Cisco IOS XR ROM Monitor Guide

Cisco IOS XR Software Release 3.4

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Text Part Number: OL-10962-03

Cisco IOS XR ROM Monitor Guide

Preface

This book presents configuration information and examples for using the ROM Monitor mode of the Cisco IOS XR software. The preface for the *Cisco IOS XR ROM Monitor Guide* consists of the following sections:

Changes to This Document

Table 1 lists the technical changes made to this document since it was first printed.

Table 1 Changes to This Document

Revision	Date	Change Summary
OL-10962-03	May 2007	Modified the software version information in the Upgrading and Downgrading ROM Monitor Firmware on Cisco CRS-1 Routers section.
OL-10962-02	March 2007	Modified the Upgrading and Downgrading ROM Monitor Firmware on Cisco CRS-1 Routers section to include procedures for upgrading or downgrading the ROM Monitor firmware on a Cisco CRS-1 using the FPD software pie.
OL-10962-01	October 2006	Initial release of the document.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. This section explains the product documentation resources that Cisco offers.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Product Documentation DVD

The Product Documentation DVD is a library of technical product documentation on a portable medium. The DVD enables you to access installation, configuration, and command guides for Cisco hardware and software products. With the DVD, you have access to the HTML documentation and some of the PDF files found on the Cisco website at this URL:

http://www.cisco.com/univercd/home/home.htm

The Product Documentation DVD is created and released regularly. DVDs are available singly or by subscription. Registered Cisco.com users can order a Product Documentation DVD (product number DOC-DOCDVD= or DOC-DOCDVD=SUB) from Cisco Marketplace at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

Ordering Documentation

You must be a registered Cisco.com user to access Cisco Marketplace. Registered users may order Cisco documentation at the Product Documentation Store at this URL:

http://www.cisco.com/go/marketplace/docstore

If you do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Documentation Feedback

You can provide feedback about Cisco technical documentation on the Cisco Technical Support & Documentation site area by entering your comments in the feedback form available in every online document.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you will find information about how to do the following:

- Report security vulnerabilities in Cisco products
- Obtain assistance with security incidents that involve Cisco products
- Register to receive security information from Cisco

A current list of security advisories, security notices, and security responses for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

To see security advisories, security notices, and security responses as they are updated in real time, you can subscribe to the Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed. Information about how to subscribe to the PSIRT RSS feed is found at this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you have identified a vulnerability in a Cisco product, contact PSIRT:

- For emergencies only—security-alert@cisco.com

  An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.
- For nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product (for example, GnuPG) to encrypt any sensitive information that you send to Cisco. PSIRT can work with information that has been encrypted with PGP versions 2.*x* through 9.*x*.

Never use a revoked encryption key or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

The link on this page has the current PGP key ID in use.

If you do not have or use PGP, contact PSIRT to find other means of encrypting the data before sending any sensitive material.

Product Alerts and Field Notices

Modifications to or updates about Cisco products are announced in Cisco Product Alerts and Cisco Field Notices. You can receive Cisco Product Alerts and Cisco Field Notices by using the Product Alert Tool on Cisco.com. This tool enables you to create a profile and choose those products for which you want to receive information.

To access the Product Alert Tool, you must be a registered Cisco.com user. (To register as a Cisco.com user, go to this URL: http://tools.cisco.com/RPF/register/register.do) Registered users can access the tool at this URL: http://tools.cisco.com/Support/PAT/do/ViewMyProfiles.do?local=en

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the **Cisco Product Identification Tool** to locate your product serial number before submitting a request for service online or by phone. You can access this tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link, clicking the **All Tools (A-Z)** tab, and then choosing **Cisco Product Identification Tool** from the alphabetical list. This tool offers three search options: by product ID or model name; by tree view; or, for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Tip Displaying and Searching on Cisco.com

If you suspect that the browser is not refreshing a web page, force the browser to update the web page by holding down the Ctrl key while pressing F5.

To find technical information, narrow your search to look in technical documentation, not the entire Cisco.com website. On the Cisco.com home page, click the **Advanced Search** link under the Search box

and then click the **Technical Support & Documentation** radio button.

To provide feedback about the Cisco.com website or a particular technical document, click **Contacts & Feedback** at the top of any Cisco.com web page.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests, or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411
Australia: 1 800 805 227
EMEA: +32 2 704 55 55
USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—An existing network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operations are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of the network is impaired while most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The Cisco Online Subscription Center is the website where you can sign up for a variety of Cisco e-mail newsletters and other communications. Create a profile and then select the subscriptions that you would like to receive. To visit the Cisco Online Subscription Center, go to this URL:

  http://www.cisco.com/offer/subscribe

- The *Cisco Product Quick Reference Guide* is a handy, compact reference tool that includes brief product overviews, key features, sample part numbers, and abbreviated technical specifications for many Cisco products that are sold through channel partners. It is updated twice a year and includes the latest Cisco channel product offerings. To order and find out more about the *Cisco Product Quick Reference Guide*, go to this URL:

  http://www.cisco.com/go/guide

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- Cisco Press publishes a wide range of general networking, training, and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:

  http://www.cisco.com/ipj

- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:

  http://www.cisco.com/en/US/products/index.html

- Networking Professionals Connection is an interactive website where networking professionals share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

  http://www.cisco.com/discuss/networking

- “What’s New in Cisco Documentation” is an online publication that provides information about the latest documentation releases for Cisco products. Updated monthly, this online publication is organized by product category to direct you quickly to the documentation for your products. You can view the latest release of “What’s New in Cisco Documentation” at this URL:

  http://www.cisco.com/univercd/cc/td/doc/abtunicd/136957.htm

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

ROM Monitor Overview and Basic Procedures

The ROM Monitor is a bootstrap program that initializes the hardware and boots the Cisco IOS XR software when you power on or reload a router. A version of the ROM Monitor software exists on each card. If the Cisco IOS XR software cannot boot on a card, the card startup ends in ROM Monitor mode. When you connect a terminal to a card that is in ROM Monitor mode, the ROM Monitor command-line interface (CLI) prompt is displayed:

Cisco CRS-1 Prompt

```
rommon B1>
```

Cisco XR 12000 Series Router Prompt

```
rommon1>
```

During normal operation, users do not see the ROM Monitor prompt or use ROM Monitor mode. ROM Monitor mode is only used in usual circumstances, such as reinstalling the entire software set, resetting the router password or specifying a configuration file to use at startup.

This chapter provides an overview of ROM Monitor concepts and operations. For instructions to perform various tasks in ROM Monitor mode, see the other chapters in this book.

This chapter includes the following main topics:

ROM Monitor Overview

The ROM Monitor software is known by many names. It is sometimes called ROMMON because of the CLI prompt in ROM Monitor mode. The ROM Monitor software is also called the boot software, boot image, or boot helper. On Cisco XR 12000 Series Routers, the Boothelper software is different from the ROM Monitor software, and it is described in About Boothelper in Cisco XR 12000 Series Routers, page 2-34.

Although it is distributed with routers that use the Cisco IOS XR software, ROM Monitor is a separate program from the Cisco IOS XR software. During normal startup, the ROM Monitor initializes the cards, and then control passes to the Cisco IOS XR software. After the Cisco IOS XR software takes over, ROM Monitor is no longer in use.

A copy of the ROM Monitor software exists on each card. If a card fails to boot the Cisco IOS XR software, the ROM Monitor software takes control and places the card in ROM Monitor mode. Because a card in ROM Monitor mode is not running the Cisco IOS XR software, that card will be unavailable for normal router operations.

When the Designated Secure Domain Router System Controller (DSDRSC) in an SDR is placed in ROM Monitor mode, the router operations are transferred to the standby DSDRSC (if available). If both the primary and standby DSDRSCs are in ROM Monitor mode, then the router operations cease since the Cisco IOS XR software is no longer running.

Understanding the role of the DSC

The active RP for the *owner SDR* is called the Designated Shelf Controller, or DSC. This card performs system-wide functions, including the creation of additional *non-owner* SDRs. If the DSC is placed in ROM Monitor mode, it is no longer running the Cisco IOS XR software. If a standby DSC is available, then the standby assumes router operations. If a standby DSC is not available or is also placed in ROM Monitor mode, then router operations will stop.

Designated Secure Domain Router System Controller (DSDRSC)

In addition to the DSC, each SDR in the system contains at least one DSDRSC. The DSDRSCs provide configuration and administrative functions for a single SDR only. The DSC also serves as the DSDRSC for the owner SDR.

Accessing ROMMON on the DSC

In most situations, you will only interact with ROM Monitor mode on the DSC (DSDRSC for the owner SDR). The DSC contains the admin configuration for the entire system, and distributes the required software to all the other nodes in the router. All of the tasks in this document describe ROM Monitor mode accessed via the DSC for the system.

Note The only time you will interact with a non-DSC node is when reinstalling the Cisco IOS XR software on the standby PRP of a Cisco XR 12000 Series Router. See Reinstalling Cisco IOS XR Software on Cisco XR 12000 Series Routers, page 2-33 for more information.

Remember, the DSC is also the following:

- The active RP of rack 0.
- The DSDRSC for the owner SDR.

Environmental Variables and the Configuration Register

Two primary connections exist between ROM Monitor and the Cisco IOS XR software: the ROM Monitor environment variables and the configuration register. The ROM Monitor environment variables define the location of the Cisco IOS XR software and how to load it. After ROM Monitor has initialized the card, it uses the environment variables to locate and load the Cisco IOS XR software.

The configuration register is a software setting that controls how a card starts up. One of the primary uses of the configuration register is to control whether the card starts in ROM Monitor mode or EXEC mode. The configuration register is set in either ROM Monitor mode or EXEC mode as needed. Typically, you set the configuration register using the Cisco IOS XR software prompt on the active RP when you need to use ROM Monitor mode. When your maintenance in ROM Monitor mode is complete, you change the configuration register so the card will reboot with the Cisco IOS XR software.

Accessing ROM Monitor Mode with a Terminal Connection

When an RP is in ROM Monitor mode, you can access the ROM Monitor software only from a terminal connected directly to the Console port of the card. Because the Cisco IOS XR software (EXEC mode) is not operating, the nonmanagement interfaces (such as POS interfaces) are not accessible. Basically, all Cisco IOS XR software resources are unavailable. The hardware is there, but no configuration exists to make use of the hardware.

Network Management Access and ROM Monitor Mode

Some people get confused when they start to use ROM Monitor mode. It is important to remember that ROM Monitor mode is a router mode, not a mode within the Cisco IOS XR software. It is best to remember that ROM Monitor software and the Cisco IOS XR software are two separate programs that run on the same router. At any given time, the router is running one of these programs, but it never runs both at the same time.

One area that confuses people when using ROM Monitor and the Cisco IOS XR software is that area that defines the IP configuration for the Management Ethernet interface. Most router users get comfortable with configuring the Management Ethernet interface in the Cisco IOS XR software. When the router is in ROM Monitor mode, however, the router is not running the Cisco IOS XR software, so that Management Ethernet interface configuration is not available.

When you want to access other devices, such as a TFTP server, while in ROM Monitor mode on Cisco CRS-1s, you must configure the ROM Monitor variables with IP access information. On Cisco XR 12000 Series Routers, you must configure the Boothelper software, as described in About Boothelper in Cisco XR 12000 Series Routers, page 2-34.

Entering ROM Monitor Mode

The following sections describe two ways to enter ROM Monitor mode:

Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode

In normal operating conditions, it should not be necessary to use ROM Monitor mode. If you do find it necessary to place a designated system controller (DSC) in ROMMON, make sure that the system is in a steady state and that you are prepared for the consequences of a system reload. In particular, verify the items described in the "Prerequisites" section on page 1-4.

Prerequisites

Before you place a DSC in ROM Monitor mode, verify that the system is in a steady state:

1. Prepare the DSC:
   a. Anticipate substantial downtime, including the loss of packet forwarding on the system.
   b. Verify the sanity of the configuration file system using the command **cfs check** in EXEC mode.
   c. Verify that all changes to the active router configuration are saved with the **commit** command in any configuration mode.
   d. Verify that all changes to the active software set are saved with the **install commit** command in Administration EXEC mode.
   e. Verify that all install commit processes are complete with the **show install committed** command in Administration EXEC mode. This command displays the committed packages that become active during the next router boot.
2. Verify that the other nodes in the system are in a steady state:
   a. If a standby DSC is installed, verify that it is in the "ready" state with the **show redundancy** command in EXEC mode.
   b. Verify that all available nodes in the system are in IOS XR RUN state with the **show platform** command in EXEC mode.

After you have verified that the system is in a stable state, you can enter ROM Monitor mode by setting the configuration register setting and entering the **reload** command, as described in the following steps.

SUMMARY STEPS

1. Verify that the router is in a steady state.
2. Connect a terminal to the DSC console port and log in to the router.
3. **admin**
4. Place the DSC, or all RPs in ROM Monitor Mode:

- Place only the DSC in ROM Monitor mode:
  a. **config-register 0x0**
  b. **exit**
  c. **reload**
- OR
  Place all RPs in ROM Monitor mode:
  a. **config-register 0x0 location all**
  b. **reload location all**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Verify that the router is in a steady state.	Ensures that all configurations are saved and that no installation processes are running. • See the "Prerequisites" section on page 1-4
Step 2	Connect a terminal to the DSC console port and log in to the router.	Connects a terminal or PC to the DSC console port and establishes a router management session. • See "Connecting and Communicating with the Router" in the *Cisco IOS XR Getting Started Guide* for more information on connecting a terminal.
Step 3	**admin** **Example:** `RP/0/RP0/CPU0:router# admin`	Enters administration EXEC mode.

Step 4	**config-register 0x0**
	exit
	reload
	
	or
	config-register 0x0 location all
	reload location all
	
	Examples:
	`RP/0/RP0/CPU0:router(admin)# config-register 0x0`
	`RP/0/RP0/CPU0:router(admin)# exit`
	`RP/0/RP0/CPU0:router# reload`
	
	or
	
	`RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all`
	`RP/0/RP0/CPU0:router(admin)# reload location all`
		Enter the following commands to place only the DSC in ROM Monitor mode:
		a. Enter the command **config-register 0x0** to set the configuration register for ROM Monitor mode during the next card reload.
		b. Enter the command **exit** to exit administration EXEC mode.
		c. Enter the command **reload** to reload the DSC and enter ROMMON mode.
		Note If there is a standby DSC, the configuration register on the standby DSC is also set to 0x0. When you place the active RP in ROM Monitor mode, the system fails over to the standby RP, which then becomes the active RP. If both RPs need to be in ROM Monitor mode, connect to the new active RP and enter the **reload** command.
		
		OR
		
		Enter the following commands to place all RPs and SCs in ROM Monitor mode:
		a. Enter the **config-register 0x0 location all** command to reset the configuration register for all RPs in the system.
		b. Enter the **reload location all** command in administration EXEC mode to reload all RPs in the system.
		
		Caution Resetting the configuration register may change the baud rate for the console.

Tip To verify the configuration register setting, enter the **show variables boot** command administration EXEC mode.

Examples

The following examples show how to place the DSC in ROM Monitor mode:

- Verifying the Router State: Example, page 1-6
- Placing the DSC in ROM Monitor Mode: Example, page 1-6

Verifying the Router State: Example

The following example shows the redundancy roles of both RPs and that both are operating in IOS XR RUN state:

```
RP/0/RP0/CPU0:router# show redundancy

Redundancy information for node 0/RP0/CPU0:
==========================================
Node 0/RP0/CPU0 is in ACTIVE role
Partner node (0/RP1/CPU0) is in STANDBY role
Standby node in 0/RP1/CPU0 is ready

RP/0/RP0/CPU0:router# show platform

Node            Type            PLIM            State           Config State
-------------------------------------------------------------------------------
0/1/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/1/0           MSC(SPA)        4XOC3-POS       OK              PWR,NSHUT,MON
0/1/5           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/6/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/6/0           MSC(SPA)        4XOC3-POS       OK              PWR,NSHUT,MON
0/6/4           MSC(SPA)        8XOC3/OC12-POS  OK              PWR,NSHUT,MON
0/6/5           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/RP0/CPU0      RP(Active)      N/A             IOS XR RUN      PWR,NSHUT,MON
0/RP1/CPU0      RP(Standby)     N/A             IOS XR RUN      PWR,NSHUT,MON
```

Placing the DSC in ROM Monitor Mode: Example

The following example shows how to place the DSC in ROM Monitor mode. This example is for a Cisco XR 12000 Series Router.

```
RP/0/0/CPU0:router# admin

RP/0/0/CPU0:router(admin)# config-register 0x0

Successfully set config-register to 0x0 on node 0/0/CPU0
Successfully set config-register to 0x0 on node 0/1/CPU0

RP/0/0/CPU0:router(admin)# exit

RP/0/0/CPU0:router# reload

Proceed with reload? [confirm]

System Bootstrap, Version 12.0(20040624:164256) [assafb-misc1 1.14dev(0.91)] DEV
ELOPMENT SOFTWARE
Copyright (c) 1994-2004 by cisco Systems, Inc.
```

```
DRAM DIMM Slot 1: 512M found, Slot 2: Empty
MPC7450 platform with 524288 Kbytes of main memory

rommon 1 >
```

Manually Halting the Initialization Process During System Reload

To force the DSC to stop loading and enter ROM Monitor mode, press Ctrl-C when you see the following message:

```
MBI validation sending request.
HIT CTRL-C to abort
```

This message usually appears during the first 20 seconds of system startup. It may be necessary to press the Ctrl-C keys repeatedly during this time to ensure that the initialization process stops and the system enters ROMMON.

This operation can be performed only from a terminal directly connected to the DSC console port. See "Connecting and Communicating with the Router" in *Cisco IOS XR Getting Started Guide* for more information.

Note When the DSC is placed in ROMMON, it switches over to the standby DSC, which can then also be placed in ROMMON. Repeat this process for both RPs.

ROM Monitor Commands

The commands in ROM Monitor are different from those available in the Cisco IOS XR software. You can run ROM Monitor commands only while in ROMMON, and you cannot run Cisco IOS XR software commands. This section includes the following topics:

Commonly Used ROM Monitor Commands

The commands commonly used in ROM Monitor are summarized in Table 1-1. For specific instructions to use these commands, refer to the relevant procedure in this document.

Table 1-1 Commonly Used ROM Monitor Commands

ROMMON Command	Description
boot *image*	Manually boots a vm Cisco IOS XR software image.
boot *image* –**o** *config-file-path*	Manually boots the Cisco IOS XR software with a temporary alternative Administration configuration file.
boot *image* –**a** *config-file-path*	Manually boots the Cisco IOS XR software with an alternative secure domain router (SDR) configuration file.
confreg	Changes the config-register setting.

Table 1-1 Commonly Used ROM Monitor Commands (continued)

ROMMON Command	Description
dev	Displays the available local storage devices (for example, disk0 and disk1).
dir	Displays the files on a storage device.
dumpplaneeeprom	Displays the chassis serial number in a Cisco CRS-1 router.
reset	Resets the node.
set	Displays the currently set ROM Monitor environmental settings.
sync	Saves the new ROM Monitor environmental settings.
unset	Removes an environmental variable setting.
version	Displays the ROM Monitor version.

Displaying the Available ROM Monitor Commands

Table 1-2 describes the available help commands for ROM Monitor mode.

Table 1-2 Help Commands in ROMMON

Command	Description
help or **?**	Displays a summary of all available ROM Monitor commands.
-?	Displays information about command syntax.

Note Commands are case sensitive. You can halt any command by pressing Ctrl-C.

Examples

The following example shows what appears when you enter the **?** command on a Cisco CRS-1:

```
rommon B5 > ?
alias               set and display aliases command
show_bcm_links      Show Links status on Broadcom Switches
show_bcm            Show Broadcom Switches Information
boot                boot up an external process
confreg             configuration register utility
cont                continue executing a downloaded image
context             display the context of a loaded image
dev                 list the device table
dir                 list files in file system
dis                 disassemble instruction stream
dnld                serial download a program module
help                monitor builtin command help
history             monitor command history
meminfo             main memory information
dumpspd             Dump the Serial Presents Detect info from the SDRAM DIMMs
dumpplaneeeprom     Dump the contents of the back plane
repeat              repeat a monitor command
reset               system reset
```

```
scanpci0            scan for devices on PCI bus 0
scanpci1            scan for devices on PCI bus 1
set                 display the monitor variables
smptest             Test the other CPU on an SMP board
sync                write monitor environment to NVRAM
tftpdnld            tftpdnld no longer available, use boot
unalias             unset an alias
unset               unset a monitor variable
version             display rommon software, board, version
writei2c            Write to an I2C device
rommon B2 >
```

The following example shows the parameters for the **dir** (directory) command:

```
rommon 7 > dir -?
bad device name
usage: dir <device>
```

Displaying the Configuration Register Setting

To display the current configuration register setting, enter the **confreg** command without parameters as follows:

```
rommon B1 > confreg


          Configuration Summary
   (Virtual Configuration Register: 0x0)
enabled are:
console baud: 9600
boot: the ROM Monitor

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

The configuration register setting is labeled *Virtual Configuration Register*. Enter **no** to avoid changing the configuration register setting. To change the configuration setting with this command, see the "Resetting to EXEC Mode Using Prompts" section on page 1-13.

Environment Variable Settings

The ROM Monitor environment variables define the attributes of the ROM Monitor such as the IP address for an RP control Ethernet port, or the location of the Cisco IOS XR software and how to load it. Environmental variables are entered like commands and are always followed by the equal sign (=). Environment variable settings are entered in capital letters, followed by a definition For example:

```
TURBOBOOT=on,disk0,format
```

Under normal operating conditions, you will not need to modify these variables. They are cleared or set only when you need to make changes to the way ROM Monitor operates.

This section includes the following topics:

Frequently Used Environmental Variables

Table 1-3 shows the main ROMMON environmental variables. For instructions to use these variables, see the relevant instructions in this document.

Table 1-3 Frequently Used ROM Monitor Environmental Variables

Environmental variable	Description
IP_ADDRESS=*ip_address*	On the Cisco CRS-1 RP only. Sets the IP address for the Management Ethernet interface on the DSC.
IP_SUBNET_MASK=*ip_address*	On the Cisco CRS-1 RP only. Sets the subnet mask for the Management Ethernet interface on the DSC.
DEFAULT_GATEWAY=*ip_address*	On the Cisco CRS-1 RP only. Sets the default gateway that serves the DSC.
TFTP_SERVER=*ip_address*	Sets the IP address of the TFTP server where a bootable software image is located.
TFTP_FILE=*drive* **:** *path* **/** *file*	Sets the directory and filename of a a bootable software image.
TURBOBOOT=*on, boot-device, options*	Completely replaces the existing software when the router is reloaded.
BOOT=*drive* **:** *path* **/** *file*	Identifies the boot software for a node. This variable is usually set automatically when the router boots.
AUX_AUTHEN_LEVEL=*number*	Bypasses **ksh** authentication. A reboot is required only on the card that has to bypass authentication.
IOX_ADMIN_CONFIG_FILE= *drive* **:** *path* **/** *file*	Permanently changes the location of the default Administration configuration file.
IOX_CONFIG_FILE=*drive* **:** *path* **/** *file*	Permanently changes the location of the secure domain router (SDR) configuration file.
IOX_CONFIG_MEDIUM=*drive* **:** *path*	Permanently changes the default location where configuration files are saved.

Displaying Environment Variable Settings

To display the current environment variable settings, enter the **set** command as follows:

```
rommon B1 > set

PS1=rommon ! >
TFTP_VERBOSE=2
IP_ADDRESS=1.1.1.1
IP_SUBNET_MASK=255.255.0.0
TFTP_SERVER=
DEFAULT_GATEWAY=12.25.0.1
TFTP_FILE=
CONFIG_FILE=
BOOT=disk0:hfr-os-mbi-1.0.0/mbihfr-rp.vm,1;
rommon B2 >
```

Entering Environment Variable Settings

Environment variable settings are entered in capital letters, followed by a definition. The following example shows the environmental variables used to configure the control Ethernet port on a Cisco CRS-1 router.

```
rommon B1> IP_ADDRESS=1.1.1.1
rommon B2> IP_SUBNET_MASK=255.255.254.0
rommon B3> DEFAULT_GATEWAY=1.1.0.1
```

Saving Environment Variable Settings

To save the current environment variable settings, enter the **sync** command as follows:

```
rommon B1 > sync
```

Note Environmental values that are not saved with the **sync** command are discarded whenever the system is reset or booted.

Viewing Chassis Serial Numbers (Cisco CRS-1 Routers)

The chassis serial number is required for multishelf routers and can be read from an SC or RP that is running in ROM Monitor mode. This may be necessary if the physical label is missing or damaged.

Note You can view the chassis serial numbers using the Cisco IOS XR software. For more information, see "Displaying the Chassis Serial Numbers (Cisco CRS-1 Routers)" in *Cisco IOS XR Getting Started Guide*.

Step 1 Attach a console to the console port of an SC or RP in the chassis. (Only the SC or RP needs to run to perform this procedure. Other cards need not be inserted.)

Step 2 If you have not already done so, apply power to the chassis.

Step 3 Enter ROM Monitor mode, as described in the "Entering ROM Monitor Mode" section on page 1-3.

Step 4 Enter the ROMMON command dumpplaneeeprom in the privilege mode of ROMMON to display the chassis serial number. In the following example, the serial number is TBC0636606900000.

```
rommon B3 >
rommon B3 > priv
rommon B3 > dumpplaneeeprom
EEPORM data backplane
000000  00 00 01 e2 00 00 00 00 00 00 00 00 00 00 00 00 ................
000010  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000020  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000030  00 00 00 00 00 00 08 00 45 3b 61 01 04 00 00 00 ........E;a.....
000040  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000050  54 42 43 30 36 33 36 36 30 36 39 30 30 30 30 30 TBC0636606900000
000060  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000070  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000080  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000090  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000a0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000b0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
```

```
0000c0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000d0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000e0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000f0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
```

Note The chassis serial number is displayed in the output to the right (row "00050"). A similar number is present for every chassis.

Step 5 Return the router to EXEC mode, as described in the "Exiting ROM Monitor Mode" section on page 1-12.

Exiting ROM Monitor Mode

To exit ROM Monitor mode, you must change the configuration register to 0x2102 and reset the RP. This process can be done by either entering CLI commands or responding to prompts.

Tip The first RP to enter EXEC mode becomes the DSC. You can determine which RP is the DSC by resetting that card to EXEC mode first and then waiting 1 to 2 minutes to allow it to boot fully. You can also fail over to the standby DSDRSC at any time with the **redundancy switchover** command in EXEC mode.

The following sections describe ways to exit ROM Monitor mode:

- Resetting to EXEC Mode with CLI Commands, page 1-12
- Resetting to EXEC Mode Using Prompts, page 1-13

Resetting to EXEC Mode with CLI Commands

Perform this task to reset the configuration register in ROMMON and start the RP in EXEC mode.

SUMMARY STEPS

1. **confreg 0x2102**
2. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**confreg 0x2102** **Example:** `rommon B1> confreg 0x2102`	Resets the configuration register to enter EXEC mode when the system is reset.
Step 2	**reset** **Example:** `rommon B1> reset`	Resets and initializes the router.

Resetting to EXEC Mode Using Prompts

In ROM Monitor mode, you can also change the configuration register value using the configuration register prompts.

Enter the **confreg** command, as shown in the following example, and respond to each question when prompted.

SUMMARY STEPS

1. **confreg**
2. Respond to each prompt as instructed.
3. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**confreg** **Example:** `rommon B1> confreg 0x2102`	Initiates the configuration register configuration prompts.
Step 2	Respond to each prompt as instructed.	For more information, see the example that follows this procedure.
Step 3	**reset** **Example:** `rommon B1> reset`	Resets and initializes the router.

Examples

The following example shows the commands required and the prompts that appear when you reset the RP to EXEC mode using the configuration register prompts:

```
rommon B1> confreg


          Configuration Summary
   (Virtual Configuration Register: 0x0)
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]: n
change console baud rate? y/n  [n]:  n
change the boot characteristics? y/n  [n]: y
enter to boot:
 0 = ROM Monitor
 1 = MBI Validation Boot Mode
    [0]:  1


          Configuration Summary
   (Virtual Configuration Register: 0x2102)
enabled are:
console baud: 9600
boot: image specified by the boot system commands

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


You must reset or power cycle for new config to take effect
rommon B2> reset
```

Note Minimum Boot Image (MBI) validation mode causes the RP to boot the startup Cisco IOS XR software and configuration.

Router Recovery with ROM Monitor

The standard way to install new software on the DSC is by using the **install** command in administration EXEC mode. However, if the DSC is unable to boot the Cisco IOS XR software or you want to completely replace the existing software, you can reinstall the software while the DSC is in ROM Monitor mode. When you install the Cisco IOS XR software from ROM Monitor mode, you must use a special software installation file with a *vm* file extension. These files are called *vm files*. You cannot install software in package installation envelope (PIE) files from ROM Monitor mode.

Note Installation using a *vm* file in ROM Monitor mode should be performed only from the DSC of the system.

Caution Reinstalling the Cisco IOS XR software from ROMMON replaces the currently installed router software and causes substantial router downtime. We recommend installing or upgrading software packages from EXEC mode using PIE files, as described in the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*.

This chapter contains the following sections:

About ROMMON Installation Files

This section includes the following topics:

Locating Installable Files

To obtain Cisco IOS XR software and version information, use the Cisco IOS XR Software Selector tool at the following website:

http://www.cisco.com/cgi-bin/Software/IOXPlanner/planner-tool/ioxplanner.cgi?

The Cisco IOS XR Software Selector tool allows you to browse for your software upgrade from a single interface. You can display and select software by package name, release, or platform. The tool also includes posting images and Extensible Markup Language (XML) schemas. Choosing a platform, release, or software feature automatically limits the choices based on your selection until you arrive at your preferred software.

The software packages that you can install from ROMMON are listed in Table 2-1.

Table 2-1 Downloadable Software for Installation from ROM Monitor

Software Package Name	Description
Cisco IOS XR IP/MPLS Core Software	This package contains two copies of the Cisco IOS XR Unicast Routing Core Bundle. One copy is in the package installation envelope (PIE) file format and can be installed while Cisco IOS XR is running, as described in the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*. The other copy is in a vm file that can be installed from ROM Monitor. This package also includes the Cisco IOS XR MPLS, Manageability, and Multicast packages (in PIE files).
Cisco IOS XR IP/MPLS Core Software 3DES	This package contains everything in the Cisco IOS XR IP/MPLS Core Software package, and it contains the Cisco IOS XR Security package (in a PIE file).

The packages listed in Table 2-1 are distributed in files with *tar* filename extensions (tar files are assembled with the UNIX tar utility). When you download a tar file, you must unpack the tar file with a software program before you can install any of the files in the package.

The files that you can install from ROM Monitor have a *vm* filename extension. These files contain the software included in the Cisco IOS XR Unicast Routing Core Bundle. The other files in the packages are PIE files.

Note The tar files contain both PIE files and vm files. If the router is operating properly, you can install the software using the appropriate PIE file with little or no interruption to router traffic, as described in the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*. If the router cannot boot the Cisco IOS XR software, install the core software using the vm file first, then install any additional packages using the PIE files after the router enters EXEC mode.

Packages for the Cisco XR 12000 Series Router contain additional files which are described in Table 2-2.

Table 2-2 Additional Files for the Cisco XR 12000 Series Router

Filename	Description
mbiprp-rp.vm-3.4.0	This software is for all performance route processors (PRPs) except the DSC and must be loaded on a PRP before it can communicate with the DSC.
bfprp_romupgrade-1.14.0.91	This software is for the ROM Monitor upgrade of the PRP cards, and later versions may display a different version number at the end of the filename. For instructions on installing this software, see "Upgrading and Downgrading Boothelper and ROM Monitor on Cisco XR 12000 Series Routers".
c12kprp-boot-mz.120-32.S3	This software is the Boothelper for the PRP cards, and later versions may display a different version number at the end of the filename. For instructions on installing this software, see "Upgrading and Downgrading Boothelper and ROM Monitor on Cisco XR 12000 Series Routers".

tar Filenames and Version Numbers

The format for a tar filename is:

platform-bundle_name-major.minor.maintenance.tar

The tar filename components are described in Table 2-3.

Table 2-3 tar Filename Components

Component	Description
platform	Identifies the platform for which the software package is designed. For packages designed for the Cisco CRS-1 router, the platform designation is "CRS-1." For packages designed for the Cisco XR 12000 Series Router, the platform designation is "XR12000."
bundle_name	Identifies a specific bundle. The "iosxr" bundle name indicates a file that includes all packages in the Cisco IOS XR Unicast Routing Core Bundle and the Management, MPLS, and Multicast packages. These packages are described in the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*. The "iosxr-k9" bundle name indicates a file that includes all packages in the "iosxr" bundle file plus the Security package.

Table 2-3 tar Filename Components (continued)

Component	Description
major	Identifies the major release of this package. A major release occurs when there is a major architectural change to the product (for example, a major new capability is introduced). All packages operating on the router must be at the same major release level. A major release is the least frequent release and may require a router reboot.
minor	Identifies the minor release of this package. A minor release contains one or more of the following: New features Bug fixes The minor release version does not have to be identical for all software packages operating on the router, but the operating packages must be certified by Cisco as compatible with each other. A minor release may require a router reboot.
maintenance	Identifies the maintenance release of this package. A maintenance release contains a collection of bug fixes for a package. The maintenance release version does not have to be identical for all software packages operating on the router, but the major and minor versions of the maintenance release must match the those of the package being updated. A maintenance release usually does not require a router reboot.

vm Filenames and Version Numbers

The format for a composite vm filename for Cisco CRS-1s is:

comp-*platform-package_name*.vm-*major.minor.maintenance*

The format for a vm filename for Cisco XR 12000 Series Routers is:

platform-package_name.vm-*major.minor.maintenance*

The “comp” prefix indicates that the file is a composite of multiple packages. The other filename components are described in Table 2-4.

Table 2-4 vm Filename Components

Component	Description
platform	Identifies the platform for which the software package is designed. • For packages designed for Cisco CRS-1s, the platform designation is "hfr." • For packages designed for Cisco XR 12000 Series Routers, the platform designation is "c12k." • The mbiprp platform name specifies a special file for the Cisco XR 12000 Series Router. This file is described in Table 2-2.
package_name	Identifies a specific package. • The "mini" package name indicates a composite package that includes all packages in the Cisco IOS XR Unicast Routing Core Bundle, which is described in the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*. • The rp package name specifies a special file for the Cisco XR 12000 Series Router. This file is described in Table 2-2.
major	Identifies the major release of this package. • A major release occurs when there is a major architectural change to the product (for example, a major new capability is introduced). • All packages operating on the router must be at the same major release level. • A major release is the least frequent release and may require a router reboot.
minor	Identifies the minor release of this package. • A minor release contains one or more of the following: – New features – Bug fixes • The minor release version does not have to be identical for all software packages operating on the router, but the operating packages must be certified by Cisco as compatible with each other. • A minor release may require a router reboot.
maintenance	Identifies the maintenance release of this package. • A maintenance release contains a collection of bug fixes for a package. • The maintenance release version does not have to be identical for all software packages operating on the router, but the major and minor versions of the maintenance release must match the those of the package being updated. • A maintenance release usually does not require a router reboot.

About Turboboot

The Turboboot environmental variable automates the software installation process in ROM Monitor mode and determines the installation settings, such as the boot device (destination disk) for software installation. The following is the syntax for the Turboboot environmental variable:

TURBOBOOT=on, {*boot-device*}**,**[**format** | **clean**]

In the following example, the Turboboot variable is set to **on**, the boot device (destination disk) is the flash disk in **disk0:**, and the installation process will **format** the disk.

```
TURBOBOOT=on,disk0,format
```

There are three main arguments and keywords for the Turboboot variable:

- **on**: Installs and activates the Cisco IOS XR software packages when the RP is booted with the vm image
- *boot-device*: selects the destination disk for software installation. See the "About the Boot Device (Destination Disk)" section on page 2-20 for more information.
- [**format** | **clean**]: When the **clean** option is selected, the Cisco IOS XR software is completely replaced, but all other files on the disk are preserved, including configuration files for each secure domain router (SDR). When the **format** option is selected, the Cisco IOS XR software is completely replaced, and only the admin configuration is preserved. All other files on the disk, including all configuration files for the SDRs, and all user files, are deleted. The admin configuration contains the configuration that determines SDR names and inventory. The SDR configurations include router configurations such as BGP and interface configurations.

Note Each argument is separated by a comma (,).

For more information, see Environment Variable Settings, page 1-9.

About the Boot Device (Destination Disk)

When you install the Cisco IOS XR software using the Turboboot method in ROM Monitor mode, you must specify a *boot-device* for the router. The boot device is the local disk on the RP where the software is installed.

- On the Cisco CRS-1, the supported boot devices are disk0 and disk1. If a boot-device is not specified, disk0 is used by default. If disk0 is not installed, then disk1 will be used.
- On the Cisco XR 12000 Series Router, the supported boot devices are disk0, disk1, and compact flash.
- See the "About Turboboot" section on page 2-20 for more information on Turboboot usage and syntax.

The *boot-device* determines the slot where all software will be installed on all RPs and distributed route processors (DRPs) that act as the designated secure domain router system controllers (DSDRSCs). In other words, when you Turboboot the Cisco IOS XR software to the DSC, all the other RPs in the system must include a disk in that same slot. The system uses these disks to distribute the software to each RP in the system. In addition, any additional software or software upgrades are automatically saved to the same boot device.

Once the Cisco IOS XR software is installed to the boot device using the Turboboot method, all additional software and software upgrades are automatically installed and synced to that same boot device and cannot be changed. For example:

- If the RP is Turbobooted with disk0 (TURBOBOOT=on,disk0), then all packages are installed to disk0: and the boot device is “disk0:”.
- If the RP is Turbobooted with disk1 (TURBOBOOT=on,disk1), then all packages are installed to disk1: and the boot device is “disk1:”.
- On a Cisco XR 12000 Series Router, you can also Turboboot using compact flash disk as the boot device.
- Once you boot the Cisco IOS XR software, you are *not* allowed to add packages to anywhere other than the boot device. For example, you cannot boot the DSC to disk1: and decide to add your packages to disk0: or vice versa.

Note We recommend using disk0 as the boot device. Disk0 is preinstalled in most RPs, which ensures that the correct disk is used to store the software packages on the entire system.

Reinstalling Cisco IOS XR Software on Cisco CRS-1 Routers

Caution Reinstalling Cisco IOS XR software from ROMMON replaces the currently installed router software and causes substantial router downtime. We recommend installing or upgrading software packages from the EXEC mode using package installation envelope (PIE) files, as described in the “Upgrading and Managing Cisco IOS XR Software” chapter of *Cisco IOS XR Getting Started Guide*.

This section includes the following topics:

Cisco CRS-1 Router Installation Overview

When you reinstall the software from ROM Monitor mode, you can do either of the following procedures:

- Load the Cisco IOS XR software from a vm file on a TFTP server to the DSC.
- Transfer the vm file to a local storage device and then load the Cisco IOS XR software from that storage device to the DSC.

The following sections provide an overview of the processes:

Installation from a TFTP Server

When you install Cisco IOS XR software from a TFTP server to the DSC, you must perform the following procedures:

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system on each SDR using the command **cfs check**.
3. Place all RPs and DRPs in ROM Monitor mode.
4. From ROM Monitor mode, clear the ROM Monitor environmental variables on all RPs, including the DSC.
5. On the DSC, configure the IP parameters for the Management Ethernet interface. This is performed with the card in ROM Monitor, and is required to access the TFTP server.
6. On the DSC, configure the TURBOBOOT environment variable to either clean or format the boot disk during the installation. The recommended boot device is disk0:.
7. On the DSC, boot the Cisco IOS XR software from a vm file on the TFTP server.
8. Reset all other RPs to boot the Cisco IOS XR software.

After you boot the Cisco IOS XR software, the Turboboot process will either clean or format the boot device, based on the TURBOBOOT environment variable setting.

Caution If the Turboboot variable is set to format the boot device, all SDR configurations are deleted: only the admin configuration is preserved. Review the sections About Turboboot, page 2-20 and About the Boot Device (Destination Disk), page 2-20 for more information.

For the procedure to install Cisco IOS XR software from a TFTP server, see the "Reinstalling to a Cisco CRS-1 Router from a TFTP Server Image" section on page 2-23.

Installation from a Local Storage Device

When you install Cisco IOS XR software from a local storage device, you must perform the following procedures:

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system on each SDR using the command **cfs check**.
3. Copy the required vm file to the DSC flash disk that will hold the installable file. We recommend using disk1. You can also replace the flash disk with a flash disk that already has the correct image.
4. Place all RPs and DRPs in ROM Monitor mode.
5. From ROM Monitor mode, clear the ROM Monitor environmental variables on all RPs, including the DSC.
6. On the DSC, configure the TURBOBOOT environment variable to either clean or format the boot disk during the installation. The recommended boot device is disk0:.
7. Turboboot the DSC with the vm image located on the local storage device.
8. Reset all other RPs to boot the Cisco IOS XR software.

Caution If the Turboboot variable is set to **format** the boot device, all existing SDR configurations are deleted. Only the Admin configuration is preserved. Review the sections About Turboboot, page 2-20 and About the Boot Device (Destination Disk), page 2-20 for more information.

For the procedure to install Cisco IOS XR software from a local storage device, see the "Reinstalling to a Cisco CRS-1 Router from an Image on a Local Storage Device" section on page 2-28.

Reinstalling to a Cisco CRS-1 Router from a TFTP Server Image

Cisco IOS XR software can be reinstalled directly from a vm file located on a TFTP server. Complete the instructions in this section exactly as described.

Restrictions for TFTP Services

TFTP services by some vendors (such as Sun Solaris) may not support files larger than 32 MB. Because most Cisco IOS XR vm images are larger than 32 MB, you may need to use one of the following options:

- Use a third-party or freeware TFTP server that supports file sizes larger than 32 MB.
- Download a patch from Sun Microsystems to correct this limitation (http://www.sun.com).
- Install the Cisco IOS XR software from a vm image located on the local flash disk. See the "Reinstalling to a Cisco CRS-1 Router from an Image on a Local Storage Device" section on page 2-28.

Prerequisites

Before reinstalling Cisco IOS XR software from a TFTP server image, verify that the following prerequisites have been met:

- Cisco CRS-1 routers running Cisco IOS XR Software Release 3.4.0 or higher require ROM Monitor release 1.42. See ROM Monitor Compatibility with Cisco IOS XR Software, page 5-69 for more information.
- Before you begin, collect the following information.
  - IP address of the Management Ethernet interface on the DSC
  - Subnet mask of the Management Ethernet interface on the DSC
  - IP address of the default gateway that serves your router
  - IP address of the TFTP server from which the software will be downloaded
  - The filename and directory of the vm installation file that will be installed on the router
  - Determine the boot device for your system. See About the Boot Device (Destination Disk), page 2-20 for more information.

Note This procedure installs the Cisco IOS XR software on a router that previously ran the Cisco IOS XR software. If you are upgrading a Cisco XR 12000 Series Router that is currently running Cisco IOS software, you need to first upgrade the router to Cisco IOS XR software, as described in the document titled *Upgrading from Cisco IOS to Cisco IOS XR Software on the Cisco XR 12000 Series Router.*

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system:.
   a. **cfs check**
   b. Repeat on each SDR in the system.
3. Place all RPs in ROM Monitor mode:
   a. **admin**
   b. **config-register 0x0 location all**
   c. **reload location all**
4. Clear the ROM Monitor environmental variables on all RPs, including the DSC:
   a. **unset BOOT**
   b. **unset TFTP_FILE**
   c. **sync**
   d. Repeat for each RP in the system (line card chassis and fabric chassis).
5. On the DSC, set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode:
   a. **IP_ADDRESS=***ip_address*
   b. **IP_SUBNET_MASK=***mask*
   c. **DEFAULT_GATEWAY=***ip_address*
6. Set the Turboboot variables on the DSC:
   a. **TURBOBOOT=on, disk0,** *options*
   b. **sync**
7. On the DSC, boot the vm image located on the tftp server:
   boot tftp://*server/directory/filename*
8. Reset all other RPs to boot the Cisco IOS XR software:
   a. **confreg 0x2**
   b. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Back up the router configuration while still in EXEC mode.	(Optional) To preserve the current router configuration, copy it to another disk while still in EXEC mode. See the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide* for more information.
Step 2	Verify the sanity of the configuration file system. Repeat on each SDR in the system. **cfs check** **Example** `RP/0/RP0/CPU0:router# cfs check`	(Optional) Verifies the sanity of the router configuration, and resolves any internal inconsistencies. Repeat the **cfs check** command on each SDR in the system. **Note** This step is only necessary if you wish to preserve the router configurations (if Turboboot is set to **clean**). If Turboboot is set to **format**, then the disk will be erased and the existing configurations will be deleted. The default option is **clean**.

Step 3	Place all RPs in ROM Monitor mode:
	admin
	config-register 0x0 location all
	reload location all
	Example
	`RP/0/RP0/CPU0:router# admin`
	`RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all`
	`RP/0/RP0/CPU0:router(admin)# reload location all`
		See Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode, page 1-4 for more information.

Step 4	Clear the ROM Monitor environmental variables on all RPs, including the DSC.
	unset BOOT
	unset TFTP_FILE
	sync
	Example
	`rommon B1> unset BOOT`
	`rommon B2> unset TFTP_FILE`
	`rommon B3> sync`
		Ensures all RPs in the system are prepared for Turboboot. Repeat for each RP in the system (line card chassis and fabric chassis).
		Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.
		All variable names are case sensitive.
		a. Clears the BOOT variable.
		b. Clears the TFTP_FILE variable.
		c. Saves the changes.
		Note If the **unset** command displays an error message, it is most likely because the variable you are trying to change is not set. If this is the case, ignore the message and continue.

	Command or Action	Purpose

Step 5	On the DSC, sets the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode:
	IP_ADDRESS=*ip_address*
	IP_SUBNET_MASK=*mask*
	DEFAULT_GATEWAY=*ip_address*
	Example
	`rommon B4> IP_ADDRESS=1.1.1.1`
	`rommon B5> IP_SUBNET_MASK=255.255.254.0`
	`rommon B6> DEFAULT_GATEWAY=1.1.0.1`
		Enter these settings exactly as shown. All variable names are case sensitive.
		a. Sets the IP address for the Management Ethernet interface on the DSC.
		b. Sets the subnet mask for the Management Ethernet interface on the DSC.
		c. Identifies the default gateway that serves the DSC.

Step 6	On the DSC, set the Turboboot variables:
	TURBOBOOT=on, *boot-device*, *options*
	sync
	Example
	`rommon B7> TURBOBOOT=on,disk0,format`
	`rommon B8> sync`
		Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (,).
		• To enable the Turboboot process, specify on.
		• Specify a boot device where all software will be installed on the DSC and all DSDRSCs. We recommend disk0.
		• To replace the existing software without formatting the boot device, replace options with clean.
		• To replace the existing software and format the boot device, replace options with format.
		• The default option is clean.
		• Any existing configuration is preserved.

	Command or Action	Purpose

Step 7	On the DSC, boot the vm image located on the tftp server:
	boot tftp://*server*/*directory*/*filename*
	Example
	`rommon B9> boot`
	`tftp://223.255.254.254/softdir/comp-hfr-mini.vm`
		Retrieves the file from the TFTP server and installs it on the boot disk.
		• Run this command on the DSC and specify the vm installation file from the TFTP server.
		• This process removes any existing software packages, resets the configuration register to 0x2, and boots the DSC.
		• Allow the system to fully boot. The TURBOBOOT process takes some time. Do not enter any commands until you are prompted to enter a username or until the CLI prompt appears.
		• The "Press RETURN to get started" message appears twice. The first occurrence appears when the software is loaded into memory. The second occurrence happens after the software has been installed on the disk.
		• The DSC is fully booted when the following message appears:
		`SYSTEM CONFIGURATION COMPLETED`

Step 8	Reset all other RPs to boot the Cisco IOS XR software:
	confreg 0x2
	reset
	Example
	`rommon B4> confreg 0x2`
	`rommon B5> reset`
		a. Sets the configuration register to automatically start the boot process instead of staying in ROM Monitor mode.
		b. Resets the RP and starts the boot process.
		The RPs synchronize the new Cisco IOS XR software from the DSC.

Examples

Verify the sanity of the configuration file system on each SDR in the system:

```
RP/0/RP0/CPU0:router# cfs check
```

Place all RPs in ROM Monitor mode:

```
RP/0/RP0/CPU0:router# admin
RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all
RP/0/RP0/CPU0:router(admin)# reload location all
```

Clear the ROM Monitor environmental variables on all RPs, including the DSC:

```
rommon B1> unset BOOT
rommon B2> unset TFTP_FILE
rommon B3> sync
```

Set the IP Environment Variables to configure the ROM Monitor Management Ethernet interface on the DSC:

```
rommon B4> IP_ADDRESS=10.1.1.1
rommon B5> IP_SUBNET_MASK=255.255.254.0
rommon B6> DEFAULT_GATEWAY=10.1.0.1
```

Turboboot the DSC. The following example shows how to boot the router using the specified vm file on the specified TFTP server:

```
rommon B7> TURBOBOOT=on,disk0,format
rommon B8> sync
rommon B9> boot tftp://10.10.10.10/software/comp-hfr-mini.vm-3.4.0
```

Reset all other RPs to boot the Cisco IOS XR software:

```
rommon B8> confreg 0x2
rommon B9> reset
```

Reinstalling to a Cisco CRS-1 Router from an Image on a Local Storage Device

This section describes the tasks required to install Cisco IOS XR software on the boot device using a vm image stored on a local storage device. The local storage device can be either of the removable flash disks in disk0 or disk1. We recommend using disk1 as the storage device for the vm image, and disk0 as the boot device (destination disk).

Complete the procedures exactly as described in this section.

Note Before booting begins on the DSC, a delay of 10 minutes or more may occur while the vm image is read to memory from the removable local storage device.

Prerequisites

A valid vm image, as described in the "Locating Installable Files" section on page 2-16, must be located on a flash disk installed the RP. We recommend using disk1:.

If this file is not present on a local disk or a different version is required, use one of the following options:

- Cisco CRS-1 routers running Cisco IOS XR Software Release 3.4.0 or higher require ROM Monitor release 1.40. See ROM Monitor Compatibility with Cisco IOS XR Software, page 5-69 for more information.
- While the router is still in EXEC mode, copy the necessary vm image from a TFTP, an FTP, or an rcp server to disk0 or disk1. This process is described in the "Upgrading and Managing Cisco IOS XR software" chapter of *Cisco IOS XR Getting Started Guide*. See specifically the section "Obtaining and Placing Cisco IOS XR Software".
- Consult your system administrator for a flash disk containing the bootable vm file.
- Consult your Cisco representative for a flash disk containing the bootable vm file. See Obtaining Additional Publications and Information, page xii for more information.

Note The removable flash disk used to store the installation file should be used to store archives only of vm and PIE files. This disk cannot be used as a destination for installed software or configurations. Only the boot device can be used to store active software and configurations. See the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*. See specifically the section "Overview of Package Management" for more information.

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system:
   a. **cfs check**
   b. Repeat on each SDR in the system.
3. Copy the required vm file to the DSC flash disk that will hold the installable file. We recommend using disk1. You can also replace the flash disk with a flash disk that already has the correct image.
4. Place all RPs in ROM Monitor mode:
   a. **admin**
   b. **config-register 0x0 location all**
   c. **reload location all**
5. Clear the ROM Monitor environmental variables on all RPs, including the DSC:
   a. **unset BOOT**
   b. **unset TFTP_FILE**
   c. **sync**
   d. Repeat for each RP in the system (line card chassis and fabric chassis).
6. Set the Turboboot variables on the DSC:
   a. **TURBOBOOT=on**, **disk0**, *options*
   b. **sync**
7. On the DSC, boot the vm image located on the local storage device:
   boot *device***:/***filename*
8. Reset all other RPs to boot the Cisco IOS XR software:
   c. **confreg 0x2**
   d. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Back up the router configuration while still in EXEC mode.	(Optional) To preserve the current router configuration, copy it to another disk while still in EXEC mode. See the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide* for more information.
Step 2	Verify the sanity of the configuration file system. Repeat on each SDR in the system. **cfs check** **Example** `RP/0/RP0/CPU0:router# cfs check`	(Optional) Verifies the sanity of the router configuration, and resolves any internal inconsistencies. Repeat the **cfs check** command on each SDR in the system. **Note** This step is only necessary if you wish to preserve the router configurations (if Turboboot is set to **clean**). If Turboboot is set to **format**, then the disk will be erased and the existing configurations will be deleted. The default option is **clean**.
Step 3	Copy the required vm file to the DSC flash disk, or replace the flash disk with a flash disk that has the correct image.	Places the software on the router in preparation for installation. • We recommend using flash disk1: to hold the installable file. • For more information, see the "Prerequisites" section for this procedure.

Step 4	Place all RPs in ROM Monitor mode:
	admin
	config-register 0x0 location all
	reload location all
	Example
	`RP/0/RP0/CPU0:router# admin`
	`RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all`
	`RP/0/RP0/CPU0:router(admin)# reload location all`
		See Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode, page 1-4 for more information.

Step 5	Clear the ROM Monitor environmental variables on all RPs, including the DSC.
	unset BOOT
	unset TFTP_FILE
	sync
	Example
	`rommon B1> unset BOOT`
	`rommon B2> unset TFTP_FILE`
	`rommon B3> sync`
		Ensures all RPs in the system are prepared for Turboboot. Repeat for each RP in the system (line card chassis and fabric chassis).
		Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.
		All variable names are case sensitive.
		a. Clears the BOOT variable.
		b. Clears the TFTP_FILE variable.
		c. Saves the changes.
		Note If the **unset** command displays an error message, it is most likely because the variable you are trying to change is not set. If this is the case, ignore the message and continue.

	Command or Action	Purpose

Step 6	On the DSC, set the Turboboot variables:
	TURBOBOOT=on, *boot-device*, *options*
	sync
	Example
	`rommon B7> TURBOBOOT=on,disk0,format`
	`rommon B8> sync`
		Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (,).
		• To enable the Turboboot process, specify on.
		• Specify a boot device where all software will be installed on the DSC and all DSDRSCs. We recommend disk0.
		• To replace the existing software without formatting the boot device, replace options with clean.
		• To replace the existing software and format the boot device, replace options with format.
		• The default option is clean.
		• Any existing configuration is preserved.

Step 7	On the DSC, boot the vm image located the local storage device: **boot** *devixe:/filename* **Example** `rommon B7> boot disk1:/comp-hfr-mini.vm-3.4.0`	Boots the file located on the local storage device and installs it to the boot disk. • This process removes any existing software packages, resets the configuration register to 0x2, and boots the system. • Allow the RP to fully boot. The "Press RETURN to get started" message appears twice. The first occurrence appears when the software is loaded into memory. The second occurrence happens after the software has been installed on the disk. • The system is fully booted when the following message appears: `SYSTEM CONFIGURATION COMPLETED` **Note** A delay of 10 minutes or more occurs while the software is read from the flash disk.

Step 8	Reset all other RPs to boot the Cisco IOS XR software:
	confreg 0x2
	reset
	Example
	`rommon B4> confreg 0x2`
	`rommon B5> reset`
		a. Sets the configuration register to automatically start the boot process instead of staying in ROM Monitor mode.
		b. Resets the RP and starts the boot process.
		The RPs synchronize the new Cisco IOS XR software from the DSC.

Examples

Verify the sanity of the configuration file system on each SDR in the system:

```
RP/0/RP0/CPU0:router# cfs check
```

Place all RPs in ROM Monitor mode:

```
RP/0/RP0/CPU0:router# admin
RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all
RP/0/RP0/CPU0:router(admin)# reload location all
```

Clear the ROM Monitor environmental variables on all RPs, including the DSC:

```
rommon B1> unset BOOT
rommon B2> unset TFTP_FILE
rommon B4> sync
```

Turboboot the DSC:

```
rommon B5> TURBOBOOT=on,disk0,format
rommon B6> sync
rommon B7> boot disk1:/comp-hfr-mini.vm-3.4.0
```

Note A delay of 10 minutes or more occurs while the software is read from the flash disk.

Reset all other RPs to boot the Cisco IOS XR software:

```
rommon B8> confreg 0x2
rommon B9> reset
```

What to Do Next

After the system is up and in EXEC mode, you can execute the full range of CLI commands from the DSC.

Note If there was no previous router configuration, you must enter a root-system username and password when the boot process is complete.

After reinstalling the software, you might want to verify interfaces, install additional packages or perform other configuration tasks:

1. For instructions to verify that the interfaces are up and properly configured, see “Verifying the System Interfaces” in the “Upgrading and Managing Cisco IOS XR Software” chapter of *Cisco IOS XR Getting Started Guide*.
2. Install additional software from the PIE files, as necessary. See “Upgrading and Managing Cisco IOS XR Software” chapter of *Cisco IOS XR Getting Started Guide* for more information.
3. See Cisco Technical Support & Documentation Website, page x for a list of the additional documentation required to fully configure the router.

Reinstalling Cisco IOS XR Software on Cisco XR 12000 Series Routers

Caution Reinstalling the Cisco IOS XR software from ROMMON replaces the currently installed router software and causes substantial router downtime. We recommend installing or upgrading software packages from the EXEC mode using package installation envelope (PIE) files, as described in the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*.

This section includes the following topics:

Cisco XR 12000 Series Router Installation Overview

To reinstall the software from ROM Monitor mode, perform either of the following procedures:

- Installation from a TFTP Server, page 2-33: use this method to boot the Cisco IOS XR software from a vm file located on a TFTP server.
- Installation from a Local Storage Device, page 2-34: use this method to first transfer the vm file to a local storage device and then boot the Cisco IOS XR software from that local storage device.

Installation from a TFTP Server

To install the Cisco IOS XR software from a TFTP server, perform the following procedures:

1. Start the DSC Boothelper and either configure or verify the configuration of the Management Ethernet interface on the PRP to which you are installing the software.
2. Place the DSC in ROM Monitor mode.
3. Clear any environment variables that might interfere with the installation.
4. Configure the TURBOBOOT environment variable to either clean or format the boot device during the installation.
5. Boot the Cisco IOS XR software from a vm file on the TFTP server. After you boot the Cisco IOS XR software, the Turboboot process will either clean or format the boot device based on the TURBOBOOT environment variable setting.
6. Boot the standby DSC and all other PRPs with the MBI.

Caution If the Turboboot variable is set to format the boot device, all SDR configurations are deleted. Only the admin configuration is preserved. Review the sections About Turboboot, page 2-20 and About the Boot Device (Destination Disk), page 2-20 for more information.

For the procedure to install the Cisco IOS XR software from a TFTP server, see the "Reinstalling to a Cisco XR 12000 Series Router from a TFTP Server Image" section on page 2-43.

Installation from a Local Storage Device

To install the Cisco IOS XR software from a local storage device, perform the following procedures:

1. Copy the new Cisco IOS XR software to the local storage device on the DSC. We recommend disk1.
2. Place the router in ROM Monitor mode.
3. Clear any environment variables that might interfere with the installation.
4. Configure the TURBOBOOT environment variable to either clean or format the boot device during the installation.
5. Boot the new Cisco IOS XR software from the image on the local storage device. After you boot the Cisco IOS XR software, the Turboboot process will either clean or format the boot device based on the TURBOBOOT environment variable setting.
6. Boot the standby DSC and all other PRPs with the MBI.

Caution If the Turboboot variable is set to format the boot device, all SDR configurations are deleted. Only the admin configuration is preserved. Review the sections About Turboboot, page 2-20 and About the Boot Device (Destination Disk), page 2-20 for more information.

For the procedure to install the Cisco IOS XR software from a local storage device (such as disk1), see the "Reinstalling to a Cisco XR 12000 Series Router from an Image on a Local Storage Device" section on page 2-47.

About Boothelper in Cisco XR 12000 Series Routers

Boothelper software is additional software that extends the capabilities of ROM Monitor on a Cisco XR 12000 Series Router. With Boothelper, ROM Monitor can load images from compact flash and TFTP servers. Without Boothelper, ROM Monitor can only load images from a local storage device (disk0, disk1, and bootflash).

Before you can use Boothelper to connect to remote devices, such as a TFTP server, you must configure the Management Ethernet interface in the Boothelper software. After Boothelper is configured, you do not need to load the software. When the configuration register is set to load software (setting 0x2102), the software is loaded in the following sequence:

1. ROM Monitor
2. Boothelper
3. Cisco IOS XR software

If the Boothelper software cannot load, the ROM Monitor prompt appears. If the Cisco IOS XR software cannot load, the Boothelper prompt appears as follows:

```
router(boot)>
```

If all the software loads correctly, the Cisco IOS XR software prompt appears.

Boothelper Procedures (Cisco XR 12000 Series Routers)

This section provides the following procedures for use on Cisco XR 12000 Series routers:

Starting the Router with Boothelper

In normal operating conditions, it should not be necessary to start the router with Boothelper. If you want to reinstall software from a vm image on a remote server, you must start Boothelper to verify or configure the Management Ethernet interface. See About Boothelper in Cisco XR 12000 Series Routers, page 2-34 for more information.

SUMMARY STEPS

1. Restart the router in ROM Monitor mode.
2. **confreg 0x0**
3. **reset**
4. **unset BOOT**
5. **unset BOOTLDR=**
   or
   set BOOTLDR=bootflash:/*filename*
6. **sync**
7. **boot**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Restart the router in ROM Monitor mode.	Restarts the router in ROM Monitor mode. For more information, see Entering ROM Monitor Mode, page 1-3.
Step 2	**confreg 0x0** **Example** `rommon 1 > confreg 0x0`	Configures the router to restart in ROM Monitor mode. • This step and the next are not necessary if you have already set the configuration register to 0x0 in Step 1.
Step 3	**reset** **Example** `rommon 2 > reset`	Activates the configuration change made in Step 2.
Step 4	**unset BOOT** **Example** `rommon 3 > unset boot`	Clears the setting of the BOOT environment variable. • If the router has been running Cisco IOS XR software, the BOOT variable is probably set to load that software.

	Command or Action	Purpose
Step 5	**unset BOOTLDR=** or **set BOOTLDR=bootflash:/**filename **Example** rommon 2 > unset BOOTLDR= or rommon 2 > set BOOTLDR=bootflash:/c12kprp-boot-mz	Configures ROM Monitor to load the Boothelper software. • **unset BOOTLDR=** If the Boothelper file is the first file in bootflash (dir bootflash:), it will automatically be loaded when the **boot** command is run. Unset the Boothelper if the Boothelper file is the first file in bootflash. • **set BOOTLDR=bootflash:/***filename* If the Boothelper file is not the first file in bootflash, set the bootflash variable to specify the name and location of the Boothelper file.
Step 6	**sync** **Example** rommon 3 > sync	Saves the configuration change in Step 4.
Step 7	**boot** **Example** rommon 3 > boot	Boots the Boothelper software.

Examples

Starting the Router with Boothelper: Example

The following example shows how to start the router with Boothelper:

```
rommon 1 > confreg 0x0


rommon 2 > reset

System Bootstrap, Version 12.0(20040624:164256) [assafb-misc1 1.14dev(0.91)] DEE
Copyright (c) 1994-2004 by cisco Systems, Inc.

DRAM DIMM Slot 1: 512M found, Slot 2: 1024M found
MPC7450 platform with 1572864 Kbytes of main memory

rommon 1 > unset BOOT

rommon 2 > unset BOOTLDR=
rommon 3 > sync

rommon 4 > boot

Self decompressing the image : BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB [OK]

              Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
```

```
            cisco Systems, Inc.
            170 West Tasman Drive
            San Jose, California 95134-1706



Cisco Internetwork Operating System Software
IOS (tm) GS Software (C12KPRP-BOOT-M), Version 12.0(31)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Sat 16-Apr-05 22:45 by kellythw
Image text-base: 0x00010000, data-base: 0x0095D000

cisco 12410/PRP (MPC7450) processor (revision 0x00) with 1572864K bytes of memo.
MPC7450 CPU at 665Mhz, Rev 2.1, 256KB L2, 2048KB L3 Cache
Last reset from sw reset

3 Route Processor Cards
2 Clock Scheduler Cards
5 Switch Fabric Cards
1 8-port OC3 POS controller (8 POS).
1 four-port OC12 POS controller (4 POS).
1 OC48 POS controller (1 POS).
2 Four Port Gigabit Ethernet/IEEE 802.3z controllers (8 GigabitEthernet).
2 Ethernet/IEEE 802.3 interface(s)
8 GigabitEthernet/IEEE 802.3 interface(s)
13 Packet over SONET network interface(s)
2043K bytes of non-volatile configuration memory.

1000944K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
65536K bytes of Flash internal SIMM (Sector size 256K).
.
.
.
Press RETURN to get started!


router(boot)>
```

Configuring the Management Ethernet Interface

To enable network communications when the Cisco IOS XR software is not loaded, you must configure the Management Ethernet interface in Boothelper. The Boothelper configuration is most often used to enable access to TFTP servers when reinstalling software from vm files.

Prerequisites

Before you begin, collect the following information:

- IP address of the Management Ethernet interface for your RP
- Subnet mask of the Management Ethernet interface for your RP
- IP address of the default gateway that serves your RP

SUMMARY STEPS

1. Start the Boothelper software.
2. **enable**

3. Enter the password.
4. **show interface ethernet** *interfaceNumber*
5. **configure terminal**
6. **interface ethernet** *interfaceNumber*
7. **ip address** *ipaddress subnetmask*
8. **mac-address** *macaddress*
9. **no ip directed-broadcast**
10. **no ip route-cache**
11. **no shutdown**
12. **end**
13. **ip default-gateway** *ipAddress*
14. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Start the Boothelper software.	Starts the Boothelper. • For more information, see the "Starting the Router with Boothelper" section on page 2-35.
Step 2	**enable** **Example:** `router(boot)> enable`	Places the router in privileged EXEC mode.
Step 3	Enter the password. **Example:** `Password:`	Submits the password for authentication. • The password is not displayed on the screen.
Step 4	**show interface ethernet** *interfaceNumber* **Example:** `router(boot)# show interface ethernet 0`	Displays the current interface configuration and statistics for the specified interface. • Enter **0** for Ethernet interface 0 or **1** for Ethernet interface 1. • Enter **3** for Ethernet interface 3 on a PRP-2 card only. • If the current configuration is correct, skip to Step 13.
Step 5	**configure terminal** **Example:** `router(boot)# configure terminal`	Places the router in configuration mode.

	Command or Action	Purpose
Step 6	**interface ethernet** *interfaceNumber* **Example:** `router(b(config)# interface ethernet 0`	Selects an interface to configure. • Enter **0** for Ethernet interface 0 or **1** for Ethernet interface 1. **Note** The Ethernet ports correspond to the Management Ethernet interfaces in the Cisco IOS XR software. For example, Ethernet 0 corresponds to MgmtEth0/x/CPU0/0 in the Cisco IOS XR software.
Step 7	**ip address** *ipaddress subnetmask* **Example:** `router(b(config-if)# ip address 10.8.28.103 255.255.0.0`	Configures the IP address and subnet mask for the interface. • Replace *ipaddress* with the IP address for the interface. • Replace *subnetmask* with the subnet mask for the interface.
Step 8	**mac-address** *macaddress* **Example:** `router(b(config-if)# mac-address 0007.b39b.a7ff`	Configures the MAC address for the interface. • Replace *macaddress* with the MAC address for the interface. • This MAC address applies only while the node is running Boothelper.
Step 9	**no ip directed-broadcast** **Example:** `router(b(config-if)# no ip directed-broadcast`	Disables the translation of a directed broadcast to physical broadcasts.
Step 10	**no ip route-cache** **Example:** `router(b(config-if)# no ip route-cache`	Disables all switching options supported by the **ip route-cache** command.
Step 11	**no shutdown** **Example:** `router(b(config-if)# no shutdown`	Brings up the interface.
Step 12	**end** **Example:** `router(b(config-if)# end`	Exits interface configuration mode.

	Command or Action	Purpose
Step 13	**ip default-gateway** *ipAddress* **Example:** `router(b(config)# ip default-gateway 10.10.0.1`	Defines the IP address for the default gateway.

Step 14	**reload**
	
	Example:
	`router(boot)# reload`
	
	`System configuration has been modified. Save? [yes/no]: y`
	`Building configuration...`
	`[OK]`
	`Proceed with reload? [confirm]`
		Restarts the RP.
		• Type **Y** and press **Return** to save the configuration.
		• Press **Return** when asked to confirm that you want to reload the router.
		• Because the configuration register is still set to 0x0, the router reloads ROM Monitor.

Examples

Example: Configuring the Management Ethernet Interface

The following example shows how to configure Management Ethernet interface 0 on a PRP in Boothelper:

```
router(boot)> enable

Password:

router(boot)# show interface ethernet 0

Ethernet0 is administratively down, line protocol is down
  Hardware is 10/100 Ethernet, address is 0007.b39b.a7ff (bia 0007.b39b.a7ff)
  Internet address is 12.8.28.103/16
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 babbles, 0 late collision, 0 deferred
     1 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out

router(boot)# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.

router(b(config)# interface ethernet 0

router(b(config-if)# ip address 10.8.28.103 255.255.0.0
```

```
router(b(config-if)# mac-address 0007.b39b.a7ff

router(b(config-if)# no ip directed-broadcast

router(b(config-if)# no ip route-cache

router(b(config-if)# no shutdown

router(b(config-if)# end

router(boot)# reload

System configuration has been modified. Save? [yes/no]: y
Building configuration...
[OK]
Proceed with reload? [confirm]

System Bootstrap, Version 12.0(20040624:164256) [assafb-misc1 1.14dev(0.91)] DEE
Copyright (c) 1994-2004 by cisco Systems, Inc.

DRAM DIMM Slot 1: 512M found, Slot 2: 1024M found
MPC7450 platform with 1572864 Kbytes of main memory

rommon 1 >
```

Exiting Boothelper and Starting ROM Monitor

If an RP is running Boothelper software and you want to return to ROM Monitor mode, use the following procedure.

SUMMARY STEPS

1. **enable**
2. Enter the password.
3. **configure terminal**
4. **config-register 0x0**
5. **exit**
6. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `router(boot)> enable`	Places the router in privileged EXEC mode.
Step 2	Enter the password. **Example:** `Password:`	Submits the password for authentication. • The password is not displayed on the screen.

	Command or Action	Purpose
Step 3	**configure terminal** **Example:** router(boot)# **configure terminal**	Places the RP in configuration mode.
Step 4	**config-register 0x0** **Example:** router(b(config)# **config-register 0x0**	Configures the RP to start in ROM Monitor mode when the next reload occurs.
Step 5	**exit** **Example:** router(b(config)# **exit**	Exits configuration mode.
Step 6	**reload** **Example:** router(boot)# **reload** System configuration has been modified. Save? [yes/no]: **y** Building configuration... [OK] Proceed with reload? [confirm]	Restarts the RP. • Type **Y** and press **Return** to save the configuration. • Press **Return** when asked to confirm that you want to reload the router. • Because the configuration register is set to 0x0, the router reloads ROM Monitor.

Examples

The following example is provided:

- Exiting Boothelper and Starting ROM Monitor, page 2-42

Exiting Boothelper and Starting ROM Monitor

The following example shows how to exit Boothelper and start ROM Monitor on an RP:

```
router(boot)> enable

Password:

router(boot)# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.

router(b(config)# config-register 0x0

router(b(config)# exit

router(boot)# reload

System configuration has been modified. Save? [yes/no]: y
Building configuration...
[OK][OK][OK]
Proceed with reload? [confirm]

System Bootstrap, Version 12.0(20040624:164256) [assafb-misc1 1.14dev(0.91)] DEVELOPMENT
SOFTWARE
Copyright (c) 1994-2004 by cisco Systems, Inc.
```

```
DRAM DIMM Slot 1: 512M found, Slot 2: 1024M found
MPC7450 platform with 1572864 Kbytes of main memory

rommon 1 >
```

Reinstalling to a Cisco XR 12000 Series Router from a TFTP Server Image

The Cisco IOS XR software can be reinstalled directly from a vm file located on a TFTP server. Complete the instructions in this section exactly as described.

Restrictions for TFTP Services

TFTP services by some vendors (such as Sun Solaris) may not support files larger than 32 MB. Because most Cisco IOS XR vm images are larger than 32 MB, you may need to use one of the following options:

- Use a third-party or freeware TFTP server that supports file sizes larger than 32 MB.
- Download a patch from Sun Microsystems to correct this limitation (http://www.sun.com).
- Install the Cisco IOS XR software from a vm image located on the local flash disk. See the "Reinstalling to a Cisco XR 12000 Series Router from an Image on a Local Storage Device" section on page 2-47.

Prerequisites

The following hardware and software are required:

- ROM Monitor 1.14 or higher
- Boothelper c12kprp-boot-mz.120-32.S3
- 256 MB or higher flash disk0

Before you begin, collect the following information.

- IP address of the TFTP server from which the software will be downloaded
- The filename and directory of the vm installation file that will be installed on the router

Note This procedure installs the Cisco IOS XR software on a router that previously ran the Cisco IOS XR software. If you are upgrading a Cisco XR 12000 Series Router that is currently running Cisco IOS software, you need to first upgrade the router to Cisco IOS XR software, as described in *Upgrading from Cisco IOS to Cisco IOS XR Software on the Cisco XR 12000 Series Router.*

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Place both the DSC and standby DSC in ROM Monitor mode.
3. Configure Boothelper for network access.
4. **set**
5. **unset BOOT**
6. **unset TFTP_FILE**
7. **unset CONFIG_FILE**

8. **TURBOBOOT=on**, *boot-device*, *options*
9. **sync**
10. **boot tftp://***server/directory/filename*
11. Boot all non-DSC PRPs with the MBI.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Back up the router configuration while still in EXEC mode.	(Optional) To preserve the current router configuration, copy it to another disk while still in EXEC mode. • For more information, see "Managing Configuration History and Rollback" in the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*.
Step 2	Place both the DSC and standby DSC in ROM Monitor mode.	Places the PRPs in ROM Monitor mode. • See Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode, page 1-4 for more information.
Step 3	Configure Boothelper for network access.	Enables network access for the PRP in preparation for downloading the new software.
Step 4	**set** **Example:** `rommon1> set`	Displays the ROM Monitor environment variables.
Step 5	**unset BOOT** **Example:** `rommon2> unset BOOT`	Clears the setting for the BOOT variable. • This step is not required if the **set** command display shows that no value is assigned to this variable.
Step 6	**unset TFTP_FILE** **Example:** `rommon3> unset TFTP_FILE`	Clears the setting for the TFTP_FILE variable. • This step is not required if the **set** command display shows that no value is assigned to this variable.
Step 7	**unset CONFIG_FILE** **Example:** `rommon4> unset CONFIG_FILE`	Clears the setting for the CONFIG_FILE variable. • This step is not required if the **set** command display shows that no value is assigned to this variable.

	Command or Action	Purpose
Step 8	**TURBOBOOT=on**, *boot-device*, *options* **Example:** `rommon5> TURBOBOOT=on,disk0,format`	Sets the Turboboot parameters. • Separate each parameter with a comma (,). • To enable the Turboboot process, specify **on**. • Specify a boot device where all software will be installed on the DSC and all DSDRSCs. We recommend disk0:. • To replace the existing software without formatting the boot device, replace *options* with **clean.** • To replace the existing software and format the boot device, replace *options* with **format.** • The default option is **clean**. • Any existing configuration is preserved.
Step 9	**sync** **Example:** `rommon6> sync`	Saves the new ROM Monitor variable settings.
Step 10	**boot tftp://***server/directory/filename* **Example:** `rommon7> boot tftp://223.255.254.254/softdir/c12k-mini.vm-3.4.0`	Retrieves the file from the TFTP server and installs it on the boot device. • Execute this command on the active PRP and specify the vm installation file from the TFTP server. • This process removes any existing software packages, resets the configuration register to 0x2, and boots the system. • Allow the system to fully boot. The "Press RETURN to get started" message appears twice. The first occurrence appears when the software is loaded into memory. The second occurrence happens after the software has been installed on the disk. • The system is fully booted when the following message appears: `SYSTEM CONFIGURATION COMPLETED` • Do not wait for this step to complete before starting the next step.

	Command or Action	Purpose
Step 11	Boot all non-DSC PRPs with the MBI.	Prepares PRPs to communicate with the DSC. • For instructions on booting the non-DSC PRPs with the MBI, see the "Bringing Up Non-DSC PRPs on Cisco XR 12000 Series Routers" section on page 2-51. • If the PRP is in a redundancy slot that is paired with an active PRP, the PRP starts as the standby for that PRP. The adjacent redundancy slots are as follows: – Slot 0 and Slot 1 – Slot 2 and Slot 3 – Slot 4 and Slot 5 – Slot 6 and Slot 7 – Slot 8 and Slot 9 – Slot 10 and Slot 11 – Slot 12 and Slot 13 – Slot 14 and Slot 15 • If the PRP is not in a redundancy slot that is paired with an active PRP, the PRP becomes available for assignment to SDRs. • Redundancy slot pairs are described in the "Managing the Router Hardware" chapter of *Cisco IOS XR Getting Started Guide*.

Examples

Setting the TURBOBOOT Variable

The following example shows how to set the TURBOBOOT variable on the DSC and save the change:

```
rommon1> TURBOBOOT=on,disk0,format
rommon2> sync
```

Booting the vm Installation File

The following example shows how to boot the DSC using the specified vm file on the specified TFTP server:

```
rommon 2> boot tftp://10.10.10.10/software/c12k-mini.vm-3.4.0

.
.
.

bios con0/RP1/CPU0 is now available


Press RETURN to get started.
```

Reinstalling to a Cisco XR 12000 Series Router from an Image on a Local Storage Device

This section describes the tasks required to install the Cisco IOS XR software on the boot device (such as disk0) using a vm image stored on a a local flash storage device (such as disk1). Complete the procedures exactly as described in this section.

Note Before booting begins, a delay of 10 minutes or more may occur while the vm image is read to memory from the removable flash disk1.

Prerequisites

A valid vm image, as described in the "Locating Installable Files" section on page 2-16, must be located on flash disk (disk1).

If this file is not present on disk1 or a different version is required, use one of the following options:

- While the router is still in EXEC mode, copy the necessary vm image from a TFTP, an FTP, or an rcp server to the local storage device. We recommend flash disk1. This process is described in the the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide*.
- Consult your system administrator for a flash disk containing the bootable vm file.
- Consult your Cisco representative for a flash disk containing the bootable vm file. See Obtaining Additional Publications and Information, page -xii for more information.

Note We recommend the removable flash disk disk1 to store archives of vm and PIE files. The disk used to store the installable files cannot be used as a destination for installed software or configurations. Only the boot device can be used to store active software and configurations. See About the Boot Device (Destination Disk), page 2-20 for more information. See also the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide* for more information.

The following hardware and software are required:

- ROM Monitor 1.14 or higher
- Boothelper c12kprp-boot-mz.120-32.S3
- 256 MB or higher flash disk0.

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Copy the required vm file to the DSC flash disk that will store the files. We recommend the use of flash disk1. You can also use a flash disk that already has the correct image.
3. Place both the DSC and standby DSC in ROM Monitor mode.
4. **set**
5. **unset BOOT**
6. **unset TFTP_FILE**
7. **unset CONFIG_FILE**

8. **TURBOBOOT=on**, *boot-device*, *options*
9. **sync**
10. **boot disk1:**/*filename*
11. Boot all non-DSC PRPs with the MBI.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Back up the router configuration while still in EXEC mode.	(Optional) To preserve the current router configuration, copy it to another disk while still in EXEC mode. • See "Managing Configuration History and Rollback" in *Cisco IOS XR Getting Started Guide* for more information.
Step 2	Copy the required vm file to the DSC local storage device (such as flash disk1). Or insert a flash disk that has the correct image.	Places the software on the router in preparation for installation. • For more information, see the "Prerequisites" section for this procedure.
Step 3	Place both the DSC and standby DSC in ROM Monitor mode.	See Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode, page 1-4 for more information.
Step 4	**set** **Example:** `rommon1> set`	Displays the ROM Monitor environment variables.
Step 5	**unset BOOT** **Example:** `rommon2> unset BOOT`	Clears the setting for the BOOT variable. • This step is not required if the **set** command display shows that no value is assigned to this variable.
Step 6	**unset TFTP_FILE** **Example:** `rommon3> unset TFTP_FILE`	Clears the setting for the TFTP_FILE variable. • This step is not required if the **set** command display shows that no value is assigned to this variable.
Step 7	**unset CONFIG_FILE** **Example:** `rommon4> unset CONFIG_FILE`	Clears the setting for the CONFIG_FILE variable. • This step is not required if the **set** command display shows that no value is assigned to this variable.

	Command or Action	Purpose
Step 8	**TURBOBOOT=on**, *boot-device*, *options* **Example:** `rommon5> TURBOBOOT=on,disk0,format`	Sets the TURBOBOOT parameters. • Separate each parameter with a comma (,). • To enable the Turboboot process, specify **on**. • Specify a boot device where all software will be installed on the DSC and all DSDRSCs. We recommend disk0:. • To replace the existing software without formatting the boot device, replace *options* with **clean.** • To replace the existing software and format the boot device, replace *options* with **format.** • The default option is **clean**. • Any existing configuration is preserved.
Step 9	**sync** **Example:** `rommon6> sync`	Saves the new ROM Monitor variable settings.
Step 10	**boot** *device*:*/filename* **Example:** `rommon7> boot disk1:/c12k-mini.vm-3.4.0`	Boots the file located on the local storage device and and installs it to the boot device. • This process removes any existing software packages, resets the configuration register to 0x2, and boots the system. • Allow the system to fully boot. The "Press RETURN to get started" message appears twice. The first occurrence appears when the software is loaded into memory. The second occurrence happens after the software has been installed on the disk. • The system is fully booted when the following message appears: `SYSTEM CONFIGURATION COMPLETED` **Note** A delay of 10 minutes or more occurs while the software is read from the flash disk.

	Command or Action	Purpose
Step 11	Boot all non-DSC PRPs with the MBI.	Prepares PRPs to communicate with the DSC. • For instructions on booting the non-DSC PRPs with the MBI, see the "Bringing Up Non-DSC PRPs on Cisco XR 12000 Series Routers" section on page 2-51. • If the PRP is in a redundancy slot that is paired with an active PRP, the PRP starts as the standby for that PRP. The adjacent redundancy slots are as follows: – Slot 0 and Slot 1 – Slot 2 and Slot 3 – Slot 4 and Slot 5 – Slot 6 and Slot 7 – Slot 8 and Slot 9 – Slot 10 and Slot 11 – Slot 12 and Slot 13 – Slot 14 and Slot 15 • If the PRP is not in a redundancy slot that is paired with an active PRP, the PRP becomes available for assignment to SDRs. • Redundancy slot pairs are described in "Managing the Router Hardware" in *Cisco IOS XR Getting Started Guide*.

Examples

Setting the TURBOBOOT Variable

The following example shows how to set the TURBOBOOT variable on the DSC and save the change:

```
rommon2> TURBOBOOT=on,disk0,format
rommon3> sync
```

Booting the vm Installation File

The following example shows how to boot the DSC using the specified vm file on flash disk1:

```
rommon4> boot disk1:/c12k-mini.vm-3.4.0
```

What to Do Next

After the system is up, it is in normal EXEC mode, and you can execute the full range of CLI commands.

Note If there was no previous router configuration, you must enter a root-system username and password when the boot process is complete.

After reinstalling the software, you might want to refer to the following additional instructions:

1. See "Verifying the System Interfaces" in *Cisco IOS XR Getting Started Guide* for instructions to verify that the interfaces are up and properly configured.
2. Install additional software from the PIE files, as necessary. See the "Upgrading and Managing Cisco IOS XR Software" chapter of *Cisco IOS XR Getting Started Guide* for more information.
3. See Obtaining Additional Publications and Information, page xii for a list of the additional documentation required to fully configure the router.

Bringing Up Non-DSC PRPs on Cisco XR 12000 Series Routers

If the Cisco IOS XR software has not been previously installed on a PRP and the PRP is installed in a Cisco XR 12000 Series Router, the card state shown by the **show platform** command is "Card Present." To bring up the card for use in the router, you must first install the minimum boot image (MBI) software on the card. This section describes how to install the MBI on non-DSC RPs.

Prerequisites

The following hardware and software are required:

- ROM Monitor 1.14 or later
- Boothelper c12kprp-boot-mz.120-32.S3
- 256 MB or higher flash disk0

Before you begin, collect the following information.

- IP address of the TFTP server from which the software will be downloaded
- The filename and directory of the MBI file that will be installed on the PRP

SUMMARY STEPS

1. Restart the PRP in ROM Monitor mode.
2. **set**
3. **unset TURBOBOOT**
4. **unset BOOT**
5. **sync**
6. **boot tftp://***server***/***path***/mbiprp-rp.vm**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Restart the PRP in ROM Monitor mode.	Restarts the PRP in ROM Monitor mode. • If the rommon prompt appears, the PRP is already in ROM Monitor mode. • If the boot prompt appears, the PRP is in Boothelper. For information on starting ROM Monitor from this point, see the "Exiting Boothelper and Starting ROM Monitor" section on page 2-41.
Step 2	**set** **Example:** `rommon 1 > set`	Displays the current setting of the ROM Monitor environment variables.
Step 3	**unset TURBOBOOT** **Example:** `rommon 2 > unset TURBOBOOT`	Clears any value assigned to the TURBOBOOT variable. • If the TURBOBOOT variable displays no value in Step 2, you can skip this step.
Step 4	**unset BOOT** **Example:** `rommon 3 > unset BOOT`	Clears the setting of the BOOT environment variable. • If the BOOT variable displays no value in Step 2, you can skip this step.
Step 5	**sync** **Example:** `rommon 4 > sync`	Saves any configuration changes you have made to the environment variables.
Step 6	**boot tftp://***server*/*path*/**mbiprp-rp.vm** **Example:** `rommon 5 > boot tftp://server1/path/mbiprp-rp.vm`	Boots the MBI software. • For more information on the MBI software and locating the MBI, see the "Locating Installable Files" section on page 2-16. • When the MBI is loaded, the **show platform** command displays the state as "MBI Running." • If the PRP is in a redundancy slot that is paired with a DSC or DSDRSC, the PRP synchronizes the configuration with the active PRP, and this takes some time. When the synchronization is complete, the **show platform** command displays the state as "IOS-XR RUN." • Redundancy slot pairs are described in the "Managing the Router Hardware" chapter of *Cisco IOS XR Getting Started Guide*.

Examples

The following example is provided:

- Bringing Up a Non-DSC RP, page 2-53

Bringing Up a Non-DSC RP

The following example shows how to bring up a non-DSC RP with the MBI:

```
rommon 1 > set
PS1=rommon ! >
IP_SUBNET_MASK=
TFTP_SERVER=
DEFAULT_GATEWAY=
IP_ADDRESS=
RET_2_RUTC=
IOX_ADMIN_CONFIG_FILE=
CONFIG_FILE=
BOOTLDR=
CONFGEN=
CHASSIS_SN=TBA07280054
IOX_CONFIG_FILE=
AUX_AUTHEN_LEVEL=0
TURBOBOOT=on,disk0,format
ReloadReason=79
BSI=0
RET_2_RCALTS=
BOOT=tftp://server1/path/file

rommon 2 > unset TURBOBOOT

rommon 3 > unset BOOT

rommon 4 > sync

rommon 5 > boot tftp://server1/path/mbiprp-rp.vm

Self decompressing the image : BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB [OK]

Loading path/mbiprp-rp.vm from server1 (via Ethernet0): !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 8726056 bytes]
Zø#####################################################################
System page at phys:00023000 user:00023000 kern:00023000
Starting next program at v0022a188

Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

           Cisco Systems, Inc.
           170 West Tasman Drive
           San Jose, California 95134-1706

Cisco IOS XR Software for the Cisco XR c12000-mbiprp,
Copyright (c) 2006 by Cisco Systems, Inc.
```

Managing Configuration Files in ROM Monitor

Cisco IOS XR software creates two types of configuration files, the admin configuration file and secure domain router (SDR) configuration files.

- There is only one admin configuration file, which is stored on the designated system controller (DSC) and contains system-wide configurations for items such as SDR names and node inventory.
- In addition, each SDR has its own SDR configuration to specify the parameters for routing, interfaces, SDR usernames, and other SDR-specific configurations. By default, the configuration file for each SDR is stored on the designated secure domain router system controller (DSDRSC) for the SDR.

For more information on SDRs, DSDRSCs and admin plane configuration, see the "Configuring Secure Domain Routers on Cisco IOS XR Software" chapter of *Cisco IOS XR System Management Configuration Guide*.

The following sections describe ways to manage the use of configuration files from ROM Monitor.

Caution The default configuration should be sufficient for most situations. The options described in the following sections are for rare cases in which an alternative configuration is required. Use of these options can result in system errors or downtime. Consult Cisco technical support before using these options.

This chapter contains the following sections:

Specifying an Alternative Admin Configuration

The admin configuration stores system-wide configurations such as the SDR names and node inventory for the entire system. This is separate from the individual SDR configurations that store routing and interface configurations.

To specify an alternative admin configuration file from ROMMON, use the methods described in the following sections:

- Specifying a Temporary Alternative Administrative Configuration with the -o Boot Option, page 3-56
- Specifying a Permanent Alternative Administrative Configuration File with the IOX_ADMIN_CONFIG_FILE= Variable, page 3-57

Caution The default committed admin configuration should be sufficient for most situations. The option described in this section is for rare cases when an alternative admin configuration is required. Use of this method can result in system errors or downtime.

Specifying a Temporary Alternative Administrative Configuration with the -o Boot Option

To specify a temporary admin configuration file with the -o boot option, use the following procedure. With this method, the specified configuration file is used for a single router boot. If the DSC is reset again, the permanent configuration file is used.

Step 1 Place the DSC and the standby DSC in ROM Monitor mode, as described in Entering ROM Monitor Mode, page 1-3.

Step 2 Set the configuration register of the standby DSC to 0x0 so that the standby DSC does not take control:

```
rommon 1> confreg 0x0
```

Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command. See "ROM Monitor Overview and Basic Procedures" for more information on ROMMON commands and environmental variables.

Step 3 Set the active RP configuration register to 0x2102:

```
rommon 1 > confreg 0x2102
```

Step 4 Enter the set command to display the current environment variable settings:

```
rommon 2 > set
```

Note the filename set in the BOOT variable.

Step 5 Enter the **boot** command using the following command syntax:

boot *image* **–o** *config-file-path*

Replace *image* with the filename listed in the boot variable, and replace *config-file-path* with the path and filename for the configuration file. Example:

```
rommon 3> boot tftp://223.255.254.254/images/comp-hfr-mini.vm -o
/disk1:/cfgarchives/admingold.conf
```

Note The pathname should be a valid UNIX pathname (a slash [/] must be included after the device: “disk1:/”).

Although this command causes the router to boot from an alternative configuration, the system reverts to the default committed configuration on the next system reload.

Step 6 Set the configuration register of the standby DSC to 0x102:

```
rommon 1> confreg 0x102
```

Step 7 Reset the standby DSC so that the new setting can take effect and the standby DSC becomes operational:

```
rommon 2 > reset
```

Specifying a Permanent Alternative Administrative Configuration File with the IOX_ADMIN_CONFIG_FILE= Variable

To permanently change the location of the default admin configuration file, specify the filename and directory path in the "IOX_ADMIN_CONFIG_FILE=" environment variable while in ROMMON mode. Specifying the variable forces the use of the specified file for all boots while this variable is set.

Step 1 Place the DSC and the standby DSC in ROM Monitor mode, as described in Entering ROM Monitor Mode, page 1-3.

Step 2 Set the configuration register of the standby DSC to 0x0 so that the standby DSC does not take control:

```
rommon 1> confreg 0x0
```

Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command.

Step 3 Set the DSC configuration register to 0x2102:

```
rommon 1 > confreg 0x2102
```

Step 4 Enter the set command to display the current environment variable settings:

```
rommon 2 > set
```

Step 5 Note the filename set in the IOX_ADMIN_CONFIG_FILE variable.

Step 6 To define the path to a different admin configuration file, set the IOX_ADMIN_CONFIG_FILE variable using the following syntax:

```
rommon B1> IOX_ADMIN_CONFIG_FILE=drive:path/file
```

Step 7 To save the change, enter the **sync** command as follows:

```
rommon B1> sync
```

Step 8 Boot the router with the following command:

```
rommon B1> boot
```

Step 9 Set the configuration register of the standby DSC to 0x102:

```
rommon 1> confreg 0x102
```

Step 10 Reset the standby DSC so that the new setting can take effect and the standby DSC becomes operational:

```
rommon 2 > reset
```

Note The IOX_ADMIN_CONFIG_FILE= variable is overridden by the **boot** command when it is entered with the **-o** option.

Specifying an Alternative SDR Configuration

You can specify an alternative configuration for an SDR from ROMMON, using the methods described in the following sections. These procedures are run from the DSDRSC for the SDR. The DSC is also the DSDRSC of the owner SDR. For all other non-owner SDRs, the DSDRSC is the RP or DRP assigned as the DSDRSC.

Note For more information on SDRs and DSDRSCs, see the "Configuring Secure Domain Routers on Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide*.

This section includes the following instructions:

- Specifying a Temporary SDR Configuration File with the -a Boot Option, page 3-58
- Specifying a Permanent SDR Configuration File with the IOX_CONFIG_FILE= Variable, page 3-59

Caution The default committed SDR configuration should be sufficient for most situations. The option described in this section is for rare cases when an alternative SDR configuration is required. Use of this method can result in system errors or downtime.

Specifying a Temporary SDR Configuration File with the -a Boot Option

To specify a temporary SDR configuration file with the -a boot option, use the following procedure:

Step 1 Place the DSDRSC and the standby DSDRSC in ROM Monitor mode, as described in Entering ROM Monitor Mode, page 1-3.

Step 2 Set the configuration register of the standby DSDRSC to 0x0 so that the standby DSDRSC does not take control:

```
rommon 1> confreg 0x0
```

Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command.

Step 3 Set the DSDRSC configuration register to 0x2102:

```
rommon 1 > confreg 0x2102
```

Step 4 Enter the set command to display the current environment variable settings:

```
rommon 2 > set
```

Note the filename set in the BOOT variable.

Step 5 Enter the **boot** command using the following command syntax:

boot *image* **–a** *config-file-path*

Replace *image* with the filename listed in the BOOT variable, and replace *config-file-path* with the path and filename for the configuration file. Example:

```
rommon 3> boot tftp://223.255.254.254/images/comp-hfr-mini.vm -a
/disk1:/cfgarchives/SDRgold.conf
```

Note The pathname should be a valid UNIX pathname (a slash [/] must be included after the device: “disk1:/”).

Although this command causes the SDR to boot from an alternative configuration, the system reverts to the default committed configuration on the next reload.

Step 6 Set the configuration register of the standby DSDRSC to 0x102:

```
rommon 1> confreg 0x102
```

Step 7 Reset the standby DSDRSC so that the new setting can take effect and the standby DSDRSC becomes operational:

```
rommon 2 > reset
```

Specifying a Permanent SDR Configuration File with the IOX_CONFIG_FILE= Variable

To permanently change the location of the default configuration file for an SDR, specify the filename and directory path in the "IOX_CONFIG_FILE=" environment variable while in ROMMON mode. Specifying the variable forces the use of the specified file for all boots while this variable is set.

Step 1 Place the DSDRSC and the standby for it in ROM Monitor mode, as described in Entering ROM Monitor Mode, page 1-3.

Step 2 Set the configuration register of the standby DSDRSC to 0x0 so that the standby DSDRSC does not take control:

```
rommon 1> confreg 0x0
```

Note The configuration register is not an environment variable like TURBOBOOT (which is described earlier in this chapter). Do not enter an equal sign when entering the **confreg** command.

Step 3 Set the DSDRSC configuration register to 0x2102:

```
rommon 1 > confreg 0x2102
```

Step 4 Enter the set command to display the current environment variable settings:

```
rommon 2 > set
```

Step 5 Note the filename set in the IOX_CONFIG_FILE variable.

Step 6 To define the path to a different SDR configuration file, set the IOX_CONFIG_FILE variable using the following syntax:

```
rommon B1> IOX_CONFIG_FILE=drive:path/file
```

Step 7 To save the change, enter the **sync** command as follows:

```
rommon B1> sync
```

Step 8 Boot the router with the following command:

```
rommon B1> boot
```

Step 9 Set the configuration register of the standby DSDRSC to 0x102:

```
rommon 1> confreg 0x102
```

Step 10 Reset the standby DSDRSC so that the new setting can take effect and the standby DSDRSC becomes operational:

```
rommon 2 > reset
```

Note The IOX_CONFIG_FILE= variable is overridden by the **boot** command when it is entered with the **-a** option.

Specifying an Alternate Storage Location for Configuration Files

To change the default location where the configuration files for an SDR are saved (committed), specify the location and directory path in the "IOX_CONFIG_MEDIUM=" environment variable while in ROMMON mode. Specifying the variable forces the use of the specified location while this variable is set.

Step 1 Place the DSDRSC and the standby DSDRSC in ROM Monitor mode, as described in Entering ROM Monitor Mode, page 1-3.

Step 2 Set the configuration register of the standby DSDRSC to 0x0 so that the standby DSDRSC does not take control:

```
rommon 1> confreg 0x0
```

Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command.

Step 3 Set the DSDRSC configuration register to 0x2102:

```
rommon 1 > confreg 0x2102
```

Step 4 Enter the set command to display the current environment variable settings:

```
rommon 2 > set
```

Step 5 Note the filename set in the IOX_CONFIG_MEDIUM variable.

Step 6 To specify a different location, set the IOX_CONFIG_MEDIUM variable using the following syntax:

```
rommon B1> IOX_CONFIG_MEDIUM=/location:/path/
```

For the Cisco CRS-1, replace *location* with **disk0** or **disk1**. Replace *path* with the path to the directory in which you want to store the configuration files.

For the Cisco XR 12000 Series Router, replace *location* with **disk0**, **disk1**, or **compactflash**. Replace *path* with the path to the directory in which you want to store the configuration files.

Note By default, the directory /disk0:/usr is available for storing alternative configurations and other user files. We recommend that you do not use a directory path starting with /disk0:/config because that path is used to store system files.

Step 7 To save the change, enter the **sync** command as follows:

```
rommon B1> sync
```

Step 8 Boot the router with the following command:

```
rommon B1> boot
```

Step 9 Set the configuration register of the standby DSDRSC to 0x102:

```
rommon 1> confreg 0x102
```

Step 10 Reset the standby DSDRSC so that the new setting can take effect and the standby DSDRSC becomes operational:

```
rommon 2 > reset
```

Password Recovery in ROM Monitor Mode

If the root password is forgotten, it can be recovered only at the DSC. To recover the password at the DSC, set the configuration register to 0x42 on the active RP and reboot the router. When the router boots, a password recovery dialog appears. This dialog prompts you to reset the root-system username and password. After you save the new password, the configuration register automatically resets to the prior value (such as 0x2102).

This chapter also includes instructions to bypass ksh authentication on a node.

This chapter contains the following sections:

Recovering the Root Password on Single-RP Routers

Use the following procedure to recover the router password from a router with a single RP.

Step 1 Place the router in ROM Monitor mode, as described in Entering ROM Monitor Mode, page 1-3.

Step 2 Set the RP configuration register to 0x42 at the ROMMON prompt:

```
rommon 1 > confreg 0x42
```

Note The configuration register is not an environment variable like TURBOBOOT (which is described earlier in this chapter). Do not enter an equal sign when entering the **confreg** command.

Step 3 Reset or power cycle the router so that the new setting can take effect:

```
rommon 2 > reset
```

Step 4 Press **Return** at the prompt to enter the password recovery dialog. Then enter the new root-system username and password and save the configuration.

```
router con0/0/CPU0 is now available

Press RETURN to get started.


--- Administrative User Dialog ---
```

```
  Enter root-system username: user
  Enter secret:
  Enter secret again:
RP/0/0/CPU0:Jan 10 12:50:53.105 : exec[65652]: %MGBL-CONFIG-6-DB_COMMIT :
'Administration configuration committed by system'. Use 'show configuration commit changes
2000000009' to view the changes.
Use the 'admin' mode 'configure' command to modify this configuration.


User Access Verification

Username: user
Password:
RP/0/0/CPU0:router#
```

Recovering the Root Password on Redundant-RP Routers

Use the following procedure to recover the router password from a router with redundant RPs.

Step 1 Place both RPs in ROM Monitor mode, as described in Entering ROM Monitor Mode, page 1-3.

Step 2 Set the configuration register of the standby RP to 0x0 so that the standby RP does not take control during the password recovery:

```
rommon 1> confreg 0x0
```

Note The configuration register is not an environment variable like TURBOBOOT (which is described earlier in this chapter). Do not enter an equal sign when entering the **confreg** command.

Step 3 Set the active RP configuration register to 0x42:

```
rommon 1 > confreg 0x42
```

Step 4 Reset or power cycle the router so that the new setting can take effect:

```
rommon 2 > reset
```

Step 5 Press **Return** at the prompt to enter the password recovery dialog. Then enter the new root-system username and password and save the configuration, as shown in the following example:

```
router con0/0/CPU0 is now available

Press RETURN to get started.


--- Administrative User Dialog ---


  Enter root-system username: user
  Enter secret:
  Enter secret again:
RP/0/0/CPU0:Jan 10 12:50:53.105 : exec[65652]: %MGBL-CONFIG-6-DB_COMMIT :
'Administration configuration committed by system'. Use 'show configuration commit changes
2000000009' to view the changes.
```

```
Use the 'admin' mode 'configure' command to modify this configuration.


User Access Verification

Username: user
Password:
RP/0/0/CPU0:router#
```

Step 6 Set the configuration register of the standby RP to 0x102:

```
rommon 1> confreg 0x102
```

Step 7 Reset the standby RP so that the new setting can take effect and the standby RP becomes operational:

```
rommon 2 > reset
```

Bypassing ksh Authentication

You can also bypass the ksh authentication for the auxiliary port of the route processor (RP), standby RP, and distributed RP cards and for console and auxiliary ports of line cards (LCs) and service processors (SPs). The situations where ksh authentication may need to be bypassed include the following:

- DSC (active RP) disk0 corruption
- Loss of Qnet connectivity
- Inability to determine the node ID of the DSC (ACTIVE RP)

For information and instructions to bypass ksh authentication, see the “Configuring AAA Services on Cisco IOS XR Software” chapter of *Cisco IOS XR System Security Configuration Guide*.

Upgrading and Downgrading ROM Monitor Firmware on Cisco CRS-1 Routers

This chapter describes how to upgrade or downgrade the ROM Monitor firmware on a Cisco CRS-1.

Caution The ROM Monitor software must be upgraded to version 1.42 or higher on all RPs before a Cisco CRS-1 system is upgraded to Cisco IOS XR Software Release 3.4.1 or higher release. If the router is brought up with an incompatible version of the ROM Monitor software, then the standby RP may fail to boot. For instructions to overcome a boot block in the standby RP in a single-chassis system, see Overriding a ROM Monitor Boot Block in a Single-chassis System, page 5-83. If a boot block occurs in a multishelf system, contact your Cisco Systems support representative for assistance. See Obtaining Technical Assistance, page x

In addition, Cisco CRS-1 multishelf systems should be upgraded to ROMMON release 1.40 before being upgraded to Cisco IOS XR Release 3.4.1 to ensure that RPs are assigned the correct rack numbers during system boot.

For more information, see ROM Monitor Compatibility with Cisco IOS XR Software, page 5-69.

Information About ROM Monitor Firmware

The ROM Monitor, which is also known as ROMMON, is a bootstrap program that initializes the hardware and boots the Cisco IOS XR firmware when you power on or restart a Cisco CRS-1. ROM Monitor upgrades can be required to resolve firmware defects or support new features. Typically, ROM Monitor upgrades are infrequent and not required for every Cisco IOS XR software upgrade.

Before upgrading or downgrading ROM Monitor firmware, you should understand the following concept:

- About ROMMON A and ROMMON B, page 5-68
- Upgrading or Downgrading a Single Node or All Nodes, page 5-68
- ROM Monitor Compatibility with Cisco IOS XR Software, page 5-69

Tip Information on operating the router in ROM Monitor mode is provided in ROM Monitor Overview and Basic Procedures, page 1-1.

About ROMMON A and ROMMON B

Each node in a Cisco CRS-1 router includes two copies of ROM Monitor: ROMMON A and ROMMON B. During power on, ROMMON A loads first. If ROMMON A detects the presence of ROMMON B, it checks the compatibility and integrity of the ROMMON B code. If ROMMON B passes these tests, ROMMON A passes control of the router to ROMMON B.

You can upgrade ROMMON B or both ROMMON A and ROMMON B. When you upgrade only ROMMON B, the router can still use the unmodified ROMMON A if the ROM Monitor upgrade is interrupted or fails for any reason.

Note If the new ROMMON B is not compatible with the older installed version, both ROMMON A and ROMMON B must be upgraded. For example, if a router is running a version of ROMMON earlier than version 1.32, you should upgrade both ROMMON A and ROMMON B. However, if a router is already running ROMMON version 1.32 or higher for ROMMON A and ROMMON B, then only ROMMON B should be upgraded to the latest release. This ensures that the router can still use the unmodified ROMMON A if the ROM Monitor upgrade is interrupted or fails for any reason. See Table 5-2 for more information.

Upgrading or Downgrading a Single Node or All Nodes

The upgrade and downgrade procedures for ROMMON firmware are the same. Install a higher version to upgrade the firmware, or a lower version to downgrade the firmware.

ROM Monitor operates on every node within the router. During an upgrade or downgrade, the ROMMON firmware is copied into hardware EEPROMs in the router. For more information on ROMMON firmware compatibility with the Cisco IOS XR software and Cisco CRS-1 router, see ROM Monitor Compatibility with Cisco IOS XR Software, page 5-69.

For most upgrades, we recommend upgrading or downgrading the ROMMON firmware on all nodes. You can also upgrade or downgrade a single node which is useful when moving a card between two routers or adding a card that is not running the correct ROM Monitor version. When you upgrade a single node that uses ROM Monitor in both the CPU0 and SP modules, such as a line card node, we recommend that you upgrade both modules to the same ROM Monitor version.

Reloading Nodes After a ROMMON Firmware Change

The new ROMMON firmware is not active on a node until the card is reloaded. For example, if you upgrade a single node, you must reload that node only after the upgrade. If you upgrade or downgrade all nodes, you must also reload all nodes to active the new ROMMON version.

To gracefully reload all nodes, reload the standby RP, perform a redundancy switchover, reload the second RP, and then reload all other nodes in the system.

If the router does not contain a redundant standby RP, or if you wish to perform a cold restart, you can also reload all nodes at the same time, including the primary RP (DSC). Remember that a cold restart will result in router downtime while the cards reboot.

Instructions to reload the nodes are included in Upgrading or Downgrading ROM Monitor Using the FPD Pie, page 5-70.

ROM Monitor Compatibility with Cisco IOS XR Software

The ROM Monitor software must be upgraded to version 1.42 or a later version on all RPs before a Cisco CRS-1 system is upgraded to Cisco IOS XR Software Release 3.4.1 or later release. If the router is brought up with an incompatible version of the ROM Monitor software, then the standby RP may fail to boot.

In addition, Cisco CRS-1 multishelf systems should be upgraded to ROMMON release 1.40 before being upgraded to Cisco IOS XR Release 3.4.1 to ensure that RPs are assigned the correct rack numbers during system boot.

Note If the new ROMMON B is not compatible with the older installed version, both ROMMON A and ROMMON B must be upgraded. For example, if a router is running a version of ROMMON older than version 1.32, you should upgrade both ROMMON A and ROMMON B. However, if a router is already running ROMMON version 1.32 or later version for ROMMON A and ROMMON B, then only ROMMON B should be upgraded to the latest release. This ensures that the router can still use the unmodified ROMMON A if the ROM Monitor upgrade is interrupted or fails for any reason. See Table 5-2 for more information.

Note We recommend you do not upgrade ROMMON A. If you must upgrade ROMMON A, please contact Cisco Technical Support. See the "Obtaining Technical Assistance" section on page x for Cisco Technical Support contact information. The following commands will upgrade ROMMON A:
upgrade hw-module fpd all location *node-id*
upgrade hw-module fpd rommon location *node-id*

Overriding a Boot Block in the Standby RP

If a Cisco CRS-1 system is upgraded to Cisco IOS XR Software Release 3.4.1 before the ROM Monitor firmware is upgraded, a boot block may occur in the standby RP.

- For instructions to override a boot block in a single-chassis system, see Overriding a ROM Monitor Boot Block in a Single-chassis System, page 5-83.
- If a boot block occurs in a multishelf system, contact your Cisco Systems support representative for assistance. See Obtaining Technical Assistance, page x.

Table 5-1 shows the ROM Monitor requirements for Cisco IOS XR Software Releases 3.01 and later releases.

Table 5-1 Cisco CRS-1 ROM Monitor Requirements

Cisco IOS XR software release	ROMMON version supported on RPs	ROMMON versions NOT supported on RPs
Release 3.0.1	1.19x	1.38
Release 3.0.1 with CSCee55511 SMU	1.19x, 1.38	—
Release 3.2.0	1.19x, 1.38	—
Release 3.2.5	1.38	1.19x (CSCei40918)
Release 3.3.0 and up	1.38 or higher[1]	1.19x
Release 3.3.1 and up	1.40 or higher	1.19x
Release 3.4.0 and up	1.42 or higher[2]	1.19x

1. For RP/B the supported version is 1.38.
2. For Cisco CRS-1 multishelf systems the minimum supported version is 1.40.

Note If you are running a Cisco IOS XR Software Release 3.2.5 version, or earlier, RP/B is not supported in Cisco CRS-1 systems (single or multishelf). RP/B was introduced in Cisco IOS XR Software Release 3.3.0 with minimum supported ROMMON version of 1.38.

Table 5-2 When to Upgrade ROMMON A or ROMMON B, or Both

Current ROMMON Version	What to Upgrade
A ROMMON version earlier than 1.32 is running on the router (for example, ROMMON version 1.19x)	Upgrade both ROMMON A and ROMMON B.
ROMMON version 1.32 or later version is running on the router	Upgrade ROMMON B only. When you verify that the new firmware is running correctly and the system is stable, you can also upgrade ROMMON A.

Upgrading or Downgrading ROM Monitor Using the FPD Pie

The following procedure upgrades or downgrades the ROM Monitor firmware using the ROM Monitor image contained in the FPD software PIE. This section also includes instructions to reload a node, gracefully reload all nodes in the system, or perform a cold restart for all nodes in the system.

Note We recommend you do not upgrade ROMMON A. If you must upgrade ROMMON A, please contact Cisco Technical Support. See the "Obtaining Technical Assistance" section on page x for Cisco Technical Support contact information. The following commands will upgrade ROMMON A:
upgrade hw-module fpd all location *node-id*
upgrade hw-module fpd rommon location *node-id*

Note Upgrading the ROM monitor image on a card using the **reload** keyword temporarily places the card offline at the end of the upgrade procedure, and may interrupt traffic.

If you are not sure whether a care requires a ROM monitor upgrade, you can install the card and use the **show hw-module fpd** command to determine if the ROM monitor image on the card is compatible with the currently running Cisco IOS XR software release.

Prerequisites

Before upgrading or downgrading ROM Monitor firmware, verify that the following prerequisites have been met:

- The ROMMON firmware must be compatible with the Cisco IOS XR software version on your router.
- The FPD PIE must be installed on your router. Refer to the *Upgrading and Managing Cisco IOS XR Software* module in *Cisco IOS XR System Management Configuration Guide* for more information on installing software PIEs.

SUMMARY STEPS

1. **show hw-module fpd location all**
2. **admin**
3. **show fpd package**
4. **upgrade hw-module fpd rommon2 location** [**all** | *node-id*]
5. **exit**
6. If you are upgrading a single node on a router, including a standby DSDRSC, go to Step 9.
7. If you are upgrading a router with redundant DSCs, and wish to perform a graceful reload, go to Step 10.
8. If you are upgrading a router with a single RP, or wish to perform a cold restart on all nodes, go to Step 11.
9. Reload a single node:
   a. **hw-module location** *nodeID* **reload**
   b. Go to Step 12.
10. Gracefully reload all nodes on a system that includes redundant RPs:
    a. (Optional) **cfs check**
    b. (Optional) Repeat on each secure domain router (SDR) impacted by the reload operation.
    c. **hw-module location** *nodeID* **reload**
    d. **show redundancy**
    e. **redundancy switchover**
    f. **show redundancy**
    g. **hw-module location** *nodeID* **reload**
    h. Repeat Step a. to Step g. for all DSDRSC pairs in the system.
    i. **admin**

j. **show platform**

k. **hw-module location** *nodeID* **reload**

l. Repeat Step k. for all other upgraded nodes in the system.

m. **show platform**

n. Go to Step 12.

11. Reload all nodes in a system (cold restart):

a. (Optional) **cfs check**

b. (Optional) Repeat on each SDR impacted by the **reload** operation.

c. **admin**

d. **reload location all**

12. **show platform**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show hw-module fpd location all** **Example:** `RP/0/RP0/CPU0:Router# show hw-module fpd location all`	Displays the current FPD image versions for all cards installed in the router. Use this command to determine if you must upgrade the ROM monitor image on your cards.
Step 2	**admin** **Example:** `RP/0/RP0/CPU0:Router# admin`	Enters administration EXEC mode from EXEC mode.
Step 3	**show fpd package** **Example:** `RP/0/RP0/CPU0:Router(admin)# show fpd package`	(Optional) Displays which cards are supported with your current Cisco IOS XR software release, which FPD or ROM monitor image you need for each card, and what the minimum hardware requirements are for the cards. If there are multiple FPD images for your card, use this command to determine which FPD image to use if you only want to upgrade a specific FPD type.
Step 4	**upgrade hw-module fpd rommon2 location** *node-id* **Example:** `RP/0/RP0/CPU0:Router(admin)# upgrade hw-module fpd rommon2 location 0/SM3/SP`	Upgrades the ROMMON B images on the specified card. **Note** The **reload** keyword causes the card to be reloaded after the ROM monitor image has been updated. This interrupts traffic transmission. If you do not use the **reload** keyword, you must manually reload the card before the upgrade is complete. Use the **hw-module node reload** command to reload a card.
Step 5	**exit** **Example:** `RP/0/RP0/CPU0:Router(admin)# exit`	Exits administration EXEC mode and returns to EXEC mode.

	Command or Action	Purpose
Step 6	If you are upgrading a single node on a router, including a standby DSDRSC, go to Step 9 for instructions to reload the node.	—
Step 7	If you are upgrading a router with redundant DSCs, and wish to perform a graceful reload, go to Step 10 for instructions to gracefully reload all nodes.	—
Step 8	If you are upgrading a router with a single RP, or wish to perform a cold restart on all nodes, go to Step 11 for instructions to perform a cold restart of all nodes.	—
Step 9	Reload a single node: **a.** **hw-module location** *nodeID* **reload** **b.** Go to Step 12 **Example:** `RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload`	**a.** Reloads a single node within a router, such as a standby RP. The new ROMMON firmware is not active on a node until the card is reloaded. – Replace *nodeID* with the node ID you specified when upgrading ROM Monitor. – When reloading cards that contain both a CPU and an SP (such as an MSC card), it is only necessary to reload the CPU node. When the CPU is reloaded, the SP will also reload. **b.** Go to Step 12 to verify that the correct ROMMON firmware is active on each node.

	Command or Action	Purpose

Step 10	Gracefully reload all nodes on a system that includes redundant RPs (DSCs):
	a. cfs check
	b. Repeat on each secure domain router (SDR) impacted by the reload operation.
	c. hw-module location *nodeID* **reload**
	d. show redundancy
	e. redundancy switchover
	f. show redundancy
	g. hw-module location *nodeID* **reload**
	h. Repeat Step a. to Step g. for all DSDRSC pairs in the system.
	i. admin
	j. show platform
	k. hw-module location *nodeID* **reload**
	l. Repeat Step k. to reload all upgraded nodes in the system.
	m. show platform
	n. Go to Step 12.
	
	Example:
	`RP/0/RP0/CPU0:router# cfs check`
	`RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload`
	`RP/0/RP0/CPU0:router# show redundancy`
	`RP/0/RP0/CPU0:router# redundancy switchover`
	`RP/0/RP0/CPU0:router# show redundancy`
	`RP/0/RP0/CPU0:router# hw-module location 0/RP0/CPU0 reload`
	`RP/0/RP0/CPU0:router# admin`
	`RP/0/RP0/CPU0:router(admin)# show platform`
	`RP/0/RP0/CPU0:router(admin)# hw-module location 0/1/CPU0 reload`
	`RP/0/RP0/CPU0:router(admin)# hw-module location 0/2/CPU0 reload`
	`RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM0/SP reload`
	`RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM1/SP reload`
	`RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM2/SP reload`
	`RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM3/SP reload`
	`RP/0/RP0/CPU0:router(admin)# show platform`
		Gracefully reloads all nodes on a system that includes redundant RPs. The new ROMMON firmware is not active on a node until the card is reloaded.
		a. (Optional) Use **cfs check** command to ensure the sanity of the configuration file system for the owner SDR.
		b. (Optional) Repeat the **cfs check** command on the DSDRSC of each additional non-owner SDR in the system to verify the configuration file system for each non-owner SDR
		c. Reloads the standby RP to activate the new ROMMON firmware.
		Note The standby RP is the standby DSC for the system. The primary and standby DSCs are also the DSDRSCs for the owner SDR.
		d. Use the **show redundancy** command to verify the redundancy status of the DSC nodes. Wait for the standby RP to return to "Ready" state.
		e. Use the **redundancy switchover** command to cause the primary (active) RP to fail over to the redundant standby RP.
		Note The standby RP must be ready to take over.
		f. Use the **show redundancy** command to verify the status of the RP nodes. Wait for the standby RP to return to ready state.
		g. Reload the original primary RP to activate the new ROMMON firmware.
		h. (Optional) Repeat Step a. to Step g. on all DSDRSCs in the system to ensure a graceful restart for all SDRs.
		i. Use the **admin** command to enter administration EXEC mode.
		j. Use the **show platform** command to view all the nodes in the system. Enter this command in administration EXEC mode to display information for all nodes in the system, including admin plane resources such as fabric cards.
		k. Use the **hw-module location** *nodeID* **reload** command to reload each additional card where the ROMMON firmware was changed. additional non-DSDRSC nodes. Each node must be reloaded to activate the new ROMMON firmware.

	Command or Action	Purpose
		– Replace *nodeID* with the node ID you specified when upgrading ROM Monitor. – When reloading cards that contain both a CPU and an SP (such as an MSC card), it is only necessary to reload the CPU node. When the CPU is reloaded, the SP will also reload. l. Repeat Step k. to reload all upgraded nodes in the system. m. Use the **show platform** command to view all the nodes in the system. Verify that all the reloaded nodes are in the "IOS XR RUN" state.

Step 11	Reload all nodes in the system (cold restart):
	a. **cfs check**
	b. Repeat on each SDR impacted by the reload operation.
	c. **admin**
	d. **reload** [**location all**]
	Example:
	`RP/0/RP0/CPU0:router# cfs check`
	`RP/0/RP0/CPU0:router# admin`
	`RP/0/RP0/CPU0:router(admin)# reload location all`
		Reloads all nodes, including the DSC. Use these commands if you are upgrading a router with a single RP, or wish to perform a cold restart of all nodes. The new ROMMON firmware is not active on a node until the card is reloaded.
		Caution Reloading the primary RP (DSC) interrupts all service.
		a. (Optional) Ensures the sanity of the configuration file system for the owner SDR.
		b. (Optional) Ensures the sanity of the configuration file system for each non-owner SDR in the system.
		c. Enters administration EXEC mode.
		d. Reloads the DSDRSC with the upgraded ROM Monitor firmware. Use the command **reload location all** in administration EXEC mode to reload all nodes in the system.

Step 12	**show platform** **Example:** `RP/0/RP0/CPU0:Router# show platform`	Verifies that the ROM monitor image on the card has been successfully upgraded by displaying the status of all cards in the system.

Troubleshooting Tips

- If any node cannot be upgraded successfully or if you see error messages similar to the following message, try reformatting the bootflash (**format bootflash:** [**location all** | *nodeID*]) and then repeat this upgrade procedure:

  ```
  LC/0/3/CPU0:rommon_burner[65635]: %ROMMON_BURNER-3-FILE_OP_ERR : Opening ROMMON flash
  partition failed: No such file or directory in function main at line 952
  ```

- If you are upgrading only ROMMON B and the version does not change to the expected version after the upgrade, the upgrade might have failed. When the router cannot load ROMMON B, it loads ROMMON A.
- If both ROMMANB and ROMMON A are damaged due to an unexpected node reset or a power interruption during the upgrade, the affected route processors must be returned to Cisco for repair.

Configuration Examples for ROM Monitor Upgrades

This section provides the following configuration examples:

ROM Monitor Upgrade Using the FPD Pie: Example

The following example illustrates how to display ROM monitor image using the FPD pie information for all cards in the router:

```
RP/0/RP0/CPU0:Router(admin)# show hw-module fpd location all

==================================== ========================================
                                     Existing Field Programmable Devices
                                     ========================================
                                       HW                        Current SW Upg/
Location     Card Type               Version Type Subtype Inst    Version   Dng?
============ ======================= ======= ==== ======= ==== =========== ====
0/0/SP       YYY-XXXIface            255.254 lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/0/CPU0     CRS1-SIP-800              0.104 lc   fpga    0       2.0      No
                                             lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/0/0        SPA-OC192POS-XFP            2.1   spa  fpga    0       1.2      No
--------------------------------------------------------------------------------
0/0/1        SPA-10X1GE-V2               1.0   spa  fpga    1       1.10     No
--------------------------------------------------------------------------------
0/0/2        SPA-1X10GE-L-V2             1.0   spa  fpga    2       1.9      No
--------------------------------------------------------------------------------
0/0/5        SPA-5X1GE-V2                1.0   spa  fpga    5       1.10     No
--------------------------------------------------------------------------------
0/2/SP       YYY-XXXIface            255.254 lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/2/CPU0     YYY-XXXIface            255.254 lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/RP0/CPU0   HQ Route Processor          0.1   lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/SM0/SP     Fabric HS123                0.1   lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/SM1/SP     Fabric HS123                0.1   lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/SM2/SP     Fabric HS123                0.1   lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
--------------------------------------------------------------------------------
0/SM3/SP     Fabric HS123                0.1   lc   rommon  0       1.43     No
                                             lc   rommon2 0       1.43     No
```

The following example shows how to determine what FPD images are available for each card in the router:

```
RP/0/RP0/CPU0:router(admin)# show fpd package

================================ ================================================
                                        Field Programmable Device Package
                                 ================================================
                                                                        SW      Min Req
Card Type            FPD Description            Type Subtype   Version   HW Vers
==================== ========================== ==== ======= =========== =======
CRS1-SIP-800         JACKET FPGA swv2.0         lc   fpga        2.0       0.0
                     FPGA swv2.0 hwv80          lc   fpga        2.0       0.80
--------------------------------------------------------------------------------
8-10GBE              FPGA swvA.0                lc   fpga       10.0       0.0
--------------------------------------------------------------------------------
Route Processor      ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
SC                   ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
HQ Route Processor   ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
Shelf Controller GE  ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
Route Processor B    ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
Shelf Controller GE2 ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
DRP                  ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
DRP_B                ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
S1S2S3               ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
--------------------------------------------------------------------------------
S1S3                 ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
```

```
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
S2                   ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
Fabric HS123         ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
Fabric HS123 Star    ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
Fabric HS13 Star     ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
Fabric QQS123        ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
LED                  ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
YYY-XXXIface         ROMMON2 swv1.43 asmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 dsmp       lc   rommon2     1.43      0.0
                     ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 asmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 dsmp        lc   rommon      1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
PSAL                 ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
FAN                  ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
FC Fan Controller    ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
LED                  ROMMON2 swv1.43 sp         lc   rommon2     1.43      0.0
                     ROMMON swv1.43 sp          lc   rommon      1.43      0.0
-------------------------------------------------------------------------------
SPA-4XT3/E3          SPA E3 Subrate FPGA        spa  fpga2       1.4       0.0
                     SPA T3 Subrate FPGA        spa  fpga3       1.4       0.0
                     SPA I/O FPGA               spa  fpga        1.0       0.0
                     SPA ROMMON                 spa  rommon      2.12      0.0
-------------------------------------------------------------------------------
SPA-2XT3/E3          SPA E3 Subrate FPGA        spa  fpga2       1.4       0.0
                     SPA T3 Subrate FPGA        spa  fpga3       1.4       0.0
                     SPA I/O FPGA               spa  fpga        1.0       0.0
                     SPA ROMMON                 spa  rommon      2.12      0.0
-------------------------------------------------------------------------------
SPA-OC192POS         SPA FPGA swv1.3            spa  fpga        1.3       0.0
-------------------------------------------------------------------------------
SPA-8XOC12-POS       SPA FPGA swv1.0            spa  fpga        1.0       0.5
-------------------------------------------------------------------------------
SPA-4XOC3-POS        SPA FPGA swv3.4            spa  fpga        3.4       0.0
-------------------------------------------------------------------------------
SPA-OC192POS-XFP     SPA FPGA swv1.2            spa  fpga        1.2       0.0
-------------------------------------------------------------------------------
SPA-8X1GE            SPA FPGA swv1.8            spa  fpga        1.8       0.0
-------------------------------------------------------------------------------
SPA-2XOC48POS/RPR    SPA FPGA swv1.0            spa  fpga        1.0       0.0
-------------------------------------------------------------------------------
SPA-4XOC48POS/RPR    SPA FPGA swv1.0            spa  fpga        1.0       0.0
-------------------------------------------------------------------------------
SPA-10X1GE-V2        SPA FPGA swv1.10           spa  fpga        1.10      0.0
```

```
--------------------------------------------------------------------------------
SPA-8X1GE-V2         SPA FPGA swv1.10           spa  fpga        1.10      0.0
--------------------------------------------------------------------------------
SPA-5X1GE-V2         SPA FPGA swv1.10           spa  fpga        1.10      0.0
--------------------------------------------------------------------------------
SPA-1X10GE-L-V2      SPA FPGA swv1.9            spa  fpga        1.9       0.0
--------------------------------------------------------------------------------
```

The following example shows how to upgrade ROMMON B:

```
RP/0/RP0/CPU0:Router(admin)# upgrade hw-module fpd rommon2 force location 0/SM3/SP

% RELOAD REMINDER:
  - The upgrade operation of the target module will not interrupt its normal
    operation. However, for the changes to take effect, the target module
    will need to be manually reloaded after the upgrade operation. This can
    be accomplished with the use of "hw-module <target> reload" command.
  - If automatic reload operation is desired after the upgrade, please use
    the "reload" option at the end of the upgrade command.
  - The output of "show hw-module fpd location" command will not display
    correct version information after the upgrade if the target module is
    not reloaded.
Continue? [confirm]

Starting the upgrade/download of following FPD:

=========== ==== ======= ======= =========== =========
                                  Current    Upg/Dng
Location    Type Subtype Upg/Dng   Version    Version
=========== ==== ======= ======= =========== =========
0/SM3/SP    lc   rommon2 upg         1.43        1.43
-----------------------------------------------------------
SP/0/SM3/SP:Feb 20 15:58:25.656 : lc_fpd_upgrade[112]: %PLATFORM-UPGRADE_FPD-6-START :
Starting to upgrade rommon2 subtype image from 1.43 to 1.43 for for this card  on location
0/SM3/SP SP/0/SM3/SP:Feb 20 15:58:25.692 : upgrade_daemon[128]: Start Upgrade...
SP/0/SM3/SP:Feb 20 15:58:25.696 : upgrade_daemon[128]: programming...with file
/net/node0_RP0_CPU0/dev/shmem/hfr-fpd-3.5.0.0I/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin
SP/0/SM3/SP:Feb 20 15:58:25.719 : upgrade_daemon[128]: Verifying
/net/node0_RP0_CPU0/dev/shmem/hfr-fpd-3.5.0.0I/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin:
SP/0/SM3/SP:Feb 20 15:58:25.920 : upgrade_daemon[128]: Passed.
SP/0/SM3/SP:Feb 20 15:58:31.257 : upgrade_daemon[128]: Verifying ROMMON B:
SP/0/SM3/SP:Feb 20 15:58:31.297 : upgrade_daemon[128]: Passed.
SP/0/SM3/SP:Feb 20 15:58:31.301 : upgrade_daemon[128]:  OK, ROMMON B is programmed
successfully.
SP/0/SM3/SP:Feb 20 15:58:31.310 : lc_fpd_upgrade[112]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon2 subtype image for for this card  on location 0/SM3/SP

% Successfully upgraded 1 FPD for Fabric HS123 on location 0/SM3/SP
```

Graceful Reload of a Cisco CRS-1 Router

In the following example, a Cisco CRS-1 router is gracefully reloaded following a ROMMON upgrade or downgrade.

```
RP/0/RP0/CPU0:router# cfs check

Creating any missing directories in Configuration File system...OK
Initializing Configuration Version Manager...OK
Syncing commit database with running configuration...OK
```

```
Re-initializing cache files...OK
Updating Commit Database.  Please wait...[OK]


RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload

WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y


RP/0/RP0/CPU0:router# show redundancy

Redundancy information for node 0/RP0/CPU0:
==========================================
Node 0/RP0/CPU0 is in ACTIVE role
Partner node (0/RP1/CPU0) is in STANDBY role
Standby node in 0/RP1/CPU0 is ready

Reload and boot info
----------------------
RP reloaded Sun Jun 11 17:46:26 2006: 1 hour, 10 minutes ago
Active node booted Sun Jun 11 17:46:26 2006: 1 hour, 10 minutes ago
Standby node boot Sun Jun 11 18:50:39 2006: 6 minutes ago
Standby node last went not ready Sun Jun 11 18:51:18 2006: 6 minutes ago
Standby node last went ready Sun Jun 11 18:53:21 2006: 4 minutes ago
There have been 0 switch-overs since reload


RP/0/RP0/CPU0:router# redundancy switchover

Updating Commit Database.  Please wait...[OK]
Proceed with switchover 0/RP0/CPU0 -> 0/RP1/CPU0? [confirm]
Initiating switch-over.
RP/0/RP0/CPU0:Router#

<Your 'TELNET' connection has terminated>



User Access Verification

Username: username
Password: <secret>
Last switch-over Tue Jun 13 12:07:34 2006: 1 minute ago


RP/0/RP1/CPU0:router# show redundancy

Redundancy information for node 0/RP1/CPU0:
==========================================
Node 0/RP1/CPU0 is in ACTIVE role
Partner node (0/RP0/CPU0) is in STANDBY role
Standby node in 0/RP0/CPU0 is ready

Reload and boot info
----------------------
RP reloaded Sun Jun 11 19:47:43 2006: 1 day, 16 hours, 24 minutes ago
Active node booted Sun Jun 11 19:48:25 2006: 1 day, 16 hours, 24 minutes ago
Last switch-over Tue Jun 13 12:07:34 2006: 5 minutes ago
Standby node boot Tue Jun 13 12:08:50 2006: 3 minutes ago
Standby node last went not ready Tue Jun 13 12:09:21 2006: 3 minutes ago
Standby node last went ready Tue Jun 13 12:11:21 2006: 1 minute ago
There has been 1 switch-over since reload
```

```
RP/0/RP1/CPU0:router# hw-module location 0/rp0/cpu0 reload

WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y


RP/0/RP1/CPU0:router# show redundancy

Redundancy information for node 0/RP1/CPU0:
==========================================
Node 0/RP1/CPU0 is in ACTIVE role
Partner node (0/RP0/CPU0) is in STANDBY role
Standby node in 0/RP0/CPU0 is ready

Reload and boot info
----------------------
RP reloaded Sun Jun 11 19:47:43 2006: 1 day, 16 hours, 30 minutes ago
Active node booted Sun Jun 11 19:48:25 2006: 1 day, 16 hours, 30 minutes ago
Last switch-over Tue Jun 13 12:07:34 2006: 11 minutes ago
Standby node boot Tue Jun 13 12:15:24 2006: 3 minutes ago
Standby node last went not ready Tue Jun 13 12:18:26 2006:  11 seconds ago
Standby node last went ready Tue Jun 13 12:18:26 2006:  11 seconds ago
There has been 1 switch-over since reload


RP/0/RP1/CPU0:router# admin


RP/0/RP1/CPU0:router(admin)# show platform

Node            Type            PLIM            State           Config State
--------------------------------------------------------------------------------
0/1/SP          MSC(SP)         N/A             IOS XR RUN      PWR,NSHUT,MON
0/1/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/1/0           MSC(SPA)        4XOC3-POS       OK              PWR,NSHUT,MON
0/1/5           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/6/SP          MSC(SP)         N/A             IOS XR RUN      PWR,NSHUT,MON
0/6/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/6/0           MSC(SPA)        4XOC3-POS       OK              PWR,NSHUT,MON
0/6/4           MSC(SPA)        8XOC3/OC12-POS  OK              PWR,NSHUT,MON
0/6/5           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/RP0/CPU0      RP(Standby)     N/A             IOS XR RUN      PWR,NSHUT,MON
0/RP1/CPU0      RP(Active)      N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM0/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM1/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM2/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM3/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON


RP/0/RP1/CPU0:router(admin)# hw-module location 0/1/cpu0 reload warm

WARNING: This will warm reload the requested node.
Do you wish to continue?[confirm(y/n)]y

RP/0/RP1/CPU0:router(admin)# hw-module location 0/6/cpu0 reload warm

WARNING: This will warm reload the requested node.
Do you wish to continue?[confirm(y/n)]y

RP/0/RP1/CPU0:router(admin)# hw-module location 0/sm0/sp reload

WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y
```

```
RP/0/RP1/CPU0:router(admin)# hw-module location 0/sm1/SP reload

WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y

RP/0/RP1/CPU0:router(admin)# hw-module location 0/sm2/SP reload

WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y

RP/0/RP1/CPU0:router(admin)# hw-module location 0/sm3/SP reload


WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y

RP/0/RP1/CPU0:router(admin)# show platform

Node            Type            PLIM            State           Config State
--------------------------------------------------------------------------------
0/1/SP          MSC(SP)         N/A             IOS XR RUN      PWR,NSHUT,MON
0/1/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/1/0           MSC(SPA)        4XOC3-POS       OK              PWR,NSHUT,MON
0/1/5           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/6/SP          MSC(SP)         N/A             IOS XR RUN      PWR,NSHUT,MON
0/6/CPU0        MSC             Jacket Card     IOS XR RUN      PWR,NSHUT,MON
0/6/0           MSC(SPA)        4XOC3-POS       OK              PWR,NSHUT,MON
0/6/4           MSC(SPA)        8XOC3/OC12-POS  OK              PWR,NSHUT,MON
0/6/5           MSC(SPA)        8X1GE           OK              PWR,NSHUT,MON
0/RP0/CPU0      RP(Standby)     N/A             IOS XR RUN      PWR,NSHUT,MON
0/RP1/CPU0      RP(Active)      N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM0/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM1/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM2/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON
0/SM3/SP        FC/S(SP)        N/A             IOS XR RUN      PWR,NSHUT,MON

RP/0/RP1/CPU0:router(admin)# show diag  | inc ROM|NODE|PLIM

NODE 0/1/SP : MSC(SP)
  ROMMON: Version 1.40(20060207:032848)  [CRS-1 ROMMON]
PLIM 0/1/CPU0 : JACKET CARD
  ROMMON: Version 1.40(20060207:032757)  [CRS-1 ROMMON]
NODE 0/1/0 : 4xOC3 POS SPA
NODE 0/1/5 : 8xGE SPA
NODE 0/6/SP : MSC(SP)
  ROMMON: Version 1.40(20060207:032848)  [CRS-1 ROMMON]
PLIM 0/6/CPU0 : JACKET CARD
  ROMMON: Version 1.40(20060207:032743)  [CRS-1 ROMMON]
NODE 0/6/0 : 4xOC3 POS SPA
NODE 0/6/4 : 8xOC3/OC12 POS SPA
NODE 0/6/5 : 8xGE SPA
NODE 0/RP0/CPU0 : RP
  ROMMON: Version 1.40(20060207:032757)  [CRS-1 ROMMON]
NODE 0/RP1/CPU0 : RP
  ROMMON: Version 1.40(20060207:032757)  [CRS-1 ROMMON]
NODE 0/SM0/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS-1 ROMMON]
NODE 0/SM1/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS-1 ROMMON]
NODE 0/SM2/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS-1 ROMMON]
NODE 0/SM3/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS-1 ROMMON]
```

Overriding a ROM Monitor Boot Block in a Single-chassis System

When a single chassis Cisco CRS-1 system is upgraded to Cisco IOS XR software Release 3.4.1 or higher, the ROM Monitor firmware must be upgraded to release 1.42 or higher *before* the Cisco IOS XR software is installed or upgraded.

If a single chassis Cisco CRS-1 system is brought up with the incorrect ROM Monitor firmware, the standby RP will fail to boot, and the following console message is displayed:

```
Received boot request from an RP with an empty rack serial number, which indicates an
attempt to boot a RP with ROMMON v1.19x as the standby. Boot request is being failed !
Refer to customer documentation for configuring a boot override.
```

To correct this error, you must override the boot block as described in the following instructions. When the RP is running, immediately upgrade the ROM Monitor firmware.

Caution The override instructions are used only to bring up the standby RP for the purpose of upgrading the ROM Monitor firmware.

Restrictions

- These instructions are for an RP in a single chassis system only.

Note If a boot block occurs in a multishelf system, contact your Cisco Systems support representative for assistance. See Obtaining Technical Assistance, page x.

SUMMARY STEPS

1. **admin**
2. **configure**
3. **hw-module boot override**
4. Complete the instructions in Upgrading or Downgrading ROM Monitor Using the FPD Pie, page 5-70.

DETAILED STEPS

	Command or Action	Purpose
Step 1	**admin** **Example:** `RP/0/RP0/CPU0:Router# admin`	Places the router in administration EXEC mode.
Step 2	**configure** **Example:** `RP/0/RP0/CPU0:Router(admin)# configure`	Enters administration configuration mode.

	Command or Action	Purpose
Step 3	**hw-module boot override** **Example:** `RP/0/RP0/CPU0:Router(admin-config)# hw-module boot override`	Allows the RP to boot so the ROM Monitor firmware can be upgraded to the proper version. A message will appear
Step 4	Complete the instructions in Upgrading or Downgrading ROM Monitor Using the FPD Pie, page 5-70.	Upgrades the ROM Monitor firmware on the RP, which allows the RP to boot normally.

Examples

In the following example, an error message is displayed on the console. The boot block is then cleared to allow the user to upgrade the ROM Monitor firmware.

```
Received boot request from an RP with an empty rack serial number, which indicates an
attempt to boot a RP with ROMMON v1.19x as the standby. Boot request is being failed !
Refer to customer documentation for configuring a boot override.

RP/0/RP0/CPU0:Router# admin
RP/0/RP0/CPU0:Router(admin)# configure
RP/0/RP0/CPU0:Router(admin-config)# hw-module boot override

WARNING !!! WARNING !!! Received boot request from an RP with an empty rack serial number.
Permitting RP to boot due to config override. Please upgrade RP ROMMON to latest
recommended version
```

What to Do Next

Complete the instructions in the following section: Upgrading or Downgrading ROM Monitor Using the FPD Pie, page 5-70.

Additional References

Related Documents

Related Topic	Document Title
Hardware component commands	*Cisco IOS XR Interface and Hardware Component Command Reference*
System management commands	*Cisco IOS XR System Management Command Reference*

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of 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.	http://www.cisco.com/techsupport

Upgrading and Downgrading Boothelper and ROM Monitor on Cisco XR 12000 Series Routers

This chapter describes how to upgrade or downgrade the Boothelper and ROM Monitor software on a Cisco XR 12000 Series Router.

Information About ROM Monitor and Boothelper Software

Before upgrading or downgrading ROM Monitor or Boothelper software, you should understand the following concept:

ROM Monitor and Boothelper Upgrade and Downgrade Basics

The ROM Monitor, which is also known as ROMMON, is a bootstrap program that initializes the hardware and boots the Cisco IOS XR software when you power on or restart a Cisco XR 12000 Series Router. ROM Monitor upgrades can be required to resolve software defects or to support new features. Typically, ROM Monitor upgrades are infrequent and are not required for every Cisco IOS XR software upgrade.

Tip Information on operating the router in ROM Monitor mode is provided in Router Recovery with ROM Monitor, page 2-15.

The upgrade and downgrade procedures for ROM Monitor are the same. During the upgrade or downgrade process, you select the firmware that is used for ROM Monitor. This firmware can represent an upgrade or a downgrade. The firmware must be compatible with the hardware, but it need not be a later version of the ROM Monitor already installed. During an upgrade or downgrade, the firmware is copied into hardware EEPROMs in the router.

Boothelper software is additional software that extends the capabilities of ROM Monitor on a Cisco XR 12000 Series Router. Without Boothelper, ROM Monitor can load images from disk0, disk1, and bootflash. With Boothelper, ROM Monitor can load images from disk0, disk1, bootflash, compact flash, and TFTP servers.

Boothelper software is stored in bootflash and can be upgraded or downgraded by replacing the software in bootflash with a different Boothelper image.

Tip Information on starting and configuring Boothelper is provided in ROM Monitor Overview and Basic Procedures, page 1-1.

How to Upgrade or Downgrade Boothelper

This section contains the following procedure:

- Upgrading or Downgrading Boothelper, page 6-88

Upgrading or Downgrading Boothelper

The following procedure upgrades or downgrades the Boothelper.

Prerequisites

Before starting the procedure described in this section, complete the following:

- Determine if there is a Boothelper upgrade file for your version of Cisco IOS XR software.
- To prepare for a Boothelper upgrade, copy the Boothelper upgrade file to the router or to a local workstation from which you can copy files to the router. You can also perform the upgrade with a Boothelper upgrade file located on a TFTP server.

SUMMARY STEPS

1. Establish a connection to the active RP.
2. **dir bootflash:**
3. **format bootflash:**
4. **squeeze bootflash:**
5. **copy** *upgradeImage* **bootflash:**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Establish a connection to the active RP.	Allows you to manage the active RP. • For more information, see "Connecting and Communicating with the Router" in *Cisco IOS XR Getting Started Guide*.
Step 2	**dir bootflash:** **Example:** `RP/0/0/CPU0:Router# dir bootflash:`	Displays the bootflash contents. • The Boothelper filename shows the file version number. • If the correct version is in use, there is no need to upgrade.
Step 3	**format bootflash:** **Example:** `RP/0/0/CPU0:Router# format bootflash:`	Formats bootflash and erases all contents.
Step 4	**squeeze bootflash:** **Example:** `RP/0/0/CPU0:Router# squeeze bootflash:`	Permanently erases the files tagged as "deleted" in the file system.
Step 5	**copy** *upgradeImage* **bootflash:** **Example:** `RP/0/0/CPU0:Router# copy disk0:c12kprp-boot-mz.120-32.S3 bootflash:`	Copies a file to bootflash. • The file system changes you make to the active RP are replicated on the standby RP.

Example

In the following example, the bootflash is upgraded with a file located on a TFTP server.

```
RP/0/0/CPU0:router# dir bootflash:

Directory of bootflash:

10   -rwx  5192        Thu Apr 28 03:37:53 2005  crashinfo5
381  -rwx  5177        Wed Jun  1 22:12:54 2005  crashinfo4
440  -rwx  1389        Sat Jul 16 14:20:08 2005  snmp/ifindex-table
443  -rwx  3047        Sun Jul 24 06:19:25 2005  crashinfo
444  -rwx  5177        Sun Jul 24 06:30:00 2005  crashinfo3
445  -rwx  3223556     Thu Aug  4 21:55:27 2005  c12kprp-boot-mz.120-29.S

66322432 bytes total (58795492 bytes free)

RP/0/0/CPU0:router# format bootflash:

Format operation may take a while. Continue? [confirm] y
Format will destroy all data on "bootflash:". Continue? [confirm] y

Formatting sector 1
Format of bootflash: complete
```

```
RP/0/0/CPU0:router# squeeze bootflash:

All deleted files will be removed. Continue? [confirm] y
Squeeze operation may take a while. Continue? [confirm] y

Squeeze under progress 254
Squeeze of bootflash: complete

RP/0/0/CPU0:router# disk0:c12kprp-boot-mz.120-32.S3
Destination filename [/bootflash:/c12kprp-boot-mz.120-32.S3]? <return>
Accessing disk0:c12kprp-boot-mz.120-32.S3
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
3223556 bytes copied in     23 sec (   138000)bytes/sec

RP/0/0/CPU0:router# dir bootflash:

Directory of bootflash:

1    -rwx  3223556     Thu Aug  4 22:09:23 2005  c12kprp-boot-mz.120-32.S3

66322432 bytes total (63098748 bytes free)
RP/0/0/CPU0:router#
```

How to Upgrade or Downgrade ROM Monitor

This section contains the following procedures:

- Upgrading or Downgrading ROM Monitor, page 6-90

Upgrading or Downgrading ROM Monitor

The following procedure upgrades or downgrades the ROM Monitor.

Prerequisites

Before starting the procedure described in this section, complete the following:

- Determine if there is an ROM Monitor upgrade file for your version of Cisco IOS XR software.
- To prepare for a ROM Monitor upgrade, copy the ROM Monitor upgrade file to the router or to a local workstation from which you can copy files to the router.
- If you want to upgrade ROM Monitor without interrupting traffic through the router, install a standby RP and verify that the standby RP is operating in standby mode.

SUMMARY STEPS

1. Establish a connection to the active RP.
2. **show version**
3. **copy** *source destination*
4. **dir** *device*
5. **admin**

6. If you are upgrading a standalone RP, go to Step 15.
7. **show redundancy**
8. **config-register 0x0**
9. **redundancy switchover**
10. **confreg 0x2**
11. **boot** *upgradeImage*
12. Establish a connection to the active RP (formerly the standby RP).
13. **admin**
14. **show redundancy**
15. **config-register 0x0**
16. **redundancy switchover** or **reload**
17. **confreg 0x2**
18. **boot** *upgradeImage*

DETAILED STEPS

	Command or Action	Purpose
Step 1	Establish a connection to the active RP.	Allows you to manage the active RP. • For more information, see "Connecting and Communicating with the Router" in *Cisco IOS XR Getting Started Guide*.
Step 2	**show version** **Example:** `RP/0/0/CPU0:Router# show version`	Displays software version information. • The ROM Monitor version appears near the top of the **show version** command display. The line is labeled "ROM:." • Review the command display to determine which version of ROM Monitor is in use on the RP. If the correct version is in use, there is no need to upgrade.
Step 3	**copy** *source destination* **Example:** `RP/0/0/CPU0:Router# copy tftp:software/filename disk0:`	Copies the ROM Monitor upgrade file to the router. • Copy the upgrade file to the root directory of any device on the router. For example, you can copy the file to disk0.
Step 4	**dir** *device* **Example:** `RP/0/0/CPU0:Router# dir disk0:`	Displays the directory contents for a device root directory. • Verify that the upgrade file appears in the directory.
Step 5	**admin** **Example:** `RP/0/0/CPU0:router# admin`	Enters administration EXEC mode.
Step 6	If you are upgrading a standalone RP, go to Step 15	—

	Command or Action	Purpose
Step 7	**show redundancy** **Example:** `RP/0/0/CPU0:router(admin)# show redundancy`	Displays the status of the standby RP. • Verify that the standby RP is working properly. • If the standby RP is not ready, there is a traffic interruption during the upgrade.
Step 8	**config-register 0x0** **Example:** `RP/0/0/CPU0:router(admin)# config-register 0x0`	Set the configuration register on the active RP to 0x0. • This configures the RP to load ROM Monitor when it restarts.
Step 9	**redundancy switchover** **Example:** `RP/0/0/CPU0:Router# redundancy switchover`	Reloads the active RP in a dual RP router. • The former standby RP becomes the active RP. • The former active RP restarts in ROM Monitor mode due to the configuration register setting defined in Step 8. **Note** The **redundancy switchover** command does not reload the software if the standby RP is not ready to take over.
Step 10	**confreg 0x2** **Example:** `rommon1> confreg 0x2`	Resets the configuration register to enter EXEC mode when the system is reset.
Step 11	**boot** *upgradeImage* **Example:** `rommon2> boot upgradeImage`	Boots the RP with the ROM Monitor upgrade image.
Step 12	Establish a connection to the active RP (formerly the standby RP).	Allows you to manage the active RP. • For more information, see "Connecting and Communicating with the Router" in *Cisco IOS XR Getting Started Guide*.
Step 13	**admin** **Example:** `RP/0/1/CPU0:router# admin`	Enters administration EXEC mode.
Step 14	**show redundancy** **Example:** `RP/0/0/CPU0:router(admin)# show redundancy`	Displays the status of the standby RP. • Verify that the standby RP is working properly. • If the standby RP is not ready, there is a traffic interruption during the upgrade.
Step 15	**config-register 0x0** **Example:** `RP/0/1/CPU0:router(admin)# config-register 0x0`	Set the configuration register on the active RP to 0x0.

	Command or Action	Purpose

Step 16	**redundancy switchover** or **reload**
	
	Example:
	`RP/0/1/CPU0:Router# redundancy switchover`
	
	or
	
	`RP/0/1/CPU0:Router# reload`
		Reloads the active RP.
		• Use the **redundancy switchover** command in a dual RP router. The former standby RP becomes the active RP, and the former active RP restarts in ROM Monitor mode due to the configuration register setting defined in Step 15.
		Note The **redundancy switchover** command does not reload the software if the standby RP is not ready to take over.
		• Use the **reload** command in a single RP router.
		Note When the **reload** command is entered on a single RP router, all traffic is interrupted.

Step 17	**confreg 0x2** **Example:** `rommon B1> confreg 0x2`	Resets the configuration register to enter EXEC mode when the system is reset.
Step 18	**boot** *upgradeImage* **Example:** `rommon B2> boot upgradeImage`	Boots the RP with the ROM Monitor upgrade image.

Example

In the following example, the ROM Monitor software is upgraded on a single RP:

```
RP/0/0/CPU0:router# show version | include ROM

ROM: System Bootstrap, Version 12.0(20040624:164256) [assafb-misc1 1.14dev(0.91)
] SOFTWARE


RP/0/0/CPU0:router# copy tftp://192.168.1.1/users/bfprp_romupgrade-1.14.0.91 disk0:

Destination filename [/disk0:/bfprp_romupgrade-1.14.0.91]?
Copy : Destination exists, overwrite ?[confirm]
Accessing tftp://192.168.1.1/users/bfprp_romupgrade-1.14.0.91
CCCCCCCCCCC
170268 bytes copied in      0 sec

RP/0/0/CPU0:router# dir disk0:

Directory of disk0:

2           drwx  4096        Sun Jul 31 02:25:48 2005  LOST.DIR
3           drwx  4096        Sun Jul 31 02:25:52 2005  config
37          drwx  4096        Sun Jul 31 02:27:48 2005  c12k-os-mbi-3.4.0
4040        drwx  4096        Sun Jul 31 02:47:44 2005  instdb
4042        drwx  4096        Sun Jul 31 02:31:14 2005  c12k-base-3.4.0
19570       drwx  4096        Sun Jul 31 02:31:32 2005  c12k-admin-3.4.0
20991       drwx  4096        Sun Jul 31 02:31:58 2005  c12k-fwdg-3.4.0
22567       drwx  4096        Sun Jul 31 02:32:30 2005  c12k-lc-3.4.0
25548       drwx  4096        Sun Jul 31 02:32:54 2005  c12k-rout-3.4.0
29          drwx  4096        Sun Jul 31 02:38:49 2005  shutdown
```

```
28460       dr-x  4096        Sun Jul 31 02:40:03 2005  aaa
28468       drwx  4096        Sun Jul 31 02:36:53 2005  usr
28469       drwx  4096        Sun Jul 31 02:36:53 2005  var
66592       -rwx  2765        Sun Jul 31 02:45:50 2005  sam_certdb
28494       drwx  4096        Sun Jul 31 02:45:39 2005  c12k-infra-test-3.4.0
66784       -rwx  126         Sun Jul 31 02:45:50 2005  sam_crldb
66880       -rwx  170268      Thu Aug  4 22:21:21 2005  bfprp_romupgrade-1.14.0.
91

256462848 bytes total (113434624 bytes free)
RP/0/0/CPU0:router#

RP/0/0/CPU0:router(admin)# config-register 0x0

Successfully set config-register to 0x0 on node 0/0/CPU0

RP/0/0/CPU0:router(admin)# exit
RP/0/0/CPU0:router# reload
Updating Commit Database.  Please wait...[OK]
Proceed with reload? [confirm] y

System Bootstrap, Version 12.0(20040624:164256) [assafb-misc1 1.14dev(0.91)] DEV
ELOPMENT SOFTWARE
Copyright (c) 1994-2004 by cisco Systems, Inc.

DRAM DIMM Slot 1: 512M found, Slot 2: Empty
MPC7450 platform with 524288 Kbytes of main memory

rommon 2 > confreg 0x2
rommon 3 > boot disk0:bfprp_romupgrade-1.14.0.91

GRP Boot ROM Programming6322432 bytes total (620
Verify the device manufacturing code
RP/0/0/CPU0:i
mft = 0x1, dev = 0x4F tftp://192.168.1.1
Erasing Flashot-users$
Sector address = fff00000
Erasing the Flash...
% Incomplete com
Sector address = fff10000
RP/0/0/CPU0:iox1-shared-
Erasing the Flash...192.168.1.1/auto/t
Sector address = fff20000
Erasing the Flash...
Sector address = fff30000ootflash:/c12kprp-boot-mz

Erasing the Flash...
Sector address = fff40000
Copy : Destination e
Erasing the Flash...nfirm]
Sector address = fff50000
Accessing tftp://
Erasing the Flash...tftpboot-users/
Sector address = fff60000
Erasing the Flash...
Sector address = fff70000
Erasing the Flash...
Verifying FlashCCCCCCCCCCCCCCC
Verify Boot Sector Complete!
All Programming Complete!
CCCCCC
Verify Boot Sector Complete!
All Programming Complete!
CCCCCC
```

```
router con0/0/CPU0 is now available



Press RETURN to get started.



Username: user
Password: secret
RP/0/0/CPU0:router#
```

Additional References

Related Documents

Related Topic	Document Title
Hardware component commands	*Cisco IOS XR Interface and Hardware Component Command Reference*
System management commands	*Cisco IOS XR System Management Command Reference*

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of 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.	http://www.cisco.com/techsupport

Symbols

A

B

C

D

E

F

H

L

P

R

S

T

U

V