



CHAPTER 3

Installing and Removing Air Circulation Components

This chapter provides instructions on how to install and replace the Cisco CRS Carrier Routing System 4-Slot Line Card Chassis air circulation components.

This chapter presents the following topics:

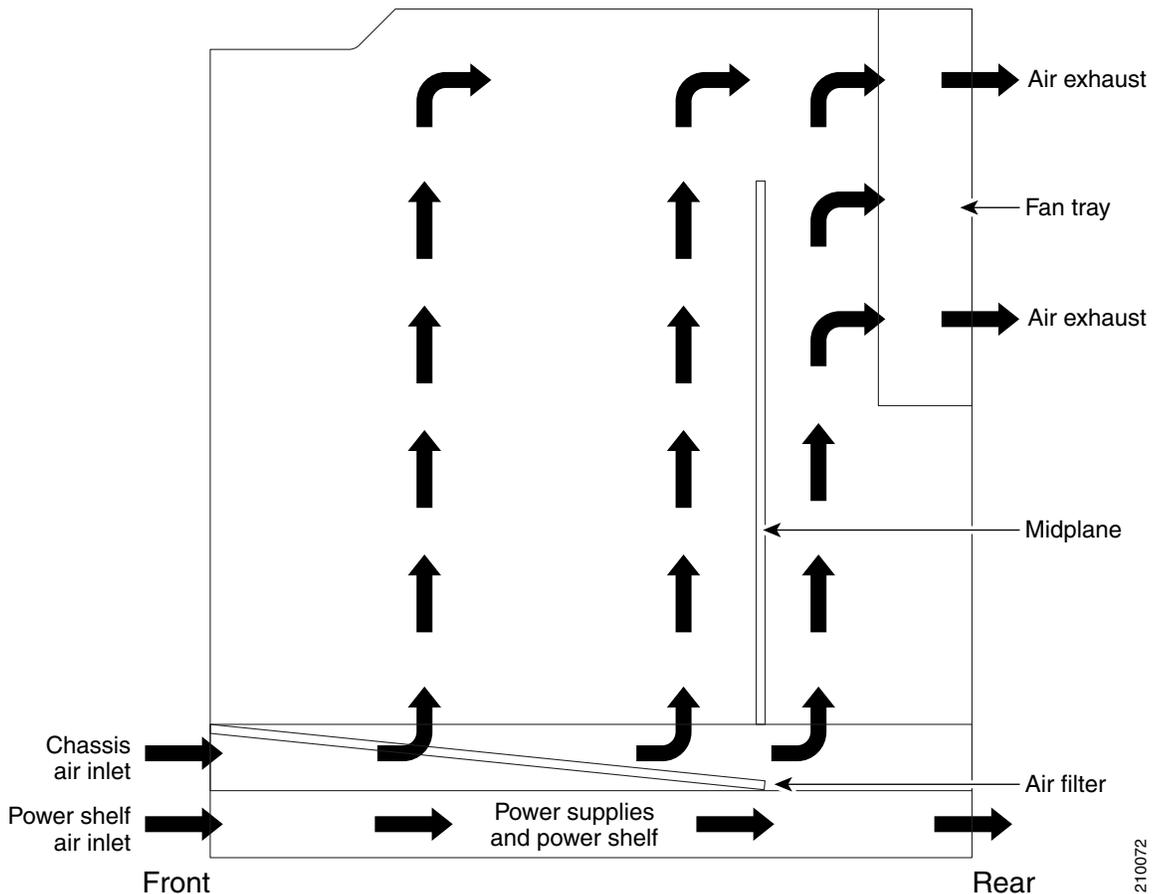
- [About Line Card Chassis Airflow, page 3-1](#)
- [How to Install or Remove Air Circulation Components, page 3-3](#)

About Line Card Chassis Airflow

The Cisco CRS 4-slot line card chassis has a single fan tray containing four fans that cool the chassis card cage. Cool air flows in at the bottom front of the chassis and flows through the chassis card cage and through the fans in the fan tray before being exhausted through the top rear of the chassis (see [Figure 3-1](#)).

In addition, each power module at the bottom of the chassis has self-contained fans that pull in cool air from the front of the chassis and exhaust warm air out the rear. There is parallel path for airflow through the fabric cards.

Figure 3-1 Airflow Through the Cisco CRS 4-Slot Line Card Chassis

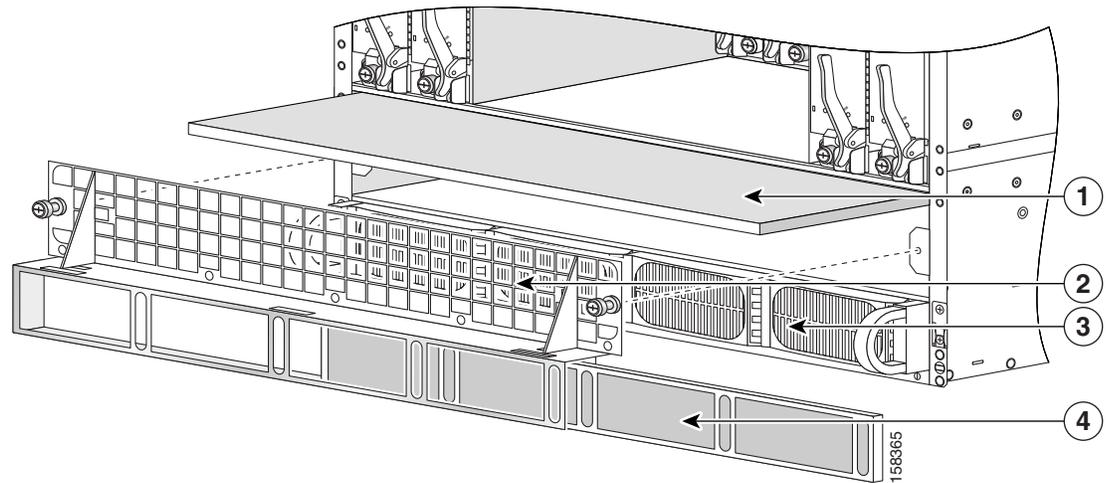


A replaceable air filter is located inside the chassis below the PLIM card cage at an angle. In addition, there is a removable air filter on the front of the power tray air intake grille on the front (PLIM) side of the chassis. (See [Figure 3-2](#).)

Air Filter Replacement Frequency Recommendation

How often the air filters should be replaced depends on the facility environment. In a dirty environment, or when you start getting frequent temperature alarms, you should always check the intake grilles for debris, and then check the air filters to see if they need to be replaced.

Figure 3-2 System Air Filters



1	Chassis air filter	3	Power tray and power supplies
2	Air intake grille	4	Power tray air filter

**Note**

We recommend that you check the air filters once a month. Replace a filter when you notice a significant amount of dust.

**Caution**

To remain NEBS compliant, the chassis air filter can be replaced only when the fan trays are not running.

The Cisco CRS 4-slot line card chassis airflow volumes are as follows:

- Chassis airflow: Up to 880 cubic feet (24,919 liters) per minute
- Power system airflow: Up to 60 cubic feet (1699 liters) per minute

How to Install or Remove Air Circulation Components

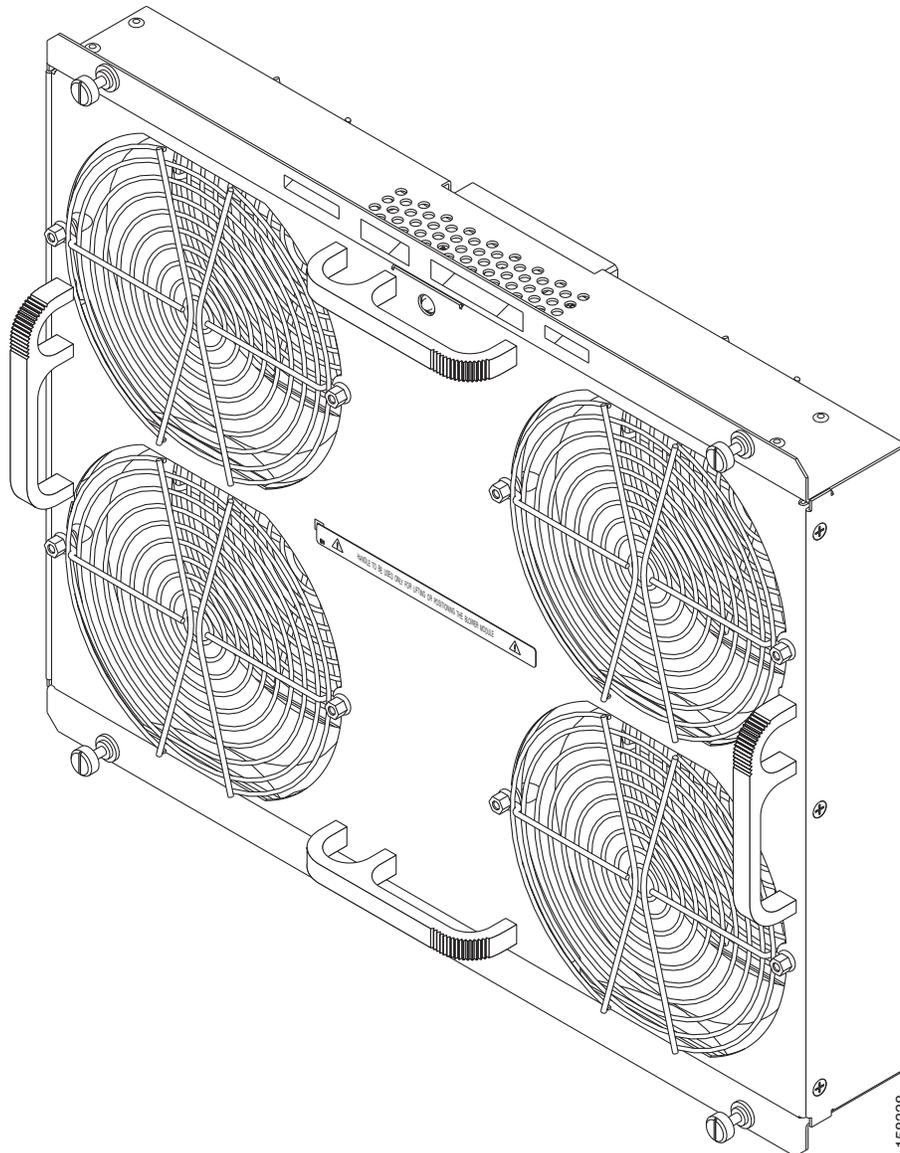
This section contains the following procedures:

- [Installing a Fan Tray, page 3-4](#)
- [Removing a Fan Tray, page 3-5](#)
- [Installing the Chassis Air Filter, page 3-7](#)
- [Removing the Chassis Air Filter, page 3-9](#)
- [Installing a Power Tray Air Filter, page 3-10](#)
- [Removing a Power Tray Air Filter, page 3-12](#)

Installing a Fan Tray

This section describes how to install a fan tray in the Cisco CRS 4-slot line card chassis. For information on the chassis airflow and circulation, see the [“About Line Card Chassis Airflow”](#) section on page 3-1. The fan tray installs into the rear (SFC) side of the chassis (see [Figure 3-3](#)). For complete information on regulatory compliance and safety, see *Cisco CRS Carrier Routing System Regulatory Compliance and Safety Information*.

Figure 3-3 Fan Tray



Prerequisites

No prerequisites exist for this task.

Required Tools and Equipment

You need the following tools and part to perform this task:

- ESD-preventive wrist strap
- Large flat-blade screwdriver
- Fan tray (Cisco product number CRS-4-FAN-TR=)

Steps

To install a fan tray, follow these steps:

Step 1 Attach the ESD-preventive wrist strap to your wrist and connect its leash to one of the ESD connection sockets on the rear (SFC) side of the chassis or a bare metal surface on the chassis.

Step 2 Holding the fan tray by the handles, position it in front of the fan tray bay on the upper rear (SFC) side of the chassis. Slide the tray partway into its slot.



Caution A fan tray weighs about 16 lb (7 kg.). Use two hands when handling a fan tray.



Caution Do not set the fan tray down on the connector; doing so could damage it.

Step 3 Slide the fan tray all the way in. Press it firmly into the chassis so that the connector on the back of the fan tray is seated firmly against the connector on the interior of the chassis.



Caution To prevent damage to the chassis connector, do not use excessive force when inserting a fan tray into its bay.

Step 4 Using the screwdriver, tighten the four captive screws (one for each corner).



Note All electrical and control line connections are made automatically when the connectors mate.

Removing a Fan Tray

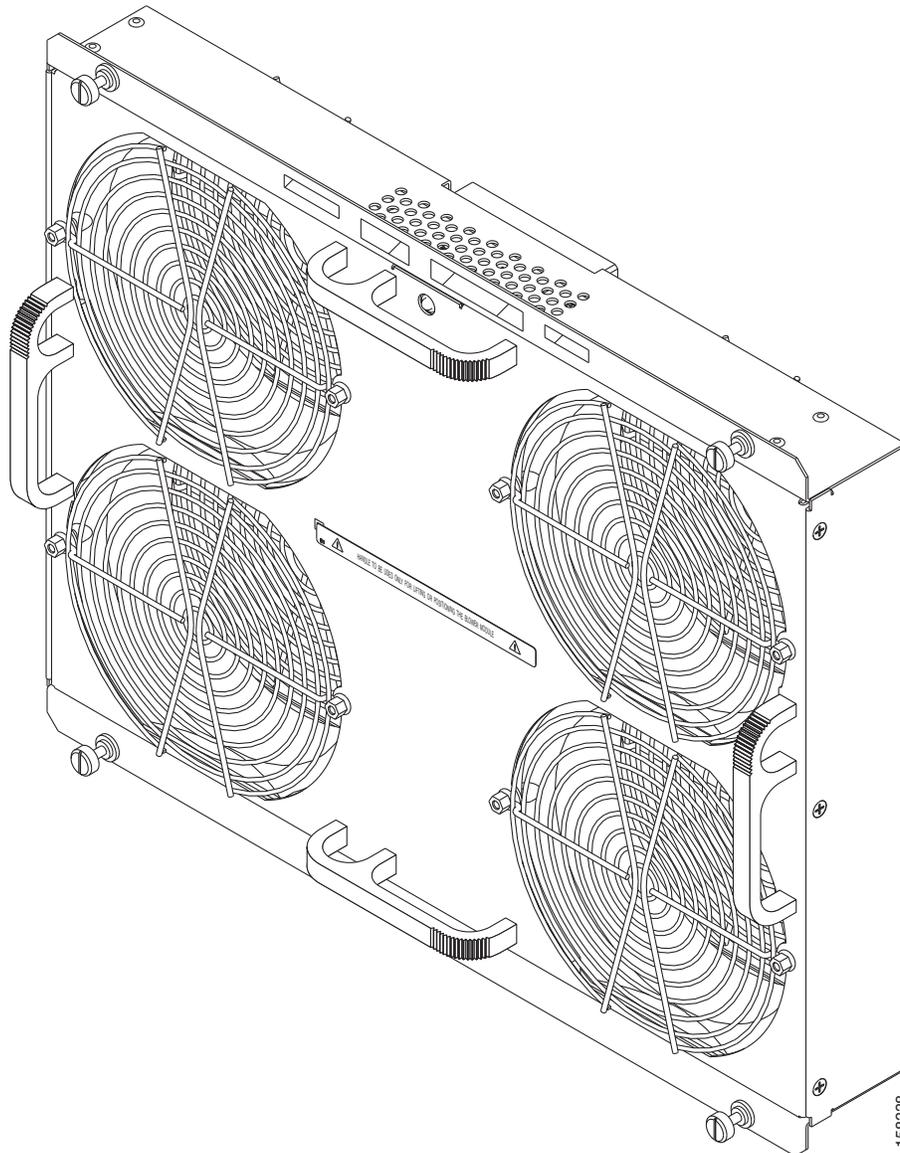
This section describes how to remove a fan tray from the Cisco CRS 4-slot line card chassis. For information on the chassis airflow and circulation, see the [“About Line Card Chassis Airflow” section on page 3-1](#).

The fan tray installs into the rear (SFC) side of the chassis (see [Figure 3-4](#)). For complete information on regulatory compliance and safety, see *Cisco CRS Carrier Routing System Regulatory Compliance and Safety Information*.

**Caution**

The chassis automatically powers down if the fan tray is unseated from its connector for more than one minute. If you plan on hot swapping the fan tray, have the replacement fan tray readily available and be sure to insert it and seat it against its connector within 45 seconds. Familiarize yourself with the procedure in the “Installing a Fan Tray” section on page 3-4 before attempting to hot swap the fan tray.

Figure 3-4 Fan Tray



Prerequisites

No prerequisites exist for this task.

Required Tools and Equipment

You need the following tools to perform this task:

- ESD-preventive wrist strap
- Large flat-blade screwdriver

Steps

To remove a fan tray, follow these steps:

Step 1 Attach the ESD-preventive wrist strap to your wrist and connect its leash to one of the ESD connection sockets on the rear (SFC) side of the chassis or a bare metal surface on the chassis.

Step 2 Using the large flat-blade screwdriver, loosen the four captive screws on the fan tray (one for each corner).



Caution A fan tray weighs about 16 lb (7 kg.). Use two hands when handling a fan tray.

Step 3 Grasp the fan tray by the handles and pull it gently straight out to disconnect the fan tray from the connector mounted on the back of the fan tray.

Step 4 Remove the fan tray completely from the fan tray bay. Set the fan tray safely aside.



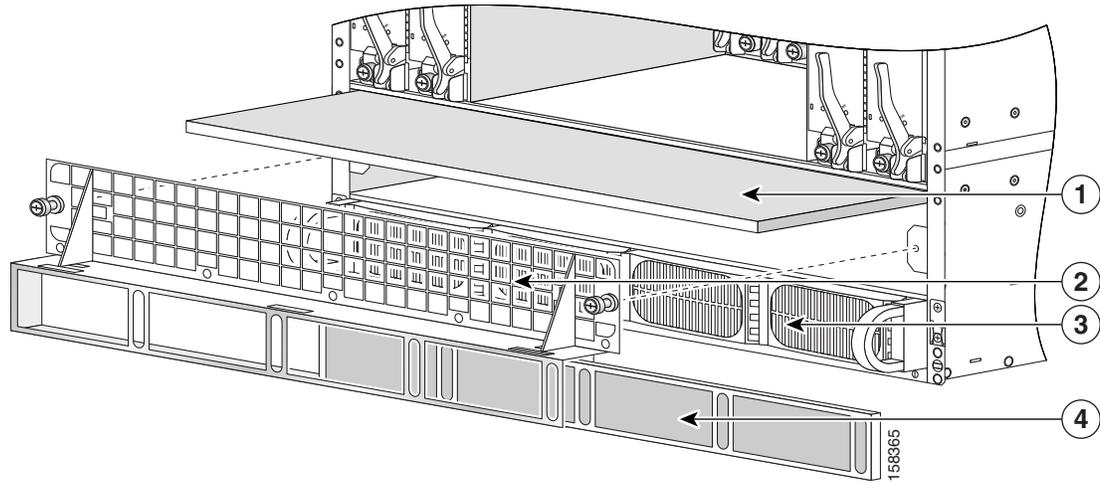
Caution Do not set the fan tray down on the connector; doing so could damage it.

Installing the Chassis Air Filter

This section describes how to install the air filter in the Cisco CRS 4-slot line card chassis. For further information, see the [“About Line Card Chassis Airflow” section on page 3-1](#). For complete information on regulatory compliance and safety, see *Cisco CRS Carrier Routing System Regulatory Compliance and Safety Information*.

The Cisco CRS 4-slot line card chassis has a serviceable air filter that plugs into the front (PLIM) side of the chassis (see item 1 in [Figure 3-5](#)) just inside the air intake slot. During operation, the air filter access is hidden by the lower chassis grille.

Figure 3-5 Chassis Air Filter



1	Chassis air filter	3	Power tray and power supplies
2	Air intake grille	4	Power tray air filter

Prerequisites

Before performing this task, you must first remove any chassis front cosmetic covers, the lower chassis air intake grille and power tray air filter cover (see the “[Installing a Power Tray Air Filter](#)” section on page 3-10).



Caution

Never operate the Cisco CRS 4-slot line card chassis without an air filter. Doing so can damage the hardware.

Required Tools and Equipment

You need the following part to perform this task:

- Chassis air filter (Cisco product number: CRS-4-FILTER=)
- Medium flat-blade screwdriver

Steps

To install the chassis air filter, follow these steps:

- Step 1** If an air filter is currently in the slot, remove it.
- Step 2** Slide the new air filter into the air filter slot until it is seated fully within the slot.

Step 3 Replace the lower chassis grille:

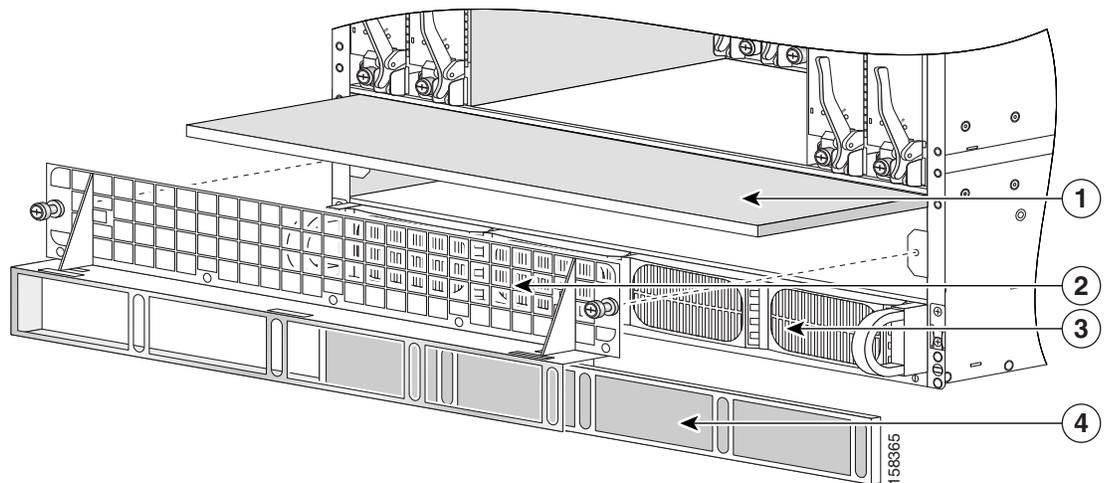
- a. Position the grille in front of the air intake slot on the lower front side of the chassis and press it gently into place. Make sure that you align the guide pins on the lower corners of the grille with the guide pin holes on the chassis.
- b. Use a medium flat-blade screwdriver to tighten the two captive screws (one for each side) that hold the grille to the front of the chassis.

Removing the Chassis Air Filter

This section describes how to remove the air filter in the Cisco CRS 4-slot line card chassis. For further information, see the [“About Line Card Chassis Airflow”](#) section on page 3-1. For complete information on regulatory compliance and safety, see *Cisco CRS Carrier Routing System Regulatory Compliance and Safety Information*.

The chassis has a serviceable air filter that plugs into the front (PLIM) side of the chassis (see item 1 in [Figure 3-6](#)) just inside the air intake slot. During operation, the air filter access is hidden by the lower chassis grille.

Figure 3-6 Chassis Air Filter



1	Chassis air filter	3	Power tray and power supplies
2	Air intake grille	4	Power tray air filter

**Caution**

To remain NEBS compliant, the chassis air filter can be replaced only when the fan tray is not running. The chassis powers down one minute after the fan tray is removed, so we recommend using two people to replace the chassis air filter at NEBS-compliant sites. Familiarize yourself with the steps in the [“Installing a Fan Tray”](#) section on page 3-4 and the [“Removing a Fan Tray”](#) section on page 3-5 prior to replacing the chassis air filter.

Prerequisites

Before performing this task, you must first remove the lower chassis grille and power tray air filter cover (see the [“Installing a Power Tray Air Filter”](#) section on page 3-10).

**Caution**

Never operate the line card chassis without an air filter. Doing so can damage the hardware.

Required Tools and Equipment

You need the following tools to perform this task:

- ESD-preventive wrist straps
- Large flat-blade screwdriver

Steps

To remove the chassis air filter, follow these steps:

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- Step 1** Attach the ESD-preventive wrist strap to your wrist and connect its leash to one of the ESD connection sockets on the front (PLIM) side of the chassis or a bare metal surface on the chassis.
 - Step 2** Unscrew the two captive screws that connect the air intake grille to the front (PLIM) side of the chassis.
 - Step 3** Set the air intake grille carefully aside.
 - Step 4** Grasp the air filter and carefully slide it from the slot. Set the air filter carefully aside.
 - Step 5** Install the replacement air filter (if necessary). See the [“Installing the Chassis Air Filter”](#) section on page 3-7.
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What to Do Next

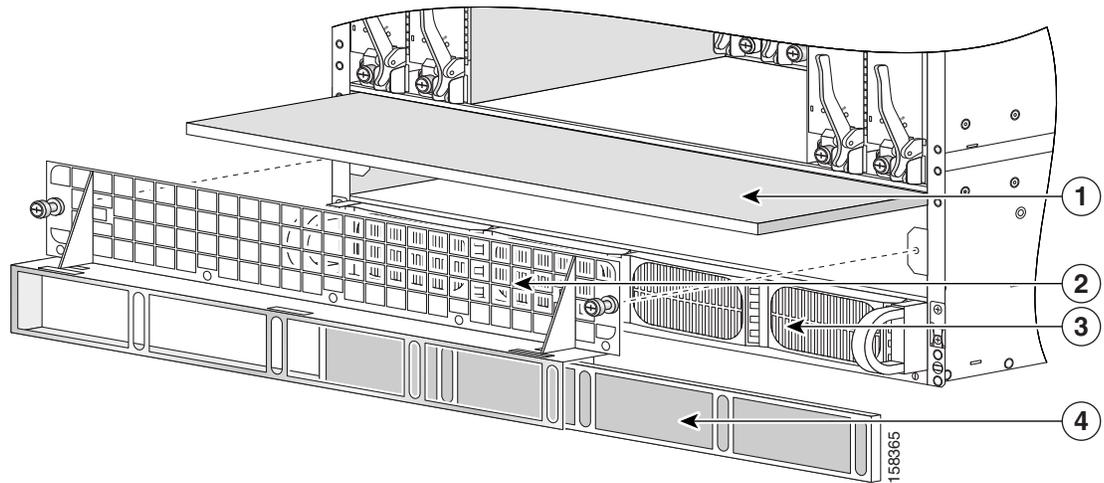
After performing this task, replace the lower chassis grille (see the [“Installing a Power Tray Air Filter”](#) section on page 3-10) and the front cover plates.

Installing a Power Tray Air Filter

This section describes how to install a power tray air filter for the Cisco CRS 4-slot line card chassis. For further information, see the [“About Line Card Chassis Airflow”](#) section on page 3-1. For complete information on regulatory compliance and safety, see *Cisco CRS Carrier Routing System Regulatory Compliance and Safety Information*.

The power tray has a serviceable air filter that is inserted into the lower chassis grille, just in front of the power tray (see item 4 in [Figure 3-7](#)).

Figure 3-7 Power Tray Air Filter



1	Chassis air filter	3	Power tray and power modules
2	Air intake grille	4	Power tray air filter

Prerequisites

No prerequisites exist for this task.



Caution

Never operate the line card chassis without an air filter. Doing so can damage the hardware.

Required Tools and Equipment

You need the following tools and part to perform this task:

- ESD-preventive wrist strap
- Medium flat-blade screwdriver
- Power tray air filter

Steps

To install a power tray air filter, follow these steps:

- Step 1** Attach the ESD-preventive wrist strap to your wrist and connect its leash to one of the ESD connection sockets on the front (PLIM) side of the chassis or a bare metal surface on the chassis.
- Step 2** Remove the lower chassis grille:
 - Use the medium flat-blade screwdriver to loosen the two captive screws (one for each side) that hold the grille to the front of the chassis.
 - Gently remove the grille from the chassis.
- Step 3** Slide the air filter into the air filter slot on the grille (see [Figure 3-7](#)).

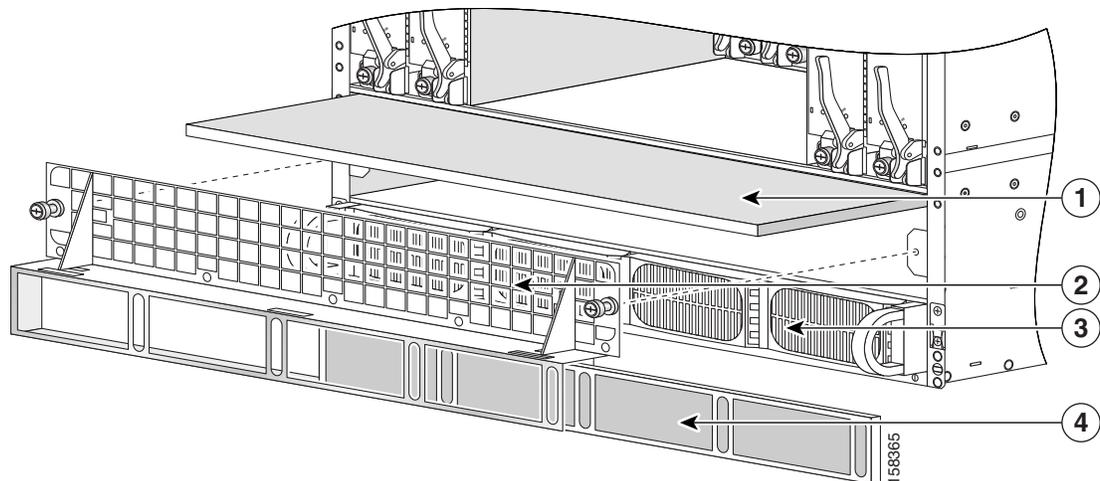
- Step 4** Reinstall the lower chassis grille:
- a. Position the grille in front of the air intake slot on the lower front side of the chassis and press it gently into place. Make sure that you align the guide pins on the lower corners of the grille with the guide pin holes on the chassis.
 - b. Use a medium flat-blade screwdriver to tighten the two captive screws (one for each side) that hold the grille to the front of the chassis.

Removing a Power Tray Air Filter

This section describes how to remove a power tray air filter. For further information, see the [“About Line Card Chassis Airflow”](#) section on page 3-1. For complete information on regulatory compliance and safety, see *Regulatory Compliance and Safety Information for the Cisco CRS Carrier Routing System*.

The power tray has a serviceable air filter that is inserted into the lower chassis grille, just in front of the power tray (see item 4 in [Figure 3-8](#)).

Figure 3-8 Power Tray Air Filter



1	Chassis air filter	3	Power tray and power modules
2	Air intake grille	4	Power tray air filter

Prerequisites

No prerequisites exist for this task.



Caution

Never operate the line card chassis without an air filter. Doing so can result in damage to the hardware.

Required Tools and Equipment

You need the following tools to perform this task:

- ESD-preventive wrist strap
- Medium flat-blade screwdriver

Steps

To remove a power tray air filter, follow these steps:

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- Step 1** Attach the ESD-preventive wrist strap to your wrist and connect its leash to one of the ESD connection sockets on the front (PLIM) side of the chassis or a bare metal surface on the chassis.
- Step 2** Remove the lower chassis grille (if necessary):
- a. Use a medium flat-blade screwdriver to tighten the two captive screws (one for each side) that hold the grille to the front of the chassis.
 - b. Gently remove the grille from the chassis.
- Step 3** Slide the air filter from the air filter slot on the grille (see [Figure 3-8](#)).
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What to Do Next

After performing this task, you may install a new air filter (see the [“Installing a Power Tray Air Filter”](#) section on page 3-10).

