

Installing a Switch

For initial switch setup, assigning the switch IP address, and powering on information, see the switch getting started guide on Cisco.com.

This chapter contains these topics:

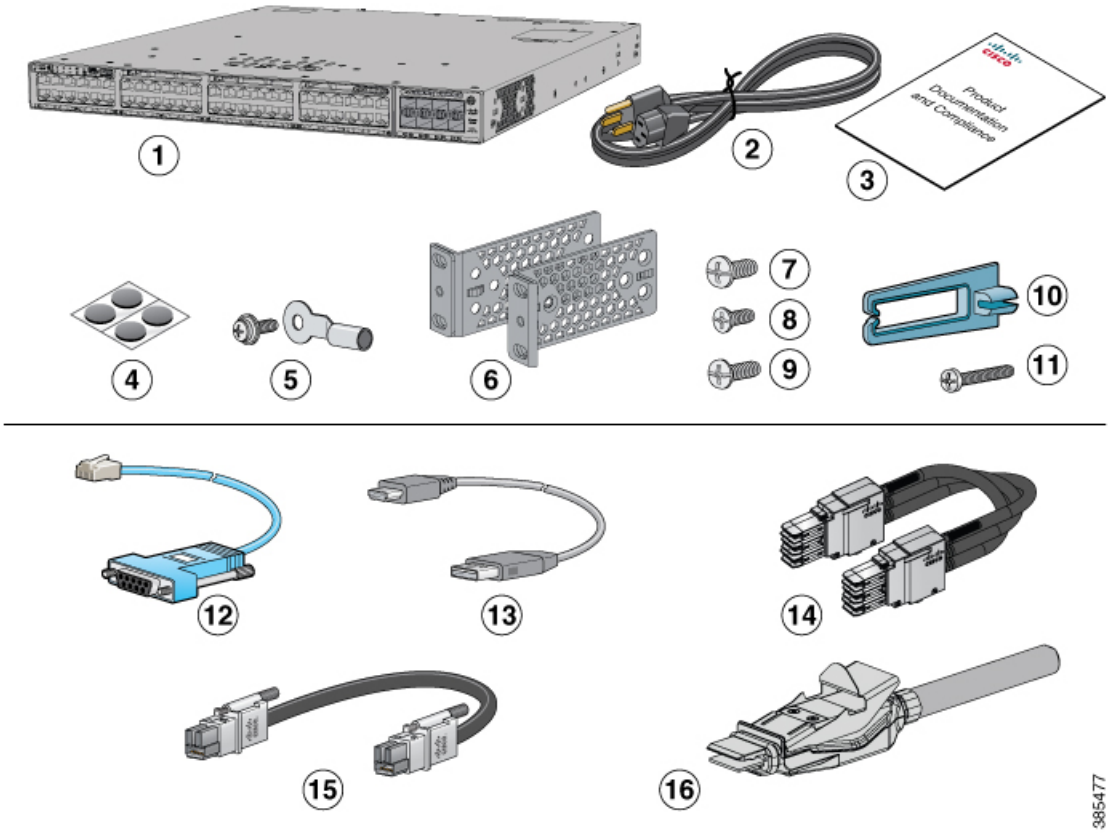
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Shipping Box Contents

The shipping box contains the model of the switch you ordered and other components needed for installation. Some components are optional, depending on your order.

Note Verify that you have received these items. If any item is missing or damaged, contact your Cisco representative or reseller for instructions.

Figure 1: Components Delivered in the Shipping Box



1	Cisco Catalyst 9300 Series switch with optional network module[1] (power supply and fan modules not shown)	9	Eight number-8 Phillips flat-head screws
2	AC power cord	10	Cable guide
3	Product documentation and compliance document	11	M4.0 x 20mm Phillips pan-head screw
4	Four rubber mounting feet	12	(Optional) RJ-45 console cable
5	Ground lug screw and ring terminal	13	(Optional) USB console cable
6	Two 19-inch mounting brackets	14	(Optional) StackWise-480/1T cable (0.5-meter, 1-meter, or 3-meter)
7	Four number-12 pan-head screws	15	(Optional) StackPower cable (0.3-meter or 1.5-meter)
8	Four number-10 pan-head screws	16	(Optional) StackWise-320 cable

Note 1. The item is orderable.

Tools and Equipment

Obtain these necessary tools:

- A Number-2 Phillips screwdriver.

Verifying Switch Operation

Before you install the switch in a rack, or on a table or shelf, power on the switch and verify that it passes POST.

To power on the switch, plug one end of the AC power cord into the switch AC power connector, and plug the other end into an AC power outlet.

As the switch powers on, it begins the POST, a series of tests that runs automatically to ensure that the switch functions properly. LEDs can blink during the test. The SYST LED blinks green, and the other LEDs remain solid green.

When the switch completes POST successfully, the SYST LED remains green. The other LEDs turn off and then reflect the switch operating status. If a switch fails POST, the SYST LED turns amber.

POST failures are usually fatal. Call Cisco technical support representative if your switch fails POST.

After a successful POST, unplug the power cord from the switch and install the switch in a rack, on a table, or on a shelf.

Planning a Switch Data Stack

Cisco Catalyst 9300 switches can share bandwidth by using data stacking. The following table lists the supported stacking options:

Table 1: Supported Stacking Options

Switch Model	Stacking Option	Supported Bandwidth
C9300X modular uplinks	StackWise-1T	1 Tbps
C9300 modular uplinks	StackWise-480	480 Gbps
C9300L fixed uplinks	StackWise-320	320 Gbps

Mixed stacking between C9300X and C9300 switches are supported at StackWise-480 speed. However, you cannot stack fixed uplink switches with modular uplink switches or other Cisco Catalyst switches.

Switch Stacking and Power Stacking Guidelines

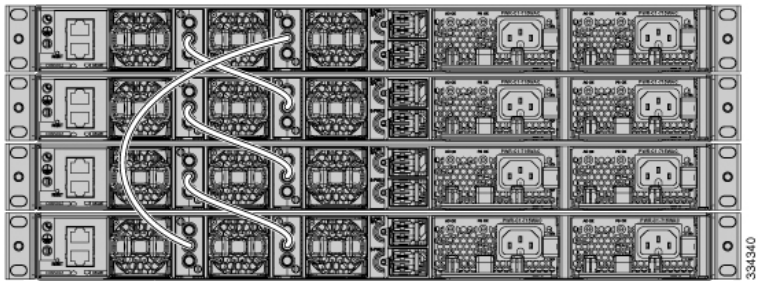
Before connecting the switches in a stack, ensure that you read these stacking guidelines:

- Size of the switch and any optional power supply module. The 1100 W/1900 W power supply module is longer than the other modules. Stacking switches with the same power supply modules together makes it easier to cable the switches.
- Length of cable. Depending on the configurations that you have, you might need different sized cables. If you do not specify the length of the StackWise cable, the 0.5 meter cable is supplied. If you need the 1 meter cable or the 3 meter cable, you can order it from your Cisco supplier. For cable part numbers, see StackWise Accessories. The Data Stack Cabling Configurations, on page 4 provides examples of recommended configurations.
- For rack mounted switch stacks that are members of a StackPower stack as well as a data stack, see Planning a StackPower Stack, on page 7.
- Up to four switches can be configured in a StackPower stack using the StackPower connector at the rear of the switch. However, with XPS-2200, you can configure up to nine C9300 switches in a StackPower stack. Currently, C9300X switches do not support XPS-2200.

Data Stack Cabling Configurations

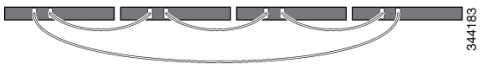
This is an example of a recommended configuration that uses the supplied 0.5-meter StackWise cable. In this example, the switches are stacked in a vertical rack or on a table. This configuration provides redundant connections. The configuration example uses the supplied 0.5-meter StackWise cable. The example shows the full-ring configuration that provides redundant connections.

Figure 2: Data Stacking the Switches in a Rack or on a Table Using the 0.5-meter StackWise Cables



This example shows a recommended configuration when the switches are mounted side-by-side. Use the 1-meter and the 3-meter StackWise cables to connect the switches. This configuration provides redundant connections.

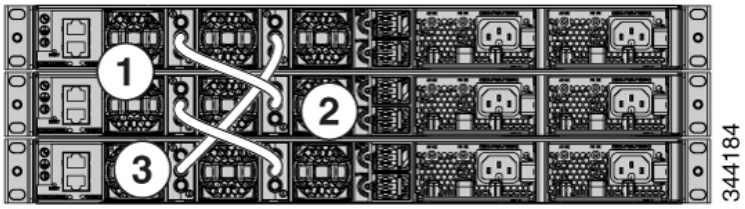
Figure 3: Data Stacking in a Side-by-Side Mounting



Data Stack Bandwidth and Partitioning Examples

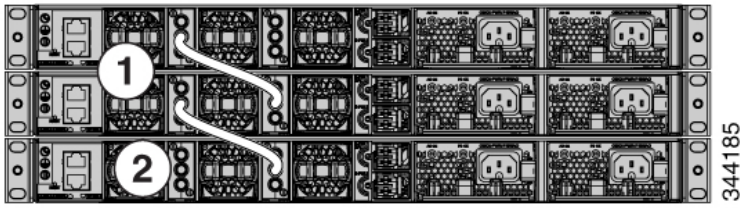
This section provides examples of data stack bandwidth and possible data stack partitioning. The figure shows a data stack of switches that provides full bandwidth and redundant StackWise cable connections.

Figure 4: Example of a Data Stack with Full Bandwidth Connections



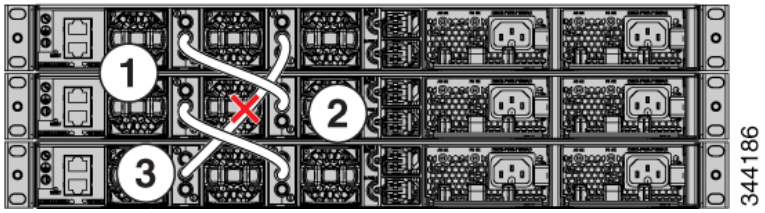
This figure shows an example of a stack of switches with incomplete StackWise cabling connections. This stack provides only half bandwidth and does not have redundant connections.

Figure 5: Example of a Data Stack with Half Bandwidth Connections



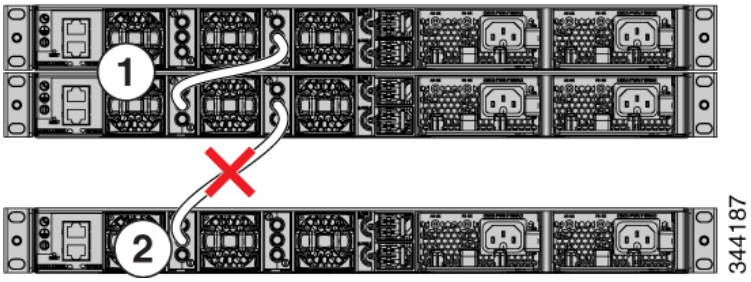
The figures below show data stacks of switches with failover conditions. In this figure, the StackWise cable is bad in link 2. Therefore, this stack provides only half bandwidth and does not have redundant connections.

Figure 6: Example of a Data Stack with a Failover Condition



In this figure, link 2 is bad. Therefore, this stack partitions into two stacks, and the top and bottom switches become the active switch in the stack. If the bottom switch is a member (not active or standby switch), it reloads.

Figure 7: Example of a Partitioned Data Stack with a Failover Condition



Power-On Sequence for Switch Stacks

Consider these guidelines before you power on the switches in a stack:

- The sequence in which the switches are first powered on might affect the switch that becomes the stack master.
- There are two ways to elect an active switch:
  - If you want a particular switch to become the active switch, configure it with the highest priority. Among switches with same priority, the switch with the lowest MAC address becomes the active switch.
  - If you want a particular switch to become the active switch, power on that switch first. This switch remains the active switch until a reelection is required. After 2 minutes, power on the other switches in the stack. If you have no preference as to which switch becomes the active switch, power on all the switches in the stack within 1 minute. These switches participate in the active switch election. Switches powered on after 2 minutes do not participate in the election.

If changes are made to the stack without powering down the switches, the following results can occur:

- If two operating partial ring stacks are connected together using a stack cable, a stack merge can take place. This situation reloads the whole stack (all switches in the stack).
- If some switches in the stack are completely separated from the stack, a stack split can occur.
- A stack split can occur on a full ring stack if:
  - More than one running switch is removed without powering down.
  - More than one stack cable is removed without powering down.
- A stack split can occur in a partial ring stack if:
  - A switch is removed without powering down.
  - A stack cable is removed without powering down.
- In a split stack, depending on where the active and standby switches are located, either two stacks might be formed (with the standby taking over as the new active switch in the newly formed stack) or all the members in the newly formed stack might reload.

Note These results depend on how the switches are connected. You can remove two or more switches from the stack without splitting the stack.

For conditions that can cause a stack reelection or to manually elect the active switch, see the stacking software configuration guide on Cisco.com at this URL: http://www.cisco.com/go/c9300.

Planning a StackPower Stack

StackPower Stacking Guidelines

You can configure a StackPower stack for either power sharing or redundancy. In power-sharing mode, the power of all the power supplies in the stack is aggregated and distributed among the stack members.

In redundant mode, when the total power budget of the stack is calculated, the wattage of the largest power supply is not included. That power is held in reserve and used to maintain power to switches and attached devices when one power supply fails. Following the failure of a power supply, the StackPower mode becomes power sharing.

Note Power-sharing mode is the recommended configuration for Cisco Catalyst 9300 Series Switches.

For general concepts and management procedures for switch power stacks, see the Software Configuration Guide on Cisco.com.

Before connecting the switches in a power stack, read the following guidelines:

- C9300 and C9300X switches support Cisco StackPower providing up to 1000 W of power in nominal conditions and 2400 W of power in failure conditions across a power stack. Cisco StackPower is not supported in C9300L switches.
- A switch power stack can include a maximum of four switches in a ring topology and nine switches in a star topology. Currently, C9300X switches do not provide support for XPS-2200.
- Size of the switch and any optional power supply module. The 1100 W/1900 W power supply module is 1.5 inches (3.81 cm) longer than the other modules, and with the attached cable retention clip, it extends 3 inches (7.62 cm) from the switch chassis. Stacking switches with the same power supply modules together makes it easier to cable the switches. For switch dimensions, see Appendix A, “Technical Specifications.”
- Length of cable. Depending on the configurations that you have, you might need different sized cables. If you do not specify the length of the StackPower cable, the 0.3 meter cable is supplied. If you need the 1.5 meter cable, you can order it from your Cisco supplier. For cable part numbers, see StackPower Connector. The StackPower Cabling Configurations, on page 8 provides examples of recommended configurations.
- For rack mounted switch stacks that are members of a data stack and a StackPower stack, see Switch Stacking and Power Stacking Guidelines, on page 4

StackPower Cabling Configurations

This section describes the recommended cabling configurations for a StackPower stack. There are two types of StackPower cables.

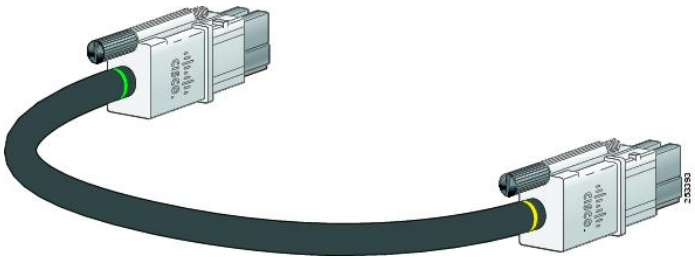
The cable in the figure connects a switch to another switch in a power stack or with an XPS. StackPower cables have color bands on the cable ends:

- The cable end with the green band can connect only to a switch.
- The cable end with the yellow band can connect to a switch or an XPS.

The cable is available in two lengths.

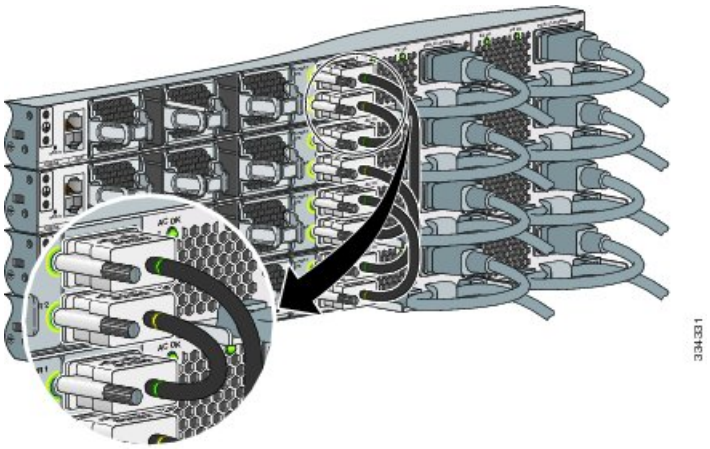
Part Number	Cable Type	Length
CAB-SPWR-30CM	StackPower Cable	0.3 meter
CAB-SPWR-150CM	StackPower Cable	1.5 meter

Figure 8: StackPower Cable for Use with Cisco Catalyst 9300 Series Switches



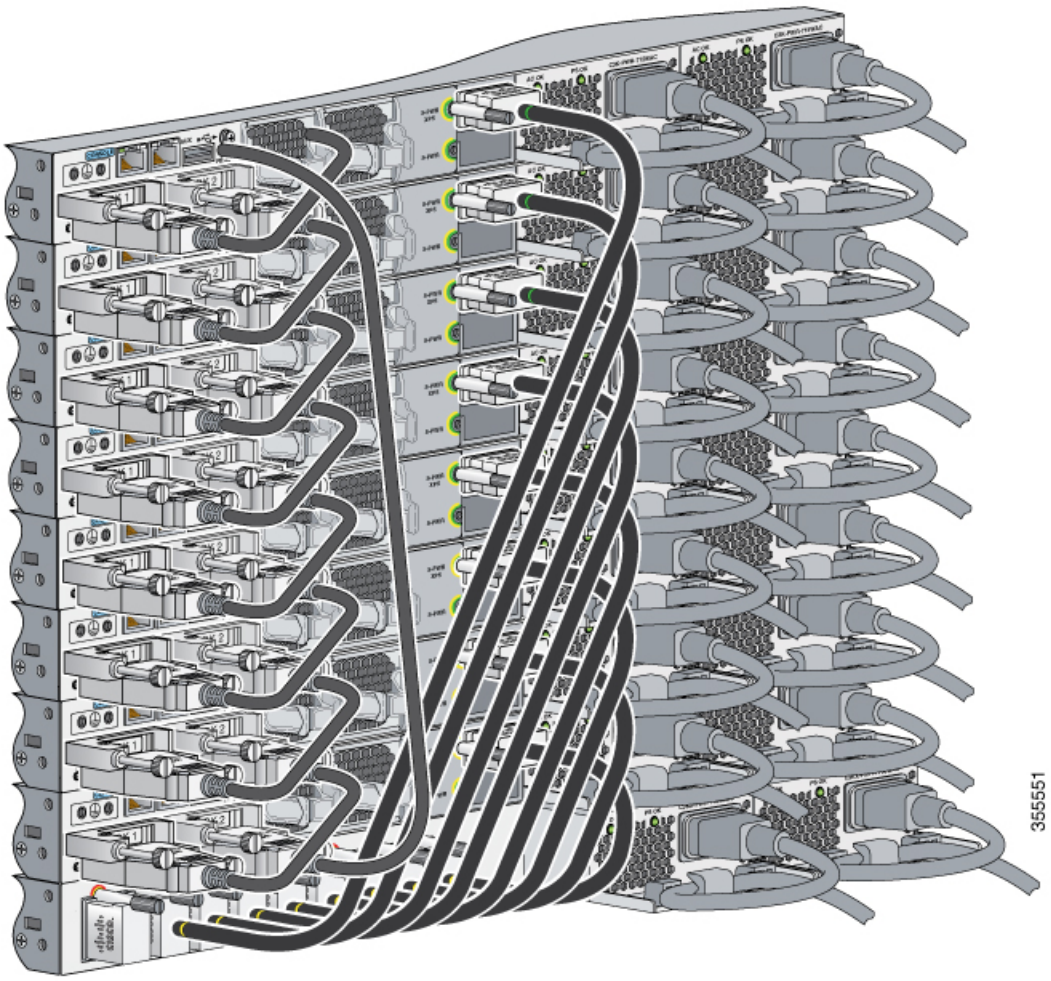
This figure shows a ring configuration using both of the supplied 0.3-meter StackPower cables and one 1.5-meter cable. In the examples that follow, the switches are stacked in a vertical rack or on a table.

Figure 9: StackPower Ring Topology



This figure shows 8 switches connected in a star topology.

Figure 10: StackPower Star Topology

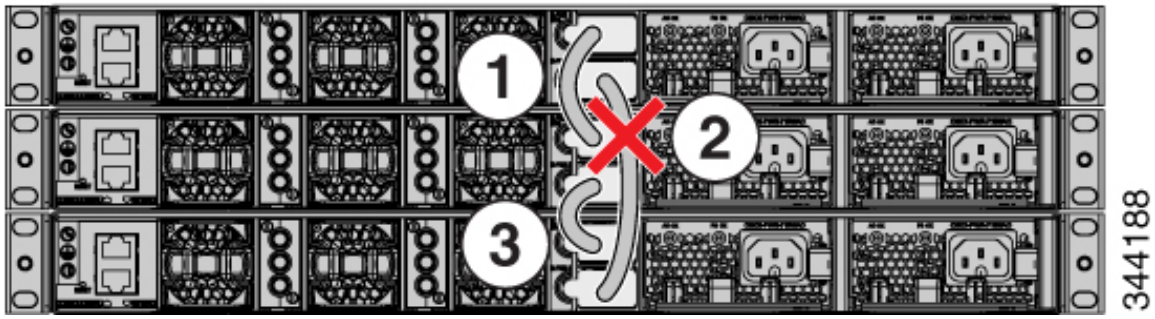


StackPower Partitioning Examples

These figures show StackPower stacks of switches with failover conditions.

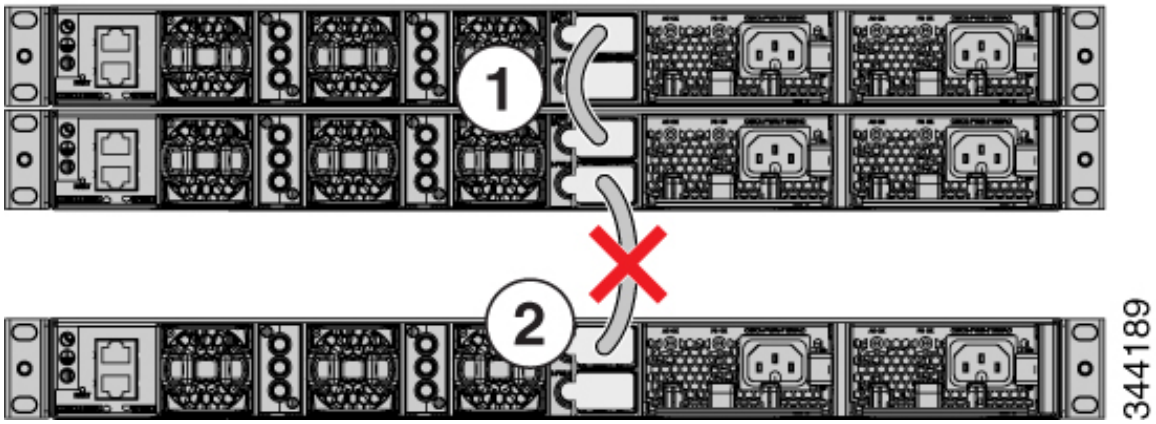
In the following figure, the StackPower cable 2 is faulty. This is considered a broken ring and is a fault condition. Power is still shared across the stack, but this condition will place a limitation on power budgeting and the number of high priority ports it can protect in the case of any further failures such as failure of power supply, AC mains, StackPower port and so on. StackPower is not intended for secondary failures and hence restoration of the failed component or power should be done immediately.

Figure 11: Example of a StackPower Stack with a Failover Condition



In the following figure, StackPower port B on the center switch has failed and the stack partitions into two stacks. The top two switches share power, and the bottom switch is now a separate stack. After initial failure of cable 2, any further failure of a port is considered a double fault, which a StackPower cannot handle. A double fault could result in unintended high priority ports being shut. If you are unable to physically restore a bad cable, adjust port priorities and restore any offline supplies, as available.

Figure 12: Example of a Partitioned StackPower Stack with a Failover Condition



Installing the Switch

Caution Handle the switch with care. Do not shake, drop, or turn the unit upside down. Rough handling may cause a noise, which is due to air baffles shifting inside the chassis, and this is normal. The noise will not occur if the unit is handled with care.

Switches should be installed in the typical flat orientation, with the Cisco logo on the faceplate positioned in the top-left corner.

Rack-Mounting

Installation in racks other than 19-inch racks requires a bracket kit not included with the switch.

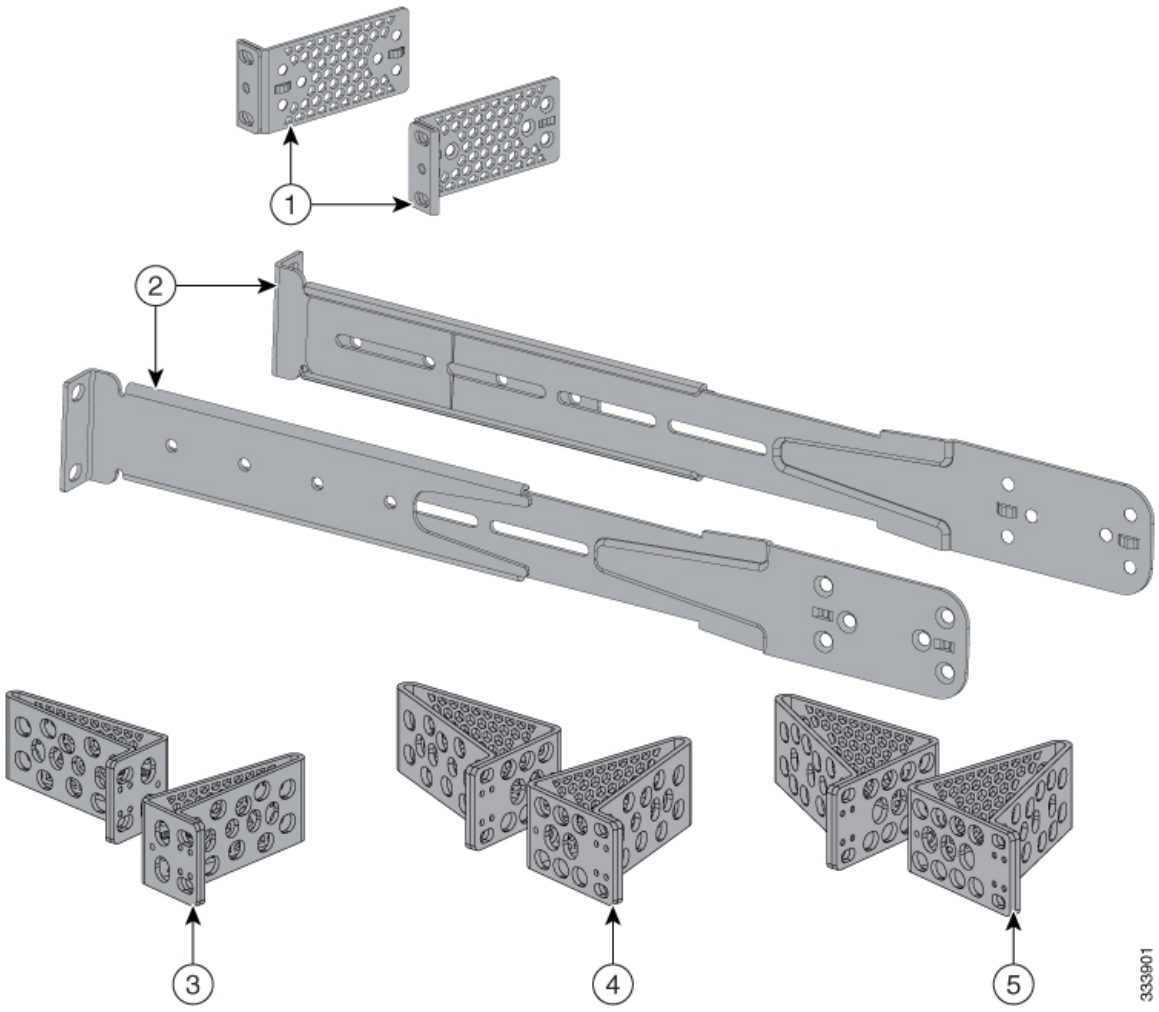
Warning **Statement 1006—**Chassis Warning for Rack-Mounting and Servicing

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

The following figure shows the standard 19-inch brackets and other optional mounting brackets. You can order the optional brackets from your Cisco sales representative.

Figure 13: Rack-Mounting Brackets



1	19-inch brackets (ACC-KIT-T1=)	4	23-inch brackets (RACK-KIT-T1=)
2	Extension rails and 5 brackets for four-point mounting, includes 19-inch brackets (4PT-KIT-T2=)	5	24-inch brackets (RACK-KIT-T1=)
3	ETSI brackets (RACK-KIT-T1=)	-	-

Attaching the Rack-Mount Brackets

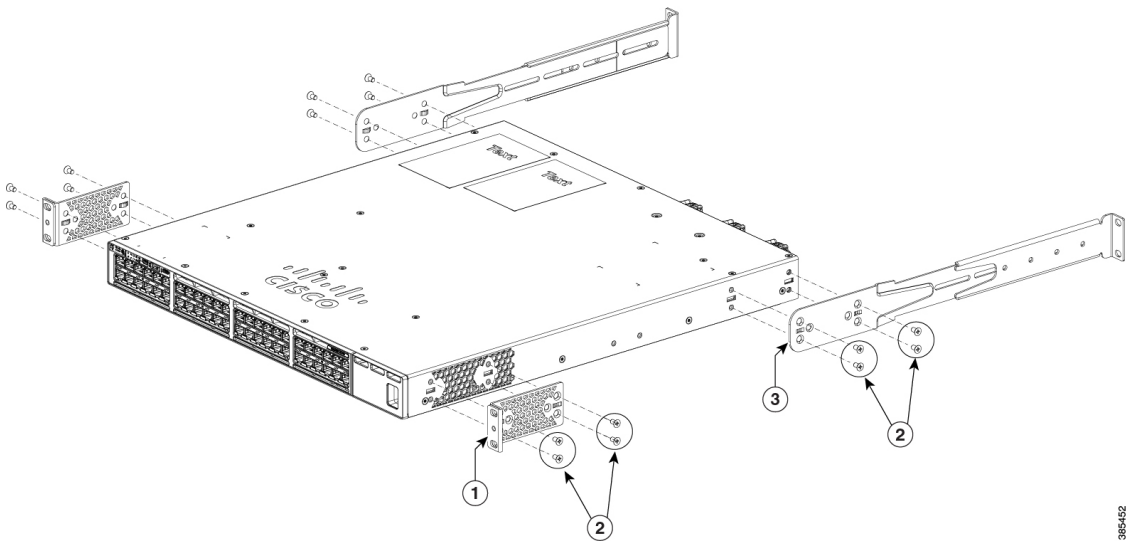
Before you begin

You can use the minimum recommended number of two screws for installing the rack-mount bracket to each side of the switch. If required, while mounting, you can use the additional four screws provided in the accessory kit.

Procedure

Step 1 Use two Phillips flat-head screws to attach the long side of the bracket to each side of the switch for the front or rear mounting positions.

Figure 14: Attaching 19-inches Rack Mount Brackets and Extension Rails



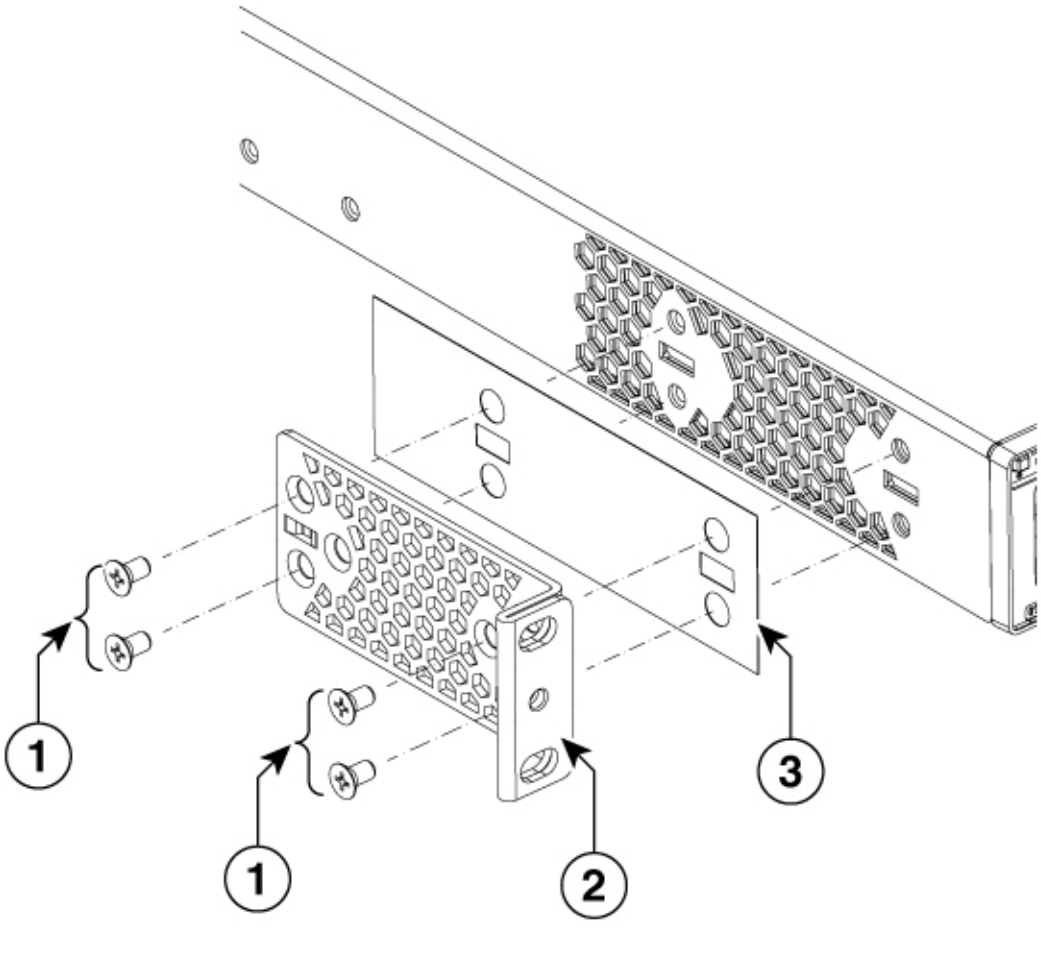
1	19-inch bracket	3	19-inch extension rail
2	Number-8 Phillips flat-head screws (48-2927-01)	-	-

Step 2 For Network Equipment-Building Standards (NEBS) compliant installations, perform the following steps:

a) Stick the labels available with CAT-A-AIRFLOW kit on to each side of the switch as shown in the following illustration. Make sure you align the holes in the labels with the screw holes in the chassis.
b) Secure the brackets to the chassis using the flat head screws provided with the bracket.

Note
NEBS is supported only with four-point mounting.

Figure 15: Attaching the NEBS-Compliant Air Vent Label to the Switch



1	Number-8 Phillips flat-head screws	3	NEBS-compliant CAT-A-AIRFLOW kit
2	19-inch bracket	-	-

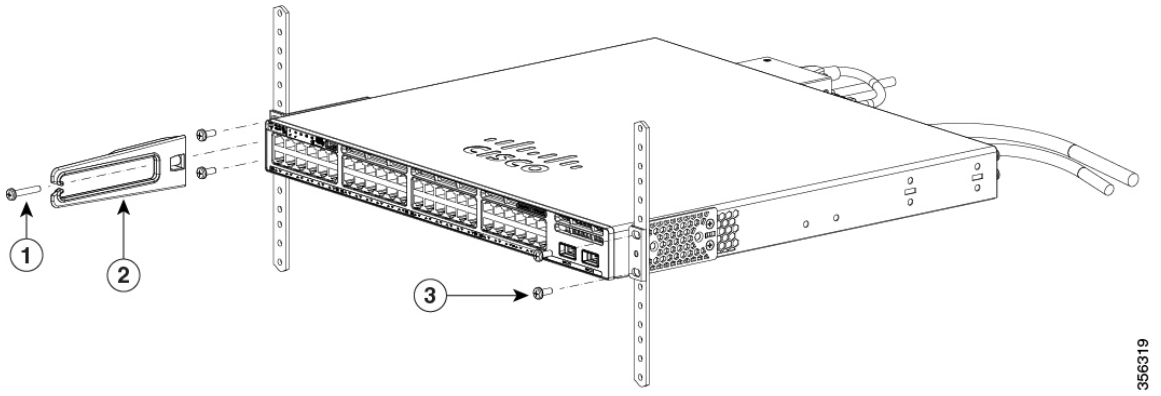
Mounting the Switch in a Rack

Procedure

Step 1 Use the four supplied Phillips machine screws to attach the brackets to the rack.

Step 2 Use the black Phillips machine screw to attach the cable guide to the left or right bracket.

Figure 16: Front-Mounting Position



1	Phillips machine screw, black	3	Number-12 or number-10 Phillips machine screws
2	Cable guide	-	-

Figure 17: Mid-Mounting Position

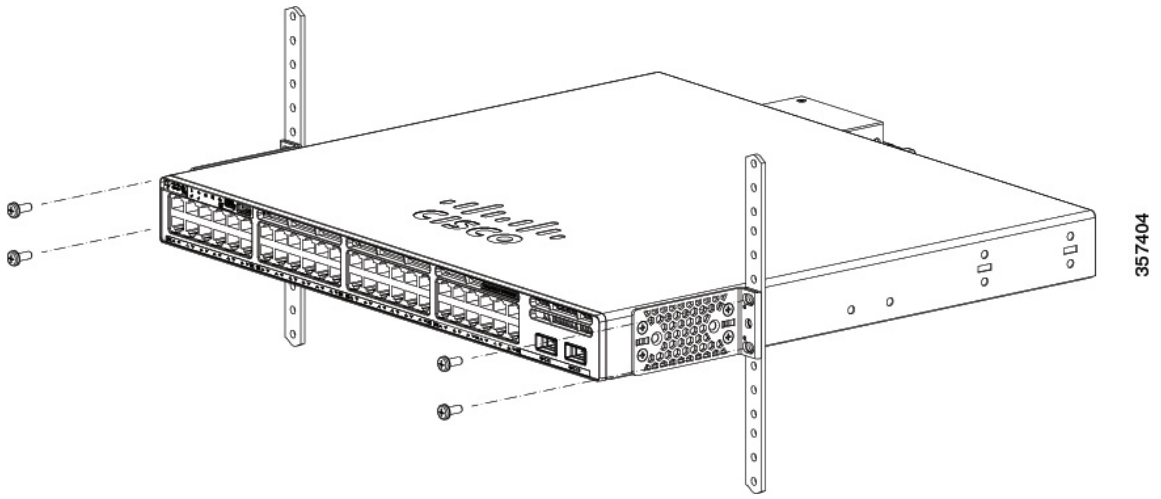


Figure 18: Rear-Mounting Position

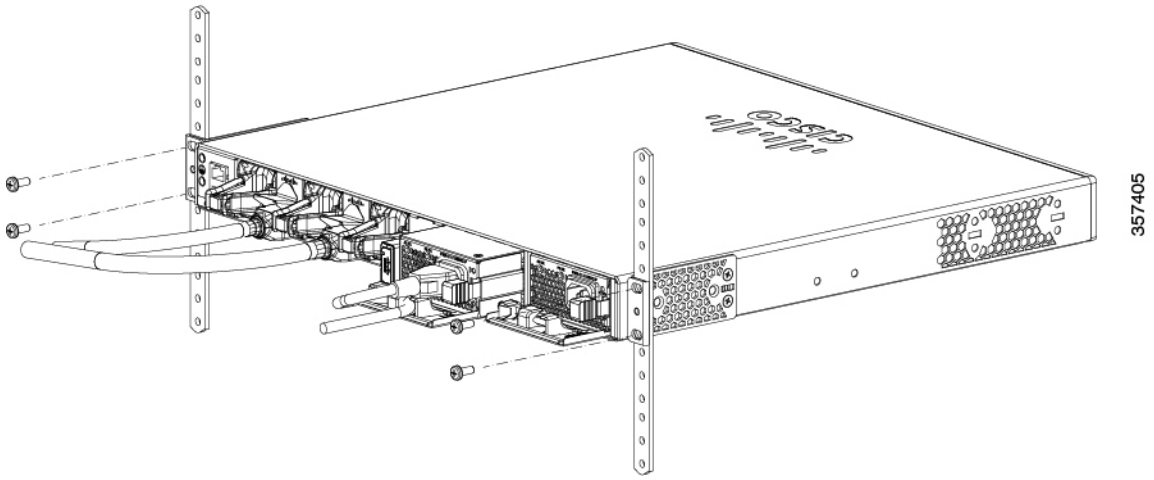
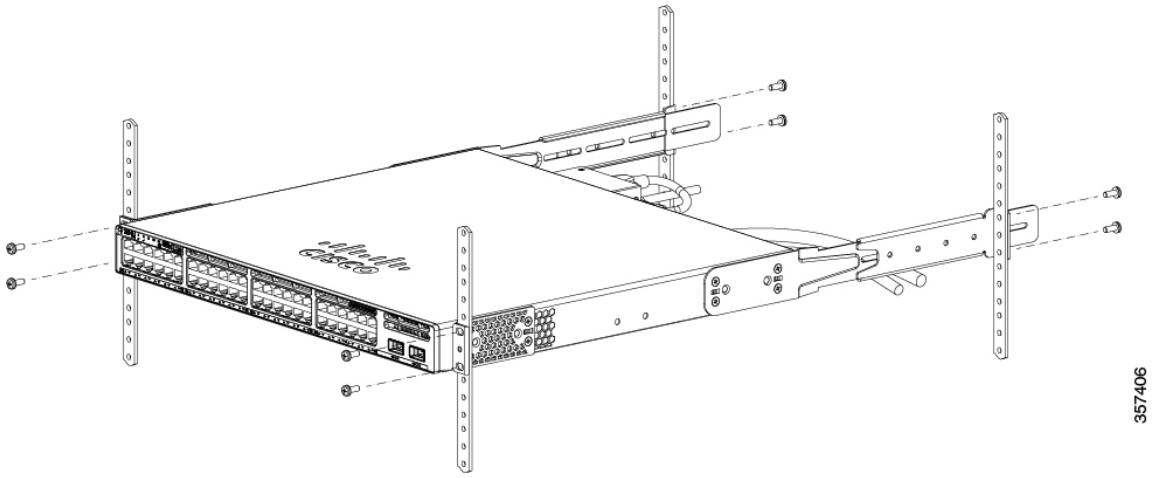


Figure 19: Four-Point Mounting Position



Installing the Switch on a Table or Shelf

Procedure

Step 1 To install the switch on a table or shelf, locate the adhesive strip with the rubber feet in the mounting-kit envelope.

Step 2 Attach the four rubber feet to the four circular etches on the bottom of the chassis.

Step 3 Place the switch on the table or shelf near an AC power source.

Step 4 When you complete the switch installation, see After Switch Installation, on page 16for information on switch configuration.

After Switch Installation

- Configure the switch using the Web User Interface. For more information, see "Configuring the Switch Using the Web User Interface" topic in the *Software Configuration Guide*.
- Connect the StackPower and StackWise ports.
- Install the power cord retainer (optional).
- Connect the required devices to the switch ports.
- Turn on the power supply switches to power up the system. While powering up, the switch performs a series of bootup diagnostic tests.

Note The switch is designed to boot up in less than 30 minutes, provided that the neighboring devices are in fully operational state.

- Verify port connectivity after connecting devices to the switch ports. The LED turns green when the switch and the attached device have a link.

Connecting the StackWise Cables

Before connecting the StackWise cables, review the Planning a Switch Data Stack, on page 3. Always use a Cisco-approved StackWise cable to connect the switches.

Connecting a StackWise-320 Cable

Procedure

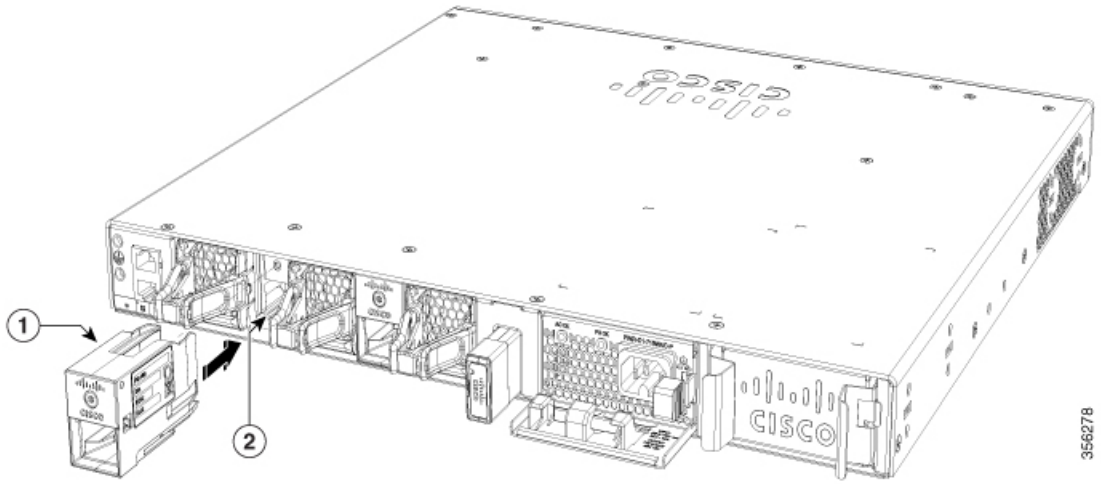
Step 1 Remove the dust covers from the StackWise cables and store them for future use.

A StackWise adapter must be installed in the StackWise port to enable stacking. In a default setup, the StackWise adapter blanks are installed in the StackWise ports. If StackWise is ordered with the switch, StackWise adapters are already installed in the StackWise ports, and you can proceed to step 4.

Step 2 Remove the StackWise adapter blanks from each destination StackWise port using the Torx T15 Allen key provided in the stacking kit (or a Torx T15 screwdriver). Store them for future use.

Step 3 Install the StackWise adapter in each destination StackWise port, and secure it in place using the supplied Torx T15 key, or a Torx T15 screwdriver.

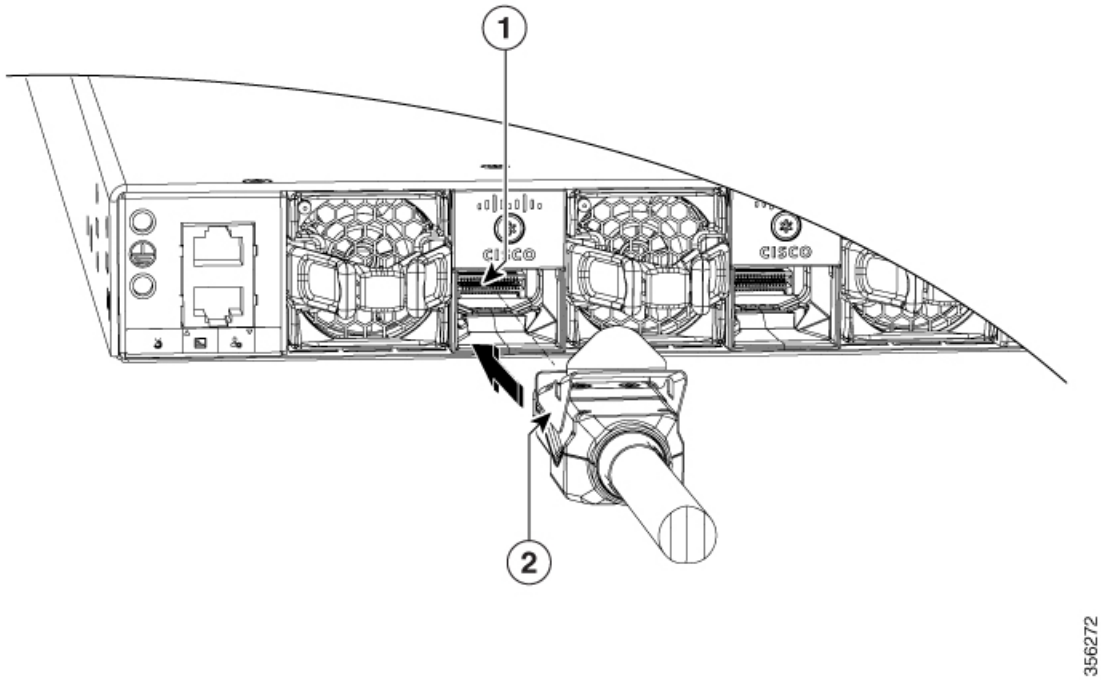
Figure 20: Inserting the StackWise-320 Adapter



1	StackWise-320 adapter	2	StackWise port

Step 4 Align and insert the StackWise cable connector into the StackWise adapter in the StackWise port. Push inwards until the spring latch locks into the slot.

Figure 21: Installing the StackWise-320 Cable in a StackWise Port



1	StackWise-320 adapter	2	Stacking cable

To remove a StackWise-320 adapter from the connector, make sure you press down the spring latch to unlock it from the slot.

Removing and installing the StackWise cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary (installing and removing it up to 200 times is supported).

Step 5 Connect the other end of the cable to the StackWise port on the other switch.

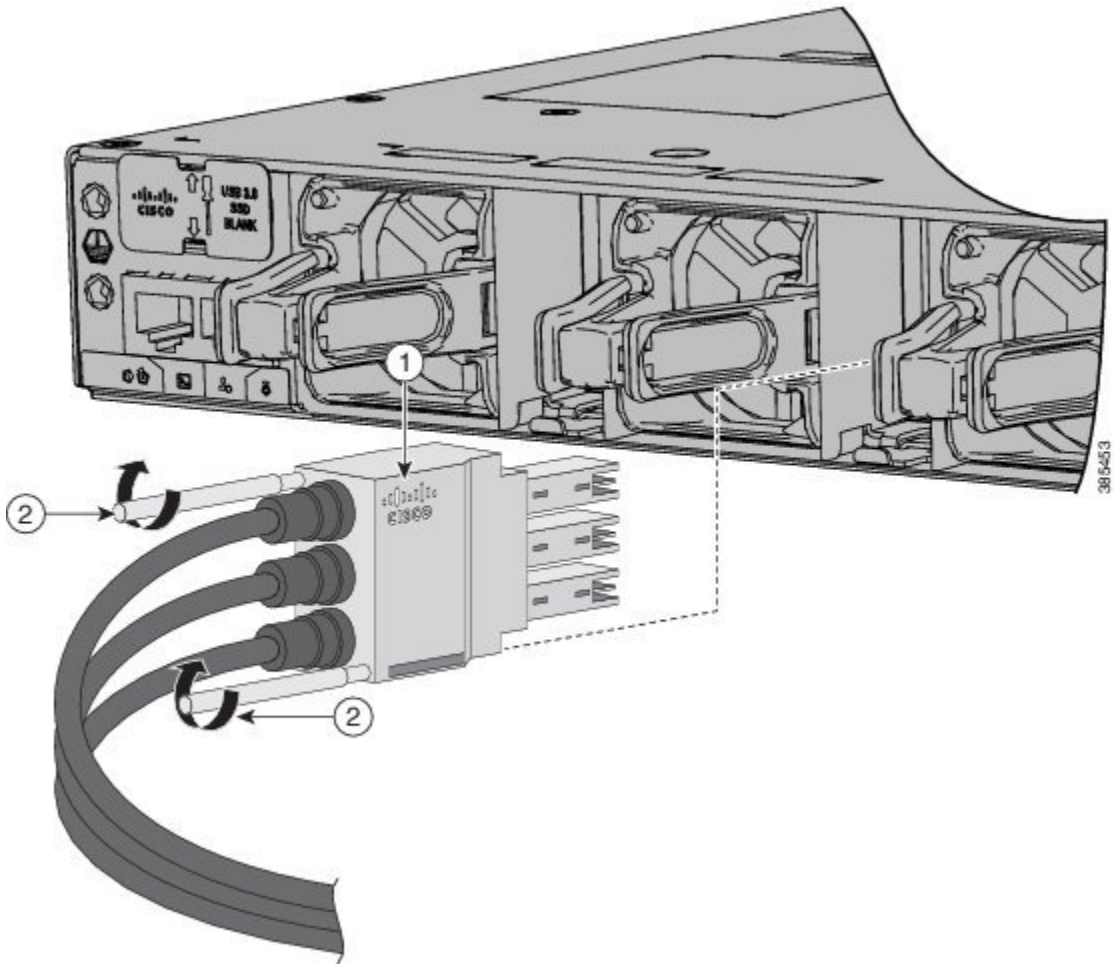
Connecting a StackWise-480/1T Cable

Procedure

Step 1 Remove the dust covers from the StackWise cables and store them for future use.

Step 2 Connect the cable to the StackWise port on the switch rear panel. Align the connector and connect the StackWise cable to the StackWise port on the switch rear panel and finger-tighten the screws (clockwise direction). Make sure the Cisco logo is on the top side of the connector as shown in the figure.

Figure 22: Connecting the StackWise-480/1T Cable in a StackWise Port



1	Cisco logo	2	Connector screws

Step 3 Connect the other end of the cable to the port on the other switch and finger-tighten the screws. Avoid overtightening the screws.

To remove the StackWise-480/1T cable from the connector, make sure you fully unscrew the correct screws. When the connectors are not being used, replace the dust covers.

Caution

Removing and installing the StackWise cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary (installing and removing it up to 200 times is supported).

Connecting to the StackPower Ports

Before you begin

Before connecting the StackPower cables, review Planning a Switch Data Stack, on page 3. Always use a Cisco-approved StackPower cable to connect the switches. To prevent misconfiguration, the StackPower ports on the switch are keyed and have colored bands that match the keying and bands on the StackPower cable connectors.

Procedure

Step 1 Remove the dust covers from the StackPower cable connectors.

Step 2 Connect the end of the cable with a green band to either StackPower port on the first switch. Align the connector correctly, and insert it into a StackPower port on the switch rear panel.

Step 3 Connect the end of the cable with the yellow band to another switch (to configure StackPower power sharing).

Step 4 Hand-tighten the captive screws to secure the StackPower cable connectors in place.

Caution
Removing and installing the StackPower cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary.

Installing a Network Module in the Switch

For information on network modules, see:

- Installing a Network Module

Installing and Removing Cisco Pluggable Transceiver Modules

See these sections for information on Cisco pluggable transceiver modules (SFP, SFP, SFP28 and QSFP+ modules):

- Installing a Cisco Pluggable Transceiver Module
- Removing Cisco Pluggable Transceiver Modules
- Cisco 40-Gigabit QSFP+ Transceiver Modules Installation Note

Connecting Devices to the Ethernet Ports

- 10/100/1000/Multigigabit Ethernet Port Connections, on page 21

• PoE+ and Cisco UPOE/UPOE+ Port Connections, on page 21

10/100/1000/Multigigabit Ethernet Port Connections

The switch 10/100/1000 and Multigigabit Ethernet port configuration changes to operate at the speed of the attached device. If the attached ports do not support autonegotiation, you can manually set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have the speed and duplex parameters manually set can reduce performance or result in no linkage.

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex.
- Set the interface speed and duplex parameters on both ends of the connection.

Auto-MDIX Connections

The autonegotiation and the auto-MDIX features are enabled by default on the switch.

With autonegotiation, the switch port configurations change to operate at the speed of the attached device. If the attached device does not support autonegotiation, you can manually set the switch interface speed and duplex parameters.

With auto-MDIX, the switch detects the required cable type for copper Ethernet connections and configures the interface accordingly.

If auto-MDIX is disabled, use the guidelines in this table to select the correct cable.

Table 2: Recommended Ethernet Cables (When Auto-MDIX is Disabled)

Device	Crossover Cable	Straight-Through Cable
Switch to switch	Yes	No
Switch to hub	Yes	No
Switch to computer or server	No	Yes
Switch to router	No	Yes
Switch to IP phone	No	Yes

[1] 100BASE-TX and 1000BASE-T traffic requires twisted four-pair, Category 5 or higher. 10BASE-T traffic can use Category 3 cable or higher.

PoE+ and Cisco UPOE/UPOE+ Port Connections

The 10/100/1000/Multigigabit Ethernet PoE+ and Cisco UPOE/UPOE+ ports have the same autonegotiation settings and cabling requirements that are described in the 10/100/1000/Multigigabit Ethernet Port Connections, on page 21. These ports can provide PoE, PoE+, or Cisco UPOE/UPOE+ inline power.

PoE inline power supports devices compliant with the IEEE 802.3af standard, as well as prestandard Cisco IP Phones and Cisco Aironet Access Points. Each port can deliver up to 15.4 W of PoE. PoE+ inline power

supports devices compliant with the IEEE 802.3at standard, by delivering up to 30 W of PoE+ power per port to all switch ports.

Cisco UPOE+/UPOE uses the same cabling standard as PoE. However, instead of transmitting power over two of the twisted pairs, it provides the capability to source up to 90 W of power by using all four twisted pairs of standard Ethernet cabling (Category 5e or higher). To achieve this, it uses two Power Sourcing Equipment (PSE) controllers to power both the signal pairs and the spare pairs. Cisco UPOE+ guarantees 71.3 W of power to a class 8 Powered Device (PD). The following figure shows the architectural difference between PoE/PoE+ and Cisco UPOE/UPOE+.

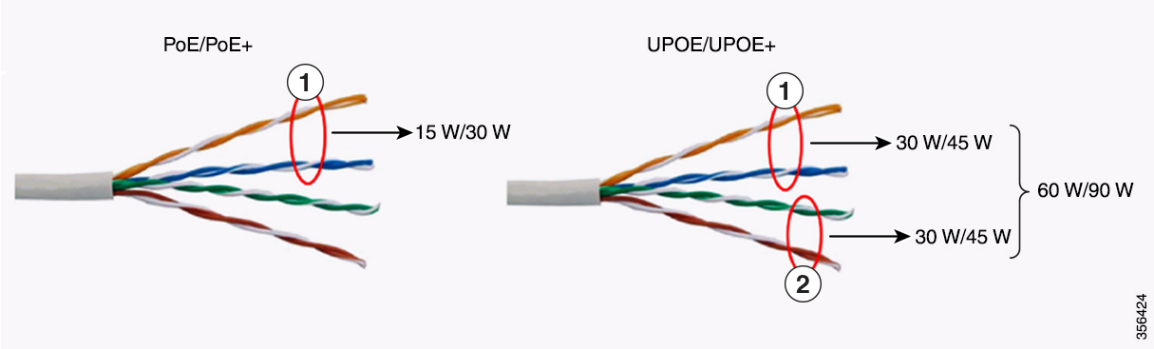


Table 3: PoE/PoE+ and Cisco UPOE/UPOE+ Differences

1	Signal pair	2	Spare pair

See Power Supply Modules for the power supply modules required to support PoE, PoE+, and Cisco UPOE/UPOE+ on 24- and 48-port switches.

Caution Ethernet twisted pair cables can store high levels of static electricity. Always ground the cables to a suitable and safe earth ground before connecting them to the switch or other devices.

Caution Noncompliant cabling or powered devices can cause a PoE port fault. Use only standard-compliant cabling to connect Cisco prestandard IP Phones and wireless access points, IEEE 802.3af, 802.3at (PoE+), or 802.3bt (UPOE/UPOE+)-compliant devices. You must remove any cable or device that causes a PoE fault.