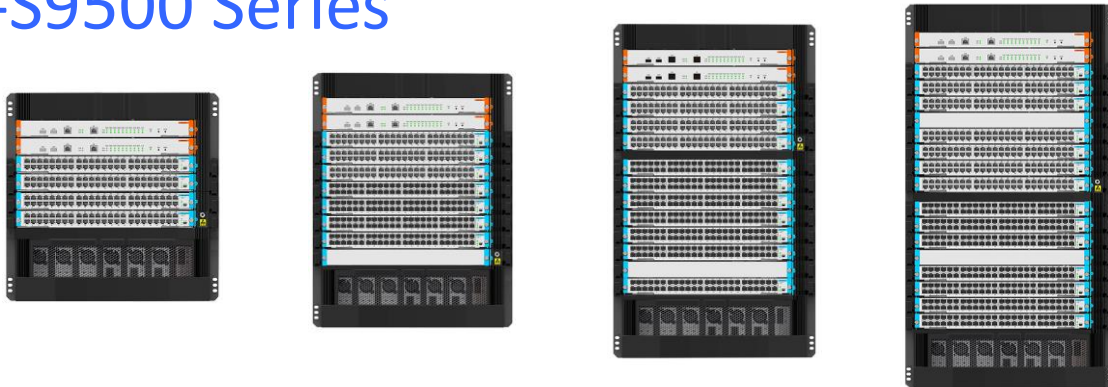


TR-S9500 Series



High Performance Core Switches Series

Product Overview

TECHROUTES TR-S9500 Series is a new generation high-performance core switch oriented for high-performance computing, data center and high-end campuses. TR-S9500 Series adopts advanced hardware architecture design. TR-S9500 Series supports up to 64Tbps switching capacity, 768 10G ports, 512 40G ports and 128 100G ports. Besides, it is to be configured with 256 100G ports in the future.

TR-S9500 Series supports TVSS, TRILL, SDN and FCoE/FC. By cooperating with TR-S5800 Series, TR-S9500 Series can access to 15000+ 10G servers.

Developed on the basis of a software platform TECHROUTES with its own independent intellectual property rights, TR-S9500 Series provides high-performance L2/L3/L4 wire speed switching capacity by integrating services such as IPv6, MPLS VPN, network security, flow analysis, virtualization, with high reliable techniques including continuous forwarding, graceful restarting and loop network protection, the work efficiency of TR-S9500 Series and its maximum running time are guaranteed.

TR-S9500 Series supports the “GreenTouch” architecture and “Smart@CHIP”. Its power consumption is lower than 200W.

TR-S9500 Series has four models: TR-S9506, TR-S9510, TR-S9514 and TR-S9518.

Product Characteristics

- **Advanced Hardware Architecture Design & Industry-Leading Processing capacity**
- TR-S9500 Series adopts the industry leading hardware architecture design. Its control engine and SFUs are detached, which provides continuous broadband upgrade capacity.
- With high-performance ASIC switch chip and multi-core processor, TR-S9500 Series supports up to 40Tbps switching capacity.
- TR-S9500 Series supports high-intensity 10G service cards and realizes the wire-speed switching of 3 layers without blocking.

- TR-S9500 Series supports 768 10G ports, 256 40G ports and 96 100G ports. Besides, it is to be configured with 256 100G ports in the future.
- A single service card of TR-S9500 Series supports up to 512K MAC address entries and 512K layer-3 routing tables.

➤ Rich Data Center Services

- TVSS (TECHROUTES Virtual Switch System)
- TR-S9500 Series supports TVSS, which can virtualize multiple physical devices into one in logic. The virtualized system is superior to the independent physical device in performance, reliability, flexibility and management.
- Doubled Performance: The virtualized system makes the best use of each link in the device and avoids the blocking of STP to the link.
- High-reliability: Based on the advanced distributed processing technique and the efficient function of cross-physical device link aggregation, TR-S9500 Series provides with non-stop layer-3 routing forwarding and avoids single points of failure.
- Flexibility: With the function of TR-S9500 virtual cluster service cards, the distance of virtual cluster system can expand to 80KM, breaking the geographic restriction of traditional cluster technique.
- Easy Management: The whole virtual system realizes single IP unified management and simplifies the management of network device and network topology.
- Large Layer-2 Network Technique: TR-S9500 Series adopts large layer-2 network technique which supports TRILL/SPB protocol. With the technique, the network structure has become simple and compress, which can access to data center large-scale servers.
- Unified Architecture: TR-S9500 Series supports FCoE (FC over Ethernet) technique, which solves the problem of discrepancy between LAN network and FC storage network and integrates computing, data and storage networking.
- SDN: TR-S9500 Series supports SDN (Software Defined Network), which can realize network virtualization and centralized management.

➤ Data Center Level High-reliability

- TR-S9500 Series adopts HPS (Hitless Protection System). The key components of TR-S9500 Series such as the power system and the fan system support redundancy design. All system modules support hot-swap and seamless switching without need of manual intervention.
- TR-S9500 Series supports redundancy protection mechanism such as STP/RSTP/MSTP protocol, VRRP protocol, ring network protection, dual uplink active/standby link protection and LACP link aggregation.
- TR-S9500 Series supports ISSU (In-Service Software Upgrade), guaranteeing the user data non-stop forwarding when the system is upgrading.
- TR-S9500 Series supports BFD and realizes fault detection and service recovery in seconds through linking with layer-2 or layer-3 protocol.
- TR-S9500 Series has perfect Ethernet OAM, 802.3ah, 802.1ag and ITU-Y.1731 which can real time monitor the network operating state and rapidly detect and locate the malfunction.
- High Reliability (99.999%): MTTR of TR-S9500 Series is 50ms, meeting the requirement of the carrier-level service.

➤ Comprehensive Service

- TR-S9500 Series Supports complete layer-2 and layer-3 multicast routing protocol and meets the access requirement of IPTV, multi-terminal high-definition video monitoring and high-definition video meeting.
- TR-S9500 Series supports complete layer-3 routing protocol and a super-large routing table capacity, which make super-large data center network, campus network, enterprise network and industry private networks available.
- TR-S9500 Series supports complete MPLS VPN of layer-2 and layer-3, which meets the requirement of industry private VPN users and enterprise network VPN users.
- TR-S9500 Series also provides with value-added services including POE and traffic analysis.

➤ Comprehensive IPv6 Solutions

- TR-S9500 Series comprehensively supports IPv6 Neighbor Discovery, ICMPv6, Path MTU Discovery and DHCPv6.
- TR-S9500 Series supports IPv6 based Ping, Traceroute, Telnet, SSH, ACL, meeting the need of IPv6 network equipment management and service control.
- TR-S9500 Series supports IPv6 multicast characteristics including MLD, MLD Snooping and IPv6 layer-3 routing protocols including IPv6 static routing, RIPng, OSPFv3 and BGP4+.
- TR-S9500 Series supports IPv4-to-IPv6 technologies including IPv6 manual/automatic tunnel, auto tunnel, IPv6-to-IPv4 tunnel, and ISATAP tunnel.

➤ Comprehensive Security Mechanism

- TR-S9500 Series adopts advanced hardware architecture design, realizing the hierarchical scheduling and protection of the packet. It provides multiple security measures to defend against DOS or TCP attacks; and supports command line authority control based on user levels.
- Comprehensive Security Certification: TR-S9500 Series complies with IEEE 802.1x, Radius, Tacacs+.
- Enhanced Service Security Mechanism: TR-S9500 Series supports the plain text or MD5 authentication of relevant routing protocol; uRRF; DPI (Deep Packet Inspection) and (Deep Packet Filtration); DPI for control packets and data packets.

➤ Innovative Green Environmental design

- TR-S9500 Series supports the "GreenTouch" architecture.
- Smart Power Management System: TR-S9500 Series adopts advanced power system architecture design which can realize the function of efficient power switching, private power monitoring, soft start, real-time monitoring, intelligent adjustment and energy-saving.
- Smart Fan Management System: TR-S9500 Series is designed with the intelligent fan and supports switching between front-back mode and back-front mode and fan automatic speed regulation.
- TR-S9500 Series supports Efficient Ethernet and complies with International standard IEEE 802.3az.

Technical Specifications

Item	TR-S9506	TR-S9510	TR-S9514	TR-S9518
Switching capacity	16Tbps	32Tbps	64Tbps	64Tbps
Packet forwarding rate	3840Mpps/7680 Mpps	7680Mpps/15360Mpps	7680Mpps/23040 Mpps	7680Mpps/30720M pps
Total Number of Slots	10	14	18	22
MCU slots	2	2	2	2
SFU slots	4	4	4	4
Service card slots	4	8	12	16
Data Center Characteristics	TVSS			
	TRILL/SPB large layer-2 technique			
	FCoE technique			
	SDN			
MAC Switching Capacity	Static configuration and dynamically learning of MAC address			
	Check and delete MAC address			
	Configuring of MAC address aging time			
	Limit on MAC address learning number			
	MAC address filtering function			
	Black-hole MAC items			
VLAN	4K VLAN entries			
	GVRP			
	1:1 and N:1 VLAN Mapping			
	Basic QinQ and selective QinQ			
	Private VLAN			
STP	802.1D (STP), 802.1W (RSTP), 802.1S (MSTP)			
	BPDU protection, root protection and ring protection			
Multicast	IGMP v1/v2/v3			
	IGMP Snooping			
	IGMP Fast Leave			
	Multicast group policy and multicast number limit			
	Multicast traffic cross VLAN duplication			
	PIM-SM and PIM-DM			
IPv4	Static routing, RIP v1/v2, OSPF and BGP			
	Policy routing.			
	Load balance through equal-cost routing			

	Graceful Restart of OSPF and BGP
	BFD for OSPF and BGP
IPv6	ICMPv6, DHCPv6, ACLv6, IPv6 Telnet
	IPv6 Neighbor Discovery
	Support Path MTU Discovery
	MLD and MLD Snooping
	IPv6 static routing, RIPng, OSPFv3 and BGP4+
	Manual tunnel, ISATAP tunnel and 6-to-4 tunnel
MPLS VPN	LDP protocol
	MCE
	P/PE of MPLS VPN
	MPLS Traffic Engineering (TE)
	MPLS Operations, Administration, and Maintenance (OAM)
QoS	Traffic classification of each field of L2/L3/L4 protocol headers
	CAR traffic control
	802.1P/DSCP priority remark
	Multiple queuing algorithms such as SP, WRR or SP+WRR
	Tail-Drop, WRED
	Traffic supervision and traffic shaping
Security features	Identification and filtering of L2/L3/L4 based ACL
	Defend against DOS or TCP attacks
	Suppression of broadcast, multicast and unknown unicast packet
	Port isolation
	Port security, IP+MAC+port binding
	DHCP Snooping, DHCP Option 82
	IEEE 802.1x certification
	Radius and Tacacs+
	uRPF
	Command line authority control based on user levels
Reliability	Dual Master Control Redundancy (except S9503)
	Power 1+1 redundancy
	Master control, service card hot swap and service automatic recovery
	Static LACP link aggregation and cross service card link aggregation
	Ring network protection including EAPS
	VRRP and HSRP
	Ethernet OAM 802.3ah/802.1ag/ITU-Y.1731
	GR for OSPF and BGP
	BFD for OSPF and BGP
	ISSU
Management and Maintenance	Console, Telnet and SSH
	SNMP v1/v2/v3
	Upload and download of TFTP files

	Remote Network Monitoring (RMON)			
	Statistics analysis of sFLOW, Netflow			
Value-added services	POE function			
Energy saving	IEEE 802.3az green Efficient Ethernet			
Environment	Operating temperature/humidity:0°C-50°C, 10%-90% non-condensing			
	Storage temperature/ humidity: -20°C-70°C; 5%-95% non-condensing			
Power supply	AC:100V-240V, 50Hz±10%			
	DC: -48V			
Dimensions mm (WxDxH)	482×564×486	482×564×620	482×564×798	482×564×975
	11U	14U	18U	22U

Ordering Information

Item	Description
Chassis of TR-S9500 Series	
TR-S9506	Integrated Chassis of S9506 switch (2 fan trays, 7 power slots, 2 master slots, 4 SFU slots, 4 service slots)
TR-S9510	Integrated Chassis of S9510 switch (3 fan trays, 7 power slots, 2 master slots, 4 SFU slots, 8 service slots)
TR-S9514	Integrated Chassis of S9514 switch (4 fan trays, 7 power slots, 2 master slots, 4 SFU slots, 12 service slots)
TR-S9518	Integrated Chassis of S9518 switch (5 fan trays, 7 power slots, 2 master slots, 4 SFU slots, 16 service slots)
Power Supply of TR-S9500 Series	
LS95-PWR-AC	TR-S9500 Series AC power modules 1200W
LS95-PWR-DC	TR-S9500 Series DC power modules 1200W
LS95-PWR-POE	TR-S9500 Series POE AC power modules 1000W
Console Board of TR-S9500 Series	
LS95-MCU	Console Board of TR-S9500 Series
SFU of TR-S9500 Series	
LS9506-SFU	SFU of TR-S9506 Series
LS9510-SFU-I	SFU-I of TR-S9510 Series
LS9510-SFU-II	SFU-II of TR-S9510 Series
LS9514-SFU-I	SFU-I of TR-S9514 Series
LS9514-SFU-II	SFU-II of TR-S9514 Series
LS9518-SFU-I	SFU-I of TR-S9518 Series
LS9518-SFU-II	SFU-II of TR-S9518 Series
Console Board of TR-S9500 Series	
Gigabit Service Cards	
LS95-16GT16GS	16 Gigabit TX ports (RJ45), 16 Gigabit optical service cards (SFP)
LS95-48GT	48 Gigabit TX ports (RJ45)

LS95-48GS	48 Gigabit SFP service cards
10G + Gigabit Service Cards	
LS95-32GT4TS	32 Gigabit TX ports (RJ45), 4 10G service cards (SFP+)
10G Service Cards	
LS95-12TS	12 10G optical service cards (SFP+)
LS95-32TS	32 10G optical service cards (SFP+)
LS95-48TS	48 10G optical service cards (SFP+)
40G Service Cards	
LS95-8QS	8-port 40G optical service cards (QSFP+)
LS95-16QS	16-port 40G optical service cards (QSFP+)
100g Service Cards	
LS95-1CF	1-port 100G optical service card (CFP)
LS95-4CF	4-port 100G optical service card (CFP)
Value-Added Services	
LS95-48GT-POE	48 Gigabit TX POE/POE+ service cards (RJ45)
LS95-12TS-VSS	12 10G optical virtualized service cards (SFP+)
Optical Modules	
Gigabit Optical Modules	
GSFP-TX-B	Gigabit SFP optical ports transfers to RJ45 TX port modules
GSFP-SX-D	Gigabit SFP multi-mode (500m, 850nm, LC, DDM)
GSFP-LX-10-D	Gigabit SFP single mode (10Km, 1310nm, LC, DDM)
GSFP-LX-20-D	Gigabit SFP single mode (20Km, 1310nm, LC, DDM)
GSFP-LX-40-D	Gigabit SFP single mode (40Km, 1310nm, LC, DDM)
GSFP-ZX-80-D	Gigabit SFP single mode (80Km, 1550nm, LC, DDM)
GSFP-LX-SM1310-10-BIDI	Gigabit SFP single mode, single-core bidirectional (10Km, TX1310/RX1550, LC, DDM)
GSFP-LX-SM1550-10-BIDI	Gigabit SFP single mode, single-core bidirectional (10Km, TX1550/RX1310, LC, DDM)
GSFP-LX-SM1310-20-BIDI	Gigabit SFP single mode, single-core bidirectional (20Km, TX1310/RX1550, LC, DDM)
GSFP-LX-SM1550-20-BIDI	Gigabit SFP single mode, single-core bidirectional (20Km, TX1550/RX1310, LC, DDM)
GSFP-LX-SM1310-40-BIDI	Gigabit SFP single mode, single-core bidirectional (40Km, TX1310/RX1550, LC, DDM)
GSFP-LX-SM1550-40-BIDI-1310	Gigabit SFP single mode, single-core bidirectional (40Km, TX1550/RX1310, LC, DDM)
GSFP-LX-SM1490-80-BIDI	Gigabit SFP single mode, single-core bidirectional (80Km, TX1490/RX1550, LC, DDM)
GSFP-LX-SM1550-80-BIDI	Gigabit SFP single mode, single-core bidirectional (80Km, TX1550/RX1490, LC, DDM)
10G Optical Modules	

10G-SFP+SX	10G SFP+ multi-mode (300m, 850nm, LC)
10G-SFP+LX-10	10G SFP+ single mode (10Km, 1310nm, LC, DDM)
10G-SFP+LX-20	10G SFP+ single mode (20Km, 1310nm, LC, DDM)
10G-SFP+LX-40	10G SFP+ single mode (40Km, 1550nm, LC, DDM)
10G-SFP+LX-80	10G SFP+ single mode (80Km, 1550nm, LC, DDM)
40G Optical Modules	
QSFP+LX-10	40G QSFP+ Single-mode (10Km, 1310nm, LC, DDM)
100G Optical Modules	
CFP-LX-10	100G CFP Single-mode (10Km, 1310nm, LC, DDM)