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1 Product Overview

Overview

The H3C S12500 series routing switches are new-generation core routing switches developed by Hangzhou H3C Technologies Co., Ltd. (hereinafter referred to as H3C) based on its 100 G platform. The S12500 series features:

- Advanced multi-level, multi-plane non-blocking switching architecture.
- Ultra-high port density and support for multiple interface types including the 10-GE XFP optical interface, GE SFP optical interface, and 10/100/1000 Mbps electrical interface.
- Future-proof design, allowing the series to provide in the future value-added security services like firewall, IPSec, and LB to meet the requirements of intelligent IP networks.

The S12500 series are mainly deployed at:

- core layer and distribution layer of large-scale data centers (DCs)
- core layer of large-scale industry networks and campus networks
- large clusters and grid computing

The S12500 series include these models:

- S12508

The S12508 provides eight line processing unit (LPU) slots, two main processing unit slots, and nine switching fabric module slots.

- S12518

The S12518 provides eighteen LPU slots, two main processing unit (MPU) slots, and nine switching fabric module slots.

Note

In this manual, the hardware configurations of the S12508 and the S12518 are the same unless otherwise specified.

General Architecture

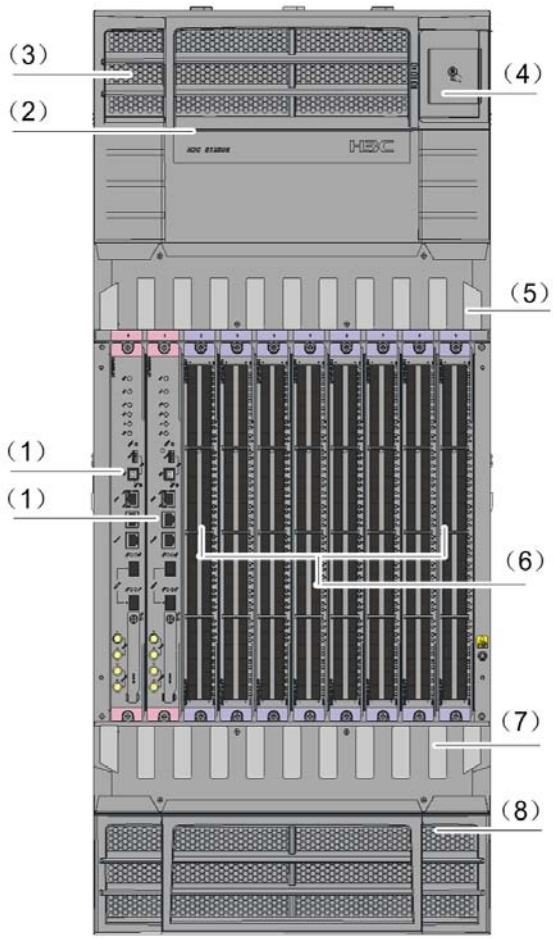
The S12500 series use an integrated chassis, which consists of a backplane section, power supply section, fan section, board section, and air filter section.

Chassis and Slots

Note

- When installed with two MPUs, the S12500 switch supports active/standby switchover.
- Your devices might look different from the figures in the manual.

Figure 1-1 S12508 front view

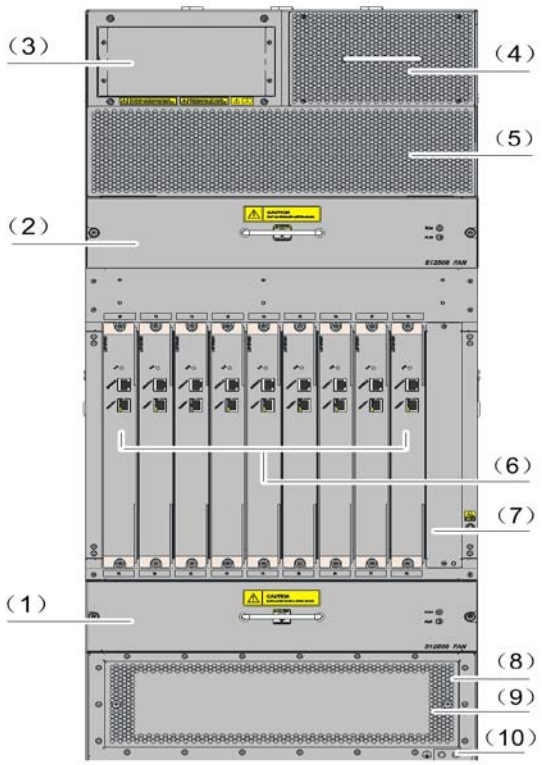


(1) MPU slots (slots 0 and 1)	(2) Power frame front panel	(3) Power frame slot
(4) Power switch	(5) Upper cabling rack	(6) LPU slots (slots 2 to 9)
(7) Lower cabling rack	(8) Air filter	

Note

You can open the front panel upwards so that you can see the power supply air filter and power frame slot.

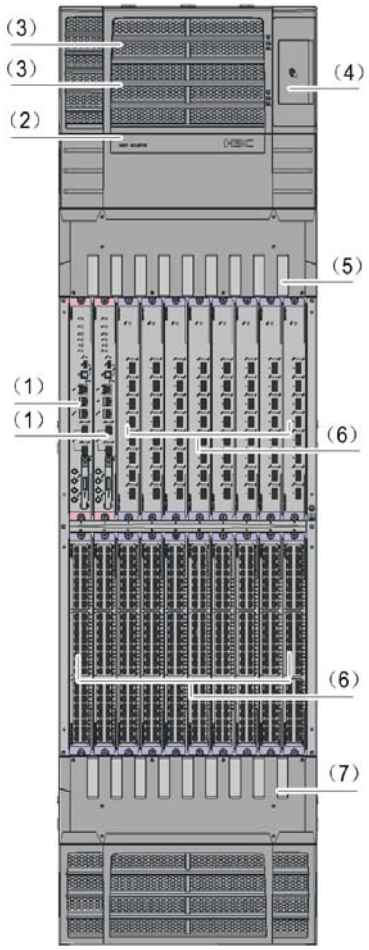
Figure 1-2 S12508 rear view



(1) Lower fan tray slot	(2) Upper fan tray slot	(3) Power input module slot
(4) Power air exhaust vents	(5) System air exhaust vents	(6) Switching fabric module slots (slots 10 to 18)
(7) Cover plate	(8) Air filter	(9) System air intake vents
(10) Grounding screw		

- The S12508 provides two MPU slots, eight LPU slots, and nine switching fabric module slots.
- The chassis top provides one AC power frame to accommodate up to six AC power modules (at least two are required).
- The rear of the chassis has two fan trays into which fans can be inserted horizontally. The fan on top exhausts warm air and the one below it draws in fresh air.

Figure 1-3 Front view of the S12518

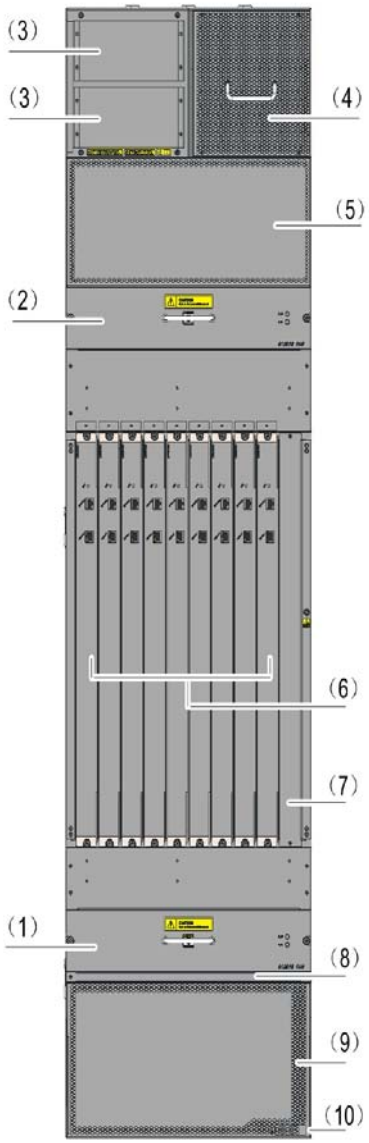


(1) MPU slots (slots 0 and 1)	(2) Front panel	(3) Two power frame slots
(4) Power switch	(5) Upper cabling rack	(6) LPU slots (slots 2 to 19)
(7) Lower cabling rack		

Note

You can open the front panel upwards so that you can see the power supply air filter and power supply slot.

Figure 1-4 S12518 rear view



(1) Lower fan tray slot	(2) Upper fan tray slot	(3) Two power input module slots
(4) Power air exhaust vents	(5) System air exhaust vents	(6) Switching fabric module slots (slots 20 to 28)
(7) Cover plate	(8) Air filter	(9) System air intake vents
(10) Grounding screw		

- The S12518 provides two MPU slots, 18 LPU slots, and nine switching fabric module slots.
- The chassis top provides two AC power frames to accommodate up to 2 × 6 AC power modules (at least two modules are required for each frame).
- The rear of the chassis has two fan trays into which fans can be inserted horizontally. The fan on top exhausts air and the one below it draws in fresh air.

Backplane

The backplane of an S12500 switch is located in the integrated chassis. It implements high-speed data interconnection between switching fabric modules and LPUs, and system management and control

signal exchange between MPUs and LPUs and switching fabric modules. .The backplane mainly implements these functions:

- Provides communication channels for signal exchange between boards.
- Supports hot-swapping of boards.
- Auto-detects types of boards in slots.
- Connects with power modules to provide distributed power supply for MPUs, LPUs, switching fabric modules, fan trays, and power modules, and to provide monitoring channels.

Power Supply System

The power supply system is at the chassis top. It allows the flexible configuration of power modules. The power supply fans draws cool air in from the front and exhausts air out the back.

AC power frame and AC power module

- An S12508 switch is configured with one AC power frame. An S12518 switch is configured with two AC power frames.
- Each AC power frame accommodates up to six hot-swappable 1U AC power modules.
- Supports load balancing and N+1/N+M redundancy for the power modules.

Table 1-1 AC power module specifications

Item	Description
Rated input voltage range	100 VAC to 120 VAC/200 VAC to 240 VAC; 50 Hz or 60 Hz
Max. input voltage range	90 VAC to 264 VAC; 47 Hz to 63 Hz
Output power	2000 W at 200 VAC to 240 VAC input

Note

An S12500 switch should be installed with at least two power modules. N+1 or N+2 redundancy is recommended.

Power entry module (PEM)

The PEM is located in the upper part of the chassis rear, as shown in Figure 1-2 and Figure 1-4, to supply power to the power modules. It supplies power to the PSUs.

Table 1-2 PEM specifications

PEM model	Description	Power modules supported
LSTM2PEMC6 (C20-type PEM)	• Applicable to 110V or 220 V AC power system and uses single-phase AC power. • Comprises six independent C20 (16 A) sockets, numbered 1, 3, and 5 from left to right on the upper part, and 2, 4, and 6 from left to right on the upper part.	6 (with C20 socket numbers corresponding to PSU IDs respectively)

Power monitoring module

The power monitoring module is (vertically installed) between the power module slots and power switch to monitor the alarm status, in-position status, and operating status of the power modules in real time.

Fan Tray

Both the S12508 and the S12518 have two fan trays (one on top of the other) to provide the following functions:

- Load balancing and 1+1 redundancy for effective heat dissipation and single-point failure prevention.
- Status monitoring: Fan rotation speed monitoring, fault alarms, and so on.
- Intelligent fan speed adjustment controlled by MPU or temperature. The speed of each fan group (four fan groups, each having three fans) is controlled to reduce noises and energy consumption effectively.
- Two LEDs on the front panel of a fan tray provide the fan tray operating information.

A fan tray consists of 12 fan units measuring 120 × 120 × 38 mm (4.72 × 4.72 ×1.50 in.) and one fan monitoring board. Fans receive DC power from the backplane. Fan trays are hot-swappable.

Note

When any fan unit in a fan tray fails, other fan units in the fan tray will rotate at the highest speed.

The S12508 and the S12518 use different fan trays with different powers:

- The maximum power of one S12508 fan tray is 160 W.
- The maximum power of one S12518 fan tray is 650 W.

The appearance and LEDs of the S12518 fan tray are similar to those of the S12508. The following uses the S12508 fan tray as an example.

Figure 1-5 S12508 fan tray

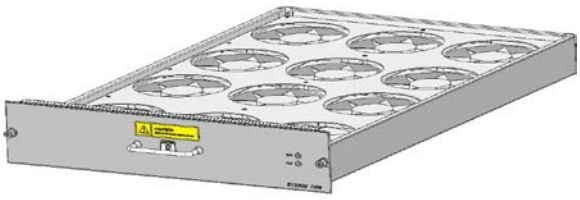
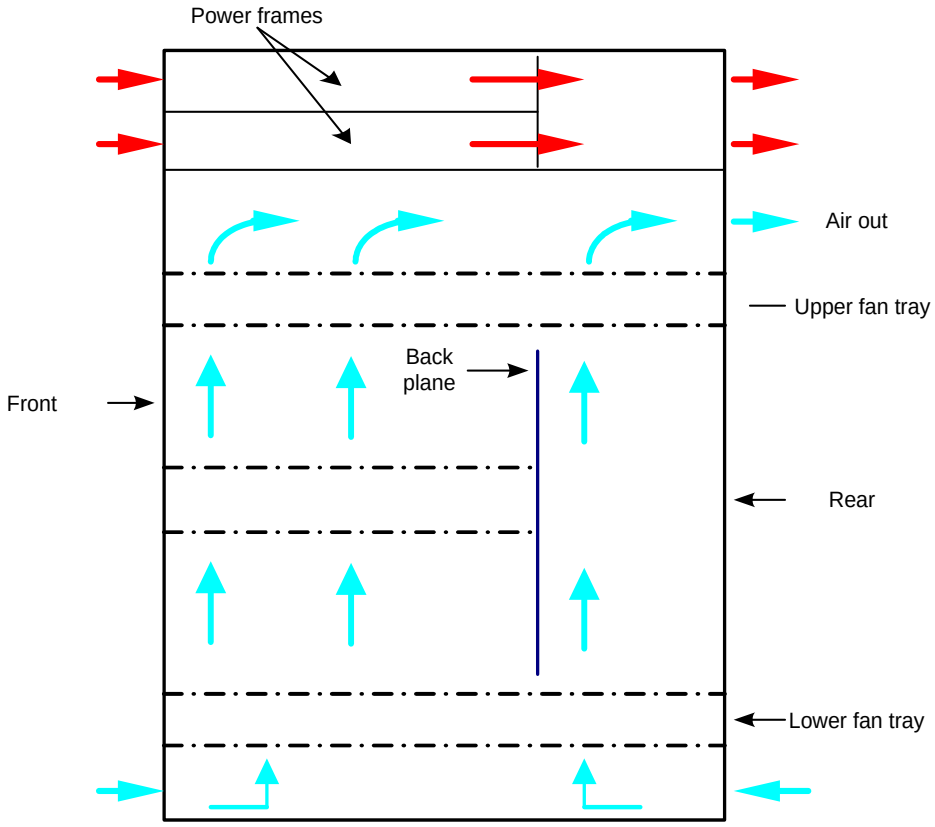


Table 1-3 Description of fan LEDs

LED	Color	Status	Description
RUN	Green	OFF	The fan tray fails.
		Blinking	The fan tray is operating normally.
ALM	Red	OFF	The fan tray is in a normal state.
		Blinking	The fan tray is faulty.

Figure 1-6 shows the ventilation inside the S12518 chassis. The ventilation inside the S12508 chassis is similar.

Figure 1-6 Ventilation inside the chassis



Main Processing Unit

Specifications

As the core of an S12500 switch, a main processing unit (MPU) implements the following functions:

- Calculating routes and maintaining forwarding tables;
- Providing system configuration and monitoring functions to monitor line cards, and upgrade and reset line card software.
- Supporting the Operation, Administration and Maintenance (OAM) functions.

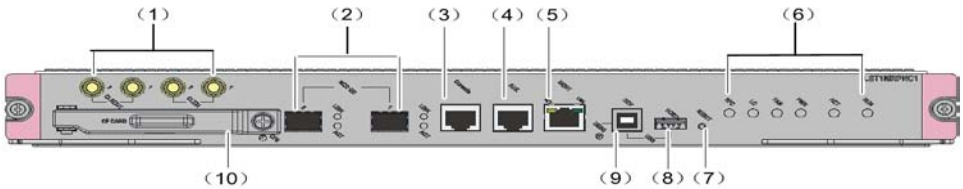
Table 1-4 MPU specifications

Item	Specifications
Model	LST1MRPNC1 (for S12508 and S12518)
CPU	MPC8548+MPC8544
Flash	128 MB
Boot ROM	4 MB
NVRAM	1 MB
SDRAM (DDR2)	1 GB (expandable to 2 GB)
CF card	256 MB by default
Dimensions (H × W × D)	40 × 400 × 467 mm (1.57 × 15.75 × 18.39 in.)
Interface type	• One Console port • One AUX port • One network management port • One CF card slot • One USB(HOST) interface For detailed interface specifications, see section S12500 Interface Specifications.
Power consumption range	45 W to 70 W

Note

- To use a USB disk on the MPU, you are recommended to purchase one from H3C.
- MPC8544 is the fast fault detection and restoration (FFDR) CPU.

Figure 1-7 LST1MRPNC1 front panel



(1) SMB coaxial clock interfaces (reserved)	(2) MCC GE interfaces and LEDs (reserved)
(3) Console port	(4) AUX port
(5) Network management port	(6) Status LEDs
(7) Reset button	(8) Active (HOST)USB interface
(9) Standby (DEV) USB interface and its LED (reserved)	
(10) CF card and its LED	

Note

Currently, the device does not support the standby (DEV) USB interface, MCC GE interfaces, and SMB coaxial clock interfaces.

LEDs

Table 1-5 Description of the CF card LED

LED	Status	Description
CFS	Steady ON	The CF card is in position and idle. Do not hot-unplug it now.
	Blinking	The CF card is in position and performing read/write operations. Do not unplug it now.
	OFF	The CF card is out of position or offline. You can plug in or unplug the CF card now.

Table 1-6 Description of MPU LEDs

MPU LED	Status	Description
SFC (green-red)	Blinking (green)	All the switching fabric modules are working normally.
	Blinking (red)	At least one switching fabric module is faulty.
	Steady ON	The MPU is faulty.
	OFF	The MPU is faulty.
LC (green-red)	Blinking (green)	All the line cards are working normally.
	Blinking (red)	At least one line card is faulty.
	Steady ON	The MPU is faulty.
	OFF	The MPU is faulty.
FAN (green-red)	Blinking (green)	All the fan trays are working normally.
	Blinking (red)	One or two fan trays are faulty.
	Steady ON	The MPU is faulty.
	OFF	The MPU is faulty.
PWR (green-red)	Blinking (green)	All the power frames are working normally.
	Blinking (red)	One or two power frames are faulty.
	Steady ON	The MPU is faulty.
	OFF	The MPU is faulty.
ACT (green)	ON	The board is in active state.
	OFF	The board is in standby state.
RUN (green-red)	Blinking (green)	The MPU is working normally.

MPU LED	Status	Description
	Blinking (red)	The MPU is faulty.
	Steady ON	The MPU is faulty.
	OFF	The MPU is faulty.

Line Cards

Specifications

Table 1-7 Line cards specifications

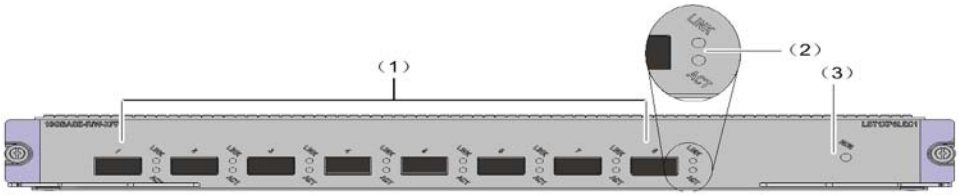
Item	Model				
	LST1XP8LEB1/LST1XP8LEC1	**LST1XP4LEB1/LST1XP4LEC1**	**LST1GP48LEB1/LST1GP48LEC1**	**LST1GT48LEB1/LST1GT48LEC1**	**LST1XP32REB1/LST1XP32REC1 (High-port-density card)**
CPU	MPC8544				
Boot ROM	2 MB				
SDRAM	512 MB				
Dimensions (H × W × D)	40 × 400 × 467 mm (1.57 × 15.75 × 18.39 in.)				
Interface type	10GBase-R XFP/LC optical interface; 10GBase-W XFP/LC optical interface		GE SFP/LC optical interface	10/100/1000 Mbps autosensing RJ-45 electrical interface	10GBase-R SFP+/LC optical interface
Power consumption range	210 W to 280 W / 233 W to 300 W	110 W to 140 W / 115 W to 150 W	105 W to 170 W / 115 W to 180 W	110 W to 175 W / 115 W to 190 W	About 315 W to 400 W / 325 W to 420 W

Note

For detailed interface type descriptions, see section S12500 Interface Specifications.

LST1XP8LEB1/LST1XP8LEC1

Figure 1-8 LST1XP8LEC1 front panel



(1) 10GBase-R XFP/LC optical interfaces/10GBase-W XFP/LC optical interfaces (eight in total)	
(2) Interface LEDs	(3) RUN LED of the line card

Note

The appearance of the LST1XP8LEB1 is similar to that of the LST1XP8LEC1.

Table 1-8 Description of LST1XP8LEB1/LST1XP8LEC1 interface LEDs

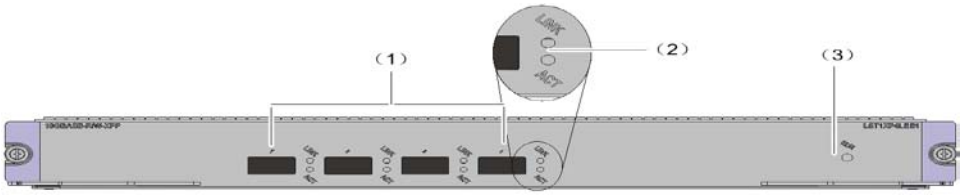
LED	Color	Status	Description
LINK	Green	OFF	No link is present.
		ON	A link is present.
ACT	Orange	OFF	No data is being transmitted or received through the interface.
		Blinking	The interface is receiving or sending data.

Table 1-9 Description of the RUN LED for the LST1XP8LEB1/LST1XP8LEC1 line card

LED	Status	Description
RUN (green-red)	Blinking (green)	The card is working normally.
	Blinking (red)	The card is faulty.
	Steady ON	The card is faulty.
	OFF	The card is faulty.

LST1XP4LEB1/LST1XP4LEC1

Figure 1-9 LST1XP4LEB1 front panel



(1) 10GBase-R XFP/LC optical interfaces/10GBase-W XFP/LC optical interfaces (four in total)	
(2) Interface LEDs	(3) RUN LED of the line card

Note

The appearance of the LST1XP4LEC1 is similar to that of the LST1XP4LEB1.

Table 1-10 Description of LST1XP4LEB1/LST1XP4LEC1 interface LEDs

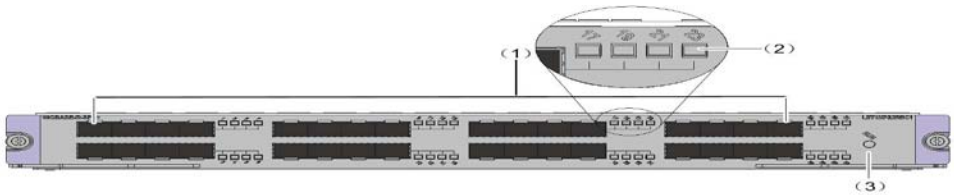
LED	Color	Status	Description
LINK	Green	OFF	No link is present.
		ON	A link is present.
ACT	Orange	OFF	No data is being transmitted or received through the interface.
		Blinking	The interface is receiving or sending data.

Table 1-11 Description of the RUN LED for the LST1XP4LEB1/LST1XP4LEC1 line card

LED	Status	Description
RUN (green-red)	Blinking (green)	The card is working normally.
	Blinking (red)	The card is faulty.
	Steady ON	The card is faulty.
	OFF	The card is faulty.

LST1XP32REB1/LST1XP32REC1

Figure 1-10 LST1XP32REC1 front panel



(1) 10GBase-R SFP+/LC optical interfaces (32 in total)	
(2) RUN LED of the line card	(3) Interface LEDs

Note

The appearance of the LST1XP32REB1 is similar to that of the LST1XP32REC1.

Table 1-12 Description of LST1XP32REB1/LST1XP32REC1 interface LEDs

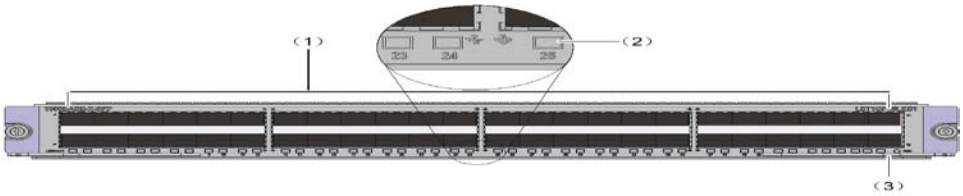
LED	Status	Description
LINK/ACT	Steady ON	A link is present.
	OFF	No link is present.
	Blinking	Data is being sent or received through the interface.

Table 1-13 Description of the RUN LED for the LST1XP32REB1/LST1XP32REC1 line card

LED	Status	Description
RUN (green-red)	Blinking (green)	The card is working normally.
	Blinking (red)	The card is faulty.
	Steady ON	The card is faulty.
	OFF	The card is faulty.

LST1GP48LEB1/LST1GP48LEC1

Figure 1-11 LST1GP48LEB1 front panel



(1)1000 Mbps SFP/LC optical interfaces (48 in total)	
(2) Interface LED	(3) RUN LED of the line card

Note

The appearance of the LST1GP48LEC1 is similar to that of the LST1GP48LEB1.

Table 1-14 Description of LST1GP48LEB1/LST1GP48LEC1 interface LEDs

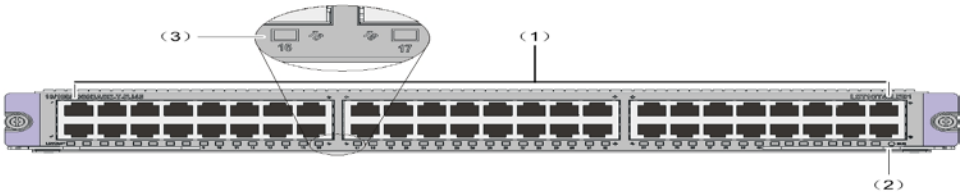
LED	Status	Description
LINK/ACT	Steady ON	The interface is properly connected to another interface.
	OFF	The interface is not connected to any other interface.
	Blinking	Data is being sent or received through the interface.

Table 1-15 Description of the RUN LED for the LST1GP48LEB1/LST1GP48LEC1 line card

LED	Status	Description
RUN (green-red)	Blinking (green)	The card is working normally.
	Blinking (red)	The card is faulty.
	Steady ON	The card is faulty.
	OFF	The card is faulty.

LST1GT48LEB1/LST1GT48LEC1

Figure 1-12 LST1GT48LEB1 front panel



(1) 10/100/1000 Mbps autosensing RJ-45 electrical interfaces (48 in total)	
(2) RUN LED of the line card	(3) Interface LED

Note

The appearance of the LST1GT48LEC1 is similar to that of the LST1GT48LEB1.

Table 1-16 Description of LST1GT48LEB1/LST1GT48LEC1 interface LEDs

LED	Status	Description
LINK/ACT	Steady ON	The interface is properly connected to another interface.
	OFF	The interface is not connected to any other interface.
	Blinking	Data is being sent or received through the interface.

Table 1-17 Description of the RUN LED for the LST1GT48LEB1/LST1GT48LEC1 line card

LED	Status	Description
RUN (green-red)	Blinking (green)	The card is working normally.
	Blinking (red)	The card is faulty.
	Steady ON	The card is faulty.
	OFF	The card is faulty.

Switching Fabric Modules

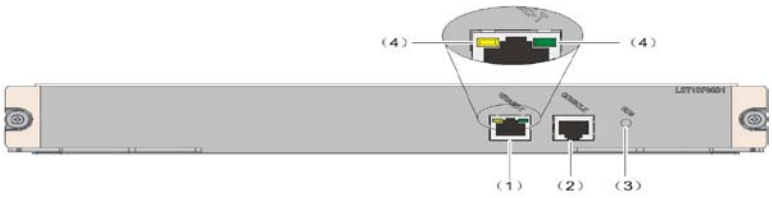
Specifications

Table 1-18 Switching fabric modules specifications

Item	Model	
	LST1SF08B1	LST1SF18B1
Applicable device	S12508	S12518
CPU	MPC8248	MPC8248
Boot ROM	4 MB	4 MB
SDRAM	128 MB	128 MB
Dimensions (H × W × D)	167 × 40 × 318 mm (6.57 × 1.57 × 12.52 in.)	167 × 40 × 618 mm (6.57 × 1.57 × 24.33 in.)
Power consumption range	36 W to 45 W	93 W to 110 W

LST1SF08B1

Figure 1-13 LST1SF08B1 front panel



(1) 10Base-T interface	(2) Console port
(3) RUN LED of the switching fabric module	(4) Interface LEDs

Table 1-19 Interface LEDs

LED	Color	Status	Description
LINK	Green	OFF	No link is present.
		ON	A link is present.
ACT	Orange	OFF	No data is being transmitted or received through the interface.
		Blinking	The interface is receiving or sending data.

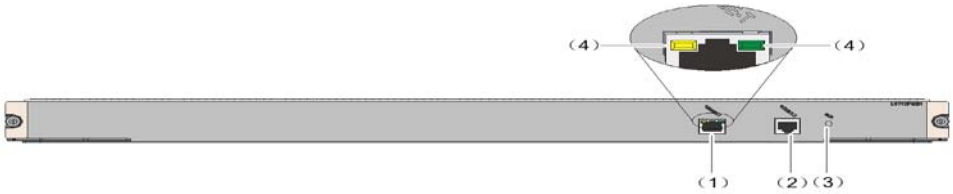
Table 1-20 Description of the RUN LED for the LST1SF08B1 switching fabric module

LED	Status	Description
RUN	Blinking (green)	The board is working normally.

LED	Status	Description
(green-red)	Blinking (red)	The board is faulty.
	Steady ON (red or green)	The board is faulty.
	OFF	The board is faulty.

LST1SF18B1

Figure 1-14 LST1SF18B1 front panel



(1) 10Base-T interface	(2) Console port
(3) RUN LED of the switching fabric module	(4) Interface LEDs

Table 1-21 Description of the interface LEDs

LED	Color	Status	Description
LINK	Green	OFF	No link is present.
		ON	A link is present.
ACT	Orange	OFF	No data is being transmitted or received through the interface.
		Blinking	The interface is receiving or sending data.

Table 1-22 Description of the RUN LED for the LST1SF18B1 switching fabric module

LED	Status	Description
RUN (green-red)	Blinking (green)	The board is working normally.
	Blinking (red)	The board is faulty.
	Steady ON (red or green)	The board is faulty.
	OFF	The board is faulty.

2 Features

Overview

The main features of the S12500 series are as follows:

- Advanced system architecture: Super-large capacity and excellent scalability
- Intelligent Resilient Framework 2 (IRF): Innovative virtualization technology
- High-performance QoS: Large-capacity buffer, supporting a burst size of data in 200 ms
- High availability and zero service interruptions
- All-round security mechanism
- Superior ease of use: Abundant maintenance and diagnosis functions
- Environment-friendly design

Advanced System Architecture

- The sixth-generation 100G-platform-based switches adopt a multi-level, multi-plane, non-blocking switching architecture to provide higher performance and better scalability, fully meeting the requirements of data centers and future development.
- Super-large switching capacity: For the switching capacity provided by a single device, refer to Table 3-1.
- Ultra-high port density: One device supports Up to 576 × 10-GE ports to meet the high-density application requirements of data centers.
- Distributed high-performance forwarding: The packet processing capability reaches 1900 Mpps, and L2/IPv4/IPv6/MPLS distributed full wire-speed forwarding is supported.
- Per-slot bandwidth is 180 Gbps (expandable to 360 Gbps), with smooth support for 40-GE and 100-GE next-generation Ethernet interfaces.

Intelligent Resilient Framework (IRF)

- Providing an advanced virtualization technology that allows multiple switches to be interconnected to form one logical switching entity, thus reducing the maintenance cost.
- Supporting inter-frame resilient interconnection of ports and inter-frame link aggregation. IRF supports the resilient interconnection of up to twelve 10-GE ports located in different frames, providing bandwidth of up to 120 Gbps. In addition to expanding the available ports and switching capacity, IRF also enhances the reliability of the devices, reducing the impact of single device failures on the network.

High-Performance QoS

- Average 256 MB buffer for each 10GE port, supporting a burst size of data in 200 ms to meet the high burst size requirements at large data centers.

- Unique and leading distributed service scheduling based on Credit allocation and Pull mode: Each port supports eight queues to allow for accurate bandwidth allocation and traffic shaping per queue, supporting SP, DWRR, and SP+DWRR scheduling. The Pull mode naturally supports distributed ingress buffering so that the buffers on the service boards can be shared and used effectively. The Pull mode has the advantages of non-blocking and accurate control over the traditional Push mode. This enables the system to achieve substantial developments in terms of QoS.

High Availability and Zero Service Interruptions

- Fully-distributed switching architecture and software architecture: Basis for high performance, high scalability, and high availability
- Separation between the control plane and forwarding plane, 1+1 redundancy for control plane, and N+1 redundancy for forwarding plane enhance the system's fault isolation ability and reliability.
- Control plane has three CPU systems: MPU CPU system, Fast Fault Discovery and Restore (FFDR) CPU system, and Embedded Maintenance Subsystem (EMS). The FFDR CPU system is dedicated to quickly detecting BFD, OAM, and other faults and cooperates with the protocols at the control plane to support fast protection switchover and fast convergence. The EMS CPU system supports power management and provides an emergency channel.
- N+1 redundancy and fault tolerance of switching plane: Automatic fault detection and isolation in sub-microseconds. When redundancy is configured, the failure of a switching fabric module does not affect service provisioning. When no redundancy is configured, the forwarding performance degrades as the number of faulty boards increases to achieve Graceful Degrade.
- L2 reliability: Ethernet port bundling, DLDP, Smart Link, and RRPP
- L3 reliability: NSF/GR for uninterrupted forwarding, ECMP, fast reroute (FRR), and BFD for VRRP/BGP/IS-IS/RIP/OSPF/RSVP/static routing.
- Service reliability: TE FRR/IP FRR/LDP FRR/VPN FRR.
- Supports online patching.
- Vertical-insertion structure and 1+1 redundant fan trays fully meet the ventilation and reliability requirements of data centers. 1+1 redundant power frames, N+M redundant power modules

All-Round Security Mechanism

- Support for bit-based masks to perform accurate secure access control for L2/IPv4/IPv6/MPLS packets and their field combinations; PCL rule flexibility: Ingress PCL, Egress PCL, VLAN PCL, Port PCL, and global PCL; PCL action flexibility: Permit, Deny, redirecting to Next Hop/CPU/Port/ Trunk/Tunnel, mirroring to CPU/Port/Trunk/VLAN, Mark/Remark DSCP/EXP /UP/TC/DP, and traffic accounting and policing.
- Multi-level protection and security of control plane: Uses PCLs to identify the protocol traffic transferred to the control CPU, mirror the traffic to different queues, perform priority scheduling and traffic control, prevent Distributed Denial of Service (DDoS) attacks, and support hardware-based traffic limiting.
- Multi-level protection and security of forwarding plane: port security control, bridge security control, route security control, and application layer security control. Large-capacity bidirectional ACL, uRPF, address binding, and port isolation.
- Management plane security: Supports SSH, Radius/TACACS+, and Syslog.
- Multiple attack prevention mechanisms: ARP depth detection, IP attack detection, TCP attack detection, IP Source Guard, and so on.

Superior Ease of Use

- Automatically detects, reports, and isolates hardware faults.
- Power management, environment and hot spot temperature monitoring, automatic adjustment of fan speed.
- Saves key information before the CPU system reboots due to a fault for subsequent fault analysis and location.
- Supports board offline fault diagnosis to quickly and conveniently locate site faults.
- Network Quality Analyzer (NQA): Supports service-level online fault diagnosis, analyzes network or service quality by using different detection methods, such as TCP, UDP-Jitter, ICMP, HTTP, FTP, DHCP, DLSw, and SNMP, and generates detection results.
- Visual network traffic monitoring and analysis: Sampled Flow (sFlow) is a network traffic monitoring technology based on packet sampling. sFlow mainly analyzes network traffic and supports accurate network traffic monitoring over Gigabit or higher-speed networks.
- Supports 802.3ah OAM and provides multiple device-level and network-level fault detection methods.

Environment-Friendly Design

- Developed power management functions allow powering off idle boards to reduce power consumption.
- Temperature monitoring, automatic fan speed adjustment, and fan section speed adjustment effectively reduce noises and extends fan service periods.

3 Technical Specifications

S12500 System Configuration

Table 3-1 S12500 system configuration

Item	S12508	S12518
Switching capacity	3.06 Tbps	6.66 Tbps
Packet forwarding rate	960 Mpps	2160 Mpps
Number of LPU slots	8	18
Number of MPU slots	2	2
Number of switching fabric module slots	9	9
Max. number of 10GE ports	256	576
Max. number of GE ports	384	864
MPU redundancy	1+1	1+1
Redundant backup for switching fabric module	N+1 (N = 6 to 8)	N+1 (N = 6 to 8)
Fan tray	1+1	1+1
Total power	4700 W	11100 W
Output power	≤ 12000 W	≤ 12000 W × 2
Dimensions (H × W × D)	975 × 442 × 740 mm (38.39 × 17.40 × 29.13 in.)	1686 × 442 × 740 mm (66.38 × 17.40 × 29.13 in.)
Weight	Net weight: < 95 kg (209.44 lb.) Full configuration: 160 kg (352.73 lb.)	Net weight: < 160 kg (352.73 lb.) Full configuration: 280 kg (617.28 lb.)
MTBF (years)	27	25
Availability	0.999995	0.999994
Operating temperature	0°C to 40°C (32°F to 104°F) (long-term) –10°C to 50°C (14°F to 122°F) (no more than 96 hours of continuous operation and less than 15 days in one year)	
Relative humidity (noncondensing)	5% to 90%	
Storage temperature	–40°C to +70°C (–40°F to 158°F)	
Operating altitude	⩽ 3000 m (9842.52 ft.)	

Note

Values followed by an asterisk (*) are to be supported in a later release.

S12500 Interface Specifications

The S12500 series support the following interface types:

- Console Port
- Network Management Interface
- AUX Port
- USB Interfaces
- CF Card Slot
- 10G XFP Transceiver
- 10G SFP+ Transceiver
- Gigabit SFP Transceiver
- 10/100/1000 Mbps Electrical Interface

Console Port

The console port adopts an RJ-45 connector and can be connected to a computer for system debugging, configuration, maintenance, management, and host software loading.

Table 3-2 Console port specifications

Item	Specification
Connector	RJ-45
Interface standard	Asynchronous EIA/TIA-232
Baud rate	9600 bps to 115200 bps (9600 bps by default)
Supported services	It can be connected to the serial interface of a local PC running terminal emulation software, or to an ASCII terminal. Command line interface (CLI) is supported.

Network Management Interface

The 10/100/1000BASE-T autosensing RJ-45 network management interface allows you to perform software upgrade and device management through an NMS, without occupying any service port slot.

Table 3-3 Network management interface specifications

Item	Specification
Connector	RJ-45
Number of interfaces	1
Interface speed	10/100/1000 Mbps, autosensing

Item	Specification
Transmission medium and maximum transmission distance	Crossover, category-5 twisted pair cable, with a maximum transmission distance of 100 m (328.08 ft.)
Supported services	Device software upgrade and network management

AUX Port

The AUX port adopts an RJ-45 connector. As the backup port for the console port, the AUX port can be connected to a terminal or through a pair of Modems to a remote device for remote debugging, configuration, maintenance, and management.

Table 3-4 AUX port specifications

Item	Specification
Connector type	RJ-45
Interface standard	Asynchronous EIA/TIA-232
Baud rate	9600 bps to 115200 bps (115200 bps by default)
Supported services	It can be connected to the serial port of a remote PC through dialup connection (using a pair of modems at the two ends).

USB Interfaces

Table 3-5 USB interface specifications

Item	Specification
Connector type	USB A type connector for the HOST USB interface (Active) USB B type connector for the DEV USB interface (Standby)
Interface standard	USB 2.0 (full-speed 12 Mbps, low-speed 1.5 Mbps)
Supported service	External storage media is supported.

CF Card Slot

Compact flash (CF) cards are advanced portable storage products. They have fast-speed, large-capacity, small volume, light-weight, and low power consumption.

Table 3-6 CF card slot specifications

Item	Specification
Number of CF card slots	1
Supported CF card capacity	256 MB/512 MB/1 GB (256 MB by default)
CF card function	It can be used to record logs and store multiple program files and configuration files.

Note

- The device only supports CF cards provided by H3C. If other CF cards are used, compatibility and reliability cannot be ensured.
- An inserted CF card can be used only after you install and fasten the card cover.

10G XFP Transceiver

Table 3-7 10G XFP transceiver specifications

Model	Central wavelength	Connector	Fiber	Max. transmission distance
XFP-SX-MM850	850 nm	LC	62.5/125 µm multimode fiber	33 m (108.27 ft.)
			50/125 µm multimode fiber	300 m (984.25 ft.)
XFP-LX-SM1310	1310 nm		9/125 µm single mode fiber	10 km (6.21 miles)
XFP-LH40-SM1550-F1	1550 nm		9/125 µm single mode fiber	40 km (24.86 miles)
XFP-LH80-SM1550	1550 nm		9/125 µm single mode fiber	80 km (49.71 miles)

10G SFP+ Transceiver

Table 3-8 10G SFP+ transceiver specifications

Model	Central wavelength	Connector	Fiber	Max. transmission distance
SFP+-SR-MM850	850 nm	LC	62.5/125 µm multimode optical fiber	33 m (108.3 ft)
			50/125 µm multimode optical fiber	300 m (984.25 ft.)
SFP-XG-LX220-MM1310	1310nm	LC	62.5/125 µm multimode optical fiber	220 m (721.79 ft.)
			50/125 µm multimode optical fiber	
SFP-XG-LX-SM1310	1310nm	LC	9/125 µm single-mode optical fiber	10 km (6.21 miles)

Gigabit SFP Transceiver

Table 3-9 1G SFP transceiver specifications

Model	Central wavelength	Connector	Fiber/cable	Max. transmission distance
SFP-GE-SX-MM850-A	850 nm	LC	50/125μm multimode optical fiber	550 m (1804.46 ft.)
			62.5/125μm multimode optical fiber	275 m (902.23 ft.)
SFP-GE-LX-SM1310-A	1310 nm		9/125μm single mode optical fiber	10 km (6.21 miles)
SFP-GE-LH40-SM1310				40 km (24.86 miles)
SFP-GE-LH40-SM1550	1550 nm			
SFP-GE-LH70-SM1550				70 km (43.50 miles)
SFP-GE-LH100-SM1550				100 km (62.14 miles)
SFP-GE-LX-SM1310-BIDI	1490 nm (receive)/1310 nm (send)			10 km (6.21 miles)
SFP-GE-LX-SM1490-BIDI				10 km (about 6.21 miles)
SFP-GE-LH70-SM1470-CW	1470 nm			70 km (43.50 miles)
SFP-GE-LH70-SM1490-CW	1490 nm			
SFP-GE-LH70-SM1510-CW	1510 nm			
SFP-GE-LH70-SM1530-CW	1530 nm			
SFP-GE-LH70-SM1550-CW	1550 nm			
SFP-GE-LH70-SM1570-CW	1570 nm			
SFP-GE-LH70-SM1590-CW	1590 nm			
SFP-GE-LH70-SM1610-CW	1610 nm			
SFP-GE/FE-LX10-SM1310	1310 nm			10 km (6.21 miles)

Model	Central wavelength	Connector	Fiber/cable	Max. transmission distance
SFP-FE-SX-MM1310-GE	1310 nm		50/125μm multimode optical fiber	10 km (about 6.21 miles)
			62.5/125μm multimode optical fiber	
SFP-GE-T	—	RJ-45	Category 5 twisted pair	100 m (328.08 ft.)

Note

The optical transceiver SFP-FE-SX-MM1310-GE supports 100 Mbps only.

10/100/1000 Mbps Electrical Interface

A 10/100/1000 Mbps electrical interface adopts an RJ-45 connector, which connects with a category 5 twisted pair cable with a maximum transmission distance of 100 m (328.08 ft.).

Figure 3-1 RJ-45 connector

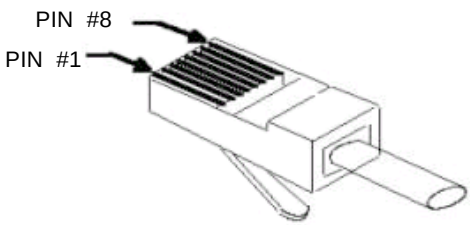


Table 3-10 Pin assignment of the RJ-45 connector

Pin No	10Base-T/100Base-TX/1000Base-T	
	Signal	Function
1	MX_0+	Transmit and receive data
2	MX_0-	Transmit and receive data
3	MX_1+	Transmit and receive data
4	MX_2+	Transmit and receive data
5	MX_2-	Transmit and receive data
6	MX_1-	Transmit and receive data
7	MX_3+	Transmit and receive data
8	MX_3-	Transmit and receive data

S12500 Software Feature List

Table 3-11 S12500 software feature list

Category	Features
Link layer	Link aggregation, port isolation, port mirroring DLDP
MAC address management	Limit to the number of MAC addresses learned Static MAC address configuration
VLAN	Port-based VLAN
QinQ	Basic QinQ and selective QinQ
Virtualization	IRF
Spanning Tree Protocol	STP/MSTP/RSTP BPDU tunnel Digest snooping
Traffic suppression	Port-based broadcast/unknown multicast/unknown unicast traffic suppression Traffic thresholds defined as a rate in pps or bps
Traffic accounting	Output queue traffic accounting PCL accounting (EPCL/IPCL)
QoS	Mark/reMark CAR (Ingress/Egress) Traffic shaping (Egress) Congestion management Queue management Dynamic modular QoS CLI (MQC)
ACL	Ingress/egress ACLs Basic/advanced/user-defined ACLs Port-based/VLAN/global ACLs
IPv4 protocols	TCP, UDP, RawIP, Ping, TraceRoute Telnet, FTP, TFTP ICMPv4 DNS UDP Helper DHCP NTP ARP, ARP Proxy Soft NAT

Category	Features
IPv6 protocols	IPv4/IPv6 dual stack TCP6, UDP6, RawIP6, Pingv6, TraceRoute6 Telnet6, FTP6, TFTP6 DNS6 ICMPv6 VRRPv3 DHCP6 ND PMTUD (IPv6)
IPv4 routing protocols	RIPv1/v2 OSPFv2 IS-IS BGPv4 Static routing/route policy/route recursion/policy based routing for IPv4
IPv6 routing protocols	RIPng OSPFv3 IS-IS6 BGP4+ Static routing/route policy/route recursion/policy based routing for IPv6
Layer-2 multicast	IGMPv1/v2/v3 Snooping MLDv1/v2 Snooping IPv4/IPv6 multicast VLAN+
Layer-3 multicast	Multicast static routing IPv4 intra-domain routing, IPv4 inter-domain routing IPv4 multicast group management IPv6 intra-domain routing, IPv6 inter-domain routing IPv6 multicast group management
MPLS	MPLS L3VPN MPLS TE/FRR VPLS VLL Multicast VPN
Device security	Data packet attack defense Protocol packet attack defense Attack detection Protocol packet protection Packet receive/send diagnosis
Network security	Packet validity check URPF check Packet filtering ARP attack defense SIP/SA consistency check Protocol-classification-based traffic limit

Category	Features
User security	Device management security Network user binding NAS AAA SSH2.0
Device management methods	CLI-based device configuration through the console port Remote CLI-based device configuration through the AUX port (Modems are used in between.) CLI-based device management through Telnet CLI-based device management through sTelnet (SSH)
File management	File upload/download through FTP/TFTP File upload/download through SFTP/SCOPY Creation, copy, deletion, and saving of files and directories and formatting
Supported system operating modes	• Standard mode • Enhanced Layer-2 mode • Enhanced Layer-3 mode
Network maintenance	Ping TraceRoute LSP Ping/Tracert mTraceRT Port loopback detection NQA
Network management	SNMPv1/SNMPv2c/SNMPv3 RMON Network management platform iMC LLDP/LLDP-MED MIB
HA	Board hot swapping Switching fabric module redundancy Active/standby switchover Inline hot fix GR VRRP, VRRPE BFD for VRRP/BGP/IS-IS/RIP/OSPF/RSVP/static routing Smart Link RRPP IP FRR IRF-BASED-ISSU MPLS TE FRR

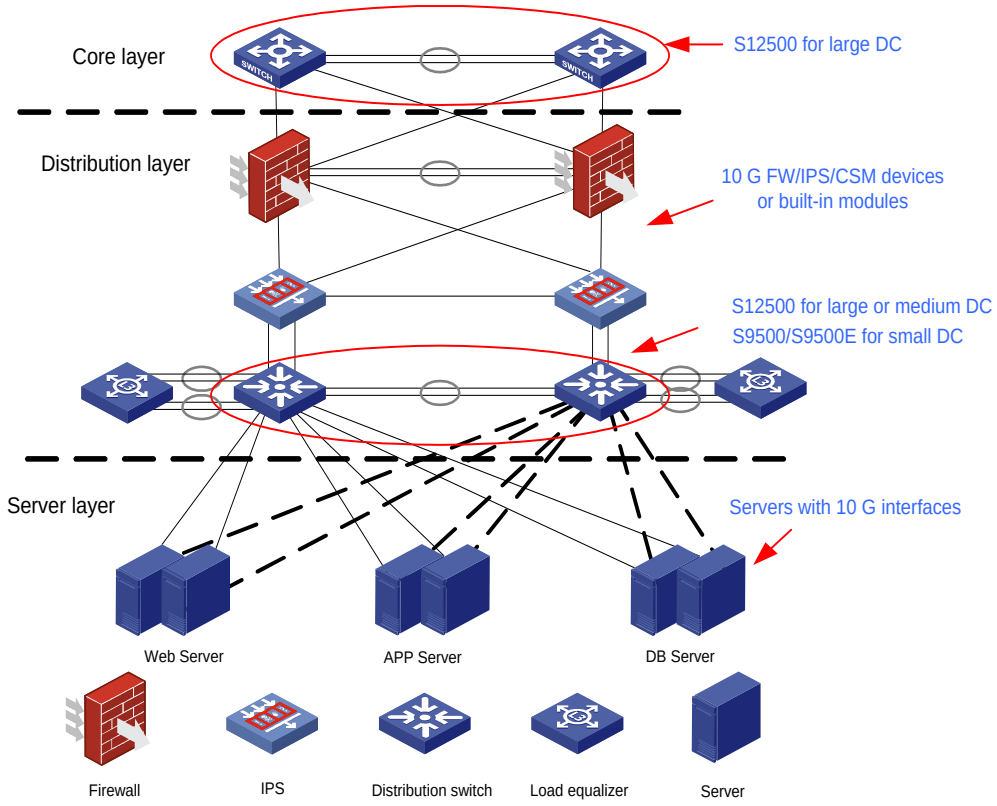
Note

All specifications are subject to changes without notice. For up-to-date information, refer to the latest manuals on H3C website at www.h3c.com.

4 Typical Applications

Data Centers

Figure 4-1 Data center scenario



Data centers combine data computation, switching, and storage. They are essential to the business operations of enterprises. Data centers combine network and storage technologies and represent most service requests and data storage traffic on networks. The S12500 series can help you build a reliable, secure, manageable data center network.

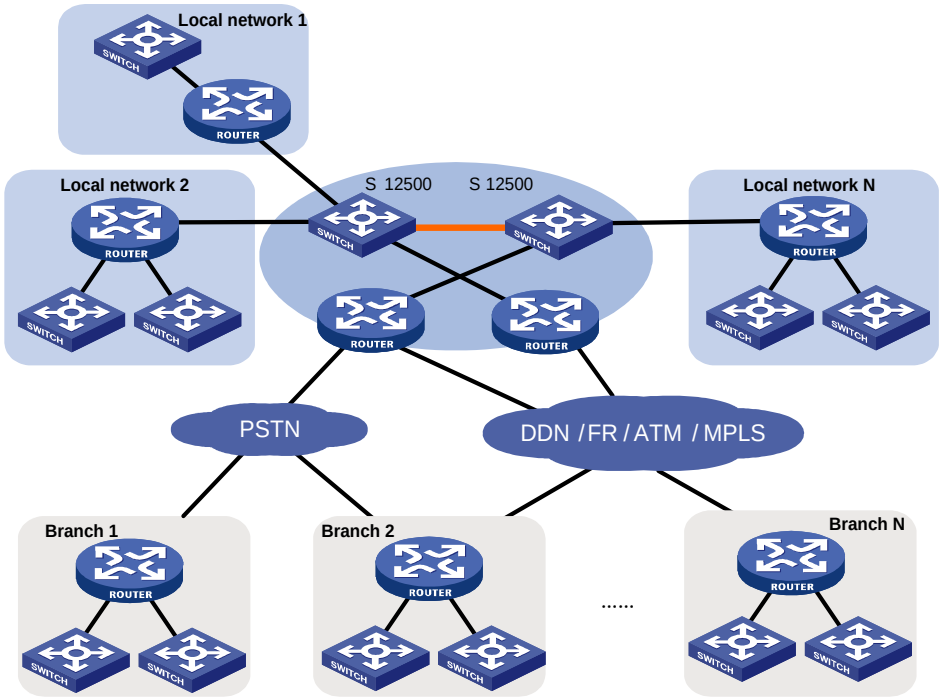
As shown in Figure 4-1, the data center network is broken down into the core layer, distribution layer, and server layer. The S12500 series are deployed at the core layer and the distribution layer.

- The core layer of a data center network functions to fast forward data and deliver high reliability based on the data link and network layer to avoid single points of failure. The S12500 series deliver sound reliability mechanisms while delivering powerful forwarding capacity with its dense 10-GE ports. See High Availability and Zero Service Interruptions) for more information.
- By employing IRF, the S12500 series not only expand the available ports and switching capacity, but also simplify the network structure and help save the management costs. With features such as mutual backup among member devices and inter-frame link aggregation, the S12500 series promote the reliability of data center networks to a new level.

- At the distribution layer, the S12500 series deliver a wide range of features like high-capacity ingress/egress ACLs/VLAN ACLs, and VRRP to provide strong support for services. See S12500 Software Feature List for more information. At the distribution layer, you can network the S12500 series with H3C S9500E/S7500E/S5800 switches, firewall, and IPS devices to provide a total network solution.

Core Switches on Enterprise Networks

Figure 4-2 S12500 application in the core of enterprise networks



- With large switching capacity and Layer-2/-3 wire speed forwarding, the S12500 series can be deployed as core switches on an enterprise network for high-capacity data switching.
- With sound high reliability design and mechanisms, the S12500 series can maintain normal operations of the enterprise network well. See High Availability and Zero Service Interruptions) for more information.
- With complete MPLS VPN solutions, the S12500 series can help isolate data of different services.
- The S12500 series can be networked with H3C S9500/S9500E/S7506E/S5516/S3526 switches, and low-end to mid-range routers to provide a total network solution.

5 Ordering Guide

Ordering an S12500 Routing Switch

This section tells you what to consider when purchasing an S12500 routing switch.

Network requirements

- Location of the switch in your network, and the role it plays
- Adequate switching capability of the switch for handling network traffic
- Required processing and connecting capabilities for uplinks and downlinks
- Scalability of the switch for network expansion
- Reliability required
- Required transmission distance in the network

Chassis

Table 5-1 S12500 models

Model	Configuration	Remarks
S12508	S12508 chassis, 8 LPUs, 3.06 Tbps switching capacity	Please select as needed
S12518	S12518 chassis, 18 LPUs, 6.66 Tbps switching capacity	

Power modules

Table 5-2 S12500 power modules

Specification	Quantity	Remarks
100 VAC to 120 VAC/200 VAC to 240 VAC	S12508: equipped with one PSU frame, which can accommodate up to 6 power modules S12518: equipped with one or two PSU frames, each of which can accommodate up to 6 power modules.	The power modules equipped should meet the power requirement of the switch. N+1 or N+2 redundancy is recommended.

MPUs

Table 5-3 S12500 MPUs

MPU	Product models	Remarks
LST1MRPNC1	Applicable to S12508 and S12518	OAM supported

Line Cards

Table 5-4 S12500 line cards

LPU	Configuration	Remarks
LST1XP8LEB1/LST1XP8LEC1	Eight 10GBase-R XFP/LC optical interfaces/10GBase-W XFP/LC optical interfaces	Applicable to the S12508 and S12518.
LST1XP4LEB1/LST1XP4LEC1	Four 10GBase-R XFP/LC optical interfaces /10GBase-W XFP/LC optical interfaces	
LST1XP32REB1/LST1XP32REC1	Thirty-two 10GBase-R SFP+/LC optical interfaces (high-port-density card)	
LST1GP48LEB1/LST1GP48LEC1	Forty-eight 1G SFP/LC optical interfaces	
LST1GT48LEB1/LST1GT48LEC1	Forty-eight 10/100/1000 Mbps autosensing RJ-45 electrical interfaces	

Switching Fabric Modules

Table 5-5 S12500 switching fabric modules

Switching fabric module	Specification	Remarks
LST1SF08B	N+1 redundancy supported (N is in the range 6 to 8)	Applicable to the S12508
LST1SF18B	N+1 redundancy supported (N is in the range 6 to 8)	Applicable to the S12518