CloudEngine S5331-S Series Switches

CloudEngine S5331-S series switches are next-generation standard gigabit switches that provide GE electrical/optical downlink ports and 10GE uplink ports.

Product Overview

The CloudEngine S5331-S series switches are based on next-generation high-performing hardware and the Huawei Versatile Routing Platform (VRP). The CloudEngine S5331-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 S5331-S can be used in various scenarios. For example, it can be used as an access or aggregation switch on a campus network or Metropolitan Area Network.

Models and Appearances

The following models are available in the CloudEngine S5331-S series.

Models and Appearances	Description
 CloudEngine S5331-S32ST4X	• 24 x GE SFP port，8 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • Forwarding performance: 108 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S32ST4X-A	• 24 x GE SFP port，8 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • AC power supply • Forwarding performance: 108 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S32ST4X-D	• 24 x GE SFP port，8 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • DC power supply • Forwarding performance: 108 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S24S8T4X-A	• 24 x GE SFP port，8 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports* • AC power supply • Forwarding performance: 108 Mpps • Switching capacity: 336 Gbps • Note: GE0/0/1 to GE0/0/24 are SFP ports

Models and Appearances	Description
 CloudEngine S5331-S24S8T4X-D	• 24 x GE SFP port，8 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports* • DC power supply • Forwarding performance: 108 Mpps • Switching capacity: 336 Gbps • Note: GE0/0/1 to GE0/0/24 are SFP ports
 CloudEngine S5331-S48S4X	• 48 x GE SFP ports, 4 x 10GE SFP+ ports • 1+1 power backup • Forwarding performance: 125 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S48S4X-A	• 48 x GE SFP ports, 4 x 10GE SFP+ ports • AC power supply • Forwarding performance: 125 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S48S4X-D	• 48 x GE SFP ports, 4 x 10GE SFP+ ports • DC power supply • Forwarding performance: 125 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S24T4X	• 24 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • Forwarding performance: 96 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S24T4X-A	• 24 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • AC power supply • Forwarding performance: 96 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S24T4X-D	• 24 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • DC power supply • Forwarding performance: 96 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S24P4X	• 24 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • PoE+ • Forwarding performance: 96 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S48T4X	• 48 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • Forwarding performance: 125 Mpps • Switching capacity: 336 Gbps
 CloudEngine S5331-S48T4X-A	• 48 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • AC power supply • Forwarding performance: 125 Mpps • Switching capacity: 336 Gbps

Models and Appearances	Description
 CloudEngine S5331-S48P4X	• 48 x 10/100/1000Base-T Ethernet ports, 4 x 10GE SFP+ ports • 1+1 power backup • PoE+ • Forwarding performance: 125 Mpps • Switching capacity: 336 Gbps

Features and Highlights

Powerful Service Processing Capability and Multiple Security Control Mechanisms

- The CloudEngine S5331-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 S5331-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 S5331-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 S5331-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 S5331-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 S5331-S supports strict ARP learning, which protects a network against ARP spoofing attacks to ensure normal network access.

Easy O&M

- The CloudEngine S5331-S supports Super Virtual Fabric (SVF), which virtualizes the "Core/aggregation + Access switch + AP" structure into a logical device. The CloudEngine S5331-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 S5331-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 S5331-S functions as a client in an SVF system.
- The CloudEngine S5331-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 S5331-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 S5331-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 S5331-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 S5331-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 S5331-S supports Smart Link. One CloudEngine S5331-S switch can connect to multiple aggregation switches through multiple links, implementing backup of uplinks and significantly improving reliability of access devices.
- The CloudEngine S5331-S supports Ethernet OAM (IEEE 802.3ah/802.1ag) to detect link faults quickly.

Mature IPv6 Technologies

- The CloudEngine S5331-S uses the mature, stable VRP 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 S5331-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.

Intelligent Stack (iStack)

- The CloudEngine S5331-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 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 S5331-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.

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.

Intelligent O&M

- The CloudEngine S5331-S provides telemetry technology to collect device data in real time and send the data to Huawei campus network analyzer(iMaster NCE-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 S5331-S 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.

Cloud 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).

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.

Product Specifications

Item	CloudEngine S5331-S32ST4X	CloudEngine S5331-S32ST4X-A/D	CloudEngine S5331-S48S4X	CloudEngine S5331-S48S4X-A/D
Fixed port	24 x GE SFP ports，8 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports	24 x GE SFP ports，8 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports	48 x GE SFP ports, 4 x 10GE SFP+ ports	48 x GE SFP ports, 4 x 10GE SFP+ ports
Dimensions (H x W x D)	43.6 mm x 442 mm x 420 mm	43.6 mm x 442 mm x 220 mm	43.6 mm x 442 mm x 420 mm	43.6 mm x 442 mm x 220 mm
Chassis height	1 U	1 U	1 U	1 U
Chassis weight (including packaging)	7.35 kg	4.02/3.87 kg	7.51 kg	4.69 kg
Power supply type	• 150 W AC (pluggable) • 600 W AC (pluggable) • 180 W DC (pluggable) • 1000 W DC (pluggable)	Built-in AC/DC	• 150 W AC (pluggable) • 600 W AC (pluggable) • 180 W DC (pluggable) • 1000 W DC (pluggable)	Built-in AC
Rated voltage range	• AC input (150/600 W AC): 100 V AC to 240 V AC, 50/60 Hz • DC input (180/1000 W DC): -48 VDC to -60 V DC	AC model: • AC input : 100 V AC to 240 V AC, 50/60 Hz • DC input: 240V DC DC model: • -48 VDC to -60 V DC	• AC input (150/600 W AC): 100 V AC to 240 V AC, 50/60 Hz • DC input (180/1000 W DC): -48 VDC to -60 V DC	AC model: • AC input : 100 V AC to 240 V AC, 50/60 Hz • DC input: 240V DC DC model: • -48 VDC to -60 V DC
Maximum voltage range	• 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): 190V to 290 V DC (meeting 240 V high-voltage DC certification) • DC input (180/1000 W DC): -38.4 V DC to -72V DC	AC model: • AC input: 90 V AC to 264 V AC, 47 Hz to 63 Hz • High-voltage DC input: 190 V DC to 290 V DC (meeting 240 V high-voltage DC certification) DC model: -38.4 V DC to -72V DC	• 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): 190V to 290 V DC (meeting 240 V high-voltage DC certification) • DC input (180/1000 W DC): -38.4 V DC to -72V DC	AC model: • AC input: 90 V AC to 264 V AC, 47 Hz to 63 Hz • High-voltage DC input: 190 V DC to 290 V DC (meeting 240 V high-voltage DC certification) • DC model: -38.4 V DC to -72V DC
Maximum power consumption	120 W	94 W	142 W	121 W

Item	CloudEngine S5331-S32ST4X	CloudEngine S5331-S32ST4X-A/D	CloudEngine S5331-S48S4X	CloudEngine S5331-S48S4X-A/D
Minimum power consumption	44.5W	41.8W/41.5W	50.5W	47.3W
Noise	• Under normal temperature (sound power): 45.47dB (A) • Under high temperature (sound power): 73.74dB (A) • Under normal temperature (sound pressure): 31.79dB (A)	• Under normal temperature (sound power): 46.8dB (A) • Under high temperature (sound power): 73.2dB (A) • Under normal temperature (sound pressure): 35dB (A)	• Under normal temperature (sound power): 61dB (A) • Under high temperature (sound power): 75.7dB (A) • Under normal temperature (sound pressure): 46dB (A)	• Under normal temperature (sound power): 56.8dB (A) • Under high temperature (sound power): 73.9dB (A) • Under normal temperature (sound pressure): 44.8dB (A)
Operating temperature	• 0-1800 m altitude: -5° C to +45° C • 1800-5000 m altitude: The operating temperature reduces by 1° C 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 1° C 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 1° C 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 1° C every time the altitude increases by 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% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)
Surge protection specification (service port)	±7 kV	±7 kV	NA	NA
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 kV in common mode	• 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	• 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	• 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
Heat dissipation	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment

Item	CloudEngine S5331-S24T4X	CloudEngine S5331-S24T4X-A	CloudEngine S5331-S24T4X-D	CloudEngine S5331-S24P4X
Fixed port	24 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports	24 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports	24 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports	24 x 10/100/1000Base-T (PoE+) ports, 4 x 10GE SFP+ ports
Dimensions (H x W x D)	43.6 mm x 442 mm x 420 mm	43.6 mm x 442 mm x 220 mm	43.6 mm x 442 mm x 220 mm	43.6 mm x 442 mm x 420 mm

Item	CloudEngine S5331-S24T4X	CloudEngine S5331-S24T4X-A	CloudEngine S5331-S24T4X-D	CloudEngine S5331-S24P4X
Chassis height	1 U	1 U	1 U	1 U
Chassis weight (including packaging)	4.84/8.4 kg	3.04/4.4 kg	3.26/4.62 kg	8.6 kg
Power supply type	• 150 W AC (pluggable) • 600 W AC (pluggable) • 180 W DC (pluggable) • 1000 W DC (pluggable)	Built-in AC	Built-in DC	• 1000 W PoE AC (pluggable) • 1000 W PoE DC (pluggable)
Rated voltage range	• 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 (180/1000 W DC): -48 VDC to -60 V DC	AC input : 100 V AC to 240 V AC, 50/60 Hz	DC input : -48 VDC to -60 V DC	• AC input (1000 W AC PoE): 100 V AC to 240 V AC, 50/60 Hz • DC input (1000 W AC PoE): 240 V DC • DC input (1000 W DC PoE): -48 VDC to -60 V DC
Maximum voltage range	• 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 (180/1000 W DC): -38.4 V DC to -72V DC	AC input : 90 V AC to 290 V AC, 45 Hz to 65 Hz	DC input : -38.4 V DC to - 72V DC	• 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) • DC input (1000 W DC PoE): -38.4 V DC to -72V DC
Maximum power consumption	114 W	80 W	76 W	• 121 W (without PD) • 977 W (with PD, PD power consumption of 720 W)
Minimum power consumption	44 W	48W	42W	82W
Noise	• Under normal temperature (sound power): 57.5dB (A) • Under high temperature (sound power): 70.9dB (A) • Under normal temperature (sound pressure): 47.5dB (A)	• Under normal temperature (sound power): 44.90 dB (A) • Under high temperature (sound power): 73.80 dB (A) • Under normal temperature (sound pressure): 31.21 dB (A)	• Under normal temperature (sound power): 44.90 dB (A) • Under high temperature (sound power): 73.80 dB (A) • Under normal temperature (sound pressure): 31.21 dB (A)	• Under normal temperature (sound power): 62.3dB (A) • Under high temperature (sound power): 71.8dB (A) • Under normal temperature (sound pressure): 52.8dB (A)
Operating temperature	• 0-1800 m altitude: -5° C to +45° C	• 0-1800 m altitude: -5° C to +45° C	• 0-1800 m altitude: -5° C to +45° C	• 0-1800 m altitude: -5° C to +45° C

Item	CloudEngine S5331-S24T4X	CloudEngine S5331-S24T4X-A	CloudEngine S5331-S24T4X-D	CloudEngine S5331-S24P4X
	• 1800-5000 m altitude: The operating temperature reduces by 1°C every time the altitude increases by 220 m.	• 1800-5000 m altitude: The operating temperature reduces by 1°C every time the altitude increases by 220 m.	• 1800-5000 m altitude: The operating temperature reduces by 1°C every time the altitude increases by 220 m.	• 1800-5000 m altitude: The operating temperature reduces by 1°C every time the altitude increases by 220 m.
Storage temperature	-40°C to +70°C	-40℃ to +70℃	-40℃ to +70℃	-40°C to +70°C
Relative humidity	5% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)
Surge protection specification (service port)	±6 kV	±7 kV	±7 kV	±6 kV
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 kV in common mode	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	• 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
Heat dissipation	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment

Item	CloudEngine S5331-S48T4X	CloudEngine S5331-S48T4X-A	CloudEngine S5331-S48P4X	CloudEngine S5331-S24S8T4X-A/D
Fixed port	48 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports	48 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports	48 x 10/100/1000Base-T (PoE+)ports, 4 x 10GE SFP+ ports	24 x GE SFP ports，8 x 10/100/1000Base-T ports, 4 x 10GE SFP+ ports
Dimensions (H x W x D)	43.6 mm x 442 mm x 420 mm	43.6 mm x 442 mm x 220 mm	43.6 mm x 442 mm x 420 mm	43.6 mm x 442 mm x 220 mm
Chassis height	1 U	1 U	1 U	1 U
Chassis weight (including packaging)	8.55 kg	4.57 kg	8.8 kg	4.52/4.37 kg
Power supply type	• 150 W AC (pluggable) • 600 W AC (pluggable) • 180 W DC (pluggable) • 1000 W DC (pluggable)	Built-in AC	• 1000 W PoE AC (pluggable) • 1000 W PoE DC (pluggable)	Built-in AC/DC
Rated voltage range	• 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,	AC input : 100 V AC to 240 V AC, 50/60 Hz	• AC input (1000 W AC PoE): 100 V AC to 240 V AC, 50/60 Hz • DC input (1000 W AC	AC model: • AC input : 100 V AC to 240 V AC, 50/60 Hz • DC input: 240V DC

Item	CloudEngine S5331-S48T4X	CloudEngine S5331-S48T4X-A	CloudEngine S5331-S48P4X	CloudEngine S5331-S24S8T4X-A/D
	50/60 Hz • DC input (180/1000 W DC): -48 VDC to -60 V DC		PoE): 240 V DC • DC input (1000 W DC PoE): -48 VDC to -60 V DC	DC model: • -48 VDC to -60 V DC
Maximum voltage range	• 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 (180/1000 W DC): -38.4 V DC to -72V DC	AC input : 90 V AC to 290 V AC, 45 Hz to 65 Hz	• 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) • DC input (1000 W DC PoE): -38.4 V DC to -72V DC	AC model: • AC input: 90 V AC to 264 V AC, 47 Hz to 63 Hz • High-voltage DC input: 190 V DC to 290 V DC (meeting 240 V high-voltage DC certification) DC model: -38.4 V DC to -72V DC
Maximum power consumption	124 W	102 W	• 132 W (without PD) • 1750 W (with PD, PD power consumption of 1440 W)	93.92W/93.39W
Minimum power consumption	50 W	48W	86W	41.71W/41.42W
Noise	• Under normal temperature (sound power): 57.5dB (A) • Under high temperature (sound power): 70.9dB (A) • Under normal temperature (sound pressure): 47.5dB (A)	• Under normal temperature (sound power): 44.90 dB (A) • Under high temperature (sound power): 73.80 dB (A) • Under normal temperature (sound pressure): 31.21 dB (A)	• Under normal temperature (sound power): 62.3dB (A) • Under high temperature (sound power): 71.8dB (A) • Under normal temperature (sound pressure): 52.8dB (A)	• Under normal temperature (sound power): 46.8dB (A) • Under high temperature (sound power): 73.2dB (A) • Under normal temperature (sound pressure): 35dB (A)
Operating temperature	• 0-1800 m altitude: -5° C to +45° C • 1800-5000 m altitude: The operating temperature reduces by 1° C 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 1° C 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 1° C 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 1° C every time the altitude increases by 220 m.
Storage temperature	-40°C to +70°C	-40℃ to +70℃	-40℃ to +70℃	-40°C to +70°C
Relative humidity	5% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)
Surge protection specification (service port)	±6 kV	±7 kV	±6 kV	±7 kV

Item	CloudEngine S5331-S48T4X	CloudEngine S5331-S48T4X-A	CloudEngine S5331-S48P4X	CloudEngine S5331-S24S8T4X-A/D
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 kV in common mode	AC power port: ±6 kV in differential mode, ±6 kV in common mode	• 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	• 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
Heat dissipation	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment	Air cooling heat dissipation, intelligent speed adjustment

Service Features

Feature	Description
MAC address table	IEEE 802.1d standards compliance
	64K 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
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
IP routing	Static routes, RIP v1/2, RIPng, OSPF, OSPFv3, IS-IS, IS-ISv6, BGP, BGP4+, ECMP, routing policy
	Up to 16K FIBv4 entries

Feature	Description
	Up to 8K 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 8K 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)
	Blackhole MAC address entries
	Limit on the number of learned MAC addresses

Feature	Description
	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
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)	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.
	Working as an SVF client that is plug-and-play with zero configuration
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
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)

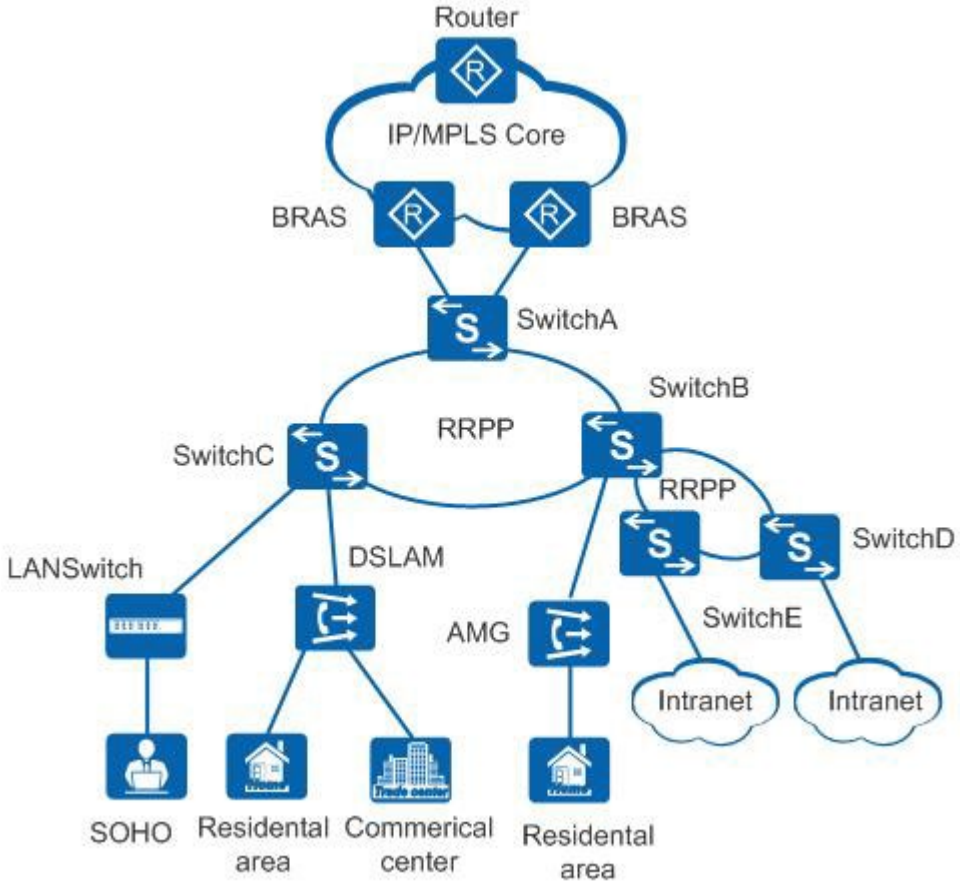
Feature	Description
	Web-based NMS
	System logs and alarms of different levels
	GVRP
	MUX VLAN
	NetStream
	Intelligent O&M

*CloudEngine S5331-S series switches require the VXLAN license to support the VXLAN feature.

Networking and Applications

Application on a ETTx/MAN

CloudEngine S5331-S series switches can be deployed at the access layer of a Ettx/MAN(Metropolitan Area Network) to build a high-performance, multi-service, and highly reliable ISP MAN network.



Ordering Information

The following table lists ordering information of the CloudEngine S5331-S series switches.

Model	Product Description
CloudEngine S5331-S32ST4X	CloudEngine S5331-S32ST4X(8*10/100/1000BASE-T ports, 24*GE SFP ports, 4*10GE SFP+

Model	Product Description
	ports, without power module)
CloudEngine S5331-S32ST4X-A	CloudEngine S5331-S32ST4X-A(8*10/100/1000BASE-T ports, 24*GE SFP ports, 4*10GE SFP+ ports, AC power, front access)
CloudEngine S5331-S32ST4X-D	CloudEngine S5331-S32ST4X-D(8*10/100/1000BASE-T ports, 24*GE SFP ports, 4*10GE SFP+ ports, DC power, front access)
CloudEngine S5331-S24S8T4X-A	CloudEngine S5331-S24S8T4X-A(24*GE SFP ports, 8*10/100/1000BASE-T ports, 4*10GE SFP+ ports, AC power, front access)
CloudEngine S5331-S24S8T4X-D	CloudEngine S5331-S24S8T4X-D(24*GE SFP ports, 8*10/100/1000BASE-T ports, 4*10GE SFP+ ports, DC power, front access)
CloudEngine S5331-S48S4X	CloudEngine S5331-S48S4X(48*GE SFP ports, 4*10GE SFP+ ports, without power module)
CloudEngine S5331-S48S4X-A	CloudEngine S5331-S48S4X-A(48*GE SFP ports, 4*10GE SFP+ ports, AC power, front access)
CloudEngine S5331-S48S4X-D	CloudEngine S5331-S48S4X-D(48*GE SFP ports, 4*10GE SFP+ ports, DC power, front access)
CloudEngine S5331-S24T4X	CloudEngine S5331-S24T4X (24*10/100/1000BASE-T ports, 4*10GE SFP+ ports, without power module)
CloudEngine S5331-S24T4X-A	CloudEngine S5331-S24T4X-A (24*10/100/1000BASE-T ports, 4*10GE SFP+ ports, AC power)
CloudEngine S5331-S24T4X-D	CloudEngine S5331-S24T4X-D (24*10/100/1000BASE-T ports, 4*10GE SFP+ ports, DC power)
CloudEngine S5331-S24P4X	CloudEngine S5331-S24P4X (24*10/100/1000BASE-T (PoE+) ports, 4*10GE SFP+ ports, without power module)
CloudEngine S5331-S48T4X	CloudEngine S5331-S48T4X (48*10/100/1000BASE-T ports, 4*10GE SFP+ ports, without power module)
CloudEngine S5331-S48T4X-A	CloudEngine S5331-S48T4X-A (48*10/100/1000BASE-T ports, 4*10GE SFP+ ports, AC power)
CloudEngine S5331-S48P4X	CloudEngine S5331-S48P4X (48*10/100/1000BASE-T (PoE+) ports, 4*10GE SFP+ ports, without power module)
PAC150S12-R	150 W AC power module
PDC180S12-CR	180 W DC power module
PAC1000S56-CB	1000 W AC PoE power module
PDC1000S56-CB	1000 W DC PoE power module
S53S-M-Lic	S53XX-S Series Basic SW,Per Device

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