



Managing Configuration Files, System Images, and Functional Images

This chapter describes some fundamental tasks you perform to maintain the configuration files, system images, and hardware functional images used by your ATM switch router.



Note

This chapter provides advanced configuration instructions for the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. For complete descriptions of the commands mentioned in this chapter, refer to the *ATM Switch Router Command Reference* publication.

The chapter includes the following sections:

- Configuring a Static IP Route on page 22-1
- Understanding the Cisco IOS File System on page 22-2
- Maintaining System Images and Configuration Files on page 22-3
- Maintaining Functional Images (Catalyst 8540 MSR) on page 22-5
- Maintaining Functional Images (Catalyst 8510 MSR and LightStream 1010) on page 22-7

Check the information in the first sections of the chapter to determine if it applies to your installation. Also, familiarize yourself with the Cisco IOS File System section, as this describes new features in this release. If you are an experienced IOS user, you can skip the third section.

Configuring a Static IP Route

If you are managing the ATM switch router through an Ethernet interface or ATM subinterface on the multiservice route processor, and your management station or Trivial File Transfer Protocol (TFTP) server is on a different subnet than the ATM switch router, you must first configure a static IP route.



Caution

Failure to configure a static IP route prior to installing the new image will result in a loss of remote administrative access to the ATM switch router. If this happens, you can regain access from a direct console connection, although this requires physical access to the console port.

To configure a static IP route, perform the following steps, beginning in global configuration mode:

	Command	Purpose
Step 1	Switch(config)# ip route <i>prefix</i> ¹ <i>mask</i> ² ethernet 0 atm 0 [.subinterface#]	Configures a static IP route on the Ethernet interface or ATM subinterface of the route processor.
Step 2	Switch(config)# end Switch#	Returns to privileged EXEC mode.
Step 3	Switch# copy system:running-config nvrnram:startup-config	Saves the configuration to NVRAM.

1. The IP route prefix of the remote network where the management station or TFTP server resides.
2. The subnet mask of the remote network where the management station or TFTP server resides.

The following example shows how to configure an IP address on the main Ethernet port, then save the configuration.

```
Switch(config)# interface ethernet 0
Switch(config-if)# ip address 172.20.52.11 255.255.255.224
Switch(config-if)# end
Switch# copy system:running-config nvrnram:startup-config
```

Understanding the Cisco IOS File System

This release of the ATM switch router system software uses the Cisco IFS (IOS File System). With IFS, you now access files on a storage device by specifying a filename and the file system containing the file. The following old command, for example, accesses the running-config and startup-config files:

```
Switch# copy running-config startup-config
```

With IFS, you additionally specify the system containing the files using the syntax *filesystem:filename*. For example:

```
Switch# copy system:running-config nvrnram:startup-config
```

The syntax *filesystem:filename* is called the file URL. In addition, remote file systems (such as TFTP, FTP, and rcp) allow you to specify additional options in the file URL, such as username, password, remote host, and so on. This way, you can enter all the required information at once without having to respond to prompts.

With IFS, some show commands have been replaced with more commands. For example:

```
Switch# show running-config
```

has been replaced with the following command:

```
Switch# more system:running-config
```

For complete information on using file URLs and the new IFS commands and syntax, refer to the *Configuration Fundamentals Configuration Guide* and the *Configuration Fundamentals Command Reference* publications.

File Systems and Memory Devices

File systems on the ATM switch router include read-only memory (RAM, or system), Flash memory (such as bootflash and the Flash PC cards in slot0 and slot1), and remote file systems (such as TFTP or rcp servers).

You can use the **show file systems** privileged EXEC command to display the valid file systems on your ATM switch router. The following example shows the file systems on a Catalyst 8540 MSR:

```
Switch# show file systems
File Systems:

      Size(b)      Free(b)      Type  Flags  Prefixes
*  20578304      8984376      flash  rw     slot0: flash:
      7995392      118192       flash  rw     slot1:
      7602176      636256       flash  rw     bootflash:
      -           -           unknown  rw     rcsf:
      -           -           opaque   rw     null:
      -           -           opaque   rw     system:
      -           -           network  rw     tftp:
      520184      517855       nvram   rw     nvram:
      -           -           network  rw     rcp:
      -           -           network  rw     ftp:
      5242880      0            opaque  ro     atm-acct-ready:
      5242880      5242880      opaque  ro     atm-acct-active:
      20578304      5264212      flash  rw     sec-slot0:
      -           -           flash  rw     sec-slot1:
      7602176      641048       flash  rw     sec-bootflash:
      520184      517855       nvram   rw     sec-nvram:
      -           -           nvram   rw     sec-rcsf:
```

File System Tasks

Refer to the *Configuration Fundamentals Configuration Guide* for details on the following frequently performed tasks:

- Format flash memory on a new Flash PC card or on any Flash memory device that has locked blocks or failed sectors
- Manage files on file systems, including setting the default file system, listing files on a file system, deleting and recovering files, and so on.

Maintaining System Images and Configuration Files

The following sections list common tasks you perform to maintain system images and configuration files on your ATM switch router:

- Modifying, Downloading, and Maintaining Configuration Files on page 22-4
- Modifying, Downloading, and Maintaining System Images on page 22-4
- Rebooting and Specifying Startup Information on page 22-4
- Additional File Transfer Features on page 22-5

For detailed instructions on performing these tasks, refer to the *Configuration Fundamentals Configuration Guide*.

Modifying, Downloading, and Maintaining Configuration Files

The following are frequently performed tasks to maintain configuration files:

- Copy configuration files from the ATM switch router to a network server—You can copy files to a TFTP server or rcp server for backup purposes or to store alternative configurations.
- Copy configuration files from a network server to the ATM switch router—You can copy configuration files from a TFTP server or an rcp server to the running configuration or startup configuration of the ATM switch router to restore a configuration, to use a configuration from another device, or to ensure that you have the same configuration on several devices.
- Maintain configuration files larger than NVRAM—You can maintain configuration files larger than NVRAM by compressing them, storing them on Flash memory devices, or storing them on TFTP or rcp servers for downloading at system startup.
- Copy configuration files between different locations—You can copy configuration files from Flash memory to the startup or running configuration, copy configuration files between Flash memory devices, or copy a configuration file from a server to Flash memory.
- Reexecute the configuration commands in startup configuration or clear the configuration information.

Modifying, Downloading, and Maintaining System Images

The following are frequently performed tasks to maintain system image files:

- Copy images from Flash memory to a network server—You can store system images for backup or other purposes by copying them from a Flash memory device to a TFTP or rcp server.
- Copy images from a network server to Flash memory—You perform this procedure when upgrading your system image or functional image.
- Copy images between local Flash memory devices.

Rebooting and Specifying Startup Information

The following commonly performed tasks are used to reboot the ATM switch router and specify startup information:

- Modify the configuration register boot field—You use the configuration register boot field to specify whether the ATM switch router loads a system image, and where it obtains the system image, or whether the system image loads from ROM.
- Specify the system startup image—You can enter multiple **boot** commands in the startup configuration file or in the BOOT environment variable to provide main and alternative methods for loading a system image onto the ATM switch router.
- Specify the startup configuration file—You can configure the CONFIG_FILE environment variable to load the startup configuration file from NVRAM (the default), from a Flash memory device, or from a network server.
- Enter ROM monitor mode or manually load a system image from ROM monitor if a valid system image is not found or if the configuration file is corrupted.

Additional File Transfer Features

The following file configuration file transfer options are also available:

- Configure the ATM switch router as a TFTP server to provide other devices on the network with system images and configuration files.
- Configure the ATM switch router to use the remote copy protocol (rcp) and remote shell (rsh) protocol—With rsh you can execute commands remotely; with rcp, you can copy files to and from a file system residing on a remote host or network server.

Maintaining Functional Images (Catalyst 8540 MSR)

You can load functional images used by certain hardware controllers in the ATM switch router. This section describes the function and maintenance of functional image.

Understanding Functional Images (Catalyst 8540 MSR)

Functional images provide the low-level operating functionality for various hardware controllers. On hardware controllers with insystem programmable devices, such as field programmable gate arrays (FPGAs) and Erasable Programmable Logic Devices (EPLDs), the hardware functional images can be reprogrammed independently of loading the system image and without removing the devices from the controller.

On the ATM switch router, you can reprogram the functional images on the route processors, rommon, switch processors, switch processor feature cards, carrier modules, full-width modules, and network clock modules.

All new hardware is shipped with functional images preloaded. Loading a different functional image is required only when upgrading or downgrading functional image versions.

Loading Functional Images (Catalyst 8540 MSR)

You load a functional image in two steps:

-
- | | |
|---------------|--|
| Step 1 | Copy the image to a Flash memory device (bootflash, slot0, or slot1). For instructions on copying files to a Flash memory device, refer to the <i>Configuration Fundamentals Configuration Guide</i> . |
| Step 2 | Load the image from the Flash memory device to the hardware controller. |
-

**Note**

The command for loading functional images on the ATM switch router differs from that described in the Cisco IOS documentation.

To download a functional image from a Flash memory device to a hardware controller, use the following command in privileged EXEC mode:

Command	Purpose
reprogram <i>device:filename</i> { <i>slot</i> [<i>subcard</i>] rommon }	Loads the functional image with the specified filename to a device.

The **reprogram** command checks the compatibility of the image for the selected card type before downloading the functional image. If you have specified a slot number without a subcard, the functional image is downloaded to the full-width module that occupies that slot.

**Note**

After loading a new functional image on the primary route processor or on one of the switch processors, you must power-cycle the switch for the hardware to reconfigure itself with the new image.

**Caution**

Do not interrupt the download procedure. Wait until it has finished before attempting any commands on the switch.

Example

The following example demonstrates loading the functional image `fi_c8540_rp.B.3_91` from the Flash PC card in slot 0 to the controller for the route processor in slot 4.

```
Switch# reprogram slot0:fi_c8540_rp.B.3_91 4
```

Displaying the Functional Image Information (Catalyst 8540 MSR)

To display the functional image version in a hardware controller, use the following command in privileged EXEC mode:

Command	Purpose
show functional-image-info { <i>slot slot</i> / <i>subslot slot/subslot</i> }	Displays the functional image information.

The following example shows the functional image information in the controller for the route processor module in slot 4:

```
Switch# show functional-image-info slot 4

Details for cpu Image on slot: 4

Functional Version of the FPGA Image: 4.8
#Jtag-Distribution-Format-B
#HardwareRequired: 100(3.0-19,4.0-19,5.0-19)
#FunctionalVersion: 4.8
#Sections: 1
#Section1Format: MOTOROLA_EXORMAX

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generated by:      holliday
on:                Mon Mar  6 13:59:17 PST 2000
using:             /vob/cougar/bin/jtag_script Version 1.13
config file:      cpu.jcf

Chain description:
Part type Bits Config file
10k50      10  ../cidrFpga2/max/cidr_fpga.ttf
xcs4062    3  ../cubiFpga2/xil/cubi.bit
xcs4062    3  ../cubiFpga2/xil/cubi.bit
generic    2
XC4005     3  /vob/cougar/custom/common/jtcfg/xil/jtcfg_r.bit
Number devices          = 5
Number of instruction bits = 21

FPGA config file information:
Bitgen date/time  Sum  File
100/03/02 19:14:49 7068  ../cidrFpga2/max/cidr_fpga.ttf
1999/04/15 18:46:32 36965  ../cubiFpga2/xil/cubi.bit
1999/04/15 18:46:32 36965  ../cubiFpga2/xil/cubi.bit
98/06/11 16:56:44 49904  /vob/cougar/custom/common/jtcfg/xil/jtcfg_r.bit
#End-Of-Header
```

Maintaining Functional Images (Catalyst 8510 MSR and LightStream 1010)

You can load functional images used by certain hardware controllers in the ATM switch router. This section describes the function and maintenance of functional images.

Understanding Functional Images (Catalyst 8510 MSR and LightStream 1010)

Functional images provide the low-level operating functionality for various hardware controllers. On hardware controllers with insystem programmable devices, such as Field Programmable Gate Arrays (FPGAs) and Erasable Programmable Logic Devices (EPLDs), the hardware functional images can be reprogrammed independently of loading the system image and without removing the devices from the controller.

**Note**

You can currently reprogram the functional image on the channelized DS3 and channelized E1 Frame Relay port adapters.

All new hardware is shipped with functional images preloaded. Loading a different functional image is required only when upgrading or downgrading functional image versions.

Loading Functional Images (Catalyst 8510 MSR and LightStream 1010)

You load a functional image in two steps:

-
- Step 1** Copy the image to a Flash memory device (bootflash, slot0, or slot1). For instructions on copying files to a Flash memory device, refer to the *Configuration Fundamentals Configuration Guide*.
- Step 2** Load the image from the Flash memory device to the hardware controller.
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**Note**

The command for loading functional images on the ATM switch router differs from that described in the Cisco IOS documentation.

To download a functional image from a Flash memory device to a hardware controller, use the following command in privileged EXEC mode:

Command	Purpose
reprogram <i>device:filename</i> {slot [subcard]} rommon }	Loads the functional image with the specified filename to a device.

The **reprogram** command checks the compatibility of the image for the selected card type before downloading the functional image.

**Caution**

Do not interrupt the download procedure. Wait until it has finished before attempting any commands on the switch.

Example

The following example demonstrates loading the functional image `abr_tmp.exo` from the Flash PC card in slot 0 to the controller in slot 0, subcard 1:

```
Switch# reprogram slot0:abr_tmp.exo 0 1
```


Displaying the Functional Image Information (Catalyst 8510 MSR and LightStream 1010)

To display the functional image version in a hardware controller, use the following command in privileged EXEC mode:

Command	Purpose
show functional-image-info {slot <i>slot</i> subslot <i>slot/subcard</i> }	Displays the functional image information.

The following example shows the functional image information for the module in slot 4, subcard 0:

```
Switch# show functional-image-info subslot 4/0
###HardwareRequired   : B8(3.2)
###FunctionalVersion   : 2.3
##Sections            : 1
##Section1Format      : BINARY, length = 303016
# PUMA-4CE1 Firmware image
# Firmware Image      : fi-c8510-4e1fr.2_3
#
# EPLD config file   : C85MS-4E1-FRRJ48.jcf
# Chain description:
# Part type  Bits  Config file
# EPM7256S   10   /cougar/custom/puma/pld/testbench/PROG_FILES/4CE1/PLD/DB/7256.pof
# EPM7064S   10   /cougar/custom/puma/pld/testbench/PROG_FILES/4CE1/PLD/DB/7064.pof
# EPM7064S   10   /cougar/custom/puma/pld/testbench/PROG_FILES/4CE1/PLD/MB/7064.pof
# Number devices    = 3
# Number of instruction bits = 30
#
# FPGA config file information:
###End-of-header
```

