



## Working with System Software Images

This chapter describes how to work with system software image files on the Catalyst enterprise LAN switches.



### Note

For complete syntax and usage information for the commands used in this chapter, refer to the *Catalyst 4500 Series, Catalyst 2948G, and Catalyst 2980G Switches Command Reference*.

This chapter consists of these sections:

- [Software Image Naming Conventions, page 33-1](#)
- [Downloading System Software Images to the Switch Using TFTP, page 33-1](#)
- [Uploading System Software Images to a TFTP Server, page 33-4](#)
- [Downloading System Software Images to the Switch Using rcp, page 33-5](#)
- [Uploading System Software Images to an rcp Server, page 33-8](#)
- [Upgrading the ROM Monitor, page 33-9](#)

## Software Image Naming Conventions

The software images on the Catalyst 4500 series switches use the following naming conventions. Software release 6.1(3) is used in the examples:

- 6.1(3) Flash image (standard)—cat4000.6-1-3.bin
- 6.1(3) Flash image (CiscoView)—cat4000-cv.6-1-3.bin
- 6.1(3) Flash image (Secure Shell)—cat4000-k9.6-1-3.bin

## Downloading System Software Images to the Switch Using TFTP

The following sections describe how to download system software images to the switch supervisor engine and to intelligent modules.

## Understanding How TFTP Software Image Downloads Work

You can download system software images to the switch using the Trivial File Transfer Protocol (TFTP). TFTP allows you to download system image files over the network from a TFTP server.

When you download a software image, the image file is downloaded to the supervisor engine Flash memory. You can store multiple image files on the Flash memory system devices.

For more information on working with system software image files on the Flash file system, see [Chapter 34, “Working With the Flash File System.”](#)

## Preparing to Download an Image Using TFTP

Before you begin downloading a software image using TFTP, make sure of the following:

- Ensure that the workstation acting as the TFTP server is configured properly.
- Ensure that the switch has a route to the TFTP server. The switch and the TFTP server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the TFTP server using the **ping** command.
- Ensure that the software image to be downloaded is in the correct directory on the TFTP server (for example, /tftpboot on a UNIX workstation).
- Ensure that the permissions on the file are set correctly. Permissions on the file should be at least read for the specific username. If you are not using a Telnet session with a valid username, you can use the **set rcp username** command to specify a valid username.
- Ensure that a power interruption (or other problem) does not occur during the download procedure; this can corrupt the Flash code. If the Flash code is corrupted, you can connect to the switch through the console port. You can download the Flash code again through an enabled port in VLAN 1. By default, port 1/1 is enabled. You can use port 1/1 or enable another port.

## Downloading Supervisor Engine Images Using TFTP

To download a supervisor engine software image to the switch from a TFTP server, follow these steps:

- 
- Step 1** Copy the software image file to the appropriate TFTP directory on the workstation.
- Step 2** Log into the switch through the console port or through a Telnet session. If you log in using Telnet, your Telnet session disconnects when you reset the switch to run the new software.
- Step 3** Download the software image from the TFTP server using the **copy tftp flash** command. When prompted, enter the IP address or host name of the TFTP server and the name of the file to download. On those platforms that support the Flash file system, you are also prompted for the Flash device to which to copy the file and the destination filename.




---

**Note** The Catalyst 4500 series, 2948G, and 2980G switches have only one Flash device (**bootflash**).

---

The switch downloads the image file from the TFTP server, and the image is copied to the bootflash.




---

**Note** The switch remains operational while the image downloads.

---



```
#####
#####
```

```
System Power On Diagnostics
NVRAM Size .. .....512KB
ID Prom Test .....Passed
DPRAM Size .....16KB
DPRAM Data 0x55 Test .....Passed
DPRAM Data 0xaa Test .....Passed
DPRAM Address Test .....Passed
Clearing DPRAM .....Done
System DRAM Memory Size .....32MB
DRAM Data 0x55 Test .....Passed
DRAM Data 0xaa Test .....Passed
DRAM Address Test .....Passed
Clearing DRAM .....Done
EARL++ .....Present
EARL RAM Test .....Passed
EARL Serial Prom Test .....Passed
Level2 Cache .....Present
Level2 Cache test.....Passed
```

```
Boot image: bootflash:cat4000.6-1-1.bin
```

```
Cisco Systems Console
```

```
Enter password:
07/21/2000,13:52:51:SYS-5:Module 1 is online
07/21/2000,13:53:11:SYS-5:Module 4 is online
07/21/2000,13:53:11:SYS-5:Module 5 is online
07/21/2000,13:53:14:PAGP-5:Port 1/1 joined bridge port 1/1.
07/21/2000,13:53:14:PAGP-5:Port 1/2 joined bridge port 1/2.
07/21/2000,13:53:40:SYS-5:Module 2 is online
07/21/2000,13:53:45:SYS-5:Module 3 is online
```

```
Console> show version 1
```

| Mod | Port | Model    | Serial #    | Versions                                 |
|-----|------|----------|-------------|--|
| 1   | 0    | WS-X4012 | JAB03130104 | Hw : 1.5<br>Gsp: 6.1(1.4)<br>Nmp: 6.1(1) |

```
Console>
```

## Uploading System Software Images to a TFTP Server

The next two sections describe how to upload system software images from a switch to a TFTP server.

For more information on working with system software image files on the Flash file system, see [Chapter 34, “Working With the Flash File System.”](#)



## Understanding How rcp Software Image Downloads Work

You can download system software images to the switch using the remote copy protocol (rcp); rcp allows you to download system image files over the network from an rcp server.

You can store multiple image files in the Flash memory.

For more information on working with system software image files on the Flash file system, see to [Chapter 34, “Working With the Flash File System.”](#)

## Preparing to Download an Image Using rcp

Before you begin downloading a software image using rcp, make sure of the following:

- Ensure that the workstation acting as the rcp server supports the remote shell (rsh).
- Ensure that the switch has a route to the rcp server. The switch and the rcp server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the rcp server using the **ping** command.
- If you are accessing the switch through the console or a Telnet session without a valid username, make sure that the current rcp username is the one you want to use for the rcp download. You can enter the **show users** command to view the current valid username. If you do not want to use the current username, create a new rcp username using the **set rcp username** command. The new username will be stored in NVRAM. If you are accessing the switch through a Telnet session with a valid username, this username will be used and there is no need to set the rcp username.
- A power interruption (or other problem) during the download procedure can corrupt the Flash code. If the Flash code is corrupted, you can connect to the switch through the console port. You can download the Flash code again through an enabled port in VLAN 1. By default, port 1/1 is enabled. You can use port 1/1.

## Downloading Supervisor Engine Images Using rcp

To download a supervisor engine software image to the switch from an rcp server, follow these steps:

- 
- Step 1** Copy the software image file to the appropriate rcp directory on the workstation.
- Step 2** Log into the switch through the console port or through a Telnet session. If you log in using Telnet, your Telnet session disconnects when you reset the switch to run the new software.
- Step 3** Download the software image from the rcp server using the **copy rcp flash** command. When prompted, enter the IP address or host name of the rcp server and the name of the file to download. On those platforms that support the Flash file system, you are also prompted for the Flash device to which to copy the file and the destination filename.




---

**Note** The Catalyst 4500 series, 2948G, and 2980G switches have only one Flash device (**bootflash**).

---

The switch downloads the image file from the rcp server and copies the image to bootflash.




---

**Note** The switch remains operational while the image downloads.

---



```

System Power On Diagnostics
NVRAM Size .. .....512KB
ID Prom Test .....Passed
DPRAM Size .....16KB
DPRAM Data 0x55 Test .....Passed
DPRAM Data 0xaa Test .....Passed
DPRAM Address Test .....Passed
Clearing DPRAM .....Done
System DRAM Memory Size .....32MB
DRAM Data 0x55 Test .....Passed
DRAM Data 0xaa Test .....Passed
DRAM Address Test .....Passed
Clearing DRAM .....Done
EARL++ .....Present
EARL RAM Test .....Passed
EARL Serial Prom Test .....Passed
Level2 Cache .....Present
Level2 Cache test.....Passed

```

```
Boot image: bootflash:cat4000.6-1-1.bin
```

```
Cisco Systems Console
```

```

Enter password:
07/21/2000,13:52:51:SYS-5:Module 1 is online
07/21/2000,13:53:11:SYS-5:Module 4 is online
07/21/2000,13:53:11:SYS-5:Module 5 is online
07/21/2000,13:53:14:PAGP-5:Port 1/1 joined bridge port 1/1.
07/21/2000,13:53:14:PAGP-5:Port 1/2 joined bridge port 1/2.
07/21/2000,13:53:40:SYS-5:Module 2 is online
07/21/2000,13:53:45:SYS-5:Module 3 is online

```

```
Console> show version 1
```

| Mod | Port | Model    | Serial #    | Versions                                     |
|-----|------|----------|-------------|--|
| 1   | 0    | WS-X4012 | JAB03130104 | Hw : 1.5<br>Gsp: 6.1(1.4)<br>Nmp: 6.1(0.104) |

```
Console>
```

## Uploading System Software Images to an rcp Server

The next two sections describe how to upload system software images from a switch to an rcp server.

For more information on working with system software image files on the Flash file system, see [Chapter 34, “Working With the Flash File System.”](#)

## Preparing to Upload an Image to an rcp Server

Before you attempt to upload a software image to an rcp server, do the following:

- Ensure that the workstation acting as the rcp server is configured properly.
- Ensure that the switch has a route to the rcp server. The switch and the rcp server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the rcp server using the **ping** command.
- If you are overwriting an existing file (including an empty file, if you had to create one), ensure that the permissions on the file are set correctly. Make sure that the permissions on the file are set to write for the specific username.

## Uploading Software Images to an rcp Server

To upload a software image on a switch to an rcp server for storage, follow these steps:

- 
- Step 1** Log in to the switch through the console port or a Telnet session.
- Step 2** Upload the software image to the rcp server using the **copy flash rcp** command. When prompted, specify the rcp server address and the destination filename. On platforms that support the Flash file systems, you are first prompted for the Flash device and source filename. If desired, you can use the **copy file-id rcp** command on these platforms.

The software image is uploaded to the rcp server.

---

This example shows how to upload the supervisor engine software image to an rcp server:

```

Console> (enable) copy flash rcp
Flash device [bootflash]? bootflash:
Name of file to copy from []? cat4000.6-1-1.bin
IP address or name of remote host [172.20.52.3]? 172.20.52.10
Name of file to copy to [cat4000.6-1-1.bin]?
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC

File has been copied successfully.
Console> (enable)

```

## Upgrading the ROM Monitor

If the ROM Monitor (ROMMON) loaded onto your switch is version 4.5(1) or earlier, you need to upgrade the ROMMON to version 6.1(4) in order to run software release 7.1 or later releases.



### Caution

To avoid actions that might render your system unbootable, read this entire section before starting the upgrade.

---

You can do this procedure entirely over a Telnet connection, but if something fails, you will need to have access to the console serial port. If done improperly, the system can be rendered unbootable. It will then have to be returned to Cisco for repair.

This section describes an upgrade to ROMMON version 6.1(4). The same procedure applies to other ROMMON versions, but you will have to substitute appropriate version numbers in the upgrade image names.

To upgrade the ROMMON follow these steps:

- Step 1** Download the **promupgrade** program from Cisco.com and place it on a TFTP server in a directory that is accessible from the switch to be upgraded.

The **promupgrade** programs are available at the same location on cisco.com where you download Catalyst 4000 system images.

To upgrade to ROMMON version 6.1(4), download the **cat4000-promupgrade.6-1-4.bin** file.

- Step 2** In privileged mode on your switch, use the **show version** command to verify the ROMMON version loaded on the switch.

The ROMMON version number is listed as the System Bootstrap Version. For example, the following system is running ROMMON version 6.1(2):

```
Console> (enable) show version
WS-C4003 Software, Version NmpSW:5.5(8)
Copyright (c) 1995-2001 by Cisco Systems, Inc.
NMP S/W compiled on May 24 2001, 21:12:09
GSP S/W compiled on May 24 2001, 18:39:50

System Bootstrap Version:6.1(2)

Hardware Version:1.0 Model:WS-C4003 Serial #:xxxxxxxxx
.
.
.
Console > (enable)
```

- Step 3** Use the **dir bootflash:** command to ensure that there is sufficient space in Flash memory to store the **promupgrade** image. If there is insufficient space, delete one or more images and then enter the **squeeze bootflash:** command to reclaim the space.

- Step 4** Download the **promupgrade** image into Flash using the **copy tftp** command.

This example shows how to download the **promupgrade** image **cat4000-promupgrade.6-1-4.bin** from the remote host **Lab\_Server** to bootflash.

```
Console> (enable) copy tftp flash
IP address or name of remote host []? Lab_Server
Name of file to copy from []? /cat4000-promupgrade.6-1-4.bin
Flash device []? bootflash
Name of file to copy to []? cat4000-promupgrade.6-1-4.bin

9205592 bytes available on device bootflash, proceed (y/n) [n]? y
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
File has been copied successfully.
Console > (enable)
```

- Step 5** Ensure that the last line in the output of the **show boot** command is the following:

```
"boot:image specified by the boot system commands."
```

If the last line in the output of the **show boot** command does not say

```
"boot:image specified by the boot system commands," go to Step 6.
```

If the last line in the output of the **show boot** command is the following:

"boot:image specified by the boot system commands," go to Step 7.

This example shows the autoboot configuration:

```

Console> (enable) show boot
BOOT variable = bootflash:cat4000.5-5-8.bin,1;
CONFIG_FILE variable = bootflash:switch.cfg

Configuration register is 0x102
ignore-config:disabled
auto-config:non-recurring
console baud:9600
→ boot:image specified by the boot system commands
Console > (enable)

```

**Step 6** If the last line in the output of the **show boot** command does not say

"boot:image specified by the boot system commands," use the **set boot config-register** command to set the boot configuration.

This example shows how to set the boot configuration:

```

Console> (enable) set boot config-register boot system
Configuration register is 0x102
ignore-config:disabled
auto-config:non-recurring
console baud:9600
boot:image specified by the boot system commands
Console> (enable)

```

**Step 7** Use the **set boot system flash** command to prepend the **promupgrade** image to the boot string.



**Note** Make sure that you use the **prepend** keyword with the **set boot system flash** command. The switch always boots the first image in the boot string, and you want the **promupgrade** image to boot first.

This example shows how to prepend the **promupgrade** image to the boot string:

```

Console> (enable) set boot system flash bootflash:cat4000-promupgrade.6-1-4.bin prepend
BOOT variable = bootflash:cat4000-promupgrade.6-1-4.bin,1;bootflash:cat4000.5-5-8.bin,1;

```

**Step 8** Reset the switch to boot the **promupgrade** program.



**Caution**

No intervention is necessary to complete the upgrade. Do not interrupt the boot process by performing a reset, power cycle, OIR of the supervisor engine, and so on, for at least 5 minutes. If the process is not allowed to complete, you might damage the switch and have to return it to Cisco for repair.

Upgrading the ROMMON may require up to 5 minutes because the switch boots the **promupgrade** image. This special program erases the current ROMMON from Flash and installs the new one. After you install the new ROMMON, the system resets again and boots the next image in the BOOT string. If the BOOT string was configured as described in Step 7 on page 33-11, the next image is the software image that the switch was originally configured to boot.



**Note** A Telnet session is disconnected when you reset the switch; you will lose connectivity to the switch.



```

NMP S/W compiled on May 24 2001, 21:12:09
GSP S/W compiled on May 24 2001, 18:39:50

System Bootstrap Version:6.1(4)

Hardware Version:1.0 Model:WS-C4003 Serial #:xxxxxxxxx

.
.
.
Console > (enable)

```

- Step 10** Enter the **clear boot system flash** *promupgrade\_image* command to remove the **promupgrade** program from the autoboot string.

**Caution**

When entering the **clear boot system flash cat.4000-promupgrade.6-1-4.bin** command, be sure to type the correct **promupgrade** image in the command syntax. If you enter only **clear boot system flash**, all images in the autoboot string are cleared, and the switch does not know which image to boot.

This example shows how to remove the **promupgrade** image **cat.4000-promupgrade.6-1-4.bin** from the boot sequence. Notice that the response message shows the system image for software release 5.5(8) in the autoboot string.

```

Console> (enable) clear boot system flash bootflash:cat4000-promupgrade.6-1-4.bin
BOOT variable = bootflash:cat4000.5-5-8.bin,1;

```

- Step 11** Enter **del** to delete the **promupgrade** program from Flash memory. Squeeze the flash memory to reclaim unused space.

This example shows how to delete the **promupgrade** image **cat.4000-promupgrade.6-1-4.bin** from Flash and reclaim unused space:

```

Console> (enable) del bootflash:cat4000-promupgrade.6-1-4.bin
Console> (enable) squeeze bootflash:

```

```

All deleted files will be removed, proceed (y/n) [n]? y

```

```

Squeeze operation may take some time, proceed (y/n) [n]? y
Console > (enable)

```

- Step 12** After removing the **promupgrade** image from the BOOT string, use the **show boot** command to verify that the BOOT string is set correctly.

