Upgrading and Downgrading ROM Monitor Firmware

This chapter describes how to upgrade or downgrade the ROM Monitor Firmware.

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 router. 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.

The ROM Monitor firmware on all Route Processors (RP)s must be compatible with the current Cisco IOS XR software release running on the router before it is upgraded to the latest Cisco IOS XR Software Release.

If the router is brought up with an incompatible version of the ROM Monitor software, then the standby RP may fail to boot. If a boot block occurs in a multishelf system, contact your Cisco Technical Support representative for assistance.

Cisco CRS multishelf systems should be upgraded to ROMMON release 1.54 (minimum version required) before being upgraded to Cisco IOS XR Release 4.2 or later, to ensure that RPs are assigned the correct rack numbers during a system boot.

Note   ROMMON versions are backward compatible. You need not downgrade the ROMMON versions if the current version is higher than the listed compatible version.

ROMMON A and ROMMON B

Each node in a Cisco CRS 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.

Normally, you only upgrade ROMMON B. ROMMON A is a backup for ROMMON B. When you upgrade the ROMMON B, the router uses the unmodified ROMMON A if the ROM Monitor upgrade is interrupted or fails for any reason.

Failures are most likely to occur during ROMMON upgrades or downgrades and unlikely to fail during normal usage. A failure in ROMMON A results in an inactive card that must be returned to the authorized merchandiser.

By default, on an MSC/FP-140 and PRP ROMMON, there is a dedicated piece of hardware that chooses to boot ROMMON B. This resets the board and selects ROMMON A in the event of a boot-timer expiry, which means that ROMMON A and ROMMON B are fully independent and identical images.

Note
- ROMMON 1.x and ROMMON 2.x are not compatible to each other. Failure to keep ROMMON A and ROMMON B on the same major version breaks the failsafe mechanism for ROMMON A and ROMMON B on the packet-processing card (PPC). (ROMMON B is not used.)

- We recommend that you upgrade ROMMON A and ROMMON B to a minimum of ROMMON version 2.03 or later after the Cisco IOS XR software is upgraded to release 4.2.0 or later.

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 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 activate 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. Remember that a cold restart results in router downtime while the cards reboot.

ROM Monitor Compatibility with Cisco IOS XR Software

The ROM Monitor firmware on all RPs must be compatible with the Cisco IOS XR software release currently running on the router before a Cisco CRS system is upgraded to latest Cisco IOS XR Software Release. If the router is brought up with an incompatible version of the ROM Monitor software, the standby RP may fail to boot.

This table describes the minimum ROMMON version required for Cisco IOS XR Software Release:

Table 1: Minimum ROMMON version required for Cisco IOS XR Software Release

Cisco IOS XR Software Release	Minimum ROMMON version
4.1.x	2.03
4.2.x	2.06

In addition, Cisco CRS multishelf systems should be upgraded to ROMMON release 1.54 before being upgraded to Cisco IOS XR Software Release 4.2.0 or later, to ensure that RPs are assigned the correct rack numbers during system boot.

After you upgrade to latest Cisco IOS XR Software Release, you should upgrade the ROM Monitor firmware to the recommended version for that release.

Note   If the ROM Monitor firmware is not compatible with the Cisco IOS XR software currently running on the router, refer to the documentation for your currently running software release for instructions on upgrading the ROM Monitor firmware to a compatible version. After you upgrade to latest Cisco IOS XR Software Release, use the instructions in this module to upgrade your ROM Monitor firmware to a version compatible with that release.

Overriding a Boot Block in the Standby RP

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

Note   If you are running Cisco IOS XR Software Release 3.2.6, or an earlier release, RP/B is not supported in Cisco CRS systems (single-shelf or multishelf). RP/B was introduced in Cisco IOS XR Software Release 3.3.0 with a minimum supported ROMMON version of 1.38.

Split-Boot Support

In split-boot feature, the minimal boot image (MBI) resides within bootflash memory and the rest of the packages reside on the PCMCIA cards. Split-boot applies only to the RP node, DRP nodes of the LC chassis, and SC node of the fabric chassis. ROM Monitor boots the MBI from bootflash memory. MBI boots other packages (Manageability, Security, MPLS, and Multicast) from flash disk (disk0/disk1) on all RP, DRP, and SC nodes within the Cisco CRS\ router. When the MBI is installed, it contains all the necessary file system drivers, which can then access the packages and files from the PCMCIA cards.

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Note
- The flash disk drives, disk0 and disk1, are not accessible from ROM Monitor due to the FAT 32 file system. However, the flash disk drives are accessible from ROM Monitor in the FAT 16 file system. All Cisco IOS XR software Releases after 3.8.0 support both FAT 16 and FAT 32 file systems. Earlier releases support only the FAT 16 filesystem.

- The PRP supports FAT 32 file systems in ROMMON.

Prerequisites

The following are the prerequisites for implementing the split-boot feature on ROM Monitor:

- New ROMMON with split-boot support: The minimum ROMMON version of 1.53 is required to support Split-boot. When the Cisco CRS router uses Cisco IOS XR software Release 4.2.0 or a later release, you must upgrade the ROM Monitor based on the instructions mentioned in the next section.

- Install code with split-boot support: All RP, DRP, and SC nodes must have a working bootflash; otherwise, the router fails to boot.

Safe Messages to Ignore

Safe messages do not indicate any error. They appear because the new ROM Monitor first searches for the MBI in bootflash memory in Release 3.7.0 and earlier releases of Cisco IOS XR software. However, these safe messages are not displayed if you are using Cisco IOS XR Software Release 3.8.0 and later releases.

When the flash disk is booting RP, DRP, and SC nodes that have the new ROM Monitor with a Cisco IOS XR software image earlier than Release 4.2.0, the safe messages are displayed under the following conditions:

- When the BOOT variable is set to BOOT=disk0:<mbi_image_path>/<mbi.vm>:

```
Fail to open file name disk0/<mbi_image_path>/<mbi.vm>
```

- When disk mirroring is enabled and when the BOOT_DEV_SEQ_OPER variable is set to BOOT_DEV_SEQ_OPER=disk0:,disk1:

```
Fail to open file name disk0/<mbi_image_path>/<mbi.vm>
Fail to open file name disk1/<mbi_image_path>/<mbi.vm>
```

Turboboot Errors

A process called Turboboot is performed on the Cisco CRS routers to install Cisco IOS XR software into a persistent storage device for the first time. This persistent storage device subsequently diskboots the Cisco CRS router. When diskbooted, the router can be warm booted with a newer version of software, which might require a reload of the node.

The Turboboot errors appear when any one of the following conditions occurs:

- If the bootflash is bad or missing on the active RP (at least in the Turboboot phase), the Turboboot operation fails with the following error messages:

```
<snip>
```

```
TURBOBOOT: Failed to obtain turboboot parameters: 'Turboboot' detected the 'fatal'
condition 'No devices that qualifies for boot device are found
 in the system'
TURBOBOOT: Resetting TURBOBOOT rommon variable to (TURBOBOOT=).
TURBOBOOT: Setting config-register to NOT autoboot the router and NOT disable send
break.
TURBOBOOT: Failed reading/validating turboboot settings: 'Turboboot' detected the 'fatal'
 condition 'No devices that qualifies for boot device
are found in the system'
</snip>
```

- If the bootflash on the standby RP is bad or missing, the installation encounters a fatal error condition and sends a message that '*bootflash is either corrupt or missing'*.

Note   Ensure that all required bootflashes are present and working on all Cisco CRS routers before installing the new Cisco IOS XR software and the new ROM Monitor that supports split-boot.

Upgrading or Downgrading ROM Monitor Using the FPD PIE

The field-programmable devices (FPDs) are hardware devices implemented on router cards that support separate software upgrades. A field-programmable gate array (FPGA) is a type of programmable memory device that exists on most hardware components of a router. The term "FPD" describes any type of programmable hardware device on SIPs and shared port adapters (SPAs), including FPGAs. Cisco IOS XR software provides the Cisco FPD upgrade feature to manage the upgrade of FPD images on SIPs and SPAs.

Use the following procedure to upgrade or downgrade the ROM Monitor firmware using the ROM Monitor image contained in the field-programmable device (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 upgrading one card at a time. After each upgrade, you should see a message indicating that the upgrade was performed successfully. Reload the card only after the upgrade finishes successfully.

If you are not sure if a card 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:

- ROMMON firmware is compatible with the Cisco IOS XR software version on your router.

- FPD PIE is installed on your router. For more information on installing software PIEs, see the *Upgrading and Managing Cisco IOS XR Software* module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*.

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> **Note**   If the Cisco IOS XR software was upgraded to Release 4.2.0 or a later release before the ROMMON firmware was upgraded to a compatible version, and the standby RP fails to boot, clear the boot block with the **hw-module boot override** command in administration configuration mode.

SUMMARY STEPS

1. **show hw-module fpd location all**
2. **admin**
3. **show fpd package**
4. **upgrade hw-module fpd rommon location** [**all** | *node-id*]
5. **upgrade hw-module fpd rommonA location** [**all** | *node-id*]
6. **exit**
7. If you are upgrading a single node on a router, including a standby DSDRSC, go to Step 9.
8. If you are upgrading a router with redundant DSCs, and want to perform a graceful reload, go to Step 10.
9. If you are upgrading a router with a single RP, or want to perform a cold restart on all nodes, go to Step 11.
10. Reload a single node.
11. Gracefully reload all nodes on a system that includes redundant RPs (DSCs).
12. Reload all nodes in the system (cold restart).
13. **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 want to upgrade only a specific FPD type.
Step 4	**upgrade hw-module fpd rommon location** [**all**	*node-id*]	

	Command or Action	**Purpose**
Step 5	**upgrade hw-module fpd rommonA location** [**all** | *node-id*] **Example:** `RP/0/RP0/CPU0:router(admin)#upgrade hw-module fpd rommon location 0/SM3/SP`	Upgrades the ROMMON B and ROMMON A images on the specified card (*node-id*) or all cards (**all**). You need to explicitly upgrade the ROMMON A using the hidden command, provided your ROMMON is earlier than Release 1.52. **Note** Before you continue to reload the card, you should see a message indicating that the upgrade was completed successfully. **Caution** Do not stop the upgrade or reload any cards while the upgrade process is in progress. It may corrupt the firmware making the card unbootable.
Step 6	**exit** **Example:** `RP/0/RP0/CPU0:router(admin)# exit`	Exits administration EXEC mode and returns to EXEC mode.
Step 7	If you are upgrading a single node on a router, including a standby DSDRSC, go to Step 9.	Continues to reload the node.
Step 8	If you are upgrading a router with redundant DSCs, and want to perform a graceful reload, go to Step 10.	Continues to gracefully reload all nodes.
Step 9	If you are upgrading a router with a single RP, or want to perform a cold restart on all nodes, go to Step 11.	Continues to perform a cold restart of all nodes.
Step 10	Reload a single node. **Example:** `RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload`	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 *node-id* 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. Go to Step 12 to verify that the correct ROMMON firmware is active on each node.

Step 11	Gracefully reload all nodes on a system that includes redundant RPs (DSCs).
	
	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`
		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.
		
		(Optional) Use **cfs check** command to ensure the sanity of the configuration file system for the owner SDR.
		
		(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.
		
		Reloads the standby RP to activate the new ROMMON firmware.

Command or Action	Purpose

```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```
	Note • The standby RP is the standby DSC for the system. The primary and standby DSCs are also the DSDRSCs for the owner SDR.
	
	Use the **show redundancy** command to verify the redundancy status of the DSC nodes. Wait for the standby RP to return to "Ready" state.
	
	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.
	
	Use the **show redundancy** command to verify the status of the RP nodes. Wait for the standby RP to return to ready state.
	
	Reload the original primary RP to activate the new ROMMON firmware.
	
	(Optional) Repeat Step a to Step g on all DSDRSCs in the system to ensure a graceful restart for all SDRs.
	
	Use the **admin** command to enter administration EXEC mode.
	
	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.
	
	Use the **hw-module location** *node-id* **reload** command to reload each additional card where the ROMMON firmware was changed. Each node must be reloaded to activate the new ROMMON firmware.
	
	Replace *node-id* 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.
	
	Repeat Step k to reload all upgraded nodes in the system.

	Command or Action	Purpose
		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 12	Reload all nodes in the system (cold restart). **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.
		
		 Reloading the primary RP (DSC) interrupts all service.
		
		 (Optional) Ensures the sanity of the configuration file system for the owner SDR.
		
		 (Optional) Ensures the sanity of the configuration file system for each non-owner SDR in the system.
		
		 Enters administration EXEC mode.
		
		 Reloads the DSDRSC with the upgraded ROM Monitor firmware. Use the **reload location all** command in administration EXEC mode to reload all nodes in the system.

Step 13	**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, if you do not receive a message indicating a successful upgrade, or if you see error messages similar to the following message, try reformatting the bootflash (**format bootflash:** [**location all** | *node-id*]) 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 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 ROMMON B 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.

Upgrading ROM Monitor Manually Using the CLI

1. Download the ROMMON firmware from the CCO location and copy the file into a local disk drive.

2. Upgrade ROMMON using the upgrade rommonB command in the Admin mode:

> **Note** Use the ROMMON firmware that is stored in the local disk drive from Step 1.

```
RP/0/RP1/CPU0(admin)#upgrade rommonB loc 1/rp1/cpu0 disk0
Wed Dec 11 01:52:35.719 UTC
Please do not power cycle, reload the router or reset any nodes until
 all upgrades are completed.
Please check the syslog to make sure that all nodes are upgraded successfully.
If you need to perform multiple upgrades, please wait for current upgrade
 to be completed before proceeding to another upgrade.
Failure to do so may render the cards under upgrade to be unusable.

RP/1/RP1/CPU0:Dec 11 01:52:36.290 : upgrade_daemon[367]: Running rommon upgrade
RP/1/RP1/CPU0:Dec 11 01:52:36.408 : syslog_dev[91]: upgrade_daemon[367]: Starting init
RP/1/RP1/CPU0:Dec 11 01:52:36.408 : syslog_dev[91]: upgrade_daemon[367]: Opening rommon
 bin file
RP/1/RP1/CPU0:Dec 11 01:53:22.169 : syslog_dev[91]: upgrade_daemon[367]: Unlocking SPI
Flash
RP/1/RP1/CPU0:Dec 11 01:53:22.169 : syslog_dev[91]: upgrade_daemon[367]: Erasing ROMMON
 B...
RP/1/RP1/CPU0:Dec 11 01:53:22.169 : syslog_dev[91]: upgrade_daemon[367]: Programming SPI
 Flash ROMMON B
RP/1/RP1/CPU0:Dec 11 01:53:22.169 : syslog_dev[91]: upgrade_daemon[367]:
RP/1/RP1/CPU0:Dec 11 01:53:22.169 : syslog_dev[91]: upgrade_daemon[367]: Verifying ROMMON
 B:
RP/1/RP1/CPU0:Dec 11 01:53:22.169 : syslog_dev[91]: upgrade_daemon[367]:   PASSED.
RP/1/RP1/CPU0:Dec 11 01:53:22.169 : syslog_dev[91]: upgrade_daemon[367]: OK, ROMMON B
is programmed successfully.
```

> **Note**
> - Before you continue, ensure that a syslog message that the upgrade was completed successfully is displayed.
> - We recommend to upgrade all line cards.

3. Reload the cards using `hw-module location reload` command.

ROM Monitor Upgrades: Examples

This section provides the following configuration examples:

ROM Monitor Upgrade: Example

The following example illustrates how to display ROM monitor image information for all cards in the router. ROMMON B is referred to as rommon in the display.

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

Sun Jun  6 04:24:16.510 DST

==================================== ==========================================
```

```
                                      Existing Field Programmable Devices
                                      ===========================================
                                      HW                       Current SW Upg/
Location      Card Type               Version Type  Subtype Inst  Version  Dng?
============  =======================  ======= ====  ======= ====  =========== ====
0/1/SP        40G-MSC                  0.2     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/1/CPU0      CRS-SIP-800              0.96    lc    fpga1   0     6.00     No
                                               lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/1/0         SPA-4XOC3-POS            1.0     spa   fpga1   0     3.04     No
--------------------------------------------------------------------------------
0/1/1         SPA-4XT3/E3              1.1     spa   fpga1   1     1.00     No
                                               spa   rommon  1     2.12     No
                                               spa   fpga2   1     1.04     No
                                               spa   fpga3   1     1.04     No
--------------------------------------------------------------------------------
0/1/4         SPA-4XOC48POS/RPR        1.0     spa   fpga1   4     1.00     No
--------------------------------------------------------------------------------
0/1/5         SPA-8X1GE                2.2     spa   fpga1   5     1.08     No
--------------------------------------------------------------------------------
0/4/SP        DRP                      0.3     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/4/CPU0      DRP                      0.3     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/4/CPU1      DRP                      0.3     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/6/SP        40G-MSC                  0.3     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/6/CPU0      CRS-SIP-800              0.96    lc    fpga1   0     6.00     No
                                               lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/6/0         SPA-4XOC3-POS            1.0     spa   fpga1   0     3.04     No
--------------------------------------------------------------------------------
0/6/1         SPA-1X10GE-WL-V2         1.0     spa   fpga1   1     1.11     No
--------------------------------------------------------------------------------
0/6/4         SPA-8XOC12-POS           1.1     spa   fpga1   4     1.00     No
--------------------------------------------------------------------------------
0/6/5         SPA-8X1GE                2.2     spa   fpga1   5     1.08     No
--------------------------------------------------------------------------------
0/RP0/CPU0    RP                       0.1     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/RP1/CPU0    RP                       0.1     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/SM0/SP      Fabric HS123             0.1     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/SM1/SP      Fabric HS123             0.1     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/SM2/SP      Fabric HS123             0.1     lc    rommonA 0     2.03     No
                                               lc    rommon  0     2.03     No
--------------------------------------------------------------------------------
0/SM3/SP      Fabric HS123             0.1     lc    rommonA 0     2.03     No
```

```
                                            lc   rommon  0     2.03    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

Sun Jun  6 04:25:46.199 DST
```

	Field Programmable Device Package						
Card Type	FPD Description	Type	Subtype	SW Version	Min Req SW Ver	Min Req HW Vers
140G-MSC	FPGA Linecard 32.0	lc	fpga2	32.00	0.0	0.0
	FPGA CPU 6.0	lc	fpga1	6.00	0.0	0.0
	ROMMONA swv2.03 kensho	lc	rommonA	2.03	0.0	0.0
	ROMMONB swv2.03 kensho	lc	rommon	2.03	0.0	0.0
1OC768-ITU/C	OPTICS FIRMWARE 110B10	lc	fpga2	110.10	0.0	0.0
1OC768-DWDM-L	OPTICS FIRMWARE 110B10	lc	fpga2	110.10	0.0	0.0
1OC768-DPSK/C	OPTICS FIRMWARE 110B14	lc	fpga2	110.14	0.0	0.0
1OC768-DPSK/C-O	OPTICS FIRMWARE 110B14	lc	fpga2	110.14	0.0	0.0
1OC768-DPSK/C-E	OPTICS FIRMWARE 110B14	lc	fpga2	110.14	0.0	0.0
CRS-CGSE-PLIM	FPGA mCPU0 0.559	lc	fpga2	0.559	0.0	0.0
	FPGA sCPU0 0.559	lc	fpga3	0.559	0.0	0.0
	FPGA mCPU1 0.559	lc	fpga4	0.559	0.0	0.0
	FPGA sCPU1 0.559	lc	fpga5	0.559	0.0	0.0
	FPGA PLIM_SVC 0.41014	lc	fpga1	0.41014	0.0	0.0
20-10GBE	FPGA 42.0	lc	fpga3	42.00	0.0	0.0
12-10GBE	FPGA 42.0	lc	fpga3	42.00	0.0	0.0
1-100GBE	FPGA 14.0	lc	fpga3	14.00	0.0	0.0
	FPGA 26.0	lc	fpga4	26.00	0.0	0.0
	FPGA 20.0	lc	fpga5	20.00	0.0	0.0
14-10GBE	FPGA 42.0	lc	fpga3	42.00	0.0	0.0
CRS-SIP-800	JACKET FPGA swv6.0	lc	fpga1	6.00	5.0	0.0
	FPGA swv6.0 hwv80	lc	fpga1	6.00	5.0	0.80
8-10GBE	FPGA swvA.0	lc	fpga1	10.00	0.0	0.0
OC48-POS-16-ED	FPGA PLIM_OC48 9.0	lc	fpga1	9.00	0.0	0.0
4-10GBE	FPGA sw_4p_v15.0	lc	fpga1	15.00	0.0	0.0

```
 --More--
```

The following example shows how to upgrade ROMMON B:

```
RP/0/RP0/CPU0:Router(admin)# upgrade hw-module fpd rommon 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   rommon  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 rommon   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 rommon   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 Router: Example

The following example shows how a Cisco CRS router is gracefully reloaded following a ROMMON upgrade or downgrade:

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

Sun Jun  6 04:27:09.007 DST

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

Sun Jun  6 04:28:20.813 DST
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
Standby node in 0/RP1/CPU0 is NSR-ready
```

```
Reload and boot info
--------------------
RP reloaded Mon May 17 21:51:56 2010: 2 weeks, 5 days, 6 hours, 36 minutes ago
Active node booted Mon May 17 21:51:56 2010: 2 weeks, 5 days, 6 hours, 36 minutes ago
Standby node boot Mon May 17 21:51:31 2010: 2 weeks, 5 days, 6 hours, 36 minutes ago
Standby node last went not ready Mon May 17 22:03:02 2010: 2 weeks, 5 days, 6 hours, 25
minutes ago
Standby node last went ready Mon May 17 22:03:02 2010: 2 weeks, 5 days, 6 hours, 25 minutes
 ago
Standby node last went not NSR-ready Fri Jun  4 17:59:52 2010: 1 day, 10 hours, 28 minutes
 ago
Standby node last went NSR-ready Fri Jun  4 18:00:28 2010: 1 day, 10 hours, 27 minutes ago
There have been 0 switch-overs since reload

Active node reload "Cause: Lost DSC"
Standby node reload "Cause: User reload request"

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


Sun Jun  6 04:30:19.934 DST
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
0/1/1           MSC(SPA)        4T3E3           OK          PWR,NSHUT,MON
0/1/4           MSC(SPA)        4XOC48-POS      OK          PWR,NSHUT,MON
0/1/5           MSC(SPA)        8X1GE           OK          PWR,NSHUT,MON
0/4/SP          DRP(SP)         N/A             IOS XR RUN  PWR,NSHUT,MON
0/4/CPU0        DRP(Active)     DRP-ACC         IOS XR RUN  PWR,NSHUT,MON
0/4/CPU1        DRP(Active)     DRP-ACC         IOS XR RUN  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
0/6/1           MSC(SPA)        1x10GE          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
0/SM0/SP        FC-40G/S(SP)    N/A             IOS XR RUN  PWR,NSHUT,MON
0/SM1/SP        FC-40G/S(SP)    N/A             IOS XR RUN  PWR,NSHUT,MON
0/SM2/SP        FC-40G/S(SP)    N/A             IOS XR RUN  PWR,NSHUT,MON
0/SM3/SP        FC-40G/S(SP)    N/A             IOS XR RUN  PWR,NSHUT,MON

RP/0/RP0/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/RP0/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/RP0/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/RP0/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/RP0/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/RP0/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/RP0/CPU0:router(admin)# show platform

Sun Jun  6 04:30:19.934 DST
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
0/1/1           MSC(SPA)        4T3E3            OK             PWR,NSHUT,MON
0/1/4           MSC(SPA)        4XOC48-POS       OK             PWR,NSHUT,MON
0/1/5           MSC(SPA)        8X1GE            OK             PWR,NSHUT,MON
0/4/SP          DRP(SP)         N/A              IOS XR RUN     PWR,NSHUT,MON
0/4/CPU0        DRP(Active)     DRP-ACC          IOS XR RUN     PWR,NSHUT,MON
0/4/CPU1        DRP(Active)     DRP-ACC          IOS XR RUN     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
0/6/1           MSC(SPA)        1x10GE           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
0/SM0/SP        FC-40G/S(SP)    N/A              IOS XR RUN     PWR,NSHUT,MON
0/SM1/SP        FC-40G/S(SP)    N/A              IOS XR RUN     PWR,NSHUT,MON
0/SM2/SP        FC-40G/S(SP)    N/A              IOS XR RUN     PWR,NSHUT,MON
0/SM3/SP        FC-40G/S(SP)    N/A              IOS XR RUN     PWR,NSHUT,MON

RP/0/RP0/CPU0:router(admin)# show diag  | inc ROM|NODE|PLIM

NODE 0/1/SP : MSC(SP)
  ROMMON: Version 1.40(20060207:032848)  [CRS ROMMON]
PLIM 0/1/CPU0 : JACKET CARD
  ROMMON: Version 1.40(20060207:032757)  [CRS 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 ROMMON]
PLIM 0/6/CPU0 : JACKET CARD
  ROMMON: Version 1.40(20060207:032743)  [CRS 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 ROMMON]
NODE 0/RP1/CPU0 : RP
  ROMMON: Version 1.40(20060207:032757)  [CRS ROMMON]
NODE 0/SM0/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS ROMMON]
NODE 0/SM1/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS ROMMON]
NODE 0/SM2/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS ROMMON]
NODE 0/SM3/SP : FC/S
  ROMMON: Version 1.40(20060207:032848)  [CRS ROMMON]
```

Additional References

Related Documents

Related Topic	Document Title
Hardware component commands	*Interface and Hardware Component Command Reference for Cisco CRS Routers*
System management commands	*System Management Command Reference for Cisco CRS Routers*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support