CloudEngine S5732-H Series All-Optical Switches

CloudEngine S5732-H series switches are next-generation enhanced all-optical GE/10GE hybrid switches that provide 24-port and 48 port models, and provide fixed 6*40GE uplink ports.

Product Overview

The CloudEngine S5732-H series switches are the next-generation enhanced all-optical Ethernet switches developed by Huawei. The CloudEngine S5732-H builds on Huawei's unified Versatile Routing Platform (VRP) and boasts various IDN features. For example, the integrated wireless AC capabilities can manage up to 1,024 wireless APs; the free mobility feature ensures consistent user experience; the VXLAN functionality implements network virtualization; and built-in security probes support abnormal traffic detection, threat analysis even in encrypted traffic, and network-wide threat deception. With these merits, the CloudEngine S5732-H can function as core switches for small-sized campus networks and aggregation/access switches for medium- and large-sized campus networks, and also work as access switches for Metropolitan Area Network.

Models and Appearances

The following models are available in the CloudEngine S5732-H series.

Models and Appearances	Description
 CloudEngine S5732-H24S6Q	• 20 x GE SFP ports, 4 x 10GE SFP+ ports, 6 x 40GE QSFP+ ports • 1+1 power backup • Forwarding performance: 450 Mpps • Switching capacity: 600 Gbps/2.4 Tbps
 CloudEngine S5732-H48S6Q	• 44 x GE SFP ports, 4 x 10GE SFP+ ports, 6 x 40GE QSFP+ ports • 1+1 power backup • Forwarding performance: 486 Mpps • Switching capacity: 648 Gbps/2.4 Tbps

Features and Highlights

Enabling Networks to Be More Agile for Services

- CloudEngine S5732-H has a built-in high-speed and flexible processor chip. The chip's flexible packet processing and traffic control capabilities can meet current and future service requirements, helping build a highly scalable network.
- In addition to capabilities of traditional switches, the CloudEngine S5732-H provides open interfaces and supports user-defined forwarding behavior. Enterprises can use the open interfaces to develop new protocols and functions independently or jointly with equipment vendors to build campus networks meeting their own needs.

- CloudEngine S5732-H series switches, on which enterprises can define their own forwarding models, forwarding behavior, and lookup algorithms. Microcode programmability makes it possible to provide new services within six months, without the need of replacing the hardware. In contrast, traditional ASIC chips use a fixed forwarding architecture and follow a fixed forwarding process. For this reason, new services cannot be provisioned until new hardware is developed to support the services one to three years later.

Delivering Abundant Services More Agilely

- This CloudEngine S5732-H provides the integrated WLAN AC(native AC) function that can manage 1,024 APs, reducing the costs of purchasing additional WLAN AC hardware and breaking the forwarding performance bottleneck of an external WLAN AC. With this switch series, customers can stay ahead in the high-speed wireless era.
- With the unified user management function, the CloudEngine S5732-H authenticates both wired and wireless users, ensuring a consistent user experience no matter whether they are connected to the network through wired or wireless access devices. The unified user management function supports various authentication methods, including 802.1x, MAC address, and Portal authentication, and is capable of managing users based on user groups, domains, and time ranges. These functions visualize user and service management and boost the transformation from device-centric management to user experience-centric management.
- The CloudEngine S5732-H provides excellent quality of service (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.

Note: The CloudEngine S5732-H can manage 16 APs by default . You can purchase licenses for more AP management on demand.

Providing Fine Granular Network Management More Agilely

- The CloudEngine S5732-H 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 and 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 CloudEngine S5732-H 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.
- The CloudEngine S5732-H 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.
- With the Easy Deploy function, the CloudEngine S5732-H manages access switches in a similar way an AC manages APs. In deployment, access switches and APs can go online with zero-touch configuration. In the Easy Deploy solution, the Commander collects topology information about the connected clients and stores the clients' startup information based on the topology. Clients can be replaced with zero-touch configuration. The Commander can deliver configurations and scripts to clients in batches and query the delivery results. In addition, the Commander can collect and display information about power consumption on the entire network.

Comprehensive VPN Technologies

- The CloudEngine S5732-H supports the MPLS function, and can be used as access devices of high-quality enterprise leased line.
- The CloudEngine S5732-H allows users in different VPNs to connect to the same switch and isolates users through multi-instance routing. Users in multiple VPNs connect to a provider edge (PE) device through the same physical port on the switch, which reduces the cost on VPN network deployment.

Flexible Ethernet Networking

- In addition to traditional Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), and Multiple Spanning Tree Protocol (MSTP), the CloudEngine S5732-H 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 S5732-H supports Smart Link and Virtual Router Redundancy Protocol (VRRP), which implement backup of uplinks. One CloudEngine S5732-H switch can connect to multiple aggregation switches through multiple links, significantly improving reliability of access devices.

Various Security Control Methods

- The CloudEngine S5732-H supports 802.1x authentication, MAC address authentication, Portal authentication, and hybrid authentication, and can dynamically delivery user policies such as VLANs, QoS policies, and access control lists (ACL). It also supports user management based on user groups.
- The CloudEngine S5732-H 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 S5732-H 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 S5732-H supports strict ARP learning, which prevents ARP spoofing attackers from exhausting ARP entries.

Mature IPv6 Features

- The CloudEngine S5732-H is developed based on the mature, stable VRP and supports IPv4/IPv6 dual stacks, IPv6 routing protocols (RIPng, OSPFv3, BGP4+, and IS-IS for IPv6). With these IPv6 features, the CloudEngine S5732-H can be deployed on a pure IPv4 network, a pure IPv6 network, or a shared IPv4/IPv6 network, helping achieve IPv4-to-IPv6 transition.

Intelligent Stack (iStack)

- The CloudEngine S5732-H 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 capacity by simply adding member switches. iStack also simplifies device configuration and management. After a stack is set up, up to nine 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 the stack.

VXLAN Features

- 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 CloudEngine S5732-H 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.

Intelligent O&M

- The CloudEngine S5732-H 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 S5732-H supports a variety of intelligent O&M features for audio and video services, including the enhanced Media Delivery Index (eMDI). With this eDMI 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 S5732-H switches use NetStream to collect campus network data and then report such data to the Huawei HiSec Insight. 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 HiSec Insight 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 S5732-H 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 HiSec Insight. The HiSec Insight uses the AI algorithm to train the traffic model and compare characteristics of extracted encrypted traffic to identify malicious traffic. The HiSec Insight 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 S5732-H 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 HiSec Insight. The HiSec Insight analyzes security logs. If the HiSec Insight determines that the suspicious traffic is an attack, it generates an alarm and provides handling suggestions. After the administrator confirms the alarm, the HiSec Insight 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.

Open Programmability System (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 S5732-H 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 deploying Huawei CloudCampus Solution in the on-premises scenario, as it 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, MPLS, SVF, and others Note: For details, see the Service Features	√	√	√
Basic network automation based on the iMaster NCE-Campus: • Basic automation: Plug-and-play, SSID, and AP group management • Basic monitoring: Application visualization • NE management: Image and topology management and discovery • WLAN enhancement: Roaming and optimization for up to 128 APs • User access authentication,	×	√	√
Advanced network automation and intelligent O&M:	×	×	√

Switch Functions	N1 Basic Software	N1 Foundation Software Package	N1 Advanced Software Package
VXLAN, free mobility, and CampusInsight basic functions			

Note: Only V200R019C00 and later versions can support N1 mode

Product Specifications

Item	CloudEngine S5732-H24S6Q	CloudEngine S5732-H48S6Q
Fixed port	20 x GE SFP ports, 4 x 10GE SFP+ ports, 6 x 40GE QSFP+ ports	44 x GE SFP ports, 4 x 10GE SFP+ ports, 6 x 40GE QSFP+ ports
Dimensions (W x D x H)	442 mm x 420 mm x 43.6 mm	442 mm x 420 mm x 43.6 mm
Chassis height	1 U	1 U
Chassis weight (including packaging)	8.9 kg	9.2 kg
Power supply type	• 600 W AC (pluggable) • 1000 W DC (pluggable)	• 600 W AC (pluggable) • 1000 W DC (pluggable)
Rated voltage range	• 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 (600 W AC): 100 V AC to 240 V AC, 50/60 Hz • DC input (1000 W DC): -48 VDC to -60 V DC
Maximum voltage range	• 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 (1000 W DC): -36 V DC to -72V DC	• 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 (1000 W DC): -36 V DC to -72V DC
Maximum power consumption	229 W	255 W
Noise	• Under normal temperature (sound power): 65dB (A) • Under high temperature (sound power): 88dB (A) • Under normal temperature (sound pressure): 52dB (A)	• Under normal temperature (sound power): 65dB (A) • Under high temperature (sound power): 88dB (A) • Under normal temperature (sound pressure): 52dB (A)
Operating temperature	• 0-1800 m altitude: -5°C to +45°C • 1800-5000 m altitude: The operating temperature reduces by 1ºC every time the altitude increases by 220 m.	• 0-1800 m altitude: -5°C to +45°C • 1800-5000 m altitude: The operating temperature reduces by 1ºC every time the altitude increases by 220 m.
Storage temperature	-40℃ to +70℃	-40℃ to +70℃
Relative humidity	5% to 95% (non-condensing)	5% to 95% (non-condensing)
Surge protection specification (power port)	• AC power port: ±6 kV in differential mode, ±6 kV in common mode • DC power port: ±2 kV in differential mode, ±4	• AC power port: ±6 kV in differential mode, ±6 kV in common mode • DC power port: ±2 kV in differential mode, ±4

Item	CloudEngine S5732-H24S6Q	CloudEngine S5732-H48S6Q
	kV in common mode	kV in common mode
Heat dissipation	Air cooling heat dissipation, intelligent speed adjustment, and pluggable fans	Air cooling heat dissipation, intelligent speed adjustment, and pluggable fans

Service Features

Except for special instructions, the following features are supported by CloudEngine S5732-H with N1 basic software.

Feature	Description
MAC address table	IEEE 802.1d standards compliance
	128K MAC address entries
	MAC address learning and aging
	Static, dynamic, and blackhole MAC address entries
	Packet filtering based on source MAC addresses
VLAN	4094 VLANs
	Guest VLAN and voice VLAN
	GVRP
	MUX VLAN
	VLAN assignment based on MAC addresses, protocols, IP subnets, policies, and ports
	VLAN mapping
Wireless service	AP access control, AP domain management, and AP configuration template management
	Radio management, unified static configuration, and dynamic centralized management
	WLAN basic services, QoS, security, and user management
	CAPWAP, tag/terminal location, and spectrum analysis
Ethernet loop protection	RRPP ring topology and RRPP multi-instance
	Smart Link tree topology and Smart Link multi-instance, providing millisecond-level protection switching
	SEP
	ERPS (G.8032)
	BFD for OSPF, BFD for IS-IS, BFD for VRRP, and BFD for PIM
	STP (IEEE 802.1d), RSTP (IEEE 802.1w), and MSTP (IEEE 802.1s)
	BPDU protection, root protection, and loop protection
MPLS	MPLS L3VPN
	MPLS L2VPN (VPWS/VPLS)
	MPLS-TE
	MPLS QoS
IP routing	Static routes, RIP v1/2, RIPng, OSPF, OSPFv3, IS-IS, IS-ISv6, BGP, BGP4+, ECMP, routing policy

Feature	Description
	Up to 192K FIBv4 entries
	Up to 80K FIBv6 entries
Interoperability	VLAN-Based Spanning Tree (VBST), working with PVST, PVST+, and RPVST
	Link-type Negotiation Protocol (LNP), similar to DTP
	VLAN Central Management Protocol (VCMP), similar to VTP
IPv6 features	Up to 80K ND entries
	PMTU
	IPv6 Ping, IPv6 Tracert, and IPv6 Telnet
	ACLs based on source IPv6 addresses, destination IPv6 addresses, Layer 4 ports, or protocol types
	Multicast Listener Discovery snooping (MLDv1/v2)
	IPv6 addresses configured for sub-interfaces, VRRP6, DHCPv6, and L3VPN
Multicast	IGMP v1/v2/v3 snooping and IGMP fast leave
	Multicast forwarding in a VLAN and multicast replication between VLANs
	Multicast load balancing among member ports of a trunk
	Controllable multicast
	Port-based multicast traffic statistics
	IGMP v1/v2/v3, PIM-SM, PIM-DM, and PIM-SSM
	MSDP
	MVPN
QoS/ACL	Rate limiting in the inbound and outbound directions of a port
	Packet redirection
	Port-based traffic policing and two-rate three-color CAR
	Eight queues per port
	DRR, SP and DRR+SP queue scheduling algorithms
	WRED
	Re-marking of the 802.1p and DSCP fields of packets
	Packet filtering at Layer 2 to Layer 4, filtering out invalid frames based on the source MAC address, destination MAC address, source IP address, destination IP address, TCP/UDP port number, protocol type, and VLAN ID
	Queue-based rate limiting and shaping on ports
Security	Hierarchical user management and password protection
	DoS attack defense, ARP attack defense, and ICMP attack defense
	Binding of the IP address, MAC address, port number, and VLAN ID
	Port isolation, port security, and sticky MAC
	MAC Forced Forwarding (MFF)

Feature	Description
	Blackhole MAC address entries
	Limit on the number of learned MAC addresses
	IEEE 802.1x authentication and limit on the number of users on a port
	AAA authentication, RADIUS authentication, and HWTACACS authentication
	NAC
	SSH V2.0
	HTTPS
	CPU protection
	Blacklist and whitelist
	Attack source tracing and punishment for IPv6 packets such as ND, DHCPv6, and MLD packets
	Secure Boot
	IPSec
	ECA
	Deception
Reliability	LACP
	E-trunk
	Ethernet OAM (IEEE 802.3ah and IEEE 802.1ag)
	ITU-Y.1731
	DLDP
	LLDP
	BFD for BGP, BFD for IS-IS, BFD for OSPF, BFD for static route
VXLAN*	VXLAN L2 and L3 gateways
	Centralized and distributed gateway
	BGP-EVPN
	Configured through the NETCONF protocol
Super Virtual Fabric (SVF)	Working as an SVF Parent to vertically virtualize downlink switches and APs as one device for management.
	A two-layer client architecture is supported.
	IGMP snooping can be enabled on access switches (ASs) and the maximum number of access users on a port can be configured.
	ASs can be independently configured. Services that are not supported by templates can be configured on the parent.
	Third-party devices are allowed between SVF parent and clients.
iPCA	Directly coloring service packets to collect real-time statistics on the number of lost packets and packet loss ratio
	Collection of statistics on the number of lost packets and packet loss ratio at network and device levels

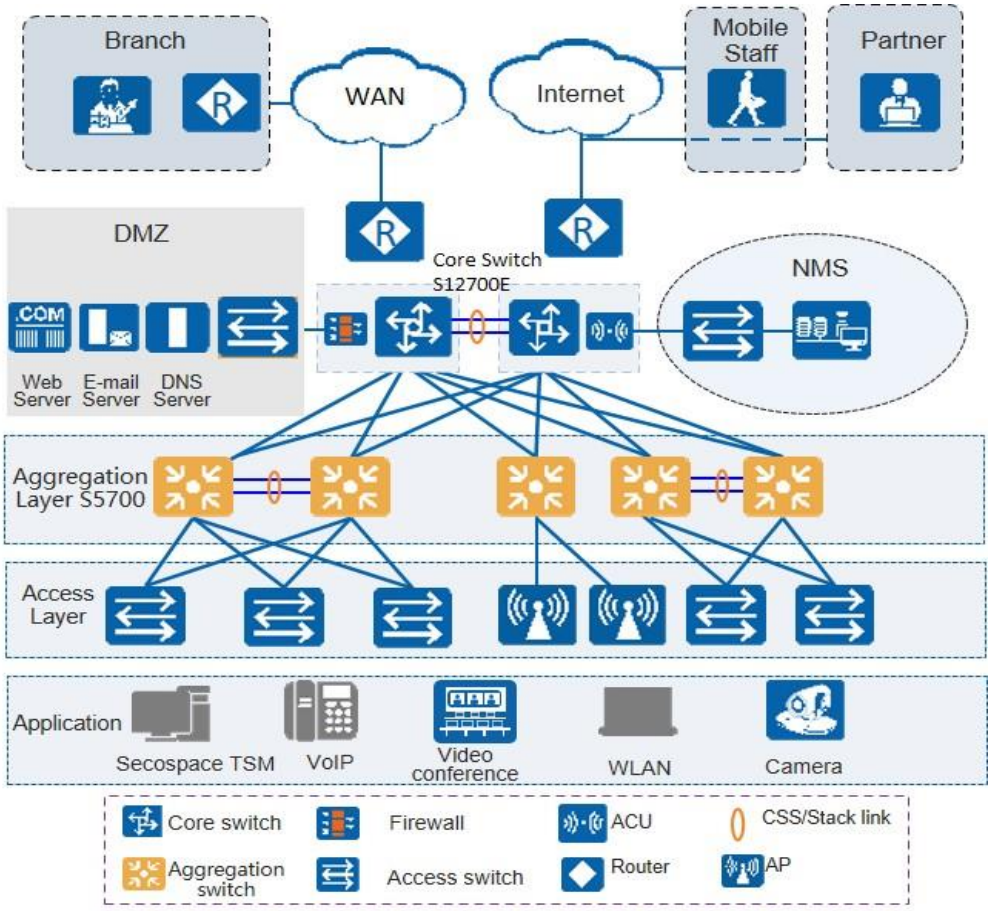
Feature	Description
TWAMP	Two-way IP link performance measurement
	Measurement on two-way packet delay, one-way packet loss rate, and one-way packet jitter
Management and maintenance	iStack, with up to 9 member switches in a stack
	SNMP v1/v2c/v3
	RMON
	Smart Application Control (SAC)
	Web-based NMS
	System logs and alarms of different levels
	GVRP
	MUX VLAN
	IEEE 802.3az Automatic power adjustment on Ethernet interfaces
	NetStream
	Intelligent O&M

*CloudEngine S5732-H series switches require the VXLAN license or N1 advanced software package to support the VXLAN feature.

Networking and Applications

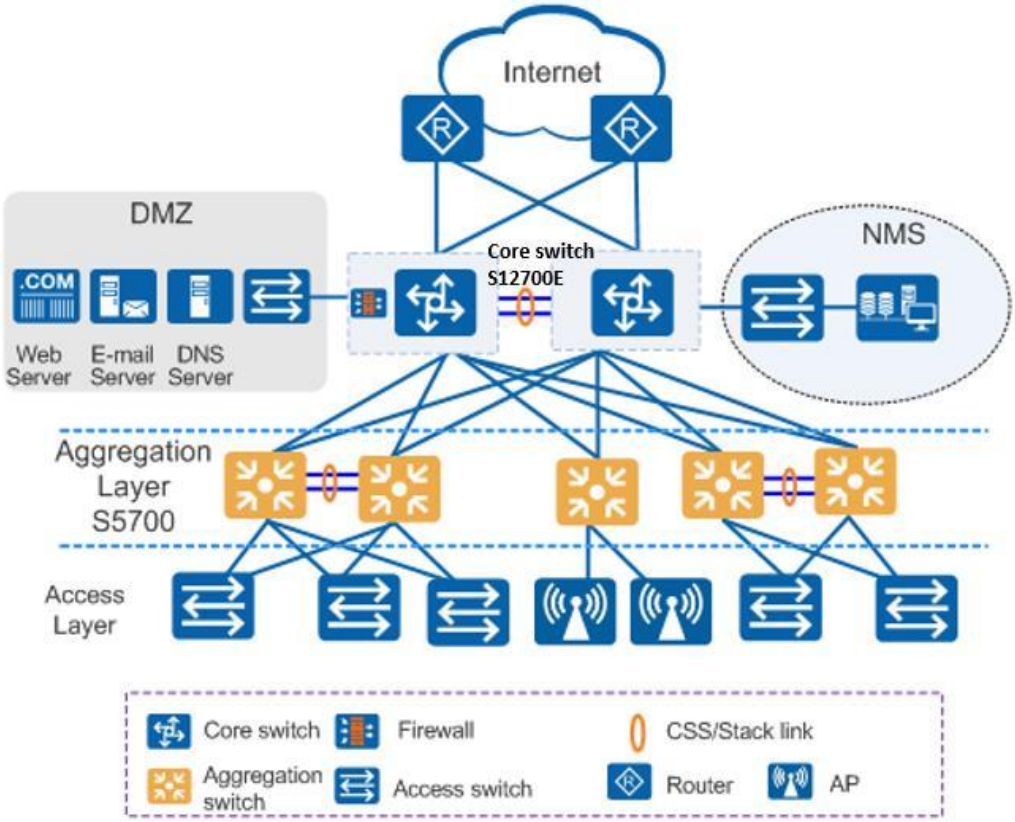
Large-Scale Enterprise Campus Network

CloudEngine S5732-H series switches can be deployed at the access layer of a campus network to build a high-performance and highly reliable enterprise network.



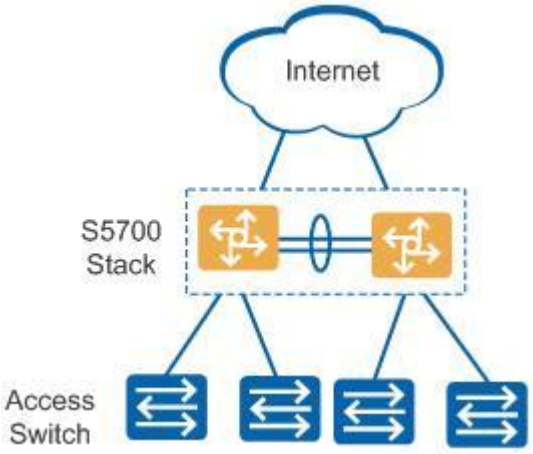
Small- or Medium-scale Enterprise Campus Network

CloudEngine S5732-H 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.



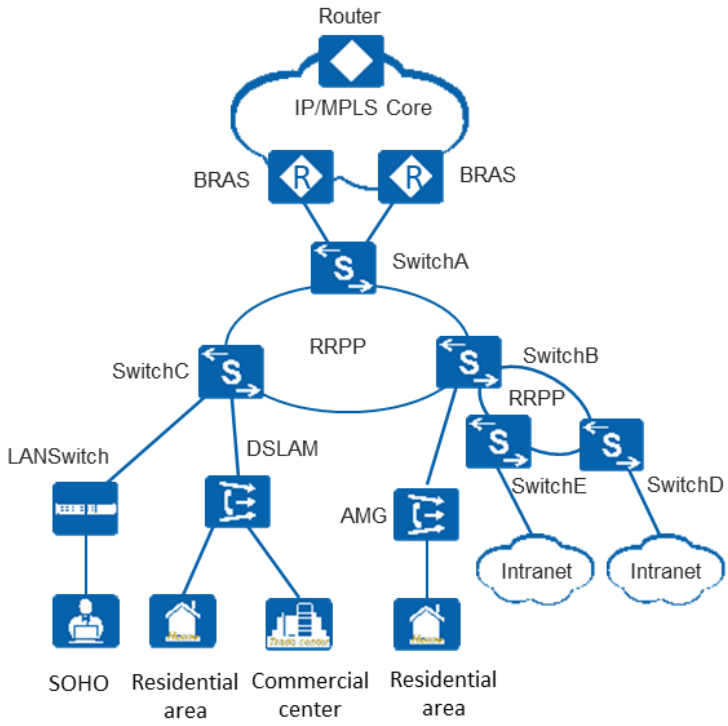
Small-scale Enterprise Campus Network

With powerful aggregation and routing capabilities of CloudEngine S5732-H series switches make them suitable for use as core switches in a small-scale enterprise network. Two or more S5732-H 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

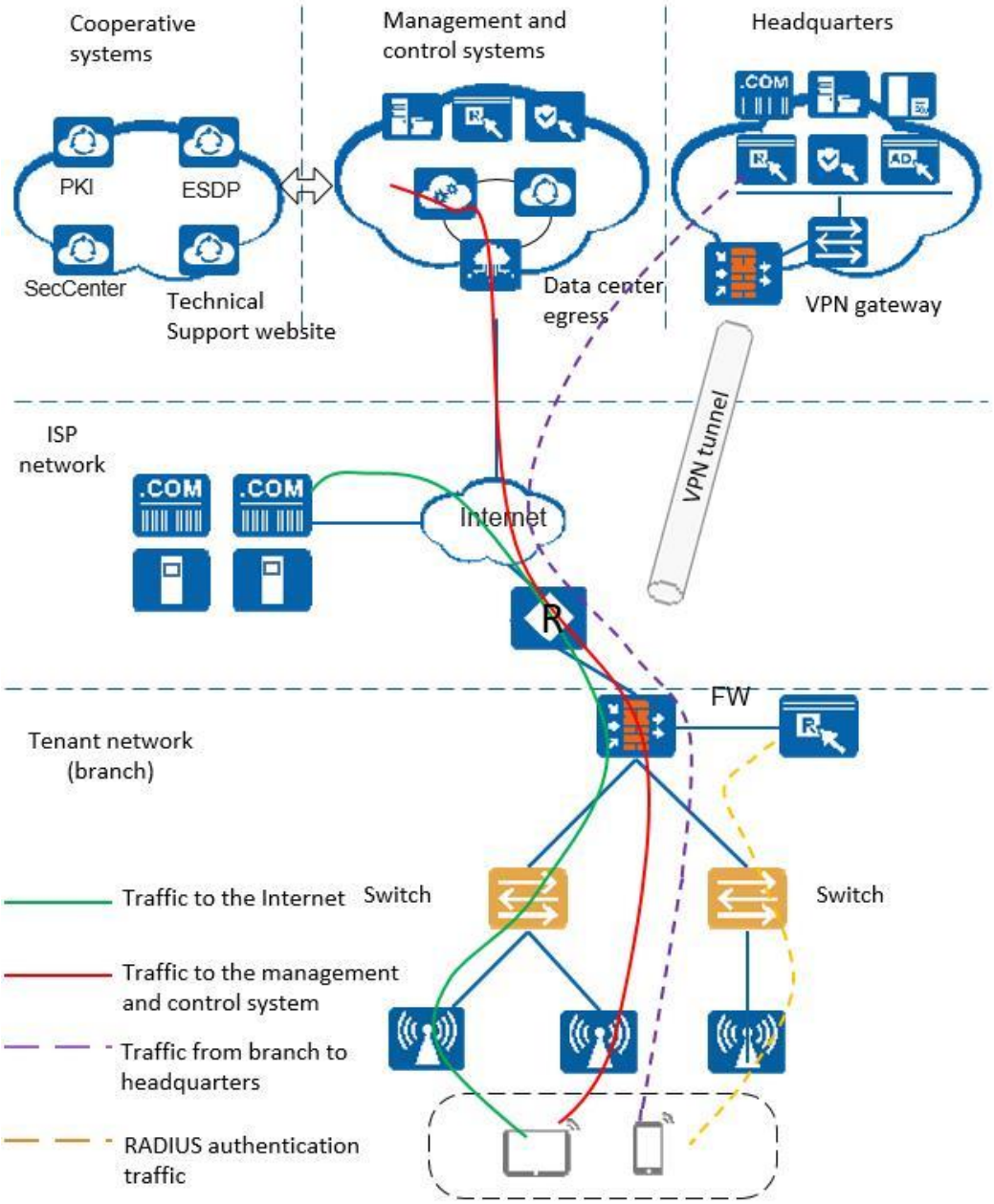
CloudEngine S5732-H series switches can be deployed at the access layer of a MAN(Metropolitan Area Network) to build a high-performance, multi-service, and highly reliable ISP MAN network.



Application in Public Cloud

CloudCampus Solution is a network solution suite based on Huawei public cloud. CloudEngine S5732-H 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.



Ordering Information

The following table lists ordering information of the CloudEngine S5732-H series switches.

Model	Product Description
CloudEngine S5732-H24S6Q	CloudEngine S5732-H24S6Q (20 x GE SFP ports, 4 x 10GE SFP+ ports, 6 x 40GE QSFP+ ports, without power module)
CloudEngine S5732-H48S6Q	CloudEngine S5732-H48S6Q (44 x GE SFP ports, 4 x 10GE SFP+ ports, 6 x 40GE QSFP+ ports, without power module)
PAC600S12-CB	600W AC power module
PDC1000S12-DB	1000W DC power module
FAN-031A-B	Fan module
L-1AP-S57	S57 Series, Wireless Access Controller AP Resource License-1AP

Model	Product Description
N1-S57H-M-Lic	S57XX-H Series Basic SW,Per Device
N1-S57H-M-SnS1Y	S57XX-H Series Basic SW,SnS,Per Device,1Year
N1-S57H-F-Lic	N1-CloudCampus,Foundation,S57XX-H Series,Per Device
N1-S57H-F-SnS1Y	N1-CloudCampus,Foundation,S57XX-H Series,SnS,Per Device,1Year
N1-S57H-A-Lic	N1-CloudCampus,Advanced,S57XX-H Series,Per Device
N1-S57H-A-SnS1Y	N1-CloudCampus,Advanced,S57XX-H Series,SnS,Per Device,1Year
N1-S57H-FToA-Lic	N1-Upgrade-Foundation to Advanced,S57XX-H,Per Device
N1-S57H-FToA-SnS1Y	N1-Upgrade-Foundation to Advanced,S57XX-H,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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