

# Cisco Catalyst 2960-S and 2960-SF Series Switches

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## Product Overview

**Q.** What are the notable differences between the Cisco® Catalyst® 2960-S, 2960-SF, and 2960 Series Switches?

**A.** The Cisco Catalyst 2960-S and 2960-SF Series are the newest members of the 2960 family that offer a rich set of Layer 2 features. While the 2960-S provides Gigabit Ethernet (10/100/1000) connectivity with 10G/1G SFP+ uplinks, the 2960-SF provides Fast Ethernet (10/100) connectivity with 1G SFP uplinks. They bring the following new capabilities to the Catalyst 2960 family of Layer 2 switches, including:

- Cisco FlexStack stacking capabilities
- 10 Gigabit Ethernet uplinks with SFP+
- Support for Power over Ethernet Plus (PoE+)
- Cisco Generic Online Diagnostics (GOLD) and onboard failure logging (OBFL)
- USB interfaces for file transfer and management
- 10/100 out-of-band (OOB) management

A complete Cisco Catalyst 2960 Series model selection guide is available here:

[http://www.cisco.com/en/US/products/ps6406/prod\\_models\\_comparison.html](http://www.cisco.com/en/US/products/ps6406/prod_models_comparison.html).

**Q.** What are the notable hardware differences between the LAN Base and LAN Lite switches?

**A.** The Cisco Catalyst 2960-S and 2960-SF switches support the LAN Base and the LAN Lite software feature sets. The LAN Base feature set comes with advanced Layer 2(L2) features and is typically targeted at large enterprise customers. The LAN Lite feature set has entry-level L2 features and is targeted at mid market deployments. Following are the notable hardware differences:

- Ease of management with Cisco FlexStack
- Power of Ethernet (PoE/PoE+) capabilities
- Increased number of VLANs
- Redundant power system (Cisco RPS 2300) support (2960-S only)
- SFP+ (for the Cisco Catalyst 2960-S Series)
- A wider selection of Small Form-Factor Pluggable (SFP) ports. See the Cisco Catalyst 2960S Series data sheet for a complete list of supported SFPs

**Q.** What is Cisco FlexStack stacking?

**A.** Cisco FlexStack is a hot-swappable, modular stacking solution that provides a true stacking capability, with all switches acting as a single switching unit with a unified data plane, using a single IP address. Cisco FlexStack is supported by the Catalyst 2960-S and 2960-SF series and allows the stacking of up to four switches, with a throughput of 20 gigabits per second.

**Q.** What are the FlexStack high availability features?

**A.** The following features enhance high availability and manageability across a stack:

- Cross-stack EtherChannel
- Switched Port Analyzer (SPAN)
- FlexLink technology

**Q.** Where can I find technical and product specifications and other information about the Cisco Catalyst 2960-S and 2960-SF Series Switches?

**A.** For product literature, including data sheets and product specifications, visit <http://www.cisco.com/go/2960>.

**Q.** What are the benefits of Power over Ethernet Plus?

**A.** Switches supporting Power over Ethernet Plus (PoE+) can supply power to any IEEE 802.3af or IEEE 802.3at compliant end device. PoE+ removes the need for wall power to each PoE+ enabled device and eliminates the cost for additional electrical cabling that would otherwise be necessary in IP phone and wireless LAN deployments. PoE switches also eliminate the need for power injectors and PoE midspans for powering IP devices. The list of devices that require more than the 15.4W provided by 802.3at is growing. Devices currently requiring more than 15.4W of PoE power include Cisco video IP phones and IP video cameras. Additional devices requiring more than 15.4W of power are coming, and the Cisco Catalyst 2960-S and 2960-SF Series are leading the way to allow these devices to be deployed in the network.

Cisco Catalyst 2960-S and the 2960-SF Series Switches support IEEE 802.3at (PoE+) devices.

**Q.** How many end devices can the Cisco Catalyst 2960-S and 2960-SF Series provide PoE and PoE+ to?

**A.** The Cisco Catalyst 2960S-48FPD-L and C2960S-48FPS-L can support 48 PoE ports with full Class 3 PoE power of 15.4W each, for a total output capacity of 740W. All Cisco Catalyst 2960-S Series Switches with PoE capability support PoE+. A complete list of Catalyst 2960-S and 2960-SF Series Switches, with their PoE capacities, is given in Table 1 and Table 2.

**Table 1.** PoE Capacity of the Cisco Catalyst 2960-S Series Switches

Model	Maximum Number of PoE+ Ports	Maximum Number of PoE Ports	PoE Budget
<b>10 Gigabit Uplinks</b>			
Cisco Catalyst 2960S-48FPD-L	24 at 30W	48 at 15.4W	740W
Cisco Catalyst 2960S-48LPD-L	12 at 30W	24 at 15.4W	370W
Cisco Catalyst 2960S-24PD-L	12 at 30W	24 at 15.4W	370W
<b>1 Gigabit Uplinks</b>			
Cisco Catalyst 2960S-48FPS-L	24 at 30W	48 at 15.4W	740W
Cisco Catalyst 2960S-48LPS-L	12 at 30W	24 at 15.4W	370W
Cisco Catalyst 2960S-24PS-L	12 at 30W	24 at 15.4W	370W

**Table 2.** PoE Capacity of the Cisco Catalyst 2960-SF Series Switches

Model	Maximum Number of PoE+ Ports	Maximum Number of PoE Ports	PoE Budget
<b>1 Gigabit Uplinks</b>			
Cisco Catalyst 2960S-F48FPS-L	24 at 30W	48 at 15.4W	740W
Cisco Catalyst 2960S-F48LPS-L	12 at 30W	24 at 15.4W	370W
Cisco Catalyst 2960S-F24PS-L	12 at 30W	24 at 15.4W	370W

**Q.** Do the Cisco Catalyst 2960-S and 2960-SF Series Switches have redundant power supply (RPS) support?

**A.** The following Cisco Catalyst 2960S Switches have RPS support:

- Catalyst 2960S-48FPD-L
- Catalyst 2960S-48LPD-L
- Catalyst 2960S-48TD-L
- Catalyst 2960S-24PD-L
- Catalyst 2960S-24TD-L
- Catalyst 2960S-48FPS-L
- Catalyst 2960S-48LPS-L

- Catalyst 2960S-48TS-L
- Catalyst 2960S-24PS-L
- Catalyst 2960S-24TS-L

A converged voice and data network has the greatest power availability when a Cisco Catalyst 2960-S Series Switch is combined with the Cisco RPS 2300 Redundant Power System for protection against internal power supply failures and an uninterruptible power supply (UPS) to safeguard against power outages. For more information about the Cisco RPS 2300, visit

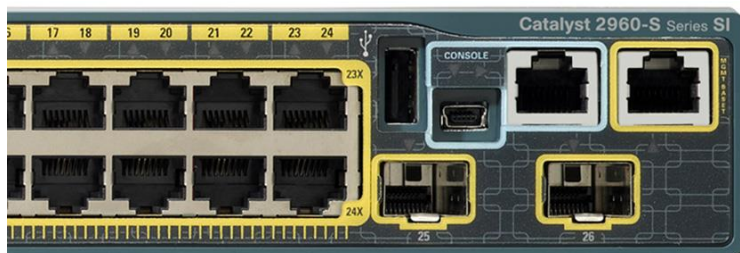
<http://www.cisco.com/en/US/products/hw/routers/ps2883/ps5066/index.html>.

The Catalyst 2960-S PoE switches use the 22-pin cable CAB-RPS2300-E=.

The Cisco Catalyst 2960-SF Series and the 2960-S switches with LAN Lite Software do not have RPS support.

- Q.** How can I tell the difference between the LAN Base and LAN Lite switches for the Cisco Catalyst 2960-S Series?
- A.** On the front of the switch, in the top right corner, the LAN Lite switches have "Catalyst 2960-S Series SL." The LAN Base switches have "Catalyst 2960-S Series."

**Figure 1.** Cisco Catalyst 2960-S LAN Lite Switch



From the rear of the Cisco Catalyst 2960-S Series Switch, the LAN Lite models do not support stacking. The left side will not have a location for the FlexStack module to be inserted.

From the Cisco IOS® Software command line, there are two ways to tell which software image the switch has.

1. The last letter in the product ID. If the last letter is "-L," it's LAN Base. If it's "-S," it's LAN Lite.

For example:

WS-C2960S-48LPS-L is LAN Base.

WS-C2960S-48TS-S is LAN Lite.

2. The output from the "show license" Cisco IOS Software command-line interface (CLI) command. If LAN Base is being used, that will be the active license. If it's LAN Lite, that will be the active license. In the following example output, LAN Base is the active license.

```
C2960-S_Switch# show license
Index 1 Feature: lanlite
      Period left: 0 minute 0 second
Index 2 Feature: lanbase
      Period left: Life time
      License Type: Permanent
```

License State: Active, In Use  
License Priority: Medium  
License Count: Non-Counted

- Q.** Do I need a software license for the Cisco Catalyst 2960-S or the 2960-SF Series Switches?
- A.** No. Cisco Catalyst 2960-S and 2960-SF Series Switches use the Universal image, but no license is required. The feature is bound to the hardware model type and cannot be changed.

For convenience, a single software image is used for all Cisco Catalyst 2960-S and 2960-SF Series Switches, regardless of whether they are a LAN Base or LAN Lite model.

- Q.** Can a Cisco Catalyst 2960-S or 2960-SF Series LAN Lite switch be upgraded to LAN Base?
- A.** No. The feature set is bound to the hardware model. To get the features and capabilities of LAN Base, you must purchase a LAN Base switch.

### Software Capabilities

- Q.** What are the notable differences between the Cisco Catalyst 2960-S and 2960-SF LAN Base and LAN Lite switches?
- A.** Cisco Catalyst 2960 LAN Base switches have several advantages:
- Enhanced security with Layer 2 through 4 access control lists (ACLs), Dynamic Host Configuration Protocol (DHCP) snooping, and more extensive Network Admission Control (NAC) capabilities such as web authentication and 802.1X enhancements
  - Additional quality of service (QoS) capabilities: The LAN Base software supports policing, class and policy maps, security ACLs, differentiated services code point (DSCP), AutoQoS, and configurable queue weights, buffers, and thresholds
  - Higher network-level availability with features such as FlexLink and link state tracking
  - Increased number of VLANs (256) and other enhancements, such as IPv6 host, Multicast Listener Discovery (MLD) snooping, Link Layer Discovery Protocol Media Endpoint Devices (LLDP-MED), Remote SPAN (RSPAN), multicast VLAN registration (MVR), DHCP option 82, and IP SLA (responder)
- Q.** Can I upgrade or downgrade a Cisco Catalyst 2960-S or 2960-SF Series Switch between the LAN Base and LAN Lite images?
- A.** No. Cisco Catalyst 2960 Series Switches cannot be upgraded from LAN Lite to LAN Base and cannot be downgraded from LAN Base to LAN Lite.
- Q.** How do I get the cryptography features, and is there an additional charge for them?
- A.** Cisco Catalyst 2960-S and 2960-SF Series Switches will support Cisco IOS Software images with cryptography features by default. These are the only images available. These images with cryptography features will be loaded during manufacture. Non-K9 images will not be available for the Cisco Catalyst 2960-S or 2960-SF Series Switches.
- Q.** Do the Cisco Catalyst 2960-S and 2960-SF Series support IPv6?
- A.** Yes. Cisco Catalyst 2960-S and 2960-SF are IPv6 certified. These switches with LAN Base software support IPv6 host, management, MLD snooping, port-based ACLs, router ACLs, and First Hop Security (RA Guard, Source Guard, and Binding Integrity Guard).

- Q.** Are there Cisco Catalyst 2960-S and 2960-SF models that runs the LAN Lite feature set?
- A.** Yes. There are two LAN Lite models available in the Cisco Catalyst 2960-S family and two in the 2960-SF family. Each has two 1 Gigabit uplinks. (See Table 3.)

**Table 3.** Catalyst 2960-S and 2960-SF LAN Lite Switches

Model	Description	Uplinks
Cisco Catalyst 2960S-48TS-S	48 10/100/1000 Ports	2 SFP
Cisco Catalyst 2960S-24TS-S	24 10/100/1000 Ports	2 SFP
Cisco Catalyst 2960S-F48TS-S	48 10/100 Ports	2 SFP
Cisco Catalyst 2960S-F24TS-S	24 10/100 Ports	2 SFP

- Q.** Can I obtain a Cisco IOS Software update for the Cisco Catalyst 2960-S and 2960-SF Series at no additional cost?
- A.** Yes. Cisco offers ongoing Cisco IOS Software updates for certain fixed-configuration and stackable Cisco Catalyst switches at no additional cost. For the life of the product, updates within the Cisco IOS Software package purchased (LAN Lite and LAN Base) will be made available.
- Q.** How do I get an update for the Cisco IOS Software for the Cisco Catalyst 2960-S and 2960-SF Series at no additional cost?
- A.** Visit <http://www.cisco.com>, click “Downloads,” and select “Switch Software.” Downloading software requires a Cisco.com username and password. If you do not have a Cisco.com username, you can obtain one by clicking “Register” at the top of any page on Cisco.com.

## Intelligent Switching

- Q.** Why do I need intelligence at the edge of my network?
- A.** Networks have evolved to address four new developments at the network edge:
- Increase in desktop computing power
  - Introduction of bandwidth-intensive applications
  - Expansion of highly sensitive data on the network
  - Presence of multiple device types, such as IP phones and wireless LAN access points

These new demands compete for resources with many existing mission-critical applications. As a result, IT professionals must view the edge of the network as critical to effectively manage the delivery of information and applications. As companies increasingly rely on networks as the strategic business infrastructure, it is important to help ensure high availability, security, scalability, and control. By adding intelligent functions to the wiring closet, you can deploy network wide intelligent services that address these requirements in a consistent way, from the desktop to the core and through the WAN. Cisco Catalyst Intelligent Ethernet switches can help you realize the full benefits of adding intelligent services to your network. Deploying switches with capabilities that make the network infrastructure highly available to accommodate time-critical needs, scalable to accommodate growth, secure enough to protect confidential information, and capable of differentiating and controlling traffic flows provides the basis of further optimizing network operations.

- Q.** Can you provide more details about how Cisco Catalyst Intelligent Ethernet switches will help my network?
- A.** New applications are requiring higher bandwidth and the need to differentiate and control the traffic flow. Applications such as enterprise resource planning (ERP; Oracle or SAP, for example), voice (IP telephony traffic), and computer-aided design and manufacturing (CAD/CAM) require priority over less time-sensitive applications such as FTP or Simple Mail Transfer Protocol (SMTP). It is undesirable to have a large file download that is destined for one port on a switch increase latency in voice traffic destined for another port on the same switch. This condition is avoided by making sure that voice traffic is properly classified and prioritized throughout the network. Cisco Catalyst Intelligent Ethernet switches implement superior QoS to help ensure that network traffic is classified and prioritized and congestion is avoided.

## Network Security

- Q.** How do Cisco Intelligent Ethernet switches manage the security needs of a network?
- A.** With the rise in internal threats to a network, Cisco Intelligent Ethernet switches enhance data security through a wide range of features, including SSH Protocol, SNMP v3, ACLs, 802.1X, port security, Private VLAN Edge, DHCP Interface Tracker, MAC address notification, and RADIUS/TACACS+. Depending on your security needs, the Cisco Catalyst 2960-S and 2960-SF Series complements devices such as firewalls, VPNs, and intrusion detection systems (IDSs).
- Q.** How can I keep unauthorized users from accessing my network?
- A.** The Cisco Catalyst 2960-S and 2960-SF Series supports the IEEE 802.1X standard, which works in conjunction with a RADIUS server to authenticate users as they access a network. Additionally, portions of the network can be restricted by using ACLs. Access can be denied based on MAC addresses, IP addresses, or TCP/User Datagram Protocol (UDP) ports. ACL lookups are done in hardware and do not compromise forwarding and routing performance. An additional protection method is to use port security, which helps ensure that the appropriate user is on the network by limiting access to the port based on MAC addresses.
- Q.** How can I monitor or track activities in my network?
- A.** The Cisco Catalyst 2960-S and 2960-SF Series can complement an IDS or firewall with features such as MAC address notification, which sends an alert to a management station so that network administrators know when and where users come onto the network and can take appropriate action. The DHCP Interface Tracker (option 82) feature tracks where a user is physically connected on a network by providing both switch and port ID to a DHCP server. DHCP snooping enables the administrator to keep track of both dynamic and static IP/MAC mapping tables.
- Q.** How can I protect administration passwords and traffic going to the switch during configuration or troubleshooting?
- A.** To protect administration traffic during the configuration or troubleshooting of a switch (such as passwords or device configuration settings), the best approach is to encrypt the data using both SSH and SNMP v3 to provide encryption of data during Telnet sessions and SNMP sessions.

## Network Management

- Q.** What network management applications support Cisco Catalyst 2960 and 2960-S Series Switches?
- A.** The following Cisco network management applications can be used to manage the Cisco Catalyst 2960-S and 2960-SF Series Switches:
- Cisco Prime™ infrastructure. Cisco Prime network management solutions provide comprehensive network lifecycle management. For more information about Cisco Prime, visit <http://www.cisco.com/go/prime>.



- Cisco Network Assistant: An application from Cisco used for managing small networks. This application can be downloaded from Cisco.com. For more information about Cisco Network Assistant, visit <http://www.cisco.com/go/can>.

- Device manager: An HTML-based application that is located on the switch.

**Q.** Can you describe how Cisco Network Assistant manages Cisco Catalyst 2960-S and 2960-SF Series Switches?

**A.** Cisco Catalyst 2960-S and 2960-SF Series Switches can be managed using Cisco Network Assistant software, which uses Cisco switch clustering technology. Cisco Network Assistant is a PC-based network management application optimized for LANs of small and medium-sized businesses with up to 250 users. Cisco Network Assistant offers centralized management of Cisco switches, routers, and WLAN access points. It supports a wide range of Cisco Catalyst Intelligent Ethernet switches. Through a user-friendly GUI, users can configure and manage a wide array of switch functions and start the device manager of Cisco routers and Cisco wireless access points.

Cisco Network Assistant provides an integrated management interface for delivering intelligent services, enabling users to manage their entire LAN with one robust tool. By bringing the simplicity of traditional LAN switching to intelligent services such as multilayer switching, QoS, multicast, and security ACLs, Cisco Network Assistant offers administrators benefits formerly reserved for only the most complex networks. Cisco Network Assistant's Guide mode leads you through the configuration of high-end features and provides enhanced online help for context-sensitive assistance. In addition, a solution wizard provides automated configuration of the switch for video streaming or video conferencing.

Cisco Network Assistant supports standards-based connectivity options such as Ethernet, Fast Ethernet, Cisco Fast EtherChannel technology, Gigabit Ethernet, and Gigabit EtherChannel connectivity. Because Cisco switch clustering technology is not limited by proprietary stacking modules, stacking cables, or interconnection media, Cisco Network Assistant expands the traditional cluster domain beyond a single wiring closet and lets you combine interconnections to meet specific management, performance, and cost requirements.

Cisco Catalyst 2960-S and 2960-SF Series Switches can be configured as either command or member switches in a Cisco switch cluster. Cisco Network Assistant also allows you to designate a standby or redundant command switch, which takes the commander duties should the primary command switch fail. Other important features include the ability to configure multiple ports and switches simultaneously, as well as to perform software updates across the entire cluster at once. Bandwidth graphs and link reports provide useful diagnostic information, and the topology map gives network administrators a quick view of the network status.

## Applications and Use Cases

**Q.** Where do I use Cisco Catalyst 2960S and 2960-SF Series Switches with the LAN Base and LAN Lite software?

**A.** Cisco Catalyst 2960-S and 2960-SF LAN Base switches deliver intelligent services for enterprise and branch deployments. The LAN Base software supports enhanced Layer 2+ security, QoS, PoE+, availability, and scalable management to enable new converged applications. Cisco Catalyst 2960-S and 2960-SF LAN Base switches include both 10/100 Fast Ethernet and 10/100/1000 Gigabit Ethernet connectivity in 24-, and 48-port configurations.

Cisco Catalyst 2960-S and 2960-SF LAN Lite switches are for midmarket deployments. They simplify the migration from non intelligent hubs and unmanaged switches to a fully scalable and reliable network. The LAN

Lite software supports standard Layer 2 security, QoS, and availability while lowering the network total cost of ownership. Cisco Catalyst 2960-S and 2960-SF LAN Lite switches include both 10/100 Fast Ethernet and 10/100/1000 Gigabit Ethernet connectivity in 24- and 48-port configurations.

All Cisco Catalyst 2960-S and 2960-SF Series Switches have technical support service options available through Cisco SMARTnet® Service. All come with an enhanced limited lifetime hardware warranty, and LAN Base and LAN Lite software updates are provided at no additional cost.

## Warranty and Service

- Q.** What is the hardware warranty and return policy on the Cisco Catalyst 2960-S and 2960-SF Series Switches?
- A.** The Cisco Catalyst 2960-S and 2960-SF Series Switches come with an enhanced limited lifetime warranty (ELLW). The warranty for the Cisco 2960-S and 2960-SF Series switches has the same terms as our standard limited lifetime warranty (LLW) plus the addition of next business day delivery of replacement hardware where available and 90 days of 8x5 Cisco Technical Assistance Center (TAC) support (Table 4).

Your formal warranty statement, including the warranty applicable to Cisco software, appears in the Cisco information packet that accompanies your Cisco product. We encourage you to review carefully the warranty statement shipped with your specific product before use.

Cisco reserves the right to refund the purchase price as its exclusive warranty remedy.

For further information about warranty terms, visit <http://www.cisco.com/go/warranty>.

**Table 4.** Limited Lifetime Warranty Terms

	Cisco Limited Lifetime Hardware Warranty	Cisco Enhanced Limited Lifetime Hardware Warranty
<b>Devices covered</b>	Applies to Cisco Catalyst 2960 Series Switches sold on or after May 1, 2009.	Applies to Cisco Catalyst 2960-S and 2960-SF Series Switches.
<b>Warranty duration</b>	As long as the original customer owns the product.	As long as the original end user continues to own or use the product, provided that: fan and power supply warranty is limited to five (5) years.
<b>End-of-life policy</b>	In the event of discontinuance of product manufacture, Cisco warranty support is limited to five (5) years from the announcement of discontinuance.	In the event of discontinuance of product manufacture, Cisco warranty support is limited to five (5) years from the announcement of discontinuance.
<b>Hardware replacement</b>	Cisco or its service center will use commercially reasonable efforts to ship a replacement part within ten (10) working days after receipt of the return materials authorization (RMA) request. Actual delivery times might vary depending on customer location.	Cisco or its service center will use commercially reasonable efforts to ship a replacement for next business day delivery, where available. Otherwise, a replacement will be shipped within ten (10) working days after receipt of the RMA request. Actual delivery times might vary depending on customer location.
<b>Effective date</b>	Hardware warranty commences from the date of shipment to customer (and in case of resale by a Cisco reseller, not more than ninety [90] days after original shipment by Cisco).	Hardware warranty commences from the date of shipment to customer (and in case of resale by a Cisco reseller, not more than ninety [90] days after original shipment by Cisco).
<b>TAC support</b>	Not included.	Cisco will provide, during customer's local business hours, 8 hours per day, 5 days per week, basic configuration, diagnosis, and troubleshooting of device-level problems for up to a 90-day period from the date of shipment of the originally purchased Catalyst 2960-S product. This support does not include solution- or network-level support beyond the specific device under consideration.
<b>Cisco.com access</b>	Warranty allows guest access only to Cisco.com.	Warranty allows guest access only to Cisco.com.

- Q.** What is the software update policy for Cisco Catalyst 2960-S and 2960-SF Series Switches with LAN Base Software?
- A.** Customers with Cisco Catalyst LAN Base software licenses will be provided with maintenance updates and bug fixes designed to maintain the compliance of the software with published specifications, release notes,

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and industry standards compliance as long as the original end user continues to own or use the product or up to one year from the end-of-sale date for this product, whichever occurs earlier. Customers with licenses for our premium software images, Enterprise Services or IP Services, require a service support contract such as Cisco SMARTnet Service to download updates.

This policy supersedes any previous warranty or software statement and is subject to change without notice.

## Technical Questions

- Q.** Why should I purchase a technical service contract for these switches when they include a limited lifetime warranty (LLW)?
- A.** Cisco service and support has received numerous industry recognitions and awards for excellence in technology service and support.

Adding a Cisco Technical Services contract to warranty coverage provides access to the Cisco TAC beyond the 90-day period allowed by the LLW. It also can provide a variety of hardware replacement options to meet critical business needs, as well as updates for licensed premium Cisco IOS Software and registered access to the extensive Cisco.com knowledge base and support tools.

For information about Cisco Technical Services, visit <http://www.cisco.com/go/ts>.

For information about the Cisco LLW, visit <http://www.cisco.com/go/warranty>.

- Q.** What types of services and support are available for the Cisco Catalyst 2960-S and 2960-SF Series?
- A.** A full complement of lifecycle services and support is available for the Cisco Catalyst 2960-S and 2960-SF Series Switches. From implementation to operation and optimization, Cisco offers technical support service delivered either directly or through a Cisco partner.

Through a discovery process that begins with understanding your business objectives, we help you integrate the Cisco Catalyst switch into your architecture and incorporate network services onto it. Sharing knowledge and leading practices, we support your success every step of the way as you deploy, absorb, manage, and scale new technology. Choose from a flexible suite of support services designed to meet your business needs and help you maintain high-quality network performance while controlling operational costs.

For more information, visit <http://www.cisco.com/go/services>.

## FlexStack

- Q.** What is FlexStack technology?
- A.** FlexStack technology is based on Cisco StackWise® technology. FlexStack has the same operational features as the StackWise technology, allowing multiple physical switches to be managed as a single logical switch. Having multiple physical switches in a single FlexStack allows the network operator to increase network availability by using the redundancy built into FlexStack. Redundant features of FlexStack include EtherChannel uplinks and master switch failover protection.
- Q.** Will management of Cisco Catalyst 2960-S and 2960-SF Series Switches in a FlexStack be the same as management of Catalyst 3750 switches using StackWise technology?
- A.** Yes. The Catalyst 2960-S and 2960-SF switches were designed to be managed in the same way as the Catalyst 3750, 3750-E, and 3750-X switches running the StackWise solution.

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- Q.** What is the bandwidth of FlexStack?
- A.** Each FlexStack link is a 10 Gigabit link. This is a full-duplex, bidirectional link. Thus, each switch member has 20 Gigabits of FlexStack bandwidth, because each has two FlexStack links.
- Q.** Can FlexStack operate with only one stack link operational?
- A.** Yes. FlexStack can operate with a single stack link. When operating in this mode, the stack is not operating in a redundant fashion. If each member in the stack connects to two separate members forming a ring, the operational loss of a single member will not break up the stack. When FlexStack is connected in a fully redundant fashion, as it is when a ring is formed with the FlexStack cables, it will continue to operate a single unit when it loses a member or a single stack link failure occurs.
- Q.** Can I stack a Cisco Catalyst 2960-S or 2960-SF using FlexStack switch with a Catalyst 3750, 3750-E, or 3750-X using StackWise?
- A.** No. FlexStack and StackWise are different technologies and these switches cannot be stacked together.
- Also, FlexStack cables have different connectors than the StackWise cables.
- Q.** Can I stack a Cisco Catalyst 2960-S with the 2960-SF in the same stack?
- A.** Yes. Both these families support FlexStack and can be in the same stack.
- Q.** Is FlexStack a ring topology like the StackWise and StackWise Plus solutions?
- A.** No. FlexStack operates hop by hop. Because of this, FlexStack will not recover as quickly as StackWise or StackWise+ from stack link outages.
- Q.** What is FlexStack's recovery time for a link outage?
- A.** The recovery time for end-user traffic will be 1 to 2 seconds, depending upon the number of members in the stack.
- Q.** Do Cisco Catalyst 2960-S and 2960-SF Series Switches use a spanning tree across the stack?
- A.** No. FlexStack uses a formula based on the shortest path to help ensure that packets that need to be sent to all stack members are forwarded to all members but that no member sees the same packet twice. It's not Open Shortest Path First (OSPF) but is based on the master's computation of the shortest path.
- Q.** Can I insert the FlexStack module with the Cisco Catalyst 2960-S or 2960-SF switches powered on and operational?
- A.** Yes. The FlexStack module is hot swappable. However, when a switch joins an existing stack, new members are always rebooted.
- Q.** What is the maximum number of members in a single FlexStack?
- A.** Four.
- Q.** Can I have different Cisco Catalyst 2960-S or 2960-SF models in the same FlexStack?
- A.** Yes. All Catalyst 2960-S or 2960-SF models that run the LAN Base image can be stacked together. Cisco Catalyst 2960-S or 2960-SF switches that run LAN Lite cannot be stacked.
- Q.** Can the LAN Lite models join a FlexStack?
- A.** No. LAN Lite switches do not support FlexStack capability.
- Q.** What are the available FlexStack cable lengths?
- A.** Three FlexStack cables lengths are supported:

- 0.5 meter
- 1.0 meter
- 3.0 meter

**Q.** Are the Cisco Catalyst 2960-S and 2960-SF series line rate?

**A.** Yes. All Cisco Catalyst 2960-S and 2960-SF models are line rate for all packet sizes. This includes the two 10 Gigabit links and the two FlexStack links.

## Features, Transceivers, and So On

**Q.** What types of 10 Gigabit SFP+ modules are supported by the Cisco Catalyst 2960-S Series Switches?

**A.** For a list of the 10 Gigabit SFP+ modules, visit

[http://www.cisco.com/en/US/products/hw/modules/ps5455/products\\_device\\_support\\_tables\\_list.html](http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html).

**Q.** What types of SFP modules are supported by the Cisco Catalyst 2960-S and 2960-SF Series Switches?

**A.** For a list of the 10 Gigabit SFP+ modules, visit

[http://www.cisco.com/en/US/products/hw/modules/ps5455/products\\_device\\_support\\_tables\\_list.html](http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html).

**Q.** Are the 10 Gigabit SFP+ modules hot-swappable?

**A.** Yes.

**Q.** Does the 10 Gigabit uplink upgrade require a separate module?

**A.** No. The SFP+ and SFP slots are built in.

**Q.** Can the 10 Gigabit SFP+ slots on the Cisco Catalyst 2960-S model support 1 Gigabit SFP modules?

**A.** Yes. The Catalyst 2960-S models that support 10 Gigabit SFP+ modules can also support SFP modules that operate at 1 Gigabit.

**Q.** Can the 10 Gigabit SFP+ slots on the Cisco Catalyst 2960-S models support 100-Mb SFP modules?

**A.** No. The Catalyst 2960-S models that support 10 Gigabit SFP+ modules cannot support SFP modules that operate at less than 1 Gigabit.

**Q.** Can I reuse the 10 Gigabit X2 module from the Cisco Catalyst 3750-E series in the Catalyst 2960-S?

**A.** No. The Catalyst 2960-S uses SFP+ modules only.

**Q.** Do the Cisco Catalyst 2960-S and 2960-SF support field-replaceable power supplies?

**A.** No. All power supplies are fixed.

**Q.** Do the Cisco Catalyst 2960-S and 2960-SF support field-replaceable fans?

**A.** No. All fans are fixed inside the chassis of the switch.

**Q.** What is the airflow on the Cisco Catalyst 2960-S and 2960-SF switches?

**A.** Airflow is side to back. There is a central blower in the rear of the Catalyst 2960-S and 2960-SF switches that pulls the air inside the switch and blows it out the back.

**Q.** How many fans do the Cisco Catalyst 2960-S and 2960-SF switches have?

**A.** The Catalyst 2960-S and 2960-SF switches have one blower in the center rear.

**Q.** What is the Switch Database Management (SDM) template for Cisco Catalyst 2960-S models?

**A.** There is a single default SDM template for the Catalyst 2960-S and 2960-SF switches. It cannot be modified.

- Q.** Is there a difference between Cisco Catalyst 2960-S/2960-SF LAN Base and LAN Lite SDM templates?
- A.** The difference is that the LAN Lite models have no hardware resources to support IPv6 multicast groups and IPv6 security access control entries (ACEs).
- Q.** What are the differences between the Cisco Catalyst 2960-S and 2960-SF SDM templates?
- A.** Table 5 provides a comparison of the SDM templates on the Catalyst 2960-S and 2960-SF models.

**Table 5.** Comparison of SDM Templates on the Cisco Catalyst 2960-S and 2960 Series Switches

SDM TCAM Resource	Catalyst 2960-S/2960-SF LAN Base	Catalyst 2960S/2960-SF LAN Base Routing	Catalyst 2960S/2960SF LAN Lite
Unicast MAC addresses	8000	4000	8000
IPv4 IGMP groups	0.25K	0.25K	0.25K
IPv6 multicast groups/routes	0.25K	0.25K	0
IPv4/MAC QoS ACEs	0.375K	0.375K	0.375K
IPv4/MAC security ACEs	0.375K	0.375K	0.125K
IPv6 QoS ACEs	0.125K	0.125K	0
IPv6 security ACEs	0.125K	0.25K	0

- Q.** Do the Cisco Catalyst 2960-S and 2960-SF switches have a front panel out-of-band (OOB) Ethernet management interface?
- A.** Yes. The OOB management interface is a 10/100 Ethernet port. The OOB port is referred to as “Fa0” in the switch and is a Layer 3 interface. The Fa0 interface must have an IP address assigned in order to function.
- Q.** What are high level differences between Cisco Catalyst 2960-SF, 2960-S, and 3750X models.
- A.** See Table 6.

**Table 6.** Differences Between Cisco Catalyst 2960-SF, 2960-S, and 3750X Models

Feature	2960-SF	2960-S	3750X
IPv4 and IPv6 routing	No	No	Yes
Support for Interswitch Link (ISL)	No	No	Yes
Support for MACsec (802.1ae)	No	No	Yes
Support for Catalyst integrated security	Yes	Yes	Yes
Support for EnergyWise	Yes	Yes	Yes
Support for Smart Install with Director Role	No	No	Yes
Support for Smart Install Client role	Yes	Yes	Yes
Support for IPv6 QoS	Yes	Yes	Yes
Support for IPv6 host	Yes	Yes	Yes
Number of egress queues per port	4	4	4
Maximum MTU	9000	9198	9000

- Q.** Does the Cisco Catalyst 2960-S/2960-SF OOB Ethernet management interface support IPv6 addressing?
- A.** Yes. It supports static and DHCP IPv6 addressing.
- Q.** What IPv6 features are available on the Cisco Catalyst 2960-S and 2960-SF switches?
- A.** The Catalyst 2960-S LAN Base models support the following IPv6 features:
- IPv6 host
  - IPv6 MLD v1 and v2 snooping

- IPv6 security ACLs
- IPv6 DHCP client
- IPv6 First Hop Security
- IPv6 QoS

**Q.** Do the Cisco Catalyst 2960-S and 2960-SF switches support IPv6 hostname?

**A.** Yes

**Q.** How can I manage the Cisco Catalyst 2960-S and 2960-SF Series switch with IPv6?

**A.** The Catalyst 2960-S and 2960-SF support the IPv6 host feature. An IPv6 address can be assigned to a VLAN interface either statically or via DHCP.

The following IPv6 management protocols are supported:

- HTTP, HTTP(s) over IPv6
- SNMP over IPv6
- Syslog over IPv6
- DHCP-based auto config (Auto Install) and image download
- telnet and ssh

**Q.** What multicast protocols do the Cisco Catalyst 2960-S and 2960-SF Series Switches support?

**A.** All Catalyst 2960-S and 2960-SF switches running the LAN Base software support the following multicast protocols

- IGMP v1, v2, and v3 snooping
- IGMP v1 and v2 filtering
- IGMP snooping timer
- IGMP throttle
- IGMP querier
- Configurable IGMP leave timer
- MVR

**Q.** What software images do the Cisco Catalyst 2960-S Series Switches support?

**A.** All Catalyst 2960-S and 2960-SF switches (including the LAN Lite models) use the Universal image.

The tar file will be named c2960s-universal9-tar.150-2.SE1 for 2960-S and 2960-SF switches.

The name will change over time as new Cisco IOS Software releases are made available.

**Q.** Do I have to install a license to use the Cisco Catalyst 2960-S Universal image?

**A.** No. All Catalyst 2960-S and 2960-SF models use the Universal image. The license associated with the switch at manufacturing is the only license needed. The feature set is fixed during manufacture.

**Q.** Do the Cisco Catalyst 2960-S and 2960-SF switches have a K9 and non-K9 Cisco IOS Software image?

**A.** No. The only image is the K9 image. The K9 image is loaded during manufacture.

**Q.** Do the Cisco Catalyst 2960-S and 2960-SF switches support Cisco GOLD for in-field hardware debugging?

**A.** Yes. The Catalyst 2960-S and 2960-SF support the following GOLD tests:

TestPortAsicStackPortLoopback

---

```
TestPortAsicLoopback
TestPortAsicCam
TestPortAsicMem
TestInlinePwrCtrlr
```

The following GOLD tests are not supported by the Catalyst 2960-S and 2960-SF switches:

```
TestPortAsicRingLoopback
TestMicRingLoopback
```

- Q.** Do the Cisco Catalyst 2960-S and 2960-SF Series Switches support MACsec (802.1ae)?
- A.** No. The MACsec feature is available on the [Cisco Catalyst 3750-X models](#).
- Q.** Do the Cisco Catalyst 2960-S and 2960-SF Series Switches support Catalyst Integrated Security Features (ISF)?
- A.** Yes. Certain models of the Catalyst 2960-S and 2960-SF switches support the LAN Base software. LAN Base supports the Layer 2 security features in Catalyst ISF.
- Q.** Do the Cisco Catalyst 2960-S and 2960-SF Series Switches support Cisco EnergyWise?
- A.** Yes.
- Q.** Do the Cisco Catalyst 2960-S and 2960-SF Series Switches support Smart Install?
- A.** Only in Client mode. The Catalyst 2960-S and 2960-SF switches cannot act as director (IBD).



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