



## CHAPTER 2

# Introduction to the Cisco SCE 8000 10 GBE Platform

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## Introduction

This chapter provides an introduction to the Cisco SCE 8000 10 GBE platform, the Service Control hardware component.

- [Information About the Cisco SCE 8000 10 GBE Platform, page 2-2](#)
- [Service Control Module \(Cisco SCE 8000-SCM-E\), page 2-4](#)
- [Introduction to SIPs and SPAs, page 2-6](#)
- [The Cisco SCE 8000-SIP LED, page 2-9](#)
- [The 1-Port 10 GBE SPA Interface Module, page 2-10](#)
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# Information About the Cisco SCE 8000 10 GBE Platform

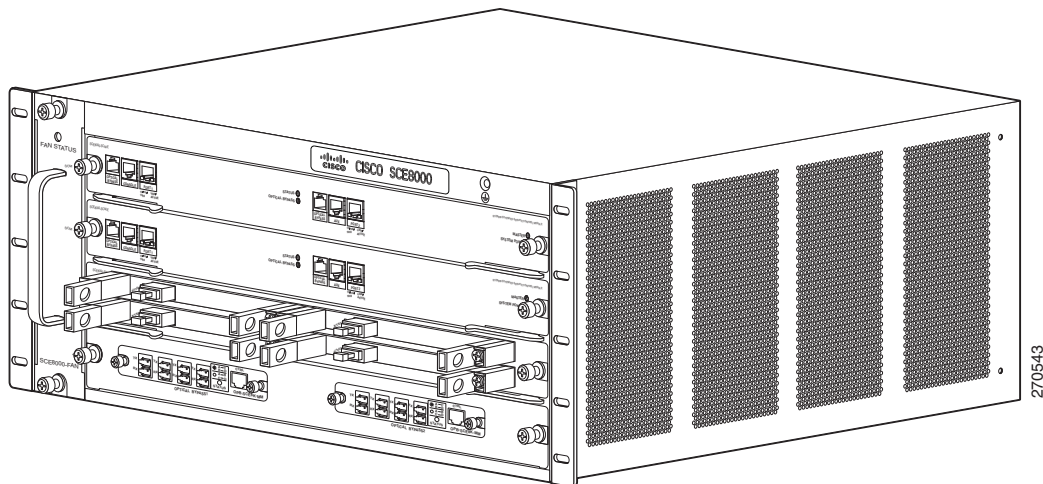
The Service Control Engine (SCE) platform, which is the hardware component of the Cisco Service Control solution, is designed to support observation, analysis, and control of Internet/IP traffic. [Table 2-1](#) summarizes model information for the Cisco SCE 8000 platform.

**Table 2-1 SCE Platform Model Information**

Model number	Cisco SCE 8000 10 GBE
Link type	10 Gigabit Ethernet
Number of ports	2 or 4
Number of links	1 or 2

The *Cisco SCE 8000 10 GBE* is a transparent element with 10 GBE links service throughput (See [Figure 2-1](#)). It can be installed inline in the network where the entire traffic passes through it or in receive-only mode where it receives replication of the traffic through SPAN ports or optical splitters.

**Figure 2-1 Cisco SCE 8000 Platform**



The Cisco SCE 8000 supports the following network insertion models:

- Single appliance (inline)
- Single appliance (receive-only)
- Cascade configuration
- MGSCP configuration

The Cisco SCE 8000 platform is a 4-slot chassis hosting the following modules:

- One or two Service Control Modules (Cisco SCE 8000-SCM-E) that each contain special purpose fast path chipset, traffic processors and control processor.
- One SPA Interface Processor card (Cisco SCE 8000-SIP) that holds up to four SPA 10 GBE interface modules.
- One optional optical bypass module hosting panel that holds up to two optical bypass modules.

In addition, the Cisco SCE 8000 chassis contains two power supply modules in a 1+1 configuration, as well as a fan tray module.

## Service Control Module (Cisco SCE 8000-SCM-E)

The Cisco SCE 8000 GBE contains one or two Cisco SCE 8000-SCMs located in slots 1 and 2 (the top two slots). If only one Cisco SCE 8000-SCM module is installed, it must be installed in slot 1.

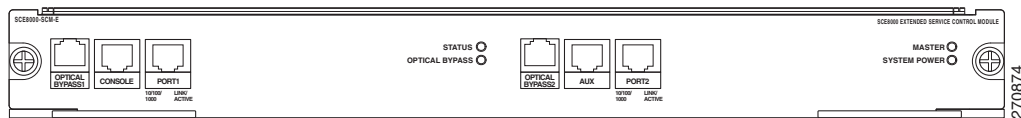
The Cisco SCE 8000-SCM in slot 1 performs the following functions:

- Service engine (Deep Packet Inspection (DPI)) and traffic processing
- Management interfaces and functionality
- Chassis control and management

The Cisco SCE 8000-SCM in slot 2 serves only DPI and traffic processing purposes, doubling the performance and capacity of the Cisco SCE 8000. Although the two modules are identical (with the same ports and LEDs), this second SCM module does not run chassis management or control software.

The Service Control module contains ports and LEDs as shown in [Figure 2-2](#), and described in [Table 2-2](#) and [Table 2-3](#).

**Figure 2-2 Cisco SCE 8000-SCM-E**



### Note

Although the Cisco SCE 8000-SCM module in slot 2 contains all the ports listed in [Table 2-2](#), these ports are not used. All connections should be made to the Cisco SCE 8000-SCM module in slot 1.

**Table 2-2 Cisco SCE 8000-SCM-E Ports**

Port	Quantity	Description	Connect This Port To...
10/100/1000	2 (Port1 and Port2)	10/100/1000 Ethernet RJ-45 ports for management of the Cisco SCE 8000.  CLI designation: interface GigabitEthernet 1/1, 1/2  OR interface MNG 01, 0/2	A LAN using a GBE cable with an RJ-45 connector.  If both interfaces are used to provide a redundant management interface, connect both ports to the LAN via a switch.
Console	1	RS-232 RJ-45 port used by technicians.	A local terminal (console) using an RS-232 cable with an RJ-45 connector, as provided in the Cisco SCE 8000 kit.
AUX	1	RS-232 RJ-45 port used by technicians.	—
Bypass	2	RJ-11 port.	The control connector on the optical bypass module.

**Table 2-3 Cisco SCE 8000-SCM-E LEDs**

LEDs	Description
Power	<ul style="list-style-type: none"> <li>Green—Installed power supplies are functioning normally.</li> <li>Amber—Only one power supply is functioning normally.</li> <li>Unlit—No power from either power supply.</li> </ul>
Status	<p>The Status LED indicates the operational status of the Cisco SCE 8000 10 GBE system, as follows:</p> <ul style="list-style-type: none"> <li>Unlit—No power from either power unit.</li> <li>Amber—The system is booting up.</li> <li>Flashing amber—The system is operational, but is in a warning state.</li> <li>Green—The system is fully operational.</li> <li>Red—There is a problem or failure</li> </ul> <p><b>Note</b> Alarms are hierarchical: Failure takes precedence over Warning, which takes precedence over Operational.</p>
Optical bypass	<ul style="list-style-type: none"> <li>Green—Optic bypass modules are present, but not operating.</li> <li>Amber—Optic bypass modules are present and operating.</li> <li>Unlit—Optic bypass modules are not present or there is no power.</li> </ul> <p>On a slave Cisco SCE 8000-SMC-E module (in slot 2), this LED is always off.</p> <p><b>Note</b> This functionality is consistent even when the Cisco SCE 8000 10 GBE is turned off.</p>
Master	<p>Master Service Control module indicator.</p> <ul style="list-style-type: none"> <li>Steady green—Master Service Control module (in slot 1)</li> <li>Unlit—Slave Service Control module (in slot 2)</li> </ul>
Port1 and Port2 (Management interfaces)	<p>The Port1 and Port2 LEDs indicate the operational status of the Cisco SCE 8000 out-of-band LAN-based management port, as follows:</p> <ul style="list-style-type: none"> <li>Link/Active <ul style="list-style-type: none"> <li>Steady green—Port link is up</li> <li>Flashing green—Activity on the port link</li> <li>Unlit—Port link is down</li> </ul> </li> <li>Speed <ul style="list-style-type: none"> <li>Unlit—Port is set to 10 Mbps</li> <li>Steady green—Port is set to 100 Mbps</li> <li>Steady amber—Port is set to 1000 Mbps</li> </ul> </li> </ul> <p>On a slave Cisco SCE 8000-SMC-E module (in the second slot), this LED is always off.</p>

# Introduction to SIPs and SPAs

SIPs and SPAs are a new carrier card and port adapter architecture used to increase modularity, flexibility, and density for network connectivity. This section describes the SIPs and SPAs and provides some guidelines for their use.

- [SPA Interface Processors, page 2-6](#)
- [Specifying the SIP Subslot Location for a SPA, page 2-6](#)
- [Shared Port Adapters, page 2-7](#)
- [Modular Optics, page 2-8](#)
- [XFP Connections, page 2-9](#)

## SPA Interface Processors

The SIP module supported by the Cisco SCE 8000 chassis is the Cisco SCE 8000-SIP.

The following list describes some of the general characteristics of a SIP:

- SIP is a carrier card that inserts into a slot in the chassis like a line card. It provides no network connectivity on its own.
- SIP contains one or more subslots (bays), which are used to house one or more SPAs. The SPA provides interface ports for network connectivity.
- During normal operation the SIP should reside in the Cisco SCE 8000 chassis fully populated either with functional SPAs in all subslots, or with a blank filler plate (SPA-BLANK=) inserted in all empty subslots.

## Specifying the SIP Subslot Location for a SPA

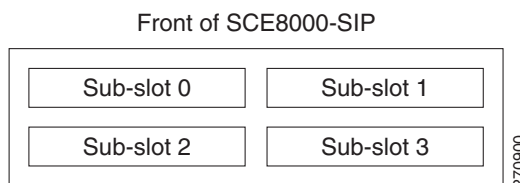
Cisco SCE 8000-SIP subslots begin their numbering with “0” and have a horizontal orientation.

[Figure 2-3](#) shows the subslot numbering for the Cisco SCE 8000-SIP.

The Cisco SCE 8000-SIP supports four subslots for the installation of SPAs, as follows:

- SIP subslot 0—Top-left subslot
- SIP subslot 1—Top-right subslot
- SIP subslot 2—Bottom-left subslot
- SIP subslot 3—Bottom-right subslot

**Figure 2-3** SPA Module Subslot Location



## Shared Port Adapters

The SPA supported by the Cisco SCE 8000-SIP is the 1-Port 10-Gigabit Ethernet SPA, SPA-1X10GE-L-V2

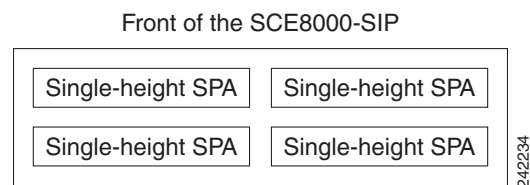
The following list describes some of the general characteristics of a SPA:

- A SPA is a modular type of port adapter that inserts into a subslot of a compatible SIP carrier card to provide network connectivity and increased interface port density. The Cisco SCE 8000-SIP can hold up to four SPAs.

If the interfaces are connected in subscriber/network pairs, either two or four SPAs must be installed.

- The supported SPA is a single-height SPAs, which inserts into one SIP subslot. (See [Figure 2-4](#).)

**Figure 2-4**      **Single-Height SPA Size**



- Each SPA provides a one 10 GBE port, which is the interface to either subscriber or network traffic. These interfaces can be individually configured using the Cisco command-line interface (CLI).
  - Either a blank filler plate or a functional SPA should reside in every subslot of an SIP during normal operation to maintain cooling integrity. Blank filler plates are available in single-height form only.
- If the interfaces are connected in subscriber/network pairs, the Cisco SCE 8000-SIP must be either fully populated or have both the bottom bays covered with blank filler plates.

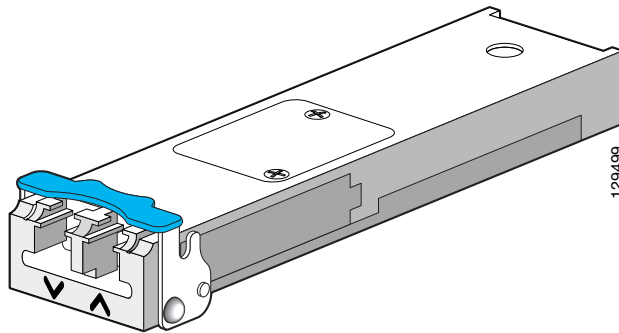
## Modular Optics

The SPAs implement 10 GBE small form-factor pluggable (XFP) optical transceivers to provide network connectivity (See [Figure 2-5](#)). An XFP module is a transceiver device that mounts into the front panel to provide network connectivity.


**Note**

It is highly recommended to use only the XFP modules listed as supported in this document. Use of unsupported or unqualified XFP modules may affect reliability or operation.

**Figure 2-5** 10 GBE Small Form-factor Pluggable (XFP0)



The interface connector on the 1-Port 10-Gigabit Ethernet SPA is a fiber optic receiver that supports one XFP.

The types of optics modules that have been qualified for use with the 1-Port 10-Gigabit Ethernet SPA on the Cisco SCE 8000 platform are as follows:

- XFP-10GLR-OC192SR
- XFP-10GER-OC192IR
- XFP-10GZR-OC192LR
- XFP-10G-MM-SR



## XFP Connections

The qualified XFPs include an optical transmitter and receiver pair integrated with Clock and Data Recovery (CDR) integrated circuits. The XFPs provide high-speed serial links at 10.3125 Gbps on single mode fibers. [Table 2-4](#) lists the XFP port cabling specifications.

The transmit side recovers and retimes the 10 Gbps serial data and passes it to a laser driver. The laser driver biases and modulates a laser, enabling data transmission over fiber through an LC connector. The receive side recovers and retimes the 10 Gbps optical data stream from a photo detector trans impedance amplifier and passes it to an output driver.

See the label on the XFP for technology type and model.

XFP dimensions are:

- Height 12.5 mm
- Width 18.35 mm
- Length 71.1mm

The XFP operating temperature range is from 0°C to 70°C (32°F to 158°F).

**Table 2-4** XFP Port Cabling Specifications

XFP	Wavelength	Fiber Type
XFP-10GLR-OC192SR	1310 nm	SMF
XFP-10GER-OC192IR	1550 nm	SMF
XFP-10GZR-OC192LR	1550 nm	SMF
XFP-10G-MM-SR	850 nm	MMF

## The Cisco SCE 8000-SIP LED

[Table 2-5](#) list the status and description of the Cisco SCE 8000-SIP LED.

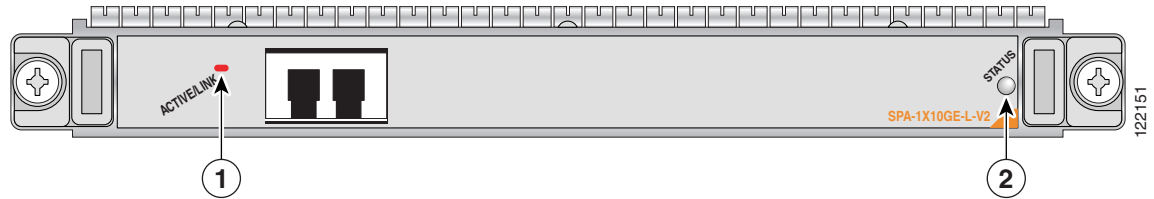
**Table 2-5** Cisco SCE 8000-SIP LED

LEDs	Description
Status	<ul style="list-style-type: none"> <li>• Green—Operational</li> <li>• Flashing Amber—Electrical bypass in operation</li> <li>• Red—Not initialized or failed</li> <li>• Unlit—No power</li> </ul>

## The 1-Port 10 GBE SPA Interface Module

The Cisco SCE 8000-SIP is installed in slot 3 of the Cisco SCE 8000 chassis. It hosts up to four single-width, single-height 1-Port 10 GBE SPA interface modules, but in the Cisco SCE 8000, it must be configured with either two 1-Port 10 GBE SPAs (in the top two subslots) or four 1-Port 10 GBE SPAs, to provide interfaces for either one or two complete traffic links. [Figure 2-6](#) provides an illustration of the SPA module, [Table 2-6](#) lists the SPA module ports, and [Table 2-7](#) lists the SPA module LEDs.

**Figure 2-6** 1-Port 10 GBE SPA Interface Module



**Table 2-6** SPA Ports

Port	Quantity	Description	Connect This Port To...
10 GBE Line port	1 on each SPA	Any one of the following: <ul style="list-style-type: none"> <li>• XFP-10GLR-OC192SR (10km)</li> <li>• XFP-10GER-OC192IR (40km)</li> <li>• XFP-10GZR-OC192LR (80km)</li> <li>• XFP-10G-MM-SR (300m)</li> </ul> CLI designation: interface TenGigabitEthernet 3/0/0, 3/1/0/, 3/2/0, 3/3/0.	Any one of the following: <ul style="list-style-type: none"> <li>• Subscriber side network component</li> <li>• Network side network component</li> <li>• Optical bypass 10 GBE line port</li> <li>• 10 GBE line port of a cascaded Cisco SCE 8000 platform</li> <li>• EtherChannel port of a Cisco 7600 Series router (MGSCP topology)</li> </ul> See <a href="#">Connecting the Line Ports to the Network, page 6-2</a> for further information.

**Table 2-7 SPA LEDs**

<b>LEDs</b>	<b>Description</b>
Active/Link (1)	<ul style="list-style-type: none"><li>• Green—Port is enabled by software and the link is up.</li><li>• Amber—Port is enabled by software and the link is down.</li><li>• Unlit—Port is not enabled by software.</li></ul>
Status (2)	<p>The Status LED indicates the operational status of the SPA module, as follows:</p> <ul style="list-style-type: none"><li>• Green—SPA is ready and operational.</li><li>• Amber—SPA power is on and good, and SPA is being configured.</li><li>• Off—SPA power is off.</li></ul>

# The Cisco SCE 8000 Optical Bypass

This section describes the following:

- [Optical Bypass Functionality, page 2-12](#)
- [Optical Bypass Module \(OPB-SCE8K\), page 2-13](#)

The Cisco SCE 8000 platform optical bypass module preserves the service provider 10 GBE links under all circumstances. At power failure, the bypass is automatically activated. It can also be activated by the Cisco SCE 8000 software.

The Cisco SCE 8000-SIP module already includes an internal electrical bypass, but it is strongly recommended to use the optical bypass module for addressing the following scenarios:

- During platform reboot (Software reload)—If the external bypass module is not used, there is a 11-second period during which the link is forced down (cutoff functionality). If any routing or spanning tree protocols are used in the network, this delay may be extended.
- During a power failure—The Cisco SCE 8000 has two power supplies. A power failure occurs only when both of them fail.

In case the Cisco SCE 8000 platform must be replaced, it is possible to remove the bypass modules from the Cisco SCE 8000 chassis without disconnecting them from the network and then reinstall them in the new SCE platform, so that traffic links are preserved even in a case of complete failure and replacement of the Cisco SCE 8000 platform. (See the [“Replacing the Optical Bypass Module Without Disrupting Traffic on the Link”](#) section on page 9-34.)

## Optical Bypass Functionality

The optical bypass module is connected bump-in-the-wire in the 10-GBE link. It is then connected to the Cisco SCE 8000 platform with two types of connections:

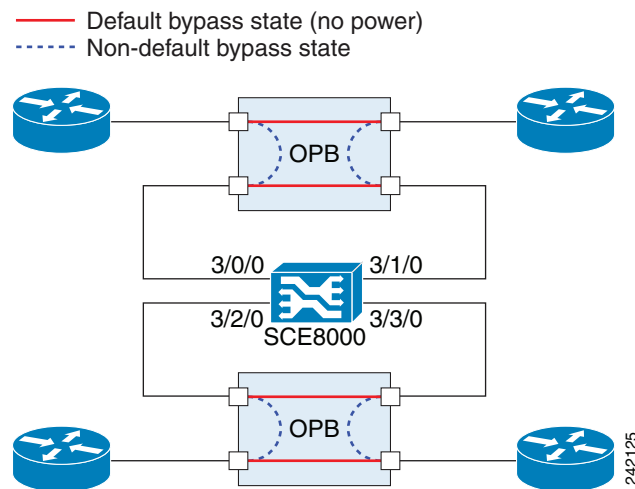
- 10 GBE optical connections for data link traffic—10 GBE connections from the optical bypass module to one pair of the 10 GBE SPA ports.
- Control connection—Connection to the RJ-11 External Bypass connector on the Cisco SCE 8000-SCM, so the optical bypass is activated if the Cisco SCE 8000 platform fails.

## Optical Bypass Module Connectivity

The optical bypass module functions as follows:

- Under normal conditions, the bypass module directs traffic to flow via the Cisco SCE 8000. (See [Figure 2-7](#).)
- Under failure conditions, the optical bypass shortcuts the interfaces that are connected to the traffic link, and all traffic flows through the optical bypass module, bypassing the SCE platform. (See [Figure 2-7](#).)

**Figure 2-7**      **Optical Bypass Module Connectivity**



## Optical Bypass Module (OPB-SCE8K)

There are two types of optical bypass modules to support different optic types:

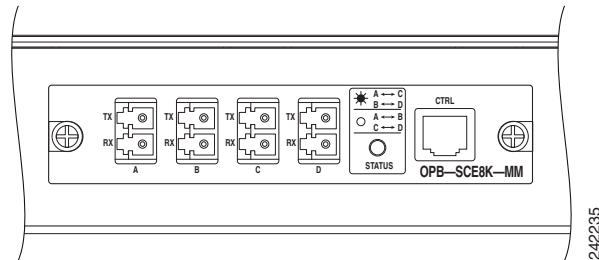
- OPB-SCE8K-SM supports Single-Mode optics and should be used with Cisco SCE 8000 equipped with Single-Mode optics.
- OPB-SCE8K-MM supports Multi-Mode optics and should be used with Cisco SCE 8000 equipped with Multi-Mode optics.

The optical bypass module is installed either internally, in slot #4 of the Cisco SCE 8000 chassis or in an external mounting panel in the rack.

Up to two optical bypass modules can be mounted internally, supporting inline insertion into two links.

Up to four optical bypass modules can be mounted using an external mount panel (OPB-SCE8K-EXT-PNL). A single panel can serve two Cisco SCE 8000 platforms, each cutting two links or up to four Cisco SCE 8000 platforms, each cutting a single link. The optical bypass module is displayed in Figure 2-8. Table 2-8 lists the optical bypass module ports, and Table 2-9 lists the optical bypass module LEDs.

**Figure 2-8** Optical Bypass Module



**Table 2-8** Optical Bypass Module Ports

Port	Quantity	Description	Connect This Port To
10 GBE Line port	4	10 GBE ports A through D Duplex LC, panel mount adaptor for LC/UPC connectors	SPA interfaces on the Cisco SCE 8000.  See <a href="#">Cabling the 10 GBE Line Interface Ports: Using the External Optical Bypass Module</a> , page 6-14 for further information.
CTRL	1	RJ-11 port	RJ-11 Optical Bypass port on the Cisco SCE 8000-SCM-E.

**Table 2-9** Optical Bypass Module LEDs

LEDs	Description
Status	The Status LED indicates the operational status of the optical bypass module, as follows: <ul style="list-style-type: none"> <li>Green—Bypass module has been de-activated (traffic flows through the Cisco SCE 8000 platform)</li> <li>Off—Bypass module is active (traffic does not flow through the Cisco SCE 8000 platform)</li> </ul>

## Optical Bypass Module Specifications

This section describes the following:

### Fiber Cable Type

The fiber cable type within the Optical Bypass Module area as follows:

- OPB-SCE8K-MM: 50 um core
- OPB-SCE8K-SM: SMF-28

Maximum optical path (fiber length of two ports) is 600 m.

### Switching Time

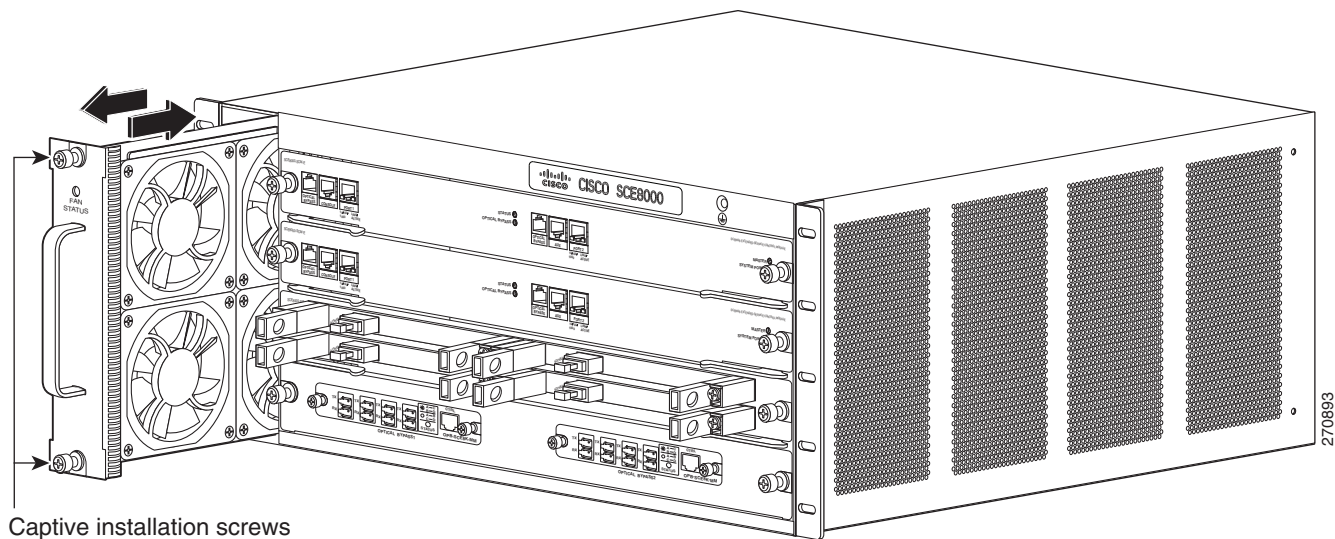
Switching time is measured from trigger to stable 90% optical output.

- Typical switching time: 3 ms
- Maximal switching time: 10 ms

## Fan Assembly

The system fan assembly, located in the chassis, provides cooling air for the installed modules (See [Figure 2-9](#)). Sensors on the fan assembly and within the system monitor the internal air temperatures. If the air temperature exceeds a preset threshold, the environmental monitor displays warning messages.

**Figure 2-9** Fan Assembly



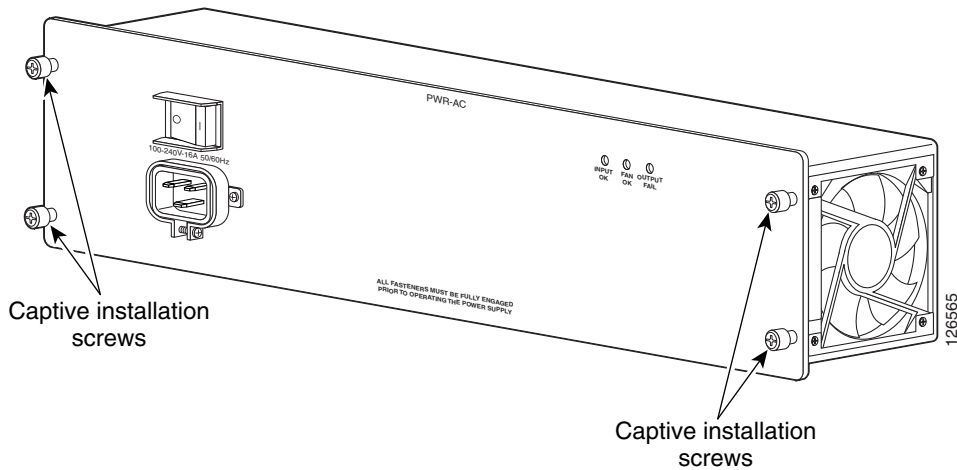
If an individual fan within the assembly fails, the FAN STATUS LED turns red. To replace a fan assembly, see [“Removing and Replacing the Fan Assembly”](#) section on page 9-13.

## Power Supplies

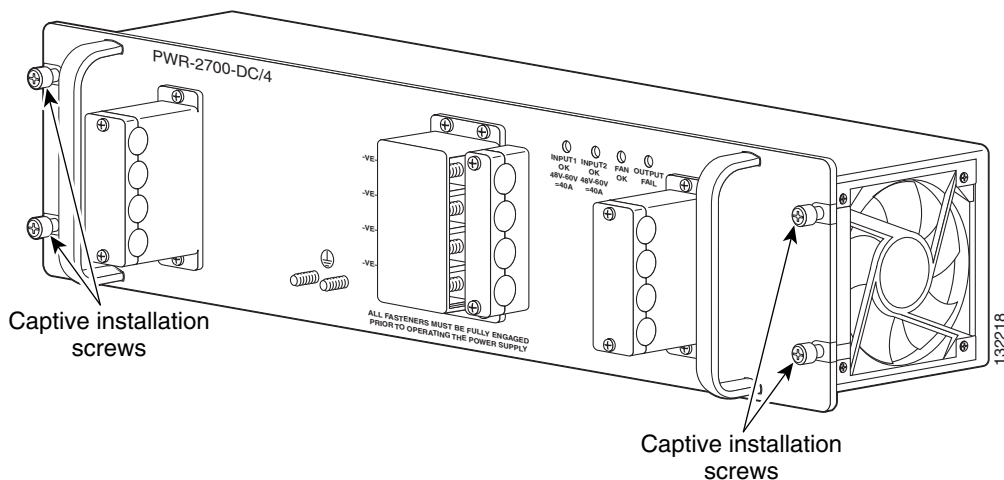
The Cisco SCE 8000 platform supports redundant AC- or DC-input power supplies. The following power supplies are available for the Cisco SCE 8000 platform:

- 2700 W AC input (PWR-2700-AC/4): uses an external power cord directly connected to the AC power supply. (See [Figure 2-10](#).)
- 2700 W DC input (PWR-2700-DC/4): uses an external terminal block on the back side of the chassis for input power connection. (See [Figure 2-11](#).)

**Figure 2-10** PWR-2700-AC/4



**Figure 2-11** PWR-2700-DC/4



The AC-input and DC-input power supplies support redundancy. When power is removed from one supply, the redundant power feature causes the second supply to produce full power.



## Power Supply Cooling

Power supplies have built-in fans and are completely self-cooling. Air enters from the right of the fan and exits through the left.

## Load Sharing

With two power supplies, each power supply concurrently provides approximately half of the required power to the system. If one power supply fails, the second power supply immediately assumes full power to maintain uninterrupted system operation. The second power supply enables load sharing and fault tolerance automatically; no software configuration is required.

# Checking the Shipping Container Contents

Use the Cisco SCE 8000 Component List to check the contents of the Cisco SCE 8000 platform shipping container.



**Tip**

Do not discard the shipping container when you unpack the Cisco SCE 8000. Flatten the shipping cartons and store them with the pallet. You need these containers to move or ship the Cisco SCE 8000.

## Cisco SCE 8000 Component and Accessory Lists

Table 2-10 lists the Cisco SCE 8000 components.

**Table 2-10** Cisco SCE 8000 Component List

Component	Description
Cisco SCE 8000-SCM-E	Cisco SCE 8000 Service Control Module.
Cisco SCE 8000-SIP	Cisco SCE 8000 SPA Jacket card Interface Processor.
2 or 4 SPA Jacket cards	SPA Interface. See the following list of supported SPA models.
2 or 4 XFP Optics	XFP optic modules. See the following list of supported XFP models.
2 Cisco PWR-2700-AC/4 or 2 Cisco PWR-2700-DC/4	Cisco power supply units, AC or DC. Hot swappable, redundant power supply.
Cisco SCE 8000-FAN	Redundant fans unit.

Table 2-11 lists the Cisco SCE 8000 accessories.

**Table 2-11** Cisco SCE 8000 Accessory List

Accessory	Description
Management cables	<ul style="list-style-type: none"> <li>Gigabit Ethernet cable for connecting to the Management ports</li> <li>RS-232 serial cables (DB-9 to RJ-45 and DB-25 to RJ-45) for connecting to a local terminal</li> </ul>
Power cables	Two AC power supply cords, if ordered with AC-input power supply units
Grounding kit 69-0815-01	<ul style="list-style-type: none"> <li>Grounding lug</li> <li>Two M4 hex-head screws with locking washers</li> </ul>
Optical Bypass module kit	<ul style="list-style-type: none"> <li>Optical Bypass Module</li> <li>Control Cable (2 m)</li> <li>Control Cable (40 cm)</li> </ul>

**Note**

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Cisco does not ship the entire Cisco SCE 8000 documentation set automatically with each system. You must specifically order the documentation as part of the sales order. If you ordered documentation and did not receive it, we will ship the documents to you within 24 hours. To order documents, contact a customer service representative.

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# Cisco SCE 8000 Installation Checklist

To assist you with your installation and to provide a historical record of what was done by whom, photocopy the following Cisco SCE 8000 Installation Checklist (See [Table 2-12](#)). Indicate when each procedure or verification is completed. When the checklist is completed, place it in your site log along with the other records for your new Cisco SCE 8000 platform.

**Table 2-12** Cisco SCE 8000 Installation Checklist

Task	Verified By	Date
Date Cisco SCE 8000 received		
Cisco SCE 8000 and all accessories unpacked		
Safety recommendations and guidelines reviewed		
Topology verified: number of Cisco SCE 8000 platforms, number of links, and whether inline or receive-only		
Installation Checklist copied		
Site log established and background information entered		
Site power voltages verified		
Site environmental specifications verified		
Required passwords, IP addresses, device names, and so on, needed for initial configuration available (see <a href="#">“Initial Setup Parameters” section on page 5-3</a> )		
Required tools available		
Network connection equipment available		
Cisco SCE 8000 mounted in rack		
System grounding established, if required		
AC/DC power cables connected to AC/DC sources and Cisco SCE 8000 chassis		
Optical bypass modules installed (optional)		
Console port set for 9600 baud, 8 data bits, no parity, and 1 stop bit (9600 8N1)		
ASCII terminal attached to console port		
Management port is operational		
Network interface cables and devices connected		
System power turned on		
System boot complete (Status LED is on)		
10 GBE line ports operational		
Correct hardware configuration displayed after system banner appears		