Overview

This chapter provides an overview of the Cisco NCS 6000 Series Routers and a summary of the installation process.

Note The installation of a Cisco NCS 6000 Series Router may require space, floor loading, power, and cooling modifications to a facility. Therefore, you should plan the site well in advance of the scheduled delivery of the chassis system.

Overview of the Cisco NCS 6000 Series Routers

The Cisco NCS 6000 Series Router 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 Cisco NCS 6000 Series Routers include the Cisco NCS 6008 Line Card Chassis (LCC) and the Cisco NCS 6000 Fabric Card Chassis (FCC).

- The Cisco NCS 6008 LCC is a single-chassis system that provides eight Tbps of full-duplex network bandwidth through eight line cards. Each card delivers up to 1 Tbps throughput using a mix of 10-Gbps, 40-Gbps, or 100-Gbps interfaces per card. The Cisco NCS 6008 LCC also provides modular optics options to meet a wide range of distance requirements. In a multi-chassis configuration, the LCC can be expanded to support up to 128 Tbps of full-duplex forwarding throughput.
- The Cisco NCS 6000 FCC is a switch fabric chassis. The switch fabric is implemented though switch fabric cards installed in the chassis. The Cisco NCS 6000 FCC is part of the Cisco NCS 6000 Multi-Chassis system that also includes the Cisco NCS 6008 LCC. The system can expand from a single chassis to various multi-chassis configurations for increased routing capacity and is capable of supporting up to 16 LCCs interconnected to 4 FCCs. For information on the fabric system and multi-chassis cabling

configurations, see the Cisco Network Convergence System 6000 Fabric Card Chassis Hardware Installation Guide .

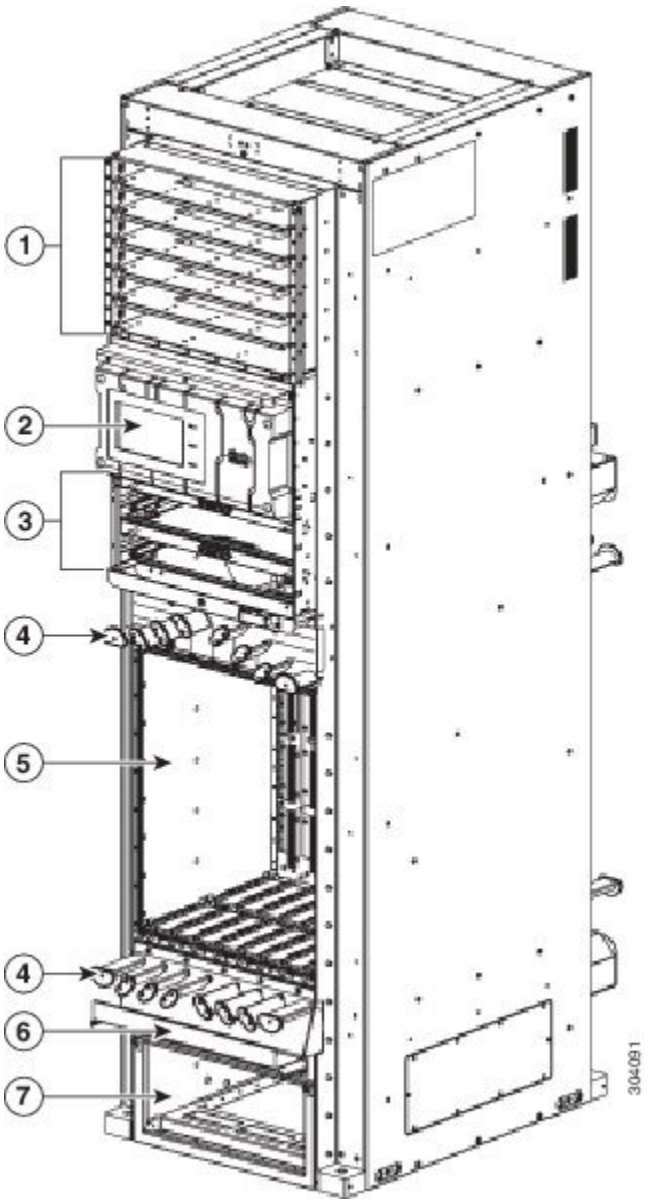
The LCC and FCC each have an integrated rack. An external rack is not required. The chassis is bolted to the facility floor. Each chassis has its own power and cooling systems. Power systems are available using either AC or DC power. Main Components of the Cisco NCS 6008 LCC, on page 8 lists the main components of the LCC. Main Components of the Cisco NCS 6000 FCC, on page 9 lists the main components of the FCC.

Front and Rear Views of the Cisco NCS 6000 Series Chassis

Cisco NCS 6008 LCC Front View, on page 3 and Cisco NCS 6008 LCC Rear View, on page 4 show the front and rear views of the Cisco NCS 6008 LCC. Cisco NCS 6000 FCC Front View, on page 5 and Cisco NCS 6000 FCC Rear View, on page 7 show the front and rear views of the Cisco NCS 6000 FCC.

Cisco NCS 6008 LCC Front View

Figure 1: Front View of the Cisco NCS 6008 LCC

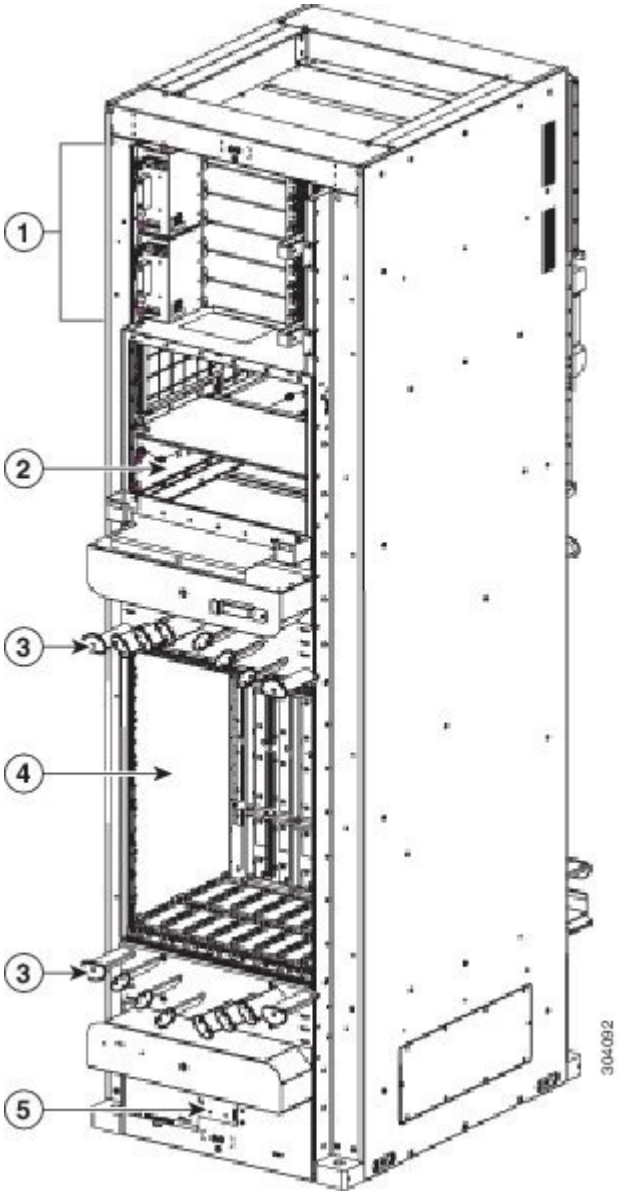


1	Six power trays	5	One card cage with eight LC slots
2	Craft panel display	6	Air filter access
3	Two fan trays	7	Air inlet plenum

4	Cable management brackets		

Cisco NCS 6008 LCC Rear View

Figure 2: Rear View of the Cisco NCS 6008 LCC

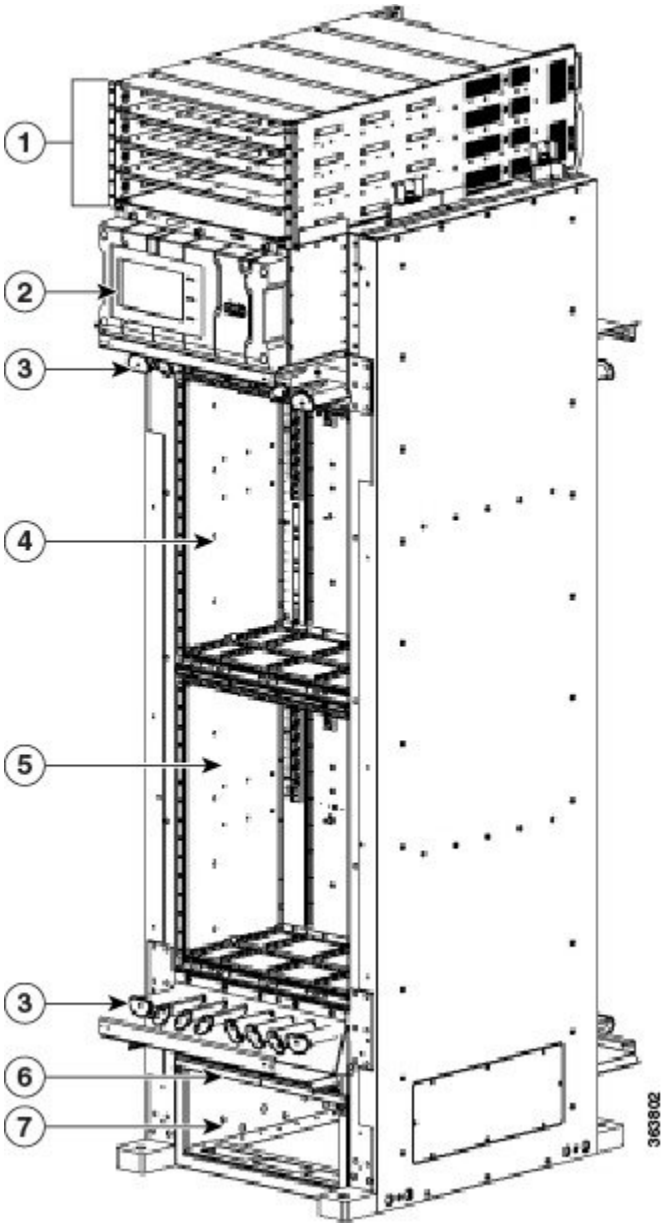


1	Power input feeds (AC or DC)	4	One card cage with slots for FCs and RP cards
2	Air exhaust plenum	5	Temperature sensor

3	Cable management bracket		

Cisco NCS 6000 FCC Front View

Figure 3: Front View of the Cisco NCS 6000 FCC

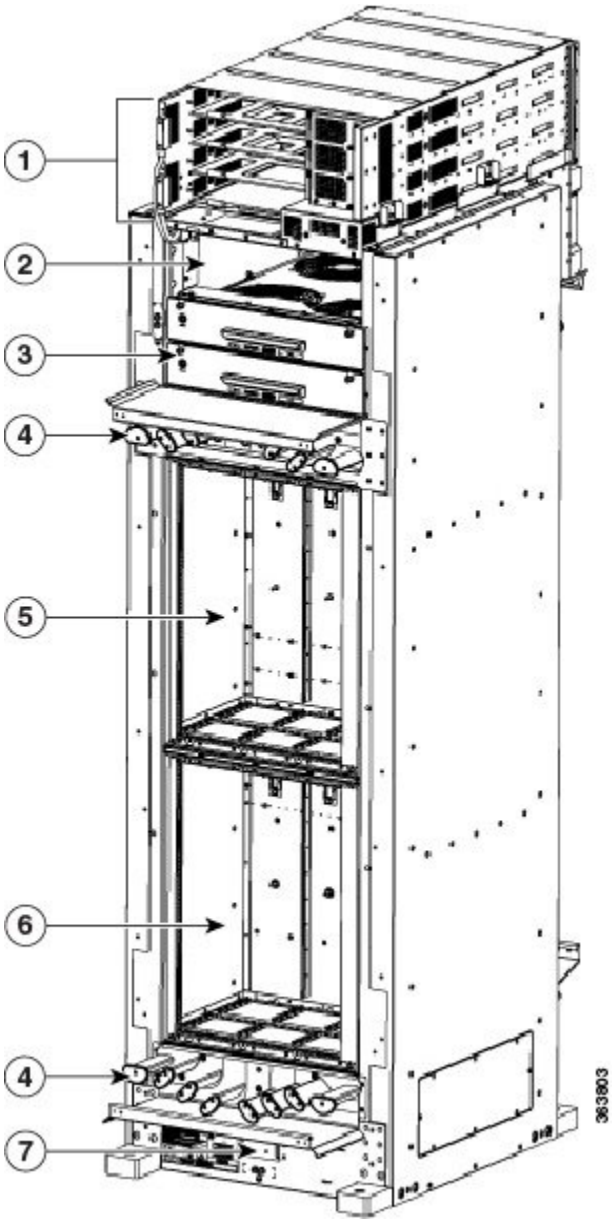


1	Power enclosure	5	Lower card cage

2	Craft panel display	6	Removable air filter
3	Two cable management brackets	7	Air inlet plenum
4	Upper card cage		

Cisco NCS 6000 FCC Rear View

Figure 4: Rear View of the Cisco NCS 6000 FCC



1	Power enclosure	5	Upper card cage
2	Air exhaust plenum	6	Lower card cage
3	Two fan trays	7	Temperature sensor

4	Cable management brackets		

Chassis Components

Main Components of the Cisco NCS 6008 LCC

This table lists the main components of the Cisco NCS 6008 LCC.

Table 1: Main Components of the Cisco NCS 6008 LCC

Component	Description
Chassis midplane	The chassis midplace distributes power and provides management, control, and data interconnections for other components in the system. Each LC is connected through the midplane to the FCs. The midplane is not field replaceable by the user.
Route Processor (RPs) Card	Two RP cards (RP0/RP1) are inserted into the rear of the LCC (Cisco NCS 6008 LCC Rear View, on page 4). These cards provide the intelligence of the system by functioning as the system controller and providing route processing and chassis management. The RP cards also monitor system alarms and control the system fans. The LEDs on the front panel indicate active alarm conditions.
Fabric Cards (FCs)	Six FCs are inserted into the rear of the LCC (Cisco NCS 6008 LCC Rear View, on page 4). The FCs provide the switch fabric for the routing system and performs the cross-connect function of the routing system, connecting every LC to each other. The switch fabric receives ingress user data from one LC slot and performs the switching necessary to route the data to the appropriate egress LC slot.
Line Cards (LCs)	As many as eight LCs can be inserted into the front of the LCC (Cisco NCS 6008 LCC Front View, on page 3). These cards provide the physical interfaces and optical connections for the user data.
Fan Trays	Two redundant fan trays are inserted into the front of the LCC (Cisco NCS 6008 LCC Front View, on page 3). Each fan tray contains six axial fans. The fans pull cooling air through the chassis from the front to rear.
Air Filter	A removable air filter is located at the bottom of the LCC, below the card cage, and inside the front air intake (Cisco NCS 6008 LCC Front View, on page 3).
Power Trays	Six power trays provide redundant power to the LCC (Cisco NCS 6008 LCC Front View, on page 3).Both AC and DC power trays are available. Each AC power tray has three slots for AC PMs. Each DC power tray has four slots for DC PMs. Mixing AC and DC power supplies is not supported. The power trays are field-replaceable (after power down). The PMs are hot-swappable.

Component	Description
Cable management brackets	The LCC has cable management features on the front and rear sides of the chassis. 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. Four horizontal cable management brackets are preinstalled on the LCC (two on the front side and two on the rear side of the LCC (Cisco NCS 6008 LCC Front View, on page 3 and Cisco NCS 6008 LCC Rear View, on page 4).
Cable troughs	Four vertical cable troughs for cable management (two on the front-side and two on the rear-side of the LCC) Cisco NCS 6008 LCC Front View, on page 3 and Cisco NCS 6008 LCC Rear View, on page 4.
Temperature sensor assembly	A temperature sensor is located on the lower rear side of the LCC (Cisco NCS 6008 LCC Rear View, on page 4).
Craft panel display	A craft panel display, located on the front of the LCC (Cisco NCS 6008 LCC Front View, on page 3), 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 LCC.

Main Components of the Cisco NCS 6000 FCC

This table lists the main components of the Cisco NCS 6000 FCC.

Table 2: Main Components of the Cisco NCS 6000 FCC

Component	Description
Chassis midplane	The chassis midplane distributes power and provides interconnections for other components in the system. Each S2 FC is connected through the midplane to the FCC. The midplane is not a field-replaceable unit (FRU).
S2 Fabric Cards (FCs)	The FCC has 12 FC slots: Six FC slots on the front side of the FCC (3 slots on the upper cage and three slots on the lower cage), and six FC slots on the rear side of the FCC (three slots on the upper cage and three slots on the lower cage). FCC Slot Numbers–Front and Rear Side, on page 13.
CXP optical modules and connectors	The connections between the LCC and the FCC are implemented through a number of bi-directional optical links. Pluggable CXP form-factor optics are used for these interconnects. CXP optical modules are used on the S2 FC and S13 FC to connect the two cards together. The CXP module uses a 24-fiber MPO connector that supports 12 bi-directional optical links up to 100 meters of OM-4 multi-mode fiber.

Component	Description
Shelf Controller Cards	The Cisco NCS 6000 FCC offers two types of shelf controller cards: the SC card and the SC-SW card. • The SC-SW card is a 56-port combination card that integrates a shelf controller and switch for the NCS 6000 Control Ethernet into one physical card. The shelf controller (SC) portion controls the route processing and management functions for the FCC and its components. The switch (SW) portion interconnects all the route processors (RPs) and SCs in a multi-chassis system. The LEDs on the SC-SW indicate active alarm conditions. • The SC card is a shelf-controller-only card. The FCC ships with two shelf controller cards, either two SC-SW cards or a combination SC-SW card and SC card pre-installed in the FCC. The cards are inserted into two dedicated slots on the front of the FCC. One SC-SW or SC card installs into slot SC0 on the upper card cage and the other SC-SW or SC card installs into slot SC1 on the lower card cage (FCC Slot Numbers–Front and Rear Side, on page 13). 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 SC-SW or SC card must be operational for the FCC to function. **Note** In a multi-chassis system with more than one FCC, we recommend that the SC-SW cards are not installed in the same FCC.
Power enclosure	The power enclosure is a separate unit that is installed at the top of the FCC (Cisco NCS 6000 FCC Front View, on page 5).The enclosure has four slots for AC or DC power trays, and two power control modules (PCMs). Each set of power trays has a power control module (PCM) with its own I/O power switch. • Each AC power tray has three slots for PMs. Each DC power tray has four slots for PMs. • Mixing AC and DC power supplies is not supported. The AC and DC power trays are (after power down). The PMs are hot-swappable.
Fan trays	Two redundant fan trays are inserted into the rear of the FCC (Cisco NCS 6000 FCC Rear View, on page 7). Each fan tray contains four axial fans. The fans pull cooling air through the chassis from the front to the rear.
Air filter	A removable air filter is located below the lower cable management bracket and inside the front air intake on the front of the FCC (Cisco NCS 6000 FCC Front View, on page 5).
Cable management brackets	The FCC has cable management features on the front and rear sides 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. Four horizontal cable management brackets are preinstalled on the FCC (two on the front side and two on the rear side of the FCC (Cisco NCS 6000 FCC Front View, on page 5 and Cisco NCS 6000 FCC Rear View, on page 7). Each side of the FCC has one cable management bracket above the upper card cage and one cable management bracket below the lower card cage.
Cable troughs	Four vertical cable troughs are supplied for cable management, two on the front side of the FCC and two on the rear side of the FCC (Cisco NCS 6000 FCC Front View, on page 5 and Cisco NCS 6000 FCC Rear View, on page 7).

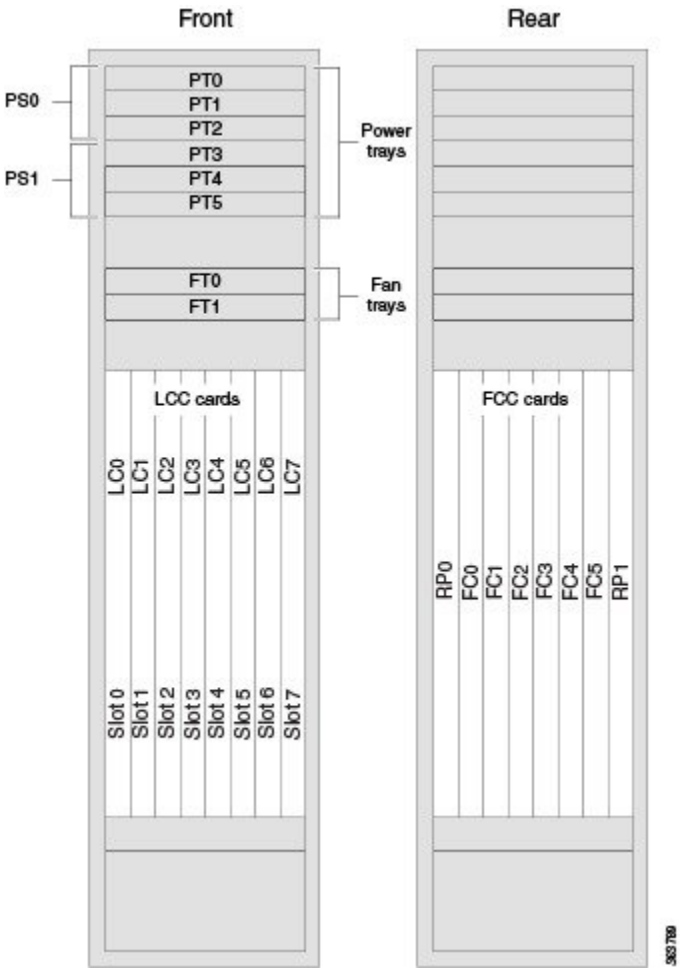
Component	Description
Temperature sensor assembly	A temperature sensor is located on the lower rear side of the FCC (Cisco NCS 6000 FCC Rear View, on page 7).
Craft panel display	A craft panel display, located on the front of the FCC (Cisco NCS 6000 FCC Front View, on page 5), consists of an LCD touch-screen display and LEDs used to indicate system alarms. The craft panel has a basic interface used to monitor the operation of the FCC.

Chassis Slot Numbers

LCC Slot Numbers--Front and Rear Side

This figure shows the slot numbers on the front (LC) side and rear (RP and FC) side of the LCC.

Figure 5: Cisco NCS 6008 LCC Slot Numbers—Front and Rear Side



Front of the LCC

The front (LC) side of the LCC has the following card slots:

- Eight LC slots (left to right: 0, 1, 2, 3, 4, 5, 6, 7).
- Two fan trays for redundancy. The fan trays are accessed from the front side of the chassis.
- Six power trays for redundancy.

The upper two power trays (0–2) are contained within power shelf 0 (PS0), and the lower two power trays (3–5) are contained within power shelf 1 (PS1).

Rear of the LCC

The rear side of the LCC has the following card slots:

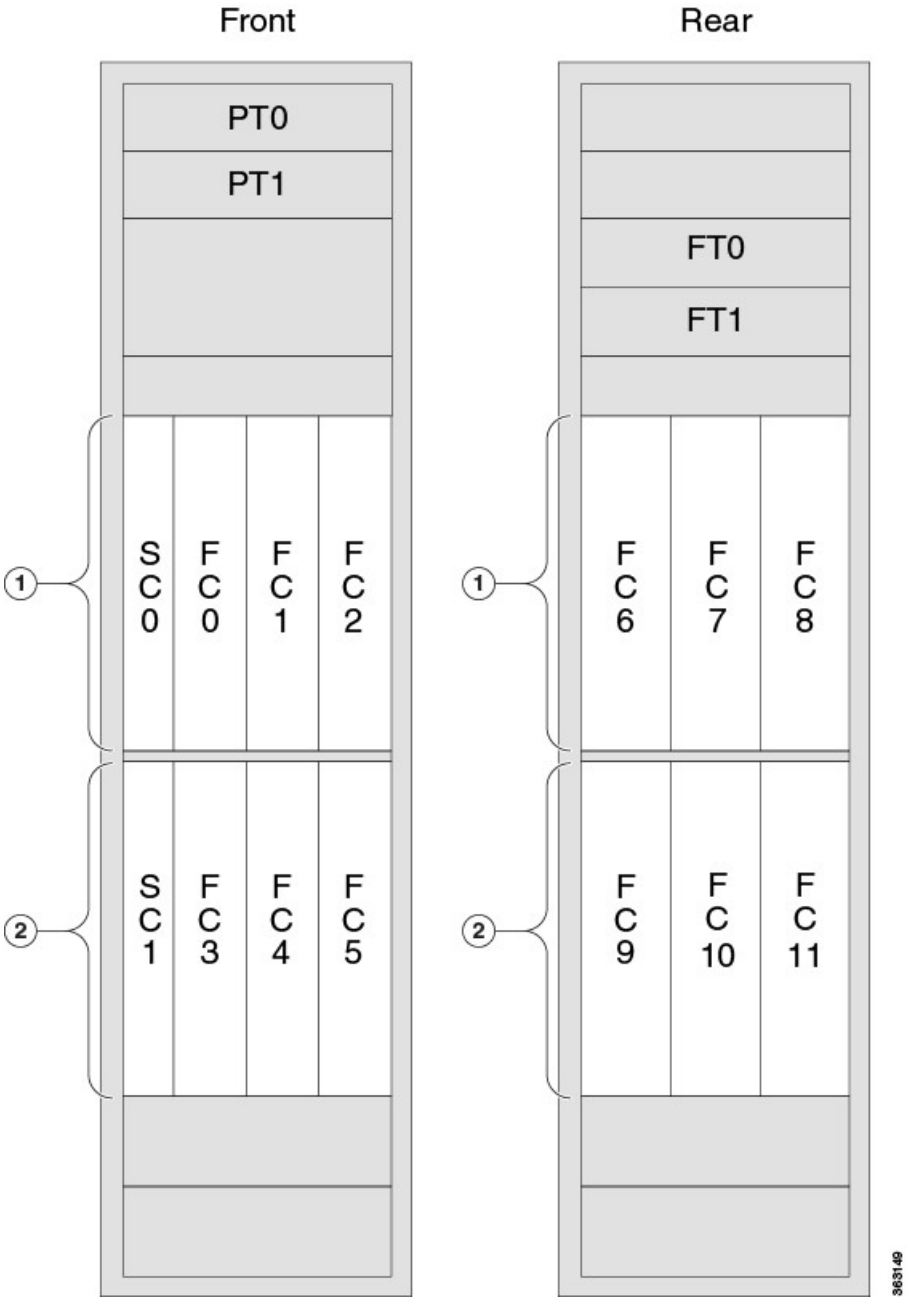
- Two RP card slots (RP0 on the far left of the chassis and RP1 on the far right)
- Six FC slots (left to right: 0, 1, 2, 3, 4, 5)

The FC slots can be populated with FCs for a standalone or a multi-chassis configuration. See the *Components Product IDs* section for fabric card product information.

FCC Slot Numbers–Front and Rear Side

This figure shows the slot numbers on the front and rear side of the FCC.

Figure 6: Cisco NCS 6000 FCC Slot Numbers —Front and Rear Sides



Front of the FCC

- Four power trays for redundancy. The upper two power trays (0–1) are contained within power shelf 0 (PS0) and the lower two power trays (2–3) are contained within power shelf 1 (PS1).
- Two SC slots for redundancy (for SC and SC-SW cards) and six FC slots.
  - Upper card cage: (left to right: SC0, FC0, FC1, FC2)
  - Lower card cage: (left to right: SC1, FC3, FC4, FC5)

Rear of the FCC

- Two fan trays for redundancy.
  - Upper fan tray: FT0
  - Lower fan tray: FT1
- Six FC slots
  - Upper card cage: (left to right: FC6, FC7, FC8)
  - Lower card cage: (left to right: FC9, FC10, FC11)

Overview of Site Planning Steps

This table lists the sequence of tasks to perform as you plan the installation of the routing system. Use the table as a checklist for all aspects of the installation. For information about a particular task, see the appropriate section of this site planning guide. After completing the checklist, consult your Cisco installation coordinator for a site-readiness inspection.

Table 3: Site Planning Checklist

Site Planning Steps	See	Check
1. Consider equipment arrival, storage, and transport to the installation site.	"Basic Site and Installation Planning" section	
2. Consider the space where the routing system will be installed.	"Aisle Spacing and Maintenance Access Floor Plan" section	
3. Plan for power (AC or DC).	*Power and Cooling* chapter. "LCC Power Specifications" section or "FCC Power Specifications" section	
4. Consider cooling and airflow requirements.	"Chassis Cooling System" section "Facility Cooling Requirements" section "LCC Chassis Specifications" section or "FCC Chassis Specifications" section	

Site Planning Steps	See	Check
5. Consider cable management.	"Cable Management" section	
6. Consider Cisco installation services.	"Cisco Installation Services" section	