



## Working with the Cisco IOS File System, Configuration Files, and Software Images

This appendix describes how to manipulate the Catalyst 3750-X or 3560-X switch flash file system, how to copy configuration files, and how to archive (upload and download) software images to a Catalyst 3750-X or 3560-X switch or to a Catalyst 3750-X switch stack.

Unless otherwise noted, the term *switch* refers to a standalone switch and to a switch stack.

**Note**

For complete syntax and usage information for the commands used in this chapter, see the switch command reference for this release and the *Cisco IOS Configuration Fundamentals Command Reference, Release 12.4*.

- [Working with the Flash File System, page 1-1](#)
- [Working with Configuration Files, page 1-9](#)
- [Working with Software Images, page 1-25](#)

## Working with the Flash File System

The flash file system is a single flash device on which you can store files. It also provides several commands to help you manage software image and configuration files. The default flash file system on the switch is named *flash:*.

As viewed from the stack master, or any stack member, *flash:* refers to the local flash device, which is the device attached to the same switch on which the file system is being viewed. In a switch stack, each of the flash devices from the various stack members can be viewed from the stack master. The names of these flash file systems include the corresponding switch member numbers. For example, *flash3:*, as viewed from the stack master, refers to the same file system as does *flash:* on stack member 3. Use the **show file systems** privileged EXEC command to list all file systems, including the flash file systems in the switch stack.

No more than one user at a time can manage the software images and configuration files for a switch stack.

These sections contain this configuration information:

- [Displaying Available File Systems, page 1-2](#)
- [Setting the Default File System, page 1-3](#)
- [Displaying Information about Files on a File System, page 1-3](#)

- [Changing Directories and Displaying the Working Directory, page 1-4](#)
- [Creating and Removing Directories, page 1-5](#)
- [Copying Files, page 1-5](#)
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- [Creating, Displaying, and Extracting Files, page 1-6](#)

## Displaying Available File Systems

To display the available file systems on your switch, use the **show file systems** privileged EXEC command as shown in this example for a standalone switch.

```
Switch# show file systems
File Systems:
      Size(b)      Free(b)      Type  Flags  Prefixes
*  15998976      5135872      flash  rw     flash:
      -            -            opaque  rw     bs:
      -            -            opaque  rw     vb:
      524288      520138      nvram   rw     nvram:
      -            -            network  rw     tftp:
      -            -            opaque  rw     null:
      -            -            opaque  rw     system:
      -            -            opaque  ro     xmodem:
      -            -            opaque  ro     ymodem:
```

This example shows a switch stack. In this example, the stack master is stack member 2; therefore `flash2:` is aliased to `flash:`. The file system on stack member 5 is displayed as `flash5` on the stack master.

```
Switch# show file systems
File Systems:
      Size(b)      Free(b)      Type  Flags  Prefixes
*  57409536      25664000      flash  rw     flash: flash2:
      -            -            opaque  rw     system:
      524288      512375      nvram   rw     nvram:
      -            -            opaque  ro     xmodem:
      -            -            opaque  ro     ymodem:
      -            -            opaque  rw     null:
      -            -            opaque  ro     tar:
      -            -            network  rw     tftp:
      -            -            network  rw     rcpc:
      -            -            network  rw     http:
      -            -            network  rw     ftp:
      -            -            opaque  ro     cns:
      57409536      27306496      flash  rw     flash5:
```

**Table 1-1** *show file systems* Field Descriptions

Field	Value
Size(b)	Amount of memory in the file system in bytes.
Free(b)	Amount of free memory in the file system in bytes.

Table 1-1 *show file systems Field Descriptions (continued)*

Field	Value
Type	Type of file system. <b>flash</b> —The file system is for a flash memory device. <b>nvr</b> am—The file system is for a NVRAM device. <b>opaque</b> —The file system is a locally generated <i>pseudo</i> file system (for example, the <i>system</i> ) or a download interface, such as brimux. <b>unknown</b> —The file system is an unknown type.
Flags	Permission for file system. <b>ro</b> —read-only. <b>rw</b> —read/write. <b>wo</b> —write-only.
Prefixes	Alias for file system. <b>flash:</b> —Flash file system. <b>nvr</b> am:—NVRAM. <b>null:</b> —Null destination for copies. You can copy a remote file to null to find its size. <b>rcp:</b> —Remote Copy Protocol (RCP) network server. <b>system:</b> —Contains the system memory, including the running configuration. <b>tftp:</b> —TFTP network server. <b>xmodem:</b> —Obtain the file from a network machine by using the Xmodem protocol. <b>ymodem:</b> —Obtain the file from a network machine by using the Ymodem protocol.

## Setting the Default File System

You can specify the file system or directory that the system uses as the default file system by using the **cd *filesystem*:** privileged EXEC command. You can set the default file system to omit the *filesystem:* argument from related commands. For example, for all privileged EXEC commands that have the optional *filesystem:* argument, the system uses the file system specified by the **cd** command.

By default, the default file system is *flash*.

You can display the current default file system as specified by the **cd** command by using the **pwd** privileged EXEC command.

## Displaying Information about Files on a File System

You can view a list of the contents of a file system before manipulating its contents. For example, before copying a new configuration file to flash memory, you might want to verify that the file system does not already contain a configuration file with the same name. Similarly, before copying a flash configuration file to another location, you might want to verify its filename for use in another command.

To display information about files on a file system, use one of the privileged EXEC commands in [Table 1-2](#):

**Table 1-2 Commands for Displaying Information About Files**

Command	Description
<b>dir</b> [/all] [filesystem:][filename]	Display a list of files on a file system.
<b>show file systems</b>	Display more information about each of the files on a file system.
<b>show file information</b> file-url	Display information about a specific file.
<b>show file descriptors</b>	Display a list of open file descriptors. File descriptors are the internal representations of open files. You can use this command to see if another user has a file open.

To display information about the driver text object in the CISCO-MEMORY-POOL-MIB, use the **show memory** privileged EXEC command:

```
Switch# show memory
          Head    Total(b)    Used(b)    Free(b)    Lowest(b)    Largest(b)
Processor 2BF1A9C  205661540  43619116  162042424  160085888  159736648
      I/O  F000000  16769024  10503052   6265972    6132844   6127744
Driver te  1800000    4194304         44    4194260    4194260    4194260
```

## Changing Directories and Displaying the Working Directory

Beginning in privileged EXEC mode, follow these steps to change directories and to display the working directory.

	Command	Purpose
<b>Step 1</b>	<b>dir</b> filesystem:	Display the directories on the specified file system. For <i>filesystem:</i> , use <b>flash:</b> for the system board flash device.
<b>Step 2</b>	<b>cd</b> new_configs	Change to the directory of interest. The command example shows how to change to the directory named <i>new_configs</i> .
<b>Step 3</b>	<b>pwd</b>	Display the working directory.

## Creating and Removing Directories

Beginning in privileged EXEC mode, follow these steps to create and remove a directory:

	Command	Purpose
Step 1	<b>dir</b> <i>filesystem:</i>	Display the directories on the specified file system. For <i>filesystem:</i> , use <b>flash:</b> for the system board flash device.
Step 2	<b>mkdir</b> <i>old_configs</i>	Create a new directory.  The command example shows how to create the directory named <i>old_configs</i> . Directory names are case sensitive.  Directory names are limited to 45 characters between the slashes (/); the name cannot contain control characters, spaces, deletes, slashes, quotes, semicolons, or colons.
Step 3	<b>dir</b> <i>filesystem:</i>	Verify your entry.

To delete a directory with all its files and subdirectories, use the **delete /force /recursive filesystem:/file-url** privileged EXEC command.

Use the **/recursive** keyword to delete the named directory and all subdirectories and the files contained in it. Use the **/force** keyword to suppress the prompting that confirms a deletion of each file in the directory. You are prompted only once at the beginning of this deletion process. Use the **/force** and **/recursive** keywords for deleting old software images that were installed by using the **archive download-sw** command but are no longer needed.

For *filesystem*, use **flash:** for the system board flash device. For *file-url*, enter the name of the directory to be deleted. All the files in the directory and the directory are removed.



### Caution

When files and directories are deleted, their contents cannot be recovered.

## Copying Files

To copy a file from a source to a destination, use the **copy source-url destination-url** privileged EXEC command. For the source and destination URLs, you can use **running-config** and **startup-config** keyword shortcuts. For example, the **copy running-config startup-config** command saves the currently running configuration file to the NVRAM section of flash memory to be used as the configuration during system initialization.

You can also copy from special file systems (**xmodem:**, **ymodem:**) as the source for the file from a network machine that uses the Xmodem or Ymodem protocol.

Network file system URLs include **ftp:**, **rnp:**, and **tftp:** and have these syntaxes:

- FTP—**ftp:**[[//username [:password]@location]/directory]/filename
- RCP—**rnp:**[[//username@location]/directory]/filename
- TFTP—**tftp:**[[//location]/directory]/filename

Local writable file systems include flash:.

Some invalid combinations of source and destination exist. Specifically, you cannot copy these combinations:

- From a running configuration to a running configuration
- From a startup configuration to a startup configuration
- From a device to the same device (for example, the **copy flash: flash:** command is invalid)

For specific examples of using the **copy** command with configuration files, see the [“Working with Configuration Files” section on page 1-9](#).

To copy software images either by downloading a new version or by uploading the existing one, use the **archive download-sw** or the **archive upload-sw** privileged EXEC command. For more information, see the [“Working with Software Images” section on page 1-25](#).

## Deleting Files

When you no longer need a file on a flash memory device, you can permanently delete it. To delete a file or directory from a specified flash device, use the **delete [/force] [/recursive] [filesystem:]file-url** privileged EXEC command.

Use the **/recursive** keyword for deleting a directory and all subdirectories and the files contained in it. Use the **/force** keyword to suppress the prompting that confirms a deletion of each file in the directory. You are prompted only once at the beginning of this deletion process. Use the **/force** and **/recursive** keywords for deleting old software images that were installed by using the **archive download-sw** command but are no longer needed.

If you omit the *filesystem:* option, the switch uses the default device specified by the **cd** command. For *file-url*, you specify the path (directory) and the name of the file to be deleted.

When you attempt to delete any files, the system prompts you to confirm the deletion.



### Caution

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When files are deleted, their contents cannot be recovered.

---

This example shows how to delete the file *myconfig* from the default flash memory device:

```
Switch# delete myconfig
```

## Creating, Displaying, and Extracting Files

You can create a file and write files into it, list the files in a file, and extract the files from a file as described in the next sections.



### Note

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Instead of using the **copy** privileged EXEC command or the **archive** privileged EXEC command, we recommend using the **archive download-sw** and **archive upload-sw** privileged EXEC commands to download and upload software image files. For switch stacks, the **archive download-sw** and **archive upload-sw** privileged EXEC commands can only be used through the stack master. Software images downloaded to the stack master are automatically downloaded to the rest of the stack members.

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To upgrade a switch with an incompatible software image, use the **archive copy-sw** privileged EXEC command to copy the software image from an existing stack member to the incompatible switch. That switch automatically reloads and joins the stack as a fully functioning member.

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Beginning in privileged EXEC mode, follow these steps to create a file, display the contents, and extract it.

	Command	Purpose
Step 1	<b>archive /create</b> <i>destination-url</i> <b>flash:/file-url</b>	<p>Create a file and add files to it.</p> <p>For <i>destination-url</i>, specify the destination URL alias for the local or network file system and the name of the file to create. The <i>-filename.</i> is the file to be created. These options are supported:</p> <ul style="list-style-type: none"> <li>Local flash file system syntax:  <b>flash:</b></li> <li>FTP syntax:  <b>ftp:[[/username[:password]@location]/directory]/-filename.</b></li> <li>RCP syntax:  <b>rcp:[[/username@location]/directory]/-filename.</b></li> <li>TFTP syntax:  <b>tftp:[[/location]/directory]/-filename.</b></li> </ul> <p>For <b>flash:/file-url</b>, specify the location on the local flash file system in which the new file is created. You can also specify an optional list of files or directories within the source directory to add to the new file. If none are specified, all files and directories at this level are written to the newly created file.</p>
Step 2	<b>archive /table</b> <i>source-url</i>	<p>Display the contents of a file.</p> <p>For <i>source-url</i>, specify the source URL alias for the local or network file system. The <i>-filename.</i> is the file to display. These options are supported:</p> <ul style="list-style-type: none"> <li>Local flash file system syntax:  <b>flash:</b></li> <li>FTP syntax:  <b>ftp:[[/username[:password]@location]/directory]/-filename.</b></li> <li>RCP syntax:  <b>rcp:[[/username@location]/directory]/-filename.</b></li> <li>TFTP syntax:  <b>tftp:[[/location]/directory]/-filename.</b></li> </ul> <p>You can also limit the file displays by specifying a list of files or directories after the file. Only those files appear. If none are specified, all files and directories appear.</p>

	Command	Purpose
Step 3	<b>archive /xtract</b> <i>source-url</i> <b>flash:/file-url</b> [ <i>dir/file...</i> ]	<p>Extract a file into a directory on the flash file system.</p> <p>For <i>source-url</i>, specify the source URL alias for the local file system. The <i>-filename.</i> is the file from which to extract files. These options are supported:</p> <ul style="list-style-type: none"> <li>local flash file system syntax: <b>flash:</b></li> <li>FTP syntax: <b>ftp:</b>[[//<i>username[:password]</i>@<i>location</i>]/<i>directory</i>]/<i>-filename.</i></li> <li>RCP syntax: <b>rcp:</b>[[//<i>username</i>@<i>location</i>]/<i>directory</i>]/<i>-filename.</i></li> <li>TFTP syntax: <b>tftp:</b>[[//<i>location</i>]/<i>directory</i>]/<i>-filename.</i></li> </ul> <p>For <b>flash:/file-url</b> [<i>dir/file...</i>], specify the location on the local flash file system from which the file is extracted. Use the <i>dir/file...</i> option to specify a list of files or directories within the file to be extracted. If none are specified, all files and directories are extracted.</p>
Step 4	<b>more</b> [/ascii   /binary   /ebcdic] <i>file-url</i>	Display the contents of any readable file, including a file on a remote file system.

This example shows how to create a file. This command writes the contents of the *new-configs* directory on the local flash device to a file named *saved.* on the TFTP server at 172.20.10.30:

```
Switch# archive /create tftp:172.20.10.30/saved. flash:/new-configs
```



#### Note

The following examples show Catalyst 3750-E switch outputs. The outputs would be similar for the Catalyst 3750-X and 3560-X.

This example shows how to display the contents of a switch file that is in flash memory.

```
Switch# archive /table flash:..
info (219 bytes)
/ (directory)
/html/ (directory)
/html/foo.html (0 bytes)
/.bin (610856 bytes)
/info (219 bytes)
```

This example shows how to display only the */html* directory and its contents:

```
Switch# archive /table flash: /html
/html
/html/ (directory)
/html/const.htm (556 bytes)
/html/xhome.htm (9373 bytes)
/html/menu.css (1654 bytes)
<output truncated>
```

This example shows how to extract the contents of a file located on the TFTP server at 172.20.10.30.

```
Switch# archive /xtract tftp://172.20.10.30/saved. flash:/new-configs
```



This example shows how to display the contents of a configuration file on a TFTP server:

```
Switch# more tftp://serverA/hampton/savedconfig
!  
! Saved configuration on server  
!  
version 12.2  
service timestamps log datetime localtime  
service linenummer  
service udp-small-servers  
service pt-vty-logging  
!  
<output truncated>
```

## Working with Configuration Files

This section describes how to create, load, and maintain configuration files.



### Note

For information about configuration files in switch stacks, see the [“Switch Stack Configuration Files” section on page 1-16](#).

Configuration files contain commands entered to customize the function of the Cisco IOS software. A way to create a basic configuration file is to use the **setup** program or to enter the **setup** privileged EXEC command. For more information, see [Chapter 1, “Assigning the Switch IP Address and Default Gateway.”](#)

You can copy (*download*) configuration files from a TFTP, FTP, or RCP server to the running configuration or startup configuration of the switch. You might want to perform this for one of these reasons:

- To restore a backed-up configuration file.
- To use the configuration file for another switch. For example, you might add another switch to your network and want it to have a configuration similar to the original switch. By copying the file to the new switch, you can change the relevant parts rather than recreating the whole file.
- To load the same configuration commands on all the switches in your network so that all the switches have similar configurations.

You can copy (*upload*) configuration files from the switch to a file server by using TFTP, FTP, or RCP. You might perform this task to back up a current configuration file to a server before changing its contents so that you can later restore the original configuration file from the server.

The protocol you use depends on which type of server you are using. The FTP and RCP transport mechanisms provide faster performance and more reliable delivery of data than TFTP. These improvements are possible because FTP and RCP are built on and use the TCP/IP stack, which is connection-oriented.

These sections contain this configuration information:

- [Guidelines for Creating and Using Configuration Files, page 1-10](#)
- [Configuration File Types and Location, page 1-10](#)
- [Creating a Configuration File By Using a Text Editor, page 1-11](#)
- [Copying Configuration Files By Using TFTP, page 1-11](#)
- [Copying Configuration Files By Using FTP, page 1-13](#)

- [Copying Configuration Files By Using RCP, page 1-17](#)
- [Clearing Configuration Information, page 1-20](#)
- [Replacing and Rolling Back Configurations, page 1-20](#)

## Guidelines for Creating and Using Configuration Files

Creating configuration files can aid in your switch configuration. Configuration files can contain some or all of the commands needed to configure one or more switches. For example, you might want to download the same configuration file to several switches that have the same hardware configuration.

Use these guidelines when creating a configuration file:

- We recommend that you connect through the console port or Ethernet management port for the initial configuration of the switch. If you are accessing the switch through a network connection instead of through a direct connection to the console port or Ethernet management port, keep in mind that some configuration changes (such as changing the switch IP address or disabling ports) can cause a loss of connectivity to the switch.
- If no password has been set on the switch, we recommend that you set one by using the **enable secret** *secret-password* global configuration command.



### Note

The **copy {ftp: | rcp: | tftp:} system:running-config** privileged EXEC command loads the configuration files on the switch as if you were entering the commands at the command line. The switch does not erase the existing running configuration before adding the commands. If a command in the copied configuration file replaces a command in the existing configuration file, the existing command is erased. For example, if the copied configuration file contains a different IP address in a particular command than the existing configuration, the IP address in the copied configuration is used. However, some commands in the existing configuration might not be replaced or negated. In this case, the resulting configuration file is a mixture of the existing configuration file and the copied configuration file, with the copied configuration file having precedence.

To restore a configuration file to an exact copy of a file stored on a server, copy the configuration file directly to the startup configuration (by using the **copy {ftp: | rcp: | tftp:} nvram:startup-config** privileged EXEC command), and reload the switch.

## Configuration File Types and Location

Startup configuration files are used during system startup to configure the software. Running configuration files contain the current configuration of the software. The two configuration files can be different. For example, you might want to change the configuration for a short time period rather than permanently. In this case, you would change the running configuration but not save the configuration by using the **copy running-config startup-config** privileged EXEC command.

The running configuration is saved in DRAM; the startup configuration is stored in the NVRAM section of flash memory.

## Creating a Configuration File By Using a Text Editor

When creating a configuration file, you must list commands logically so that the system can respond appropriately. This is one method of creating a configuration file:

- 
- |               |  |
|---------------|--|
| <b>Step 1</b> | Copy an existing configuration from a switch to a server.<br><br>For more information, see the <a href="#">“Downloading the Configuration File By Using TFTP”</a> section on page 1-12, the <a href="#">“Downloading a Configuration File By Using FTP”</a> section on page 1-14, or the <a href="#">“Downloading a Configuration File By Using RCP”</a> section on page 1-18. |
| <b>Step 2</b> | Open the configuration file in a text editor, such as vi or emacs on UNIX or Notepad on a PC.  |
| <b>Step 3</b> | Extract the portion of the configuration file with the desired commands, and save it in a new file.  |
| <b>Step 4</b> | Copy the configuration file to the appropriate server location. For example, copy the file to the TFTP directory on the workstation (usually /tftpboot on a UNIX workstation).   |
| <b>Step 5</b> | Make sure the permissions on the file are set to world-read.   |
- 

## Copying Configuration Files By Using TFTP

You can configure the switch by using configuration files you create, download from another switch, or download from a TFTP server. You can copy (upload) configuration files to a TFTP server for storage.

These sections contain this configuration information:

- [Preparing to Download or Upload a Configuration File By Using TFTP, page 1-11](#)
- [Downloading the Configuration File By Using TFTP, page 1-12](#)
- [Uploading the Configuration File By Using TFTP, page 1-13](#)

## Preparing to Download or Upload a Configuration File By Using TFTP

Before you begin downloading or uploading a configuration file by using TFTP, do these tasks:

- Ensure that the workstation acting as the TFTP server is properly configured. On a Sun workstation, make sure that the /etc/inetd.conf file contains this line:

```
tftp dgram udp wait root /usr/etc/in.tftpd in.tftpd -p -s /tftpboot
```

Make sure that the /etc/services file contains this line:

```
tftp 69/udp
```

**Note**

You must restart the inetd daemon after modifying the /etc/inetd.conf and /etc/services files. To restart the daemon, either stop the inetd process and restart it, or enter a **fastboot** command (on the SunOS 4.x) or a **reboot** command (on Solaris 2.x or SunOS 5.x). For more information on the TFTP daemon, see the documentation for your workstation.

- 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 by using the **ping** command.

- Ensure that the configuration file to be downloaded is in the correct directory on the TFTP server (usually /tftpboot on a UNIX workstation).
- For download operations, ensure that the permissions on the file are set correctly. The permission on the file should be world-read.
- Before uploading the configuration file, you might need to create an empty file on the TFTP server. To create an empty file, enter the **touch filename** command, where *filename* is the name of the file you will use when uploading it to the server.
- During upload operations, if you are overwriting an existing file (including an empty file, if you had to create one) on the server, ensure that the permissions on the file are set correctly. Permissions on the file should be world-write.

## Downloading the Configuration File By Using TFTP

To configure the switch by using a configuration file downloaded from a TFTP server, follow these steps:

- 
- Step 1** Copy the configuration file to the appropriate TFTP directory on the workstation.
- Step 2** Verify that the TFTP server is properly configured by referring to the [“Preparing to Download or Upload a Configuration File By Using TFTP”](#) section on page 1-11.
- Step 3** Log into the switch through the console port, the Ethernet management port, or a Telnet session.
- Step 4** Download the configuration file from the TFTP server to configure the switch.

Specify the IP address or hostname of the TFTP server and the name of the file to download.

Use one of these privileged EXEC commands:

- **copy tftp:[[/location]/directory]/filename system:running-config**
- **copy tftp:[[/location]/directory]/filename nvram:startup-config**
- **copy tftp:[[/location]/directory]/filename flash[n]:/directory/startup-config**




---

**Note** You can only enter the **flashn** parameter (for example, **flash3**) on Catalyst 3750-E switches.

---

The configuration file downloads, and the commands are executed as the file is parsed line-by-line.

---

This example shows how to configure the software from the file *tokyo-config* at IP address 172.16.2.155:

```
Switch# copy tftp://172.16.2.155/tokyo-config system:running-config
Configure using tokyo-config from 172.16.2.155? [confirm] y
Booting tokyo-config from 172.16.2.155:!!! [OK - 874/16000 bytes]
```

## Uploading the Configuration File By Using TFTP

To upload a configuration file from a switch to a TFTP server for storage, follow these steps:

- 
- Step 1** Verify that the TFTP server is properly configured by referring to the [“Preparing to Download or Upload a Configuration File By Using TFTP”](#) section on page 1-11.
  - Step 2** Log into the switch through the console port, the Ethernet management port, or a Telnet session.
  - Step 3** Upload the switch configuration to the TFTP server. Specify the IP address or hostname of the TFTP server and the destination filename.

Use one of these privileged EXEC commands:

- **copy system:running-config tftp:**[[*//location*]/*directory*]/*filename*
- **copy nvram:startup-config tftp:**[[*//location*]/*directory*]/*filename*
- **copy flash[n]:/directory/startup-config tftp:**[[*//location*]/*directory*]/*filename*



---

**Note** You can only enter the **flash***n* parameter (for example, **flash3**) on Catalyst 3750-E switches.

---

The file is uploaded to the TFTP server.

---

This example shows how to upload a configuration file from a switch to a TFTP server:

```
Switch# copy system:running-config tftp://172.16.2.155/tokyo-config
Write file tokyo-config on host 172.16.2.155? [confirm] y
#
Writing tokyo-config!!! [OK]
```

## Copying Configuration Files By Using FTP

You can copy configuration files to or from an FTP server.

The FTP protocol requires a client to send a remote username and password on each FTP request to a server. When you copy a configuration file from the switch to a server by using FTP, the Cisco IOS software sends the first valid username in this list:

- The username specified in the **copy** command if a username is specified.
- The username set by the **ip ftp username** *username* global configuration command if the command is configured.
- Anonymous.

The switch sends the first valid password in this list:

- The password specified in the **copy** command if a password is specified.
- The password set by the **ip ftp password** *password* global configuration command if the command is configured.
- The switch forms a password named *username@switchname.domain*. The variable *username* is the username associated with the current session, *switchname* is the configured hostname, and *domain* is the domain of the switch.

The username and password must be associated with an account on the FTP server. If you are writing to the server, the FTP server must be properly configured to accept your FTP write request.

Use the **ip ftp username** and **ip ftp password** commands to specify a username and password for all copies. Include the username in the **copy** command if you want to specify only a username for that copy operation.

If the server has a directory structure, the configuration file is written to or copied from the directory associated with the username on the server. For example, if the configuration file resides in the home directory of a user on the server, specify that user's name as the remote username.

For more information, see the documentation for your FTP server.

These sections contain this configuration information:

- [Preparing to Download or Upload a Configuration File By Using FTP, page 1-14](#)
- [Downloading a Configuration File By Using FTP, page 1-14](#)
- [Uploading a Configuration File By Using FTP, page 1-16](#)

## Preparing to Download or Upload a Configuration File By Using FTP

Before you begin downloading or uploading a configuration file by using FTP, do these tasks:

- Ensure that the switch has a route to the FTP server. The switch and the FTP server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the FTP server by using the **ping** command.
- If you are accessing the switch through the console or a Telnet session and you do not have a valid username, make sure that the current FTP username is the one that you want to use for the FTP download. You can enter the **show users** privileged EXEC command to view the valid username. If you do not want to use this username, create a new FTP username by using the **ip ftp username username** global configuration command during all copy operations. The new username is stored in NVRAM. If you are accessing the switch through a Telnet session and you have a valid username, this username is used, and you do not need to set the FTP username. Include the username in the **copy** command if you want to specify a username for only that copy operation.
- When you upload a configuration file to the FTP server, it must be properly configured to accept the write request from the user on the switch.

For more information, see the documentation for your FTP server.

## Downloading a Configuration File By Using FTP

Beginning in privileged EXEC mode, follow these steps to download a configuration file by using FTP:

	Command	Purpose
Step 1		Verify that the FTP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload a Configuration File By Using FTP”</a> section on page 1-14.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.
Step 3	<b>configure terminal</b>	Enter global configuration mode on the switch.  This step is required only if you override the default remote username or password (see Steps 4, 5, and 6).

	Command	Purpose
Step 4	<b>ip ftp username</b> <i>username</i>	(Optional) Change the default remote username.
Step 5	<b>ip ftp password</b> <i>password</i>	(Optional) Change the default password.
Step 6	<b>end</b>	Return to privileged EXEC mode.
Step 7	<b>copy</b> <b>ftp:[[/[username[:password]@]location]/directory]</b> <b>/filename] system:running-config</b>  or  <b>copy</b> <b>ftp:[[/[username[:password]@]location]/directory]</b> <b>/filename] nvram:startup-config</b>	Using FTP, copy the configuration file from a network server to the running configuration or to the startup configuration file.

This example shows how to copy a configuration file named *host1-config* from the *netadmin1* directory on the remote server with an IP address of 172.16.101.101 and to load and run those commands on the switch:

```
Switch# copy ftp://netadmin1:mypass@172.16.101.101/host1-config system:running-config
Configure using host1-config from 172.16.101.101? [confirm]
Connected to 172.16.101.101
Loading 1112 byte file host1-config:[OK]
Switch#
%SYS-5-CONFIG: Configured from host1-config by ftp from 172.16.101.101
```

This example shows how to specify a remote username of *netadmin1*. The software copies the configuration file *host2-config* from the *netadmin1* directory on the remote server with an IP address of 172.16.101.101 to the switch startup configuration.

```
Switch# configure terminal
Switch(config)# ip ftp username netadmin1
Switch(config)# ip ftp password mypass
Switch(config)# end
Switch# copy ftp: nvram:startup-config
Address of remote host [255.255.255.255]? 172.16.101.101
Name of configuration file[rtr2-config]? host2-config
Configure using host2-config from 172.16.101.101?[confirm]
Connected to 172.16.101.101
Loading 1112 byte file host2-config:[OK]
[OK]
Switch#
%SYS-5-CONFIG_NV:Non-volatile store configured from host2-config by ftp from
172.16.101.101
```

## Uploading a Configuration File By Using FTP

Beginning in privileged EXEC mode, follow these steps to upload a configuration file by using FTP:

	Command	Purpose
Step 1		Verify that the FTP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload a Configuration File By Using FTP”</a> section on page 1-14.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.
Step 3	<b>configure terminal</b>	Enter global configuration mode.  This step is required only if you override the default remote username or password (see Steps 4, 5, and 6).
Step 4	<b>ip ftp username</b> <i>username</i>	(Optional) Change the default remote username.
Step 5	<b>ip ftp password</b> <i>password</i>	(Optional) Change the default password.
Step 6	<b>end</b>	Return to privileged EXEC mode.
Step 7	<b>copy system:running-config</b> <b>ftp:[[/[username[:password]@]location]/directory]</b> <b>/filename]</b>  or  <b>copy nvram:startup-config</b> <b>ftp:[[/[username[:password]@]location]/directory]</b> <b>/filename]</b>	Using FTP, store the switch running or startup configuration file to the specified location.

This example shows how to copy the running configuration file named *switch2-config* to the *netadmin1* directory on the remote host with an IP address of 172.16.101.101:

```
Switch# copy system:running-config ftp://netadmin1:mypass@172.16.101.101/switch2-config
Write file switch2-config on host 172.16.101.101?[confirm]
Building configuration...[OK]
Connected to 172.16.101.101
Switch#
```

This example shows how to store a startup configuration file on a server by using FTP to copy the file:

```
Switch# configure terminal
Switch(config)# ip ftp username netadmin2
Switch(config)# ip ftp password mypass
Switch(config)# end
Switch# copy nvram:startup-config ftp:
Remote host[]? 172.16.101.101
Name of configuration file to write [switch2-config]?
Write file switch2-config on host 172.16.101.101?[confirm]
! [OK]
```



## Copying Configuration Files By Using RCP

The RCP provides another method of downloading, uploading, and copying configuration files between remote hosts and the switch. Unlike TFTP, which uses User Datagram Protocol (UDP), a connectionless protocol, RCP uses TCP, which is connection-oriented.

To use RCP to copy files, the server from or to which you will be copying files must support RCP. The RCP copy commands rely on the rsh server (or daemon) on the remote system. To copy files by using RCP, you do not need to create a server for file distribution as you do with TFTP. You only need to have access to a server that supports the remote shell (rsh). (Most UNIX systems support rsh.) Because you are copying a file from one place to another, you must have read permission on the source file and write permission on the destination file. If the destination file does not exist, RCP creates it for you.

The RCP requires a client to send a remote username with each RCP request to a server. When you copy a configuration file from the switch to a server, the Cisco IOS software sends the first valid username in this list:

- The username specified in the **copy** command if a username is specified.
- The username set by the **ip rcmd remote-username username** global configuration command if the command is configured.
- The remote username associated with the current TTY (terminal) process. For example, if the user is connected to the router through Telnet and was authenticated through the **username** command, the switch software sends the Telnet username as the remote username.
- The switch hostname.

For a successful RCP copy request, you must define an account on the network server for the remote username. If the server has a directory structure, the configuration file is written to or copied from the directory associated with the remote username on the server. For example, if the configuration file is in the home directory of a user on the server, specify that user's name as the remote username.

These sections contain this configuration information:

- [Preparing to Download or Upload a Configuration File By Using RCP, page 1-17](#)
- [Downloading a Configuration File By Using RCP, page 1-18](#)
- [Uploading a Configuration File By Using RCP, page 1-19](#)

## Preparing to Download or Upload a Configuration File By Using RCP

Before you begin downloading or uploading a configuration file by using RCP, do these tasks:

- 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 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 by using the **ping** command.
- If you are accessing the switch through the console or a Telnet session and you do not have a valid username, make sure that the current RCP username is the one that you want to use for the RCP download. You can enter the **show users** privileged EXEC command to view the valid username. If you do not want to use this username, create a new RCP username by using the **ip rcmd remote-username username** global configuration command to be used during all copy operations. The new username is stored in NVRAM. If you are accessing the switch through a Telnet session and you have a valid username, this username is used, and you do not need to set the RCP username. Include the username in the **copy** command if you want to specify a username for only that copy operation.

- When you upload a file to the RCP server, it must be properly configured to accept the RCP write request from the user on the switch. For UNIX systems, you must add an entry to the `.rhosts` file for the remote user on the RCP server. For example, suppose that the switch contains these configuration lines:

```
hostname Switch1
ip rcmd remote-username User0
```

If the switch IP address translates to *Switch1.company.com*, the `.rhosts` file for User0 on the RCP server should contain this line:

```
Switch1.company.com Switch1
```

For more information, see the documentation for your RCP server.

## Downloading a Configuration File By Using RCP

Beginning in privileged EXEC mode, follow these steps to download a configuration file by using RCP:

	Command	Purpose
Step 1		Verify that the RCP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload a Configuration File By Using RCP”</a> section on page 1-17.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.
Step 3	<b>configure terminal</b>	Enter global configuration mode.  This step is required only if you override the default remote username (see Steps 4 and 5).
Step 4	<b>ip rcmd remote-username</b> <i>username</i>	(Optional) Specify the remote username.
Step 5	<b>end</b>	Return to privileged EXEC mode.
Step 6	<b>copy</b> <b>rcp:[[/[username@]location]/directory]/filename]</b> <b>system:running-config</b>  or  <b>copy</b> <b>rcp:[[/[username@]location]/directory]/filename]</b> <b>nvr:startup-config</b>	Using RCP, copy the configuration file from a network server to the running configuration or to the startup configuration file.

This example shows how to copy a configuration file named *host1-config* from the *netadmin1* directory on the remote server with an IP address of 172.16.101.101 and load and run those commands on the switch:

```
Switch# copy rcp://netadmin1@172.16.101.101/host1-config system:running-config
Configure using host1-config from 172.16.101.101? [confirm]
Connected to 172.16.101.101
Loading 1112 byte file host1-config:![OK]
Switch#
%SYS-5-CONFIG: Configured from host1-config by rcp from 172.16.101.101
```

This example shows how to specify a remote username of *netadmin1*. Then it copies the configuration file *host2-config* from the *netadmin1* directory on the remote server with an IP address of 172.16.101.101 to the startup configuration:

```
Switch# configure terminal
Switch(config)# ip rcmd remote-username netadmin1
Switch(config)# end
Switch# copy rcp: nvram:startup-config
Address of remote host [255.255.255.255]? 172.16.101.101
Name of configuration file[rtr2-config]? host2-config
Configure using host2-config from 172.16.101.101?[confirm]
Connected to 172.16.101.101
Loading 1112 byte file host2-config:[OK]
[OK]
Switch#
%SYS-5-CONFIG_NV:Non-volatile store configured from host2-config by rcp from
172.16.101.101
```

## Uploading a Configuration File By Using RCP

Beginning in privileged EXEC mode, follow these steps to upload a configuration file by using RCP:

	Command	Purpose
Step 1		Verify that the RCP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload a Configuration File By Using RCP”</a> section on page 1-17.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.
Step 3	<b>configure terminal</b>	Enter global configuration mode.  This step is required only if you override the default remote username (see Steps 4 and 5).
Step 4	<b>ip rcmd remote-username</b> <i>username</i>	(Optional) Specify the remote username.
Step 5	<b>end</b>	Return to privileged EXEC mode.
Step 6	<b>copy system:running-config</b> <b>rcp:[[/[<i>username</i>@]<i>location</i>]/<i>directory</i>]/<i>filename</i>]</b> or <b>copy nvram:startup-config</b> <b>rcp:[[/[<i>username</i>@]<i>location</i>]/<i>directory</i>]/<i>filename</i>]</b>	Using RCP, copy the configuration file from a switch running or startup configuration file to a network server.

This example shows how to copy the running configuration file named *switch2-config* to the *netadmin1* directory on the remote host with an IP address of 172.16.101.101:

```
Switch# copy system:running-config rcp://netadmin1@172.16.101.101/switch2-config
Write file switch-config on host 172.16.101.101?[confirm]
Building configuration...[OK]
Connected to 172.16.101.101
Switch#
```

This example shows how to store a startup configuration file on a server:

```
Switch# configure terminal
Switch(config)# ip rcmd remote-username netadmin2
Switch(config)# end
Switch# copy nvram:startup-config rcp:
Remote host[]? 172.16.101.101
Name of configuration file to write [switch2-config]?
Write file switch2-config on host 172.16.101.101?[confirm]
![OK]
```

## Clearing Configuration Information

You can clear the configuration information from the startup configuration. If you reboot the switch with no startup configuration, the switch enters the setup program so that you can reconfigure the switch with all new settings.

### Clearing the Startup Configuration File

To clear the contents of your startup configuration, use the **erase nvram:** or the **erase startup-config** privileged EXEC command.



**Caution**

You cannot restore the startup configuration file after it has been deleted.

### Deleting a Stored Configuration File

To delete a saved configuration from flash memory, use the **delete flash:filename** privileged EXEC command. Depending on the setting of the **file prompt** global configuration command, you might be prompted for confirmation before you delete a file. By default, the switch prompts for confirmation on destructive file operations. For more information about the **file prompt** command, see the *Cisco IOS Command Reference for Release 12.4*.



**Caution**

You cannot restore a file after it has been deleted.

## Replacing and Rolling Back Configurations

The configuration replacement and rollback feature replaces the running configuration with any saved Cisco IOS configuration file. You can use the rollback function to roll back to a previous configuration.

- [Understanding Configuration Replacement and Rollback, page 1-21](#)
- [Configuration Guidelines, page 1-22](#)
- [Configuring the Configuration Archive, page 1-23](#)
- [Performing a Configuration Replacement or Rollback Operation, page 1-23](#)

## Understanding Configuration Replacement and Rollback

- [Archiving a Configuration, page 1-21](#)
- [Replacing a Configuration, page 1-21](#)
- [Rolling Back a Configuration, page 1-22](#)

### Archiving a Configuration

The configuration archive provides a mechanism to store, organize, and manage an archive of configuration files. The **configure replace** privileged EXEC command increases the configuration rollback capability. As an alternative, you can save copies of the running configuration by using the **copy running-config destination-url** privileged EXEC command, storing the replacement file either locally or remotely. However, this method lacks any automated file management. The configuration replacement and rollback feature can automatically save copies of the running configuration to the configuration archive.

You use the **archive config** privileged EXEC command to save configurations in the configuration archive by using a standard location and filename prefix that is automatically appended with an incremental version number (and optional timestamp) as each consecutive file is saved. You can specify how many versions of the running configuration are kept in the archive. After the maximum number of files are saved, the oldest file is automatically deleted when the next, most recent file is saved. The **show archive** privileged EXEC command displays information for all the configuration files saved in the configuration archive.

The Cisco IOS configuration archive, in which the configuration files are stored and available for use with the **configure replace** command, is in any of these file systems: FTP, HTTP, RCP, TFTP.

### Replacing a Configuration

The **configure replace** privileged EXEC command replaces the running configuration with any saved configuration file. When you enter the **configure replace** command, the running configuration is compared with the specified replacement configuration, and a set of configuration differences is generated. The resulting differences are used to replace the configuration. The configuration replacement operation is usually completed in no more than three passes. To prevent looping behavior no more than five passes are performed.

You can use the **copy source-url running-config** privileged EXEC command to copy a stored configuration file to the running configuration. When using this command as an alternative to the **configure replace target-url** privileged EXEC command, note these major differences:

- The **copy source-url running-config** command is a merge operation and preserves all the commands from both the source file and the running configuration. This command does not remove commands from the running configuration that are not present in the source file. In contrast, the **configure replace target-url** command removes commands from the running configuration that are not present in the replacement file and adds commands to the running configuration that are not present.
- You can use a partial configuration file as the source file for the **copy source-url running-config** command. You must use a complete configuration file as the replacement file for the **configure replace target-url** command.

## Rolling Back a Configuration

You can also use the **configure replace** command to roll back changes that were made since the previous configuration was saved. Instead of basing the rollback operation on a specific set of changes that were applied, the configuration rollback capability reverts to a specific configuration based on a saved configuration file.

If you want the configuration rollback capability, you must first save the running configuration before making any configuration changes. Then, after entering configuration changes, you can use that saved configuration file to roll back the changes by using the **configure replace** *target-url* command.

You can specify any saved configuration file as the rollback configuration. You are not limited to a fixed number of rollbacks, as is the case in some rollback models.

## Configuration Guidelines

Follow these guidelines when configuring and performing configuration replacement and rollback:

- Make sure that the switch has free memory larger than the combined size of the two configuration files (the running configuration and the saved replacement configuration). Otherwise, the configuration replacement operation fails.
- Make sure that the switch also has sufficient free memory to execute the configuration replacement or rollback configuration commands.
- Certain configuration commands, such as those pertaining to physical components of a networking device (for example, physical interfaces), cannot be added or removed from the running configuration.
  - A configuration replacement operation cannot remove the **interface** *interface-id* command line from the running configuration if that interface is physically present on the device.
  - The **interface** *interface-id* command line cannot be added to the running configuration if no such interface is physically present on the device.
- When using the **configure replace** command, you must specify a saved configuration as the replacement configuration file for the running configuration. The replacement file must be a complete configuration generated by a Cisco IOS device (for example, a configuration generated by the **copy running-config** *destination-url* command).



### Note

If you generate the replacement configuration file externally, it must comply with the format of files generated by Cisco IOS devices.

## Configuring the Configuration Archive

Using the **configure replace** command with the configuration archive and with the **archive config** command is optional but offers significant benefit for configuration rollback scenarios. Before using the **archive config** command, you must first configure the configuration archive. Starting in privileged EXEC mode, follow these steps to configure the configuration archive:

	Command	Purpose
Step 1	<b>configure terminal</b>	Enter global configuration mode.
Step 2	<b>archive</b>	Enter archive configuration mode.
Step 3	<b>path</b> <i>url</i>	Specify the location and filename prefix for the files in the configuration archive.
Step 4	<b>maximum</b> <i>number</i>	(Optional) Set the maximum number of archive files of the running configuration to be saved in the configuration archive.  <i>number</i> —Maximum files of the running configuration file in the configuration archive. Valid values are from 1 to 14. The default is 10.  <b>Note</b> Before using this command, you must first enter the <b>path</b> archive configuration command to specify the location and filename prefix for the files in the configuration archive.
Step 5	<b>time-period</b> <i>minutes</i>	(Optional) Set the time increment for automatically saving an archive file of the running configuration in the configuration archive.  <i>minutes</i> —Specify how often, in minutes, to automatically save an archive file of the running configuration in the configuration archive.
Step 6	<b>end</b>	Return to privileged EXEC mode.
Step 7	<b>show running-config</b>	Verify the configuration.
Step 8	<b>copy running-config startup-config</b>	(Optional) Save your entries in the configuration file.

## Performing a Configuration Replacement or Rollback Operation

Starting in privileged EXEC mode, follow these steps to replace the running configuration file with a saved configuration file:

	Command	Purpose
Step 1	<b>archive config</b>	(Optional) Save the running configuration file to the configuration archive.  <b>Note</b> Enter the <b>path</b> archive configuration command before using this command.
Step 2	<b>configure terminal</b>	Enter global configuration mode.
Step 3		Make necessary changes to the running configuration.
Step 4	<b>exit</b>	Return to privileged EXEC mode.

	Command	Purpose
Step 5	<b>configure replace</b> <i>target-url</i> [ <b>list</b> ] [ <b>force</b> ] [ <b>time seconds</b> ] [ <b>nolock</b> ]	<p>Replace the running configuration file with a saved configuration file.</p> <p><i>target-url</i>—URL (accessible by the file system) of the saved configuration file that is to replace the running configuration, such as the configuration file created in Step 2 by using the <b>archive config</b> privileged EXEC command.</p> <p><b>list</b>—Display a list of the command entries applied by the software parser during each pass of the configuration replacement operation. The total number of passes also appears.</p> <p><b>force</b>— Replace the running configuration file with the specified saved configuration file without prompting you for confirmation.</p> <p><b>time seconds</b>—Specify the time (in seconds) within which you must enter the <b>configure confirm</b> command to confirm replacement of the running configuration file. If you do not enter the <b>configure confirm</b> command within the specified time limit, the configuration replacement operation is automatically stopped. (In other words, the running configuration file is restored to the configuration that existed before you entered the <b>configure replace</b> command).</p> <p><b>Note</b> You must first enable the configuration archive before you can use the <b>time seconds</b> command line option.</p> <p><b>nolock</b>—Disable the locking of the running configuration file that prevents other users from changing the running configuration during a configuration replacement operation.</p>
Step 6	<b>configure confirm</b>	<p>(Optional) Confirm replacement of the running configuration with a saved configuration file.</p> <p><b>Note</b> Use this command only if the <b>time seconds</b> keyword and argument of the <b>configure replace</b> command are specified.</p>
Step 7	<b>copy running-config startup-config</b>	(Optional) Save your entries in the configuration file.



# Working with Software Images

This section describes how to archive (download and upload) software image files, which contain the system software, the Cisco IOS code, and the embedded device manager software.

**Note**

Instead of using the **copy** privileged EXEC command or the **archive tar** privileged EXEC command, we recommend using the **archive download-sw** and **archive upload-sw** privileged EXEC commands to download and upload software image files. For switch stacks, the **archive download-sw** and **archive upload-sw** privileged EXEC commands can only be used through the stack master. Software images downloaded to the stack master are automatically downloaded to the rest of the stack members.

When a power stack contains members without a PSU, use the **archive download-sw /force-ucode-reload** privileged EXEC command to download software image files.

To upgrade a switch with an incompatible software image, use the **archive copy-sw** privileged EXEC command to copy the software image from an existing stack member to the incompatible switch. That switch automatically reloads and joins the stack as a fully functioning member.

You can download a switch image file from a TFTP, FTP, or RCP server to upgrade the switch software. If you do not have access to a TFTP server, you can download a software image file directly to your PC or workstation by using a web browser (HTTP) and then by using the device manager or Cisco Network Assistant to upgrade your switch. For information about upgrading your switch by using a TFTP server or a web browser (HTTP), see the release notes.

You can replace the current image with the new one or keep the current image in flash memory after a download.

You can use the **archive download-sw /allow-feature-upgrade** privileged EXEC command to allow installation of an image with a different feature set, for example, upgrading from the universal image to the IP services feature set. You can also use the **boot auto-download-sw** global configuration command to specify a URL to use to get an image for automatic software upgrades. When you enter this command, the master switch uses this URL in case of a version mismatch.

You upload a switch image file to a TFTP, FTP, or RCP server for backup purposes. You can use this uploaded image for future downloads to the same switch or to another of the same type.

The protocol that you use depends on which type of server you are using. The FTP and RCP transport mechanisms provide faster performance and more reliable delivery of data than TFTP. These improvements are possible because FTP and RCP are built on and use the TCP/IP stack, which is connection-oriented.

These sections contain this configuration information:

- [Image Location on the Switch, page 1-26](#)
- [File Format of Images on a Server or Cisco.com, page 1-26](#)
- [Copying Image Files By Using TFTP, page 1-27](#)
- [Copying Image Files By Using FTP, page 1-31](#)
- [Copying Image Files By Using RCP, page 1-35](#)
- [Copying an Image File from One Stack Member to Another, page 1-39](#)
- [Software for the Network Services Module Software, page 1-40](#)

**Note**

For a list of software images and the supported upgrade paths, see the release notes.

## Image Location on the Switch

The Cisco IOS image is stored as a *.bin* file in a directory that shows the version number. A subdirectory contains the files needed for web management. The image is stored on the system board flash memory (flash:).

You can use the **show version** privileged EXEC command to see the software version that is currently running on your switch. In the display, check the line that begins with `System image file is...`. It shows the directory name in flash memory where the image is stored.

You can also use the **dir filesystem:** privileged EXEC command to see the directory names of other software images that you might have stored in flash memory. You can use the **archive download-sw /directory** privileged EXEC command to specify a directory once followed by a tar file or list of tar files to be downloaded instead of specifying complete paths with each tar file. For example, in a mixed hardware stack, you can enter **archive download-sw /directory tftp://10.1.1.10/c3750-ipservices-tar.122-35.SE.tar c3750e-universal-tar.122-35.SE2.tar**.

## File Format of Images on a Server or Cisco.com

Software images on a server or downloaded from Cisco.com are in a file format, which contains these files:

- An *info* file, which serves as a table of contents for the file
- One or more subdirectories containing other images and files, such as Cisco IOS images and web management files

This example shows some of the information contained in an info file. [Table 1-3](#) provides additional details about this information:

```
system_type:0x00000000:c3750e-universal-mz.122-35.SE2
  image_family:C3750E
  stacking_number:1.9
  info_end:
version_suffix:universal-mz.122-35.SE2
  version_directory:c3750e-universal-mz.122-35.SE2
  image_system_type_id:0x00000000
  image_name:c3750e-universal-mz.122-35.SE2.bin
  ios_image_file_size:6398464
  total_image_file_size:8133632
  image_feature:IP|LAYER_3|PLUS|MIN_DRAM_MEG=128
  image_family:C3750E
  stacking_number:1.9
  board_ids:0x401100c4 0x00000000 0x00000001 0x00000003 0x00000002 0x00008000 0x00008002
0x40110000
  info_end:
```

**Note**

On Catalyst 3560-X switches, the `stacking_number` field does not apply to the switch.

**Table 1-3** *info File Description*

Field	Description
version_suffix	Specifies the Cisco IOS image version string suffix
version_directory	Specifies the directory where the Cisco IOS image and the HTML subdirectory are installed
image_name	Specifies the name of the Cisco IOS image in the file
ios_image_file_size	Specifies the Cisco IOS image size in the file, which is an approximate measure of the flash memory that the Cisco IOS image needs.
total_image_file_size	Specifies the size of all the images (the Cisco IOS image and the web management files) in the file, which is an approximate measure of the flash memory needed.
image_feature	Describes the core functionality of the image
image_min_dram	Specifies the minimum amount of DRAM needed to run this image
image_family	Describes the family of products on which the software can be installed

## Copying Image Files By Using TFTP

You can download a switch image from a TFTP server or upload the image from the switch to a TFTP server.

You download a switch image file from a server to upgrade the switch software. You can overwrite the current image with the new one or keep the current image after a download.

You upload a switch image file to a server for backup purposes; this uploaded image can be used for future downloads to the same or another switch of the same type.



### Note

Instead of using the **copy** privileged EXEC command or the **archive tar** privileged EXEC command, we recommend using the **archive download-sw** and **archive upload-sw** privileged EXEC commands to download and upload software image files. For switch stacks, the **archive download-sw** and **archive upload-sw** privileged EXEC commands can only be used through the stack master. Software images downloaded to the stack master are automatically downloaded to the rest of the stack members.

To upgrade a switch with an incompatible software image, use the **archive copy-sw** privileged EXEC command to copy the software image from an existing stack member to the incompatible switch. That switch automatically reloads and joins the stack as a fully functioning member.

These sections contain this configuration information:

- [Preparing to Download or Upload an Image File By Using TFTP, page 1-28](#)
- [Downloading an Image File By Using TFTP, page 1-28](#)
- [Uploading an Image File By Using TFTP, page 1-30](#)

## Preparing to Download or Upload an Image File By Using TFTP

Before you begin downloading or uploading an image file by using TFTP, do these tasks:

- Ensure that the workstation acting as the TFTP server is properly configured. On a Sun workstation, make sure that the `/etc/inetd.conf` file contains this line:

```
tftp dgram udp wait root /usr/etc/in.tftpd in.tftpd -p -s /tftpboot
```

Make sure that the `/etc/services` file contains this line:

```
tftp 69/udp
```



### Note

You must restart the `inetd` daemon after modifying the `/etc/inetd.conf` and `/etc/services` files. To restart the daemon, either stop the `inetd` process and restart it, or enter a **fastboot** command (on the SunOS 4.x) or a **reboot** command (on Solaris 2.x or SunOS 5.x). For more information on the TFTP daemon, see the documentation for your workstation.

- 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 by using the **ping** command.
- Ensure that the image to be downloaded is in the correct directory on the TFTP server (usually `/tftpboot` on a UNIX workstation).
- For download operations, ensure that the permissions on the file are set correctly. The permission on the file should be world-read.
- Before uploading the image file, you might need to create an empty file on the TFTP server. To create an empty file, enter the **touch filename** command, where *filename* is the name of the file you will use when uploading the image to the server.
- During upload operations, if you are overwriting an existing file (including an empty file, if you had to create one) on the server, ensure that the permissions on the file are set correctly. Permissions on the file should be world-write.

## Downloading an Image File By Using TFTP

You can download a new image file and replace the current image or keep the current image.

Beginning in privileged EXEC mode, follow Steps 1 through 3 to download a new image from a TFTP server and to overwrite the existing image. To keep the current image, follow Steps 1, 2, and 4.

	Command	Purpose
Step 1		Copy the image to the appropriate TFTP directory on the workstation. Make sure the TFTP server is properly configured; see the <a href="#">“Preparing to Download or Upload an Image File By Using TFTP”</a> section on page 1-28.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.

	Command	Purpose
Step 3	<pre>archive download-sw /allow-feature-upgrade [/directory] /overwrite /reload tftp:[//location]/directory/image-name1.tar [image-name2.tar image-name3.tar image-name4.tar]</pre>	<p>(Optional) Download the image files from the TFTP server to the switch, and overwrite the current image.</p> <ul style="list-style-type: none"> <li>• The <b>/allow-feature-upgrade</b> option allows installation of a software images with different feature sets.</li> <li>• (Optional) The <b>/directory</b> option specifies a directory for the images.</li> <li>• The <b>/overwrite</b> option overwrites the software image in flash memory with the downloaded image.</li> <li>• The <b>/reload</b> option reloads the system after downloading the image unless the configuration has been changed and not been saved.</li> <li>• For <i>//location</i>, specify the IP address of the TFTP server.</li> <li>• For <i>/directory/image-name1.tar [/directory/image-name2.tar image-name3.tar image-name4.tar]</i>, specify the directory (optional) and the images to download. Directory and image names are case sensitive.</li> </ul>
Step 4	<pre>archive download-sw [/directory] /leave-old-sw /reload tftp:[//location]/directory/image-name1.tar [image-name2.tar image-name3.tar image-name4.tar]</pre>	<p>(Optional) Download the images file from the TFTP server to the switch, and keep the current image.</p> <ul style="list-style-type: none"> <li>• (Optional) The <b>/directory</b> option specifies a directory for the images.</li> <li>• The <b>/leave-old-sw</b> option keeps the old software version after a download.</li> <li>• The <b>/reload</b> option reloads the system after downloading the image unless the configuration has been changed and not been saved.</li> <li>• For <i>//location</i>, specify the IP address of the TFTP server.</li> <li>• For <i>/directory/image-name1.tar [/directory/image-name2.tar image-name3.tar image-name4.tar]</i>, specify the directory (optional) and the images to download. Directory and image names are case sensitive.</li> </ul>

The download algorithm verifies that the image is appropriate for the switch model and that enough DRAM is present, or it aborts the process and reports an error. If you specify the **/overwrite** option, the download algorithm removes the existing image on the flash device whether or not it is the same as the new one, downloads the new image, and then reloads the software.



#### Note

If the flash device has sufficient space to hold two images and you want to overwrite one of these images with the same version, you must specify the **/overwrite** option.

If you specify the **/leave-old-sw**, the existing files are not removed. If there is not enough space to install the new image and keep the current running image, the download process stops, and an error message is displayed.

The algorithm installs the downloaded image on the system board flash device (flash:). The image is placed into a new directory named with the software version string, and the BOOT environment variable is updated to point to the newly installed image.

If you kept the old image during the download process (you specified the **/leave-old-sw** keyword), you can remove it by entering the **delete /force /recursive filesystem:/file-url** privileged EXEC command. For *filesystem*, use **flash:** for the system board flash device. For *file-url*, enter the directory name of the old image. All the files in the directory and the directory are removed.

**Caution**

For the download and upload algorithms to operate properly, do *not* rename image names.

## Uploading an Image File By Using TFTP

You can upload an image from the switch to a TFTP server. You can later download this image to the switch or to another switch of the same type.

Use the upload feature only if the web management pages associated with the embedded device manager have been installed with the existing image.

Beginning in privileged EXEC mode, follow these steps to upload an image to a TFTP server:

	Command	Purpose
Step 1		Make sure the TFTP server is properly configured; see the <a href="#">“Preparing to Download or Upload an Image File By Using TFTP”</a> section on page 1-28.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.
Step 3	<b>archive upload-sw</b> <b>tftp:[//location]/directory/image-name.tar</b>	Upload the currently running switch image to the TFTP server. <ul style="list-style-type: none"> <li>For <i>//location</i>, specify the IP address of the TFTP server.</li> <li>For <i>/directory/image-name.tar</i>, specify the directory (optional) and the name of the software image to be uploaded. Directory and image names are case sensitive. The <i>image-name.tar</i> is the name of the software image to be stored on the server.</li> </ul>

The **archive upload-sw** privileged EXEC command builds an image file on the server by uploading these files in order: info, the Cisco IOS image, and the web management files. After these files are uploaded, the upload algorithm creates the file format.

**Caution**

For the download and upload algorithms to operate properly, do *not* rename image names.

## Copying Image Files By Using FTP

You can download a switch image from an FTP server or upload the image from the switch to an FTP server.

You download a switch image file from a server to upgrade the switch software. You can overwrite the current image with the new one or keep the current image after a download.

You upload a switch image file to a server for backup purposes. You can use this uploaded image for future downloads to the switch or another switch of the same type.



### Note

Instead of using the **copy** privileged EXEC command or the **archive tar** privileged EXEC command, we recommend using the **archive download-sw** and **archive upload-sw** privileged EXEC commands to download and upload software image files. For switch stacks, the **archive download-sw** and **archive upload-sw** privileged EXEC commands can only be used through the stack master. Software images downloaded to the stack master are automatically downloaded to the rest of the stack members.

To upgrade a switch with an incompatible software image, use the **archive copy-sw** privileged EXEC command to copy the software image from an existing stack member to the incompatible switch. That switch automatically reloads and joins the stack as a fully functioning member.

These sections contain this configuration information:

- [Preparing to Download or Upload an Image File By Using FTP, page 1-31](#)
- [Downloading an Image File By Using FTP, page 1-32](#)
- [Uploading an Image File By Using FTP, page 1-34](#)

## Preparing to Download or Upload an Image File By Using FTP

You can copy images files to or from an FTP server.

The FTP protocol requires a client to send a remote username and password on each FTP request to a server. When you copy an image file from the switch to a server by using FTP, the Cisco IOS software sends the first valid username in this list:

- The username specified in the **archive download-sw** or **archive upload-sw** privileged EXEC command if a username is specified.
- The username set by the **ip ftp username *username*** global configuration command if the command is configured.
- Anonymous.

The switch sends the first valid password in this list:

- The password specified in the **archive download-sw** or **archive upload-sw** privileged EXEC command if a password is specified.
- The password set by the **ip ftp password *password*** global configuration command if the command is configured.
- The switch forms a password named *username@switchname.domain*. The variable *username* is the username associated with the current session, *switchname* is the configured hostname, and *domain* is the domain of the switch.

The username and password must be associated with an account on the FTP server. If you are writing to the server, the FTP server must be properly configured to accept the FTP write request from you.

Use the **ip ftp username** and **ip ftp password** commands to specify a username and password for all copies. Include the username in the **archive download-sw** or **archive upload-sw** privileged EXEC command if you want to specify a username only for that operation.

If the server has a directory structure, the image file is written to or copied from the directory associated with the username on the server. For example, if the image file resides in the home directory of a user on the server, specify that user's name as the remote username.

Before you begin downloading or uploading an image file by using FTP, do these tasks:

- Ensure that the switch has a route to the FTP server. The switch and the FTP server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the FTP server by using the **ping** command.
- If you are accessing the switch through the console or a Telnet session and you do not have a valid username, make sure that the current FTP username is the one that you want to use for the FTP download. You can enter the **show users** privileged EXEC command to view the valid username. If you do not want to use this username, create a new FTP username by using the **ip ftp username username** global configuration command. This new name will be used during all archive operations. The new username is stored in NVRAM. If you are accessing the switch through a Telnet session and you have a valid username, this username is used, and you do not need to set the FTP username. Include the username in the **archive download-sw** or **archive upload-sw** privileged EXEC command if you want to specify a username for that operation only.
- When you upload an image file to the FTP server, it must be properly configured to accept the write request from the user on the switch.

For more information, see the documentation for your FTP server.

## Downloading an Image File By Using FTP

You can download a new image file and overwrite the current image or keep the current image.

Beginning in privileged EXEC mode, follow Steps 1 through 7 to download a new image from an FTP server and to overwrite the existing image. To keep the current image, follow Steps 1 to 6 and Step 8.

	Command	Purpose
Step 1		Verify that the FTP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload an Image File By Using FTP”</a> section on page 1-31.
Step 2		Log into the switch through the console port or a Telnet session.
Step 3	<b>configure terminal</b>	Enter global configuration mode.  This step is required only if you override the default remote username or password (see Steps 4, 5, and 6).
Step 4	<b>ip ftp username</b> <i>username</i>	(Optional) Change the default remote username.
Step 5	<b>ip ftp password</b> <i>password</i>	(Optional) Change the default password.
Step 6	<b>end</b>	Return to privileged EXEC mode.



	Command	Purpose
Step 7	<b>archive download-sw /allow-feature-upgrade</b> <b>[/directory] /overwrite /reload</b> <b>tftp:[//location]/directory/image-name1.tar</b> <b>[image-name2.tar image-name3.tar</b> <b>image-name4.tar]</b>	(Optional) Download the image files from the FTP server to the switch, and overwrite the current image. <ul style="list-style-type: none"> <li>• The <b>/allow-feature-upgrade</b> option allows installation of a software image with a different feature set.</li> <li>• (Optional) The <b>/directory</b> option specifies a directory for the images.</li> <li>• The <b>/overwrite</b> option overwrites the software image in flash memory with the downloaded image.</li> <li>• The <b>/reload</b> option reloads the system after downloading the image unless the configuration has been changed and not been saved.</li> <li>• For <b>//username[:password]</b>, specify the username and password; these must be associated with an account on the FTP server. For more information, see the <a href="#">“Preparing to Download or Upload an Image File By Using FTP”</a> section on page 1-31.</li> <li>• For <b>@location</b>, specify the IP address of the FTP server.</li> <li>• For <b>/directory/image-name1.tar</b> <b>[/directory/image-name2.tar image-name3.tar</b> <b>image-name4.tar]</b>, specify the directory (optional) and the images to download. Directory and image names are case sensitive.</li> </ul>
Step 8	<b>archive download-sw [/directory] /leave-old-sw</b> <b>/reload</b> <b>tftp:[//location]/directory/image-name1.tar</b> <b>[image-name2.tar image-name3.tar</b> <b>image-name4.tar]</b>	(Optional) Download the image files from the FTP server to the switch, and keep the current image. <ul style="list-style-type: none"> <li>• (Optional) The <b>/directory</b> option specifies a directory for the images.</li> <li>• The <b>/leave-old-sw</b> option keeps the old software version after a download.</li> <li>• The <b>/reload</b> option reloads the system after downloading the image unless the configuration has been changed and not been saved.</li> <li>• For <b>//username[:password]</b>, specify the username and password. These must be associated with an account on the FTP server. For more information, see the <a href="#">“Preparing to Download or Upload an Image File By Using FTP”</a> section on page 1-31.</li> <li>• For <b>@location</b>, specify the IP address of the FTP server.</li> <li>• For <b>directory/image-name.tar</b>, specify the directory and the image to download. Directory and image names are case sensitive.</li> </ul>

The download algorithm verifies that the image is appropriate for the switch model and that enough DRAM is present, or it aborts the process and reports an error. If you specify the **/overwrite** option, the download algorithm removes the existing image on the flash device, whether or not it is the same as the new one, downloads the new image, and then reloads the software.

**Note**

If the flash device has sufficient space to hold two images and you want to overwrite one of these images with the same version, you must specify the **/overwrite** option.

If you specify the **/leave-old-sw**, the existing files are not removed. If there is not enough space to install the new image and keep the running image, the download process stops, and an error message is displayed.

The algorithm installs the downloaded image onto the system board flash device (flash:). The image is placed into a new directory named with the software version string, and the BOOT environment variable is updated to point to the newly installed image.

If you kept the old image during the download process (you specified the **/leave-old-sw** keyword), you can remove it by entering the **delete /force /recursive filesystem:/file-url** privileged EXEC command. For *filesystem*, use **flash:** for the system board flash device. For *file-url*, enter the directory name of the old software image. All the files in the directory and the directory are removed.

**Caution**

For the download and upload algorithms to operate properly, do *not* rename image names.

## Uploading an Image File By Using FTP

You can upload an image from the switch to an FTP server. You can later download this image to the same switch or to another switch of the same type.

Use the upload feature only if the web management pages associated with the embedded device manager have been installed with the existing image.

Beginning in privileged EXEC mode, follow these steps to upload an image to an FTP server:

	Command	Purpose
Step 1		Verify that the FTP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload a Configuration File By Using FTP”</a> section on page 1-14.
Step 2		Log into the switch through the console port, the Ethernet management port, or remotely through a Telnet session by using the IP address of the Ethernet management port.
Step 3	<b>configure terminal</b>	Enter global configuration mode.  This step is required only if you override the default remote username or password (see Steps 4, 5, and 6).
Step 4	<b>ip ftp username</b> <i>username</i>	(Optional) Change the default remote username.
Step 5	<b>ip ftp password</b> <i>password</i>	(Optional) Change the default password.

	Command	Purpose
Step 6	<b>end</b>	Return to privileged EXEC mode.
Step 7	<b>archive upload-sw</b> <b>ftp:[/[username[:password]@]location]/directory]/</b> <b>image-name.tar.</b>	Upload the currently running switch image to the FTP server. <ul style="list-style-type: none"> <li>For <i>//username:password</i>, specify the username and password. These must be associated with an account on the FTP server. For more information, see the <a href="#">“Preparing to Download or Upload an Image File By Using FTP”</a> section on page 1-31.</li> <li>For <i>@location</i>, specify the IP address of the FTP server.</li> <li>For <i>/directory/image-name.tar</i>, specify the directory and the name of the software image to be uploaded. Directory and image names are case sensitive. The <i>image-name.tar</i> is the name of the software image to be stored on the server.</li> </ul>

The **archive upload-sw** command builds an image file on the server by uploading these files in order: info, the Cisco IOS image, and the web management files. After these files are uploaded, the upload algorithm creates the file format.

**Caution**

For the download and upload algorithms to operate properly, do *not* rename image names.

## Copying Image Files By Using RCP

You can download a switch image from an RCP server or upload the image from the switch to an RCP server.

You download a switch image file from a server to upgrade the switch software. You can overwrite the current image with the new one or keep the current image after a download.

You upload a switch image file to a server for backup purposes. You can use this uploaded image for future downloads to the same switch or another of the same type.

**Note**

Instead of using the **copy** privileged EXEC command or the **archive tar** privileged EXEC command, we recommend using the **archive download-sw** and **archive upload-sw** privileged EXEC commands to download and upload software image files. For switch stacks, the **archive download-sw** and **archive upload-sw** privileged EXEC commands can only be used through the stack master. Software images downloaded to the stack master are automatically downloaded to the rest of the stack members.

To upgrade a switch with an incompatible software image, use the **archive copy-sw** privileged EXEC command to copy the software image from an existing stack member to the incompatible switch. That switch automatically reloads and joins the stack as a fully functioning member.

These sections contain this configuration information:

- [Preparing to Download or Upload an Image File By Using RCP, page 1-36](#)
- [Downloading an Image File By Using RCP, page 1-37](#)
- [Uploading an Image File By Using RCP, page 1-38](#)

## Preparing to Download or Upload an Image File By Using RCP

RCP provides another method of downloading and uploading image files between remote hosts and the switch. Unlike TFTP, which uses User Datagram Protocol (UDP), a connectionless protocol, RCP uses TCP, which is connection-oriented.

To use RCP to copy files, the server from or to which you will be copying files must support RCP. The RCP copy commands rely on the rsh server (or daemon) on the remote system. To copy files by using RCP, you do not need to create a server for file distribution as you do with TFTP. You only need to have access to a server that supports the remote shell (rsh). (Most UNIX systems support rsh.) Because you are copying a file from one place to another, you must have read permission on the source file and write permission on the destination file. If the destination file does not exist, RCP creates it for you.

RCP requires a client to send a remote username on each RCP request to a server. When you copy an image from the switch to a server by using RCP, the Cisco IOS software sends the first valid username in this list:

- The username specified in the **archive download-sw** or **archive upload-sw** privileged EXEC command if a username is specified.
- The username set by the **ip rcmd remote-username username** global configuration command if the command is entered.
- The remote username associated with the current TTY (terminal) process. For example, if the user is connected to the router through Telnet and was authenticated through the **username** command, the switch software sends the Telnet username as the remote username.
- The switch hostname.

For the RCP copy request to execute successfully, an account must be defined on the network server for the remote username. If the server has a directory structure, the image file is written to or copied from the directory associated with the remote username on the server. For example, if the image file resides in the home directory of a user on the server, specify that user's name as the remote username.

Before you begin downloading or uploading an image file by using RCP, do these tasks:

- 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 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 by using the **ping** command.
- If you are accessing the switch through the console or a Telnet session and you do not have a valid username, make sure that the current RCP username is the one that you want to use for the RCP download. You can enter the **show users** privileged EXEC command to view the valid username. If you do not want to use this username, create a new RCP username by using the **ip rcmd remote-username username** global configuration command to be used during all archive operations. The new username is stored in NVRAM. If you are accessing the switch through a Telnet session and you have a valid username, this username is used, and there is no need to set the RCP username. Include the username in the **archive download-sw** or **archive upload-sw** privileged EXEC command if you want to specify a username only for that operation.
- When you upload an image to the RCP to the server, it must be properly configured to accept the RCP write request from the user on the switch. For UNIX systems, you must add an entry to the .rhosts file for the remote user on the RCP server. For example, suppose the switch contains these configuration lines:

```
hostname Switch1
ip rcmd remote-username User0
```

If the switch IP address translates to *Switch1.company.com*, the *.rhosts* file for User0 on the RCP server should contain this line:

```
Switch1.company.com Switch1
```

For more information, see the documentation for your RCP server.

## Downloading an Image File By Using RCP

You can download a new image file and replace or keep the current image.

Beginning in privileged EXEC mode, follow Steps 1 through 6 to download a new image from an RCP server and overwrite the existing image. To keep the current image, go to Step 6.

	Command	Purpose
Step 1		Verify that the RCP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload an Image File By Using RCP”</a> section on page 1-36.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.
Step 3	<b>configure terminal</b>	Enter global configuration mode.  This step is required only if you override the default remote username (see Steps 4 and 5).
Step 4	<b>ip rcmd remote-username</b> <i>username</i>	(Optional) Specify the remote username.
Step 5	<b>end</b>	Return to privileged EXEC mode.
Step 6	<b>archive download-sw /allow-feature-upgrade</b> <b>[/directory] /overwrite /reload</b> <b>tftp:[//location]/directory/image-name1.tar</b> <b>[image-name2.tar image-name3.tar</b> <b>image-name4.tar]</b>	Download the images file from the RCP server to the switch and overwrite the current image.  <ul style="list-style-type: none"> <li>The <b>/allow-feature-upgrade</b> allows installation of a software image with a different feature set.</li> <li>(Optional) The <b>/directory</b> option specifies a directory for the images.</li> <li>The <b>/overwrite</b> option overwrites the software image in flash memory with the downloaded image.</li> <li>The <b>/reload</b> option reloads the system after downloading the image unless the configuration has been changed and not been saved.</li> <li>For <i>//username</i>, specify the username. For the RCP copy request to execute successfully, an account must be defined on the network server for the remote username. For more information, see the <a href="#">“Preparing to Download or Upload an Image File By Using RCP”</a> section on page 1-36.</li> <li>For <i>@location</i>, specify the IP address of the RCP server.</li> <li>For <i>/directory/image-name1.tar [directory/image-name2.tar image-name3.tar image-name4.tar]</i>, specify the directory (optional) and the images to download. Directory and image names are case sensitive.</li> </ul>

Command	Purpose
<b>Step 7</b> <b>archive download-sw</b> [/directory] <b>/leave-old-sw /reload</b> <b>tftp:[[/location]/directory]image-name1.tar</b> <b>[image-name2.tar image-name3.tar</b> <b>image-name4.tar]</b>	Download the images file from the RCP server to the switch and keep the current image. <ul style="list-style-type: none"> <li>• (Optional) The <b>/directory</b> option specifies a directory for the images.</li> <li>• The <b>/leave-old-sw</b> option keeps the old software version after a download.</li> <li>• The <b>/reload</b> option reloads the system after downloading the image unless the configuration has been changed and not been saved.</li> <li>• For <b>//username</b>, specify the username. For the RCP copy request to execute, an account must be defined on the network server for the remote username. For more information, see the <a href="#">“Preparing to Download or Upload an Image File By Using RCP”</a> section on page 1-36.</li> <li>• For <b>@location</b>, specify the IP address of the RCP server.</li> <li>• For <b>/directory/image-name1.tar [/directory/image-name2.tar image-name3.tar image-name4.tar]</b>, specify the directory (optional) and the images to download. Directory and image names are case sensitive.</li> </ul>

The download algorithm verifies that the image is appropriate for the switch model and that enough DRAM is present, or it aborts the process and reports an error. If you specify the **/overwrite** option, the download algorithm removes the existing image on the flash device whether or not it is the same as the new one, downloads the new image, and then reloads the software.

**Note**

If the flash device has sufficient space to hold two images and you want to overwrite one of these images with the same version, you must specify the **/overwrite** option.

If you specify the **/leave-old-sw**, the existing files are not removed. If there is not enough room to install the new image and keep the running image, the download process stops, and an error message is displayed.

The algorithm installs the downloaded image onto the system board flash device (flash:). The image is placed into a new directory named with the software version string, and the BOOT environment variable is updated to point to the newly installed image.

If you kept the old software during the download process (you specified the **/leave-old-sw** keyword), you can remove it by entering the **delete /force /recursive filesystem:/file-url** privileged EXEC command. For **filesystem**, use **flash:** for the system board flash device. For **file-url**, enter the directory name of the old software image. All the files in the directory and the directory are removed.

**Caution**

For the download and upload algorithms to operate properly, do *not* rename image names.

## Uploading an Image File By Using RCP

You can upload an image from the switch to an RCP server. You can later download this image to the same switch or to another switch of the same type.

The upload feature should be used only if the web management pages associated with the embedded device manager have been installed with the existing image.

Beginning in privileged EXEC mode, follow these steps to upload an image to an RCP server:

	Command	Purpose
Step 1		Verify that the RCP server is properly configured by referring to the <a href="#">“Preparing to Download or Upload an Image File By Using RCP”</a> section on page 1-36.
Step 2		Log into the switch through the console port, the Ethernet management port, or a Telnet session.
Step 3	<b>configure terminal</b>	Enter global configuration mode.  This step is required only if you override the default remote username (see Steps 4 and 5).
Step 4	<b>ip rcmd remote-username</b> <i>username</i>	(Optional) Specify the remote username.
Step 5	<b>end</b>	Return to privileged EXEC mode.
Step 6	<b>archive upload-sw</b> <b>rcp:</b> [[ <i>//username@location</i> ]/ <i>directory</i> ]/ <i>image-name.tar</i> ]	Upload the currently running switch image to the RCP server.  <ul style="list-style-type: none"> <li>For <i>//username</i>, specify the username; for the RCP copy request to execute, define an account on the network server for the remote username. For more information, see the <a href="#">“Preparing to Download or Upload an Image File By Using RCP”</a> section on page 1-36.</li> <li>For <i>@location</i>, specify the IP address of the RCP server.</li> <li>For <i>/directory</i>]/<i>image-name.tar</i>, specify the directory (optional) and the name of the software image to be uploaded. Directory and image names are case sensitive.</li> <li>The <i>image-name.tar</i> is the name of software image to be stored on the server.</li> </ul>

The **archive upload-sw** privileged EXEC command builds an image file on the server by uploading these files in order: info, the Cisco IOS image, and the web management files. After these files are uploaded, the upload algorithm creates the file format.



#### Caution

For the download and upload algorithms to operate properly, do *not* rename image names.

## Copying an Image File from One Stack Member to Another

For switch stacks, the **archive download-sw** and **archive upload-sw** privileged EXEC commands can be used only through the stack master. Software images downloaded to the stack master are automatically downloaded to the rest of the stack members.

To upgrade a switch that has an incompatible software image, use the **archive copy-sw** privileged EXEC command to copy the software image from an existing stack member to the one that has incompatible software. That switch automatically reloads and joins the stack as a fully functioning member.

**Note**

To use the **archive copy-sw** privileged EXEC command, you must have downloaded from a TFTP server the images for both the stack member switch being added and the stack master. You use the **archive download-sw** privileged EXEC command to perform the download.

Beginning in privileged EXEC mode from the stack member that you want to upgrade, follow these steps to copy the running image file from the flash memory of a different stack member:

	Command	Purpose
Step 1	<b>archive copy-sw</b> <i>/destination-system destination-stack-member-number /force-reload source-stack-member-number</i>	<p>Copy the running image file from a stack member, and then unconditionally reload the updated stack member.</p> <p><b>Note</b> At least one stack member must be running the image that is to be copied to the switch that is running the incompatible software.</p> <p>For <b>/destination-system</b> <i>destination-stack-member-number</i>, specify the number of the stack member (the destination) to which to copy the source running image file. If you do not specify this stack member number, the default is to copy the running image file to all stack members.</p> <p>Specify <b>/force-reload</b> to unconditionally force a system reload after the software image downloads.</p> <p>For <i>source-stack-member-number</i>, specify the number of the stack member (the source) from which to copy the running image file. The stack member number range is 1 to 9.</p>
Step 2	<b>reload slot</b> <i>stack-member-number</i>	Reset the updated stack member, and put this configuration change into effect.

## Software for the Network Services Module Software

The C3KX-SM-10GT 10-Gigabit Ethernet network services module requires an additional software image to support the features that are available only on the service module. You use the **archive download-sw** privileged EXEC command on the switch to download the software image, which must be compatible with the Cisco IOS software running on the switch. If the versions are not compatible, the service module runs in pass-through mode, which means that none of the service-module-specific features are available.

When you install a network services module and boot up the switch, the switch runs a compatibility check to verify that the software version in the service module is compatible with the software running on the switch.

When you download software by entering the **archive download-sw** privileged EXEC command, the switch also runs a version check to verify software compatibility, if applicable:

- If the switch is in a switch stack, it checks the compatibility of the stack protocol and the switches in the stack.
- If a network services module is installed, it checks the compatibility of the switch software and the network services module software.



**Note**

If the switch is not in a stack or if there is no network services module installed, no version compatibility check is needed.

If a mismatch between the service module and the switch is detected, this syslog message appears:

```
The FRULink 10G Service Module (C3KX-SM-10G) software version
is incompatible with the IOS software version. Please update
the software. Module is in pass-thru mode.
```

Service-module-specific features require the IP base or IP services feature set. If the switch is running the LAN base software feature set, this message appears:

```
Mar 1 00:01:32.341: %PLATFORM_SM10G-6-LICENSE: FRULink 10G Service Module
(C3KX-SM-10G) features are not supported with this license level. Module is in
pass-thru mode.
```

You can use the **show switch service-module** user EXEC command to view a service module on the switch or any service modules in the stack, and the service module software version supported by the switch/

This is an example of output when the software versions are compatible:

```
Switch# show switch service-modules
Switch/Stack supports service module CPU version: 03.00.24
Switch# H/W Status      Temperature      CPU
          (CPU/FPGA)      Link      Version
-----
1         OK             86C/70C      connected  03.00.24
```

This is an example of output when a switch with a service module installed is running the LAN base feature set:

```
Switch# show switch service-modules
Switch/Stack supports service module CPU version: 03.00.25
Switch# H/W Status      Temperature      CPU
          (CPU/FPGA)      Link      Version
-----
1         LB-PASS-THRU *  71C/59C      notconnected N/A

*   Module services not supported on a Lanbase license
```

