Replacing Cisco ASR 9000 Series Router Components

The router is equipped as ordered and is ready for installation and startup when it is shipped. As network requirements change, you may need to upgrade the system by adding or changing components. This chapter describes how to maintain router components.

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- Replacing the Chassis Air Filter, on page 4
- Removing and Replacing the Fan Trays, on page 10
- Removing and Replacing Power System Components, on page 12
- Removing and Replacing Cards from the Chassis, on page 25
- Repackaging the Line Card for Return Shipment, on page 27
- Migrating from RP1 to RP2 Card, on page 31
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- Migrating from RSP440 to RSP880 or RSP880-LT Card, on page 37
- Migrating from RSP4-S to RSP880-LT Card (ASR 9906 Router), on page 39
- Migrating from RSP4/RSP4-S/RSP-L to RSP5 Card, on page 42
- Migrating from FC1 to FC2 Card, on page 44
- Migrating from A99-SFC2 to A99-SFC3 Card, on page 45
- Migrating from A99-SFC-S/A99-SFC-T to A99-SFC3-S/A99-SFC3-T Card, on page 46
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- Packing a Chassis for Shipment, on page 48
- Installing a Replacement Chassis in the Equipment Rack, on page 48

Prerequisites and Preparation

Before you perform any of the procedures in this chapter, be sure that you:

- Review the b-asr9k-hardware-installation-guide_chapter1.pdf#nameddest=unique_8.
- Read the safety and ESD-prevention guidelines described in b-asr9k-hardware-installation-guide_chapter1.pdf#nameddest=unique_10.
- Ensure that you have all the necessary tools and equipment before beginning the procedure.

Have access to the safety and compliance document during the installation, see:
Field Replaceable Units

In the Cisco ASR 9006 Router, Cisco ASR 9010 Router, and Cisco ASR 9904 Router, the following components are field replaceable units (FRU):

- All line cards
- RSP cards
- Power modules
- Fan trays
- Air filters
- Line card and RSP blank fillers
- Compact flash disk
- Gigabit Ethernet small form-factor pluggable (SFP) transceiver modules
- 10-Gigabit Ethernet small form-factor pluggable (SFP+) transceiver modules
- 10-Gigabit Ethernet small form-factor pluggable (XFP) transceiver modules
- Optional card cage doors (Cisco ASR 9010 Router only)

Note

The backplane is not field-replaceable.

In the Cisco ASR 9906 Router, Cisco ASR 9910 Router, Cisco ASR 9912 Router, and Cisco ASR 9922 Router, the following components are FRUs:

- All line cards
- RP cards
- RSP cards (only for Cisco ASR 9906 Router and Cisco ASR 9910 Router)
- Fabric cards
- Power modules
- Fan trays and covers
- Air filters
- Foam media (only for Cisco ASR 9922 Router, Cisco ASR 9912 Router)
- Blank line card fillers
- Gigabit Ethernet small form-factor pluggable (SFP) transceiver modules
- 10-Gigabit Ethernet small form-factor pluggable (SFP+) transceiver modules
- 100-Gigabit Ethernet small form-factor pluggable (CFP) transceiver modules
- Optional card cage doors
The backplane, midplane (only for Cisco ASR 9906 Router and Cisco ASR 9910 Router), PEM, and BPID cards are not FRUs but are field serviceable.

### Online Insertion and Removal

Most Cisco ASR 9000 Series Routers FRUs can be removed and replaced with the power on and the system operating. This is known as online insertion and removal (OIR). Power modules, fan trays, Route Switch Processor (RSP) cards, Route Processor (RP) cards, Fabric Controller (FC) cards, Line Cards (LCs), shared port adapter (SPA), and SPA interface processor (SIP) cards all support OIR. Unless otherwise noted, the maintenance tasks described in this chapter can be performed while the router remains powered on.

**Caution**

Never unplug all the fan trays at the same time.

**Note**

Although the power trays are not a true FRU because they do not support OIR, a procedure for replacing the power trays in Cisco ASR 9000 Series Routers is included in this chapter if a replacement becomes necessary.

### OIR Monitoring

The BPID board monitors OIR by counting the number of card insertions for each slot and saving that information in non-volatile memory. OIR monitoring is done for all fan trays, RSP cards, RP cards, FCs, and LCs. A card insertion is determined by the CAN Bus Controller (CBC) of the inserted card booting up and sending a CBC message which is intercepted by the BPID board. Note that a CBC reset or power cycle on a card will also be interpreted as a card insertion.

**Note**

A card with an OIR count that exceeds 175 will generate a minor alarm against that slot. If the card OIR count exceeds 200, a major alarm is generated against that slot. Fan tray insertion counts are not checked against a threshold. See the Release Notes for Cisco ASR 9000 Series Aggregation Services Routers for Cisco IOS XR Software Release 3.9.1 for information about CLI commands for obtaining and resetting card insertion data.

### Powering Off the Router

**Caution**

Do not turn off the switch on the power tray to remove individual power modules. Power modules support OIR, so they can be removed and replaced with the power on and the system operating.

If it becomes necessary to turn all power off to the router, follow these steps:
Procedure

Step 1  Set the power switch on each power tray to the off (0) position.
Step 2  Power off all circuit breakers for the source power lines connected to the power trays.
Step 3  Verify that the Pwr OK indicator on each power module is off.
Step 4  Verify that the OK indicator on the fan tray is off.

Replacing the Chassis Air Filter

The Cisco ASR 9000 Series Routers are equipped with user-replaceable air filters that help prevent dust from being drawn into the router. One time per month (or more often in dusty environments), examine the air filters for damage and cleanliness.

Note

In the Cisco ASR 9006 Router, Cisco ASR 9010 Router, Cisco ASR 9904 Router, Cisco ASR 9906 Router, and Cisco ASR 9910 Router, the chassis air filter is not serviceable. We recommend that you replace the filter at regular maintenance intervals. The interval may vary between 3 and 12 months depending on the environment.

Note

In the Cisco ASR 9922 Router and Cisco ASR 9912 Router, the three air filters (left, center, and right) contain foam media which filters the air going into the chassis. The three air filters can be removed from the chassis so that the foam media (Cisco PIDs 9922-CEN-FLTRMED= and 9922-LR-FLTRMED=) can be replaced on a regular maintenance interval. The interval may vary between 3 and 12 months depending on the environment.

Caution

Damage to the air filter can restrict the airflow, cause overheating in the router, and degrade electromagnetic interference (EMI) compliance. Be careful when cleaning and replacing the filter.

This table describes the air filter locations for the Cisco ASR 9000 Series Routers.

<table>
<thead>
<tr>
<th>Router</th>
<th>Air Filter Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco ASR 9010 Router</td>
<td>Located underneath the fan trays.</td>
</tr>
<tr>
<td>Cisco ASR 9006 Router</td>
<td>Located along the right side of the chassis and is accessible from the rear.</td>
</tr>
<tr>
<td>Cisco ASR 9904 Router</td>
<td>Single air filter located along the right side of the chassis and is accessible from the rear.</td>
</tr>
<tr>
<td>Cisco ASR 9910 Router</td>
<td>Located underneath the card cage.</td>
</tr>
<tr>
<td>Cisco ASR 9906 Router</td>
<td>Located underneath the card cage.</td>
</tr>
<tr>
<td>Router</td>
<td>Air Filter Location</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cisco ASR 9922 Router</td>
<td>Three air filters located on the front of the middle card cage (Figure 5: Cisco</td>
</tr>
<tr>
<td></td>
<td>ASR 9922 Router Chassis Air Filters, on page 7).</td>
</tr>
<tr>
<td>Cisco ASR 9912 Router</td>
<td>Three air filters on the front of the RP and FC card cage (Figure 7: Cisco ASR</td>
</tr>
<tr>
<td></td>
<td>9912 Router Chassis Air Filter , on page 8).</td>
</tr>
</tbody>
</table>

Follow these steps to replace an air filter:

**Procedure**

**Step 1**

For the Cisco ASR 9006 Router, Cisco ASR 9010 Router, Cisco ASR 9904 Router, Cisco ASR 9906 Router, and Cisco ASR 9910 Router, choose the procedure for your router:

- For the Cisco ASR 9010 Router, Cisco ASR 9906 Router, and Cisco ASR 9910 Router, remove the air filter by simply sliding it out of the chassis.

**Note** If the accessory grill has been installed on the front of the Cisco ASR 9010 Router, remove it from the front of the chassis by simply pulling on the grill until it comes loose. See the Installing Base Chassis Accessories on the Cisco ASR 9010 Router, and Figure 2 for information about the accessory grill.

*Figure 1: Replacing the Cisco ASR 9010 Router Chassis Air Filter*
• For the Cisco ASR 9006 Router and Cisco ASR 9904 Router, loosen the thumb screw that secures the filter to the chassis, and then slide the air filter out of the chassis.

**Figure 3: Replacing the Cisco ASR 9006 Router Chassis Air Filter**

| 1 | Air filter | 2 | Thumb screw |
Step 2
For the Cisco ASR 9922 Router and Cisco ASR 9912 Router, remove the three air filters by pulling them off the front of the chassis (Cisco ASR 9922 Router Chassis Air Filters) and (Cisco ASR 9912 Router Chassis Air Filter). Then, for each filter, loosen the thumb screws, rotate the inner frame out, and replace the foam media (Removing the Cisco ASR 9922 Router Chassis Center Air Filter—Version 1 and Removing the Cisco ASR 9922 Router Chassis Side Air Filter—Versions 1 and 2).

Note In the Cisco ASR 9922 Router (version 2 air filter) the center air filter, shown in Cisco ASR 9922 Router Chassis Center Air Filter—Version 2, does not contain replaceable foam media. The left and right air filters are the same as version 1 and contain replaceable foam media.

Figure 5: Cisco ASR 9922 Router Chassis Air Filters
Replacing the Chassis Air Filter

Figure 6: Cisco ASR 9922 Router Chassis Center Air Filter—Version 2

Figure 7: Cisco ASR 9912 Router Chassis Air Filter
Step 3  Visually check the condition of the air filter and/or its foam media to determine whether to install a new replacement filter or foam media.

Step 4  Install the new air filter.

- For the Cisco ASR 9010 Router, Cisco ASR 9906 Router, and Cisco ASR 9910 Router, slide the new air filter into the air filter door (honeycomb side up).
For the Cisco ASR 9006 Router and Cisco ASR 9904 Router, tighten the thumb screw to secure the filter to the chassis.

For the Cisco ASR 9922 Router (version 1 air filter) and Cisco ASR 9912 Router, tighten the thumb screws that attach the inner frame to the air filter and re-attach the three air filters to the front of the chassis. For the Cisco ASR 9922 Router (version 2 air filter) tighten the thumb screws that attach the inner frame to the left and right air filters only. Attach the new center air filter, with arrows pointing upwards, and re-attach both side filters to the front of the chassis.

Note
For the version 2 air filter on the Cisco ASR 9922 Router, the center does not have thumb screws because it does not have replaceable foam media.

Caution
Align and seat the door carefully to avoid damaging the EMI-preventive gaskets on the door. The air filter door must be closed and secured at all times to maintain correct EMI performance.

Removing and Replacing the Fan Trays

Prerequisites

• For the Cisco ASR 9010 Router remove the accessory grill before removing and replacing the fan trays.

• For the Cisco ASR 9906 Router, Cisco ASR 9922 Router and Cisco ASR 9912 Router, remove the fan tray cover before removing the fan trays for replacement.

Required Tools and Equipment

• 6-inch long number 2 Phillips screwdriver (torque 10 in-lb)

Removing a Fan Tray

Follow these steps to remove and replace the fan trays:

⚠️ Caution
Never unplug all the fan trays at the same time.

⚠️ Caution
Be sure that the fans have stopped running before removing the fan tray. The fans can take from 3 to 5 seconds to completely stop running after disengaging the fan tray latch. Handling the fan tray before the fans have stopped running could cause fingertip injury.
Due to air leakage, the chassis should not be operated with any of the fan trays completely missing. Replace any missing fan tray within five minutes. Any fan tray replacement should be performed when the chassis is back to room temperature.

If the accessory grill has been installed on the front of the Cisco ASR 9010 Router, you must remove it before you can remove the lower fan tray. You can remove the accessory grill by simply pulling on the grill until it comes loose. See Installing Base Chassis Accessories on the Cisco ASR 9010 Router, and Figure 2 for information about the accessory grill.

If the fan tray cover has been installed on the front of the Cisco ASR 9922 Router or Cisco ASR 9912 Router, you must remove it before you can remove the fan tray. Remove the fan tray cover by simply pulling on the cover until it comes loose.

To remove a fan tray from the chassis (see Figure 1, Figure 3, Figure 4, or Figure 1):

**Procedure**

**Step 1**
Use the 6-inch long number 2 Phillips screwdriver to loosen the captive screw(s) that secure the fan tray.

**Step 2**
Use the handle on the fan tray front panel to pull the fan tray halfway out of the module bay.

**Step 3**
Slide out the fan tray completely from the chassis while supporting it with your other hand.

**Caution**
Use two hands when handling the fan tray. Each Cisco ASR 9010 Router version 1 fan tray weighs about 16 pounds (7.27 kg). Each Cisco ASR 9910 Router version 1 fan tray weighs about 26.55 pounds (12.04 kg). Each Cisco ASR 9906 Router fan tray weighs about 8.0 pounds (3.63 kg). Each Cisco ASR 9922 Router fan tray or Cisco ASR 9010 Router version 2 fan tray weighs about 18 pounds (8.18 kg).

**Installing a Fan Tray**

**Note**
If you are upgrading a fan tray, follow these guidelines:

- Remove and install fan trays one at a time.
- Perform FPD upgrade on the fan tray. Refer to the "Upgrading Field-Programmable Devices" chapter in the System Management Configuration Guide for Cisco ASR 9000 Series Routers.

To install a fan tray into the chassis:
Procedure

**Step 1**  
Lift the fan tray (with two hands) and slide it halfway into the module bay.

**Step 2**  
Slowly push the fan tray into the chassis until it mates with the backplane connector at the back of the module bay.

**Caution**  
To prevent damage to the connectors, do not use excessive force when inserting the fan tray into the chassis.

**Step 3**  
Tighten the captive screw(s) on the fan tray using the 6-inch long number 2 Phillips screwdriver to a torque of 10 +/- 1 in-lb to secure it to the chassis.

**Step 4**  
Verify that the (green) OK status indicator on the front of the fan tray goes on. If the OK indicator does not light, see *Troubleshooting the Cooling Subsystem*.

---

**Removing and Replacing Power System Components**

The Cisco ASR 9000 Series Routers support OIR of power modules. If you are replacing a redundant power module, you can remove and install the power module while the system remains powered on without causing an electrical hazard or damage to the system. This feature enables you to replace a power module while the system maintains all routing information and ensures session preservation.

However, to maintain operational redundancy and proper cooling, and to meet EMI compliance standards, you must have at least one working power module installed (more than one for a fully configured system). When you remove a failed power module with the router in operation, perform the replacement as quickly as possible. Make sure you have the replacement power module ready before beginning the removal and installation procedure.

**Note**  
For the RSP/RP to communicate properly to a power module in a power tray, input power to at least one of the power modules in the power tray should be present.

This section contains procedures on how to remove and install AC and DC power modules used in the Cisco ASR 9000 Series Routers.

**Caution**  
Do not turn off the switch on the power tray to remove individual power modules. Power modules support OIR, so they can be removed and replaced with the power on and the system operating.

---

**Changing Between Version 1, Version 2, Version 3, AC, and DC Power Modules**

**Note**  
The `pwrmod_change` command is not supported on the Cisco ASR 9912 Router and Cisco ASR 9922 Router.

Follow these steps when changing between version 1, version 2, version 3, AC, and DC power modules:
Procedure

Step 1 Before making any physical changes, check the software configuration to ensure no ROMMON variable CHASSIS_TYPE (such as CHASSIS_TYPE=10_SLOT) is set to override the chassis type.

Step 2 At the Cisco IOS-XR command prompt on the RSP console, run the `pwrmod_change` command. This command displays the current power module and system information.

Example:

```
RP/0/RSP0/CP0/RO9_P2RSP3# run
Wed Jul 4 20:18:58.034 UTC
# pwrmod_change
Current system:
  power supply type : AC power supply version 2
  chassis type : 10-slot
  chassis bpid: 0x2fa, PID: ASR-9010-AC
  UDI name: ASR-9010 AC, UDI desc: ASR-9010 AC

Step 3 Enter your new power module type.

Example:

Please enter the number that corresponds to the power supply type that is being migrated to. Do not enter the current power system information, use the future power system type.

1) AC power supply version 1, fits 3 across in single power shelf
2) DC power supply version 1, fits 3 across in single power shelf
3) AC power supply version 2, fits 4 across in single power shelf
4) DC power supply version 2, fits 4 across in single power shelf
5) AC power supply version 3, fits 3 across in single power shelf
6) DC power supply version 3, fits 4 across in single power shelf

ATTENTION: You are about to commit a change in the power system type for the chassis. Please confirm that the OLD and NEW power system information listed here is correct. Once the system software change is committed, you must physically remove the OLD power system and replace it with the NEW power system of the type specified below here. Any mismatch between the programmed system value and the actual physical installation may cause boot and power management issues in the system.

OLD POWER SYSTEM:
  power supply type: AC power supply version 2
  chassis type: 10-slot
  chassis bpid: 0x2fa, PID: ASR-9010-AC
  UDI name: ASR-9010 AC, UDI desc: ASR-9010 AC

NEW POWER SYSTEM:
  power supply type: DC power supply version 2
  chassis type: 10-slot
  chassis bpid: 0x2fa, PID: ASR-9010-DC
  UDI name: ASR-9010 DC, UDI desc: ASR-9010 DC

Step 4 Confirm your choice.

Example:

Please confirm that you wish to upgrade from AC power supply version 2 power system to DC power supply version 2 power system by typing "yes" at the prompt below. Any other response will cancel the power system change operation [yes/cancel]?

yes

Step 5 After the success message appears, power down the chassis.
Example:

```
start update CBC eeprom, offset = 0x0,length=1000
..............................................................
done update CBC eeprom
start update I2C eeprom
..............................................................
done update I2C eeprom
```

The power system programming change is complete. The system must now be completely powered down, and the NEW power system hardware installed. When the system is rebooted the software will recognize the new power system. Please power down the system at this point.

---

**Step 6**  
Remove the old power module (see Removing a Version 1 AC or DC Power Module, on page 14 or Removing a Version 2 or Version 3 AC or DC Power Module).

**Caution**  
Use two hands to remove the power module. The power supply weighs about 6.5 pounds (2.95 kg).

**Step 7**  
Install the new power module (see Installing a Version 1 AC or DC Power Module, on page 16 or Installing a Version 2 or Version 3 AC or DC Power Module, on page 16).

**Caution**  
To prevent damage to the power tray backplane connector, do not use excessive force when inserting the power module into the power tray.

**Step 8**  
Power up the chassis.

**Step 9**  
Verify that the (green) Power Input indicator on the front of the power module goes on. If the indicator does not light, see Troubleshooting the Power Subsystem.

---

**Removing a Version 1 AC or DC Power Module**

Follow these steps to remove a version 1 AC or DC power module from the power tray (figure below).

**Procedure**

**Step 1**  
Push the door latch to the left to release the door.

**Step 2**  
Pivot the door to the right to eject the power module from its bay.

**Step 3**  
Slide the power module out of its bay while supporting it with your other hand.

**Caution**  
Use two hands to remove the power module. The power supply weighs about 6.5 pounds (2.95 kg).
Figure 10: Removing or Installing a Version 1 AC or DC Power Module

Removing a Version 2 or Version 3 AC or DC Power Module

Follow these steps to remove a version 2 or version 3 AC or DC power module from the chassis (see figure titled Removing or Installing a Version 2 or Version 3 AC or DC Power Module). The Cisco ASR 9904 Router chassis only has one power tray as shown in the figure titled Removing or Installing a Version 2 AC or DC Power Module from the Cisco ASR 9904 Router.

Procedure

Step 1
Pull the handle down.

Note Unscrew the screw that secures the power module using a 7/16 hex socket and torque wrench with the torque set to 50 in-lb.

Step 2
Slide the power module out of its bay while supporting it with your other hand.

Figure 11: Removing or Installing a Version 2 or Version 3 AC or DC Power Module
Installing a Version 1 AC or DC Power Module

Follow these steps to install a new version 1 AC or DC power module (Figure 10: Removing or Installing a Version 1 AC or DC Power Module, on page 15):

**Procedure**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Slide the power module into the bay until it mates with its backplane connector.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Pivot the door to the left until the door latch locks.</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td>To prevent damage to the power tray backplane connector, do not use excessive force when inserting the power module into the power tray.</td>
</tr>
</tbody>
</table>

| Step 3 | Verify that the (green) Power Input indicator on the front of the power module goes on. If the indicator does not light, see Troubleshooting the Power Subsystem. |

Installing a Version 2 or Version 3 AC or DC Power Module

Follow these steps to install a new version 2 or version 3 AC or DC power module (Figure 11: Removing or Installing a Version 2 or Version 3 AC or DC Power Module, on page 15):
**Procedure**

**Step 1** Slide the power module into the bay until it mates with its backplane connector.

**Step 2** Move the handle up.

**Step 3** Tighten the screw that secures the power module using a 7/16 hex socket and torque wrench with the torque set to 50 in-lb.

**Caution** To prevent damage to the power tray backplane connector, do not use excessive force when inserting the power module into the power tray.

**Step 4** Verify that the (green) Power Input indicator on the front of the power module goes on. If the indicator does not light, see Troubleshooting the Power Subsystem.

---

**Disconnecting AC Power**

Follow these steps to disconnect an individual AC power cord:

**Procedure**

**Step 1** Power OFF (0) the circuit breaker assigned to the AC power source you are disconnecting.

**Step 2** Loosen the retainer bracket holding the AC power cord to the power tray receptacle.

**Step 3** Unplug the AC power cord from the power tray receptacle.

**Caution** Do not turn off the switch on the power tray to remove AC power cords. An individual AC power cord can be unplugged while the system is powered from other AC power sources.

---

**Disconnecting AC Power**

If it becomes necessary to disconnect all AC power from the router, follow these steps:

**Procedure**

**Step 1** Set the power switch at the rear of the Version 1 AC power tray to the OFF (0) position. For Version 2 and Version 3 AC power trays, set the power switch at the front of the to the OFF (0) position.

**Caution** Do not disconnect all power from the router to replace components, including power modules. See Removing and Replacing Power System Components, on page 12.

**Step 2** Power OFF (0) the circuit breakers assigned to the AC power sources you are disconnecting.

**Caution** To ensure that power remains off while you are performing this procedure, lock-out/tag-out the circuit breaker switch in the OFF (0) position until you are ready to turn it on.
Reconnecting AC Power

Follow these steps to reconnect an individual AC power cord to a power tray:

Procedure

Step 1  Power OFF (0) the circuit breaker assigned to the AC power source you are reconnecting.
Step 2  Plug the AC power cord into the power tray receptacle.
Step 3  Close and tighten the retainer bracket holding the AC power cord to the power tray receptacle.
Step 4  Power on the AC power source circuit breaker.

Caution  Do not turn off the switch on the power tray to reconnect AC power cords. An individual AC power cord can be plugged in while the system is powered from other AC power sources.

Reconnecting AC Power

If power has been totally disconnected from the router, follow these steps to reconnect AC power to the AC power tray:

Procedure

Step 1  Verify that the power switch at the rear of the Version 1 AC power tray is set to the OFF (0) position. For Version 2 and Version 3 AC power trays, verify that the power switch at the front of the power tray set to the OFF (0) position.
Step 2  Check that the circuit breaker assigned to the AC power source you are connecting is set to OFF (0).

Caution  To ensure that power remains off while you are performing this procedure, lock-out/tag-out the circuit breaker switch in the OFF (0) position until you are ready to turn it on.

Step 3  Plug the AC power cords into the power tray receptacle (Figure 1).
Step 4  Close the retainer bracket to secure the AC power cord plug to the power tray receptacle.
Step 5  Power on the AC power source circuit breaker.
Step 6  Set the power switch at the rear of the AC power tray to the ON (1) position.

Caution  The following procedure is only to be used when reconnecting power to all power trays in a system that has been powered down completely.
Disconnecting DC Power

Follow these steps to disconnect an individual DC power source from a power tray (Figure 2 for version 1 DC power, Figure 3 for version 2 DC power, or Figure 3 for version 3 DC power):

**Procedure**

**Step 1**  
Power off the circuit breaker assigned to the DC power source you are disconnecting.

**Caution**  
To ensure that power remains off while you are performing this procedure, lock-out/tag-out the circuit breaker switch in the STANDBY (0) position until you are ready to turn it on.

**Step 2**  
Remove the clear plastic safety covers that fit over the DC power connection terminal studs.

**Caution**  
To prevent injury and damage to the equipment, always remove the source DC power cables and ground from the power tray terminals in the following order: (1) negative (–), (2) positive (+), (3) ground.

**Step 3**  
Disconnect the DC power cables from their terminals in the following order and note the color of each cable (Figure 2 for version 1 DC power, Figure 3 for version 2 DC power, or Figure 3 for version 3 DC power):

a) Negative (PWR) cables first.
b) Positive (RTN) cables next.
c) Ground cable last.

**Step 4**  
Repeat Step 1 through Step 3 for the other power tray, if installed.

**Caution**  
It is not necessary to disconnect all power from the router to replace components, including power modules. See Removing and Replacing Power System Components, on page 12.

Disconnecting DC Power

If it becomes necessary to disconnect all DC power from the router, follow these steps (Figure 2 for version 1 DC power, Figure 3 for version 2 DC power, or Figure 3 for version 3 DC power):

**Procedure**

**Step 1**  
Set the power tray switch to the STANDBY (0) position.

**Step 2**  
Power OFF (0) the circuit breaker assigned to the DC power source you are disconnecting.

**Caution**  
To ensure that power remains off while you are performing this procedure, lock-out/tag-out the circuit breaker switch in the OFF (0) position until you are ready to turn it on.

**Step 3**  
Remove the clear plastic safety covers that fit over the DC power connection terminal studs.

**Caution**  
To prevent injury and damage to the equipment, always remove the source DC power cables and ground from the power tray terminals in the following order: (1) negative (–), (2) positive (+), (3) ground.
Reconnecting DC Power

Follow these steps to reconnect DC power to a DC power tray:

**Procedure**

**Step 1**  Set the power switch to the OFF (0) position.

**Step 2**  Check that the circuit breaker assigned to the DC power source you are reconnecting is powered OFF (0).

**Step 3**  Reconnect the DC power cables in the following order:

a)  Ground cables first.

b)  Positive (RTN) cables next.

c)  Negative (PWR) cable last.

d)  Repeat Step 1 through Step 3 for the other power tray (Cisco ASR 9010 Router only)

**Caution**  To prevent injury and damage to the equipment, always attach the ground and source DC power cable lugs to the power tray terminals in the following order: (1) ground to ground, (2) positive (+) to positive (+), (3) negative (–) to negative (–).

**Caution**  Do not overtighten the nuts that secure the DC power cables to the power tray terminals. The nuts should be tightened using the 7/16 hex socket and torque wrench to a torque of 45 to 50 in-lb.

**Step 4**  Replace the clear plastic safety covers over the DC power connection terminal studs and tighten the screws.

**Step 5**  Set the DC power source circuit breaker to ON (1).

**Step 6**  Set the power tray switch to ON (1).

**Caution**  Use this procedure only when reconnecting power to all power modules in a system that is powered down completely.
Removing an AC or DC Power Tray from a Cisco ASR 9000 Series Router

The power trays are not a true FRU because they do not support OIR. However, if replacement is necessary, follow these steps to remove and replace the power trays in a Cisco ASR 9000 Series Router.

**Caution**

Power tray removal and replacement procedures are to be performed by qualified service persons only.

**Caution**

All power to the node must be shut off at the branch circuit disconnect device before beginning power tray replacement procedures. Removal of a tray requires disconnection of power cabling on the back of the chassis that exposes service persons to exposed wiring from the unaffected tray.

**Caution**

All terminal block covers should be replaced prior to energizing the power cabling to the system.

Follow these steps to remove an AC or DC power tray from the chassis:

**Procedure**

**Step 1**  
Disconnect AC or DC power from the power tray rear panel.

**Step 2**  
Remove all power modules from the power tray.

**Step 3**  
For the Cisco ASR 9010 Router, remove the front grill by pulling it away from the chassis (see figure below).

*Figure 13: Removing the Front Grill on the Cisco ASR 9010 Router*

**Step 4**  
For the Cisco ASR 9922 Router, the front power tray bezel is a standard item that comes with ball studs already installed. Simply install it by snapping it onto the chassis, or remove it by pulling it away from the chassis (see figure below).
**Figure 14: Removing the Front Power Tray Bezel on the Cisco ASR 9922 Router**

**Step 5**
For the Cisco ASR 9912 Router, the vented power tray bezel is a base chassis accessory that snaps onto the front of the power system. Comes with ball studs already installed. Remove it by pulling it away from the chassis (Figure 1).

**Step 6**
Loosen and remove the four screws (two screws at each end) that attach the power tray to the chassis.

**Step 7**
Loosen the two captive screws (one per ejector lever) to release the ejector levers. The *Removing a Power Tray—Version 1 Power Tray* figure shows the process for the version 1 power trays, and the figure *Removing a Power Tray—Version 2 Power Tray* shows the process for the version 2 power trays. The process for version 3 power trays is similar to the process for version 2 power trays, as shown in figure *Removing a Power Tray—Version 2 Power Tray*.

**Figure 15: Removing a Power Tray—Version 1 Power Tray (Cisco ASR 9010 Router Shown)**
Step 8  Rotate the ejector levers away from the tray to unseat the tray from its mating connector. The figure *Removing a Power Tray—Version 1 Power Tray* shows the process for the version 1 power trays, and the figure *Removing a Power Tray—Version 2 Power Tray* shows the process for the version 2 and version 3 power trays.

Step 9  Slide the power tray out of the bay of the chassis.

## Installing an AC or DC Power Tray into a Cisco ASR 9000 Series Router

Follow these steps to install an AC or DC power tray into the chassis:

**Procedure**

### Step 1
Slide the power tray into the bay until it engages its mating connector on the chassis. The ejector levers will partly rotate inward as you do this.

### Step 2
Fully rotate the ejector levers inward to fully seat the power tray into its mating connector and seat the power tray mounting ears against the chassis mounting ears. The figure *Rotating the Ejector Levers Inward to Seat the Version 1 Power Tray* shows how to install the version 1 power trays and the figure *Rotating the Ejector Levers Inward to Seat the Version 2 Power Tray* shows how to install the version 2 power trays. The installation of version 3 power trays is similar to the installation of version 2 power trays, as shown in the figure *Rotating the Ejector Levers Inward to Seat the Version 2 Power Tray*. When the power tray is fully seated, the captive screw in each ejector aligns with the screw hole in the power tray frame.
Figure 17: Rotating the Ejector Levers Inward to Seat the Version 1 Power Tray

1. Screw hole in the power tray frame for ejector lever captive screw
2. Ejector lever captive screw
3. Power tray mounting ear

Figure 18: Rotating the Ejector Levers Inward to Seat the Version 2 Power Tray
Step 3 Install the captive screw in each ejector lever into the screw hole in the power tray frame (figures Rotating the Ejector Levers Inward to Seat the Version 1 Power Tray or Rotating the Ejector Levers Inward to Seat the Version 2 Power Tray).

Step 4 Use the 6-inch long number 2 Phillips screwdriver to tighten the two ejector screws to a torque of 10 +/- 1 in-lb to secure the ejectors and to secure the tray to its mating connector.

Step 5 Install and tighten two screws through the power tray mounting ears on each side into the screw holes in the chassis mounting ears to secure the tray to the chassis.

Removing and Replacing Cards from the Chassis

This section describes the procedures for removing and installing an RSP card, RP card, FC, or LC.

See the Cisco ASR 9000 Series Aggregation Services Router SIP and SPA Hardware Installation Guide for information about removing and installing SIP and SPA cards.

- For a information about the router components and slot numbering for the Cisco ASR 9010 Router, Cisco ASR 9006 Router, and Cisco ASR 9904 Router, see Removing RSP Cards and Line Cards from the Cisco ASR 9010 Router, Cisco ASR 9006 Router, Cisco ASR 9904 Router, Cisco ASR 9906 Router, and Cisco ASR 9910 Router.

- For a information about the router components and slot numbering for the Cisco ASR 9922 Router and Cisco ASR 9912 Router, see Removing RP Cards, Fabric Cards, and Line Cards from the Cisco ASR 9922 Router and Cisco ASR 9912 Router.

- The Cisco ASR 9906 and Cisco ASR 9910 chassis are midplane chassis and the method of removal and replacing cards is different from other routers. The RSP (RSP0, RSP1) cards are located in the front of the chassis. The 4 line cards on the Cisco ASR 9906 (LC0 - LC3) and 8 line cards on the Cisco ASR 9910 (LC0 - LC7) slots are located in the front of the chassis. The 5 fabric cards (FC0 - FC4) can be inserted or removed from the rear side of the chassis.

Caution Handle all cards by the metal card carrier edges only; avoid touching the board or any connector pins. After removing a card, carefully place it in an antistatic bag or similar environment to protect it from ESD and dust in the optic ports (fiber-optic line cards).

Caution Be careful to avoid damaging the EMI gasket that runs along the full height of the card front panel edges. Damage to the EMI gasket can affect the ability of your system to meet EMI requirements.

Caution To avoid damaging card mechanical components, never carry an RSP card, RP card, FC, or LC by the captive installation screws or ejector levers. Doing so can damage these components and cause card insertion problems.
The BPID board monitors OIR by counting the number of card insertions for each slot and saving that information in non-volatile memory. OIR monitoring is done for all line cards, the RSP, the RP, and the fan trays. See OIR Monitoring, on page 3 for more information.

Removing Cards from the Chassis

Follow these steps to remove and replace FC, or LC from the card cage:

**Procedure**

**Step 1**

Power down the card using either of the two processes:

a) Use the CLI to power down the card.

```
Router# admin
Router (admin)# config
Router (admin-config)# hw-module power disable location location
commit
exit
```

The location is specified in rack/slot/cpu notation. For example, `hw-module power disable location 0/1/CPU0`.

b) Disengage the card from the back plane by performing Step 3a, 3b, and 3c. Leave the card inside the slot. Once the card is powered down wait 10 minutes for the line card to cool down below a temperature suitable to touch

**Step 2**

Disconnect any cables from the card.

a) Identify the type of line card and its slot number. Write this information down before you disconnect the cables. You’ll need this information when you reinstall the line cards.

b) Identify the line card cable and its port connection. Label the cable with this information.

c) Starting with the port of the line card farthest from the cable management bracket, disconnect the interface cable connectors from each of the line card ports.

d) Carefully remove the cables from the cable-management bracket attached to the front panel of the line card.

e) (Optional) Use the 6-inch long number 2 Phillips screwdriver to a torque of 10 +/- 1 in-lb to loosen the captive screw that secures the cable-management bracket to the line card and remove the cable-management bracket from the line card.

f) Carefully remove the cables from the horizontal cable management tray at the top of the chassis or side cable management brackets (Cisco ASR 9006 Router) and carefully place the cable bundle out of the way.

**Step 3**

Remove the card:

a) Use the 6-inch long number 2 Phillips screwdriver to loosen the captive screws at each end of the card front panel.

b) On the FC and LC push in both ejector lever release buttons.

c) Pivot the ejector levers to unseat the card from the backplane connector.

d) Slide the card out of the slot and place it directly into an antistatic bag or other ESD-preventive container.
Replacing Cards in the Chassis

Follow these steps to replace a previously removed RSP card, RP card, FC, or LC from the card cage:

Procedure

**Step 1** Install the card:
- a) Slide the card into the slot, being sure to install the card in the same slot you recorded when you removed the card.
- b) Use the 6-inch long number 2 Phillips screwdriver to a torque of 10 +/−1 in-lb to tighten the captive screws at each end of the card front panel.
- c) Pivot the ejector levers to seat the card into the backplane connector.

**Step 2** Reconnect cables to the card:
- a) If you previously disconnected the card cable management bracket, reattach it to the card and use the 6-inch long number 2 Phillips screwdriver to a torque of 10 +/−1 in-lb to tighten the captive screw on the bracket to secure it to the card front panel.
- b) Carefully reroute the cables through the horizontal cable management tray at the top of the chassis (the Cisco ASR 9922 Router has an additional tray at the bottom of the chassis) or side cable management brackets (Cisco ASR 9006 Router and Cisco ASR 9904 Router).
- c) Carefully reroute cables through the card cable-management bracket.
- d) Starting with the port of the card closest to the cable management bracket, reconnect the interface cable connectors to each of the card ports using the cable and port connection information you recorded when removing the cables.

**Step 3** If the card was powered down using CLI before removal, then power up the card using the CLI:

```bash
Router# admin
Router(admin)# config
Router(config)# no hw-module power disable location location
Router(config)# commit
Router(config)# exit
```

The location is specified in rack/slot/cpu notation. For example, `no hw-module power disable location 0/1/CPU0`.

Repackaging the Line Card for Return Shipment

Follow these steps to repackage the line card for return shipment.
**Before you begin**

- Create an RMA. For details on the RMA process, see *Product Returns & Replacements (RMA).*
- Ensure that you have all the necessary tools and equipment before beginning the procedure:
  - Packaging material. Use the existing packaging material or order a new packaging material.
  - Screwdriver
  - 3M 373 3.00-inch wide pressure-sensitive carton sealing tape

**Procedure**

**Step 1**
Remove the three screws from the plastic blocker present on the wooden base board and remove the blocker.

*Figure 19: Removing the Plastic Blocker*

<table>
<thead>
<tr>
<th></th>
<th>Plastic Blocker</th>
<th>3</th>
<th>Screws</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Wooden Base Board</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Step 2**
Insert the line card into the slots in the plastic side rails of the wooden base board.
Step 3
Refix the plastic blocker into the wooden base board. Tighten the three screws applying a minimum torque value of 40 in-lbs.

Note Depending on the line card being packaged, orient the plastic blocker as per the instructions printed on the top face of the blocker.

Step 4
Secure the line card inside the inner packaging box:

Note For safety and ease of handling, two persons should carry the card.

a) Place the line card inside the ESD bag; with the base of the ESD bag positioned on the inner packaging box.
b) Fold and seal the ESD bag with invisible tape.
c) Close the inner packaging box and seal it with pressure-sensitive carton sealing tape.
Step 5

Pack the sealed line card package:

a) Place the foam cushion into the outer packaging box.
b) Place the sealed line card package sideways into the foam cushion.
c) Place the pink rolled foam inside the outer packaging box, between the sealed line card package and outer packaging box. This pink rolled foam is used to spread on a flat surface and place the line card on it, while unpacking.

![Figure 23: Packing the Sealed Line Card Package](image)
d) Place the foam cushion on the sealed line card package.

**Step 6**

Close and seal the outer packaging box using 3M 373 3.00-inch wide pressure-sensitive carton sealing tape, and prepare the box for return shipment.

*Figure 24: Closing and Sealing the Outer Packaging Box*

---

**Migrating from RP1 to RP2 Card**

Before you begin:

- You must have console access to the router.
- The router must be running Cisco IOS XR software release 5.3.2 or later version.
- The router must have two RP1 cards (active and standby) up and running.
- Cisco ASR 9000 Ethernet Line Card (first generation) must be removed from the chassis as they are incompatible with RP2.
- Cisco ASR 9000 High Density 100GE Ethernet line cards must be power down or temporarily removed before starting the migration procedure. Use the `hw-module power disable location node-id` command in admin-config mode to power down the LC.

**Procedure**

**Step 1**

Use the `show redundancy summary` command to verify that the RP0 and RP1 are in Ready State.

**Example:**

```
Router# show redundancy summary
Wed Jun 17 11:20:19.086 PST
Redundancy information for node 0/RP1/CPU0:
==========================================
Node 0/RP1/CPU0 is in ACTIVE role
Node Redundancy Partner (0/RP0/CPU0) is in STANDBY role
Standby node in 0/RP0/CPU0 is ready
Standby node in 0/RP0/CPU0 is NSR-ready
Node 0/RP1/CPU0 is in process group PRIMARY role
Process Redundancy Partner (0/RP0/CPU0) is in BACKUP role
Backup node in 0/RP0/CPU0 is ready
Backup node in 0/RP0/CPU0 is NSR-ready

Group Primary Backup Status
--------- ------- ------- --------
v6-routing 0/RP1/CPU0 0/RP0/CPU0 Ready
mcast-routing 0/RP1/CPU0 0/RP0/CPU0 Ready
netmgmt 0/RP1/CPU0 0/RP0/CPU0 Ready
v4-routing 0/RP1/CPU0 0/RP0/CPU0 Ready
central-services 0/RP1/CPU0 0/RP0/CPU0 Ready
dlrsc 0/RP1/CPU0 0/RP0/CPU0 Ready
dsc 0/RP1/CPU0 0/RP0/CPU0 Ready

Active node reload "Cause: Initiating switch-over."
Standby node reload "Cause: Initiating switch-over."
```

**Step 2**

Remove the standby RP1 card and insert RP2. Follow the procedure explained in the topic *Removing and Replacing Cards from the Chassis*, on page 25.

**Step 3**

Connect to RP2 console port and type CTRL+C to break into ROMMON.

**Step 4**

From the ROMMON prompt of RP2, set ROMMON variable to activate 1GE mode for peer RP communication:

**Example:**

```
rommon B1> RSP_LINK_1G=1
rommon B1> sync
```

**Step 5**

Verify that config register is set correctly in ROMMON:
**Example:**

rommon B1> confreg

**Step 6**  
Reset RP2 card in ROMMON. Now the RP2 becomes the standby RP in slot 0 and synchronizes configuration from active RSP440 in slot 1.

**Example:**

rommon B1> reset -h

**Note**  
The RP2 card reloads and user is disconnected from ROMMON automatically.

**Step 7**  
Wait until standby node reach NSR-ready state and status of ALL the groups is Ready state. Use show redundancy command to verify the same.

**Step 8**  
From active RP, verify the both RPs have synchronized the SNMP engine ID and SNMP ifindex-table between each other:

**Example:**

#more disk0:snmp/ifindex-table loc 0/rp0/cpu0  
#more disk0:snmp/ifindex-table loc 0/rp1/cpu0  
#more disk0:snmp/snmp_persist loc 0/rp0/cpu0  
#more disk0:snmp/snmp_persist loc 0/rp1/cpu0

**Step 9**  
Manually copy Embedded Event Manager (EEM) scripts from RP1 to RP2 disks if applicable.

**Note**  
The EEM scripts are files located on RP’s hard disk. These files are not automatically synced between Active and Standby RPs.

**Step 10**  
Perform redundancy switchover from active RP1 to standby RP2.

**Example:**

Router# redundancy switchover

**Note**  
A physical OIR is not supported, hence you must perform CLI switchover.

**Step 11**  
Verify that the active RP is RP2 and it has the running configuration from RP1.

**Example:**

Router# show redundancy summary  
Router# show running config

**Step 12**  
Remove RP1. Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

**Step 13**  
Insert and boot RP2. After booting, the RP2 becomes standby RP. Do not set the ROMMON variable.

**Step 14**  
Repeat Step 7, Step 8 and Step 9.

**Step 15**  
(Optional) Perform FPD upgrade on the RP2. Use these commands:

**Example:**
Migrating from RP2 to RP3 Card

Before you begin:

- You must have console access to the router. Default console speed on RP3 is set as 115200.
- The router must be running Cisco 64-bit IOS XR software release 6.5.15 or later version. If your router is running a 32-bit IOS XR release, you will need to migrate to 64-bit XR release 6.5.15 or later. Refer to Migration Guide for Cisco ASR 9000 Series Routers.

Note
RP3 is only supported with 64-bit IOS XR software releases.

- The router must have two RP2 cards (active and standby) up and running.
- First and second generation Cisco ASR 9000 Ethernet Line Cards must be removed from the chassis as they are incompatible with RP3.

Procedure

Step 1
Use the `show redundancy summary` command to verify that the RP0 and RP1 are in Ready State.

Example:

```
Router# show redundancy summary

Active/Primary Standby/Backup
---------------------------
0/RP0/CPU0(A) 0/RP1/CPU0(S) {Node Ready, NSR: Ready}
0/RP0/CPU0(P) 0/RP1/CPU0(B) {Proc Group Ready, NSR: Ready}
```

Step 2
Shutdown the standby RP2 card (slot 1) using the `admin hw-module shutdown location 0/RP1` command.

Step 3
Remove the standby RP2 card. When RP2 is removed, an alarm is generated indicating that the redundancy is lost. Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

Step 4
Insert RP3 in slot 1 and allow RP3 to boot up.
Step 5  Verify both the RPs are in IOS XR RUN state using the `show platform` command.

**Example:**

```
Router# show platform
```

<table>
<thead>
<tr>
<th>Node</th>
<th>Type</th>
<th>State</th>
<th>Config state</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/RP0/CPU0</td>
<td>A99-RP2-SE(Active)</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/RP1/CPU0</td>
<td>A99-RP3-SE(Standby)</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FT0</td>
<td>ASR-9922-FAN-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FT1</td>
<td>ASR-9922-FAN-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FT2</td>
<td>ASR-9922-FAN-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FT3</td>
<td>ASR-9922-FAN-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC0</td>
<td>A99-SFC2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC1</td>
<td>A99-SFC2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC2</td>
<td>A99-SFC2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC3</td>
<td>A99-SFC2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC4</td>
<td>A99-SFC2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC5</td>
<td>A99-SFC2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC6</td>
<td>A99-SFC2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/PT0</td>
<td>A9K-AC-FEM-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/PT1</td>
<td>A9K-AC-FEM-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/PT2</td>
<td>A9K-AC-FEM-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/PT3</td>
<td>A9K-AC-FEM-V2</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
</tbody>
</table>

Step 6  Verify RP2 in slot 0 and RP3 in slot 1 reach full synchronization (NSR-ready state) and status of ALL the groups is in Ready state. Use `show redundancy` command to verify the same.

Step 7  Manually copy Embedded Event Manager (EEM) scripts from RP2 to RP3 disks if applicable.

**Note**  The EEM scripts are files located on RP’s hard disk. These files are not automatically synced between Active and Standby RPs.

Step 8  From active RP, verify both RPs have synchronized the SNMP engine ID and SNMP ifindex-table between each other:

**Example:**

```
#more disk0:snmp/ifindex-table loc 0/rp0/cpu0
#more disk0:snmp/ifindex-table loc 0/rp1/cpu0
#more disk0:snmp/snmp_persist loc 0/rp0/cpu0
#more disk0:snmp/snmp_persist loc 0/rp1/cpu0
```

Step 9  Perform redundancy switchover from active RP2 to standby RP3. This results in RP3 (slot 1) becoming active RP and RP2 (slot 0) becoming standby RP.

**Example:**

```
Router# redundancy switchover
```

Step 10 Verify that both the RPs are in IOS XR RUN state using the `show platform` command

**Example:**

```
Router# show platform
Thu Jul 12 20:50:28.317 UTC
```
Step 11 Verify RP3 in slot 1 and RP2 in slot 0 reach full synchronization (NSR-ready state) and status of ALL the groups is Ready state. Use show redundancy command to verify the same.  

Example:

Router# show redundancy  
Fri Jul 12 20:51:19.365 UTC
Active NodeStandby Node  
----------- ------------  
0/RP1/CPU0 0/RP0/CPU0 (Node Ready, NSR:Ready)

Step 12 Remove standby RP2 (slot 0). Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.  

Step 13 Insert and boot RP3 (slot 0). After booting, RP3 (slot 0) becomes standby RP. Verify using the show platform command.  

Example:

Router# show platform  
Thu Jul 12 20:50:28.317 UTC
Node Type State Config state  
-------------------------------------------  
0/RP0/CPU0 A99-RP3-SE(Standby) IOS XR RUN NSHUT  
0/RP1/CPU0 A99-RP3-SE(Active) IOS XR RUN NSHUT  
0/FT0 ASR-9922-FAN-V2 OPERATIONAL NSHUT  
0/FT1 ASR-9922-FAN-V2 OPERATIONAL NSHUT  
0/FT2 ASR-9922-FAN-V2 OPERATIONAL NSHUT  
0/FT3 ASR-9922-FAN-V2 OPERATIONAL NSHUT  
0/1/CPU0 A9K-8X100GE-TR IOS XR RUN NSHUT  
0/FC0 A99-SFC2 OPERATIONAL NSHUT  
0/FC1 A99-SFC2 OPERATIONAL NSHUT  
0/FC2 A99-SFC2 OPERATIONAL NSHUT  
0/FC3 A99-SFC2 OPERATIONAL NSHUT  
0/FC4 A99-SFC2 OPERATIONAL NSHUT  
0/FC5 A99-SFC2 OPERATIONAL NSHUT  
0/FC6 A99-SFC2 OPERATIONAL NSHUT  
0/PT1 A9K-AC-PFM-V2 OPERATIONAL NSHUT  
0/PT2 A9K-AC-PFM-V2 OPERATIONAL NSHUT  
0/PT3 A9K-AC-PFM-V2 OPERATIONAL NSHUT
Step 14  Repeat Step 6, Step 7 and Step 8.

Step 15  (Optional) Perform FPD upgrade on RP3. Use these commands:

**Note**  An FPD upgrade can be performed after the FCs and LCs are added to the system.

**Example:**

```
sysadmin-vm:0_RP1# upgrade hw-module location 0/RP0 fpd
sysadmin-vm:0_RP1# upgrade hw-module location 0/RP1 fpd
```

Step 16  Reload the system once FPDs are upgraded using the `admin hw-module location all reload` command.

---

**Migrating from RSP440 to RSP880 or RSP880-LT Card**

**Before you begin:**

- You must have console access to the router.
- The router must be running Cisco IOS XR software release 5.3.2 or later version to support RSP880.
- The router must be running Cisco IOS XR software release 6.2.2 or later version to support RSP880-LT.
- The router must have two RSP440 cards (active and standby) up and running.
- Cisco ASR 9000 Ethernet Line Card (first generation) must be removed from the chassis as they are incompatible with RSP880.
- Cisco ASR 9000 High Density 100GE Ethernet line cards (third generation) must be power down or temporarily removed before starting the migration procedure. Use the `hw-module power disable location node-id` command in admin-config mode to power down the LC.

**Procedure**

**Step 1**  Use show redundancy summary command to identify the active and standby RSPs.

**Example:**

```
Router# show redundancy summary
Wed Jun 17 11:18:51.391 PST
Active/Primary Standby/Backup
------------------- -------------------
0/RSP0/CPU0(A) 0/RSP0/CPU0(S) (Node Ready, NSR: Ready)
0/RSP0/CPU0(P) 0/RSP1/CPU0(S) (Proc Group Ready, NSR: Ready)
```

Make sure RSP1 is the active RSP card. If not, then use redundancy switchover command to perform redundancy switchover from RSP0 to RSP1, and make RSP1 as active RSP.

**Step 2**  Remove the standby RSP440 (RSP0) and insert RSP880 in slot 0. Follow the procedure explained in the topic *Removing and Replacing Cards from the Chassis*, on page 25.
**Step 3**
Connect to RSP880 console port and type `CTRL+C` to break into ROMMON.

**Step 4**
From the ROMMON prompt, set ROMMON variable to activate 1GE mode for peer RSP communication.

**Example:**
ROMMON prompt on RSP880 (A)

```
rommon B1> RSP_LINK_1G=1
rommon B1> sync
```

ROMMON prompt on RSP880-LT

```
rommon B1> RSP_LINK_1G=1
rommon B1> ALDRIN_VERSION_DISABLE=1
rommon B1> RSP4L_ALDRIN_1G=1
rommon B1> sync
```

**Step 5**
Verify that config register is set correctly in ROMMON.

**Example:**

```
rommon B1> confreg
```

**Step 6**
Reset RSP880 card. Now the RSP880 becomes the standby RSP in slot 0 and synchronizes configuration from active RSP440 in slot 1.

**Example:**

```
rommon B1> reset –h
```

**Note**
The RSP880 reloads and the user is disconnected from ROMMON automatically.

**Step 7**
Wait until standby node reaches NSR-ready state and status of ALL the groups is Ready state. Use show redundancy command to verify the same.

**Example:**

```
Router# show redundancy
Tue Nov 18 07:51:47.098 EDT
Redundancy information for node 0/RSP0/CPU0:
==========================================
Node 0/RSP1/CPU0 is in ACTIVE role
Node Redundancy Partner (0/RSP0/CPU0) is in STANDBY role
Standby node in 0/RSP0/CPU0 is ready
Standby node in 0/RSP0/CPU0 is NSR-ready
Node 0/RSP1/CPU0 is in process group PRIMARY role
Process Redundancy Partner (0/RSP0/CPU0) is in BACKUP role
Backup node in 0/RSP0/CPU0 is ready
Backup node in 0/RSP0/CPU0 is NSR-ready
```

<table>
<thead>
<tr>
<th>Group</th>
<th>Primary</th>
<th>Backup</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>dsc</td>
<td>0/RSP1/CPU0</td>
<td>0/RSP0/CPU0</td>
<td>Ready</td>
</tr>
<tr>
<td>dlrsc</td>
<td>0/RSP1/CPU0</td>
<td>0/RSP0/CPU0</td>
<td>Ready</td>
</tr>
</tbody>
</table>
Step 8  From the active RSP, verify that both RSPs have synchronized the SNMP engine ID and SNMP ifindex-table between each other:

Example:

```
#more disk0:snmp/ifindex-table loc 0/rsp0/cpu0
#more disk0:snmp/ifindex-table loc 0/rsp1/cpu0
#more disk0:snmp/snmp_persist loc 0/rsp0/cpu0
#more disk0:snmp/snmp_persist loc 0/rsp1/cpu0
```

Step 9  Manually copy Embedded Event Manager (EEM) scripts from RSP440 to RSP880 disks if applicable.

Note  The EEM scripts are files located on RSP’s hard disk. These files are not automatically synced between Active and Standby RSPs.

Step 10  Perform redundancy switchover from active RSP440 (slot 1) to standby RSP880 in (slot 0)

Example:

```
Router# redundancy switchover
```

Step 11  Remove RSP440 from slot 1. Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

Step 12  Insert and boot RSP880. After booting, the RSP 880 becomes standby RSP. Do not set the ROMMON variable.

Step 13  Repeat Step 7, Step 8 and Step 9.

Step 14  (Optional) Perform FPD upgrade on the RSP880. Use these commands:

Example:

```
Router# (admin) upgrade hw-module fpd all location 0/rsp0/cpu0
Router# (admin) upgrade hw-module fpd all location 0/rsp1/cpu0
```

Step 15  Clear ROMMON variable for active RSP from XR prompt:

Example:

```
Router# run nvram_rommonvar RSP_LINK_1G 0
```

Migrating from RSP4-S to RSP880-LT Card (ASR 9906 Router)

Before you begin:

- You must have console access to the router.
• The router must be running Cisco IOS XR software release 6.3.2 or later version.
• The router must have two RSP4-S cards (active and standby) up and running.
• Set the MISMATCH_RP_ENABLED ROMMON variable to 1:
  1. Connect to the RSP4-S console port and press CTRL+C to break into ROMMON.
  2. From the ROMMON prompt on the RSP4-S, set the ROMMON variable to allow mismatched RSP:

```
rrommon Bl> MISMATCH_RP_ENABLED=1
```

Procedure

**Step 1**
Enter the `show redundancy summary` command to identify the active and standby RSPs.

**Example:**
```
Router# show redundancy summary  
Wed Jun 17 11:18:51.391 PST  
Active/Primary Standby/Backup  
-----------------------------  
0/RSP1/CPU0(A) 0/RSP0/CPU0 (S) (Node Ready, NSR: Ready)  
0/RSP1/CPU0(P) 0/RSP0/CPU0(B) (Proc Group Ready, NSR: Ready)
```

**Step 2**
Remove the standby RSP4-S from slot 0 and insert the RSP880-LT. Follow the procedure in Removing and Replacing Cards from the Chassis, on page 25.

**Step 3**
Wait until the standby node reaches NSR-ready state and the status of all groups is in Ready state. Enter the `show redundancy` command to verify.

**Example:**
```
Router# show redundancy  
Wed Jun 17 11:18:53.098 PST  
Redundancy information for node 0/RSP1/CPU0:  
------------------------------------------  
Node 0/RSP1/CPU0 is in ACTIVE role  
Node Redundancy Partner (0/RSP0/CPU0) is in STANDBY role  
Standby node in 0/RSP0/CPU0 is ready  
**Standby node in 0/RSP0/CPU0 is NSR-ready**  
Node 0/RSP1/CPU0 is in process group PRIMARY role  
Process Redundancy Partner (0/RSP0/CPU0) is in BACKUP role  
Backup node in 0/RSP0/CPU0 is ready  
Backup node in 0/RSP0/CPU0 is NSR-ready  
```

**Step 4**
Perform redundancy switchover from active RSP4-S (slot 1) to standby RSP880-LT (slot 0).

**Example:**
Router# redundancy switchover
Proceed with switchover 0/RSP1/CPU0 -> 0/RSP0/CPU0? [confirm] y
Initiating switch-over.
RP/0/RSP0/CPU0:Jun 17 11:18:55.098 PST: rmf_svr[418]: %HA-REDCON-4-FAILOVER_REQUESTED:
failover has been requested by operator, waiting to initiate
RP/0/RSP1/CPU0:Jun 17 11:18:55.098 PST: nvram[74]: %MEDIA-NVRAM-6-UNMOUNT: nvram unmount
requested due to process restart or card reload
Connection closed by foreign host.

RP/0/RSP0/CPU0:Jun 17 11:26:55.098 PST: rmf_svr[418]: %HA-REDCON-1-BACKUP_READY: backup
process groups between 0/RSP0/CPU0 and 0/RSP1/CPU0 are ready
RP/0/RSP1/CPU0:Jun 17 11:26:55.098 PST: rmf_svr[420]: %HA-REDCON-6-STBY_BACKUP_READY: This
card is standby and its backup process groups are ready

The RSP880-LT in slot 0 becomes the active RSP.

Step 5 Remove the RSPS-4 from slot 1 and insert the RSP880-LT. Follow the procedure in Removing and Replacing
Cards from the Chassis, on page 25. After booting, the RSP880-LT is slot 1 becomes the standby RSP.

Step 6 Enter the show redundancy and show platform commands to confirm the RSPs have synchronized and are
in the correct state.

Example:

Router# show redundancy
Redundancy information for node 0/RSP0/CPU0:

Node 0/RSP0/CPU0 is in ACTIVE role
Node Redundancy Partner (0/RSP1/CPU0) is in STANDBY role
Standby node in 0/RSP1/CPU0 is ready
Standby node in 0/RSP1/CPU0 is NSR-not-configured
Node 0/RSP0/CPU0 is in process group PRIMARY role
Process Redundancy Partner (0/RSP1/CPU0) is in BACKUP role
Backup node in 0/RSP1/CPU0 is ready
Backup node in 0/RSP1/CPU0 is NSR-ready

<table>
<thead>
<tr>
<th>Group</th>
<th>Primary</th>
<th>Backup</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>dsc</td>
<td>0/RSP0/CPU0</td>
<td>0/RSP1/CPU0</td>
<td>Ready</td>
</tr>
<tr>
<td>dlrs</td>
<td>0/RSP0/CPU0</td>
<td>0/RSP1/CPU0</td>
<td>Ready</td>
</tr>
<tr>
<td>central-services</td>
<td>0/RSP0/CPU0</td>
<td>0/RSP1/CPU0</td>
<td>Ready</td>
</tr>
<tr>
<td>v4-routing</td>
<td>0/RSP0/CPU0</td>
<td>0/RSP1/CPU0</td>
<td>Ready</td>
</tr>
<tr>
<td>netmgmt</td>
<td>0/RSP0/CPU0</td>
<td>0/RSP1/CPU0</td>
<td>Ready</td>
</tr>
<tr>
<td>mcast-routing</td>
<td>0/RSP0/CPU0</td>
<td>0/RSP1/CPU0</td>
<td>Ready</td>
</tr>
<tr>
<td>v6-routing</td>
<td>0/RSP0/CPU0</td>
<td>0/RSP1/CPU0</td>
<td>Ready</td>
</tr>
</tbody>
</table>

Router# show platform

<table>
<thead>
<tr>
<th>Node</th>
<th>Type</th>
<th>State</th>
<th>Config State</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/RSP0/CPU0</td>
<td>A9K-RSP880-LT-TR(Active)</td>
<td>IOS XR RUN</td>
<td>PWR, NSWHT, MON</td>
</tr>
<tr>
<td>0/RSP1/CPU0</td>
<td>A9K-RSP880-LT-TR(Standby)</td>
<td>IOS XR RUN</td>
<td>PWR, NSWHT, MON</td>
</tr>
<tr>
<td>0/0/CPU0</td>
<td>A99-6X100GE-TR</td>
<td>IOS XR RUN</td>
<td>PWR, NSWHT, MON</td>
</tr>
<tr>
<td>0/2/CPU0</td>
<td>A99-12X100GE</td>
<td>IOS XR RUN</td>
<td>PWR, NSWHT, MON</td>
</tr>
<tr>
<td>0/3/CPU0</td>
<td>A99-6X100GE-TR</td>
<td>IOS XR RUN</td>
<td>PWR, NSWHT, MON</td>
</tr>
</tbody>
</table>
Migrating from RSP4/RSP4-S/RSP-L to RSP5 Card

Before you begin:

- You must have console access to the router. Default console speed on RSP5 is set as 115200.
- The router must be running Cisco 64-bit IOS XR software release 6.5.15 or later version. If your router is running a 32-bit IOS XR release, you will need to migrate to 64-bit XR release 6.5.15 or later. Refer to Migration Guide for Cisco ASR 9000 Series Routers.

**Note**

RSP5 is only supported with 64-bit IOS XR software releases.

- The router must have two RSP4/S/L cards (active and standby) up and running. In this section, RSP refers to RSP4/RSP4-S/RSP4-L in the system.
- First and second generation Cisco ASR 9000 Ethernet Line Cards must be removed from the chassis as they are incompatible with RSP5.

**Procedure**

**Step 1**

Use the `show redundancy summary` command to verify that the RSP0 and RSP1 are in Ready State.

**Example:**

```
Router# show redundancy summary
```

<table>
<thead>
<tr>
<th>Active/Primary</th>
<th>Standby/Backup</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/RSP0/CPU0(A)</td>
<td>0/RSP1/CPU0(S)</td>
</tr>
<tr>
<td>(Node Ready, NSR: Ready)</td>
<td></td>
</tr>
<tr>
<td>0/RSP1/CPU0(P)</td>
<td>0/RSP1/CPU0(B)</td>
</tr>
<tr>
<td>(Proc Group Ready, NSR: Ready)</td>
<td></td>
</tr>
</tbody>
</table>

**Step 2**

Shut down the standby RSP card (slot 1) using the `admin hw-module shutdown location 0/RSP1` command.

**Step 3**

Remove the standby RSP card (slot 1). When RSP is removed, an alarm is generated indicating that the redundancy is lost. Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

**Step 4**

Insert RSP5 in slot 1 and allow RSP5 to boot up.

**Step 5**

Verify both the RSPs are in IOS XR RUN state using the `show platform` command.

**Example:**

```
Router# show platform
```

<table>
<thead>
<tr>
<th>Node</th>
<th>Type</th>
<th>State</th>
<th>Config state</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/RSP0/CPU0</td>
<td>A9K-RSP880-LT-TR(Active)</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/RSP1/CPU0</td>
<td>A9K-RSP5-TR(Standby)</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FT0</td>
<td>ASR-9910-FAN</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FT1</td>
<td>ASR-9910-FAN</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/L/CPU0</td>
<td>A9K-8X100GE-TR</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC0</td>
<td>A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC1</td>
<td>A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
<tr>
<td>0/FC2</td>
<td>A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
</tr>
</tbody>
</table>
Step 6: Verify RSP in slot 0 and RSP5 in slot 1 reach full synchronization (NSR-ready state) and status of ALL the groups is Ready state. Use `show redundancy` command to verify the same.

Step 7: Manually copy Embedded Event Manager (EEM) scripts from RSP to RSP5 disks if applicable.

**Note**: The EEM scripts are files located on RSP’s hard disk. These files are not automatically synced between Active and Standby RSPs.

Step 8: From active RSP, verify the both RSPs have synchronized the SNMP engine ID and SNMP ifindex-table between each other:

**Example**:

```
#more disk0:snmp/ifindex-table loc 0/rsp0/cpu0
#more disk0:snmp/ifindex-table loc 0/rsp1/cpu0
#more disk0:snmp/snmp_persist loc 0/rsp0/cpu0
#more disk0:snmp/snmp_persist loc 0/rsp1/cpu0
```

Step 9: Perform redundancy switchover from active RSP to standby RSP5. This results in RSP5 (slot 1) becoming active RSP and RSP (slot 0) becoming standby RP.

**Example**:

```
Router# redundancy switchover
```

Step 10: Verify that both the RSPs are in IOS XR RUN state using the `show platform` command

**Example**:

```
Router# show platform
```

<table>
<thead>
<tr>
<th>Node</th>
<th>Type</th>
<th>State</th>
<th>Config state</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/RSP0/CPU0 A9K-RSP880-LT-TR(Standby)</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/RSP1/CPU0 A9K-RSP5-TR(Active)</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/FT1     ASR-9910-FAN</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/1/CPU0  A9K-8X100GE-TR</td>
<td>IOS XR RUN</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/FC0     A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/FC1     A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/FC2     A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/FC3     A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/FC4     A99-SFC-S</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/PT0     A9K-AC-PDM-V3</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
<tr>
<td>0/PT1     A9K-AC-PDM-V3</td>
<td>OPERATIONAL</td>
<td>NSHUT</td>
<td></td>
</tr>
</tbody>
</table>

Step 11: Verify RSP5 in slot 1 and RSP in slot 0 reach full synchronization (NSR-ready state) and status of ALL the groups is Ready state. Use show redundancy command to verify the same.

**Example**:
Step 12 Remove standby RSP (slot 0). Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

Step 13 Insert and boot RSP5 (slot 0). After booting, the RSP5 becomes standby RSP.

Example:

Step 14 Repeat Step 6, Step 7 and Step 8.

Step 15 (Optional) Perform FPD upgrade on the RSP5. Use these commands:

Note An FPD upgrade can be performed after all the FCs/LCs are added to the system.

Example:

sysadmin-vm:0_RSP1# upgrade hw-module location 0/RSP0 fpd
sysadmin-vm:0_RSP1# upgrade hw-module location 0/RSP1 fpd

Step 16 Reload the system once FPDs are upgraded using the admin hw-module location all reload command.

---

Migrating from FC1 to FC2 Card

Procedure

Step 1 Remove the FC1 card from slot FC0. Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

Step 2 Insert FC2 card in slot FC0. Follow the procedure explained in the topic Replacing Cards in the Chassis, on page 27.
Step 3  Wait for FC2 to come online. Verify the card state using the `show controller fabric plane all` command. In the output, Admin State and Oper State value should be 01 (that means the card state is up), Links Down should be zero, and the values of In pkt count and Out pkt count should be incrementing.

Example:

```
Router# show controllers fabric plane all
Wed Apr 13 08:32:02.464 PDT
Flags: Admin State: 1-Up 2-Down 12-UnPowered 16-Shutdown
Oper State: 1-Up 2-Down 3-Admin Down

Summary for All Fabric Planes:

<table>
<thead>
<tr>
<th>Plane Id</th>
<th>Admin State</th>
<th>Oper State</th>
<th>Links Up</th>
<th>Links Down</th>
<th>In Pkt Count</th>
<th>Out Pkt count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>01</td>
<td>01</td>
<td>42</td>
<td>00</td>
<td>5942644519</td>
<td>5942644481</td>
</tr>
<tr>
<td>1</td>
<td>01</td>
<td>01</td>
<td>42</td>
<td>00</td>
<td>5906049163</td>
<td>5906047719</td>
</tr>
<tr>
<td>2</td>
<td>01</td>
<td>01</td>
<td>42</td>
<td>00</td>
<td>5939106251</td>
<td>5939105048</td>
</tr>
<tr>
<td>3</td>
<td>01</td>
<td>01</td>
<td>42</td>
<td>00</td>
<td>5933726816</td>
<td>5933725418</td>
</tr>
<tr>
<td>4</td>
<td>01</td>
<td>01</td>
<td>42</td>
<td>00</td>
<td>5931138987</td>
<td>5931137649</td>
</tr>
<tr>
<td>5</td>
<td>01</td>
<td>01</td>
<td>22</td>
<td>00</td>
<td>5920246359</td>
<td>5920245399</td>
</tr>
<tr>
<td>6</td>
<td>01</td>
<td>01</td>
<td>22</td>
<td>00</td>
<td>5920165028</td>
<td>5920163883</td>
</tr>
</tbody>
</table>
```

Step 4  Repeat Step 1 through Step 3 for migrating remaining FCs from slot FC1 to slot FC6.

---

Migrating from A99-SFC2 to A99-SFC3 Card

Cisco ASR 9912 and Cisco ASR 9922 chassis supports the A99-SFC3 fabric card.

Procedure

Step 1  Remove the A99-SFC2 card from slot FC0. Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

Alarms are raised when fabric cards are removed and when the system has a combination of old and new generation fabric cards. These alarms clear when all the fabric cards are replaced.

Step 2  Insert A99-SFC3 card in slot FC0. Follow the procedure explained in the topic Replacing Cards in the Chassis, on page 27.

Step 3  Wait for A99-SFC3 card to come online. Verify the card state is OPERATIONAL using the `show platform` command.

Step 4  Repeat Step 1 through Step 3 for migrating remaining FCs from slot FC1 to slot FC6.

Example:

```
Router# show platform
Node       Type              State      Config state
---------- ------------------ -------- ------------------
0/RSP0/CPU0 A9K-RSP5-TR(Standby) IOS XR RUN         NSHUT
```
Migrating from A99-SFC-S/A99-SFC-T to A99-SFC3-S/A99-SFC3-T Card

Cisco ASR 9906 chassis supports the A99-SFC3-T fabric card and Cisco ASR 9910 chassis supports the A99-SFC3-S fabric card. In this section, SFC refers to A99-SFC-S/A99-SFC-T.

Procedure

Step 1
Remove the SFC card from slot FC0. Follow the procedure explained in the topic Removing and Replacing Cards from the Chassis, on page 25.

Alarms are raised when fabric cards are removed and when the system has a combination of old and new generation fabric cards. These alarms clear when all the fabric cards are replaced.

Step 2
Insert A99-SFC3-T/A99-SFC3-S card in slot FC0. Follow the procedure explained in the topic Replacing Cards in the Chassis, on page 27.

Step 3
Wait for A99-SFC3-T/A99-SFC3-S card to come online. Verify the card state is OPERATIONAL using the show platform command.

Example:

```
Router# show platform
Node   Type                   State     Config state
------- --------------------------------- --------- ------------
0/RSP0/CPU0  A9K-RSP5-TR(Standby)  IOS XR RUN  NSHUT
0/RSP1/CPU0  A9K-RSP5-TR(Active)   IOS XR RUN  NSHUT
0/FT0       ASR-9910-FAN          OPERATIONAL NSHUT
0/FT1       ASR-9910-FAN          OPERATIONAL NSHUT
0/L/CPU0    A9K-8X100GE-TR       IOS XR RUN  NSHUT
0/FC0       A99-SFC3-S            OPERATIONAL NSHUT
0/FC1       A99-SFC3-S            OPERATIONAL NSHUT
0/FC2       A99-SFC3-S            OPERATIONAL NSHUT
0/FC3       A99-SFC3-S            OPERATIONAL NSHUT
0/FC4       A99-SFC3-S            OPERATIONAL NSHUT
```

Use the `admin show alarm` and `show pfm location all` commands to verify no additional alarms are raised after replacing all the FCs.
Use the **admin show alarm** and **show pfm location all** commands to verify no additional alarms are raised after replacing all the FCs.

## Removing a Chassis from the Equipment Rack

Follow these steps to remove the chassis and its components from the equipment rack:

### Procedure

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Power off the router (see Powering Off the Router, on page 3).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caution</td>
<td>You must use two people to remove the chassis from the equipment rack safely. An empty chassis can weigh up to approximately 300 pounds (136 kg).</td>
</tr>
<tr>
<td>Step 2</td>
<td>Power off the circuit breakers to the power supplies.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Disconnect the power from the power modules on the rear of the chassis.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Disconnect the supplemental bonding and grounding connection from the chassis (see Supplemental Bonding and Grounding Connections ).</td>
</tr>
<tr>
<td>Step 5</td>
<td>Remove the fan tray (see Removing and Replacing the Fan Trays, on page 10).</td>
</tr>
<tr>
<td>Step 6</td>
<td>Disconnect RSP/RP cables connected to the console port, auxiliary port, or either of the management Ethernet ports. Be sure to label each of the RSP/RP cables before you disconnect the cables.</td>
</tr>
<tr>
<td>Step 7</td>
<td>Disconnect any cables connected to the external alarm port on the alarm display. Label each of the alarm display cables before you disconnect the cables.</td>
</tr>
<tr>
<td>Step 8</td>
<td>Disconnect the line card interface cables.</td>
</tr>
<tr>
<td>Step 9</td>
<td>Remove the RSP cards, RP cards, FCs, and LCs from the chassis (see Removing and Replacing Cards from the Chassis, on page 25).</td>
</tr>
<tr>
<td>Step 10</td>
<td>Remove the chassis air filter (see Replacing the Chassis Air Filter, on page 4).</td>
</tr>
<tr>
<td>Step 11</td>
<td>Remove the chassis from the rack.</td>
</tr>
<tr>
<td>a)</td>
<td>Using the side handles to support the weight of the chassis, remove the screws that attach the chassis rack mount flanges and the side rack mount brackets to the rack posts.</td>
</tr>
<tr>
<td>b)</td>
<td>Carefully lift the chassis out of the rack and set it aside.</td>
</tr>
<tr>
<td>c)</td>
<td>Use the rear handle on the Cisco ASR 9922 Router to push the chassis out of the rack and onto an adjacent pallet jack for transport.</td>
</tr>
</tbody>
</table>
Packing a Chassis for Shipment

Use the packaging that came with the replacement chassis to repack and ship the chassis being replaced. Before shipping the chassis being replaced, pack the chassis back into the shipping rack (see Unpacking the Router).

Installing a Replacement Chassis in the Equipment Rack

Follow these steps to install the replacement chassis and components in the equipment rack:

Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Install the new chassis in the rack (see Rack-Mounting the Router Chassis).</td>
</tr>
<tr>
<td>Step 2</td>
<td>Install the power modules (see Removing and Replacing Power System Components, on page 12).</td>
</tr>
<tr>
<td>Step 3</td>
<td>Install the fan tray (see Removing and Replacing the Fan Trays, on page 10).</td>
</tr>
<tr>
<td>Step 4</td>
<td>Install the RSP cards, RP cards, FCs, and LCs. (see Removing and Replacing Cards from the Chassis, on page 25).</td>
</tr>
<tr>
<td>Step 5</td>
<td>Install the chassis air filter (see Replacing the Chassis Air Filter, on page 4).</td>
</tr>
<tr>
<td>Step 6</td>
<td>Connect all line card and interface cables (see Connecting Line Card Network Interface Cables).</td>
</tr>
<tr>
<td>Step 7</td>
<td>Connect the supplemental bonding and grounding connection (if there is one) to the chassis (see Supplemental Bonding and Grounding Connections).</td>
</tr>
<tr>
<td>Step 8</td>
<td>Connect power to the power trays on the rear of the chassis.</td>
</tr>
<tr>
<td>Step 9</td>
<td>To turn on power to the router, see Powering On the Router.</td>
</tr>
</tbody>
</table>