



Upgrading the Cisco IOS Software

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This document describes how to upgrade the Cisco Internetworking Operating System (IOS) software image on the Cisco Connected Grid Router 2010.

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Restrictions for Upgrading the System Image

Cisco CGR 2010 routers download images to new Advanced Capability CompactFlash (CF) memory cards. There are two slots available for this CF:

- PCMCIA
- USB



Note

Legacy CF will not operate in Cisco CGR 2010 routers. When legacy CF is inserted, the following error message appears:

WARNING: *Unsupported compact flash detected. Use of this card during normal operation can impact and severely degrade performance of the system. Please use supported compact flash cards only.*

- Cisco IOS images for the access point download images to CF embedded on the access point.



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Table 1 Compact Flash Slot Numbering and Naming

Slot Number	PCMCIA CF Filenames	USB CF Filenames
Slot0 ¹	flash0 ²	usbflash0
Slot1	flash1	usbflash1

1. Slot 0 is the default CF slot. It stores the system image, configurations, and data files. CF must be present in this slot for the router to boot and perform normal file operations.
2. Filenames **flash** and **flash0** refer to the same device.

Information About Upgrading the System Image

To upgrade the system image on your router, review the following sections:

- [Why Would I Upgrade the System Image?](#), page 56
- [Which Cisco IOS Release Is Running on My Router Now?](#), page 56
- [How Do I Choose the New Cisco IOS Release and Feature Set?](#), page 56
- [Where Do I Download the System Image?](#), page 57

Why Would I Upgrade the System Image?

System images contain the Cisco IOS software. Your router already has an image on it when it is shipped to you.

At some point, you may want to load a different image onto the router. For example, you may want to upgrade the IOS software to the latest release, or to use the same Cisco IOS release for all the routers in a network. Each system image contains different sets of Cisco IOS features, therefore you must select an appropriate system image to suit your network requirements.

Which Cisco IOS Release Is Running on My Router Now?

To determine the Cisco IOS release that is currently running on your router, and the filename of the system image, enter the **show version** command in user EXEC or privileged EXEC mode.

How Do I Choose the New Cisco IOS Release and Feature Set?

Cisco Connected Grid Router 2010 routers support Cisco IOS software entitlement and enforcement. See the [Software Activation on Cisco Integrated Services Routers](#) for feature and package license information.

To determine which Cisco IOS releases and feature sets support your router platform and its required features, go to [Cisco Feature Navigator](#). You must have an account on Cisco.com to access the Cisco Feature Navigator. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Where Do I Download the System Image?

To download a system image, you must have an account on Cisco.com to gain access to the following websites. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box, and follow the instructions that appear.

If you know which Cisco IOS release and feature set you want to download, go to the [Download Software](#) website.

If you want more information about downloading software, see [Loading and Managing System Images](#).

How to Upgrade the Cisco IOS Image

This section provides information about upgrading the Cisco IOS image on the router and Cisco IOS image on the access point.

Router Upgrade

- [Saving Backup Copies of Your Old System Image and Configuration, page 57](#)
- [DRAM Size and the New System Image, page 59](#)
- [Ensuring Adequate Flash Memory for the New System Image, page 59](#)
- [Copying the System Image into Flash Memory, page 62](#)
- [Loading the New System Image, page 67](#)
- [Saving Backup Copies of Your New System Image and Configuration, page 71](#)

Saving Backup Copies of Your Old System Image and Configuration

To avoid unexpected downtime if you encounter serious problems using your new system image or startup configuration, we recommend that you save backup copies of your current startup configuration file and Cisco IOS software system image file on a server.

For more detailed information, see the “[Managing Configuration Files](#)” chapter and the “[Loading and Maintaining System Images](#)” chapter of *Cisco IOS Configuration Fundamentals Configuration Guide, Release 15.0*.

To save backup copies of the startup configuration file and the system image file, complete the following steps:

SUMMARY STEPS

1. **enable**
2. **copy nvram:startup-config {ftp: | rcp: | tftp:}**
3. **dir flash:**
4. **copy flash: {ftp: | rcp: | tftp:}**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	copy nvram:startup-config {ftp: rcp: tftp:} Example: Router# copy nvram:startup-config ftp:	Copies the startup configuration file to a server. <ul style="list-style-type: none"> The configuration file copy can serve as a backup copy. Enter the destination URL when prompted.
Step 3	dir flash: Example: Router# dir flash:	Displays the layout and contents of a flash memory file system. <ul style="list-style-type: none"> Learn the name of the system image file.
Step 4	copy flash: {ftp: rcp: tftp:} Example: Router# copy flash: ftp:	Copies a file from flash memory to a server. <ul style="list-style-type: none"> Copy the system image file to a server. This file can serve as a backup copy. Enter the flash memory partition number if prompted. Enter the filename and destination URL when prompted.

Examples

The following examples show how to copy a startup configuration to a TFTP server and how to copy from files flash memory to an FTP server.

Copying the Startup Configuration to a TFTP Server: Example

The following example shows copying the startup configuration to a TFTP server:

```
Router# copy nvram:startup-config tftp:
Remote host[]? 192.0.0.1
Name of configuration file to write [rtr2-config]? rtr2-config-b4upgrade
Write file rtr2-config-b4upgrade on host 192.0.0.1?[confirm] <cr>
![OK]
```

Copying from Flash Memory to a TFTP Server: Example

The following example uses the **dir flash:** command in privileged EXEC mode to learn the name of the system image file and the **copy flash: tftp:** command to copy the system image to a TFTP server.

```
Router# dir flash:
Directory of flash:/

 1  -rw-          166502  Feb 18 2028 22:47:24 +00:00  crashinfo_19000218-224723C

1024655360 bytes total (1024475136 bytes free)
Router#

Router# copy flash: tftp:
```

```

IP address of remote host [255.255.255.255]? 192.0.0.1
filename to write on tftp host? cgr2010
writing cgr2010 !!!!...
successful ftp write.

```

DRAM Size and the New System Image

This section describes how to check whether your router has enough DRAM for upgrading to the new system image.



Note

The DRAM in the Cisco CGR 2010 is fixed and cannot be removed and replaced by DRAM with more memory.

Ensuring Adequate Flash Memory for the New System Image

This section describes how to check whether your router has enough flash memory to upgrade to the new system image and, if necessary, how to properly delete files in flash memory to make room for the new system image.

Cisco CGR 2010 routers have two sets of external CF slots: 2 PCMCIA and 2 USB. Use the secondary CF for overflow files, if required. [Table 2](#) lists CF slot numbering and naming.

Table 2 CF Slot Numbering and Naming

Slot Number	PCMCIA CF Filenames	USB CF Filenames	Size
Slot0 ¹	flash0 ²	usbflash0	256MB
Slot1	flash1	usbflash1	0
Total	-	-	4GB

1. Slot 0 is the default CF slot. CF in slot0 stores system image, configuration, and data files. CF must be present in this slot for the router to boot and perform normal file operations.
2. Filenames **flash** and **flash0** refer to the same device.

Prerequisites

- Choose the Cisco IOS release and system image to which you want to upgrade. See the [“Information About Upgrading the System Image”](#) section on page 56.
- Select the system image in the [Download Software](#) website.

You must have an account on Cisco.com to access this website. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

From the File Download Information table, write down the minimum flash requirements for the image.

SUMMARY STEPS

1. **enable**
2. **dir flash:**

3. From the displayed output of the **dir flash:** command, compare the number of bytes *available* to the minimum flash requirements for the new system image.
 - a. If the available memory is equal to or greater than the new system image's minimum flash requirements, proceed to the [“Copying the System Image into Flash Memory” section on page 62](#).
 - b. If the available memory is less than the new system image's minimum flash requirements, proceed to [Step 4](#).
4. From the displayed output of the **dir flash:** command, compare the number of bytes *total* to the size of the system image to which you want to upgrade.
 - a. If the total memory is less than the new system image's minimum flash requirements, you **cannot** upgrade your compact flash memory card because the DRAM is fixed. You must delete files in flash memory to make room for the new system image.



Note The DRAM in the Cisco CGR 2010 router is fixed and cannot be removed and replaced by DRAM with more memory.

- b. If the total memory is equal to or greater than the new system image's minimum flash requirements, proceed to [Step 5](#).
5. Enter the **dir /all flash:** command.
6. From the displayed output of the **dir /all flash:** command, write down the names and directory locations of the files that you can delete.
7. (Optional) Enter the **copy flash: {tftp | rcp}** command.
8. (Optional) Repeat [Step 7](#) for each file that you identified in [Step 6](#).
9. Enter the **delete flash:directory-path/filename** command.
10. Repeat [Step 9](#) for each file that you identified in [Step 6](#).
11. Enter the **dir flash:[partition-number:]** command.
12. From the displayed output of the **dir flash:** command, compare the number of bytes *available* to the size of the system image to which you want to upgrade.
 - a. If the available memory is less than the new system image's minimum flash requirements, then you cannot download the new image.
 - b. If the available memory is equal to or greater than the new system image's minimum flash requirements, proceed to the [“Copying the System Image into Flash Memory” section on page 62](#).

DETAILED STEPS

-
- Step 1** Use the **enable** command to enter privileged EXEC mode. Enter your password if prompted. For example:

```
Router> enable
Password:
Router#
```

- Step 2** Use the **dir flash:** command to display the layout and contents of flash memory:

```
Router# dir flash:

Directory of flash:/
```

```

1  -rw-      166502  Feb 18 2028 22:47:24 +00:00  crashinfo_19000218-224723C
1024655360 bytes total (1024475136 bytes free)

```

- Step 3** From the displayed output of the **dir flash:** command, compare the number of bytes *available* to the minimum flash requirements for the new system image.
- If the available memory is equal to or greater than the new system image’s minimum flash requirements, proceed to the “[Copying the System Image into Flash Memory](#)” section on page 62.
 - If the available memory is less than the new system image’s minimum flash requirements, proceed to [Step 4](#).
- Step 4** From the displayed output of the **dir flash:** command, compare the number of bytes *total* to the size of the system image to which you want to upgrade.
- If the total memory is less than the new system image’s minimum flash requirements, you **cannot** upgrade your compact flash memory card because the DRAM is fixed. You must delete files in flash memory to make room for the new system image.
 - If the total memory is equal to or greater than the new system image’s minimum flash requirements, proceed to [Step 5](#).

- Step 5** Enter the **dir /all flash:** command to display a list of all files and directories in flash memory:

```

Router# dir /all flash:

Directory of flash:/

1  -rw-      166502  Feb 18 2028 22:47:24 +00:00  crashinfo_19000218-224723C

1024655360 bytes total (1024475136 bytes free)
Router#

```

- Step 6** From the displayed output of the **dir /all flash:** command, write down the names and directory locations of the files that you can delete. If you cannot delete any files, you cannot download the new image.



Note The DRAM in the Cisco CGR 2010 router is fixed and cannot be removed and replaced by DRAM with more memory.



Note Do not delete the system image that the router already uses. If you are not sure which files can be safely deleted, either consult your network administrator. You **cannot** upgrade your compact flash memory card to a size that can accommodate both the existing files and the new system image.

- Step 7** (Optional) Enter the **copy flash:{tftp | rcp}** to copy a file to a server before deleting the file from flash memory. When prompted, enter the filename and the server’s hostname or IP address:

```
Router# copy flash tftp
```

- Step 8** (Optional) Repeat [Step 7](#) for each file that you identified in [Step 6](#).

- Step 9** Enter the **delete flash:directory-path/filename** command to delete a file in flash memory:

```

Router# delete flash:c29xx.tmp

Delete filename [cgr2010.tmp]? <cr>
Delete flash:cgr2010.tmp? [confirm] <cr>

```

- Step 10** Repeat [Step 9](#) for each file that you identified in [Step 6](#).
- Step 11** Enter the **dir flash:** command to display the layout and contents of flash memory.
- Step 12** From the displayed output of the **dir flash:** command, compare the number of bytes *available* to the size of the system image to which you want to upgrade.
- If the available memory is less than the new system image’s minimum flash requirements you **cannot** download the new image.
 - If the available memory is equal to or greater than the new system image’s minimum flash requirements, proceed to the [“Copying the System Image into Flash Memory”](#) section on page 62.
-

What to Do Next

Proceed to the [“Copying the System Image into Flash Memory”](#) section on page 62.

Copying the System Image into Flash Memory

This section describes how to copy the system image into the compact flash memory card for your router. Choose one of the following methods:

- [Using TFTP or Remote Copy Protocol to Copy the System Image into Flash Memory, page 62](#)
- [Using the ROM Monitor to Copy the System Image over a Network, page 64](#)

Using TFTP or Remote Copy Protocol to Copy the System Image into Flash Memory

This section describes how to use TFTP or Remote Copy Protocol (RCP) to upgrade the system image. This is the recommended and most common method of upgrading the system image.

Prerequisites

- Install a TFTP server or an RCP server application on a TCP/IP-ready workstation or PC. Many third-party vendors provide free TFTP server software, which you can find by searching for “TFTP server” in a web search engine.

If you use TFTP:

- Configure the TFTP application to operate as a TFTP *server*, not a TFTP *client*.
- Specify the outbound file directory to which you will download and store the system image.
- Download the new Cisco IOS software image into the workstation or PC. See the [“Where Do I Download the System Image?”](#) section on page 57.
- Establish a console session to the router. We recommend that you connect your PC directly to the router console port. See the hardware installation guide that shipped with your router.
- Verify that the TFTP or RCP server has IP connectivity to the router. If you cannot successfully ping between the TFTP or RCP server and the router, do one of the following:
 - Configure a default gateway on the router.
 - Make sure that the server and the router each have an IP address in the same network or subnet. See the tech note, [Determining IP Addresses: Frequently Asked Questions](#).

**Tip**

For more detailed information on how to perform the prerequisites, see the [Software Installation and Upgrade Procedure](#).

SUMMARY STEPS

1. **enable**
2. **copy tftp flash:**
or
copy rcp flash:
3. When prompted, enter the IP address of the TFTP or RCP server.
4. When prompted, enter the filename of the Cisco IOS software image to be installed.
5. When prompted, enter the filename as you want it to appear on the router.
6. If an error message appears that says, “Not enough space on device,” do one of the following, as appropriate:
 - If you are certain that all the files in flash memory should be erased, enter **y** twice when prompted to erase flash before copying.
 - If you are *not* certain that all files in flash memory should be erased, press **Ctrl-Z** and follow the instructions in the “[Ensuring Adequate Flash Memory for the New System Image](#)” section on [page 59](#).
7. If the error message does not appear, enter **no** when prompted to erase the flash memory before copying.

DETAILED STEPS

- Step 1** Use the **enable** command to enter privileged EXEC mode. Enter your password if prompted:

```
Router> enable
Password: <password>
Router#
```

- Step 2** Enter the **copy tftp flash:** command
or
copy rcp flash command to copy a file from a server to flash memory.

For example:

```
Router# copy tftp flash:
Address or name of remote host [223.255.254.254]?
Source filename [ypatel/cgs2520-ip-services-mz.s12]?
Destination filename [cgs2520-ip-services-mz.s12]?
Accessing tftp://223.255.254.254/ypatel/cgs2520-ip-services-mz.s12...
Loading ypatel/cgs2520-ip-services-mz.s12 from 223.255.254.254 (via GigabitEthernet0/0):
!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 11776175 bytes]

11776175 bytes copied in 20.576 secs (572326 bytes/sec)

Router#
```

- Step 3** When prompted, enter the IP address of the TFTP or RCP server:

```
Address or name of remote host []? 10.10.10.2
```

Step 4 When prompted, enter the filename of the Cisco IOS software image to be installed:

```
Source filename []? cgr2010-universalk9-mz.SPA.151-1.T
```



Note The filename is case sensitive.

Step 5 When prompted, enter the filename as you want it to appear on the router. Typically, the same filename is entered as was used in [Step 4](#):

```
Destination filename []? cgr2010-universalk9-mz.SPA.151-1.T
```

Step 6 If an error message appears that says, “Not enough space on device,” do one of the following as appropriate:

- If you are certain that all the files in flash memory should be erased, enter **y** when prompted twice to confirm that flash memory will be erased before copying:

```
Accessing tftp://10.10.10.2/cgr2010-universalk9-mz.SPA.151-1.T.bin...
Erase flash: before copying? [confirm] y
Erasing the flash filesystem will remove all files! Continue? [confirm] y
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
```

- If you are *not* certain that all the files in flash memory should be erased, press **Ctrl-Z** and follow the instructions in the [“Ensuring Adequate Flash Memory for the New System Image”](#) section on [page 59](#).

Step 7 If the error message does not appear, enter **no** when prompted to erase the flash memory before copying:

```
Accessing tftp://10.10.10.2/cgr2010-universalk9-mz.SPA.151-1.T.bin...
Erase flash: before copying? [confirm] no
```

Troubleshooting Tips

See [Resolving Common Image Installation Problems](#).

What to Do Next

Proceed to the [“Loading the New System Image”](#) section on [page 67](#).

Using the ROM Monitor to Copy the System Image over a Network

This section describes how to download a Cisco IOS software image from a remote TFTP server to the router flash memory using the **ftpdnld** ROM monitor command.



Caution

Using the **ftpdnld** ROM monitor command may erase the system image, configuration, and data files. System image, configuration, and data files must be present on USB CF in slot0 for the router to boot and perform normal file operations.

Before you can enter the **ftpdnld** ROM monitor command, you must set the ROM monitor environment variables.

Prerequisites

Connect the TFTP server to a fixed network port on your router.

Restrictions

The LAN ports on network modules or interface cards are not active in ROM monitor mode. Therefore, only a fixed port on your router can be used for TFTP download. This can be either a fixed Ethernet port on the router or one of the Gigabit Ethernet ports on routers equipped with them.



Note

You can use this command only to download files to the router. You cannot use **ftpdnld** to get files from the router.

SUMMARY STEPS

1. Enter ROM monitor mode
2. Set the IP_ADDRESS=ip_address configuration variable.
3. Set the IP_SUBNET_MASK=ip_address configuration variable.
4. Set the DEFAULT_GATEWAY=ip_address configuration variable.
5. Set the TFTP_SERVER=ip_address configuration variable.
6. Set the TFTP_FILE=[directory-path/]filename configuration variable.
7. (Optional) Set the GE_PORT=[0 | 1] port number for download.
8. (Optional) Set the TFTP_MEDIA_TYPE=[0 | 1] copper or fiber.
9. (Optional) Set the TFTP_MACADDR= mac address of unit.
10. (Optional) Set the TFTP_VERBOSE= [0 | 1 | 2] print setting variable.
11. (Optional) Set the TFTP_RETRY_COUNT=retry_times configuration variable.
12. (Optional) Set the TFTP_TIMEOUT=timeout of operation in seconds.
13. (Optional) Set the TFTP_ACK_RETRY=ack retry in seconds.
14. (Optional) Set the TFTP_CHECKSUM=[0 | 1] perform checksum test on image.
15. (Optional) Set the TFTP_DESTINATION=[flash0 | flash1 | usbflash0 | usbflash1] flash destination device for file.
16. (Optional) Set the GE_SPEED_MODE= speed configuration.
17. Use the **set** command to verify that you have set the variables correctly.
18. Use the **ftpdnld [-r]** command to download the image.

DETAILED STEPS

-
- Step 1** Enter ROM monitor mode.
- Step 2** Set the IP address of the router. For example:
- ```
rommon > IP_ADDRESS=172.16.23.32
```
- Step 3** Set the IP subnet mask. For example:
- ```
rommon > IP_SUBNET_MASK=255.255.255.224
```

- Step 4** Set the default gateway address. For example:
- ```
rommon > DEFAULT_GATEWAY=172.16.23.40
```
- Step 5** Set the TFTP server IP address, which is the location from which the software will be downloaded:
- ```
rommon > TFTP_SERVER=172.16.23.33
```
- Step 6** Set the name and directory location to which the image file will be downloaded onto the router. For example:
- ```
rommon > TFTP_FILE=archive/rel22/<image name>
```
- Step 7** (Optional) Set the input port to use a Gigabit Ethernet port. Usage is GE\_PORT=[0 | 1]. For example:
- ```
rommon > GE_PORT=0
```
- Step 8** (Optional) Set the Ethernet media type. Usage is TFTP_MEDIA_TYPE=[0 | 1], where Copper= 0 and Fiber=1:
- ```
rommon > TFTP_MEDIA_TYPE=1
```
- Step 9** (Optional) Decide whether the router will perform a checksum test on the downloaded image. Usage is TFTP\_CHECKSUM=[0 | 1], where 1=checksum test is performed (default) and 0=no checksum test. For example:
- ```
rommon > TFTP_CHECKSUM=0
```
- Step 10** (Optional) Set the number of times that the router will attempt Address Resolution Protocol (ARP) and TFTP download. The default is 7 attempts. For example:
- ```
rommon > TFTP_RETRY_COUNT=10
```
- Step 11** (Optional) Set the amount of time, in seconds, before the download process times out. The default is 2400 seconds (40 minutes). The following example shows 1800 seconds (30 minutes):
- ```
TFTP_TIMEOUT=1800
```
- Step 12** (Optional) Configure the print variable. Usage is TFTP_VERBOSE= [0 | 1 | 2], where print:
- 0= is quiet.
 - 1= in progress.
 - 2= verbose
- Step 13** Use the **set** command to display the ROM monitor environment variables to verify that you have configured them correctly. For example:
- ```
rommon > set
```
- Step 14** Download the system image, as specified by the ROM monitor environmental variables, using the **tftpdnld [-r]** command. Without the **-r** option, the command downloads the specified image and saves it in flash memory, deleting all existing data in all partitions in flash memory. Using the **-r** option downloads and boots the new software but does not save the software to flash memory.
- ```
rommon> tftpdnld [-r]
A prompt is displayed:
Do you wish to continue? y/n: [n]: y
```
- Entering “y” confirms that you want to continue with the TFTP download.
-

What to Do Next

Proceed to the [“Loading the New System Image”](#) section on page 67.

Loading the New System Image

This section describes how to load the new system image that you copied into flash memory. First, determine whether you are in ROM monitor mode or in the Cisco IOS CLI. Then choose one of the following methods of loading the new system image:

- [Loading the New System Image from the Cisco IOS Software, page 67](#)
- [Loading the New System Image from ROM Monitor Mode, page 69](#)

Loading the New System Image from the Cisco IOS Software

This section describes how to load the new system image from the Cisco IOS software.

SUMMARY STEPS

1. **dir flash:**
2. **configure terminal**
3. **no boot system**
4. (Optional) **boot system flash** *system-image-filename*
5. (Optional) Repeat to specify the order in which the router should attempt to load any backup system images.
6. **exit**
7. **show version**
8. If the last digit in the configuration register is 0 or 1, proceed to [Step 9](#). However, if the last digit in the configuration register is between 2 and F, proceed to [Step 12](#).
9. **configure terminal**
10. **config-register 0x2102**
11. **exit**
12. **copy run start**
13. **reload**
14. When prompted to save the system configuration, enter **no**.
15. When prompted to confirm the reload, enter **y**.
16. **show version**

DETAILED STEPS

Step 1 Enter the **dir flash:** command to display a list of all files and directories in flash memory:

```
Router# dir flash:  
  
Directory of flash:/
```

```

    3  -rw-      6458388   Mar 01 1993 00:00:58  c38xx.tmp
  1580 -rw-      6462268   Mar 06 1993 06:14:02  c38xx-ata

```

```
63930368 bytes total (51007488 bytes free)
```



Note Determine whether the new system image is the first file or the only file listed in the **dir flash** command output (is not required if it is the first file or only file listed).

Step 2 Enter the **configure terminal** command to enter global configuration mode:

```
Router# configure terminal
```

```
Router(config)#
```

Step 3 Enter the **no boot system** command to delete all entries in the bootable image list, which specifies the order in which the router attempts to load the system images at the next system reload or power cycle:

```
Router(config)# no boot system
```

Step 4 If the new system image is the first file or the only file displayed in the **dir flash:** command output, you do not need to perform the following step.

Enter the **boot system flash *system-image-filename*** command to load the new system image after the next system reload or power cycle. For example:

```
Router(config)# boot system flash cgr2010-universalk9-mz.SPA.151-1.T.bin
```

Step 5 (Optional) Repeat to specify the order in which the router should attempt to load any backup system images.

Step 6 Enter the **exit** command to exit global configuration mode:

```
Router(config)# exit
```

```
Router#
```

Step 7 Enter the **show version** command to display the configuration register setting:

```
Router# show version
```

```

Cisco Internetwork Operating System Software
.
.
.
Configuration register is 0x0

```

```
Router#
```

Step 8 If the last digit in the configuration register is 0 or 1, proceed to [Step 9](#). However, if the last digit in the configuration register is between 2 and F, proceed to [Step 12](#).

Step 9 Enter the **configure terminal** command to enter global configuration mode:

```
Router# configure terminal
```

```
Router(config)#
```

Step 10 Enter the **config-register 0x2102** command to set the configuration register so that, after the next system reload or power cycle, the router loads a system image from the **boot system** commands in the startup configuration file:

```
Router(config)# config-register 0x2102
```

Step 11 Enter the **exit** command to exit global configuration mode:

```
Router(config)# exit  
Router#
```

Step 12 Enter the **copy run start** command to copy the running configuration to the startup configuration:

```
Router# copy run start
```

Step 13 Enter the **reload** command to reload the operating system:

```
Router# reload
```

Step 14 When prompted to save the system configuration, enter **no**:

```
System configuration has been modified. Save? [yes/no]: no
```

Step 15 When prompted to confirm the reload, enter **y**:

```
Proceed with reload? [confirm] y
```

Step 16 Enter the **show version** command to verify that the router loaded the proper system image:

```
Router# show version  
  
00:22:25: %SYS-5-CONFIG_I: Configured from console by console  
Cisco Internetwork Operating System Software  
.  
.  
.  
System returned to ROM by reload  
System image file is "flash:cgr2010-universalk9-mz.SPA.151-1.T.bin"
```

What to Do Next

Proceed to the [“Saving Backup Copies of Your New System Image and Configuration”](#) section on page 71.

Loading the New System Image from ROM Monitor Mode

This section describes how to load the new system image from ROM monitor mode.

SUMMARY STEPS

1. **dir flash0:[partition-number:]**
2. **confreg 0x2102**
3. **boot flash0:[partition-number:]filename**
4. After the system loads the new system image, press **Return** a few times to display the Cisco IOS command-line interface (CLI) prompt.
5. **enable**
6. **configure terminal**
7. **no boot system**
8. **boot system flash0: new-system-image-filename**

9. (Optional) Repeat to specify the order in which the router should attempt to load any backup system images.
10. **exit**
11. **copy run start**

DETAILED STEPS

- Step 1** Enter the **dir flash0:[partition-number:]** command to list files in flash memory:

```
rommon > dir flash0:
program load complete, entry point: 0x80803000, size: 0x1b340
Directory of flash0:

2      47089944  -rw- cgr2010-universalk9-mz.SPA.151-1.T
rommon 3 >
```

Note whether the new system image is the first file or the only file listed in the **dir flash0:** command output. (is not required if the image is the first file or only file listed.)

- Step 2** Enter the **confreg 0x2102** command to set the configuration register so that, after the next system reload or power cycle, the router loads a system image from the boot system commands in the startup configuration file:

```
rommon > confreg 0x2102
```

- Step 3** Enter the **boot flash0:[partition-number:]filename** command to force the router to load the new system image:

```
rommon > boot flash0:cgr2010-universalk9-mz.SPA.151-1.T.bin
```

- Step 4** After the system loads the new system image, press **Return** a few times to display the Cisco IOS CLI prompt.

- Step 5** Enter the **enable** command to enable privileged EXEC mode, and enter your password if prompted:

```
Router> enable
Password: <password>
Router#
```

- Step 6** Enter the **configure terminal** command to enter global configuration mode:

```
Router# configure terminal
Router(config)#
```

- Step 7** Enter the **no boot system** to eliminate all entries in the bootable image list, which specifies the system image that the router loads at startup:

```
Router(config)# no boot system
```

- Step 8** If the new system image is the first file or only the file displayed in the **dir flash0:** command output, this step is not required.

Enter the **boot system flash new-system-image-filename** command to load the new system image after the next system reload or power cycle:

```
Router(config)# boot system flash cgr2010-universalk9-mz.SPA.151-1.T.bin
```

- Step 9** (Optional) Repeat to specify the order in which the router should attempt to load any backup system images.

Step 10 Enter the **exit** command to exit global configuration mode:

```
Router(config)# exit  
Router#
```

Step 11 Enter the **copy run start** command to copy the running configuration to the startup configuration:

```
Router# copy run start
```

What to Do Next

Proceed to the [“Saving Backup Copies of Your New System Image and Configuration”](#) section on page 71.

Saving Backup Copies of Your New System Image and Configuration

To aid file recovery and to minimize downtime in the event of file corruption, we recommend that you save backup copies of the startup configuration file and the Cisco IOS software system image file on a server.



Tip

Do not erase any existing backup copies of your configuration and system image that you saved before upgrading your system image. If you encounter serious problems using your new system image or startup configuration, you can quickly revert to the previous working configuration and system image, if necessary.

For more detailed information, see the [“Managing Configuration Files”](#) chapter and the [“Loading and Maintaining System Images”](#) chapter of *Cisco IOS Configuration Fundamentals Configuration Guide, Release 15.0*.

To save backup copies of the startup configuration file and the system image file, complete the following steps:

SUMMARY STEPS

1. **enable**
2. **copy nvram:startup-config {ftp: | rcp: | tftp:}**
3. **dir flash0:**
4. **copy flash0: {ftp: | rcp: | tftp:}**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	copy nvram:startup-config {ftp: rcp: tftp:} Example: Router# copy nvram:startup-config ftp:	Copies the startup configuration file to a server. <ul style="list-style-type: none"> The configuration file copy serves as a backup copy. Enter the destination URL when prompted.
Step 3	dir flash0: Example: Router# dir flash0:	Displays the layout and contents of a flash memory file system. <ul style="list-style-type: none"> Write down the name of the system image file.
Step 4	copy flash0: {ftp: rcp: tftp:} Example: Router# copy flash0: ftp:	Copies a file from flash memory to a server. <ul style="list-style-type: none"> Copy the system image file to a server to serve as a backup copy. Enter the flash memory partition number if prompted. Enter the filename and destination URL when prompted.

Examples

Copying the Startup Configuration to a TFTP Server: Example

The following example shows the startup configuration being copied to a TFTP server:

```
Router# copy nvram:startup-config tftp:

Remote host[]? 172.16.101.101

Name of configuration file to write [rtr2-config]? <cr>
Write file rtr2-config on host 172.16.101.101?[confirm] <cr>
![OK]
```

Copying from Flash Memory to a TFTP Server: Example

The following example uses the **dir flash:** privileged EXEC command to obtain the name of the system image file and the **copy flash: tftp:** privileged EXEC command to copy the system image to a TFTP server. The router uses the default username and password.

```
Router# dir flash0:

System flash directory:
File Length Name/status
1 4137888 cgr2010-mz
[4137952 bytes used, 12639264 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)\

Router# copy flash0: tftp:
IP address of remote host [255.255.255.255]? 192.0.0.1
filename to write on tftp host? cgr2010-mz
```

```
writing cgr2010-mz !!!!...
successful ftp write.
```

Additional References

The following sections provide references related to upgrading the system image on your router.

Related Documents and Websites

Related Topic	Document Title or Website
Matching Cisco IOS releases and features to hardware	Cisco Feature Navigator
Choosing and downloading system images	Cisco Download Software website
Loading and maintaining system images	Cisco IOS and NX-OS Software, Loading and Managing System Images
Removing, inserting, and upgrading compact flash memory cards	Hardware Installation Guide for your router
Connecting your PC to the router console port	Hardware Installation Guide for your router

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 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. ¹	http://www.cisco.com/public/support/tac/home.shtml

1. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click Cancel at the login dialog box and follow the instructions that appear.

