Managing 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.

For complete descriptions of the commands listed in this module, see Additional References, on page 34. To locate documentation for other commands that might appear in the course of performing a configuration task, search online in *Cisco ASR 9000 Series Aggregation Services Router Commands Master List*.

Table 1: Feature History for Managing Router Hardware with Cisco IOS XR Software

Release	Modification
Release 3.7.2	This feature was introduced.
Release 3.9.0	No modification.

This module contains the following topics:

Prerequisites for Managing Router Hardware

You must be in a user group associated with a task group that includes the proper task IDs. The command reference guides include the task IDs required for each command. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Displaying Hardware Status

This section describes how to display different types of hardware status information.

Displaying SDR Hardware Version Information

To display hardware version information for the components assigned to a secure domain router (SDR), connect to the designated shelf controller (DSC) and enter the **show diag** command in EXEC mode. The displayed information includes the card serial number and the ROMMON software version.

The syntax for the **show diag** command in EXEC mode is:

show diag [*node-id* | **details** | **summary**]

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

```
RP/0/RSP0/CPU0:router# show diag

Mon Jun 29 00:36:41.576 PST

NODE module 0/RSP0/CPU0 :

  MAIN:  board type 0x100302
  S/N:   FOC1230803H
  Top Assy. Number:   68-3160-04
  PID:   A2K-RSP-4G-HDD=
  UDI_VID:   VP4
  HwRev: V4.8
  New Deviation Number: 0
  CLEI:  IPUCARJBAA
  Board State : IOS XR RUN
  PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
  MONLIB: QNXFFS Monlib Version 3.2
  ROMMON: Version 1.0(20081208:173612) [ASR9K ROMMON]
  Board FPGA/CPLD/ASIC Hardware Revision:
    Compact Flash : V1.0
     XbarSwitch0  : V1.3
     XbarSwitch1  : V1.3
     XbarArbiter  : V1.0
     XbarInterface  : V0.0
     IntCtrl  : V1.14
     ClkCtrl  : V1.13
     PuntFPGA  : V1.5
     HD  : V3.0
     USB0  : V77.20
     USB1  : V77.20
     CPUCtrl  : V1.17
     UTI  : V1.6
     LIU  : V1.0
     MLANSwitch  : V0.0
     EOBCSwitch  : V2.0
     CBC (active partition)  : v1.2
     CBC (inactive partition)  : v1.1

NODE module 0/1/CPU0 :

  MAIN:  board type 0x20207
  S/N:   FOC123081J6
```

```
Top Assy. Number:   68-3182-03
PID:   A9K-40GE-B
UDI_VID:   V1D
HwRev: V0.0
New Deviation Number: 0
CLEI:
Board State : IOS XR RUN
PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
ROMMON: Version 1.0(20081208:174521) [ASR9K ROMMON]
Board FPGA/CPLD/ASIC Hardware Revision:
   NP0  : V3.194
   NP1  : V3.194
   NP2  : V3.194
   NP3  : V3.194
   XbarInterface  : V18.4
   Bridge0  : V0.38
   Bridge1  : V0.38
   CPUCtrl  : V0.15
   USB  : V77.20
   PortCtrl  : V0.8
   PHYCtrl  : V0.6
   40 Port Gigabit Ethernet Daughter board  : V0.0
   CBC (active partition)  : v2.2
   CBC (inactive partition)  : v2.1

NODE module 0/4/CPU0 :

  MAIN:  board type 0x2020a
  S/N:   FOC123081JA
  Top Assy. Number:   68-3183-02
  PID:   A9K-8T/4-B
  UDI_VID:   V1D
  HwRev: V0.0
  New Deviation Number: 0
  CLEI: IPU3AE0CAA
  Board State : IOS XR RUN
  PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
  ROMMON: Version 1.0(20081208:174521) [ASR9K ROMMON]
  Board FPGA/CPLD/ASIC Hardware Revision:
   NP0  : V3.194
   NP1  : V3.194
   NP2  : V3.194
   NP3  : V3.194
   XbarInterface  : V18.4
   Bridge0  : V0.38
   Bridge1  : V0.38
   CPUCtrl  : V0.15
   USB  : V77.20
   PortCtrl  : V0.10
   PHYCtrl  : V0.7
   PHY0  : V0.16
   PHY1  : V0.16
   PHY2  : V0.16
   PHY3  : V0.16
   PHY4  : V0.16
   PHY5  : V0.16
   PHY6  : V0.16
   PHY7  : V0.16
   8 Port Ten Gigabit Ethernet Daughter board  : V0.0
   CBC (active partition)  : v2.2
   CBC (inactive partition)  : v2.1

NODE module 0/6/CPU0 :
```

```
MAIN:  board type 0x20208
S/N:   FHH12250033
Top Assy. Number:   68-3184-02
PID:   A9K-4T-B
UDI_VID:   V1D
HwRev: V0.0
New Deviation Number: 0
CLEI:
Board State : IOS XR RUN
PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
ROMMON: Version 1.0(20081208:174521) [ASR9K ROMMON]
Board FPGA/CPLD/ASIC Hardware Revision:
   NP0  : V3.194
   NP1  : V3.194
   NP2  : V3.194
   NP3  : V3.194
   XbarInterface  : V18.4
   Bridge0  : V0.38
   Bridge1  : V0.38
   CPUCtrl  : V0.15
   USB  : V77.20
   PHY0  : V0.16
   PHY1  : V0.16
   PHY2  : V0.16
   PHY3  : V0.16
   PortCtrl  : V0.10
   PHYCtrl  : V0.7
   4 Port Ten Gigabit Ethernet Daughter board  : V0.0
   CBC (active partition)  : v2.2
   CBC (inactive partition)  : v2.1
```

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

```
RP/0/RSP0/CPU0:router# show diag 0/6/cpu0

Mon Jun 29 00:41:43.450 PST

NODE module 0/6/CPU0 :

  MAIN:  board type 0x20208
  S/N:   FHH12250033
  Top Assy. Number:   68-3184-02
  PID:   A9K-4T-B
  UDI_VID:   V1D
  HwRev: V0.0
  New Deviation Number: 0
  CLEI:
  Board State : IOS XR RUN
  PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
  ROMMON: Version 1.0(20081208:174521) [ASR9K ROMMON]
  Board FPGA/CPLD/ASIC Hardware Revision:
     NP0  : V3.194
     NP1  : V3.194
     NP2  : V3.194
     NP3  : V3.194
     XbarInterface  : V18.4
     Bridge0  : V0.38
     Bridge1  : V0.38
     CPUCtrl  : V0.15
     USB  : V77.20
     PHY0  : V0.16
```

```
PHY1  : V0.16
PHY2  : V0.16
PHY3  : V0.16
PortCtrl  : V0.10
PHYCtrl  : V0.7
4 Port Ten Gigabit Ethernet Daughter board  : V0.0
CBC (active partition)  : v2.2
CBC (inactive partition)  : v2.1
```

Displaying System Hardware Version Information

To display hardware version information for all or some of the components assigned in a system, connect to the designated shelf controller (DSC) and enter the **show diag** command in administration EXEC mode. When this command is entered in administration EXEC mode, you can display information on RSPs, line cards, and system components such as the chassis, fan trays, and power supplies.

Note If you enter the **show diag** command in EXEC mode, the software displays only the hardware assigned to the SDR to which you are connected.

The syntax for the **show diag** command in administration EXEC mode is:

show diag [*node-id* | **chassis** | **details** | **fans** | **memory** | **power-supply** | **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 in the system:

```
RP/0/RSP0/CPU0:router(admin)# show diag

Mon Jun 29 01:21:04.571 PST

NODE module 0/RSP0/CPU0 :

  MAIN:  board type 0x100302
  S/N:   FOC1230803H
  Top Assy. Number:   68-3160-04
  PID:    A2K-RSP-4G-HDD=
  UDI_VID:   VP4
  HwRev: V4.8
  New Deviation Number: 0
  CLEI:   IPUCARJBAA
  Board State : IOS XR RUN
  PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
  MONLIB: QNXFFS Monlib Version 3.2
  ROMMON: Version 1.0(20081208:173612) [ASR9K ROMMON]
  Board FPGA/CPLD/ASIC Hardware Revision:
    Compact Flash : V1.0
    XbarSwitch0  : V1.3
    XbarSwitch1  : V1.3
    XbarArbiter  : V1.0
    XbarInterface  : V0.0
    IntCtrl  : V1.14
```

```
        ClkCtrl  : V1.13
        PuntFPGA  : V1.5
        HD  : V3.0
        USB0  : V77.20
        USB1  : V77.20
        CPUCtrl  : V1.17
        UTI  : V1.6
        LIU  : V1.0
        MLANSwitch  : V0.0
        EOBCSwitch  : V2.0
        CBC (active partition)  : v1.2
        CBC (inactive partition)  : v1.1

NODE fantray 0/FT0/SP :

  MAIN:  board type 0x900211
  S/N:
  Top Assy. Number:   32-0000-00
  PID:
  UDI_VID:
  HwRev: V32.0
  New Deviation Number: 0
  CLEI:
  PLD:    Motherboard: N/A, Processor: N/A, Power: N/A
  ROMMON:
  Board FPGA/CPLD/ASIC Hardware Revision:
     CBC (active partition)  : v4.0
     CBC (inactive partition)  : v0.13

NODE fantray 0/FT1/SP :

  MAIN:  board type 0x900211
  S/N:
  Top Assy. Number:   32-0000-00
  PID:
  UDI_VID:
  HwRev: V32.0
  New Deviation Number: 0
  CLEI:
  PLD:    Motherboard: N/A, Processor: N/A, Power: N/A
  ROMMON:
  Board FPGA/CPLD/ASIC Hardware Revision:
     CBC (active partition)  : v4.0
     CBC (inactive partition)  : v0.13

NODE module 0/1/CPU0 :

  MAIN:  board type 0x20207
  S/N:   FOC123081J6
  Top Assy. Number:   68-3182-03
  PID:   A9K-40GE-B
  UDI_VID:   V1D
  HwRev: V0.0
  New Deviation Number: 0
  CLEI:
  Board State : IOS XR RUN
  PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
  ROMMON: Version 1.0(20081208:174521) [ASR9K ROMMON]
  Board FPGA/CPLD/ASIC Hardware Revision:
     NP0  : V3.194
     NP1  : V3.194
     NP2  : V3.194
     NP3  : V3.194
     XbarInterface  : V18.4
```

```
      Bridge0  : V0.38
      Bridge1  : V0.38
      CPUCtrl  : V0.15
      USB  : V77.20
      PortCtrl  : V0.8
      PHYCtrl  : V0.6
      40 Port Gigabit Ethernet Daughter board  : V0.0
      CBC (active partition)  : v2.2
      CBC (inactive partition)  : v2.1

NODE module 0/4/CPU0 :

  MAIN:  board type 0x2020a
  S/N:   FOC123081JA
  Top Assy. Number:   68-3183-02
  PID:   A9K-8T/4-B
  UDI_VID:   V1D
  HwRev: V0.0
  New Deviation Number: 0
  CLEI:  IPU3AE0CAA
  Board State : IOS XR RUN
  PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
  ROMMON: Version 1.0(20081208:174521) [ASR9K ROMMON]
  Board FPGA/CPLD/ASIC Hardware Revision:
      NP0  : V3.194
      NP1  : V3.194
      NP2  : V3.194
      NP3  : V3.194
      XbarInterface  : V18.4
      Bridge0  : V0.38
      Bridge1  : V0.38
      CPUCtrl  : V0.15
      USB  : V77.20
      PortCtrl  : V0.10
      PHYCtrl  : V0.7
      PHY0  : V0.16
      PHY1  : V0.16
      PHY2  : V0.16
      PHY3  : V0.16
      PHY4  : V0.16
      PHY5  : V0.16
      PHY6  : V0.16
      PHY7  : V0.16
      8 Port Ten Gigabit Ethernet Daughter board  : V0.0
      CBC (active partition)  : v2.2
      CBC (inactive partition)  : v2.1

NODE module 0/6/CPU0 :

  MAIN:  board type 0x20208
  S/N:   FHH12250033
  Top Assy. Number:   68-3184-02
  PID:   A9K-4T-B
  UDI_VID:   V1D
  HwRev: V0.0
  New Deviation Number: 0
  CLEI:
  Board State : IOS XR RUN
  PLD:    Motherboard: N/A, Processor: 0x8004 (rev: 2.2), Power: N/A
  ROMMON: Version 1.0(20081208:174521) [ASR9K ROMMON]
  Board FPGA/CPLD/ASIC Hardware Revision:
      NP0  : V3.194
      NP1  : V3.194
      NP2  : V3.194
```

```
                    NP3  : V3.194
                    XbarInterface  : V18.4
                    Bridge0  : V0.38
                    Bridge1  : V0.38
                    CPUCtrl  : V0.15
                    USB  : V77.20
                    PHY0  : V0.16
                    PHY1  : V0.16
                    PHY2  : V0.16
                    PHY3  : V0.16
                    PortCtrl  : V0.10
                    PHYCtrl  : V0.7
                    4 Port Ten Gigabit Ethernet Daughter board  : V0.0
                    CBC (active partition)  : v2.2
                    CBC (inactive partition)  : v2.1

      NODE power-module 0/PM0/SP :

        MAIN:  board type 0xf00188
        S/N:
        Top Assy. Number:   341-00032-01
        PID:   A9K-3KW-AC
        UDI_VID:   V00
        HwRev: V0.0
        New Deviation Number: 0
        CLEI:  ACACACACAC
        PLD:     Motherboard: N/A, Processor: N/A, Power: N/A
        ROMMON:
        Board FPGA/CPLD/ASIC Hardware Revision:

      NODE power-module 0/PM1/SP :

        MAIN:  board type 0xf00188
        S/N:
        Top Assy. Number:   341-00032-01
        PID:   A9K-3KW-AC
        UDI_VID:   V00
        HwRev: V0.0
        New Deviation Number: 0
        CLEI:  ACACACACAC
        PLD:     Motherboard: N/A, Processor: N/A, Power: N/A
        ROMMON:
        Board FPGA/CPLD/ASIC Hardware Revision:

      NODE power-module 0/PM2/SP :

        MAIN:  board type 0xf00188
        S/N:
        Top Assy. Number:   341-00032-01
        PID:   A9K-3KW-AC
        UDI_VID:   V00
        HwRev: V0.0
        New Deviation Number: 0
        CLEI:  ACACACACAC
        PLD:     Motherboard: N/A, Processor: N/A, Power: N/A
        ROMMON:
        Board FPGA/CPLD/ASIC Hardware Revision:

      Rack 0 - ASR-9010 Chassis, Includes Accessories
        RACK NUM: 0
        S/N:
        PID:   ASR-9010 Backplane
        VID:   0.1
        Desc:  ASR-9010 Chassis, Includes Accessories
```

```
    CLEI:  NOCLEI
    Top Assy. Number:   68-1234-56
```

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

```
RP/0/RSP0/CPU0:router(admin)# show diag chassis

Mon Jun 29 01:25:05.711 PST

Rack 0 - ASR-9010 Chassis, Includes Accessories
  RACK NUM: 0
  S/N:
  PID:   ASR-9010 Backplane
  VID:   0.1
  Desc:  ASR-9010 Chassis, Includes Accessories
  CLEI:  NOCLEI
  Top Assy. Number:   68-1234-56
```

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

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

Sat Aug  1 22:52:39.089 DST

Cisco IOS XR Software, Version 3.9.0.16I[DT_IMAGE]
Copyright (c) 2009 by Cisco Systems, Inc.

ROM: System Bootstrap, Version 1.1(20090521:183759) [ASR9K ROMMON],

router uptime is 1 day, 2 hours, 34 minutes
System image file is "bootflash:disk0/asr9k-os-mbi-3.9.0.16I/mbiasr9k-rp.vm"

cisco ASR9K Series (MPC8641D) processor with 4194304K bytes of memory.
MPC8641D processor at 1333MHz, Revision 2.2

2 Management Ethernet
12 TenGigE
40 GigabitEthernet
219k bytes of non-volatile configuration memory.
975M bytes of compact flash card.
33994M bytes of hard disk.
1605616k bytes of disk0: (Sector size 512 bytes).
1605616k bytes of disk1: (Sector size 512 bytes).

Configuration register on node 0/RSP0/CPU0 is 0x102
Boot device on node 0/RSP0/CPU0 is disk0:
Package active on node 0/RSP0/CPU0:
asr9k-scfclient, V 3.9.0.16I[DT_IMAGE], Cisco Systems, at disk0:asr9k-scfclient-3.9.0.16I
    Built on Thu Jul 30 12:09:40 DST 2009
    By sjc-lds-208 in /auto/ioxbuild7/production/3.9.0.16I.DT_IMAGE/asr9k/workspace for
c4.2.1-p0
```

```
asr9k-adv-video, V 3.9.0.16I[DT_IMAGE], Cisco Systems, at disk0:asr9k-adv-video-3.9.0.16I
    Built on Thu Jul 30 13:49:37 DST 2009
    By sjc-lds-208 in /auto/ioxbuild7/production/3.9.0.16I.DT_IMAGE/asr9k/workspace for
c4.2.1-p0

asr9k-fpd, V 3.9.0.16I[DT_IMAGE], Cisco Systems, at disk0:asr9k-fpd-3.9.0.16I
    Built on Thu Jul 30 12:26:21 DST 2009
    By sjc-lds-208 in /auto/ioxbuild7/production/3.9.0.16I.DT_IMAGE/asr9k/workspace for
c4.2.1-p0

asr9k-diags, V 3.9.0.16I[DT_IMAGE], Cisco Systems, at disk0:asr9k-diags-3.9.0.16I
    Built on Thu Jul 30 12:09:43 DST 2009
    By sjc-lds-208 in /auto/ioxbuild7/production/3.9.0.16I.DT_IMAGE/asr9k/workspace for
c4.2.1-p0

asr9k-k9sec, V 3.9.0.16I[DT_IMAGE], Cisco Systems, at disk0:asr9k-k9sec-3.9.0.16I
    Built on Thu Jul 30 12:25:25 DST 2009
    By sjc-lds-208 in /auto/ioxbuild7/production/3.9.0.16I.DT_IMAGE/asr9k/workspace for
c4.2.1-p0

asr9k-mgbl, V 3.9.0.16I[DT_IMAGE], Cisco Systems, at disk0:asr9k-mgbl-3.9.0.16I
    Built on Thu Jul 30 13:48:16 DST 2009
 --More--
```

Displaying Router Power Consumption

With the introduction of PLIMs and MSCs that consume higher power than before, and given the modular power available on a configurable number of power modules, it is possible that a fully loaded chassis can consume more power than available to the system. For this reason it is important to monitor your router power consumption and pay attention to any warnings or alarms regarding power.

Your router monitors the power necessary to run all cards in the system, and if the power requirements exceed the available power, syslog messages or alarms are displayed. Syslog messages can be displayed following two possible events:

- A board is powered up and a shortage of available power is detected.

- Available power becomes lower than the power consumed by inserted cards, for example because a power module is removed.

The following considerations are used when calculating the power consumption:

- Powering on an MSC or DRP adds to the power requirements of the chassis.

- Inserting or removing power modules affects the calculation of available power.

- Line cards are allowed to power up, before their power consumption is calculated.

- The power consumption of a SIP or SPA is calculated as though it is fully populated.

- RP, Switch Fabric, Fan tray, Fan controller and Alarm module power consumption is always added to the total chassis power usage regardless of whether they are physically present or not.

- The power of one power module is reserved for redundancy against a module failure (redundancy threshold), and thus subtracted from the calculation of available power.

Note For systems with modular power supplies, the total power availability is the sum of all power modules in both shelves *minus* one. This one power module is reserved to guard against a single module failure.

Note In a 4-Slot line card chassis, the total power available is the sum of all the power modules present (maximum of four).

Alarms and Messages

The following alarms can be raised:

- A major alarm is raised when the power consumption exceeds the power budget, and the alpha display on the alarm module is set to "PWR CRITICAL."

- A minor alarm is raised when the redundancy threshold is crossed, and the alpha display is set to "PWR LOW."

- A critical alarm is raised when there is a zone failure, and the alpha display is set to "ZONEX PWR FAIL," where "X" is the zone number.

Syslog messages are displayed when a power event is registered.

Table 2: Syslog Messages Displayed on Systems with Modular Power Supplies

Event	Message
Power budget is exceeded	Power allotted to cards in this rack has exceeded the available rack power budget. Please check the 'show power' command to resolve this situation.
Power budget is restored	Power budget is now sufficient for rack power.
Power consumption exceeds the capacity of both shelves minus the capacity of one power module	Rack power is now being allotted from all power modules. Power module redundancy is no longer available, a single power module failure might result in card power loss.
Power consumption drops below the capacity of both shelves minus the capacity of one power module	Power allotment in this rack is now normal. Power module redundancy restored.

Table 3: Syslog Messages Displayed on Systems with Fixed Power Supplies

Event	Message
Zone power budget is exceeded	Power allotted in zone X has exceeded the available zone power budget. Please check the 'show power' command to resolve this situation.
Zone power budget is restored	Power budget for zone X is now sufficient for zone power.

Event	Message
Zone failure	Zone X has lost power. Check that power modules Ax and Bx are providing power.
Zone restoration	Zone X is now receiving power.

show power command Sample Output

Use the **show power** commands to display the total power available and the total power being consumed.

The **show power allotted** command displays the power allotted to the cards in the chassis. This example is from a system using modular power supplies:

```
RP/0/RP0/CPU0:router(admin)# show power allotted location 0/0/*

Sun Nov 18 22:00:51.176 UTC
nodeid = 0x2a00000f
Node             Card Type        State            PID              Power Allotted
---------------- ---------------- ---------------- ---------------- ----------------
0/0/*            FP-140G          POWERED UP       CRS-MSC-FP140       450.0W
0/0/PL0          14-10GbE         POWERED UP       14X10GBE-WL-XF      150.0W
```

The **show power capacity** command displays the power supplied to a rack. This example is from a system using fixed power supplies:

```
RP/0/RP1/CPU0:router(admin)# show power capacity rack 0

Tue Nov 20 19:43:30.458 OST
--------------------------------------------------------------------------
Rack 0: Cisco CRS Fixed AC Power System
--------------------------------------------------------------------------
Zone             Power Module     State            Zone Power Capacity
---------------- ---------------- ---------------- --------------------
 Zone 1:          A[0]             NOT PRESENT        2500.0W
                  B[0]             OK
 Zone 2:          A[0]             NOT PRESENT        2500.0W
                  B[0]             OK
 Zone 3:          A[0]             NOT PRESENT        2500.0W
                  B[0]             OK
--------------------------------------------------------------------------
Total Rack Power Capacity:                           7500.0W
```

The **show power summary** displays a summary of the power consumption and availability for a rack. This example is from a system using modular power supplies:

```
RP/0/RP0/CPU0:router(admin)# show power summary rack 0

Sun Nov 18 22:02:40.434 UTC
Location         Power Capacity   Power Allotted   Power Available
---------------- ---------------- ---------------- ------------------
Rack :  0           7600.0W          1285.0W           6315.0W
```

Displaying SDR Node IDs and Status

In EXEC mode, the **show platform** command displays information for all nodes assigned to the owner SDR. For each node, this information includes the host card type, the operational state, and the configuration state. To display information on a single node, enter the command with a node ID.

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

show platform [*node-id*]

The following example displays the status for all nodes in the SDR to which you are connected:

```
RP/0/RSP0/CPU0:router# show platform
Mon Aug  3 07:39:01.416 DST
Node            Type                    State           Config State
----------------------------------------------------------------------
0/RSP0/CPU0     A9K-RSP-4G(Active)      IOS XR RUN      PWR,NSHUT,MON
0/1/CPU0        A9K-40GE-B              IOS XR RUN      PWR,NSHUT,MON
0/4/CPU0        A9K-8T/4-B              IOS XR RUN      PWR,NSHUT,MON
0/6/CPU0        A9K-4T-B                IOS XR RUN      PWR,NSHUT,MON
```

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

- *rack* —In a single-shelf system the rack number is always "0."

- *slot* —Number of the physical slot in which the card is installed.

- *module* —Subslot number of a system hardware component.

Table 4: Node ID Components, on page 13 summarizes the *node-id* for each type of card.

Table 4: Node ID Components

Card Type (the card to which your are issuing commands)	Rack (always "0")	Slot (the physical slot in which the card is installed)	Module (the entity on the card that is the target of the command)
Route switch processor	0	RSP0 and RSP1	CPU0
40-Port Gigabit Ethernet Line Card 8-Port 10-Gigabit Ethernet Line Card 4-Port 10-Gigabit Ethernet Line Card	0-255	4-7 (6-slot chassis) 0–7 (10-slot chassis)	0-X (SFP and XFP module number on the line card)
Power Modules	0	PM0-PM5 (10-slot chassis) PM0-PM2 (6-slot chassis	—
Fan controller cards	0	FC0–FC1	—

Displaying Router Node IDs and Status

In administration EXEC mode, the **show platform** command displays information for all router nodes. In administration EXEC mode, the command display also includes additional node IDs such as those for fabric cards, alarm modules, and fan controllers. For each node, this information includes the host card type, the operational state, and the configuration state. To display information on a single node, enter the command with a node ID.

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

show platform [*node-id*]

The following example displays the status for all nodes in the system:

```
RP/0/RSP0/CPU0:router(admin)# show platform

Sat Mar 24 05:02:18.569 DST
Node            Type                    State           Config State
-----------------------------------------------------------------------
0/RSP0/CPU0     A9K-RSP-4G(Active)      IOS XR RUN      PWR,NSHUT,MON
0/1/CPU0        A9K-40GE-B              IOS XR RUN      PWR,NSHUT,MON
0/4/CPU0        A9K-8T/4-B              IOS XR RUN      PWR,NSHUT,MON
0/6/CPU0        A9K-4T-B                IOS XR RUN      PWR,NSHUT,MON
```

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

- *rack* —In a single-shelf system the rack number is always "0."

- *slot* —Number of the physical slot in which the card is installed.

- *module* —Subslot number of a system hardware component.

summarizes the *node-id* argument for each type of card.

Displaying Router Environment Information

The **show environment** command displays hardware information for the system, including fan speeds, LED indications, power supply voltage and current information, and temperatures.

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

show environment [*options*]

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

```
RP/0/RSP0/CPU0:router(admin)# show environment

Mon Jun 29 04:32:07.587 PST

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

R/S/I   Modules         Inlet           Hotspot
                        Temperature     Temperature
```

```
                              (deg C)        (deg C)


0/1/*
        host                  31.5           39.5

0/RSP0/*
        host                  26.6           36.6

0/4/*
        host                  29.8           38.8

0/6/*
        host                  32.7           42.0

0/FT0/*
        host                  27.2           28.2
0/FT1/*
        host                  27.4           30.2


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

R/S/I   Modules Sensor                  (mV)   Margin

0/1/*
        host    IBV                     10647  n/a
        host    5.0V                    4929   n/a
        host    VP3P3_CAN               3288   n/a
        host    3.3V                    3301   n/a
        host    2.5V                    2516   n/a
        host    1.8VB                   1810   n/a
        host    1.2VB                   1193   n/a
        host    1.8VA                   1800   n/a
        host    0.9VB                    884   n/a
        host    1.2V_LDO_BRG0           1193   n/a
        host    1.2V_LDO_BRG1           1195   n/a
        host    1.8VC                   1811   n/a
        host    1.5VB                   1505   n/a
        host    1.5VA                   1503   n/a
        host    1.1V(1.05V_CPU)         1052   n/a
        host    0.75VA                   751   n/a
        host    0.75VB_0.75VC            754   n/a
        host    1.1VB                   1102   n/a
        host    1.2V_TCAM0              1003   n/a
        host    1.2V_TCAM1              1000   n/a
        host    1.0V_Bridge_LDO          998   n/a
        host    1.0VB                   1043   n/a
        host    0.75VD_and_0.75VE        752   n/a
        host    1.2V_TCAM2              1005   n/a
        host    1.2V_TCAM3              1002   n/a
        host    1.5VC                   1504   n/a
        host    1.8VD                   1803   n/a
        host    1.1VC                   1099   n/a
        host    ZARLINK_3.3V            3272   n/a
        host    ZARLINK_1.8V            1808   n/a
        host    1.2V_DB                 1195   n/a
        host    3.3V_DB                 3316   n/a
        host    2.5V_DB                 2534   n/a
        host    1.5V_DB                 1509   n/a

0/RSP0/*
        host    0.75VTT                  749   n/a
        host    0.9VTT_A                 910   n/a
```

```
            host    0.9VTT_B                    904   n/a
            host    IBV                       10586   n/a
            host    5.0V                       5013   n/a
            host    VP3P3_CAN                  3277   n/a
            host    3.3V                       3299   n/a
            host    2.5V                       2518   n/a
            host    1.8VB                      1807   n/a
            host    1.2VA                      1205   n/a
            host    1.2VB                      1202   n/a
            host    1.05V                      1047   n/a
            host    1.2VD                      1205   n/a
            host    1.8VA                      1811   n/a
            host    1.5V                       1496   n/a
            host    1.9V                       1887   n/a

0/4/*
            host    IBV                       10627   n/a
            host    5.0V                       4917   n/a
            host    VP3P3_CAN                  3279   n/a
            host    3.3V                       3296   n/a
            host    2.5V                       2522   n/a
            host    1.8VB                      1805   n/a
            host    1.2VB                      1188   n/a
            host    1.8VA                      1796   n/a
            host    0.9VB                       881   n/a
            host    1.2V_LDO_BRG0              1192   n/a
            host    1.2V_LDO_BRG1              1195   n/a
            host    1.8VC                      1806   n/a
            host    1.5VB                      1510   n/a
            host    1.5VA                      1503   n/a
            host    1.1V(1.05V_CPU)           1048   n/a
            host    0.75VA                      753   n/a
            host    0.75VB_0.75VC               757   n/a
            host    1.1VB                      1105   n/a
            host    1.2V_TCAM0                 1003   n/a
            host    1.2V_TCAM1                 1000   n/a
            host    1.0V_Bridge_LDO             997   n/a
            host    1.0VB                      1037   n/a
            host    0.75VD_and_0.75VE           755   n/a
            host    1.2V_TCAM2                 1004   n/a
            host    1.2V_TCAM3                 1005   n/a
            host    1.5VC                      1505   n/a
            host    1.8VD                      1808   n/a
            host    1.1VC                      1104   n/a
            host    ZARLINK_3.3V              3285   n/a
            host    ZARLINK_1.8V              1806   n/a
            host    1.2V_DB                    1205   n/a
            host    3.3V_DB                    3318   n/a
            host    2.5V_DB                    2493   n/a
            host    1.5V_DB                    1497   n/a
            host    1.8V_DB                    1825   n/a
            host    5.0V_XFP_DB               5001   n/a
            host    1.2VB_DB                   1228   n/a

0/6/*
            host    IBV                       10628   n/a
            host    5.0V                       4893   n/a
            host    VP3P3_CAN                  3281   n/a
            host    3.3V                       3297   n/a
            host    2.5V                       2524   n/a
            host    1.8VB                      1804   n/a
            host    1.2VB                      1204   n/a
            host    1.8VA                      1795   n/a
            host    0.9VB                       881   n/a
```

```
        host     1.2V_LDO_BRG0               1194   n/a
        host     1.2V_LDO_BRG1               1193   n/a
        host     1.8VC                       1815   n/a
        host     1.5VB                       1495   n/a
        host     1.5VA                       1503   n/a
        host     1.1V(1.05V_CPU)            1052   n/a
        host     0.75VA                       752   n/a
        host     0.75VB_0.75VC               749   n/a
        host     1.1VB                       1001   n/a
        host     1.2V_TCAM0                   999   n/a
        host     1.2V_TCAM1                  1002   n/a
        host     1.0V_Bridge_LDO             995   n/a
        host     1.0VB                       1050   n/a
        host     0.75VD_and_0.75VE           752   n/a
        host     1.2V_TCAM2                  1002   n/a
        host     1.2V_TCAM3                   995   n/a
        host     1.5VC                       1502   n/a
        host     1.8VD                       1802   n/a
        host     1.1VC                       1101   n/a
        host     ZARLINK_3.3V                3273   n/a
        host     ZARLINK_1.8V                1804   n/a
        host     1.2V_DB                     1200   n/a
        host     3.3V_DB                     3314   n/a
        host     2.5V_DB                     2496   n/a
        host     1.5V_DB                     1496   n/a
        host     1.8V_DB                     1824   n/a
        host     5.0V_XFP_DB                 5004   n/a
        host     1.2VB_DB                    1227   n/a

LED Information
----------------------------------------------

R/S/I   Modules LED              Status

0/RSP0/*
        host    Critical-Alarm  Off
        host    Major-Alarm     Off
        host    Minor-Alarm     Off
        host    ACO             Off

Fan Information
----------------------------------------------

  Fan speed (rpm):
        FAN0    FAN1    FAN2    FAN3    FAN4    FAN5    FAN6    FAN7    FAN8    FAN9
FAN10   FAN11

0/FT0/*
        3510    3510    3510    3540    3510    3570    3480    3570    3510    3510
3510    3510
0/FT1/*
        3540    3510    3450    3540    3480    3600    3480    3450    3540    3540
3480    3540

Power Supply Information
----------------------------------------------

R/S/I   Modules Sensor          Watts

0/PM0/*
        host    PM              3000

0/PM1/*
        host    PM              3000
```

```
0/PM2/*
        host    PM              3000

Power Shelves Type: AC

Total Power Capacity:                   9000W
Protected Power Capacity:               4500W
Worst Case Power Used:                  3145W
 Slot                                              Max Watts
 ----                                              ---------
 0/1/CPU0                                              375
 0/RSP0/CPU0                                           250
 0/RSP1/CPU0                                           350
 0/4/CPU0                                              375
 0/6/CPU0                                              375
 0/FT0/SP                                              710  (default)
 0/FT1/SP                                              710  (default)

Worst Case Protected Power Available:   1355W
```

Configuring the Chassis Altitude

To allow your router to adjust the fan speed to compensate for lower cooling capabilities at higher altitudes, you should configure the chassis altitude setting. Use the **environment altitude** command in administration configuration mode. The default setting is 1800 meters.

The syntax for the environment altitude command is:

environment altitude *altitude* **rack** *rack-no*

Displaying RP Redundancy Status

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

The **show redundancy** operates in EXEC and administration EXEC mode.

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

```
RP/0/RSP0/CPU0:router(admin)# show redundancy

Mon Jun 29 04:49:26.098 PST
Redundancy information for node 0/RSP0/CPU0:
==========================================
Node 0/RSP0/CPU0 is in ACTIVE role
Node 0/RSP0/CPU0 has no valid partner

Reload and boot info
---------------------
A9K-RSP-4G reloaded Thu Jun 11 15:20:50 2009: 2 weeks, 3 days, 13 hours, 28 minutes ago
Active node booted Thu Jun 11 15:20:50 2009: 2 weeks, 3 days, 13 hours, 28 minutes ago

Active node reload "Cause: Turboboot completed successfully"
```

Displaying Field-Programmable Device Compatibility

The **show hw-module fpd** command displays field-programmable device (FPD) compatibility for all modules or a specific module.

The syntax for the **show hw-module fpd** command is:

show hw-module fpd location {**all** | *node-id*}

The **show hw-module fpd** operates in EXEC and administration EXEC mode.

The following example shows how to display FPD compatibility for all modules in the router:

```
RP/0/RSP0/CPU0:router# ios#show hw-module fpd
Tue Jan 22 13:56:55.082 UTC

                                                      FPD Versions
                                                      =================
Location   Card type         HWver FPD device    ATR Status   Running Programd
--------------------------------------------------------------------------------
0/RP0      NCS-55A2-MOD-S    0.3   MB-MIFPGA          CURRENT    0.19    0.19
0/RP0      NCS-55A2-MOD-S    0.3   Bootloader         CURRENT    1.10    1.10
0/RP0      NCS-55A2-MOD-S    0.3   CPU-IOFPGA         CURRENT    1.18    1.18
0/RP0      NCS-55A2-MOD-S    0.3   MB-IOFPGA          CURRENT    0.18    0.18
0/PM0      NC55-1200W-ACFW   1.0   LIT-PriMCU-ACFW    NEED UPGD  2.08    2.08
0/PM1      NC55-1200W-ACFW   1.0   LIT-PriMCU-ACFW    NEED UPGD  2.08    2.08
RP/0/RP0/CPU0:ios#.
```

✎

Note   After Release 5.3.x, Upg/Dng? will display Yes only for upgrade.

The following example shows the FPD for which upgrage will be skipped.

```
RP/0/RP0/CPU0:router# show hw-module fpd location all

==================================== ===========================================
                                     Existing Field Programmable Devices
                                     ===========================================
                                     HW                        Current SW Upg/
Location     Card Type               Version Type Subtype Inst  Version   Dng?
============ ======================= ======= ==== ======= ==== =========== ====
0/SM1/SP     140G-4-S1S2S3           0.1     lc   rommonA  0    2.08        Yes
--------------------------------------------------------------------------------
                                             1c   rommon   0    2.08        Yes
--------------------------------------------------------------------------------
                                             1c   fpqa1    0    6.04^       No
--------------------------------------------------------------------------------
                                             1c   fpga2    0    4.01        No
--------------------------------------------------------------------------------
NOTES:
1. ^ One or more FPD will be intentionally skipped from upgrade using CLI with option "all"
 or during "Auto fpd".
    It can be upgraded only using the "admin> upgrade hw-module fpd <fpd> location <loc>"
CLI with exact location.
```

The following example shows how to display FPD compatibility for a specific module in the router:

Table 5: show hw-module fpd Field Descriptions

Field	Description
Location	Location of the module in the *rack*/*slot*/*module* notation.
Card Type	Module part number.
HW Version	Hardware model version for the module.
Type	Hardware type. Can be one of the following types: • spa—Shared port adapter • lc—Line card
Subtype	FPD type. Can be one of the following types: • fabldr—Fabric downloader • fpga1—Field-programmable gate array • fpga2—Field-programmable gate array 2 • fpga3—Field-programmable gate array 3 • fpga4—Field-programmable gate array 4 • fpga5—Field-programmable gate array 5 • rommonA—Read-only memory monitor A • rommon—Read-only memory monitor B
Inst	FPD instance. The FPD instance uniquely identifies an FPD and is used by the FPD process to register an FPD.
Current SW Version	Currently running FPD image version.
Upg/Dng?	Specifies whether an FPD upgrade or downgrade is required. A downgrade is required in rare cases when the version of the FPD image has a higher major revision than the version of the FPD image in the current Cisco IOS XR software package.

RSP Redundancy and Switchover

This section describes RSP redundancy and switchover commands and issues.

Establishing RSP Redundancy

Your router has two slots for RSPs: RSP0 and RSP1 (see). RSP0 is the slot on the left, facing the front of the chassis, and RSP1 is the slot on right. These slots are configured for redundancy by default, and the redundancy cannot be eliminated. To establish RSP redundancy, install RSPs into both slots.
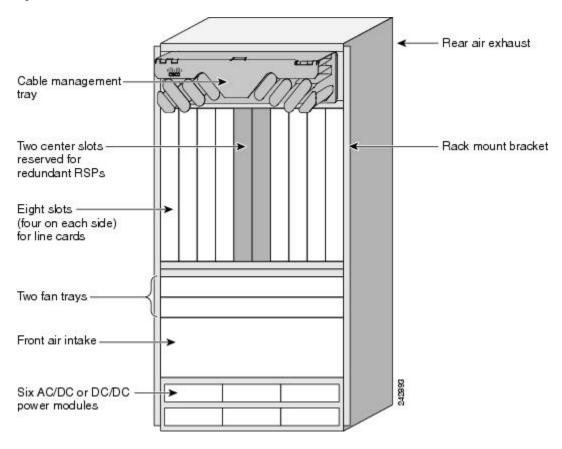
Figure 1: Redundant Set of RSPs Installed in Slots RSP0 and RSP1 in an 8-Slot Chassis

Determining the Active RP in a Redundant Pair

During system startup, one RSP in each redundant pair becomes the active RSP. You can tell which RSP is the active RSP in the following ways:

- The active RSP can be identified by the green Primary LED on the faceplate of the card. The active RSP is indicated when the Primary LED is on. The alphanumeric LED display on the RSP displays ACTV RP.

- The slot of the active RSP is indicated in the CLI prompt. For example:

```
RP/0/RSP1/CPU0:router#
```

In this example, the prompt indicates that you are communicating with the active RSP in slot RSP1. See *Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide* for a complete description of the CLI prompt.

- Enter the **show redundancy** command in EXEC mode to display a summary of the active and standby RSP status. For example:

```
RP/0/RSP0/CPU0:router(admin)# show redundancy

Mon Jun 29 04:49:26.098 PST
Redundancy information for node 0/RSP0/CPU0:
==========================================
```

```
Node 0/RSP0/CPU0 is in ACTIVE role
Node 0/RSP0/CPU0 has no valid partner

Reload and boot info
---------------------
A9K-RSP-4G reloaded Thu Jun 11 15:20:50 2009: 2 weeks, 3 days, 13 hours, 28 minutes ago
Active node booted Thu Jun 11 15:20:50 2009: 2 weeks, 3 days, 13 hours, 28 minutes ago

Active node reload "Cause: Turboboot completed successfully"
```

Role of the Standby RSP

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

Summary of Redundancy Commands

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

Table 6: RSP Redundancy Commands

Command	Description
show redundancy	Displays the redundancy status of the RSPs. This command also displays the boot and switch-over history for the RSPs.
redundancy switchover	Forces a manual switchover to the standby RSP. This command works only if the standby RSP is installed and in the "ready" state.
show platform	Displays the status for node, including the redundancy status of the RSP cards. In EXEC mode, this command displays status for the nodes assigned to the SDR. In administration EXEC mode, this command displays status for all nodes in the system.

Automatic Switchover

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

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

RSP Redundancy During RSP Reload

The **reload** command causes the active RSP to reload the Cisco IOS XR software. When an RSP reload occurs, the RSPs respond as follows:

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

⚠️

Caution You should not use the **reload** command to force an RSP switchover because the result could be a significant loss of router operations. Instead, use the **redundancy switchover** command to fail over to the standby RSP, then use the **hw-module location** *node-id* **reload** command to reload the new standby RSP.

Related Topics

Manual Switchover

You can force a manual switchover from the active RSP to the standby RSP using the **redundancy switchover** command.

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

```
RP/0/RSP0/CPU0:router# show redundancy

  This node (0/RSP0/CPU0) is in ACTIVE role
  Partner node (0/RSP1/CPU0) is in STANDBY role
  Standby node in 0/RSP1/CPU0 is ready

  RP/0/RSP0/CPU0:router# redundancy switchover
  Updating Commit Database.  Please wait...[OK]
  Proceed with switchover 0/RSP0/CPU0 -> 0/RSP1/CPU0? [confirm]
  Initiating switch-over.
  RP/0/RSP0/CPU0:router#

  <Your 'TELNET' connection has terminated>
```

In the preceding example, the Telnet connection is lost when the previously active RP resets. To continue management of the router, you must connect to the newly activated RP as shown in the following example:

```
User Access Verification

  Username: xxxxx
  Password: xxxxx
  Last switch-over Sat Apr 15 12:26:47 2009: 1 minute ago
```

```
RP/0/RSP1/CPU0:router#
```

If the standby RSP 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/RSP0/CPU0:router# show redundancy

  Redundancy information for node 0/RP1/CPU0:
  ==========================================
  Node 0/RSP0/CPU0 is in ACTIVE role
  Partner node (0/RSP1/CPU0) is in UNKNOWN role

  Reload and boot info
  --------------------
  RP reloaded Wed Mar 29 17:22:08 2009: 2 weeks, 2 days, 19 hours, 14 minutes ago
  Active node booted Sat Apr 15 12:27:58 2009: 8 minutes ago
  Last switch-over Sat Apr 15 12:35:42 2009: 1 minute ago
  There have been 4 switch-overs since reload

  RP/0/RSP0/CPU0:router# redundancy switchover

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

Communicating with a Standby RP

The active RSP automatically synchronizes all system software, settings, and configurations with the standby RSP.

If you connect to the standby RSP through the console port, you can view the status messages for the standby RSP. The standby RSP does not display a CLI prompt, so you cannot manage the standby card while it is in standby mode.

If you connect to the standby RSP through the management Ethernet port, the prompt that appears is for the active RSP, and you can manage the router the same as if you had connected through the management Ethernet port on the active RSP.

CPAK

CPAKs are the Cisco's innovation for 100G pluggable optics, which is built with the industry leading smallest form factor, in full compliant with IEEE802.3ae specification for 100GE-SR10, -LR4, and can interoperate with all IEEE 802.3ba compliant CFP-SR10 or CFP-LR4 100G optics.

The key new functionality is that CPAK variants are being constructed that represent 10 x 10GE ports. A single physical port on the linecard needs to instantiate multiple breakout Ethernet interfaces, very much similar to serial interface channelization.

Modes Supported on CPAKs

This table clearly lists the modes supported with the relevant PID:

CPAK (PID)	Modes Supported
CPAK-100G-SR10	100 GE, 10 GE, 40 GE
CPAK-100G-LR	100 GE
CPAK-10X10G-LR	10 GE.

The standard R/S/I/P format is 4-tuple. 5-tuple interfaces are represented as - R/S/I/P/SP. P is the CPAK port and SP indicates the breakout port. A CPAK which is configured as 5 tuple after executing the **breakout** command can be configured as 0x10G configuration. A CPAK, without the breakout mode can only be configured as 100G, represents a 4 tuple configuration. The default interface type is HundredGigE. If there is no configuration, then Hundred GigE interface would be created for the CPAK ports.

Configuring Breakout

This task enables the user to configure the breakout option.

SUMMARY STEPS

1. **configure**
2. **hw-module location preconfigure** *location* **port breakout** *interface*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure**	
Step 2	**hw-module location preconfigure** *location* **port breakout** *interface* **Example:** ```RP/0/RSP0/CPU0:router (config) # hw-module location 0/0/CPU0 port 0 breakout 10x TenGigE```	Configures the breakout option. **Note** The optional keyword, **preconfigure** enables the user to preconfigure breakout on an empty slot. SR10 CPAK can operate in the following modes - 1x100GE or 10x10GE. 1x100GE is the default option. 10x10 CPAK can also support 10x10GE.

Power saving mode

8x100GE Line card consists of 4 Slices (0,1,2,3). Each slice has two physical ports. Slice-1, 2 and 3 can be configured into power save mode. Power save option is not applicable to Slice-0. Use the **hw-module power saving** command to configure the required slice to power saving mode.

Once a slice is configured in the power saving mode, the interfaces will be deleted and hence all traffic passing through the interfaces will be dropped.

Table 7: Slice-Port mapping table

Slice 1	Ports 2,3
Slice 2	Ports 4,5

Slice 3	Ports 6,7

To configure the power save option

This task enables the user to configure the power save option.

SUMMARY STEPS

1. **admin**
2. **configure**
3. **hw-module power saving location** *location* **slice** *number*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**admin** **Example:** RP/0/RSP0/CPU0:router# admin	Enters administration EXEC mode.
Step 2	**configure**	
Step 3	**hw-module power saving location** *location* **slice** *number* **Example:** RP/0/RSP0/CPU0:router (admin-config) # **hw-module power saving location 0/1/CPU0 slice 3**	Configures the power saving option for the specified slice. The available options are Slice1, 2, 3. **Note** Power save option is not applicable for Slice 0.

What to do next

Use the **show plat slices** command to get the status of the slices.

Reloading, Shutting Down, or Power Cycling a Node

Use the commands described in this section to reload the Cisco IOS XR software on the active RSP 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.

summarizes the commands described in this section.

Table 8: Commands to Reload, Shut Down, or Power Cycle a Node

Command	Description
hw-module location *node-id* **power disable**	This command administratively turns the power off for a node. It is entered in administration configuration mode. The changes do not take effect until you enter the **commit** command. To power on a node, use the **no** form of this command. **Note** This command cannot be used to disable power on the RSP from which the command is entered.
hw-module location *node-id* **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 the **all** keyword in place of the *node-id* argument. The node reloads with the current running configuration and active software set for that node.

Reloading the Active RSP

The **reload** command causes the active RSP to reload the Cisco IOS XR software according to the configuration register setting. This setting determines how the active RSP 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 *ROM Monitor Configuration Guide for Cisco ASR 9000 Routers*.

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

SUMMARY STEPS

1. **show redundancy**
2. **admin**
3. **show variables boot**
4. (Optional) **config-register** *register-value*
5. **admin**
6. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show redundancy** **Example:** `RP/0/RSP0/CPU0:router# show redundancy`	Displays the RSP redundancy status. • If a standby RSP is in "ready" redundancy state, the **reload** command also causes the router to gracefully fail over to the standby RSP.

	Command or Action	**Purpose**
Step 2	**admin** **Example:** `RP/0/RSP0/CPU0:router# admin`	Enters administration EXEC mode.
Step 3	**show variables boot** **Example:** `RP/0/RSP0/CPU0:router(admin)# show variables boot`	Displays the configuration register setting. • Enter this command in administration EXEC mode. • For normal operations, the configuration register setting is 0x102 or 0x2102, which causes the active RSP to reload the Cisco IOS XR software. • Verify that the configuration register setting is 0x102 or 0x2102. If it is not, complete Step 4, on page 28 to reset the configuration register to 0x102 or 0x2102. **Note** For instructions on how to enter ROM Monitor bootstrap mode, see *ROM Monitor Configuration Guide for Cisco ASR 9000 Routers*.
Step 4	(Optional) **config-register** *register-value* **Example:** `RP/0/RSP0/CPU0:router(admin)# config-register 0x102`	Sets the configuration register to the respective value. This step is necessary only if the register is not set to the respective value (0x102 or 0x2102) in the running configuration. You can use either 0x102 or 0x2102. Both these values specify the same functionality, as bit 13 in 0x2102 is not significant for Cisco IOS XR software.
Step 5	**admin** **Example:** `RP/0/RSP0/CPU0:router# admin`	Enters administration EXEC mode.
Step 6	**reload** **Example:** `RP/0/RSP0/CPU0:router# reload`	Reloads the active RSP according to the configuration register setting. • If the setting is 0x102 or 0x2102 , then the RSP reloads the Cisco IOS XR software. • If the standby RSP is in "ready" redundancy state, the router switches over to the standby RSP. • If a standby RSP is not installed or not in a "ready" state, the router experiences a loss of service while the active RSP is reloading the Cisco IOS XR software.

Flash Disk Recovery

When an RSP is power cycled or experiences an ungraceful reset, the boot disk (PCMCIA flash disk used to boot the card) may experience a file-system corruption. If this occurs, an error message is displayed and the

RSP fails to boot. The corrupted flash disk is automatically reformatted and the Cisco IOS XR software is restored from the designated system controller (DSC) for the system.

For example, if a flash disk for an RSP is corrupted, the RP fails to boot and the following error message is displayed:

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

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

Cisco IOS XR Software for the Cisco XR Cisco ASR 9000 Series Router-mbirp,
Copyright (c) 2009 by Cisco Systems, Inc.
Unable to mount /disk0:, filesystem is corrupted.
Check fsck log at /tmp/chkfs_fd0.log
init: special_commands:wait for disk0: failed
```

If this occurs, then the flash disk is automatically reformatted and the Cisco IOS XR software is restored to the flash disk.

Note   If the flash disk is badly damaged and cannot be reformatted, the disk must be replaced.

If the corrupted flash disk is the DSC, then the router fails over to the standby DSC. If no standby DSC is installed, then the system fails to boot.

Using Controller Commands to Manage Hardware Components

The **controller** , **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 *Interface and Hardware Component Command Reference for Cisco ASR 9000 Series Routers*.

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:* [*options*]

Table 9: format command Syntax Description, on page 30 describes the **format** command syntax.

Table 9: format command Syntax Description

Variable	Description
filesystem	Specifies the memory device to format. The supported file systems are: • **bootflash:** • **compactflash:** • **configflash:** • **harddisk:** • **harddiska:** • **disk0:** • **disk1:** Enter **format ?** to see the devices supported on your router.
options	Enter **format** *filesystem:* **?** to see the available options. For more information, see *System Management Command Reference for Cisco ASR 9000 Series Routers*.

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

```
RP/0/RSP0/CPU0:router# format harddisk:
```

Removing and Replacing Cards

This section describes card replacement issues and procedures.

Removing Line Cards

Line cards are designed for online insertion and removal (OIR). A line card is a single card that contains all service processing functions and physical line interfaces.

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/RSP0/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 line card 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 line card with another line card 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 "router 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 line card supports a specific media type (Packet over SONET/SDH [POS] or Ethernet, for example) and port count. If you replace a line card with one that supports a different media type or port count, you should review the configuration and revise it to support the replacement line card.

Replacing a Line Card 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 , on page 30 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 with the Same Media Type and a Different Port Count

When you replace a line card with a card that is of the same media type with a different port count, the guidelines in Removing Line Cards , on page 30 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/RSP0/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 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 Removing Line Cards , on page 30 apply. Review the running configuration in the router and revise the configuration as necessary for the new media type.

Examples: Breakout and Power saving options

The following are the examples for the **power save** and **breakout** options:

Power saving mode

Configuring the power saving option:

```
admin
 config
  hw-module power saving location 0/0/CPU0 slice 3
 !

show platform slices
Line Card       Slice   Config          Status
0/0/CPU0        0       Power on        Completed
                1       Power on        Completed
                2       Power on        Completed
                3       Power saving    Completed
```

Breakout option

Configuring the breakout option:

```
config
 hw-module location 0/0/CPU0 port 0 breakout 10xTenGigE
!
```

show command output indicating the breakout ports:

```
RP/0/RSP0/CPU0:TD02#show ipv4 interface brief | include Hun
Sun Sep  7 15:59:33.446 PST
HundredGigE0/0/0/0            34.34.34.2     Down              Down
HundredGigE0/0/0/1            100.0.1.1      Up                Up
HundredGigE0/0/0/2            unassigned     Up                Up
HundredGigE0/0/0/3            unassigned     Up                Up
HundredGigE0/0/0/4            unassigned     Shutdown          Down
HundredGigE0/0/0/5            unassigned     Shutdown          Down
HundredGigE0/0/0/6            unassigned     Shutdown          Down
HundredGigE0/0/0/7            unassigned     Shutdown          Down


RP/0/RSP0/CPU0:router(config)#hw-module location 0/0/CPU0 port 2 breakout 10xTenGigE
RP/0/RSP0/CPU0:router(config)#commit

RP/0/RSP0/CPU0:router#show ipv4 interface brief | include Ten
TenGigE0/0/0/2/0             unassigned     Shutdown          Down
TenGigE0/0/0/2/1             unassigned     Shutdown          Down
TenGigE0/0/0/2/2             unassigned     Shutdown          Down
TenGigE0/0/0/2/3             unassigned     Shutdown          Down
TenGigE0/0/0/2/4             unassigned     Shutdown          Down
TenGigE0/0/0/2/5             unassigned     Shutdown          Down
TenGigE0/0/0/2/6             unassigned     Shutdown          Down
TenGigE0/0/0/2/7             unassigned     Shutdown          Down
TenGigE0/0/0/2/8             unassigned     Shutdown          Down
TenGigE0/0/0/2/9             unassigned     Shutdown          Down
```

Upgrading the CPU Controller Bits

Use this procedure to upgrade the CPU controller bits on all nodes that are installed in the router or on a specific node.

SUMMARY STEPS

1. **admin**
2. **upgrade cpuctrlbits** {**all** | **location** *node-id*}

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**admin**	Enters administration EXEC mode.
	Example:	
	`RP/0/RSP0/CPU0:router# admin`	

	Command or Action	Purpose
Step 2	**upgrade cpuctrlbits** {**all**	**location** *node-id*} **Example:** `RP/0/RSP0/CPU0:router(admin)# upgrade cpuctrlbits all`	Upgrades the CPU controller bits on all nodes in the router. Use the **location** *node-id* keyword and argument to upgrade the CPU controller bits on a specific node.

Examples

The following example shows how to upgrade the CPU controller bits on all nodes in a router:

```
RP/0/RSP0/CPU0:router# admin
RP/0/RSP0/CPU0:router(admin)# upgrade cpucrtlbits all

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.
```

Additional References

The following sections provide references related to hardware management on Cisco IOS XR software.

Related Documents

Related Topic	Document Title
Cisco IOS XR hardware commands	Hardware Redundancy and Node Administration Commands on *the Cisco ASR 9000 Series Router* module of *System Management Command Reference for Cisco ASR 9000 Series Routers*
Cisco IOS XR hardware documentation	See Cisco Carrier Routing System Install and Upgrade Guides at: http://www.cisco.com/en/US/products/ps5763/prod_installation_guides_list.html
Information about getting started with Cisco IOS XR software	*Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide*
ROM Monitor	*ROM Monitor Configuration Guide for Cisco ASR 9000 Routers*
Cisco IOS XR command master list	*Cisco ASR 9000 Series Aggregation Services Router Commands Master List*

Related Topic	Document Title
Information about user groups and task IDs	*Configuring AAA Services on the Cisco ASR 9000 Series Router* module of *System Security Configuration Guide for Cisco ASR 9000 Series Routers*

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIBs	MIBs Link
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/cisco/web/support/index.html