Booting Commands

This chapter provides detailed descriptions of the commands used to modify the rebooting procedures of the router.

For configuration information and examples, refer to the "Rebooting" chapter in the *Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.2*.

Flash Memory File System Types

Cisco platforms generally use one of three different Flash memory file system types. Some commands are supported on only one or two file system types. This chapter notes commands that are not supported on all file system types.

Use Table 39 to determine which Flash memory file system type your platform uses.

Table 39 Flash Memory File System Types

Type	Platforms
Class A	Cisco 7000 family, Cisco 12000 series, LightStreamLS1010
Class B	Cisco 1003, Cisco 1004, Cisco 1005, Cisco 2500 series, Cisco 3600 series, Cisco 4000 series, Cisco AS5200 access servers
Class C	Cisco MC3810 multiservice concentrators, disk0 of Cisco SC3640 system controllers

boot

To boot the router manually, use the **boot** command in ROM monitor mode. The syntax of this command varies according to the platform and ROM monitor version.

boot

boot *file-url*

boot *filename* [*tftp-ip-address*]

boot flash [*flash-fs***:**][*partition-number***:**][*filename*]

Cisco 7000 Series, 7200 Series, 7500 Series Routers

boot *flash-fs***:**[*filename*]

Cisco 1600 and Cisco 3600 Series Routers

boot [*flash-fs***:**][*partition-number***:**][*filename*]

Syntax Description

file-url	URL of the image to boot (for example, `boot tftp://172.16.15.112/routertest`).
filename	When used in conjunction with the *ip-address* argument, the *filename* argument is the name of the system image file to boot from a network server. The filename is case sensitive. When used in conjunction with the **flash** keyword, the *filename* argument is the name of the system image file to boot from Flash memory. On all platforms except the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers, the system obtains the image file from internal Flash memory. On the Cisco 1600 series, Cisco 3600 series and Cisco 7000 family routers, the *flash-fs***:** argument specifies the Flash memory device from which to obtain the system image. (See the *flash-fs***:** argument later in this table for valid device values.) The filename is case sensitive. Without the *filename* argument, the first valid file in Flash memory is loaded.
tftp-ip-address	(optional) IP address of the TFTP server on which the system image resides. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.
flash	Boots the router from Flash memory. Note that this keyword is required in some boot images.

flash-fs:	(Optional) Specifying the Flash file system is optional for all platforms except the Cisco 7500 series routers. Possible file systems are: • **flash:**—Internal Flash memory on the Cisco 1600 series routers and Cisco 3600 series routers. This is the only valid Flash file system for the Cisco 1600 series routers. • **bootflash:**—Internal Flash memory on the Cisco 7000 family. • **slot0:**—Flash memory card in the first PCMCIA slot on the Cisco 7000 family and Cisco 3600 series routers. • **slot1:**—Flash memory card in the second PCMCIA slot on the Cisco 7000 family and Cisco 3600 series routers.
partition-number:	(Optional) Specifies the partition number of the file system the file should be loaded from. This argument is not available on all platforms.

Defaults

For most platforms, if you enter the **boot** command and press Return, the router boots from ROM by default. However, for some platforms, such as the Cisco 3600 series routers, if you enter the **boot** command and press Return, the router boots the first image in Flash memory. Refer to the documentation for your platform for information about the default image.

If the *partition-number* is not specified, the first partition is used.

If the *filename* is not specified, the first file in the partition or file system is used.

For other defaults, see the "Syntax Description" section.

Command Modes

ROM monitor

Command History

Release	Modification
10.3	The command was introduced.

Usage Guidelines

To determine which form of this command to use, refer to the documentation for your platform or use the CLI help (**?**) feature.

Use this command only when your router cannot find the boot configuration information needed in NVRAM. To enter ROM monitor mode, use one of the following methods:

- Enter the **reload** EXEC command, then press the **Break** key during the first 60 seconds of startup.
- Set the configuration register bits 0 to 3 to zero (for example, set the configuration register to 0x0) and enter the **reload** command.

The ROM Monitor prompt is either ">" or, for newer platforms, "rommon *x*>". Enter only lowercase commands.

These commands work only if there is a valid image to boot. Also, from the ROM monitor prompt, issuing a prior reset command is necessary for the boot to be consistently successful.

Refer to your hardware documentation for information on correct jumper settings for your platform.

Note For some platforms the **flash** keyword is now required. If your attempts to use the boot command are failing using the older **boot flash:***x*:[*filename*] syntax, try using the **boot flash flash:***x*:[*filename*] syntax.

Examples

In the following example, a router is manually booted from ROM:

```
> boot
F3:
(ROM Monitor copyrights)
```

In the following example, a router boots the file named routertest from a network server with the IP address 172.16.15.112 using the *file-url* syntax:

```
> boot tftp://172.16.15.112/routertest
F3
(ROM Monitor copyrights)
```

The following example shows the **boot flash** command without the *filename* argument. The first valid file in Flash memory is loaded.

```
> boot flash
F3: 1858656+45204+166896 at 0x1000
Booting gs7-k from flash memory RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR [OK - 1903912/13765276 bytes]
F3: 1858676+45204+166896 at 0x1000
(ROM Monitor copyrights)
```

The following example boots from Flash memory using the file named gs7-k:

```
> boot flash gs7-k
F3: 1858656+45204+166896 at 0x1000

Booting gs7-k from flash memory RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRR [OK - 1903912/13765276 bytes]
F3: 1858676+45204+166896 at 0x1000

(ROM Monitor copyrights)
```

In the following example, the **boot flash flash:** command boots the relocatable image file named igs-bpx-l from partition 2 in Flash memory:

```
> boot flash flash:2:igs-bpx-l
F3: 3562264+98228+303632 at 0x30000B4

(ROM Monitor copyrights)
```

In the following command, the Cisco 7000 family router accepts the **flash** keyword for compatibility but ignores it, and boots from slot 0:

```
> boot flash slot0:gs7-k-mz.103-9
F3: 8468+3980384+165008 at 0x1000
```

In the following example, the command did not function because it must be entered in lowercase:

```
rommon 10 > BOOT
command "BOOT" not found
```

The following example boots the first file in the first partition of internal Flash memory of a Cisco 3600 series router:

```
> boot flash:
```

The following example boots the first image file in the first partition of the Flash memory card in slot 0 of a Cisco 3600 series router:

```
> boot slot0:
```

The following example shows the ROM monitor booting the first file in the first Flash memory partition on a Cisco 1600 series router:

```
> boot flash:
```

Related Commands

Command	Description
continue	Returns to EXEC mode from ROM monitor mode by completing the boot process.

boot bootldr

To specify the location of the boot image that ROM uses for booting, use the **boot bootldr** command in global configuration mode. To remove this boot image specification, use the **no** form of this command.

boot bootldr *file-url*

no boot bootldr

Syntax Description

file-url	URL of the boot image on a Flash file system.

Defaults

Refer to your platform documentation for the location of the default boot image.

Command Modes

Global configuration

Command History

Release	Modification
11.0	The command was introduced.

Usage Guidelines

The **boot bootldr** command sets the BOOTLDR variable in the current running configuration. You must specify both the Flash file system and the filename.

Note When you use this global configuration command, you affect only the running configuration. You must save the variable setting to your startup configuration to place the information under ROM monitor control and to have the variable function as expected. Use the **copy system:running-config nvram:startup-config** command to save the variable from your running configuration to your startup configuration.

The **no** form of the command sets the BOOTLDR variable to a null string. On the Cisco 7000 family routers, a null string causes the first image file in boot flash memory to be used as the boot image that ROM uses for booting.

Use the **show boot** command to display the current value for the BOOTLDR variable.

Examples

In the following example, the internal Flash memory contains the boot image:

```
boot bootldr bootflash:boot-image
```

The following example specifies that the Flash memory card inserted in slot 0 contains the boot image:

```
boot bootldr slot0:boot-image
```

Related Commands

Command	Description
copy system:running-config nvram:startup-config	Copies any file from a source to a destination.
show bootvar	Displays the contents of the BOOT variable, the name of the configuration file pointed to by the CONFIG_FILE variable, the contents of the BOOTLDR variable, and the configuration register setting.
show (Flash file system)	Displays the layout and contents of a Flash memory file system.

boot bootstrap

To configure the filename that is used to boot a secondary bootstrap image, use the **boot bootstrap** command in global configuration mode. To disable booting from a secondary bootstrap image, use the **no** form of this command.

boot bootstrap *file-url*

no boot bootstrap *file-url*

boot bootstrap flash [*filename*]

no boot bootstrap flash [*filename*]

boot bootstrap [**tftp**] *filename* [*ip-address*]

no boot bootstrap [**tftp**] *filename* [*ip-address*]

Syntax Description

file-url	URL of the bootstrap image.
flash	Boots the router from Flash memory.
filename	(Optional with **flash**) Name of the system image to boot from a network server or from Flash memory. If you omit the filename when booting from Flash memory, the router uses the first system image stored in Flash memory.
tftp	(Optional) Boots the router from a system image stored on a TFTP server.
ip-address	(Optional) IP address of the TFTP server on which the system image resides. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

Defaults

No secondary bootstrap

Command Modes

Global configuration

Command History

Release	Modification
10.0	The command was introduced.

Usage Guidelines

The **boot bootstrap** command causes the router to load a secondary bootstrap image over the network. The secondary bootstrap image then loads the specified system image file. See the appropriate hardware installation guide for details on the configuration register and secondary bootstrap filename.

Use this command when you have attempted to load a system image but have run out of memory even after compressing the system image. Secondary bootstrap allows you to load a larger system image through a smaller secondary image.

Examples

In the following example, the system image file named sysimage-2 will be loaded by using a secondary bootstrap image:

```
boot bootstrap bootflash:sysimage-2
```

boot system

To specify the system image that the router loads at startup, use one of the following **boot system** commands in global configuration mode. To remove the startup system image specification, use the **no** form of the command.

boot system *file-url*

no boot system *file-url*

boot system flash [*flash-fs***:**][*partition-number***:**][*filename*]

no boot system flash [*flash-fs***:**][*partition-number***:**][*filename*]

boot system mop *filename* [*mac-address*] [*interface*]

no boot system mop *filename* [*mac-address*] [*interface*]

boot system rom

no boot system rom

boot system {**rcp** | **tftp** | **ftp**} *filename* [*ip-address*]

no boot system {**rcp** | **tftp** | **ftp**} *filename* [*ip-address*]

no boot system

Syntax Descriptionn

file-url	URL of the system image to load at system startup.
flash	On all platforms except the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers, this keyword boots the router from internal Flash memory. If you omit all arguments that follow this keyword, the system searches internal Flash for the first bootable image. On the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers, this keyword boots the router from a Flash device, as specified by the device: argument. On the Cisco 1600 series and Cisco 3600 series routers, if you omit all optional arguments, the router searches internal Flash memory for the first bootable image. On the Cisco 7000 family routers, when you omit all arguments that follow this keyword, the system searches the PCMCIA slot 0 for the first bootable image.

*flash-fs***:**	(Optional) Flash file system containing the system image to load at startup. The colon is required. Valid file systems are as follows: • **flash:**—Internal Flash memory on the Cisco 1600 series and Cisco 3600 series routers. For the Cisco 1600 series and Cisco 3600 series routers, this file system is the default if you do not specify a file system. This is the only valid file system for the Cisco 1600 series. • **bootflash**—Internal Flash memory in the Cisco 7000 family. • **slot0**—First PCMCIA slot on the Cisco 3600 series and Cisco 7000 family routers. For the Cisco 7000 family routers, this file system is the default if you do not specify a file system. • **slot1**—Flash memory card in the second PCMCIA slot on the Cisco 3600 series and Cisco 7000 family routers.
*partition-number***:**	(Optional) Number of the Flash memory partition that contains the system image to boot, specified by the optional *filename* argument. If you do not specify a filename, the router loads the first valid file in the specified partition of Flash memory. This argument is only valid on routers that can be partitioned.
filename	(Optional when used with the **boot system flash** command) Name of the system image to load at startup. It is case sensitive. If you do not specify a filename, the router loads the first valid file in the specified Flash file system, the specified partition of Flash memory, or the default Flash file system if you also omit the *flash-fs***:** argument.
mop	Boots the router from a system image stored on a Digital MOP server. Do not use this keyword with the Cisco 3600 series or Cisco 7000 family routers.
mac-address	(Optional) MAC address of the MOP server containing the specified system image file. If you do not include the MAC address argument, the router sends a broadcast message to all MOP boot servers. The first MOP server to indicate that it has the specified file is the server from which the router gets the boot image.
interface	(Optional) Interface the router uses to send out MOP requests to the MOP server. The interface options are **async**, **dialer**, **ethernet**, **serial**, and **tunnel**. If you do not specify the *interface* argument, the router sends a request out on all interfaces that have MOP enabled. The interface that receives the first response is the interface the router uses to load the software.
rom	Boots the router from ROM. Do not use this keyword with the Cisco 3600 series or the Cisco 7000 family routers.
rcp	Boots the router from a system image stored on a network server using rcp.
tftp	Boots the router from a system image stored on a TFTP server.
ftp	Boots the router from a system image stored on an FTP server.
ip-address	(Optional) IP address of the server containing the system image file. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

Defaults

If you configure the router to boot from a network server but do not specify a system image file with the **boot system** command, the router uses the configuration register settings to determine the default system image filename. The router forms the default boot filename by starting with the word *cisco* and then appending the octal equivalent of the boot field number in the configuration register, followed by a hyphen (-) and the processor type name (cisco*nn-cpu*). Refer to the appropriate hardware installation guide for details on the configuration register and default filename. See also the **config-register** or **confreg** command. For additional information about defaults, see the preceding "Syntax Description" section.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

For this command to work, the **config-register** command must be set properly.

Enter several **boot system** commands to provide a fail-safe method for booting your router. The router stores and executes the **boot system** commands in the order in which you enter them in the configuration file. If you enter multiple boot commands of the same type—for example, if you enter two commands that instruct the router to boot from different network servers—then the router tries them in the order in which they appear in the configuration file. If a **boot system** command entry in the list specifies an invalid device, the router omits that entry. Use the **boot system rom** command to specify use of the ROM system image as a backup to other **boot** commands in the configuration.

For some platforms, the boot image must be loaded before the system image is loaded. However, on many platforms, the boot image is loaded only if the router is booting from a network server or if the Flash file system is not specified. If the file system is specified, the router will boot faster because it need not load the boot image first.

This section contains the following usage guideline sections:

- Change the List of Boot System Commands
- Boot Compressed Images
- Understand the rcp Protocol
- Stop Booting and Enter ROM Monitor Mode
- Cisco 1600 Series, Cisco 3600 Series, and Cisco 7000 Family Notes

Change the List of Boot System Commands

To remove a single entry from the bootable image list, use the **no** form of the command with an argument. For example, to remove the entry that specifies a bootable image on a Flash memory card inserted in the second slot, use the **no boot system flash slot1:**[*filename*] command. All other entries in the list remain.

To eliminate all entries in the bootable image list, use the **no boot system** command. At this point, you can redefine the list of bootable images using the previous **boot system** commands. Remember to save your changes to your startup configuration by issuing the **copy system:running-config nvram:startup-config** command.

Each time you write a new software image to Flash memory, you must delete the existing filename in the configuration file with the **no boot system flash** *filename* command. Then add a new line in the configuration file with the **boot system flash** *filename* command.

Note If you want to rearrange the order of the entries in the configuration file, you must first issue the **no boot system** command and then redefine the list.

Boot Compressed Images

You can boot the router from a compressed image on a network server. When a network server boots software, both the image being booted and the running image must fit into memory. Use compressed images to ensure that enough memory is available to boot the router. You can compress a software image on any UNIX platform using the **compress** command. Refer to your UNIX platform's documentation for the exact usage of the **compress** command. (You can also uncompress data with the UNIX **uncompress** command.)

Understand the rcp Protocol

The rcp protocol requires a client to send the remote username in an rcp request to a server. When the router executes the **boot system rcp** command, the Cisco IOS software sends the host name as both the remote and local usernames by default. For the rcp protocol to execute properly, an account must be defined on the network server for the remote username configured on the router.

If the server has a directory structure, the rcp software searches for the system image to boot from the remote server relative to the directory of the remote username.

By default, the router software sends host name as the remote username. You can override the default remote username by using the **ip rcmd remote-username** command. 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.

Understand TFTP

You need a TFTP server running in order to retrieve the router image from the host.

Understand FTP

You need to an FTP server running in order to fetch the router image from the host. You also need an account on the server or anonymous file access to the server.

Stop Booting and Enter ROM Monitor Mode

During the first 60 seconds of startup, you can force the router to stop booting by pressing the Break key. The router will enter ROM Monitor mode, where you can change the configuration register value or boot the router manually.

Cisco 1600 Series, Cisco 3600 Series, and Cisco 7000 Family Notes

For the Cisco 3600 series and Cisco 7000 family, the **boot system** command modifies the BOOT variable in the running configuration. The BOOT variable specifies a list of bootable images on various devices.

Note When you use the **boot system** global configuration command on the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family, you affect only the running configuration. You must save the BOOT variable settings to your startup configuration to place the information under ROM monitor control

and to have the variable function as expected. Use the **copy system:running-config nvram:startup-config** EXEC command to save the variable from your running configuration to your startup configuration.

To view the contents of the BOOT variable, use the **show bootenv** EXEC command.

Examples

The following example illustrates a list specifying two possible internetwork locations for a system image, with the ROM software being used as a backup:

```
boot system tftp://192.168.7.24/cs3-rx.90-1
boot system tftp://192.168.7.19/cs3-rx.83-2
boot system rom
```

The following example boots the system boot relocatable image file named igs-bpx-l from partition 2 of the Flash device:

```
boot system flash:2:igs-bpx-l
```

The following example instructs the router to boot from an image located on the Flash memory card inserted in slot 0 of the Cisco 7000 RSP7000 card, Cisco 7200 NPE card, or Cisco 7500 series RSP card:

```
boot system slot0:new-config
```

The following example specifies the file named new-ios-image as the system image for a Cisco 3600 series router to load at startup. This file is located in the fourth partition of the Flash memory card in slot 0.

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# boot system slot0:4:dirt/images/new-ios-image
```

This example boots from the image file named c1600-y-l in partition 2 of Flash memory of a Cisco 1600 series router:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# boot system flash:2:c1600-y-l
```

Related Commands

Command	Description
config-register	Changes the configuration register settings.
copy	Copies any file from a source to a destination.
ip rcmd remote username	Configures the remote username to be used when requesting a remote copy using rcp.
show bootvar	Displays the contents of the BOOT variable, the name of the configuration file pointed to by the CONFIG_FILE variable, the contents of the BOOTLDR variable, and the configuration register setting

config-register

To change the configuration register settings, use the **config-register** command in global configuration mode.

config-register *value*

Syntax Description

value	Hexadecimal or decimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF (0 to 65535 in decimal).

Defaults

Refer to the documentation for your platform for the default configuration register value. For many newer platforms, the default is 0x2102, which causes the router to boot from Flash memory and the Break key to be ignored.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command applies only to platforms that use a software configuration register.

The lowest four bits of the configuration register (bits 3, 2, 1, and 0) form the boot field. The boot field determines if the router boots manually, from ROM, or from Flash or the network.

To change the boot field value and leave all other bits set to their default values, follow these guidelines:

- If you set the configuration register boot field value to 0x0, you must boot the operating system manually with the **boot** command.
- If you set the configuration register boot field value to 0x1, the router boots using the default ROM software.
- If you set the configuration register boot field to any value from 0x2 to 0xF, the router uses the boot field value to form a default boot filename for booting from a network server.

For more information about the configuration register bit settings and default filenames, refer to the appropriate router hardware installation guide.

Examples

In the following example, the configuration register is set to boot the system image from Flash memory:

```
config-register 0x2102
```

Related Commands

Command	Description
boot system	Specifies the system image that the router loads at startup.
confreg	Changes the configuration register settings while in ROM monitor mode.
o	Lists the value of the boot field (bits 0 to 3) in the configuration register.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

confreg

To change the configuration register settings while in ROM monitor mode, use the **confreg** command in ROM monitor mode.

confreg [*value*]

Syntax Description

value	(Optional) Hexadecimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF.

Defaults

Refer to your platform documentation for the default configuration register value.

Command Modes

ROM monitor

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Not all versions in the ROM monitor support this command. Refer to your platform documentation for more information on ROM monitor mode.

If you use this command without specifying the configuration register value, the router prompts for each bit of the configuration register.

The lowest four bits of the configuration register (bits 3, 2, 1, and 0) form the boot field. The boot field determines if the router boots manually, from ROM, or from Flash or the network.

To change the boot field value and leave all other bits set to their default values, follow these guidelines:

- If you set the configuration register boot field value to 0x0, you must boot the operating system manually with the **boot** command.
- If you set the configuration register boot field value to 0x1, the router boots using the default ROM software.
- If you set the configuration register boot field to any value from 0x2 to 0xF, the router uses the boot field value to form a default boot filename for booting from a network server.

For more information about the configuration register bit settings and default filenames, refer to the appropriate router hardware installation guide.

Examples

In the following example, the configuration register is set to boot the system image from Flash memory:

```
confreg 0x210F
```

In the following example, no configuration value is entered, so the system prompts for each bit in the register:

```
rommon 7 > confreg
```

```
     Configuration Summary
enabled are:
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n  [n]:  y
enable  "diagnostic mode"? y/n  [n]:  y
enable  "use net in IP bcast address"? y/n  [n]:

enable  "load rom after netboot fails"? y/n  [n]:
enable  "use all zero broadcast"? y/n  [n]:
enable  "break/abort has effect"? y/n  [n]:
enable  "ignore system config info"? y/n  [n]:
change console baud rate? y/n  [n]:  y
enter rate: 0 = 9600, 1 = 4800, 2 = 1200, 3 = 2400  [0]:  0
change the boot characteristics? y/n  [n]:  y
enter to boot:
 0 = ROM Monitor
 1 = the boot helper image
 2-15 = boot system
    [0]:  0

     Configuration Summary
enabled are:
diagnostic mode
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n  [n]:

You must reset or power cycle for new config to take effect.
rommon 8>
```

continue

To return to EXEC mode from ROM monitor mode, use the **continue** command in ROM monitor mode.

continue

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

ROM monitor

Command History

Release	Modification
11.0	The command was introduced.

Usage Guidelines

Use this command to return to EXEC mode from ROM monitor mode, to use the system image instead of reloading. On older platforms, the angle bracket (>) indicates that the router is in ROM monitor mode. On newer platforms, rommon *number*> is the default ROM monitor prompt. Typically, the router is in ROM monitor mode when you manually load a system image or perform diagnostic tests. Otherwise, the router will most likely never be in this mode.

Caution While in ROM monitor mode, the Cisco IOS system software is suspended until you issue either a reset or the **continue** command.

Examples

In the following example, the **continue** command switches the router from ROM monitor to EXEC mode:

```
> continue
Router#
```

Related Commands

Command	Description
boot	Boots the router manually.

reload

To reload the operating system, use the **reload** command in EXEC mode.

reload [*text* | **in** [*hh***:**]*mm* [*text*] | **at** *hh***:***mm* [*month day* | *day month*] [*text*] | **cancel**]

Syntax Description

text	(Optional) Reason for the reload, 1 to 255 characters long.
in [*hh***:**]*mm*	(Optional) Schedule a reload of the software to take effect in the specified minutes or hours and minutes. The reload must take place within approximately 24 days.
at *hh***:***mm*	(Optional) Schedule a reload of the software to take place at the specified time (using a 24-hour clock). If you specify the month and day, the reload is scheduled to take place at the specified time and date. If you do not specify the month and day, the reload takes place at the specified time on the current day (if the specified time is later than the current time), or on the next day (if the specified time is earlier than the current time). Specifying 00:00 schedules the reload for midnight. The reload must take place within approximately 24 days.
month	(Optional) Name of the month, any number of characters in a unique string.
day	(Optional) Number of the day in the range from 1 to 31.
cancel	(Optional) Cancel a scheduled reload.

Command Modes

EXEC

Command History

Release	Modification
10.0	The command was introduced.

Usage Guidelines

The **reload** command halts the system. If the system is set to restart on error, it reboots itself. Use the **reload** command after configuration information is entered into a file and saved to the startup configuration.

You cannot reload from a virtual terminal if the system is not set up for automatic booting. This prevents the system from dropping to the ROM monitor and thereby taking the system out of the remote user's control.

If you modify your configuration file, the system prompts you to save the configuration. During a save operation, the system asks you if you want to proceed with the save if the CONFIG_FILE variable points to a startup configuration file that no longer exists. If you say "yes" in this situation, the system goes to setup mode upon reload.

When you schedule a reload to occur at a later time, it must take place within approximately 24 days.

The **at** keyword can be used only if the system clock has be set on the router (either through NTP, the hardware calendar, or manually). The time is relative to the configured time zone on the router. To schedule reloads across several routers to occur simultaneously, the time on each router must be synchronized with NTP.

To display information about a scheduled reload, use the **show reload** EXEC command.

Examples

The following example immediately reloads the software on the router:

```
Router# reload
```

The following example reloads the software on the router in 10 minutes:

```
Router# reload in 10

Router# Reload scheduled for 11:57:08 PDT Fri Apr 21 1996 (in 10 minutes)
Proceed with reload? [confirm]
Router#
```

The following example reloads the software on the router at 1:00 p.m. today:

```
Router# reload at 13:00

Router# Reload scheduled for 13:00:00 PDT Fri Apr 21 1996 (in 1 hour and 2 minutes)
Proceed with reload? [confirm]
Router#
```

The following example reloads the software on the router on April 20 at 2:00 a.m.:

```
Router# reload at 02:00 apr 20

Router# Reload scheduled for 02:00:00 PDT Sat Apr 20 1996 (in 38 hours and 9 minutes)
Proceed with reload? [confirm]
Router#
```

The following example cancels a pending reload:

```
Router# reload cancel

%Reload cancelled.
```

Related Commands

Command	Description
copy system:running-config nvram:startup-config	Copies any file from a source to a destination.
show reload	Displays the reload status on the router.

show boot

The **show boot** command has been replaced by the **show bootvar** command. See the description of the **show bootvar** command in this chapter for more information.

show bootvar

To display the contents of the BOOT variable, the name of the configuration file pointed to by the CONFIG_FILE variable, the contents of the BOOTLDR variable, and the configuration register setting, use the **show bootvar** command in EXEC mode.

show bootvar

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3 AA	This command was introduced.

Usage Guidelines

The **show bootvar** command replaces the **show boot** command.

The **show bootvar** command allows you to view the current settings for the following variables:

- BOOT
- CONFIG_FILE
- BOOTLDR

The BOOT variable specifies a list of bootable images on various devices. The CONFIG_FILE variable specifies the configuration file used during system initialization. The BOOTLDR variable specifies the Flash device and filename containing the rxboot image that ROM uses for booting. You set these variables with the **boot system**, **boot config**, and **boot bootldr** global configuration commands, respectively.

When you use this command on a device with multiple RSP cards (Dual RSPs), this command also shows you the variable settings for both the master and slave RSP card.

Examples

The following is sample output from the **show bootvar** command:

```
Router# show bootvar

BOOT variable =
CONFIG_FILE variable = nvram:
Current CONFIG_FILE variable = slot0:router-config
BOOTLDR variable not exist

Configuration register is 0x0

Router#
```

In the sample output, the BOOT variable contains a null string. That is, a list of bootable images is not specified.

The CONFIG_FILE variable points to the configuration file in NVRAM as the startup (initialization) configuration. The run-time value for the CONFIG_FILE variable points to the router-config file on the Flash memory card inserted in the first slot of the RSP card. That is, during the run-time configuration, you have modified the CONFIG_FILE variable using the **boot config** command, but you have not saved the run-time configuration to the startup configuration. To save your run-time configuration to the startup configuration, use the **copy system:running-config nvram:startup-config** command. If you do not save the run-time configuration to the startup configuration, then the system reverts to the saved CONFIG_FILE variable setting for initialization information upon reload. In this sample, the system reverts to NVRAM for the startup configuration file.

The BOOTLDR variable does not yet exist. That is, you have not created the BOOTLDR variable using the **boot bootldr** global configuration command.

The following example is output from the **show bootvar** command for a Cisco 7513 router configured for HSA:

```
Router# show bootvar

BOOT variable =
CONFIG_FILE variable =
Current CONFIG_FILE variable =
BOOTLDR variable does not exist

Configuration register is 0x0

current slave is in slot 7
BOOT variable =
CONFIG_FILE variable =
BOOTLDR variable does not exist

Configuration register is 0x0

Router#
```

Related Commands

Command	Description
boot bootstrap	Configures the filename that is used to boot a secondary bootstrap image.
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).
boot system	Specifies the system image that the router loads at startup.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

show reload

To display the reload status on the router, use the **show reload** command in EXEC mode.

show reload

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

You can use the **show reload** command to display a pending software reload. To cancel the reload, use the **reload cancel** privileged EXEC command.

Examples

The following sample output from the **show reload** command shows that a reload is schedule for 12:00 a.m. (midnight) on Saturday, April 20:

```
Router# show reload

Reload scheduled for 00:00:00 PDT Sat April 20 (in 12 hours and 12 minutes)
Router#
```

Related Commands

Command	Description
reload	Reloads the operating system.

show version

To display information about the currently loaded software version along with hardware and device information, use the **show version** command in EXEC mode.

show version

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
9.0	This command was introduced.
12.3(4)T	The output format of this command was updated.
12.2(25)S	The output format of this command was updated.

Usage Guidelines

This command displays information about the Cisco IOS software version currently running on a routing device, the ROM Monitor and Bootflash software versions, and information about the hardware configuration, including the amount of system memory. Because this command displays both software and hardware information, the output of this command is the same as the output of the **show hardware** command. (The **show hardware** command is a command alias for the **show version** command.)

Specifically, the **show version** command provides the following information:

- Software information
  - Main Cisco IOS image version
  - Main Cisco IOS image capabilities (feature set)
  - Location and name of bootfile in ROM
  - Bootflash image version (depending on platform)
- Device-specific information
  - Device name
  - System uptime
  - System reload reason
  - Config-register setting
  - Config-register settings for after the next reload (depending on platform)

- Hardware information
  - Platform type
  - Processor type
  - Processor hardware revision
  - Amount of main (processor) memory installed
  - Amount I/O memory installed
  - Amount of Flash memory installed on different types (depending on platform)
  - Processor board ID

The output of this command uses the following format:

```
Cisco IOS Software, <platform> Software (<image-id>), Version <software-version>,
<software-type>
TAC Support: http://www.cisco.com/tac
Copyright (c) <date-range> by Cisco Systems, Inc.
Compiled <day> <date> <time> by <compiler-id>

ROM: System Bootstrap, Version <software-version>,  <software-type>
BOOTLDR: <platform> Software (image-id), Version <software-version>,  <software-type>

<router-name> uptime is <w> weeks, <d> days, <h> hours, <m> minutes
System returned to ROM by reload at <time> <day> <date>
System image file is "<filesystem-location>/<software-image-name>"
Last reload reason: <reload-reason>

Cisco <platform-processor-type> processor (revision <processor-revision-id>) with
<free-DRAM-memory>K/<packet-memory>K bytes of memory.
Processor board ID <ID-number>
<CPU-type> CPU at <clock-speed>Mhz, Implementation <number>, Rev <Revision-number>,
<kilobytes-Processor-Cache-Memory>KB <cache-Level> Cache
```

See the Examples section for descriptions of the fields in this output.

Examples

The following is sample output from the **show version** command issued on a Cisco 3660 running Cisco IOS Release 12.3(4)T:

```
Router# show version
Cisco IOS Software, 3600 Software (C3660-I-M), Version 12.3(4)T
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2003 by Cisco Systems, Inc.
Compiled Thu 18-Sep-03 15:37 by ccai

ROM: System Bootstrap, Version 12.0(6r)T, RELEASE SOFTWARE (fc1)
ROM:

C3660-1 uptime is 1 week, 3 days, 6 hours, 41 minutes
System returned to ROM by power-on
System image file is "slot0:tftpboot/c3660-i-mz.123-4.T"

Cisco 3660 (R527x) processor (revision 1.0) with 57344K/8192K bytes of memory.
Processor board ID JAB055180FF
R527x CPU at 225Mhz, Implementation 40, Rev 10.0, 2048KB L2 Cache


3660 Chassis type: ENTERPRISE
2 FastEthernet interfaces
4 Serial interfaces
```

```
DRAM configuration is 64 bits wide with parity disabled.
125K bytes of NVRAM.
16384K bytes of processor board System flash (Read/Write)

Flash card inserted. Reading filesystem...done.
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

Configuration register is 0x2102
```

The following is sample output from the **show version** command issued on a Cisco 7200 router running Cisco IOS Release 12.4(4)T. This output shows the total bandwidth capacity and the bandwith capacity that is configured on the Cisco 7200. Displaying bandwidth capacity is available in Cisco IOS Release 12.2 and later releases.

```
Router# show version
Cisco IOS Software, 7200 Software (C7200-JS-M), Version 12.4(4)T, RELEASE SOFTW)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Thu 27-Oct-05 05:58 by ccai

ROM: System Bootstrap, Version 12.1(20000710:044039) [nlaw-121E_npeb 117], DEVEE
BOOTLDR: 7200 Software (C7200-KBOOT-M), Version 12.3(16), RELEASE SOFTWARE (fc4)

router uptime is 5 days, 18 hours, 2 minutes
System returned to ROM by reload at 02:45:12 UTC Tue Feb 14 2006
System image file is "disk0:c7200-js-mz.124-4.T"
Last reload reason: Reload Command


Cisco 7206VXR (NPE400) processor (revision A) with 491520K/32768K bytes of memo.
Processor board ID 26793934
R7000 CPU at 350MHz, Implementation 39, Rev 3.2, 256KB L2 Cache
6 slot VXR midplane, Version 2.6

Last reset from power-on

PCI bus mb0_mb1 (Slots 0, 1, 3 and 5) has a capacity of 600 bandwidth points.
Current configuration on bus mb0_mb1 has a total of 440 bandwidth points.
This configuration is within the PCI bus capacity and is supported.

PCI bus mb2 (Slots 2, 4, 6) has a capacity of 600 bandwidth points.
Current configuration on bus mb2 has a total of 390 bandwidth points
This configuration is within the PCI bus capacity and is supported.

Please refer to the following document "Cisco 7200 Series Port Adaptor
Hardware Configuration Guidelines" on Cisco.com <http://www.cisco.com>
for c7200 bandwidth points oversubscription and usage guidelines.


4 Ethernet interfaces
2 FastEthernet interfaces
2 ATM interfaces
125K bytes of NVRAM.

62976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
125952K bytes of ATA PCMCIA card at slot 1 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2002

Router#
```

For information about PCI buses and bandwidth calculation, go to http://www.cisco.com/univercd/cc/td/doc/product/core/7206/port_adp/config/3875in.htm#wp1057192.

Table 40 describes the significant fields shown in the display.

Table 40 show version Field Descriptions

Field	Description

`Cisco IOS Software, <platform> Software (<image-id>), Version <software-version>, <release-type>`
 	
Example:
`Cisco IOS Software, 7200 Software (C7200-G4JS-M), Version 12.3(4)T`
	platform—Cisco hardware device name.
	
	image-id—The coded software image identifier, in the format *platform-features-format* (for example, "c7200-g4js-mz".
	
	software-version—The Cisco IOS software release number, in the format *x.y*(*z*)*A*, where *x.y* is the main release identifier, *z* is the maintenance release number, and *A*, where applicable, is the special release train identifier. For example, 12.3(4)T indicates the fourth maintenance release of the 12.3T special technology release train.
	
	Note In the full software image filename, 12.3(4)T appears as 123-4.T. In the IOS Upgrade Planner, 12.3(4)T appears as 12.3.4T (ED).
	
	release-type—The description of the release type. Possible values include MAINTENANCE [for example, 12.3(3)] or INTERIM [for example, 12.3(3.2)].
	
	Tips Refer to "The ABC's of Cisco IOS Networking" (available on Cisco.com) for more information on Cisco IOS software release numbering and software versions.
	
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`TAC Support: http://www.cisco.com/tac Copyright (c) <date-range> by Cisco Systems, Inc.`	The Cisco Technical Assistance Center (TAC) contains more than 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content. Cisco IOS software, including the source code, user-help, and documentation, is copyrighted by Cisco Systems, Inc. It is Cisco's policy to enforce its copyrights against any third party who infringes on its copyright.
`ROM: System Bootstrap, Version 12.0(6r)T, RELEASE SOFTWARE (fc1)`	The system "bootstrap" software, stored in ROM memory.
`BOOTFLASH:`	The system "bootflash" software, stored in Flash memory (if applicable).

`<device> uptime is ...`
 	
Example:
`C3660-1 uptime is 1 week, 3 days, 6 hours, 41 minutes`
	The amount of time the system has been up and running.

Table 40 show version Field Descriptions (continued)

Field	Description

`System returned to ROM by <reload-reason> at <time> <day> <date>`
 	
Example:
`System returned to ROM by reload at 20:56:53 UTC Tue Nov 4 2003`
	Shows the last recorded reason for a system reload, and time of last reload.

`Last reload reason: <reload-reason>`
 	
Example:
`Last reload reason: Reload command`
	Shows the last recorded reason for a system reload.

`Last reset from <reset-reason>`
 	
Example:
`Last reset from power-on`
	Shows the last recorded reason for a system reset. Possible *reset-reason* values include:
	• power-on—System was reset with the initial power on or a power cycling of the device.
	• s/w peripheral—System was reset due to a software peripheral.
	• s/w nmi—System was reset by a nonmaskable interrupt (NMI) originating in the system software. For example, on some systems, you can configure the device to reset automatically if two or more fans fail.
	• push-button—System was reset by manual activation of a RESET push-button (also called a hardware NMI).
	• watchdog—System was reset due to a watchdog process.
	• unexpected value—May indicate a bus error, such as for an attempt to access a nonexistent address (for example, “System restarted by bus error at PC 0xC4CA, address 0x210C0C0”).
	(This field was formerly labeled as the “System restarted by” field.”)

`System image file is "<file-location/file-name>”`
 	
Example:
`System image file is "slot0:tftpboot/c3660-i-mz.123-3.9.T2"`
	Displays the file location (local or remote filesystem) and the system image name.

Table 40 show version Field Descriptions (continued)

Field	Description

`Cisco <platform> (<processor-type>) processor (revision <processor-revision-id>) with <free-DRAM-memory>K/<packet-memory>K bytes of memory.`
 	
Example: Separate DRAM and Packet Memory
 	
`Cisco RSP4 (R5000) processor with 65536K/2072K bytes of memory`
 	
Example: Combined DRAM and Packet Memory
 	
`Cisco 3660 (R527x) processor (revision 1.0) with 57344K/8192K bytes of memory.`
	This line can be used to determine how much Dynamic RAM (DRAM) is installed on your system, in order to determine if you meet the "Min. Memory" requirement for a software image. DRAM (including SDRAM) is used for system processing memory and for packet memory.
	
	Two values, separated by a slash, are given for DRAM: The first value tells you how DRAM is available for system processing, and the second value tells you how much DRAM is being used for Packet memory.
	
	The first value, Main Processor memory, is either:
	• The amount of DRAM available for the processor, or
	• The total amount of DRAM installed on the system.
	
	The second value, Packet memory, is either:
	• The total physical input/output (I/O) memory (or "Fast memory") installed on the router (Cisco 4000, 4500, 4700, and 7500 series), or
	• The amount of "shared memory" used for packet buffering. In the shared memory scheme (Cisco 2500, 2600, 3600, and 7200 Series), a percentage of DRAM is used for packet buffering by the router's network interfaces.
	
	Note The terms "I/O memory" or "iomem"; "shared memory"; "Fast memory" and "PCI memory" all refer to "Packet Memory". Packet memory is either separate physical RAM or shared DRAM.
	
	Separate DRAM and Packet Memory
	
	The 4000, 4500, 4700, and 7500 series routers have separate DRAM and Packet memory, so you only need to look at the first number to determine total DRAM. In the example to the left for the Cisco RSP4, the first value shows that the router has 65536K (65,536 kilobytes, or 64 megabytes) of DRAM. The second value, 8192K, is the Packet memory.
	
	Combined DRAM and Packet Memory
	
	The 2500, 2600, 3600, and 7200 series routers require a minimum amount of I/O memory to support certain interface processors.
	
	The 1600, 2500, 2600, 3600, and 7200 series routers use a fraction of DRAM as Packet memory, so you need to add both numbers to find out the real amount of DRAM. In the example to the left for the Cisco 3660, the router has 57,344 kilobytes (KB) of free DRAM and 8,192 KB dedicated to Packet memory. Adding the two numbers together gives you 57,344K + 8,192K = 65,536K, or 64 megabytes (MB) of DRAM.

Table 40 show version Field Descriptions (continued)

Field	Description
	For more details on memory requirements, see the document "How to Choose a Cisco IOS® Software Release" on Cisco.com.

`Configuration register is <value>`
 	
Example:
`Configuration register is 0x2142 (will be 0x2102 at next reload)`
	Shows the current configured hex value of the software configuration register. If the value has been changed with the **config-register** command, the register value that will be used at the next reload is displayed in parenthesis.
	
	The boot field (final digit) of the software configuration register dictates what the system will do after a reset.
	
	For example, when the boot field of the software configuration register is set to 00 (for example, 0x0), and you press the NMI button on a Performance Route Processor (PRP), the user-interface remains at the ROM monitor prompt (rommon>) and waits for a user command to boot the system manually. But if the boot field is set to 01 (for example, 0x1), the system automatically boots the first Cisco IOS image found in the onboard Flash memory SIMM on the PRP.
	
	The factory-default setting for the configuration register is 0x2102. This value indicates that the router will attempt to load a Cisco IOS software image from Flash memory and load the startup configuration file.

Related Commands

Command	Description
show inventory	Displays the Cisco Unique Device Identifier information, including the Product ID, the Version ID, and the Serial Number, for the hardware device and hardware components.