IBM

System i and System p

i5/OS and related software
Distributing software

Version 6 Release 1

IBM

System i and System p

i5/OS and related software
Distributing software

Version 6 Release 1

IBM

> **Note**
>
> Before using this information and the product it supports, read the information in "Notices," on page 31.

Contents

Distributing software

Sometimes it is desirable to duplicate some or all of a system's programs, including the operating system, onto another system. You can also duplicate some or all of a logical partition's programs onto another logical partition. The distribution process is especially useful and convenient when your network is large and you want all the systems in your computing environment to be identical.

To do this with a minimum of effort and maximum benefits, you need to plan and consider the options available for distributing software products. You can use System i® Navigator or central site distribution to distribute supported products. You can also use virtual images as distribution media.

Note: By using the code examples, you agree to the terms of the "Code license and disclaimer information" on page 28.

What's new for V6R1

Read about new or significantly changed information for the Distributing software topic collection.

In addition to being able to use virtual optical images to distribute software using central site distribution, you can use virtual tape devices. Instructions are included in "Optional: Preparing the central system for virtual tape images" on page 15.

The virtual optical device support of i5/OS® provides a method for using virtual optical images from a single image source that can be shared with other systems in a network. A client with the virtual optical device type 632B model 003 can access images located on a server that uses the Network File System (NFS). See "Distributing additional licensed programs or fixes by using the Network File System" on page 23.

You can use the Duplicate Optical (DUPOPT) command to duplicate virtual images to physical DVD or CD-RW media. Refer to the topic "Optional: Duplicating virtual images to physical media" on page 18.

A copy of the image catalog information is now stored in the image catalog directory in a file called QIMGCLG. This makes the software distribution and catalog creation after moving the image files between systems easier. The new *IMPORT parameter of the Create Image Catalog (CRTIMGCLG) command allows a catalog to be created based on existing catalog information that is located in the QIMGCLG file. Catalog entries will appear as they did in the previous catalog. Steps for this are included in "Optional: Preparing the target system for virtual images" on page 21.

How to see what's new or changed

To help you see where technical changes have been made, this information uses:
* The ≫ image to mark where new or changed information begins.
* The ≪ image to mark where new or changed information ends.

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

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

PDF file for Distributing software

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

To view or download the PDF version of this document, select Distributing software (about 30 pages).

You might want to print only the specific reference information associated with distributing software using Central site distribution.
- "Central site distribution media contents" on page 24
- "Licensed programs that do not support secondary languages" on page 26
- "Cover sheet for central site distribution media" on page 27

You can also view or download this related topic:

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

Saving PDF files

To save a PDF on your workstation for viewing or printing:
1. Right-click the PDF link in your browser.
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.
4. Click **Save**.

Downloading Adobe Reader

You need Adobe® Reader installed on your system to view or print these PDFs. You can download a free copy from the Adobe Web site (www.adobe.com/products/acrobat/readstep.html) .

Planning to distribute software

You can use either System i Navigator or central site distribution to distribute software. The quantity and type of software that you want to distribute determines which distribution tool you should use.

When to use System i Navigator

System i Navigator allows you to logically group a number of programs and files on a source i5/OS system and distribute those objects to one or more target i5/OS systems. It is the quickest and most efficient way to distribute one or more licensed programs, your own software products, fixes, or user libraries.

When to use central site distribution

Central site distribution is most often used to distribute the software involved in a full system upgrade or the software of a logical partition. This usually includes a collection of software such as the i5/OS operating system, program temporary fixes (PTFs), IBM® licensed programs, non-IBM licensed programs, and user libraries. You can also use central site distribution to distribute the software of a logical partition to several systems that might or might not be partitioned.

What to do next:
- "Distributing software using System i Navigator" on page 3
- "Distributing software using central site distribution" on page 5

Distributing software using System i Navigator

You can use System i Navigator to logically group a number of programs and files on a source i5/OS system or logical partition and distribute those objects to one or more target i5/OS systems or logical partitions.

This is the quickest and most efficient way to distribute one or more licensed programs, your own software products, fixes, or user libraries.

Sending IBM software products using System i Navigator

You can use System i Navigator to send IBM software products from one i5/OS system or logical partition to another i5/OS system or logical partition.

About this task

To send and install IBM products, complete the following tasks:

1. In your **System i Navigator** window, expand **Management Central**.
2. Expand **Endpoint Systems**.
3. Expand a system.
4. Expand **Configuration and Service**.
5. Expand **Software Inventory**.
6. Select either **Installed Products** or **Supported Products**.
7. From the right pane, right-click the product that you want to send and install. Select **Send and Install**. You can send and install only products that have a status of Installed or Managed.
8. Follow the wizard's instructions for sending and installing the product.

Results

Detailed task help is available from the System i Navigator window. Just click **Help** from the menu bar and select **Help Topics**. Select **What can I do with . . .?** to find out what you can do and where you need to be in the System i Navigator window to make it happen.

Packaging and sending your own software products using System i Navigator

In addition to sending IBM products from one i5/OS system or logical partition to another i5/OS system or logical partition, you can also use System i Navigator to package and send your own software products.

About this task

Product packaging enables you to make your application programs into a packaged product that is installed and maintained in the same manner as the IBM licensed programs. Once your application has been packaged as a product, you can manage all of the objects for that application as a single entity. Several methods are available that allow you to package your own products:

* Product and package function in System i Navigator
* IBM System Manager for i5/OS licensed program
* Software Product APIs

One of the advantages to packaging your application with System i Navigator is that it is part of the i5/OS operating system; and therefore, involves no additional cost. With System i Navigator, you can distribute your applications and fixes in the same way that you distribute i5/OS licensed programs. You

can track your fixes the same way as you track IBM fixes. A product definition contains all the information that you need to send and install a product across multiple systems.

You need to create a product definition before you can package, or convert, your application into a product that your system recognizes as a product. The source system on which you create the product definition is used to manage the product. To package and distribute a product, do the following tasks.

1. Create a product definition by following these steps:
   a. In System i Navigator, expand **Management Central**.
   b. Expand **Definitions**.
   c. Right-click **Product** and select **New Definition**.
   d. Follow the wizard's instructions for creating a new product definition. The source system on which you create the Management Central product definition is used to manage the product.

      As part of the wizard, you can indicate that you want to prompt users to accept a license agreement when the product is installed. Add the license documents from the Add License Documents dialog. For information on how to create these license documents, see Generating online software agreements for your own products.

2. Install the product on the source system.
3. Send and install the product on other systems by following these steps:
   a. In System i Navigator, expand **Management Central**.
   b. Expand **Definitions**.
   c. Select **Product**.
   d. Right-click the product definition that you want to send to and install on a target system and select **Send and Install**.
   e. Follow the wizard's instructions for installing the product definition on a target system. Clicking **Finish** causes the product to be sent and installed on the target system, and the status changes from **Installed** to **Managed**.

      Note:
      - Only product definitions that have a status of **Installed** or **Managed** can be sent and installed.
      - Only fixes that have been applied are sent when you send and install a product.

Results

Because the product is installed on the source system, the product is available to be managed. A status of **Managed** means that the definition can no longer be changed. To make any changes to the product for the current release requires that you generate a fix.

After you have installed the product on the source system, you can generate fixes to that product. For information on how to do this, see Generating fixes for installed products using Management Central.

Detailed task help is available from the System i Navigator window. Click **Help** from the menu bar and select **Help Topics**. Select **What can I do with . . .?** to find out what you can do and where you need to be in the System i Navigator window to make it happen.

What to do next:

After you package and send your own software products, send your fixes that you have generated. For specific information, see Sending and installing fixes.

Distributing software using central site distribution

The central site distribution process for distributing software is especially useful and convenient when your network is large and you want all the i5/OS systems or logical partitions in your computing environment to be identical.

The central site process for distributing software saves you time, effort, and expense by reducing the number of steps in the installation procedures for the target systems. For example, if you apply a cumulative PTF package on your source system before you distribute your software, you save time because you do not need to apply the same package on your target systems.

If you plan to distribute the user data and the i5/OS release to only one system, go to the Data migrations topic.

You can also distribute one or more licensed programs using CD-ROM. For instructions about premastering a CD-ROM for distribution, refer to Using CD-ROM in Distributing iSeries Software .

Central site distribution concepts

Central site distribution is the process of duplicating the software of one system or logical partition (the central system) with the i5/OS operating system and distributing it to multiple systems (target systems).

A *central system* is the system that is licensed to receive media supplied by IBM. In a distributed systems network, the central system is usually defined to be the focal point in a communications network for alerts, application design, and network management tasks. The central system can also distribute licensed programs to other systems that operate independently of the central system. However, these systems depend on the central system for distributing licensed programs.

A *target system* refers to the system that depends on the central system for distribution of Licensed Internal Code, the i5/OS operating system, and licensed programs. These systems are possibly unattended. The target systems can be part of a distributed systems communications network, or they might operate independently of the central system but rely on the central system for licensed program distributions and for application development and maintenance.

Overview of tasks to distribute software using central site distribution

The general tasks of distributing software from a central system include preparing the central system and target systems, creating the media, and installing the software on target systems.

1. Prepare to distribute software from a central system.
   a. Select the type of distribution media to use, an installation profile, and an installation method for the target systems.
   b. (Optional) write a user-defined installation program to eliminate installation tasks for the operators at the target systems.
   c. Ensure that you have the proper cumulative fix package or other PTFs applied on the central system.
   d. Ensure that the central system and target systems are ready for distribution
2. Create the distribution media using option 40 on the GO LICPGM menu.
   a. The following is a list of tasks completed using option 40:
      1) End all subsystems.
      2) Save the Licensed Internal Code, i5/OS operating system, system configuration data, security objects, system resources manager (SRM) objects, and user profiles.
      3) Save the QGPL library. This library includes the user-defined installation program called QLPUSER.
      4) Save the QUSRSYS library.

5) Save licensed programs you want to distribute. Select licensed programs you want to distribute from the Save Licensed Program display. The Extended Base Support and the Extended Base Directory Support options are preselected because they are required.

b. Save additional objects to the distribution media after option 40 is complete. For example, you can save user libraries, user directories, and secondary language files. If you write a user-defined installation program it can be used to restore these additional libraries and objects.

3. Install the distribution media on the target systems.

Do not put objects into the QGPL and QUSRSYS libraries on the central system that you do not want to distribute to the target systems.

Central site distribution of software license information

You can distribute license information for software products that use i5/OS license management.

For these products, the license information includes message queues to receive messages, the log violations indicator, the usage limit, and software license keys. The current list of license users is not distributed from the central system to the target systems.

To display a list of software products and features that use license management, run the Work with License Information (WRKLICINF) command.

You can include all of the software license information for all of the target systems on your distribution media. The appropriate license information for each target system is automatically loaded as part of the installation process.

Setting the usage limit is different depending on the type of product being distributed. The usage limit for standard products that contain license information must be set on the central system before you create the distribution media. It is then automatically included on the distribution media and distributed to the target systems. For keyed products, the usage limit is part of the license key. Every keyed product on each target system requires a unique key for the product to run on the target systems. Thus, you must add all the license keys for all the target systems to the distribution media before you create the distribution media.

When to distribute license information for licensed programs

The appropriate time to distribute license information for a licensed program is when you install a new license term for that program.

The *license term* is the length of time the authorized usage limit for a licensed program lasts. The usage limit can last for a version, a release, or a modification level.

For example, if the license term for product X is by version, the authorized usage limit is valid for the entire version of the product. When license information has been installed for product X, it will not be installed again until a new version of product X is distributed. This original license information is preserved at the target systems even when new release and modification levels are installed. When a new version of product X is distributed, the usage limit may need to be changed on the target systems.

Software license keys

The license keys file contains the software license keys you want to distribute.

When you use option 40 (Create a distribution media) on the GO LICPGM menu or run the Save System (SAVSYS) command, the system adds the file to the distribution media. The QALZALPKEY file is deleted from the target systems after the license keys are loaded.

A warning message that specifies the date that the grace period expires is sent to the message queue each day a keyed product is used. The message is sent to the QSYSOPR message queue and any other message queues that you have defined through the Change License Information (CHGLICINF) command.

> **Related information**
>
> Setting the usage limit

Types of distribution media for central site distribution

The types of distribution media or methods available to the central system for central site distribution are image catalog (optical or tape), shared virtual optical images using the Network File System, tape media, digital video disc (DVD), CD-ROM, and using the Duplicate Optical (DUPOPT) command or Duplicate Tape (DUPTAP) command.

Each distribution media has advantages and disadvantages. Determine which media suits your computing environment.

Image catalog
> This media requires disk space to hold all virtual images created on the central system and distributed to the target systems. If you have ample storage, this option is cost-effective and convenient.
>
> First, prepare the central system to distribute virtual images; then create the distribution media and distribute using FTP. You can also create DVD for central site distribution and then add the DVD to an image catalog and distribute using FTP. Or you can create the virtual images, convert them to DVD or CD-ROM (for optical devices) or tape media (for tape devices), and distribute the physical media. Using virtual images as central site distribution media gives you flexibility and is particularly useful for optical media verification, unattended installations, and upgrading software within a network.
>
> Virtual tape provides higher availability and shorter backup times than the other forms of media. Virtual tape devices can perform the same tasks as physical tape except that you cannot use the Save Storage (SAVSTG) command with a virtual tape device. For further details, see the topic Virtual tape.
>
> For more information about requirements when using image catalogs as the distribution media for central site distribution, see Preparing for virtual optical storage.

Virtual optical device that uses images shared by a the Network File System
> A special type of virtual optical device (632B; model 003) supports virtual image files on a remote system in the network. A image directory identifies a network path on the central system that contains the virtual image files that are prepared for use with a target system. A virtual optical device can be used to install additional licensed programs or PTFs. For further details, see Virtual optical storage using the Network File System.

Tape   High-speed tape is the fastest way to distribute the software involved in a full-system upgrade or the software of a logical partition. However, tape hardware and media is more costly than DVD hardware and media.

DVD   DVD is slower than high-speed tape, but is more cost-effective.

CD-ROM

> Refer to Using CD-ROM in Distributing iSeries Software for information about using only CD-ROM as the distribution media for central site distribution.

Duplicate Optical command
> You can use the Duplicate Optical (DUPOPT) command to create actual media from a virtual image of the central site media.

| **Duplicate Tape command**
| The Duplicate Tape (DUPTAP) command can be used to create actual tape media from a virtual
| image of the central site media. The format of the virtual tape images needs to be compatible
| with your physical tape device.

Installation profiles for central site distribution

IBM supplies four installation profiles that you can use to install the distribution media at the target
systems. You can also customize these profiles to suit your specific needs.

Installation profiles contain the tasks you want to perform during the installation process. They bring
many benefits to the automatic installation process. The choices you make when creating an installation
profile affect only the target systems, not the central system. You can use one of the profiles supplied by
IBM, or you can customize the profiles supplied by IBM to better suit your needs.

IBM installation profiles

IBM provides installation profiles that fit almost every situation. The following is a list of installation
profiles in order of most commonly used. This list includes profile descriptions and special considerations
associated with each.

Replace current release (QRPLRELLVL)
       Use this option to distribute the software involved in a full-system upgrade. The system replaces
       licensed programs that are at the same version, release, and modification as on the media.

Install new system (QINSNEWSYS)
       Use this option to distribute the software involved in a full-system upgrade to a new target
       system. That is, you can use central site distribution to install a new system. Or, you can use this
       option to distribute the software of a logical partition. The target systems must already have the
       current level of the licensed internal code installed.

IBM replace current release (QIBMRPLRLS)
       Use this option to distribute the software involved in a full-system upgrade. The system does not
       replace licensed programs that are at the same version, release, and modification as on the media.

Change primary language (QCHGPRILNG)
       If you plan to distribute the software involved in a full-system upgrade or the software of a
       logical partition and you want to change the primary language, use either the Replace current
       release profile or the IBM replace current release profile. If you plan only to change the primary
       language on the target system, refer to Considerations for changing a primary language.

Customized IBM installation profiles

If you want to create your own installation profile or customize the IBM-supplied installation profiles,
select option 41 (Work with installation profiles) from the GO LICPGM menu. To work with installation
profiles, you must have *CHANGE authority to the QALPAUTO file in the QUSRSYS library.

Benefits of using automatic installation and installation profiles to install distribution media

Using an installation profile to install the media that contains licensed programs and application
programs has several advantages.

* The tasks that operators at the target systems must do other than mounting distribution media are
  reduced or eliminated.
* You can create customized installation profiles to control the installation at the target systems
* You have the capability to restart after a failure, including bypassing parts of the installation that were
  successful.
* The number of messages during the installation are reduced or eliminated.

- You can use a user-defined installation program to install applications or further customize the system after a successful installation.

When you use an installation profile, the following operator tasks are eliminated:
- Select the option to install the operating system
- Confirm the installation of the operating system
- Select a language feature
- Confirm a language feature
- Select installation options
- Select IPL options

> **Related concepts**
>
> "Installation methods for the target systems"
> Automatic installation and manual installation are the two methods for installing the distribution media at the target systems. To help you decide which installation method to choose, review this information.

Installation methods for the target systems

Automatic installation and manual installation are the two methods for installing the distribution media at the target systems. To help you decide which installation method to choose, review this information.

Automatic installation

> Automatic installation means that the target system operators simply load distribution media as prompted. This method is the most commonly used because it allows you to use installation profiles and a user-defined installation program.
>
> You can use an installation profile to install media containing licensed programs, fixes (PTFs), and application programs. Installation profiles eliminate additional tasks for the target system operators and allow you to customize the installation process.
>
> You may want to write a user-defined installation program to distribute customer-written applications and eliminate additional tasks for the target system operators.

Manual installation

> Use manual installation only if you need to add disk storage to the target systems.

> **Related concepts**
>
> "Benefits of using automatic installation and installation profiles to install distribution media" on page 8
> Using an installation profile to install the media that contains licensed programs and application programs has several advantages.

Licensed program compression and decompression for central site distribution

Before you create the distribution media, consider this information about compressing and decompressing objects.

When you compress licensed programs you receive several benefits including saving storage space. When creating distribution media for central site distribution, you can leave all the licensed programs that have high usage decompressed. Or, you can distribute some of a licensed program in a compressed state and some of the program in a decompressed state.

Before you create the distribution media, consider these items:
- You can compress both IBM objects and your own user-created objects. IBM program objects can be compressed only in the restricted state. Use the Compress Object (CPROBJ) control language command to compress objects.
- Programs (*PGM), service programs (*SRVPGM), and modules (*MODULE) automatically and permanently decompress the first time they are used.

- The first time a compressed panel (*PNLGRP), menu (*MENU), printer file (*FILE with attribute PRTF), or display file (*FILE with attribute DSPF) is used, it is temporarily decompressed. If such a temporarily decompressed object is used five times or for more than two consecutive days on the same initial program load (IPL), it is permanently decompressed.
- Usually an operation on a compressed object takes a little longer than if the object were decompressed. While a very large compressed object is decompressing, the system will send the message, `Operation in progress. Please wait.`

IBM recommends the following actions to help you reduce the amount of disk space used on the target systems. At the same time, these actions ensure that frequently used objects are decompressed:

- Compress everything you are sending to the target systems.
- Use the objects on the central system in the same manner they will be used on the target systems. Do so at least five times for panel groups, menus, printer files, and display files.
- If you are creating a premastering media, files on CD-ROMs cannot span volumes. Compress objects so that the resulting saved file fits on the CD-ROM.

For more information about compressing and decompressing objects, see Compressed objects and storage space.

Distribution of primary languages and secondary languages
You can use central site distribution to distribute primary languages and secondary languages.

Primary languages

The primary language is the language that is installed on the system as the default language used to display and print information. The IBM licensed program distribution media contains the primary languages. The distribution media you create at the central system copies the primary languages so you can install them at your target systems.

Secondary languages

The distribution of secondary languages is more complicated than that of primary languages. Secondary languages are saved to the distribution media as described in "Checklist: Creating central site distribution media" on page 16 and are restored at the target systems by using the user-defined installation program as described in "Installation tasks for the target systems" on page 22.

Distribution of program temporary fixes (PTFs)
You can use the central site distribution process to apply fixes to the central system and distribute them to the target system. You apply fixes only once.

You can distribute fixes as part of the software involved in a full-system upgrade or logical partition. In the central site distribution process, fixes are distributed as follows. First, fixes are applied to the central system. When the distribution media is created, fixes are saved to the distribution media and distributed. Finally, when the distribution media is installed at the target systems, the Licensed Internal Code Copy A and Copy B is replaced and licensed programs are installed at the central system PTF level.

Using central site distribution to distribute fixes has advantages. One advantage is that no special PTF installation instructions are needed at the target systems. Another advantage is that the target systems will be at the same PTF and release levels as the central system.

Another way to distribute PTFs from a central system to a remote target system is to share virtual optical images with a Network File System (NFS) network. For more information, see Virtual optical storage using the Network File System.

Checklist: Preparing to distribute software using central site distribution

To distribute software from a central system, complete the steps in this checklist.

Before you begin

1. Become familiar with the "Overview of tasks to distribute software using central site distribution" on page 5. This is an overview of the central site distribution process including an outline of the objects saved using option 40 (Create a distribution media) on the GO LICPGM menu.

2. Verify that the target systems have adequate storage space to handle all distributed licensed programs. Refer to Ensuring the system meets disk storage requirements for upgrades to verify adequate storage space.

3. Verify that the central and target systems will be at compatible software and hardware releases after the central site distribution. Refer to the System i hardware<img> Web site to determine the i5/OS releases that can be installed on each model. Select the information on **Marketing life**.

4. Verify that the central and target systems will be at compatible i5/OS releases after the central site distribution. Refer to i5/OS release interoperability to verify this. If you have several systems in a network, they must be at compatible releases to exchange data or to save and restore objects.

5. Ensure that all program temporary fixes (PTFs) are applied to the central system. IBM recommends that you permanently apply all Licensed Internal Code PTFs on your central system to ensure that the media can be installed on target systems that have new hardware features. For information on how to permanently apply Licensed Internal Code PTFs, see Advanced fix installation: Applying Licensed Internal Code fixes without an IPL. For more information about PTFs in the central site distribution process, refer to "Distribution of program temporary fixes (PTFs)" on page 10.

6. Ensure the central system is stable. You may want to test the central system for a few weeks to ensure stability.

7. Consider running the Check Product Option (CHKPRDOPT) command on your central system to ensure that all requisite PTFs for the licensed programs you plan to distribute are installed.

Preparing to distribute software from a central system

1. Select the installation method for the target systems. Choose automatic installation or manual installation as described in "Installation methods for the target systems" on page 9.

2. If you chose the automatic installation method in step 1, select or customize one of the following installation profiles.
   - Replace current release (QRPLRELLVL)
   - Install new system (QINSNEWSYS)
   - IBM replace current release (QIBMRPLRLS)
   - Change primary language (QCHGPRILNG)

   You can also create your own installation profile. For more information, refer to "Installation profiles for central site distribution" on page 8.

3. Select the distribution media. The media types are described in "Types of distribution media for central site distribution" on page 7.

4. Prepare the license information of products that use i5/OS license management. Refer to "Preparing software license information for central site distribution" on page 12.

5. Create an installation program for the target system. Automatically restore additional libraries and other objects that you plan to save on the distribution media. Refer to "Optional: Writing a user-defined installation program for the target systems" on page 13.

6. Consider compressing and decompressing licensed programs. Compress licensed programs using the Compress Object (CPROBJ) command. For information, refer to "Licensed program compression and decompression for central site distribution" on page 9.

| 7. If you selected image catalog as the distribution media, go to either "Optional: Preparing the central
| system for virtual optical images" on page 14 or "Optional: Preparing the central system for virtual
| tape images" on page 15.

When you are finished

1. Record your selections of the installation method for the target systems, the installation profile, and
   the distribution media.
2. Record a strategy for distributing licensed information and ensure that information is ready to
   distribute.
3. Ensure your user-defined program works as expected.

Next topic: When you have completed the tasks in this checklist, go to "Checklist: Creating central site
distribution media" on page 16.

Preparing software license information for central site distribution

To prepare for distributing software license information for licensed programs by using distribution
media and central site distribution, follow these instructions.

About this task

The software license information you must distribute is the usage limit for each product. The usage limit
must be distributed to ensure that the product can be used on the target systems. Keyed products require
more care than standard products because they require a unique license key for each target system.

To prepare software license information for distribution, complete the following tasks:

1. Prepare license information for standard products. To distribute license information for standard
   products, you must set the usage limit for the target systems. After you complete this task, the usage
   limit will automatically be included on the distribution media.
2. Prepare license keys for keyed products:
   a. Run the Add License Key (ADDLICKEY) command to add all the license keys for all the target
      systems to the license key repository. To learn more about the license key repository, see Adding
      license key information.
   b. Create the license key file using the Display License Key Information (DSPLICKEY) command:

      ```
      DSPLICKEY PRDID(*ALL) LICTRM(*ALL) FEATURE(*ALL) SERIAL(*ALL)
       OUTPUT(*LICKEYFILE) LICKEYFILE(QSYS/QALZALPKEY) LICKEYMBR(QALZALPKEY)
      ```

      The license key file must be called QALZALPKEY in the QSYS library. Any other name results in
      a failure to install the license keys during the software upgrade.

Results

Next topic: "Distributing software license information using System i Navigator or paper."

Distributing software license information using System i Navigator or paper

To distribute software license information, complete theses tasks.

About this task

- Distribute license keys using System i Navigator.

  You can package and send license keys by using the Management Central distribution function
  available in System i Navigator.
- Distribute license information on paper:
  1. Prepare the license information for distribution:
     a. Find the Proof of Entitlement for each product you plan to distribute.
     b. Make copies of each Proof of Entitlement.

    c. Send a copy of each Proof of Entitlement along with the distribution media to each target system.

2. After the distribution media is installed on the target system, update the license information at the target system:

    a. Display a list of the installed products and features that use license management using the Work with License Information (WRKLICINF) command.

    b. Press F11 (Display usage information) to display the usage limit. The usage limit for a product is normally 0 if it has not been updated.

    c. Select option 5 (Display detail) to check the compliance type of the product. If the compliance type is *KEYED, continue to the next step. If the compliance type is *WARNING or *OPRACTION, set the usage limit for standard products and then continue to the next step.

    d. Type 1 (Add license key) in the option column next to the product you want to add and press Enter.

    e. Update the prompts to match the information you received from your software provider and press Enter.

       Normally, you need to update the license key and usage limit fields. In some cases, you may need to update the processor group, the expiration date, and the vendor data fields. The new usage limit is displayed on the Work with License Information display.

    f. Repeat the above steps for each product that is displayed by the WRKLICINF command.

Next topic: Continue with "Optional: Writing a user-defined installation program for the target systems" or go to step 6 on page 11 in the checklist.

Optional: Writing a user-defined installation program for the target systems

To write the user-defined installation program, complete these procedures.

About this task

The user-defined installation program performs tasks and sends the appropriate instructions to the operators at the target systems. It allows you to perform many installation tasks automatically and install customer-written applications at the target systems.

1. Include instructions in your program to restore objects on the target system. For a list of instructions you can include in the user-defined installation program, refer to "Installation tasks for the target systems" on page 22. You can include all of the instructions in your program or only those that apply to your distribution.

2. Create and save your program in the QGPL library and call it QLPUSER. If the QLPUSER program already exists in the QGPL library, the system deletes the program during automatic installation before restoring the QGPL library. This ensures that the distribution media will control additional processing.

3. When you finish writing your program, perform the following tasks:

    a. Test your user-defined installation program to ensure that it works as expected.

    b. Keep a copy of your program in one of your user libraries on the central system.

    c. If you have several target systems that need unique processing, create a separate program for each.

Results

Example: User-defined installation program

The following control language (CL) program is an example of a user-defined installation program. It sends an instruction to the operator at the target system. It also restores a library that contains an application and copies the command to start the application in the QGPL library. The &DEVICE parameter in this example is the name of your media device. The &SUCCESS parameter is used as an indication of whether all licensed programs installed successfully.

Note: By using the following code example, you agree to the terms of the "Code license and disclaimer information" on page 28.

```
PGM         PARM(&DEVICE &SUCCESS)
 DCL         VAR(&DEVICE) TYPE(*CHAR) LEN(10)
 DCL         VAR(&SUCCESS) TYPE(*CHAR) LEN(1)
 IF          COND(&SUCCESS *EQ '1') THEN(DO)
     SNDUSRMSG  MSG('Load the tape in ' *CAT &DEVICE *CAT +
                          'and press the Enter key.')
     RSTLIB SAVLIB(APP1) DEV(&DEVICE)
     CRTDUPOBJ OBJ(STRAPP1) FROMLIB(APP1)   +
                          OBJTYPE(*CMD) TOLIB(QGPL)
 ENDDO
 ELSE
     SNDUSRMSG  MSG('One or more licensed programs failed to +
                          install.')
 ENDPGM
```

Next topic: Continue with the tasks in the checklist (step 6 on page 11).

Optional: Preparing the central system for virtual optical images

To prepare the central system for virtual optical images, complete these tasks.

1. **Ensure that the system has enough disk space**

   Ensure that the system has enough disk space to hold all the virtual optical images you are going to create. Refer to the Image catalog requirements listed in Preparing for virtual optical storage for information about disk space requirements for virtual images.

   Include the total amount of the virtual image sizes in the total storage needed for an upgrade on the target system.

2. **Create a virtual optical device**

   CRTDEVOPT DEVD(*virtual-device-name*) RSRCNAME(*VRT) ONLINE(*YES) TEXT(*text-description*)

3. **Vary on the virtual optical device**

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

4. **Create an image catalog**

   Create an image catalog for the licensed programs that you want to distribute. 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(*image-catalog-name*)

   You can optionally add image catalog images with the CRTIMGCLG command. Skip step 5 if you use this option. The following example command adds three catalog entries with a volume size of 1 gigabyte and volume names that are generated with a prefix of ABC.

   CRTIMGCLG IMGCLG(*catalog-name*) DIR(*catalog-path*) TYPE(*OPT) CRTDIR(*YES) ADDVRTVOL(3) PREFIX(ABC) IMGSIZ(1000) TEXT(*image-catalog-name*)

5. **Add an image catalog entry**

   Add a new image catalog entry with a size of 48MB to 16GB. If you plan to save the full operating system, add a new image catalog entry with a size of 4GB.

   If you plan to duplicate image catalogs to DVD, then ensure you select a virtual image size that matches the size of the DVD media you plan to write to.

   If you want to save to a 4.7GB DVD, for example, use the following command to create the proper image size:

   ADDIMGCLGE IMGCLG(*catalog-name*) FROMFILE(*NEW) TOFILE(*file-name*) SIZE(*DVD4700) TEXT(*text-description*)

   If you want to save the i5/OS operating system, licensed programs, or PTFs to CD-ROM media of 650MB or greater, use the following command to create the proper image size:

```
ADDIMGCLGE IMGCLG(catalog-name) FROMFILE(*NEW) TOFILE(file-name) SIZE(*CD650)
TEXT(text-description)
```

Repeat this step for the number of desired images. You should add the images in the same order as you are going to install from them.

If you plan to use physical tape as distribution media, refer to "Optional: Duplicating virtual images to physical media" on page 18.

6. **Load the image catalog**

   This step associates the virtual optical device to the image catalog. Up to 35 virtual optical devices can be active.

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

7. **Initialize the new volume**

   ```
   INZOPT NEWVOL(MYSAVEVOL1) DEV(virtual-device-name) TEXT('volume text')
   ```

   Repeat this step for the number of new images you want to initialize. Use the Work with Image Catalog Entries (WRKIMGCLGE) command to select the image to be initialized or use the Load/Unload/Mount Image Catalog Entry (LODIMGCLGE) command to continue to the next volume to be initialized.

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

   When you have completed initializing the new volumes, leave the first entry in mounted status.

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

Results

Next topic: "When you are finished" on page 12

Optional: Preparing the central system for virtual tape images

To prepare the central system for virtual tape images, complete these tasks.

1. **Ensure that the system has enough disk space**

   Ensure that the system has enough disk space to hold all the virtual images you are going to create. Refer to the Image catalog requirements listed in Preparing for virtual optical storage for information about disk space requirements for virtual images.

   Include the total amount of the virtual image sizes in the total storage needed for an upgrade on the target system.

2. **Create a virtual tape device**

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

3. **Vary on the virtual tape device**

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

4. **Create an image catalog**

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

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

   You can optionally add image catalog images with the CRTIMGCLG command. If you use this option, skip step 5. The following example command adds three catalog entries with a volume size of 1 gigabyte and volume names that are generated with a prefix of ABC. All images are automatically initialized.

   ```
   CRTIMGCLG IMGCLG(catalog-name) DIR(catalog-path) TYPE(*TAP) CRTDIR(*YES) ADDVRTVOL(3)
   PREFIX(ABC) IMGSIZ(1000) TEXT(image-catalog-name)
   ```

5. **Add an image catalog entry**

| (Repeat this step for the number of desired images. Add the images in the same order as you are
| going to install from them.)

| Add a new image catalog entry with a size of 48MB to 1 000 000MB. The minimum size of the first
| volume must be 2000MB.

| ADDIMGCLGE IMGCLG(*catalog-name*) FROMFILE(*NEW) TOFILE(*file-name*) IMGSIZ(*image-size*)
| TEXT(*text-description*)

| Optionally you can add the density (format) parameter to this command. For further information on
| the format of virtual tape images, refer to "Optional: Distributing virtual images" on page 19.

| **Note:** The default tape image size is 1 gigabyte if you do not specify a value for IMGSIZ.
| 6. **Load the image catalog**

| This step associates the virtual tape device to the image catalog. Up to 35 virtual tape devices can be
| active.

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

| **Results**

| Tape images are automatically initialized.

| **Next topic:** "When you are finished" on page 12

Checklist: Creating central site distribution media

| If you selected tape, DVD, or image catalog as the distribution media, complete the tasks in this checklist
| to create the distribution media.

| If you selected CD-ROM as the distribution media, refer to Using CD-ROM in Distributing iSeries

| Software ➡️ to create the CD-ROM.

Before you begin

| 1. If you plan to distribute secondary language files, ensure you know the following:
| • The national language version feature code for the secondary language.
| • The "Licensed programs that do not support secondary languages" on page 26.
| 2. If you selected tape or DVD as the distribution media, print a copy of the distribution media cover
| sheet for central site distribution media. You will need it when you create the distribution media.
| 3. Ensure that you have a dedicated central system.
| 4. Ensure that you have *SAVSYS and *JOBCTL special authorities. If you do not have these authorities,
| you will be unable to create the distribution media.
| 5. Ensure that *JRNRCV objects are not in the QSYS library.
| 6. Change the QALWOBJRST (Allow Object Restore) system value to *ALL on the central system. The
| Allow Object Restore (QALWOBJRST) system value specifies whether objects with security-sensitive
| attributes can be restored.
| 7. Run the Check Object Integrity (CHKOBJITG) command to verify the signatures of the operating
| system objects. If any of the central system object signatures are bad or missing, the installation will
| fail.
| 8. Consider how you want Cryptographic Services master keys to be distributed. Normally you would
| not want to share your master keys with other parties. To prevent your master keys from being
| recovered on other systems, it is recommended that you clear all master keys before you create the
| distribution media.

| If you do not want to clear your master keys, an alternative is to set the Save/Restore Master Key
| which is used to encrypt the master keys before they are saved to the distribution media. The

encrypted master keys are restored on the target system but remain encrypted in a pending state. Users of target systems will need to clear out the pending master keys.

If you want to distribute master keys, you must share the source system Save/Restore Master Key with the target systems so that the encrypted master keys are decrypted after they are restored. For further information on Cryptographic Services master keys, see Managing master keys.

Creating the distribution media

1. Rename or delete history logs on the central system:
   a. Type `CHGMSGQ MSGQ(QHST) DLVRY(*DFT)` to turn all message logging off.
   b. Type `DSPLOG QHST` (Display History Log) to make sure that all messages are written to the history log. Press Enter after the history log is shown.
   c. Type `WRKOBJ QSYS/QHST* *FILE` (Work with Objects and Display All History Logs) to work with all of the history logs. Press Enter.
   d. Use the rename or delete option on each history log. The history logs must be deleted from QSYS or renamed to make sure the history logs will not be distributed to the target system.
2. Select option 40 (Create a distribution media) from the GO LICPGM menu and complete each task.

   Note: If you chose an optical image catalog as the distribution media, inquiry message OPT149F might appear during processing. If you are using a tape image catalog as the distribution media, inquiry message CPA6798 might appear. Either message means that the initialized volumes are full. To continue processing, select option A (for optical) or *GEN (for tape) and press Enter. Selecting option A or *GEN creates, loads, mounts, and initializes a new volume and processing will continue.

3. After you complete option 40, complete the following tasks to save secondary language files to the distribution media. In the name of the QSYS29*xx* library, and the language parameter of the SAVLICPGM command, *xx* represents the national language version feature code for the secondary language.
   a. Save the QSYS29*xx* library. This library contains the secondary language files.
   b. Save each licensed program specifying the language parameter and the object type parameter for each licensed program. The parameter of OBJTYPE must be *LNG. For example: `SAVLICPGM LICPGM(5761WDS) DEV(TAP01) LNG(29xx) OBJTYPE(*LNG) ENDOPT(*LEAVE)`
   c. Save the QIBM/PRODDATA/OS/MRI29*xx* directory using the Save (SAV) command.
4. Save additional user libraries to the distribution media using the Save Library (SAVLIB) command.
5. Save user directories and other objects to the distribution media using the Save (SAV) command.
6. Save the license keys file at the end of the last distribution media.
7. To set write protection for virtual images, see Changing the write protection for image catalog entries for virtual optical media.
8. To add DVD media to an image catalog, go to Preparing to upgrade or replace software using an image catalog.
9. To convert virtual images to DVD or CD-ROM, see Creating actual media from a virtual image.

The User Profiles (QFILEUPR) file and the Device Configuration (QFILEIOC) file do not appear on the list of file names supplied by IBM. However, these files appear on the distribution media you create using option 40 (Create a distribution media).

When you are finished

1. Type the Change Message Queue (CHGMSGQ) command to set the delivery parameter for the QHST message queue to the previous value (before you create the distribution media). This turns all message logging on again.
2. "Duplicating and distributing tape or DVD distribution media" on page 18
3. "Optional: Duplicating virtual images to physical media" on page 18

4. "Optional: Duplicating DVD media to virtual images" on page 19
5. "Optional: Distributing virtual images" on page 19

Next topic: When you have completed the tasks in this checklist, go to "Checklist: Installing central site distribution media on the target system" on page 20.

> **Related reference**
>
> "Cover sheet for central site distribution media" on page 27
> Use this sheet to record information for duplicating and distributing tape or DVD distribution media.

Duplicating and distributing tape or DVD distribution media

After you create tape or DVD distribution media, you must verify the contents of the media, duplicate the media, and distribute the media to the target systems.

About this task

Note: Steps for duplicating virtual optical images or virtual tape images to physical media are located in the topic "Optional: Duplicating virtual images to physical media."

To duplicate and distribute tape or DVD distribution media, complete the following instructions:

1. Verify the contents and record a listing of licensed programs on the distribution media cover sheet.
   - If you are using tape, type DSPTAP DEV(TAP01) OUTPUT(*PRINT)
   - If you are using optical, type DSPOPT VOL(volume_id) DEV(OPTxx) DATA(*DIRATR) OUPUT(*PRINT) PATH(*ALL)

   For a complete list of files saved to the distribution media refer to "Central site distribution media contents" on page 24.
2. Duplicate the media. Make one copy for each target system.
   - Use the Duplicate Tape (DUPTAP) command to duplicate tape.
   - Use the Duplicate Optical (DUPOPT) command to duplicate DVD.
3. Make copies of the distribution media cover sheet as needed.
4. Include a cover sheet with each copy of the distribution media. The target systems use the cover sheet to locate a specific licensed program on the distribution media.

Results

Next topic: "Checklist: Installing central site distribution media on the target system" on page 20.

Optional: Duplicating virtual images to physical media

You can duplicate either virtual optical images to DVD-RAM or recordable media or duplicate virtual tape volumes to physical tape devices.

About this task

To duplicate virtual optical images to DVD-RAM or recordable media on the central system, follow these steps.

1. Ensure your image catalog is loaded in your virtual device.
2. Use the Duplicate Optical (DUPOPT) command to duplicate virtual images to physical recordable media. Examples of recordable media are DVD-R, DVD+R, DVD-RW, DVD+RW, CD-R, and CD-RW. For details, see Creating actual media from a virtual image.

If you plan to duplicate the virtual tape volumes to physical tape devices, you need to make sure that you create the virtual tape volumes by using a block size that is compatible with your physical tape device. If you are unsure what block size your tape device supports, you can view the supported block

size information by using System i Navigator to display the properties of your physical tape device.

Table 1. Format of virtual tape images

Volume density	Optimum block size
*VRT256K	256KB
*VRT240K	240KB
*VRT64K	64KB
*VRT32K	Optimum block size is not used. Compatible with all devices.

To duplicate virtual tape images to tape media on the central system, follow these steps:

1. Ensure your image catalog is loaded in your virtual device.
2. Use Duplicate Tape (DUPTAP) command to duplicate virtual images to tape.

Results

Next topic: "Checklist: Installing central site distribution media on the target system" on page 20

Optional: Duplicating DVD media to virtual images

To duplicate DVD media on the central system, follow these steps.

1. **Create an image catalog**

   The Create Image Catalog (CRTIMGCLG) command associates an image catalog with a target directory where the optical image files are loaded. Enter the following command:

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

2. **Add an image catalog entry**

   Add an image catalog entry for each physical media that you have. Repeat this step for each volume of media. Add the images 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.

   Enter the following to add an image catalog entry to an image catalog from a physical optical media device named OPTxx:

   ADDIMGCLGE IMGCLG(*catalog-name*) FROMDEV(OPTxx) TOFILE(*file-name*) TEXT(*text-description*)

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

   You now have virtual images in the catalog path that you specified on the CRTIMGCLG command.

Results

Next topic: "Optional: Distributing virtual images"

Optional: Distributing virtual images

To distribute the virtual images, following these steps.

1. **Verify that the images are in the correct order** WRKIMGCLGE IMGCLG(*catalog-name*)

   If you want to sort the images, 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. By default, the volume with the lowest index is mounted; all the other volumes are loaded.

2. Distribute the virtual images using one of the following methods:

   - **Distribute the virtual images using FTP**

a. Consider securing the data you plan to distribute using digital certificates for signing objects. When you have finished securing the data you plan to FTP to the target systems, return to this page and FTP the image catalogs and virtual images.

b. Start an FTP session with a remote system where the image files exist: FTP RMTSYS(*remote-system*)

c. Set the file naming format: NAMEFMT 1

d. Set the remote directory: CD '*/directory-name*'

e. Set the local directory: LCD '*/directory-name*'

f. Issue the BINARY command to set the transfer type: BINARY

g. Issue the MGET to get the image files from the remote system: MGET *

h. Quit the FTP session: QUIT

- **Distribute the image catalog and virtual images using physical media**

  To save the image catalog to tape, enter the following command:

  SAVOBJ OBJ(*image-catalog-name*) LIB(QUSRSYS) OBJTYPE(*IMGCLG) DEV(*device-name*)

  To save the image files, enter the following command. (In the following example, the directory name is the name associated with the image catalog.)

  SAV DEV('/QSYS.LIB/*device-name*.DEVD') OBJ(('/*directory-name*'))

Results

Next topic: "Checklist: Installing central site distribution media on the target system"

Checklist: Installing central site distribution media on the target system

To install the distribution media at the target system, complete these procedures.

1. If you plan to install virtual images on the target system, you must prepare the target system. Refer to "Optional: Preparing the target system for virtual images" on page 21.

2. Install the distribution media on the target systems by using the steps outlined in the following information of the Installing, upgrading, or deleting i5/OS and related software topic:

   - Preparing to upgrade or replace i5/OS software
   - Use one of the following upgrade methods:
     - Upgrading or replacing software using automatic installation
     - Upgrading or replacing software using manual installation

3. Complete any tasks described in "Installation tasks for the target systems" on page 22 that were not done as part of a user-defined installation program.

   Note: Software agreements do not need to be accepted again on the target system.

When you are finished

1. If you wrote a user-defined installation program, verify that the user-defined installation program (QLPUSER) loaded successfully

2. If you distributed Infoprint Designer for iSeries®, see Clear two files from the integrated file system.

3. (Optional) Change the electronic customer support data.

When you complete the steps in this checklist, you have completed the central site distribution.

Optional: Preparing the target system for virtual images
About this task

To prepare the target system for virtual images, complete these tasks.

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

   Virtual optical device:

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

   Virtual tape device:

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

2. **Vary on the virtual optical device**

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

3. Depending on how you distributed the virtual images, do either of the following tasks:

   - *If you distributed the virtual images from the central system using FTP,* complete the following tasks. These tasks assume that the images are located in directory specified on the Create Image Catalog command in step 3a.

     a. **Create the image catalog**

        - For optical, enter this command:

          ```
          CRTIMGCLG  IMGCLG(image-catalog-name) DIR(directory-name) TEXT(text-description)
          TYPE(*OPT)
          ```

        - For tape, enter this command:

          ```
          CRTIMGCLG  IMGCLG(image-catalog-name) DIR(directory-name) TEXT(text-description)
          TYPE(*TAP)
          ```

        If both systems are at V6R1 or later, another option is to create an optical image catalog that is imported from the image catalog directory:

        ```
        CRTIMGCLG  IMGCLG(image-catalog-name) DIR(directory-name) IMPORT(*YES)
        TEXT(text-description)
        ```

     b. **Add the image catalog entries for each image**

        (This command is not needed if you use the *IMPORT option.)

        ```
        ADDIMGCLGE IMGCLG(image-catalog-name) FROMFILE(image-file-name) TOFILE(*FROMFILE)
        IMGCLGIDX(*AVAIL)
        ```

        To prevent the system from generating a new name for the catalog entry, specify the exact name of the file (without the path) on the FROMFILE parameter.

   - *If you saved your image catalog and image files to physical media,* enter the following on the target system to restore the image catalog from tape:

     ```
     RSTOBJ OBJ(image-catalog-name) SAVLIB(QUSRSYS) OBJTYPE(*IMGCLG) DEV(device name)
     ```

     Enter the following on the target system to restore the directory from tape:

     ```
     RST DEV('/QSYS.LIB/device-name.DEVD') OBJ(('/directory-name'))
     ```

4. **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.

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

5. **Verify that the images are in the correct order**

   You can choose one of the following possible methods:

   - Use the Verify Image Catalog command to verify the images in your catalog.

     - (For a complete release upgrade) VFYIMGCLG IMGCLG(catalog-name) TYPE(*UPGRADE) SORT(*YES)

     - (For licensed programs only) VFYIMGCLG IMGCLG(catalog-name) TYPE(*OTHER)

     - (For PTFs and cumulative fixes) VFYIMGCLG IMGCLG(catalog-name) TYPE(*PTF) SORT(*YES)

- Use the Work with Image Catalog Entries (WRKIMGCLGE) command to verify the images and to see the order of the images.

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

  Press PF7 to prompt for the VFYIMGCLG command. Enter either *UPGRADE, *OTHER, or *PTF for the type and *YES for the sort field.

  The system puts the images in the correct order. By default, the volume with the lowest index is mounted; all the other volumes are loaded.

Results

Next topic: Either continue with the steps in "Installation tasks for the target systems" or complete the final tasks in the "Checklist: Installing central site distribution media on the target system" on page 20.

Installation tasks for the target systems

If you did not write a user-defined installation program, you must complete these tasks to restore objects to the target system that were saved to the distribution media.

About this task

You can include all of these tasks or some of these tasks in a user-defined installation program. The program then automatically performs these tasks after the distribution media is installed on the target system.

Complete the following tasks after the distribution media has been installed on the target system if you did not write a user-defined installation program; or include these tasks in your user-defined installation program. Ensure that only objects saved to the distribution media are restored and that those objects are restored in the same order they are saved.

1. Restore user profiles using the Restore User Profile (RSTUSRPRF) command.
2. Restore system configuration data using the Restore Configuration (RSTCFG) command.

   Note: The only time restoring system configuration data is appropriate is when the central and target systems have exactly the same hardware configuration.

3. Restore secondary language files:
   a. Restore the QSYS29*xx* library on the target system using the Restore Library (RSTLIB) command, where *xx* represents the national language version feature code for the secondary language.
   b. Restore the licensed programs on the target system using the Restore Licensed Program (RSTLICPGM) command, specifying 29*xx* for the LNG parameter and *LNG for the RSTOBJ parameter. For example:

      ```
      RSTLICPGM LICPGM(5761WDS) DEV(TAP01) RSTOBJ(*LNG) LNG(29xx) ENDOPT(*LEAVE)
      ```

   c. Restore the QIBM/PRODDATA/OS/MRI29*xx* directory on the target system using the Restore (RST) command, where *xx* represents the national language version feature code for the secondary language.
4. Restore user libraries using the Restore Library (RSTLIB) command.
5. Restore file system objects using the Restore (RST) command.
6. Restore license key information:
   a. Restore the license keys file.
   b. Run the Add License Key (ADDLICKEY) command to add all of the *LOCAL licenses from the license keys file.
   c. Delete the license keys file.
7. Install new licensed programs that IBM distributes independently from an i5/OS release.
8. Install applications using control language (CL) commands.

9. Install user products that are packaged by the IBM System Manager for i5/OS licensed program using the Restore Licensed Program (RSTLICPGM) command.

Next topic:

- If you installed the distribution media on the target system, complete the tasks in Installing distribution media on the target system.
- If you plan to write a user-defined installation program, go back to "Optional: Writing a user-defined installation program for the target systems" on page 13.

Optional tasks to complete after installation

When you have completed the installation of the distribution media on the target system, perform these tasks that apply to your distribution on the target system.

About this task

Verify that the user-defined installation program (QLPUSER) loaded successfully

1. Select option 50 (Display log for messages) from the GO LICPGM menu.
2. Verify that the message received is `User install processing completed`.

Results

Verify that requisite PTFs for licensed programs are installed

For example, use the Check Product Option (CHKPRDOPT) command:

`CHKPRDOPT PRDID(product-identifier) RLS(release) DETAIL (*FULL)`

Clear two files in the integrated file system if you distributed Infoprint Designer for iSeries

- At the command line, type RMVLNK '/QIBM/ProdData/AFPDesigner/session/IPDes'.
- At the command line, type RMVLNK '/QIBM/ProdData/AFPDesigner/session/IPIEd'.

Change the electronic customer support data

1. Change the telephone numbers for service and marketing:
   - Type `CALL QESPHONE` and press Enter.
   - Type `CALL QTIPHONE` and press Enter.
2. Change the information in the contact database to include a person and a voice telephone number at the location of the target system:
   a. Enter the Work with Support Contact Information (WRKCNTINF) command from any command line.
   b. Select option 2 (Work with local service information) on the Work with Support Contact Information display.

Delete your image catalog and images to free up space

To delete the catalog and all the optical images (image files), type the following:

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

Distributing additional licensed programs or fixes by using the Network File System

An additional way to distribute licensed programs or fixes is to share virtual optical images on a server with other systems in a network through the Network File System (NFS).

For directions on setting up the client and the server to share image sources, refer to the Storage solutions topic, Setting up a virtual optical device within a Network File System network.

Distributing software reference

This information contains a collection of supporting reference material related to distributing software.

Central site distribution media contents

The i5/OS distribution media contents table lists the files saved to the distribution media.

Use the following table to verify that you correctly transferred all of the files to the distribution media. This table is the key for generic file names that are listed in the distribution media contents table that follows.

Key		
Symbol	**Description**	**Example**
xx	National language version (NLV) identifier	24 indicates English
yy	Two-digit number	61
PID	Product identifier	SS1
v	Version	6
r	Release	1
m	Modification	0
nn	Last optional file consisting of additional product libraries or integrated file system files	
zz	Level indicator	00

The following table lists the files in the order that they are saved to the distribution media. Use this table to verify that you correctly transferred all of the files to the distribution media.

Distribution media contents		
Tape file name	**Optical file name**	**Description**
57yy-SS1 IBM i5/OS		
Not used on tape	/QCDIML	IML bootstrap file for CD-ROM installations only
QFILEIML	Not used on CD-ROM	IML bootstrap file for tape installations only
QVvRrMmLzz.L29xx (first time saved for the tape file name)	/QLANGID/SVvRrMm	Version release modification indicator file for the Licensed Internal Code (installation use)
	/QLANGID/S_L29xx	Primary language indicator file for the Licensed Internal Code (installation use)
	/QLANGID/S_LVLzz	Level indicator file for the Licensed Internal Code (installation use)
QFILESCR	/QFILESCR	Licensed Internal Code displays

Distribution media contents		
Tape file name	Optical file name	Description
QIAM400	/QIAM400	Indicates that the media contains the i5/OS operating system
QFILELDS	/QFILELDS	Licensed Internal Code security information
QFILEMCD	/QFILEMCD	All Licensed Internal Code file
QFILEBT	/QFILEBT	Licensed Internal Code file
QVvRrMmLzz.L29xx (second time saved for the tape file name)	/QLANGID/QVvRrMm	Version release modification indicator file for the i5/OS operating system (installation use)
	/QLANGID/Q_L29xx	Primary language indicator file for the i5/OS operating system (installation use)
	/QLANGID/Q_LVLzz	Level indicator file for the i5/OS operating system (installation use)
QFILEIPL	/QFILEIPL	Installation file
QFILEIN	/QFILEIN	Installation file
Q57yySS1vrmM.0001	/Q57yySS1/QvrmzzM_/Q00/Q01	Installation file (QSYS simple objects)
Q57yySS1vrmM.0002 through Q57yySS1vrmM.0016	/Q57yySS1/QvrmzzM_/Q00/Q02 through /Q57yySS1/QvrmzzM_/Q00/Q16	Installation file (QSYS simple objects)
Q57yySS1vrmxx0001 through Q57yySS1vrmxx0007	/Q57yySS1/Qvrmzzxx/Q00/Q01 through /Q57yySS1/Qvrmzzxx/Q00/Q07	Installation file (QSYS simple objects)
Q57yySS1vrmxx0090	/Q57yySS1/Qvrmzzxx/Q00/Q90	Installation file (QSYS complex objects)
Q57yySS1vrmxx0091	/Q57yySS1/Qvrmzzxx/Q00/Q91	Installation file (Objects in base directories)
Q57yySS1vrmM.0090	Q57yySS1/QvrmzzM_/Q00/Q90	Installation file (QSYS complex objects)
Q57yy999vrmM.0091 through Q57yySS1vrmM.0094	Q57yySS1/QvrmzzM_/Q00/Q91 through Q57yySS1/QvrmzzM_/Q00/Q94	Installation file (Objects in base directories)
QFILEUPR	/QFILEUPR	User profiles and other security information
QFILEIOC	/QFILEIOC	Configuration information
QINPREP	/QINPREP	Installation file
Q57yy999vrmM.0000	/Q57yy999/QvrmzzM_/Q00/Q00	Software agreement file for Machine Code
Q57yySS1vrmM.0000	/Q57yySS1/QvrmzzM_/Q00/Q00	Software agreement file for i5/OS
QGPL.vrmzz.xx	/QUSRLIBS/Qvrmzzxx/QGPL	QGPL library file
QUSRSYS.vrmzz.xx	/QUSRLIBS/Qvrmzzxx/QUSRSYS	QUSRSYS library file
Example of licensed program files		

Distribution media contents		
Tape file name	**Optical file name**	**Description**
Q57yyPIDvrmM.000	/Q57yyPID/QvrmM_/Q00/Q00	Software agreements file (not all licensed programs will have this file)
Q57yyPIDvrmM.0001	/Q57yyPID/QvrmM_/Q00/Q01	Installation control file (*PGM objects)
Q57yyPIDvrmM.0002	/Q57yyPID/QvrmM_/Q00/Q02	Product library file
Q57yyPIDvrmM.0003	/Q57yyPID/QvrmM_/Q00/Q03	Optional files consisting of additional product libraries or integrated file system files
:	:	:
Q57yyPIDvrmM.00nn	/Q57yyPID/QvrmM_/Q00/Qnn	Last optional file consisting of an additional product library or integrated file system file
Q57yyPIDvrmxx0001	/Q57yyPID/Qvrmxx/Q00/Q01	Installation control file (*LNG objects)
Q57yyPIDvrmxx0002	/Q57yyPID/Qvrmxx/Q00/Q02	Product library file
Q57yyPIDvrmxx0003	/Q57yyPID/Qvrmxx/Q00/Q03	Optional files consisting of additional product libraries or integrated file system files
:	:	:
Q57yyPIDvrmxx00nn	/Q57yyPID/Qvrmxx/Q00/Qnn	Last optional file consisting of an additional product library or integrated file system file
Example of secondary language files		
QSYS29xx	/QSYS29xx	Secondary language library for NLV 29xx
Q57yyPIDvrmxx0001	/Q57yyPID/Qvrmxx/Q00/Q01	Installation control file (*LNG objects)
Q57yyPIDvrmxx0002	/Q57yyPID/vrmxx/Q00/Q02	Product library file
Q57yyPIDvrmxx0003	/Q57yyPID/Qvrmxx/Q00/Q03	Optional files consisting of additional product libraries or integrated file system files
:	:	:
Q57yyPIDvrmxx00nn	/Q57yyPID/Qvrmxx/Q00/Qnn	Last optional file consisting of an additional product library or integrated file system file

Licensed programs that do not support secondary languages

These licensed programs or i5/OS options do not support secondary languages.

- 5761-SS1 options 6, 7, 8, 9, 13, 18, 21, 26, 27, 36, 37, 38, 39, 41, 42, 43, 44, 45, and 46
- 5761-JV1 options 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12
- 5769-FNT options 1 through 15
- 5769-FN1 options 1 through 5
- 5761-RD1 options 11, and 12
- 5761-WDS options 35, 45, 55, and 60
- 5761-BR1 options 1 and 2

| • 5761-XW1 option 1
  • 5722-IP1 option 1

Cover sheet for central site distribution media

Use this sheet to record information for duplicating and distributing tape or DVD distribution media.

Central site identification _____

Target site identification _____

Version _____ Release _____ Modification _____

Contents of media:

IBM Licensed Internal Code

IBM i5/OS operating system

_____

_____

_____

_____

_____

_____

Special instructions:

This form may be copied as necessary.

Related reference

"Checklist: Creating central site distribution media" on page 16
If you selected tape, DVD, or image catalog as the distribution media, complete the tasks in this checklist to create the distribution media.

Troubleshooting software distribution

Use this information to understand your options when you have problems distributing software with the i5/OS operating system.

Troubleshooting installation of the user-defined installation (QLPUSER) program

If the target system does not receive the message `User installation processing completed` after you install the distribution media, a problem may have occurred with the installation of the QLPUSER program.

- **Message CPI3D8B: User installation processing failed**

  If the target system received the `User installation processing failed` message, it indicates that the system ran the QLPUSER program in the QGPL library and that one or more errors occurred as a result.

- **No messages appear**

  If no messages appear, it indicates that one of the following instances occurred:

  - The QLPUSER program did not exist in the QGPL library on the distribution media.
  - The installation of the IBM-supplied products failed in such a way that the QLPUSER program could not be called.
  - QGPL or QUSRSYS did not install successfully. If either of these libraries did not install successfully on the target system, the QLPUSER program was not called.

Related information for Distributing software

Product manuals, IBM Redbooks® publications (in PDF format), Web sites, and other information center topic collections contain information that relates to the Distributing software topic collection. You can view or print any of the PDF files.

IBM Redbooks

- IBM System i5® Handbook ![redbook icon] (V5R4)

- Managing OS/400 with Operations Navigator V5R1 Volume 4: Packages and Products ![redbook icon]

Web sites

Using CD-ROM in Distributing iSeries Software ![web icon]

Other information

- Installing, upgrading, or deleting i5/OS and related software
- Compressed objects and storage space
- Storage solutions and, in particular, Virtual optical storage

Code license and disclaimer information

IBM grants you a nonexclusive copyright license to use all programming code examples from which you can generate similar function tailored to your own specific needs.

SUBJECT TO ANY STATUTORY WARRANTIES WHICH CANNOT BE EXCLUDED, IBM, ITS PROGRAM DEVELOPERS AND SUPPLIERS MAKE NO WARRANTIES OR CONDITIONS EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT, REGARDING THE PROGRAM OR TECHNICAL SUPPORT, IF ANY.

UNDER NO CIRCUMSTANCES IS IBM, ITS PROGRAM DEVELOPERS OR SUPPLIERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY:

1. LOSS OF, OR DAMAGE TO, DATA;

2. DIRECT, SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR

3. LOST PROFITS, BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.

SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF DIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, SO SOME OR ALL OF THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

Appendix. Notices

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

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

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

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

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

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106-0032, Japan

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

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

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

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

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

IBM Corporation

31

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

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

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

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

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

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

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

COPYRIGHT LICENSE:

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

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

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_. All rights reserved.

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

Programming interface information

This Distribute software publication documents intended Programming Interfaces that allow the customer to write programs to obtain the services of IBM i5/OS.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

| i5/OS
| IBM
| Infoprint
| iSeries
| OS/400
| Redbooks
| System i
| WebSphere

| Adobe, Acrobat, Portable Document Format (PDF), and PostScript are either registered trademarks or
| trademarks of Adobe Systems Incorporated in the United States, other countries, or both.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions

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

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

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

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

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

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

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

IBM ®

Printed in USA