the Licensed Internal Code to stop any space allocation requests due to a previous call to QLPALCSP with the Start space allocation parameter set to 1. You do not need to perform the IPL at this time, but you must do this before you begin to upgrade.
- For the value 1, preparation for the allocation is done immediately by moving data off the load-source disk unit to ensure that the space can be allocated more quickly during the next IPL. This option is recommended to minimize the length of time that the next IPL will take to complete the operation.

The QLPALCSP API also has an optional parameter (**IPL required**) that will let you know whether an IPL is needed. If you do not use the **IPL required** parameter of this API, review the job log after the API is called. If you see the following information message, you do not need to perform an IPL as you have the required space necessary.

```
CPI3DBF - Allocating additional space is not necessary
```

If you receive message CPF3DF7, you are directed to upgrade your load-source disk unit with device parity protection. Options for upgrading the load-source disk unit, including the load-source disk unit with device parity protection, are available under the topic Disk management checklist in the i5/OS Information Center (**Systems management → Disk management → Disk management checklist**). Otherwise contact your authorized service provider for assistance.

For more information on the QLPALCSP API, refer to the Allocate Licensed Internal Code space (QLPALCSP) API topic in the i5/OS Information Center (**Programming → APIs**).

Choosing disk configuration

If you are using automatic installation to upgrade the i5/OS operating system and do not want nonconfigured disk units added, PTFs are available that enable you to set your disk configuration option.

About this task

If you are upgrading from V5R2 to V5R4 and want to change your disk configuration, refer to the instructions in the topic "Installing optional i5/OS PTF to choose disk configuration" on page 28.

If you are currently on a V5R3 or V5R4 system and are replacing the operating system, do the following to keep your current disk configuration:

Procedure

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 i5/OS upgrade or replacement of your software.

About this task

To calculate an estimate of this time, refer to "Estimates for i5/OS software installation time" on page 189.

Preparing your console for software installation

Before you install a new i5/OS software release, consider this information on consoles.

About this task

Although you can use twinaxial console on most systems, IBM recommends for V5R4 that you use either Operations Console or Hardware Management Console. For requirements on twinaxial console, Operations Console, and PCs, refer to the category, Connecting to iSeries in the i5/OS Information Center. If you are moving from twinaxial console to Operations Console, use the *iSeries Setup and Operations*, SK3T-4098 CD-ROM 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 i5/OS console, see Managing i5/OS consoles in the IBM Systems Hardware Information Center (**Managing consoles, interfaces, and terminals → Managing i5/OS consoles**).

For all systems, verify that the console mode value is set correctly for your console. In addition, you can specify that an i5/OS 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:

Procedure

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
2	Operations Console (directly attached)
3	Operations Console (LAN attached)
4	Hardware Management Console (HMC)

   During an installation or upgrade to V5R4, 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 failure but continues to run uninterrupted. For more information, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center (**Managing consoles, interfaces, and terminals** → **Managing i5/OS consoles** → **Managing Operations Console** → **Planning for your configuration** → **General Operations Console considerations** → **Console takeover and recovery**).

Results

If you use Operations Console, do the following before you install V5R4 on your system:

- Review the Operations Console topic in the i5/OS Information Center (**Connecting to iSeries** → **Operations Console**). To review the most recent information on the Operations Console client, go to the Operations Console Web site (http://www.ibm.com/eserver/iseries/access/console/)
- If you are installing or upgrading to the V5R4 Licensed Internal Code and you use an I_BASE_01 Licensed Internal Code CD-ROM with the label RSA, you might not be able to get the Operations Console directly connected. If you received SRC A600 5008, you need to obtain the I_BASE_01 CD-ROM that has an RSC or later identifier.
- IBM recommends that you update IBM eServer iSeries Access for Windows to V5R4 before you upgrade the i5/OS operating system. For more information, see iSeries Access for Windows: Installation and setup in the i5/OS Information Center (**Connecting to iSeries** → **iSeries Access** → **iSeries Access for Windows** → **Installation and setup**).
- If you use the Operations Console configuration, `Local console directly attached to the server with a server that has no logical partitions`, and the adapter used for the cable connection is 2771, the adapter must be in a specific position. For independent or primary partitions only, the position is based on the server model shown in the following table.

Note: This applies only to System i 270 and 8xx models. This does not apply to IBM System i5, System p5, and IBM eServer i5 and p5 systems.

Table 5. Card position

Server model	Operations Console asynchronous card position for the cable
270	C07
800 or 810	C07
820	C06
825	C06
830 or SB2	C02
840 or SB3	C02
870 or 890	C02

- When you receive the i5/OS release upgrade, the shipped service tools user IDs (except 11111111) 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.

Stopping the integrated server and other application servers

If you have System i integration with BladeCenter® and System x® installed, you must vary it off before you begin the i5/OS installation process. Other applications servers should be stopped before you upgrade your software.

About this task

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. For these instructions, refer to the topic Upgrade the integrated server side of IBM i5/OS Integrated Server Support in the i5/OS Information Center (**Integrated operating environments → Windows environment on iSeries → Install and configure → Install Windows 2000 Server or Windows Server 2003 → Upgrade the integrated server side of IBM i5/OS Integrated Server Support**).

Notify users before you stop the integrated server. The Chapter 8, “Checklist: Completing the i5/OS upgrade or replacement,” on page 87 contains instructions on starting the server after you have completed your installation.

To stop the integrated server, do the following:

Procedure

1. Type `GO NWSADM` on an i5/OS control language (CL) command line. The Network Server Administration display appears.
2. Select option 3 (Stop a network server).

Results

Other application servers, such as Lotus® Domino® Enterprise Server for AS/400 (5769-LNT), should be stopped before upgrading your software.

Saving the system

Before you upgrade to a new i5/OS release, you should have a current backup copy of your system.

About this task

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 i5/OS Information Center, the topic Backing up your system (**Systems management → Backing up and recovering your system → Backing up your system**) contains information on how to perform your save strategy and also the steps to automatically save your entire system.

Procedure

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.

Results

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.

Chapter 6. Upgrading or replacing software using automatic installation

To use the automatic installation method to replace the Licensed Internal Code, the IBM i5/OS operating system, and licensed programs currently installed on your system with the V5R4 release, follow these procedures.

Before you begin automatic installation

Before you upgrade to a new i5/OS release by using the automatic installation method, verify these points.

About this task

1. Verify that this is the correct topic for you to use for your software upgrade. Refer to "Supported releases and nonsupported models for i5/OS (OS/400) upgrades" on page 13 to determine which releases are supported for upgrades to V5R4.
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 i5/OS software installation" on page 16. 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 optical 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 i5/OS Information Center (**Service tools → Managing service tools → Configuring the service tools server → Changing the service tools language of your system or logical partition**).
3. Complete the preparation tasks in Chapter 5, "Preparing to upgrade or replace i5/OS software," on page 23 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 i5/OS operating system for the upgrade to occur. Also before upgrading to V5R4, you must determine if you need to allocate additional space for the Licensed Internal Code.
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 38 to create a device, an image catalog, and an image catalog entry.

   To upgrade from either V5R2 or V5R3 to V5R4 using an image catalog, do the following steps:

   a. If you are upgrading from V5R2, load and apply the required V5R2 PTF SI19886. If you are upgrading from V5R3, load and apply the required V5R3 PTF SI19888.
   b. Perform the setup steps in "Preparing to upgrade or replace software using an image catalog" on page 38. Perform step 6 on page 41 at least a day before you do the actual installation. This ensures that your installation media are ready to use.

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5. 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 51.
6. If you plan to use or if you are using logical partitions, refer to these topics:
   - Planning for logical partitions:
     - For IBM System i5, System p5, and IBM eServer i5 and p5 systems, read the topic Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning → Solution Planning → Planning for logical partitions**).
     - For System i 8xx and earlier models, see Plan for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Plan for logical partitions**).
   - Reference codes are viewable under the primary partition or the Hardware Management Console:
     - For IBM System i5, System p5, and IBM eServer i5 and p5 systems, refer to Reference codes list for customers in the IBM Systems Hardware Information Center (**Customer service, support, and troubleshooting → Reference codes list for customers**) for more information.
     - For System i 8xx or earlier models, refer to Troubleshoot logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Troubleshoot logical partitions**).
   - Alternate IPL device within a logical partition:
     - If you plan to use an alternate IPL device within a logical partition on IBM System i5, System p5, and IBM eServer i5 and p5 systems, refer to the Alternate restart device and removable media devices for logical partitions topic in the IBM Systems Hardware Information Center (**Partitioning the server → Concepts for partitioning the server → Physical and virtual hardware resources → I/O devices → IOAs for i5/OS logical partitions → Alternate restart device and removable media devices for i5/OS logical partitions**).
     - For System i 8xx or earlier models, refer to the Logical partition concept: alternate restart (IPL) devices and removable media device topic in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Logical partition concepts → Hardware for logical partitions → Logical partition concept: disk units → Logical partition concept: alternate restart (IPL) devices and removable media device**).
7. If you are using an alternate installation device, ensure that the alternate installation device is enabled. See “Alternate installation device” on page 201 for information on 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 all of the i5/OS licensed programs that are currently installed and that have been refreshed.

About this task

To add new products, either use the Work with Licensed Programs menu (type GO 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 primary partition or HMC. 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 i5/OS software installation" on page 179.

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 i5/OS operating system) that you plan to install. You must also allocate additional space for Licensed Internal Code. These tasks are described in "Required: Accepting software agreements" on page 45 and "Required: Allocating additional space for Licensed Internal Code" on page 49. If these steps are not completed, the upgrade will not be completed.

If you are using image catalogs, you need to have completed steps 1 on page 40 through 5 on page 40 in the topic "Preparing to upgrade or replace software using an image catalog" on page 38. Then return to this topic. Ignore the following steps that refer to loading volumes.

Procedure

1. If you are using an image catalog (virtual optical device) to install, perform this step at least a day before you do the actual installation. If you are not using an image catalog, go to step 2.

   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 3 on page 58.
2. Arrange the installation media that you plan to install in the following order (you might not have all of these). The identifiers for the IBM-supplied media

B29xx_01 and B29xx_02 (for example, RS 540-xx for V5R4) must match. Verify also that B29xx_01 and B29xx_02 are in the correct primary language.
a. I_BASE_01 Licensed Internal Code for i5/OS
b. B29xx_01 i5/OS
c. B29xx_02 i5/OS no-charge options
d. B29MM_03 i5/OS no-charge options
e. B29MM_04 i5/OS no-charge options
f. D29xx_01 i5/OS no-charge options
g. D29xx_02 i5/OS no-charge options
h. D29xx_03 i5/OS no-charge options
i. D29xx_04 i5/OS no-charge options
j. D29xx_05 i5/OS no-charge licensed programs
k. D29xx_06 i5/OS no-charge licensed programs
l. D29xx_07 i5/OS no-charge licensed programs
m. L29xx_01 priced licensed programs
n. L29xx_02 priced licensed programs
o. F29xx_01 single licensed programs

Keep the following installation media available for later use:
a. N29xx_01 Secondary Language Media
b. Cydddvrm_01 Cumulative PTF Package (if ordered)
c. SK3T-4091 i5/OS Information Center

For descriptions of the optical media, refer to "Media labels and their contents" on page 208.

3. Verify that your system unit is powered on. If your system unit is powered off, go to "Starting from a power-off condition" on page 179 and perform the procedure there. That procedure tells you when to return here.
4. On your console, ensure that you have a connection to the system.
5. Load the first volume of installation media that contains Licensed Internal Code into the installation device that is defined for the system. (If you are using IBM-supplied media, this volume is labeled I_BASE_01.) 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 "Alternate installation device" on page 201.
6. Use the control panel to set the mode to **Normal**.

For logical partitions only
Use the virtual control panel (Work with Partition Status display on your primary partition or partition status on systems with HMC) 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 on page 59. **Notes:** 1. If you have not already set up an alternate IPL device for a logical partition, refer to online help information in IBM iSeries Navigator. 2. If you are using another method to select an alternate IPL device in a logical partition, refer to the topic "Overview: Alternate installation device" on page 201.

7. If you have not previously performed an IPL either to perform the tasks to allocate the required additional storage for the V5R4 Licensed Internal Code (might be required) or 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.

   Note: If you are not sure that additional space for the Licensed Internal Code has been allocated, follow the steps in "Required: Allocating additional space for Licensed Internal Code" on page 49. If additional space has been allocated, you receive the message `Allocating additional space is not necessary`.

   If you are using an image catalog to perform your upgrade and you performed the IPL in this step, you need to perform step 5 on page 40 in "Scenario: Preparing to upgrade or replace software using an image catalog" on page 39 and then return here to the next step.
8. Power down the system or logical partition to perform the upgrade.
   - If you are upgrading from V5R2 to V5R4 and you are using a virtual optical device to install, ensure you have loaded and applied V5R2 PTF SI19886. If you are upgrading from V5R3 to V5R4, ensure you have loaded and applied V5R3 PTF SI19888.

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

     ```
     PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(*IMGCLG)
      IMGCLG(catalog-name)
     ```
   - If you are performing any other upgrade, type the following:

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

   Note: If you have nonconfigured disk units present, performing this step configures disk units automatically by default. If you do not want nonconfigured disk units added, follow the directions in the topic "Installing optional i5/OS PTF to choose disk configuration" on page 28.

   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 i5/OS software installation" on page 179 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 primary partition or HMC.
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 i5/OS software installation” on page 179 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.

```
                  Install Licensed Internal Code - Status

 Install of the Licensed Internal Code in progress.

             +-----------------------------------------------------+
 Percent     |                           XX %                      |
 complete    +-----------------------------------------------------+


 Elapsed time in minutes  . . . . . . . . :     x.x



Please wait.
```

    If you are using an image catalog (virtual optical 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 162 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 I_BASE_01 volume and insert the B29xx_01 volume. 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.

15. 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.

```
Message ID. . . :   CPI2070                  i5/OS Installation Status

          +--------------------------------------------------+
Stage 2   |                      XX %                        |
          +--------------------------------------------------+


Installation                                                      Objects
Stage                                              Completed      Restored

   1 Creating needed profiles and libraries . . . . :   X

>> 2 Restoring programs to library QSYS . . . . . . :                 XXXXX

   3 Restoring language objects to library QSYS . . :

   4 Updating program table . . . . . . . . . . . . :

   5 Installing database files. . . . . . . . . . . :

   6 Completing i5/OS installation . . . . . . . . . :

i5/OS is a trademark of IBM in the United States and other countries.
```

16. 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
  5722SS1     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.

17. 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
                                                          System:   XXXX
Queue  . . . . . :   QSYSOPR               Program . . . . :   *DSPMSG
  Library  . . . :     QSYS                   Library . . . :
Severity . . . . :   95                     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 usually 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 161 to determine the problem.

Verifying completion of automatic installation

To verify that you have successfully completed an i5/OS upgrade by using the automatic installation method, follow these steps.

Procedure

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 i5/OS 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 i5/OS 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 12 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 161 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 219 lists the possible installed status value descriptions.

Results

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 130 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 137 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 i5/OS upgrade or replacement," on page 87 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 i5/OS operating system, and licensed programs currently installed on your system with the V5R4 release.

Before you begin manual installation

Verify these points before you upgrade to a new i5/OS release using the manual installation method.

About this task

1. Verify that this is the correct topic for you to use for your software upgrade. Refer to "Supported releases and nonsupported models for i5/OS (OS/400) upgrades" on page 13 to determine which releases are supported for upgrades to V5R4. 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 i5/OS software installation" on page 16. 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 optical 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 i5/OS Information Center (**Security → Service tools → Managing service tools → Configuring the service tools server → Changing the service tools language of your system or logical partition**).
3. Complete the preparation tasks in Chapter 5, "Preparing to upgrade or replace i5/OS software," on page 23 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 i5/OS 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 38 to create a device, an image catalog, and an image catalog entry.

   To upgrade from either V5R2 or V5R3 to V5R4 using an image catalog, do the following steps:

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a. If you are upgrading from V5R2, load and apply the required V5R2 PTF SI19886. If you are upgrading from V5R3, load and apply the required V5R3 PTF SI19888.

b. Perform the setup steps in "Preparing to upgrade or replace software using an image catalog" on page 38. Perform step 6 on page 41 at least a day before you do the actual installation. This ensures that your installation media are ready to use.

5. 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 51.

6. If you plan to use or if you are using logical partitions, refer to these topics:
   - Planning for logical partitions:
     - For IBM System i5, System p5, and IBM eServer i5 and p5 systems, read the topic Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning → Solution planning → Planning for logical partitions**).
     - For System i 8xx and earlier models, see Plan for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Plan for logical partitions**).
   - Reference codes are viewable under the primary partition or the Hardware Management Console:
     - For IBM System i5, System p5, and IBM eServer i5 and p5 systems, refer to Reference codes list for customers in the IBM Systems Hardware Information Center (**Customer service, support, and troubleshooting → Reference codes list for customers**) for more information.
     - For System i 8xx or earlier models, refer to Troubleshoot logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Troubleshoot logical partitions**).
   - Alternate IPL device within a logical partition:
     - If you plan to use an alternate IPL device within a logical partition on IBM System i5, System p5, and IBM eServer i5 and p5 systems, refer to the Alternate restart device and removable media devices for logical partitions topic in the IBM Systems Hardware Information Center (**Partitioning the server → Concepts for partitioning the server → Physical and virtual hardware resources → I/O devices → IOAs for i5/OS logical partitions → Alternate restart device and removable media devices for i5/OS logical partitions**).
     - For System i 8xx or earlier models, refer to the Logical partition concept: alternate restart (IPL) devices and removable media device topic in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Logical partition concepts → Hardware for logical partitions → Logical partition concept: disk units → Logical partition concept: alternate restart (IPL) devices and removable media device**).

7. If you are using an alternate installation device, ensure that the alternate installation device is enabled. See "Alternate installation device" on page 201 for information on 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.

About this task

As you perform these steps, reference codes appear on the data display of the control panel or the virtual control panel on the primary partition or Hardware Management Console (HMC). 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 i5/OS software installation" on page 179.

If you are using image catalogs, you need to have completed steps 1 on page 40 through step 5 on page 40 in the topic "Preparing to upgrade or replace software using an image catalog" on page 38. Then return to this topic. In the following procedures, ignore the steps that refer to loading volumes.

Procedure

1. If you are using an image catalog (virtual optical device) to install, perform this step at least a day before you do the actual installation. If you are not using an image catalog, go to step 2.

   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 3 on page 68.
2. Arrange the installation media that you plan to install in the following order.

   Note: You might not have all of these. For example, if you are replacing Licensed Internal Code and i5/OS of the same version and release, you need only I_BASE_01, B29xx_01, and B29xx_02. The identifiers for the B29xx_01 and B29xx_02 media (for example, RS 540-xx for V5R4) must match. Verify also that B29xx_01 and B29xx_02 are in the correct primary language.

   a. I_BASE_01 Licensed Internal Code for i5/OS
   b. B29xx_01 i5/OS
   c. B29xx_02 i5/OS no-charge options
   d. B29MM_03 i5/OS no-charge options
   e. B29MM_04 i5/OS no-charge options

f. D29xx_01 i5/OS no-charge options
g. D29xx_02 i5/OS no-charge options
h. D29xx_03 i5/OS no-charge options
i. D29xx_04 i5/OS no-charge options
j. D29xx_05 i5/OS no-charge licensed programs
k. D29xx_06 i5/OS no-charge licensed programs
l. D29xx_07 i5/OS no-charge licensed programs
m. L29xx_01 priced licensed programs
n. L29xx_02 priced licensed programs
o. F29xx_01 single licensed programs

Keep the following installation media available for later use:
a. N29xx_01 Secondary Language Media
b. Cydddvrm_01 Cumulative PTF Package (if ordered)
c. SK3T-4091 i5/OS Information Center

For descriptions of the optical media, refer to "Media labels and their contents" on page 208.

3. If you have not previously performed an IPL either to perform the tasks to allocate additional storage for the V5R4 Licensed Internal Code (required) or to change the disk configuration (optional), you must do this IPL now before you power down the system or logical partition.

   Note: If you are not sure that additional space for the Licensed Internal Code has been allocated, follow the steps in "Required: Allocating additional space for Licensed Internal Code" on page 49.

   If you are using an image catalog to perform your upgrade and you performed the IPL in this step, you need to perform step 5 on page 40 in "Scenario: Preparing to upgrade or replace software using an image catalog" on page 39 and then return here to the next step.
4. Verify that your system unit is powered on. If your system unit is not powered on, go to "Starting from a power-off condition" on page 179 and perform the procedure there. That procedure tells you when to return here.
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 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, use the following sources to locate and select the alternate IPL resource:

   - For IBM System i5, System p5, and IBM eServer i5 and p5 systems, Managing i5/OS logical partitions in the IBM Systems Hardware Information Center (**Partitioning the server → Partitioning with an HMC → Partitioning for i5/OS with an HMC → Managing i5/OS logical partitions**).
   - For System i 8xx and earlier models, Manage logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with iSeries Navigator → Manage logical partitions**).
7. Load the first volume of installation media that contains Licensed Internal Code into the installation device that is defined for the system. (If you are using IBM-supplied media, this volume is labeled I_BASE_01.) 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 "Alternate installation device" on page 201.

8. 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 primary partition or HMC. Also make sure that you have already selected the alternate IPL device before you perform the initial program load (IPL) in the next step.
9. Power down the system or logical partition:
   - If you are upgrading from V5R2 to V5R4 and you are using a virtual optical device to do the upgrade, ensure you have loaded and applied V5R2 PTF SI19886. If you are upgrading from V5R3 to V5R4, ensure you have loaded and applied V5R3 PTF SI19888.

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

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

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

     ```
     PWRDWNSYS 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.
10. If the system attention light appears and a reference code listed in the topic "Reference codes for i5/OS software installation" on page 179 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 primary partition or the HMC. When the State changes to `Failed`, that is the equivalent of having the attention light on for the primary partition.
11. If you are using an image catalog (virtual optical device) to install, go to step 18 on page 73.
12. 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 now language-independent. It is important that you complete this step carefully.

```
            Select a Language Group


The language feature shown is the language feature
installed on the system.

Attention:  To keep the same primary language, ensure that the
media you use for installing the operating system
matches the language feature shown.  If the operating
system media does not match what is shown, the
installation process will attempt to install the
operating system in a different language feature than
Licensed Internal Code.  This is undesirable.


Type choice, press Enter.

  Language feature . . . . . .   2924
```

To keep the same service tools language, verify that the displayed language feature matches the service tools language that you want. If you want the service tools language to match your primary language, check the feature that is printed on the media that contains the operating system. The operating system media are labeled B29xx_nn, where 29xx indicates the feature for the primary language.

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

Refer to "Feature codes for national language version" on page 214 for a list of the language feature codes.

To change the service tools language to match the primary language, type the language feature that appears on the media that contains the operating system. Press Enter.

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

```
            Confirm Language Group


Language feature  . . . . . :   2924

Press Enter to confirm your choice for language feature.
Press F12 to change your choice for language feature.
```

Press Enter.

14. The Install Licensed Internal Code display appears.

```
                    Install Licensed Internal Code
                                                        System: XXXX
Select one of the following:

     1. Install Licensed Internal Code
     2. Work with Dedicated Service Tools (DST)
     3. Define alternate installation device
```

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. “Overview: Alternate installation device” on page 201 describes when you can use an alternate installation device.)
- 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 15. 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. If you are not using an alternate installation device, go on to step 17 on page 72.

Press Enter.

15. **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
  _             5
  _             6
  _             7
  _             8
  _             9
  _             A
  _             B
  _             C
  _             D
                                                              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

         Bus      Resource                    Serial
 Option  Number   Name         Type   Model   Number          Selected
   _        1     TAP08        6386   001     00-11111
   _        3     TAP19        3570   B11     13-22222            *



F2=Deselect device    F3=Exit    F5=Refresh    F12=Cancel
```

d. Type 1 to select the device and make any needed corrections to select, enable, or disable the device. Press Enter to confirm the changes.

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.

16. If there is an alternate installation device defined and enabled, the Confirm Alternate Installation Device display appears.
    - To install from the alternate installation device, press Enter.
    - To install from optical media, press F12 to Cancel. You see the Licensed Internal Code display. Perform step 14 on page 70 and select option 3 (Define alternate installation device). Perform step 15 on page 71 and disable the alternate installation device.
17. 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
```

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 or did not allocate additional space for the Licensed Internal Code, error messages are shown. Follow the instructions in the error messages. More information is in the topics “Required: Allocating additional space for Licensed Internal Code” on page 49 and “Required: Accepting software agreements” on page 45.

18. The Install Licensed Internal Code - Status display appears on your console. You do not need to respond to this display. It remains on your console for up to 30 minutes.

```
                  Install Licensed Internal Code - Status

 Install of the Licensed Internal Code in progress.

             +-----------------------------------------------------+
 Percent     |                           XX %                      |
 complete    +-----------------------------------------------------+


 Elapsed time in minutes  . . . . . . . . :     x.x



Please wait.
```

If you are using an image catalog (virtual optical 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.

19. 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 162 for the recovery actions.

20. The Disk Configuration Attention Report display might appear. If it does, display the detailed report for each problem 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 177.

```
                     Disk Configuration Attention Report

 Type option, press Enter.
    5=Display Detailed Report

 Press F10 to accept all the problems and continue the IPL.
 The system will attempt to correct them.

 OPT  Warning
  _   xxxxxxxx xxxx xxxxxxxxx xxxxx xx xxxxx xxxxxxxx
  _   xxxxx_xx_xxxxx xxxxxx_ xxxxxxxx xxxxxxx xxxxxxxxxx________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
                                                              More...

 F3=Exit    F10=Accept the problems and continue    F12=Cancel
 ____________________________________________________________________________
```

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.

If you are upgrading a primary partition, a disk configuration error with SRC B600 5390 and SRC B600 5311 might be shown on the product activity log (PAL). Secondary partitions report a status of `new` and all system resources are temporarily owned by the primary partition. If you try to continue an IPL, an error message, `Hardware resource information persistence disabled`, is received. This indicates a problem with the memory configuration. To correct this problem, do the following tasks:

a. Sign on to Dedicated Service Tools Sign-on prompt and return to the Use Dedicated Service Tools (DST) menu.
b. Select the option, Work with partitions.
c. Select the option, Work with partition configuration.
d. Select the option, Change partition processing resources on each partition. Change the minimum memory value to force a recalculation of these values; then make the appropriate configuration change.

21. 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.
22. 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 218 for more information.
23. 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.
24. If the Accept Console display in step 21 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 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 (**Managing consoles, interfaces, and terminals → Managing i5/OS consoles → Managing Operations Console → Planning for your configuration → General Operations Console considerations → Console takeover and recovery**).

   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 i5/OS operating system

Follow these steps to replace the IBM i5/OS operating system by using the manual installation method.

About this task

Procedure

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
```

   Ensure that the installation media that contains the Licensed Internal Code is in the installation device that is defined for the system. If you are using IBM-supplied media, this volume is labeled I_BASE_01.

   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 (V5R2 or V5R3), 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 optical - preselected image catalog
     4. Current alternate selected device           None
```

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

3. The Confirm Install of the Operating System display is shown on your console. Press Enter.
4. The Select a Language Group display appears, which shows the primary language currently installed on the system. The primary language value should match the language feature number that is printed on the installation media. To find the appropriate feature code for your language, refer to "Feature codes for national language version" on page 214.

```
                          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
```

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

   Press Enter.
5. Either the Confirm Language Feature Selection display or the Confirm Select Service Tools Language display is shown on your console. Press Enter.
6. If the Add All Disk Units to the System menu does not appear, go to step 8 on page 78.
7. **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 7b on page 77.

```
                       Add All Disk Units to the System
                                                              System: XXXX

Non-configured device parity capable disk units are attached
to the system.  Disk units can not be added automatically.
It is more efficient to device parity protect these
units before adding them to the system.
These disk units may be parity enabled and added at SST (i5/OS).
Configured disk units must have parity enabled at DST.

Select one of the following:

     1. Perform any disk configuration at SST (i5/OS)
     2. Perform disk configuration using DST
```

      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 option Start device parity protection. If you have PTFs loaded that enable the RAID 6 feature, the Work with Device Parity

Protection display has two options to start device parity. If you want the disk units to be protected with a higher level of device parity protection, the system has the appropriate hardware installed, and the PTFs that enable the RAID 6 protection capability are loaded and applied, select the option Start device parity protection RAID 6. If you want the disk units to be protected with the RAID 5 protection level, select the option Start device parity RAID 5. If you do not have the PTFs that enable the RAID 6 feature to be loaded and applied, the Work with Device Parity Protection display shows only the option Start device parity.

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 Logical Partition Validation Tool (LVT) supplied by IBM for the configuration selection. To access the tool, go to the Logical Partitioning Web site (http://www.ibm.com/eserver/iseries/lpar).

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 177 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                    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 completes, continue the manual installation process with the next step.

   This completes the subtask for adding disk units.

8. 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.
9. 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. (If you are using IBM-supplied media, this volume is labeled B29xx_01, where 29xx is the identifier for the primary language.) 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.

10. 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.)

11. 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                  i5/OS Installation Status

          +--------------------------------------------------+
Stage 2   |                      XX %                        |
          +--------------------------------------------------+


Installation                                                    Objects
Stage                                              Completed    Restored

   1 Creating needed profiles and libraries . . . . :   X

>> 2 Restoring programs to library QSYS . . . . . . :               XXXXX

   3 Restoring language objects to library QSYS . . :

   4 Updating program table . . . . . . . . . . . . :

   5 Installing database files. . . . . . . . . . . :

   6 Completing i5/OS installation . . . . . . . . . :

i5/OS is a trademark of IBM in the United States and other countries.
```

12. After the operating system has been replaced, the Sign On display appears on your console.

What to do next

You have completed the installation of the i5/OS 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 i5/OS release" on page 97.

Replacing the licensed programs

Follow these steps to replace licensed programs related to i5/OS by using the manual installation method.

About this task

Procedure

1. Begin this task at the Sign On display.

```
                            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 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 (QSCANFSCTL) system value. If you have not already done so, consider specifying *NOPOSTRST for the QSCANFSCTL 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 i5/OS Information Center (**Files and file systems** → **Integrated file system** → **Integrated file system concepts** → **Scanning support**).

   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`

3. The Edit Rebuild of Access Paths display could be shown. If it is, press Enter to continue.
4. Additional display messages could be shown.

   Press Enter after each message to continue.
5. The i5/OS Main Menu (or the menu you chose as an initial menu) appears on your console.

   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.

6. The i5/OS Main Menu (or the menu you chose as an initial menu) appears on your console.

   Type `GO LICPGM` and press Enter.

7. 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.

8. 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 only appears if you used the LICPGM menu option to Prepare for Install, which is described in "Required: Creating a custom list of software to install" on page 41.
   - 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, go to step 5 on page 132 and then return here.

9. 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
  5722SS1     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.

10. 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.

11. 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.

12. 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 i5/OS upgrade by using the manual installation method.

About this task

Procedure

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 12 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 161 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 219 lists the possible installed status value descriptions.

Results

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 130 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 137 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 i5/OS upgrade or replacement," on page 87 and complete the instructions.

Chapter 8. Checklist: Completing the i5/OS upgrade or replacement

Use this checklist to complete the IBM i5/OS upgrade or replacement processes.

Procedure

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 i5/OS Information Center (**Security** → **Service tools user IDs and passwords** → **Managing service tools user IDs and passwords** → **Managing service tools user IDs** → **Changing service tools user IDs and passwords**).
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. **For logical partitions only:**

   Attention: For System i 8xx and earlier models, do not perform the next step (step 5) to install the cumulative PTF package until after you are aware of the unique PTF installation considerations involved on a system with logical partitions. You could potentially lose data. Refer to the topic Installing fixes on systems with logical partitions in the i5/OS Information Center (**i5/OS and related software** → **Maintaining and managing i5/OS and related software** → **Using software fixes** → **Installing fixes** → **Step 3: Choosing your fix installation scenario** → **Distributing fixes to multiple systems with iSeries Navigator** → **Installing fixes on systems with logical partitions**) to understand how to install the cumulative PTF package on a system with logical partitions.
5. 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 176 has more information on INZSYS.
6. Apply any PTF groups that you have ordered. For more information on PTF groups, refer to "Reviewing software PTF (fix) requirements" on page 26. 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 i5/OS Information Center (**i5/OS and related software** → **Maintaining and managing i5/OS and related software** → **Using software fixes** → **Installing fixes**).
7. If your IBM System i5 or IBM eServer i5 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

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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 level of the server firmware on your system. You also might be required to perform a server IPL after you upgrade or install a new level of the licensed program that is used to manage the server firmware on the service partition.

- To find out if you need to do a server IPL, type one of the following commands as appropriate:
  - If your system has V5R4M0 Licensed Internal Code installed, type `DSPPTF 5722999` on the i5/OS control language (CL) command line and press Enter. If a server IPL is required, message CPD35F8 **Server IPL required** field is shown at the bottom of the display.
  - If your system has V5R4M5 Licensed Internal Code installed, type `DSPFMWSTS` on the i5/OS 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 one of the following commands as appropriate:
  - If your system has V5R4M0 Licensed Internal Code installed, type `DSPPTF 5729999` on the CL command line and press Enter. If your system is operating as a service partition, the IPL Source field indicates the copy of the server firmware that was used on the previous server IPL.
  - If your system has V5R4M5 Licensed Internal Code installed, 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.

8. 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 176 to determine the problem.
9. If you used an image catalog to perform your upgrade, consider the following tasks:
   a. You might want to remove all installation images from you system. To delete the catalog and all the optical images (image files), type the following:

      ```
      DLTIMGCLG IMGCLG(mycatalog) KEEP(*NO)
      ```

b. If 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)
```

10. 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 i5/OS Information Center (**Security → Service tools → Managing service tools → Configuring the service tools server → Changing the service tools language of your system or logical partition**).
11. Install software license keys for your i5/OS 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 i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Working with software agreements and licenses → Managing software agreements and license keys → Displaying and changing software license information → Adding license key information**).

    After updating the license key information, return here and continue with the next step.
12. 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.
13. 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.
14. 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 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.

15. If you changed the scan control (QSCANFSCTL) 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.
16. If you changed any other system value such as security level (QSECURITY) during your upgrade, change it back now.
17. 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).
18. 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.
19. If you have not already verified the compatibility of your licensed programs with the i5/OS 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 219 and determine how to proceed.
20. Save your system using your normal save procedures. Refer to the instructions in the Backing up your system topic in the i5/OS Information Center (**Systems management → Backup and recovery → Backing up and recovering your system → Backing up your system**). 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 15.
21. If you plan to install and use the i5/OS Information Center either from a workstation or the system, refer to the CD-ROMs that come with your software order: Find *iSeries Information Center*, SK3T-4091. This package also includes the PDF versions of System i manuals. For the installation instructions, see the readme.txt file.
22. If you have installed IBM eServer iSeries Access Family products, you might have other tasks that you need to complete. You can find further information about installing iSeries Access Family products in the following sources:
    - iSeries Access for Windows in the i5/OS Information Center (**Connecting to iSeries → iSeries Access → iSeries Access for Windows**).
    - The IBM eServer iSeries Access Family Web site (http://www.ibm.com/eserver/iseries/access).
23. 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 iSeries Access Family function. If you have products such as these, complete your PC installation by using the instructions for the product.

24. If you have a System 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).
25. If you installed 5722-TC1, TCP/IP Utilities, go to the topic TCP/IP setup in the i5/OS Information Center (**Networking → TCP/IP setup**) for advanced configuration and setup information.
26. 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.
27. 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
28. If you use IBM Performance Management for eServer iSeries function, the Collection Services tool, or the Performance Tools for iSeries licensed program and you collected data prior to 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 Data (CVTPFRDTA) command to convert the data in the collection library.
    - Use the automatic data collection support.

      If you do not convert your performance database files and if Collection Services is started and you specified the option to create database files automatically, a performance library for the prior release files is created. The performance 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 QPFRDvrmnn, 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 QPFRDvrmnn library with the Delete Library (DLTLIB) command (DLTLIB qpfrdvrmnn)
    - Delete the QAPMxxxx files.

      If you do not convert your performance database files and do not run Collection Services, you can delete the QAPMxxxx files with the Delete File (DLTF) command (DLTF library/QAPM*).

Results

You have completed upgrading to the new release on your system.

Chapter 9. Replacing Licensed Internal Code and i5/OS of the same version and release

Use this procedure to install a new modification of Licensed Internal Code and a more recent update of the i5/OS operating system to support new hardware.

This is not a backup and recovery procedure. If you have ordered feature code 2693, follow these tasks to replace the Licensed Internal Code and the operating system.

Checklist: i5/OS software replacement

Use this checklist to complete all the tasks for a software replacement of the same i5/OS release.

The information in this checklist is a summary of the major task categories 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 software replacement. This information is found in the IBM System i5 Handbook at the following Web site: `publib-b.boulder.ibm.com/cgi-bin/searchsite.cgi?query=iseries+AND+handbook`. Use this Web page to search for the correct version.
2. Know your current strategy for connecting a console to your system or logical partition. Your current connection strategy influences your planning activities. For information about twinaxial consoles and Operations Console, refer to the Connecting to iSeries topic in the i5/OS Information Center. For information about managing your systems with Hardware Management Console, refer to the topic Managing your server using the Hardware Management Console in the IBM Systems Hardware Information Center (**Managing your server and devices → Managing your server using the Hardware Management Console**).
3. If you are using IBM System i5, System p5, and IBM eServer i5 and p5 systems, 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 i5/OS release" on page 97.
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 8. 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.

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Software replacement tasks

1. Verify the contents of your software order.
   a. You need three CD-ROMs: I_BASE_01, B29xx_01, and B29xx_02. The identifiers for the B29xx_01 and B29xx_02 media (for example, `RS 540-xx` for V5R4) must match. Verify also that B29xx_01 and B29xx_02 are in the correct primary language.
   b. "Identifying and reviewing information resources" on page 23
2. "Reviewing software PTF (fix) requirements" on page 26
   a. "Finding the latest PSP information" on page 26
   b. "Analyzing fixes you currently have on your system" on page 27
   c. "Obtaining a record of PTFs applied" on page 95
   d. **"Required: Installing the Prepare for Install PTFs for V5R2 and V5R3" on page 27**
   e. "Permanently applying PTFs for a replacement of the same release" on page 95
3. "Working with critical system values before you install software" on page 29
   a. "Recording and printing all system values before you install software" on page 29
   b. "Changing certain system values (QSYSLIBL, QUSRLIBL, QALWOBJRST, or QVFYOBJRST)" on page 30 (Only QALWOBJRST applies to a replacement.)
   c. "Optionally changing the scan control system value" on page 31
4. "Ensuring two-phase commit integrity" on page 33
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 CPRJOBTBL(*NONE).
6. "Gathering performance data for benchmark" on page 34
7. "Preparing the upgrade device and media" on page 37
8. "Preparing to upgrade or replace software using an image catalog" on page 38. (Only 3 CD-ROMs are used: I_BASE_01, B29xx_01, and B29xx_02.)
   a. "Determining storage requirements for image catalog installation" on page 38
   b. "Freeing up space on the load-source disk unit for an image catalog" on page 39
   c. "Scenario: Preparing to upgrade or replace software using an image catalog" on page 39
9. "Determining storage space required for a replacement of the same release" on page 96
10. "Preparing your console for software installation" on page 51
11. "Stopping the integrated server and other application servers" on page 53
12. "Saving the system" on page 54
13. "Replacing software of the same release using manual installation" on page 96
14. "Installing PTFs for the Licensed Internal Code and the operating system" on page 96
15. "Checklist: Completing the replacement of the same i5/OS release" on page 97

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 Maintaining and managing i5/OS and related software (**i5/OS and related software → Maintaining and managing i5/OS and related software**) topic in the i5/OS Information Center .
2. For information about software distribution of supported products, go to the Distributing software (**i5/OS and related software → Distributing software**) topic in the in the i5/OS 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 i5/OS upgrade procedures.

About this task

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 i5/OS.

To determine what PTFs have been applied to Licensed Internal Code, enter the following on the i5/OS control language (CL) command line:

```
DSPPTF LICPGM(5722999) to *PRINT or *OUTFILE
```

To determine what PTFs have been applied to the i5/OS operating system, enter the following on the CL command line:

```
DSPPTF LICPGM(5722SS1) to *PRINT or *OUTFILE
```

Permanently applying PTFs for a replacement of the same release

Permanently apply Licensed Internal Code and i5/OS operating system PTFs by using the following commands as recommended before all installations (the delay option is chosen so you can schedule the IPL).

About this task

Note: The primary partition of a logically partitioned system must be handled carefully.

1. Ensure the secondary partitions are in a normal IPL mode with the system IPL action of IPL.
2. Ensure the primary partition is a normal IPL mode.
3. Perform the APYPTF commands on the primary partition.

   For more information on IBM System i5, System p5, and IBM eServer i5 and p5 systems, refer to Managing i5/OS logical partitions in the IBM Systems Hardware Information Center (**Partitioning the server → Partitioning with an HMC → Partitioning for i5/OS with an HMC → Managing i5/OS logical partitions**) for more information. For System i 8xx or earlier models, refer to Manage logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Manage logical partitions**).

```
APYPTF LICPGM(5722999) SELECT(*ALL) APY(*PERM) DELAYED(*YES) IPLAPY(*YES)
APYPTF LICPGM(5722SS1) SELECT(*ALL) APY(*PERM) DELAYED(*YES) IPLAPY(*YES)
```

Perform an IPL:

```
PWRDWNSYS RESTART(*YES)
```

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.

Before you begin

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 38.

Replacing software of the same release using manual installation

Use the manual installation method to upgrade or replace your software of the same i5/OS release.

Refer to Chapter 7, "Upgrading or replacing software using manual installation," on page 65. Complete the tasks in "Replacing the Licensed Internal Code" on page 67 and "Replacing the i5/OS operating system" on page 75. 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 i5/OS operating system.

About this task

1. Mount the PTF media.
2. Type `GO PTF`. On option 7, select 5722999 and 5722SS1.
3. After all the media is processed, perform an IPL.

To determine if all the Licensed Internal Code PTFs and the i5/OS PTFs that were applied to the partition before the installation exist on the partition now, enter the following on an i5/OS control language (CL) command line:

```
DSPPTF LICPGM(5722999) to *PRINT or *OUTFILE
DSPPTF LICPGM(5722SS1) 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 i5/OS release

Use this checklist to complete any of the V5R4-to-V5R4 IBM i5/OS replacement processes.

Procedure

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 i5/OS Information Center (**Security** → **Service tools user IDs and passwords** → **Managing service tools user IDs and passwords** → **Managing service tools user IDs** → **Changing service tools user IDs and passwords**).
2. If your IBM System i5 or IBM eServer i5 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 level of the server firmware on your system. You also might be required to perform a server IPL after you upgrade or install a new level of the licensed program that is used to manage the server firmware on the service partition.

   - To find out if you need to do a server IPL, type one of the following commands as appropriate:
     - If your system has V5R4M0 Licensed Internal Code installed, type `DSPPTF 5722999` on the i5/OS control language (CL) command line and press Enter. If a server IPL is required, message CPD35F8 **Server IPL required** field is shown at the bottom of the display.
     - If your system has V5R4M5 Licensed Internal Code installed, type `DSPFMWSTS` on the i5/OS 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 one of the following commands as appropriate:
     - If your system has V5R4M0 Licensed Internal Code installed, type `DSPPTF 5729999` on the CL command line and press Enter. If your system is operating as a service partition, the IPL Source field indicates the copy of the server firmware that was used on the previous server IPL.
     - If your system has V5R4M5 Licensed Internal Code installed, 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 image catalogs 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 image catalogs to perform your installation and you previously used the Start ASP Balance (STRASPBAL) command to end the allocation of storage for the load-source disk unit, enter the following 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 i5/OS Information Center (**Security → Service tools → Managing service tools → Configuring the service tools server → Changing the service tools language of your system or logical partition**).
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 (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.
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 (QSCANFSCTL) 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 server topic in the i5/OS Information Center (**Systems management → Backup and recovery → Backing up and recovering your system → Backing up 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 15.
12. If you plan to install and use the i5/OS Information Center either from a workstation or the system, refer to the CD-ROMs that come with your software order. Find *iSeries Information Center*, SK3T-4091. This package also includes the PDF versions of System i manuals. For the installation instructions, see the readme.txt file.
13. If you have a System 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).
14. 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.
15. 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

Results

You have completed the replacement of the same release on your system.

Chapter 10. Checklist: i5/OS software installation readiness

Use this checklist to help consolidate and verify that you have completed all the preparation tasks for an i5/OS software installation.

Following is a summary of the major task categories 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. This information is found in the IBM System i5 Handbook at the following Web site: `http://publib-b.boulder.ibm.com/cgi-bin/searchsite.cgi?query=iseries+AND+handbook`. Use this Web page to search for the correct version.
2. Know your current strategy for connecting a console to your system or logical partition. Your current connection strategy influences your planning activities. For information about twinaxial consoles and Operations Console, refer to the Connecting to iSeries topic in the i5/OS Information Center. For information about managing your systems with Hardware Management Console, refer to the topic Managing your server using the Hardware Management Console in the IBM Systems Hardware Information Center (**Managing your server and devices → Managing your server using the Hardware Management Console**).
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 8. 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 103
   a. "Identifying and reviewing information resources" on page 103
   b. "Verifying the correct optical distribution media" on page 104
   c. "Verifying license keys for keyed products" on page 25
2. "Performing initial installation tasks" on page 105
   a. "Ensuring you have the latest information" on page 105
   b. "Determining disk storage space required for a new installation" on page 105
   c. "Estimating installation time" on page 106
   d. "Preparing your console for software installation" on page 51
   e. "Preparing the installation device and media" on page 108

After you finish

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

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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 i5/OS and related software in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software**) .
2. For information about software distribution of supported products, go to the Distributing software in the i5/OS Information Center (**i5/OS and related software → Distributing software**) topic.

Chapter 11. Installing i5/OS and related software on a new system or logical partition

Follow these procedures to plan and prepare to install the i5/OS 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 i5/OS 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 i5/OS software," on page 23. If 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 147.

Preparing to install the i5/OS release

Perform these preparatory tasks before you schedule your i5/OS 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, you will need to plan in advance of your installation and have a basic understanding of logical partitions, your software requirements, and your hardware requirements. For System i 8xx and earlier models, refer to the topic Plan for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Plan for logical partitions**). For IBM System i5, System p5, and IBM eServer i5 and p5 systems, see the topic Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning → Solution Planning → Planning for logical partitions**). You can also have different release levels on different partitions. For directions on how to do these correctly for iSeries 8xx and earlier models, see the topic Logical partition release support in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Logical partition concepts → Software licensing and licensed programs for logical partitions → Logical partition release support**).

Verifying the contents of your software order

To save you time and avoid frustration, verify that the contents of your i5/OS 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 i5/OS software. Use these documents to plan your installation process.

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About this task

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

Setup and Operations CD-ROM

With every order that includes Operations Console, you receive *iSeries Setup and Operations*, SK3T-4098. This CD-ROM contains IBM eServer iSeries Access for Windows and the EZ-Setup wizard.

Information Center CD-ROM

This CD-ROM, *iSeries Information Center*, SK3T-4091, ships with your i5/OS software upgrade order.

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 i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Fixes concepts and terms → Where to find information about fixes → Preventive service planning information**).

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 about a week or two before your i5/OS installation 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 i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Ordering fixes**).

Verifying the correct optical distribution media

Ensure that you have the correct media for your upcoming i5/OS installation tasks.

About this task

Procedure

1. Verify that the optical media for Licensed Internal Code and i5/OS are for V5R4.
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.

About this task

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 on the Customer Notice for details on how to contact the IBM Software License Key Center.

For general information on licensed keys, refer to the topic Software license keys in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Working with software agreements and licenses → Software agreements and licensing concepts → Software license keys**).

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 i5/OS installation.

About this task

- **Find the latest available PSP information** Keep informed on the most recent information about conditions that could impede your software installation process. Review the most recent edition of the preventive service planning information in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Fixes concepts and terms → Where to find information about fixes → Preventive service planning information**).
- **Order current cumulative PTF packages and required group fixes** The cumulative PTF package does not come with your software order. About a week or two before your installation, order the most recent cumulative PTF package and also order PTF groups that pertain to your environment.

Determining disk storage space required for a new installation

Before you schedule a time to install the new i5/OS release, you need to know the the storage space that is required.

About this task

Load-source disk unit requirements: V5R4 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 i5/OS Information Center (**Systems management → Disk management → Disk management checklist**). 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 i5/OS release of software on your system.

About this task

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 i5/OS software installation time" on page 189. Ignore the tasks that refer to upgrades.

Preparing your console for software installation

Before you install a new i5/OS software release, consider this information on consoles.

About this task

Although you can use twinaxial console on most systems, IBM recommends for V5R4 that you use either Operations Console or Hardware Management Console. For requirements on twinaxial console, Operations Console, and PCs, refer to the category, Connecting to iSeries in the i5/OS Information Center. If you are moving from twinaxial console to Operations Console, use the *iSeries Setup and Operations*, SK3T-4098 CD-ROM 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 i5/OS console, see Managing i5/OS consoles in the IBM Systems Hardware Information Center (**Managing consoles, interfaces, and terminals → Managing i5/OS consoles**).

For all systems, verify that the console mode value is set correctly for your console. In addition, you can specify that an i5/OS 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:

Procedure

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
2	Operations Console (directly attached)
3	Operations Console (LAN attached)
4	Hardware Management Console (HMC)

During an installation or upgrade to V5R4, 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 failure but continues to run uninterrupted. For more information, see the topic Console takeover and recovery in the IBM Systems Hardware Information Center (**Managing consoles, interfaces, and terminals → Managing i5/OS consoles → Managing Operations Console → Planning for your configuration → General Operations Console considerations → Console takeover and recovery**).

Results

If you use Operations Console, do the following before you install V5R4 on your system:

- Review the Operations Console topic in the i5/OS Information Center (**Connecting to iSeries → Operations Console**). To review the most recent information on the Operations Console client, go to the Operations Console Web site (http://www.ibm.com/eserver/iseries/access/console/)
- If you are installing or upgrading to the V5R4 Licensed Internal Code and you use an I_BASE_01 Licensed Internal Code CD-ROM with the label RSA, you might not be able to get the Operations Console directly connected. If you received SRC A600 5008, you need to obtain the I_BASE_01 CD-ROM that has an RSC or later identifier.
- IBM recommends that you update IBM eServer iSeries Access for Windows to V5R4 before you upgrade the i5/OS operating system. For more information, see iSeries Access for Windows: Installation and setup in the i5/OS Information Center (**Connecting to iSeries → iSeries Access → iSeries Access for Windows → Installation and setup**).
- If you use the Operations Console configuration, `Local console directly attached to the server with a server that has no logical partitions`, and the adapter used for the cable connection is 2771, the adapter must be in a specific position. For independent or primary partitions only, the position is based on the server model shown in the following table.

  Note: This applies only to System i 270 and 8xx models. This does not apply to IBM System i5, System p5, and IBM eServer i5 and p5 systems.

Table 6. Card position

Server model	**Operations Console asynchronous card position for the cable**
270	C07
800 or 810	C07
820	C06
825	C06
830 or SB2	C02

Table 6. Card position (continued)

Server model	Operations Console asynchronous card position for the cable
840 or SB3	C02
870 or 890	C02

- When you receive the i5/OS release upgrade, the shipped service tools user IDs (except 11111111) 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 i5/OS software from optical media, tape devices or tape libraries, or alternate installation devices.

About this task

If you are not sure which installation device to use, refer to "Types of software installation devices" on page 8. "Installation devices and media" on page 199 contains more detailed information on the devices and media available.

Installing the i5/OS release

Install the i5/OS 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 i5/OS logical partition with twinaxial console or Operations Console installed.

If you are using the Hardware Management Console to install Licensed Internal Code, review the Managing your server using the Hardware Management Console topic in the IBM Systems Hardware Information Center (**Managing your server and devices → Managing your server using the Hardware Management Console**).

After you perform the instructions in this topic, follow the instructions in "Installing software on a new system or logical partition (without i5/OS installed)" on page 115 to install the i5/OS 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 i5/OS logical partition.

About this task

1. Ensure you have completed the preparation tasks in the i5/OS Information Center topic "Preparing to install the i5/OS release" on page 103.

2. Verify your console information in the topic "Preparing your console for software installation" on page 51.
3. If you have not already done so, review the information on planning for logical partitions:
   - For IBM System i5, System p5, and IBM eServer i5 and p5 systems, read the topic Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning → Solution Planning → Planning for logical partitions**).
   - For System i 8xx and earlier models, see Plan for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Plan for logical partitions**).

   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 primary partition or the Hardware Management Console. 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 primary partition or the HMC.

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 primary partition or HMC 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.

Procedure

1. Load the first volume of installation media that contains the Licensed Internal Code into the installation device that is defined for the system. (If you are using IBM-supplied media, this volume is labeled I_BASE_01.) 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 116.
2. Make sure you can access either the primary partition or the Hardware Management Console (HMC) to control your new logical partition.

   If power is not on, go to the following sources for more information and return here when done.
   - For IBM System i5, System p5, and IBM eServer i5 and p5 systems, Restarting and shutting down i5/OS in a logical partition in the IBM

Systems Hardware Information Center (**Partitioning the server → Partitioning with an HMC → Partitioning for i5/OS with an HMC → Using i5/OS installed on a logical partition → Restarting and shutting down i5/OS in a logical partition**).

- For System i 8xx and earlier models, Restart and power down a system with logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Manage logical partitions → Restart and power down a system with logical partitions**).

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 eServer iSeries Access for Windows icon and double-click **iSeries Operations Console**.)
4. Verify that this logical partition has an alternate IPL resource (the resource for loading) assigned. For more information on alternate IPL resources, see the following sources:
   - IBM System i5, System p5, and IBM eServer i5 and p5 systems, Alternate restart device and removable media devices for i5/OS logical partitions in the IBM Systems Hardware Information Center (**Partitioning the server → Concepts for partitioning the server → Physical and virtual hardware resources → I/O devices → IOAs for i5/OS logical partitions → Alternate restart device and removable media devices for i5/OS logical partitions**).
   - For System i 8xx and earlier models, Logical partition concepts in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with and iSeries server → Logical partition concepts**).
5. Load the installation media volume that contains Licensed Internal Code (I_BASE_01) 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 primary partition or HMC, but the installation is done on the logical partition.
7. Use the control panel to power on this logical partition.
8. Wait for the i5/OS display to appear that has the language feature to select. (This could take several minutes, but you can monitor the status.)

   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 now language-independent. It is important that you complete this step carefully.

The language that is entered on this i5/OS display must match the language that is on the B29xx_01 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 national language version" on page 214 to locate the appropriate feature code for your language.

```
II    555555555             //      000000          SSSSS
      55                   //     00      00      SS     SS
      55                  //     00        00    SS
      55                 //     00          00     SS
II     5555555          //      00          00       SS
II           55        //       00          00         SS
II           55       //        00          00           SS
II           55      //          00        00            SS
II    55    55      //            00      00     SS     SS
II     55555       //               000000         SSSSS




LANGUAGE FEATURE ===>   2924
```

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. The language feature is shown on the label of your installation media as B29xx_nn, where 29xx indicates the feature for the primary language.

Press Enter.

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

```
            Confirm Language Group


  Language feature  . . . . . . . . . . . . . . :   2924

  Press Enter to confirm your choice for language feature.
  Press F12 to change your choice for language feature.
```

Press Enter.

10. The Install Licensed Internal Code display appears.

```
                     Install Licensed Internal Code
                                                        System: XXXX
Select one of the following:

     1. Install Licensed Internal Code
     2. Work with Dedicated Service Tools (DST)
     3. Define alternate installation device
```

Attention: Tape devices attached by a Fibre Channel interface will need to be set up as alternate installation devices.

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 CD-ROM, DVD-RAM, 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. “Overview: Alternate installation device” on page 201 describes when you can use an alternate installation device.)
- 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. If you are not using an alternate installation device, go on to step 13 on page 113.

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
  _             5
  _             6
  _             7
  _             8
  _             9
  _             A
  _             B
  _             C
  _             D
                                                           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

         Bus      Resource                    Serial
 Option  Number   Name         Type   Model   Number          Selected
   _        1     TAP08        6386   001     00-11111
   _        3     TAP19        3570   B11     13-22222            *



F2=Deselect device    F3=Exit    F5=Refresh    F12=Cancel
```

d. Type 1 to select the device and make any needed corrections to select, enable, or disable the device. Press Enter to confirm the changes.

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 there is an alternate installation device defined and enabled, the Confirm Alternate Installation Device display appears.
    - To install from the alternate installation device, press Enter.
    - To install from optical media, press F12 to Cancel. You see the Licensed Internal Code display. Perform step 10 on page 111 and select option 3 (Define alternate installation device). Perform step 11 on page 112 and disable the alternate installation device.
13. 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.

14. 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.

15. 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     |                          XX %                       |
 complete    +-----------------------------------------------------+


 Elapsed time in minutes  . . . . . . . . :     x.x



Please wait.
```

16. 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 19 on page 115.
17. 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 177 for more information.

```
                    Disk Configuration Attention Report

 Type option, press Enter.
    5=Display Detailed Report

 Press F10 to accept all the following problems and continue.
 The system will attempt to correct them.

 Opt  Problem
  _   xxxxxxxx xxxx xxxxxxxxx xxxxx xx xxxxx xxxxxxxx
  _   xxxxx_xx_xxxxx xxxxxx_ xxxxxxxx xxxxxxx xxxxxxxxxx________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
  _   ____________________________________________________________
                                                              More...

F3=Exit   F10=Accept the problems and continue   F12=Cancel
```

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.

18. 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.
19. 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.
20. If the Accept Console display in step 18 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 (**Managing consoles, interfaces, and terminals → Managing i5/OS consoles → Managing Operations Console → Planning for your configuration → General Operations Console considerations → Console takeover and recovery**).

       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.

Results

You have completed the installation of Licensed Internal Code on a new logical partition. The optical media that you will need for the operating system and other licensed programs are listed in step 2 on page 116 of "Installing i5/OS on a new system or logical partition" on page 116. Continue with step 10 on page 118.

Installing software on a new system or logical partition (without i5/OS installed)

Follow these instructions to install the i5/OS 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.

About this task

Refer to the i5/OS globalization topic in the i5/OS Information Center (**Programming → i5/OS Globalization**) 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 V5R4 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 V5R4M0.
- 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 108 first and then continue with step 10 on page 118 in this topic.

Before you begin to install software on a new system or logical partition

Verify these points before you install i5/OS software on a new system or logical partition.

If you have not already done so, complete the tasks in the i5/OS Information Center topic "Preparing to install the i5/OS release" on page 103.

Do you plan to use logical partitions? For System i 8xx and earlier models, read the topic Plan for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Plan for logical partitions**). For IBM System i5, System p5, and IBM eServer i5 and p5 systems, read the topic Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning → Solution Planning → Planning for logical partitions**). Additionally, refer to the Logical Partitioning Web site (http://www.ibm.com/eserver/iseries/lpar).

For logical partitions only
If you perform these actions on a system with logical partitions, the instructions pertain only to that partition. If that partition is a primary partition, these instructions will change the power status and perform an IPL on the entire system. There is no effect if you are on a system managed by Hardware Management Console. **Attention:** If you are installing on a primary partition, you must shut down all partitions before performing these instructions. Otherwise, you could lose data or damage system software objects. You must perform these instructions for each partition with which you will do the related work. Also, references to the control panel refer either to the virtual control panel (Work with Partition Status display) on your primary partition.

Installing i5/OS on a new system or logical partition

Follow these steps to install the i5/OS operating system on a new system or logical partition.

Procedure

1. Ensure that the system is powered off before you begin.
2. Arrange the installation media that you plan to install in the following order (you might not have all of these). The identifiers for the IBM-supplied media

B29xx_01 and B29xx_02 (for example, RS 540-xx for V5R4) must match. Verify also that B29xx_01 and B29xx_02 are in the correct primary language.

a. B29xx_01 IBM i5/OS
b. B29xx_02 i5/OS no-charge options
c. B29MM_03 i5/OS no-charge options
d. B29MM_04 i5/OS no-charge options
e. D29xx_01 i5/OS no-charge options
f. D29xx_02 i5/OSno-charge options
g. D29xx_03 i5/OS no-charge options
h. D29xx_04 i5/OS no-charge options
i. D29xx_05 i5/OS no-charge licensed programs
j. D29xx_06 i5/OS no-charge licensed programs
k. D29xx_07 i5/OS no-charge licensed programs
l. L29xx_01 priced licensed programs
m. L29xx_02 priced licensed programs
n. F29xx_01 single licensed programs

Keep the following installation media available for later use:

a. N29xx_01 Secondary Language Media
b. Cydddvrm_01 Cumulative PTF Package (if ordered)
c. SK3T-4091 i5/OS Information Center

For descriptions of the optical media, see "Media labels and their contents" on page 208.

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 eServer iSeries Access for Windows icon and double-click **iSeries 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 177 to determine the appropriate action.
8. 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
```

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 (**Managing consoles, interfaces, and terminals → Managing i5/OS consoles → Managing Operations Console → Planning for your configuration → General Operations Console considerations → Console takeover and recovery**).

   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.

```
                              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
```

9. Load the first volume of installation media that contains the operating system. (If you are using IBM-supplied media, the first volume is labeled B29xx_01, where 29xx is the identifier for the primary language.) 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.

```
                          Install Device Type Selection
                                                          System: XXXX
Select the installation device type:

     1. Tape
     2. Optical
     3. Virtual optical - preselected image catalog
     4. Current alternate selected device           None
```

    Type the number that corresponds to the correct device type and press Enter.
11. The Confirm Install of i5/OS 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 value should match the language feature number that is printed on the installation media. Refer to “Feature codes for national language version” on page 214 for a list of language feature codes.

```
                          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
```

    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 you are upgrading a service partition, a disk configuration error with SRC B600 5390 and SRC B600 5311 may be issued to the Product Activity Log (PAL). Secondary partitions, report a status of new and all system resources are temporarily owned by the primary partition. If you try to continue an IPL, an error, "Hardware resource information persistence disabled" is received. This would indicate a problem with the memory configuration.
15. If the Add All Disk Units to the System menu is not shown, go to the IPL Step in Progress display in step 17 on page 121.

    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 105.

16. **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 16b on page 120.

```
                      Add All Disk Units to the System
                                                             System: XXXX

Non-configured device parity capable disk units are attached
to the system.  Disk units can not be added automatically.
It is more efficient to device parity protect these
units before adding them to the system.
These disk units may be parity enabled and added at SST (i5/OS).
Configured disk units must have parity enabled at DST.

Select one of the following:

     1. Perform any disk configuration at SST (i5/OS)
     2. Perform disk configuration using DST
```

    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.

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 Logical Partition Validation Tool (LVT) supplied by IBM for the configuration selection. To access the tool, go to the Logical Partitioning Web site (http://www.ibm.com/eserver/iseries/lpar).

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 177 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                    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.

17. 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

18. 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.)

19. 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                  i5/OS Installation Status

          +-------------------------------------------------+
Stage 2   |                      XX %                       |
          +-------------------------------------------------+


Installation                                                    Objects
Stage                                              Completed    Restored

   1 Creating needed profiles and libraries . . . . :   X

>> 2 Restoring programs to library QSYS . . . . . . :               XXXXX

   3 Restoring language objects to library QSYS . . :

   4 Updating program table . . . . . . . . . . . . :

   5 Installing database files. . . . . . . . . . . :

   6 Completing i5/OS installation . . . . . . . . . :

i5/OS is a trademark of IBM in the United States and other countries.
```

20. Messages similar to the following might appear:

```
                              Display Messages
                                                        System:   XXXX
 Queue  . . . . . :   QSYSOPR               Program . . . . :   *DSPMSG
   Library  . . . :     QSYS                  Library . . . :
 Severity . . . . :   10                     Delivery  . . . :   *BREAK

 Press Enter to continue.
   System operator message queue QSYSOPR created again.
   Console values lost.
```

Press Enter.

21. 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.

22. Several Display Messages displays could be 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 . . . . :   60                     Delivery  . . . :   *BREAK

 Press Enter to continue.
   System object QWCSCPF created again during IPL.
```

23. 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 (QSCANFSCTL) system value. If you have not already done so, consider specifying *NOPOSTRST for the QSCANFSCTL 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 i5/OS Information Center (**Files and file systems** → **Integrated file system** → **Integrated file system concepts** → **Scanning support**).

  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

24. Additional display messages could be shown.

    Press Enter after each message to continue.

25. 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 i5/OS 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.

26. The Edit Rebuild of Access Paths display could be shown. If it is, press Enter to continue.
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 the Licensed Internal Code (5722999) and the i5/OS operating system (5722SS1). 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 i5/OS Main Menu appears on your console, you have completed the task of installing the operating system.

Results

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 131.

Installing software on a new system (with i5/OS installed)

Use these procedures if you already have the i5/OS operating system on your new system and want to install other licensed programs.

The following instructions assume that V5R4 of the 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 i5/OS operating system on a new system.

If you have not already done so, complete the tasks in the i5/OS Information Center topic “Preparing to install the i5/OS release” on page 103.

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 i5/OS installed)” on page 115 if you are adding disk units. If you are planning to use device parity protection, auxiliary storage pools, or mirrored protection, refer to the book *Backup and Recovery, SC41-5304-07*, before you begin.

Do you plan to use logical partitions? For System i 8xx and earlier models, read the topic Plan for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Plan for logical partitions**). For IBM System i5, System p5, and IBM eServer i5 and p5 systems, read the topic Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning → Solution Planning → Planning for logical partitions**). Additionally, refer to the Logical Partitioning Web site:

`www.ibm.com/eserver/iseries/lpar`

For logical partitions only
If you perform these actions on a system with logical partitions, the instructions pertain only to that partition. If that partition is a primary partition, these instructions will change the power status and perform an IPL on the entire system. There is no effect if you are on a system managed by Hardware Management Console. **Attention:** If you are installing on a primary partition, you must shut down all partitions before performing these instructions. Otherwise, you could lose data or damage system software objects. You must perform these instructions for each partition with which you will do the related work. Also, references to the control panel refer either to the virtual control panel (Work with Partition Status display) on your primary partition.

Performing the initial program load (IPL)

To prepare the system for i5/OS user operations, follow this procedure.

About this task

Note: If you already have the i5/OS Main Menu on your console, go to "Using the Work with Licensed Programs menu to install IBM licensed programs" on page 131 to install additional licensed programs.

Procedure

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. Use the control panel to 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
                                                System. . . . . :   XXXX
 Queue  . . . . . :   QSYSOPR                   Program . . . . :   *DSPMSG
   Library  . . . :     QSYS                       Library . . . :
 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 i5/OS 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 (QSCANFSCTL) system value. If you have not already done so, consider specifying *NOPOSTRST for the QSCANFSCTL 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 i5/OS Information Center (**Files and file systems** → **Integrated file system** → **Integrated file system concepts** → **Scanning support**).

  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 i5/OS 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 the Licensed Internal Code (5722999) and the operating system (5722SS1). 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
                                          System. . . . . :   XXXX
Queue  . . . . . :   QSYSOPR              Program . . . . :   *DSPMSG
  Library  . . . :     QSYS                 Library . . . :
Severity . . . . :   10                   Delivery  . . . :   *BREAK

Press Enter to continue.
  All jobs in system lost.  Job and output queues cleared.
```

19. The i5/OS Main Menu appears on your console.

Results

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 131.

Installing additional licensed programs

To install additional licensed programs or optional parts of licensed programs on your system or i5/OS 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 i5/OS software release upgrade or independently of one.

If you have not already done so, complete the tasks in "Preparing to install the i5/OS release" on page 103.

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 (SF99540). When you order the cumulative PTF package, you also get the latest PTF HIPER Group CD-ROM (SF99539) and the Database Group CD-ROM (SF99504).
- 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 *iSeries 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.

- i5/OS libraries QGPL and QUSRSYS
- i5/OS option 3 - Extended Base Directory Support
- i5/OS 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."

If you are selecting more than one licensed program and want to ensure that the products you select install as fast as possible, review the information in "i5/OS installation processes" on page 190. The topic, "Required: Accepting software agreements" on page 45 describes how to accept the software agreements for licensed programs before an upgrade to take advantage of multiprocess installation.

Do you plan to use or are you using logical partitions? For System i 8xx and earlier models, read the topic Plan for logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Plan for logical partitions**). For IBM System i5, System p5, and IBM eServer i5 and p5 systems, read the topic Planning for logical partitions in the IBM Systems Hardware Information Center (**Planning → Solution Planning → Planning for logical partitions**).

Do 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 38 to create a device, image catalog, and an image catalog entry. Information about upgrading

Using the Work with Licensed Programs menu to install IBM licensed programs

If you have logical partitions, you must perform this procedure on each i5/OS logical partition to which you want to install the IBM licensed programs.

Procedure

1. If you are not already signed on to the system as the security officer (QSECOFR user profile), do so now.

   Note: The i5/OS 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 optical device), the setup instructions are in the topic "Preparing to upgrade or replace software using an image catalog" on page 38.

   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, start with i5/OS media volume B29xx_02. To install keyed products, load the volumes labeled L29xx_01 and L29xx_02. If you have priced features of i5/OS or single licensed programs, load the volume labeled F29xx_01. For more information on the optical media you received with your order, see "Media labels and their contents" on page 208. Wait until the In Use indicator goes out before you continue.
3. 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.

4. Type `GO LICPGM` and press Enter.

5. 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 want to accept software agreements for your licensed programs individually, continue with step 6.

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.

6. 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 222.

Press Enter. If you typed 1, continue with step 10 on page 134 of these instructions.

7. 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

         Licensed  Product
Option   Program   Option       Description
  _      _______   _______
  _      5722SS1               i5/OS - Library QGPL
  _      5722SS1               i5/OS - Library QUSRSYS
  _      5722SS1   1           i5/OS - Extended Base Support
  _      5722SS1   2           i5/OS - Online Information
  _      5722SS1   3           i5/OS - Extended Base Directory Support
  _      5722SS1   5           i5/OS - System/36 Environment
  _      5722SS1   6           i5/OS - System/38 Environment
  _      5722SS1   7           i5/OS - Example Tools Library
  _      5722SS1   8           i5/OS - AFP Compatibility Fonts
  _      5722SS1   9           i5/OS - *PRV CL Compiler Support
  _      5722SS1   12          i5/OS - Host Servers
  _      5722SS1   13          i5/OS - System Includes
                                                                    More...
 F3=Exit   F11=Display status/release   F12=Cancel   F19=Display trademarks
```

Notes:

- The libraries QGPL and QUSRSYS, and Extended Base Support (option 1) and Extended Base Directory Support (option 3) are preselected if you are installing licensed programs as part of a new system installation. 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.

8. The Confirm Install of Licensed Programs display appears on the console. Press Enter to confirm your choices.
9. 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`

10. 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                          Type
  5722SS1   12     i5/OS - Host Servers                 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.

11. 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
                                                          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.

12. 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.
13. 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 161 to determine the problem.

    `Work with licensed programs function has completed.` Continue with the next step.
14. 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 219 lists the possible installed status value descriptions.

Results

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 7 on page 133 (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" 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).
   - **Yes.** Go to "Installing a secondary language" on page 137 and complete the instructions.
3. You must complete the installation process before you put your system into operation. Go to "Checklist: Completing the i5/OS installation" on page 141 and complete the instructions.

Using the Restore Licensed Programs command to install IBM or non-IBM licensed programs

To use the i5/OS Restore Licensed Programs (RSTLICPGM) command to install licensed programs on a system, follow these procedures.

About this task

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 137 and complete the instructions. Otherwise, you must complete the installation process and then go to "Checklist: Completing the i5/OS installation" on page 141 and complete the instructions.

Procedure

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 `GO 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 *xxxxxxx* 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 *xxxxxxx* 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 136 and 5 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 131.

Results

You have completed this task.

1. Do you need to install other licensed programs such as Lotus Domino for iSeries, TCP/IP, or WebSphere® to allow your company to participate over the Internet with other e-businesses?
   - **No.** Go to the next step.
   - **Yes.** Go to the i5/OS 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 i5/OS installation" on page 141 and complete the instructions.

Installing a secondary language

Follow these instructions to install a new i5/OS 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 i5/OS operating system.

Complete the tasks in the i5/OS Information Center topic: "Preparing to install the i5/OS release" on page 103. Pay particular attention to the "Globalization and i5/OS software installation" on page 16 topic for more information about installing and using secondary languages.

Installing secondary languages for IBM licensed programs

Follow these steps to install an i5/OS secondary language for IBM licensed programs.

Procedure

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 on the secondary language media. You will need this in step 8. _____

   Secondary language media is identified by the N29xx on the label. The identifier is in the form 29xx, where xx is a unique number for each language. To find the appropriate feature code for your language, refer to "Feature codes for national language version" on page 214.
3. Load the secondary language media volume in the installation device.
4. Type the following command on any i5/OS 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:
7. 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.
8. The Install Secondary Languages display appears.

   ```
                          Install Secondary Languages
                                                          System:   XXXX
   Primary language . . . . . :   2924
   Description  . . . . . . . :   English

   Type options, press Enter.
     1=Install

                                                                 Installed
   Option  Language  Description                    Library     Release
     _       2902    Estonian                       QSYS2902
     _       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.
9. 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.

                                                                 Installed
Option  Language  Description                      Library      Release
  1       2911   Slovenian                        QSYS2911
```

Press Enter.

10. 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
5722WDS    *BASE   WebSphere Development Studio                 2911
```

11. 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.

12. 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 161 to determine the problem.

    `Work with licensed programs function has completed.` Continue with the next step.

Results

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 138 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 i5/OS installation" on page 141 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.

About this task

You might be instructed to use the i5/OS 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 i5/OS installation" and complete the instructions.

Procedure

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 *xxxxxxx* is the product identifier for the licensed program and 29*xx* 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 29*xx* is the national language version feature code.
5. Repeat steps 3 and 4 until you have installed all of the secondary languages for the licensed programs and optional parts that were independently installed.

Results

You have completed this task.

You must complete the installation process before you put your system into operation. Go to "Checklist: Completing the i5/OS installation" and complete the instructions.

Checklist: Completing the i5/OS installation

Use this checklist to complete the i5/OS installation processes.

Procedure

1. If you still have default passwords for your service tools user IDs, change them now. For information on service tools user IDs, see Change service tools user IDs and passwords in the i5/OS Information Center (**Security → Service tools user IDs and passwords → Managing service tools user IDs and passwords → Managing service tools user IDs → Changing service tools user IDs and passwords**).

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. **For logical partitions only:**

   Attention: For System i 8xx and earlier models, do not perform the next step (step 5) to install the cumulative PTF package until after you are aware of the unique PTF installation considerations involved on a system with logical partitions. You could potentially lose data. Refer to the topic Install fixes on systems with logical partitions in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Installing fixes → Step 3: Choosing your fix installation scenario → Distributing fixes to multiple systems with iSeries Navigator → Installing fixes on systems with logical partitions**) to understand how to install the cumulative PTF package on a system with logical partitions.
5. 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 on PTF groups, refer to "Ensuring you have the latest information" on page 105. 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 Install fixes in the i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes → Installing fixes**).

   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 176 has more information on INZSYS.
6. If your IBM System i5 or IBM eServer i5 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 portion of the Licensed Internal Code. You also might be required to perform a server IPL after you upgrade or install a new level of the Licensed Internal Code on the service partition.

   - To find out if you need to do a server IPL, type DSPPTF 5722999 on the i5/OS control language (CL) command line and press Enter. If a server IPL is required, message CPD35F8 `Server IPL required` is shown at the bottom of the display.
   - To find out if your system is operating as a service partition, type DSPPTF 5729999 on the CL command line and press Enter. If your system is

operating as a service partition, the IPL Source field indicates the copy of the server firmware that was used on the previous server IPL.

Note: When shutting down your service partition for eServer i5 models, 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 176 to determine the problem.
8. If you used image catalogs 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)
   ```
9. If you used image catalogs to perform your installation and you previously used the Start ASP Balance (STRASPBAL) command to end the allocation of storage for the load-source disk unit, enter the following 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)
   ```
10. 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 i5/OS Information Center (**i5/OS and related software → Maintaining and managinge i5/OS and related software → Working with software agreements and licenses → Managing software agreements and license keys → Displaying and changing software license information → Adding license key information**).

    After updating the license key information, return here and continue with the next step.
11. 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.

12. 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.

13. 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 219 and determine how to proceed.

14. If you changed any other system value such as for example security level (QSECURITY) during your installation, change it back now.

15. If you changed the scan control (QSCANFSCTL) 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.

16. 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).

17. Save your system using your normal save procedures. Refer to the instructions in the Backing up your system topic in the i5/OS Information Center (**Systems management → Backup and recovery → Backing up and recovering your system → Backing up your system**). 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 15.

18. If you plan to install and use the i5/OS Information Center either from a workstation or the system, refer to the CD-ROMs that come with your software order. Find *iSeries Information Center*, SK3T-4091. This package also includes the PDF versions of System i manuals. For the installation instructions, see the readme.txt file.

19. If you have installed IBM eServer iSeries Access Family products, you might have other tasks that you need to complete. You can find further information about installing iSeries Access Family products in the following sources:
    - iSeries Access for Windows in the i5/OS Information Center (**Connecting to iSeries → iSeries Access → iSeries Access for Windows**).
    - The IBM eServer iSeries Access Family Web site (http://www.ibm.com/eserver/iseries/access).
20. You might have installed licensed programs that require additional installation steps on PCs, or you might have programs that install on PCs through an iSeries Access Family function. If you have products such as this, complete your PC installation by using the instructions for the product.
21. If you have a System i integration with BladeCenter and System x that you stopped before you began the installation process, restart it now.
    a. Type `GO NWSADM` on the CL command line. The Network Server Administration display appears.
    b. Select option 2, Start a network server.
22. If you installed 5722-TC1, TCP/IP Utilities, go to the topic TCP/IP setup in the i5/OS Information Center (**Networking → TCP/IP setup**) for advanced configuration and setup information.
23. 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.
24. 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

What to do next

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 i5/OS logical partition.

Before you begin to change the primary language, read the topic, "Globalization and i5/OS software installation" on page 16.

Obtain either of the following media:

- A complete set of the primary language media, which includes the Licensed Internal Code media and the IBM i5/OS (5722-SS1) media. The media labels include the characters I_BASE_01 and B29xx_01, for example, where 29xx is the language feature code for the primary language that you want to install. Use either the steps in this topic collection ("Changing the primary language" on page 148) 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 55 or Chapter 7, "Upgrading or replacing software using manual installation," on page 65.
- Secondary language media. You need to ensure that the media label includes the characters N29xx and the name of the language. The character N indicates that the media contains only language objects, and 29xx is the language feature code of the secondary language. You will also need the Licensed Internal Code media that is labeled I_BASE_01 and B29xx_01 media from you system's primary language media set. Follow the instructions for using secondary language media in "Changing the primary language" on page 148.

  Note: If the label on the secondary language media does not match this description, do not continue with the instructions in this part. If the letter B precedes the language feature code, go to "Installing software on a new system or logical partition (without i5/OS installed)" on page 115 and use those instructions to change your 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 i5/OS release" on page 103.

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Changing the primary language

Follow these steps to change the primary language on the system or i5/OS logical partition.

About this task

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 i5/OS Information Center (**Security** → **Service tools** → **Managing service tools** → **Configuring the service tools server** → **Changing the service tools language of your system or logical partition**).

If you have secondary logical partitions, you must perform these instructions for each partition to which you change the primary language.

Procedure

1. Begin at the i5/OS Main Menu (or the menu you chose as your initial menu).
   Load the first volume of the media that contains the Licensed Internal Code (labeled I_BASE_01). Have the operating system (5722-SS1) media available. This volume is labeled B29xx_01. 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 `PWRDWNSYS OPTION(*IMMED) RESTART(*YES)` and press Enter.
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 optical - preselected image catalog
     4. Current alternate selected device           None
```

Type 2 (Optical) and press Enter.

5. The Confirm Install of i5/OS 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 Select Service Tools Language display appears on your console.

```
Confirm                 Select Service Tools Language

Service language selected . . . . . . . . . :   2938

The IBM Licensed Internal Code (I.BASE.01)  V5R4M5
media is required.


Press Enter to confirm your choice to change the service
      Tools language.

Press F12 to return to change your choice.



 F12=Cancel
```

. Changing the service tools language and the primary language.

```
                    Confirm Language Feature Selection
                                                          System:   SYSTEM1
 Language feature  . . . . . . . . . . . . . . . :   2938

 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  . . . . . . :   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
```

   Load the first volume of the IBM-supplied installation media that contains the operating system. (This volume is labeled B29xx_01, where 29xx is the identifier for the primary language.)

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 i5/OS 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, which is labeled N29xx. The value 29xx is the feature code of the secondary language.

```
                              Message

Message ID  . . . . . :   CPA2057       Type . . . . . :   Inquiry
From program  . . . . :   XXXXXXX       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 i5/OS primary language.

About this task

If you have secondary logical partitions, you must perform this procedure on each partition to which you want to install the licensed programs.

Procedure

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.

2. 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.
```

3. 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

4. Additional display messages could be shown.

   Press Enter after each message to continue.

5. The i5/OS Main Menu (or the menu you chose as your initial menu) appears on your console.

   Type CHGMSGQ QSYSOPR *BREAK SEV(95) and press Enter.

6. A message display could appear. Press Enter.
7. The i5/OS Main Menu (or the menu you chose as your initial menu) appears again.

   Type GO LICPGM and press Enter.

8. 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

12. 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
 5722SS1            i5/OS - Library QUSRSYS                 2922
```

13. If you see the following message, load the next volume of the language media and continue the installation Be certain that the label on 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.

14. 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 i5/OS Main Menu.

    Work with licensed programs function not complete. Go to Chapter 14, "Troubleshooting software installation problems," on page 161 to determine the problem.

Results

You have completed this task.

To complete your installation, go to "Checklist: Completing the i5/OS installation" on page 141 and follow the instructions there.

Chapter 13. Deleting software related to the i5/OS 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 i5/OS licensed programs to give you more storage.

About this task

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 8 on page 158. (Table 8 on page 158 shows V5R4 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 iSeries 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 i5/OS software distribution media, make sure that you first save the affected licensed program. Type GO LICPGM on the i5/OS 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 Table 8 on page 158, the Chapter 15, “i5/OS software reference,” on page 185 topics (**Installation notes about the i5/OS release** and **Installation notes about other licensed programs**), and the keys in the following table to help you determine which programs or optional parts you might want to delete.

Table 7. Keys for deleting unwanted licensed programs table

Key	Description
a	You cannot delete the entire operating system. You can delete optional parts, but you cannot delete i5/OS option 1 or option 3.
b	IBM recommends that you do not delete this part.
c	Delete this optional part if you are running only iSeries applications.

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Table 7. Keys for deleting unwanted licensed programs table (continued)

Key	Description
d	This optional part is needed only by software developers.
e	Do not delete this optional part if you are using the Print Services Facility™.
f	Delete this part if you do not need to compile CL programs for a previous release.
g	This option is a separately orderable feature.
h	This optional part is needed if you use Unicode applications.
i	Do not delete if you are using IBM eServer iSeries Access Family products.
j	If you are not using this specific client, you can delete the complete licensed program for that client.
k	If you delete this optional part, you must first remove QHLPSYS from the system library list. Refer to "Considerations for deleting licensed programs" for more information.
l	You can delete these if you are not using them.

Table 8. Deleting unwanted licensed programs and optional parts after the installation is complete

Keys	Licensed program and optionally installable product part	Number for product option
a	5722-SS1 i5/OS	
a	Extended Base Support	1
k	Online Information (Online help information)	2
a	Extended Base Directory Support	3
c	System/36 and System/38 Environment	5 and 6
d	Example Tools Library	7
e	AFP Compatibility Fonts	8
f	*PRV CL Compiler Support	9
b, i	Host Servers	12
d	System Openness Includes	13
l	GDDM®	14
g	Media and Storage Extensions	18
l	i5/OS optional parts 21, 22, 25, 30, 31, 33, 34, 35, and 43.	21 - 43
h	International Components for Unicode	39
i	5722-XW1 IBM eServer iSeries Access Family	Base
i	5722-XW1 iSeries Access Enablement Support	1
j	5722-XE1 IBM eServer iSeries Access for Windows	Base
j	5722-XH2 IBM eServer iSeries Access for Web	Base

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 i5/OS 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 i5/OS operating system.

Procedure

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.

Results

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 i5/OS 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 i5/OS software installation error, first you need to determine what your first step to recovery should be.

Type of installation failure	
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, use the book Backup and Recovery 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.

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Where to start recovery		
Installation procedure in use	**Task number in use at time of failure**	**Where to start**
Using image catalogs to install		"Image catalog recovery"
Using Operations Console to install		"Operations Console recovery" on page 163
Replacing a release using automatic installation	Task 1. Using automatic installation	"Starting point for automatic installation recovery" on page 165
Replacing a release using manual installation	Task 1. Replacing the Licensed Internal Code	"Licensed Internal Code recovery" on page 166
	Task 2. Replacing the operating system	"Operating system recovery" on page 168
	Task 3. Replacing the licensed programs	"Licensed programs, PTFs, and secondary language recovery" on page 170
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 168
Installing software on a new system (without the operating system installed)	Task 1. Installing the operating system	"Operating system recovery" on page 168
Changing your primary language	Task 1. Changing the primary language	"Operating system recovery" on page 168
	Task 2. Installing the licensed programs	"Licensed programs, PTFs, and secondary language recovery" on page 170
Installing additional licensed programs	Task 1. Installing IBM licensed programs	"Licensed programs, PTFs, and secondary language recovery" on page 170
	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 170
	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 i5/OS 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 9. Image Catalog Verification Recovery

Message	Description
CPF9897 CPDBD1E	**Cause (Reason code 01):** The load-source disk unit must have at least 1074 MB of free storage space to be able to install from an image catalog (virtual optical device). **Recovery:** 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 47, contains the procedure. **Cause (Reason code 02):** Installation of the release requires additional allocation of space for License Internal Code. **Recovery:** Follow the directions in the error message. More information is in the topic, "Required: Allocating additional space for Licensed Internal Code" on page 49. **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 iSeries model. **Recovery:** Try your request again with a supported release.
CPF3DE5	**Cause:** The Licensed Internal Code and i5/OS software agreements have not been accepted. **Recovery:** Perform the steps "Required: Accepting software agreements" on page 45.
CPD4F23	**Cause:** The release is not supported on this server model. **Recovery:** Specify a supported release or server model. Then try the request again.
CPD4F1C	**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. **Recovery:** Perform an unattended IPL, then retry your request

Operations Console recovery

Following are common problems that can occur when using Operations Console during an i5/OS 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 11111111) 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 10. Reference code A6005008: LAN

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 10. Reference code A6005008: LAN (continued)

LAN			
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
Word 16		The twinaxial-related reference code is represented by the first 4 characters. The console type value is represented by the last 4 characters in the form xxxx xxxx. 00 indicates not defined by user (old default value) 01 indicates twinaxial console 02 indicates Operations Console (direct) 03 indicates Operations Console (LAN) 04 indicates Hardware Management Console (HMC)	

Table 11. Reference code A6005008: Cable

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 i5/OS 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 174.

- 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.

Where to start recovery for the automatic installation process	
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 168
Messages starting with CPZ20xx	"Operating system recovery" on page 168
Message that indicates the load source disk unit needs additional space for Licensed Internal Code.	"Licensed Internal Code recovery"
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 170

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.`

Return code for Licensed Internal Code - Error display	
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 load source disk unit needs additional space for Licensed Internal Code, follow the directions in the error message. Ensure that you have adequate disk storage before you allocate the additional space for the Licensed Internal Code. The tasks for this are described in the topic "Ensuring the system meets disk storage requirements for upgrades" on page 46. The tasks for allocating additional space are in the topic, "Required: Allocating additional space for Licensed Internal Code" on page 49.
3. 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 45.
4. For Licensed Internal Code reference codes, go to one of the following sources:
   - If the reference code is of the form A6xx 6xxx, refer to the appendix on Licensed Internal Code reference codes in the book Backup and Recovery .

- If any reference code other than an A6xx 6xxx appears, go to Analyzing and handling problems in the i5/OS Information Center (**Troubleshooting → Analyzing and handling problems**) and follow the instructions.

5. 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.
6. 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 201 or "Disabling an alternate installation device" on page 204 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.
7. Start the installation process again.

   If you were using the automatic installation process, go to "Starting the automatic installation process again" on page 174 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 175 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.

Error messages	
Message	**Description**
B60041FD	**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. **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.

Error messages	
Message	**Description**
B60041FC	**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. **Recovery:** Use physical media to perform the installation.

Operating system recovery

Use this procedure if an error occurred when you installed the i5/OS 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 174.
3. Start the manual installation again using the following steps.

   Attention: If you do this on a primary partition when secondary partitions are active, this will cause all partitions to IPL immediately. If you have active secondary partitions, power them off before you use this procedure.

   a. Load the first volume (B29xx_01) 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 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 i5/OS installation media that you are using.

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 i5/OS Information Center (**Troubleshooting → Analyzing and handling problems**). 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 i5/OS Information Center (**Troubleshooting → Analyzing and handling problems**). Take the appropriate recovery action.

Operating system problems	
Symptom	**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 i5/OS Information Center (**Troubleshooting → Analyzing and handling problems**).

The following table contains some of the error messages that could occur during the installation of the operating system.

Error messages	
Message	**Description**
CPA3DE6	**Cause:** Software agreements were not found on the volume loaded in the alternate IPL device. **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.
CPFA0C6	**Cause:** /QNetWare file system failed to mount. **Recovery:** If you are performing an i5/OS upgrade to V5R4, ignore this message. Option 25 (i5/OS - NetWare Enhanced Integration) of the operating system (5722-SS1) will be mounted later.
CPZ2003 CPZ2004 CPZ2005 CPZ2010 CPZ2011	**Cause:** The installation process received a tape or optical media error code. **Recovery for Error Code Ex10 0019 or Ex10 001A:** 1. Clean the media. • 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. • If you were using the automatic installation process, go to “Starting the automatic installation process again” on page 174. • If you were using the manual installation process, go to step 3 in “Licensed Internal Code recovery” on page 166 to start the installation process again. 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. **Recovery for all other error codes:** Contact your authorized service provider.

Error messages	
Message	**Description**
CPZ2022	**Cause:** The restore options read from the installation profile are not valid. **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. **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.
CPZ2023	**Cause:** The installation options read from the installation profile are not compatible with the current state of the system. 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. **Recovery:** Try to install the operating system again using the manual installation process.
CPZ20xx	**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. **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. **Note:** A short time after you press Enter, a B900 xxxx reference code is displayed. Analyzing and handling problems in the i5/OS Information Center (**Troubleshooting → Analyzing and handling problems**) contains additional information.

Licensed programs, PTFs, and secondary language recovery

Use this procedure if an error occurred when you installed an i5/OS licensed program, PTF, or secondary language.

1. Type `GO LICPGM` on an i5/OS 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 219 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 174. If you were using the manual installation process, go to “Starting the manual installation process again” on page 175.

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.

Error messages	
Message	**Description**
CPA3DD2 CPA3DD3	**Cause:** The system could not identify the last volume loaded in the device. **Recovery:** Open the device door, verify that correct volume is loaded, and close the device door.
CPA3DDD CPA3DDF	**Cause:** The installation process is expecting more licensed programs to be loaded. **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.
CPA3DE1	**Cause:** The volume that is loaded does not contain licensed programs that are supported through the Work with Licensed Programs (LICPGM) menu. **Recovery:** Load the optical media that contains licensed programs.
CPDB6DA	**Cause:** During a manual installation, the software agreement for a licensed program was not accepted and cannot be installed. **Recovery:** Follow the instructions in “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 131 to accept the software agreement and retry the installation.
CPDB6DB	**Cause:** During an automatic installation, the software agreement for a licensed program was not accepted and cannot be installed. **Recovery:** Follow the instructions in “Using the Work with Licensed Programs menu to install IBM licensed programs” on page 131 to accept the software agreement and retry the installation.
CPD32B0 reason code 7 CPF327E reason code 3	**Cause:** 5722SS1 option 1, Extended Base Support, failed to install. **Recovery:** Use the Reclaim Storage (RCLSTG) command and try to install option 1 again.

Error messages	
Message	**Description**
CPD3713	**Cause:** The licensed program is currently installed on your system and was not found on the distribution media. **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 130 or delete the licensed program from your systemif you no longer want it.
CPD3D82 CPF3D8F	**Cause:** These messages could be shown if you did not end all of the subsystems before you started the installation process. **Recovery:** End all subsystems and start installing the licensed programs again.
CPF371C CPF3731	**Cause:** Look at the messages previously listed in the job log to determine the failure. **Recovery:** Take the recommended recovery action. If you received one of these messages, the installation process ended before you completed installing the licensed programs.
CPF371D CPF371E	**Cause:** These messages could be shown if the wrong volume is loaded. The online information of the message can help determine the cause. **Recovery:** Load the correct volume and start the process again.
CPF3D96	**Cause:** Errors occurred during the restoring process for a licensed program. **Recovery:** Take the recommended recovery action explained in the online help information. 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.
CPF3D81 CPF3D84 CPF3D8B CPF3D8C CPF3D90 CPF3D91	**Cause:** Errors occurred when restoring a licensed program or PTFs. **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.
CPF3D82 CPF3D83	**Cause:** There is not enough auxiliary storage to install the licensed programs that you selected. **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.

Error messages	
Message	**Description**
CPF3D85 CPF3D86 CPF3D8E	**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. **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.
CPF3DD3	**Cause:** The device description could not be found or could not be used. **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.
CPI3D82 CPI3D84 CPI3D85	**Cause:** A licensed program that is included on the distribution media was not currently installed on the system. **Recovery:** Use the online information of the message for recovery help. Use the topic "Installing additional licensed programs" on page 130 to install the licensed program.
Media error messages	**Cause:** A media error occurred during the installation process. **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.

Starting the automatic installation process again

If you want to start the i5/OS automatic installation process again after recovering from an error, use one of these possible methods.

Methods for starting the automatic installation process again	
Method	**Instructions**
Method 1: Licensed Internal Code	**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. **How to use:** To start an installation process again, use the instructions in Chapter 6, "Upgrading or replacing software using automatic installation," on page 55.

Methods for starting the automatic installation process again	
Method	**Instructions**
Method 2: Operating System	**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. **How to use:** 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 primary partition or HMC. 2. Start the IPL. 3. Load the volume B29xx_01 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. Continue with step 11 (begins with loading the next volume (B29xx_01) under "Replacing software using the automatic installation method" on page 56.
Method 3: Licensed Programs	**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. **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 130.

Starting the manual installation process again

If you want to start the i5/OS manual installation process again after you recover from an error while installing licensed programs, PTFs, or secondary languages, use one of these methods.

Methods for starting the manual installation process again	
Method	**Instructions**
Method 1	**When to use:** This method should be used if several licensed programs are not installed. **How to use:** To start an installation process again using method 1, use option 1 (Install all) on the Work with Licensed Programs display. Refer to "Manual installation Option 1. Install all" on page 222.

Methods for starting the manual installation process again	
Method	**Instructions**
Method 2	**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. **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 130. Complete all of the instructions in that part.
Method 3	**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. **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).
Method 4	**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. **How to use:** To install the cumulative PTF package, use the instructions in the *System PTF Shipping Information Letter*.

Initialize System (INZSYS) recovery

In an i5/OS 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 i5/OS 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 i5/OS 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.

Disk configuration warning messages	
Warning messages	**Your action: Option 1 (Restore Licensed Internal Code)**
Disk unit not formatted for optimal performance	Do the following: 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. You cannot reformat the disk units during the upgrade procedure.

Disk configuration warning messages	
Warning messages	**Your action: Option 1 (Restore Licensed Internal Code)**
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.
Overflowed ASPs	Wait to correct the problem until after the upgrade process is completed. The book Backup and Recovery describes how to reset an overflowed ASP.
Lower level of protection	Ignore during the installation procedure. However, you should analyze your mirrored configuration after the installation procedure.
Logical partition configuration error (only System i 8xx or earlier models)	Do the following: 1. Type 5 (Display Detailed Report). 2. Write down the disk units that contain the error. 3. Press F12 to return to the warning report display. 4. Press F10 to accept the warning and continue. Refer to Troubleshooting logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Troubleshooting logical partitions**).
Unit is missing connection.	Contact hardware support before you proceed.

Starting from a power-off condition

If your system unit power is off, perform the following steps to power on the system and begin a normal i5/OS installation.

When you complete this topic, you will be instructed to return to the appropriate step of your original installation procedures.

1. Use the control panel to set the mode and IPL type:
   - If you were directed here from Chapter 6, "Upgrading or replacing software using automatic installation," on page 55, set the IPL type to **D** and the mode to **Normal**. On some models, this will appear as **DN**.
   - If you were directed here from Chapter 7, "Upgrading or replacing software using manual installation," on page 65, set the IPL type to **D** and the mode to **Manual**. On some models, this will appear as **DM**
2. Press Enter on the control panel.
3. On your console, ensure that you have a connection to the system.
4. If your installation device has separate on and off switches, verify that the switch is in the On position.
5. Load the media and make the device ready. If you cannot load the media now, you will be able to in step 7.
6. Turn the power on for the system by pushing the power switch once.
7. If you could not load your media in the previous steps, load the first volume into the tape or optical device for the alternate IPL now.
8. You are ready to return to your original installation procedures.
   - If you are performing automatic installation, continue with step 4 on page 58 in the automatic installation procedures.
   - If you are performing a manual installation, continue with step 5 on page 68 in the manual installation procedures (replacing Licensed Internal Code).

Reference codes for i5/OS 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 i5/OS software installation

This table identifies the most common reference codes related to an i5/OS software installation or upgrade.

If you are looking at reference codes on a system with logical partitions, the reference code gives an indication of the type of partition to which it pertains. For example, the reference code B1xx xxxx indicates a primary partition. The reference code B2xx xxxx indicates a secondary partition.

Table 12. Common reference codes

Symptom	Action
A1xx 19xx **A12x 19xx** **(x is any character)**	These reference codes appear if the installation device for an alternate IPL is not ready. Check the following: • 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? 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. Then perform the appropriate procedure under "i5/OS installation recovery after using reference codes" on page 182.
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 65.
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 "i5/OS installation recovery after using reference codes" on page 182.
B101 4500	This reference code appears when an error is detected with the System 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:** System 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 "i5/OS installation recovery after using reference codes" on page 182.
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 "i5/OS installation recovery after using reference codes" on page 182.

Table 12. Common reference codes (continued)

Symptom	Action
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 "i5/OS installation recovery after using reference codes" on page 182.
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. ForSystem i 8xx and earlier models, refer to Manage logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Manage logical partitions**) for more information. For IBM System i5, System p5, and IBM eServer i5 and p5 systems, see Managing i5/OS logical partitions in the IBM Systems Hardware Information Center (**Partitioning the server → Partitioning with an HMC → Partitioning for i5/OS with an HMC → Managing i5/OS logical partitions**).
B2pp 1320 (pp is the partition ID)	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. For more information on System i 8xx and earlier models, refer to Manage logical partitions in the i5/OS Information Center (**Systems management → Logical partitions → Partitioning with an iSeries server → Manage logical partitions**). For information on IBM System i5, System p5, and IBM eServer i5 and p5 systems, see Managing i5/OS logical partitions in the IBM Systems Hardware Information Center (**Partitioning the server → Partitioning with an HMC → Partitioning for i5/OS with an HMC → Managing i5/OS logical partitions**).
B2pp 3110 (pp is the partition ID)	The power-on operation for the logical partition failed. Scan the reference code history list of the logical partition for previous B2ppxxxx failure reference codes. Resolve each problem found, and then retry the partition IPL. If it continues to fail, contact your service provider.
B2pp 3200 (pp is the partition ID)	The logical partition failed to initialize a program load. 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.

Table 12. Common reference codes (continued)

Symptom	Action
B2xx xxxx	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. For more information, refer to the following topics: • For System i 8xx and earlier models, see Logical partitions in the i5/OS Information Center (**Systems management → Logical partitions**). • For IBM System i5, System p5, and IBM eServer i5 and p5 systems, see Partitioning for i5/OSwith an HMC in the IBM Systems Hardware Information Center (**Partitioning the server → Partitioning with an HMC → Partitioning for i5/OS with an HMC**).
B608 1105	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: • 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. To use the alternate installation device, do the following: 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	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. (For optical media, this volume is labeled B29xx_01.) Then perform the appropriate procedure under "i5/OS installation recovery after using reference codes."
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 "i5/OS installation recovery after using reference codes."
Any other reference code	Go to Chapter 14, "Troubleshooting software installation problems," on page 161, and follow the instructions there.

i5/OS installation recovery after using reference codes

After taking the corrective action for a reference code, perform one of these procedures to continue the i5/OS 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 166. Otherwise, continue with step 12 on page 60.

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 166. Otherwise, continue with step 12 on page 69.

Chapter 15. i5/OS software reference

This topic contains a collection of supporting information about the concepts and tasks related to upgrading or installing i5/OS software.

Licensed program releases and sizes

The following licensed programs are available this release and are compatible with the i5/OS 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	Version	Status	Storage (MB)	Description
5722	999	V5R4M0	Refreshed	4080.0	Licensed Internal Code
5722	SS1 Base (QGPL, QUSRSYS, QSYS)	V5R4M0	Refreshed	1677.4	i5/OS
5722	SS1 option 1	V5R4M0	Refreshed	139.7	Extended Base Support
5722	SS1 option 2	V5R4M0	Refreshed	40.0	Online Information
5722	SS1 option 3	V5R4M0	Refreshed	1782.4	Extended Base Directory Support
5722	SS1 option 5	V5R4M0	Refreshed	23.9	System/36 Environment
5722	SS1 option 6	V5R4M0	Refreshed	11.9	System/38 Environment
5722	SS1 option 7	V5R4M0	Refreshed	8.8	Example Tools Library
5722	SS1 option 8	V5R4M0	Refreshed	16.0	AFP Compatibility Fonts
5722	SS1 option 9	V5R4M0	Refreshed	96.1	*PRV CL Compiler Support
5722	SS1 option 12	V5R4M0	Refreshed	15.6	Host Servers
5722	SS1 option 13	V5R4M0	Refreshed	388.9	System Openness Includes
5722	SS1 option 14	V5R4M0	Refreshed	33.8	GDDM
5722	SS1 option 18	V5R4M0	Refreshed	1.0	Media and Storage Extensions
5722	SS1 option 21	V5R4M0	Refreshed	117.5	Extended NLS Support
5722	SS1 option 22	V5R4M0	Refreshed	1.8	ObjectConnect
5722	SS1 option 23	V5R4M0	Refreshed	4.4	OptiConnect
5722	SS1 option 25	V5R4M0	Refreshed	18.6	NetWare Enhanced Integration
5722	SS1 option 26	V5R4M0	Refreshed	0.4	DB2 Symmetric Multiprocessing
5722	SS1 option 27	V5R4M0	Refreshed	0.5	DB2 Multisystem
5722	SS1 option 29	V5R4M0	New	87.9	Integrated Server Support
5722	SS1 option 30	V5R4M0	Refreshed	17.1	Qshell
5722	SS1 option 31	V5R4M0	Refreshed	8.4	Domain Name System
5722	SS1 option 33	V5R4M0	Refreshed	369.2	Portable App Solutions Environment
5722	SS1 option 34	V5R4M0	Refreshed	32.6	Digital Certificate Manager

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Product	Option	Version	Status	Storage (MB)	Description
5722	SS1 option 35	V5R4M0	Refreshed	20.0	CCA Cryptographic Service Provider
5722	SS1 option 36	V5R4M0	Refreshed	0.4	PSF 1-45 IPM Printer Support
5722	SS1 option 37	V5R4M0	Refreshed	0.3	PSF 1-100 IPM Printer Support
5722	SS1 option 38	V5R4M0	Refreshed	0.3	PSF Any Speed Printer Support
5722	SS1 option 39	V5R4M0	Refreshed	368.6	International Components for Unicode
5722	SS1 option 41	V5R4M0	Refreshed	0.4	HA Switchable Resources
5722	SS1 option 42	V5R4M0	Refreshed	0.5	HA Journal Performance
5722	SS1 option 43	V5R4M0	Refreshed	849.2	Additional Fonts
5722	AF1 base	V5R2M0	Ship level	19.7	IBM Advanced Function Printing Utilities for iSeries
5722	AP1 base	V5R3M0	Ship level	18.9	IBM Advanced DBCS Printer Support for iSeries
5722	AP1 option 1	V5R3M0	Ship level	2.7	Adv DBCS Printer Support - IPDS
5722	BR1 base	V5R4M0	Refreshed	214.9	IBM Backup Recovery and Media Services for i5/OS
5722	BR1 option 1	V5R4M0	Refreshed	0.2	BRMS - Network Feature
5722	BR1 option 2	V5R4M0	Refreshed	0.1	BRMS - Advanced Feature
5722	BZ1 base	V5R1M0	Ship level	8.6	IBM Business Solutions
5722	CM1 base	V5R4M0	Refreshed	10.7	IBM Communications Utilities for i5/OS
5722	CR1 base	V5R2M0	Ship level	4.0	IBM Cryptographic Support for AS/400
5722	DB1 base	V5R3M0	Ship level	85.7	IBM System/38 Utilities for AS/400
5722	DE1 base	V5R4M0	Refreshed	0.5	IBM DB2 Universal Database™ Extenders for iSeries V8.2
5722	DE1 option 1	V5R4M0	Refreshed	15.4	Text Extender for iSeries
5722	DE1 option 2	V5R4M0	Refreshed	22.7	XML Extender
5722	DE1 option 3	V5R4M0	Refreshed	109.3	Text Search Engine
5722	DFH base	V5R4M0	Refreshed	48.3	IBM CICS® Transaction Server for i5/OS
5722	DFH option 1	V5R4M0	Refreshed	6.3	CICS - Sample Applications
5722	DG1 base	V5R4M0	Refreshed	204.6	IBM HTTP Server for i5/OS
5722	DG1 option 1	V5R4M0	Refreshed	14.7	Triggered Cache Manager
5722	DP4 base	V5R2M0	Ship level	24.4	IBM DB2 DataPropagator for iSeries, V8.1
5722	DS1 base	V5R3M0	Ship level	8.2	IBM Business Graphics Utility for AS/400

Product	Option	Version	Status	Storage (MB)	Description
5769	FN1 base	V4R2M0	Ship level	2.0	IBM Advanced Function Printing DBCS Fonts for AS/400
5769	FN1 option 1	V4R2M0	Ship level	100.2	AFP DBCS Fonts - Japanese
5769	FN1 option 2	V4R2M0	Ship level	35.3	AFP DBCS Fonts - Korean
5769	FN1 option 3	V4R2M0	Ship level	18.6	AFP DBCS Fonts - Traditional Chinese
5769	FN1 option 4	V4R2M0	Ship level	12.4	AFP DBCS Fonts - Simplified Chinese
5769	FN1 option 5	V4R2M0	Ship level	6.1	AFP DBCS Fonts - Thai
5769	FNT base	V4R2M0	Ship level	2.0	IBM Advanced Function Printing Fonts for AS/400
5769	FNT option 1	V4R2M0	Ship level	8.3	AFP Fonts - Sonoran Serif
5769	FNT option 2	V4R2M0	Ship level	6.8	AFP Fonts - Sonoran Serif Headliner
5769	FNT option 3	V4R2M0	Ship level	8.1	AFP Fonts - Sonoran Sans Serif
5769	FNT option 4	V4R2M0	Ship level	6.7	AFP Fonts - Sonoran Sans Serif Headliner
5769	FNT option 5	V4R2M0	Ship level	6.4	AFP Fonts - Sonoran Sans Serif Condensed
5769	FNT option 6	V4R2M0	Ship level	5.4	AFP Fonts - Sonoran Sans Serif Expanded
5769	FNT option 7	V4R2M0	Ship level	6.1	AFP Fonts - Monotype Garamond
5769	FNT option 8	V4R2M0	Ship level	6.5	AFP Fonts - Century Schoolbook
5769	FNT option 9	V4R2M0	Ship level	2.6	AFP Fonts - Pi and Specials
5769	FNT option 10	V4R2M0	Ship level	6.1	AFP Fonts - ITC Souvenir
5769	FNT option 11	V4R2M0	Ship level	6.3	AFP Fonts - ITC Avant Garde Gothic
5769	FNT option 12	V4R2M0	Ship level	5.7	AFP Fonts - Math and Science
5769	FNT option 13	V4R2M0	Ship level	1.7	AFP Fonts - DATA1
5769	FNT option 14	V4R2M0	Ship level	2.4	AFP Fonts - APL2®
5769	FNT option 15	V4R2M0	Ship level	1.6	AFP Fonts - OCR A and OCR B
5722	IP1 base	V5R3M0	Ship level	85.7	IBM Infoprint Server for iSeries
5722	IP1 option 1	V5R3M0	Ship level	1.4	PS to AFP Transform
5722	JC1 base	V5R4M0	Refreshed	55.7	IBM Toolbox for Java™
5722	JS1 base	V5R4M0	Refreshed	91.3	IBM Advanced Job Scheduler for i5/OS
5722	JV1 base	V5R4M0	Refreshed	15.8	IBM Developer Kit for Java
5722	JV1 option 5	V5R4M0	Refreshed	268.9	Java Developer Kit 1.3
5722	JV1 option 6	V5R4M0	Refreshed	55.6	Java Developer Kit 1.4
5722	JV1 option 7	V5R4M0	Refreshed	562.8	Java Developer Kit 5.0

Product	Option	Version	Status	Storage (MB)	Description
5722	JV1 option 8	V5R4M0	New	244.5	J2SE 5.0 32 bit
1TME	LCF base	V4R1M0	Ship level	5.7	Tivoli® Management Agent
5722	LSV base	V5R4M0	New	16.9	IBM i5/OS Integration for Linux on xSeries
5722	MG1 base	V5R4M0	Refreshed	39.7	IBM Managed System Services for i5/OS
5722	NAE base	V5R4M0	New	169.4	IBM Network Authentication Enablement for i5/OS
5722	PT1 base	V5R4M0	Refreshed	14.0	IBM Performance Tools for iSeries
5722	PT1 option 1	V5R4M0	Refreshed	14.1	Performance Tools - Manager Feature
5722	PT1 option 2	V5R4M0	Refreshed	1.0	Performance Tools - Agent Feature
5722	QU1 base	V5R4M0	Refreshed	7.1	IBM Query for iSeries
5722	RD1 base	V5R4M0	Refreshed	21.9	IBM DB2 Content Manager OnDemand for i5/OS
5722	RD1 option 1	V5R4M0	Refreshed	40.7	OnDemand Spooled File Archive Feature
5722	RD1 option 2	V5R4M0	Refreshed	3.9	OnDemand Object Archive Feature
5722	RD1 option 3	V5R4M0	Refreshed	4.0	OnDemand Record Archive Feature
5722	RD1 option 4	V5R4M0	Refreshed	5.5	OnDemand AnyStore Feature
5722	RD1 option 5	V5R4M0	Refreshed	7.8	OnDemand Server Feature
5722	RD1 option 10	V5R4M0	Refreshed	76.6	OnDemand Common Server Feature
5722	RD1 option 11	V5R4M0	Refreshed	27.2	OnDemand Web Enablement Kit
5722	RD1 option 12	V5R4M0	Refreshed	96.1	OnDemand PDF Indexer Feature
5733	SC1 base	V5R4M0	Refreshed	1.6	IBM Portable Utilties for i5/OS
5722	SM1 base	V5R4M0	Refreshed	22.6	IBM System Manager for i5/OS
5722	ST1 base	V5R4M0	Refreshed	18.3	IBM DB2 Query Manager and SQL Development Kit for iSeries
5722	TC1 base	V5R4M0	Refreshed	37.8	IBM TCP/IP Connectivity Utilities for i5/OS
5722	VI1 base	V5R3M0	Ship level	25.5	IBM Content Manager for iSeries
5722	VI1 option 1	V5R3M0	Ship level	85.0	Content Manager for iSeries
5722	VI1 option 2	V5R3M0	Ship level	46.5	Content Manager for iSeries
5722	WDS base	V5R4M0	Refreshed	27.5	IBM WebSphere Development Studio for iSeries

Product	Option	Version	Status	Storage (MB)	Description
5722	WDS option 21	V5R4M0	Refreshed	36.0	iSeries Tools - Application Development
5722	WDS option 31	V5R4M0	Refreshed	10.9	ILE RPG
5722	WDS option 32	V5R4M0	Refreshed	6.3	System/36 Compatible RPG II
5722	WDS option 33	V5R4M0	Refreshed	5.1	System/38 Compatible RPG III
5722	WDS option 34	V5R4M0	Refreshed	5.7	RPG/400®
5722	WDS option 35	V5R4M0	Refreshed	20.8	ILE RPG *PRV Compiler
5722	WDS option 41	V5R4M0	Refreshed	22.4	ILE COBOL
5722	WDS option 42	V5R4M0	Refreshed	6.4	System/36 Compatible COBOL
5722	WDS option 43	V5R4M0	Refreshed	5.7	System/38 Compatible COBOL
5722	WDS option 44	V5R4M0	Refreshed	7.4	OPM COBOL
5722	WDS option 45	V5R4M0	Refreshed	43.0	ILE COBOL *PRV Compiler
5722	WDS option 51	V5R4M0	Refreshed	12.9	ILE C
5722	WDS option 52	V5R4M0	Refreshed	46.6	ILE C++
5722	WDS option 56	V5R4M0	Refreshed	1.8	IXLC for C/C++
5722	WDS option 60	V5R4M0	Refreshed	4.7	Workstation Tools - Base
5722	XE1 base	V5R4M0	Refreshed	249.7	IBM eServer iSeries Access for Windows
5722	XH2 base	V5R4M0	Refreshed	487.3	IBM eServer iSeries Access for Web
5722	XP1 base	V5R3M0	Ship level	2.6	IBM eServer iSeries Access for Wireless
5722	XW1 base	V5R4M0	Refreshed	0.5	IBM eServer iSeries Access Family
5722	XW1 option 1	V5R4M0	Refreshed	0.3	iSeries Access Enablement Support

Estimates for i5/OS 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 i5/OS release.

"Minimizing software installation time" on page 34 can help you make the best use of the time you spend on software installation.

Common methods of estimating i5/OS installation time

The most common ways to estimate your installation time for an upgrade are described 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 i5/OS 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

i5/OS 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 i5/OS 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 installation 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 object conversions. Follow the steps in "Times for conversions" on page 197 to determine how much time you need to add for the following conversions:

   - "Conversion of objects that contain SQL statements" on page 197

     Time for SQL conversion: _____
   - "Database file conversions" on page 198

     Time for database file conversion: _____
   - "IBM Backup Recovery and Media Services for i5/OS conversions" on page 198

     Time for IBM Backup Recovery and Media Services for i5/OS conversion: _____

6. If your system uses mirroring or an implementation of a RAID-5 technique on the disk units in the system ASP, add extra time as described in "Data protection mechanisms" on page 198.

   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 *iSeries System 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 198): _____

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 i5/OS 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 13. Licensed program time information

Product	Option	Description	Value for replacing licensed program	Value for adding licensed program
5722-SS1	Library	i5/OS - Library QGPL	—	—
5722-SS1	Library	i5/OS - Library QUSRSYS	—	—
5722-SS1	0	i5/OS - Per Processor Pricing Key	—	—
5722-SS1	1	Extended Base Support	1.9	1.8
5722-SS1	2	Online Information	0.5	0.3
5722-SS1	3	Extended Base Directory Support	21.0	15.1
5722-SS1	5	System/36 Environment	2.1	0.7
5722-SS1	6	System/38 Environment	1.3	0.8
5722-SS1	7	Example Tools Library	0.8	0.4
5722-SS1	8	AFP Compatibility Fonts	1.3	0.7
5722-SS1	9	*PRV CL Compiler Support	10.8	4.2
5722-SS1	12	Host Servers	1.8	0.6
5722-SS1	13	System Openness Includes	21.4	7.2
5722-SS1	14	GDDM	1.7	0.5
5722-SS1	18	Media and Storage Extensions	0.3	0.2
5722-SS1	21	Extended NLS Support	2.1	1.7
5722-SS1	22	ObjectConnect	0.4	0.3

Table 13. Licensed program time information (continued)

Product	Option	Description	Value for replacing licensed program	Value for adding licensed program
5722-SS1	23	OptiConnect	0.5	0.4
5722-SS1	25	NetWare Enhanced Integration	1.0	0.6
5722-SS1	26	DB2 Symmetric Multiprocessing	0.2	0.2
5722-SS1	27	DB2 Multisystem	0.2	0.2
5722-SS1	29	Integrated Server Support	1.8	2.2
5722-SS1	30	Qshell	1.1	0.7
5722-SS1	31	Domain Name System	0.6	0.4
5722-SS1	33	Portable App Solutions Environment	7.6	5.9
5722-SS1	34	Digital Certificate Manager	1.4	0.8
5722-SS1	35	CCA Cryptographic Service Provider	1.6	0.8
5722-SS1	36	PSF 1-45 IPM Printer Support	0.2	0.1
5722-SS1	37	PSF 1-100 IPM Printer Support	0.2	0.1
5722-SS1	38	PSF Any Speed Printer Support	0.2	0.2
5722-SS1	39	International Components for Unicode	4.4	3.1
5722-SS1	41	HA Switchable Resources	0.2	0.2
5722-SS1	42	HA Journal Performance	0.2	0.2
5722-SS1	43	Additional Fonts	7.1	5.6
5722-AF1	Base	IBM Advanced Function Printing Utilities for iSeries	1.8	0.8
5722-AP1	Base	IBM Advanced DBCS Printer Support for iSeries	1.5	0.7
5722-AP1	1	Adv DBCS Printer Support - IPDS	0.3	0.3
5722-BR1	Base	IBM Backup Recovery and Media Services for i5/OS	10.8	5.3
5722-BR1	1	BRMS - Network Feature	0.2	0.2
5722-BR1	2	BRMS - Advanced Feature	0.1	0.1
5722-BZ1	Base	IBM Business Solutions	0.7	0.4
5722-CM1	Base	IBM Communications Utilities for i5/OS	1.2	0.6
5722-CR1	Base	IBM Cryptographic Support for AS/400	0.3	0.2
5722-DB1	Base	IBM System/38 Utilities for AS/400	1.5	0.6
5722-DE1	Base	IBM DB2 Universal Database Extenders for iSeries V8.2	0.2	0.2
5722-DE1	1	Text Extender for iSeries	0.7	0.4
5722-DE1	2	XML Extender	0.7	0.7
5722-DE1	3	Text Search Engine	1.7	1.2
5722-DFH	Base	IBM CICS Transaction Server for i5/OS	2.1	0.7
5722-DFH	1	CICS - Sample Applications	0.3	0.2
5722-DG1	Base	IBM HTTP Server for i5/OS	6.6	4.4
5722-DG1	1	Triggered Cache Manager	1.0	0.7
5722-DP4	Base	IBM DB2 DataPropagator for iSeries, V8.1	1.3	1.6

Table 13. Licensed program time information (continued)

Product	Option	Description	Value for replacing licensed program	Value for adding licensed program
5722-DS1	Base	IBM Business Graphics Utility for AS/400	0.3	0.2
5769-FN1	Base	IBM Advanced Function Printing DBCS Fonts for AS/400	0.1	0.1
5769-FN1	1	AFP DBCS Fonts - Japanese	1.3	1.0
5769-FN1	2	AFP DBCS Fonts - Korean	0.6	0.4
5769-FN1	3	AFP DBCS Fonts - Traditional Chinese	0.3	0.2
5769-FN1	4	AFP DBCS Fonts - Simplified Chinese	0.2	0.2
5769-FN1	5	AFP DBCS Fonts - Thai	0.2	0.1
5769-FNT	Base	IBM Advanced Function Printing Fonts for AS/400	0.1	0.1
5769-FNT	1	AFP Fonts - Sonoran Serif	0.2	0.2
5769-FNT	2	AFP Fonts - Sonoran Serif Headliner	0.1	0.1
5769-FNT	3	AFP Fonts - Sonoran Sans Serif	0.2	0.1
5769-FNT	4	AFP Fonts - Sonoran Sans Serif Headliner	0.1	0.1
5769-FNT	5	AFP Fonts - Sonoran Sans Serif Condensed	0.2	0.1
5769-FNT	6	AFP Fonts - Sonoran Sans Serif Expanded	0.1	0.1
5769-FNT	7	AFP Fonts - Monotype Garamond	0.1	0.1
5769-FNT	8	AFP Fonts - Century Schoolbook	0.1	0.1
5769-FNT	9	AFP Fonts - Pi and Specials	0.1	0.1
5769-FNT	10	AFP Fonts - ITC Souvenir	0.1	0.1
5769-FNT	11	AFP Fonts - ITC Avant Garde Gothic	0.1	0.1
5769-FNT	12	AFP Fonts - Math and Science	0.1	0.1
5769-FNT	13	AFP Fonts - DATA1	0.1	0.1
5769-FNT	14	AFP Fonts - APL2	0.1	0.1
5769-FNT	15	AFP Fonts - OCR A and OCR B	0.1	0.1
5722-IP1	Base	IBM Infoprint Server for iSeries	3.9	3.0
5722-IP1	1	PS to AFP Transform	0.4	0.3
5722-JC1	Base	IBM Toolbox for Java	2.2	1.5
5722-JS1	Base	IBM Advanced Job Scheduler for i5/OS	8.1	3.0
5722-JV1	Base	IBM Developer Kit for Java	1.2	0.5
5722-JV1	5	Java Developer Kit 1.3	3.2	2.3
5722-JV1	6	Java Developer Kit 1.4	2.0	1.0
5722-JV1	7	Java Developer Kit 5.0	6.9	5.7
5722-JV1	8	J2SE 5.0 32 bit	1.0	1.6
1TME-LCF	Base	Tivoli Management Agent	0.5	0.5
5722-LSV	Base	IBM i5/OS Integration for Linux on xSeries	0.4	0.4
5722-MG1	Base	IBM Managed System Services for i5/OS	1.2	0.7
5722-NAE	Base	IBM Network Authentication Enablement for i5/OS	4.1	4.5

Table 13. Licensed program time information (continued)

Product	Option	Description	Value for replacing licensed program	Value for adding licensed program
5722-PT1	Base	IBM Performance Tools for iSeries	1.3	0.8
5722-PT1	1	Performance Tools - Manager Feature	1.0	0.7
5722-PT1	2	Performance Tools - Agent Feature	0.2	0.3
5722-QU1	Base	IBM Query for iSeries	0.6	0.5
5722-RD1	Base	IBM DB2 Content Manager OnDemand for i5/OS	0.9	0.7
5722-RD1	1	OnDemand Spooled File Archive Feature	1.0	0.6
5722-RD1	2	OnDemand Object Archive Feature	0.2	0.2
5722-RD1	3	OnDemand Record Archive Feature	0.2	0.1
5722-RD1	4	OnDemand AnyStore Feature	0.1	0.1
5722-RD1	5	OnDemand Server Feature	0.2	0.1
5722-RD1	10	OnDemand Common Server Feature	2.8	1.3
5722-RD1	11	OnDemand Web Enablement Kit	0.6	0.4
5722-RD1	12	OnDemand PDF Indexer Feature	0.6	0.4
5722-SM1	Base	IBM System Manager for i5/OS	0.8	0.4
5722-ST1	Base	IBM DB2 Query Manager and SQL Development Kit for iSeries	1.4	0.7
5722-TC1	Base	IBM TCP/IP Connectivity Utilities for i5/OS	2.2	1.0
5722-VI1	Base	IBM Content Manager for iSeries	0.8	0.3
5722-VI1	1	Content Manager for iSeries	4.1	1.2
5722-VI1	2	Content Manager for iSeries	0.1	0.1
5722-WDS	Base	IBM WebSphere Development Studio for iSeries	6.0	1.2
5722-WDS	21	iSeries Tools - Application Development	1.8	1.3
5722-WDS	31	ILE RPG	1.0	0.4
5722-WDS	32	System/36 Compatible RPG II	1.4	0.5
5722-WDS	33	System/38 Compatible RPG III	1.3	0.4
5722-WDS	34	RPG/400	1.4	0.3
5722-WDS	35	ILE RPG *PRV Compiler	0.7	0.3
5722-WDS	41	ILE COBOL	1.0	0.4
5722-WDS	42	System/36 Compatible COBOL	1.5	0.3
5722-WDS	43	System/38 Compatible COBOL	1.4	0.3
5722-WDS	44	OPM COBOL	1.6	0.3
5722-WDS	45	ILE COBOL *PRV Compiler	0.8	0.3
5722-WDS	51	ILE C	1.9	0.7
5722-WDS	52	ILE C++	1.4	0.7
5722-WDS	56	IXLC for C/C++	0.5	0.1
5722-WDS	60	Workstation Tools - Base	0.7	0.3
5722-XE1	Base	IBM eServer iSeries Access for Windows	2.9	2.0
5722-XH2	Base	IBM eServer iSeries Access for Web	8.2	6.5

Table 13. Licensed program time information (continued)

Product	Option	Description	Value for replacing licensed program	Value for adding licensed program
5722-XP1	Base	IBM eServer iSeries Access for Wireless	0.5	0.4
5722-XW1	Base	IBM eServer iSeries Access Family	0.2	0.2
5722-XW1	1	iSeries Access Enablement Support	0.2	0.2

Total licensed program installation time: _____

Times for conversions

The number and type of conversions that occur when you upgrade to a new i5/OS release can have a significant effect either during the upgrade or during normal operations after you upgrade. 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 **i5/OS Information Center** (http://www.ibm.com/eserver/iseries/infocenter) for that release.

Integrated file system conversions:

(This information applies only if you are upgrading from the V5R2 operating system. The conversion does not affect the length of time for an upgrade.) As of V5R1, the "root" (/), QOpenSys, and user-defined file systems (UDFS) in the integrated file system support the *TYPE2 directory format.

The *TYPE2 directory format is an enhancement of the original *TYPE1 directory format. *TYPE2 directories have a different internal structure than *TYPE1 directories and provide improved performance and reliability. In releases V5R1 and V5R2, you could optionally convert to the *TYPE2 directory format using the appropriate conversion utility. Additionally, if the system was preloaded with V5R2, the directory format was *TYPE2.

If you have not previously converted to support *TYPE2 directories, the conversion to *TYPE2 directories automatically begins for any of the file systems shortly after V5R4 is installed. This conversion runs in the background during normal operations and should not significantly impact your system activity. For more information on integrated file system directory conversions, see Converting directories from *TYPE1 to *TYPE2 in the i5/OS Information Center (**Files and file systems → Integrated file system → Converting directories from *TYPE1 to *TYPE2**).

Conversion of objects that contain SQL statements:

In i5/OS V5R4, the internal representation of SQL statements has been changed to support statements up to 2 097 152 bytes in length.

The first time these objects are referenced after an upgrade to the new release, the internal representation of SQL statements in programs, service programs,

Distributed Relational Database Architecture™ (DRDA®) packages, and extended dynamic packages that were created before V5R4 is converted automatically to the new format. This conversion should not significantly affect the time to install the release, but could be noticed after the installation is complete and objects that contain SQL statements are referenced for the first time. To control when these object conversions are performed, use the Start Object Conversion (STROBJCVN) command after you upgrade. For further information, see Informational APAR II14080 on the Support for IBM System i Web site (www.ibm.com/systems/support/i/). In the navigation bar, click **Technical databases**; then click **Authorized Problem Analysis Reports APARs**.

Database file conversions:

In i5/OS V5R4, database files that were created on a release earlier than V5R4 are converted to eliminate a performance degradation that might occur due to Enhanced Hardware Storage Protection support.

Because database files (*FILE objects) consist of many machine interface (MI) objects, the time to convert them could be significant when an application is started the first time after V5R4 is installed. Also, because the MI objects will have their header size increased to 4K during the conversion, each MI object associated with a database file will grow in size by 4K (4096 bytes).

To spread the MI object conversions out over a period of time, the database file conversion support is designed to be done when the database MI objects are first accessed or used after V5R4 is installed. If you would like to evaluate the impact that the database file conversions might have on one or more of your applications and determine if you have enough time during your upgrade window to take the necessary steps to eliminate the startup performance degradation for your more critical applications, run the QDBFIMIC program that is included in PTF SI18716 (if you are upgrading from V5R2) or PTF SI18615 (if you are upgrading from V5R3). The cover letter for these PTFs (and all other PTFs) is on the Support for IBM System i Web site (www.ibm.com/servers/support/i/). In the navigation bar, click **Technical databases**; then click **PTF Cover Letters**.

IBM Backup Recovery and Media Services for i5/OS conversions:

If you have this licensed program installed, review the following information on product initialization.

If you are upgrading IBM Backup Recovery and Media Services for i5/OS (Backup Recovery and Media Services), 5722-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 Memo to Users in the i5/OS Information Center has more information about BRMS product initialization and methods for determining the estimated product initialization time. The *Memo to Users* is also available from the Support for IBM System i Web site (www.ibm.com/systems/support/i/).

Data protection mechanisms

If your system uses mirroring or an implementation of a RAID 5 technique on the disk units in the system ASP, your i5/OS 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, the total installation time (for Licensed Internal Code, the i5/OS 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 techniques do not affect the duration of save operations.

Using the percents given, include a time estimate for your system in "Checklist: Estimating i5/OS installation time" on page 191.

Installation devices and media

These devices can be used to install the i5/OS release.

"Types of software installation devices" on page 8 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 i5/OS release.

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 179 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.

Image catalog for a virtual optical device

You can use an optical image catalog to perform an i5/OS software upgrade, install PTFs (fixes), or install single licensed programs that you receive on CD-ROM or optical media. You can also use a tape image catalog and a virtual tape device to install PTFs or to install single licensed programs. You cannot, however, use a virtual tape device to install or upgrade to an i5/OS release.

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 i5/OS 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 optical devices do not support the following:
  - Write operations (prior to 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 1074 MB of free storage on the load-source disk unit. "Preparing to upgrade or replace software using an image catalog" on page 38 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 47 describes other general considerations on how to free up space in the load-source disk unit.

Tape or tape libraries

This topic includes i5/OS 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 is either an internal or an external tape unit attached to a storage IOA on system bus 1. If you have only one tape unit, use it as the tape unit for the alternate IPL. 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 or to install single licensed programs. You cannot use virtual tape to install or upgrade an i5/OS 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 161 for recovery information.

Sharing a tape device

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.

Setting up your tape library for installation

When you install a release using a tape library device, do not use the device in library mode or random mode. The 3494 tape library should use standalone mode. The 3490 and 35xx tape libraries should use either automatic, sequential, or manual mode. Refer to the operator's guide for the media library device for information on setting up and using the correct mode.

Non-IBM tape device

This topic provides recommendations for non-IBM tape device use during an i5/OS 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 i5/OS installation process, and receive message CPF5401. If this occurs, contact your vendor to confirm whether your tape drive is compatible with V5R4.

Alternate installation device

This information describes setup and disabling guidelines for an alternate i5/OS installation device

If you use an alternate installation device, you need to ensure that the device is set up and enabled. You will need the following media:

- Media containing Licensed Internal Code that matches the level on your installation media. It is recommended that you use your IBM-supplied Licensed Internal Code media. Tape or DVD-RAM media can also be used.
- Tape or optical Installation media.

The following topics pertain to the setup and use of an alternate installation device.

Overview: Alternate installation device

You can perform i5/OS 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.

If you use an alternate installation device, the system uses 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.

You can use the alternate installation device function for any installation or recovery that requires replacing Licensed Internal Code, the operating system, licensed programs, or data. Some models might require that you set up an alternate installation device and then use the alternate installation device to install the distribution media created by a central site or for recovery using a SAVSYS media volume.

Attention: Tape devices attached by a Fibre Channel interface will need to be set up as alternate installation devices.

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 CD-ROM, DVD-RAM, or tape media that contains the Licensed Internal Code and your save media.

Setting up an alternate installation device

Before you use an alternate i5/OS installation device, certain requirements must be met.

About this task

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 different bus and you do not have this information available, you will not be able to complete installations or recoveries.

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.

Do the following to set the addresses and enable the alternate installation device:

Note:

- You need to know the password for Dedicated Service Tools to perform this procedure.
- **Logical partition users:**
  - If you have a primary partition and are going to use the following command on the primary partition, be sure to power off all secondary partitions before running the command.
  - If you are using the Hardware Management Console, refer to the Managing your server using the Hardware Management Console topic in the IBM Systems Hardware Information Center (**Managing your server and devices → Managing your server using the Hardware Management Console**).

Procedure

1. Use the control panel to set the mode to **Manual**. Then perform an IPL using the command: `PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)`

   Note: An alternative to this step is to use the control panel to select function 21 (Dedicated Service Tools). If you use this alternative, go to step 3. You will not need to perform step 12 on page 204.
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.

```
                  Dedicated Service Tools (DST) Sign On
                                                        System:   SYSTEMA
Type choices, press Enter.
   DST user . . . . . . . . . . . .  QSECOFR
   DST password . . . . . . . . . .
```

   Sign on using the QSECOFR user profile.

   Note: Do not sign on with a profile other than QSECOFR.
4. The Use Dedicated Service Tools (DST) menu appears. From the Use Dedicated Service Tools (DST) menu, do the following:
   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. When the Select Media Type display appears, select 1 for tape or 2 for optical media. Press Enter.
6. From the Select Alternate Installation Device display, type a 5 (Display details) next to the resource you want and press the Enter key.

```
                    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

         Bus      Resource                    Serial
 Option  Number   Name         Type   Model   Number          Selected
   _        1     OPT08        6330   002     00-11111
   _        3     TAP19        3570   B11     13-22222            *



F2=Deselect device    F3=Exit    F5=Refresh    F12=Cancel
```

7. The Display Device Details display appears.

```
                          Display Device Details
                                                          System:   SYSTEMA
 Resource                                  Serial
 Name            Type        Model         Number
 TAP19           3570        B11           13-22222

 Physical location:
   Location text . . . . . . . :
   Frame ID  . . . . . . . . . :
   Card slot . . . . . . . . . :

 Logical address:
  SPD bus:
   System bus  . . . . . . . . :   0003
   System board  . . . . . . . :   0000
   System card . . . . . . . . :   0002

  Storage:
   I/O bus number  . . . . . . :   0000
   Controller  . . . . . . . . :   0007
   Device address  . . . . . . :   0000

 F3=Exit   F12=Cancel
```

You need to have a record of the addresses assigned to the alternate installation device selected for installing and recovering your system. Record the following information:

- Type/Model: _____
- System bus: _____
- System card: _____

Note:

a. 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.

b. If more than one alternate installation device is defined, only one can be enabled.
c. 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
                                                          System:   SYSTEMA
Select one of the following:

     1. Exit Dedicated Service Tools (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

Certain situations might require that an alternate i5/OS installation device be disabled.

About this task

An alternate installation device can be disabled for one of the following reasons:

- To continue with an installation using CD-ROM media.
- To enable a different device as an alternate installation device.
- To correct the logical address if hardware has been moved or changed.

Procedure

1. Use the control panel to set the mode to **Manual**. Then perform an attended IPL using the command: `PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)`.

   Note: An alternative to this step is to use the control panel to select function 21. (Dedicated Service Tools). If you use this alternative, skip steps 2 and 9 on page 205 below.

   Note: If you have a primary partition and secondary partitions and are going to use this command on the primary partition, be sure to power off all secondary partitions before running the command.

   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 (**Managing your server and devices → Managing your server using the Hardware Management Console**).
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, do the following:
   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 Dedicated Service Tools (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 an i5/OS manual installation, follow these procedures.

About this task

Procedure

1. The Install Licensed Internal Code display appears.

```
                      Install Licensed Internal Code
                                                          System: XXXX
Select one of the following:

     1. Install Licensed Internal Code
     2. Work with Dedicated Service Tools (DST)
     3. Define alternate installation device
```

   Type 3, and press Enter. This will verify the address of an alternate installation device attached to the system and determine whether it is enabled or disabled.
2. **Verifying and selecting alternate installation device:** 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
  _             5
  _             6
  _             7
  _             8
  _             9
  _             A
  _             B
  _             C
  _             D
                                                              More.....
F2=Deselect Device  F3=Exit       F12=Cancel
```

a. Verify that the selected device is on the correct system bus (the bus to which your device is attached). If you do not know the correct bus, you can try each bus number. 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 can take several minutes. If you see the message `No alternate installation device configured`, wait one minute and refresh the screen.

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

         Bus      Resource                    Serial
 Option  Number   Name         Type   Model   Number          Selected
   _        1     TAP08        6386   001     00-11111
   _        3     TAP19        3570   B11     13-22222            *



F2=Deselect device    F3=Exit    F5=Refresh    F12=Cancel
```

d. Type 1 to select the device and make any needed corrections to select, enable, or disable the device. Press Enter to confirm the changes.

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.

i5/OS release interoperability

A system interoperates with another system when you exchange data or when you save and restore objects. Review the supported combinations of OS/400 and i5/OS 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 interoperates with another system when it exchanges data or 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 releases on systems must all be supported when data is exchanged

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.

For example, PCs that have V5R4M0 IBM eServer iSeries Access for Windows installed support functions on systems running i5/OS (OS/400) V5R2 or later.

Requirements for saving and restoring objects to be interoperable with previous 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 on supported combinations of i5/OS (OS/400) releases or saving objects to a system that is running a previous release, see the section on release-to-release support in the Backup and Recovery manual.

Installation notes about the i5/OS release

This information describes miscellaneous requirements or changes to the i5/OS release.

Note: The system must be in a restricted state to install the QGPL and QUSRSYS libraries, and to install Option 12 (Host Servers).

5722-SS1, i5/OS Option 1 This option installs automatically when you install the new release of the operating system. You cannot delete this option.

5722-SS1, i5/OS Option 3 This option installs automatically when you install the new release of the operating system. This option contains IFS directories. You cannot delete this option.

IBM Cryptographic Access Provider 128-bit for iSeries, 5722-AC3, has been removed. The function from this licensed program is now included in IBM Network Authentication Enablement for i5/OS (5722-NAE), and in several i5/OS (5722-SS1) options.

IBM iSeries Integration for Windows Server, 5722-WSV, is now part of the operating system as option 29, IBM i5/OS Integration for Windows Server.

To find other information about what's new or changed this release, see the Memo to Users in the information center. For more information on 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 i5/OS order.

If you requested electronic software delivery, refer to the Electronic software delivery
Web site for the list of filenames associated with the standard set and keyed set (http://www.ibm.com/servers/support/software/delivery/en_US/downloadinfo.html)

products.

Your media for installation needs to be arranged in the order that is listed. The licensed programs are identified as standard set products and keyed set products.

Release identifier for V5R4: R04M00

Distribution media labels indicate the version, release, and modification level in a format that is different from what appears on displays during installation. The media labels show the release and modification level in the format R0xM00.

Media type identifiers

Labels on the distribution media that are used for installation have unique identifiers. Media type identifiers help you determine when to use each media volume. The identifier on the label begins with the letters *RS* and is followed by a series of numbers. The identifiers for B29xx_01 and B29xx_02 must match each other.

Note: With your V5R4 software order, you receive the *Prepare for install PTFs for V5R1, V5R2, and V5R3*, SK3T-8163, CD-ROM. This media contains PTFs that you temporarily apply to be able to accept online software agreements for V5R4 licensed programs.

When you are ready to install your new software, arrange the media in this order:

1. I_BASE_01 Licensed Internal Code for i5/OS

   This language-independent Licensed Internal Code supports all national language features. The Licensed Internal Code is part of the standard set of media.
2. B29xx_01 IBM i5/OS

   This standard set media contains the base part of the i5/OS operating system.

3. B29xx_02 i5/OS no-charge options

   This standard set media contains IBM-supplied libraries QGPL and QUSRSYS and a no-charge optional part of i5/OS.

4. B29MM_03 i5/OS no-charge options

   This standard set media contains the no-charge option 3, i5/OS - Extended Base Directory Support.

5. B29MM_04 i5/OS no-charge options

   This standard set media contains more of the no-charge option 3, i5/OS - Extended Base Directory Support.

6. D29xx_01 i5/OS no-charge options

   This standard set media contains more of the no-charge optional parts of i5/OS.

7. D29xx_02 i5/OS no-charge options

   This standard set media contains more of the no-charge optional parts of i5/OS.

8. D29xx_03 i5/OS no-charge options

   This standard set media contains option 43 of the operating system, i5/OS - Additional Fonts.

9. D29xx_04 no-charge licensed programs

   This standard set media contains some of the no-charge licensed programs.

10. D29xx_05 no-charge licensed programs

    This standard set media contains some of the no-charge Java Developer Kit licensed programs.

11. D29xx_06 no-charge licensed program

    This standard set media contains the no-charge Java Developer Kit 5.0 licensed program.

12. D29xx_07 no-charge licensed program

    This standard set media contains the no-charge J2SE 5.0 32 bit licensed program.

13. L29xx_01 Priced licensed programs

    This keyed set media contains keyed options of i5/OS and some of the keyed products and keyed product options.

14. L29xx_02 Priced licensed programs

    This keyed set media contains additional keyed products and keyed product options.

15. F_MULTI_NLV keyed set

    This keyed set media contains additional keyed products and keyed product options.

16. F29xx_01 Single licensed programs

    This media contains individual products that you ordered. Each piece of media is labeled in the same manner: F29xx_01. If you receive more than one media volume for a single licensed program, the additional volumes are labeled F29xx_02, F29xx_03, and so on. Refer to “Licensed program releases and sizes” on page 185 for the single products available this release.

17. N29xx_01 Secondary Language Media

    This media contains only language objects for the indicated secondary language. For secondary language media, the value for 29xx is the feature

code of the secondary language as used for installation. “Feature codes for national language version” on page 214 contains a listing of the specific national language feature codes.

18. SK3T-4091 i5/OS Information Center

    This media volume comes with all i5/OS orders. This package includes the i5/OS Information Center and PDF versions of System i topics and manuals.

Notes:

1. Keep all of your distribution media. You might need them for recovery procedures.
2. Media identifiers that contain the string 29*xx* (where *xx* are numerals) indicate language-specific media. This string indicates the national language feature code for the primary language. For example, media labeled B2928_01 would be i5/OS with French as the primary language.
3. You might receive additional media volumes that do not conform to these descriptions. Examples include media that contain PRPQs or media for iSeries Access products that are installed on workstations. Also, IBM Business Partners might label the media differently.
4. 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.

Standard set products

The following tables list specific i5/OS products that are contained in the standard set CD-ROMs at the time of publication.

The standard set comes with every software release order. It contains the hardware and software components to install on your system. This includes the Licensed Internal Code, the operating system, its no-charge options, and no-charge (bonus) licensed programs and features, such as online help messages.

I_BASE_01 standard set

Product	Description
5722999	Licensed Internal Code for i5/OS

B29xx_01 standard set

Product	Description
5722SS1	i5/OS

B29xx_02 standard set

Product	Description
5722SS1	i5/OS (continued)
5722SS1	i5/OS - Library QGPL
5722SS1	i5/OS - Library QUSRSYS
5722SS1 option 1	i5/OS - Extended Base Support
5722SS1 option 2	i5/OS - Online Information

B29MM_03 standard sets

Product	Description
5722SS1 option 3	i5/OS - Extended Base Directory Support

B29MM_04 standard sets

Product	Description
5722SS1 option 3	i5/OS - Extended Base Directory Support (continued)

D29xx_01 standard set

Product	Description
5722SS1 option 3	i5/OS - Extended Base Directory Support (continued)
5722SS1 option 5	i5/OS - System/36 Environment
5722SS1 option 6	i5/OS - System/38 Environment
5722SS1 option 7	i5/OS - Example Tools Library
5722SS1 option 8	i5/OS - AFP Compatibility Fonts
5722SS1 option 9	i5/OS - *PRV CL Compiler Support
5722SS1 option 12	i5/OS - Host Servers
5722SS1 option 13	i5/OS - System Openness Includes
5722SS1 option 14	i5/OS - GDDM
5722SS1 option 21	i5/OS - Extended NLS Support
5722SS1 option 22	i5/OS - ObjectConnect
5722SS1 option 29	i5/OS - Integrated Server Support

Note: 5722SS1 option 25 (i5/OS - NetWare Enhanced Integration), if ordered, is delivered on separate media.

D29xx_02 standard set

Product	Description
5722SS1 option 30	i5/OS - Qshell
5722SS1 option 31	i5/OS - Domain Name System
5722SS1 option 33	i5/OS - Portable Application Solutions Environment
5722SS1 option 34	i5/OS - Digital Certificate Manager
5722SS1 option 35	i5/OS - CCA Cryptograhic Service Provider
5722SS1 option 39	i5/OS - International Components for Unicode

D29xx_03 standard set

Product	Description
5722SS1 option 43	i5/OS - Additional Fonts

D29xx_04 standard set

Product	Description
5722BZ1 *BASE	IBM Business Solutions
5722DG1 *BASE	IBM HTTP Server for iSeries
5722DG1 option 1	Triggered Cache Manager
5722JC1 *BASE	IBM Toolbox for Java
5722LSV *BASE	IBM i5/OS Integration for Linux on xSeries
5722NAE *BASE	IBM Network Authentication Enablement for i5/OS
1TMELCF *BASE	Tivoli Management Agent
5722TC1 *BASE	IBM TCP/IP Connectivity Utilities for iSeries
5722XE1 *BASE	IBM eServer iSeries Access for Windows
5722XP1 *BASE	IBM eServer iSeries Access for Wireless

D29xx_05 standard set

Product	Description
5722JV1 *BASE	IBM Developer Kit for Java
5722JV1 option 5	Java Developer Kit 1.3
5722JV1 option 6	Java Developer Kit 1.4

D29xx_06 standard set

Product	Description
5722JV1 option 7	Java Developer Kit 5.0

D29xx_07 standard set

Product	Description
5722JV1 option 8	J2SE 5.0 32 bit

Keyed set products

The following tables list i5/OS products that are contained in the priced licensed programs CD-ROMs at the time of publication.

The keyed set comes with the standard set for every software or upgrade order. It contains keyed products and program options. Use the following information to verify the licensed programs that you ordered.

L29xx_01 keyed set

Product	Description
5722SS1 option 18	i5/OS - Media and Storage Extensions
5722SS1 option 36	i5/OS - PSF 1-45 IPM Printer Support
5722SS1 option 37	i5/OS - PSF 1-100 IPM Printer Support
5722SS1 option 38	i5/OS - PSF Any Speed Printer Support

Product	Description
5722SS1 option 41	i5/OS - HA Switchable Resources
5722SS1 option 42	i5/OS - HA Journal Performance
5722AF1 *BASE	IBM Advanced Function Printing Utilities for iSeries
5722BR1 *BASE	IBM Backup Recovery and Media Services for i5/OS
5722BR1 option 1	BRMS - Network Feature
5722BR1 option 2	BRMS - Advanced Feature
5722CM1 *BASE	IBM Communications Utilities for i5/OS
5722DE1 *BASE	IBM DB2 Universal Database Extenders for iSeries V8.2
5722DE1 option 1	Text Extender for iSeries
5722DE1 option 2	XML Extender
5722DE1 option 3	Text Search Engine
5722JS1 *BASE	IBM Advanced Job Scheduler for i5/OS
5722PT1 *BASE	IBM Performance Tools for iSeries
5722PT1 option 1	Performance Tools - Manager Feature
5722PT1 option 2	Performance Tools - Agent Feature
5722QU1 *BASE	IBM Query for iSeries
5722ST1 *BASE	IBM DB2 Query Manager and SQL Development Kit for iSeries
5722WDS *BASE	IBM WebSphere Development Studio for iSeries
5722WDS option 21	iSeries Tools - Application Development
5722WDS option 31	Compiler - ILE RPG
5722WDS option 32	Compiler - System/36 Compatible RPG II
5722WDS option 33	Compiler - System/38 Compatible RPG III
5722WDS option 34	Compiler - RPG/400
5722WDS option 35	Compiler - ILE RPG *PRV
5722WDS option 41	Compiler - ILE COBOL
5722WDS option 42	Compiler - System/36 Compatible COBOL
5722WDS option 43	Compiler - System/38 Compatible COBOL
5722WDS option 44	Compiler - OPM COBOL
5722WDS option 45	Compiler - ILE COBOL *PRV
5722WDS option 51	Compiler - ILE C
5722WDS option 52	Compiler - ILE C++
5722WDS option 56	Compiler - IXLC for C/C++
5722WDS option 60	Workstation Tools - Base

L29xx_02 keyed set

Product	Description
5722DP4 *BASE	IBM DB2 DataPropagator for iSeries V8.1
5722XH2 *BASE	IBM eServer iSeries Access for Web
5722XW1 *BASE	IBM eServer iSeries Access Family

Product	Description
5722XW1 option 1	iSeries Access Enablement Support
5722IP1 *BASE	Infoprint Server for iSeries. **Note:** Option 1 (PS to AFP Transform), if ordered, is delivered on separate media.
5722AP1 *BASE (if media is in double-byte character set language)	IBM Advanced DBCS Printer Support for iSeries
5722AP1 option 1 (if media is in double-byte character set language)	Advanced DBCS Printer Support - IPDS

F_MULTI_NLV keyed set

Product	Description
5733QU2 *BASE	IBM DB2 Web Query for System i
5733QU2 option 1	Active Reports
5733QU2 option 2	OLAP Module
5733QU2 option 4	Run Time User Enablement
5733QU3 *BASE	IBM DB2 Web Query Report Broker
5733QU4 *BASE	IBM DB2 Web Query Software Development Kit

Feature codes for national language version

Use this table to locate the appropriate i5/OS feature code for your primary or secondary language.

Note: Labels on the installation media indicate the feature code for the primary language (29xx). When you install the i5/OS operating system, the system prompts for the primary language in the form 29xx.

The secondary language feature code is only used when ordering secondary languages (55xx). 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 as a secondary language, the secondary language media volume would be labeled N2928, and you would select 2928 from the list of feature codes when you install the secondary language.

Primary language feature code	Secondary language feature code	National language
2902	5502	Estonian
2903	5503	Lithuanian
2904	5554	Latvian
2905	5505	Vietnamese
2906	5506	Lao
2909	5509	Belgian English
2911	5511	Slovenian

Primary language feature code	Secondary language feature code	National language
2912	5512	Croatian
2913	5513	Macedonian
2914	5514	Serbian Cyrillic
2922	5522	Portuguese
2923	5523	Dutch Netherlands
2924	5524	English
2925	5525	Finnish
2926	5526	Danish
2928	5528	French
2929	5529	German
2930	5530	Japanese
2931	5531	Spanish
2932	5532	Italian
2933	5533	Norwegian
2937	5537	Swedish
2938	5538	English Uppercase DBCS
2939	5539	German Multinational Character Set
2940	5540	French Multinational Character Set
2942	5542	Italian Multinational Character Set
2954	5554	Arabic
2956	5556	Turkish
2957	5557	Greek
2958	5558	Icelandic
2961	5561	Hebrew
2962	5662	Japanese Kanji
2963	5563	Belgian Dutch
2966	5566	Belgian French
2972	5572	Thai
2974	5574	Bulgarian
2975	5575	Czech
2976	5576	Hungarian
2978	5578	Polish
2979	5579	Russian
2980	5580	Brazilian Portuguese
2981	5581	Canadian French
2984	5584	English DBCS
2986	5586	Korean
2987	5587	Traditional Chinese

Primary language feature code	Secondary language feature code	National language
2989	5589	Simplified Chinese
2992	5592	Romanian
2994	5594	Slovakian
2995	5595	Albanian
2996	5596	Portuguese Multinational Character Set
2998	5598	Farsi

Blank displays

During an i5/OS 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 161 and follow the instructions.

Using D-mode IPL to refresh the vital product data

If you installed or upgraded to a POWER6 model and are starting the system for the first time, follow these steps to start your system and locate the load source.

Before you begin

Before you begin this procedure, be sure that you have completed the necessary hardware planning procedures and that you are familiar with how to set up and operate the Hardware Management Console (HMC). For more information about using the HMC as your i5/OS console, see the Operations Guide for i5/OS Consoles.

Ensure that your service representative has completed the hardware upgrade installation instructions and that your system is in Standby status.

About this task

To start your system and locate the load source, follow these steps:

Procedure

1. Verify that your i5/OS system console is set up correctly and is ready.
2. Ensure that the alternate installation device is set up correctly. For instructions, see "Alternate installation device" on page 201 and then return here.
3. Make sure that the I_BASE_01 Licensed Internal Code optical media is loaded into the device that is defined for the system.
4. On the HMC, in the Navigation area, expand the **Systems Management** folder.
   a. In the Navigation area, click **Servers**. Select the server.

b. In the Contents area, select the logical partition that you want to start.
c. Select **Tasks** > **Operations** > **Activate**.
d. Under activation option, click **Manufacturing Default Configuration**. For the Keylock position, select **Manual**. For the IPL type, select **D: IPL from the alternate load source (CD or tape) for install**.
e. Click **OK** to activate the system. This IPL can take several minutes.

5. If you are using the HMC console, open the console window.
   a. On the HMC, in the Navigation area, expand the **Systems Management** folder.
   b. In the Navigation area, click **Servers**. Select the server.
   c. In the Contents area, select the logical partition that you want to start.
   d. Select **Tasks** > **Console window** > **Open dedicated 5250 console**.
6. The Select a Language Group display appears.

```
                        Select a Language Group


The language feature shown is the language feature
installed on the system.

Attention:  To keep the same primary language, ensure that the
media you use for installing the operating system
matches the language feature shown.  If the operating
system media does not match what is shown, the
installation process will attempt to install the
operating system in a different language feature than
Licensed Internal Code.  This is undesirable.


Type choice, press Enter.

  Language feature . . . . . .   2924
```

   The language feature 2924 (English) is the default for this display.

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

   To change the service tools language to match the primary language, type the language feature that appears on the media that contains the operating system.

   Press Enter.
7. After you enter the language feature, the Confirm Language Group display appears.

```
             Confirm Language Group


  Language feature  . . . . . :   2924

  Press Enter to confirm your choice for language feature.
  Press F12 to change your choice for language feature.
```

   Press Enter.
8. The Install Licensed Internal Code display appears.

```
                    Install Licensed Internal Code
                                                          System: XXXX
Select one of the following:

     1. Install Licensed Internal Code
     2. Work with Dedicated Service Tools (DST)
     3. Define alternate installation device
```

Select option 2 (Work with Dedicated Service Tools (DST)) and press Enter.

9. At the Sign On display, sign on as the security officer (QSECOFR for the service tools user and QSECOFR for the service tools password).
10. Select option 2 (Work with Disk Units) and press Enter.
11. Select option 8 (Update system vital product data) to identify the location of the load-source disk unit. Press Enter.
12. The Update System Vital Product Data display appears. Press Enter to confirm that the vital product data should be written. Press F12 twice. Then press 1 and Enter to exit DST.
13. On the HMC, in the Navigation area, expand the **Systems Management** folder.
    a. In the Navigation area, click **Servers**. Select the server.
    b. In the Contents area, select the logical partition you want to start.
    c. Select **Tasks** > **Properties**.
    d. Select **Setting**. Change the IPL source to **B** and the keylock position to **Manual**.
    e. Click **OK**.
14. On the HMC, in the Navigation area, expand the **Systems Management** folder.
    a. In the Navigation area, click **Servers**. Select the server.
    b. In the Contents area, select the logical partition that you want to start.
    c. Select **Tasks** > **Operations** > **Shutdown** to power off the logical partition.
15. On the Shutdown Partitions window, under **Shutdown options**, select **Delayed**. Click **OK**.
16. On the HMC, in the Navigation area, expand the **Systems Management** folder.
    a. In the Navigation area, click **Servers**. Select the server.
    b. Select **Tasks** > **Operations** > **Power On**.
    c. Select **Partition auto start** and click OK.

What to do next

Continue with your installation or hardware upgrade 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 System i models 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.

***BKLVLOPT**
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 i5/OS 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 41.

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 23.

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 `GO 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 47.

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, "i5/OS 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 i5/OS 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 47.

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 32.

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 for the immediate next release. This option does not provide status, however, on whether the space can be allocated. If you are upgrading from V5R2 to V5R4, the preferred method of allocating additional space is to use the Allocate Licensed Internal Code (LIC) Space API (QLPALCSP). If you are upgrading from V5R3 to V5R4, it is required that you use the QLPALCSP API. Directions for doing this are included in "Required: Allocating additional space for Licensed Internal Code" on page 49.

The **Keep disk configuration** option appears starting in V5R3. Use this option to change your disk configuration before you upgrade or replace a release.

Options on Work with Licensed Programs menu

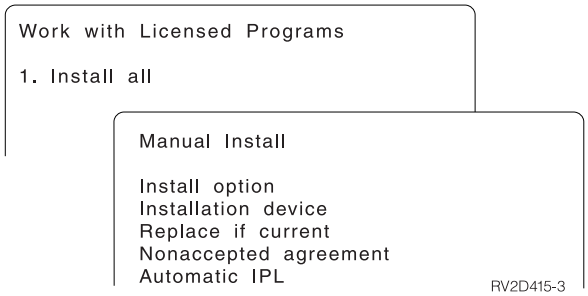
Use this information to determine when and how you can use these options.

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 8.

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.

Attention: If you do this on a primary partition when secondary partitions are active, this will cause all partitions to do an IPL immediately. If you have active secondary partitions, power them off prior to using this procedure.

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 (**Managing your server and devices → Managing your server using the Hardware Management Console**).

Automatic installation options

The i5/OS 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 220 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 41 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 i5/OS 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 or not the licensed program is successfully installed. Refer to "Installed status values" on page 219 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 161 to install the licensed program again.

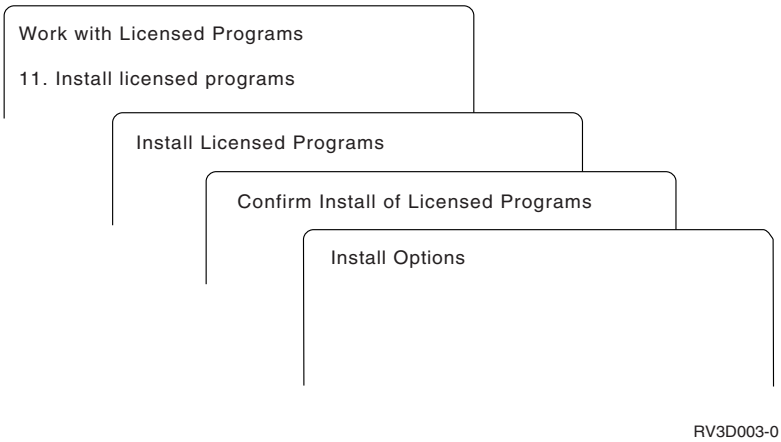
You can use the F11 key to view the Installed Release column. This column shows the release and modification of each installed licensed program. The F11 key has a third view, also, that shows the product option number of each licensed program.

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 i5/OS operating system became available.

Note: Before you install any licensed programs, be sure to check the product documentation in the i5/OS 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 8.

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 230.) 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 161 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.

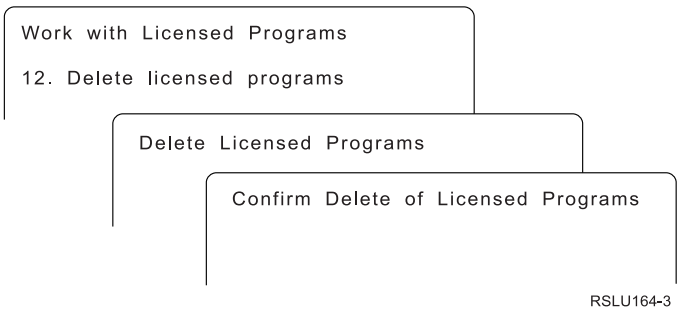
Option 12. Delete licensed programs

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 158 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.



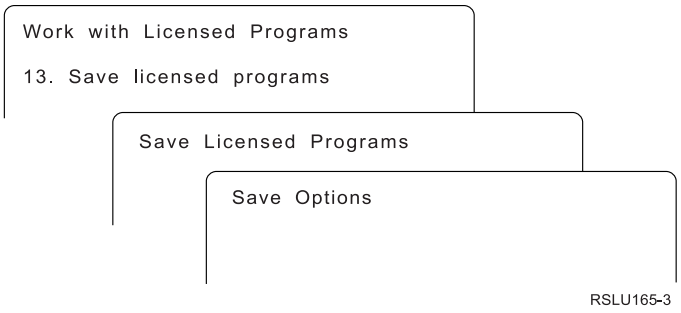
Type a 4 in the Option column next to the licensed program or optional part of a licensed program that you want to delete from your system.

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 8.

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 i5/OS Information Center (**i5/OS and related software → Distributing software**). For information on saving your system, refer to the Backing up your system topic in the i5/OS Information Center (**Systems management → Backing up and recovering your system → Backing up your system**).

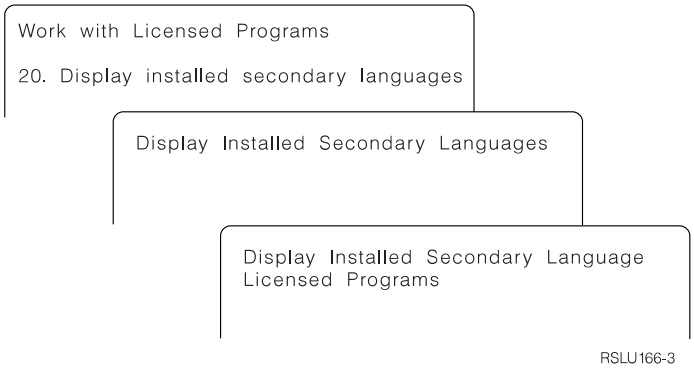
Options for secondary languages

Secondary languages on an i5/OS system can be displayed, installed, or deleted.

Option 20. Display secondary languages

After an i5/OS 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.



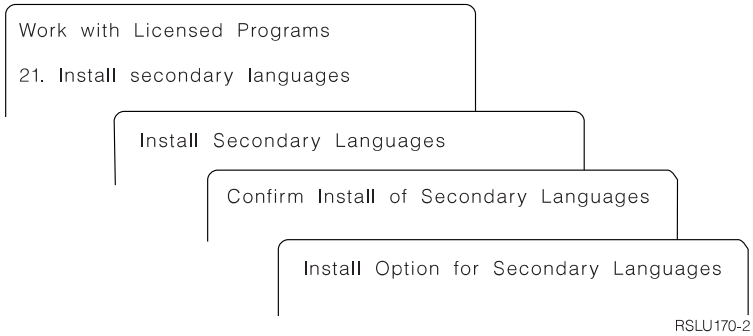
Type 5 in the Option column next to a secondary language, and press Enter to see the licensed programs that are installed with the particular secondary language.

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 219.

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:

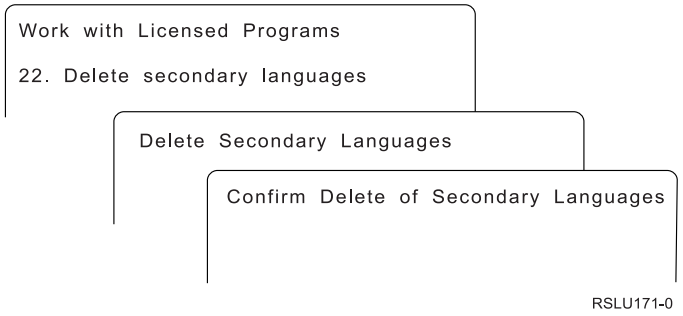
- The language you selected to install
- The library where it will be installed
- The release level of the language

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 8 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.

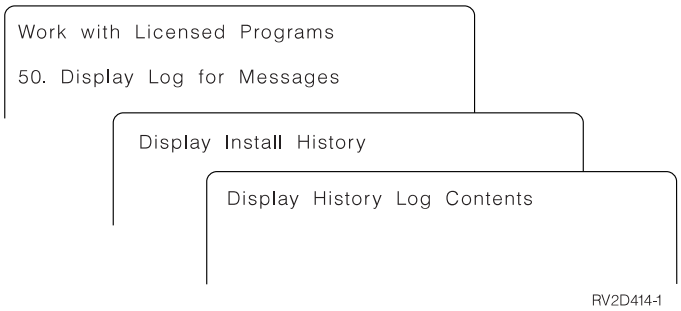
More information about secondary language libraries in user profiles is available in the i5/OS Globalization topic in the i5/OS Information Center (**Programming → i5/OS Globalization**).

Completion status

When you install licensed programs, a secondary language, or PTFs, make sure that the i5/OS 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 161 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 i5/OS 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 i5/OS Information Center (**i5/OS and related software → Maintaining and managing i5/OS and related software → Using software fixes**).

Option 72 shows the Licensed Commands display.

More information about the following commands is available in the topic Control language (CL) in the i5/OS Information Center (**Programming → CL**).

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 software installation

This list includes related sources of information for i5/OS software installation or upgrades.

Manuals

- **Memo to Users** (about 50 pages)

  This document provides information about software and hardware changes that could potentially affect your system operations.

- **Backup and Recovery** (about 600 pages)

  This document provides general information about i5/OS backup and recovery options. Topics include saving your system, restoring to different releases of i5/OS (OS/400), and selecting the right recovery strategy.

IBM Redbooks®

- **IBM System i5 Handbook**

  This book provides a product overview of the eServer and IBM Systems i5 and System i servers. It discusses the features, functions, and technical specifications for server models offered today, and identifies the software supported by the current product line. Use this Web page (http://publib-b.boulder.ibm.com/cgi-bin/searchsite.cgi?query=iseries+AND+handbook) to search for the correct version.

- **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 i5/OS from the load-source disk unit that is attached via the 2847 I/O processor.

Web sites

- **Support for IBM System 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 System i Support: Planning** (http://www.ibm.com/systems/support/i/planning/)

  This Web site provides links to a variety of planning tools and information.

- **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 on products or features that might not be supported in future releases of the i5/OS operating system or on future System i models.

- **IBM System i services** (http://www.ibm.com/services/its/us/inteapps.html)

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This Web site contains information on the services IBM has available for System i maintenance services.

- **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 i5/OS 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)

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Other information in the i5/OS Information Center

- The **Backup and recovery** category contains information on 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 iSeries Navigator.
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i5/OS and related software
Installing, upgrading, or deleting i5/OS and related software
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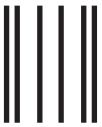

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