Overview: Cisco ASR 1000 Series Aggregation Services Routers SIPs

This chapter describes the SPA interface processors (SIPs) that are supported on the Cisco ASR 1000 Series Aggregation Services Routers and contains the following sections:

SIP Summary

Summary descriptions of the SIPs that are supported on the Cisco ASR 1000 Series Routers are shown in Table 2-1.

Note The Description column indicates the aggregate bandwidth supported by the SIP across all subslots, and not per SPA subslot.

Table 2-1 SIP Summary

SIP	Product Number	Description	Maximum Number of SPAs	Minimum Cisco IOS Release
Cisco ASR 1000 Series SIP10G	ASR-1000-SIP10	10 Gbps SPA interface processor	4	Cisco IOS XE Release 2.2
Cisco ASR 1000 Series SIP40G	ASR-1000-SIP40	40 Gbps SPA interface processor	4[1]	Cisco IOS XE Release 3.1S

1. The Cisco ASR1000-SIP40 carrier card supports four half-height SPAs, two full-height SPAs, or a combination of two half-height and one full-height SPAs. Double-wide SPAs are not supported.

Checking Hardware and Software Compatibility

To check the minimum software requirements of Cisco IOS software with the hardware installed on your router, Cisco maintains the Software Advisor tool on Cisco.com. This tool does not verify whether SIPs or SPAs 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. For details regarding the hardware and software supported for ASR1000 SIPs, refer Table 2-2.

Note The Cisco ASR 1002-X Router has an integrated route processor, embedded services processor, and SIP.

Table 2-2 Hardware and Software Support Matrix for ASR1000 SIPs

SIP Type	Cisco IOS XE Software Release	Supported Route Processor	Supported ESP	Supported Cisco ASR 1000 Router Chassis
ASR1000-SIP10	Cisco IOS XE Release 2	ASR1000-RP1 and ASR1000-RP2	ASR1000-ESP10, ASR1000-ESP10-N, ASR1000-ESP20, ASR1000-ESP40, and ASR1000-ESP100 **Note** ASR1000-ESP100 is supported only on routers on which ASR1000-RP2 is installed.	Cisco ASR1002, Cisco ASR 1002-F, Cisco ASR 1004, Cisco ASR 1006, and Cisco ASR 1013 Routers
ASR1000-SIP40[1]	Cisco IOS XE Release 3.1S	ASR1000-RP2 and later RPs	ASR1000-ESP10, ASR1000-ESP10-N, ASR1000-ESP20, ASR1000-ESP40, and ASR1000-ESP100 ASR1000-ESP100 is supported only on routers on which ASR1000-RP2 is installed.	Cisco ASR 1002-X, Cisco ASR 1004, Cisco ASR 1006, and Cisco ASR 1013 Routers[2]
ASR1000-SIP40	Cisco IOS XE Release 3.2S	ASR1000-RP2 and later RPs	Primarily supported only on ASR1000-ESP40[3]	Cisco ASR 1004 Routers
ASR1000-SIP40[1]	Cisco IOS XE Release 3.7S	ASR1000-RP2 and later RPs	ASR1000-ESP10, ASR1000-ESP10-N, ASR1000-ESP20	Cisco ASR 1002-X, Cisco ASR 1004, Cisco ASR 1006, and Cisco ASR 1013 Routers

1. ASR1000-SIP40 when used with ESP20, it comes up in SIP10 mode with 10 Gbps throughput.
2. The Cisco ASR 1013 Router has limitation to support ASR1000-SIP40 at slots 4 and 5 at 40G mode. If a ASR1000-SIP40 is installed at slots 4 or 5, it will work as a SIP10 at 10G mode.
3. Support for ASR1000-SIP40 and ASR1000-ESP40 added on Cisco ASR 1004 Router Chassis from Cisco IOS XE Release 3.2S and future releases.

SPA Interface Addresses on SIPs

Interface addresses specify the physical location of each interface on a router or switch. Table 2-3 describes how to identify the interface addresses for SPAs supported on the SIPs.

Table 2-3 SPA Interface Addresses

SIP	Address Format	Description
Cisco ASR 1000 Series SIP	*router-module-slot/SIP-subslot/SPA-port-number*	Router module slot—0 through 2 SIP subslot—0 through 3 SPA port number—0 through x **Note** The maximum number of SPA ports depends on the type of SPA.

Identifying Slots and Subslots for SIPs and SPAs

This section describes how to specify the physical locations of a SIP and SPA on the Cisco ASR 1000 Series Routers within the command-line interface (CLI) to configure or monitor the devices.

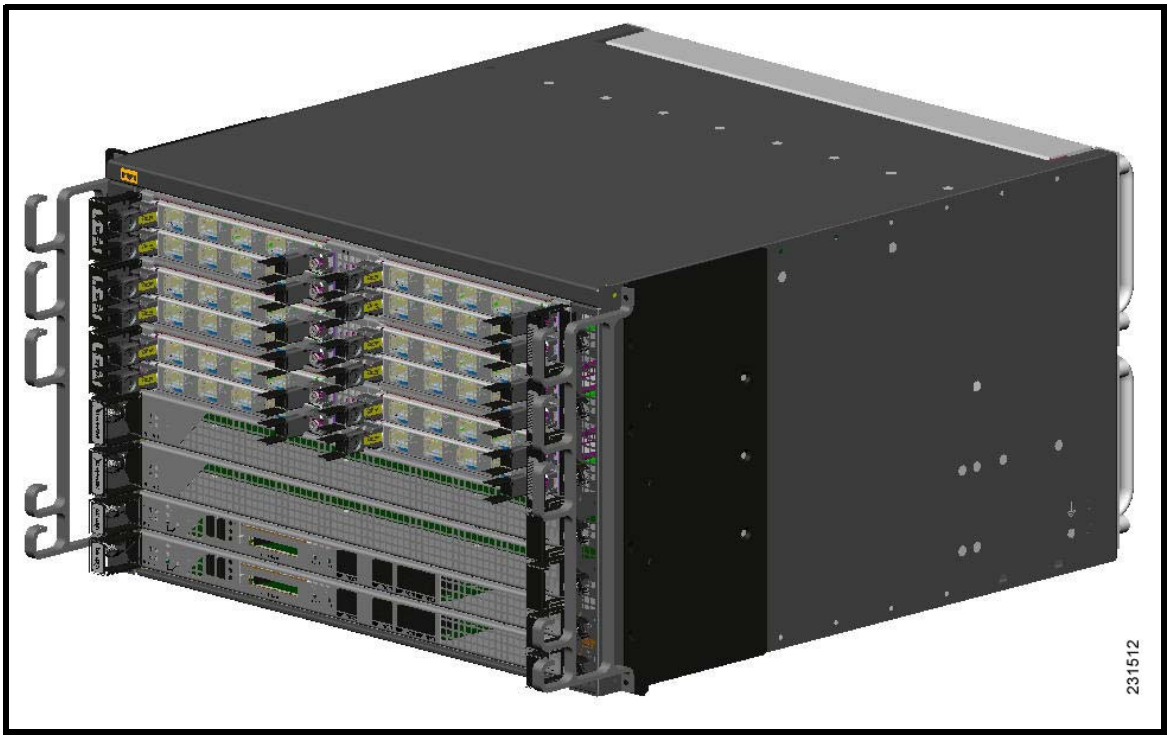
Specifying the Slot Location for a SIP

The Cisco ASR 1000 Series Routers support different chassis models, each of which supports a certain number of chassis slots.

- The Cisco ASR 1013 Router supports six chassis slots for SIPs.
- The Cisco ASR 1006 Router supports three chassis slots for SIPs.
- The Cisco ASR 1004 Router supports two chassis slots for SIPs.
- The Cisco ASR 1002 Router and Cisco ASR 1002-X Router support one chassis slot for a SIP that is permanently installed, and the integrated Route Processor and Gigabit Ethernet ports reside in SPA subslot 0.

Figure 2-1 shows an example of a SIP installed on a Cisco ASR 1006 Router. The router has three chassis slots for SIPs, and can accommodate a total of twelve SPAs.

Figure 2-1 SIP and SPAs Installed in a Cisco ASR 1006 Router



Some commands allow you to display information about the SIP itself, such as **show platform**, **show diag**, and **show diag subslot**. These commands require you to specify the chassis slot location where the SIP that you want information about is installed.

For example, to display status and slot-related information about the SIP installed in any of the chassis slots, enter the following command:

```
Router# show platform
Chassis type: ASR1006

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1000-SIP10       ok                    2d21h
 0/0      SPA-2X1GE-V2        ok                    2d21h
 0/1      SPA-2X1GE-V2        ok                    2d21h
 0/2      SPA-2X1GE-V2        ok                    2d21h
 0/3      SPA-1XOC12-POS      ok                    2d21h
1         ASR1000-SIP10       ok                    22:46:22
 1/0      SPA-1X10GE-L-V2     ok                    22:45:29
 1/1      SPA-1XOC12-POS      ok                    22:45:26
 1/2      SPA-1X10GE-L-V2     ok                    22:45:22
 1/3      SPA-1XOC12-POS      ok                    22:45:18
2         ASR1000-SIP10       ok                    1d20h
 2/0      SPA-5X1GE-V2        ok                    1d20h
 2/1      SPA-5X1GE-V2        ok                    1d20h
 2/2      SPA-5X1GE-V2        ok                    1d20h
 2/3      SPA-5X1GE-V2        ok                    1d20h
R0        ASR1000-RP1         ok, active            3d20h
F0        ASR1000-ESP10       ok, active            3d20h
P0        ASR1006-PWR-AC      ok                    3d20h
```

```
P1         ASR1006-FAN          ok                     3d20h

Slot       CPLD Version         Firmware Version
---------  -------------------  ------------------------------------
0          07091401             12.2(33r)XN2
1          07091401             12.2(33r)XN2
2          07091401             12.2(33r)XN2
R0         07082312             12.2(33r)XN2
```

The following example shows the **show platform** command output for the ASR 1013 chassis with Cisco ASR1000-SIP10 and Cisco ASR1000-SIP40 installed:

```
Router# show platform
Chassis type: ASR1013

Slot       Type                 State                  Insert time (ago)
---------  -------------------  ---------------------  -----------------
0          ASR1000-SIP10        ok                     1w0d
1          ASR1000-SIP40        ok                     1w0d
 1/1       SPA-5X1GE-V2         ok                     1w0d
2          ASR1000-SIP40        ok                     1w0d
 2/1       SPA-1X10GE-L-V2      ok                     1w0d
 2/3       SPA-1X10GE-L-V2      ok                     1w0d
3          ASR1000-SIP40        ok                     1w0d
 3/3       SPA-4XT3/E3          ok                     1w0d
4          ASR1000-SIP40        ok                     1w0d
 4/2       SPA-5X1GE-V2         ok                     1w0d
 4/3       SPA-4XCT3/DS0        ok                     1w0d
5          ASR1000-SIP40        ok                     1w0d
R0         ASR1000-RP2          ok, active             1w0d
R1         ASR1000-RP2          ok, standby            1w0d
F0         ASR1000-ESP40        ok, active             1w0d
P0         ASR1013-PWR-AC       ok                     1w0d
P1         ASR1013-PWR-AC       ps, fail               1w0d
P2         ASR1013-PWR-AC       ok                     1w0d
P3         ASR1013-PWR-AC       ps, fail               1w0d

Slot       CPLD Version         Firmware Version
---------  -------------------  ------------------------------------
0          00200800             15.0(1r)S
1          00200800             15.0(1r)S
2          00200800             15.0(1r)S
3          00200800             15.0(1r)S
4          00200800             15.0(1r)S
5          00200800             15.0(1r)S
R0         10021901             15.0(1r)S
R1         10021901             15.0(1r)S
F0         1001270D             15.0(1r)S
```

Specifying the SIP Subslot Location for a SPA

SIP subslots begin their numbering with “0” and have a horizontal orientation, as shown in the “SIP and SPA Product Overview” chapter of the *Cisco ASR 1000 Series Aggregation Services Routers SIP and SPA Software Configuration Guide*.

The Cisco ASR 1000 series SIP supports four subslots for the installation of SPAs. As shown in Figure 2-2, the subslot locations are oriented as follows:

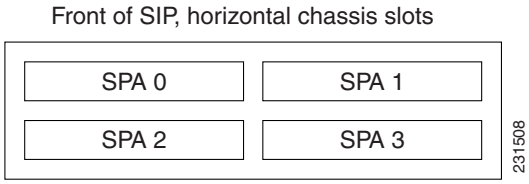
- SIP subslot 0—Top-left subslot
- SIP subslot 1—Top-right subslot

- SIP subslot 2—Bottom-left subslot
- SIP subslot 3—Bottom-right subslot

Note On the Cisco ASR 1002 Router and Cisco ASR 1002-X Router, SIP subslot 0 is not available for SPA insertion. It is the slot that is used for the integrated Route Processor and Gigabit Ethernet ports.

Figure 2-2 shows the SPA numbering sequence on a Cisco ASR 1000 Series Routers SIP.

Figure 2-2 Cisco ASR 1000 Series SIP SPA Numbering



The SIP subslot numbering is indicated by a small numeric label beside the subslot on the faceplate.

Just as with the SIPs, some commands allow you to display information about the SPA itself, such as **show diag subslot**. These commands require you to specify both the physical location of the SIP and SPA in the format, *slot*/*subslot*, where:

- *slot*—Specifies the chassis slot number in the Cisco ASR 1000 Series Routers where the SIP is installed.
- *subslot*—Specifies the slot of the SIP where the SPA is installed.

To display the operational status for a SPA installed in the SIP, enter the **show platform** command.

```
Router# show platform
Chassis type: ASR1006

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1000-SIP10       ok                    2d21h
 0/0      SPA-2X1GE-V2        ok                    2d21h
 0/1      SPA-2X1GE-V2        ok                    2d21h
 0/2      SPA-2X1GE-V2        ok                    2d21h
 0/3      SPA-1XOC12-POS      ok                    2d21h
1         ASR1000-SIP10       ok                    22:46:22
 1/0      SPA-1X10GE-L-V2     ok                    22:45:29
 1/1      SPA-1XOC12-POS      ok                    22:45:26
 1/2      SPA-1X10GE-L-V2     ok                    22:45:22
 1/3      SPA-1XOC12-POS      ok                    22:45:18
2         ASR1000-SIP10       ok                    1d20h
 2/0      SPA-5X1GE-V2        ok                    1d20h
 2/1      SPA-5X1GE-V2        ok                    1d20h
 2/2      SPA-5X1GE-V2        ok                    1d20h
 2/3      SPA-5X1GE-V2        ok                    1d20h
R0        ASR1000-RP1         ok, active            3d20h
F0        ASR1000-ESP10       ok, active            3d20h
P0        ASR1006-PWR-AC      ok                    3d20h
P1        ASR1006-FAN         ok                    3d20h

Slot      CPLD Version        Firmware Version
--------- ------------------- ----------------------------------------
0         07091401            12.2(33r)XN2
1         07091401            12.2(33r)XN2
2         07091401            12.2(33r)XN2
```

```
R0         07082312            12.2(33r)XN2
```

The following is a **show platform** command output example displaying the status of the DSP SPA installed on a Cisco ASR 1000 Series Routers:

```
Router# show platform
Chassis type: ASR1004

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
1         ASR1000-SIP10       ok                    00:14:53
 1/0      SPA-10X1GE-V2       ok                    00:12:51
 1/3      SPA-DSP             ok                    00:12:47
R0        ASR1000-RP1         ok, active            00:14:53
F0        ASR1000-ESP10       ok, active            00:14:53
P0        ASR1004-PWR-AC      ps, fail              00:14:04
P1        ASR1004-PWR-AC      ok                    00:14:03

Slot      CPLD Version        Firmware Version
--------- ------------------- ------------------------------------
1         07091401            12.2(33r)XN2
R0        07062111            12.2(33r)XN2
F0        07051650            12.2(33r)XN2
```

Cisco ASR 1000 Series SPA Interface Processor Overview

This section provides an overview of the SPA Interface Processor (SIP) supported on the Cisco ASR 1000 Series Routers. This section contains the following topics:

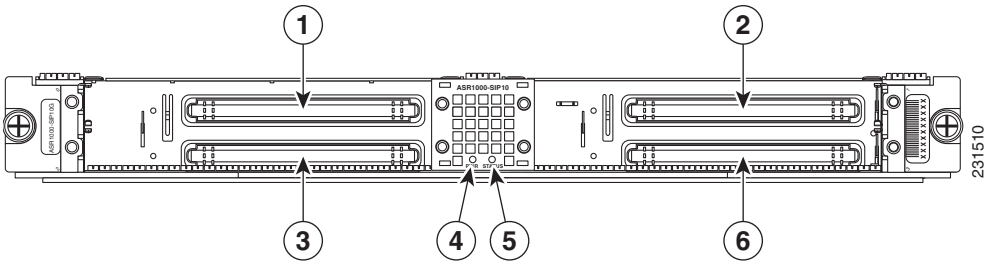
Cisco ASR1000-SIP10 Overview

The following sections describe the Cisco ASR1000-SIP10:

Cisco ASR1000-SIP10 LEDs

The Cisco ASR1000-SIP10 has two LEDs, as shown in Figure 2-3.

Figure 2-3 Cisco ASR1000-SIP10 Faceplate



1	SPA, subslot 0	**4**	PWR LED
2	SPA, subslot 1	**5**	STATUS LED
3	SPA, subslot 2	**6**	SPA, subslot 3

The Cisco ASR1000-SIP10 LEDs are described in Table 2-4.

Table 2-4 Cisco ASR1000-SIP10 LEDs

LED Label	Color	State	Meaning
STATUS	Red	On	The Cisco ASR1000-SIP10 has encountered an error.
	Yellow	On	The Cisco ASR1000-SIP10 is loading.
	Green	On	The Cisco ASR1000-SIP10 is online.
	Off	Off	The Cisco ASR1000-SIP10 is powered off.
PWR	Green	On	The Cisco ASR1000-SIP10 is powered on.
	Off	Off	The Cisco ASR1000-SIP10 is powered off.

Cisco ASR1000-SIP10 Physical Specifications

The Cisco ASR1000-SIP10 physical specifications are described in Table 2-5.

Table 2-5 Cisco ASR1000-SIP10 Physical Specifications

Description	Specifications
Physical dimension (HxWxD)	1.630 inches (41.4 mm) x 16.725 inches (424.8 mm) x 14.187 inches (360.3 mm)
Shipping weight	8.5 lb (3.9 kg)
Operating temperature	Nominal—40.9°F to 104°F (5 to 40°C) Short Term—40.9°F to 131°F (5 to 55°C)

Table 2-5 Cisco ASR1000-SIP10 Physical Specifications (continued)

Description	Specifications
Relative humidity	Operating Humidity Nominal—5% to 85% noncondensing Operating Humidity Short Term—5% to 90% noncondensing
Storage temperature	–40°F to 158°F (–40°C to 70°C)

Cisco ASR1000-SIP40 Overview

The Cisco ASR1000-SIP40 supports up to 40 Gbps total bandwidth for the four SPA bays and 46 Gbps sustained through carrier card when utilizing two four-link 6.25GHz ESIs. Following are the features of the Cisco ASR1000-SIP40:

- Supports 40 Gbps of non oversubscribed throughput.
- Compatible with existing and future SPAs, ESPs, and RPs.
- Supports online-insertion-and-removal (OIR) of all SIP-10 SPAs and Cisco ASR1000-SIP40.
- Provides higher port density support of 48 point dual priority, and 96 point single priority.
- Enables enhanced QoS and timestamp support.
- Performs ingress packet prioritization based on Layer 2 or Layer 3 headers.
- Enables the flow-control of the SPAs.
- Distributes line clocking reference from a single SPA to the RPs.
- From Release 3.7.0S onward, the Cisco ASR1000-SIP40 is supported on all the routers that support the Cisco ASR1000-SIP10.

Note The Cisco ASR1000-SIP40 supports four half-height SPAs, two full-height SPAs, and a combination of two half-height and one full-height SPAs. The Cisco ASR1000-SIP40 does not support double-wide SPAs, and double-high SPAs having two connectors.

The LEDs on the modules are the same for both the Cisco ASR1000-SIP10 and Cisco ASR1000-SIP40.

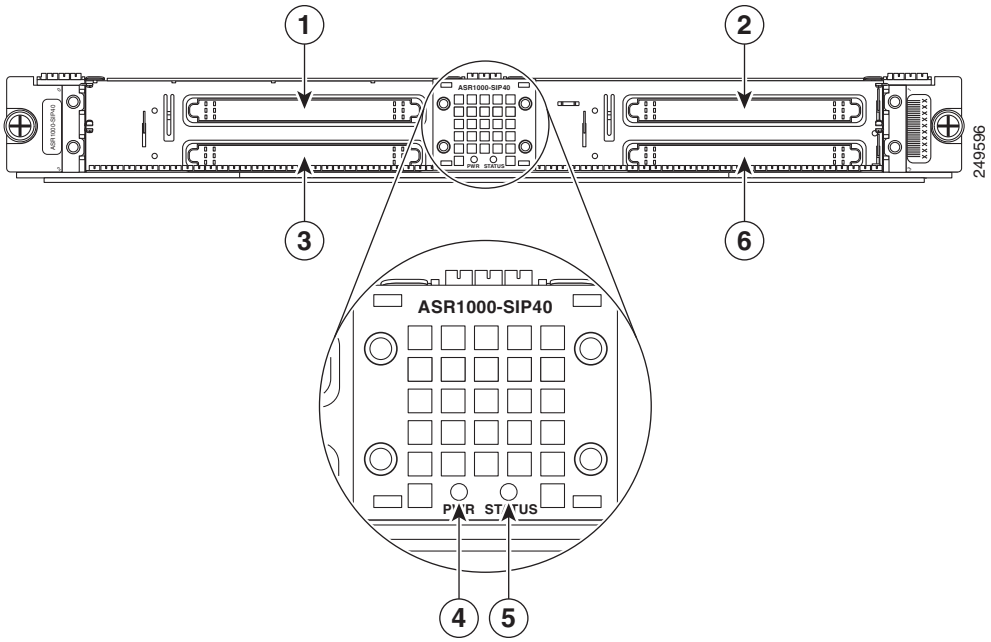
The following sections describe the Cisco ASR1000-SIP40:

- Cisco ASR1000-SIP40 LEDs
- Cisco ASR1000-SIP40 Physical Specifications

Cisco ASR1000-SIP40 LEDs

The Cisco ASR1000-SIP40 has two LEDs, as shown in Figure 2-4.

Figure 2-4 Cisco ASR1000-SIP40 Faceplate



1	SPA, subslot 0	**4**	PWR LED
2	SPA, subslot 1	**5**	STATUS LED
3	SPA, subslot 2	**6**	SPA, subslot 3

The Cisco ASR1000-SIP40 LEDs are described in Table 2-6.

Table 2-6 Cisco ASR1000-SIP40 LEDs

LED Label	Color	State	Meaning
STATUS	Red	On	The Cisco ASR1000-SIP40 has encountered an error.
	Yellow	On	The Cisco ASR1000-SIP40 is loading.
	Green	On	The Cisco ASR1000-SIP40 is online.
	Off	Off	The Cisco ASR1000-SIP40 is powered off.
PWR	Green	On	The Cisco ASR1000-SIP40 is powered on.
	Off	Off	The Cisco ASR1000-SIP40 is powered off.

Cisco ASR1000-SIP40 Physical Specifications

The Cisco ASR1000-SIP40 physical specifications are shown in Table 2-7.

Table 2-7 Cisco ASR1000-SIP40 Physical Specifications

Description	Specifications
Physical dimension (HxWxD)	1.630 inches (41.4 mm) x 16.725 inches (424.8 mm) x 14.187 inches (360.3 mm)
Shipping weight	8.5 lb (3.9 kg)
Operating temperature	Nominal—40.9 to 104°F (5 to 40°C) Short Term—40.9 to 131°F (5 to 55°C)
Relative humidity	Operating Humidity Nominal—5% to 85% noncondensing Operating Humidity Short Term—5% to 90% noncondensing
Storage temperature	–40F to 158F (–40°C to 70°C)

Cisco ASR 1013 Router and Slot Numbering for SIP

The Cisco ASR 1013 Router supports the Cisco ASR1000-SIP40 and Cisco ASR1000-SIP10. In the Cisco ASR 1013 Router, the Cisco ASR 1000 Series SIP supports:

- Four half-height SPAs with up to 24 ports per SPA
- Two full-height SPAs with up to 48 ports per SPA
- Two half-height and one full-height SPA combination that does not exceed 96 ports

The Cisco ASR 1013 Router uses the same SPA subslot numbering as the Cisco ASR 1006 Router and Cisco ASR 1004 Router.

Figure 2-5 Cisco ASR 1013 Router SPA Interface Slot Numbering

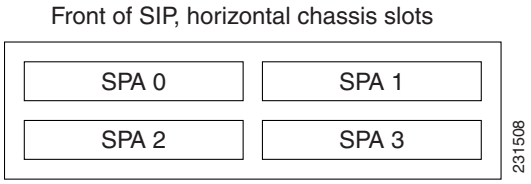
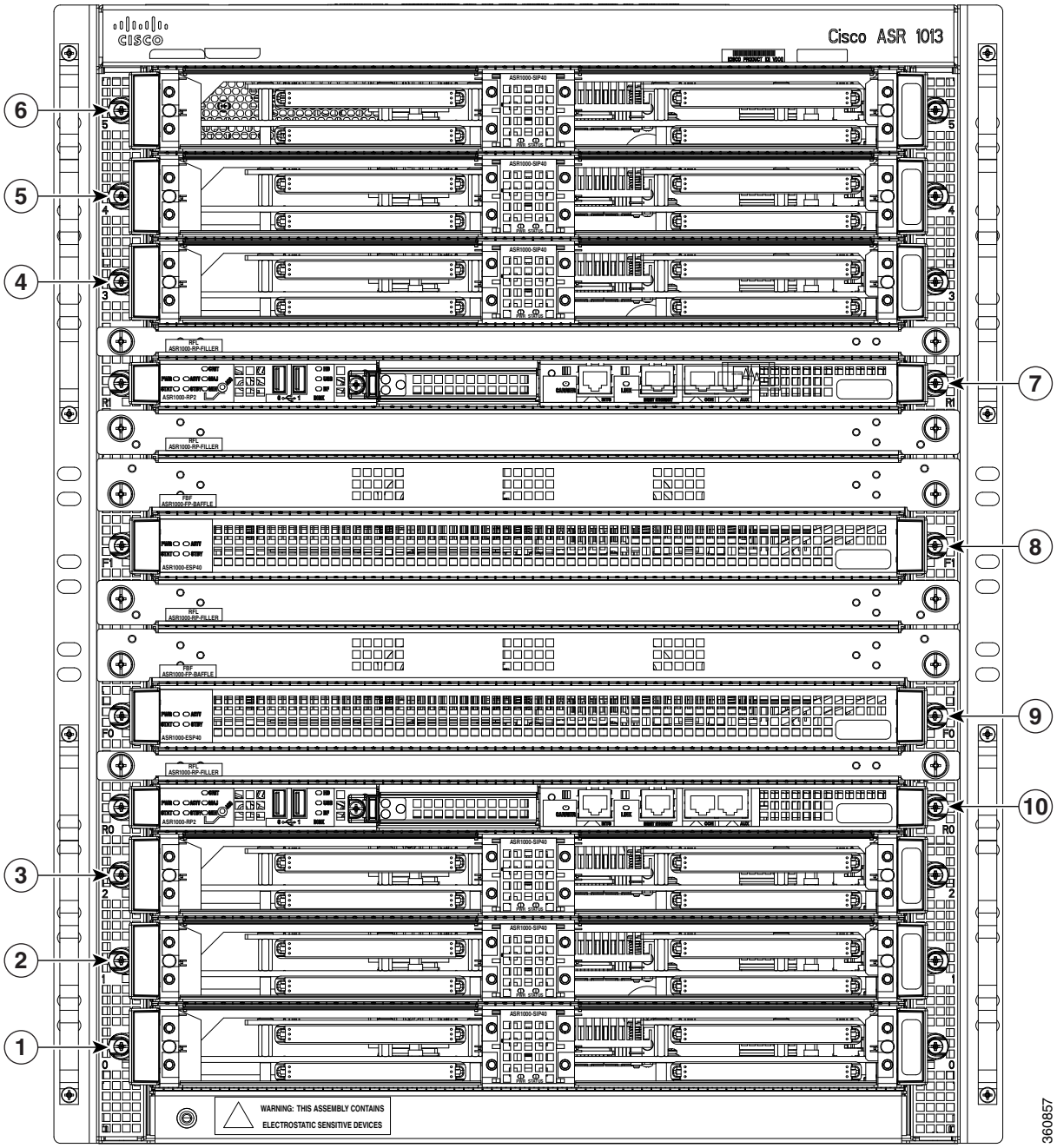


Figure 2-6 shows the slot numbering for the shared port adapters on the Cisco ASR 1013 Routers.

Note The Cisco ASR1000-ESP10 and Cisco ASR1000-ESP20 will not plug into the Cisco ASR 1013 Router ESP slots. The Cisco ASR 1013 Router supports six SIP slots only with the combination of Cisco ASR1000-ESP40 and RP2.

Figure 2-6 Cisco ASR 1013 Router SPA Interface Slot Numbering



1	SPA—Slot 0	**6**	SPA—Slot 5
2	SPA—Slot 1	**7**	RP-2—R1
3	SPA—Slot 2	**8**	ESP-40/ESP-100—F1
4	SPA—Slot 3	**9**	RP-Filler—F0
5	SPA—Slot 4	**10**	RP-2—R0