Huawei S9300 Switch Product Brochures

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Huawei Technologies Co., Ltd.

S9300 Series Terabit Routing Switches

Product Overview

Huawei S9300 series (S9300 for short) terabit routing switches are next-generation high-end smart switches tailored for multiservice networks. The S9300 uses Huawei's intelligent multilayer switching concept to provide high-performance L2/L3 switching services as well as rich network applications such as High-Definition (HD) video, elastic cloud computing, hardware IPv6, unified security, and H-QoS. Secure, reliable, and scalable, and providing converged, end-to-end routing and switching functions, the S9300 switches are widely used in Wide Area Networks (WANs), Metropolitan Area Networks (MANs), and data centers to help carriers build application-centric networks.

The S9300 is available in three models: S9303, S9306, and S9312. All S9300 models use interchangeable modules and components for inexpensive switching capacity and port expansion. In addition, S9300 models use innovative energy saving technologies that greatly reduce energy consumption and noise without compromising performance or stability.

An S9300 running a system software version of V2R5C00 or later can be upgraded to an agile switch by using an X1E card, which is equipped with the first Ethernet Network Processor (ENP) of Huawei.

S9303	S9306	S9312

Product Features

Agile Switch, Enabling Networks to Be More Agile for Services

- The high-speed ENP is tailored for Ethernet networks. The ENP's flexible packet processing and traffic control capabilities can meet current and future service requirements and help build a highly scalable network. The ENP has a fully programmable architecture, in which customers can define their own forwarding models, forwarding behaviors, and lookup algorithms. Microcode programmability enables new services to be provisioned within six months, without the need of replacing the hardware. In contrast, with traditional ASIC chips, new services cannot be provisioned until new

hardware is developed to support the services, which may take 1 to 3 years, because ASIC chips use a fixed forwarding architecture and follow a fixed forwarding process.

- By using an X1E board, the S9300 supports the unified user management function to authenticate both wired and wireless users, ensuring a consistent user experience regardless of whether they use wired or wireless access devices to connect to the network. The unified user management function supports various authentication methods, including 802.1x, MAC, and Portal authentications, and is capable of managing users based on user groups, domains, and time ranges. This function visualizes user and service management and enables the transformation from device-centric management to user-centric management.

- The X1E board supports the Packet Conservation Algorithm for Internet (iPCA) function, which changes the traditional method of using simulated traffic for fault location. iPCA technology can monitor network quality for any service flow at any network node, at any time, and without extra costs. It can detect temporary service interruptions in a very short time and precisely identify faulty ports. This cutting-edge fault detection technology turns "extensive management" to "fine granular management."

Innovative CSS Technology

- S9300 switches can set up a clustering switch system (CSS) through cluster cards or service ports. The CSS provides industry-leading 256 Gbps inter-chassis bandwidth due to Huawei's novel approach of using the switching fabric clustering technology in CSS. Member switches can be connected through the service ports on LPUs. These service ports can be configured as stack member ports and added to a logical stack port to enable connection through SFP+ optical modules and fibers, or direct connection through SFP+ stack cables. Virtualization technology improves link use efficiency and prevents single-point failures through inter-chassis link aggregation.

- The S9300 uses route hot backup technology to back up and uninterruptedly forward all data of the control and data planes at Layer 3. This technology significantly improves reliability and performance of the S9300. The inter-chassis links in a CSS can be bundled to improve link use efficiency and eliminate single-point failures.

- The S9300 can use common service ports as cluster ports, and member switches can be connected through optical fibers. This increases the permitted distance between switches in the CSS.

- All member switches in a CSS are managed through a single IP address, which simplifies network device and topology management, improves network operation efficiency, and reduces maintenance costs.

Carrier-Class Reliability

- The S9300's key components, such as MPUs, power supplies, and fans trays, use a redundant design, and all modules are hot swappable to ensure stable network running.

- The S9300 supports 3.3 ms hardware-based BFD for static routes and routing protocols such as RIP, OSPF, BGP, IS-IS, VRRP, PIM, and MPLS. Hardware-based BFD significantly improves network reliability.

- The S9300 supports hardware-based Ethernet OAM in compliance with IEEE 802.3ah, 802.1ag, and ITU-Y. 1731. Hardware-based Ethernet OAM can collect precise network parameters, such as transmission latency and jitter, to help customers monitor network operating status in real time and to realize fast fault detection, location, and failover.

- The S9300 supports Graceful Restart (GR) technology to implement nonstop forwarding (NSF) and ensure reliable and high-speed operation of the entire network.

Powerful Service Processing Capabilities

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- The S9300 provides high-density 10GE ports and provide 2 x 100GE line card, Each S9312 chassis can provide a maximum of 480 x 10GE ports and 24 x 100GE ports, meeting the requirements of bandwidth-consuming applications, such as multimedia conferencing and data access.

- Based on a multi-service routing and switching platform, the S9300 provides wireless access, voice, video, and data services for network access, aggregation, and core layers, helping customers build a highly reliable, low-latency, and multi-service network.

- The S9300 supports distributed MPLS L2/L3VPN functions including MPLS, virtual private LAN service (VPLS), hierarchical VPLS (HVPLS), and virtual leased line (VLL), to provide secure access for VPN users.

- The S9300 supports comprehensive Layer 2 and Layer 3 multicast protocols, including Protocol Independent Multicast Sparse Mode (PIM SM), PIM Dense Mode (DM), PIM Source-Specific Multicast (SSM), Multicast Listener Discovery (MLD), and Internet Group Management Protocol (IGMP) snooping, to ensure high-quality HD video surveillance and video conferencing services.

- The S9300 supports multi-service virtualization technology to provide value-added service (VAS) solutions for campus networks. This technology virtualizes the VAS capabilities, such as firewall (FW), antivirus engine (AVE), and application security gateway (ASG), so that the network entities, such as switches, routers, ACs, APs, and terminals, can use these virtualized capabilities without the restriction of physical locations.

- The software platform where the S9300 runs supports various routing protocols (including IPv6) to meet carriers' network requirements and allows carriers to smoothly upgrade their networks to IPv6.

Various Network Traffic Analysis Functions

The S9300 supports NetStream, including V5/V8/V9 versions. The NetStream features involve aggregation traffic template, real-time traffic sampling, dynamic report generation, traffic attribute analysis, and traffic exception alarms. The S9300 sends traffic statistics logs to master and backup servers simultaneously to avoid data loss. NetStream helps monitor the operating status and traffic model on the entire network. It also provides fault pre-detection, effective fault rectification, fast problem handling, and security monitoring capabilities to help customers optimize network structure and adjust service deployment.

Comprehensive Security Measures

- NGFW is a next-generation firewall card installed on an S9300. In addition to the traditional defense functions, such as identity authentication and Anti-DDoS, the NGFW supports IPS, anti-spam, web security, and application control functions.

- The S9300 provides comprehensive network admission control (NAC) solutions, involving MAC, 802.1x, and Portal authentications as well as authentication triggered by DHCP snooping. These authentication methods ensure the security of various access users, such as dumb terminals, mobile users, and users allocated dynamic IP addresses.

- The S9300 supports a two-level CPU protection mechanism, which supports 1K CPU hardware queues and separates the data plane from the control plane, to help minimize threats of DoS attacks, unauthorized access, and control plane overloading. With this mechanism, the S9300 offers an industry-leading integrated security solution.

Comprehensive IPv6 Solution

- The S9300 software and hardware platforms support IPv6. The Ministry of Industry and Information Technology (MIIT) has certified the S9300 as IPv6 network-access compliant and has awarded IPv6 Ready Logo Phase 2 certification.

- The S9300 supports IPv6 routing protocols such as RIPng, OSPFv3, IS-ISv6, as well as IPv6 static routes, and supports BGP4+, MLD v1/v2, MLD snooping, PIM-SM/DMv6, and PIM-SSMv6.

- The S9300 supports various IPv4-to-IPv6 technologies to ensure seamless network migration. The technologies include IPv6 manual tunnel, 6to4 tunnel, Intra-site Automatic Tunnel Addressing Protocol (ISATAP) tunnel, Generic Routing Encapsulation (GRE) tunnel, and IPv4-compatible automatic tunnel.

Innovative Energy Saving Design

- The S9300 uses a rotating ventilation channel to improve heat dissipation efficiency and a variable-current chip to dynamically adjust power according to traffic volume. These technologies reduce power consumption of the entire chassis by 11%. The S9300 supports port sleeping. Idle ports enter the sleeping state to reduce power consumption.

- The S9300 supports intelligent fan-speed adjustment, in which fans are grouped into multiple zones and fan speed in each zone is adjusted individually based on service loads. This technology lowers power consumption, reduces noise, and extends the service life of fans.

- The S9300 supports Energy Efficient Ethernet (EEE) in compliance with IEEE 802.3az. Transceivers on line cards can quickly transition to the lower power idle state to reduce power consumption when no traffic is being transmitted.

Product Specifications

Item	S9303	S9306 S9306 PoE	S9312 S9312 PoE
Switching capacity	1.92Tbps	3.84Tbps	3.84Tbps
Packet forwarding rate	1440Mpps	2880Mpps	2880Mpps
Service slot quantity	3	6	12
User management	Unified user management		
	802.1x, MAC, and Portal authentications		
	Charging based on traffic volume and online duration		
	User authorization based on user groups, domains, and time ranges		
VLAN	Access, trunk, and hybrid		
	Default VLAN		
	VLAN switching		
	QinQ and selective QinQ		
	MAC-based VLAN assignment		
MAC address	MAC address learning and aging		
	Static, dynamic, and blackhole MAC address entries		

| Item	S9303	S9306 S9306 PoE	S9312 S9312 PoE
	Packet filtering based on source MAC addresses		
	MAC address limiting based on ports and VLANs		
STP/ERPS	STP (IEEE 802.1d), RSTP (IEEE 802.1w), and MSTP (IEEE 802.1s)		
	BPDU protection, root protection, and loop protection		
	BPDU tunnel		
	G.8032 Ethernet Ring Protection Switching (ERPS)		
IP routing	IPv4 dynamic routing protocols, such as RIP, OSPF, IS-IS, and BGP		
	IPv6 routing protocols, such as RIPng, OSPFv3, IS-ISv6, and BGP4+		
Multicast	IGMPv1/v2/v3 and IGMP v1/v2/v3 snooping		
	PIM-DM, PIM-SM, and PIM-SSM		
	MSDP and MBGP		
	Prompt leave		
	Multicast traffic control		
	Multicast querier		
	Multicast protocol packet suppression		
	Multicast CAC		
	Multicast ACL		
MPLS	Basic MPLS functions		
	MPLS OAM		
	MPLS TE		
	MPLS VPN/VLL/VPLS		
Reliability	LACP and inter-chassis E-Trunk		
	VRRP and BFD for VRRP		
	BFD for BGP/IS-IS/OSPF/static route		
	NSF and GR for BGP/IS-IS/OSPF/LDP		
	TE FRR and IP FRR		
	Ethernet OAM in compliance with IEEE 802.3ah and 802.1ag (hardware-level)		
	ITU-Y.1731		

Item	S9303	S9306 S9306 PoE	S9312 S9312 PoE
	DLDP		
QoS	Traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p fields		
	ACL, CAR, and actions including Remark and Schedule		
	Queuing algorithms, such as SP, WRR, DRR, SP+WRR, and SP+DRR		
	Congestion avoidance mechanisms, including WRED and tail drop		
	H-QOS		
	Traffic shaping		
Configuration and maintenance	iPCA, monitor network quality for any service flow at any network node, at any time, and without extra costs		
	Terminal access services such as console port login, Telnet, and SSH		
	Network management protocols, such as SNMPv1/v2/v3		
	File uploading and downloading through FTP and TFTP		
	BootROM upgrade and remote in-service upgrade		
	Hot patches		
	User operation logs		
Security and user management	802.1x authentication and Portal authentication		
	NAC		
	RADIUS and HWTACACS authentication for login users		
	Command line authority control based on user levels (unauthorized users cannot use commands)		
	Defense against DoS attacks, TCP SYN Flood attacks, UDP Flood attacks, broadcast storms, and traffic flooding attacks		
	1K CPU queues		
	Ping and traceroute		
	RMON		
Security protection	Firewall		
	Network Address Translation (NAT)		
	IPSec, SSL VPN		
	Intrusion Protection System (IPS)		

| Item	S9303	S9306 S9306 PoE	S9312 S9312 PoE
	Load balancing Analog Digital Conversion (ADC)		
Energy saving	Energy Efficient Ethernet (802.3az)		
Dimensions (W x D x H)	442 mm x 476 mm x 175 mm	442 mm x 476 mm x 442 mm	442 mm x 476 mm x 664 mm
Weight (empty chassis)	< 15 Kg	< 30 Kg	< 45 Kg
Operating voltage	DC: -38.4 V to -72 V AC: 90 V to 290 V		
Total power capacity	2200 W	4400 W	4400 W

Applications

- **Applications in Carriers' MANs**

The S9300 provides carrier-class reliability, security, and manageability. By converging DSLAM, LAN, and enterprise access services, the S9300 provides large-capacity switching and high-density 10G interfaces. At the convergence layer, the interface rate can be smoothly upgraded from 10GE to 40GE/100GE, meeting the increasing bandwidth requirements of ISP networks. The S9300 supports features such as RRPP, Ethernet OAM, VRRP, and MPLS L2/L3VPN, and satisfies the requirements for IPTV, high speed Internet (HSI), and enterprise leased lines.
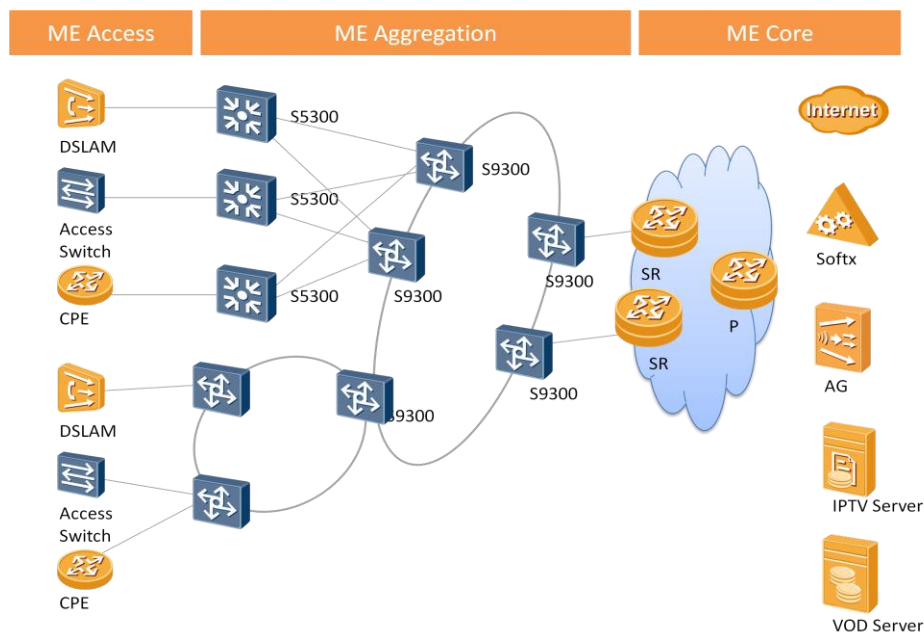
- **Applications in Large-Scale Data Centers**

The S9300 switches function as high-density 10G core and aggregation nodes in large-scale data centers, helping enterprises build highly reliable, non-blocking, and virtualized data center networks. The S9300 switches use various technologies, including IP FRR, hardware-level BFD, NSF, VRRP, and E-Trunk, to ensure uninterrupted services. In addition, the S9300 switches support the CSS function to improve network IT efficiency and reduce network maintenance costs.
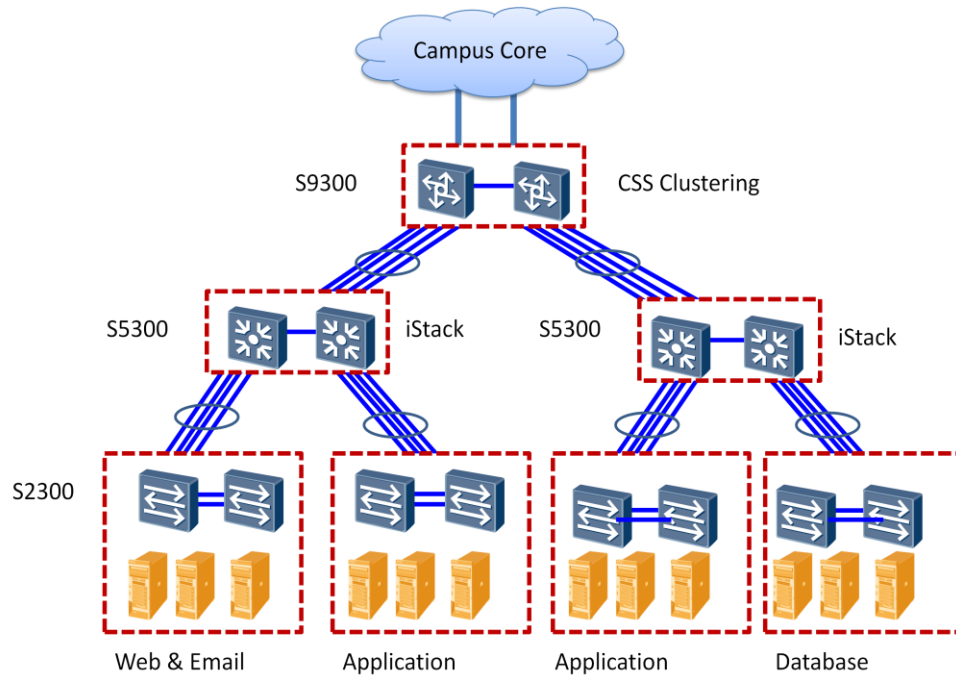
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