

IBM i  
7.5

*IBM i and related software*  
*Distributing software*



**Note**

Before using this information and the product it supports, read the information in [“Notices” on page 27.](#)

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

© **Copyright International Business Machines Corporation 1998, 2022.**

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

---

# Contents

<b>Distributing software.....</b>	<b>1</b>
PDF file for Distributing software.....	1
Planning to distribute software.....	1
Distributing software using central site distribution.....	2
Central site distribution concepts.....	2
Overview of tasks to distribute software using central site distribution.....	2
Central site distribution of software license information.....	3
Types of distribution media for central site distribution.....	4
Installation profiles for central site distribution.....	5
Benefits of using automatic installation and installation profiles to install distribution media.....	5
Installation methods for the target systems.....	6
Licensed program compression and decompression for central site distribution.....	6
Distribution of primary languages and secondary languages.....	7
Distribution of program temporary fixes (PTFs).....	7
Checklist: Preparing to distribute software by using central site distribution.....	7
Preparing software license information for central site distribution.....	9
Distributing software license information .....	9
Optional: Writing a user-defined installation program for the target systems.....	10
Optional: Preparing the central system for virtual optical images.....	10
Optional: Preparing the central system for virtual tape images.....	12
Checklist: Creating central site distribution media.....	13
Duplicating and distributing tape or DVD distribution media.....	14
Optional: Duplicating virtual images to physical media.....	15
Optional: Duplicating DVD media to virtual images.....	15
Optional: Distributing virtual images.....	16
Checklist: Installing central site distribution media on the target system.....	17
Optional: Preparing the target system for virtual images.....	17
Installation tasks for the target systems.....	19
Optional tasks to complete after installation.....	19
Distributing additional licensed programs or fixes by using the Network File System.....	20
Distributing software reference.....	20
Central site distribution media contents.....	20
Determining licensed programs installed in a secondary language.....	24
Cover sheet for central site distribution media.....	24
Troubleshooting software distribution.....	25
Related information for Distributing software.....	25
 <b>Notices.....</b>	 <b>27</b>
Programming interface information.....	28
Trademarks.....	28
Terms and conditions.....	29



---

# 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 central site distribution to distribute supported products and 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 26.

---

## 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](#).

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 20
- [“Determining licensed programs installed in a secondary language”](#) on page 24
- [“Cover sheet for central site distribution media”](#) on page 24

You can also view or download this related topic:


[Installing, upgrading, or deleting IBM i 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](http://www.adobe.com/products/acrobat/readstep.html) ([www.adobe.com/products/acrobat/readstep.html](http://www.adobe.com/products/acrobat/readstep.html)) .

---

## Planning to distribute software

You can use central site distribution to distribute software.

### 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 IBM i 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 central site distribution” on page 2](#)


## 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 IBM i 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 IBM i release to only one system, go to the [Data migrations](#) topic.

You can also distribute one or more licensed programs using Tape, CD-ROM, DVD, Virtual media, and Removable Mass Storage (RMS) devices. For more information on these devices, refer to [Storage solutions](#)  in the IBM i documentation.

### 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 IBM i 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 IBM i 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:
    - i) End all subsystems.
    - ii) Save the Licensed Internal Code, IBM i operating system, system configuration data, security objects, system resources manager (SRM) objects, and user profiles.
    - iii) Save the QGPL library. This library includes the user-defined installation program called QLPUSER.

- iv) Save the QUSRSYS library.
  - v) 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 IBM i 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 license key repository on the central system 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 (NFS), tape media, DVD, CD-ROM, Removable Mass Storage (RMS), 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.

### Removable Mass Storage

RMS is a type of device and media that is high capacity, random access, and interchangeable between systems and partitions. RMS devices and media are similar to optical storage regarding behavior and access interfaces. They are managed and used with existing optical device functions and commands.

### 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

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 13 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 19.

## 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 by 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 2. The overview of the central site distribution process includes an outline of the objects that are saved by 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 to IBM i maps](#)  Website to determine the IBM i releases that can be installed on each model.
4. Verify that the central and target systems will be at compatible IBM i releases after the central site distribution. Refer to [IBM i 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 suggests 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, see [“Distribution of program temporary fixes \(PTFs\)”](#) on page 7.
6. Ensure that the central system is stable. You might 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 6.
2. If you chose the automatic installation method in step [“1”](#) on page 8, 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, see [“Installation profiles for central site distribution”](#) on page 5.
3. Select the distribution media. The media types are described in [“Types of distribution media for central site distribution”](#) on page 4.
4. Prepare the license information of products that use IBM i license management. Refer to [“Preparing software license information for central site distribution”](#) on page 9.
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 10.
6. Consider compressing and decompressing licensed programs. Compress licensed programs by using the Compress Object (CPROBJ) command. For information, refer to [“Licensed program compression and decompression for central site distribution”](#) on page 6.
7. If you selected image catalog as the distribution media, go to either [“Optional: Preparing the central system for virtual optical images”](#) on page 10 or [“Optional: Preparing the central system for virtual tape images”](#) on page 12.

## 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 that your user-defined program works as expected.

**Next topic:** When the tasks in this checklist are complete, go to [“Checklist: Creating central site distribution media” on page 13.](#)

## 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.

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 (ADDLICENSE) 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 (DSPLICENSE) command:

```
DSPLICENSE PRDID(*ALL) LICTRM(*ALL) FEATURE(*ALL) SERIAL(*ALL)
OUTPUT(*LICENSEFILE) LICENSEFILE(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.

**Next topic:** [“Distributing software license information ” on page 9.](#)

## Distributing software license information

To distribute software license information, complete these tasks.

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 (WRKLICENSE) 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 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”](#) on page 10 or go to step [“6”](#) on page 8 in the checklist.

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

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

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 19. 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.

### 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 26.

```
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 8).

## 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) RSRNAME(*VRT) ONLINE(*YES) TEXT(text-description)
```

## 3. Vary on the virtual optical device

```
VRRCFG 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” on page [11](#) 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 48 MB to 1 000 000 GB.

If you plan to save the OS using SAVSYS, the first volume in the image catalog must be at least 2000 MB in size.

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 IBM i 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 15](#).

## 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)
```

**Next topic:** [“When you are finished” on page 8](#)

## 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) RSRNAME(*VRT) ONLINE(*YES) TEXT(text-description)
```

### 3. Vary on the virtual tape device

```
VRRCFG 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” on page 12. 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 48 MB to 1 000 000 MB. The minimum size of the first volume must be 2000 MB.

```
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 16](#).

**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)

Tape images are automatically initialized.

**Next topic:** [“When you are finished” on page 8](#)

## 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.

### Before you begin

1. If you plan to distribute secondary language files, refer to [“Determining licensed programs installed in a secondary language” on page 24](#) to verify the secondary language is installed for the desired LPP and operating system option.
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 following Check Object Integrity (CHKOBJITG) command to verify the signatures of operating system objects that will cause the SAVSYS operation to fail.

```
CHKOBJITG OBJ('/QSYS.LIB/*.*') OUTFILE(<lib_name>/<outfile>) CHKDMN(*NO)
CHKPGMMOD(*NO) CHKCMD(*NO) CHKSIG(*SIGNED) CHKLIB(*NO) SCANFS(*NO)
CHKLIC(*NO)
```

**Note:** There is more functionality in the CHKOBJITG command besides verifying signatures that you can use before you create the distribution media.

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 OBJ(QSYS/QHST\*) OBJTYPE(\*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 for each secondary language to be saved to the distribution media. In the library name of QSYS29xx, and the language parameter of the SAVLICPGM command, xx represents the national language version feature code for the secondary language.
  - a. Save the QSYS29xx 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(5770WDS) DEV(device\_name) LNG(29xx) OBJTYPE(\*LNG) ENDOPT(\*LEAVE)
  - c. Save the QIBM/PRODDATA/OS/MRI29xx 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 that are 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 14](#)
3. [“Optional: Duplicating virtual images to physical media” on page 15](#)
4. [“Optional: Duplicating DVD media to virtual images” on page 15](#)
5. [“Optional: Distributing virtual images” on page 16](#)

**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 17](#).

## Related reference

[Cover sheet for central site distribution media](#)

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.

**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” on page 15](#).

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) OUTPUT(*PRINT) PATH(*ALL)`

For a complete list of files saved to the distribution media refer to [“Central site distribution media contents”](#) on page 20.

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.

**Next topic:** [“Checklist: Installing central site distribution media on the target system”](#) on page 17.

## 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.

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.

**Next topic:** [“Checklist: Installing central site distribution media on the target system”](#) on page 17

## 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.

**Next topic:** [“Optional: Distributing virtual images” on page 16](#)

## 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

- 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.
- Start an FTP session with a remote system where the image files exist: `FTP RMTSYS(remote-system)`
- Set the file naming format: `NAMEFMT 1`
- Set the remote directory: `CD '/directory-name'`
- Set the local directory: `LCD '/directory-name'`
- Issue the BINARY command to set the transfer type: `BINARY`
- Issue the MGET to get the image files from the remote system: `MGET *`
- 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'))
```

**Next topic:** [“Checklist: Installing central site distribution media on the target system” on page 17](#)

## 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 17.
2. Install the distribution media on the target systems by using the steps outlined in the following information of the [Installing, upgrading, or deleting IBM i and related software](#) topic:
  - [Preparing to upgrade or replace IBM i 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 19 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

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) RSRCTYPE(*VRT) ONLINE(*YES) TEXT(text-description)
```

Virtual tape device:

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

#### 2. Vary on the virtual device

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

#### 3. Depending on how you distributed the virtual images, do one 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 the directory specified on the Create Image Catalog command in step [“3.a”](#) on page 17.

##### 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)
```

**Note:** Additional parameters are available on the CRTIMGCLG command to fully populate the image catalog with image catalog entries.

- An optical image catalog can be imported from the image catalog directory using parameter IMPORT(\*YES):

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

- All volumes found in the image catalog directory can be added to the image catalog by using parameter ADDVRTVOL(\*DIR).

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

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

(This command is not needed if you use the IMPORT or ADDVRTVOL option on the CRTIMGCLG command..)

```
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 command 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.

**Next topic:** Either continue with the steps in “Installation tasks for the target systems” on page 19 or complete the final tasks in the [“Checklist: Installing central site distribution media on the target system” on page 17.](#)

## 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.

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 QSYS29xx 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 29xx for the LNG parameter and \*LNG for the RSTOBJ parameter. For example: RSTLICPGM LICPGM(5770WDS) DEV(*device-name*) RSTOBJ(\*LNG) LNG(29xx) ENDOPT(\*LEAVE)
  - c. Restore the QIBM/PRODDATA/OS/MRI29xx 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 (ADDLICENSE) 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 IBM i release.
8. Install applications using control language (CL) commands.
9. Install user products that are packaged by the IBM System Manager for IBM i 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 10.

## 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.

### 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.

### 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 IBM i 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	70



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.

(continued)

Key		
Symbol	Description	Example
PID	Product identifier	SS1
v	Version	7
r	Release	5
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 i		
Not used on tape	/QCDIML	IML bootstrap file for optical installations only
QFILEIML	Not used on optical	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
QIAM400	/QIAM400	Indicates that the media contains the IBM i operating system
QFILELDS	/QFILELDS	Licensed Internal Code security information
QFILEMCD	/QFILEMCD	All Licensed Internal Code file

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.

(continued)

Distribution media contents		
Tape file name	Optical file name	Description
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 IBM i operating system (installation use)
	/QLANGID/Q_L29xx	Primary language indicator file for the IBM i operating system (installation use)
	/QLANGID/Q_LVLzz	Level indicator file for the IBM i operating system (installation use)
QFILEIPL	/QFILEIPL	Installation file
QFILEIN	/QFILEIN	Installation file
Q57yySS1vrmmM.0001	/Q57yySS1/QvrmmzM_/Q00/Q01	Installation file (QSYS simple objects)
Q57yySS1vrmmM.0002 through Q57yySS1vrmmM.0016	/Q57yySS1/QvrmmzM_/Q00/Q02 through /Q57yySS1/QvrmmzM_/Q00/Q16	Installation file (QSYS simple objects)
Q57yySS1vrmmxx0001 through Q57yySS1vrmmxx0007	/Q57yySS1/Qvrmmzxx/Q00/Q01 through /Q57yySS1/Qvrmmzxx/Q00/Q07	Installation file (QSYS simple objects)
Q57yySS1vrmmxx0090	/Q57yySS1/Qvrmmzxx/Q00/Q90	Installation file (QSYS complex objects)
Q57yySS1vrmmxx0091	/Q57yySS1/Qvrmmzxx/Q00/Q91	Installation file (Objects in base directories)
Q57yySS1vrmmM.0090	Q57yySS1/QvrmmzM_/Q00/Q90	Installation file (QSYS complex objects)
Q57yy999vrmmM.0091 through Q57yySS1vrmmM.0094	Q57yySS1/QvrmmzM_/Q00/Q91 through Q57yySS1/QvrmmzM_/Q00/Q94	Installation file (Objects in base directories)
QFILEUPR	/QFILEUPR	User profiles and other security information
QFILEIOC	/QFILEIOC	Configuration information
QINPREP	/QINPREP	Installation file
Q57yy999vrmmM.0000	/Q57yy999/QvrmmzM_/Q00/Q00	Software agreement file for Machine Code
Q57yySS1vrmmM.0000	/Q57yySS1/QvrmmzM_/Q00/Q00	Software agreement file for IBM i
QGPL.vrmzz.xx	/QUSRLIBS/Qvrmmzxx/QGPL	QGPL library file

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.

(continued)

Distribution media contents		
Tape file name	Optical file name	Description
QUSRSYS.vrmzz.xx	/QUSRLIBS/Qvrmzzxx/QUSRSYS	QUSRSYS library file
Example of licensed program files		
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
:	:	:

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.

(continued)

Distribution media contents		
Tape file name	Optical file name	Description
Q57yyPIDvrmxx00nn	/Q57yyPID/Qvrmxx/Q00/Qnn	Last optional file consisting of an additional product library or integrated file system file

## Determining licensed programs installed in a secondary language

There are a couple of methods that can be used to determine which licensed programs or IBM i options are installed in the various secondary languages.

- Display installed Licensed Programs
  1. Enter command `GO LICPGM` on the command line.
  2. Select option 20 (Display installed secondary languages).
  3. Type option 5 to display installed licensed program for each installed secondary language.
- Access an outfile containing software resources
  1. Enter command `DSPSFWRSC OUTPUT(*OUTFILE) OUTFILE(<lib_name>/<Outfile_name>)`.
  2. Field name `LCPFGI` contains feature codes. Any entry with field value equal to `29xx` indicates a language. Any language that does not match the primary language value indicates that the product is installed with a secondary language.

## 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 i operating system

---

---

---

---

---

---

---

Special instructions:

This form may be copied as necessary.

#### **Related reference**

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.

## **Troubleshooting software distribution**

---

Use this information to understand your options when you have problems distributing software with the IBM i 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, Websites, and other knowledge center topic collections contain information that relates to the Distributing software topic collection. You can view or print any of the PDF files.

### **Websites**

- [IBM i and Related Software](#) on 
- [Creating Optical Distribution Media](#) 

## Other information

- [Installing, upgrading, or deleting IBM i 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.

## Notices

---

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### COPYRIGHT LICENSE:

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

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

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

© Copyright IBM Corp. \_enter the year or years\_.

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

## Programming interface information

---

This publication documents intended Programming Interfaces that allow the customer to write programs to obtain the services of IBM i.

## Trademarks

---

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be



trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "[Copyright and trademark information](http://www.ibm.com/legal/copytrade.shtml)" at [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml).

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

IT Infrastructure Library is a registered trademark of AXELOS Limited.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux® is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

ITIL is a registered trademark of AXELOS Limited..

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

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

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

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

## Terms and conditions

---

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

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

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

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

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

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

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







Product Number: 5770-SS1