



Replacing 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.

Procedures for maintaining the router are described in these sections:

- [Prerequisites and Preparation, on page 1](#)
- [Removing and Replacing the Fan Tray, on page 5](#)
- [Removing and Replacing the Air Filter on Cisco ASR 9001 Router, on page 8](#)
- [Removing and Replacing the Air Filter for Cisco ASR 9903 and Cisco ASR 9902, on page 9](#)
- [Replace the Port Expansion Card, on page 12](#)
- [Removing and Replacing AC or DC Power System Components, on page 14](#)
- [Removing a Chassis from the Equipment Rack, on page 19](#)
- [Installing a Replacement Chassis in the Equipment Rack, on page 20](#)
- [Packing a Chassis for Shipment, on page 20](#)

Prerequisites and Preparation

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

- Review the [Safety Guidelines](#).
- Read the safety and ESD-prevention guidelines described in the [Compliance and Safety Information](#), and the [Regulatory Compliance and Safety Information for the Cisco ASR 9000 Aggregation Services Router](#).
- Ensure that you have all the necessary tools and equipment before beginning the procedure.

Field Replaceable Units

These components are field replaceable units (FRUs):

- Chassis
- Route Processor cards (Cisco ASR 9903 and Cisco ASR 9902 Router)
- Power modules
- Fan tray

- Transceiver modules
- Modular port adapters (Cisco ASR 9001 Router)
- Port Expansion Cards (PECs)

Online Insertion and Removal

Some field-replaceable units (FRUs) for the Cisco ASR 9000 Series Routers can be removed and replaced with the power on and the system operating. This facility is known as online insertion and removal (OIR). Unless otherwise noted, the maintenance tasks described in this chapter can be performed while the router remains powered on.

The following table displays the supported line cards, ports, and OIR duration for QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules:

Table 1: Supported Line Cards, Ports, and OIR Duration for QDD-400G-ZR-S and QDD-400G-ZRP-S Optical Modules

Line card	Supported front panel ports	Maximum supported OIR duration at mean sea level (MSL) with QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules
A9K-20HG-FLEX-SE/A9K-20HG-FLEX-TR	0, 7, 8, 12, 19	1 minute at 30°C (or 86°F)
A9K-8HG-FLEX-SE/A9K-8HG-FLEX-TR	0, 7	3 minutes at 30°C (or 86°F)
A99-10X400GE-X-SE/A99-10X400GE-X-TR	3, 5, 6, 7, 9	1 minute at 30°C (or 86°F)
A9903-20HG-PEC	0, 4, 8, 12, 16	45 seconds at 30°C (or 86°F)

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 the chassis to the off (0) position.

Figure 1: Power Switch on the Cisco ASR 9902

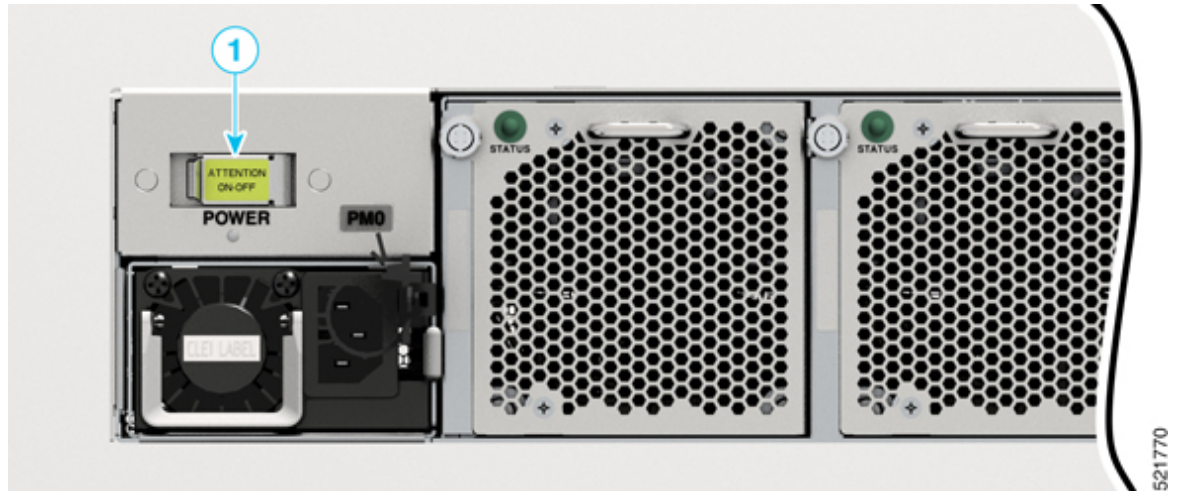


Figure 2: Power Switch on the Cisco ASR 9901

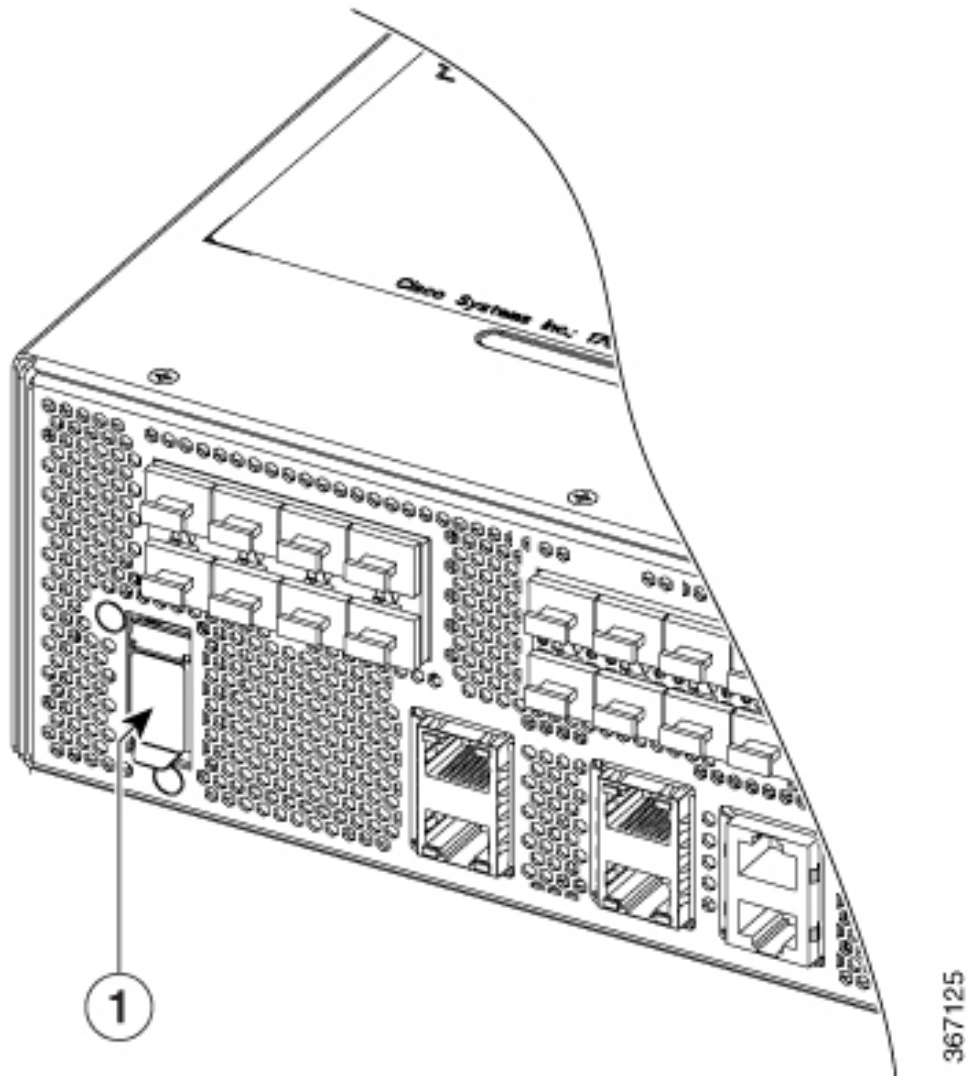
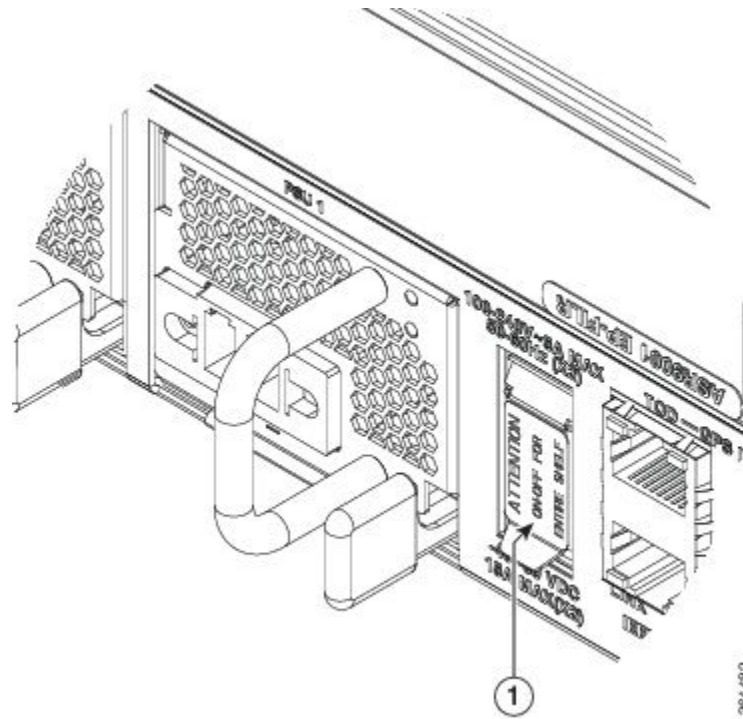


Figure 3: Power Switch on the Cisco ASR 9001



1	Power Switch
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- 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.

Removing and Replacing the Fan Tray



Note Fan tray OIR (Online Insertion and Removal) is supported from Cisco IOS XR Release 4.2.3.

The fan tray can be removed and replaced while the router is operating.

Cisco ASR 9901 and Cisco ASR 9902—We recommend that you replace a fan tray within 5 minutes at 30°C operating temperature.

Cisco ASR 9001—We recommend that you replace the fan tray within the following times to ensure that the router does not overheat:

- 3.1 minutes at 25°C operating temperature
- 2 minutes at 40°C operating temperature

- 42 seconds at 55°C operating temperature



Warning The fans might still be turning when you remove the fan assembly from the chassis. **Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing.** Statement 263



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.

Removing and Replacing a Fan Tray



Caution Each Cisco ASR 9901, ASR 9902 Router fan tray weighs approximately 1.1 pounds (0.5 kg). The Cisco ASR 9001 Router fan tray weighs approximately 2.6 pounds (1.2 kg). Use both hands when handling the fan tray.

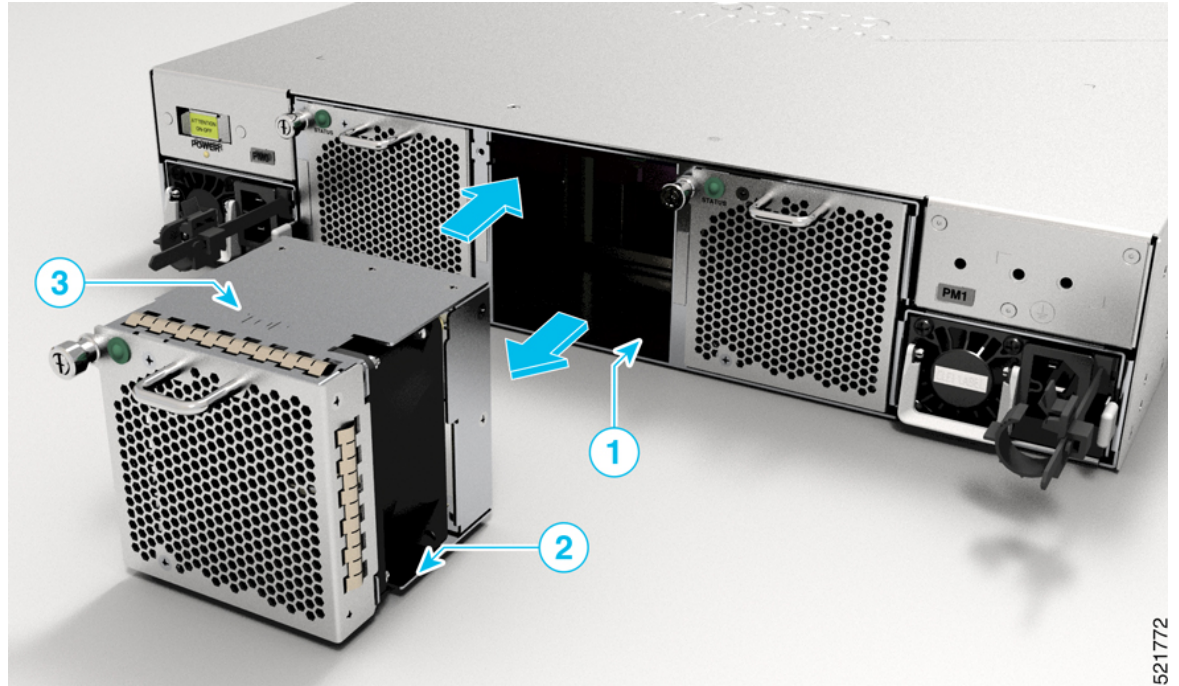
To remove and replace a fan tray from the chassis:

Procedure

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- Step 1** 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 (see the following figure).
- Step 3** Slide out the fan tray completely from the chassis while supporting it with your other hand.
- On Cisco ASR 9902 and 9901 router, before reinstalling the fan tray, wait for other fan LEDs to turn OFF (approx 30 seconds). This indicates the onset of the a five-minute period for the fan tray replacement. The LEDs turn green after the fan tray replacement is complete.
- Note** If you miss the five-minute window, other fan LEDs would turn ON. You should slide in the fan tray back to its original position and then repeat the Step 3.
- Step 4** To reinstall the fan tray, lift the fan tray (with two hands) and slide it halfway into the module bay (see the following figure).
- On Cisco ASR 9902 and 9901 router, we recommend that you replace a fan tray within 5 minutes.
- Note**
- Step 5** 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 6** Tighten the captive screw(s) on the fan tray to a torque of 10 +/-1 in-lb to secure it to the chassis.

Step 7 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](#) section.

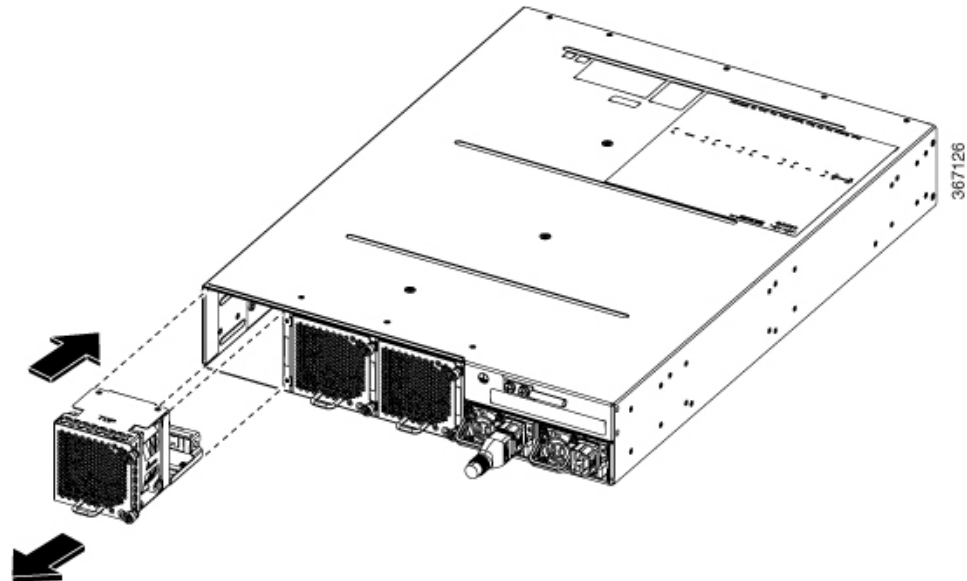
Figure 4: Removing or Installing the Fan Tray on the Cisco ASR 9902 Router Chassis



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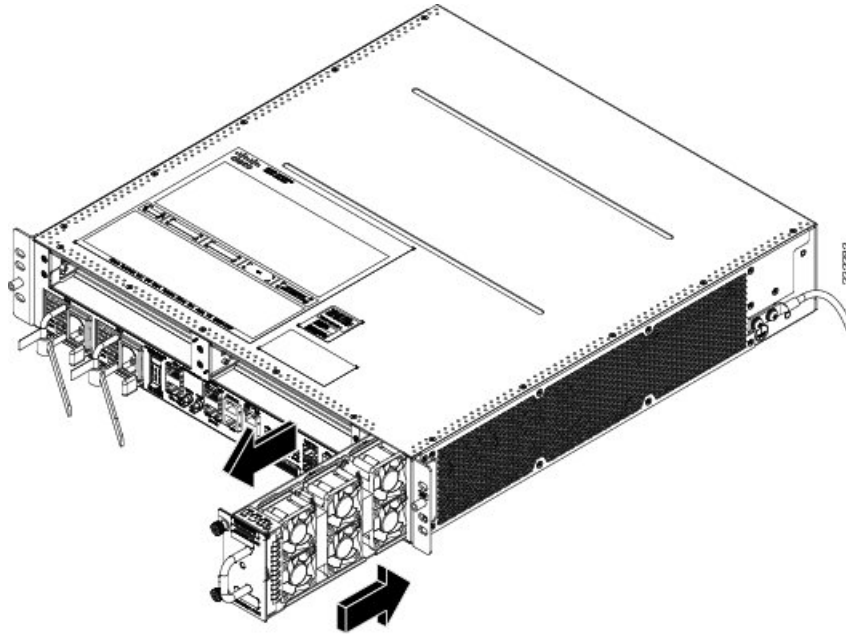
1	Module bay	3	Fan Tray
2	Guide rail		

Figure 5: Removing or Installing the Fan Tray on the Cisco ASR 9901 Router Chassis



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Figure 6: Removing or Installing the Fan Tray on the Cisco ASR 9001 Router Chassis



Removing and Replacing the Air Filter on Cisco ASR 9001 Router

The Cisco ASR 9001 Series Router, when used with the air plenum, has a serviceable air filter (Cisco PID ASR-9001-PLNMFLTR=) that is accessible from the top of the of the air filter assembly (see the following figure). The air filter removes dust from the room air drawn into the chassis by the fan trays.

Regularly check the air filter at least every three months. If used in a dusty environment, check the air filter once a month. Replace it if it appears excessively dirty or damaged. Failure to replace a compromised air filter can result in insufficient air circulation through the chassis.



Note To comply with Telecordia GR-63-Core standard air filter requirements for NEBS deployments, the air filter must be replaced.



Note The air filter can be removed from the air plenum assembly without removing the cables or the fan tray.

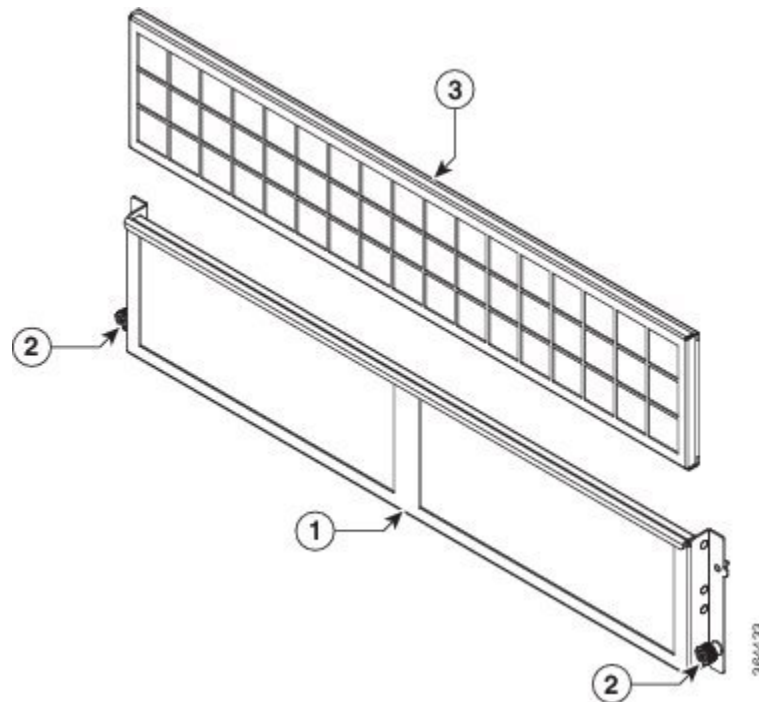
To replace the air filter, follow these steps:

Procedure

Step 1 Loosen the two captive screws on the air filter cover and remove it from the chassis.

Step 2 Grasp the pull tab in the center of the air filter, and slide it out from the slot.

Figure 7: Replacing the Air Filter



1	Air filter cover	2	Two captive screws
3	Air filter		

Step 3 Install the replacement air filter.

Note Verify the air flow direction when installing the new air filter. An air flow direction arrow is stamped on the air filter frame and should be pointing towards the chassis and be visible when installed in the air filter cover.

- a) Slide the new air filter into the slot.
- b) Tighten the two captive screws on the front of the air filter cover.

Removing and Replacing the Air Filter for Cisco ASR 9903 and Cisco ASR 9902

The Cisco ASR 9903 and Cisco ASR 9902 Router have a serviceable air filter (Cisco PID: ASR-9903-FILTER and ASR-9902-FILTER). The air filter is a single component. It removes dust from the room air drawn into the chassis by the fan trays.

Regularly check the air filter at least every three months. If used in a dusty environment, check the air filter once a month. Replace it if it appears excessively dirty or damaged. Failure to replace a compromised air filter can result in insufficient air circulation through the chassis.

To replace the air filter, follow these steps:

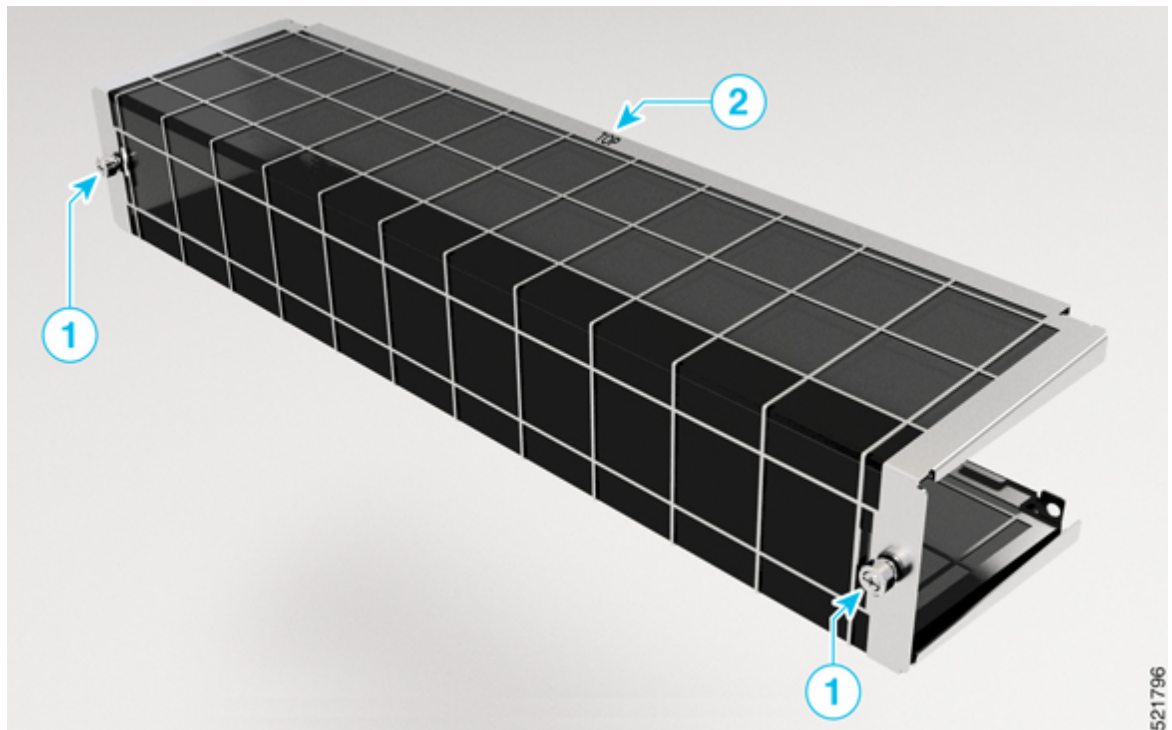


Note To comply with Telecordia GR-63-Core standard air filter requirements for NEBS deployments, the air filter must be replaced.

Procedure

Step 1 Loosen the two captive screws on the air filter and remove it from the cable management bracket.

Figure 8: Remove Air Filter

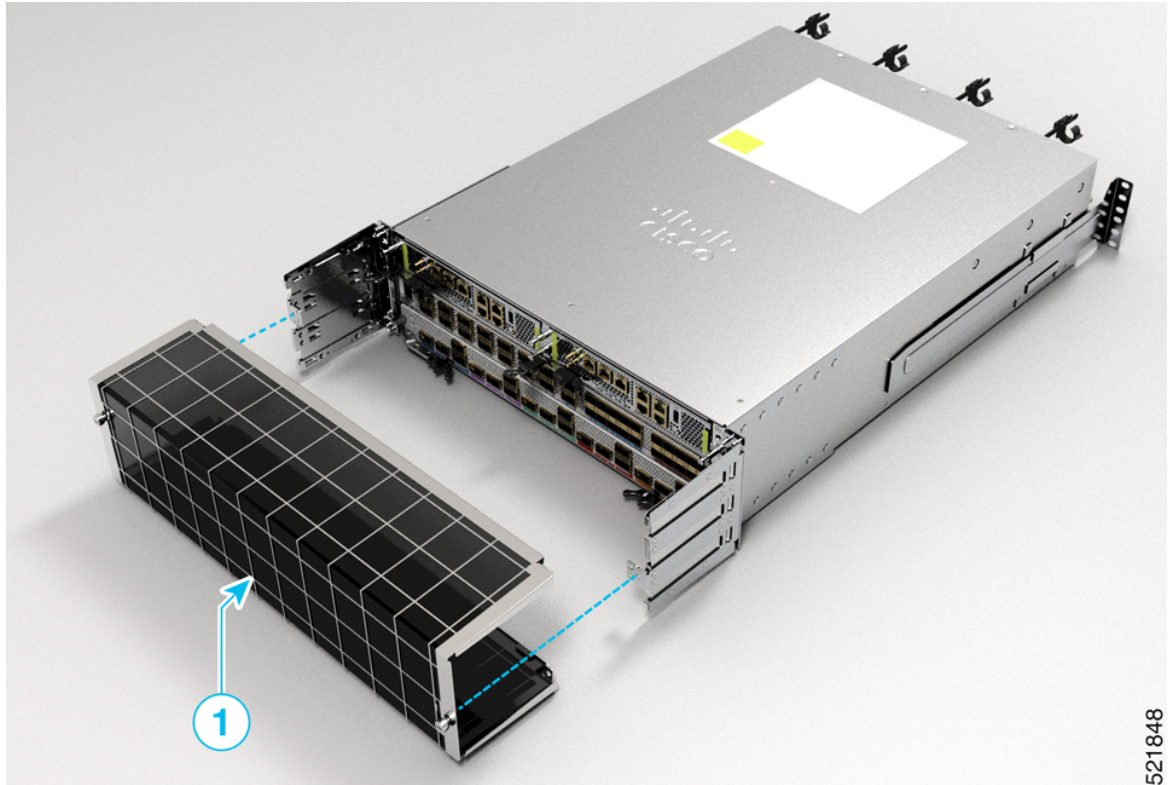


1	Two captive screws	2	TOP marking on the air filter
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Step 2 Install the replacement air filter.

- a) Place the air filter as shown in the below figure.
- b) Insert and tighten the two screws to secure the air filter.

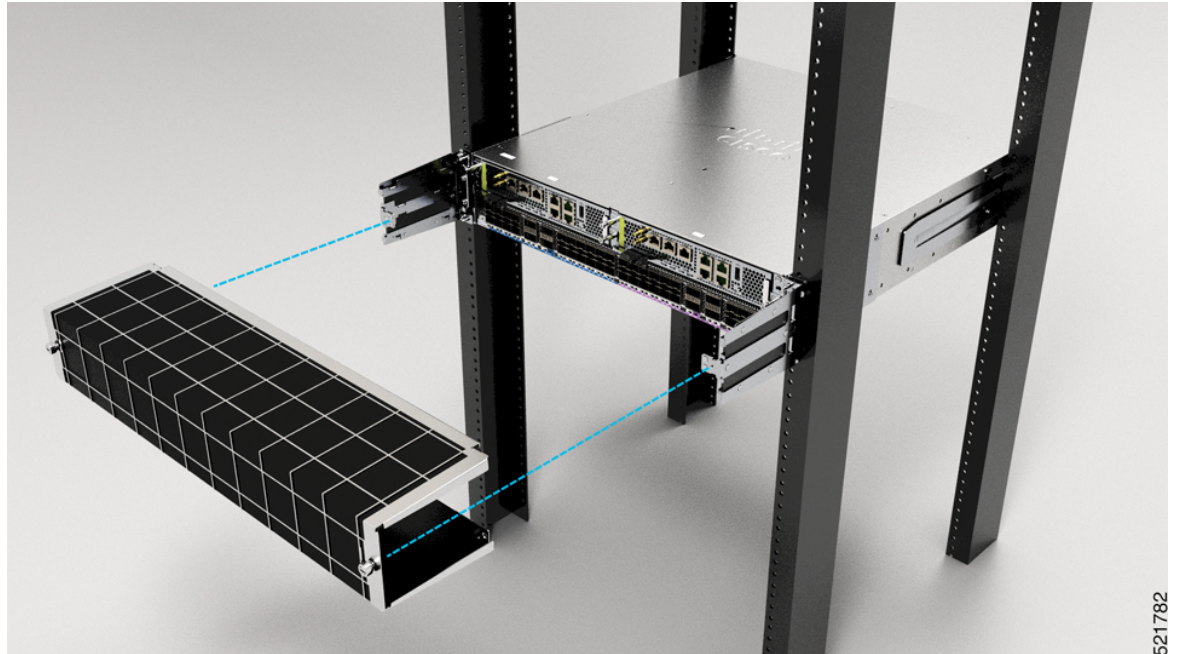
Figure 9: Install Air Filter-Cisco ASR 9903



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1	Air filter
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Figure 10: Install Air Filter-Cisco ASR 9902



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Replace the Port Expansion Card

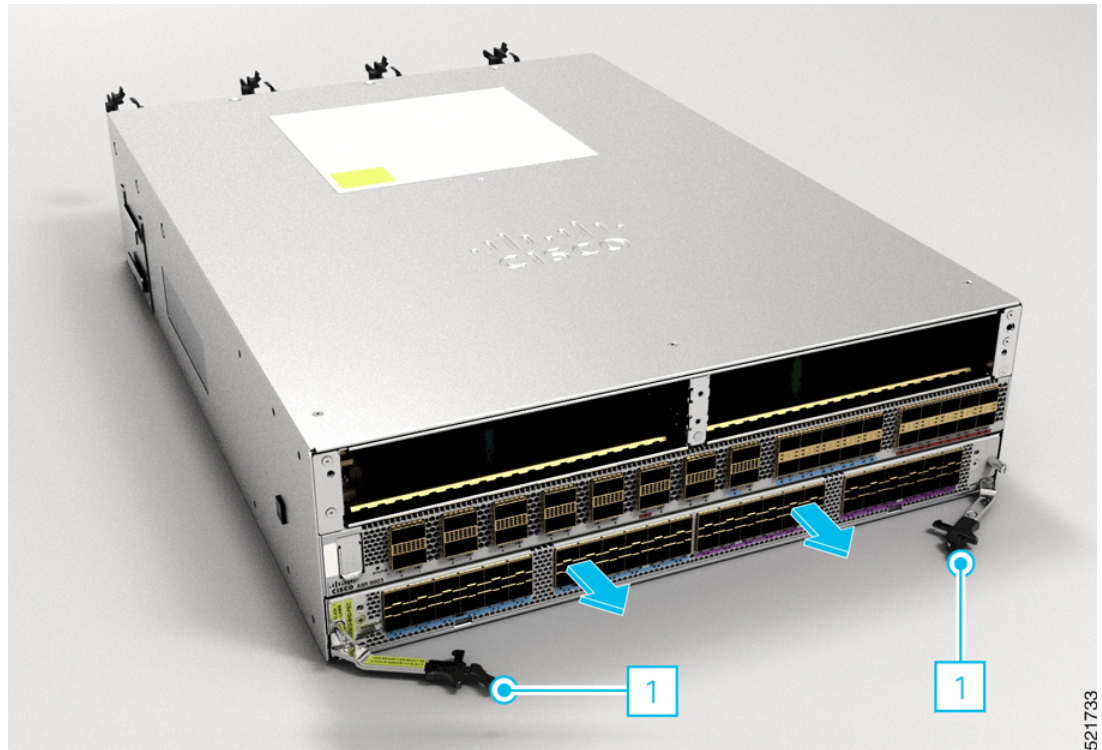
This section describes how to replace the 2T or 0.8T PEC with another PEC from the Cisco ASR 9903 chassis.

**Note**

- From Release 7.8.1 onwards, support for managed OIR is introduced on 0.8T PEC(A9903-8HG-PEC).
- From Release 7.3.2 onwards, support for managed OIR is introduced on 2T PEC(A9903-20HG-PEC).

1. Shut down the line card (LC0) using the **hw-module shutdown location** command from EXEC mode.
2. Unscrew port expansion card securing screws on either ends, one after the other.
3. Wait for the status LED to turn from green color to red color.
4. Unlatch ejector handle and use it as a lever to carefully eject the card.

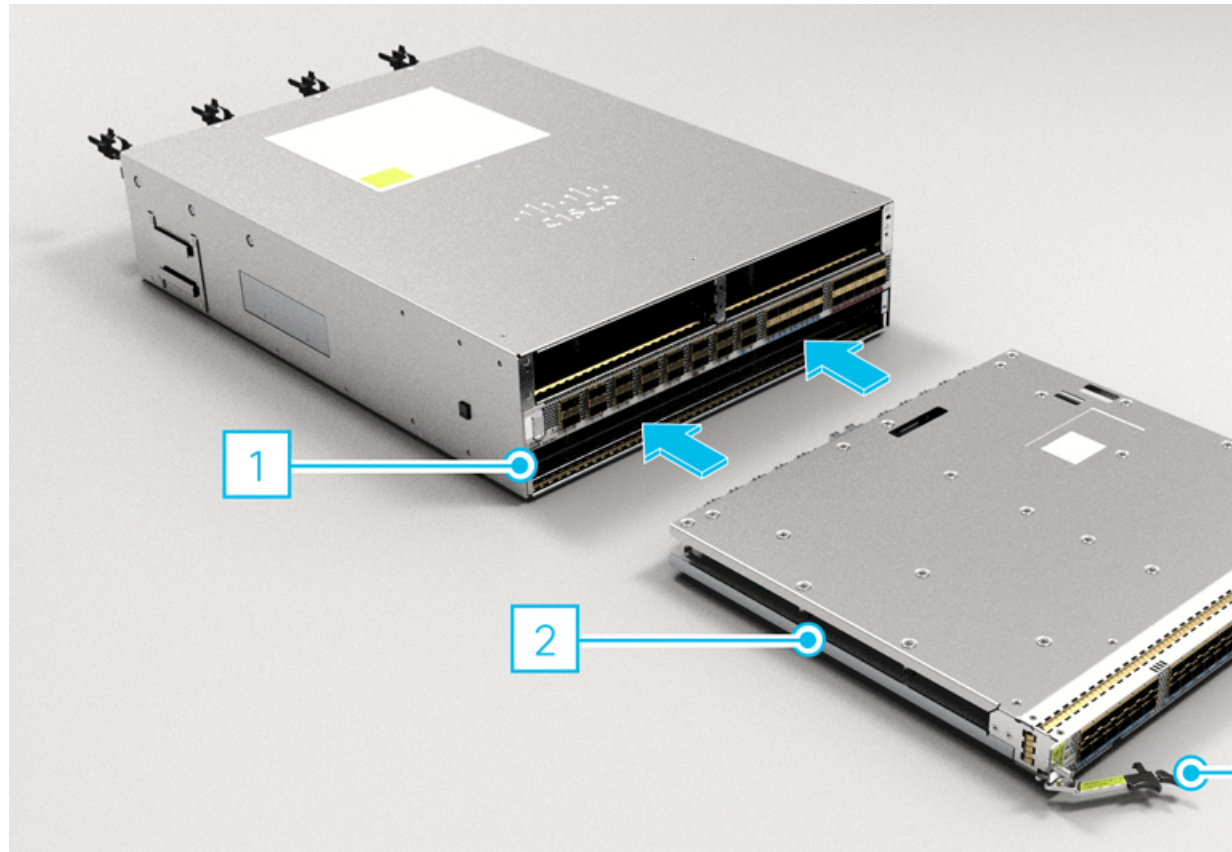
Figure 11: Remove PEC from Chassis



1	Ejector handle
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5. Gently pull the card out of the chassis.
6. Gently insert a different PEC into the chassis in proper orientation.

Figure 12: Insert a PEC into the Chassis



7. Use the ejector handle to leverage final seating of connectors and then lock the ejector handle.

1	Port expansion card slot on the chassis
2	Alignment guide on the PEC
3	Ejector handle

8. Tighten the card securing screws on both ends with the torque of 0.6 N-m.
9. Reload the router using the **hw-module location all reload** command in admin mode.
10. Wait for the status LED to turn from blinking amber color to green color.

Removing and Replacing AC or DC Power System Components

This section contains removal and replacement procedures for the AC and DC power systems used in the Cisco ASR 9000 Fixed-port Router.

Power Module Replacement Guidelines

The Cisco ASR 9000 Series Routers support online insertion and removal (OIR) for 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. When you remove a failed power module with the router in operation, perform the replacement as soon as possible. Make sure you have the replacement power module ready before beginning the removal and installation procedure.

Removing and Replacing an AC or DC Power Module

This section contains the procedure to remove and replace an AC or DC power module from the chassis.



Note It is not necessary to turn off the switch on the unit to remove individual power modules. Power modules support OIR, so they can be removed and replaced with the power on and the system operating.

Removing an AC or DC Power Module

To remove an AC or DC power module from the chassis:

Procedure

- Step 1** Disconnect the power cabling from the power module before removing it from the chassis.
- Step 2** Pull the keying lever towards the left side to unlock the module from the chassis.
- Step 3** Slide the power module out of its bay while supporting it with your other hand.

Figure 13: Removing or Installing an AC or DC Power Module (Cisco ASR 9902 AC power shown)

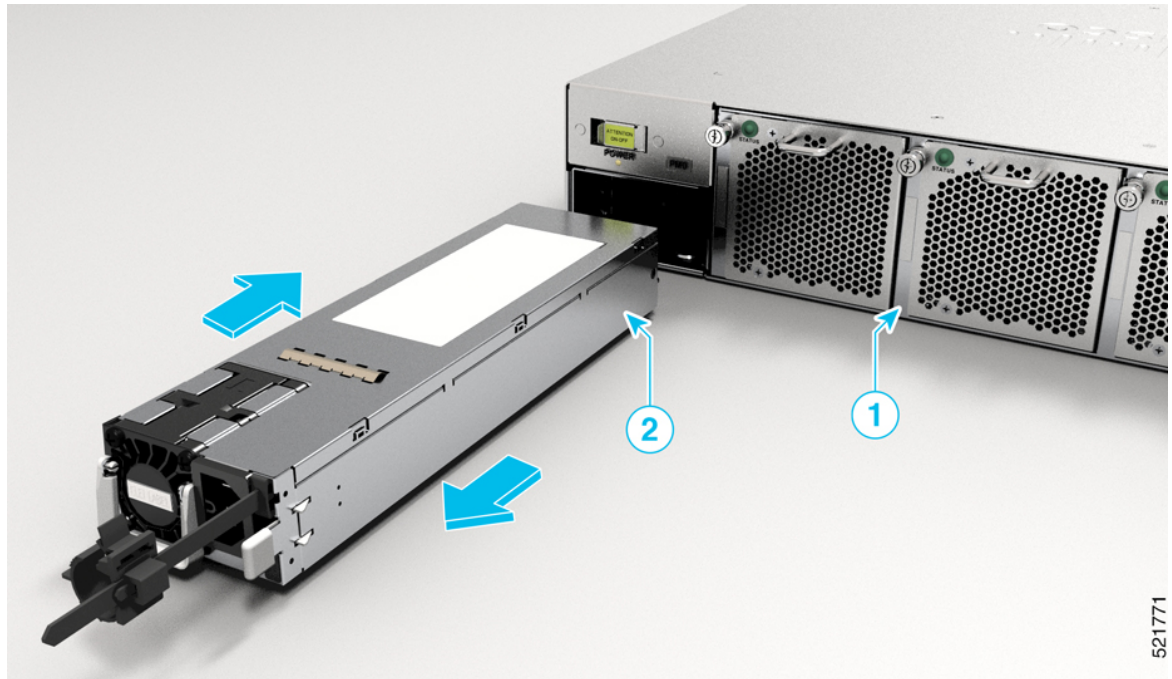


Figure 14: Removing or Installing an AC or DC Power Module (Cisco ASR 9903 AC power shown)

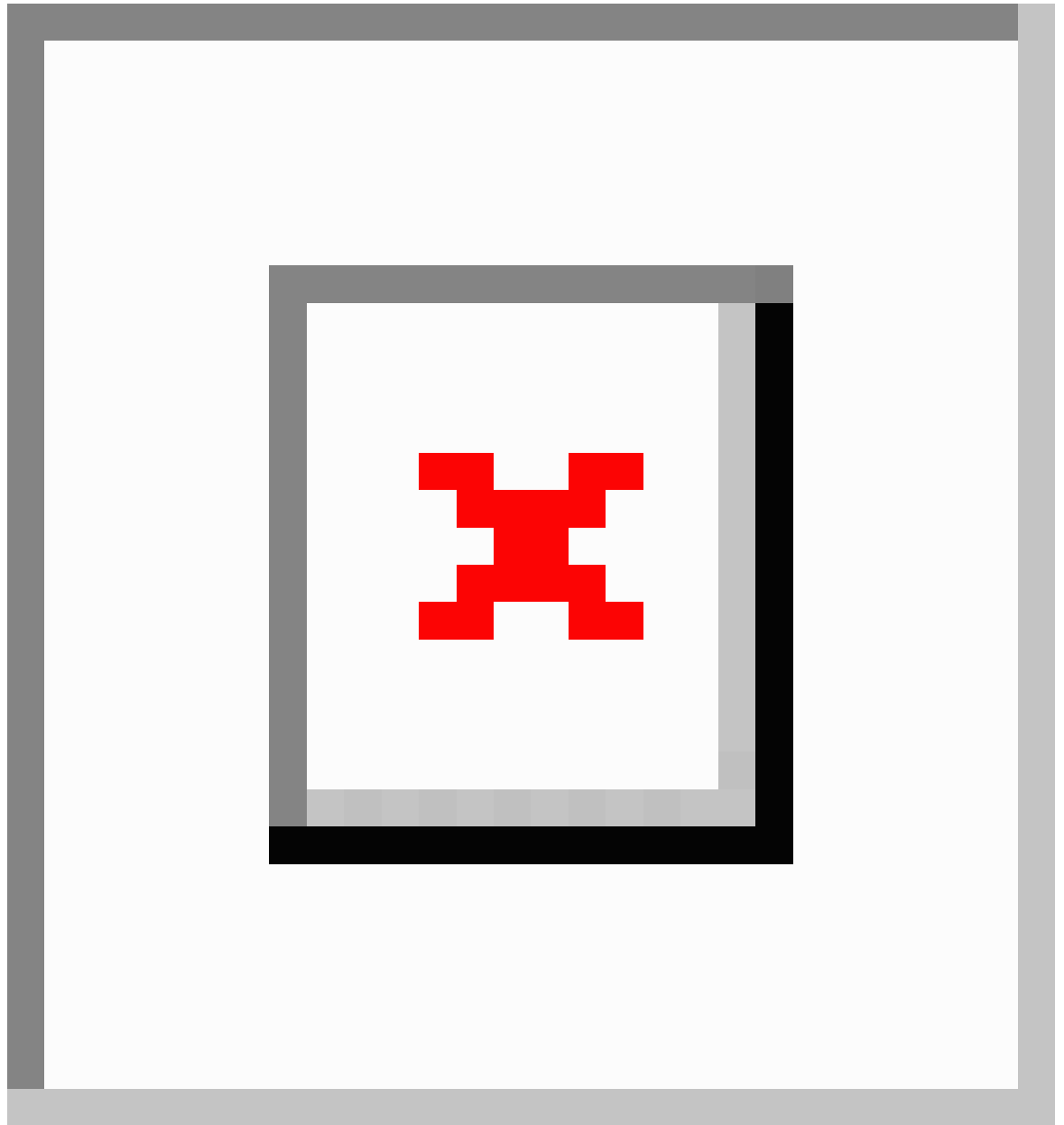


Figure 15: Removing or Installing an AC or DC Power Module (Cisco ASR 9901 AC power shown)

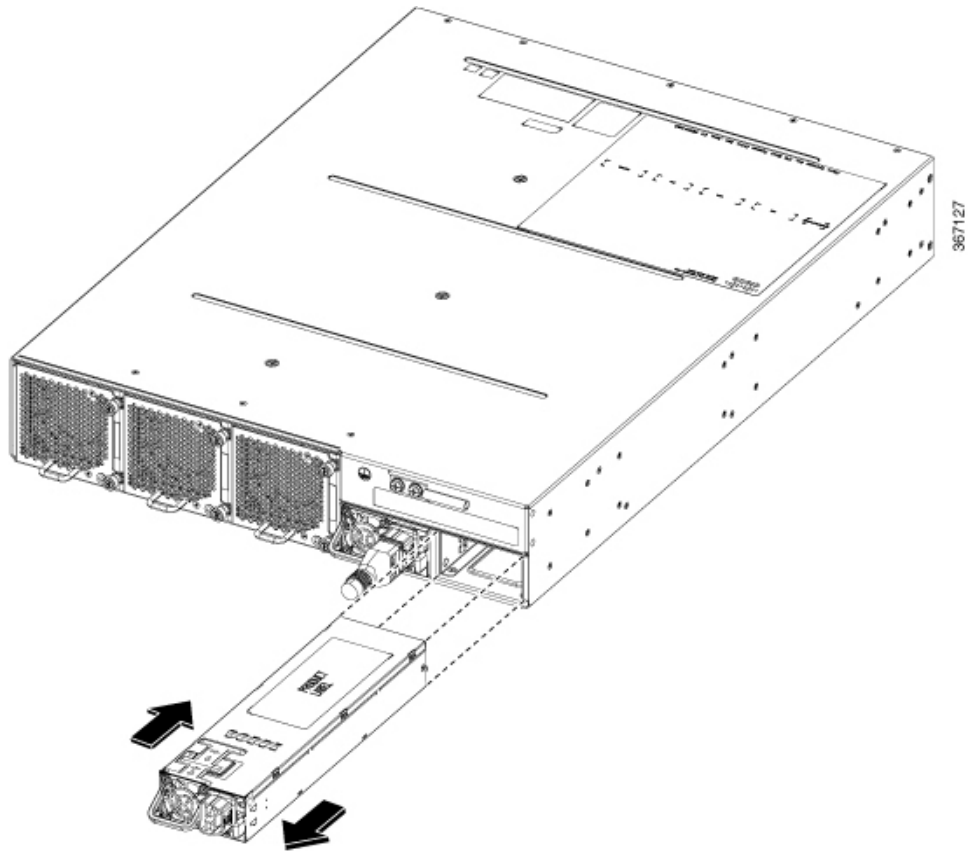
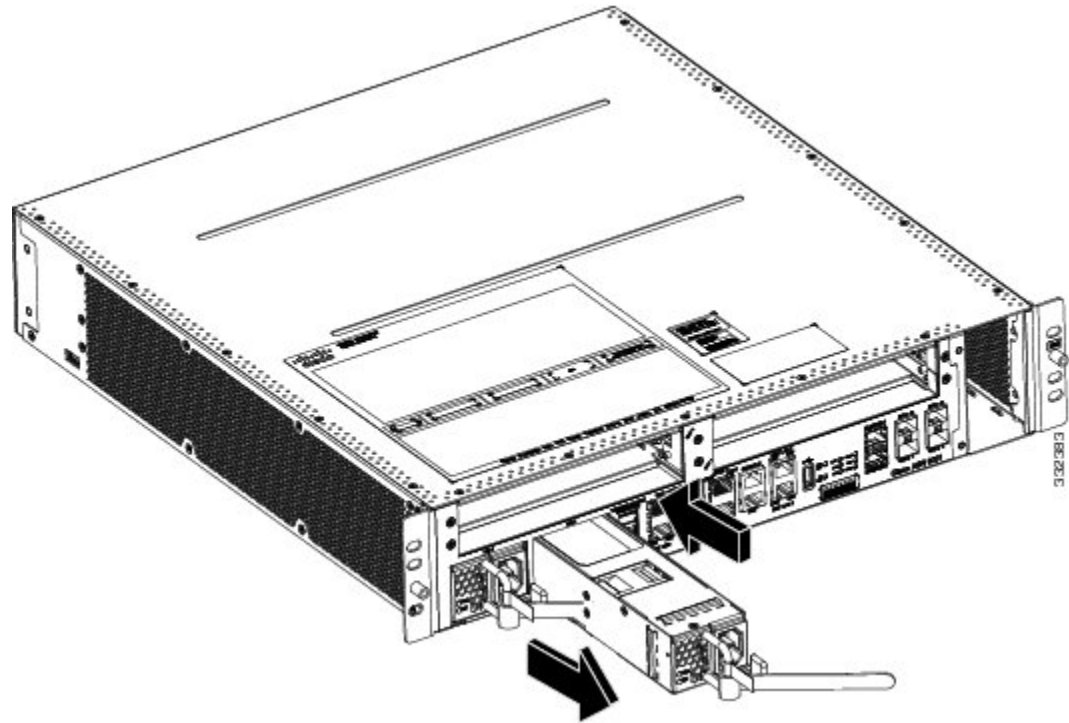


Figure 16: Removing or Installing an AC or DC Power Module (Cisco ASR 9001 AC power shown)



Installing an AC or DC Power Module

To install an AC or DC power module (see the above figure):

Procedure

- Step 1** Slide the power module into the open bay until it mates with its backplane connector. Make sure that keying lever locks with the chassis.
- Step 2** Attach the power cabling to the power module.
- Step 3** Verify that the OK (green) power indicator on the front of the power module comes ON. If the indicator does not light up, see [Troubleshooting the Power Subsystem](#) section.

Removing a Chassis from the Equipment Rack

Use this procedure to remove the chassis and its components from the equipment rack:



Caution You must use two people to remove the chassis from the equipment rack safely. An empty chassis can weigh up to approximately 24.69 pounds (11.2 kg).

Procedure

- Step 1** Power off the router (see [Powering Off the Router, on page 2](#)).
- Step 2** Power off the circuit breakers to the power supplies.
- Step 3** Disconnect the power from the power modules on the front of the chassis:
- Step 4** Disconnect RP cables connected to the console port, auxiliary port, or either of the management Ethernet ports.
- Be sure to label each of the RP cables before you disconnect the cables.
- Step 5** Disconnect the line card interface cables.
- Step 6** Disconnect the supplemental bonding and grounding connection from the chassis (see [Supplemental Bonding and Grounding Connections](#)).
- Step 7** Remove the chassis from the rack.
- Remove the screws that attach the chassis rack mount flanges and the side rack mount brackets to the rack posts.
 - Carefully lift the chassis out of the rack and set it aside.
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Installing a Replacement Chassis in the Equipment Rack

Use this procedure to install the replacement chassis and components in the equipment rack:

Procedure

- Step 1** Install the new chassis in the rack (see [Rack-Mounting the Chassis](#)).
- Step 2** Connect the supplemental bonding and grounding connection (if there is one) to the chassis (see [Supplemental Bonding and Grounding Connections](#)).
- Step 3** Connect all line card and interface cables (see [Connecting Route Processor Cables](#)).
- Step 4** Connect power to the power modules on the front of the chassis.
- Step 5** To turn on power to the router, see [Powering on the Router](#).
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Packing a Chassis for Shipment

Use the packaging that came with the replacement chassis to repack and ship the chassis being replaced.