



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 *Command Reference—Catalyst 4000 Family, Catalyst 2948G, and Catalyst 2980G Switches*.

This chapter consists of these sections:

- [Software Image Naming Conventions, page 29-1](#)
- [Downloading System Software Images to the Switch Using TFTP, page 29-1](#)
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Software Image Naming Conventions

The software images on the Catalyst 4000 family 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

These sections describe how to download system software images to the switch supervisor engine and to intelligent modules:

- [Understanding How TFTP Software Image Downloads Work, page 29-2](#)
- [Preparing to Download an Image Using TFTP, page 29-2](#)

- [Downloading Supervisor Engine Images Using TFTP, page 29-2](#)
- [Example TFTP Download Procedures, page 29-3](#)

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.

**Note**

For more information on working with system software image files on the Flash file system, refer to [Chapter 30, “Using 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.
- 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 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:

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- 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 4000 family, 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.

- Step 4** Modify the BOOT environment variable using the **set boot system flash device:filename prepend** command, so that the new image boots when you reset the switch. Specify the Flash device (*device:*) and the filename of the downloaded image (*filename*).
- Step 5** Reset the switch using the **reset system** command. If you are connected to the switch through Telnet, your Telnet session disconnects.
- Step 6** When the switch reboots, enter the **show version** command to check the version of the code on the switch.



Note For examples that show complete TFTP download procedures for the various supervisor engine and switch types, see the [“Example TFTP Download Procedures”](#) section on page 29-3.

Example TFTP Download Procedures



Note For a step-by-step procedure for downloading a supervisor engine software image from a TFTP server, see the [“Downloading Supervisor Engine Images Using TFTP”](#) section on page 29-2.

This example shows a complete TFTP download procedure of a supervisor engine software image:

```

Console> (enable) show version 1
Mod Port Model      Serial #          Versions
-----
1   0   WS-X4012   JAB03130104     Hw : 1.5
                               Gsp: 6.1(1.4)
                               Nmp: 6.1(0.104)

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

4369664 bytes available on device bootflash, proceed (y/n) [n]? y
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCC
File has been copied successfully.
Console> (enable) set boot system flash bootflash:cat4000.6-1-1.bin prepend
BOOT variable = bootflash:cat4000.6-1-1.bin,1;bootflash:cat4000.4-1-2.bin,1;
Console> (enable) reset system
This command will reset the system.
Do you want to continue (y/n) [n]? y
Console> (enable) 07/21/2000,13:51:39:SYS-5:System reset from Console//

```


Downloading System Software Images to the Switch Using rcp

These sections describe how to download system software images to the switch supervisor engine and to intelligent modules using rcp:

- [Understanding How rcp Software Image Downloads Work](#), page 29-6
- [Preparing to Download an Image Using rcp](#), page 29-6
- [Downloading Supervisor Engine Images Using rcp](#), page 29-6
- [Sample rcp Download Procedures](#), page 29-7

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.

**Note**

For more information on working with system software image files on the Flash file system, refer to [Chapter 30, “Using 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 4000 family, 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.

- Step 4** Modify the BOOT environment variable using the **set boot system flash device:filename prepend** command, so that the new image boots when you reset the switch. Specify the Flash device (*device:*) and the filename of the downloaded image (*filename*).
- Step 5** Reset the switch using the **reset system** command. If you are connected to the switch through Telnet, your Telnet session disconnects.
- During startup, the Flash memory on the supervisor engine is reprogrammed with the new Flash code.
- Step 6** When the switch reboots, enter the **show version** command to check the version of the code on the switch.

Sample rcp Download Procedures

This example shows a complete rcp download procedure of a supervisor engine software image:

```

Console> (enable) show version 1
Mod Port Model      Serial #  Versions
-----
1   2   WS-X5530   007451586 Hw : 1.3
                               Fw : 3.1.2
                               Fw1: 3.1(2)
                               Sw  : 4.1(2)

Console> (enable) copy rcp flash
IP address or name of remote host []? 172.20.52.3
Name of file to copy from []? cat4000.6-1-1.bin
Flash device [bootflash]?
Name of file to copy to [cat6000.6-1-1.bin]?

4369664 bytes available on device bootflash, proceed (y/n) [n]? y
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCC
File has been copied successfully.
Console> (enable) set boot system flash bootflash:cat4000.6-1-1.bin prepend
BOOT variable = bootflash:cat4000.6-1-1.bin,1;bootflash:cat4000.5-1-2.bin,1;
Console> (enable) reset system
This command will reset the system.
Do you want to continue (y/n) [n]? y
Console> (enable) 07/21/2000,13:51:39:SYS-5:System reset from Console//

System Bootstrap, Version 3.1(2)
Copyright (c) 1994-1997 by cisco Systems, Inc.

```


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.



Caution

To avoid actions that might render your system unbootable, please 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.

- 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 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 **show boot** command says: `boot:image` specified by the boot system commands.

- If the last line in the output of **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 **show boot** command says: `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 **show boot** command does not say: `boot:image` specified by the boot system commands, use the **set boot config-register** command 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 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 upgrade. Do **not** interrupt the boot process by performing a reset, power cycle, OIR of the supervisor, etc. for at least five minutes! If the process is not allowed to complete, you may damage the switch and have to return it to Cisco for repair.

Upgrading the ROMMON may require up to five minutes because the switch boots the **promupgrade** image. This special program erases the current ROMMON from flash and installs the new one. After installing 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 29-11, 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 for some time.

If you are connected to the console serial port, output similar to the following is displayed after you reset the switch.

```
0:00.530901:ig0:00:10:7b:aa:d3:fe is 172.20.59.203
0:00.531660:netmask:255.255.255.0
0:00.532030:broadcast:172.20.59.255
0:00.532390:gateway:172.20.59.1
WS-X4012 bootrom version 6.1(2), built on 2000.04.03 15:20:09
H/W Revisions:Meteor:2 Comet:8 Board:1
Supervisor MAC addresses:00:10:7b:aa:d0:00 through 00:10:7b:aa:d3:ff (1024 addresses)
Installed memory:64 MB
Testing LEDs... done!
The system will autoboot in 5 seconds.
Type control-C to prevent autobooting.
rommon 1 >
The system will now begin autobooting.
Autobooting image:
"bootflash:cat4000-promupgrade.6-1-4.bin"
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC#####
Replacing ROM version 6.1(2) with version 6.1(4)
```

```
Upgrading your PROM... DO NOT RESET the system
unless instructed or it may NOT be bootable!!!
Beginning erase of 524288 bytes at offset 0x0... Done!
Beginning write of system prom (467456 bytes at offset 0x0)...
This could take as little as 10 seconds or up to 2 minutes.
Please DO NOT RESET!
```

```
*****
```

```
Success!
System will reset in 2 seconds...
[ ... ]
```

The switch reboots back into the online software:

```
0:00.530856:ig0:00:10:7b:aa:d3:fe is 172.20.59.203
0:00.531616:netmask:255.255.255.0
0:00.531967:broadcast:172.20.59.255
0:00.532342:gateway:172.20.59.1
WS-X4012 bootrom version 6.1(4), built on 2000.04.03 15:20:09
H/W Revisions:Meteor:2 Comet:8 Board:1
Supervisor MAC addresses:00:10:7b:aa:d0:00 through 00:10:7b:aa:d3:ff (1024 addresses)
Installed memory:64 MB
Testing LEDs... done!
The system will autoboot in 5 seconds.
Type control-C to prevent autobooting.
rommon 1 >
The system will now begin autobooting.
Autobooting image:"bootflash:cat4000.5-5-8.bin"
```


