



CHAPTER 1

VPN Services Port Adapter Overview

This chapter provides an introduction to the VPN Services Port Adapter (VSPA) and its associated Services SPA Carrier-600 (SSC-600). It includes the following sections:

- [About the VSPA, page 1-1](#)
- [System and Environmental Requirements, page 1-2](#)
- [SSC-600 Overview, page 1-5](#)
- [VSPA Overview, page 1-6](#)
- [Using the Command-Line Interface, page 1-8](#)
- [Identifying Slots, Subslots, and Ports, page 1-8](#)

For software details for the VSPA, see the *Cisco VPN Services Port Adapter Configuration Guide*.

About the VSPA

The VSPA and its associated SSC-600 comprise a Gigabit Ethernet IP Security (IPsec) cryptographic module that you can install in the Catalyst 6500 Series switch. This section describes the VSPA and provides some guidelines for its use. The IPsec cryptographic module described in this document consists of the following two components:

Description	Model Number
Services SPA Carrier-600 (SSC-600)	WS-SSC-600
VPN Services Port Adapter (VSPA)	WS-IPSEC-3

SSC-600

The SSC-600 inserts into a switch chassis slot in the same manner as a line card and provides two subslots that are used to contain one or two VSPAs. During normal operation, the SSC-600 should reside in a switch that is fully populated either with functional VSPAs in both subslots, or with a blank filler plate (SPA-BLANK=) inserted in any empty subslots.

The SSC-600 supports online insertion and removal (OIR) with VSPAs present in the subslots. The VSPA also supports OIR and can be inserted or removed independently from the SSC-600.

VSPA

The VSPA provides hardware-accelerated IP Security (IPsec) encryption and decryption, generic routing encapsulation (GRE), and Internet Key Exchange (IKE) key generation.

The VSPA inserts into a subslot of the SSC-600. The SSC-600 can hold one or two VSPAs. To maintain cooling integrity, either a blank filler plate or a functional VSPA must reside in each subslot of a SSC-600 during normal operation.

The VSPA supports online insertion and removal (OIR). VSPAs can be inserted or removed independently from the SSC-600. The SSC-600 also supports online insertion and removal (OIR) with VSPAs inserted in its subslots.

System and Environmental Requirements

The following sections describe the system and environmental requirements for the VSPA:

- [Software Requirements, page 1-2](#)
- [Supported Hardware, page 1-3](#)
- [Memory Requirements, page 1-3](#)
- [Checking Hardware and Software Compatibility, page 1-3](#)
- [Power Management, page 1-4](#)
- [Environmental Requirements, page 1-5](#)

Software Requirements

[Table 1-1](#) lists the minimum Cisco IOS software release that supports the VSPA and SSC-600.

Table 1-1 Supported Hardware and Software

Description	Product Number	Cisco IOS Release for the Catalyst 6500 Series Switch
VSPA	WS-IPSEC-3	Cisco IOS Release 12.2(33)SXI or later
SSC-600	WS-SSC-600	

In addition to the required Cisco IOS Release, you must be running one of the following crypto images on your switch:

- Supervisor Engine 720 (including 10G)
 - s72033-adventerprisek9_wan-mz
 - s72033-advipservicesk9_wan-mz
 - s72033-adventerprisek9_wan-vz
 - s72033-advipservicesk9_wan-vz
- Supervisor Engine 32 (including 10G)
 - s3223-adventerprisek9_wan-mz
 - s3223-advipservicesk9_wan-mz

- s3223-adventerprisek9_wan-vz
- s3223-advipservicesk9_wan-vz

Supported Hardware

The hardware requirements for the VSPA and SSC-600 are as follows:

- You can install the VSPA and SSC-600 in all Catalyst 6500 Series switch models, including the E and non-E switch chassis, except the Catalyst 6503 and Catalyst 6503-E.

For more information on the Catalyst 6500 Series switch, see the *Catalyst 6500 Series Switch Installation Guide* at this URL:

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Chassis_Installation/Cat6500/6500_ins.html

- A maximum of 10 VSPAs per chassis are supported.
- The VSPA supervisor engine support is described in [Table 1-2](#) for each release.

Table 1-2 Supervisor Engine Support for the VSPA by Release

Release	Supervisor Supported
Cisco IOS Release 12.2(33)SXI	Supervisor Engine 720 (minimum 512 MB memory) Supervisor Engine 720-10G Supervisor Engine 32

Memory Requirements

Although the VSPA and SSC-600 memory is not configurable, the number of VPN tunnels supported by the system is determined by the available MSFC DRAM.

The number of VPN tunnels supported is as follows:

- Up to 8,000 tunnels with 512 MB DRAM
- Up to 16,000 tunnels with 1 GB DRAM

The number of tunnels is limited to provide some available memory for routing protocols and other applications. However, your particular use of the MSFC may demand more memory than the quantities that are listed above. In an extreme case, you could have one tunnel but still require 1-GB DRAM for other protocols and applications running on the MSFC.



Note

Although the VSPA contains an internal CompactFlash socket, it is not supported. Do not install any device in the CompactFlash socket.

Checking Hardware and Software Compatibility

To check the minimum software requirements of Cisco IOS software with the hardware installed on your switch, Cisco maintains the Software Advisor tool on Cisco.com. This tool does not verify whether modules within a system are compatible, but it does provide the minimum Cisco IOS requirements for individual hardware modules or components.

**Note**

Access to this tool is limited to users with Cisco.com login accounts.

To access Software Advisor, click **Login** at Cisco.com, type “Software Advisor” in the SEARCH box, and click **GO**. Click the link for the Software Advisor tool.

Choose a product family or enter a specific product number to search for the minimum supported software release needed for your hardware.

Power Management

Because the VSPA and SSC-600 consume chassis power, you must make sure that the chassis is within the power budget. As shown in [Table 1-3](#), the SSC-600 reserves enough power for itself and two VSAs, regardless of whether any VSAs are installed.

Table 1-3 **Module Power Reservation**

Configuration	Power Reserved (Maximum in Watts)
SSC-600 with or without VSAs installed	274.68 W

If the power limit is exceeded, the VSPA and SSC-600 are not powered up and the following error message is displayed:

```
Router#%C7KPWR-SP-4-POWERDENIED:insufficient power, module in slot 3 power denied.
```

Enter the **show power** command to determine how much power is available in the chassis and how much is being used or reserved by line cards, supervisor engines, and fan trays.

The following example shows the **show power** command output:

```
Router# show power

system power redundancy mode = combined
system power total =      1921.92 Watts (45.76 Amps @ 42V)
system power used =       1477.98 Watts (35.19 Amps @ 42V)
system power available =  443.94 Watts (10.57 Amps @ 42V)

Power-Capacity PS-Fan Output Oper
Watts   A @42V  Status Status State
-----
1  WS-CAC-2500W   1153.32 27.46 OK      OK      on
2  WS-CAC-1300W   1153.32 27.46 OK      OK      on
Pwr-Requested Pwr-Allocated Admin Oper
Watts   A @42V  Watts   A @42V  State State
-----
Slot Card-Type
-----
3  WS-X6516-GBIC   142.80  3.40  142.80  3.40  on   on
4  WS-X6548-GE-TX  142.80  3.40  142.80  3.40  on   on
5  WS-SUP720-3BXL  328.44  7.82  328.44  7.82  on   on
6  7600-SIP-400    313.74  7.47  313.74  7.47  on   on
7  WS-SSC-600     274.68  6.54  274.68  6.54  on   on
9  7600-SSC-400    226.80  5.40  226.80  5.40  on   on
Inline      Inline      Inline      Inline
Pwr-Requested Pwr-Allocated Local-Pwr-Pool Power
Watts   A @42V  Watts   A @42V  Watts   A @42V  Status
-----
4  WS-F6K-VPWR-GE    -      -      -      -      34.61  0.82  On
```

Environmental Requirements

Table 1-4 lists the environmental requirements for the VSPA and SSC-600.

Table 1-4 Environmental Requirements

Item	Specification
Temperature, ambient operating	0° to 40°C (32° to 104°F)
Temperature, ambient nonoperating	–40° to 70°C (–40° to 158°F)
Humidity (RH), ambient (noncondensing) operating	10% to 85%
Nonoperating relative humidity (noncondensing)	5% to 95%

SSC-600 Overview

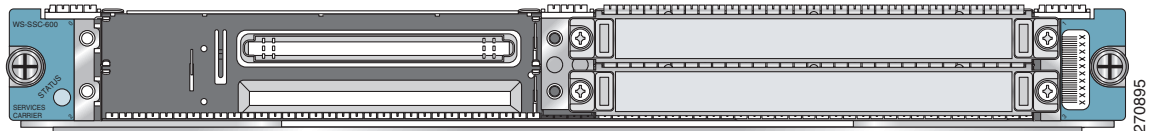
The following sections describe the SSC-600:

- [SSC-600 Front Panel, page 1-5](#)
- [SSC-600 LED, page 1-6](#)
- [SSC-600 Physical Specifications, page 1-6](#)

SSC-600 Front Panel

Figure 1-1 shows the SSC-600 front panel.

Figure 1-1 SSC-600 Faceplate



The SSC-600 front panel contains these items:

- One STATUS LED
- Two subslots, each capable of holding one VSPA

SSC-600 LED

Table 1-5 describes the operation of the SSC-600 LED.

Table 1-5 *SSC-600 LED*

LED Label	Color	State	Meaning
STATUS	Off	Off	The SSC-600 power is off.
	Orange	On	The card is booting or running diagnostics, or an overtemperature condition has been detected (minor threshold exceeded).
	Green	On	The card is ready and operational.
	Red	On	A diagnostic test has failed, or an overtemperature condition has been detected (major threshold exceeded).

SSC-600 Physical Specifications

Table 1-6 describes the SSC-600 physical specifications.

Table 1-6 *SSC-600 Physical Specifications*

Description	Specification
Physical dimensions	The SSC-600 occupies one module slot of a Catalyst 6500 Series switch chassis.
Shipping weight	8.5 lb (3.86 kg)
Operating temperature	0° to 40°C (32° to 104°F)
Storage temperature	-20° to 65°C (-4° to 149°F)
Relative humidity	10% to 90%, noncondensing

VSPA Overview

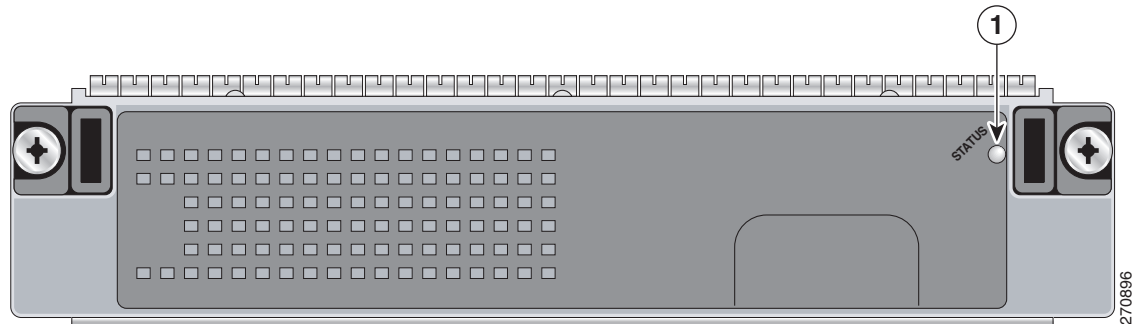
The following sections describe the VSPA:

- [VSPA Front Panel, page 1-7](#)
- [VSPA LED, page 1-7](#)
- [VSPA Physical Specifications, page 1-7](#)

VSPA Front Panel

Figure 1-2 shows the VSPA front panel.

Figure 1-2 VSPA Faceplate



1	STATUS LED
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VSPA LED

Table 1-7 describes the operation of the VSPA LED.

Table 1-7 VSPA LED

LED Label	Color	State	Meaning
STATUS	Off	Off	The VSPA power is off.
	Orange	On	The VSPA is booting or running diagnostics, or an overtemperature condition has been detected (minor threshold exceeded).
	Green	On	The VSPA is ready and operational.
	Red	On	A diagnostic test has failed, or an overtemperature condition has been detected (major threshold exceeded).

VSPA Physical Specifications

Table 1-8 describes the VSPA physical specifications.

Table 1-8 VSPA Physical Specifications

Description	Specification
Physical dimensions	The VSPA occupies one subslot on the SSC-600.
Weight	2.0 lb (0.91 kg)
Operating temperature	0° to 40°C (32° to 104°F)
Storage temperature	-20° to 65°C (-4° to 149°F)
Relative humidity	10% to 90%, noncondensing

Using the Command-Line Interface

The installation verification procedures described in this document use the Cisco IOS command-line interface (CLI) of the Catalyst 6500 Series switch. To understand the CLI and Cisco IOS command modes, see the *Cisco IOS Configuration Fundamentals Command Reference* at this URL:

http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_book.html

For detailed information on configuring the Catalyst 6500 Series switch, see the *Catalyst 6500 Release 12.2SXH and Later Software Configuration Guide* at this URL:

<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/book.html>

Identifying Slots, Subslots, and Ports

Some CLI commands, such as the **show hw-module subslot** command, allow you to display information about the VSPA and the SSC-600. These commands require you to specify the physical location of the SSC-600 using the *slot* variable, or the physical location of the VSPA using the *slot/subslot* variable.

- *slot*—Specifies the chassis slot number in the Catalyst 6500 Series switch where the SSC-600 is installed.
- *subslot*—Specifies the secondary slot of the SSC-600 where the VSPA is installed.

The subslot numbering is indicated by a small numeric label beside the subslot on the faceplate of the SSC-600. In the horizontal card orientation shown in [Figure 1-1](#), the SSC-600 subslot locations are as follows:

- Subslot 0—Left subslot
- Subslot 1—Right subslot

For example, to display the operational status of the VSPA installed in the first subslot (subslot 0) of the SSC-600 in chassis slot 3 of a Catalyst 6500 Series switch, enter the following command:

```
Router# show hw-module subslot 3/0 oir
Module           Model                Operational Status
-----
subslot 3/0     WS-IPSEC-3          ok
```

Some CLI commands require you to specify the inside and outside ports of the VSPA in the format *slot/subslot/port*. Although the VSPA ports are not actual Gigabit Ethernet ports, and do not share all properties of external Gigabit Ethernet interfaces, they can be addressed for configuration as Gigabit Ethernet trunk ports, using port numbers as follows:

- Port 1—Inside port, attached to interface VLAN
- Port 2—Outside port, attached to port VLAN

For example, to configure the outside port of a VSPA in the first subslot (subslot 0) of an SSC-600 in slot 6 of a Catalyst 6500 Series switch, enter the following command:

```
Router(config)# interface GigabitEthernet6/0/2
```