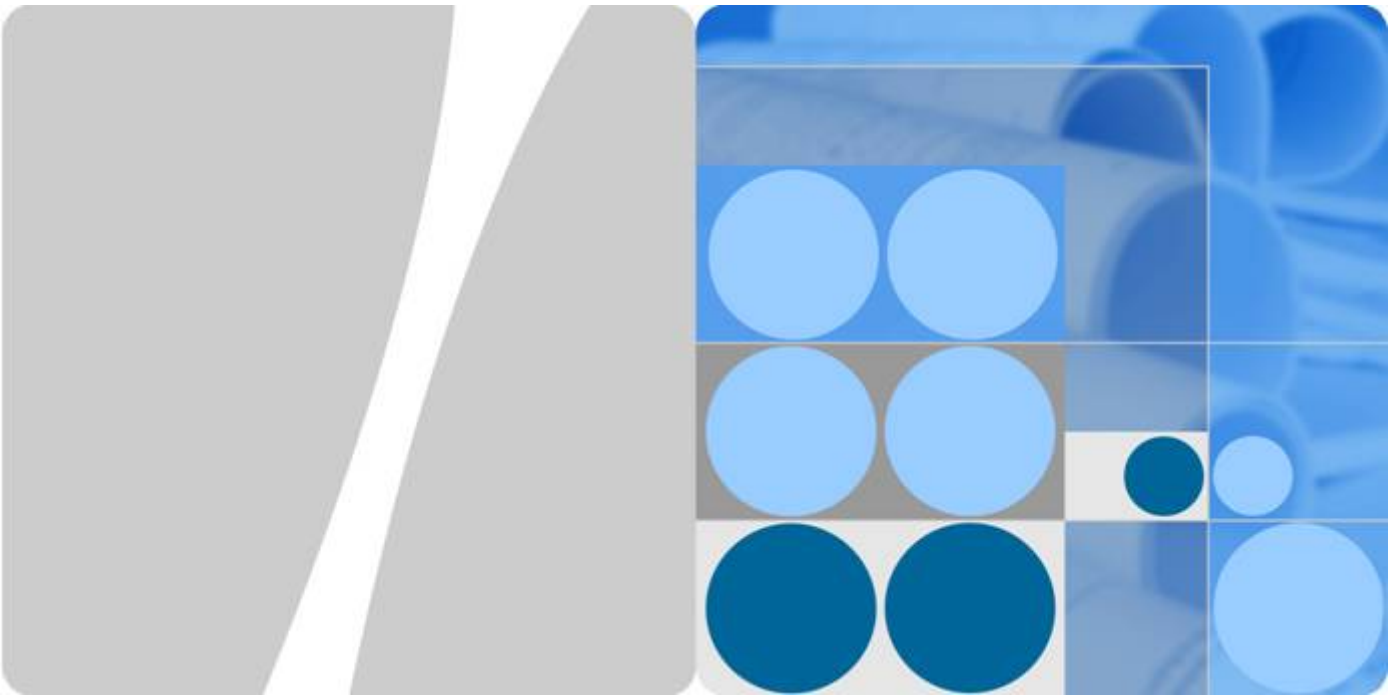

S7700 Smart Routing Switch

Product Description

Issue 03

Date 2014-01-24

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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://enterprise.huawei.com

About This Document

Intended Audience

This document describes the positioning, characteristics, architecture, link features, service features, application scenarios, operation and maintenance functions, and technical specifications of the switch.

This document helps you understand the characteristics and features of the switch.

This document is intended for:

- Network planning engineers
- Hardware installation engineers
- Commissioning engineers
- Data configuration engineers
- On-site maintenance engineers
- Network monitoring engineers
- System maintenance engineers

Statement

The device provides the mirroring function for network monitoring and fault management, during which communication data of users may be collected. Huawei alone is unable to collect or save the content of users' communications. It is suggested that you activate the interception-related functions based on the applicable laws and regulations in terms of purpose and scope of usage. You are obligated to take considerable measures to ensure that the content of users' communications is fully protected when the content is being used and saved.

The device provides the NetStream function for network traffic statistics collection and advertisement, during which personal data of users may be used. You are obligated to take considerable measures, in compliance with the laws of the countries concerned and the user privacy policies of your company, to ensure that the personal data of users is fully protected.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Updates between document issues are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Changes in Issue 03 (2014-01-27)

The third commercial release has the following updates:

The documentation is modified according to updates in product features.

Changes in Issue 02 (2013-07-25)

The second commercial release has the following updates:

The documentation is modified according to updates in product features.

Changes in Issue 01 (2013-05-30)

Initial commercial release.

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1 Mapping Between the S7700 Series Switches and Software Versions

Figure 1-1 shows S7700 version evolution.

Figure 1-1 S7700 version evolution

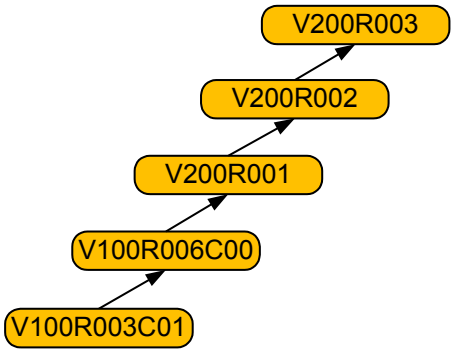


Table 1-1 lists the mapping between S7700 series switches and software versions.

Table 1-1 Mapping between the S7700 series switches and software versions

Device Series	Device Model	Software Version
S7700	S7703	V100R003C01 and later versions
	S7706	V100R003C01 and later versions
	S7712	V100R003C01 and later versions

NOTE

Unless otherwise specified, this document describes matching hardware and software performance of the switch in the latest version.

2 Product Overview

About This Chapter

2.1 System Overview

2.2 Product Characteristics

2.1 System Overview

The S7700 Smart Routing Switch (S7700 for short) is high-end smart routing switch designed for next-generation enterprise networks. The S7700 design is based on Huawei's intelligent multi-layer switching technology to provide intelligent service optimization methods, such as MPLS VPN, traffic analysis, comprehensive QoS policies, controllable multicast, load balancing, and security, in addition to high-performance Layer 2 to Layer 3 switching services. The S7700 can function either as an aggregation or core node on a campus network or in a data center to provide integrated wireless access. The S7700 also offers voice, video, and data services, helping enterprises build an integrated cost-effective end-to-end network.

The S7700 comes in three different models: S7703, S7706, and S7712. The S7703 supports a maximum of three line processing units (LPUs); the S7706 supports a maximum of six LPUs; the S7712 supports a maximum of 12 LPUs.

NOTE

The release in Russia does not provide IPSec VPN.

2.2 Product Characteristics

Powerful Service Processing Capabilities

The S7700 smart routing switch (S7700 for short) is highly scalable and permits rapid bandwidth expansion. The highly scalable backplane enables the port rates to be upgraded to 40 Gbit/s and 100 Gbit/s, and is compatible with the currently used cards, protecting customer investment. The S7700 supports:

- High 10GE port density: Each S7700 provides 480 10GE ports, bringing enterprise campus networks and data centers into the era of the all-10GE core network.
- Multi-service routing and switching platform: The S7700 provides wireless access, voice, video, and data services, helping enterprises build a highly available, low-latency, and multi-service network.
- Distributed Layer 2 and Layer 3 MPLS VPN functions: The S7700 supports Multiprotocol Label Switching (MPLS), virtual private LAN service (VPLS), hierarchical VPLS (HVPLS), and virtual leased line (VLL), providing secure access for enterprise VPN users.
- Layer 2 and Layer 3 multicast protocols: The S7700 supports Protocol Independent Multicast Sparse Mode (PIM SM), PIM Dense Mode (DM), Multicast Listener Discovery (MLD), and Internet Group Management Protocol (IGMP) snooping. These multicast protocols ensure high-quality HD video surveillance and video conferencing services.

Carrier-Grade Reliability and Visualized Fault Diagnosis

The S7700 provides redundant backup for key components, including MPUs, power modules, and fans, all of which are hot swappable. The reliability design achieves a high availability of 0.99999.

The S7700 innovatively implements the CSS function through switch fabrics, addressing the problem of low switching efficiency caused by multiple switching processes during inter-chassis

forwarding. In addition, a stack provides 256 Gbit/s stack bandwidth, highest in the industry. The links between chassis in a stack can be bundled to improve link utilization efficiency and eliminate single-point failures. The S7700 can also use common service ports as stack ports so that member switches can be connected through optical fibers. This expands the distance allowed between stacked chassis.

The S7700 has a dedicated fault detection subcard that provides hardware-based OAM functions including IEEE 802.3ah, 802.1ag, and ITU-Y.1731. Hardware-based OAM implements 3.3 ms fault detection and can check session connectivity of all terminals in real time when a network fault occurs. The S7700 can also work with an NMS. The NMS provides a graphical fault diagnosis interface and traverses all network elements and links automatically to help users detect and locate faults quickly. The S7700 implements seamless switchover between the master and slave MPUs and supports graceful restart to ensure nonstop forwarding. The in-service software upgrade (ISSU) function of the S7700 ensures uninterrupted transmission of key services during software upgrades.

Well-designed QoS Mechanism, Improving Voice and Video User Experience

The S7700's QoS control mechanisms classify traffic based on information from the link layer to the application layer. With advanced queue scheduling and congestion control algorithms, the S7700 performs accurate multi-level scheduling for data flows, satisfying enterprises' QoS requirements for a variety of services and user terminals.

The S7700 supports hardware-based low-latency queues for multicast packets so that the video service can be processed with high priority and low latency. This feature guarantees high quality of video conference and video conferencing services in an enterprise. The S7700 uses innovative priority scheduling algorithms to optimize the QoS queuing mechanism for voice and video services. The improved queuing mechanism shortens the latency of the VoIP service and eliminates the pixelation effect in the video service, improving user experience.

High Performance in IPv6 Service Processing to Allow Seamless Migration from IPv4 to IPv6

The S7700 software and hardware platforms support IPv6 and the S7700 has been granted an IPv6 Network Access License and the IPv6 Ready Logo Phase 2 Certification by the Ministry of Industry and Information Technology. The S7700 supports the IPv4/IPv6 dual stack, various tunneling technologies, IPv6 static routing, RIPng, OSPFv3, BGP+, IS-ISv6, and IPv6 multicast, meeting requirements for IPv6 networking and combined IPv4 and IPv6 networking.

Superb Traffic Analysis Capability, Helping in Real-Time Network Performance Monitoring

The S7700 supports NetStream for real-time collection and analysis of network traffic statistics. The S7700 supports the V5, V8, and V9 NetStream formats and provides aggregation traffic templates to reduce loads on the network collector. In addition, it supports real-time traffic sampling, dynamic report generation, traffic attribute analysis, and traffic exception traps. NetStream monitors network traffic in real time and analyzes device throughput, providing data for network structure optimization and capacity expansion.

Comprehensive Security Mechanisms, Defending Enterprises Against Internal and External Security Threats

The S7700 can use an integrated firewall card to provide virtual firewall and NAT multi-instance functions, allowing multiple VPN customers to share the same firewall. The firewall card uses application-specific packet filter (ASPF) to check and filter application-layer packets based on complex rules. The S7700 provides the following functions:

- Comprehensive network admission control (NAC) solutions for enterprise networks: The S7700 supports MAC address authentication, portal authentication, 802.1x authentication, and DHCP snooping-triggered authentication. These authentication methods ensure security of various access modes such as dumb terminal access, mobile access, and centralized IP address allocation.
- Two-level CPU protection mechanism: The S7700 supports 1K CPU hardware queues, separates the data plane from the control plane. This helps defend against DoS attacks and unauthorized access, and prevents control plane overloading.

Integrated AC Card to Provide Wireless Access

The S7700 wireless AC card supports radio frequency (RF) management and allows APs to automatically select their radio channels and power. When signals of different APs conflict, APs can adjust their power and channels. The received signal strength indicator (RSSI) and signal-to-noise ratio (SNR) are updated in real time so that the AC can know the radio environment of each wireless user. The RF management function helps improve network availability.

The AC card supports 802.1x authentication, MAC address authentication, Portal authentication, and WLAN authentication and privacy infrastructure (WAPI), providing access authentication for terminals of different types and security levels.

The AC card supports Layer 2 and Layer 3 roaming and allows STAs to rapidly roaming between APs. It supports 1+1 and N+1 cold backup between ACs and load balancing among ACs, improving network reliability.

Innovative Energy-Saving Chip, Allowing Intelligent Power Consumption Control

The S7700 uses innovative energy-saving chips, which can dynamically adjust power on all ports based on traffic volume. An idle port enters a sleeping mode to reduce power consumption. The S7700 supports Power over Ethernet (PoE) and uses different energy management modes according to the powered device (PD) type, ensuring flexible energy management. It supports Energy Efficient Ethernet (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.

3 Application Scenarios

About This Chapter

3.1 Application of the S7700 on a Large-scale Enterprise Campus Network
This section describes the application of the S7700 on a large-scale enterprise campus network.

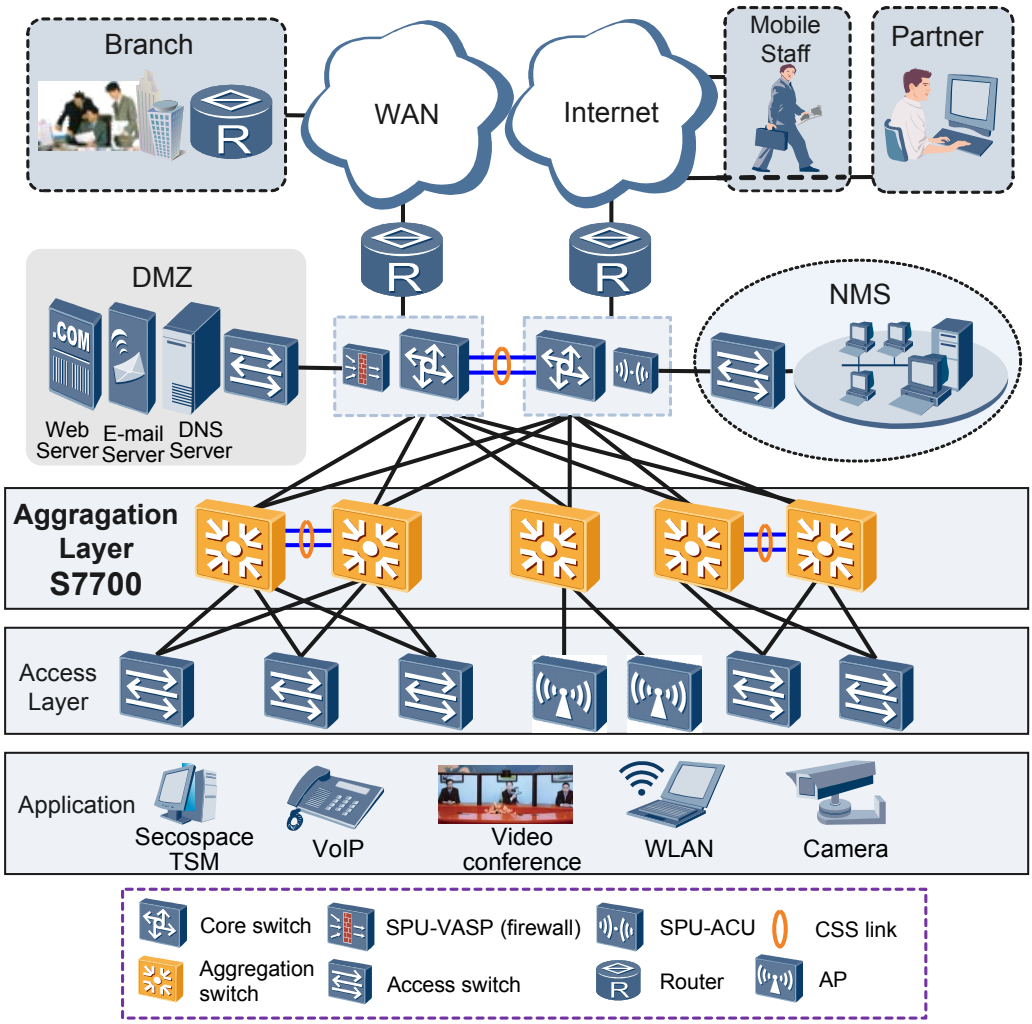
3.2 Application of the S7700 on a Small- or Medium-scale Enterprise Campus Network
This section describes the application of the S7700 on a small- or medium-scale enterprise campus network.

3.1 Application of the S7700 on a Large-scale Enterprise Campus Network

This section describes the application of the S7700 on a large-scale enterprise campus network.

As shown in **Figure 3-1**, the S7700 is deployed at the aggregation layer of a large-scale campus network, helping you built a highly reliable, scalable, and manageable enterprise campus network.

Figure 3-1 Position of the S7700 on a large-scale enterprise campus network



The S7700 uses distributed forwarding architecture, 480 Gbit/s slot bandwidth, 24 40G ports to build a high performance service platform, supporting long-term enterprise service development.

The S7700 provides innovative cluster switching system (CSS) to reduce data forwarding latency, improve IT network efficiency, and enhance enterprises' competitiveness.

The S7700 supports hardware-based Ethernet OAM/BFD and hardware CPU queues to make network more reliable and secure.

NOTE

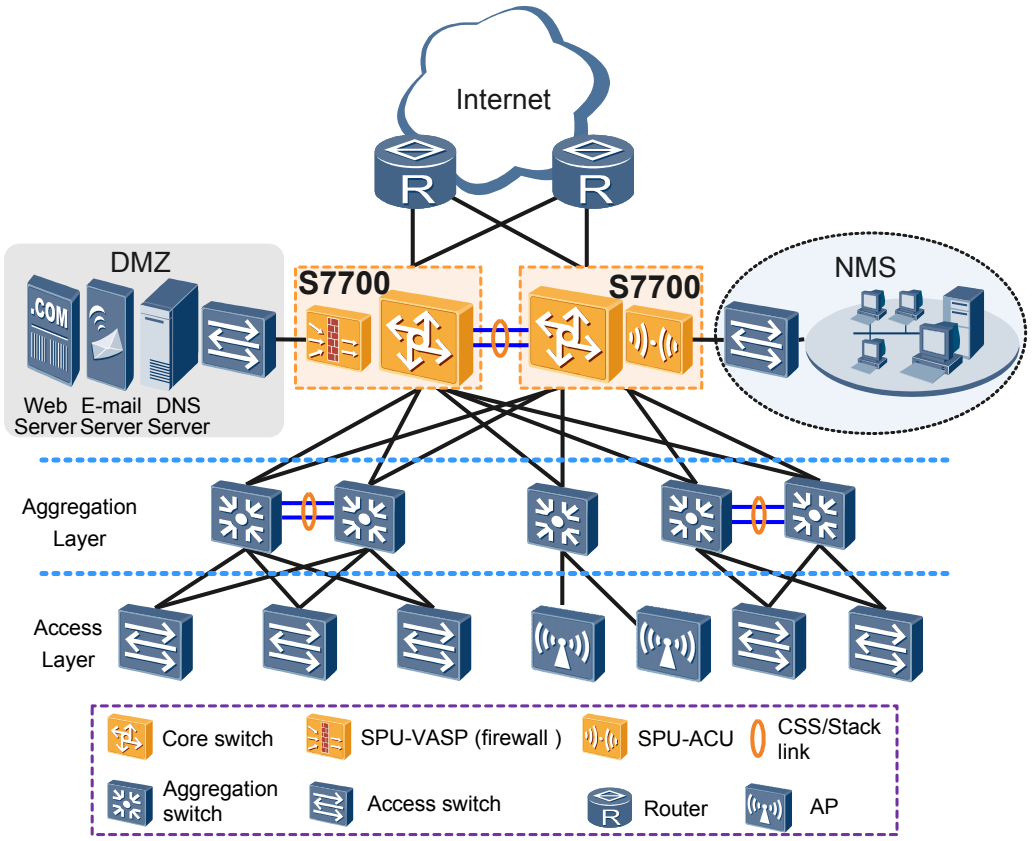
Campus switches of V200R003 do not support the ACU. The ACU is applicable only to campus switches of V200R002 and earlier versions.

3.2 Application of the S7700 on a Small- or Medium-scale Enterprise Campus Network

This section describes the application of the S7700 on a small- or medium-scale enterprise campus network.

As shown in **Figure 3-2**, the S7700 can function as a core device on a small- or medium-scale enterprise campus network. It provides a cost-effective, reliable, and easy-to-deploy network solution for a small- or medium-scale enterprise campus network.

Figure 3-2 Position of the S7700 on a small- or medium-scale enterprise campus network



The S7700 provides innovative cluster switching system (CSS) to reduce data forwarding latency, improve IT network efficiency, and enhance enterprises' competitiveness.

The S7700 uses high-reliability technologies such as hardware-based Ethernet OAM and BFD to ensure service continuity.

The S7700 supports 480 high-density 10GE ports and uses compact chassis and left-to-rear air channels to increase cabling capability, reduce switch size, and reduce power consumption.

NOTE

S7700 V200R002 and earlier versions support ACU.

4 Hardware Architecture

About This Chapter

4.1 Appearance and Structure

4.2 Hardware Module

4.1 Appearance and Structure

4.1.1 S7703

Appearance

The S7703 chassis is 4 U high (1 U = 44.45 mm). When the chassis has no cable management frame installed, the dimensions are 442 mm x 489 mm x 175 mm (W x D x H). When the chassis has cable management frames installed, the dimensions are 442 mm x 585 mm x 175 mm (W x D x H). **Figure 4-1** and **Figure 4-2** show the S7703 chassis.

Figure 4-1 S7703 chassis (front view)

Figure 4-2 S7703 chassis (rear view)

NOTE

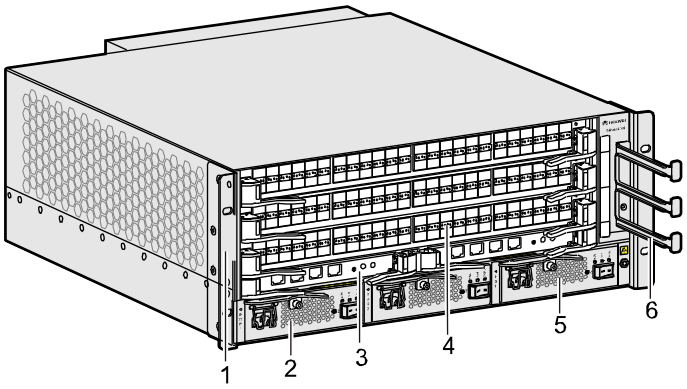
The S7703 chassis integrates the PoE and non-PoE models.

The S7703 chassis include FCC-certified chassis and common chassis.

Structure

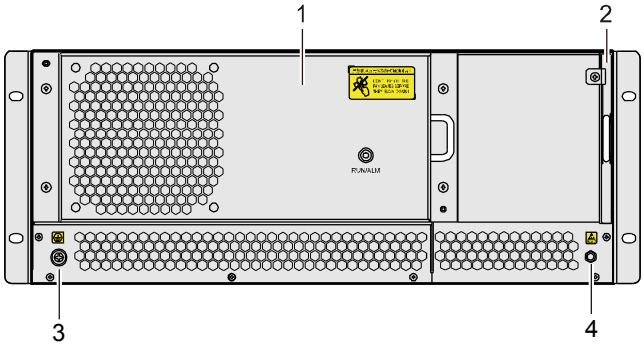
Figure 4-3 and **Figure 4-4** show the S7703 chassis structure.

Figure 4-3 S7703 chassis structure (front view)



1. Rack-mounting bracket (to secure the chassis in a rack)	2. System power module	3. MCU
4. LPU	5. PoE power module	6. Cable management frame (to arrange cables)

Figure 4-4 S7703 chassis structure (rear view)



1. Fan module **NOTE** Each chassis is configured with only one fan module. For details about the fan module, see Fan Module.	2. Air filter (to prevent dust from entering the chassis)	3. Ground screw (to ground the chassis)
4. ESD jack **NOTE** An ESD wrist strap can be inserted into this ESD jack. ESD preventive measures take effect only when the chassis is properly grounded.	-	-

4.1.2 S7706

Appearance

The S7706 chassis is 10 U high (1 U = 44.45 mm). When the chassis has no cable management frame installed, the dimensions are 442 mm x 489 mm x 441.7 mm (W x D x H). When the chassis has cable management frames installed, the dimensions are 442 mm x 585 mm x 441.7 mm (W x D x H). **Figure 4-5** and **Figure 4-6** show the S7706 chassis.

Figure 4-5 S7706 chassis (front view)

Figure 4-6 S7706 chassis (rear view)

NOTE

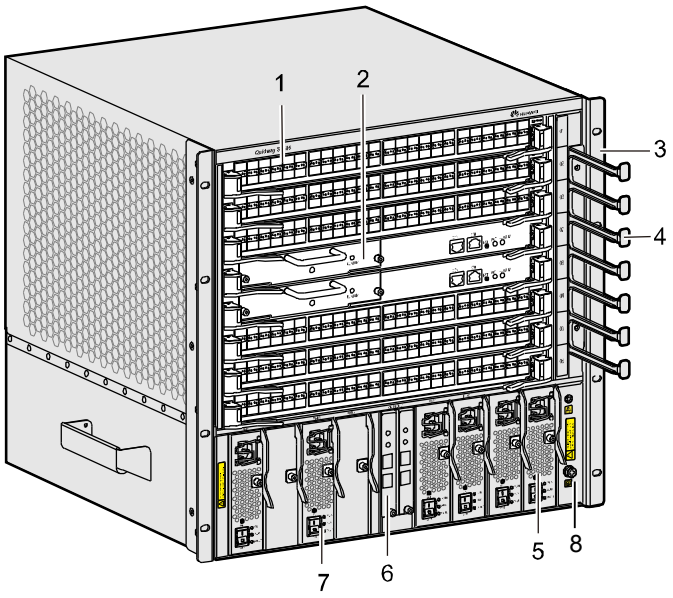
S7706 chassis include PoE chassis and non-PoE chassis. A PoE chassis is identified by PoE on the nameplate and power slots.

S7706 chassis include FCC-certified chassis and common chassis.

Structure

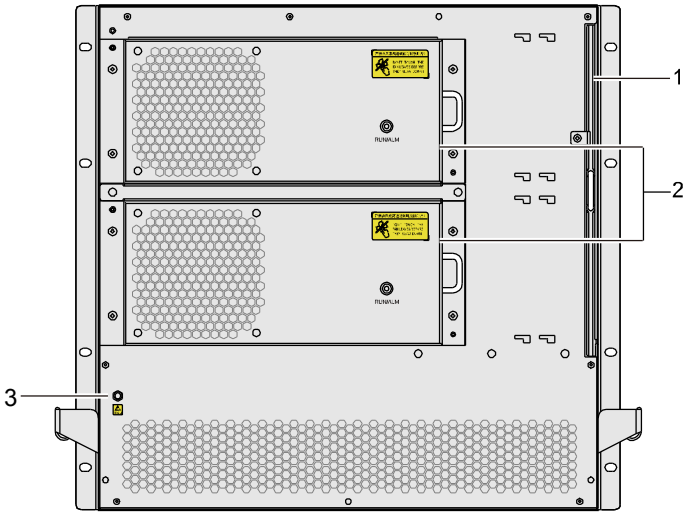
Figure 4-7 and Figure 4-8 show the structure of the S7706 chassis.

Figure 4-7 S7706 chassis structure (front view)



1. LPU	2. SRU	3. Rack-mounting bracket (to secure the chassis in a rack)
4. Cable management frame (to arrange cables)	5. PoE power module	6. CMU
7. System power module	8. Ground screw (to ground the chassis)	-

Figure 4-8 S7706 chassis structure (rear view)



1. Air filter (to prevent dust from entering the chassis)	2. Fan module **NOTE** Each chassis is configured with two fan modules. For details about the fan modules, see Fan Module.	3. ESD jack **NOTE** An ESD wrist strap can be inserted into this ESD jack. ESD preventive measures take effect only when the chassis is properly grounded.

4.1.3 S7712

Appearance

The S7712 chassis is 15 U high (1 U = 44.45 mm). When the chassis has no cable management frame installed, the dimensions are 442 mm x 489 mm x 663.95 mm (W x D x H). When the chassis has cable management frames installed, the dimensions are 442 mm x 585 mm x 663.95 mm (W x D x H). **Figure 4-9** and **Figure 4-10** show the S7712 chassis.

Figure 4-9 S7712 chassis (front view)

Figure 4-10 S7712 chassis (rear view)

NOTE

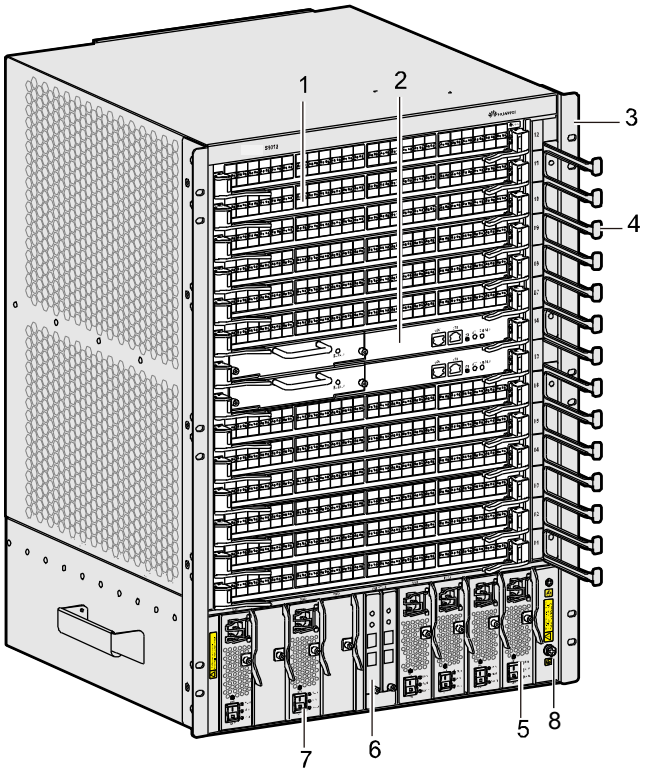
S7712 chassis include PoE chassis and non-PoE chassis. A PoE chassis is identified by PoE on the nameplate and power slots.

The S7712 uses either FCC-certified chassis or common chassis.

Structure

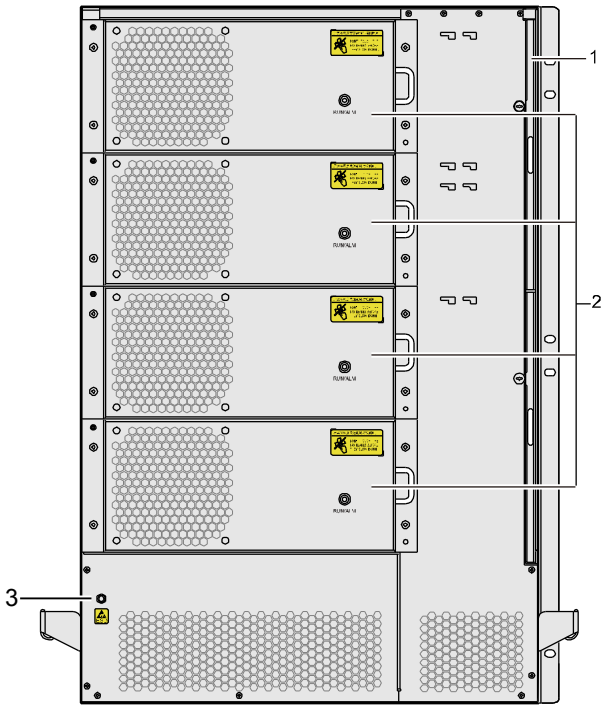
Figure 4-11 and **Figure 4-12** show the structure of the S7712 chassis.

Figure 4-11 S7712 chassis structure (front view)



1. LPU	2. SRU	3. Rack-mounting bracket (to secure the chassis in a rack)
4. Cable management frame (to arrange cables)	5. PoE power module	6. CMU
7. System power module	8. Ground screw (to ground the chassis)	-

Figure 4-12 S7712 chassis structure (rear view)



1. Air filter (to prevent dust from entering the chassis)	2. Fan module **NOTE** Each chassis is configured with four fan modules. For details about the fan modules, see Fan Module.	3. ESD jack **NOTE** An ESD wrist strap can be inserted into this ESD jack. ESD preventive measures take effect only when the chassis is properly grounded.

4.2 Hardware Module

This section describes the hardware module, including the backplane, MCU, SRU, LPU, CMU, FSU and clock board of the S7700.

Figure 4-13 shows the hardware logic structure of the S7703.

Figure 4-13 Hardware logic structure of the S7703

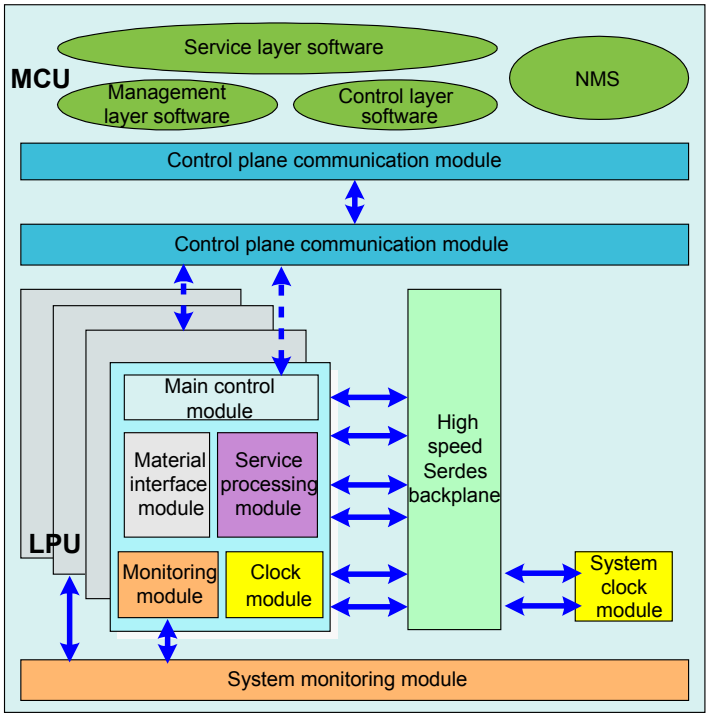
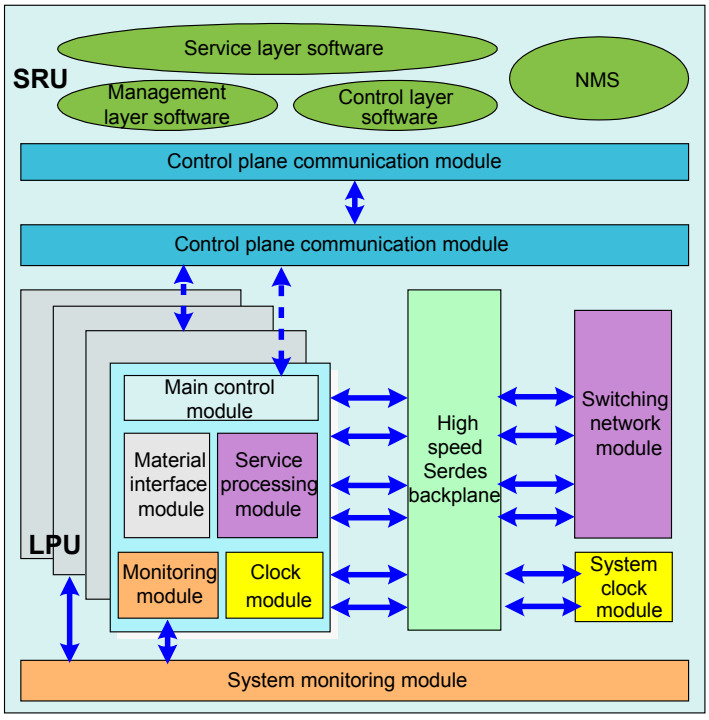


Figure 4-14 shows the hardware logic structure of the S7706 and S7712.

Figure 4-14 Hardware logic structure of the S7706 and S7712



4.2.1 Cards

NOTE

- Interface cards are classified into S series, E series, F series, B series, and POS interface cards:
  - The S series has the SA interface cards, for example, 24-port 100M/1000M BASE-X optical interface card (**SA**, SFP)-32K MAC.
  - The E series includes EA, EC, and ED interface cards, for example, 48-port 100M BASE-X optical interface card (**EA**, SFP)-32K MAC.
  - The F series consists of FA and FC interface cards, for example, 48-port 1000M BASE-T electrical interface card (**FA**, RJ45)-32K MAC.
  - The B series has BC interface cards, for example, 48-port 100M/1000M BASE-X optical interface card (**BC**, SFP)-128K MAC.
- The cards that have not gained an FCC certificate include the ES0D0X2UXA00, ES0D0X2UXC00, ES0D0X4UXA00, ES0D0X4UXC00, ES1D2X04XED0, ES1D2X08SED4 and ES0D0X12SA00.
- The FCC-compliant cards must be used together with the FCC-compliant chassis.
- When a GE optical port is configured with a 100M/1000M optical module, the port works at 1000 Mbit/s by default. When the GE optical port connects to a 100M optical port, you need to run the **speed auto-negotiation** command to enable auto-negotiation on the GE optical port. The ports work at 100 Mbit/s after negotiation.
- The GE electrical ports do not support synchronous Ethernet.

Table 4-1 Cards supported by the S7700

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
MPU	ES0D00SRUA00	S7706/S7712 Main Control Unit A	81 W (including the ES0D00FSUA00)	2.80 kg	Yes
	ES0D00SRUB00	S7706/S7712 Main Control Unit B, clock	105 W (including the ES0D00FSUA00)	2.90 kg	Yes
	ES0D00MCUA00	S7703 Main Control Unit A	18 W	0.90 kg	Yes
Subcard on the SRU	ES02VSTSA **NOTE** This card has replaced LE0D0VSTSA00 since July 1, 2013.	Cluster Switching System Service Unit	12 W	1 kg	Yes

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	LE0D0VSTSA00 **NOTE** This card is replaced by ES02VSTSA since July 1, 2013.	Cluster Switching System Service Unit	12 W	1 kg	Yes
	ES0D00FSUA00	Enhanced Flexible Service Unit	20 W	0.42 kg	Yes
Value-added service card	LE0D0VAMPA00	Value-added service card	120 W	3.10 kg	Yes
OSPU	ES1D2PS00P00	Open Service Platform Unit	137.5 W	5.50 kg	Yes
CMU	EH1D200CMU00 **NOTE** This card has replaced LE0DCMUA0000 since February 1, 2013.	Centralized Monitoring Unit	1 W	0.22 kg	Yes
	LE0DCMUA0000 **NOTE** This card is replaced by EH1D200CMU00 since February 1, 2013.	Centralized Monitoring Unit	1 W	0.22 kg	Yes
LPU	ES0D0F48TA00	48-port 10/100BASE-T interface card (EA, RJ45)-32K MAC	59 W	2.50 kg	Yes

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	ES0D0F48TC00	48-port 10/100BASE-T interface card (EC, RJ45)-128K MAC	70 W	2.62 kg	Yes
	ES0DF48TFA00	48-port 10/100BASE-T interface card (FA, RJ45)-32K MAC	40 W	2.30 kg	Yes
	ES0D0G48SA00	48-port 100/1000BASE-X interface card (EA, SFP)-32K MAC	75 W	2.54 kg	Yes
	ES0D0G48SC00	48-port 100/1000BASE-X interface card (EC, SFP)-128K MAC	92 W	2.66 kg	Yes
	ES1D2G48SED0	48-port 100M/1000M BASE-X interface card (ED, SFP)-512K MAC	110 W	2.66 kg	Yes
	ES1D2G48SFA0	48-port 100/1000BASE-X interface card (FA, SFP)-32K MAC	65 W	2.60 kg	Yes

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	ES0D0G48TA00	48-port 10/100/1000 BASE-T interface card (EA, RJ45)-32K MAC	62 W	2.50 kg	Yes
	ES0D0G48TC00	48-port 10/100/1000 BASE-T interface card (EC, RJ45)-128K MAC	68 W	2.62 kg	Yes
	ES0DG48TFA00	48-port 10/100/1000 BASE-T interface card (FA, RJ45)-32K MAC	48 W	2.50 kg	Yes
	ES0DG48CEAT0	36-port 10/100/1000 BASE-T and 12-port 100/1000BASE-X interface card (EA, RJ45/ SFP)-32K MAC	62 W	2.50 kg	Yes
	ES0D0G48VA00	48-port 10/100/1000 BASE-T PoE interface card (EA, RJ45, PoE)-32K MAC	64 W (not including PoE power consumption)	2.60 kg	Yes

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	ES0D0X4UXA00	4-port 10GBASE-X interface card (EA, XFP)-32K MAC	64 W	2.16 kg	No
	ES0D0X4UXC00	4-port 10GBASE-X interface card (EC, XFP)-128K MAC	75 W	2.28 kg	No
	ES1D2X02XED1	4-port 10GBASE-X interface card (EC, XFP), FCC-128K MAC	75 W	2.28 kg	Yes
	ES0D0X2UXA00	2-port 10GBASE-X interface card (EA, XFP)-32K MAC	52 W	2.14 kg	No
	ES0D0X2UXC00	2-port 10GBASE-X interface card (EC, XFP)-128K MAC	61 W	2.26 kg	No
	ES1D2X02XEC1	2-port 10GBASE-X interface card (EC, XFP), FCC-128K MAC	61 W	2.26 kg	Yes

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	ES1D2X04XED0	4-port 10GBASE-X interface card (ED, XFP)-512K MAC	93 W	2.30 kg	No
	ES0D0G24SA00	24-port 100/1000BASE-X interface card (SA, SFP)-32K MAC	45 W	2.22 kg	Yes
	ES0D0G24SC00	24-port 100/1000BASE-X interface card (EC, SFP)-128K MAC	63 W	2.66 kg	Yes
	ES0D0G24CA00	24-port 100/1000BASE-X and 8-port 10/100/1000BASE-T combo interface card (SA, SFP/RJ45)-32K MAC	67 W	2.26 kg	Yes
	ES0D0X12SA00	12-port 10GBASE-X interface card (SA, SFP+)-32K MAC	85 W	2.30 kg	No

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	ES0D0T24XA00	24-port 10/100/1000BASE-T and 2-port 10GBASE-X interface card (EA, RJ45/XFP)-32K MAC	53 W	2.30 kg	Yes
	ES0D0S24XA00	24-port 100/1000BASE-X and 2-port 10GBASE-X interface card (EA, SFP/XFP)-32K MAC	65 W	2.40 kg	Yes
	ES0DG24TFA00	24-port 10/100/1000BASE-T interface card (FA, RJ45)-32K MAC	32 W	2.20 kg	Yes
	ES1D2X40SFC0	40-port 10GBASE-X interface card (FC, SFP+)-128K MAC	183 W	2.90 kg	Yes
	ES1D2X16SFC0	16-port 10GBASE-X interface card (FC, SFP+)-128K MAC	150 W	2.60 kg	Yes

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	ES1D2L02QFC0	2-port 40GBASE-X interface card (FC, QSFP+)-128K MAC	88 W	2.50 kg	Yes
	ES1D2X08SED4	8-port 10GBASE-X interface card (ED, SFP+)-512K MAC	198.1 W	2.50 kg	No
	ES1D2X08SED5	8-port 10GBASE-X interface card (ED, SFP+)-512K MAC	198.1 W	2.50 kg	Yes
	ES1D2G24SED0	24-port 100/1000BASE-X interface card (ED, SFP)-512K MAC	75 W	2.66 kg	Yes
	ES1D2G48TED0	48-port 10/100/1000BASE-T interface card (ED, RJ45)-512K MAC	98 W	2.62 kg	Yes
	ES1D2G48SBC0	48-port 100/1000BASE-X interface card (BC, SFP)-128K MAC	185 W	2.90 kg	Yes

Card Type	Card Name	Card Description	Maximum Power Consumption	Weight	FCC-certified
	ES1D2G48TBC0	48-port 10/100/1000BASE-T interface card (BC, RJ45)-128K MAC	160 W	2.90 kg	Yes
	ES1D2S24XEC0	24-port 100/1000BASE-X and 2-port 10GBASE-X interface card (EC, SFP/XFP)-128K MAC	81 W	2.50 kg	Yes

NOTE

For details about cards, see Cards in the *S7700 Hardware Description*.

4.2.2 Power Supply

Table 4-2 lists power supplies supported by the S7700.

Table 4-2 Power supplies supported by the S7700

Device Model	Supporting PoE	1600 W DC	2200 W DC	800 W AC	2200 W AC
S7700	Y	Y	Y	Y	Y

For details about power supply configuration of the S7703, see *S7700 Hardware Description* - Chassis - S7703 - Slot Configuration.

For details about power supply configuration of the S7706, see *S7700 Hardware Description* - Chassis - S7706 - Slot Configuration.

For details about power supply configuration of the S7712, see *S7700 Hardware Description* - Chassis - S7712 - Slot Configuration.

5 Product Performance

About This Chapter

5.1 Product Features

5.2 Performance Specifications

5.1 Product Features

Table 5-1 lists features supported by the S7700.

Table 5-1 Features supported by the S7700

Feature		Description
Ethernet features	Ethernet	Operating modes of full duplex, half duplex, and auto-negotiation
		Rates of an Ethernet interface: 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, 10 Gbit/s, 40 Gbit/s, and auto-negotiation
		Flow control on interfaces
		Jumbo frames
		Link aggregation
		Load balancing among links of a trunk
		Transparent transmission of Layer 2 protocol packets
		Device Link Detection Protocol (DLDP)
		Link Layer Discovery Protocol (LLDP)
		Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED)
		Interface isolation and forwarding restriction
		Broadcast storm suppression
	VLAN	Access modes of access, trunk, hybrid, and QinQ
		Default VLAN
		VLAN assignment based on interfaces, MAC addresses, protocols, and IP subnets
		VLAN assignment based on the following policies: ● MAC address + IP address ● MAC address + IP address + interface number ● DHCP policies
		VLAN stacking for untagged packets
		Super VLAN
		VLAN mapping
		Selective QinQ

Feature		Description
		MUX VLAN
		Voice VLAN
		Guest VLAN
	GVRP	Generic Attribute Registration Protocol (GARP)
		GARP VLAN Registration Protocol (GVRP)
	MAC	Automatic learning and aging of MAC addresses
		Static, dynamic, and blackhole MAC address entries
		Packet filtering based on source MAC addresses
		Interface-based MAC learning limiting
		Sticky MAC address entries
		MAC address flapping detection
		Configuring MAC address learning priorities for interfaces
		Port bridge
	ARP	Static and dynamic ARP entries
		RARP
		ARP in a VLAN
		Aging of ARP entries
		Proxy ARP
		Multi-port ARP for connecting to the NLB cluster server
Ethernet loop protection	MSTP	STP
		RSTP
		MSTP
		BPDU protection, root protection, and loop protection
		TC-BPDU attack defense
		STP loop detection
	Loopback-detect	Loop detection on an interface
	SEP	Smart Ethernet Protection (SEP)
	Smart Link	Smart Link
		Smart Link multi-instance

Feature		Description
		Monitor Link
	RRPP	RRPP protective switchover
		Single RRPP ring, tangent RRPP ring, and intersecting RRPP ring
		Hybrid networking of RRPP rings and other ring networks
	ERPS	G.8032 v1/v2
		Single closed ring
		Subring
IPv4/IPv6 forwarding	IPv4 and unicast routes	Static IPv4 routes
		VRF
		DHCP client
		DHCP server
		DHCP relay
		URPF check
		Routing policies
		RIPv1/RIPv2
		OSPF
		BGP
		MBGP
		IS-IS
		PBR (redirection in a traffic policy)
	Multicast routing features	IGMPv1/v2/v3
		PIM-DM
		PIM-SM
		PIM-SSM
		MSDP
		Multicast routing policies
		RPF
	IPv6 features	IPv6 protocol stack
		ND and ND snooping

Feature		Description
		DHCPv6 snooping
		RIPng
		DHCPv6 server
		DHCPv6 relay
		OSPFv3
		BGP4+ & ISIS for IPv6
		VRRP6
		MLDv1 and MLDv2
		PIM-DM for IPv6
		PIM-SM for IPv6
		PIM-SSM for IPv6
	Transition technology	4 over 6 tunnel
		6 over 4 tunnel
		6PE
Layer 2 multicast features		IGMPv1/v2/v3 snooping
		Fast leave
		IGMP snooping proxy
		MLD snooping
		Interface-based multicast traffic suppression
		Inter-VLAN multicast replication
		Controllable multicast
MPLS&VPN	Basic MPLS functions	LDP
		Double MPLS labels
		Mapping from DSCP to EXP priorities in MPLS packets
		Mapping from 802.1p priorities to EXP priorities in MPLS packets
	MPLS TE	MPLS TE tunnel
		MPLS TE protection group
	MPLS OAM	LSP ping and LSP traceroute
		Automatic detection of LSP faults

Feature		Description
		1+1 protection switchover of LSPs
	VPN	Multi-VPN-Instance CE (MCE)
		VLL in SVC, Martini, CCC, and Kompella modes
		VLL FRR
		VPLS
		MPLS L3VPN
		HVPLS in LSP and QinQ modes
Device reliability	BFD	Basic BFD functions
		BFD for static route/IS-IS/OSPF/BGP
		BFD for PIM
		BFD for VRRP
		BFD for VLL FRR
	CSS	Service card supporting CSS
		Service interface supporting CSS
	Others	VRRP
Ethernet OAM	EFM OAM (802.3ah)	Automatic discovery
		Link fault detection
		Link fault troubleshooting
		Remote loopback
	CFM OAM (802.1ag)	Software-level CCM
		MAC ping
		MAC trace
	OAM association	Association between 802.1ag and 802.1ah
		Association between 802.1ah and 802.1ag
	Y.1731	Delay and variation measurement
QoS features	Traffic classifier	Traffic classification based on ACLs
		Traffic classification based on outer 802.1p priorities, inner VLAN IDs, outer VLAN IDs, source MAC addresses, and Ethernet types
		Traffic classification based on inner 802.1p priorities

Feature		Description
	Traffic behavior	Access control after traffic classification
		Traffic policing based on traffic classification
		Re-marking based on traffic classification
		Class-based packet queuing
		Associating traffic classifiers with traffic behaviors
	Traffic policing	Rate limit on inbound and outbound interfaces
	Traffic shaping	Traffic shapping on interfaces and queues
	Congestion avoidance	Weighted Random Early Detection (WRED)
		Tail drop
	Congestion management	Queue mapping
		Priority Queuing (PQ)
		Deficit Round Robin (DRR)
		PQ+DRR
		Weighted Round Robin (WRR)
		PQ+WRR
Configuration and maintenance	Login and configuration management	Command line configuration
		Error message and help information in English and Chinese
		Login through console and Telnet terminals
		SSH1.5/SSH2
		Send function and data communication between terminal users
		Hierarchical user authority management and commands
		SNMP-based NMS management (eSight)
		Web page-based configuration and management
		Easy-Deploy (client)
		Easy-Deploy (commander)
		Easy deployment and maintenance
	File system	File system
		Directory and file management

Feature		Description
		File upload and download through FTP, TFTP, SFTP, SCP, and FTPS
	Monitoring and maintenance	Hardware monitoring
		Reporting alarms on abnormal device temperature
		Second-time fault detection to prevent detection errors caused by instant interference
		Version matching check
		Information center and unified management over logs, alarms, and debugging information
		Electronic labels, and command line query and backup
		Virtual cable test (VCT)
		User operation logs
		Detailed debugging information for network fault diagnosis
		Network test tools such as traceroute and ping commands
		Port mirroring, flow mirroring, and remote mirroring
		Energy saving
	Version upgrade	Device software loading and online software loading
		BootROM online upgrade
		Remote in-service upgrade
		In-service patching
Security	AAA	Local authentication and authorization
		RADIUS authentication, authorization, and accounting
		HWTACACS authentication, authorization, and accounting
	NAC	802.1x authentication
		MAC address authentication
		Portal authentication
		MAC address bypass authentication
	ARP security	ARP packet rate limiting based on source MAC addresses
		ARP packet rate limiting based on source IP addresses, interfaces, and VLANs, and global ARP packet rate limiting
		ARP anti-spoofing

Feature		Description
		Association between ARP and STP
		ARP gateway anti-collision
		Dynamic ARP Inspection (DAI) and Static ARP Inspection (SAI)
		Egress ARP Inspection (EAI)
	IP security	TC-BPDU attack defense
		IP source guard
	CPU attack defense	CPU attack defense
	MFF	MAC-Forced Forwarding (MFF)
	DHCP Snooping	DHCP snooping
		Option 82 function and dynamically limiting the rate of DHCP packets
	Attack defense	Defense against flood attacks without IP payloads, attacks from IGMP null payload packets, LAND attacks, Smurf attacks, and attacks from packets with invalid TCP flag bits
		Defense against attacks from many fragments, attacks from many packets with offsets, attacks from repeated packet fragments, Tear Drop attacks, Syndrop attacks, NewTear attacks, Bonk attacks, Nesta attacks Rose attacks, Fawx attacks, Ping of Death attacks, and Jolt attacks
		Defense against TCP SYN flood attacks, UDP flood attacks (including Fraggle attacks and UDP diagnosis port attacks), and ICMP flood attacks
Network management		Ping and traceroute
		NQA
		Network Time Protocol (NTP)
		sFlow
		NetStream
		NAT (SPU)
		Load Balance (SPU)
		SNMP v1/v2c/v3
		Standard MIB
		HTTP

Feature		Description
		Hypertext Transfer Protocol Secure (HTTPS)
		Remote network monitoring (RMON)
		RMON2

5.2 Performance Specifications

Table 5-2 Performance specifications of the S7700

Attribute	Service Feature	Specifications
Ethernet	Number of MAC addresses supported by each LPU	● ED board: 512 K ● EC/BC/FC board: 128 K ● EA/SA/FA board: 32 K ● X1E board: 1 M
	Number of VLANs	4 K
	Number of trunk groups and number of interfaces supported by each trunk group	128 trunk groups, each of which supports a maximum of 8 interfaces
	Number of ARP entries	16 K
	Number of ARP entries supported by each LPU	● EA/EC/BC/ED board: 16 K ● SA/FA/FC board: 8 K (16 K on ES1D2L02QFC0) ● X1E board: 256 K
QoS	Number of QoS queues on a port	8
	CAR	● ED/EC/BC/EA/FA/FC/X1E board: 8 Kbit/s ● SA (ES0D0G24SA00/ ES0D0G24CA00) board: 64 Kbit/s ● SA (ES0D0X12SA00) board: 8 Kbit/s

Attribute	Service Feature	Specifications
ACL	ACLv4	Number of IPv4 ACLs supported by each LPU: ● ED board: 70 K for inbound traffic; 1 K for outbound traffic ● EC/BC board: 38 K for inbound traffic; 1 K for outbound traffic ● EA board: 6 K for inbound traffic; 1 K for outbound traffic ● FC board: 1 K for inbound traffic; 512 for outbound traffic ● FA board: 1.5 K for inbound traffic; 256 for outbound traffic ● SA (ES0D0G24SA00/ ES0D0G24CA00) board: 3 K for inbound traffic; 512 for outbound traffic ● SA (ES0D0X12SA00) board: 1.5 K for inbound traffic; 512 for outbound traffic ● X1E board: 64 K for inbound and outbound traffic ● OSP: 6 K for inbound traffic; 1 K for outbound traffic

Attribute	Service Feature	Specifications
	ACLv6	Number of IPv6 ACLs supported by each LPU: ● ED board: 67 K for inbound traffic; 256 for outbound traffic ● EC/BC board: 35 K for inbound traffic; 256 for outbound traffic ● EA board: 3 K for inbound traffic; 256 for outbound traffic ● FA board: 512 for inbound traffic; 128 for outbound traffic ● FC board: 512 for inbound traffic; 128 for outbound traffic ● SA (ES0D0G24SA00/ ES0D0G24CA00) board: 1 K for inbound traffic; 128 for outbound traffic ● SA (ES0D0X12SA00) board: 512 for inbound traffic; 128 for outbound traffic ● X1E board: 16K for inbound and outbound traffic ● OSP: 3 K for inbound traffic; 256 for outbound traffic
MPLS	Number of LSPs	● ED/EC/BC/EA board: 8 K ● FC/FA board: 4 K ● Others: not supported
	Number of LDP neighbors	● ED/EC/BC/EA/FC board: 512 local neighbors, 1024 remote neighbors ● FA board: 64 local neighbors, 1024 remote neighbors ● Others: not supported
L2VPN	Number of VLL entries	4 K
	Number of VSI entries	1 K
L3VPN	Number of VRFs	2 K
	Number of VPN routes	● S7706/S7712: 500,000 ● S7703: 140,000
	Number of routing entries	● S7706/S7712: 1000 K ● S7703: 300 K

Attribute	Service Feature	Specifications
	IPv4 FIB	● ED board: 512 K ● EC/BC board: 128 K ● EA board: 16 K ● SA/FA board: 12 K ● FC board: 16 K ● X1E board: 1 M
	IPv6 FIB	● ED board: 256 K ● EC/BC board: 64 K ● EA board: 8 K ● SA/FA board: 6 K ● FC board: 8 K ● X1E board: 512 K
Multicast	Number of static multicast routes	256
	Number of L2 multicast forwarding entries	4 K
	Number of L3 multicast forwarding entries	● ED/EC/BC/EA/FA/X1E board: 4 K ● SA board: 2 K
Reliability	BFD	● BFD sessions: 2000 ● Minimum fault discovery duration: If no FSU is configured, the duration is 3s; if an FSU is configured, the duration is 50 ms.
	Ethernet OAM	● 802.1ag Up to 64 MDs can be created on the entire system. The number of MAs on the entire system is as follows: – S7706/S7712: 4 K – S7703: 2 K Detection time: 3.3 ms/10 ms/ 100 ms/1s/10s/1 min/10 min ● 802.3ah Detection time: 100 ms/1s ● Y.1731: delay measurement within 1 ms

Attribute	Service Feature	Specifications
	RRPP	● Maximum number of RRPP instances: 64 ● Rings supported by the entire system: 64 ● Rings supported by each LPU: 12 major rings, 18 subrings ● Maximum number of RRPP domains: 64
	VRRP	● VRRP backup groups on the entire system: 255 ● VRRP management groups in the entire equipment: 255 ● Virtual IP addresses in each VRRP backup group: 16 ● Switchover time: If no FSU is configured, the time is 3s; if an FSU is configured, the time is 50 ms.
	SmartLink	● Maximum number of instances on the entire system: 64 ● Maximum number of Smart Link groups on the entire system: 16 ● Switchover time: less than 50 ms
	MSTP	● Maximum number of instances on the entire system: 64 ● Switchover time: second level
	SEP	● Maximum number of segments on the entire system: 256 ● Convergence time: less than 50 ms

6 Technical Specifications

About This Chapter

6.1 Physical Specifications
This section describes the dimensions, power consumption, weight, voltage, and working environment parameters of the S7700.

6.2 System Configuration

6.3 Standards Compliance

6.1 Physical Specifications

This section describes the dimensions, power consumption, weight, voltage, and working environment parameters of the S7700.

Table 6-1 Physical specifications of the S7700

Item	S7712	S7706	S7703
Dimensions (W x D x H, excluding the rack-mounting ears)	● With cable management frames: 442 mm x 585 mm x 663.95 mm (15 U high) ● Without cable management frames: 442 mm x 489 mm x 663.95 mm (15 U high)	● with cable management frames: 442 mm x 585 mm x 441.7 mm (10 U high) ● Without cable management frames: 442 mm x 489 mm x 441.7 mm (10 U high)	● With cable management frames: 442 mm x 585 mm x 175 mm (4 U high) ● Without cable management frames: 442 mm x 489 mm x 175 mm (4 U high)
Cabinet	N66E or N68E	N66E or N68E	N66E or N68E
Maximum power (full configuration) **NOTE** The heat dissipation value of a device equals the current power consumption of the device.	3000 W	1600 W	800 W
Weight (empty/fully loaded)	25 kg/70 kg	15 kg/42 kg	10 kg/22 kg
Noise at normal temperature	≤ 72 dB	≤ 72 dB	≤ 72 dB

Item		S7712	S7706	S7703
Power specifications		● DC input voltage – Rated voltage: -48 V DC/-60 V DC – Voltage range: -38.4 V DC to -72 V DC ● AC input voltage – Rated voltage: 110 V AC/220 V AC, 50/60 Hz – Voltage range: 90 V AC to 290 V AC; 47 Hz to 63 Hz (The output power reduces to half of the maximum output when the input voltage is in the range of 90 V AC to 175 V AC.)		
PoE	Power input mode	Built-in. Only the AC power supply is supported.	Built-in. Only the AC power supply is supported.	Built-in. Only the AC power supply is supported.
	Redundancy mode of power supplies	The S7712 supports power supplies in 3+1, 2+2, or 4+0 mode.	The S7706 supports power supplies in 3+1, 2+2, or 4+0 mode.	The S7703 does not support backup of AC power modules.
	Output power consumption	8800 W	8800 W	2200 W
Environment parameters		● Operating temperature and altitude: – -60 m to +1800 m: 0°C to 45°C – 1800 m to 4000 m: Temperature decreases by 1°C every time the altitude increases 200 m. – 4000 m: 0°C to 35°C ● Operating relative humidity: 5% RH to 95% RH (noncondensing) ● Storage temperature: -40°C to +70°C ● Storage altitude: < 5000 m ● Storage relative humidity: 5% RH to 95% RH (noncondensing)		

NOTE

The temperature and humidity are measured 1.5 m above the floor and 0.4 m at the front of the cabinet. There should be no protection board at the front or back of the cabinet.

6.2 System Configuration

Table 6-2 System configuration of the S7700

Item	S7712	S7706	S7703	Notes
Processor	700MHz (Dominant frequency)	700MHz (Dominant frequency)	500 MHz (Dominant frequency)	-
DDR2 SDRAM	1GB	1GB	512 MB	-
Flash Memory	Standard 64 MB, scalable to 128 MB	Standard 64 MB, scalable to 128 MB	Standard 64 MB, scalable to 128 MB	-
CF card	512 MB	512 MB	512 MB	The CF card serves as a mass storage device to save data files and logs.
Number of LPU slots	12	6	3	LPU (Optional)
Number of SRU/MCU slots	2	2	2	S7706/S7712: SRU S7703: full mesh
Maximum port density	576xFE, 576xGE, 480x10GE, 24x40GE	288xFE, 288xGE, 240x10GE, 12x40GE	144xFE, 144xGE, 120x10GE, 6x40GE	-

6.3 Standards Compliance

Table 6-3 IEEE

Standard		Description
802.1	802.1d	Spanning Tree Protocol
	802.1p	IEEE Standards for Local and Metropolitan Area Networks: Virtual Bridged Local Area Networks
	802.1q	Virtual Bridged Local Area Networks

Standard		Description
	802.1s	Multiple Spanning Tree Protocol
	802.1w	Rapid Spanning Tree Protocol
	802.1x	Port based network access control protocol
802.3	802.3	Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method and physical layer specifications
	802.3ad	Aggregation of Multiple Link Segments
	802.3ab	Physical Layer Parameters and Specifications for 1000 Mb/s Operation Over 4 Pair of Category 5 Balanced Copper Cabling, Type 1000BASE-T
	802.3ae	10GE WAN/LAN
	802.3af	DTE Power via MIDI
	802.3u	100Base-T
	802.3x	Full Duplex and flow control
	802.3z	Gigabit Ethernet Standard, 1000BASE-X

Table 6-4 RFC

Feature	Standard	Description
General Routing Protocols	RFC 768	User Datagram Protocol (UDP)
	RFC 791	Internet Protocol (IP)
	RFC 792	Internet Control Message Protocol (ICMP)
	RFC 793	Transmission Control Protocol (TCP)
	RFC 826	Address Resolution Protocol (ARP)
	RFC 854	Telnet Protocol Specification
	RFC 894	Standard for the transmission of IP datagrams over Ethernet networks. C. Hornig. Apr-01-1984. (Format: TXT=5697 bytes) (Also STD0041) (Status: STANDARD)
	RFC 951	Bootstrap Protocol
	RFC 1542	Clarifications and Extensions for the Bootstrap Protocol
	RFC 1027	Using ARP to Implement Transparent Subnet Gateways
	RFC 1122	Requirements for Internet Hosts - Communication Layers
	RFC 1256	ICMP Router Discovery Messages

Feature	Standard	Description
	RFC 1519	Classless Inter-Domain Routing (CIDR): an Address Assignment and Aggregation Strategy
	RFC 1812	Requirements for IP Version 4 Routers
	RFC 2131	Dynamic Host Configuration Protocol
	RFC 2338	Virtual Router Redundancy Protocol (VRRP)
BGP	RFC 1269	Definitions of Managed Objects for the Border Gateway Protocol: Version 3
	RFC 1771	A Border Gateway Protocol 4 (BGP-4)
	RFC 1965	Autonomous System Confederations for BGP
	RFC 1966	BGP Route-Reflection
	RFC 1997	BGP Community Attribute
	RFC 2385	TCP MD5
	RFC 2439	BGP Route Flap Damping
	RFC 2796	BGP Route Reflection
	RFC 2842	Capabilities Advertisement with BGP-4
IP Multicast	RFC 1112	Host extensions for IP multicasting
	RFC 1122	Requirements for Internet Hosts - Communication Layers
	RFC 2236	Internet Group Management Protocol, Version 2
	RFC 2283	Multiprotocol Extensions for BGP-4
	RFC 2362	Protocol Independent Multicast-Sparse Mode (PIM-SM): Protocol Specification
	draft-ietf-pim-dm-new-v2-02	Protocol Independent Multicast - Dense Mode (PIM-DM)
IS-IS	RFC 1195	Use of OSI IS-IS for Routing in TCP/IP and Dual Environments
	RFC 2763	Dynamic Hostname Exchange Mechanism for IS-IS
	RFC 2966	Domain-wide Prefix Distribution with Two-Level IS-IS
MPLS	RFC 2211	Specification of the Controlled-Load Network Element Service
	RFC 2702	Requirements for Traffic Engineering Over MPLS
	RFC 2547	BGP/MPLS VPNs
	RFC 2961	RSVP Refresh Overhead Reduction Extensions

Feature	Standard	Description
	RFC 3031	Multiprotocol Label Switching Architecture
	RFC 3032	MPLS Label Stack Encoding
	RFC 3036	LDP Specification
OSPF	RFC 1583	OSPF Version 2 (obsoletes RFC 1247/obsoleted by RFC 2178)
	RFC 1587	The OSPF NSSA Option
	RFC 1765	OSPF Database Overflow
	RFC 1850	OSPF Version 2 Management Information Base
	RFC 1997	BGP Community Attribute
	RFC 2178	OSPF Version 2 (obsoletes RFC 1583/obsoleted by RFC 2328)
	RFC 2328	OSPF Version 2 (obsoletes RFC 2178)
	RFC 2370	The OSPF Opaque LSA Option
	RFC 2385	TCP MD5
	RFC 2439	BGP Route Flap Damping
	RFC 2842	Capabilities Advertisement with BGP-4
	RFC 2918	Route Refresh Capability for BGP-4
RIP	RFC 1058	Routing Information Protocol
	RFC 2453	RIP Version 2
Denial-of-Service (DoS) Protection	RFC 2267	Network Ingress Filtering: Defeating Denial of Service Attacks which employ IP Source Address Spoofing (Obsolete)
Network Management	RFC 854	Telnet Protocol Specification
	RFC 951	Bootstrap Protocol
	RFC 1155	Structure and identification of management information for TCP/IP-based internets
	RFC 1157	A Simple Network Management Protocol (SNMP)
	RFC 1212	Concise MIB Definitions
	RFC 1213	Management Information Base for Network Management of TCP/IP-based internets: MIB-II
	RFC 1215	A Convention for Defining Traps for use with the SNMP
	RFC 1256	ICMP Router Discovery Messages

Feature	Standard	Description
	RFC 1493	Definitions of Managed Objects for Bridges
	RFC 1573	Evolution of the Interfaces Group of MIB-II
	RFC 1643	Definitions of Managed Objects for the Ethernet-like Interface Types
	RFC 1650	Definitions of Managed Objects for the Ethernet-like Interface Types using SMIv2
	RFC 1657	Basic BGP4 MIB
	RFC 1724	RIP Version 2 MIB Extension
	RFC 1757	Remote Network Monitoring Management Information Base
	RFC 1850	OSPF Version 2 Management Information Base
	RFC 1901	Introduction to Community-based SNMPv2
	RFC 1907	Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)
	RFC 2021	Remote Network Monitoring Management Information Base Version 2 using SMIv2
	RFC 2233	The Interfaces Group MIB using SMIv2
	RFC 2668	Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)
	RFC 2787	Definitions of Managed Objects for the Virtual Router Redundancy Protocol
	RFC 2925	Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations
Security	RFC 1492	An Access Control Protocol, Sometimes Called TACACS
	draft-grant-tacacs-02	TACACS+
	RFC 2138	Remote Authentication Dial In User Service (RADIUS)