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Cisco Catalyst 2960 Series Switches with LAN Base Software

Cisco® Catalyst® 2960 Series Switches with LAN Base software are a family of fixed-configuration, standalone intelligent Ethernet devices with Power Over Ethernet (PoE) or non-PoE configurations that provide desktop Fast Ethernet and Gigabit Ethernet connectivity, enabling enhanced LAN services for entry-level enterprise, midmarket, and branch office networks (See Figure 1). The Cisco Catalyst 2960 LAN Base Series offers integrated security, including Network Admission Control (NAC), advanced quality of service (QoS), and resiliency to deliver intelligent services for the network edge.

The Cisco Catalyst 2960 LAN Base Series offers:

- PoE configurations with full 15.4W for up to 24 ports
- Intelligent features at the network edge, such as sophisticated access control lists (ACLs) and enhanced security
- Dual-purpose uplinks for Gigabit Ethernet uplink flexibility, allowing use of either a copper or a fiber uplink; each dual-purpose uplink port has one 10/100/1000 Ethernet port and one Small Form-Factor Pluggable (SFP)-based Gigabit Ethernet port, with one port active at a time
- Network control and bandwidth optimization using advanced QoS, granular rate limiting, ACLs, and multicast services
- Network security through a wide range of authentication methods, data encryption technologies, and NAC based on users, ports, and MAC addresses
- Easy network configuration, upgrades, and troubleshooting using Cisco Network Assistant software
- Autoconfiguration for specialized applications using Smartports
- Limited lifetime hardware warranty
- Software updates at no additional charge

Figure 1. Cisco Catalyst 2960 Series Switches



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Configurations

The Cisco Catalyst 2960 LAN Base Series includes the following switches (Table 1):

Table 1. Switch Configurations of Cisco Catalyst 2960 LAN Base Switches

Feature	Description
Cisco Catalyst 2960PD-8TT-L	8 Ethernet 10/100 ports and 1 10/100/1000 PoE input port; compact size with no fan
Cisco Catalyst 2960-8TC-L	8 Ethernet 10/100 ports and 1 dual-purpose uplink port (10/100/1000 or SFP); compact size with no fan
Cisco Catalyst 2960-24TT-L	24 Ethernet 10/100 ports and 2 fixed Ethernet 10/100/1000 uplink ports
Cisco Catalyst 2960-48TT-L	48 Ethernet 10/100 ports and 2 fixed Ethernet 10/100/1000 uplink ports
Cisco Catalyst 2960-24LT-L	24 Ethernet 10/100 ports (PoE supported on 8 ports) and 2 fixed Ethernet 10/100/1000 uplink ports
Cisco Catalyst 2960-24PC-L	24 Ethernet 10/100 PoE ports and 2 dual-purpose uplink ports
Cisco Catalyst 2960-24TC-L	24 Ethernet 10/100 ports and 2 dual-purpose uplink ports
Cisco Catalyst 2960-48TC-L	48 Ethernet 10/100 ports and 2 dual-purpose uplink ports
Cisco Catalyst 2960G-8TC-L	8 Ethernet 10/100/1000 ports, 1 of which is dual-purpose; compact size with no fan
Cisco Catalyst 2960G-24TC-L	24 Ethernet 10/100/1000 ports, 4 of which are dual-purpose
Cisco Catalyst 2960G-48-TC-L	48 Ethernet 10/100/1000 ports, 4 of which are dual-purpose

The Cisco Catalyst 2960 LAN Base software image is a rich suite of intelligent services, including advanced QoS, rate limiting, ACLs, and IPv6 management. The SFP-based Gigabit Ethernet ports accommodate a range of SFP transceivers, including the Cisco 1000BASE-SX, 1000BASE-LX, 1000BASE-BX, 1000BASE-ZX, 100BASE-FX, 100BASE-LX, 100BASE-BX, and coarse wavelength-division multiplexing (CWDM) SFP transceivers.

Power over Ethernet

The Cisco Catalyst 2960 Series provide PoE to allow easy connectivity to Ethernet-powered devices including Cisco IP phones and wireless access points. Cisco Catalyst 2960 PoE models comply with Cisco pre-standard PoE and IEEE 802.3af. PoE removes the need for wall power to each PoE-enabled device and eliminates the cost for additional electrical cable and circuits that would otherwise be necessary in IP phone and WLAN deployments. PoE switches also eliminate the need for power injectors and PoE mid-spans for powering IP devices. The Cisco Catalyst 2960-24PC-L can support 24 simultaneous full-powered PoE port at 15.4W. The Cisco Catalyst 2960-24LT-L has 24 10/100 ports with 8 simultaneous full-powered PoE ports at 15.4W.

The Cisco Catalyst 2960-8TT-L has eight 10/100 ports with one 10/100/1000 PoE input port. This switch does not need a power supply and receives power over the uplink from an upstream PoE device, providing deployment flexibility and availability. It is ideal for wiring and space-constraint applications. The power adaptor (PWR-A=) and power cord are optional and may be ordered separately.

Gigabit Ethernet

At speeds of 1000 Mbps, Gigabit Ethernet provides the bandwidth to meet new and evolving network demands, alleviate bottlenecks, and boost performance while increasing the return on existing infrastructure investments. Today's workers are placing higher demands on networks, running multiple concurrent applications. For example, a worker joins a team conference call through an IP videoconference, sends a 10-MB spreadsheet to meeting participants, broadcasts the latest marketing video for the team to evaluate, and queries the customer relationship

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management (CRM) database for the latest real-time feedback. Meanwhile, a multigigabyte system backup starts in the background and the latest virus updates are delivered to the client.

Redundant Power System

The Cisco Catalyst 2960 Series Switches support the new generation of the Cisco Redundant Power System (RPS) 2300, which increases availability in a converged data, voice, and video network by providing transparent power backup to two of six attached switches at the same time.

Intelligence in the Network

Networks of today are evolving 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, WLAN access points, and IP video cameras

These new demands contend for resources with 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 their strategic business infrastructure, it is more important than ever to help ensure their high availability, security, scalability, and control. By adding Cisco intelligent functions for LAN access, you can now deploy networkwide intelligent services that consistently address these requirements from the desktop to the core and through the WAN.

Cisco Catalyst Intelligent Ethernet switches help you realize the full benefits of adding intelligent services into your networks. Deploying 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 is critical to further optimizing network operations.

Enhanced Security

The wide range of security features that the Cisco Catalyst 2960 LAN Base Series offers helps you protect important information, keep unauthorized people off the network, guard privacy, and maintain uninterrupted operation.

The Cisco Identity-Based Networking Services (IBNS) solution provides authentication, access control, and security policy administration to secure network connectivity and resources. Cisco IBNS in the Cisco Catalyst 2960 LAN Base Series prevents unauthorized access and helps ensure that users get only their designated privileges. It provides the ability to dynamically administer granular levels of network access. Using the 802.1x standard and the Cisco Secure Access Control Server (ACS), users can be assigned a VLAN upon authentication, regardless of where they connect to the network. This setup allows IT departments to enable strong security policies without compromising user mobility and with minimal administrative overhead.

To guard against denial-of-service (DoS) and other attacks, ACLs can be used to restrict access to sensitive portions of the network by denying packets based on source and destination MAC

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addresses, IP addresses, or TCP/User Datagram Protocol (UDP) ports. ACL lookups are done in hardware, so forwarding performance is not compromised when ACL-based security is implemented.

Port security can be used to limit access on an Ethernet port based on the MAC address of the device to which it is connected. It also can be used to limit the total number of devices plugged into a switch port, thereby protecting the switch from a MAC flooding attack as well as reducing the risks of rogue wireless access points or hubs.

With Dynamic Host Configuration Protocol (DHCP) snooping, DHCP spoofing can be thwarted by allowing only DHCP requests (but not responses) from untrusted user-facing ports. Additionally, the DHCP Interface Tracker (Option 82) feature helps enable granular control over IP address assignment by augmenting a host IP address request with the switch port ID.

The MAC Address Notification feature can be used to monitor the network and track users by sending an alert to a management station so that network administrators know when and where users entered the network. Secure Shell Protocol Version 2 (SSHv2) and Simple Network Management Protocol Version 3 (SNMPv3) encrypt administrative and network-management information, protecting the network from tampering or eavesdropping. TACACS+ or RADIUS authentication enables centralized access control of switches and restricts unauthorized users from altering the configurations. Alternatively, a local username and password database can be configured on the switch itself. Fifteen levels of authorization on the switch console and two levels on the Web-based management interface provide the ability to give different levels of configuration capabilities to different administrators.

Intelligent PoE Management

The Cisco Catalyst 2960 PoE models support Cisco IP phones and Cisco Aironet® wireless LAN access points, as well as any IEEE 802.3af-compliant end device.

- Cisco Discovery Protocol version 2 allows the Cisco Catalyst 2960 Series Switch to negotiate a more granular power setting when connecting to a Cisco powered device, such as IP phones or access points, than what is provided by IEEE classification.
- The PoE MIB provides proactive visibility into power usage and allows you to set different power level thresholds.
- Link Layer Discovery Protocol (LLDP and LLDP-MED) adds support for IEEE 802.1AB link layer discovery protocol for interoperability in multivendor networks. Switches exchange speed, duplex, and power settings with end devices such as IP phones.

Availability and Scalability

The Cisco Catalyst 2960 LAN Base Series is equipped with a large set of features that allow for network scalability and higher availability through multicast filtering as well as a complete suite of Spanning Tree Protocol enhancements aimed to maximize availability in a Layer 2 network.

Voice-aware 802.1x port security disables the offending data VLAN when a violation is detected without affecting Voice VLAN on the same switch port. Enhancements to the standard Spanning Tree Protocol, such as Per-VLAN Spanning Tree Plus (PVST+), UplinkFast, and PortFast help maximize network uptime. PVST+ allows for Layer 2 load sharing on redundant links to efficiently use the extra capacity inherent in a redundant design. UplinkFast, PortFast, and BackboneFast all greatly reduce the standard 30- to 60-second Spanning Tree Protocol convergence time. Flexlink

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provides bidirectional, fast convergence in less than 100 milliseconds. The Loopguard and bridge protocol data unit (BPDU) guard enhancements provide Spanning Tree Protocol loop avoidance.

Advanced QoS

The Cisco Catalyst 2960 LAN Base Series offers superior multilayer QoS features to help ensure that network traffic is classified and prioritized and that congestion is avoided in the best possible manner. Configuration of QoS is greatly simplified through automatic QoS (Auto QoS), a feature that detects Cisco IP phones and automatically configures the switch for the appropriate classification and egress queuing. This optimizes traffic prioritization and network availability without the challenge of a complex configuration.

The Cisco Catalyst 2960 LAN Base Series can classify, reclassify, police, mark, queue, and schedule incoming packets and can queue and schedule packets at egress. Packet classification allows the network elements to discriminate between various traffic flows and enforce policies based on Layer 2 and Layer 3 QoS fields.

To implement QoS, the Cisco Catalyst 2960 LAN Base Series Switch first identifies traffic flows or packet groups, then classifies or reclassifies these groups using the differentiated services code point (DSCP) field or the 802.1p class of service (CoS) field. Classification and reclassification can be based on criteria as specific as the source or destination IP address, source or destination MAC address, or the Layer 4 TCP or UDP port. At the ingress, the Cisco Catalyst 2960 LAN Base Series also polices to determine whether a packet is in or out of profile, marks to change the classification label, passes through or drops out of profile packets, and queues packets based on classification. Control-plane and data-plane ACLs are supported on all ports to help ensure proper treatment on a per-packet basis.

The Cisco Catalyst 2960 LAN Base Series supports four egress queues per port, giving network administrators more control in assigning priorities for the various applications on the LAN. At egress, the switch performs congestion control and scheduling, the algorithm or process that determines the order in which queues are processed. The Cisco Catalyst 2960 LAN Base Series Switch supports Shaped Round Robin (SRR) and strict priority queuing. The SRR algorithm helps ensure differential prioritization.

These QoS features allow network administrators to prioritize mission-critical and bandwidth-intensive traffic, such as enterprise resource planning (ERP), voice (IP telephony traffic), and computer-aided design and manufacturing (CAD/CAM), over applications such as FTP or e-mail. For example, it would be undesirable to have a large file download destined to one port on a switch increase latency in voice traffic destined to another port on this switch. This condition is avoided by making sure that voice traffic is properly classified and prioritized throughout the network. Other applications, such as Web browsing, can be handled on a lower-priority basis.

The Cisco Catalyst 2960 Series LAN Base can perform rate limiting through its support of the Cisco committed information rate (CIR) function. Through CIR, bandwidth can be guaranteed in increments as small as 1 Mbps. Bandwidth can be allocated based on several criteria, including MAC source address, MAC destination address, IP source address, IP destination address, and TCP or UDP port number. Bandwidth allocation is essential when network environments require service-level agreements or when it is necessary to control the bandwidth given to certain users.

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Management

The new Express Setup feature simplifies the initial configuration of a switch. Now you can set up the switch through a Web browser, eliminating the need for terminal-emulation programs and the command-line interface (CLI). Express Setup reduces the cost of deployment by helping less-skilled personnel quickly and easily set up switches.

Cisco Network Assistant is a PC-based network-management application optimized for LANs 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 switches from Cisco Catalyst 2960 through Cisco Catalyst 4506. 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. A few mouse clicks enable the Cisco recommended security, availability, and QoS features without the need to consult a detailed design guide. The Security wizard automatically restricts unauthorized access to servers with sensitive data. Smartports and wizards save time for network administrators, reduce human errors, and help ensure that the configuration of the switch is optimized for these applications. Available at no cost, Cisco Network Assistant can be downloaded from the Cisco Website.

In addition to Cisco Network Assistant, Cisco Catalyst 2960 LAN Base Series Switches provide for extensive management using SNMP network-management platforms such as the CiscoWorks LAN Management Solution (LMS). CiscoWorks LMS is a suite of powerful management tools that simplify the configuration, administration, monitoring, and troubleshooting of Cisco networks. It integrates these capabilities into a world-class solution for improving the accuracy and efficiency of your operations staff, while increasing the overall availability of your network. CiscoWorks LMS supports over 400 different device types, providing:

- Network discovery, topology views, end-station tracking, and VLAN management
- Real-time network fault analysis with easy-to-deploy device-specific best-practice templates
- Hardware and software inventory management, centralized configuration tools, and Syslog monitoring
- Network response time and availability monitoring and tracking
- Real-time device, link, and port traffic management, analysis, and reporting

Table 2 gives the features and benefits of the Cisco Catalyst 2960 LAN Base Series. Table 3 gives the hardware specifications, and Table 4 gives the power specifications. Table 5 lists the management and standards support, and Table 6 provides the safety and compliance information.

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Table 2. Features and Benefits of Cisco Catalyst 2960 LAN Base Switches

Feature	Benefit
Ease of Use and Deployment	• Express Setup simplifies initial configuration with a Web browser, eliminating the need for more complex terminal emulation programs and CLI knowledge. • IEEE 802.3af and Cisco prestandard PoE support comes with automatic discovery to detect a Cisco prestandard or IEEE 802.3af endpoint and provide the necessary power without any user configuration. • Auto Install for configuration and Image update: Simplify management of large number of switches, by automatically downloading specified configuration and image • DHCP autoconfiguration of multiple switches through a boot server eases switch deployment. • Automatic QoS (Auto QoS) simplifies QoS configuration in voice-over-IP (VoIP) networks by issuing interface and global switch commands to detect Cisco IP phones, classify traffic, and enable egress queue configuration. • Autosensing on each 10/100 port detects the speed of the attached device and automatically configures the port for 10- or 100-Mbps operation, easing switch deployment in mixed 10- and 100-Mbps environments. • Autonegotiating on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth. • Dynamic Trunking Protocol (DTP) helps enable dynamic trunk configuration across all switch ports. • Port Aggregation Protocol (PAgP) automates the creation of Cisco Fast EtherChannel® groups or Gigabit EtherChannel groups to link to another switch, router, or server. • Link Aggregation Control Protocol (LACP) allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad. This feature is similar to Cisco EtherChannel technology and PAgP. • DHCP Server enables a convenient deployment option for the assignment of IP addresses in networks that do not have without a dedicated DHCP server. • DHCP Relay allows a DHCP relay agent to broadcast DHCP requests to the network DHCP server. • 1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX, 1000BASE-BX, 100BASE-FX, 100BASE-LX, 100BASE-BX, and coarse wavelength-division multiplexing (CWDM) physical interface support through a field-replaceable SFP module provides unprecedented flexibility in switch deployment. • The default configuration stored in flash memory ensures that the switch can be quickly connected to the network and can pass traffic with minimal user intervention. • Automatic medium-dependent interface crossover (Auto-MDIX) automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed on a copper port. • Time-domain reflectometer (TDR) to diagnose and resolve cabling problems on copper ports. • Configuration Rollback provides the capability to replace the current running configuration with any saved Cisco IOS® Software configuration file. This functionality can be used to revert to a previous configuration state, effectively rolling back any configuration changes that were made since that configuration file was saved. • DHCP Auto Install (Boot Host DHCP) and Auto Image Update allows the switch to automatically download a configuration file and IOS image (future).
Manageability	

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Superior Manageability	• Cisco IOS Software CLI support provides a common user interface and command set with all Cisco routers and Cisco Catalyst desktop switches. • IP Service Level Agreement (responder only) uses active monitoring to generate traffic in a continuous, reliable, and predictable manner, thus enabling the measurement of network performance and health. • Switching Database Manager templates for security and QoS allow administrators to easily adjust memory allocation to the desired features based on deployment-specific requirements. • VLAN trunks can be created from any port using standards-based 802.1q tagging. • Up to 255 VLANs per switch and up to 128 spanning-tree instances per switch are supported. • Four thousand VLAN IDs are supported. • Voice VLAN simplifies telephony installations by keeping voice traffic on a separate VLAN for easier administration and troubleshooting. • Cisco VTP supports dynamic VLANs and dynamic trunk configuration across all switches. • IGMPv3 snooping for IPv4 and MLD v1 and v2 Snooping for IPv6 provide fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • Remote SPAN (RSPAN) allows administrators to remotely monitor ports in a Layer 2 switch network from any other switch in the same network. • For enhanced traffic management, monitoring, and analysis, the Embedded Remote Monitoring (RMON) software agent supports four RMON groups (history, statistics, alarms, and events). • Layer 2 trace route eases troubleshooting by identifying the physical path that a packet takes from source to destination. • All RMON groups are supported through a SPAN port, which permits traffic monitoring of a single port, or a group of ports, from a single network analyzer or RMON probe. • Domain Name System (DNS) provides IP address resolution with user-defined device names. • Trivial File Transfer Protocol (TFTP) reduces the cost of administering software upgrades by downloading from a centralized location. • Network Timing Protocol (NTP) provides an accurate and consistent timestamp to all intranet switches. • Multifunction LEDs per port for port status, half-duplex and full-duplex mode, and 10BASE-T, 100BASE-TX, and 1000BASE-T indication as well as switch-level status LEDs for system, and redundant power supply provide a comprehensive and convenient visual management system. • Cisco Discovery Protocol Versions 1 and 2 help enable automatic switch discovery for network management tools and communicate Voice VLAN information with Cisco IP phones. • Link Layer Discovery Protocol (LLDP) and LLDP Media Extensions (LLDP-MED) including client location information. Switches exchange link and device information in multivendor networks. • IPv6 Host provides basic IPv6 management such as IPv4/IPv6 dual stack, unicast address types, ICMPv6, AAAA DNS lookup over IPv4, Secure Shell (SSH) for v6, IPv6 neighbor discovery, CDP, Telnet, TFTP, SNMP, HTTP, HTTPS , Traceroute, syslog for v6.
Cisco Network Assistant Software	• Cisco Network Assistant is a no-charge, Windows-based application that simplifies the administration of networks of up to 250 users. It supports a wide range of Cisco Catalyst intelligent switches. With Cisco Network Assistant, users can manage Cisco Catalyst switches and launch the device managers of Cisco integrated services routers and Cisco Aironet® WLAN access points. • The easy-to-use graphical interface provides both a topology map and front-panel view of the cluster and stacks. • Configuration wizards need just a few user inputs to automatically configure the switch to optimally handle different types of traffic: voice, video, multicast, and high-priority data. • A security wizard is provided to restrict unauthorized access to applications, servers, and networks. • Upgrading the Cisco IOS Software on Cisco Catalyst switches is a simple matter of pointing and clicking, with one-click upgrades. • Cisco Network Assistant supports multilayer feature configurations such as routing protocols, ACLs, and QoS parameters. • Multidevice and multiport configuration capabilities allow administrators to save time by configuring features across multiple switches and ports simultaneously. • The user-personalized interface allows modification of polling intervals, table views, and other settings. • Alarm notification provides automated e-mail notification of network errors and alarm thresholds.
Cisco Express Setup	• Express Setup simplifies initial configuration of a switch through a Web browser, eliminating the need for terminal emulation programs and CLI knowledge. • The Web interface helps less-skilled personnel quickly and simply set up switches, thereby reducing the cost of deployment.

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CiscoWorks Support	• CiscoWorks network-management software provides management capabilities on a per-port and per-switch basis, providing a common management interface for Cisco routers, switches, and hubs. • SNMPv1, v2c, and v3 and Telnet interface support delivers comprehensive in-band management, and a CLI-based management console provides detailed out-of-band management. • The CiscoWorks LAN Management Solution supports the Cisco Catalyst 2960 Series.
Availability and Scalability	
Superior Redundancy for Fault Backup	• IEEE 802.1x Voice-aware security disables the offending data VLAN when a violation is detected without affecting Voice VLAN on the same switch port • IEEE 802.1x readiness check determines readiness of connected end hosts, before configuring 802.1x on the switch. • Cisco UplinkFast and BackboneFast technologies help ensure quick failover recovery, enhancing overall network stability and reliability. • IEEE 802.1w Rapid Spanning Tree Protocol provides rapid spanning-tree convergence independent of spanning-tree timers and the benefit of distributed processing. • Per-VLAN Rapid Spanning Tree Plus (PVRST+) allows rapid spanning-tree reconvergence on a per-VLAN spanning-tree basis, without requiring the implementation of spanning-tree instances. • Command-switch redundancy enabled in Cisco Network Assistant software allows designation of a backup command switch that takes over if the primary command switch fails. • Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD allow unidirectional links to be detected and disabled to avoid problems such as spanning-tree loops. • Switch port autorecovery (errdisable) automatically attempts to re-enable a link that is disabled because of a network error. • Cisco Redundant Power System 2300 (RPS 2300) support provides superior internal power-source redundancy for up to six Cisco networking devices, resulting in improved fault tolerance and network uptime. • Bandwidth aggregation up to 8 Gbps through Cisco Gigabit EtherChannel technology and up to 800 Mbps through Cisco Fast EtherChannel technology enhances fault tolerance and offers higher-speed aggregated bandwidth between switches and to routers and individual servers. • Flex Links provides link redundancy with convergence time 100ms without requiring Spanning Tree Protocol. • VLAN Flex Links load balancing improves network throughput by utilizing both links for traffic distribution for different VLANs. • Link State Tracking provides Layer 2 redundancy in the network when used in conjunction with server or programmable logic controller (PLC) network interface card (NIC) adapter teaming.
Integrated Cisco IOS Software Features for Bandwidth Optimization	• Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance. • IEEE 802.1d Spanning Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance. • PVST+ allows for Layer 2 load sharing on redundant links to efficiently use the extra capacity inherent in a redundant design. • IEEE 802.1s Multiple Spanning Tree Protocol allows a spanning-tree instance per VLAN, enabling Layer 2 load sharing on redundant links. • Egress committed rate (ECR) guarantee provides load balancing and redundancy. • Local Proxy Address Resolution Protocol (ARP) works in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth. • VLAN1 minimization allows VLAN1 to be disabled on any individual VLAN trunk link. • VLAN Trunking Protocol (VTP) pruning limits bandwidth consumption on VTP trunks by flooding broadcast traffic only on trunk links required to reach the destination devices. • Internet Group Management Protocol (IGMP) version 3 snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • IGMP filtering provides multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port. • Multicast VLAN registration (MVR) continuously sends multicast streams in a multicast VLAN while isolating e streams from subscriber VLANs for bandwidth and security reasons.
QoS and Control	

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Advanced QoS	• Standard 802.1p CoS and DSCP field classification are provided, using marking and reclassification on a per-packet basis by source and destination IP address, source and destination MAC address, or Layer 4 TCP or UDP port number. • Cisco control-plane and data-plane QoS ACLs on all ports help ensure proper marking on a per-packet basis. • Four egress queues per port enable differentiated management of up to four traffic types. • SRR scheduling ensures differential prioritization of packet flows by intelligently servicing the ingress and egress queues. • Weighted tail drop (WTD) provides congestion avoidance at the ingress and egress queues before a disruption occurs. • Strict priority queuing guarantees that the highest-priority packets are serviced ahead of all other traffic. • There is no performance penalty for highly granular QoS functions.
Granular Rate Limiting	• The Cisco CIR function guarantees bandwidth in increments as small as 1 Mbps. • Rate limiting is provided based on source and destination IP address, source and destination MAC address, Layer 4 TCP and UDP information, or any combination of these fields, using QoS ACLs (IP ACLs or MAC ACLs), class maps, and policy maps. • Asynchronous data flows upstream and downstream from the end station or on the uplink are easily managed using ingress policing and egress shaping. • Up to 64 aggregate or individual polices are available per Fast Ethernet or Gigabit Ethernet port.
Security	

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Networkwide Security Features	• IEEE 802.1x allows dynamic, port-based security, providing user authentication. • IEEE 802.1x with VLAN assignment allows a dynamic VLAN assignment for a specific user regardless of where the user is connected. • IEEE 802.1x with voice VLAN permits an IP phone to access the voice VLAN irrespective of the authorized or unauthorized state of the port. • IEEE 802.1x and port security are provided to authenticate the port and manage network access for all MAC addresses, including those of the client. • IEEE 802.1x with Guest VLAN allows guests without 802.1x clients to have limited network access on the guest VLAN. • Web authentication for non-802.1x clients allows non-802.1x clients to use an SSL-based browser for authentication. • MAC Auth Bypass (MAB) for voice allows third-party IP phones without an 802.1x supplicant to get authenticated using their MAC address. • Port-based ACLs for Layer 2 interfaces allow application of security policies on individual switch ports. • Unicast MAC filtering prevents the forwarding of any type of packet with a matching MAC address. • Unknown unicast and multicast port blocking allows tight control by filtering packets that the switch has not already learned how to forward. • SSHv2 and SNMPv3 provide network security by encrypting administrator traffic during Telnet and SNMP sessions. SSHv2 and the cryptographic version of SNMPv3 require a special cryptographic software image because of U.S. export restrictions. • Bidirectional data support on the Switched Port Analyzer (SPAN) port allows the Cisco Secure intrusion detection system (IDS) to take action when an intruder is detected. • TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration. • MAC address notification allows administrators to be notified of users added to or removed from the network. • DHCP snooping allows administrators to ensure consistent mapping of IP to MAC addresses. This can be used to prevent attacks that attempt to poison the DHCP binding database, and to rate-limit the amount of DHCP traffic that enters a switch port. • DHCP Interface Tracker (Option 82) feature augments a host IP address request with the switch port ID. • Port security secures the access to an access or trunk port based on MAC address. • After a specific timeframe, the aging feature removes the MAC address from the switch to allow another device to connect to the same port. • Trusted Boundary provides the ability to trust the QoS priority settings if an IP phone is present and to disable the trust setting if the IP phone is removed, thereby preventing a malicious user from overriding prioritization policies in the network. • Multilevel security on console access prevents unauthorized users from altering the switch configuration. • The user-selectable address-learning mode simplifies configuration and enhances security. • BPDU Guard shuts down Spanning Tree Protocol PortFast-enabled interfaces when BPDUs are received to avoid accidental topology loops. • Spanning-Tree Root Guard (STRG) prevents edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes. • Voice VLAN aware port security and BPDU Guard allow Voice VLAN traffic to not be disrupted when security violations occur. • IGMP filtering provides multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port. • Dynamic VLAN assignment is supported through implementation of VLAN Membership Policy Server (VMPS) client functions to provide flexibility in assigning ports to VLANs. Dynamic VLAN helps enable the fast assignment of IP addresses. • Cisco Network Assistant software security wizards ease the deployment of security features for restricting user access to a server as well as to a portion of or the entire network. • Up to 512 (Aces) are supported, with two profiles. Security (384 Security ACL entries and 128 QoS policies), and QoS (128 Security ACL entries and 384 QoS policies).

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Table 3. Cisco Catalyst 2960 LAN Base Switch Hardware

Description	Specification
Performance	• 16 Gbps switching fabric (Catalyst 2960PD-8TT-L , Catalyst 2960-8TC-L, Catalyst 2960-24TT-L, Catalyst 2960-24TC-L, Catalyst 2960-24LT-L, Catalyst 2960-24PC-L, Catalyst 2960-48TT-L, Catalyst 2960-48TC-L) • 32 Gbps switching fabric (Catalyst 2960G-8TC-L, Catalyst 2960G-24TC-L, Catalyst 2960G-48TC-L) • Forwarding rate based on 64-byte packets: ▫ Catalyst 2960PD-8TT-L: 2.7 Mpps ▫ Catalyst 2960-8TC-L: 2.7 Mpps ▫ Catalyst 2960-24TT-L: 6.5 Mpps ▫ Catalyst 2960-24TC-L: 6.5 Mpps ▫ Catalyst 2960-24LT-L: 6.5 Mpps ▫ Catalyst 2960-24PC-L : 6.5 Mpps ▫ Catalyst 2960-48TT-L: 10.1 Mpps ▫ Catalyst 2960-48TC-L: 10.1 Mpps ▫ Catalyst 2960G-8TC-L: 11.9 Mpps ▫ Catalyst 2960G-24TC-L: 35.7 Mpps ▫ Catalyst 2960G-48TC-L: 39.0 Mpps • 64 MB DRAM • 32 MB flash memory • Configurable up to 8000 MAC addresses • Configurable up to 255 IGMP groups • Configurable maximum transmission unit (MTU) of up to 9000 bytes, with a maximum Ethernet frame size of 9018 bytes (Jumbo frames) for bridging on Gigabit Ethernet ports, and up to 1998 bytes for bridging of Multiprotocol Label Switching (MPLS) tagged frames on both 10/100 and 10/100/1000 ports
Connectors and Cabling	• 10BASE-T ports: RJ-45 connectors, 2-pair Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling • 100BASE-TX ports: RJ-45 connectors, 2-pair Category 5 UTP cabling • 1000BASE-T ports: RJ-45 connectors, 4-pair Category 5 UTP cabling • 1000BASE-T SFP-based ports: RJ-45 connectors, 4-pair Category 5 UTP cabling • 1000BASE-SX, -LX/LH, -ZX, -BX and CWDM SFP-based ports. LC fiber connectors (single/multimode fiber) • 100BASE-LX, -BX, -FX: LC fiber connectors (single/multimode fiber).
Power Connectors	• Customers can provide power to a switch by using either the internal power supply or the Cisco RPS 675. The connectors are located at the back of the switch. • Note: The Catalyst 2960-8TC-L and Catalyst 2960G-8TC-L do not have RPS ports. • Internal-Power-Supply Connector • The internal power supply is an autoranging unit. • The internal power supply supports input voltages between 100 and 240VAC. • Use the supplied AC power cord to connect the AC power connector to an AC power outlet. • Cisco RPS Connector • The connector offers connection for an optional Cisco RPS 2300 that uses AC input and supplies DC output to the switch. • The connector offers a 2300W redundant power system that supports up to six external network devices and provides power to two failed devices at a time. • The connector automatically senses when the internal power supply of a connected device fails and provides power to the failed device, preventing loss of network traffic. • Only the Cisco RPS 2300 (model PWR-RPS2300) should be attached to the redundant-power-system receptacle.
Indicators	• Per-port status: Link integrity, disabled, activity, speed, full-duplex • System status: System, RPS, link status, link duplex, link speed

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Dimensions (H x W x D)	• Cisco Catalyst 2960PD-8TT-L : 1.73 x 10.6 x 6.2 in. (4.4 x 27 x 15.7 cm) • Cisco Catalyst 2960-8TC-L: 1.73 x 10.6 x 6.4 in. (4.4 x 27 x 16.3 cm) • Cisco Catalyst 2960-24TT-L: 1.73 x 17.5 x 9.3 in. (4.4 x 44.5 x 23.6 cm) • Cisco Catalyst 2960-48TT-L: 1.73 x 17.5 x 9.3 in. (4.4 x 44.5 x 23.6 cm) • Cisco Catalyst 2960-24TC-L. 1.73 x 17.5 x 9.3 in. (4.4 x 44.5 x 23.6 cm) • Cisco Catalyst 2960-24LT-L. 1.73 x 17.5 x 13 in. (4.4 x 44.5 x 33.2 cm) • Cisco Catalyst 2960-24PC-L : 1.73 x 17.5 x 13 in. (4.4 x 44.5 x 33.2 cm) • Cisco Catalyst 2960-48TC-L: 1.73 x 17.5 x 9.3 in. (4.4 x 44.5 x 23.6 cm) • Cisco Catalyst 2960G-8TC-L: 1.73 x 10.6 x 8.1 in. (4.4 x 27 x 20.5 cm) • Cisco Catalyst 2960G-24TC-L: 1.73 x 17.5 x 12.9 in. (4.4 x 44.5 x 32.8 cm) • Cisco Catalyst 2960G-48TC-L: 1.73 x 17.5 x 12.9 in. (4.4 x 44.5 x 32.8 cm)
Weight	• Cisco Catalyst 2960PD-8TT-L: 3 lb (1.4 kg) • Cisco Catalyst 2960-8TC-L: 3 lb (1.4 kg) • Cisco Catalyst 2960-24TT-L: 8 lb (3.6 kg) • Cisco Catalyst 2960-48TT-L: 8 lb (3.6 kg) • Cisco Catalyst 2960-24TC-L: 8 lb (3.6 kg) • Cisco Catalyst 2960-24LT-L : 10 lb (4.5 kg) • Cisco Catalyst 2960-24PC-L . 12 lb (5.4 kg) • Cisco Catalyst 2960-48TC-L: 8 lb (3.6 kg) • Cisco Catalyst 2960G-8TC-L: 3 lb (1.4 kg) • Cisco Catalyst 2960G-24TC-L: 10 lb (4.5 kg) • Cisco Catalyst 2960G-48TC-L: 12 lb (5.4 kg)
Environmental Ranges	Normal Operating Conditions: • -5ºC to +45ºC, up to 5,000 feet (1500 m) • -5ºC to +40ºC, up to 10,000 feet (3000 m) • -5ºC to +35ºC, up to 13,000 feet (4000 m) Short-Term* Exceptional Operating Conditions: • -5ºC to +55ºC, at sea level • -5ºC to +50ºC, up to 5,000 feet (1500 m) • -5ºC to +45ºC, up to 10,000 feet (3000 m) • -5'C to +40'C, up to 13,000 feet (4000 m) * Not more than following in one year period: 96 consecutive hours, or 360 hours total, or 15 occurrences * For Catalyst 2960G-8TC-L, reduce the high range temperature by 5ºC
Acoustic Noise	• ISO 7779: Bystander position operating to an ambient temperature of 25ºC • Cisco Catalyst 2960PD-8TT-L: 0 dBa (no fan) • Cisco Catalyst 2960-8TC-L: 0 dBa (no fan) • Cisco Catalyst 2960-24TT-L: 40 dBa • Cisco Catalyst 2960-48TT-L: 40 dBa • Cisco Catalyst 2960-24TC-L: 40 dBa • Cisco Catalyst 2960-24LT-L : 48 dBa • Cisco Catalyst 2960-24PC-L : 48 dBa • Cisco Catalyst 2960-48TC-L: 40 dBa • Cisco Catalyst 2960G-8TC-L. 0 dBa (no fan) • Cisco Catalyst 2960G-24TC-L: 41 dBa • Cisco Catalyst 2960G-48TC-L: 43 dBa
Mean Time Between Failure (MTBF)	• Cisco Catalyst 2960PD-8TT-L: 737,065 hrs • Cisco Catalyst 2960-8TC-L: 615,549 hrs • Cisco Catalyst 2960-24TT-L: 407,707 hrs • Cisco Catalyst 2960-48TT-L: 339,743 hrs • Cisco Catalyst 2960-24TC-L: 402,926 hrs • Cisco Catalyst 2960-24LT-L : 311,781 hrs • Cisco Catalyst 2960-24PC-L : 243,277 hrs • Cisco Catalyst 2960-48TC-L: 336,409 hrs • Cisco Catalyst 2960G-8TC-L: 485,576 hrs • Cisco Catalyst 2960G-24TC-L: 313,828 hrs • Cisco Catalyst 2960G-48TC-L. 221,432 hrs

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Table 4. Power Specifications for Cisco Catalyst 2960 LAN Base Switches

Description	Specification
Maximum Power Consumption	• 11W, 38 BTUs per hour (Cisco Catalyst 2960PD-8TT-L) • 20W, 68 BTUs per hour (Cisco Catalyst 2960-8TC-L) • 30W, 103 BTUs per hour (Cisco Catalyst 2960-24TT-L and Catalyst 2960-24TC-L) • 45W, 154 BTUs per hour (Cisco Catalyst 2960-48TT-L and Catalyst 2960-48TC-L) • 175W, 597 BTUs per tour (Cisco Catalyst 2960-24LT-L), Dissipated Power. 51W, 174 BTUs per hour • 470W, 1603 BTUs per hour (Cisco Catalyst 2960-24PC-L), Dissipated Power. 100W, 341 BTUs per hour • 30W, 103 BTUs per hour (Cisco Catalyst 2960G-8TC-L) • 75W, 256 BTUs per hour (Cisco Catalyst 2960G-24TC-L) • 140W, 477 BTUs per hour (Cisco Catalyst 2960G-48TC-L)
AC Input Voltage and Current	• DC input, 48 VDC, 0.3A (Cisco Catalyst 2960PD-8TT-L), • (For AC input, use PWR-A= sold separately) • 100-240VAC (autoranging), 0.5-0.25A, 50-60 Hz (Cisco Catalyst 2960-8TC-L) • 100-240VAC (autoranging), 0.8-0.4A, 50-60 Hz (Cisco Catalyst 2960G-8TC-L) • 100-240 VAC (autoranging), 3.0-1.5A, 50-60 Hz (Cisco Catalyst 2960-24LT-L) • 100-240 VAC (autoranging) 8.0-4.0A, 50-60 Hz (Cisco Catalyst 2960-24PC-L) • 100-240VAC (autoranging), 1.3–0.8A, 50–60 Hz (Cisco Catalyst 2960-24TT-L and Catalyst 2960-24TC-L and Catalyst 2960-48TT-L and Catalyst 2960-48TC-L) • 100-240VAC (autoranging), 3.0–1.5A, 50–60 Hz (Cisco Catalyst 2960G-24TC-L and Catalyst 2960G-48TC-L)
Power Rating	• Cisco Catalyst 2960PD-8TT-L : 11 W • Cisco Catalyst 2960-8TC-L: 0.035 kVA • Cisco Catalyst 2960-24TT-L: 0.05kVA • Cisco Catalyst 2960-48TT-L: 0.075kVA • Cisco Catalyst 2960-24TC-L: 0.05kVA • Cisco Catalyst 2960-24LT-L : 0.175 kVA • Cisco Catalyst 2960-24PC-L : 0.470 kVA • Cisco Catalyst 2960-48TC-L: 0.075kVA • Cisco Catalyst 2960G-8TC-L: 0.05 kVA • Cisco Catalyst 2960G-24TC-L. 0.075kVA • Cisco Catalyst 2960G-48TC-L. 0.140kVA
DC Input Voltages (RPS Input)	• (No RPS input for Cisco Catalyst 2960PD-8TT-L , Catalyst 2960-8TC-L and Catalyst 2960G-8TC-L) • Cisco Catalyst 2960-24TT-L: +12V at 5A • Cisco Catalyst 2960-48TT-L: +12V at 5A • Cisco Catalyst 2960-24TC-L: +12V at 5A • Cisco Catalyst 2960-24LT-L : +12V at 8.3A, -48V at 2.7A • Cisco Catalyst 2960-24PC-L : +12V at 11.25A, -48V at 7.8A • Cisco Catalyst 2960-48TC-L: +12V at 5A • Cisco Catalyst 2960G-24TC-L: +12V at 10.5A • Cisco Catalyst 2960G-48TC-L: +12V at 10.5A

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Table 5. Management and Standards Support for Cisco Catalyst 2960 LAN Base Switches

Description	Specification	
Management	• BRIDGE-MIB • CISCO-CABLE-DIAG-MIB • CISCO-CDP-MIB • CISCO-CLUSTER-MIB • CISCO-CONFIG-COPY-MIB • CISCO-CONFIG-MAN-MIB • CISCO-DHCP-SNOOPING-MIB • CISCO-ENTITY-VENDORTYPE-OID-MIB • CISCO-ENVMON-MIB • CISCO-ERR-DISABLE-MIB • CISCO-FLASH-MIB • CISCO-FTP-CLIENT-MIB • CISCO-IGMP-FILTER-MIB • CISCO-IMAGE-MIB • CISCO-IP-STAT-MIB • CISCO-LAG-MIB • CISCO-MAC-NOTIFICATION-MIB • CISCO-MEMORY-POOL-MIB • CISCO-PAGP-MIB • CISCO-PING-MIB • CISCO-POE-EXTENSIONS-MIB • CISCO-PORT-QOS-MIB • CISCO-PORT-SECURITY-MIB • CISCO-PORT-STORM-CONTROL-MIB • CISCO-PRODUCTS-MIB • CISCO-PROCESS-MIB • CISCO-RTTMON-MIB • CISCO-SMI-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-SYSLOG-MIB	• CISCO-TC-MIB • CICSO-TCP-MIB • CISCO-UDLDP-MIB • CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB • CISCO-VLAN-MEMBERSHIP-MIB • CISCO-VTP-MIB • ENTITY-MIB • ETHERLIKE-MIB • IEEE8021-PAE-MIB • IEEE8023-LAG-MIB • IF-MIB • INET-ADDRESS-MIB • OLD-CISCO-CHASSIS-MIB • OLD-CISCO-FLASH-MIB • OLD-CISCO-INTERFACES-MIB • OLD-CISCO-IP-MIB • OLD-CISCO-SYS-MIB • OLD-CISCO-TCP-MIB • OLD-CISCO-TS-MIB • RFC1213-MIB • RMON-MIB • RMON2-MIB • SNMP-FRAMEWORK-MIB • SNMP-MPD-MIB • SNMP-NOTIFICATION-MIB • SNMP-TARGET-MIB • SNMPv2-MIB • TCP-MIB • UDP-MIB
Standards	• IEEE 802.1D Spanning Tree Protocol • IEEE 802.1p CoS Prioritization • IEEE 802.1Q VLAN • IEEE 802.1s • IEEE 802.1w • IEEE 802.1x • IEEE 802.1AB (LLDP) • IEEE 802.3ad • IEEE 802.3af • IEEE 802.3ah (100BASE-X single/multimode fiber only) • IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports • IEEE 802.3 10BASE-T specification • IEEE 802.3u 100BASE-TX specification • IEEE 802.3ab 1000BASE-T specification • IEEE 802.3z 1000BASE-X specification	• 100BASE-BX (SFP) • 100BASE-FX (SFP) • 100BASE-LX (SFP) • 1000BASE-BX (SFP) • 1000BASE-SX (SFP) • 1000BASE-LX/LH (SFP) • 1000BASE-ZX (SFP) • 1000BASE-CWDM SFP 1470 nm • 1000BASE-CWDM SFP 1490 nm • 1000BASE-CWDM SFP 1510 nm • 1000BASE-CWDM SFP 1530 nm • 1000BASE-CWDM SFP 1550 nm • 1000BASE-CWDM SFP 1570 nm • 1000BASE-CWDM SFP 1590 nm • 1000BASE-CWDM SFP 1610 nm • RMON I and II standards • SNMPv1, SNMPv2c, and SNMPv3

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Table 6. Safety and Compliance

Description	Specification
Safety Certifications	• UL 60950-1, First Edition • CUL to CAN/CSA 22.2 No. 60950-1, First Edition • TUV/GS to EN 60950-1, First Edition • CB to IEC 60950-1 with all country deviations • AS/NZS 60950-1, First Edition • CE Marking • NOM (through partners and distributors)
Electromagnetic Compatibility Certifications	• FCC Part 15 Class A • EN 55022 Class A (CISPR22) • EN 55024 (CISPR24) • AS/NZS CISPR22 Class A • CE • CNS13438 Class A • MIC • GOST • China EMC Certifications
Environmental	Reduction of Hazardous Substances (ROHS) 5
Telco	Common Language Equipment Identifier (CLEI) code
Warranty	Limited lifetime warranty

Service and Support

Cisco is committed to minimizing total cost of ownership. Our portfolio of technical support services helps ensure that Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 7 are available as part of the Cisco Desktop Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 7. Cisco Services and Support Programs

Service and Support	Features	Benefits
• Cisco Total Implementation Solutions (TIS), available direct from Cisco • Cisco Packaged TIS, available through resellers • Cisco SMARTnet® and SMARTnet Onsite support, available direct from Cisco • Cisco Packaged SMARTnet support program, available through resellers • Cisco SMB Support Assistant	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, adds, and changes • Design review and product staging • 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center • Advance replacement of hardware parts	• Supplements existing staff • Helps ensure that functions meet needs • Mitigates risk • Helps enable proactive or expedited issue resolution • Lowers total cost of ownership by taking advantage of Cisco expertise and knowledge • Helps minimize network downtime

Ordering Information

Table 8 gives ordering information for Cisco Catalyst 2960 LAN Base Switches.

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Table 8. Ordering Information for Cisco Catalyst 2960 LAN Base Switches

Part Numbers	Description
WS-C2960PD-8TT-L	• 8 Ethernet 10/100 ports and 1 10/100/1000 PoE input port • Power adaptor (PWR-A=) and power cord sold separately • Compact size with no fan; magnet included • LAN Base Image installed
WS-C2960-8TC-L	• 8 Ethernet 10/100 ports and 1 dual-purpose uplink (dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • Compact size with no fan; magnet included • LAN Base Image installed
WS-C2960-24TT-L	• 24 Ethernet 10/100 ports and two 10/100/1000TX uplinks • 1 RU fixed-configuration • LAN Base Image installed
WS-C2960-48TT-L	• 48 Ethernet 10/100 ports and two 10/100/1000TX uplinks • 1 RU fixed-configuration • LAN Base Image installed
WS-C2960-24LT-L	• 24 Ethernet 10/100 ports with 8 PoE ports and two 10/100/1000TX uplinks • 1 RU fixed-configuration • LAN Base Image installed
WS-C2960-24PC-L	• 24 Ethernet 10/100 PoE ports and 2 dual-purpose uplinks • 1 RU fixed-configuration • LAN Base Image installed
WS-C2960-24TC-L	• 24 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • 1 RU fixed-configuration • LAN Base Image installed
WS-C2960-48TC-L	• 48 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • 1 RU fixed-configuration • LAN Base Image installed
WS-C2960G-8TC-L	• 7 Ethernet 10/100/1000 ports and 1 dual-purpose uplink (dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • Compact size with no fan; magnet included • LAN Base Image installed
WS-C2960G-24TC-L	• 20 Ethernet 10/100/1000 ports and 4 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • 1 RU fixed-configuration • LAN Base Image installed
WS-C2960G-48TC-L	• 44 Ethernet 10/100/1000 ports and 4 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • 1 RU fixed-configuration • LAN Base Image installed
PWR-RPS2300	Cisco Redundant Power System 2300 and Blower,No Power Supply
BLNK-RPS2300=	Spare Bay Insert for Cisco Redundant Power System 2300
CAB-RPS2300-E=	Spare RPS2300 Cable for Cisco Catalyst 2960-24PC-L and 2960-24LT-L switches
CAB-RPS2300=	Spare RPS2300 Cable for Cisco Catalyst 2960 switches except Catalyst 2960-24PC-L and 2960-24LT-L switches
BLWR-RPS2300=	Spare 45CFM Blower for Cisco Redundant Power System 2300
C3K-PWR-750WAC=	Catalyst 3750-E/3560-E/RPS 2300 750WAC power supply spare
PWR-A=	Power adaptor for Cisco Catalyst 2960PD-8TT-L compact switch
CBLGRD-C2960-8TC=	Cable guard for the Cisco Catalyst 2960-8TC compact switch
CBLGRD-C2960G-8TC=	Cable guard for the Cisco Catalyst 2960G-8TC compact switch
RCKMNT-19-CMPCT=	Rack-mount for the Cisco Catalyst 2960-8TC and Catalyst 2960G-8TC compact switches
RCKMNT-1RU=	Spare rack-mount kit for the Cisco Catalyst 2960 Series

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RCKMNT-REC-1RU=	1 RU recessed rack-mount kit for the Cisco Catalyst 2960 Series
GLC-LH-SM=	1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength
GLC-SX-MM=	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength
GLC-ZX-SM=	1000BASE-ZX SFP transceiver module for SMF, 1550-nm wavelength
GLC-T=	1000BASE-T SFP transceiver module for Category 5 copper wire Not supported on the Cisco Catalyst 2960-8TC and Catalyst 2960G-8TC compact switches
GLC-BX-D=	1000BASE-BX10 SFP transceiver module for single strand SMF, 1490-nm TX / 1310-nm RX wavelength
GLC-BX-U=	1000BASE-BX10 SFP transceiver module for single strand SMF, 1310-nm TX / 1490-nm RX wavelength
GLC-GE-100FX=	100BASE-FX SFP module for Gigabit Ethernet ports, 1310-nm wavelength, 2 km over MMF Not supported on the Cisco Catalyst 2960-8TC and Catalyst 2960G-8TC compact switches
GLC-FE-100FX=	100BASE-FX SFP module for 100-Mb ports, 1310-nm wavelength, 2 km over MMF
GLC-FE-100LX=	100BASE-LX10 SFP module for 100-Mb ports, 1310-nm wavelength, 10 km over SMF
GLC-FE-100BX-D=	100BASE-BX10-D SFP module for 100-Mb ports, 1550-nm TX /1310-nm RX wavelength, 10 km over single-strand SMF
GLC-FE-100BX-U=	100BASE-BX10-U SFP module for 100-Mb ports, 1310-nm TX/1550-nm RX wavelength, 10 km over single-strand SMF
CWDM-SFP-1470=	Cisco CWDM SFP 1470 nm; Gigabit Ethernet and 1G/2G FC (gray)
CWDM-SFP-1490=	Cisco CWDM SFP, 1490 nm; Gigabit Ethernet and 1G/2G FC (violet)
CWDM-SFP-1510=	Cisco CWDM SFP, 1510 nm; Gigabit Ethernet and 1G/2G FC (blue)
CWDM-SFP-1530=	Cisco CWDM SFP, 1530 nm; Gigabit Ethernet and 1G/2G FC (green)
CWDM-SFP-1550=	Cisco CWDM SFP, 1550 nm; Gigabit Ethernet and 1G/2G FC (yellow)
CWDM-SFP-1570=	Cisco CWDM SFP, 1570 nm; Gigabit Ethernet and 1G/2G FC (orange)
CWDM-SFP-1590=	Cisco CWDM SFP, 1590 nm; Gigabit Ethernet and 1G/2G FC (red)
CWDM-SFP-1610=	Cisco CWDM SFP, 1610 nm, Gigabit Ethernet and 1G/2G FC (brown)
CAB-SM-LCSC-1M	1m fiber single-mode LC-to-SC connectors
CAB-SM-LCSC-5M	5m fiber single-mode LC-to-SC connectors

For more information about Cisco products, contact:

- United States and Canada (toll free): 800 553-6387
- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408 526-7209
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