

H3C S5100 series Intelligent and Resilient Switches

Product Overview

H3C S5100 Series Ethernet Switches (hereinafter referred to as S5100 series) are a new Gigabit Ethernet switching products that entirely fulfills the enterprise customers' requirement of designing and implementing a unified, highly resilient networks. S5100 Series Ethernet Switches represent the next generation desktop switches, they provide high-density GE ports, 10GE uplink, a variety of service features and powerful QACL functions and can be used in convergence and access devices for intranets and metropolitan area networks (MANs), and can also be used for connecting data center server clusters with high availability as well as scalability.

The H3C S5100 Series Switches are available, offering a cost-effective path for meeting current and future service requirements from enterprises and commercial businesses. The abundant features include advanced quality of service (QoS), LACP, STP/RSTP/MSTP, port rate-limiting(S5100-EI only), access control lists (ACLs)(S5100-EI only), DHCP Snooping, RSPAN (Remote switched port analyzer), Protocol-Based VLAN, VLAN-VPN, policy-based VLAN and Voice VLAN(S5100-EI only), IGMP Snoopingv1/v2(S5100-EI only), multicast VLAN, port-based broadcast storm suppression, VLAN-based mirroring, MAC address-based mirroring, multicast VLAN register (MVR), SSH v2 (Secure Shell v2), VCT (Virtual Cable Test), DLDP¹ (Device Link Detection Protocol) and HGMP v2(Huawei group management protocol v2), etc.

The H3C S5100 Series Ethernet Switches include the following models: S5100-24P-SI, S5100-24P-EI, S5100-48P-SI, S5100-48P-EI, S5100-26C-EI and S5100-50C-EI. S5100-24P-SI and S5100-24P-EI have 24 Ethernet 10/100/1000 Base-T ports, 4 1000BASE-X SFP (combo). S5100-48P-SI and S5100-48P-EI have 48 Ethernet 10/100/1000Base-T ports, 4 1000BASE-X SFP (combo). S5100-26C-EI has 24 10/100/1000 Base-T ports, 4 1000BASE-X SFP Combo ports, 2 10-Gbps expansion slots (for XFP interface cards /stack cards /XENPAK optical modules). S5100-50C-EI has 48 10/100/1000 Base-T ports, 4 1000BASE-X SFP Combo ports, 2 10-Gbps expansion slots (for XFP interface cards /stack cards /XENPAK optical modules). The combo ports in S5100 are combo of 10/100/1000BASE-T and 1000BASE-X.

¹ For detail information, please refer to S5100 Series Switch System Description.



S5100-24P-SI



S5100-48P-SI



S5100-24P-EI



S5100-48P-EI



S5100-26C-EI



S5100-50C-EI

Product Features

➤ Full wire-speed, multi-layer switching

- S5100 series switches offer L2 wire-speed switching capacity. The product series offers 10GE uplink speed, satisfies the most demanding.
- The hardware supports L2 wire-speed switching, and is able to identify and process the traffic flows from L4-L7.
- With independent packet filters, all ports distinguish different flows and forward them with corresponding priority.

➤ High reliability

- S5100 series switches support STP/RSTP/MSTP (Spanning Tree Protocol/Rapid Spanning Tree Protocol/Multiple Spanning Tree Protocol). The STP/RSTP features also support BPDU guard、Root guard, Thus the redundancy back-up and error tolerance capability of the link can be greatly improved to guarantee network stability.
- S5100 series switches support link-aggregation (include manual link aggregation and LACP), it is a simple and cost efficient way to expand the bandwidth of a switch port and balance the traffic among all the ports in a link aggregation. In addition, connection reliability is enhanced.

➤ **Flexible security control policies**

- Based on the longest match routing policy, the S5100 Series forward packets one by one ensuring equal forwarding performance. This function can guard the network against the attack by Code Red and Worm Blaster, thereby guaranteeing equipment security.
- The S5100 Series support 802.1x authentication to identify users who attempt to access the network. With the 802.1x client version checking function enabled on a switch, the switch checks the version and validity of the 802.1x client running on supplicant systems to prevent those that use earlier versions of 802.1x client or illegal clients from logging in.
- The S5100 Series support 802.1x PEAP, With PEAP employed, a security channel is created, which is encrypted and is protected using transport level security (TLS) to ensure integrity. And authentication is carried out through a new type of EAP (extensible authentication protocol) negotiation between supplicant systems and authentication servers.
- The S5100 Series support Centralized MAC address authentication, it controls accesses to a network through ports and MAC addresses. This kind of authentication requires no client software. When operating in centralized MAC address authentication mode, a switch begins to authenticate the user if it detects a new user MAC address.
- The S5100 Series support The Guest VLAN function, this function enables supplicant systems that are not authenticated to access specific resources and thus perform the corresponding operations, such as obtaining 802.1x client, upgrading client, or obtaining other upgrading programs.
- The S5100 Series can also prevent unauthorized access to the network by binding MAC and port.
- The S5100 Series support Secure Shell V2 (SSH V2), which offers security information protection and powerful authentication function to safeguard the Ethernet switch from attacks such as IP address spoofing and plain text cipher interception.
- The S5100 Series support abundant mirroring modes, include traffic mirroring, VLAN-based mirroring, MAC address-based mirroring, port mirroring, and multi-source port mirroring.
- The S5100 Series support other security functions, such as hierarchical management and password protection of users, AAA authentication, RADIUS authentication, port isolation and port security.

➤ **Abundant QoS policies**

- The S5100 Series support L2~L4 complex flow classification based on source MAC address/destination MAC address/source IP address/destination IP address/ports/protocols.
- The S5100 Series support flexible queue scheduling algorithms, which can be set on the basis of port and queue at the same time. They support Strict Priority (SP), Shaped Deficit Weighted Round Robin (SDWRR) and SP+SDWRR; 8 priority

queues.

- The S5100 Series support Committed Access Rate (CAR) and limit the traffic speed with the minimum granularity of 1 kbps.
- The S5100 Series can support priority mapping, priority marking, traffic shaping for ports and queues, port-based/flow-based rate limiting, S5100 Series also support real-time update of ACL rules based on time range changes.
- The S5100 Series support RSPAN (Remote switched port analyzer), It breaks through the limitation that the mirrored port and the mirroring port have to be located in the same switch, and makes it possible that the mirrored and mirroring ports be located across several devices in the network, and greatly enhances the way that the network administrator can manage the switch.

➤ **Diversified System Configuration and management modes**

- The S5100 Series support Simple Network Management Protocol (SNMP) v1/v2/v3 and RMON (Remote Monitoring) v1, 1/2/3/9 groups of MIBs, they be managed by NMS. They can be managed by general network management platform such as OpenView, and Quidview network management system.
- The S5100 Series support Command Line Interface (CLI), Web based network management, modem dial-up and TELNET which make the equipment management more convenient.
- The S5100 Series support HGMP V2 cluster management, After enabling HGMP V2, the network administrator can manage several member switches through one command switch and only the command switch need a public network IP address, it can save public IP address greatly and manage the network more efficiently.

➤ **Abundant System Maintenance and debugging methods**

- The S5100 Series support System log, Hierarchical alarm management and alarm filtering, Detailed alarm/debug information output, Ping and Tracer, they also support remote maintenance via Telnet Modems and SSH.
- The S5100 Series support Ping, Traceroute and HWping. HWping is a new network diagnostic tool used to test the performance of protocols operating on network and It is an enhanced alternative to the ping command.
- The S5100 Series support DLDP (Device Link Detection Protocol), DLDP can detect the link status of the optical fiber cable or copper twisted pair. If DLDP finds a unidirectional link, it disables the related port automatically or informs users to disable it manually depending on specific configuration, to avoid potential network problems.
- The S5100 Series support Loopback detection on ports, after users enable loopback detection for Ethernet ports, the switch will monitor whether the ports have loopback on a regular basis; if the switch detects loopback for a particular port, and it will put that port under control.
- The S5100 Series support VCT (Virtual Cable Test) which is convenient for troubleshooting. Customers can start the virtual cable test (VCT) to make the system

test the cable connected to the current electrical Ethernet port. The test items include: whether short or open circuit exists in the Rx/Tx direction of the cable, and what is the length of the cable in normal status or the length from the port to the fault point of the cable.

Specifications

| Features | S5100-24P-SI/EI | S5100-48P-SI/EI | S5100-26C-EI | S5100-50C-EI |
|-------------------------|---|---|--|---|
| Fixed port | 24 10/100/1000 Mbps electric ports 4 Gigabit SFP Combo ports | 48 10/100/1000 Mbps electric ports 4 Gigabit SFP Combo ports | 24 10/100/1000 Mbps electric ports 4 Gigabit SFP Combo ports | 48 10/100/1000 Mbps electric ports 4 Gigabit SFP Combo ports |
| Extended slot | 0 | 0 | 2 | 2 |
| Extended module | N/A | | (1) 1 port stack 10GE Module (2) 1 port Xenpak 10GE Module (3) 1 ports XFP 10GE module | |
| Performance | | | | |
| Wire speed L2 switching | Port Switch capacity: 48Gbps Throughput: 35.71Mpps | Port Switch capacity: 96Gbps Throughput: 71.42Mpps | Port Switch capacity: 88Gbps Throughput: 65.47Mpps | Port Switch capacity: 136Gbps Throughput: 101.19 Mpps |
| Switching Fabric | 48Gbps | 96Gbps | 88Gbps | 136Gbps |
| Flash | 16M | 16M | 16M | 16M |
| Switching mode | Store and forward | | | |
| Forwarding Latency | <40μs | | | |
| Jumbo Frame | Support 9K | | | |

| Layer 2 Features | S5100-SI | S5100-EI |
|-------------------|--|--|
| MAC address table | Support 8K MAC addresses Support 1K static MAC addresses Support 256 multicast MAC addresses Support black hole MAC addresses | Address self-learning IEEE 802.1D standard Up to 16K MAC addresses Up to 1k static MAC addresses Support black hole MAC addresses |
| VLAN | Support port-based VLANs (4,094 VLANs) Support protocol-based VLANs Support configurable management VLAN GVRP | 4k VLAN (IEEE802.1Q) Voice VLAN GVRP Support port-based VLAN Support protocol-based VLAN Support policy-based VLAN |
| Stack | No | For S5100-C-EI only: Up to 16 units in one stacking group Stacking bandwidth 40 Gbps Support HGMP V2 stack |
| Link aggregation | Support dynamic aggregation of Gigabit Ethernet (GE) ports Support dynamic link aggregation through link aggregation control protocol (LACP) Support manual link aggregation Support static link aggregation Support up to 12(for S5100-24P-SI) or 24(for S5100-48P-SI) aggregation groups, each supporting up to eight GE ports | Support dynamic aggregation of Gigabit Ethernet (GE) ports Support dynamic aggregation of 10GE ports dynamic link aggregation through Link Aggregation Control Protocol (LACP) Support manual link aggregation Support static link aggregation Support up to 25 aggregation groups, each supporting 8 GE or 2 10GE ports Support load balancing and non-load balancing (when lack of hardware aggregation resources) |

| Layer 2 Features | S5100-SI | S5100-EI |
|--|---|--|
| Mirroring | Support traffic mirroring Support VLAN-based mirroring Support MAC address-based mirroring Support port mirroring Support multi-source port mirroring | |
| STP/RSTP/MSTP | IEEE 802.1D Spanning Tree Protocol (STP) IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) IEEE 802.1s Multiple Spanning Tree Protocol instances (MSTP) Support intra-domain maximum-weight spanning trees (up to 16 spanning tree instances) Support STP Root Guard Support BPDU Guard | |
| Flow control | IEEE 802.3x (full duplex) Back-pressure based flow control (half duplex) | |
| Broadcast storm suppression | Support port-based broadcast storm suppression | |
| QinQ | Support port-based QinQ | Support VLAN-VPN or double tag Support port-based QinQ Support flexible QinQ |
| Multicast | Support Internet group management protocol (IGMP) Snoopingv1/v2 Up to 128 multicast groups in a VLAN, and up to 256 multicast groups in the entire system Support multicast VLANs Support dropping known multicast packets Support outbound packet filtering for unknown multicast packets Support manual configuration of multicast MAC addresses | Support 1K multicast MAC addresses Support Internet Group Management Protocol (IGMP) Snoopingv1/v2 Up to 256 multicast groups in a VLAN, and up to 1,024 multicast groups in the entire system Support multicast VLANs Support dropping known multicast packets Support outbound packet filtering for known multicast packets Support manual configuration of multicast MAC addresses |
| Network Protocol | DHCP Snooping (Dynamic Host Configuration Protocol Snooping) DHCP Client ARP (Address Resolution Protocol) NTP (Network Time Protocol) BOOTP (Bootstrap Protocol) | |
| Convergence | | |
| Quality of service (QoS)/ Access control list (ACL) | Support IEEE 802.1p/DSCP priority Support priority mapping Support port trust mode Support RSPAN Each port supports four queues Support SP/SDWRR/SP+SDWRR queue scheduling Support port-based bidirectional rate limiting, with the minimum granularity of 1 kbps for ingress and 20 kbps for egress | Packet tagging based on 802.1p or DSCP preference L2~L4 Packet filter providing filtering based on source/destination MAC address, source/destination IP address, port, protocol, VLAN, VLAN range, MAC address range, or invalid frame Mirroring remote ports (Support RSPAN) Support priority mapping Support priority marking Support traffic statistics Support port trust mode Each port supports eight queues Support SP/SDWRR/SP+SDWRR queue scheduling Support traffic shaping for ports and queues Support port-based/flow-based rate limiting, with the minimum granularity of 1 kbps Support numeral-expressed standard ACL Support numeral-expressed extended ACL Support numeral-expressed layer 2 ACL Support ACL application Support real-time update of ACL rules based on time range changes |

| Layer 2 Features | S5100-SI | S5100-EI |
|-------------------------------------|--|---|
| Security | | |
| Network Login | Support hierarchical management and password protection of users Support Centralized MAC address authentication Support Port isolation Support MAC address black hole Support MAC Address Learning Limit Prevent unauthorized access to the network by binding of MAC and PORT Support SSH(Secure Shell) v2 Support Port security | |
| 802.1X | Up to 256 users under a single port Support port-based and MAC address-based authentication Support MAC address authentication and Fabric synchronization Support Trunk port authentication Support IEEE 802.1X user authentication Version checking (802.1 X supplicant system) Guest VLAN 802.1 X PEAP/EAP/TLS/TTLS | |
| | No | Automatic QoS ACL filtering Uplink speed limiting |
| AAA & Radius | Support AAA authentication Support RADIUS authentication | |
| Management/ Maintenance | | |
| System Configuration and Management | Support CLI (Command Line Interface) configuration mode Support Configuration via the console port Support Local/Remote configuration via Telnet Support Remote configuration via modem dial-up Support System configuration with SNMP v1, 2 and 3 Support HGMP V2 Support RMON (Remote Monitoring) v1, 1/2/3/9 groups of MIBs Support Quidview network management system Web-based network management | |
| System Maintenance and debugging | Detailed alarm/debug information output Support Ping and Tracert Support remote maintenance via Telnet Modems and SSH Support HWping Support System log Hierarchical alarm management and alarm filtering Support DLDAP (Device Link Detection Protocol) Loopback detection on ports Support VCT(Virtual Cable Test) | |
| Information center | Exporting switch synchronization information Setting the format of time stamps to be sent to log hosts | |

| Hardware configuration | S5100-24P-SI/EI | S5100-48P-SI/EI | S5100-26C-EI | S5100-50C-EI |
|------------------------|---|-----------------|--|------------------|
| Outline dimension | 43.6 × 260 × 440 mm (1.72 × 10.2 × 17.3 in.) | | 43.6 × 300 × 440 mm (1.72 × 11.8 × 17.3 in.) | |
| Weight | < 4 kg (< 8.8 lb) | 4 kg (8.8 lb) | 4 kg (8.8 lb) | < 5 kg (< 11 lb) |
| Power supply | S5100-EI series support both AC and DC power inputs AC input: Rated voltage range: 100 VAC to 240 VAC, 50 Hz or 60 Hz Max voltage range: 90 VAC to 264 VAC, 47 Hz or 63 Hz DC input: Rated voltage range: -48 V to -60 V Max voltage range: -36 V to -72V | | | |

| | | | | |
|---------------------------|---|---------|---------|---------|
| Maximum power consumption | 39 W | 78 W | 54 W | 97 W |
| MTBF (Years) | 22.0 | 21.1 | 13.3 | 12.1 |
| Noise parameter | 46.7dBA | 50.2dBA | 50.1dBA | 51.5dBA |
| Environment | Operation temperature: 0°C ~ 45°C Operating humidity: 5% to 85% non-condensing Relative humidity: 10% ~ 90%, non-condensing | | | |

Industry standards support

● Ethernet Protocol

- IEEE802.3 10BASE-T Ethernet
- IEEE802.3u 100BASE-TX Fast Ethernet
- IEEE802.1Q Virtual bridged Local Area Network (VLAN)
- IEEE 802.1P QoS
- IEEE802.3x full duplex / flow control
- IEEE802.3p four levels of priority
- IEEE 802.1w Rapid Reconfiguration(Spanning Tree)
- IEEE802.1D Spanning Tree
- IEEE802.1S MSTP
- IEEE 802.1X Port-based authentication
- IEEE 802.1Z 1000BaseX Gigabit Ethernet
- IEEE 802.3ad Link Aggregation
- IEEE 802.3ae 10 Gigabit Ethernet standard

● Administration Protocol

- RFC 1812 (IPv4)
- RFC 826 (ARP)
- RFC 959 (FTP)
- RFC 783 (TFTP)
- RFC 768 (UDP)
- RFC 791 (IP)
- RFC 792 (ICMP)
- RFC 793 (TCP)
- RFC 2474 (Diffserv)
- RFC 2131 (DHCP)
- RFC 2138 (Radius Authentication)
- RFC 2139 (Radius Accounting)
- RFC 1157 (SNMP)

RFC 1902 (SNMPv2)
RFC 854 (Telnet)
RFC 896 (Congestion control in IP/TCP network)
RFC 2576 (Coexistence between SNMP V1, V2, V3)
RFC 2819 (Remote Network Monitoring MIB (group 1,2,3,9))
RFC1954 (HTTP)

Safety and Compliance

● **Emissions / Agency Approvals**

CISPR 22 Class A
FCC Part 15 Class A
EN 55022 Class A
ICES -003 Class A
VCCI Class A
AS/NZS 3548 Class A
EN 61000-3-2
EN 61000-3-3

● **Immunity**

Product conforms to:

EN 55024: 1998
EN 61000-4-2
EN 61000-4-3
EN 61000-4-4
EN 61000-4-5
EN 61000-4-6
EN 61000-4-11

● **Safety Agency Certifications**

UL 60950-1:2003
IEC 60950-1: 2001
EN 60950-1: 2003
CSA 22.2 No. 950-1:2003
AS/NZS 60950:2000

Typical Applications

1. **Application in the access/convergent layer of large enterprise/campus network**

In a large enterprise or campus network, the S5100 series are located at the access or convergent layer. As convergent device, S5100 may downlinked to layer 2 switches, such as S3100 series, and uplinked to a high-performance core layer switch through the 10GE aggregation; as access device, S5100 can provide 1000Mbps speed connection directly to the desktop user by the GE ports. These switches together provide a network-wide intranet solution that covers 10 gigabit-to-backbone and 100/1000 Mbps-to-desktop.

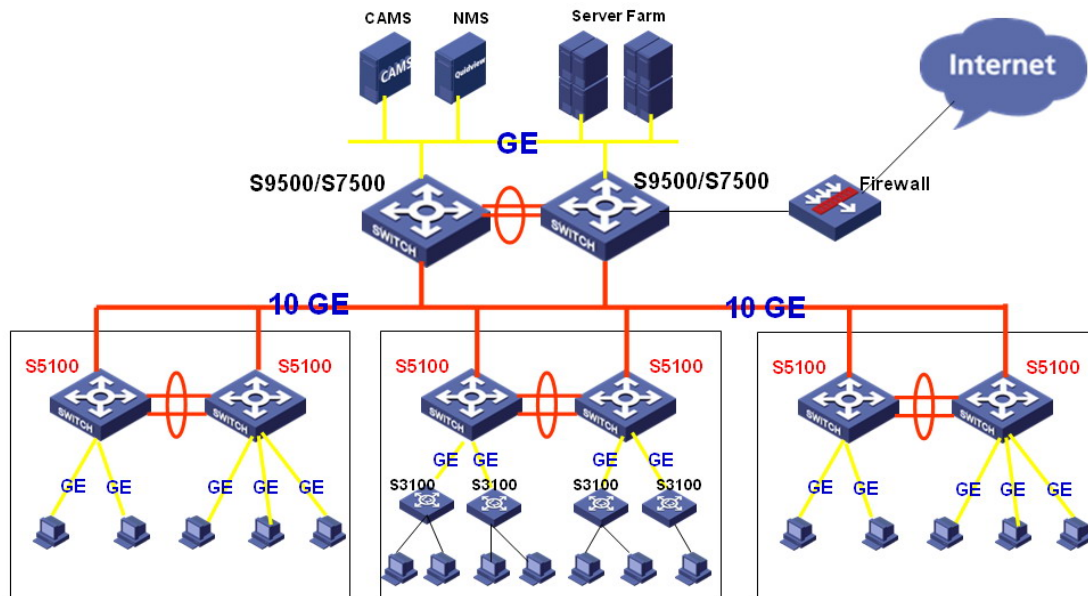


Figure 1: Application in the access/convergent layer of large enterprise/campus network

2. Application in the Datacenter

Based on high-density GE ports, S5100 series can serve as core switches which connect the servers group in the datacenter. They can provide wire-speed GE connection for the servers, and can provide 10GE uplink to core layer. This feature can satisfy the demand of varied data services and high bandwidth.

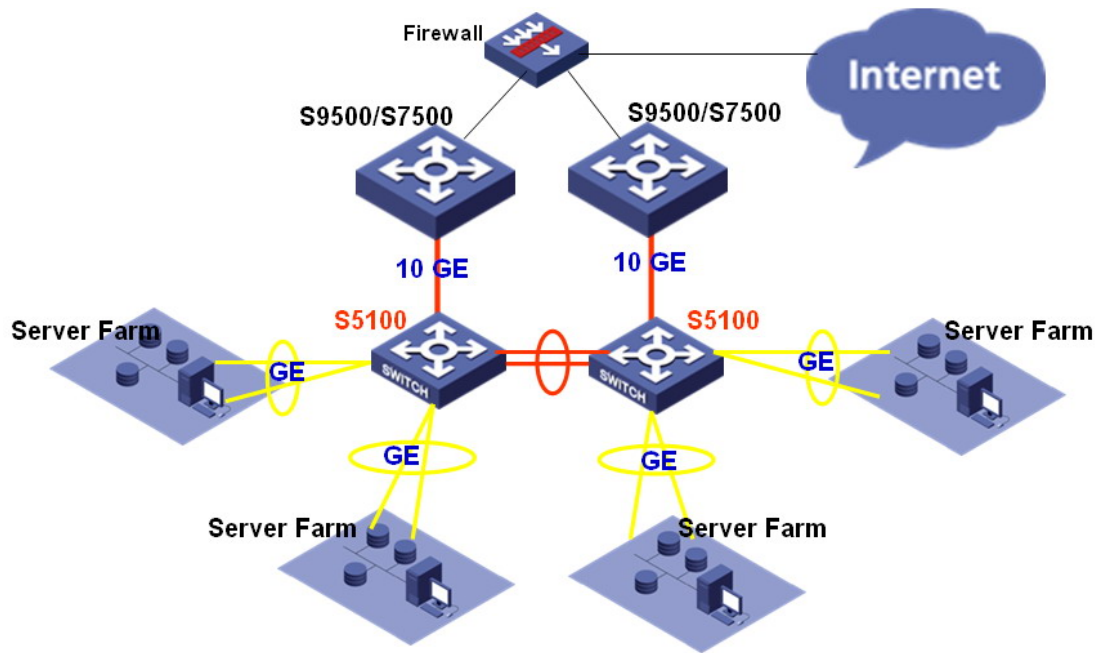


Figure 2: Application in the Datacenter

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