
# Managing the Router Hardware

This chapter describes the command-line interface (CLI) techniques and commands used to manage and configure the hardware components of a router running the Cisco IOS XR software.

## Contents

This chapter contains the following sections:



## Displaying Hardware Status

The following sections describe how to display different types of hardware status information:



### Displaying Hardware Version Information

The **show diag** command displays detailed information on the hardware components for each node. This information includes the card serial number and the ROMMON software version.

The syntax for the **show diag** command is:

**show diag** [*nodeID* | **details | summary**]

**Tip** For information on the software version, use the **show version** command.

In the following example, the **show diag** command displays information for all nodes:

```
RP/0/RP0/CPU0:Router# show diag

NODE 0/0/SP : MSC(SP)
  MAIN:  type 500060,  0800-019840-1033 rev 01 dev 010cd8
         HW version 0.0  S/N SAD07290129
  PCA:   0073-007648-04 rev 08
  Board State : IOS-XR RUN
  PLD:   Motherboard: 0xf425, Processor: 0x0000, Power: N/A
  MONLIB: QNXFFS Monlib Version 2.2
  ROMMON: Version 1.15(20040603:013227)  [CRS-1 ROMMON]


NODE 0/0/CPU0 : MSC(16OC48-POS/DPT)
  MAIN:  type 500060,  0800-019840-1033 rev 01 dev 010cd8
         HW version 0.0  S/N SAD07290129
  PCA:   0073-007648-04 rev 08
  Board State : IOS-XR RUN
  PLD:   Motherboard: 0x0025, Processor: 0xda13, Power: N/A
  MONLIB: QNXFFS Monlib Version 2.2
  ROMMON: Version 1.15(20040603:013406)  [CRS-1 ROMMON]


NODE 0/2/SP : 4OC192-POS/DPT PLIM PRESENT

NODE 0/3/SP : MSC(SP)
  MAIN:  type 500060,  0800-025021-259 rev 01 dev 000000
         HW version 0.0  S/N SAD074907X6
  PCA:   0073-007648-06 rev 11
  Board State : IOS-XR RUN
  PLD:   Motherboard: 0xfa25, Processor: 0x0000, Power: N/A
  MONLIB: QNXFFS Monlib Version 2.2
  ROMMON: Version 1.15(20040603:013227)  [CRS-1 ROMMON]


NODE 0/3/CPU0 : MSC(16OC48-POS/DPT)
  MAIN:  type 500060,  0800-025021-259 rev 01 dev 000000
         HW version 0.0  S/N SAD074907X6
  PCA:   0073-007648-06 rev 11
  Board State : IOS-XR RUN
  PLD:   Motherboard: 0x0025, Processor: 0xda13, Power: N/A
  MONLIB: QNXFFS Monlib Version 2.2
  ROMMON: Version 1.15(20040603:013406)  [CRS-1 ROMMON]


NODE 0/RP0/CPU0 : RP
  MAIN:  type 100000,  0000-000000-00 rev 01 dev 000000
         HW version 0.0  S/N SAD07150223
  PCA:   0073-007641-04 rev 05
  Board State : IOS-XR RUN
  PLD:   Motherboard: 0x0018, Processor: 0xda13, Power: 0x001f
  MONLIB: QNXFFS Monlib Version 2.1
  ROMMON: Version 1.15(20040603:013406)  [CRS-1 ROMMON]
```

**Note** Line cards in Cisco CRS-1s are called modular services cards (MSCs). The **show diag** command output is different for Cisco CRS-1s and Cisco XR 12000 Series Routers.

In the following example, the **show diag** command displays information for a single node:

```
RP/0/RP0/CPU0:router# show diag 0/2/cpu0

RACK  0 SLOT  2 : MSC(16OC48-POS/DPT)
  MAIN:  type 500060,  0000-000000-00 rev 00 dev 000000
         HW version 0.0  S/N SAD0719013M
  PCA:   0073-007648-04 rev 07
  Board State : IOS-XR RUN
  PLD:   Motherboard: 0x0024, Processor: 0xda12, Power: 0xf100
  MONLIB: QNXFFS Monlib Version 2.1
  ROMMON: Version 1.15(20040120:002937)  [CRS-1 ROMMON]
```

# Displaying Software and Hardware Information

The **show version** command displays a variety of system information, including the hardware and software versions, router uptime, boot settings (including the configuration register), and active software.

The syntax for the **show version** command is:

**show version**

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

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

Cisco IOS-XR Software, Version 1.0.0
Copyright (c) 2004 by cisco Systems, Inc.

ROM: System Bootstrap, Version 1.15(20040120:002852) ,

router uptime is 2 days, 1 hour, 59 minutes
System image file is "tftp://223.0.0.0/usr/comp-hfr-full.vm-1.0.0

cisco CRS-16/S (7450) processor with 2097152K bytes of memory.
7450 processor at 650Mhz, Implementation , Revision

4 Packet over SONET network interface(s)
4 SONET/SDH Port controller(s)
1 Ethernet/IEEE 802.3 interface(s)
2043k bytes of non-volatile configuration memory.
1000592k bytes of ATA PCMCIA card at disk 0 (Sector size 512 bytes).

Configuration register is 0x0

Package active on node 0/2/SP:
hfr-admin, V 1.0.0, Cisco Systems, at mem:hfr-admin-1.0.0
    Built on Fri Mar  5 19:12:26 PST 2004
 --More--
```

# Displaying Node IDs and Status

The **show platform** command displays the operation and configuration status of router nodes. This command also displays the card type that hosts each node and the node IDs for all nodes. To display information on a single node, enter the command with a node ID.

The syntax for the **show platform** command on Cisco CRS-1s is:

**show platform** [*nodeID*]

The syntax for the **show platform** command on Cisco XR 12000 Series Routers is:

**show platform**

The following example displays the status for all nodes in a Cisco CRS-1:

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

Node            Type            PLIM            State           Config State
--------------------------------------------------------------------------------
0/0/SP          MSC(SP)         N/A             IOS-XR RUN      PWR,NSHUT,MON
0/0/CPU0        MSC             16OC48-POS/DPT  IOS-XR RUN      PWR,NSHUT,MON
0/2/SP          MSC(SP)         N/A             IOS-XR RUN      PWR,NSHUT,MON
0/2/CPU0        MSC             16OC48-POS/DPT  IOS-XR RUN      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
```

**Note** Line cards in Cisco CRS-1s are called modular services cards (MSCs). The **show platform** command output is different for Cisco CRS-1s and Cisco XR 12000 Series Routers.

The *nodeID* appears in the *rack*/*slot*/*module* notation, and the *nodeID* components are as follows:

- The *rack* number in a single-chassis system is always “0.”
- The *slot* is the number of the physical slot in which the card is installed.
- The *module* identifies a system hardware component.

Table 6-1 summarizes the *nodeID* for each type of card in a Cisco CRS-1 system, and Table 6-2 summarizes the *nodeID* for each type of card in a Cisco XR 12000 Series Router.

***Table 6-1 Node ID Components on Cisco CRS-1 Routers***

| Card Type (the card type to which you are issuing commands) | Rack (always “0” in a single-chassis system) | Slot (the physical slot in which the card is installed) | Module (the entity on the card that executes the commands) |
|---|---|---|---|
| Route processor | 0 | RP0 and RP1 | CPU0 |
| MSC | 0 | 0–7 (8-slot chassis)<br>0–15 (16-slot chassis) | SP |
| PLIM | 0 | 0–7 (8-slot chassis)<br>0–15 (16-slot chassis) | CPU0 |
| Cisco CRS-1 SPA Interface Processor (SIP)-800 | 0 | 0–7 (8-slot chassis)<br>0–15 (16-slot chassis) | CPU0 |
| 1-Port OC-192c/STM-64c PoS XFP SPA<br>4-Port OC-3c/STM-1 PoS SPA<br>8-Port Gigabit Ethernet SPA | 0 | 0–7 (8-slot chassis)<br>0–15 (16-slot chassis) | 0-5 (SPA module number on the Cisco CRS-1 SIP-800) |
| Switch fabric module | 0 | SF0–SF3 (8-slot chassis)<br>SM0–SM7 (16-slot chassis) | service processor (SP) |
| Alarm cards | 0 | AM0–AM1 (16-slot chassis) | SP |
| Fan controller cards | 0 | FC0–FC1 (16-slot chassis) | SP |

*Table 6-2 Node ID Components on Cisco XR 12000 Series Routers*

| Card Type (the card type to which you are issuing commands) | Rack (always "0" in a single-chassis system) | Slot (the logical slot number reported in command displays) | Module (the entity on the card that executes the commands) |
|---|---|---|---|
| Route processor | 0 | 0–15[1], [2] | CPU0 |
| Cisco XR 12000 and 12000 Series line cards | 0 | 0–15[1] | CPU0 |
| Cisco XR 12000 and 12000 Series SPA Interface Processor (SIP)-600 | 0 | 0–15[1] | CPU0 |
| 1-Port 10-Gigabit Ethernet SPA<br>5-Port Gigabit Ethernet SPA<br>10-Port Gigabit Ethernet SPA<br>1-Port OC-192c/STM-64c PoS/RPR SPA | 0 | 0–15[1] | 0-1 (SPA module number on the Cisco XR12000 and 12000 Series SIP-600 ) |
| Clock and scheduler cards (CSCs) | 0 | CSC 0 and 1[3] | CPU0 |
| Switch fabric cards (SFCs) | 0 | SFC 0, 1, 2, 3, and 4[3, 4] | CPU0 |
| Consolidated switch fabric (CSF) card | 0 | Dedicated slot 17[5] | CPU0 |

1. Depends on router model.
2. RP pairs can be in any adjacent slot pairs as long as the even-numbered slot is the smaller slot number. For example, an RP pair can be installed in slots 0 and 1, 2 and 3, or 14 and 15.
3. Not used on Cisco XR 12404 routers.
4. Total number of SFC slots depends on router model.
5. Used only on Cisco XR 12404 routers.

# Displaying Router Environment Information

The **show environment** command displays hardware information for the system, including fan speeds, LED indications (Cisco CRS-1s only), power supply voltage and current information, and temperatures.

The syntax for the **show environment** command is:

**show environment** [**all** | **fans** | **leds** | **power-supply** | **table** | **temperatures** | **voltages**]

You can use the **show environment** command options to limit the detail in the command display. The following example shows the full environment status report:

```
RP/0/0/CPU0:router# show environment

Temperature Information
----------------------------------------------

R/S/I   Modules Sensor          Temp. (deg C)

0/0/*     host  Inlet              23.0
          host  Hot                23.0
0/3/*     host  Inlet              24.0
          host  Hot                33.0
0/4/*     host  Inlet              24.5
          host  Hot                31.5
0/5/*     host  Inlet              23.5
          host  Hot                30.5
0/6/*     host  Hot                31.5
          host  Inlet              22.5
0/7/*     host  Inlet              20.0
          host  Hot                29.5
0/8/*     host  Inlet              20.5
          host  Hot                32.0

Threshold Information
----------------------------------------------

R/S/I   Modules Sensor          Minor           Major           Critical
                                (Lo/Hi)         (Lo/Hi)         (Lo/Hi)

0/0/*     host  InletTemp        --/  55         --/  60         --/  --
          host  HotTemp          --/  66         --/  69         --/  --
          host  PLIM_V4_1.6V     --/  --         --/  --         --/  --
          host  PLIM_V5_1.8V     --/  --         --/  --         --/  --
          host  PLIM_V3_2.5V     --/  --         --/  --         --/  --
          host  3.3V          2950/3500       2900/3600         --/  --
          host  5V            4800/5150       4700/5200         --/  --
          host  Mbus5V        4700/5300       4500/5500         --/  --
0/3/*     host  InletTemp        --/  55         --/  60         --/  70
          host  HotTemp          --/  66         --/  69         --/  75
          host  PLIM_V3_1.5V     --/  --         --/  --         --/  --
          host  PLIM_V8_1.8V     --/  --         --/  --         --/  --
          host  PLIM_V7_2.5V     --/  --         --/  --         --/  --
          host  3.3V             --/  --         --/  --         --/  --
          host  5V            4800/5200       4700/5300       4600/5400
          host  Mbus5V        4700/5300       4600/5400       4500/5500
0/4/*     host  InletTemp        --/  55         --/  60         --/  70
          host  HotTemp          --/  66         --/  69         --/  75
          host  PLIM_V3_1.5V     --/  --         --/  --         --/  --
          host  PLIM_V8_1.8V     --/  --         --/  --         --/  --
          host  PLIM_V7_2.5V     --/  --         --/  --         --/  --
          host  PLIM_V6_1.5V     --/  --         --/  --         --/  --
          host  5V               --/  --         --/  --         --/  --
          host  3.3V             --/  --         --/  --         --/  --
          host  Mbus5V        4700/5300       4600/5400       4500/5500
```

```
0/5/*     host  InletTemp        --/  55          --/  60          --/  70
          host  HotTemp          --/  66          --/  69          --/  75
          host  PLIM_V3_1.5V     --/  --          --/  --          --/  --
          host  PLIM_V8_1.8V     --/  --          --/  --          --/  --
          host  PLIM_V7_2.5V     --/  --          --/  --          --/  --
          host  PLIM_V6_1.5V     --/  --          --/  --          --/  --
          host  5V               --/  --          --/  --          --/  --
          host  3.3V             --/  --          --/  --          --/  --
          host  Mbus5V         4700/5300        4600/5400        4500/5500
0/6/*     host  HotTemp          --/  66          --/  69          --/  75
          host  InletTemp        --/  55          --/  60          --/  70
          host  PLIM_V3_1.5V     --/  --          --/  --          --/  --
          host  PLIM_V8_1.8V     --/  --          --/  --          --/  --
          host  PLIM_V7_2.5V     --/  --          --/  --          --/  --
          host  3.3V             --/  --          --/  --          --/  --
          host  Mbus5V         4700/5300        4600/5400        4500/5500
0/7/*     host  InletTemp        --/  55          --/  60          --/  70
          host  HotTemp          --/  66          --/  69          --/  75
          host  PLIM_V3_1.5V     --/  --          --/  --          --/  --
          host  PLIM_V8_1.8V     --/  --          --/  --          --/  --
          host  PLIM_V7_2.5V     --/  --          --/  --          --/  --
          host  PLIM_V6_1.5V     --/  --          --/  --          --/  --
          host  5V               --/  --          --/  --          --/  --
          host  3.3V             --/  --          --/  --          --/  --
          host  Mbus5V         4700/5300        4600/5400        4500/5500
0/8/*     host  InletTemp        --/  55          --/  60          --/  70
          host  HotTemp          --/  66          --/  69          --/  75
          host  PLIM_V3_1.5V     --/  --          --/  --          --/  --
          host  PLIM_V8_1.8V     --/  --          --/  --          --/  --
          host  PLIM_V7_2.5V     --/  --          --/  --          --/  --
          host  3.3V             --/  --          --/  --          --/  --
          host  5V             4800/5200        4700/5300        4600/5400
          host  Mbus5V         4700/5300        4600/5400        4500/5500

Voltage Information
-------------------------------------------

R/S/I   Modules Sensor          Voltage (mV)    Margin

0/0/*     host  PLIM_V4_1.6V     1612           nominal
          host  PLIM_V5_1.8V     1804           nominal
          host  PLIM_V3_2.5V     2504           nominal
          host  3.3V             3296           nominal
          host  5V               5048           nominal
          host  Mbus5V           5048           n/a
0/3/*     host  PLIM_V3_1.5V     1496           nominal
          host  PLIM_V8_1.8V     1788           nominal
          host  PLIM_V7_2.5V     2492           nominal
          host  3.3V             3284           nominal
          host  5V               5000           nominal
          host  Mbus5V           5024           n/a
0/4/*     host  PLIM_V3_1.5V     1500           nominal
          host  PLIM_V8_1.8V     1796           nominal
          host  PLIM_V7_2.5V     2488           nominal
          host  PLIM_V6_1.5V     1508           nominal
          host  5V               4976           nominal
          host  3.3V             3288           nominal
          host  Mbus5V           5048           n/a
```

```
0/5/*     host  PLIM_V3_1.5V     1504           nominal
          host  PLIM_V8_1.8V     1792           nominal
          host  PLIM_V7_2.5V     2488           nominal
          host  PLIM_V6_1.5V     1504           nominal
          host  5V               4976           nominal
          host  3.3V             3284           nominal
          host  Mbus5V           4984           n/a
0/6/*     host  PLIM_V3_1.5V     1496           nominal
          host  PLIM_V8_1.8V     1792           nominal
          host  PLIM_V7_2.5V     2476           nominal
          host  3.3V             3300           nominal
          host  Mbus5V           5016           n/a
0/7/*     host  PLIM_V3_1.5V     1504           nominal
          host  PLIM_V8_1.8V     1796           nominal
          host  PLIM_V7_2.5V     2484           nominal
          host  PLIM_V6_1.5V     1504           nominal
          host  5V               4976           nominal
          host  3.3V             3276           nominal
          host  Mbus5V           4984           n/a
0/8/*     host  PLIM_V3_1.5V     1496           nominal
          host  PLIM_V8_1.8V     1792           nominal
          host  PLIM_V7_2.5V     2492           nominal
          host  3.3V             3280           nominal
          host  5V               5000           nominal
          host  Mbus5V           5024           n/a
```

## Displaying RP Redundancy Status

The **show redundancy** command displays the redundancy status of the route processors (RPs). This command also displays the boot and switch-over history for the RPs.

The syntax for the **show redundancy** command is:

**show redundancy**

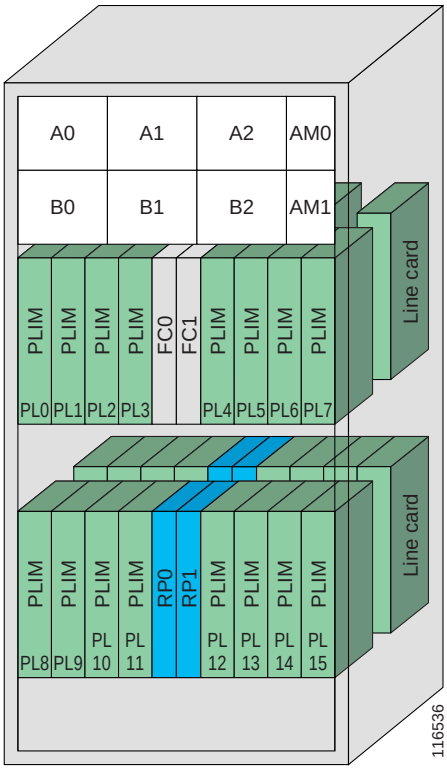
In the following example, the **show redundancy** command displays the redundancy status for a redundant RP pair:

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

This 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 Fri Apr  9 03:44:28 2004: 16 hours, 51 minutes ago
This node booted Fri Apr  9 06:19:05 2004: 14 hours, 16 minutes ago
Last switch-over Fri Apr  9 06:53:18 2004: 13 hours, 42 minutes ago
Standby node boot Fri Apr  9 06:54:25 2004: 13 hours, 41 minutes ago
Standby node last not ready Fri Apr  9 20:35:23 2004: 0 minutes ago
Standby node last ready Fri Apr  9 20:35:23 2004: 0 minutes ago
There have been 2 switch-overs since reload
```

# RP Redundancy and Switchover

Two RPs can be installed in slots RP0 and RP1 of a line card chassis to form a redundant set (see Figure 6-1). RP redundancy is enabled by default in the Cisco IOS XR software.

*Figure 6-1 Redundant Set of RPs Installed in Slots RP0 and RP1 in a 16-Slot Chassis*




Note: Illustration not to scale

# Determining the Primary RP

During system startup, the first RP to boot with a valid Cisco IOS XR software boot package becomes the active "primary RP." The primary RP can be in either slot RP0 or slot RP1. You can tell which RP is the primary RP in the following ways:

- The primary RP can be identified by the green Primary LED on the faceplate of the card. The primary RP is indicated when the Primary LED is on.
- The slot of the primary RP is indicated in the CLI prompt. For example:

  ```
  RP/0/RP1/CPU0:router#
  ```

  In this example, the prompt indicates that you are communicating with the primary RP in slot RP1. See "CLI Prompt" section on page 2-11 for a complete description of the CLI prompt.
- Enter the **show redundancy** command in EXEC mode to display a summary of the primary and standby RP status.

# Role of the Standby RP

The second RP to boot automatically becomes the "standby RP." While the primary RP manages the system and communicates with the user interface, the redundant standby RP maintains a complete backup of the software and configurations for all cards in the system. If the primary RP fails or goes off line for any reason, the standby RP immediately takes control of the system.

# Summary of Redundancy Commands

RP redundancy is enabled by default in the Cisco IOS XR software, but you can use the commands described in Table 6-3 to display the redundancy status of the cards or force a manual switchover.

*Table 6-3 RP Redundancy Commands*

| Command | Description |
|---|---|
| **show redundancy** | Displays the redundancy status of the RPs. This command also displays the boot and switch-over history for the RPs. |
| **redundancy switchover** | Forces a manual switchover to the standby RP. This command works only if the standby RP is installed and in the "ready" state. |
| **show platform** | Displays the status for all cards in the system, including the redundancy status of the RP cards. |

# Automatic Switchover

Automatic switchover from the primary RP to the standby RP occurs only if the primary RP encounters a serious system error, such as the loss of a mandatory process or a hardware failure. When an automatic switchover occurs, the RPs respond as follows:

- If a standby RP is installed and "ready" for switchover, the standby RP becomes the active primary RP. The original primary RP attempts to reboot.
- If the standby RP is not in "ready" state, then both RPs reboot. The first RP to boot successfully assumes the role of primary RP.

# RP Redundancy During RP Reload

The **reload** command causes the primary RP to reload the Cisco IOS XR software. When an RP reload occurs, the RPs respond as follows:

- If a standby RP is installed and "ready" for switchover, the standby RP becomes the active primary RP. The original primary RP reboots and becomes the standby RP.
- If the standby RP is not in the "ready" state, then both RPs reboot. The first RP to boot successfully assumes the role of primary RP.

**Caution** You should not use the **reload** command to force an RP switchover because the result could be a significant loss of router operations. Instead, use the **redundancy switchover** command to fail over to the standby RP, then use the **hw-module location** *nodeID* **reload** command to reload the RP. See the "Reloading, Shutting Down, or Power Cycling a Node" section on page 6-12 for more information.

# Manual Switchover

You can force a manual switchover from the primary RP to the standby RP using the **redundancy switchover** command.

If a standby RP is installed and ready for switchover, the standby RP becomes the active primary RP. The original primary RP becomes the standby RP. In the following example, partial output for a successful redundancy switchover operation is shown:

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

This 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# redundancy switchover

Initializing DDR SDRAM...found 2048 MB
Initializing ECC on bank 0
.
.
.
Turning off data cache, using DDR for first time

Initializing NVRAM...
Testing a portion of DDR SDRAM ...done
Reading ID EEPROMs ...
Initializing SQUID ...
Initializing PCI ...

PCI0 device[1]: Vendor ID 0x10ee

Configuring MPPs ...
Configuring PCMCIA slots ...
--More--
```

If the standby RP is not in "ready" state, the switchover operation is not allowed. In the following example, partial output for a failed redundancy switchover attempt is shown:

```
RP/0/0/CPU0:router(admin)#show redundancy
Redundancy information for node 0/0/CPU0:
==========================================
Node 0/0/CPU0 is in ACTIVE role
Partner node (0/1/CPU0) is in UNKNOWN role

Reload and boot info
----------------------
RP reloaded Thu Apr 21 16:48:48 2005: 4 hours, 49 minutes ago
Active node booted Thu Apr 21 16:48:48 2005: 4 hours, 49 minutes ago
There have been 0 switch-overs since reload

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

Switchover disallowed: Standby node is not ready.
```

## Communicating with a Standby RP

The primary RP automatically synchronizes all system software, settings, and configurations with the standby RP. Under normal operating conditions, users communicate only with the active primary RP, as indicated in the CLI prompt. Users do not communicate directly with the standby RP.

It is possible to connect a terminal directly to the Console port of the standby RP to place the card in ROM Monitor bootstrap mode or to load software directly to the standby RP. For more information on these techniques, see Appendix A, "Router Recovery and Management with ROM Monitor," and Chapter 5, "Managing Cisco IOS XR Software Packages."

# Reloading, Shutting Down, or Power Cycling a Node

Use the commands described in this section to reload the Cisco IOS XR software on the primary RP or on any specified node in the system. This section also describes the commands used to administratively shut down a node and power a node on or off.

Table 6-4 summarizes the commands described in this section.

***Table 6-4 Commands to Reload, Shut Down, or Power Cycle a Node***

| Command | Description |
|---|---|
| **hw-module location** *nodeID* **power disable** | This command must be entered in admin configuration mode and administratively turns the power off for a Cisco XR 12000 Series Router node. The changes do not take effect until you enter the **commit** command.<br>To power on a node, use the **no** form of this command.<br>**Note** This command applies only to Cisco XR 12000 Series Routers and cannot be used to disable power on the RP from which the command is entered. |
| **hw-module location** *nodeID* **reload** | This command works in EXEC mode and reloads the Cisco IOS XR software on a specific node or all nodes. To specify all nodes, enter **all** for the nodeID. The node reloads with the current running configuration and active software set for that node. |

*Table 6-4 Commands to Reload, Shut Down, or Power Cycle a Node (continued)*

| Command | Description |
|---|---|
| **hw-module location** *nodeID* **shutdown** | This command must be entered in admin configuration mode and administratively shuts down a specified node on a Cisco XR 12000 Series Router. Nodes that are shut down still have power, but cannot load or operate Cisco IOS XR software.<br>To return a node to the up state, use the **no** form of this command.<br>**Note** This command applies only to Cisco XR 12000 Series Routers and cannot be used to shut down the RP from which the command is entered. |
| **reload** | Causes the primary RP to reload the Cisco IOS XR software according to the configuration register setting (for example, 0x0 to enter ROMMON bootstrap mode, 0x2 to reload the RP to EXEC mode). See the "Reloading the Primary RP" section on page 6-13 for more information. |
| **show variables boot** | Displays the configuration register setting for the router.<br>• Use this command in admin EXEC mode.<br>• The configuration register setting determines how the router boots during a system reset. The most common configuration register settings are:<br>– 0x2: The primary RP loads the Cisco IOS XR software and default configuration on the next system boot. After logging in, the user can access EXEC mode.<br>– 0x0: The primary RP enters the bootstrap ROM Monitor (`rommon B1>`) on the next system boot. |

# Reloading the Primary RP

The **reload** command causes the primary RP to reload the Cisco IOS XR software according to the configuration register setting. This setting determines how the primary RP acts when reloaded.

This section contains instructions to reload the Cisco IOS XR software and return to EXEC mode. For instructions to use the **reload** command for entering ROM Monitor bootstrap mode, see Appendix A, "Router Recovery and Management with ROM Monitor."

**Caution** Because the reload command causes the primary RP to go offline and either reload Cisco IOS XR software or enter ROM Monitor mode, the router experiences a loss of service unless a redundant standby RP is installed and in "ready" state. To display the status of the standby RP, type the **show redundancy** command in EXEC mode.

## SUMMARY STEPS

1. **show redundancy**
2. **admin**
3. **show variables boot**
4. (Optional) Set the configuration register value to 0x2:
   a. **config-register 0x2**
   b. **commit**
   c. **end**
5. **reload**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| Step 1 | **show redundancy**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router# show redundancy` | Displays the RP redundancy status.<br>• If a standby RP is in "ready" redundancy state, the **reload** command also causes the router to gracefully fail over to the standby RP. |
| Step 2 | **admin**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router# admin` | Enters admin EXEC mode. |
| Step 3 | **show variables boot**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(admin)# show variables boot` | Displays the configuration register setting.<br>• Enter this command in admin EXEC mode.<br>• For normal operations, the configuration register setting is 0x2, which causes the primary RP to reload the Cisco IOS XR software.<br>• Verify that the configuration register setting is 0x2. If it is not, complete Step 3 to reset the configuration register to 0x2.<br>**Note** For instructions on how to enter ROM Monitor bootstrap mode, see Appendix A, "Router Recovery and Management with ROM Monitor." |

| | Command or Action | Purpose |
|---|---|---|
| **Step 4** | (Optional) Set the configuration register value to 0x2:<br>**a. config-register 0x2**<br>**b. commit**<br>**c. end**<br><br>**Example**:<br>`RP/0/RP0/CPU0:router(admin)# config-register 0x2`<br>`RP/0/RP0/CPU0:router(config)# commit`<br>`RP/0/RP0/CPU0:router(config)# end` | Sets the configuration register to 0x2.<br>• This step is necessary only if the register is not set to 0x2 in the running configuration. |
| **Step 5** | `reload`<br><br>**Example**:<br>`RP/0/RP0/CPU0:router# reload` | Reloads the primary RP according to the configuration register setting.<br>• If the setting is 0x2, then the RP reloads the Cisco IOS XR software.<br>• If the standby RP is in "ready" redundancy state, the router fails over to the standby RP.<br>• If a standby RP is not installed or not in a "ready" state, the router experiences a loss of service while the primary RP is reloading the Cisco IOS XR software. |

## Administratively Shutting Down or Powering On or Off a Node

A Cisco XR 12000 Series Router node can be administratively shut down by entering the **hw-module location** *nodeID* **shutdown** command in admin configuration mode. A node that is shut down still has power, but cannot load or run the Cisco IOS XR software.

You can also administratively turn power off for a node using the **hw-module location** *nodeID* **power disable** command in admin configuration mode.

**Note** These commands apply only to Cisco XR 12000 Series Routers and cannot be used to disable power for the RP from which the command is entered.

For more information on the use of these commands, see the *Cisco IOS XR Interface and Hardware Component Command Reference*.

# Using Controller Commands to Manage Hardware Components

The **controllers** and **show controllers** commands are used to manage and display settings for various hardware components, including the switch fabric management, Ethernet control plane, and interface manager. These commands are primarily diagnostic and related to driver-level details. The information available with these commands varies widely and is hardware specific.

For information on the use of these commands, see the *Cisco IOS XR Interface and Hardware Component Command Reference.*

# Formatting Hard Drives, Flash Drives, and Other Storage Devices

To format a storage device on the router, use the **format** command in EXEC mode.

**Caution** Formatting a storage device deletes all data on that device.

The following command syntax is used:

**format** *filesystem***:** [*monlib-filename*] [**recover**]

Table 6-5 describes the **format** command syntax.

***Table 6-5 format command Syntax Description***

| Variable | Description |
|---|---|
| *filesystem* | Specifies the memory device to format, followed by a colon. The supported file systems are **bootflash:**, **harddisk:**, **disk0:**, and **disk1:**. |
| *monlib-filename* | (Optional) Names the ROM Monitor library file (monlib file) to use for formatting the bootflash. The default monlib file is the one bundled with the system software.<br>**Note** The monlib file is used by ROMMON for accessing the file system on the medium. |
| **recover** | (Optional) Recovers any sector read errors on a flash disk (disk0: or disk1:). |

In the following example, the format command is used to format the hard disk:

```
RP/0/RP0/CPU0:router# format harddisk:
```

For information on the use of these commands, see the *Cisco IOS XR System Management Command Reference*.

# Removing and Replacing Cards

This section describes card replacement issues and procedures for the following tasks:

- Removing Line Cards, MSCs, or PLIMs, page 6-17
- Replacing an MSC, page 6-18
- Replacing a Line Card or PLIM with the Same Media Type and Port Count, page 6-18
- Replacing a Line Card or PLIM with the Same Media Type and a Different Port Count, page 6-18
- Replacing a Line Card or PLIM with a Different Media Type, page 6-19
- Removing and Replacing Cisco CRS-1 Switch Fabric Cards, page 6-19
- Removing and Replacing CSC and SFC Cards, page 6-22
- Removing and Replacing CSFC Cards, page 6-27
- Adding a Standby PRP to a Cisco 12000 Series Router, page 6-28

# Removing Line Cards, MSCs, or PLIMs

Line cards, modular services cards (MSCs), and physical layer interface modules (PLIMs) are designed for online insertion and removal (OIR). On Cisco XR 12000 Series Routers, a line card is a single card that contains all service processing functions and physical line interfaces. On Cisco CRS-1s, the service processing functions are provided on the MSC, and the physical line interface is provided on a separate card that connects the physical lines to the MSC.

The OIR feature allows you to remove and replace cards without removing power to the card or chassis. Removing a card interrupts all traffic passing through the card, but it does not remove the card configuration.

When you remove a card, the configuration remains for all interfaces, but the interfaces do not appear in the output of the **show interfaces** command. You can view interface configurations by entering the **show running-config** command. The following example shows how the configuration appears when a card is removed:

```
RP/0/0/CPU0:router# show running-config

Building configuration...
hostname router
router ospf 3269
 area 0
  interface POS0/3/0/0
   cost 20
!
interface preconfigure POS0/3/0/0
 ipv4 address 10.10.50.1 255.255.255.0
!
interface preconfigure POS0/3/0/1
 description POS0/3/0/1
 shutdown
!
interface preconfigure POS0/3/0/2
 description POS0/3/0/2
 shutdown
!
interface preconfigure POS0/3/0/3
 description POS0/3/0/3
 shutdown
!
```

In this example, the MSC in slot 3 is removed, and the interface configuration for all four interfaces changes to *interface preconfigure*. However, the *router ospf* reference to a slot 3 interface does not change. If you replace a PLIM with another PLIM that uses the same media type and port count, the configuration becomes active on the replacement card.

To remove the configuration for a slot after a card is removed, use the **no interface preconfigure** command to remove all interface configuration statements for that card in the running configuration. In addition, search the configuration for any references to the removed interfaces, such as the *outer ospf* reference to slot 3 in the preceding example.

To remove the configuration for a slot when a card is installed, use the **no interface** command to remove all interface configuration statements for that card in the running configuration. In addition, search the configuration for any references to the removed interfaces.

Each PLIM supports a specific media type (PoS or Ethernet, for example) and port count. If you replace a PLIM with one that supports a different media type or port count, you should review the configuration and revise it to support the replacement PLIM.

# Replacing an MSC

When you replace an MSC, the guidelines in the "Removing Line Cards, MSCs, or PLIMs" section on page 6-17 apply. Because only one type of MSC exists, no special procedures are required for card removal and replacement.

# Replacing a Line Card or PLIM with the Same Media Type and Port Count

When you replace a line card or PLIM with a card that is of the same media type and has the same port count as the replaced card, the guidelines in the "Removing Line Cards, MSCs, or PLIMs" section on page 6-17 apply. Because the replacement card is of the same media type and port count, no special procedures are required for card removal and replacement.

# Replacing a Line Card or PLIM with the Same Media Type and a Different Port Count

When you replace a line card or PLIM with a card that is of the same media type with a different port count, the guidelines in the "Removing Line Cards, MSCs, or PLIMs" section on page 6-17 apply.

If the new card has a greater port count than the replaced card, the configuration applies to the corresponding lower port numbers, and the ports that did not exist on the replaced card have no configuration and come up in the shutdown state.

If the new card supports fewer ports, the existing configuration for the corresponding number of ports on the new card set is applied. The previous configuration for the removed ports remains in interface preconfigure state, as shown in the following example:

```
RP/0/0/CPU0:router# show running-config

Building configuration...
hostname rtp-gsr1
interface POS0/3/0/0
 ipv4 address 10.10.50.1 255.255.255.0
!
interface preconfigure POS0/3/0/1
 description POS0/3/0/1
 shutdown
!
interface preconfigure POS0/3/0/2
 description POS0/3/0/2
 shutdown
!
interface preconfigure POS0/3/0/3
 description POS0/3/0/3
 shutdown
!
```

In the preceding example, a four-port card has been replaced with a single-port card. The configuration from port 1 on the four-port card is applied to the single port on the replacement card, and the remaining port configurations change to **interface preconfigure**. To remove the configuration for the missing interfaces, use the **no interface preconfigure** command. In addition, search for and remove any configuration references to the removed interfaces.

Whenever you replace a line card or PLIM with the same media type and a different port count, review the running configuration in the router and revise the configuration as necessary.

# Replacing a Line Card or PLIM with a Different Media Type

When you replace a line card or PLIM with a card that is of a different media type (for example, if you replace a PoS PLIM with an Ethernet PLIM), the guidelines in the "Removing Line Cards, MSCs, or PLIMs" section on page 6-17 apply. Review the running configuration in the router and revise the configuration as necessary for the new media type.

# Removing and Replacing Cisco CRS-1 Switch Fabric Cards

To prevent traffic loss, we recommend that you shut the power down on a switch fabric card before you remove it. If a switch fabric card is removed with power on, the card is not harmed, but some traffic may be lost. When the replacement card is inserted, you can restore the power to the slot and bring up the replacement card. This section describes how to properly remove and replace switch fabric modules for upgrades or repairs.

**Note** The process of removing and replacing cards while the router power is on is called *online insertion and removal* (OIR). This procedure removes power to a specific slot before the switch fabric card is replaced. The power remains on for all other slots.

**Tip** For more information about switch fabric cards, see the hardware documentation listed in the "Related Documents" section on page xv.

Before you remove a switch fabric card, be sure to monitor the "down flags," as noted in the Purpose column. Down flags reflect the internal status of the fabric plane. The down flag states are as follows:

- P—The plane has been administratively shut down by a user.
- p—The plane has been shut down by internal fabric software.
- m—Multicast traffic has been shut down.

**Note** This procedure does not apply when starting the router for the first time or after a power cycle or reload.

## Prerequisites

You should have a working knowledge of Cisco IOS XR software and have sufficient permissions to configure the software.

You must log in as root-system before starting the procedure. To confirm your login status, use the **show user group** command:

```
RP/0/RP0/CPU0:router# show user group

Username: lab
  User group root-system
  User group cisco-support
```

To confirm your login status including root, use the **show user all | include root** command:

```
RP/0/RP0/CPU0:router# show user all | include root

  User group root-system
Task:          root-system  : READ    WRITE    EXECUTE    NOTIFY
Task:              root-lr  : READ    WRITE    EXECUTE    NOTIFY
```

## SUMMARY STEPS

1. **show platform**
2. **admin configure**
3. **show controller fabric plane all**
4. **controller fabric plane** *plane_number* **shut**
5. **show controller fabric plane all**
6. **no hw-module node** *fabric_card* power
7. **commit**
8. **end**
9. Remove and replace the switch fabric card.
10. **hw-module node** *fabric_card* **power**
11. **commit**
12. **end**
13. **no controller fabric plane** *plane_number* **shut**
14. **show controller fabric plane all**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | `show platform`<br><br>**Example:**<br>`RP/0/RP0/CPU0:router# show platform` | Displays all cards on the router.<br>• Allows you to identify a fabric card (identified with an SM prefix).<br>• The number following the SM prefix identifies the corresponding fabric plane, as follows:<br>– Fabric Board — Fabric #<br>– SM0 — 0<br>– SM1 — 1<br>– SM2 — 2 |
| **Step 2** | `admin configure`<br><br>**Example:**<br>`RP/0/RP0/CPU0:router# admin configure` | Enters admin configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 3** | **show controller fabric plane all**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(admin-config)# show controller fabric plane all` | Displays the status of each fabric plane. |
| **Step 4** | **controller fabric plane** *plane_number* **shut**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(admin-config)# controller fabric plane 1 shut` | Shuts down the fabric plane. |
| **Step 5** | **show controller fabric plane all**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(admin-config)# show controller fabric plane all` | Displays the status of each fabric plane.<br>• The down flag of the **show controller fabric plane** command display should read P, which indicates that the down flag has been administratively shut down. |
| **Step 6** | **no hw-module node** *fabric_card* **power**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(config)# no hw-module node 0/SM1/SP power` | Shuts down the fabric card.<br>• The down flag of the **show controller fabric plane** command display should read pPm. |
| **Step 7** | **commit**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(config)# commit` | Commits the target configuration to the router running configuration. |
| **Step 8** | **end**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(config)# end` | Ends the configuration session and returns to EXEC mode. |
| **Step 9** | Remove and replace the switch fabric card. | Replaces the physical card. |
| **Step 10** | **hw-module node** *fabric_card* **power**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(config)# hw-module node 0/SM1/SP power` | Brings up the new fabric card.<br>• Monitor the down flag of the plane until it reads P; then wait for 1 minute before proceeding to Step 13. |
| **Step 11** | **commit**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(config)# commit` | Commits the target configuration to the router running configuration. |
| **Step 12** | **end**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(config)# end` | Ends the configuration session and returns to EXEC mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 13** | **no controller fabric plane** *plane_number* **shut**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(admin-config)# no controller fabric plane 0 shut` | Brings up the new fabric plane.<br>• The *Admin Stat*e and *Oper State* fields should read UP. The *Down Flags* field should not display a value. |
| **Step 14** | **show controller fabric plane all**<br><br>**Example:**<br>`RP/0/RP0/CPU0:router(admin)# show controller fabric plane all` | Displays the fabric plane status. |

## Examples

### show controller fabric plane Command: Example

The following example shows the display for the **show controller fabric plane all** command:

```
RP/0/RP0/CPU0:router(admin-config)# show controller fabric plane all

Plane  Admin   Oper       Down       Total     Down
Id     State   State      Flags      Bundles   Bundles
------------------------------------------------------------
0        UP     UP                     0         0
1        UP     UP                     0         0
```

# Removing and Replacing CSC and SFC Cards

On Cisco XR 12000 Series Routers that use clock and scheduler cards (CSCs) and switch fabric cards (SFCs), the CSCs and SFCs work together to provide the switch fabric for the router. Although some router cards can be removed without software preparation, it is best to shut down and remove the power from a CSC or an SFC slot before removing a card. When the new card is inserted, you can restore the power to the slot and bring up the replacement card. This section describes how to properly remove and replace CSCs and SFCs for repairs.

## Prerequisites

You should have a working knowledge of Cisco IOS XR software and have sufficient permissions to configure the software.

You must log in as root-system before starting the procedure. To confirm your login status, use the **show user group** command:

```
RP/0/RP0/CPU0:router# show user group

Username: lab
  User group root-system
  User group cisco-support
```

To confirm your login status including root, use the **show user all | include root** command:

```
RP/0/RP0/CPU0:router# show user all | include root

  User group root-system
Task:          root-system  : READ    WRITE    EXECUTE    NOTIFY
Task:              root-lr  : READ    WRITE    EXECUTE    NOTIFY
```

## SUMMARY STEPS

1. **admin configure**
2. **do show platform**
3. **hw-module location** *slot* **shutdown**
4. **hw-module location** *slot* **power disable**
5. **commit**
6. **do show platform**
7. Remove and replace the CSC or SFC.
8. **no hw-module location** *slot* **power disable**
9. **commit**
10. **do show platform**
11. **no hw-module location** *slot* **shutdown**
12. **commit**
13. **do show platform**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **admin configure**<br><br>**Example:**<br>`RP/0/0/CPU0:router# admin configure` | Enters admin configuration mode. |
| **Step 2** | **do show platform**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# do show platform` | Displays the state of all cards on the router.<br>• Allows you to identify the CSC or SFC you want to replace.<br>• Note the node ID (in the first column) for the card you want to replace. You need to enter this ID later in this procedure. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 3** | **hw-module location** *slot* **shutdown**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# hw-module location 0/16/CPU0 shutdown` | Configures a slot to shut down when the configuration is committed.<br><br>**Caution** Shut down only one CSC or SFC from the combined set of CSCs and SFCs at a time. For example, shut down one CSC or one SFC, but do not shut down two CSCs, two or more SFCs, or cards of both types at the same time. When shutting down a CSC, shutdown the standby CSC. |
| **Step 4** | **hw-module location** *slot* **power disable**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# hw-module location 0/16/CPU0 power disable` | Configures a slot to power down when the configuration is committed. |
| **Step 5** | **commit**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# commit` | Commits the target configuration to the router running configuration.<br><br>**Note** You do not need to enter the **end** or **exit** command or press Ctrl-Z to exit admin configuration mode until the end of this procedure. If you exit admin configuration mode, you must reenter this mode to complete the procedure. |
| **Step 6** | **do show platform**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# do show platform` | (Optional) Displays the state of all cards on the router.<br>• Allows you to verify that the CSC or SFC you want to replace is shut down and the power is off. |
| **Step 7** | Remove and replace the CSC or SFC. | Replaces the physical card. |
| **Step 8** | **no hw-module location** *slot* **power disable**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# no hw-module location 0/16/CPU0 power disable` | Configures a slot to power up when the configuration is committed. |
| **Step 9** | **commit**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# commit` | Commits the target configuration to the router running configuration. |
| **Step 10** | **do show platform**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# do show platform` | (Optional) Displays the state of all cards on the router.<br>• Allows you to verify that the replacement CSC or SFC has power on. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 11** | **no hw-module location** *slot* **shutdown**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# no hw-module location 0/16/CPU0 shutdown` | Configures a slot to start when the configuration is committed. |
| **Step 12** | **commit**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# commit` | Commits the target configuration to the router running configuration. |
| **Step 13** | **do show platform**<br><br>**Example:**<br>`RP/0/0/CPU0:router(admin-config)# do show platform` | (Optional) Displays the state of all cards on the router.<br>• Allows you to verify that the replacement CSC or SFC has power and has been brought up. |

## Examples

### Replacing a CSC: Example

The following example shows commands to change a CSC:

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

RP/0/0/CPU0:router(admin-config)# do show platform

Node            Type            PLIM            State           Config State
--------------------------------------------------------------------------------
0/0/CPU0        PRP(Active)     N/A             IOS-XR RUN      PWR,NSHUT,MON
0/3/CPU0        L3LC Eng 3      OC3-POS-8       IOS-XR RUN      PWR,NSHUT,MON
0/4/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/5/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/6/CPU0        L3LC Eng 3      OC48-POS        IOS-XR RUN      PWR,NSHUT,MON
0/7/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/8/CPU0        L3LC Eng 3      OC12-POS-4      IOS-XR RUN      PWR,NSHUT,MON
0/16/CPU0       CSC10           N/A             PWD             PWR,NSHUT,MON
0/17/CPU0       CSC10(P)        N/A             PWD             PWR,NSHUT,MON
0/18/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/19/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/20/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/21/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/22/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/24/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/25/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/29/CPU0       GSR16-BLOWER    N/A             PWD             PWR,NSHUT,MON

RP/0/0/CPU0:router(admin-config)# hw-module location 0/16/CPU0 shutdown

RP/0/0/CPU0:router(admin-config)# hw-module location 0/16/CPU0 power disable

RP/0/0/CPU0:router(admin-config)# commit
```

```
Primary Clock is CSC_1
Fabric Clock is Non Redundant
Bandwidth Mode : Full Bandwidth

RP/0/0/CPU0:router(admin-config)# do show platform

Node            Type            PLIM            State           Config State
--------------------------------------------------------------------------------
0/0/CPU0        PRP(Active)     N/A             IOS-XR RUN      PWR,NSHUT,MON
0/3/CPU0        L3LC Eng 3      OC3-POS-8       IOS-XR RUN      PWR,NSHUT,MON
0/4/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/5/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/6/CPU0        L3LC Eng 3      OC48-POS        IOS-XR RUN      PWR,NSHUT,MON
0/7/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/8/CPU0        L3LC Eng 3      OC12-POS-4      IOS-XR RUN      PWR,NSHUT,MON
0/16/CPU0       CSC10           N/A             Admin Down      NPWR,SHUT,MON
0/17/CPU0       CSC10(P)        N/A             PWD             PWR,NSHUT,MON
0/18/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/19/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/20/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/21/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/22/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/24/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/25/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/29/CPU0       GSR16-BLOWER    N/A             PWD             PWR,NSHUT,MON
```

**Replace the CSC or SFC at this point.**

```
RP/0/0/CPU0:router(admin-config)# no hw-module location 0/16/CPU0 power disable

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


Primary Clock is CSC_1
Fabric Clock is Redundant
Bandwidth Mode : Full Bandwidth

RP/0/0/CPU0:router(admin-config)# do show platform
Node            Type            PLIM            State           Config State
--------------------------------------------------------------------------------
0/0/CPU0        PRP(Active)     N/A             IOS-XR RUN      PWR,NSHUT,MON
0/3/CPU0        L3LC Eng 3      OC3-POS-8       IOS-XR RUN      PWR,NSHUT,MON
0/4/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/5/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/6/CPU0        L3LC Eng 3      OC48-POS        IOS-XR RUN      PWR,NSHUT,MON
0/7/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/8/CPU0        L3LC Eng 3      OC12-POS-4      IOS-XR RUN      PWR,NSHUT,MON
0/16/CPU0       CSC10           N/A             Admin Down      PWR,SHUT,MON
0/17/CPU0       CSC10(P)        N/A             PWD             PWR,NSHUT,MON
0/18/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/19/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/20/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/21/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/22/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/24/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/25/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/29/CPU0       GSR16-BLOWER    N/A             PWD             PWR,NSHUT,MON

RP/0/0/CPU0:router(admin-config)# no hw-module location 0/16/CPU0 shutdown

RP/0/0/CPU0:router(admin-config)# commit
```

```
RP/0/0/CPU0:router(admin-config)# do show platform

Node            Type            PLIM            State           Config State
-------------------------------------------------------------------------------
0/0/CPU0        PRP(Active)     N/A             IOS-XR RUN      PWR,NSHUT,MON
0/3/CPU0        L3LC Eng 3      OC3-POS-8       IOS-XR RUN      PWR,NSHUT,MON
0/4/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/5/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/6/CPU0        L3LC Eng 3      OC48-POS        IOS-XR RUN      PWR,NSHUT,MON
0/7/CPU0        L3LC Eng 3      GE-4            IOS-XR RUN      PWR,NSHUT,MON
0/8/CPU0        L3LC Eng 3      OC12-POS-4      IOS-XR RUN      PWR,NSHUT,MON
0/16/CPU0       CSC10           N/A             PWD             PWR,NSHUT,MON
0/17/CPU0       CSC10(P)        N/A             PWD             PWR,NSHUT,MON
0/18/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/19/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/20/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/21/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/22/CPU0       SFC10           N/A             PWD             PWR,NSHUT,MON
0/24/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/25/CPU0       ALARM10         N/A             PWD             PWR,NSHUT,MON
0/29/CPU0       GSR16-BLOWER    N/A             PWD             PWR,NSHUT,MON
```

# Removing and Replacing CSFC Cards

On Cisco XR 12404 routers, which use consolidated switch fabric cards (CSFCs), you must power off the router before changing a CSFC card. For more information about removing and replacing CSFCs, see the hardware documentation listed in the "Related Documents" section on page xv.

# Adding a Standby PRP to a Cisco 12000 Series Router

A second PRP card can be added to a Cisco 12000 Series Router for redundancy. To add a standby PRP, boot the card from ROMMON mode with the minimum boot image (MBI) software package. This will bring up the PRP so it can be recognized by the DSC. The new standby PRP will download the appropriate software and configurations from the DSC, and reboot.

This section provides instructions to boot the standby RP after it is installed in the chassis. See the "Related Documents" section on page -xv for more information on installing PRP cards.

## Prerequisites

- The standby PRP must be installed in a slot next to the primary PRP. For example, the PRPs can be installed in slot 0and slot 1, slot 2 and slot 3, slot 4 and slot 5, slot 6 and slot 7, slot 8 and slot 9, etc..
- MBI software package **mbiprp-rp.vm**. This package is used to boot any PRP other than the DSC, including the standby PRP and PRPs in non-owner LRs.
- ROMMON version **bfprp_romupgrade-1.14.0.91** or higher
- Boothelper version **c12kprp-boot-mz.120-30.S** or higher
- The boothelper must be stored as the first file in the bootflash, or the ROMMON variable must be set to point to the boothelper. To set the ROMMON variable, enter the following command in ROM Monitor mode: **BOOTLDR=bootflash:/c12kprp-boot-mz.120-30.S**
- Each PRP must have at least 1024 MB of memory installed. The PRP-1 ships with 512 MB, and the PRP-2 ships with 1024 MB of memory. Upgrade the memory in your PRP if necesary.
- Flashdisks:
  - The recommended flashdisk setup for all PRPs is two 512MB Sandisk Flashdisk in PCMCIA slot 0 and slot 1. The minimum requirement is one 512MB Sandisk flashdisk installed in slot 0 on every physical PRP cards in the system. PRP cards use the flashdisk to store the Cisco IOS XR software and running configurations.
  - The same flashdisk size must be used in all PRPs in the 12000 series router.
  - Each flash disk must be formatted by the Cisco IOS XR software before use. To format a disk, insert the disk into a running PRP and enter the command **format disk***number***:**. Example: **format disk0:**.

### Summary Steps

1. On the standby PRP:
   a. Attach a terminal to the console port, and place the PRP in ROM Monitor mode.
   b. **unset TURBOBOOT**
   c. **unset BOOT**
   d. **sync**
   e. **boot tftp://*server/directory/filename***
2. Wait for boot process to complete.
3. On the primary PRP (DSC):
   a. **show platform**
   b. **show redundancy**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | On the standby PRP, attach a terminal to the console port, and place the PRP in ROM Monitor mode. | Refer to Appendix A, "Router Recovery and Management with ROM Monitor" for more information. |
| **Step 2** | **unset TURBOBOOT**<br><br>**Example:**<br>rommon># **unset turboboot** | Clears the TURBOBOOT variable. The TURBOBOOT variable is only used on the DSC. |
| **Step 3** | **unset BOOT**<br><br>**Example:**<br>rommon># **unset BOOT** | Clears the boot variable. |
| **Step 4** | **sync**<br><br>**Example:**<br>rommon># **sync** | Saves the changes. |
| **Step 5** | **boot tftp://***server/directory/filename*<br><br>**Example:**<br>rommon># **boot tftp://192.168.1.1/dir/mbiprp-rp.vm** | Retrieves the file from the TFTP server and installs it on disk0:. |
| **Step 6** | Wait for boot process to complete. | The standby PRP will boot and all ROMMON variables (such as confreg and BOOT) will be set. Once the standby PRP is recognized by the DSC, the appropriate software will download and the standby PRP card will reload the Cisco IOS XR software from disk. |
| **Step 7** | On the primary PRP (DSC):<br>**show platform**<br><br>**Example:**<br>RP/0/0/CPU0:router# **show platform** | Displays the standby PRP card in the screen output. |
| **Step 8** | On the primary PRP (DSC):<br>**show redundancy**<br><br>**Example:**<br>RP/0/0/CPU0:router# **show redundancy** | Displays the redundancy status of the standby PRP card. |