QSFPTEK S5600 Series Routing Switch Instruction Manual

Contents

QSFPTEK S5600 Series Routing Switch

Information

The QSFPTEK S5600 Series Routing Switches are high-performance switches designed for next-generation

enterprise, data center, metro, and HCI (Hyper-Converged Infrastructure) networks. The switches are available in four different configurations:

- S5600-4T12X: Standard 1U 19” rack mountable; 4x 10/100/1000 Base-T ports; 12x 10GE SFP+ ports; Single built-in AC power supply; Dual built-in fans; Front-rear airflow.
- S5600-24T8X: Standard 1U 19” rack-mountable; 24x 10/100/1000 Base-T ports; 8x 10GE SFP+ ports; Single built-in AC power supply; Three built-in fans; Front-rear airflow.
- S5600-48T4X: Standard 1U 19” rack mountable; 48x 10/100/1000 Base-T ports; 4x 10GE SFP+ ports; Dual 1+1 Redundant AC hot-swap power supplies; Three built-in fans; Front-rear airflow.
- S5600-48S4X: Standard 1U 19” rack-mountable; 48x 1GE SFP ports; 4x 10GE SFP+ ports; Dual 1+1 Redundant AC hot-swap power supplies; Three built-in fans; Front-rear airflow.

Product Characteristics

- **Carrier Grade High-Performance Chip:** The switches are designed based on a high-performance Ethernet switching chip, which is Carrier Grade and helps the S5600 to meet the requirements of Metro/Enterprise/Data Center/HCI networks.
- **Varied Port Types:** The switches support 1G / 10G / 25G / 40G / 100G ports to meet different network requirements.
- **Green and Energy-Saving Design:** The switches feature intelligent FAN adjustment and real-time power consumption monitoring technology to help build a green and energy-saving data center.
- **Customized Profile:** The switches offer multiple table size configuration profiles as optimized choices for different network scenarios. They support up to 96K MAC address tables and up to 56K IP routing tables.
- **Intelligent Ethernet OAM:** The switches offer completed network fault management and performance guarantee with IEEE802.1ag and ITU-T Y.1731 end-to-end OAM. The fault management technique includes CCM, LTM, and LBM. Performance targets include measures for latency and jitter.
- **Data Center Features:** The switches support leading-edge data center features, including Priority Flow Control (PFC), Explicit Congestion Notification (ECN), Data Center TCP, MLAG, and overlay features. They also support RPC-API for SDN (Software Defined Network).

Product Usage Instructions

The QSFPTEK S5600 Series Routing Switch is designed for next-generation enterprise, data center, metro, and HCI (Hyper-Converged Infrastructure) networks. Follow the instructions below to use the product:

1. Choose the appropriate switch configuration based on your network requirements.
2. Mount the switch in a standard 1U 19” rack.
3. Connect the appropriate cables to the switch ports.
4. Power on the switch using the built-in AC power supply or the dual 1+1 Redundant AC hot-swap power supply (depending on the configuration).
5. Use the OS system software to deploy and manage the switch. The software supports mainstream protocols and applications and can be conveniently deployed and managed.
6. Use the Flexible Table Management (FTM) technology to configure table size profiles optimized for different network scenarios.
7. Use the Intelligent Ethernet OAM to monitor network services, survey end-to-end performance, and ensure

service quality matches the agreement.

8. Use the remote management/network monitoring/network fault indication/remote loopback/MIB parameter retrieval according to the standard 802.3ah EFM to manage and maintain the switch.
9. Use the Data Center features, including Priority Flow Control (PFC), Explicit Congestion Notification (ECN), Data Center TCP, MLAG, and overlay features, as needed.

The QSFPTEK S5600 Series Routing Switch is a high-performance switch designed for next-generation networks. With its varied port types, green and energy-saving design, customized profile, intelligent Ethernet OAM, and data center features, it is an ideal choice for enterprise, data center, metro, and HCI networks.

Product Overview

The QSFPTEK S5600 Series Routing Switches are high-performance 1GE/10GE switches designed based on a high-performance Ethernet switching chip. S5600's product position is to meet the requirements of next generation Enterprise, Data Center, Metro and HCI (Hyper-Converged Infrastructure) networks. QSFPTEK S5600's OS system software supports mainstream protocols and applications which can be conveniently deployed and managed. S5600 currently provide the following configurations:

Front Panel of S5600-24T8X

Front Panel of S5600-24T8X

Front Panel of S5600-48S4X

Rear Panel of S5600-48S4X

Front Panel of S5600-48T4X

Rear Panel of S5600-484X

- S5600-4T12X: Standard 1U 19'' rack mountable; 4x 10/100/1000 Base-T ports; 12x 10GE SFP+ ports; Single built-in AC power supply; Dual built-in fans; Front-rear airflow..
- S5600-24T8X: Standard 1U 19'' rack mountable; 24x 10/100/1000 Base-T ports; 8x 10GE SFP+ ports; Single built-in AC power supply; Three built-in fans; Front-rear airflow..
- S5600-48T4X: Standard 1U 19'' rack mountable; 48x 10/100/1000 Base-T ports; 4x 10GE SFP+ ports; Dual 1+1 Redundant AC hot-swap power supplies; Three built-in fans; Front-rear airflow..
- S5600-48S4X: Standard 1U 19'' rack mountable; 48x 1GE SFP ports; 4x 10GE SFP+ ports; Dual 1+1 Redundant AC hot-swap power supplies; Three built-in fans; Front-rear airflow..

Product Characteristic

Based on Carrier Grade High Performance Chip

S5600 series routing switches, which are designed based on high-performance Ethernet switching chip. The chip is Carrier Grade high-performance chip which help the S5600 to meet the requirement of Metro/Enterprise/Data Center/HCI networks.

Varied Port Types

- Support 1G / 10G / 25G / 40G / 100G ports to meet different network requirements.

System Design for Green and Energy Saving

- Intelligent FAN adjustment and real-time power consumption monitoring technology are provided for the cost of maintenance redundancy and help to build a green and energy saving data center.

Customized Profile for Different Deployment Scenarios

- The Flexible Table Management (FTM) technology offers multiple table size configuration profiles as optimized choices for different network scenarios.
- Support up to 96K MAC address tables. Support up to 56K IP routing tables.

Intelligent Ethernet OAM: completed network fault management and performance guaranty

- With the IEEE802.1ag and ITU-T Y.1731 end-to-end OAM, Ethernet service providers can monitor the services, survey the end-to end performance and ensure the service quality match the agreement.
- The fault management technique includes CCM, LTM and LBM. Performance targets include measure for latency and jitter.
- S5600 Support remote management network monitoring network fault indication remote loopback and MIB parameter retrieval according to the standard 802.3ah EFM.

Data Center Features

S5600 support leading edge Data Center features: Priority Flow Control (PFC), explicit Congestion Notification (ECN) and Data Center TCP, etc.

Support MLAG (Multi-Chassis Link Aggregation) to aggregate links across different devices. MLAG can build an Active-Active system to improve the reliability of the network links from single board grade to device grade. MLAG use a peer link between to devices to aggregate two devices and make them as one device logically. Ports of two different devices join the aggregate ports together and all port can transmit the data traffic. MLAG need to management the device respectively, but the configurations are easier than stacking, reboot is NOT required after MLAG is configured. Forwarding and configuring are processing on local device, in normal condition the traffic do NOT transmit trough the peer link, the bandwidth of peer link is not the bottleneck of the network and the latency is low.

Support overlay technology (include NVGRE/VXLAN/GENEVE etc.). Overlay can make layer2 packets across the layer3 networks by using NVGRE/VXLAN/GENEVE header to encapsulate the entire Ethernet packets. Overlay resolves the problem of MAC table size limitation in traditional layer2 networks, resolves the problem of VLAN id count limitation, and resolves the problem network dynamic adjustment which cannot achieve by VLAN/VPN. Use VXLAN for example, 24 bits VNI identifier can support at most 16777215 logic networks, layer2 networks built by VXLAN can keep the same IP/MAC etc. when move the virtue machine.

MLAG and overlay features are also good candidates for switches in data center network. S5600 supports RPC-API for SDN(Software Defined Network). SDN is a new architecture of network which can substantially simplify the management and maintenance by separating the control plane and data plane of the network.

High Reliability

- S5600 are powered by Hot-swappable power modules which supports AC/DC 1+1 redundancy Fans support 2+1 redundancy Support Real-time environment monitoring technology to detect the chipset temperature, status of fan and power, etc.
- Support LACP / ECMP / VRRP / VARP / STP/RSTP/MSTP / Smart Link / BFD / ERPS / G.8031 / G.8032 / Load-Balancing, etc. to protect the network traffic all-around effectively.
- Patented technology “Sysmon” for CPU status monitoring can take action when system is error.

Outstanding QoS Control

S5600 provides 10hardware queues per-port (8 unicast queues, 1 multicast queues, and 1 monitor queue).Support multi-stage scheduling technology such as WDRR (Weighted Deficit Round Robin) / SP (Strict Priority) and TD (Tail Drop) / WRED (Weighted Random Early Detection) to prevent congestion. Support flexible queue scheduling mechanism to do the shaping for queue or port traffic. Ingress and egress policer provide intelligent bandwidth monitoring, which support to adjust the granularity according to the port speed. Both srTCM (Single Rate Three Color Marker) and trTCM (Two Rate Three Color Marker) can be supported.

Triple-play Service Support with Bandwidth Guaranty for High Quality Application

S5600 offers high bandwidth for Triple-Play services such as IPTV, video monitoring. The built-in QoS capabilities and flexible queuing technologies guarantee high quality of services. Rich multicast protocol set (IGMP Snooping, IGMP v1/v2, PIM-SM) support up to 2K multicast groups and 4K logical replications per group. With QSFPTEKOS software, IPTV service and multicast latency control are fully supported.

Comprehensive Network Security Policy

S5600 supports subscriber-class / switch-class / network-class security control. IPv4 / IPv6 / MAC ACL can filter IPv4 / IPv6 / Non-IP packet respectively. Besides that, extended IPv4/IPv6 ACL which can match Layer2 / layer3 / layer4 information in one rule is available. The ACLs can apply to physical ports / vlan / port group / vlan group. The members of port group or vlan group share a set of ACLs and save the TCAM resource.

ARP Inspection and IP Source Guard features prevent network from malicious ARP attack. Support CPU Traffic Protection, Storm Control and CPU load optimization features. Support centralized 802.1x authentication feature to forbidden illegal user accessing network..

Convenient Management Features

Support varied management interfaces, include console port / in-band network ports / out-of-band network port / USB port. Support SNMP v1/v2/v3, Support CLI (Command Line Interface), web management, Telnet and FTP connection. Support OAM to make management more convenient, and support SSH2.0, SSL, etc. to ensure security of management.

Product Specifications

Items	S5600-4T12X	S5600-48T4X	S5600-48S4X	S5600-24T8X
Switch capability	248 Gbps	176 Gbps	176 Gbps	208 Gbps

Forwarding Rate	184.5 Mpps	132 Mpps	132 Mpps	155 Mpps
Size (H×W×D)	4.0 × 44.0 × 22.0 cm (1.6 × 17.3 × 8.7 in.)	4.36 x 44.0 x 37.0cm (1.73 x 17.5 x 14.6 in.)	4.36 x 44.0 x 37.0cm (1.73 x 17.5 x 14.6 in.)	4.36 x 44.0 x 37.0cm (1.73 x 17.5 x 14.6 in.)
Weight	2.8KG	5.1KG	6.25KG	3.5KG
RS-232 Serial Ports	1 RJ-45 console port	1 RJ-45 console port	1 RJ-45 console port	1 RJ-45 console port
Management Ports	1 RJ-45 out-of-band management port	1 RJ-45 out-of-band management port	1 RJ-45 out-of-band management port	1 RJ-45 out-of-band management port
USB Ports	/	1 Type-A USB port	1 Type-A USB port	1 Type-A USB port
10/100/1000Mb Base-T Ports	4	48	/	24
1Gb SFP Ports	/	/	48	/
10GbE SFP+ Ports	12	4	4	8
25GbE SFP28 Ports	/	/	/	/
40GbE QSFP+ Ports	/	/	/	/
100GbE QSFP28 Ports	/	/	/	/
10/100/1000Mb Base-T POE Ports	/	/	/	/
Latency	Min: 660ns	Min: 660ns	Min: 660ns	Min: 660ns

CPU	SOC(Dual core, ARM A53)	SOC(Dual core/ARM A53)	SOC(Dual core/ARM A53)	SOC(Dual core/ARM A53)
Memory	2 GB	2 GB	2 GB	2 GB
Flash	8 GB (eMMC)	8 GB (eMMC)	8 GB (eMMC)	8 GB (eMMC)
Packet Buffer Memory	9 MB	9 MB	9 MB	9 MB

Input voltage	AC Operating Voltage: 100 ~ 240V; 50/60Hz AC Maximum Voltage : 90 ~ 264V; 47~63Hz DC Operating Voltage : -48 ~ -60V			
Power supply	1 Fixed AC power supply	2 (1+1 redundant) hot-swappable	2 (1+1 redundant) hot-swappable	1 Fixed AC power supply
Airflow Option	Front-Rear	Front-Rear	Front-Rear	Front-Rear
Fans	2 Fixed	3 Fixed	3 Fixed	3 Fixed
Typical Power Draw	33W	42W	58W	52W
Max Power Draw	43W	55W	70W	55W
MTBF(Hour)	>50000	204935	189901	215299
MTBF(Year)	>5.71	23.39	21.68	24.6

S5600 Series System Specifications

Table 3-1 Series System Specifications

Description	**Specification**
Operating Temperature	0 to 45 ºC
Storage Temperature	-40 to 70 ºC
Relative Humidity	0 to 95% (non-condensing)

Table 3-2 Environment Specifications

Description	Specification
Safety Certifications	Ready to CE Marking
Electromagnetic Emissions Certifications	Ready to FCC Part 15 Class A Ready to CE
Warranty	Limited warranty

Table 3-3 Safety and Compliance

Description	Specification
Safety Certifications	Ready to CE Marking

Electromagnetic Emissions Certifications	Ready to FCC Part 15 Class A Ready to CE
Warranty	Limited warranty

S5600 Series Service Specifications

Table 3-4Service specifications

Parameter	Features
Forward mode	Support store-forward mode and cut-through mode
Ethernet features	Support full duplex, half duplex, and auto-negotiation duplex Support auto-negotiation port speed Support Jumbo Frame Support Flow Control Support Storm Control Support Port-block Support Port-isolate Support L2 Protocol Tunneling
VLAN features	Support 4094 VLANs Support VLAN access mode: Access /Trunk Support Default VLAN Support VLAN Classification Support basic QinQ, selective QinQ, and VLAN Mapping Support VLAN statistics Support Private VLAN Support Guest VLAN Support Voice VLAN
MAC Address Table	Support static MAC address Support dynamic MAC address learning and aging Support hardware learning Support black hole MAC address Support MAC Flapping detect
Link aggregation	Support Static Link aggregation Support LACP Support Static load balancing Support dynamic load balancing (DLB) Support Self-healing Support port priority and active-standby mode

Reliability features	Support STP/RSTP/MSTP protocol Support STP Protocol Protection (BPDU Filter/Guard, Root Guard, Loop Guard, Anti TC-BPDU attack) Support Single ERPS ring / tangent ERPS rings / intersecting ERPS rings Support ERPS compatible with RRPP Support G.8031 Support G.8032 Support port Loopback Detect Support BFD Support VRRP Support MLAG Support Ethernet OAM: EFM/CFM/Y.1731 Support Software class process monitoring(Sysmon) Support Hardware Watch Dog
ARP features	Support static ARP Support dynamic ARP leaning and aging Support Gratuitous ARP Support basic ARP-Proxy and local ARP-Proxy
IPv6 forwarding	Support ICMPv6 Support NDP Support PMTU Support IPv6 static routes Support RIPng Support OSPFv3 Support IPv6 over IPv4 Tunnel Support 6to4 Tunnel Support ISTAP Tunnel Support DHCPv6 Support IPv6 prefix list Support VRRP v3
Multicast features	Support IGMP v1/v2/v3 Support IGMP agent Support IGMP SSM Mapping Support PIM-SM,PIM-SSM,PIM-DM Support MLD v1/v2, MLD v1/v2 snooping Support MVR and MVR6 Support PIM-SM v6
Metro features	Support LDP

	Support MPLS Forwarding Support VPWS Support VPLS Support MPLS OAM Support MPLS Stats Support L2VPN/L3VPN Support MPLS ACL Support MPLS QoS
Data center features	Support VARP Support VXLAN Support GRE Tunnel Support NVGRE Tunnel Support GENEVE Tunnel Support DCBX Support priority-based flow control (PFC) Support PFC Deadlock detection Support EVPN
QOS features	Support traffic classification based on COS/DSCP (simple classification) Support t raffic classification based on ACL (complex classification) Support queue scheduling based on traffic classification Support Remark the priority fields(COS/DSCP) of the packet Support flow redirect ion Support flow mirror Support traffic policing Support traffic shaping Support traffic s tatistics Support SP(Strict Priority) scheduling Support WDRR (Weighted Deficit Round Robin) scheduling Support SP + WDRR mixed scheduling Support TD(Tail Drop) Support WRED (Weighted Random Early Detection) Support ECN tags based on TD and WRED
Security features	Support SSH Support Radius Support TACAS+ Support AAA Support port based dot1x and MAC based dot1x authentication/access accounting/keep alive Support configure dot1x Guest via command or Radius server

	Support access control list(ACL) Support traffic classification based on source and destination IP / source and destination MAC / source and destination layer for protocol number / VLAN ID Support ACL matching User defined fields (UDF) Support ACL active based on Time-Range Support ARP inspection Support IP source guard Support port security to limit the MAC address learning on interface Support VLAN security to limit the MAC address learning on interface Support CoPP (Control Plane Protect) black & white list and rate limit features Support CPU Traffic Limit Support Prevent DDOS attack Support ACL filtering Telnet/SSH login Support Link-Flapping detection
Configuration and maintenance	Support DHCP Server Support DHCP Relay Support DHCP Snooping Support DHCP Client Support DHCP Option82 Support RMON Support sFlow Support IP SLA Support IPFIX and MFP Support SGT Support Latency/Buffer Monitor Support EFD (Elephant Flow Detection) Support NTP Support port Errdisable state detection and recovery Support configure static DNS client Support LLDP Support port loopback Support hardware loopback (internal/external) Support to configure system time Support to configure time zone
Debugging features	Support to Debug based on modules Support CPU/memory usage display and alarm Support Device temperature/PSU/FAN/status display and alarm

	Support user operation logs Support Management of logs, alarms, and debugging information Support VCT (Virtual Cable Test) Support detailed diagnostic-information collection Support reboot information logging Support network diagnostics (ping/traceroute) Support mirror: support use port/VLAN/CPU as mirror source Support use port/port group/ VLAN / CPU as mirror destination Support ERSPAN Support to CPU/From CPU packets statistics Support L2 ping Support UDLD(Unidirectional Link Detection)
Management features	Support in-band and out-of-band management ports Support privileged user priority and privileged commands Support User block feature Support Network management based on SNMPv1/v2c/v3 Support Public and private MIB Support Public and private Trap Support Configuration and management based on WEB UI Support Configuration and management based on RPC-API Support SmartConfig(Automatically configuration when system start) Support OVSDB Support change the system specifications by choose different STM Profiles Support feature configuration based on License Support restore factory default configuration Support manual/schedule reboot Support upgrade with the local image file/remote TFTP server Support online upgrade Uboot
File system	Support file system to manage the files and directories Support upload/download files via FTP/TFTP Support transmit files via Xmodem

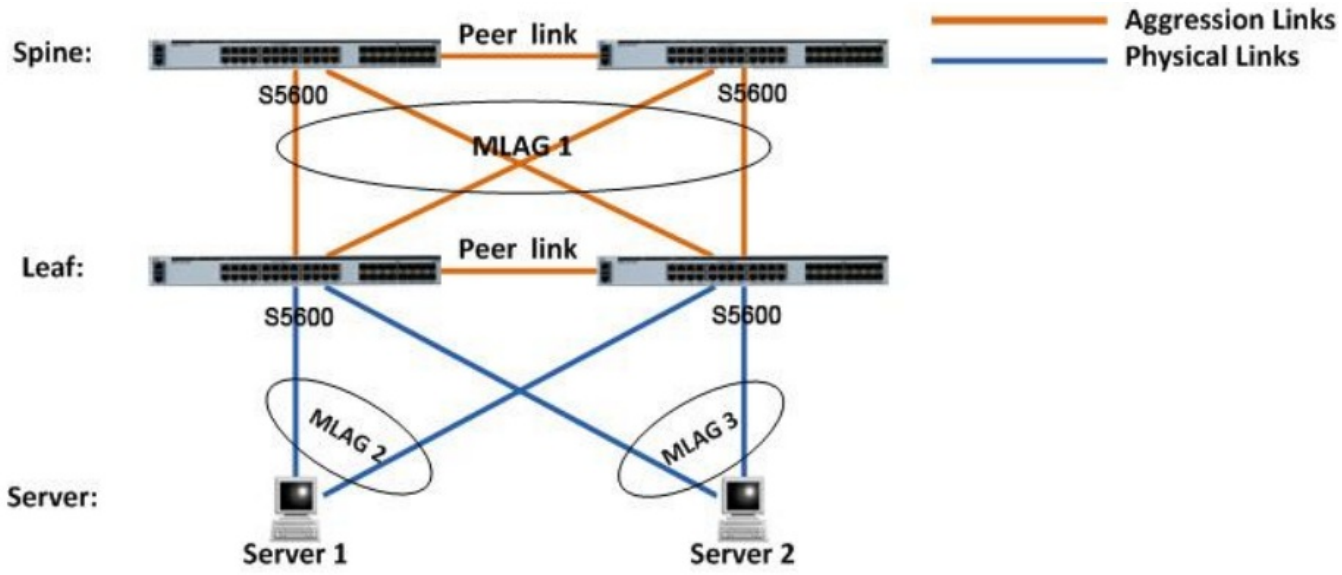
S5600 Series

Manufacturer Name	Safety	EMC	Certifications
QSFPTEK.	EN 62368-1: 2020+A11:2020 EN62479:2010	EN 55032: 2015 EN 55024: 2010 EN 61000-3-2:2014 EN 61000-3-3: 2013	CCC CE-LVD CE-EMC FCC

QSFPTEK.	EN 62368-1: 2020+A11:2020 EN62479:2011	EN 55032: 2015 EN 55024: 2010 EN 61000-3-2:2014 EN 61000-3-3: 2014	FCC ICES ETL
QSFPTEK	EN 62368-1: 2020+A11:2020 EN62479:2011	EN 55032: 2015 EN 55024: 2010 EN 61000-3-2:2014 EN 61000-3-3: 2014	CCC CE-LVD CE-EMC FCC FCC ICES

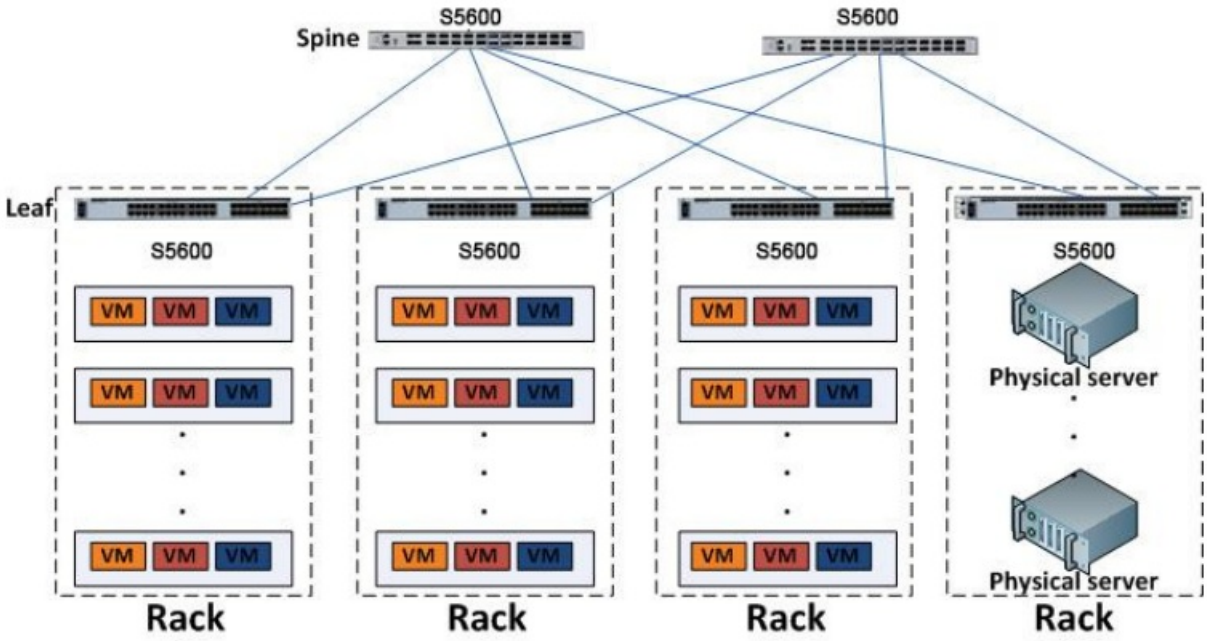
Applications

HCI Hyper-Converged Infrastructure



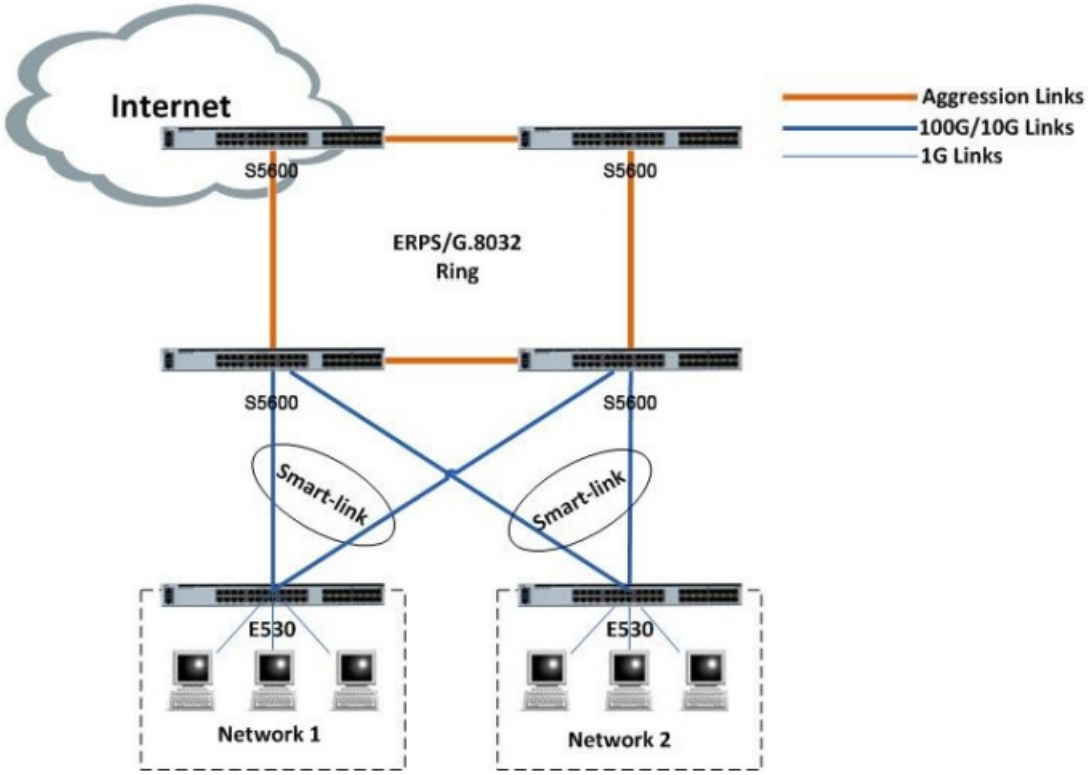
S5600 with 1GE + 10GE/40GE/100GE ports are suitable for HCI Hyper-Converged Infrastructure networks. Using 1GE ports for management network and using 10G/40GE/100G ports for data traffic network. The following features of S5600 are available for this case: VLAN, LACP, STP/RSTP/MSTP, MLAG, etc.

Enterprise Data Center



S5600 series provide 1GE/10GE/40GE/100GE ports for Access or Aggregation switches. The following figure shows a deployment example using the S5600 Series for Data Center Access network topology as TOR access devices The following features of S5600 are available for this case: VLAN, LACP, RSTP&MSTP, MLAG, DCB Features (PFC/QCN/ETS, Data Center TCP), OSPF, QoS, Overlay(NVGRE/VXLAN/GENEVE), etc.

Metro L2 Ring Network



Ring network topology allows service provider to establish robust network and operate multiple services. The following figure shows the deployment example using the S5600 Series for Metro L2 ring network topology as Aggregation or Access devices. The following features of S5600 are available for this case: QinQ / ERPS / G.8032 / EFM / CFM / LACP / Smart-link, etc.

Ordering Information

Table6-1 S5600 Series product

Product Number	Description
S5600-4T12X	Standard 1U 19’’ rack mountable; 4x 10/100/1000 Base-T ports; 12x 10GE SFP+ ports; Single built-in AC power supply; Dual built-in fans; Front-rear airflow.
S5600-48T4X	Standard 1U 19’’ rack mountable; 48x 10/100/1000 Base-T ports; 4x 10GE SFP+ ports; Dual 1+1 Redundant AC hot-swap power supplies; Three built-in fans; Front-rear airflow.
S5600-48S4X	Standard 1U 19’’ rack mountable; 48x 1GE SFP ports; 4x 10GE SFP+ ports; Dual 1+1 Redundant AC hot-swap power supplies; Three built-in fans; Front-rear airflow.
S5600-24T8X	Standard 1U 19’’ rack mountable; 24x 10/100/1000 Base-T ports; 8x 10GE SFP+ ports; Single built-in AC power supply; Three built-in fans; Front-rear airflow.

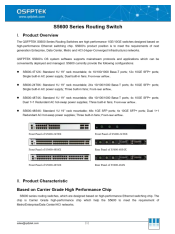
Extended Optics and Cables

Table6-2 Supported Optics and cables

Port type	Optics and cables	Note
Ethernet management port	RJ-45 connectors Cat-5 UTP cabling	–
Console port	RJ-45-to-DB9 cable	for PC connections
10/100/1000BASE-T Ports	RJ-45 connectors Cat-5 UTP cabling	–
1GE SFP	LC fiber connectors Single-mode or Multimode fiber	–
25GE SFP28	LC fiber connectors Single-mode or Multimode fiber	–
10GE SFP+	LC fiber connectors Single-mode or Multimode fiber	–
40GE QSFP+	LC fiber connectors Single-mode or Multimode fiber	–
100GE QSFP28	LC fiber connectors Single-mode or Multimode fiber	–

sales@qsfptek.com

Documents / Resources

	QSFPTEK S5600 Series Routing Switch [pdf] Instruction Manual S5600 Series Routing Switch, S5600 Series, Routing Switch, Switch

References

- QSFPTEK - Compatible Optical Transceivers Factory Outlet