Cisco Catalyst 2960-L Series Switches

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Product Overview

Cisco® Catalyst® 2960-L Series Switches are fixed and smart-managed Gigabit Ethernet switches that provide enterprise-class access switching for branch offices, out-of-the-wiring-closet applications, and critical Internet of Things (IoT) deployments, as well as small and medium-sized businesses. They operate on Cisco IOS® Software and support simple device management and network management via Command Line Interface (CLI) as well as an on-box web interface.

Catalyst 2960-L Smart Managed Switches are secure, reliable, enterprise grade switches built for small office deployments. These switches can be configured and managed via an on-box web interface allowing customers a quick and reliable way to get a small branch or office network up and running within minutes. These switches also feature limited CLI support for troubleshooting and monitoring.

The Cisco Catalyst 2960-L Series and 2960-L Smart Managed Switches are fully managed switches that offer advanced Layer 2 and basic Layer 3 features as well as Power over Ethernet Plus (PoE+) power. These switches deliver enhanced network security, network reliability, and operational efficiency.

Product Highlights

Cisco Catalyst 2960-L Switches feature:

- 8, 16, 24, or 48 Gigabit Ethernet data or PoE+ ports with line-rate forwarding
- 2 or 4 fixed 1 Gigabit Ethernet Small Form-Factor Pluggable (SFP) uplinks or 4 fixed 10 Gigabit Ethernet SFP+ uplinks
- Perpetual PoE+ support with a power budget of up to 370W
- Enhanced version of Cisco IOS LAN Lite software
- CLI and/or intuitive Web-UI manageability options
- Device management support with:
  - Over-the-air access via Bluetooth, Simple Network Management Protocol (SNMP), RJ-45 or USB console access, and virtual stacking
  - Network management with Cisco Prime®, Cisco Network Plug and Play, and Cisco DNA Center
- Security with 802.1X support for connected devices, Switched Port Analyzer (SPAN), and Bridge Protocol Data Unit (BPDU) Guard
- Basic Layer 3 features with Static routing and Routing Information Protocol (RIP)
- Fanless operation with operating temperature up to 45°C
- Compact design with a depth of less than 11.5 inches
- Reliability with higher Mean Time Between Failures (MTBF) and an Enhanced Limited Lifetime Warranty (E-LLW)

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Switch Models and Configurations

Cisco Catalyst 2960-L Switches include a single fixed power supply. Table 1 shows configuration information.

Table 1. Cisco Catalyst 2960-L Switches Configurations

Product ID*	10/100/1000 Ethernet ports	Uplink interfaces	Available PoE power	Fanless	Dimensions (H x D x W)	Weight
WS-C2960L-8TS-LL/ WS-C2960L-SM-8TS	8	2 SFP	–	Y	1.73 x 8.45 x 10.56 in. (4.4 x 21.5 x 26.8 cm)	3.33 lb (1.51kg)
WS-C2960L-8PS-LL/ WS-C2960L-SM-8PS	8	2 SFP	67W	Y	1.73 x 9.45 x 10.56 in. (4.4 x 24 x 26.8 cm)	4.50 lb (2.04kg)
WS-C2960L-16TS-LL/ WS-C2960L-SM-16TS	16	2 SFP	–	Y	1.73 x 8.45 x 10.56 in. (4.4 x 21.5 x 26.8 cm)	3.41 lb (1.55kg)
WS-C2960L-16PS-LL/ WS-C2960L-SM-16PS	16	2 SFP	120W	Y	1.73 x 9.45 x 10.56 in. (4.4 x 24 x 26.8 cm)	4.65 lb (2.11kg)
WS-C2960L-24TS-LL/ WS-C2960L-SM-24TS	24	4 SFP	–	Y	1.73 x 9.45 x 17.5 in. (4.4 x 24 x 44.5 cm)	6.04 lb (2.74kg)
WS-C2960L-24PS-LL/ WS-C2960L-SM-24PS	24	4 SFP	195W	Y	1.73 x 10.45 x 17.5 in. (4.4 x 26.5 x 44.5 cm)	7.41 lb (3.36kg)
WS-C2960L-48TS-LL/ WS-C2960L-SM-48TS	48	4 SFP	–	Y	1.73 x 9.45 x 17.5 in. (4.4 x 24 x 44.5 cm)	6.57 lb (2.98kg)
WS-C2960L-48PS-LL/ WS-C2960L-SM-48PS	48	4 SFP	370W	N	1.73 x 11.5 x 17.5 in. (4.4 x 29.2 x 44.5 cm)	10.08 lb (4.57kg)
WS-C2960L-24TQ-LL/ WS-C2960L-SM-24TQ	24	4 SFP+	–	Y	1.73 x 9.45 x 17.5 in (4.4 x 24 x 44.5 cm)	6.06 lb (2.75kg)
WS-C2960L-24PQ-LL/ WS-C2960L-SM-24PQ	24	4 SFP+	195W	Y	1.73 x 10.45 x 17.5 in (4.4 x 26.5 x 44.5 cm)	7.39 lb (3.35kg)
WS-C2960L-48TQ-LL/ WS-C2960L-SM-48TQ	48	4 SFP+	–	Y	1.73 x 9.45 x 17.5 in (4.4 x 24 x 44.5 cm)	6.68 lb (3.03kg)
WS-C2960L-48PQ-LL/ WS-C2960L-SM-48PQ	48	4 SFP+	370W	N	1.73 x 11.5 x 17.5 in (4.4 x 29.2 x 44.5 cm)	9.81 lb (4.54kg)

*Please refer to local price lists for full product SKUs.

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Software

All Cisco Catalyst 2960-L Series Switches support an enhanced version of Cisco IOS LAN Lite software image. For more information about the software features supported on the Cisco Catalyst 2960-L Series, please refer to the Cisco Feature Navigator: https://tools.cisco.com/ITDIT/CFN/jsp/index.jsp.

Switch Management

Cisco Catalyst 2960-L Switches support the following on-device management features:

- **Web UI** via Cisco Configuration Professional. Configuration Professional provides a user interface for day-zero provisioning, which enables easy onboarding of the switch. Configuration Professional also has an intuitive dashboard for configuring, monitoring, and troubleshooting the switch (Figure 1). For more information, about Cisco Configuration Professional, please refer to https://www.cisco.com/c/en/us/products/cloud-systems-management/configuration-professional-catalyst/index.html.

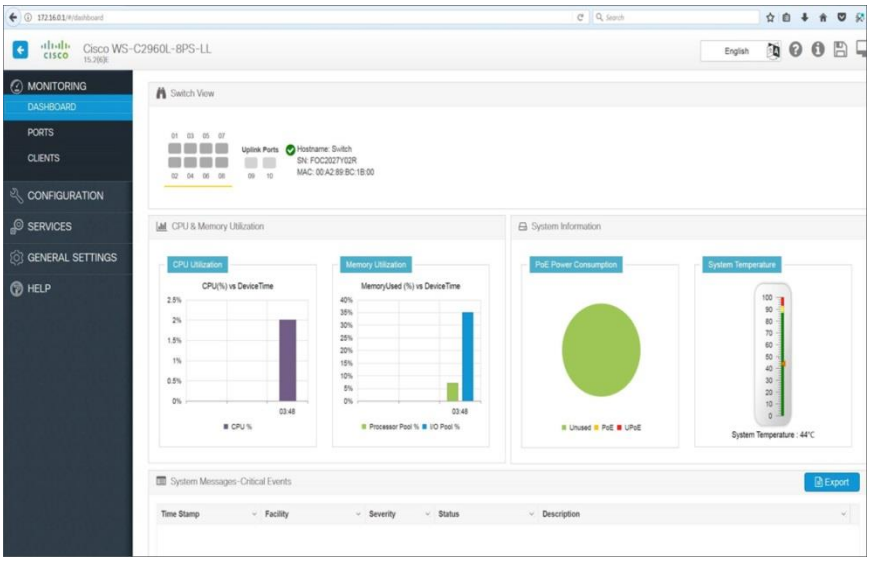

Figure 1.
Cisco Configuration Professional web UI for the Cisco Catalyst 2960-L Switches

- **Bluetooth** for over-the-air access. The switches support an external Bluetooth dongle that plugs into the USB port on the switch and allows a Bluetooth-based RF connection with external laptops and tablets (Figure 2). Laptops and tablets can access the switch CLI using a Telnet or Secure Shell (SSH) client over Bluetooth. The GUI can be accessed over Bluetooth with a browser.

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Figure 2.
Over-the-air switch access using Bluetooth

- **Virtual Stacking** for managing a group of switches as a single entity. Up to eight switches can be configured and managed using a single IP address. Switches in a virtual stack can be configured from a single switch, which is called the commander switch. All the switches in a virtual stack can be managed using the CLI, SNMP, or the web UI. Switches in the virtual stack can also be configured and managed over the air via Bluetooth from a commander switch using the web UI. Virtual stacking also offers redundancy wherein a standby commander can manage and configure the stack if the primary master fails (Figure 3).

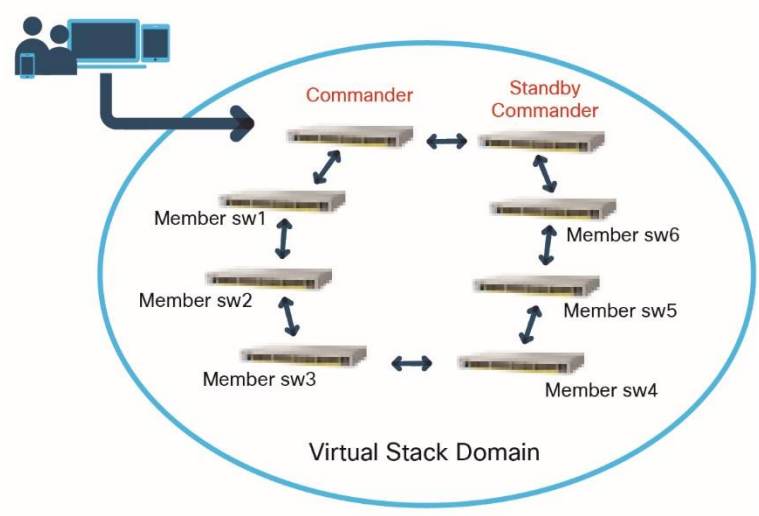

Figure 3.
Redundancy in a group of switches managed as a virtual stack

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Network Management

The Cisco Catalyst 2960-L Series Switches offer a superior CLI for detailed configuration and administration. The switches are also supported by the full range of Cisco network management solutions.

- **Cisco DNA Center** on the Cisco Catalyst 2960-L Series Switches provides a simple web user interface to enterprise network customers for day-zero plug and play, switch discovery and management, topology visualization, and software image management. For details on Cisco DNA Center features, please refer to dnac.cisco.com.
- **Cisco Prime Infrastructure** provides comprehensive network lifecycle management, including an extensive library of easy-to-use features to automate the initial and day-to-day management of your Cisco network. Cisco Prime technology integrates hardware and software platform expertise and operational experience into a powerful set of workflow-driven configuration, monitoring, troubleshooting, reporting, and administrative tools. For detailed information about Cisco Prime, visit cisco.com/go/prime.
- **Cisco Network Plug and Play** is supported using the Cisco Application Policy Infrastructure Enterprise Module (APIC-EM) and Cisco DNA Center on Cisco Catalyst 2960-L Series Switches. This provides a simple, secure, unified, and integrated offering for enterprise network customers to ease new branch or campus device rollouts or for provisioning updates to an existing network with a near zero-touch deployment experience. For detailed information about APIC-EM-based Plug-and-Play capabilities, please refer to Cisco Network Plug and Play. Licenses have to be purchased for using the Cisco Prime Infrastructure, Cisco Network Plug and Play, or Cisco DNA Center network management solution.

Intelligent PoE+

Cisco Catalyst 2960-L Switches support both IEEE 802.3af PoE and IEEE 802.3at PoE+ (up to 30W per port) to deliver a lower total cost of ownership for deployments that incorporate Cisco IP phones, Cisco Aironet® wireless access points, or other standards-compliant PoE and PoE+ end devices. PoE removes the need to supply wall power to PoE-enabled devices and eliminates the cost of adding electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments.

The Cisco Catalyst 2960-L Switches PoE power allocation is dynamic, and power mapping scales up to a maximum of 370W of PoE+ power. Intelligent power management allows flexible power allocation across all ports. With Perpetual PoE, the PoE+ power is maintained during a switch reload. This is important for critical endpoints such as medical devices and for IoT endpoints such as PoE-powered lights, so that there is no disruption during a switch reboot.

Network Security

Cisco Catalyst 2960-L Switches provide a range of security features to limit access to the network and mitigate threats, including:

- **Comprehensive 802.1X** features to control access to the network, including flexible authentication, 802.1X monitor mode, and RADIUS change of authorization.
- **802.1x support with Network Edge Access Topology (NEAT)** extends identity authentication to areas outside the wiring closet (such as conference rooms).
- **IEEE 802.1x User Distribution** enables you to load-balance users with the same group name across multiple different VLANs.
- **Disable per-VLAN MAC learning** manages the available MAC address table space by controlling which interface or VLANs learn MAC addresses.
- **Multidomain authentication** to allow an IP phone and a PC to authenticate on the same switch port while being placed on appropriate voice and data VLANs.
- **AAA command authorization** in plug-and-play (PnP) to enable seemless PnP provisioning.

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- **Access control lists (ACLS)** for IPv6 and IPv4 security and Quality-of-Service (QoS) ACL elements (ACEs).
- **Port-based ACLs** for Layer 2 interfaces to allow security policies to be applied on individual switch ports.
- **SSH, Kerberos, and SNMPv3** to provide network security by encrypting administrator traffic during Telnet and SNMP sessions. SSH, Kerberos, and the cryptographic version of SNMPv3 require a special cryptographic software image because of U.S. export restrictions.
- **SPAN,** with bidirectional data support, to allow Cisco Intrusion Detection System (IDS) to take action when an intruder is detected.
- **TACACS+ and RADIUS authentication** to facilitate centralized control of the switch and restrict unauthorized users from altering the configuration.
- **MAC address notification** to notify administrators about users added to or removed from the network.
- **MAC authentication bypass and Webauth with downloadable ACLs** allows per-user ACLs to be downloaded from the Cisco Access Control Server (ACS) as policy enforcement after authentication using MAB or Web authentication in addition to IEEE 802.1X.
- **Web Authentication redirection** enables networks to redirect guest users to the URL that they had originally requested.
- **Multilevel security on console access** to prevent unauthorized users from altering the switch configuration.
- **BPDU guard** to shut down spanning-tree PortFast-enabled interfaces when BPDUs are received to avoid accidental topology loops.
- **IP Source Guard** restricts IP traffic on nonrouted, Layer 2 interfaces by filtering traffic based on the DHCP snooping binding database or manually configuring IP source bindings.
- **SSHv2** allows use of digital certificates for authentication between user and server.
- **Spanning-Tree Root Guard (STRG)** to prevent edge devices that are not in the network administrator's control from becoming Spanning Tree Protocol (STP) root nodes.
- **Internet Group Management Protocol (IGMP) filtering** to provide multicast authentication by filtering out nonsubscribers and to limit the number of concurrent multicast streams available per port.
- **Dynamic VLAN assignment** through implementation of VLAN Membership Policy Server client capability to provide flexibility in assigning ports to VLANs. Dynamic VLAN facilitates the fast assignment of IP addresses.

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Basic Layer 3 Features

RIP is a commonly used routing protocol in small to medium-sized TCP/IP networks. It is supported in both IPv4 and IPv6 network environments.

Static routing is used to segment the network into separate workgroups and communicate across VLANs without degrading application performance.

Redundancy and Resiliency

Cisco Catalyst 2960-L Switches offer a number of redundancy and resiliency features to prevent outages and help ensure that the network remains available:

- **IEEE 802.1s/w Rapid Spanning Tree Protocol (RSTP) and Multiple Spanning Tree Protocol (MSTP)** provide rapid spanning-tree convergence independent of spanning-tree timers and also offer the benefits of Layer 2 load balancing and distributed processing.
- **Per-VLAN Rapid Spanning Tree (PVRST+)** allows rapid spanning-tree reconvergence on a per-VLAN spanning-tree basis, without requiring the implementation of spanning-tree instances.
- **Switch-port autorecovery (error disable)** automatically attempts to reactivate a link that is disabled because of a network error.
- **Link State Tracking** binds the link state of multiple interfaces. The server NIC adapters form a group to provide redundancy in the network. When the link is lost on the primary interface, network connectivity is transparently changed to the secondary interface.

Enhanced QoS

Cisco Catalyst 2960-L Switches offer intelligent traffic management that keeps everything flowing smoothly. Flexible mechanisms for marking, classifying, and scheduling deliver superior performance for data, voice, and video traffic, all at wire speed. Primary QoS features include:

- Up to **eight egress queues** and two thresholds per port, supporting egress bandwidth control, shaping, and priority queuing so that high-priority packets are serviced ahead of other traffic.
- **Ingress policing** allows the analysis of IP service levels for IP applications and services using active traffic monitoring - generating traffic in a continuous, reliable, and predictable manner—for measuring network performance. The number of ingress policers available per port is 64.
- **QoS through Differentiated Services Code Point** (DSCP) **mapping and filtering**.
- **QoS through Traffic Classification**
- **Trust Boundary** to configure device-based trust.
- **Auto-QoS** simplifies the deployment of QoS features.
- **Shaped Round Robin** (SRR) scheduling and **Weighted Tail Drop** (WTD) congestion avoidance.
- **802.1p Class of Service** (CoS) classification, with marking and reclassification.

  For more information on features supported on the intuitive Web-UI for Cisco Catalyst 2960-L Switches, refer to the Cisco Catalayst 2960-L Smart Managed Switches Configuration Guide.

Energy Management

Cisco Catalyst 2960-L Switches offer a range of industry-leading features for energy efficiency and management:

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- **IEEE 802.3az Energy Efficient Ethernet** (EEE) enables ports to dynamically sense idle periods between traffic bursts and quickly switch the interfaces into a low-power idle mode, reducing power consumption.
- **Cisco EnergyWise**® policies can be used to control the power consumed by PoE-powered endpoints, desktop and data center IT equipment, and a wide range of building infrastructure. Cisco EnergyWise technology is included on all Cisco Catalyst 2960-L Series Switches. For more information about Cisco EnergyWise technology, visit cisco.com/go/energywise.
- **Cisco Catalyst SmartOperations** is a comprehensive set of capabilities that simplify LAN planning, deployment, monitoring, and troubleshooting. Deploying SmartOperations tools reduces the time and effort required to operate the network and lowers TCO.
- **Loop detection** is a new method to detect network loops in the absence of STP.
- **Cisco AutoConfig** services determine the level of network access provided to an endpoint based on the type of the endpoint device. This feature also permits hard binding between the end device and the interface.
- **Cisco Smart Install** services enable minimal-touch deployment by providing automated Cisco IOS Software image installation and configuration when new switches are connected to the network. This enables network administrators to remotely manage Cisco IOS Software image installs and upgrades.
- **Cisco Auto SmartPorts** services enable automatic configuration of switch ports as devices connect to the switch with settings optimized for the device type, resulting in zero-touch port-policy provisioning.
- **Cisco Smart Troubleshooting** is an extensive array of diagnostic commands and system health checks in the switch, including Smart Call Home. The Cisco Generic Online Diagnostics (GOLD) and online diagnostics on switches in live networks help predict and detect failures more quickly.

For more information about Cisco Catalyst SmartOperations, visit cisco.com/go/SmartOperations.

Operational Simplicity

- **Cisco AutoSecure** provides a single-line CLI to enable baseline security features (port security, Dynamic Host Configuration Protocol [DHCP] snooping, Dynamic Address Resolution Protocol [ARP] Inspection). This feature simplifies security configurations with a single touch.
- **DHCP** auto configuration of multiple switches through a boot server eases switch deployment.
- **Auto negotiation** on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth.
- **Dynamic Trunking Protocol (DTP)** facilitates 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.
- **Automatic media-dependent interface crossover (MDIX)** automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.
- **Unidirectional Link Detection Protocol (UDLD)** and Aggressive UDLD allow unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.
- **Local Proxy 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.

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- **IGMP** snooping for IPv4 and IPv6 and Multicast Listener Discovery (MLD) v1 and v2 snooping provide fast client joins and leaves of multicast streams and limit bandwidth-intensive video traffic to only the requesters.
- **Per-port broadcast, multicast, and unicast storm control** prevents faulty end stations from degrading overall system performance.
- **Voice VLAN** simplifies telephony installations by keeping voice traffic on a separate VLAN for easier administration and troubleshooting.
- **Cisco VLAN Trunking Protocol (VTP)** supports dynamic VLANs and dynamic trunk configuration across all switches.
- 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.
- **Trivial File Transfer Protocol (TFTP)** reduces the cost of administering software upgrades by downloading from a centralized location.
- **Network Time Protocol (NTP)** provides an accurate and consistent timestamp to all intranet switches.

Specifications

Product specifications (Table 2) apply to both PoE and non-PoE models.

Table 2. Specifications

*Routes, ACEs, and multicast group scale listed below are available starting with Cisco IOS Software Release 15.2(6)E. See the release notes for more information.

	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
Console ports				
RJ45 Ethernet	1	1	1	1
USB mini-B	1	1	1	1
USB-A port for storage and Bluetooth console	1	1	1	1
Memory and processor				
CPU	ARMv7 800 MHz	ARMv7 800 MHz	ARMv7 800 MHz	ARMv7 800 MHz
DRAM	512 MB	512 MB	512 MB	512 MB
Flash memory	256 MB	256 MB	256 MB	256 MB
Performance				
Forwarding bandwidth	10 Gbps	18 Gbps	1G: 28 Gbps 10G: 64 Gbps	1G: 52 Gbps 10G: 88Gpbs
Switching bandwidth	20 Gbps	36 Gbps	1G: 56 Gbps	1G: 104 Gbps

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	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
			10G: 128 Gbps	10G: 176 Gbps
Forwarding rate (64-byte L3 packets)	14.88 Mpps	26.78 Mpps	41.67 Mpps	77.38 Mpps
Unicast MAC addresses	16000	16000	16000	16000
IPv4 unicast direct routes	512	512	512	512
IPv4 unicast indirect routes	256	256	256	256
IPv6 unicast direct routes	414	414	414	414
IPv6 unicast indirect routes	128	128	128	128
IPv4 static routes	16	16	16	16
IPv6 static routes	16	16	16	16
IPv4 multicast routes and IGMP groups	1024	1024	1024	1024
IPv6 multicast groups	1024	1024	1024	1024
IPv4/MAC security ACEs	384	384	384	384
IPv6 security ACEs	256	256	256	256
Maximum active VLANs	256	256	256	256
VLAN IDs available	4094	4094	4094	4094
IPv4 Static Routes	16	16	16	16
IPv6 Static Routes	16	16	16	16
Maximum STP instances	64	64	64	64
Maximum SPAN sessions	4	4	4	4
MTU-L3 packet	9198 bytes	9198 bytes	9198 bytes	9198 bytes
Jumbo Ethernet frame	10,240 bytes	10,240 bytes	10,240 bytes	10,240 bytes
MTBF in hours (data)	2,448,133	2,416,689	2,412,947	1,370,769
MTBF in hours (PoE)	315,044	313,496	909,838	437,970
Environment				
Operating temperature				
Up to 5,000 ft (1500 m)	23°F to 113°F (–5°C to 45°C)	23°F to 113°F (–5°C to 45°C)	23°F to 113°F (–5°C to 45°C)	23°F to 113°F (–5°C to 45°C)
	WS-C2960L-16PS-LL has maximum operating temperature of 40°C (up to 5,000 ft) and 35°C (up to 10,000			

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	8 port		16 port		24 port (1/10G uplinks)		48 port (1/10G uplinks)	
	ft).							
Up to 10,000 ft (3000 m)	23°F to 104°F (–5°C to 40°C)		23°F to 104°F (–5°C to 40°C)		23°F to 104°F (–5°C to 40°C)		23°F to 104°F (–5°C to 40°C)	
Operating altitude	10,000 ft (3000 m)		10,000 ft (3000 m)		10,000 ft (3000 m)		10,000 ft (3000 m)	
Operating relative humidity	5% to 90% at 40°C		5% to 90% at 40°C		5% to 90% at 40°C		5% to 90% at 40°C	
Storage temperature	–13° to 158°F (–25° to 70°C)		–13° to 158°F (–25° to 70°C)		–13° to 158°F (–25° to 70°C)		–13° to 158°F (–25° to 70°C)	
Storage altitude	15,000 ft (4500 m)		15,000 ft (4500 m)		15,000 ft (4500 m)		15,000 ft (4500 m)	
Storage relative humidity	5% to 95% at 65°C		5% to 95% at 65°C		5% to 95% at 65°C		5% to 95% at 65°C	
Storage altitude	**Note:** Minimum ambient temperature for cold start is 0°C (32°F).							
Electrical	**Data**	**PoE**	**Data**	**PoE**	**Data**	**PoE**	**Data**	**PoE**
Voltage (auto ranging)	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in
Frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Current	0.13A to 0.22A	0.22A to 0.27A	0.16A to 0.26A	0.24A to 0.28A	0.20A to 0.33A	0.21A to 0.26A	0.29A to 0.48A	0.37A to 0.64A
Power rating (maximum consumption)	0.04 kVA	0.11 kVA	0.05 kVA	0.19 kVA	0.06 kVA	0.24 kVA	0.09 kVA	0.48 kVA

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	8 port		16 port		24 port (1/10G uplinks)		48 port (1/10G uplinks)	
Power consumption (watts)								
0% traffic	13.0	19.9	14.9	21.9	1G: 16.5	1G: 17.52	1G: 24.36	1G: 27.24
					10G: 17.04	10G: 16.68	10G: 25.8	10G: 27
10% traffic	14.8	22.0	19.3	27.1	1G: 23.04	1G: 24	1G: 33	1G: 39.24
					10G: 22.92	10G: 23.16	10G: 38.04	10G: 39.12
100% traffic	14.9	22.0	19.3	27.1	1G: 23.64	1G: 24	1G: 33.6	1G: 40.32
					10G: 23.64	10G: 23.76	10G: 39.36	10G: 40.56
Weighted average	14.2	21.3	17.8	25.4	1G: 21.06	1G: 21.84	1G: 30.32	1G: 35.6
					10G: 21.2	10G: 21.2	10G: 34.4	10G: 35.56
	Note: The wattage rating on the power supply does not represent actual power draw. It indicates the maximum power draw possible by the power supply. This rating can be used for facility capacity planning. For PoE switches, cooling requirements are smaller than total power draw because a significant portion of the load is dissipated in the endpoints.							
Acoustic noise (48-port PoE only)								
Sound pressure	LpA (typical)				35 dB			
	LpAD (maximum)				39 dB			
Sound power	LwA (typical)				4.8 B			
	LwAD (maximum)				5.2 B			
	Note: Bystander positions operating mode at 77°F (25°C) ambient.							
Safety and compliance								
Safety	UL 60950-1 Second Edition, CAN/CSA-C22.2 No. 60950-1 Second Edition, EN 60950-1 Second Edition, IEC 60950-1 Second Edition, AS/NZS 60950-1							
EMC: emissions	47CFR Part 15 (CFR 47) Class A, AS/NZS CISPR22 Class A, CISPR22 Class A, EN55022 Class A, ICES003 Class A, VCCI Class A, EN61000-3-2, EN61000-3-3, KN22 Class A, CNS13438 Class A							
EMC: immunity	EN55024 (including EN 61000-4-5), CISPR24, EN300386, KN24							
Environmental	Reduction of Hazardous Substances (RoHS) including Directive 2011/65/EU							
Telco	Common Language Equipment Identifier (CLEI) code							
U.S. government certifications	USGv6 and IPv6 Ready Logo							

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	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
Connectors and interfaces				
Ethernet interfaces	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			
Indicator LEDs	Per-port status: link integrity, disabled, activity, speed, and full duplex			
	System status: system, PoE, and link speed			
Console cables	CAB-CONSOLE-RJ45 Console cable 6 ft. with RJ-45			
	CAB-CONSOLE-USB Console cable 6 ft. with USB Type A and mini-B connectors			
Power	Use the supplied AC power cord to connect the AC power connector to an AC power outlet			
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-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 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	
	For an updated list of supported MIBs, refer to the MIB Locator at cisco.com/go/mibs.			

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	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
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) Bluetooth Ver 4.0	IEEE 802.3ad IEEE 802.3af and IEEE 802.3at 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 IEEE 802.3u 100BASE-TX	IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X RMON I and II standards SNMP v1, v2c, and v3 IEEE 802.3az IEEE 802.3ae 10 Gigabit Ethernet IEEE 802.1ax	
RFC compliance				
	RFC 768 - UDP RFC 783 - TFTP RFC 791 - IP RFC 792 - ICMP RFC 793 - TCP RFC 826 - ARP RFC 854 - Telnet RFC 951 - Bootstrap Protocol (BOOTP) RFC 959 - FTP RFC 1112 - IP Multicast and IGMP RFC 1157 - SNMP v1 RFC 1166 - IP Addresses	RFC 1256 - Internet Control Message Protocol (ICMP) Router Discovery RFC 1305 - NTP RFC 1492 - TACACS+ RFC 1493 - Bridge MIB RFC 1542 - BOOTP extensions RFC 1901 - SNMP v2C RFC 1902-1907 - SNMP v2 RFC 1981 - Maximum Transmission Unit (MTU) Path Discovery IPv6 FRC 2068 - HTTP RFC 2131 - DHCP RFC 2138 - RADIUS RFC 2233 - IF MIB v3		

Warranty

Cisco Catalyst 2960-L Switches come with an Enhanced Limited Lifetime Warranty (E-LLW). The E-LLW provides the same terms as the Cisco standard limited lifetime warranty but adds next-business-day delivery of replacement hardware, where available, and 90 days of 8x5 Cisco Technical Assistance Center (TAC) support. 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 more information about warranty terms, visit https://www.cisco.com/go/warranty and see Table 3. Warranty terms.

Cisco enhanced limited lifetime hardware warranty	
Device covered	Applies to all Cisco Catalyst 2960-L Series Switches and 2960-L Smart Managed Switches.
Warranty duration	As long as the original end user continues to own or use the product.
End-of-life policy	In the event of discontinuance of product manufacture, Cisco warranty support is limited to 5 years from the announcement of discontinuance.

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Cisco enhanced limited lifetime hardware warranty	
Hardware replacement	Cisco or its service center will use commercially reasonable efforts to ship a Cisco Catalyst 2960-L replacement part for next-business-day delivery, where available. Otherwise, a replacement will be shipped within 10 working days after the receipt of the RMA request. Actual delivery times might vary depending on customer location.
Effective date	Hardware warranty commences from the date of shipment to customer (and in case of resale by a Cisco reseller, not more than 90 days after original shipment by Cisco).
TAC support	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 90 days from the date of shipment of the originally purchased Cisco Catalyst 2960-L product. This support does not include solution or network-level support beyond the specific device under consideration.
Cisco.com access	Warranty allows guest access only to Cisco.com.

Licensing

Cisco Catalyst 2960-L Series Switches support term-based Cisco DNA Essentials licenses (Cisco DNA Essential). Table 4 lists the features supported in Cisco DNA Essentials. Table 5 gives ordering information for Cisco DNA Essentials with the 2960-L Series.

Ordering and managing licenses with smart accounts: Creating smart accounts by using the Cisco Smart Software Manager (SSM) enables you to order devices and licensing packages and also to manage your software licenses from a centralized website. You can set up Cisco SSM to receive daily email alerts and to be notified of expiring add-on licenses that you want to renew. When the license term expires, you can either renew the add-on license to continue using it or deactivate the add-on license and then reload the switch to continue operating with the base license capabilities.

Table 3. Features supported in Cisco DNA Essentials for Cisco Catalyst 2960-L Series Switches

Category	Features
Day-zero network bring-up automation	Cisco Network Plug-and-Play application
Cisco DNA Center	Discovery, inventory, topology, software image management
Network monitoring	Device 360

Software Policy

Customers with enhanced version of Cisco IOS LAN Lite software feature sets are provided with maintenance updates and bug fixes designed to maintain the compliance of the software with published specifications, release notes, and industry standards as long as the original end user continues to own or use the product or up to 1 year from the end-of-sale date for this product, whichever occurs earlier.

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

Technical Support and Services

Table 4 describes available technical services.

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Table 4. Technical services available for Cisco Catalyst 2960-L Switches

Technical services
Cisco Smart Net Total Care™ Service • Around-the-clock, global access to the Cisco TAC • Unrestricted access to the extensive Cisco.com knowledge base and tools • Next-business-day, 8x5x4, 24x7x4, or 24x7x2 advance hardware replacement and onsite parts replacement and installation available[1] • Ongoing operating system software updates within the licensed feature set[2] • Proactive diagnostics and real-time alerts on Smart Call Home–enabled devices
Cisco Smart Foundation Service • Next-business-day advance hardware replacement as available • Access to SMB TAC during business hours (access levels vary by region) • Access to Cisco.com SMB knowledge base • Online technical resources through Smart Foundation Portal • Operating system software bug fixes and patches
Cisco Smart Care Service • Network-level coverage for the needs of small and medium-sized businesses • Proactive health checks and periodic assessments of Cisco network foundation, voice, and security technologies • Technical support for eligible Cisco hardware and software through Smart Net Total Care portal • Cisco operating system and application software updates and upgrades[2] • Next-business-day advance hardware replacement as available, 24x7x4 option available[1]
Cisco SP Base Service • Around-the-clock, global access to the Cisco TAC • Registered access to Cisco.com • Next-business-day, 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement; return to factory option available1 • Ongoing operating system software updates[2]
Cisco Focused Technical Support Services Three levels of premium, high-touch services are available: • Cisco High-Touch Operations Management Service • Cisco High-Touch Technical Support Service • Cisco High-Touch Engineering Service Valid Cisco Smart Net Total Care or SP Base contracts are required on all network equipment.

[1] Advance hardware replacement is available in various service-level combinations. For example, 8x5xNBD indicates that shipment is initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with Next-Business-Day (NBD) delivery. Where NBD is not available, same-day shipping is provided. Restrictions apply; for details, review the appropriate service descriptions.

[2] Cisco operating system updates include the following: maintenance releases, minor updates, and major updates within the licensed feature set.

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Accessories

Table 5 describes the available accessories.

Table 5. Cisco Catalyst 2960-L Switches accessories

Part numbers	Description	Compatibility
CAB-CONSOLE-RJ45	Console Cable 6 Feet with RJ-45	All models
CAB-CONSOLE-USB	Console Cable 6 Feet with USB Type A and mini-B Connectors	All models
PWR-CLP	Power Cable Restraining Clip	All models
RCKMNT-1RU-2KX	1RU Rack Mount Kit for 2960-X, 2960-XR, and 2960-L	24-port and 48-port models only
RCKMNT-REC-2KX	Recessed 1RU rack mount for 2960X, 2960-XR, and 2960-L	24-port and 48-port models only
CMPCT-MGNT-TRAY	Magnetic Mounting Tray for 3560-CX, 2960-CX, and 2960-L Compact Switches	8-port and 16-port models only
CMPCT-CBLE-GRD	Cable Guard for 3560-CX, 2960-CX, and 2960-L Compact Switches	8-port and 16-port models only
CMPCT-DIN-MNT	DIN Rail Mount for 3560-CX, 2960-CX, and 2960-L Compact Switches	8-port and 16-port models only

Ordering Information

Table 6 lists ordering information for the Cisco Catalyst 2960-L Switches. To place an order, visit the Cisco Ordering homepage at https://www.cisco.com/en/US/ordering/or13/or8/order_customer_help_how_to_order_listing.html.

Table 6. Cisco Catalyst 2960-L Series Switches ordering information

Product number	Description
Cisco Catalyst 2960-L Switches with 2x 1G SFP uplinks	
WS-C2960L-8TS-LL	8 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-8PS-LL	8 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
WS-C2960L-16TS-LL	16 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-16PS-LL	16 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
Cisco Catalyst 2960-L Switches with 4x 1G SFP Uplinks	
WS-C2960L-24TS-LL	24 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-24PS-LL	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP
WS-C2960L-48TS-LL	48 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-48PS-LL	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP
Cisco Catalyst 2960-L Switches with 4x 10G SFP+ Uplinks	

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Product number	Description
WS-C2960L-24TQ-LL	24 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-24PQ-LL	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+
WS-C2960L-48TQ-LL	48 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-48PQ-LL	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+

Table 7. Cisco Catalyst 2960-L Smart Managed Switches ordering information

Product number	Description
Cisco Catalyst 2960-L Smart Managed Switches with 2x 1G SFP uplinks	
WS-C2960L-SM-8TS	8 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-SM-8PS	8 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
WS-C2960L-SM-16TS	16 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-SM-16PS	16 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
Cisco Catalyst 2960-L Smart Managed Switches with 4x 1G SFP Uplinks	
WS-C2960L-SM-24TS	24 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-SM-24PS	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP
WS-C2960L-SM-48TS	48 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-SM-48PS	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP
Cisco Catalyst 2960-L Smart Managed Switches with 4x 10G SFP+ Uplinks	
WS-C2960L-SM-24TQ	24 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-SM-24PQ	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+
WS-C2960L-SM-48TQ	48 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-SM-48PQ	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+

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Table 8. Product IDs for Cisco DNA Essentials licenses on the Cisco Catalyst 2960-L Series

Ports	Product ID	Description
8	C2960L-DNA-E-8=	C2960L Cisco DNA Essentials, 8-port term licenses
	C2960L-DNA-E-8-3Y	C2960L Cisco DNA Essentials, 8-port, 3-year term licenses
	C2960L-DNA-E-8-5Y	C2960L Cisco DNA Essentials, 8-port, 5-year term licenses
	C2960L-DNA-E-8-7Y	C2960L Cisco DNA Essentials, 8-port, 7-year term licenses
16	C2960L-DNA-E-16=	C2960L Cisco DNA Essentials, 16-port term licenses
	C2960L-DNA-E-16-3Y	C2960L Cisco DNA Essentials, 16-port, 3-year term licenses
	C2960L-DNA-E-16-5Y	C2960L Cisco DNA Essentials, 16-port, 5-year term licenses
	C2960L-DNA-E-16-7Y	C2960L Cisco DNA Essentials, 16-port, 7-year term licenses
24	C2960L-DNA-E-24=	C2960L Cisco DNA Essentials, 24-port term licenses
	C2960L-DNA-E-24-3Y	C2960L Cisco DNA Essentials, 24-port, 3-year term licenses
	C2960L-DNA-E-24-5Y	C2960L Cisco DNA Essentials, 24-port, 5-year term licenses
	C2960L-DNA-E-24-7Y	C2960L Cisco DNA Essentials, 24-port, 7-year term licenses
48	C2960L-DNA-E-48=	C2960L Cisco DNA Essentials, 48-port term licenses
	C2960L-DNA-E-48-3Y	C2960L Cisco DNA Essentials, 48-port, 3-year term licenses
	C2960L-DNA-E-48-5Y	C2960L Cisco DNA Essentials, 48-port, 5-year term licenses
	C2960L-DNA-E-48-7Y	C2960X Cisco DNA Essentials, 48-port, 7-year term licenses

Optics Compatibility Information

The Cisco Catalyst 2960-L Switches supports a wide range of optics. Because the list of supported optics is updated on a regular basis, consult the tables available here for compatibility information: Optics Compatibility.

Contact Cisco

For more information about Cisco products, contact:

Phone: +1 800 553-NETS (6387).

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Document History

New or Revised Topic	Described In	Date
Minor text edits	Product Highlights	12/18
Product name change	Software	12/18
Minor text edits	Software Policy	12/18
Updated text for Catalyst 2960-L Smart Managed Switches	Product Overview	10/5
Deleted and add text	Product Highlights	
Name change	Switch Models and Configurations, Switch Management, Intelligent PoE+, Network Security,Redundancy and Reiliency, Enhanced QoS, Energy Management, Warranty, Technical Support and Services, Accessories, Ordering Information	10/5
Added new product id: WS-C2960L-SM-	Table 1 Cisco Catalyst 2960-L switches configurations, Optics Compatibility Information	10/5
Added new ordering information for Cisco Catalyst 2960-L Smart Managed Switches	Ordering Information	10/5

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