

Modifying, Downloading, and Maintaining Configuration Files

This chapter describes how to load and maintain configuration files. Configuration files contain commands entered to customize the function of the Cisco IOS software.

To benefit most from the instructions and organization of this chapter, your router must contain a minimal configuration that allows you to interact with the system software. You can create a basic configuration file using the **setup** command facility. See the user guide for your hardware platform for more information on using **setup** at first-time startup. See the “Using Setup for Configuration Changes” chapter in this publication for information on using **setup** after first-time startup.

For a complete description of the configuration file commands in this chapter, refer to the “Configuration File Commands” chapter in the *Configuration Fundamentals Command Reference*. To locate documentation of other commands that appear in this chapter, use the command reference master index or search online.

Note One or more of the commands that previously appeared in this chapter have been replaced by new commands. Table 6 maps the old commands to their replacements. The old commands continue to perform their normal functions in the current release, but support for these commands will cease in a future release.

Table 6 Mapping Old Commands to New Commands

Old Command	New Command
configure network	copy rcp running-config (for an rcp server) copy tftp running-config (for a TFTP server)
configure overwrite-network	copy rcp startup-config (for an rcp server) copy tftp startup-config (for a TFTP server)
show configuration	show startup-config
write erase	erase startup-config
write memory	copy running-config startup-config
write network	copy running-config rcp (for an rcp server) copy running-config tftp (for a TFTP server)
write terminal	show running-config

Configuration File Task List

To load and maintain configuration files needed for startup, complete any of the tasks in the following sections:

- Display Configuration File Information
- Understand Configuration Files
- Enter Configuration Mode and Select a Configuration Source
- Configure the Cisco IOS Software from the Terminal
- Copy Configuration Files from the Router to a Network Server
- Copy Configuration Files from a Network Server to the Router
- Maintain Configuration Files Larger than NVRAM
- Copy Configuration Files between Different Locations
- Reexecute the Configuration Commands in Startup Configuration
- Clear the Configuration Information
- Specify the Startup Configuration File

Note These tasks assume you have a minimal configuration that you want to modify.

Display Configuration File Information

Perform the following tasks in EXEC mode to display information about configuration files:

Task	Command
List the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, and the contents of the BOOTLDR environment variable.	show boot (Cisco 3600 series, Cisco 7000 family only)
List the configuration information stored in a specified file.	show file device:filename (Cisco 7000 family only)
List the configuration information in running memory.	show running-config
List the startup configuration information.	show startup-config

On all platforms except the Cisco 7000 family¹, the startup configuration is usually NVRAM. On the Cisco 7000 family, the CONFIG_FILE environment variable points to the startup configuration. The CONFIG_FILE variable defaults to NVRAM.

1. The Cisco 7000 family consists of Cisco 7000 series routers with RSP7000, Cisco 7200 series routers, and Cisco 7500 series routers.

Refer to the *Configuration Fundamentals Command Reference* for examples of these commands.

Understand Configuration Files

Configuration files contain the commands the router uses to customize the function of the Cisco IOS software. The **setup** command facility helps you create a basic configuration file. However, you can manually change the configuration by typing commands in a configuration mode.

Types of Configuration Files

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 may want to change the configuration for a short time period rather than permanently. In this case, you would change the running configuration using the **configure terminal** command but not save the configuration using the **copy running-config startup-config** command.

To change the running configuration, use the **configure terminal** command, as described in the “Configure the Cisco IOS Software from the Terminal” section. To change the startup-config, you can either save the running configuration file to the startup configuration using the **copy running-config startup-config** command (which is also described in the “Configure the Cisco IOS Software from the Terminal” section) or copy commands from a file directory to the startup configuration without affecting the running configuration (refer to the “Copy Configuration Files from a Network Server to the Router” section).

Location of Configuration Files

The configuration files are stored in the following places:

- The running configuration is stored in RAM.
- On all platforms except the Cisco 7000 family, the startup configuration is stored in nonvolatile random-access memory (NVRAM).
- On the Cisco 7000 family, the startup configuration is stored in the location specified by the CONFIG_FILE environment variable (refer to the “CONFIG_FILE Environment Variable” section for details). The CONFIG_FILE variable defaults to NVRAM and can be a file in the following devices:
 - **nvr**am: (NVRAM)
 - **bootflash**: (Internal Flash memory)
 - **slot0**: (First PCMCIA slot)
 - **slot1**: (Second PCMCIA slot)

Enter Configuration Mode and Select a Configuration Source

To enter configuration mode, enter the **configure** command at the privileged EXEC prompt. The Cisco IOS software responds with the following prompt asking you to specify the terminal, memory, or a file stored on a network server (network) as the source of configuration commands:

```
Configuring from terminal, memory, or network [terminal]?
```

Configuring from the terminal allows you to enter configuration commands at the command line. Refer to the “Configure the Cisco IOS Software from the Terminal” section for details. Configuring from memory reexecutes the commands in the startup configuration file. See the “Reexecute the

Configuration Commands in Startup Configuration” section for more details. Configuring from the network allows you to load and execute configuration commands over the network. See the “Copy Configuration Files from a Network Server to the Router” section for more details.

Configure the Cisco IOS Software from the Terminal

The Cisco IOS software accepts one configuration command per line. You can enter as many configuration commands as you want.

You can add comments to a configuration file describing the commands you have entered. Precede a comment with an exclamation point (!). Because comments are *not* stored in NVRAM or in the active copy of the configuration file, comments do not appear when you list the active configuration with the **show running-config EXEC** command. Also, when the startup configuration is NVRAM, comments do not show up when you list the startup configuration with the **show startup-config EXEC** command. Comments are stripped out of the configuration file when it is loaded onto the router. However, you can list the comments in configuration files stored on a TFTP, rcp, or MOP server.

When you configure the software from the terminal, the software executes the commands you enter at the system prompts. To configure the software from the terminal, complete the following tasks:

Task	Command
Step 1 Enter configuration mode and select the terminal option.	configure terminal
Step 2 Enter the necessary configuration commands.	See the appropriate chapter for specific configuration commands.
Step 3 Quit configuration mode.	end or press Ctrl-Z (^Z)
Step 4 Save the configuration file to your startup configuration. On most platforms, this step saves the configuration to NVRAM. On the Cisco 7000 family, this step saves the configuration to the location specified by the CONFIG_FILE environment variable. The CONFIG_FILE variable defaults to NVRAM.	copy running-config startup-config

In the following example, the software is configured from the terminal. The comment *The following command provides the router host name* identifies the purpose of the next command line. The **hostname** command changes the router name from *router1* to *router2*. By pressing **Ctrl-Z (^Z)** or entering the command **end**, the user quits configuration mode. Finally, the **copy running-config startup-config** command saves the current configuration to the startup configuration.

```
Router1# configure terminal
Router1(config)# !The following command provides the router host name.
Router1(config)# hostname router2
Router2(config)# end
Router2# copy running-config startup-config
```

When the startup configuration is NVRAM, it stores the current configuration information in text format as configuration commands, *recording only nondefault settings*. The memory is checksummed to guard against corrupted data.



Caution Some specific commands might not get saved to NVRAM. You will have to enter these commands again if you reboot the machine. These commands are noted in the documentation. We recommend that you keep a listing of these settings so you can quickly reconfigure your router after rebooting.

Copy Configuration Files from the Router to a Network Server

You can copy configuration files from the router to a TFTP server or rcp server. You might do this task to back up a current configuration file to a server before changing its contents, thereby allowing you to later restore the original configuration file from the server. The following sections describe these tasks:

- Copy a Configuration File from the Router to a TFTP Server
- Copy a Configuration File from the Router to an rcp Server

The protocol you use depends on which type of server you are using. The rcp transport mechanism provides faster performance and more reliable delivery of data than TFTP. These improvements are possible because rcp is built on and uses the Transmission Control Protocol/Internet Protocol (TCP/IP) stack, which is connection-oriented.

Copy a Configuration File from the Router to a TFTP Server

In some implementations of TFTP, you must create a dummy file on the TFTP server and give it read, write, and execute permissions before copying a file over it. Refer to your TFTP documentation for more information.

To store configuration information on a TFTP network server, complete the following tasks in the EXEC mode:

Task	Command
Step 1 Specify that the running or startup configuration file be stored on a network server.	copy running-config tftp or copy startup-config tftp
Step 2 Enter the IP address of the network server.	<i>ip-address</i>
Step 3 Enter the name of the configuration file to store on the server.	<i>filename</i>
Step 4 Confirm the entry.	<i>y</i>

The command prompts you for the destination host's address and a filename, as the following example illustrates.

The following example copies a configuration file from a router to a TFTP server:

```
Tokyo# copy running-config tftp
Remote host [172.16.2.155]?
Name of configuration file to write [tokyo-config]?
Write file tokyo-config on host 172.16.2.155? [confirm] y
#
Writing tokyo-config!!! [OK]
```

Copy a Configuration File from the Router to an rcp Server

You can copy a configuration file from the router to an rcp server.

If you copy the configuration file to a personal computer used as a file server, the computer must support rsh.

Understand the rcp Username

The rcp protocol requires a client to send a remote username on each rcp request to a server. When you copy a configuration file from the router to a server using rcp, the Cisco IOS software sends the first valid username in the following list:

- 1 The username set by the **ip rcmd remote-username** command, if the command is configured.
- 2 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 router software sends the Telnet username as the remote username.
- 3 The router host name.

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 configuration file or image is written to or copied from the directory associated with the remote username on the server. Use the **ip rcmd remote-username** command to specify which directory on the server to use. For example, if the system image resides in the home directory of a user on the server, you can specify that user's name as the remote username.

If you are writing to the server, the rcp server must be properly configured to accept the rcp write request from the user on the router. For UNIX systems, you must add an entry to the *.rhosts* file for the remote user on the rcp server. For example, suppose the router contains the following configuration lines:

```
hostname Rtr1
ip rcmd remote-username User0
```

If the router's IP address translates to Router1.company.com, then the *.rhosts* file for User0 on the rcp server should contain the following line:

```
Router1.company.com Rtr1
```

Refer to the documentation for your rcp server for more details.

Copy a Configuration File from the Router to the rcp Server Tasks

To copy a startup configuration file or a running configuration file from the router to an rcp server, complete the following tasks:

Task	Command
Step 1 Enter configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2).	configure terminal
Step 2 Specify the remote username. This step is optional, but recommended.	ip rcmd remote-username <i>username</i>
Step 3 Exit configuration mode.	end

Task	Command
Step 4 Specify that the router's running configuration or startup configuration file be stored on an rcp server.	copy running-config rcp or copy startup-config rcp
Step 5 Enter the IP address of the network server.	<i>ip-address</i>
Step 6 Enter the name of the configuration file to store on the server.	<i>filename</i>
Step 7 Confirm the entry.	<i>y</i>

Store a Running Configuration File on a Server Example

The following example copies the running configuration file named *rtr2-config* to the *netadmin1* directory on the remote host with an IP address of 172.16.101.101:

```
Router# configure terminal
Router(config)# ip rcmd remote-username netadmin1
Router(config)# end
Router# copy running-config rcp
Remote host[]? 172.16.101.101
Name of configuration file to write [Rtr2-config]?
Write file rtr2-config on host 172.16.101.101?[confirm]
Building configuration...[OK]
Connected to 172.16.101.101
Router#
```

Store a Startup Configuration File on a Server Example

The following example shows how to store a startup configuration file on a server by using rcp to copy the file:

```
Rtr2# configure terminal
Rtr2(config)# ip rcmd remote-username netadmin2
Rtr2(config)# end
Rtr2# copy startup-config rcp
Remote host[]? 172.16.101.101
Name of configuration file to write [rtr2-config]?
Write file rtr2-config on host 172.16.101.101?[confirm]
! [OK]
```

Copy Configuration Files from a Network Server to the Router

You can copy configuration files from a TFTP server or an rcp server to the running configuration or startup configuration of the router. You may want to do this for one of the following reasons:

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

The **copy tftp running-config** and **copy rcp running-config** commands load the configuration files into the router as if you were typing the commands in at the command line. They do 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 will be 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 will be used. However, some commands in the existing configuration may not be replaced or negated. In this case, the resulting configuration file will be a mixture of the existing configuration file and the copied configuration file, with the copied configuration file having precedence.

In order to restore a configuration file to an exact copy of a file stored on a server, you need to copy the configuration file directly to the startup configuration (using the **copy tftp startup-config** or **copy rcp startup-config** command) and reload the router.

The following sections describe these tasks:

- Copy a Configuration File from a TFTP Server to the Router
- Copy a Configuration File from an rcp Server to the Router

You can copy configuration files from a TFTP or rcp server. The protocol you use depends on which type of server you are using. The rcp transport mechanism provides faster performance and more reliable delivery of data than TFTP. These improvements are possible because the rcp transport mechanism is built on and uses the Transmission Control Protocol/Internet Protocol (TCP/IP) stack, which is connection-oriented.

Copy a Configuration File from a TFTP Server to the Router

To copy a configuration file from a TFTP server to the router, complete the following tasks from EXEC mode:

Task	Command
Step 1 Copy a file from a TFTP server to the router.	copy tftp running-config or copy tftp startup-config
Step 2 When prompted, enter the IP address or domain name of the server.	<i>ip-address or name</i>
Step 3 If prompted, enter the filename of the configuration file.	<i>filename</i>
Step 4 Confirm the entry.	y

In the following example, the software is configured from the file *tokyo-config* at IP address 172.16.2.155:

```
Router1# copy tftp running-config
Host or network configuration file [host]?
IP address of remote host [255.255.255.255]? 172.16.2.155
Name of configuration file [tokyo-config]?
Configure using tokyo-config from 172.16.2.155? [confirm] y
Booting tokyo-config from 172.16.2.155:!!! [OK - 874/16000 bytes]
```

Copy a Configuration File from an rcp Server to the Router

You can copy configuration files from an rcp server to the router.

If you copy the configuration file to a personal computer used as a file server, the computer must support rsh.

Understand the rcp Username

The rcp protocol requires a client to send a remote username on each rcp request to a server. When you copy a configuration file from the router to a server using rcp, the Cisco IOS software sends the first valid username in the following list:

- 1 The username set by the **ip rcmd remote-username** command, if the command is configured.
- 2 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 router software sends the Telnet username as the remote username.
- 3 The router host name.

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 configuration file or image is written to or copied from the directory associated with the remote username on the server. Use the **ip rcmd remote-username** command to specify which directory on the server to use. For example, if the system image resides in the home directory of a user on the server, you can specify that user's name as the remote username.

Copy a Configuration File from an rcp Server to the Router Tasks

To copy a configuration file from an rcp server to the running configuration or startup configuration, perform the following tasks:

Task	Command
Step 1 Enter configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2).	configure terminal
Step 2 Specify the remote username. This step is optional, but recommended.	ip rcmd remote-username <i>username</i>
Step 3 Exit configuration mode.	end
Step 4 Using rcp, copy the configuration file from a network server to running memory or the startup configuration.	copy rcp running-config or copy rcp startup-config
Step 5 When prompted, enter the IP address of the server.	<i>ip-address</i>
Step 6 When prompted, enter the name of the configuration file.	<i>filename</i>
Step 7 Confirm the entry.	y

Copy rcp Running-Config Example

The following example copies a host configuration file named *host1-confg* from the *netadmin1* directory on the remote server with an IP address of 172.16.101.101, and loads and runs those commands on the router:

```
Router# configure terminal
Router(config)# ip rcmd remote-username netadmin1
Router(config)# end
Router# copy rcp running-config
Host or network configuration file [host]?
Address of remote host [255.255.255.255]? 172.16.101.101
Name of configuration file [Router-config]? host1-confg
Configure using host1-confg from 172.16.101.101? [confirm]
Connected to 172.16.101.101
```

```
Loading 1112 byte file host1-config:[OK]
Router#
%SYS-5-CONFIG: Configured from host1-config by rcp from 172.16.101.101
```

Copy rcp Startup-Config Example

The following example specifies 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.

```
Rtr2# configure terminal
Rtr2(config)# ip rcmd remote-username netadmin1
Rtr2(config)# end
Rtr2# copy rcp 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]
Rtr2#
%SYS-5-CONFIG_NV:Non-volatile store configured from host2-config by rcp from
172.16.101.101
```

Maintain Configuration Files Larger than NVRAM

To maintain a configuration file that exceeds size of NVRAM, perform one of the tasks in the following sections:

- Compress the Configuration File
- Store the Configuration in Flash Memory (Cisco 7000 family)
- Load the Configuration Commands from the Network

Compress the Configuration File

The **service compress-config** global configuration command specifies that the configuration file is to be stored compressed in NVRAM. Once the configuration file has been compressed, the router functions normally. When the system is booted, it recognizes that the configuration file is compressed, expands it, and proceeds normally. The **show startup-config EXEC** command expands the configuration before displaying it.

To compress configuration files, perform the following tasks, beginning in global configuration mode:

Task	Command
Step 1 Verify that your system's ROMs support file compression. If not, you can install new ROMs that support file compression.	Refer to the appropriate hardware installation and maintenance publication.
Step 2 Specify that the configuration file is to be compressed.	service compress-config
Step 3 Exit global configuration mode.	end

Task	Command
Step 4 Enter the new configuration.	Use TFTP or rcp to copy the new configuration. If you try to load a configuration that is more than three times larger than the NVRAM size, the following error message is displayed: “[buffer overflow - <i>file-size</i> / <i>buffer-size</i> bytes].” or configure terminal
Step 5 When you have finished changing the running-configuration, save the new configuration.	copy running-config startup-config

The size of the configuration must not exceed three times the NVRAM size. For a 128 KB size NVRAM, the largest expanded configuration file size is 384 KB.

The **service compress-config** command works only if you have Cisco IOS Software Release 10 boot ROMs or later. Installing new ROMs is a one-time operation and is necessary only if you do not already have Cisco IOS Release 10 in ROM. If the boot ROMs do not recognize a compressed configuration, the following message is displayed:

```
Boot ROMs do not support NVRAM compression Config NOT written to NVRAM
```

The example below compresses a 129 KB configuration file to 11 KB.

```
Router# configure terminal
Router(config)# service compress-config
Router(config)# end
Router# copy tftp running-config
Host or network configuration file [host]?
IP address of remote host [255.255.255.255]? 172.16.2.155
Name of configuration file [tokyo-config]?
Configure using tokyo-config from 172.16.2.155? [confirm] y
Booting tokyo-config from 172.16.2.155:!!! [OK - 874/16000 bytes]
Router# copy running-config startup-config
Building configuration...
Compressing configuration from 129648 bytes to 11077 bytes
[OK]
```

Store the Configuration in Flash Memory (Cisco 7000 family)

On the Cisco 7000 family routers, you can store the startup configuration in Flash memory by setting the environment variable CONFIG_FILE to a file in internal Flash memory or Flash memory in a PCMCIA slot.

To store the startup configuration in Flash memory, perform the following tasks, beginning in privileged EXEC mode:

Task	Command
Step 1 Copy the current startup configuration to the new location to create the configuration file.	copy startup-config <i>device:filename</i>
Step 2 Enter global configuration mode.	configure terminal
Step 3 The buffer that holds the configuration file is usually the size of NVRAM. Larger configurations need larger buffers. Change the size of the buffer that holds the configuration commands.	boot buffersize <i>bytes</i>

Task	Command
Step 4 Specify that the startup configuration file is to be stored in Flash memory by setting the CONFIG_FILE variable.	boot config <i>device:filename</i>
Step 5 Exit global configuration mode.	end
Step 6 Enter the new configuration.	Use TFTP or rcp to copy the new configuration. If you try to load a configuration that is more than three times larger than the NVRAM size, the following error message is displayed: “[buffer overflow - <i>file-size/buffer-size</i> bytes]” or configure terminal
Step 7 When you have finished changing the running-configuration, save the new configuration.	copy running-config startup-config

Refer to the “Specify the CONFIG_FILE Environment Variable (Cisco 7000 family)” section for more information.

The following example stores the configuration file in slot 0:

```
Router# copy startup-config slot0:router-config
Router# configure terminal
Router(config)# boot buffersize 129000
Router(config)# boot config slot0:router-config
Router(config)# end
Router# copy running-config startup-config
```

Care must be taken when editing or changing a large configuration. Flash memory space is used every time a **copy running-config startup-config** is issued. Because file management for Flash memory, such as optimizing free space, is not done automatically, you must pay close attention to available Flash memory. Cisco recommends that you use a large-capacity Flash card of at least 20 MB.

Load the Configuration Commands from the Network

You can also store large configurations on TFTP or rcp servers and download them at system startup. To use a network server to store large configurations, perform the following tasks, beginning in privileged EXEC mode:

Task	Command
Step 1 Save the running configuration to a TFTP or rcp server.	copy running-config {tftp rcp}
Step 2 Enter global configuration mode.	configure terminal
Step 3 The buffer that holds the configuration file is usually the size of NVRAM. Larger configurations need larger buffers. Change the size of the buffer that holds the configuration commands.	boot buffersize <i>bytes</i>
Step 4 Specify that the startup configuration file is to be loaded from the network server at startup.	boot network [tftp rcp] filename [ip-address]
Step 5 Exit global configuration mode.	end
Step 6 Save the configuration.	copy running-config startup-config

Refer to the “Copy Configuration Files from the Router to a Network Server” and “Configure the Router to Download Configuration Files” sections for more information on these tasks.

Copy Configuration Files between Different Locations

On many platforms, such as the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers, you can copy files from one Flash memory device, such as internal Flash memory or a Flash memory card in a PCMCIA slot, to other locations. You can also copy configuration files from a TFTP or rcp server to Flash memory.

Copy Configuration Files from Flash Memory to the Startup or Running Configuration

To copy a configuration file from Flash memory directly to your startup configuration in NVRAM or your running configuration, enter one of the following command in EXEC mode:

Task	Command
Load a configuration file directly into NVRAM.	copy <i>device:[partition-number:]</i> [filename] startup-config (Cisco 1600 series and Cisco 3600 series) copy [<i>device:</i>]filename startup-config (Cisco 7000 family)
Copy a configuration file to your running configuration.	copy <i>device:[partition-number:]</i> [filename] running-config (Cisco 1600 series and Cisco 3600 series) copy [<i>device:</i>]filename running-config (Cisco 7000 family)

The following example copies the file *ios-upgrade-1* from partition 4 of the Flash memory PC Card in slot 0 to the router’s startup configuration on a Cisco 3600 series.

For a Cisco 1600 series router, the process will be the same except the device used in the **copy** command must be **flash**:

```
Router# copy slot0:4:ios-upgrade-1 startup-config

Copy 'ios-upgrade-1' from flash device
  as 'startup-config' ? [yes/no] yes
[OK]
```

Copy Configuration Files between Flash Memory Devices

On Cisco 3600 series and Cisco 7000 family routers, you can copy files from one Flash memory device, such as internal Flash memory or a Flash memory card in a PCMCIA slot, to another Flash memory device. Copying files to different Flash memory devices lets you create backup copies of working configurations and duplicate configurations for other routers.

To copy a configuration file between Flash memory devices, follow these steps in EXEC mode:

Task	Command
Step 1 Display the layout and contents of Flash memory to verify the file name.	show <i>device:</i> [all chips detailed err partition number summary]
Step 2 Copy a configuration file between Flash memory devices.	copy <i>device:[partition-number:]</i> [filename] <i>device:[partition-number:]</i> [filename]
Step 3 Verify the checksum of the file you copied.	verify <i>device:</i> [partition-number:] [filename]

Note The source device and the destination device cannot be the same. For example, the command **copy slot1: slot1:** is invalid.

Copy a Configuration File between Local Flash Memory Devices Example

The following example copies the file *running-config* from partition 1 of internal Flash memory to partition 1 of slot 1 on a Cisco 3600 series router. In this example, the source partition is not specified, so the router prompts for the partition number.

```
Router# copy flash: slot1:

System flash

Partition      Size      Used      Free      Bank-Size  State      Copy Mode
-----
1              4096K    3070K    1025K    4096K      Read/Write Direct
2              16384K   1671K    14712K   8192K      Read/Write Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 1]

System flash directory, partition 1:
File Length Name/status
  1  3142748 dirt/network/mars-test/c3600-j-mz.latest
  2    850   running-config
[3143728 bytes used, 1050576 available, 4194304 total]

PCMCIA Slot1 flash directory:
File Length Name/status
  1  1711088 dirt/gate/c3600-i-mz
  2    850   running-config
[1712068 bytes used, 2482236 available, 4194304 total]

Source file name? running-config

Destination file name [running-config]?
Verifying checksum for 'running-config' (file # 2)... OK

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'running-config' from flash: device
  as 'running-config' into slot1: device WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
...erased
!
[OK - 850/4194304 bytes]

Flash device copy took 00:00:30 [hh:mm:ss]
Verifying checksum... OK (0x16)
```

Copy a Configuration File from a Server to Flash Memory

To copy a configuration file from an rcp server to a Flash memory device, perform the following task in privileged EXEC mode:

Task	Command
Step 1 Enter configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2).	configure terminal

Task	Command
Step 2 Specify the remote username. This step is optional, but recommended.	ip rcmd remote-username <i>username</i>
Step 3 Exit configuration mode.	end
Step 4 Using rcp, copy the configuration file from a network server to the Flash memory device.	copy rcp <i>device:[partition-number:]</i> [<i>filename</i>]
Step 5 When prompted, enter the IP address of the server.	<i>ip-address</i>
Step 6 When prompted, enter the name of the configuration file.	<i>filename</i>
Step 7 Confirm the entry.	y

To copy a configuration file from a TFTP server to the router, complete the following tasks from EXEC mode:

Task	Command
Step 1 Copy the file from a TFTP server to the Flash memory device.	copy tftp <i>device:[partition-number:]</i> [<i>filename</i>]
Step 2 When prompted, enter the IP address or domain name of the server.	<i>ip-address</i> or <i>name</i>
Step 3 If prompted, enter the filename of the configuration file.	<i>filename</i>
Step 4 Confirm the entry.	y

Copy TFTP example for Cisco 7000 Family

On the Cisco 7000 family, the following example copies the *router-config* file from a TFTP server to the Flash memory card inserted in slot 0 of the Network Processing Engine (NPE) or Route Switch Processor (RSP) card. The copied file has the name *new-config*.

```
Router# copy tftp:router-config slot0:new-config
```

Reexecute the Configuration Commands in Startup Configuration

To reexecute the commands located in the startup configuration, complete the following task in privileged EXEC mode:

Task	Command
Reexecute the configuration commands located in the startup configuration.	configure memory

Clear the Configuration Information

You can clear the configuration information from the startup configuration. If you reboot the router with no startup configuration, the router will enter the setup facility so that you can configure the router from scratch.

Erase the Startup Configuration

To clear the contents of your startup configuration, perform the following task in EXEC mode:

Task	Command
Clear the contents of your startup configuration.	erase startup-config

For all platforms except the Cisco 7000 family, this command erases NVRAM. The startup configuration file cannot be restored once it has been deleted.

On the Cisco 7000 family, when you use the **erase startup-config** command, the router erases or deletes the configuration pointed to by CONFIG_FILE environment variable. If this variable points to NVRAM, the router erases NVRAM. If the CONFIG_FILE environment variable specifies a Flash memory device and configuration filename, the router deletes the configuration file. That is, the router marks the file as “deleted,” rather than erasing it. This feature allows you to recover a “deleted” file. Refer to the “Recover Deleted Files on a Flash Device” section for more information on recovering deleted files.

Erased a Stored Configuration File

To erase or delete a saved configuration from a specific Flash device, complete one of the following tasks in EXEC mode:

Task	Command
For the Cisco 7000 family, delete a specified configuration file on a specified Flash device.	delete [<i>device:</i>] <i>filename</i> (Cisco 7000 family)
For the Cisco 1600 series and Cisco 3600 series routers, erase a specified configuration file, all files on a device, or all files in a partition.	erase device: [<i>partition-number</i>] (Cisco 1600 series and Cisco 3600 series only)

When you delete a specific file in Flash memory, the system marks the file as deleted, allowing you to later recover a “deleted” file using the **undelete** command. Erased files cannot be recovered.

For the Cisco 7000 family, if you omit the device name, the Cisco IOS software uses the default device specified by the **cd** command.

If you attempt to erase or delete the configuration file specified by the CONFIG_FILE environment variable, the system prompts you to confirm the deletion.

Note The **erase** [*device:*]*filename* command differs from the **erase flash** command. The **erase** [*device:*]*filename* command erases a specified file located in internal Flash memory or on the Flash memory card inserted in a PCMCIA slot. The **erase flash** command erases internal Flash memory.

The following example erases the *myconfig* file from a Flash memory card inserted in slot 0:

```
Router# erase slot0:myconfig
```

The following example deletes the *myconfig* file from a Flash memory card inserted in slot 0:

```
Router# delete slot0:myconfig
```

Specify the Startup Configuration File

Normally, the router uses the startup configuration file in NVRAM or the device specified by the CONFIG_FILE environment variable (Cisco 7000 family) at startup. See the “Specify the CONFIG_FILE Environment Variable (Cisco 7000 family)” section for details on setting the CONFIG_FILE variable.

You can also configure the router to automatically request and receive two configuration files from the network server at startup. See the “Configure the Router to Download Configuration Files” section for details.

Specify the CONFIG_FILE Environment Variable (Cisco 7000 family)

On the Cisco 7000 family, you can configure the Cisco IOS software to load the startup configuration file specified by the CONFIG_FILE environment variable. The CONFIG_FILE variable defaults to NVRAM. To change the CONFIG_FILE variable, complete the following tasks, beginning in EXEC mode:

Task	Command
Step 1 Copy the configuration file to the device from which the router will load the file upon restart.	copy [flash mop rcp tftp running-config startup-config] device:filename
Step 2 Enter configuration mode from the terminal.	configure terminal
Step 3 Set the CONFIG_FILE environment variable. This step modifies the runtime CONFIG_FILE environment variable.	boot config device:filename
Step 4 Exit configuration mode.	end
Step 5 Save this runtime CONFIG_FILE environment variable to your startup configuration.	copy running-config startup-config
Step 6 Optionally, verify the contents of the CONFIG_FILE environment variable.	show boot

Possible devices are **nvr**am, **bootflash**, **slot0**, and **slot1**.

When saving the runtime CONFIG_FILE environment variable to the startup configuration, the router saves a complete version of the configuration file to the location specified by the CONFIG_FILE environment variable and a distilled version to NVRAM. A distilled version is one that does not contain access list information. If NVRAM contains a complete configuration file, the router prompts you to confirm your overwrite of the complete version with the distilled version. If NVRAM contains a distilled configuration, the router does not prompt you for confirmation and proceeds with overwriting the existing distilled configuration file in NVRAM.

Note If you specify a file in a Flash device as the CONFIG_FILE variable, every time you save your configuration file with the **copy running-config startup-config** command, the old configuration file is marked as deleted, and the new configuration file is saved to that device. Eventually, Flash memory will be full, since the old configuration files still take up memory. Use the **squeeze** command to permanently delete the old configuration files and reclaim the space.

The following example copies the running configuration file to the first PCMCIA slot of the RSP card in a Cisco 7500 series. This configuration is then used as the startup configuration when the system is restarted.

```
Router# copy running-config slot0:config2
Router# configure terminal
Router(config)# boot config slot0:config2
Router(config)# end
Router# copy running-config startup-config
[ok]
Router# show boot
BOOT variable = slot0:rsp-boot-m
CONFIG_FILE variable = nvram:
Current CONFIG_FILE variable = slot0:config2

Configuration register is 0x010F
```

Configure the Router to Download Configuration Files

You can configure the router to load one or two configuration files at system startup. The configuration files are loaded into memory and read in as if you were typing the commands at the command line. Thus, the configuration for the router will be a mixture of the original startup configuration and the one or two downloaded configuration files.

Network Versus Host Configuration Files

For historical reasons, the first file the router downloads is called the network configuration file. The second file the routers downloads is called the host configuration file. Two configuration files can be used when all of the routers on a network use many of the same commands. The network configuration file contains the standard commands used to configure all of the routers. The host configuration files contain the commands specific to one particular host. If you are loading two configuration files, the host configuration file should be the configuration file you want to have precedence over the other file. Both the network and host configuration files must reside on a network server reachable via TFTP, rcp, or MOP, and must be readable.

Understand the rcp Username

The rcp protocol requires a client to send a remote username on each rcp request to a server. When you copy a configuration file from a server to the router using rcp, the Cisco IOS software sends the first valid username in the following list:

- 1 The username set by the **ip rcmd remote-username** command, if the command is configured.
- 2 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 router software sends the Telnet username as the remote username.
- 3 The router host name.

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 configuration file or image is written to or copied from the directory associated with the remote username on the server. Use the **ip rcmd remote-username** command to specify which directory on the server to use. For example, if the system image resides in the home directory of a user on the server, you can specify that user's name as the remote username.

If you copy the configuration file to a personal computer used as a file server, the computer must support rsh.

Configure the Router to Download Configuration Files Task List

You can specify an ordered list of network configuration and host configuration filenames. The Cisco IOS software scans this list until it successfully loads the appropriate network or host configuration file.

To configure the router to download configuration files at system startup, perform at least one of the tasks described in the following sections:

- Configure the Router to Download the Network Configuration File
- Configure the Router to Download the Host Configuration File

If the network server fails to load a configuration file during startup, it tries again every ten minutes (the default setting) until a host provides the requested files. With each failed attempt, the network server displays a message on the console terminal. If the network server is unable to load the specified file, it displays the following message:

```
Booting host-config... [timed out]
```

Refer to the *Internetwork Troubleshooting Guide* publication for troubleshooting procedures.

If there are any problems with the startup configuration file, or if the configuration register is set to ignore NVRAM, the router enters the **setup** command facility. See the “Using Setup for Configuration Changes” chapter in this publication for details on the **setup** command.

Configure the Router to Download the Network Configuration File

To configure the Cisco IOS software to download a network configuration file from a server at startup, complete the following tasks:

Task	Command
Step 1 Enter configuration mode from the terminal.	configure terminal
Step 2 Enter the network configuration filename to download a file using TFTP, rcp, or MOP.	boot network mop filename [mac-address] [interface] boot network [tftp rcp] filename [ip-address]
Step 3 Enable the router to automatically load the network file upon restart.	service config
Step 4 Exit configuration mode.	end
Step 5 Save the configuration file to your startup configuration.	copy running-config startup-config

For Step 2, if you do not specify a network configuration filename, the Cisco IOS software uses the default filename *network-config*. If you omit both the **tftp** and the **rcp** keywords, the software assumes that you are using TFTP to transfer the file and that the server whose IP address you specify supports TFTP. If you omit the address, the router uses the broadcast address.

You can specify more than one network configuration file. The software tries them in order entered until it loads one successfully. This procedure can be useful for keeping files with different configuration information loaded on a network server.

Configure the Router to Download the Host Configuration File

To configure the Cisco IOS software to download a host configuration file from a server at startup, complete the following tasks.

Task	Command
Step 1 Enter configuration mode from the terminal.	configure terminal
Step 2 Enter the host configuration filename to be download using MOP, rcp, or TFTP.	boot host mop filename [mac-address] [interface] boot host [tftp rcp] filename [ip-address]
Step 3 Enable the device to automatically load the host file upon restart.	service config
Step 4 Exit configuration mode.	end
Step 5 Save the configuration file to your startup configuration.	copy running-config startup-config

If you do not specify a host configuration filename, the router uses its own name to form a host configuration filename by converting the name to all lowercase letters, removing all domain information, and appending *-config*. If no host name information is available, the software uses the default host configuration filename *router-config*. If you omit both the **tftp** and the **rcp** keywords, the software assumes that you are using TFTP to transfer the file and that the server whose IP address you specify supports TFTP. If you omit the address, the router uses the broadcast address.

You can specify more than one host configuration file. The Cisco IOS software tries them in order entered until it loads one successfully. This procedure can be useful for keeping files with different configuration information loaded on a network server.

Configure the Router to Download Configuration Files at System Startup Example

In the following example, a router is configured to download the host configuration file *hostfile1* and the network configuration file *networkfile1*: The router uses TFTP and the broadcast address to obtain the file.

```
Router# configure terminal
Router(config)# boot host hostfile1
Router(config)# boot network networkfile1
Router(config)# service config
Router(config)# end
Router# copy running-config startup-config
```