Product Overview

The Cisco Catalyst 9500 Series Switches family consists of fixed core and aggregation layer switches supporting redundant power supplies and modular fans. The Cisco Catalyst 9500 Series offers switch models with downlink ports of the following types:

- 8 ports of 400G QSFP-DD

- 16, 28 and 32 ports of 100G QSFP28

- 12, 24 and 32 ports of 40G QSFP

- 24 and 48 ports of 25G SFP28

- 16, 24, 40 and 48 ports of 10G SFP/SFP28

The Catalyst 9500 Series Switches provide support for the following features:

- Uplink connectivity

  - Network modules with SFP and QSFP uplink ports that provide 10G and 40G connectivity on C9500-16X and C9500-40X switches.

  - Fixed QSFP uplink ports that support 40G/100G connectivity on C9500-24Y4C and C9500-48Y4C switches.

- Advanced security capabilities like MACSec-256 and TrustWorthy systems.

- IoT integration and policy-based automation from the edge to the cloud with SD-Access solution.

- RJ-45, USB Mini-Type B and USB Type C console ports.

- Supports SATA SSD storage for container-based application hosting on select switch models.

Switch Models

*Table 1: Switch Models — Base PIDs*

Switch Model	Description
Cisco Catalyst 9500 Series Switches	
C9500-12Q	12x40 Gigabit Ethernet QSFP+ ports and 2 power supply slots
C9500-24Q	24x40 Gigabit Ethernet QSFP+ ports and 2 power supply slots
C9500-16X	16x10 Gigabit Ethernet SFP/SFP+ ports and 2 power supply slots; supports optional network modules on uplinks ports — 8x10 Gigabit Ethernet(SFP/SFP+) and 2x40 Gigabit Ethernet(QSFP+)
C9500-40X	40x10 Gigabit Ethernet SFP/SFP+ ports and 2 power supply slots; supports optional network modules on uplink ports — 8x10 Gigabit Ethernet(SFP/SFP+) and 2x40 Gigabit Ethernet(QSFP+)
Cisco Catalyst 9500 Series High Performance Switches	
C9500-32C	32x40G/100G QSFP28 ports and 2 power supply slots
C9500-32QC	32x40G or 16x100G QSFP28 ports and 2 power supply slots
C9500-24Y4C	24x1G/10G/25G SFP28 ports and 2 power supply slots; 4x40G/100G QSFP28 fixed uplink ports
C9500-48Y4C	48x1G/10G/25G SFP28 ports and 2 power supply slots; 4x40G/100G QSFP28 fixed uplink ports

Table 2: Switch Models — Bundle PIDs

| Switch Model	Description
C9500-16X-2Q	16x10 Gigabit Ethernet SFP/SFP+ ports and 2x40 Gigabit Ethernet (QSFP+) network module on uplink ports; and two power supply slots
C9500-40X-2Q	40 10-Gigabit Ethernet SFP/SFP+ ports and 2x40 Gigabit Ethernet (QSFP+) network module on uplink ports; and two power supply slots
C9500-24X	16x10 Gigabit Ethernet SFP/SFP+ ports and 8x10 Gigabit Ethernet (SFP/SFP+) network module on uplink ports; and two power supply slots
C9500-48X	40x10 Gigabit Ethernet SFP/SFP+ ports and 8x10 Gigabit Ethernet (SFP/SFP+) network module on uplink ports; and two power supply slots

Front Panel

Figure 1: Front Panel of a 24-Port Cisco Catalyst 9500 Switch
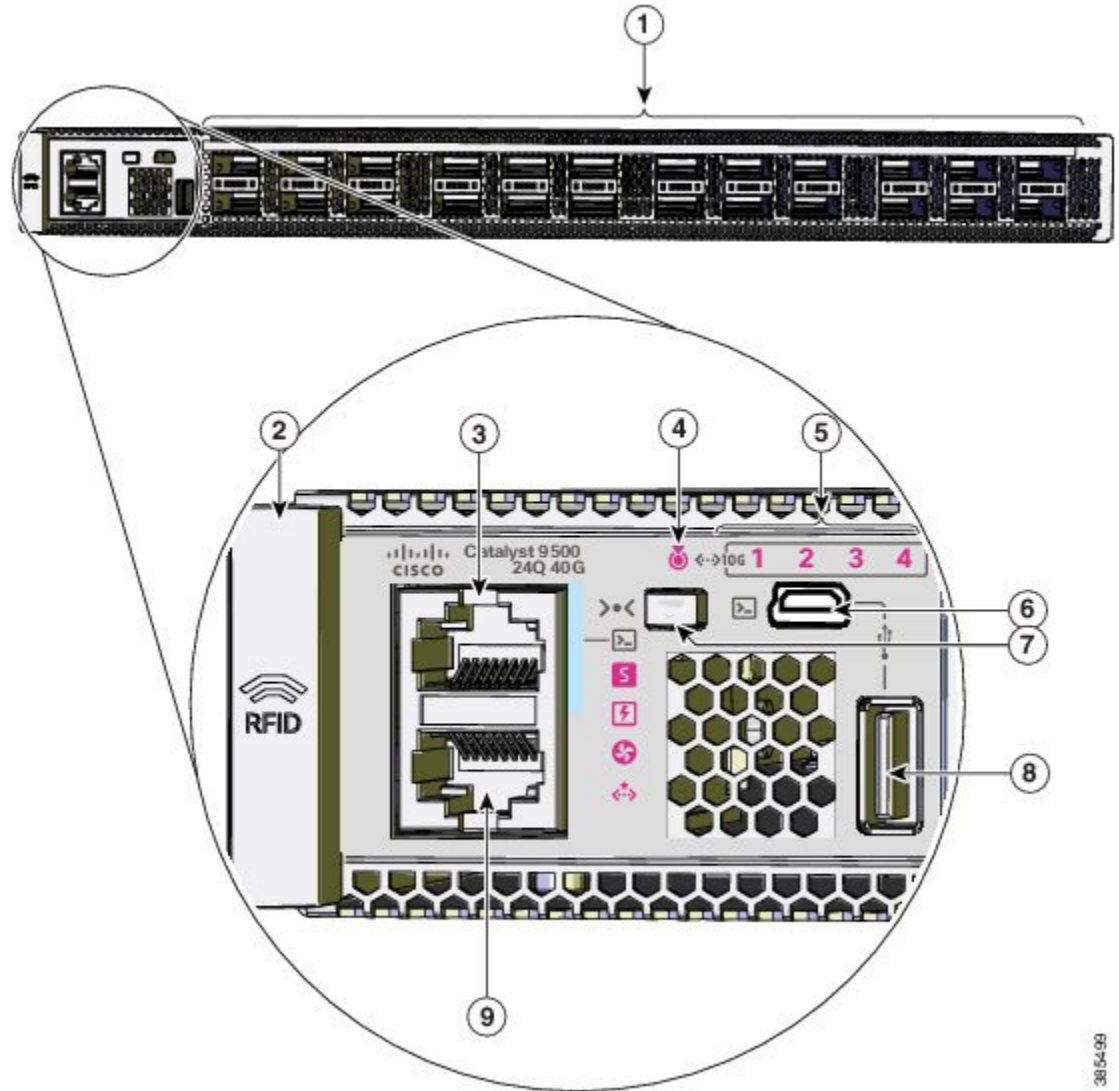
1	24 40G QSFP ports	6	USB mini Type B console port
2	RFID	7	Mode button
3	Console port (RJ-45 Serial)	8	USB 2.0 host port
4	Blue beacon LED	9	Ethernet management RJ-45 port
5	10G Status LEDs		

Figure 2: Front Panel of a Cisco Catalyst 9500 High Performance Switch (C9500-32C)
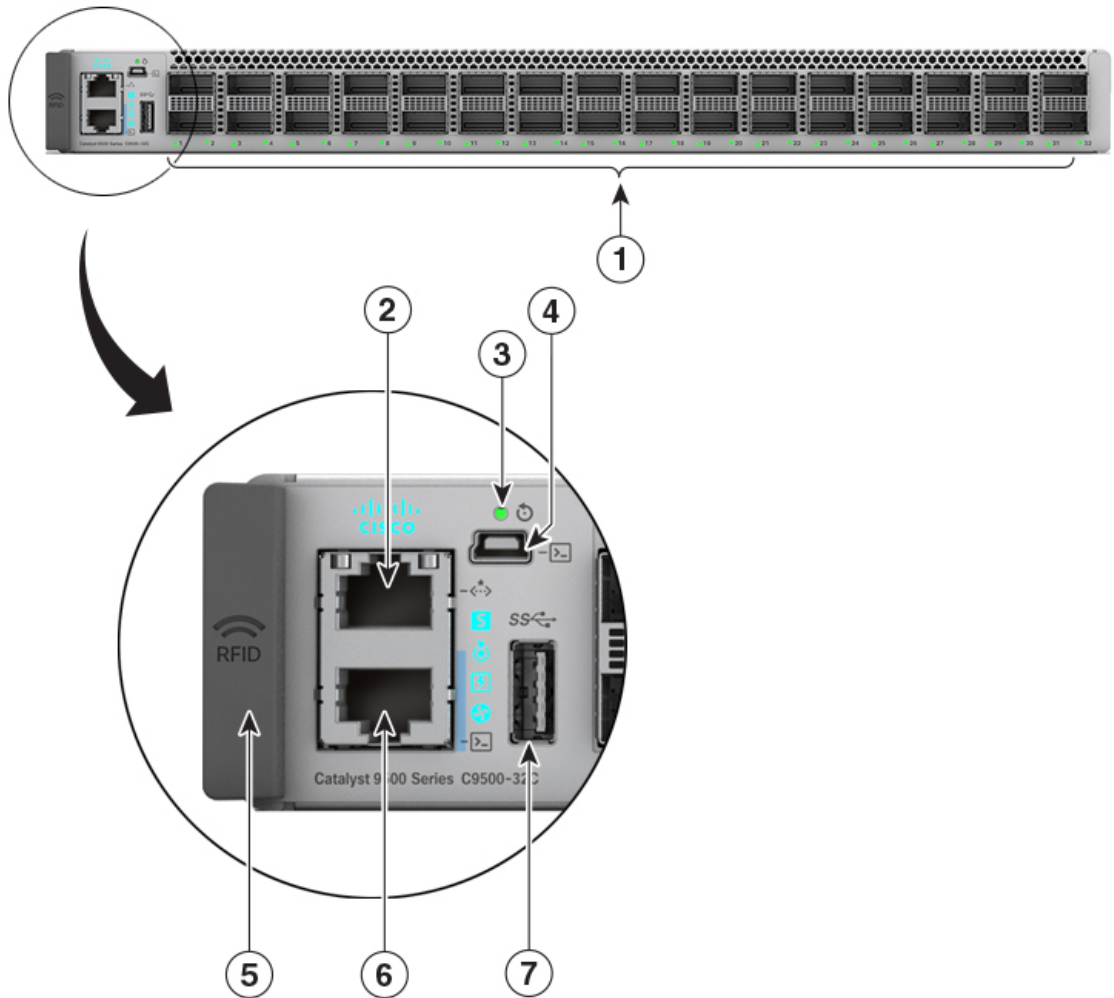
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1	32 40G/100G QSFP28 ports	5	RFID
2	Ethernet management port	6	Console port (RJ-45 Serial)
3	Reset button	7	USB 3.0 host port
4	USB mini Type B console port		

Figure 3: Front Panel of a 48-Port Cisco Catalyst 9500 High Performance Switch (C9500-48Y4C)
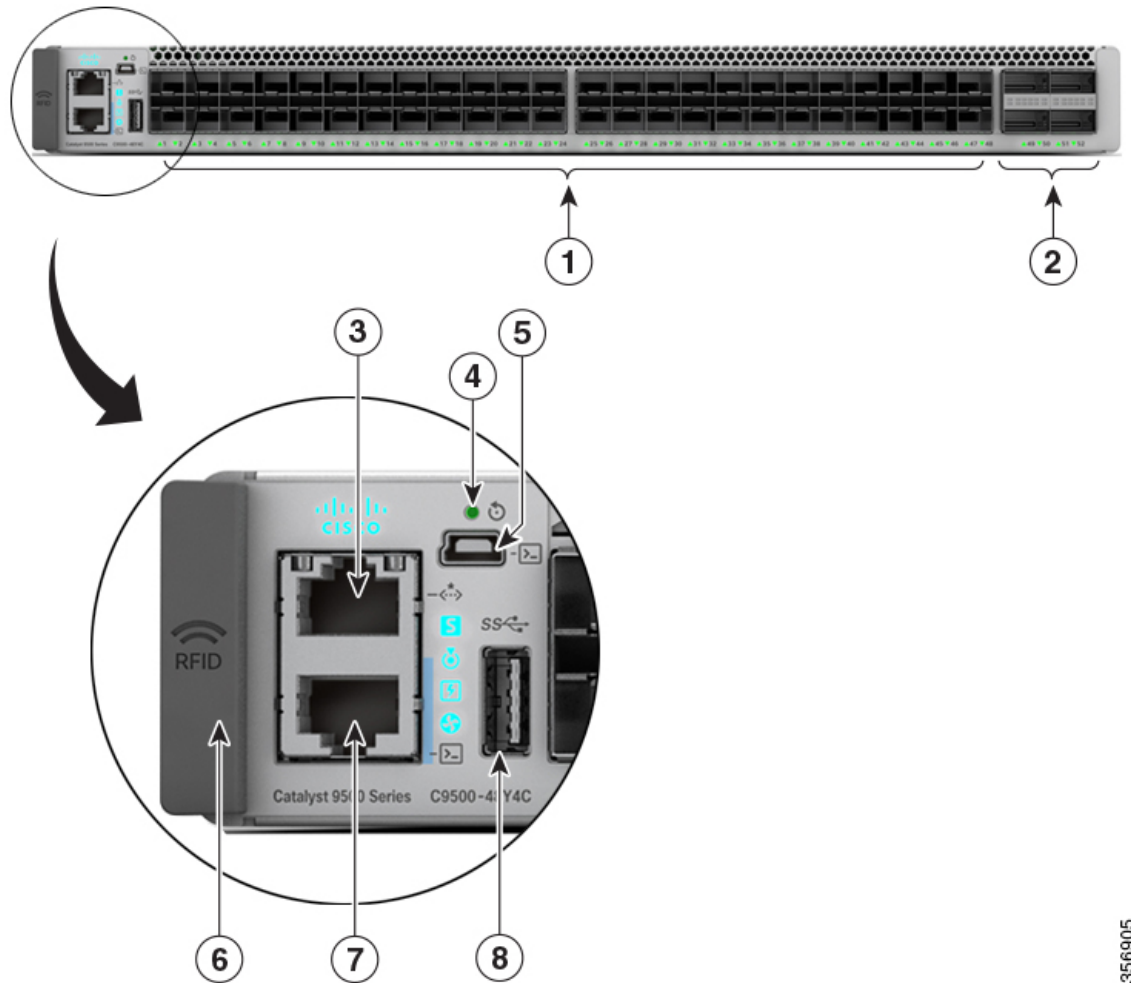
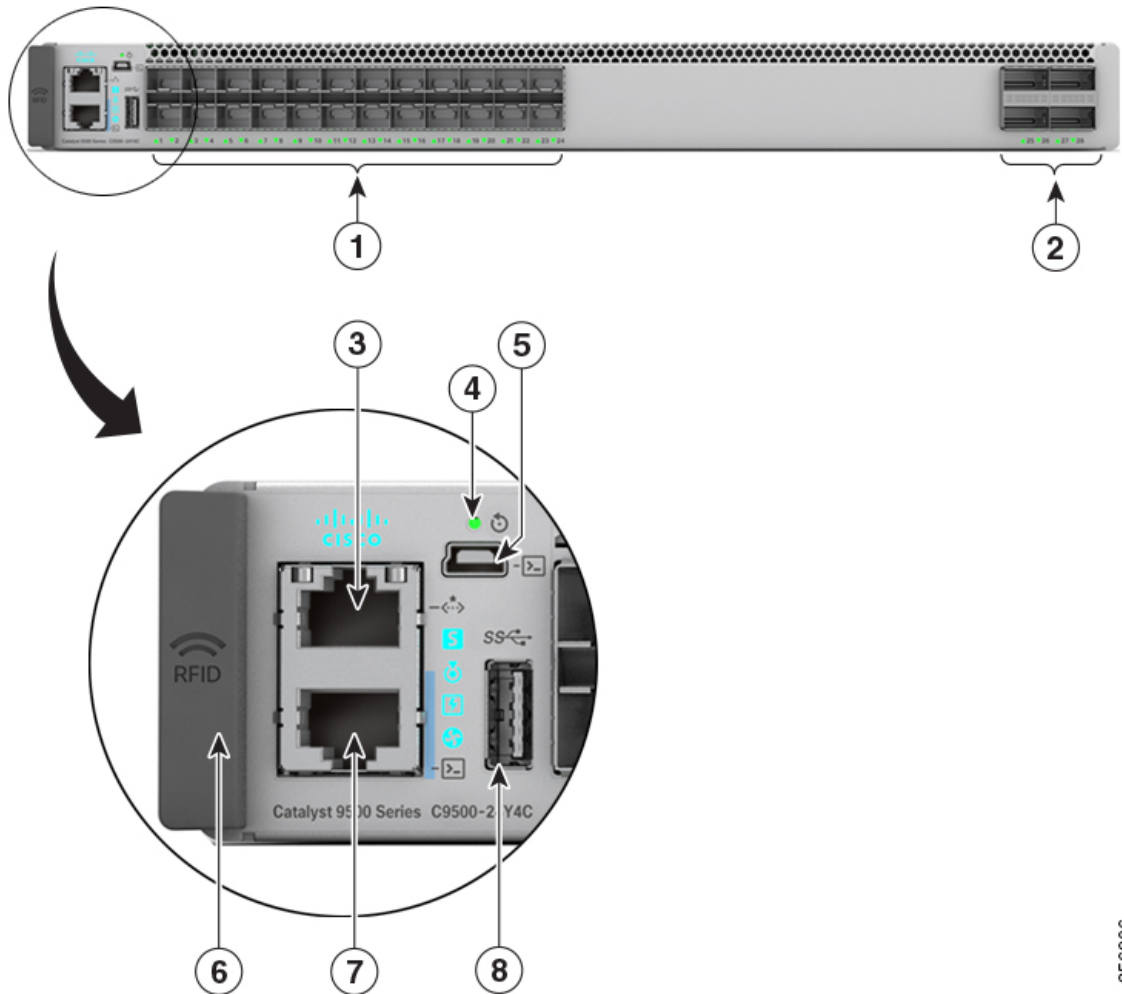| 1	48 1G/10G/25G SFP28 ports	5	USB mini Type B console port
2	Uplink ports	6	RFID
3	Ethernet management port	7	Console port (RJ-45 Serial)
4	Reset button	8	USB 3.0 host port

Figure 4: Front Panel of a 24-Port Cisco Catalyst 9500 High Performance Switch (C9500-24Y4C)

1	24 1G/10G/25G SFP28 ports	5	USB mini Type B console port
2	Uplink ports	6	RFID
3	Ethernet management port	7	Console port (RJ-45 Serial)
4	Reset button	8	USB 3.0 host port

SFP and QSFP Module Ports

The SFP and QSFP modules provide copper or fiber-optic connections to other devices. The SFP and QSFP module ports for Cisco Catalyst 9500 Series Switches are as follows :

Table 3: Cisco Catalyst 9500 Series Switch Models

Switch model	Supported ports
Cisco Catalyst 9500 Series Switches	
C9500-12Q	Supports standard 12x40G QSFP+ modules.
C9500-24Q	Supports standard 24x40G QSFP+ modules.
C9500-16X	Supports standard 16x10G SFP modules. The uplink ports support 8x10G SFP/SFP+ modules and 2x40G QSFP+ modules.
C9500-40X	Supports standard 40x10G SFP modules. The uplink ports support 8x10G SFP/SFP+ modules and 2x40G QSFP+ modules.
Cisco Catalyst 9500 Series High Performance Switches	
C9500-32C	Supports standard 32x100G or 32x40G QSFP28 modules; all ports are 100G/40G capable.
C9500-32QC	Supports standard 16x100G or 32x40G QSFP28 modules; only the ports in the top row are 100G capable.
C9500-24Y4C	Supports standard 24x25G or 24x10G SFP28 modules; all ports are 25G/10G/1G capable. The uplink ports support 4x100G or 4x40G QSFP+ modules.
C9500-48Y4C	Supports standard 48x25G or 48x10G SFP28 modules; all ports are 25G/10G/1G capable. The uplink ports support 4x100G or 4x40G QSFP28 modules.

Note   For information about SFP and QSFP network modules, see Network Modules, on page 14.

Support for Breakout Cables

On Cisco Catalyst 9500 Series High Performance Switches, breakout cables are supported only on the C9500-32C model. Breakout cables enable a single 40G QSFP+ interface to be split into four 10G SFP+ interfaces and a single 100G QSFP28 interface into four 25G SFP28 interfaces.

For supported SFP and QSFP modules, refer to the Cisco Transceiver Modules Compatibility Information at https://tmgmatrix.cisco.com/.

Port Mapping for Cisco Catalyst 9500 Series Switches

The odd-numbered ports are on the upper row and the even-numbered ports on the lower row. The following figures show how the ports and the LEDs are numbered on different switch models. This section also explains

the port mapping between 40G and 10G ports for the switches when configuring 40G ports to operate as four 10G ports using breakout cables.

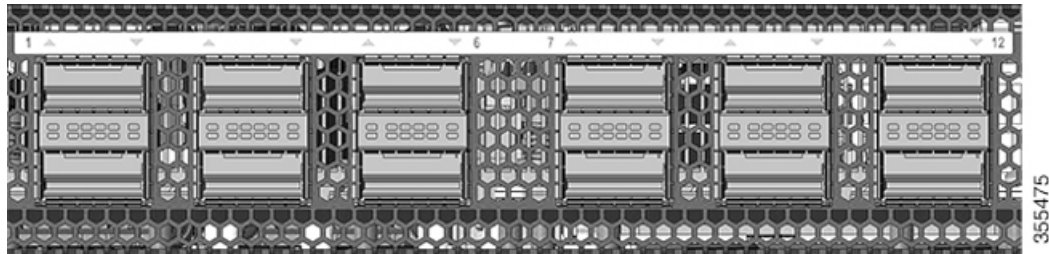### C9500-12Q

Figure 5: 40G native port numbering

Table 4: Port mapping for C9500-12Q

40-Gigabit native ports	Configurable 10-Gigabit ports with Breakout Cable
1	1, 2, 3, and 4
2	5, 6, 7, and 8
3	9, 10, 11, and 12
4	13, 14, 15, and 16
5	17, 18, 19, and 20
6	21, 22, 23, and 24
7	25, 26, 27, and 28
8	29, 30, 31, and 32
9	33, 34, 35, and 36
10	37, 38, 39, and 40
11	41, 42, 43, and 44
12	45, 46, 47, and 48

C9500-24Q

Figure 6: 40G native port numbering

Table 5: Port mapping for C9500-24Q

40-Gigabit native ports	Configurable 10-Gigabit ports with Breakout Cable
1	1, 2, 3, and 4
2	5, 6, 7, and 8
3	9, 10, 11, and 12
4	13, 14, 15, and 16
5	17, 18, 19, and 20
6	21, 22, 23, and 24
7	25, 26, 27, and 28
8	29, 30, 31, and 32
9	33, 34, 35, and 36
10	37, 38, 39, and 40
11	41, 42, 43, and 44
12	45, 46, 47, and 48
13	49, 50, 51, and 52
14	53, 54, 55, and 56
15	57, 58, 59 and 60
16	61, 62, 63, and 64
17	65, 66, 67 and 68
18	69, 70, 71, and 72
19	73, 74, 75, and 76
20	77, 78, 79, and 80
21	81, 82, 83, and 84
22	85, 86, 87, and 88
23	89, 90, 91, and 92
24	93, 94, 95, and 96

C9500-16X

Figure 7: 10G native port numbering
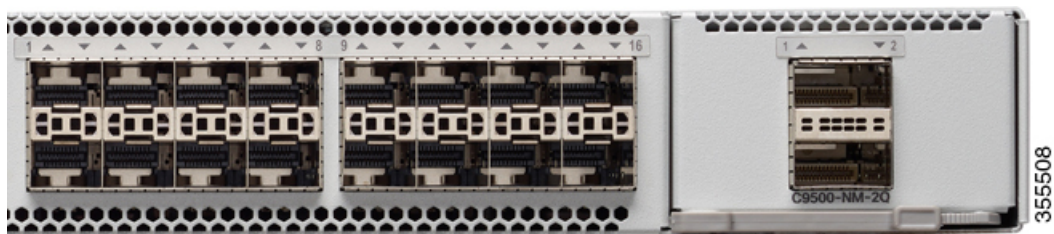
Table 6: Port mapping for C9500-16X

40-Gigabit Uplink ports	Configurable 10-Gigabit ports with Breakout Cable
17	1, 2, 3, and 4
18	5, 6, 7, and 8

C9500-40X

Figure 8: 10G native port numbering

Table 7: Port mapping for C9500-40X

40-Gigabit Uplink ports	Configurable 10-Gigabit ports with Breakout Cable
41	1, 2, 3, and 4
42	5, 6, 7, and 8

Port Mapping for Cisco Catalyst 9500 Series High Performance Switches

The following figures show how the ports are numbered on different Cisco Catalyst 9500 Series High Performance Switches.

C9500-32C

Figure 9: Native Port Numbering for C9500-32C

All the 32 ports can be configured as 100G or 40G.

Port Type	Port Number on the Switch
100G native ports	1—32
40G native ports	1—32

Breakout is supported only on 24 ports of the C9500-32C switch model. Every 4th port of C9500-32C does not support breakout due to ASIC limitation. Port numbers 4, 8, 12, 16, 20, 24, 28 and 32 do not support breakout. When you enable breakout on a native port, the port numbering convention changes from 3-tuple to 4-tuple. For example, if you enable breakout on port number 2 which is represented as Hu1/0/2, four logical ports are created which are represented as Hu1/0/2/1, Hu1/0/2/2, Hu1/0/2/3 and Hu1/0/2/4.

Table 8: Port mapping for C9500-32C

40G/100G native ports	Configurable 10G/25G ports with Breakout Cable	40G/100G native ports	Configurable 10G/25G ports with Breakout Cable
1	1/0/1/1, 1/0/1/2, 1/0/1/3, 1/0/1/4	17	1/0/17/1, 1/0/17/2, 1/0/17/3, 1/0/17/4
2	1/0/2/1, 1/0/2/2, 1/0/2/3, 1/0/2/4	18	1/0/18/1, 1/0/18/2, 1/0/18/3, 1/0/18/4
3	1/0/3/1, 1/0/3/2, 1/0/3/3, 1/0/3/4	19	1/0/19/1, 1/0/19/2, 1/0/19/3, 1/0/19/4
4	Not applicable	20	Not applicable
5	1/0/5/1, 1/0/5/2, 1/0/5/3, 1/0/5/4	21	1/0/21/1, 1/0/21/2, 1/0/21/3, 1/0/21/4
6	1/0/6/1, 1/0/6/2, 1/0/6/3, 1/0/6/4	22	1/0/22/1, 1/0/22/2, 1/0/22/3, 1/0/22/4
7	1/0/7/1, 1/0/7/2, 1/0/7/3, 1/0/7/4	23	1/0/23/1, 1/0/23/2, 1/0/23/3, 1/0/23/4
8	Not applicable	24	Not applicable
9	1/0/9/1, 1/0/9/2, 1/0/9/3, 1/0/9/4	25	1/0/25/1, 1/0/25/2, 1/0/25/3, 1/0/25/4
10	1/0/10/1, 1/0/10/2, 1/0/10/3, 1/0/10/4	26	1/0/26/1, 1/0/26/2, 1/0/26/3, 1/0/26/4
11	1/0/11/1, 1/0/11/2, 1/0/11/3, 1/0/11/4	27	1/0/27/1, 1/0/27/2, 1/0/27/3, 1/0/27/4
12	Not applicable	28	Not applicable
13	1/0/13/1, 1/0/13/2, 1/0/13/3, 1/0/13/4	29	1/0/29/1, 1/0/29/2, 1/0/29/3, 1/0/29/4
14	1/0/14/1, 1/0/14/2, 1/0/14/3, 1/0/14/4	30	1/0/30/1, 1/0/30/2, 1/0/30/3, 1/0/30/4
15	1/0/15/1, 1/0/15/2, 1/0/15/3, 1/0/15/4	31	1/0/31/1, 1/0/31/2, 1/0/31/3, 1/0/31/4
16	Not applicable	32	Not applicable

For more information about how to configure a breakout interface, see "Configuring Breakout Interfaces" section in the *Interface and Hardware Components Configuration Guide*.

C9500-32QC

Figure 10: Native Port Numbering for C9500-32QC

Port Type	Port Number on the Switch
40G native ports	1—32
100G native ports	33—48

The 40G ports on this switch can be configured to function as 100G ports using the Command Line Interface (CLI). For more information about mode conversion, see "*Configuring Interface Characteristics*" in *Interface and Hardware Components Configuration Guide*.

C9500-24Y4C

Figure 11: Native Port Numbering for C9500-24Y4C

Port Type	Port Number on the Switch
25G native ports	1—24
40G or 100G native ports	25—28

C9500-48Y4C

Figure 12: Native Port Numbering for C9500-48Y4C

Port Type	Port Number on the Switch
25G native ports	1—48
40G or 100G native ports	49—52

RFID Tag

The chassis has a built-in, front-facing, passive RFID tag that uses UHF RFID technology and requires an RFID reader with compatible software. It provides auto-identification capabilities for asset management and tracking. The RFID tags are compatible with the Generation 2 GS1 EPC Global Standard and are ISO 18000-6C compliant. They operate in the 860- to 960-MHz UHF band. For more information, see Radio Frequency Identification (RFID) on Cisco Catalyst 9000 Family Switches White Paper.

Console Ports

The console ports connect the switch to a PC running Microsoft Windows or to a terminal server.

- RJ-45 console port (EIA/TIA-232). The RJ-45 console port connection uses an RJ-45-to-DB-9 female cable.

- USB mini-Type B console port (5-pin connector).

- USB-C console port

If you use the USB mini-Type B or USB-C console ports, the Cisco Windows USB device driver must be installed on any PC connected to the console port (for operation with Microsoft Windows). Mac OS X or Linux do not require special drivers.

The 4-pin mini-Type B connector resembles the 5-pin mini-Type B connectors. They are not compatible. Use only the 5-pin mini-Type B.

This illustration shows a 5-pin mini-Type B USB port.
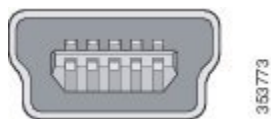
Figure 13: USB Mini-Type B Port

Figure 14: USB-C Console Port

With the Cisco Windows USB device driver, you can connect and disconnect the USB cable from the console port without affecting Windows HyperTerminal operations.

The console output always goes to both the RJ-45 and the USB console connectors, but the console input is active on only one of the console connectors at any one time. The USB console takes precedence over the RJ-45 console. When a cable is connected into the USB console port, the RJ-45 console port becomes inactive. Conversely, when the USB cable is disconnected from the USB console port, the RJ-45 port becomes active.

You can use the command-line interface (CLI) to configure an inactivity timeout which reactivates the RJ-45 console if the USB console has been activated and no input activity has occurred on the USB console for a specified time.

After the USB console deactivates due to inactivity, you cannot use the CLI to reactivate it. Disconnect and reconnect the USB cable to reactivate the USB console. For information on using the CLI to configure the USB console interface, see the Software Configuration Guide for Catalyst 9500 Switches.

Management Port

The Ethernet management port, also referred to as the Gi0/0 or GigabitEthernet0/0 port, is a VRF (VPN routing/forwarding) interface to which you can connect a PC. It supports TFTP image downloading, network management, SNMP, Telnet, and SSH connections. The switches support out-of-band management through the Mgmt-vrf. Mgmt-vrf is used to segment management traffic from the global routing table of the switch. The Ethernet management port supports speeds upto 10/100/1000 Mbps and is set to auto-negotiate.

USB Host Ports

USB host ports lets you connect different USB devices such as flash drives to the switch. USB 2.0 port supports Cisco USB flash drives with capacities from 128 MB to 8 GB (USB devices with port densities of 128 MB, 256 MB, 1 GB, 4 GB, and 8 GB are supported). The USB 3.0 port provides support for Cisco USB flash drives with capacities from 64 MB to 16 GB. Cisco IOS software provides standard file system access to the flash device: read, write, erase, and copy, as well as the ability to format the flash device with a FAT file system.

The USB host ports are located on different sides of the switches as follows:

- Cisco Catalyst 9500 Series Switches: USB 2.0 port on the front panel and USB 3.0 port on the rear panel.

- Cisco Catalyst 9500 Series High Performance Switches: USB 3.0 port on the front panel.

Mode Button

The mode button has the following function:

- Blue Beacon Mode — works with blue beacon LED to indicate that the switch needs attention

- 10G Status LED Mode — works with 10G Status LEDs to indicate status of 10G ports

Blue Beacon Mode

The blue beacon mode has higher priority over the 10G status LED mode and reset mode. The blue beacon LED can be provisioned by the operator to indicate that the switch needs attention.

10G Status LED Mode

Each 40G port can be configured to function as a 10G port using a Cisco QSFP to four SFP Active Optical Breakout Cables that connect a 40G QSFP port of the switch on one end to four 10G SFP ports of the switch on the other end. After system bootup, the four 10G Status LEDs indicate the status of 10G ports 1-4 by default which maps to 40G port number 1. A short press on the mode button moves the pointer to the next 10G group (5-8) which maps to 40G port number 2. You can check the status of all the 96 10G ports by pressing the mode button 24 times, after which it rolls back to 10G port 1-4.

Network Modules

The C9500-16X and C9500-40X switch models support two network modules that provide uplink ports to connect to other devices. The switch should only be operated with either a network module or a blank module installed.

Table 9: Network Modules

Network Module	Description
C9500-NM-8X	This module has eight 10G SFP ports. Any combination of standard SFP modules are supported.
C9500-NM-2Q	This module has two 40G QSFP ports. Any combination of standard QSFP modules are supported.

For information about the network modules, see Installing the Network Modules section. For cable specifications, see Cables and Adapters section.
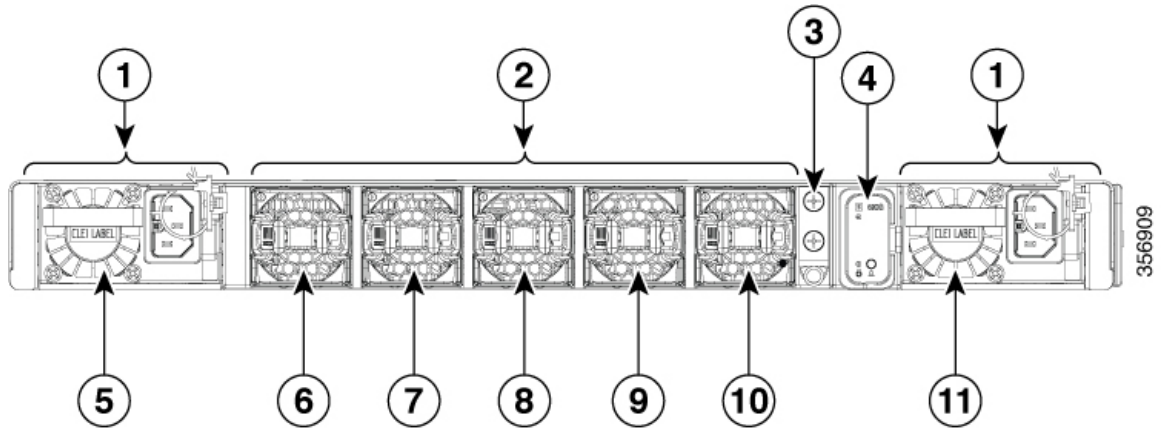
Rear Panel

Figure 15: Rear Panel of a Cisco Catalyst 9500 Switch (C9500-12Q, C9500-24Q, C9500-40X and C9500-16X)
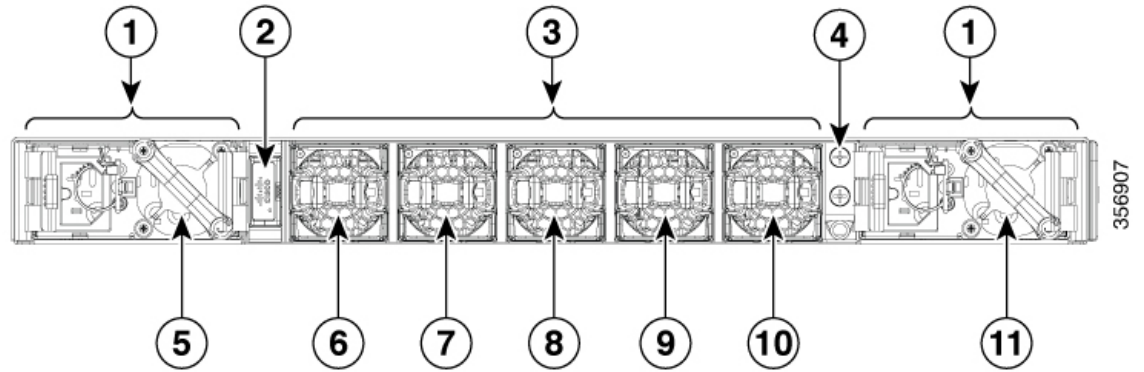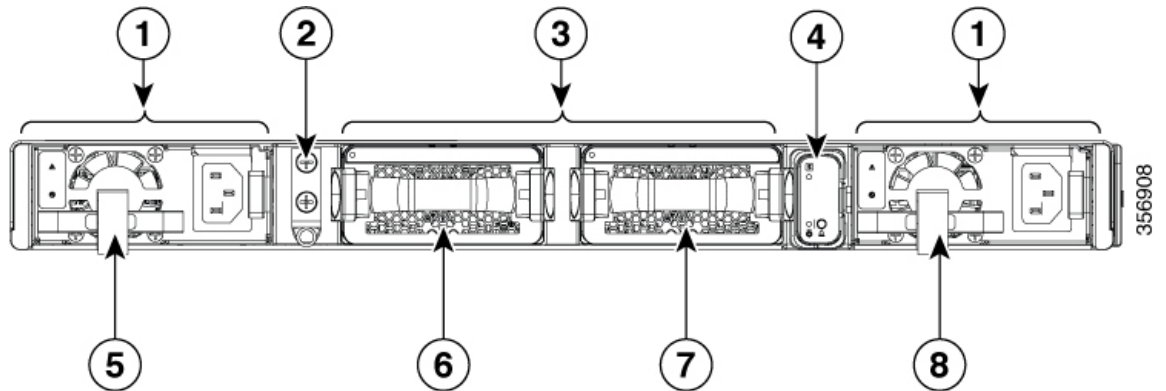

1	Power supply modules	7	Fan 3
2	USB 3.0 host port	8	Fan 2
3	Fan modules	9	Fan 1
4	Grounding pad	10	Fan 0
5	PSU 1	11	PSU 0
6	Fan 4	-	-

Figure 16: Rear Panel of a Cisco Catalyst 9500 High Performance Switch (C9500-32C)

1	Power supply modules	7	Fan 3
2	Fan modules	8	Fan 2
3	Grounding pad	9	Fan 1
4	SATA SSD module	10	Fan 0
5	PSU 1	11	PSU 0
6	Fan 4	-	-

Figure 17: Rear Panel of a Cisco Catalyst 9500 High Performance Switch (C9500-32QC, C9500-48Y4C, and C9500-24Y4C)

1	Power supply modules	5	PSU 1
2	Grounding pad	6	Fan 1
3	Fan modules	7	Fan 0
4	SATA SSD module	8	PSU 0

SATA SSD Module

To support the storage needs on the switch, the Cisco Catalyst 9500 Series High Performance Switches provide support for pluggable Serial Advanced Technology Attachment (SATA) Solid State Drive (SSD) module. The SSD module storage capacity ranges are 240GB, 480GB and 960GB. SATA SSD works as a general-purpose storage device. The storage drive can also be used to save packet captures and trace logs generated by the operating system.

Power Supply Slots

The switch has two power supply slots that accept AC and DC input power supplies. The power supply modules are field replaceable units (FRUs) and are hot-swappable. The chassis is delivered with one power supply pre-installed in the power supply slot. If only one power supply is ordered, then a blank cover is installed in the empty power supply slot, which must remain installed if a power supply is not installed.

The following table describes the internal power supply modules supported on different switch models:

Table 10: Internal Power Supply Modules

Part Number	PSU Modules	Switches Supported
PWR-C4-950WDC-R	950-W DC power supply module	Cisco Catalyst 9500 Series switches: C9500-12Q C9500-24Q C9500-40X C9500-16X
PWR-C4-950WAC-R	950-W AC power supply module	
C9K-PWR-650WAC-R	650-W AC power supply module	Cisco Catalyst 9500 Series High Performance switches: C9500-32QC C9500-48Y4C C9500-24Y4C
C9K-PWR-650WACL-R	650-W AC power supply module	
C9K-PWR-930WDC-R	930-W DC power supply module	
C9K-PWR-1600WAC-R	1600-W AC power supply module	Cisco Catalyst 9500 Series High Performance switch: C9500-32C
C9K-PWR-1600WDC-R	1600-W DC power supply module	

⚠️

Caution   In Europe, you must use C9K-PWR-650WACL-R in a dual-power supply configuration. The use of a single C9K-PWR-650WACL-R in C9500-24Y4C, C9500-48Y4C, or C9500-32QC can result in unpredictable operation and the interruption of the network service. Cisco has no liability for any use of C9K-PWR-650WACL-R that is inconsistent with this document.

Fan Modules

The switch supports field-replaceable, variable-speed modular fans with default front-to-back airflow. These fan units support Online Insertion and Removal (OIR) for up to 120 seconds. The fan unit is responsible for cooling the entire chassis and interfacing with environmental monitors to trigger alarms when conditions exceed thresholds.

The following table describes the fan modules supported on different switch models.

Table 11: Fan Modules

Part Number	Fan Modules	Switches Supported
FAN-T4-R=	Type 4 front to back cooling fan	Cisco Catalyst 9500 Series switches: C9500-12Q C9500-24Q C9500-40X C9500-16X
C9K-T1-FANTRAY=	Hot-swappable fan tray unit with dual stacked fans.	Cisco Catalyst 9500 Series High Performance switches: C9500-32QC C9500-48Y4C C9500-24Y4C
C9K-T2-FANTRAY=	Type 4 front to back cooling fan	Cisco Catalyst 9500 Series High Performance switch: C9500-32C

For more information, see Fan Module Overview.