



EXERCICI 1 (25%)

Una corporació ubicada a un edifici amb 12 plantes i uns 25 usuaris per planta, té implementada la següent arquitectura de xarxa:

- Cada planta està dotada d'un cablejat horitzontal fins a un rack al qual s'ubica un switch d'accés de nivell L2 (S5731-S48P4X).
- Els switches d'accés de les plantes es connecten amb cablejat vertical de fibra òptica amb un switch de distribució amb funcions de nivell L2 i L3 (S6730-H24X6C).
- Aquest switch de distribució centralitza les funcions de nivell L3 i té connectivitat amb un sistema VMWare on s'ubiquen els servidors *on-premise* d'aquesta organització i amb el Firewall perimetral que dona accés a Internet.
- Els usuaris s'agrupen per departaments que tenen reservada una VLAN per dades en mode accés amb el *default gateway* situat al switch de distribució. Cada VLAN té reservat un direccionament IP classe C.

S'adjunten al final d'aquest document els *datasheets* dels switches.

Amb aquesta informació respon:

- Descriu en què consisteix la segmentació de xarxa i què aporta en termes de seguretat. Amb aquesta arquitectura i les funcionalitats d'aquests equipaments. (20%)
- Desenvolupa una estratègia de segmentació de xarxa que incrementi la seguretat. (80%)

Per a la resolució d'aquest exercici es disposa de 30 minuts.

CloudEngine S6730-S Series Switches

Huawei CloudEngine S6730-S series full-featured 10GE switches are Huawei's new generation fixed switches that provide 10GE downlink ports 40GE uplink ports.

Introduction

Huawei CloudEngine S6730-S series full-featured 10 GE switches are Huawei's new generation fixed switches ,to provide 10GE downlink ports as well as 40GE uplink ports.

Huawei CloudEngine S6730-S can be used to provide high-speed access for 10 Gbit/s access to high-density servers or function as a core/aggregation switch on a campus network to provide 40 Gbit/s rate. In addition, S6730-S provides a wide variety of services, comprehensive security policies, and various QoS features to help customers build scalable, manageable, reliable, and secure campus and data center networks.

Product Overview

Models and Appearances

Appearance	Description
 CloudEngine S6730-S24X6Q	<ul style="list-style-type: none"> • 24 x 10 Gig SFP+, 6 x 40 Gig QSFP+ • Dual pluggable power modules, 1+1 power backup • Forwarding performance: 490Mpps • Switching capacity: 960Gbps/2.4Tbps <p>NOTE The value before the slash (/) refers to the device's switching capability, while the value after the slash (/) means the chip's switching capability.</p>

Fan Module

The following table lists the fan module on the CloudEngine S6730-S series.

Fan Module	Technical Specifications	Applied Switch Model
 FAN-031A-B	<ul style="list-style-type: none"> • Dimensions (W x D x H): 40 mm x 100.3 mm x 40 mm • Number of fans: 1 • Weight: 0.1 kg • Maximum power consumption: 21.6 W • Maximum fan speed: 24500±10% revolutions per minute (RPM) 	<ul style="list-style-type: none"> • CloudEngine S6730-S24X6Q

Fan Module	Technical Specifications	Applied Switch Model
	<ul style="list-style-type: none"> Maximum wind rate: 31 cubic feet per minute (CFM) Hot swap: Supported 	

Power Supply

The following table lists the power supplies on the CloudEngine S6730-S series.

Power Module	Technical Specifications	Applied Switch Model
 <p>PAC600S12-CB</p>	<ul style="list-style-type: none"> Dimensions (H x W x D): 40 mm x 90 mm x 215 mm (1.6 in. x 3.5 in. x 8.5 in.) Weight: 0.95 kg (2.09 lb) Rated input voltage range: <ul style="list-style-type: none"> 100 V AC to 240 V AC, 50/60 Hz 240 V DC Maximum input voltage range: <ul style="list-style-type: none"> 90 V AC to 290 V AC, 45 Hz to 65 Hz 190 V DC to 290 V DC Maximum input current: <ul style="list-style-type: none"> 100 V AC to 240 V AC: 8 A 240 V DC: 4 A Maximum output current: 50 A Rated output voltage: 12 V Maximum output power: 600 W Hot swap: Supported 	<ul style="list-style-type: none"> CloudEngine S6730-S24X6Q
 <p>PDC1000S12-DB</p>	<ul style="list-style-type: none"> Dimensions (H x W x D): 40 mm x 90 mm x 215 mm (1.6 in. x 3.5 in. x 8.5 in.) Weight: 1.02 kg (2.25 lb) Rated input voltage range: -48 V DC to -60 V DC Maximum input voltage range: -38.4 V DC to -72 V DC Maximum input current: 30 A Maximum output current: 83.3 A Maximum output power: 1000 W Hot swap: Supported 	<ul style="list-style-type: none"> CloudEngine S6730-S24X6Q

The CloudEngine S6730-S uses pluggable power modules. It can be configured with a single power module or double power modules for 1+1 power redundancy.

Product Features and Highlights

Abundant Convergence Feature

- The S6730-S supports SVF and functions as a parent switch. With this virtualization technology, a physical network with the "Small-sized core/aggregation switches + Access switches + APs" structure can be virtualized into a "super switch", greatly simplifying network management.
- The S6730-S provides excellent QoS capabilities and supports queue scheduling and congestion control algorithms. Additionally, it adopts innovative priority queuing and multi-level scheduling mechanisms to implement fine-grained scheduling of data flows, meeting service quality requirements of different user terminals and services.

Providing Fine Granular Network Management

- The S6730-S uses the Packet Conservation Algorithm for Internet (iPCA) technology that changes the traditional method of using simulated traffic for fault location. iPCA technology can monitor network quality for any service flow anywhere, anytime, without extra costs. It can detect temporary service interruptions in a very short time and can identify faulty ports accurately. This cutting-edge fault detection technology turns "extensive management" to "fine granular management."
- The S6730-S supports Two-Way Active Measurement Protocol (TWAMP) to accurately check any IP link and obtain the entire network's IP performance. This protocol eliminates the need of using a dedicated probe or a proprietary protocol.

Flexible Ethernet Networking

- In addition to traditional Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), and Multiple Spanning Tree Protocol (MSTP), the S6730-S supports Huawei-developed Smart Ethernet Protection (SEP) technology and the latest Ethernet Ring Protection Switching (ERPS) standard. SEP is a ring protection protocol specific to the Ethernet link layer, and applies to various ring network topologies, such as open ring topology, closed ring topology, and cascading ring topology. This protocol is reliable, easy to maintain, and implements fast service switching within 50 ms. ERPS is defined in ITU-T G.8032. It implements millisecond-level protection switching based on traditional Ethernet MAC and bridging functions.
- The S6730-S supports Smart Link and Virtual Router Redundancy Protocol (VRRP), which implement backup of uplinks. One S6730-S switch can connect to multiple aggregation switches through multiple links, significantly improving reliability of access devices.

Intelligent Stack (iStack)

- The S6730-S supports the iStack function that combines multiple switches into a logical switch. Member switches in a stack implement redundancy backup to improve device reliability and use inter-device link aggregation to improve link reliability. iStack provides high network scalability. You can increase a stack's ports, bandwidth, and processing capability by simply adding member switches. iStack also simplifies device configuration and management. After a stack is set up, multiple physical switches can be virtualized into one logical device. You can log in to any member switch in the stack to manage all the member switches in it.

Cloud-based Management

- The Huawei cloud management platform allows users to configure, monitor, and inspect switches on the cloud, reducing on-site deployment and O&M manpower costs and decreasing network OPEX. Huawei switches support both cloud management and on-premise management modes. These two management modes can be flexibly switched as required to achieve smooth evolution while maximizing return on investment (ROI).

VXLAN

- VXLAN is used to construct a Unified Virtual Fabric (UVF). As such, multiple service networks or tenant networks can be deployed on the same physical network, and service and tenant networks are isolated from each other. This capability truly achieves 'one network for multiple purposes'. The resulting benefits include enabling data transmission of different services or customers, reducing the network construction costs, and improving network resource utilization. The S6730-S series switches are VXLAN-capable and allow centralized and distributed VXLAN gateway deployment modes. These switches also support the BGP EVPN protocol for dynamically establishing VXLAN tunnels and can be configured using NETCONF/YANG.

High-Performance VRP Software System

- Huawei S series switches build on a unified Versatile Routing Platform (VRP) software system, meeting the growing network scale and the evolving Internet technologies and guaranteeing network services and network quality.
- VRP is a network operating system developed by Huawei with independent intellectual property rights. It can run on multiple hardware platforms and provide unified network, user, and management views. VRP provides flexible application solutions for users. In addition, VRP is a future-proof platform that maximally protects customer investments.
- The VRP platform is focused on IP services and uses a component-based architecture to provide more than 300 features. Besides, VRP stands out for its application-based tailorable and scalable capabilities.

OPS

- Open Programmability System (OPS) is an open programmable system based on the Python language. IT administrators can program the O&M functions of a switch through Python scripts to quickly innovate functions and implement intelligent O&M.

Big Data Powered Collaborative Security

- Agile switches use NetStream to collect campus network data and then report such data to the Huawei Cybersecurity Intelligence System (CIS). The purposes of doing so are to detect network security threats, display the security posture across the entire network, and enable automated or manual response to security threats. The CIS delivers the security policies to the Agile Controller. The Agile Controller then delivers such policies to agile switches that will handle security events accordingly. All these ensure campus network security.
- The S6730-S supports Encrypted Communication Analytics (ECA). It uses built-in ECA probes to extract characteristics of encrypted streams based on NetStream sampling and Service Awareness (SA), generates metadata, and reports the metadata to Huawei Cybersecurity Intelligence System (CIS). The CIS uses the AI algorithm to train the traffic model and compare characteristics of extracted encrypted traffic to identify malicious traffic. The CIS displays detection results on the GUI, provides threat handling suggestions, and automatically isolates threats with the Agile Controller to ensure campus network security.
- The S6730-S supports deception. It functions as a sensor to detect threats such as IP address scanning and port scanning on a network and lures threat traffic to the honeypot for further checks. The honeypot performs in-depth interaction with the initiator of the threat traffic, records various application-layer attack methods of the initiator, and reports security logs to the CIS. The CIS analyzes security logs. If the CIS determines that the suspicious traffic is an attack, it generates an alarm and provides handling suggestions. After the administrator confirms the alarm, the CIS delivers a policy to the Agile Controller. The Agile Controller delivers the policy to the switch for security event processing, ensuring campus network security.

Intelligent O&M

- The S6730-S provides telemetry technology to collect device data in real time and send the data to Huawei campus network analyzer CampusInsight. The CampusInsight analyzes network data based on the intelligent fault identification algorithm, accurately displays the real-time network status, effectively demarcates and locates faults in a timely manner, and identifies network problems that affect user experience, accurately guaranteeing user experience.
- The S6730-S supports a variety of intelligent O&M features for audio and video services, including the enhanced Media Delivery Index (eMDI). With this eMDI function, the S6730-S can function as a monitored node to periodically conduct statistics and report audio and video service indicators to the CampusInsight platform. In this way, the CampusInsight platform can quickly demarcate audio and video service quality faults based on the results of multiple monitored nodes.

Intelligent Upgrade

- Switches support the intelligent upgrade feature. Specifically, switches obtain the version upgrade path and download the newest version for upgrade from the Huawei Online Upgrade Platform (HOUP). The entire upgrade process is highly automated and achieves one-click upgrade. In addition, preloading the version is supported, which greatly shortens the upgrade time and service interruption time.
- The intelligent upgrade feature greatly simplifies device upgrade operations and makes it possible for the customer to upgrade the version independently. This greatly reduces the customer's maintenance costs. In addition, the upgrade policies on the HOUP platform standardize the upgrade operations, which greatly reduces the risk of upgrade failures.

Product Specifications

The following table describes the functions and features available on the CloudEngine S6730-S series.

Functions and Features

Function and Feature		Description	CloudEngine S6730-S24X6Q
Ethernet features	Ethernet basics	Rate auto-negotiation on an interface	Yes
		Flow control on an interface	Yes
		Jumbo frames	Yes
		Link aggregation	Yes
		Load balancing among links of a trunk	Yes
		Transparent transmission of Layer 2 protocol	Yes

Function and Feature		Description	CloudEngine S6730-S24X6Q
		packets	
		Device Link Detection Protocol (DLDP)	Yes
		Link Layer Discovery Protocol (LLDP)	Yes
		Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED)	Yes
		Interface isolation	Yes
		Broadcast traffic suppression on an interface	Yes
		Multicast traffic suppression on an interface	Yes
		Unknown unicast traffic suppression on an interface	Yes
		VLAN broadcast traffic suppression	Yes
		VLAN multicast traffic suppression	Yes
		VLAN unknown unicast traffic suppression	Yes
	VLAN	VLAN specification	4094
		VLANIF interface specification	1024
		Access mode	Yes
		Trunk mode	Yes
		Hybrid mode	Yes
		QinQ mode	Yes
		Default VLAN	Yes
		VLAN assignment based on interfaces	Yes
		VLAN assignment based on protocols	Yes
		VLAN assignment based on IP subnets	Yes
		VLAN assignment based on MAC addresses	Yes
		VLAN assignment based on MAC address + IP address	Yes
		VLAN assignment based on MAC address + IP address + interface number	Yes
		Adding double VLAN tags to packets based on interfaces	Yes
		Super-VLAN	Yes
		Super-VLAN specification	256
		Sub-VLAN	Yes
		Sub-VLAN specification	1K
		VLAN mapping	Yes
		Selective QinQ	Yes
		MUX VLAN	Yes

Function and Feature		Description	CloudEngine S6730-S24X6Q
		Voice VLAN	Yes
		Guest VLAN	Yes
	GVRP	GARP	Yes
		GVRP	Yes
	VCMP	VCMP	Yes
	MAC	MAC address	64K
		Automatic learning of MAC addresses	Yes
		Automatic aging of MAC addresses	Yes
		Static, dynamic, and blackhole MAC address entries	Yes
		Interface-based MAC address learning limiting	Yes
		Sticky MAC	Yes
		MAC address flapping detection	Yes
		Configuring MAC address learning priorities for interfaces	Yes
		MAC address spoofing defense	Yes
		Port bridge	Yes
	ARP	Static ARP	Yes
		Dynamic ARP	Yes
		ARP entry	64K
		ARP aging detection	Yes
		Intra-VLAN proxy ARP	Yes
		Inter-VLAN proxy ARP	Yes
Routed proxy ARP		Yes	
Multi-egress-interface ARP		Yes	
Ethernet loop protection	MSTP	STP	Yes
		RSTP	Yes
		MSTP	Yes
		VBST	Yes
		BPDU protection	Yes
		Root protection	Yes
		Loop protection	Yes
		Defense against TC BPDUs attacks	Yes
	Loopback detection	Loop detection on an interface	Yes
	SEP	SEP	Yes

Function and Feature		Description	CloudEngine S6730-S24X6Q
	Smart Link	Smart Link	Yes
		Smart Link multi-instance	Yes
		Monitor Link	Yes
	RRPP	RRPP	Yes
		Single RRPP ring	Yes
		Tangent RRPP ring	Yes
		Intersecting RRPP ring	Yes
		Hybrid networking of RRPP rings and other ring networks	Yes
	ERPS	G.8032 v1	Yes
		G.8032 v2	Yes
		ERPS semi-ring topology	Yes
		ERPS closed-ring topology	Yes
	IPv4/IPv6 forwarding	IPv4 and unicast routing	IPv4 static routing
VRF			Yes
DHCP client			Yes
DHCP server			Yes
DHCP relay			Yes
DHCP policy VLAN			Yes
URPF check			Yes
Routing policies			Yes
IPv4 routes			64K
RIPv1			Yes
RIPv2			Yes
OSPF			Yes
BGP			Yes
MBGP			Yes
IS-IS		Yes	
Policy-based routing (PBR)		Yes	
Multicast routing features		IGMPv1/v2/v3	Yes
		PIM-DM	Yes
		PIM-SM	Yes
		MSDP	Yes
	IPv4 multicast routes	4K	

Function and Feature		Description	CloudEngine S6730-S24X6Q
		IPv6 multicast routes	4K
		Multicast routing policies	Yes
		RPF	Yes
	IPv6 features	IPv6 protocol stack	Yes
		ND	Yes
		ND entry	32K
		ND snooping	Yes
		DHCPv6 snooping	Yes
		RIPng	Yes
		DHCPv6 server	Yes
		DHCPv6 relay	Yes
		OSPFv3	Yes
		BGP4+	Yes
		IS-IS for IPv6	Yes
		IPv6 routes	32K
		VRRP6	Yes
		MLDv1/v2	Yes
		PIM-DM for IPv6	Yes
	PIM-SM for IPv6	Yes	
	IPv6 transition technology	IPv6 manual tunneling	Yes
Layer 2 multicast features	-	IGMPv1/v2/v3 snooping	Yes
		IGMP snooping proxy	Yes
		MLD snooping	Yes
		Multicast traffic suppression	Yes
		Inter-VLAN multicast replication	Yes
Device reliability	BFD	Single-hop BFD	Yes
		BFD for static routes	Yes
		BFD for OSPF	Yes
		BFD for IS-IS	Yes
		BFD for BGP	Yes
		BFD for PIM	Yes
		BFD for VRRP	Yes
	Stacking	Service interface-based stacking	Yes

Function and Feature		Description	CloudEngine S6730-S24X6Q
		Maximum number of stacked devices	9
		Stack bandwidth (Unidirectional)	Up to 240 Gbit/s
	VRRP	VRRP standard protocol	Yes
Ethernet OAM	EFM (802.3ah)	Automatic discovery of links	Yes
		Link fault detection	Yes
		Link troubleshooting	Yes
		Remote loopback	Yes
	CFM (802.1ag)	Software-level CCM	Yes
		802.1ag MAC ping	Yes
		802.1ag MAC trace	Yes
	OAM association	Association between 802.1ag and 802.3ah	Yes
	Y.1731	Unidirectional delay and jitter measurement	Yes
Bidirectional delay and jitter measurement		Yes	
QoS features	Traffic classification	Traffic classification based on ACLs	Yes
		Configuring traffic classification priorities	Yes
		Matching the simple domains of packets	Yes
	Traffic behavior	Traffic filtering	Yes
		Traffic policing (CAR)	Yes
		Modifying the packet priorities	Yes
		Modifying the simple domains of packets	Yes
		Modifying the packet VLANs	Yes
	Traffic shaping	Traffic shaping on an egress interface	Yes
		Traffic shaping on queues on an interface	Yes
	Congestion avoidance	Weighted Random Early Detection (WRED) on queues	Yes
		Tail drop	Yes
	Congestion management	Priority Queuing (PQ)	Yes
		Weighted Deficit Round Robin (WDRR)	Yes
		PQ+WDRR	Yes
		Weighted Round Robin (WRR)	Yes
		PQ+WRR	Yes
ACL	Packet filtering at Layer 2 to Layer 4	Number of rules per IPv4 ACL	6K(shared)
		Number of rules per IPv6 ACL	6K(shared)
	Basic IPv4 ACL	Yes	

Function and Feature		Description	CloudEngine S6730-S24X6Q
		Advanced IPv4 ACL	Yes
		Basic IPv6 ACL	Yes
		Advanced IPv6 ACL	Yes
		Layer 2 ACL	Yes
		User group ACL	Yes
		User-defined ACL	Yes
Configuration and maintenance	Login and configuration management	Command line interface (CLI)-based configuration	Yes
		Console terminal service	Yes
		Telnet terminal service	Yes
		SSH v1.5	Yes
		SSH v2.0	Yes
		SNMP-based NMS for unified configuration	Yes
		Web page-based configuration and management	Yes
		EasyDeploy (client)	Yes
		EasyDeploy (commander)	Yes
		SVF	Yes
		Cloud management	Yes
		OPS	Yes
		File system	Directory and file management
	File upload and download		Yes
	Monitoring and maintenance	Deception	Yes
		ECA	Yes
		eMDI	Yes
		Hardware monitoring	Yes
		Log information output	Yes
		Alarm information output	Yes
		Debugging information output	Yes
		Port mirroring	Yes
		Flow mirroring	Yes
		Remote mirroring	Yes
		Energy saving	Yes
	Version upgrade	Version upgrade	Yes
		Version rollback	Yes
Security	ARP security	ARP packet rate limiting	Yes

Function and Feature		Description	CloudEngine S6730-S24X6Q
		ARP anti-spoofing	Yes
		Association between ARP and STP	Yes
		ARP gateway anti-collision	Yes
		Dynamic ARP Inspection (DAI)	Yes
		Static ARP Inspection (SAI)	Yes
		Egress ARP Inspection (EAI)	Yes
	IP security	ICMP attack defense	Yes
		IPSG for IPv4	Yes
		IPSG user capacity	3K
		IPSG for IPv6	Yes
		IPSGv6 user capacity	1.5K
	Local attack defense	CPU attack defense	Yes
	MFF	MFF	Yes
	DHCP snooping	DHCP snooping	Yes
		Option 82 function	Yes
		Dynamic rate limiting for DHCP packets	Yes
	Attack defense	Defense against malformed packet attacks	Yes
		Defense against UDP flood attacks	Yes
		Defense against TCP SYN flood attacks	Yes
		Defense against ICMP flood attacks	Yes
		Defense against packet fragment attacks	Yes
		Local URPF	Yes
	User access and authentication	AAA	Local authentication
Local authorization			Yes
RADIUS authentication			Yes
RADIUS authorization			Yes
RADIUS accounting			Yes
HWTACACS authentication			Yes
HWTACACS authorization			Yes
HWTACACS accounting			Yes
NAC		802.1X authentication	Yes
		MAC address authentication	Yes
	Portal authentication	Yes	

Function and Feature		Description	CloudEngine S6730-S24X6Q
		Hybrid authentication	Yes
	Policy association	Functioning as the control device	Yes
Network management	-	Ping	Yes
		Tracert	Yes
		NQA	Yes
		NTP	Yes
		iPCA	Yes
		NetStream	Yes
		SNMP v1	Yes
		SNMP v2c	Yes
		SNMP v3	Yes
		HTTP	Yes
		HTTPS	Yes
		RMON	Yes
		RMON2	Yes
		NETCONF/YANG	Yes
VXLAN	-	VXLAN Layer 2 gateway	Yes
		VXLAN Layer 3 gateway	Yes
		Centralized gateway	Yes
		Distributed gateway	Yes
		BGP-EVPN	Yes
		BGP-EVPN neighbor capacity	256
Interoperability	-	VLAN-based Spanning Tree (VBST)	Yes
		Link-type Negotiation Protocol (LNP)	Yes
		VLAN Central Management Protocol (VCMP)	Yes

NOTE

This content is applicable only to regions outside mainland China. Huawei reserves the right to interpret this content.

Hardware Specifications

The following table lists hardware specifications of the CloudEngine S6730-S series.

Item		CloudEngine S6730-S24X6Q
Physical specifications	Chassis dimensions (W x D x H, mm)	442 x 420 x 43.6
	Chassis height	1 U

Item		CloudEngine S6730-S24X6Q
	Chassis weight (full configuration weight, including weight of packaging materials)	6.95 kg
Fixed port	10GE port	24
	40GE port	6
Management port	ETH management port	Supported
	Console port (RJ45)	Supported
	USB port	USB 2.0
CPU	Frequency	1.4 GHz
	Cores	4
Memory	Memory (RAM)	4GB
	Flash	Hardware: 2 GB
Power supply system	Power supply type	<ul style="list-style-type: none"> 600 W AC (pluggable) 1000 W DC (pluggable)
	Rated voltage range	<ul style="list-style-type: none"> AC: 100 V AC to 240 V AC, 50/60 Hz;DC:190V-290V DC: -48 V DC to -60 V DC
	Maximum voltage range	<ul style="list-style-type: none"> AC: 90 V AC to 264 V AC; 47-63 Hz DC: -38.4 V DC to -72 V DC
	Maximum input current	<ul style="list-style-type: none"> 600 W AC: 8 A 1000 W DC: 30 A
	Maximum power consumption of the device	225 W
	Power consumption in the case of 30% traffic load ¹	135 W
	Power consumption in the case of 100% traffic load ¹	149 W
	Minimum power consumption of the device	88 W
Heat dissipation system	Heat dissipation mode	Air-cooled heat dissipation and intelligent fan speed adjustment
	Number of fan modules	Pluggable dual fans
	Airflow	Front-to-back
Environment parameters	Long-term operating temperature	<ul style="list-style-type: none"> 0-1800 m: 0°C to 45°C 1800-5000 m: The operating temperature decreases 1°C for every 220 m increase in altitude.
	Storage temperature	-40°C to +70°C
	Relative humidity	5%-95% (non-condensing)
	Operating altitude	5000 m
	Noise under normal temperature	65 dB(A)

Item		CloudEngine S6730-S24X6Q
	(sound power)	
	Noise under high temperature (sound power)	88 dB(A)
	Noise under normal temperature (sound pressure)	52 dB(A)
	Surge protection specification (power port)	<ul style="list-style-type: none"> AC power interface: differential mode: $\pm 6\text{kV}$: common mode: $\pm 6\text{kV}$ DC power interface: differential mode: $\pm 2\text{kV}$: common mode: $\pm 4\text{kV}$
Reliability	MTBF (year) ²	62.27
	MTTR (hour)	2
	Availability	> 0.99999
Certification		<ul style="list-style-type: none"> EMC certification Safety certification Manufacturing certification <p>NOTE For details about certifications, see the section Safety and Regulatory Compliance.</p>

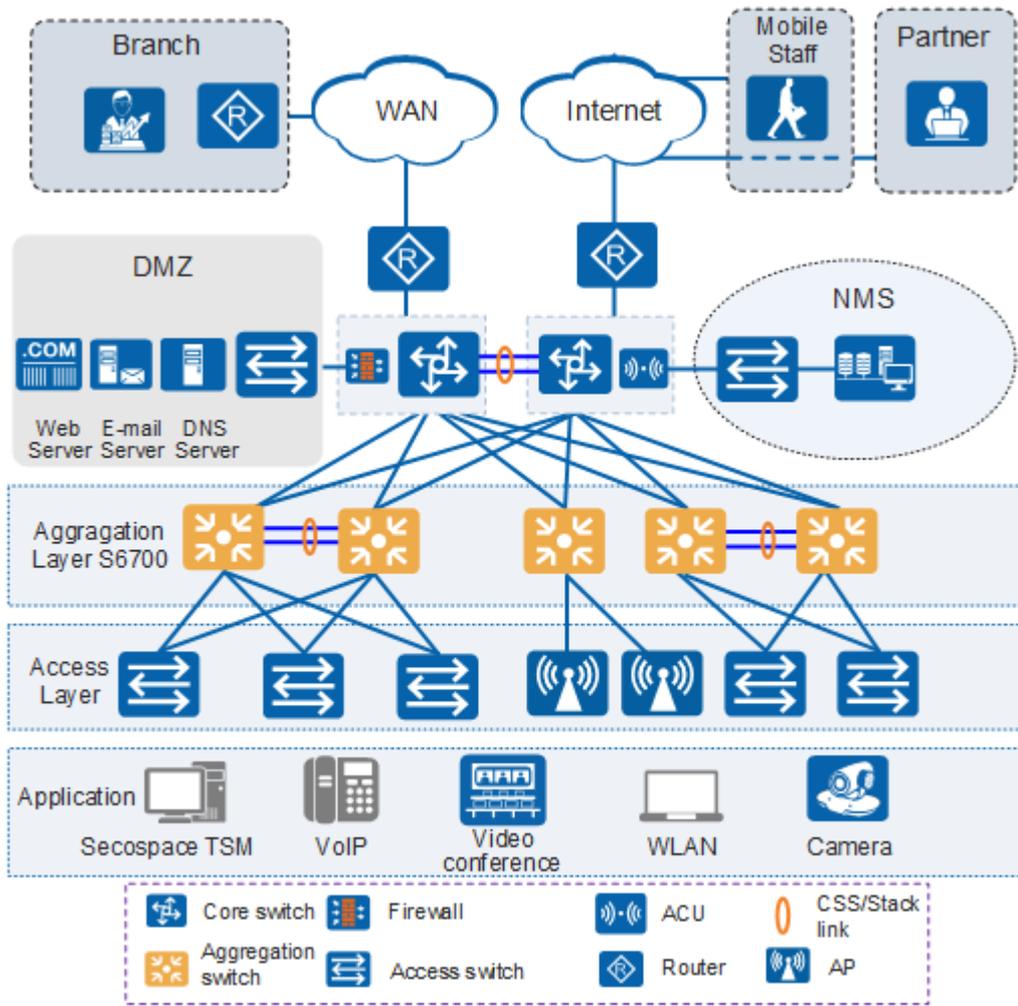
NOTE

1: The power consumption under different load conditions is calculated according to the ATIS standard. Additionally, the EEE function is enabled and there is no PoE power output.

2: The reliability parameter values are calculated based on the typical configuration of the device. The parameter values vary according to the modules configured by the customer.

Networking and Applications

Huawei CloudEngine S6730-S is a fixed agile switch with 10GE downlink and 40GE uplink ports. It supports in-depth wired and wireless convergence and unified management on devices, users, and services. The CloudEngine S6730-S can be used as the core device in an enterprise branch network or a small- or middle-sized campus network, or as the aggregation device in a large-sized campus network. The switch helps achieve a manageable and highly reliable enterprise campus network with scalable services.



Product Accessories

Optical Modules and Fibers

10GE SFP+ ports support optical modules and cables

- GE optical module
- GE-CWDM optical module
- GE-DWDM optical module
- GE copper module (100M/1000M auto-sensing)
- 10GE SFP+ optical module (OSXD22N00 not supported)
- 10GE-CWDM optical module
- 10GE-DWDM optical module
- 1 m, 3 m, 5 m, and 10 m SFP+ high-speed copper cables
- 3 m and 10 m SFP+ AOC cables
- 0.5 m and 1.5 m SFP+ dedicated stack copper cables

40GE QSFP+ ports support optical modules and cables

- QSFP+ optical module
- 1 m, 3 m, and 5 m QSFP+ to QSFP+ high-speed copper cables
- 10 m QSFP+ to QSFP+ AOC cable

NOTE

- A 40GE QSFP+ optical port cannot be split into four 10GE ports.

The fibers and optical modules supported by Huawei switches are periodically updated. For the latest information, visit <https://support.huawei.com/enterprise/en/doc/EDOC1000013621/98295a4b/pluggable-modules-for-interfaces> or contact your local Huawei sales office.

Stack Cables

The CloudEngine S6730-S Series switches support service port stacking. The applicable stack cables are as follows:

Port Supporting Stacking	Stack Cable	Rate of a Single Port
10GE ports on the front panel	<ul style="list-style-type: none">• 1 m, 3 m, and 5 m SFP+ passive high-speed copper cables• 10 m SFP+ active high-speed copper cables• 3 m and 10 m AOC cables• 10GE SFP+ optical module and optical fiber• 0.5 m and 1.5 m SFP+ dedicated stack cable	10 Gbit/s
40GE ports on the front panel	<ul style="list-style-type: none">• 1 m, 3 m, and 5 m QSFP+ passive high-speed copper cables• 10 m QSFP+ AOC cables• QSFP+ optical module (QSFP+-40G-SR-BD not supported) and optical fiber	40 Gbit/s

Safety and Regulatory Compliance

The following table lists the safety and regulatory compliance of the CloudEngine S6730-S Series.

Certification Category	Description
Safety	<ul style="list-style-type: none">• IEC 60950-1 and all country deviations• EN 60950-1• UL 60950-1• CAN/CSA 22.2 No.60950-1• GB 4943
Electromagnetic Compatibility (EMC)	<ul style="list-style-type: none">• EMI• FCC CFR47 Part 15 Class A• EN55022 Class A• CISPR 22 Class A• EN61000-3-2/IEC-1000-3-2, Power line harmonics• EN61000-4-3/IEC-1000-4-3, Radiated immunity• EN61000-4-2/IEC-1000-4-2, ESD• EN61000-4-4/IEC-1000-4-4, EFT• EN61000-4-5/IEC-1000-4-5, Surge Signal Port• EN61000-4-6/IEC-1000-4-6, Low frequency conducted immunity• EN61000-4-11/IEC-1000-4-11, Voltage dips and sags• EN61000-4-29/IEC61000-4-29, Voltage dips and sags• EMC Directive 89/336/EEC• EMC Directive 2004/108/EC

Certification Category	Description
	<ul style="list-style-type: none"> • VCCI V-3 Class A • ICES-003 Class A • AS/NZS CISPR 22 Class A • CNS 13438 Class A • GB9254 Class A

NOTE

- EMC: electromagnetic compatibility
- CISPR: International Special Committee on Radio Interference
- EN: European Standard
- ETSI: European Telecommunications Standards Institute
- CFR: Code of Federal Regulations
- FCC: Federal Communication Commission
- IEC: International Electrotechnical Commission
- AS/NZS: Australian/New Zealand Standard
- VCCI: Voluntary Control Council for Interference
- UL: Underwriters Laboratories
- CSA: Canadian Standards Association
- IEEE: Institute of Electrical and Electronics Engineers

MIB and Standards Compliance

Supported MIBs

Category	MIB
Public MIB	<ul style="list-style-type: none"> • BRIDGE-MIB • DISMAN-NSLOOKUP-MIB • DISMAN-PING-MIB • DISMAN-TRACEROUTE-MIB • ENTITY-MIB • EtherLike-MIB • IF-MIB • IP-FORWARD-MIB • IPv6-MIB • LAG-MIB • LLDP-EXT-DOT1-MIB • LLDP-EXT-DOT3-MIB • LLDP-MIB • NOTIFICATION-LOG-MIB • NQA-MIB • OSPF-TRAP-MIB • P-BRIDGE-MIB • Q-BRIDGE-MIB • RFC1213-MIB • RIPv2-MIB

Category	MIB
	<ul style="list-style-type: none"> • RMON2-MIB • RMON-MIB • SAVI-MIB • SNMP-FRAMEWORK-MIB • SNMP-MPD-MIB • SNMP-NOTIFICATION-MIB • SNMP-TARGET-MIB • SNMP-USER-BASED-SM-MIB • SNMPv2-MIB • TCP-MIB • UDP-MIB
Huawei-proprietary MIB	<ul style="list-style-type: none"> • HUAWEI-AAA-MIB • HUAWEI-ACL-MIB • HUAWEI-ALARM-MIB • HUAWEI-ALARM-RELIABILITY-MIB • HUAWEI-BASE-TRAP-MIB • HUAWEI-BRAS-RADIUS-MIB • HUAWEI-BRAS-SRVCFG-EAP-MIB • HUAWEI-BRAS-SRVCFG-STATICUSER-MIB • HUAWEI-CBQOS-MIB • HUAWEI-CDP-COMPLIANCE-MIB • HUAWEI-CONFIG-MAN-MIB • HUAWEI-CPU-MIB • HUAWEI-DAD-TRAP-MIB • HUAWEI-DC-MIB • HUAWEI-DATASYNC-MIB • HUAWEI-DEVICE-MIB • HUAWEI-DHCPR-MIB • HUAWEI-DHCPS-MIB • HUAWEI-DHCP-SNOOPING-MIB • HUAWEI-DIE-MIB • HUAWEI-DNS-MIB • HUAWEI-DLDP-MIB • HUAWEI-ELMI-MIB • HUAWEI-ERPS-MIB • HUAWEI-ERRORDOWN-MIB • HUAWEI-ENERGYMNGT-MIB • HUAWEI-EASY-OPERATION-MIB • HUAWEI-ENTITY-EXTENT-MIB • HUAWEI-ENTITY-TRAP-MIB • HUAWEI-ETHARP-MIB • HUAWEI-ETHOAM-MIB • HUAWEI-FLASH-MAN-MIB • HUAWEI-FWD-RES-TRAP-MIB

Category	MIB
	<ul style="list-style-type: none"> • HUAWEI-GARP-APP-MIB • HUAWEI-GTSM-MIB • HUAWEI-HGMP-MIB • HUAWEI-HWTACACS-MIB • HUAWEI-IF-EXT-MIB • HUAWEI-INFOCENTER-MIB • HUAWEI-IPPOOL-MIB • HUAWEI-IPV6-MIB • HUAWEI-ISOLATE-MIB • HUAWEI-L2IF-MIB • HUAWEI-L2MAM-MIB • HUAWEI-L2VLAN-MIB • HUAWEI_LDT-MIB • HUAWEI-LLDP-MIB • HUAWEI-MAC-AUTHEN-MIB • HUAWEI-MEMORY-MIB • HUAWEI-MFF-MIB • HUAWEI-MFLP-MIB • HUAWEI-MSTP-MIB • HUAWEI-MULTICAST-MIB • HUAWEI-NAP-MIB • HUAWEI-NTPV3-MIB • HUAWEI-PERFORMANCE-MIB • HUAWEI-PORT-MIB • HUAWEI-PORTAL-MIB • HUAWEI-QINQ-MIB • HUAWEI-RIPv2-EXT-MIB • HUAWEI-RM-EXT-MIB • HUAWEI-RRPP-MIB • HUAWEI-SECURITY-MIB • HUAWEI-SEP-MIB • HUAWEI-SNMP-EXT-MIB • HUAWEI-SSH-MIB • HUAWEI-STACK-MIB • HUAWEI-SWITCH-L2MAM-EXT-MIB • HUAWEI-SWITCH-SRV-TRAP-MIB • HUAWEI-SYS-MAN-MIB • HUAWEI-TCP-MIB • HUAWEI-TFTPC-MIB • HUAWEI-TRNG-MIB • HUAWEI-XQOS-MIB

 **NOTE**

For more information about MIBs supported by the CloudEngine S6730-S series, visit:
<https://support.huawei.com/enterprise/en/switches/s6700-pid-6691593?category=reference-guides>

Standards Compliance

The following table lists the standards that the CloudEngine S6730-S series complies with.

Standard Organization	Standard or Protocol
IETF	<ul style="list-style-type: none"> • RFC 768 User Datagram Protocol (UDP) • RFC 792 Internet Control Message Protocol (ICMP) • RFC 793 Transmission Control Protocol (TCP) • RFC 826 Ethernet Address Resolution Protocol (ARP) • RFC 854 Telnet Protocol Specification • RFC 951 Bootstrap Protocol (BOOTP) • RFC 959 File Transfer Protocol (FTP) • RFC 1058 Routing Information Protocol (RIP) • RFC 1112 Host extensions for IP multicasting • RFC 1157 A Simple Network Management Protocol (SNMP) • RFC 1256 ICMP Router Discovery • RFC 1305 Network Time Protocol Version 3 (NTP) • RFC 1349 Internet Protocol (IP) • RFC 1493 Definitions of Managed Objects for Bridges • RFC 1542 Clarifications and Extensions for the Bootstrap Protocol • RFC 1643 Ethernet Interface MIB • RFC 1757 Remote Network Monitoring (RMON) • RFC 1901 Introduction to Community-based SNMPv2 • RFC 1902-1907 SNMP v2 • RFC 1981 Path MTU Discovery for IP version 6 • RFC 2131 Dynamic Host Configuration Protocol (DHCP) • RFC 2328 OSPF Version 2 • RFC 2453 RIP Version 2 • RFC 2460 Internet Protocol, Version 6 Specification (IPv6) • RFC 2461 Neighbor Discovery for IP Version 6 (IPv6) • RFC 2462 IPv6 Stateless Address Auto configuration • RFC 2463 Internet Control Message Protocol for IPv6 (ICMPv6) • RFC 2474 Differentiated Services Field (DS Field) • RFC 2740 OSPF for IPv6 (OSPFv3) • RFC 2863 The Interfaces Group MIB • RFC 2597 Assured Forwarding PHB Group • RFC 2598 An Expedited Forwarding PHB • RFC 2571 SNMP Management Frameworks • RFC 2865 Remote Authentication Dial In User Service (RADIUS) • RFC 3046 DHCP Option82 • RFC 3376 Internet Group Management Protocol, Version 3 (IGMPv3) • RFC 3513 IP Version 6 Addressing Architecture • RFC 3579 RADIUS Support For EAP • RFC 4271 A Border Gateway Protocol 4 (BGP-4) • RFC 4760 Multiprotocol Extensions for BGP-4 • draft-grant-tacacs-02 TACACS+

Standard Organization	Standard or Protocol
	<ul style="list-style-type: none"> • RFC 6241 Network Configuration Protocol (NETCONF) • RFC 6020 YANG - A Data Modeling Language for the Network Configuration Protocol (NETCONF)
IEEE	<ul style="list-style-type: none"> • IEEE 802.1D Media Access Control (MAC) Bridges • IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering • IEEE 802.1Q Virtual Bridged Local Area Networks • IEEE 802.1ad Provider Bridges • IEEE 802.2 Logical Link Control • IEEE Std 802.3 CSMA/CD • IEEE Std 802.3ab 1000BASE-T specification • IEEE Std 802.3ad Aggregation of Multiple Link Segments • IEEE Std 802.3ae 10GE WEN/LAN Standard • IEEE Std 802.3x Full Duplex and flow control • IEEE Std 802.3z Gigabit Ethernet Standard • IEEE802.1ax/IEEE802.3ad Link Aggregation • IEEE 802.3ah Ethernet in the First Mile. • IEEE 802.1ag Connectivity Fault Management • IEEE 802.1ab Link Layer Discovery Protocol • IEEE 802.1D Spanning Tree Protocol • IEEE 802.1w Rapid Spanning Tree Protocol • IEEE 802.1s Multiple Spanning Tree Protocol • IEEE802.1x Port based network access control protocol
ITU	<ul style="list-style-type: none"> • ITU SG13 Y.17ethoam • ITU SG13 QoS control Ethernet-Based IP Access • ITU-T Y.1731 ETH OAM performance monitor
ISO	<ul style="list-style-type: none"> • ISO 10589 IS-IS Routing Protocol
MEF	<ul style="list-style-type: none"> • MEF 2 Requirements and Framework for Ethernet Service Protection • MEF 9 Abstract Test Suite for Ethernet Services at the UNI • MEF 10.2 Ethernet Services Attributes Phase 2 • MEF 11 UNI Requirements and Framework • MEF 13 UNI Type 1 Implementation Agreement • MEF 15 Requirements for Management of Metro Ethernet Phase 1 Network Elements • MEF 17 Service OAM Framework and Requirements • MEF 20 UNI Type 2 Implementation Agreement • MEF 23 Class of Service Phase 1 Implementation Agreement • Xmodem XMODEM/YMODEM Protocol Reference

 **NOTE**

The listed standards and protocols are fully or partially supported by Huawei switches. For details, visit <http://e.huawei.com/en> or contact your local Huawei sales office.

Ordering Information

The following table lists ordering information of the CloudEngine S6730-S series switches.

Model	Product Description
CloudEngine S6730-S24X6Q	CloudEngine S6730-S24X6Q(24 x 10 Gig SFP+, 6 x 40 Gig QSFP+. equipped power modules by default not available)
PAC600S12-CB	600W AC power module
PDC1000S12-DB	1000W DC power module
N1-S67S-M-Lic	S67 Series Basic SW,Per Device
N1-S67S-M-SnS1Y	S67 Series Basic SW,SnS,Per Device,1Year

More Information

For more information about the Huawei Campus Switches, visit <http://e.huawei.com> or contact us in the following ways:

- Global service hotline: <http://e.huawei.com/en/service-hotline>
- Logging in to the Huawei Enterprise technical support website: <http://support.huawei.com/enterprise/>
- Sending an email to the customer service mailbox: support_e@huawei.com

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CloudEngine S5731-S Series Switches

CloudEngine S5731-S series switches are next-generation standard gigabit switches that provide GE electrical downlink ports and 10GE uplink ports.

Introduction

The CloudEngine S5731-S series switches were developed based on next-generation high-performing hardware and the Huawei Versatile Routing Platform (VRP). The CloudEngine S5731-S supports simplified operations and maintenance (O&M), intelligent stack (iStack), flexible Ethernet networking. It also provides enhanced Layer 3 features and mature IPv6 features. The CloudEngine S5731-S can be used in various scenarios. For example, it can be used as an access or aggregation switch on a campus network or as an access switch for Metropolitan Area Network.

Product Overview

Models and Appearances

The following models are available in the CloudEngine S5731-S series.

Models and Appearances	Description
 CloudEngine S5731-S24T4X	<ul style="list-style-type: none"> • 24 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • Forwarding performance: 96 Mpps • Switching capacity: 128 Gbps/672 Gbps
 CloudEngine S5731-S24P4X	<ul style="list-style-type: none"> • 24 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • PoE+ • Forwarding performance: 96 Mpps • Switching capacity: 128 Gbps/672 Gbps
 CloudEngine S5731-S48T4X	<ul style="list-style-type: none"> • 48 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • Forwarding performance: 125 Mpps • Switching capacity: 176 Gbps/672 Gbps
 CloudEngine S5731-S48P4X	<ul style="list-style-type: none"> • 48 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • PoE+ • Forwarding performance: 125 Mpps

Models and Appearances	Description
	<ul style="list-style-type: none"> Switching capacity: 176 Gbps/672 Gbps

Fan Models

The following table lists the fan module applicable to the CloudEngine S5731-S.

Technical specifications of the fan module applicable to the CloudEngine S5731-S series

Fan Module	Technical Specifications	Applied Switch Model
 <p>FAN-023A-B</p>	<ul style="list-style-type: none"> Dimensions (W x D x H): 40 mm x 100.3 mm x 40 mm Number of fans: 1 Weight: 0.1 kg Maximum power consumption: 7.2 W Maximum fan speed: 18500±10% revolutions per minute (RPM) Maximum wind rate: 23 cubic feet per minute (CFM) Hot swap: Supported 	<ul style="list-style-type: none"> CloudEngine S5731-S24T4X CloudEngine S5731-S24P4X CloudEngine S5731-S48T4X CloudEngine S5731-S48P4X

Power Supply

The following table lists the power supplies applicable to the CloudEngine S5731-S.

Technical specifications of the power supplies applicable to the CloudEngine S5731-S series

Power Module	Technical Specifications	Applied Switch Model
 <p>PAC600S12-CB</p>	<ul style="list-style-type: none"> Dimensions (H x W x D): 40 mm x 90 mm x 215 mm (1.6 in. x 3.5 in. x 8.5 in.) Weight: 0.95 kg (2.09 lb) Rated input voltage range: <ul style="list-style-type: none"> 100 V AC to 240 V AC, 50/60 Hz 240 V DC Maximum input voltage range: <ul style="list-style-type: none"> 90 V AC to 290 V AC, 45 Hz to 65 Hz 190 V DC to 290 V DC Maximum input current: <ul style="list-style-type: none"> 100 V AC to 240 V AC: 8 A 240 V DC: 4 A Maximum output current: 50 A Rated output voltage: 12 V Maximum output power: 600 W Hot swap: Supported 	<ul style="list-style-type: none"> CloudEngine S5731-S24T4X CloudEngine S5731-S48T4X
 <p>PAC1000S56-CB</p>	<ul style="list-style-type: none"> Dimensions (H x W x D): 40 mm x 90 mm x 215 mm (1.6 in. x 3.5 in. x 8.5 in.) Weight: 1.1 kg (2.43 lb) Rated input voltage range: <ul style="list-style-type: none"> 100 V AC to 130 V AC, 50/60 Hz 200 V AC to 240 V AC, 50/60 Hz 	<ul style="list-style-type: none"> CloudEngine S5731-S24P4X CloudEngine S5731-S48P4X

Power Module	Technical Specifications	Applied Switch Model
	<ul style="list-style-type: none"> - 240 V DC • Maximum input voltage range: <ul style="list-style-type: none"> - 90 V AC to 290 V AC, 45 Hz to 65 Hz - 190 V DC to 290 V DC • Input current: <ul style="list-style-type: none"> - 100 V AC to 130 V AC: 12 A - 200 V AC to 240 V AC: 8 A - 240 V DC: 8 A • Maximum output current: <ul style="list-style-type: none"> - 100 V AC to 130 V AC input: 16.08 A - 200 V AC to 240 V AC input and 240 V DC input: 17.86 A • Maximum output power: <ul style="list-style-type: none"> - Total power: 900 W (100 V AC to 130 V AC input)/1000 W (200 V AC to 240 V AC input and 240 V DC input) • Hot swap: Supported 	
 <p>PAC150S12-R</p>	<ul style="list-style-type: none"> • Dimensions (H x W x D): 40 mm x 90 mm x 215 mm (1.6 in. x 3.5 in. x 8.5 in.) • Weight: 0.8 kg (1.76 lb) • Rated input voltage range: 100 V AC to 240 V AC, 50/60 Hz • Maximum input voltage range: 90 V AC to 264 V AC, 47 Hz to 63 Hz • Maximum input current: 3 A • Maximum output current: 12.5 A • Maximum output power: 150 W • Hot swap: Supported 	<ul style="list-style-type: none"> • CloudEngine S5731-S24T4X • CloudEngine S5731-S48T4X
 <p>PDC1000S12-DB</p>	<ul style="list-style-type: none"> • Dimensions (H x W x D): 40 mm x 90 mm x 215 mm (1.6 in. x 3.5 in. x 8.5 in.) • Weight: 1.02 kg (2.25 lb) • Rated input voltage range: -48 V DC to -60 V DC • Maximum input voltage range: -38.4 V DC to -72 V DC • Maximum input current: 30 A • Maximum output current: 83.3 A • Maximum output power: 1000 W • Hot swap: Supported 	<ul style="list-style-type: none"> • CloudEngine S5731-S24T4X • CloudEngine S5731-S48T4X

Product Features and Highlights

Powerful Service Processing Capability and Multiple Security Control Mechanisms

- The CloudEngine S5731-S supports many Layer 2/Layer 3 multicast protocols such as PIM SM, PIM DM, PIM SSM, MLD, and IGMP snooping, to support multi-terminal high-definition video surveillance and video conferencing services.

- The CloudEngine S5731-S supports multiple Layer 3 features including OSPF, IS-IS, BGP, and VRRP, meeting enterprises' requirements on access and aggregation service bearing, and enabling a variety of voice, video, and data applications.
- The CloudEngine S5731-S supports MAC address authentication, 802.1x authentication, and Portal authentication, and implements dynamic delivery of policies (VLAN, QoS, and ACL) to users.
- The CloudEngine S5731-S provides a series of mechanisms to defend against DoS and user-targeted attacks. DoS attacks are targeted at switches and include SYN flood, Land, Smurf, and ICMP flood attacks. User-targeted attacks include bogus DHCP server attacks, IP/MAC address spoofing, DHCP request flood, and change of the DHCP CHADDR value.
- The CloudEngine S5731-S sets up and maintains a DHCP snooping binding table, and discards the packets that do not match the table entries. You can specify DHCP snooping trusted and untrusted ports to ensure that users connect only to the authorized DHCP server.
- The CloudEngine S5731-S supports strict ARP learning, which protects a network against ARP spoofing attacks to ensure normal network access.

Easy O&M

- The CloudEngine S5731-S supports Super Virtual Fabric (SVF), which virtualizes the "Core/aggregation + Access switch + AP" structure into a logical device. The CloudEngine S5731-S provides the innovative network management solution in the industry to simplify device management. It allows plug-and-play access switches and APs. In addition, the CloudEngine S5731-S supports service configuration templates. The templates are configured on core devices and automatically delivered to access devices, enabling centralized control, simplified service configuration, and flexible configuration modification. The CloudEngine S5731-S functions as a client in an SVF system.
- The CloudEngine S5731-S supports zero-touch deployment, replacement of faulty devices without additional configuration, USB-based deployment, batch configuration, and batch remote upgrade. The capabilities facilitate device deployment, upgrade, service provisioning, and other management and maintenance operations, and also greatly reduce O&M costs. The CloudEngine S5731-S can be managed using SNMP v1/v2c/v3, CLI, web-based network management system, or SSH v2.0. Additionally, it supports RMON, multiple log hosts, port traffic statistics collection, and network quality analysis, which facilitate network optimization and reconstruction.

Multiple Reliability Mechanisms

- The CloudEngine S5731-S supports iStack. This technology can virtualize up to nine physical switches into one logical switch. Member switches in a stack implement redundancy backup to improve device reliability and use inter-device link aggregation to improve link reliability. iStack provides high network scalability. You can increase a stack's ports, bandwidth, and processing capacity by simply adding member switches. iStack also simplifies device configuration and management. After a stack is set up, multiple physical switches are virtualized into one logical device. You can log in to any member switch in the stack to manage all the member switches in the stack.
- The CloudEngine S5731-S is equipped with two removable power modules that can work in 1+1 redundancy backup mode.
- In addition to traditional STP, RSTP, and MSTP, the CloudEngine S5731-S supports Huawei-developed Smart Ethernet Protection (SEP) technology and the latest Ethernet Ring Protection Switching (ERPS) standard. SEP is a ring protection protocol specific to the Ethernet link layer, and applies to various ring network topologies, such as open ring topology, closed ring topology, and cascading ring topology. This protocol is reliable, easy to maintain, and implements fast protection switching within 50 ms. ERPS is defined in ITU-T G. 8032. It implements millisecond-level protection switching based on traditional Ethernet MAC and bridging functions.
- The CloudEngine S5731-S supports Smart Link. One CloudEngine S5731-S switch can connect to multiple aggregation switches through multiple links, implementing backup of uplinks and significantly improving reliability of access devices.
- The CloudEngine S5731-S supports Ethernet OAM (IEEE 802.3ah/802.1ag) to detect link faults quickly.

Mature IPv6 Technologies

- The CloudEngine S5731-S uses the mature, stable VRRP platform and supports IPv4/IPv6 dual stack, IPv6 RIPng, and IPv6 over IPv4 tunnels (including manual, 6-to-4, and ISATAP tunnels). With these IPv6 features, the CloudEngine S5731-S can be deployed on a pure IPv4 network, a pure IPv6 network, or a shared IPv4/IPv6 network, helping achieve IPv4-to-IPv6 transition.

PoE Power Supply

- Perpetual PoE: When a PoE switch is rebooted after the software version is upgraded, the power supply to PDs is not interrupted. This capability ensures that PDs are not powered off during the switch reboot.

- Fast PoE: PoE switches can supply power to PDs within 10s after they are powered on. This is different from common switches that generally take 1 to 3 minutes to start to supply power to PDs. When a PoE switch reboots due to a power failure, the PoE switch continues to supply power to the PDs immediately after being powered on without waiting until it finishes reboot. This greatly shortens the power failure time of PDs.

NOTE

For more information about PoE, visit

<https://e.huawei.com/en/material/onLineView?materialid=e28cc3ad158140e8af1547bc510ecd34>

Intelligent O&M

- The CloudEngine S5731-S provides telemetry technology to collect device data in real time and send the data to Huawei campus network analyzer CampusInsight. The CampusInsight analyzes network data based on the intelligent fault identification algorithm, accurately displays the real-time network status, effectively demarcates and locates faults in a timely manner, and identifies network problems that affect user experience, accurately guaranteeing user experience.
- The CloudEngine S5731-S supports a variety of intelligent O&M features for audio and video services, including the enhanced Media Delivery Index (eMDI). With this eMDI function, the switch can function as a monitored node to periodically conduct statistics and report audio and video service indicators to the CampusInsight platform. In this way, the CampusInsight platform can quickly demarcate audio and video service quality faults based on the results of multiple monitored nodes.

Intelligent Upgrade

- Switches support the intelligent upgrade feature. Specifically, switches obtain the version upgrade path and download the newest version for upgrade from the Huawei Online Upgrade Platform (HOUP). The entire upgrade process is highly automated and achieves one-click upgrade. In addition, preloading the version is supported, which greatly shortens the upgrade time and service interruption time.
- The intelligent upgrade feature greatly simplifies device upgrade operations and makes it possible for the customer to upgrade the version independently. This greatly reduces the customer's maintenance costs. In addition, the upgrade policies on the HOUP platform standardize the upgrade operations, which greatly reduces the risk of upgrade failures.

Big Data Security Collaboration

- The CloudEngine S5731-S switches use NetStream to collect campus network data and then report such data to the Huawei Cybersecurity Intelligence System(CIS). The purposes of doing so are to detect network security threats, display the security posture across the entire network, and enable automated or manual response to security threats. The CIS delivers the security policies to the iMaster NCE-Campus. The iMaster NCE-Campus then delivers such policies to switches that will handle security events accordingly. All these ensure campus network security.
- The CloudEngine S5731-S supports Encrypted Communication Analytics(ECA). It uses built-in ECA probes to extract characteristics of encrypted streams based on NetStream sampling and Service Awareness(SA), generates metadata, and reports the metadata to CIS. The CIS uses the AI algorithm to train the traffic model and compare characteristics of extracted encrypted traffic to identify malicious traffic. The CIS displays detection results on the GUI, provides threat handling suggestions, and automatically isolates threats with the iMaster NCE-Campus to ensure campus network security.
- The CloudEngine S5731-S supports deception. It functions as a sensor to detect threats such as IP address scanning and port scanning on a network and lures threat traffic to the honeypot for further checks. The honeypot performs in-depth interaction with the initiator of the threat traffic, records various application-layer attack methods of the initiator, and reports security logs to the CIS. The CIS analyzes security logs. If the CIS determines that the suspicious traffic is an attack, it generates an alarm and provides handling suggestions. After the administrator confirms the alarm, the CIS delivers a policy to the iMaster NCE-Campus. The iMaster NCE-Campus delivers the policy to the switch for security event processing, ensuring campus network security.

OPS

- Open Programmability System (OPS) is an open programmable system based on the Python language. IT administrators can program the O&M functions of a switch through Python scripts to quickly innovate functions and implement intelligent O&M.

Licensing

CloudEngine S5731-S supports both the traditional feature-based licensing mode and the latest Huawei IDN One Software (N1 mode for short) licensing mode. The N1 mode is ideal for campus network deployments in enterprise private cloud mode, and greatly enhances the customer experiences in purchasing and upgrading software services with simplicity.

Software Package Features in N1 Mode

Switch Functions	N1 Basic Software	N1 Foundation Software Package	N1 Advanced Software Package
Basic network functions: Layer 2 functions, IPv4, IPv6, SVF, and others Note: For details, see the Functions and Features	√	√	√
Basic network automation based on the Agile Controller: <ul style="list-style-type: none"> Basic automation: Plug-and-play Basic monitoring: Application visualization NE management: Image and topology management and discovery 	x	√	√
Advanced network automation and intelligent O&M: VXLAN, user access authentication, free mobility, and CampusInsight basic functions	x	x	√

Note: Only V200R019C00 and later versions can support N1 mode

Product Specifications

Functions and Features

Except for special instructions, the following features are supported by CloudEngine S5731-S with N1 basic software.

Function and feature metrics for the CloudEngine S5731-S series

Function and Feature		Description	CloudEngine S5731-S
Ethernet features	Ethernet basics	Full-duplex, half-duplex, and auto-negotiation	Yes
		Rate auto-negotiation on an interface	Yes
		Auto MDI and MDI-X	Yes
		Flow control on an interface	Yes
		Jumbo frames	Yes
		Link aggregation	Yes
		Load balancing among links of a trunk	Yes
		Transparent transmission of Layer 2 protocol packets	Yes
		Device Link Detection Protocol (DLDP)	Yes

Function and Feature	Description	CloudEngine S5731-S
	Link Layer Discovery Protocol (LLDP)	Yes
	Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED)	Yes
	Interface isolation	Yes
	Broadcast traffic suppression on an interface	Yes
	Multicast traffic suppression on an interface	Yes
	Unknown unicast traffic suppression on an interface	Yes
	VLAN broadcast traffic suppression	Yes
	VLAN multicast traffic suppression	Yes
	VLAN unknown unicast traffic suppression	Yes
VLAN	VLAN specification	4094
	VLANIF interface specification	1024
	Access mode	Yes
	Trunk mode	Yes
	Hybrid mode	Yes
	QinQ mode	Yes
	Default VLAN	Yes
	VLAN assignment based on interfaces	Yes
	VLAN assignment based on protocols	Yes
	VLAN assignment based on IP subnets	Yes
	VLAN assignment based on MAC addresses	Yes
	VLAN assignment based on MAC address + IP address	Yes
	VLAN assignment based on MAC address + IP address + interface number	Yes
	Adding double VLAN tags to packets based on interfaces	Yes
	Super-VLAN	Yes
	Super-VLAN specification	256
	Sub-VLAN	Yes
	Sub-VLAN specification	1K
	VLAN mapping	Yes
	Selective QinQ	Yes
	MUX VLAN	Yes

Function and Feature		Description	CloudEngine S5731-S
		Voice VLAN	Yes
		Guest VLAN	Yes
	GVRP	GARP	Yes
		GVRP	Yes
	VCMP	VCMP	Yes
	MAC	MAC address	32K
		Automatic learning of MAC addresses	Yes
		Automatic aging of MAC addresses	Yes
		Static, dynamic, and blackhole MAC address entries	Yes
		Interface-based MAC address learning limiting	Yes
		Sticky MAC	Yes
		MAC address flapping detection	Yes
		Configuring MAC address learning priorities for interfaces	Yes
		MAC address spoofing defense	Yes
		Port bridge	Yes
	ARP	Static ARP	Yes
		Dynamic ARP	Yes
		ARP entry	16K
		ARP aging detection	Yes
		Intra-VLAN proxy ARP	Yes
Inter-VLAN proxy ARP		Yes	
Routed proxy ARP		Yes	
Multi-egress-interface ARP		Yes	
Ethernet loop protection	MSTP	STP	Yes
		RSTP	Yes
		MSTP	Yes
		VBST	Yes
		BPDU protection	Yes
		Root protection	Yes
		Loop protection	Yes
		Defense against TC BPDU attacks	Yes
	Loopback detection	Loop detection on an interface	Yes

Function and Feature		Description	CloudEngine S5731-S	
	SEP	SEP	Yes	
	Smart Link	Smart Link	Yes	
		Smart Link multi-instance	Yes	
		Monitor Link	Yes	
	RRPP	RRPP	Yes	
		Single RRPP ring	Yes	
		Tangent RRPP ring	Yes	
		Intersecting RRPP ring	Yes	
		Hybrid networking of RRPP rings and other ring networks	Yes	
	ERPS	G.8032 v1	Yes	
		G.8032 v2	Yes	
		ERPS semi-ring topology	Yes	
		ERPS closed-ring topology	Yes	
	IPv4/IPv6 forwarding	IPv4 and unicast routing	IPv4 static routing	Yes
			VRF	Yes
			DHCP client	Yes
DHCP server			Yes	
DHCP relay			Yes	
DHCP policy VLAN			Yes	
URPF check			Yes	
Routing policies			Yes	
IPv4 routes			16K	
RIPv1			Yes	
RIPv2			Yes	
OSPF			Yes	
BGP			Yes	
MBGP			Yes	
IS-IS		Yes		
Policy-based routing (PBR)		Yes		
Multicast routing features		IGMPv1/v2/v3	Yes	
		PIM-DM	Yes	
		PIM-SM	Yes	
		MSDP	Yes	
	IPv4 multicast routes	1K		

Function and Feature		Description	CloudEngine S5731-S
		IPv6 multicast routes	1K
		Multicast routing policies	Yes
		RPF	Yes
	IPv6 features	IPv6 protocol stack	Yes
		ND	Yes
		ND entry	8K
		ND snooping	Yes
		DHCPv6 snooping	Yes
		RIPng	Yes
		DHCPv6 server	Yes
		DHCPv6 relay	Yes
		OSPFv3	Yes
		BGP4+	Yes
		IS-IS for IPv6	Yes
		IPv6 routes	8K
		VRRP6	Yes
		MLDv1/v2	Yes
		PIM-DM for IPv6	Yes
	PIM-SM for IPv6	Yes	
	IPv6 transition technology	IPv6 manual tunneling	Yes
Layer 2 multicast features	-	IGMPv1/v2/v3 snooping	Yes
		IGMP snooping proxy	Yes
		MLD snooping	Yes
		Multicast traffic suppression	Yes
		Inter-VLAN multicast replication	Yes
Device reliability	BFD	Single-hop BFD	Yes
		BFD for static routes	Yes
		BFD for OSPF	Yes
		BFD for IS-IS	Yes
		BFD for BGP	Yes
		BFD for PIM	Yes
		BFD for VRRP	Yes
	Stacking	Service interface-based stacking	Yes
		Maximum number of stacked devices	9

Function and Feature		Description	CloudEngine S5731-S
	VRRP	VRRP standard protocol	Yes
Ethernet OAM	EFM (802.3ah)	Automatic discovery of links	Yes
		Link fault detection	Yes
		Link troubleshooting	Yes
		Remote loopback	Yes
	CFM (802.1ag)	Software-level CCM	Yes
		802.1ag MAC ping	Yes
		802.1ag MAC trace	Yes
	OAM association	Association between 802.1ag and 802.3ah	Yes
Y.1731	Unidirectional delay and jitter measurement	Yes	
	Bidirectional delay and jitter measurement	Yes	
QoS features	Traffic classification	Traffic classification based on ACLs	Yes
		Matching the simple domains of packets	Yes
	Traffic behavior	Traffic filtering	Yes
		Traffic policing (CAR)	Yes
		Modifying the packet priorities	Yes
		Modifying the simple domains of packets	Yes
		Modifying the packet VLANs	Yes
	Traffic shaping	Traffic shaping on an egress interface	Yes
		Traffic shaping on queues on an interface	Yes
	Congestion avoidance	Weighted Random Early Detection (WRED) on queues	Yes
		Tail drop	Yes
	Congestion management	Priority Queuing (PQ)	Yes
		Weighted Deficit Round Robin (WDRR)	Yes
		PQ+WDRR	Yes
		Weighted Round Robin (WRR)	Yes
		PQ+WRR	Yes
ACL	Packet filtering at Layer 2 to Layer 4	Basic IPv4 ACL	Yes
		Advanced IPv4 ACL	Yes
		Basic IPv6 ACL	Yes
		Advanced IPv6 ACL	Yes
		Layer 2 ACL	Yes
		User group ACL	Yes
		User-defined ACL	Yes

Function and Feature		Description	CloudEngine S5731-S	
Configuration and maintenance	Login and configuration management	Command line interface (CLI)-based configuration	Yes	
		Console terminal service	Yes	
		Telnet terminal service	Yes	
		SSH v1.5	Yes	
		SSH v2.0	Yes	
		SNMP-based NMS for unified configuration	Yes	
		Web page-based configuration and management	Yes	
		EasyDeploy (client)	Yes	
		EasyDeploy (commander)	Yes	
		SVF	Yes	
		Cloud management	Yes	
		OPS	Yes	
		File system	Directory and file management	Yes
	File upload and download		Yes	
	Monitoring and maintenance	Deception	Yes	
		ECA	Yes	
		eMDI	Yes	
		Hardware monitoring	Yes	
		Log information output	Yes	
		Alarm information output	Yes	
		Debugging information output	Yes	
		Port mirroring	Yes	
		Flow mirroring	Yes	
		Remote mirroring	Yes	
		Energy saving	Yes	
	Version upgrade	Version upgrade	Yes	
		Version rollback	Yes	
	Security	ARP security	ARP packet rate limiting	Yes
			ARP anti-spoofing	Yes
			Association between ARP and STP	Yes
			ARP gateway anti-collision	Yes
			Dynamic ARP Inspection (DAI)	Yes
Static ARP Inspection (SAI)			Yes	

Function and Feature	Description	CloudEngine S5731-S		
		Egress ARP Inspection (EAI)	Yes	
	IP security	ICMP attack defense	Yes	
		IPSG for IPv4	Yes	
		IPSG user capacity	3000	
		IPSG for IPv6	Yes	
		IPSGv6 user capacity	1500	
	Local attack defense	CPU attack defense	Yes	
	MFF	MFF	Yes	
	DHCP snooping	DHCP snooping	Yes	
		Option 82 function	Yes	
		Dynamic rate limiting for DHCP packets	Yes	
	Attack defense	Defense against malformed packet attacks	Yes	
		Defense against UDP flood attacks	Yes	
		Defense against TCP SYN flood attacks	Yes	
		Defense against ICMP flood attacks	Yes	
		Defense against packet fragment attacks	Yes	
		Local URPF	Yes	
	User access and authentication	AAA	Local authentication	Yes
			Local authorization	Yes
			RADIUS authentication	Yes
RADIUS authorization			Yes	
RADIUS accounting			Yes	
HWTACACS authentication			Yes	
HWTACACS authorization			Yes	
HWTACACS accounting			Yes	
NAC		802.1X authentication	Yes	
		MAC address authentication	Yes	
		Portal authentication	Yes	
		Hybrid authentication	Yes	
Policy association		Functioning as the control device	Yes	
Network management		-	Ping	Yes
	Tracert		Yes	
	NQA		Yes	
	NTP		Yes	

Function and Feature		Description	CloudEngine S5731-S
		iPCA	Yes
		Smart Application Control (SAC)	Yes
		NetStream	Yes
		SNMP v1	Yes
		SNMP v2c	Yes
		SNMP v3	Yes
		HTTP	Yes
		HTTPS	Yes
		RMON	Yes
		RMON2	Yes
		NETCONF/YANG	Yes
VXLAN	-	VXLAN Layer 2 gateway	Yes, require additional license
		VXLAN Layer 3 gateway	Yes, require additional license
		Centralized gateway	Yes, require additional license
		Distributed gateway	Yes, require additional license
		BGP-EVPN	Yes, require additional license
		BGP-EVPN neighbor capacity	256, require additional license
Interoperability	-	VLAN-based Spanning Tree (VBST)	Yes
		Link-type Negotiation Protocol (LNP)	Yes
		VLAN Central Management Protocol (VCMP)	Yes

NOTE

This content is applicable only to regions outside mainland China. Huawei reserves the right to interpret this content.

Hardware Specifications

The following table lists the hardware specifications of the CloudEngine S5731-S.

Hardware specifications of CloudEngine S5731-S models

Item		CloudEngine S5731-S24T4X	CloudEngine S5731-S24P4X	CloudEngine S5731-S48T4X	CloudEngine S5731-S48P4X
Physical specifications	Dimensions (W x D x H, mm)	442 x 420 x 43.6			
	Chassis height	1 U	1 U	1 U	1 U
	Chassis weight (including packaging)	8.4 kg	8.6 kg	8.55 kg	8.9 kg
Fixed port	GE port	24	24	48	48
	10GE port	4	4	4	4

Item		CloudEngine S5731-S24T4X	CloudEngine S5731-S24P4X	CloudEngine S5731-S48T4X	CloudEngine S5731-S48P4X
Management port	ETH port	Supported	Supported	Supported	Supported
	Console port (RJ45)	Supported	Supported	Supported	Supported
	USB port	USB 2.0	USB 2.0	USB 2.0	USB 2.0
CPU	Frequency	1.4 GHz	1.4 GHz	1.4 GHz	1.4 GHz
	Cores	4	4	4	4
Storage	Memory (RAM)	4 GB	4 GB	4 GB	4 GB
	Flash memory	1 GB	1 GB	1 GB	1 GB
Power supply system	Power supply type	<ul style="list-style-type: none"> 150 W AC (pluggable) 600 W AC (pluggable) 1000 W DC (pluggable) 	1000 W PoE AC (pluggable)	<ul style="list-style-type: none"> 150 W AC (pluggable) 600 W AC (pluggable) 1000 W DC (pluggable) 	1000 W PoE AC (pluggable)
	Power supply specification	For details about power supplies, see the section Power Supply .	For details about power supplies, see the section Power Supply .	For details about power supplies, see the section Power Supply .	For details about power supplies, see the section Power Supply .
	Rated voltage range	<ul style="list-style-type: none"> AC input (150 W AC): 100 V AC to 240 V AC, 50/60 Hz AC input (600 W AC): 100 V AC to 240 V AC, 50/60 Hz DC input (1000 W DC): -48 VDC to -60 V DC 	AC input (1000 W AC PoE): 100 V AC to 240 V AC, 50/60 Hz	<ul style="list-style-type: none"> AC input (150 W AC): 100 V AC to 240 V AC, 50/60 Hz AC input (600 W AC): 100 V AC to 240 V AC, 50/60 Hz DC input (1000 W DC): -48 VDC to -60 V DC 	AC input (1000 W AC PoE): 100 V AC to 240 V AC, 50/60 Hz
	Maximum voltage range	<ul style="list-style-type: none"> AC input (150 W AC): 90 V AC to 264 V AC, 47 Hz to 63 Hz AC input (600 W AC): 90 V AC to 290 V AC, 45 Hz to 65 Hz High-voltage DC input (600 W AC): 190 V DC to 290 V DC (meeting 240 V high-voltage DC certification) DC input 	<ul style="list-style-type: none"> AC input (1000 W AC PoE): 90 V AC to 290 V AC, 45 Hz to 65 Hz High-voltage DC input (1000 W AC PoE): 190 V DC to 290 V DC (meeting 240 V high-voltage DC certification) 	<ul style="list-style-type: none"> AC input (150 W AC): 90 V AC to 264 V AC, 47 Hz to 63 Hz AC input (600 W AC): 90 V AC to 290 V AC, 45 Hz to 65 Hz High-voltage DC input (600 W AC): 190 V DC to 290 V DC (meeting 240 V high-voltage DC certification) DC input 	<ul style="list-style-type: none"> AC input (1000 W AC PoE): 90 V AC to 290 V AC, 45 Hz to 65 Hz High-voltage DC input (1000 W AC PoE): 190 V DC to 290 V DC (meeting 240 V high-voltage DC certification)

Item		CloudEngine S5731-S24T4X	CloudEngine S5731-S24P4X	CloudEngine S5731-S48T4X	CloudEngine S5731-S48P4X
		(1000 W DC): -38.4 V DC to -72V DC		(1000 W DC): -38.4 V DC to -72V DC	
	Maximum power consumption	114 W	<ul style="list-style-type: none"> 121 W (without PD) 977 W (with PD, PD power consumption of 720 W) 	124 W	<ul style="list-style-type: none"> 132 W (without PD) 1750 W (with PD, PD power consumption of 1440 W)
	Power consumption in the case of 30% traffic load ¹	88 W	95 W	101 W	108 W
	Power consumption in the case of 100% traffic load ¹	91 W	97 W	104 W	113 W
	Minimum power consumption	74 W	82 W	77 W	86 W
Heat dissipation system	Heat dissipation mode	Air-cooled heat dissipation and intelligent fan speed adjustment	Air-cooled heat dissipation and intelligent fan speed adjustment	Air-cooled heat dissipation and intelligent fan speed adjustment	Air-cooled heat dissipation and intelligent fan speed adjustment
	Number of fan modules	Pluggable dual fans	Pluggable dual fans	Pluggable dual fans	Pluggable dual fans
	Airflow	Air flows in from the front side and exhausts from the rear panel.	Air flows in from the front side and exhausts from the rear panel.	Air flows in from the front side and exhausts from the rear panel.	Air flows in from the front side and exhausts from the rear panel.
	Maximum heat dissipation of the device (BTU/hour)	389	<ul style="list-style-type: none"> 413 (without PDs) 3334 (with PDs) 	423	<ul style="list-style-type: none"> 451 (without PDs) 5973 (with PDs)
Environment parameters	Long-term operating temperature	<ul style="list-style-type: none"> 0-1800 m: -5°C to 45°C 1800-5000 m: The operating temperature decreases 1°C every time the altitude increases 220 m. 	<ul style="list-style-type: none"> 0-1800 m: -5°C to 45°C 1800-5000 m: The operating temperature decreases 1°C every time the altitude increases 220 m. 	<ul style="list-style-type: none"> 0-1800 m: -5°C to 45°C 1800-5000 m: The operating temperature decreases 1°C every time the altitude increases 220 m. 	<ul style="list-style-type: none"> 0-1800 m: -5°C to 45°C 1800-5000 m: The operating temperature decreases 1°C every time the altitude increases 220 m.
	Storage temperature	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C
	Relative humidity	5%–95% (non-condensing)	5%–95% (non-condensing)	5%–95% (non-condensing)	5%–95% (non-condensing)
	Operating altitude	5000 m	5000 m	5000 m	5000 m

Item		CloudEngine S5731-S24T4X	CloudEngine S5731-S24P4X	CloudEngine S5731-S48T4X	CloudEngine S5731-S48P4X
	Noise under normal temperature (sound power)	57.5 dB (A)	62.3 dB (A)	57.5 dB (A)	62.3 dB (A)
	Noise under high temperature (sound power)	70.9 dB (A)	71.8 dB (A)	70.9 dB (A)	71.8 dB (A)
	Noise under normal temperature (sound pressure)	47.5 dB (A)	52.8 dB (A)	47.5 dB (A)	52.8 dB (A)
	Surge protection specification (RJ45 service port)	Common mode: ±6 kV			
	Surge protection specification (power port)	<ul style="list-style-type: none"> AC power port: ±6 kV in differential mode, ±6 kV in common mode DC power port: ±2 kV in differential mode, ±4 kV in common mode 	<ul style="list-style-type: none"> Differential mode: ±6 kV Common mode: ±6 kV 	<ul style="list-style-type: none"> AC power port: ±6 kV in differential mode, ±6 kV in common mode DC power port: ±2 kV in differential mode, ±4 kV in common mode 	<ul style="list-style-type: none"> Differential mode: ±6 kV Common mode: ±6 kV
Reliability	MTBF (year) ²	57.73	57.21	55.31	54.96
	MTTR (hour)	2	2	2	2
	Availability	> 0.99999	> 0.99999	> 0.99999	> 0.99999
Certification		<ul style="list-style-type: none"> EMC certification Safety certification Manufacturing certification <p>For details about certifications, see the section Safety and Regulatory Compliance.</p>	<ul style="list-style-type: none"> EMC certification Safety certification Manufacturing certification <p>For details about certifications, see the section Safety and Regulatory Compliance.</p>	<ul style="list-style-type: none"> EMC certification Safety certification Manufacturing certification <p>For details about certifications, see the section Safety and Regulatory Compliance.</p>	<ul style="list-style-type: none"> EMC certification Safety certification Manufacturing certification <p>For details about certifications, see the section Safety and Regulatory Compliance.</p>

NOTE

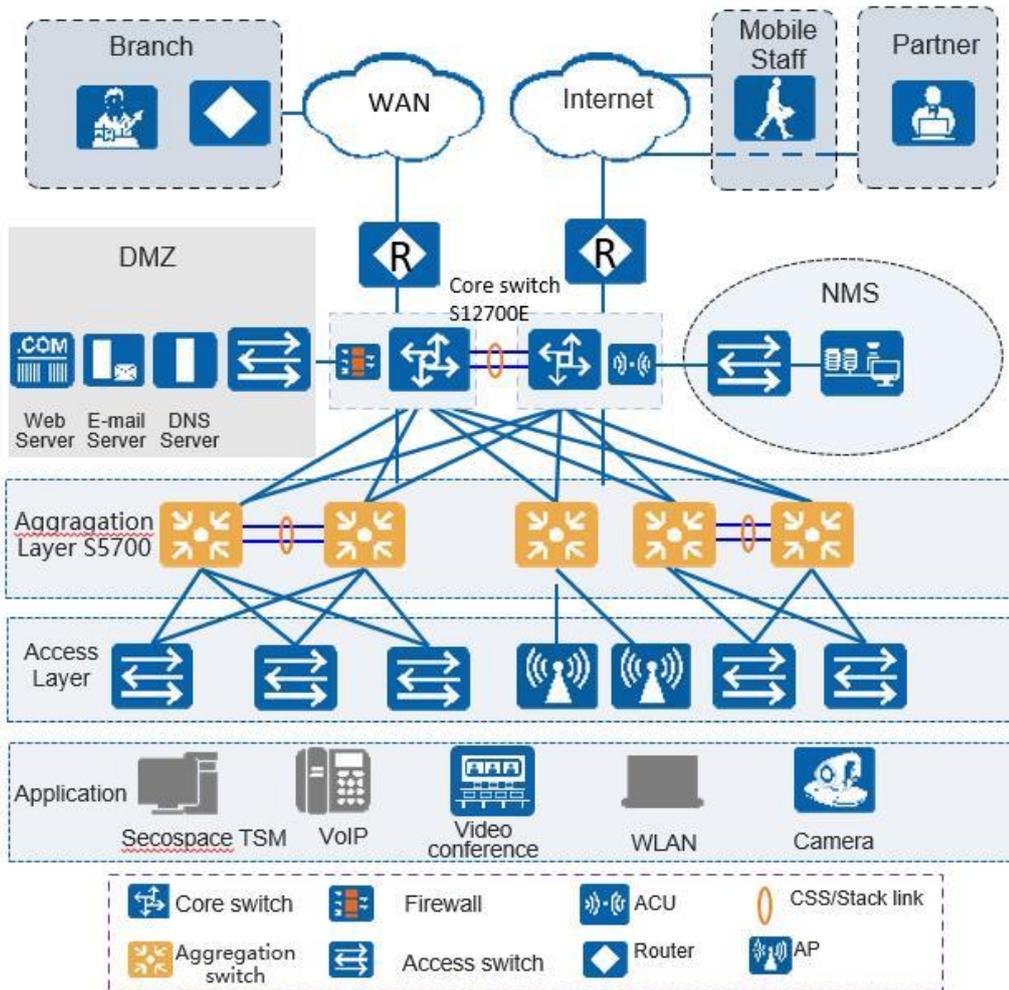
1: The power consumption under different load conditions is calculated according to the ATIS standard. Additionally, the EEE function is enabled and there is no PoE power output.

2: The reliability parameter values are calculated based on the typical configuration of the device. The parameter values vary according to the modules configured by the customer.

Networking and Applications

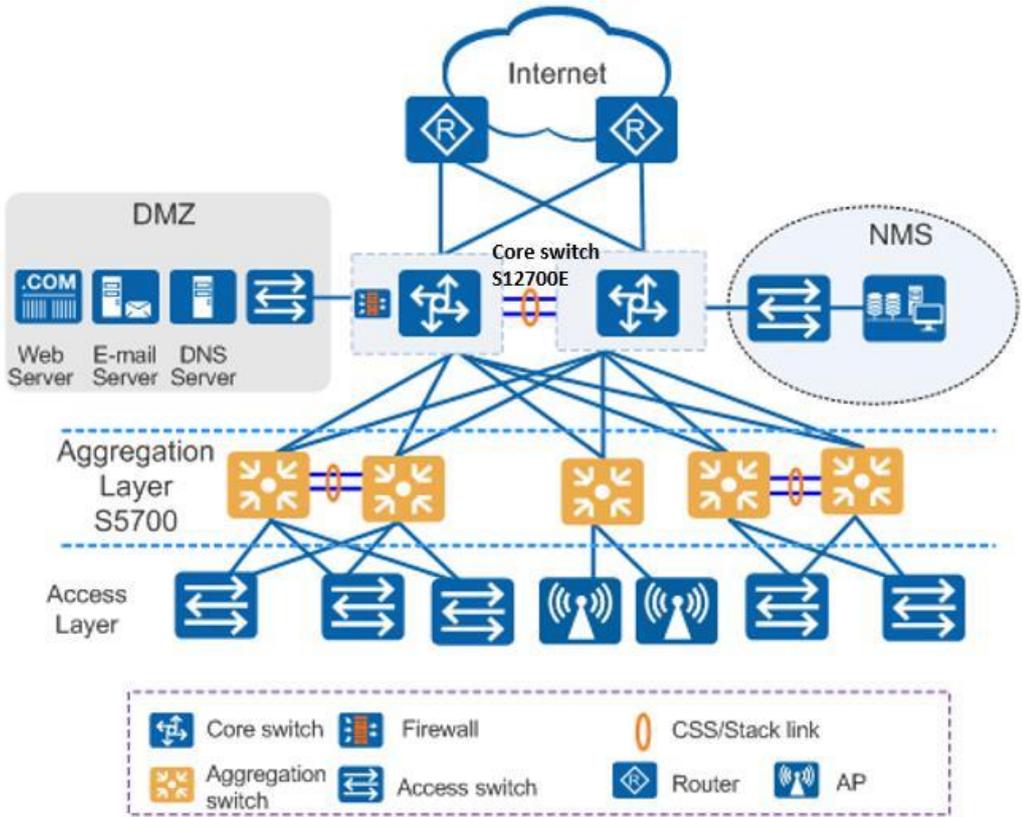
Large-Scale Enterprise Campus Network

CloudEngine S5731-S series switches can be deployed at the access layer of a campus network to build a high-performance and highly reliable enterprise network.



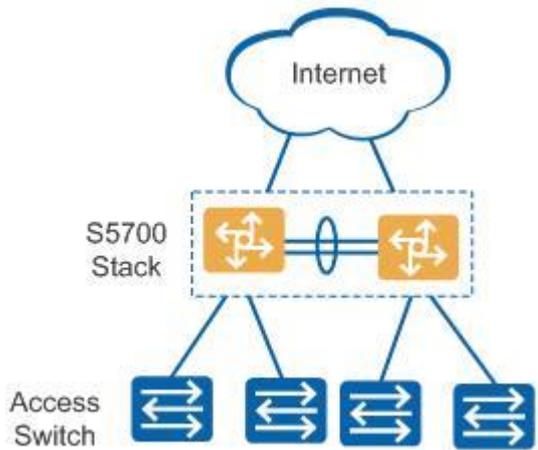
Small- or Medium-scale Enterprise Campus Network

CloudEngine S5731-S series switches can be deployed at the aggregation layer of a campus network to build a high-performance, multi-service, and highly reliable enterprise network.



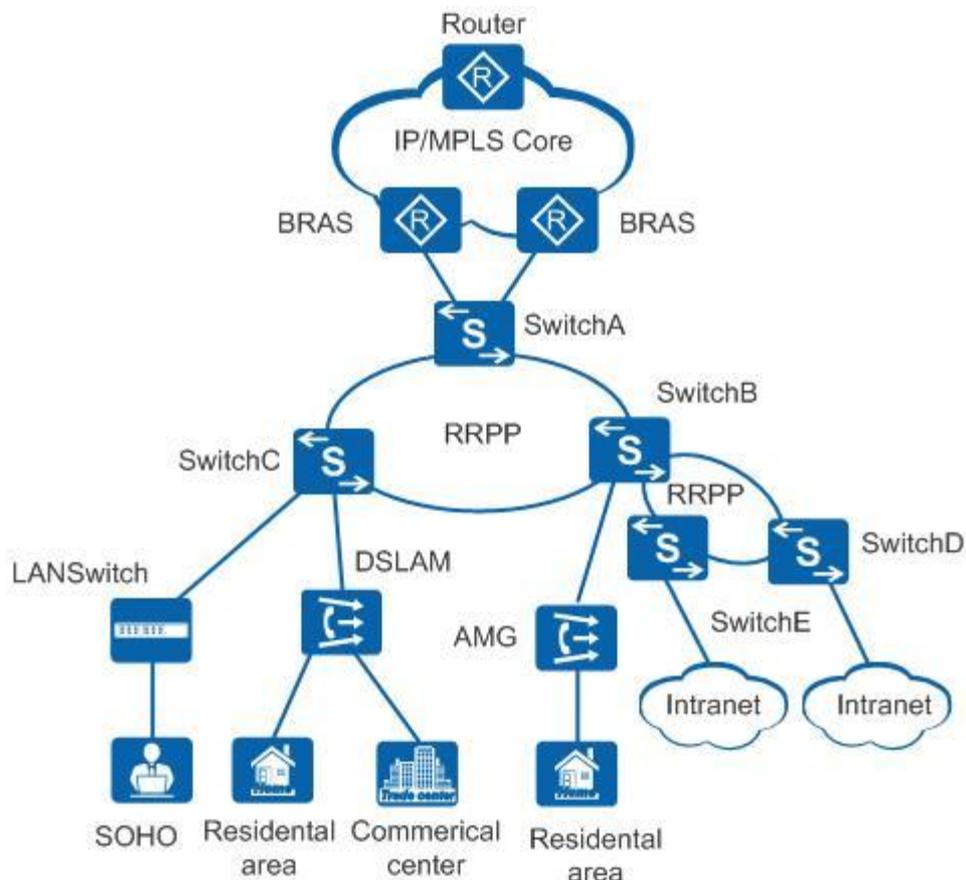
Small-scale Enterprise Campus Network

With powerful aggregation and routing capabilities of CloudEngine S5731-S series switches make them suitable for use as core switches in a small-scale enterprise network. Two or more S5731-S switches use iStack technology to ensure high reliability. They provide a variety of access control policies to achieve centralized management and simplify configuration.



Application on a MAN

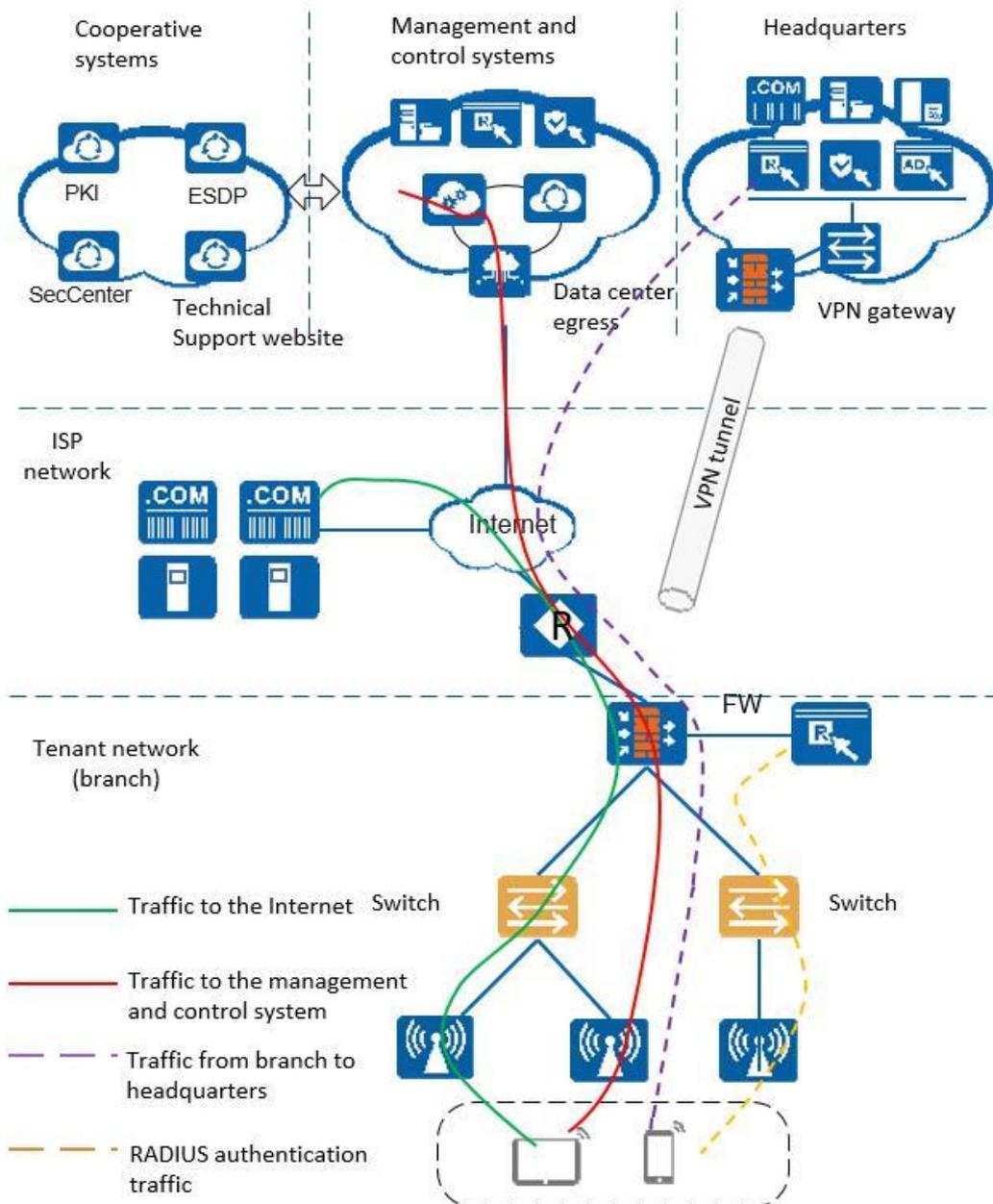
CloudEngine S5731-S series switches can be deployed at the access layer of a MAN(Metropolitan Area Network) to build a high-performance, multi-service, and highly reliable ISP MAN network.



Application in Public Cloud

CloudCampus Solution is a network solution suite based on Huawei public cloud. CloudEngine S5731-S series switches can be located at the access layer.

The switches are plug-and-play. They go online automatically after being powered on and connected with network cables, without the need for complex configurations. The switches can connect to the management and control system (CloudCampus@AC-Campus for switches running V200R019C00 and earlier versions; iMaster NCE-Campus for switches running V200R019C10 and later versions), and use bidirectional certificate authentication to ensure management channel security. The switches provide the NETCONF and YANG interfaces, through which the management and control system delivers configurations to them. In addition, remote maintenance and fault diagnosis can be performed on the management and control system.



Safety and Regulatory Compliance

The following table lists the safety and regulatory compliance of the CloudEngine S5731-S.

Safety and regulatory compliance of the CloudEngine S5731-S series

Certification Category	Description
Safety	<ul style="list-style-type: none"> • IEC 60950-1 • EN 60950-1/A11/A12 • UL 60950-1 • CSA C22.2 No 60950-1 • AS/NZS 60950.1 • CNS 14336-1 • IEC60825-1 • IEC60825-2

Certification Category	Description
	<ul style="list-style-type: none"> • EN60825-1 • EN60825-2
Electromagnetic Compatibility (EMC)	<ul style="list-style-type: none"> • CISPR22 Class A • CISPR24 • EN55022 Class A • EN55024 • ETSI EN 300 386 Class A • CFR 47 FCC Part 15 Class A • ICES 003 Class A • AS/NZS CISPR22 Class A • VCCI Class A • IEC61000-4-2 • ITU-T K 20 • ITU-T K 21 • ITU-T K 44 • CNS13438
Environment	<ul style="list-style-type: none"> • RoHS • REACH • WEEE

NOTE

- EMC: electromagnetic compatibility
- CISPR: International Special Committee on Radio Interference
- EN: European Standard
- ETSI: European Telecommunications Standards Institute
- CFR: Code of Federal Regulations
- FCC: Federal Communication Commission
- IEC: International Electrotechnical Commission
- AS/NZS: Australian/New Zealand Standard
- VCCI: Voluntary Control Council for Interference
- UL: Underwriters Laboratories
- CSA: Canadian Standards Association
- IEEE: Institute of Electrical and Electronics Engineers
- RoHS: restriction of the use of certain hazardous substances
- REACH: Registration Evaluation Authorization and Restriction of Chemicals
- WEEE: Waste Electrical and Electronic Equipment

MIB and Standards Compliance

Supported MIBs

The following table lists the MIBs supported by the CloudEngine S5731-S.

MIBs supported by the CloudEngine S5731-S series

Category	MIB
Public MIB	<ul style="list-style-type: none"> • BRIDGE-MIB

Category	MIB
	<ul style="list-style-type: none"> • DISMAN-NSLOOKUP-MIB • DISMAN-PING-MIB • DISMAN-TRACEROUTE-MIB • ENTITY-MIB • EtherLike-MIB • IF-MIB • IP-FORWARD-MIB • IPv6-MIB • LAG-MIB • LLDP-EXT-DOT1-MIB • LLDP-EXT-DOT3-MIB • LLDP-MIB • NOTIFICATION-LOG-MIB • NQA-MIB • OSPF-TRAP-MIB • P-BRIDGE-MIB • Q-BRIDGE-MIB • RFC1213-MIB • RIPv2-MIB • RMON2-MIB • RMON-MIB • SAVI-MIB • SNMP-FRAMEWORK-MIB • SNMP-MPD-MIB • SNMP-NOTIFICATION-MIB • SNMP-TARGET-MIB • SNMP-USER-BASED-SM-MIB • SNMPv2-MIB • TCP-MIB • UDP-MIB
Huawei-proprietary MIB	<ul style="list-style-type: none"> • HUAWEI-AAA-MIB • HUAWEI-ACL-MIB • HUAWEI-ALARM-MIB • HUAWEI-ALARM-RELIABILITY-MIB • HUAWEI-BASE-TRAP-MIB • HUAWEI-BRAS-RADIUS-MIB • HUAWEI-BRAS-SRVCFG-EAP-MIB • HUAWEI-BRAS-SRVCFG-STATICUSER-MIB • HUAWEI-CBQOS-MIB • HUAWEI-CDP-COMPLIANCE-MIB • HUAWEI-CONFIG-MAN-MIB • HUAWEI-CPU-MIB • HUAWEI-DAD-TRAP-MIB • HUAWEI-DC-MIB

Category	MIB
	<ul style="list-style-type: none"> • HUAWEI-DATASYNC-MIB • HUAWEI-DEVICE-MIB • HUAWEI-DHCPR-MIB • HUAWEI-DHCPS-MIB • HUAWEI-DHCP-SNOOPING-MIB • HUAWEI-DIE-MIB • HUAWEI-DNS-MIB • HUAWEI-DLDP-MIB • HUAWEI-ELMI-MIB • HUAWEI-ERPS-MIB • HUAWEI-ERRORDOWN-MIB • HUAWEI-ENERGYMNGT-MIB • HUAWEI-EASY-OPERATION-MIB • HUAWEI-ENTITY-EXTENT-MIB • HUAWEI-ENTITY-TRAP-MIB • HUAWEI-ETHARP-MIB • HUAWEI-ETHOAM-MIB • HUAWEI-FLASH-MAN-MIB • HUAWEI-FWD-RES-TRAP-MIB • HUAWEI-GARP-APP-MIB • HUAWEI-GTSM-MIB • HUAWEI-HGMP-MIB • HUAWEI-HWTACACS-MIB • HUAWEI-IF-EXT-MIB • HUAWEI-INFOCENTER-MIB • HUAWEI-IPPOOL-MIB • HUAWEI-IPV6-MIB • HUAWEI-ISOLATE-MIB • HUAWEI-L2IF-MIB • HUAWEI-L2MAM-MIB • HUAWEI-L2VLAN-MIB • HUAWEI_LDT-MIB • HUAWEI-LLDP-MIB • HUAWEI-MAC-AUTHEN-MIB • HUAWEI-MEMORY-MIB • HUAWEI-MFF-MIB • HUAWEI-MFLP-MIB • HUAWEI-MSTP-MIB • HUAWEI-BGP-VPN-MIB • HUAWEI-CCC-MIB • HUAWEI-MULTICAST-MIB • HUAWEI-NAP-MIB • HUAWEI-NTPV3-MIB • HUAWEI-PERFORMANCE-MIB • HUAWEI-PORT-MIB

Category	MIB
	<ul style="list-style-type: none"> • HUAWEI-PORTAL-MIB • HUAWEI-QINQ-MIB • HUAWEI-RIPv2-EXT-MIB • HUAWEI-RM-EXT-MIB • HUAWEI-RRPP-MIB • HUAWEI-SECURITY-MIB • HUAWEI-SEP-MIB • HUAWEI-SNMP-EXT-MIB • HUAWEI-SSH-MIB • HUAWEI-STACK-MIB • HUAWEI-SWITCH-L2MAM-EXT-MIB • HUAWEI-SWITCH-SRV-TRAP-MIB • HUAWEI-SYS-MAN-MIB • HUAWEI-TCP-MIB • HUAWEI-TFTPC-MIB • HUAWEI-TRNG-MIB • HUAWEI-XQOS-MIB

Standard Compliance

The following table lists the standards that the CloudEngine S5731-S complies with.

[Standard compliance list of the CloudEngine S5731-S series](#)

Standard Organization	Standard or Protocol
IETF	<ul style="list-style-type: none"> • RFC 768 User Datagram Protocol (UDP) • RFC 792 Internet Control Message Protocol (ICMP) • RFC 793 Transmission Control Protocol (TCP) • RFC 826 Ethernet Address Resolution Protocol (ARP) • RFC 854 Telnet Protocol Specification • RFC 951 Bootstrap Protocol (BOOTP) • RFC 959 File Transfer Protocol (FTP) • RFC 1058 Routing Information Protocol (RIP) • RFC 1112 Host extensions for IP multicasting • RFC 1157 A Simple Network Management Protocol (SNMP) • RFC 1256 ICMP Router Discovery • RFC 1305 Network Time Protocol Version 3 (NTP) • RFC 1349 Internet Protocol (IP) • RFC 1493 Definitions of Managed Objects for Bridges • RFC 1542 Clarifications and Extensions for the Bootstrap Protocol • RFC 1643 Ethernet Interface MIB • RFC 1757 Remote Network Monitoring (RMON) • RFC 1901 Introduction to Community-based SNMPv2 • RFC 1902-1907 SNMP v2 • RFC 1981 Path MTU Discovery for IP version 6 • RFC 2131 Dynamic Host Configuration Protocol (DHCP)

Standard Organization	Standard or Protocol
	<ul style="list-style-type: none"> • RFC 2328 OSPF Version 2 • RFC 2453 RIP Version 2 • RFC 2460 Internet Protocol, Version 6 Specification (IPv6) • RFC 2461 Neighbor Discovery for IP Version 6 (IPv6) • RFC 2462 IPv6 Stateless Address Auto configuration • RFC 2463 Internet Control Message Protocol for IPv6 (ICMPv6) • RFC 2474 Differentiated Services Field (DS Field) • RFC 2740 OSPF for IPv6 (OSPFv3) • RFC 2863 The Interfaces Group MIB • RFC 2597 Assured Forwarding PHB Group • RFC 2598 An Expedited Forwarding PHB • RFC 2571 SNMP Management Frameworks • RFC 2865 Remote Authentication Dial In User Service (RADIUS) • RFC 3046 DHCP Option82 • RFC 3376 Internet Group Management Protocol, Version 3 (IGMPv3) • RFC 3513 IP Version 6 Addressing Architecture • RFC 3579 RADIUS Support For EAP • RFC 4271 A Border Gateway Protocol 4 (BGP-4) • RFC 4760 Multiprotocol Extensions for BGP-4 • draft-grant-tacacs-02 TACACS+ • RFC 6241 Network Configuration Protocol (NETCONF) • RFC 6020 YANG - A Data Modeling Language for the Network Configuration Protocol (NETCONF)
IEEE	<ul style="list-style-type: none"> • IEEE 802.1D Media Access Control (MAC) Bridges • IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering • IEEE 802.1Q Virtual Bridged Local Area Networks • IEEE 802.1ad Provider Bridges • IEEE 802.2 Logical Link Control • IEEE Std 802.3 CSMA/CD • IEEE Std 802.3ab 1000BASE-T specification • IEEE Std 802.3ad Aggregation of Multiple Link Segments • IEEE Std 802.3ae 10GE WEN/LAN Standard • IEEE Std 802.3x Full Duplex and flow control • IEEE Std 802.3z Gigabit Ethernet Standard • IEEE802.1ax/IEEE802.3ad Link Aggregation • IEEE 802.3ah Ethernet in the First Mile. • IEEE 802.1ag Connectivity Fault Management • IEEE 802.1ab Link Layer Discovery Protocol • IEEE 802.1D Spanning Tree Protocol • IEEE 802.1w Rapid Spanning Tree Protocol • IEEE 802.1s Multiple Spanning Tree Protocol • IEEE 802.1x Port based network access control protocol • IEEE 802.3af DTE Power via MIDI • IEEE 802.3at DTE Power via the MDI Enhancements

Standard Organization	Standard or Protocol
	<ul style="list-style-type: none"> IEEE 802.3az Energy Efficient Ethernet
ITU	<ul style="list-style-type: none"> ITU SG13 Y.17ethoam ITU SG13 QoS control Ethernet-Based IP Access ITU-T Y.1731 ETH OAM performance monit
ISO	<ul style="list-style-type: none"> ISO 10589 IS-IS Routing Protocol
MEF	<ul style="list-style-type: none"> MEF 2 Requirements and Framework for Ethernet Service Protection MEF 9 Abstract Test Suite for Ethernet Services at the UNI MEF 10.2 Ethernet Services Attributes Phase 2 MEF 11 UNI Requirements and Framework MEF 13 UNI Type 1 Implementation Agreement MEF 15 Requirements for Management of Metro Ethernet Phase 1 Network Elements MEF 17 Service OAM Framework and Requirements MEF 20 UNI Type 2 Implementation Agreement MEF 23 Class of Service Phase 1 Implementation Agreement Xmodem XMODEM/YMODEM Protocol Reference

Ordering Information

The following table lists ordering information of the CloudEngine S5731-S series switches.

Model	Product Description
CloudEngine S5731-S24T4X	CloudEngine S5731-S24T4X (24 x 10/100/1000BASE-T ports, 4 x 10GE SFP+ ports, without power module)
CloudEngine S5731-S24P4X	CloudEngine S5731-S24P4X (24 x 10/100/1000BASE-T ports, 4 x 10GE SFP+ ports, PoE+, without power module)
CloudEngine S5731-S48T4X	CloudEngine S5731-S48T4X (48 x 10/100/1000BASE-T ports, 4 x 10GE SFP+ ports, without power module)
CloudEngine S5731-S48P4X	CloudEngine S5731-S48P4X (48 x 10/100/1000BASE-T ports, 4 x 10GE SFP+ ports, PoE+, without power module)
PAC150S12-R	150 W AC power module
PAC600S12-CB	600 W AC power module
PDC1000S12-DB	1000 W DC power module
PAC1000S56-CB	1000 W AC PoE power module
FAN-023A-B	Fan module
L-VxLAN-S57	S57 Series, VxLAN License, Per Device
N1-S57S-M-Lic	S57XX-S Series Basic SW, Per Device
N1-S57S-M-SnS1Y	S57XX-S Series Basic SW, SnS, Per Device, 1 Year
N1-S57S-F-Lic	N1-CloudCampus, Foundation, S57XX-S Series, Per Device
N1-S57S-F-SnS1Y	N1-CloudCampus, Foundation, S57XX-S Series, SnS, Per Device, 1 Year
N1-S57S-A-Lic	N1-CloudCampus, Advanced, S57XX-S Series, Per Device

Model	Product Description
N1-S57S-A-SnS1Y	N1-CloudCampus,Advanced,S57XX-S Series,SnS,Per Device,1Year
N1-S57S-FToA-Lic	N1-Upgrade-Foundation to Advanced,S57XX-S,Per Device
N1-S57S-FToA-SnS1Y	N1-Upgrade-Foundation to Advanced,S57XX-S,SnS,Per Device,1Year

More Information

For more information about Huawei Campus Switches, visit <http://e.huawei.com> or contact us in the following ways:

- Global service hotline: <http://e.huawei.com/en/service-hotline>
- Logging in to the Huawei Enterprise technical support website: <http://support.huawei.com/enterprise/>
- Sending an email to the customer service mailbox: support_e@huawei.com

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