Overview

This chapter provides an overview of the Cisco NCS 4000 Fabric Card Chassis.

About the Cisco NCS 4000 Fabric Card Chassis

The Cisco NCS 4000 Fabric Card Chassis is a highly scalable core routing platform designed for service providers to build next generation multi-service networks that provide video, data, and voice services. The fabric card chassis, also known as a switch fabric chassis, is referred to in this document as the Cisco NCS 4000 FCC.

The Cisco NCS 4000 FCC is part of the Cisco NCS 4000 Multi-Chassis system that also includes the Cisco NCS 4016 16-slot line card chassis (LCC). The system can expand from a single chassis to various multi-chassis configurations for increased routing capacity.

The Cisco NCS 4000 Multi-Chassis system scales by interconnecting LCCs to FCCs. These connections are made from the LCC switch fabric cards to the FCC fabric cards through CXP optical interconnects. The NCS 4000 has a three-stage switch fabric architecture. In a multi-chassis configuration, the first and third stages are implemented by the fabric cards (NCS4016-FC2-M) on the LCC, and the second stage is performed by the fabric cards (NCS4KF-FC2-C) on the FCC.

In the multi-chassis system, the system uptime displayed on the craft panel of each chassis in the multi-chassis system varies based on the when the chassis was booted or rebooted.

Fabric Card Chassis Components

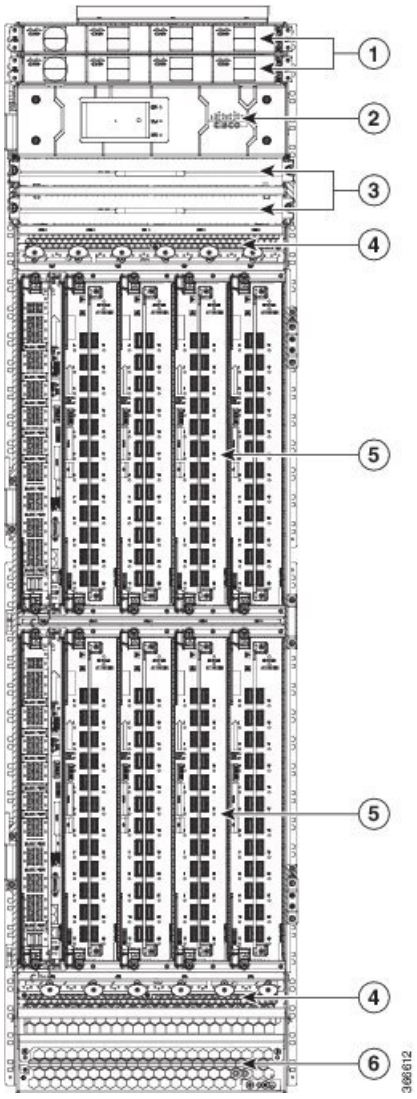
Table 1: Main Components of the Cisco NCS 4000 FCC

Component	Description
Chassis backplane	The chassis backplane distributes power and provides interconnections for other components in the system. The backplane supports the RPMC and fabric cards. The power trays, craft panel, fan trays, and temperature sensor are connected to the backplane through cabled connectors.
S2 Fabric Cards (FCs)	The FCC has eight FC slots: four slots on the upper cage and four slots on the lower cage.
CXP optical modules and connectors	The connections between the LCC and the FCC are implemented through a number of bi-directional optical links. Pluggable CXP2 form-factor optics are used for these interconnects. CXP2 optical modules are used on the NCS4KF-FC2-C and NCS4016-FC2-M cards to connect the two fabric cards together. The CXP2 module uses a 24-fiber MPO connector that supports 12 bi-directional optical links up to 100 meters of OM-4 multi-mode fiber cable.
RPMC Cards	There are two RPMC cards. The cards are inserted into two dedicated slots on the front of the FCC. One RPMC card installs into slot RPMC0 SC0/SW0 on the upper card cage and the other RPMC card installs into slot RPMC1 SC1/SW1 on the lower card cage. Both the upper and lower card slots are identical. The secondary card is installed for redundancy, so that the loss or removal of a single card does not bring down the FCC. At least one RPMC card must be operational for the FCC to function.
Power trays	There are two DC power trays. Each DC power tray has four power modules.
Fan trays	Two fan trays are inserted into the front of the FCC . Each fan tray contains six axial fans. The fans pull cooling air through the FCC from the front to the rear of the FCC. Both the fan trays must be present always for the proper functioning of the chassis.
Air filter	A removable air filter is located below the lower cable management bracket and inside the front air inlet on the front of the FCC .
Cable management brackets	The FCC has cable management features on the front side of the FCC. These brackets organize the interface cables entering and exiting the different cards, keeping them out of the way and free of sharp bends that may damage the cables. Two horizontal cable management assemblies are preinstalled on the FCC: one cable management assembly above the upper card cage and one cable management assembly below the lower card cage. The cable management bracket can be rotated to three different positions. To change the position of the cable management bracket, loosen the captive screw, align it to the required aperture, and then tighten the captive screw.
Temperature sensor assembly	A temperature sensor is used for monitoring the temperature of the air entering the chassis. This sensor is placed near the base of the chassis where the fresh air enters inside the chassis.

Component	Description
Craft panel display	A craft panel display, located on the front of the FCC and consists of an LCD touch-screen display and LEDs used to indicate system alarms. The craft panel has a basic interface used to monitor the operation of the FCC.

The following figure shows the front view of the Cisco NCS 4000 FCC.

Figure 1: Front View of the Cisco NCS 4000 FCC



1	Power trays	4	Cable management brackets
2	Craft panel display	5	Card cages
3	Two fan trays	6	Removable air filter

Slot Numbers

This section identifies the location and slot numbers for system components that plug into the Cisco NCS 4000 FCC.

The FCC has the following slots: Two RPMC card slots for redundancy and eight FC slots

- Upper card cage: (left to right: RPMC0 SC0/SW0, FC0, FC1, FC2, FC3)
- Lower card cage: (left to right: RPMC1 SC1/SW1, FC4, FC5, FC6, FC7)

Chassis Specifications

The following table lists the physical specifications of the Cisco NCS 4000 FCC.

Table 2: Cisco NCS 4000 FCC Specifications

Supported Cards and Modules	• Two RPMC cards • Eight fabric cards • Eight DC power modules • Two fan trays
Fabric Chassis Dimensions	
Height	70.7 in. (179.6 cm) as shipped
Width	17.54 in. (44.55 cm) Chassis side to side 19.5 in. (49.54 cm) with door assembled
Depth	17.77 in. (45.14 cm) with door
Aisle Spacing	To install chassis (front): 48 in. (122 cm) To service FRUs (front): 31.7 in. (80.5 cm) To service FRUs (rear): 14.0 in. (35.6 cm)
Weights	
Chassis as shipped	227.3 lb (103.1 kg)
Chassis, fully loaded with power trays, cards, and cosmetics	440.9 lb (200 kg)
Fabric Chassis Cooling	Two fan trays
Chassis airflow	Up to 1250 cubic feet per minute
DC power system airflow	240 cubic feet per minute

Safety Guidelines

Before performing any installation procedures, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment.

Note Review the safety warnings listed in Regulatory Compliance and Safety Information for the Cisco Network Convergence System 4000 Series Routers before installing, configuring, or troubleshooting any installed card.

Note Power off the PCM output switch and the power to the associated two power trays prior to removing a power tray.

The following guidelines are for your safety and to protect equipment. The guidelines do not include all hazards. Be alert.

- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Keep the work area clear and dust-free during and after installation. Do not allow dirt or debris to enter into any laser-based components.
- Keep tools and FCC components away from walk areas.
- Do not wear loose clothing, jewelry, and other items that could get caught in the FCC while working with the FCC and its components.
- Use Cisco equipment in accordance with its specifications and product-usage instructions.
- Do not work alone if potentially hazardous conditions exist.
- Make sure your installation follows national and local electrical codes:
  - In the United States, National Fire Protection Association (NFPA) 70, United States National Electrical Code; in Canada, Canadian Electrical Code, part I, CSA C22.1.
  - In other countries, International Electrotechnical Commission (IEC) 60364, part 1 through part 7.
- Connect only a DC power source that follows the safety extra-low voltage (SELV) requirements in UL/CSA/IEC/EN 60950-1 and AS/NZS 60590 to the DC input power system.
- Make sure that you have a readily accessible two-poled disconnect device incorporated in the fixed configuration wiring of a DC input power system.
- Make sure that you provide short-circuit (overcurrent) protection as part of the building installation.

Preventing Electrostatic Discharge

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. We recommend use of an ESD-preventive wrist strap whenever you handle network equipment or one of its components.

To prevent ESD damage:

- Always use an ESD-preventive wrist or ankle strap, and ensure that it makes good skin contact. Connect the equipment end of the connection cord to an ESD jack or a bare metal surface on the FCC (ensure that the FCC is grounded).
- Handle a card by its ejector levers, when applicable, or its metal carrier only; avoid touching the board or connector pins.
- Place a removed card board side up on an antistatic surface or in a static-shielding bag. If you plan to return the component to the factory, immediately place it in a static-shielding bag.
- Avoid contact between a card and clothing. The wrist strap protects the board from only ESD voltage on the body; ESD voltage on clothing can still cause damage.
- Be careful not to lay any tools on the aluminum honeycomb panel, or insert your fingers into the panel.

The following figure shows the locations of the ESD jacks on the FCC.

Figure 2: ESD Jacks on the NCS 4000 FCC