

HPE Networking Comware 5960 Switch Series

Product overview

The HPE Networking Comware 5960 Switch Series are high-density, high-performance top-of-rack (ToR) switches suited for deployment at the core and aggregation layer of enterprise data centers, large cloud service providers, and telco environments.

These switches offer multiple connectivity options with high-density 400G connectivity and are backward compatible with the widely used 100G QSFP28 ports. Switching capacity of 14.4 Tbps/25.6 Tbps and redundant hot-swappable power supplies offer exceptional performance with improved power savings. VXLAN/EVPN and DRNI lead to improved scalability and resiliency. Enhanced software features such as SR-MPLS running with the latest OS Comware v9 enables a dynamic and highly available network.

HPE Intelligent Management Center (IMC) support on these switches provides a consistent network manageability experience through centralized configuration, compliance, policy management, monitoring, and troubleshooting. The HPE Networking Comware 5960 Switch Series also supports HPE IMC Orchestrator and Analyzer for DC fabric orchestration and application telemetry.



Figure 1. HPE NW CW 5960
24x100G/200G+ 8x400GQDD Sw (R9Y12A)



Figure 2. HPE NW CW 5960
32x400G QSFP-DD Sw (R9Y13A)



Figure 3. HPE NW CW Sw 4-8C 6D
5960R (S4J82A)

Key features

- High-performance, high-density, and backward-compatible switch with flexible 400/200/100G connectivity options
- New-generation OS Comware v9 offering enhanced software features such as Segment Routing MPLS (SR-MPLS), SRv6*, PTP/SyncE, egress ACL, egress rate limiting, and others for highly distributed environments
- Dual, redundant, hot-swappable power supplies maintain a dynamic and highly available network
- Supports HPE IMC for a consistent network manageability experience; integrates with HPE IMC Orchestrator and Analyzer for DC fabric orchestration, monitoring, and application telemetry

* Supported only on HPE Networking Comware 5960R (S4J82A) model.



Features and benefits

Consistent and advanced data center switches with flexible connectivity options

- The HPE Networking Comware 5960 Switch Series offers multiple connectivity options of 25/40/100/200/400G with three SKUs:
 - A high-density 32 x 400GbE QSFP-DD switch
 - A highly flexible 24x100/200G + 8x400G QSFP-DD switch that is backward compatible with the widely used 100G QSFP28 ports
 - A high-density 48x100G QSFP28 + 6x400G QSFP-DD switch
- Supports new-generation OS Comware v9 offering enhanced features such as SR-MPLS, SRv6*, and others for highly distributed environments built on a modular and open architecture; supports containerized deployment; can run third-party software applications
- VXLAN/EVPN for network virtualization and overlay solutions for improved flexibility
- Supports DRNI that combines multiple physical switches into one virtual distributed-relay (DR) system for doubling aggregate bandwidth, fast forwarding, resiliency, and high availability

High-performance data center switching

- The HPE Networking Comware 5960 Switch Series supports redundant, hot-swappable power modules and varied fan speeds to meet the actual demands, thereby, ensuring a dynamic and highly available network
- Delivers up to 25.6 Tbps bi-directional switching capacity for demanding data center applications
- HPE Networking Comware 5960R support MACsec for all 100G and 400G ports.
- Low latency, approx 1 μ s delivering increased network throughput
- Uses programmable chips that improve flexibility and aid in network expansion by defining forwarding logic and developing new features as per user needs through simple software upgrades
- HPE Networking Comware 5960R is a router switch for border leaf or DCI connection with MACsec security connection.
- HPE Networking Comware 5960R Switch Series support 400G 120 km ZR+ transceiver, which is suitable for DCI connection scenarios, and can partially replace the transmission equipment through the ZR+ module, which is more convenient to manage.

Rich quality of service (QoS) features

- The HPE Networking Comware 5960 Switch Series support Layer 2 to Layer 4 packet filtering for traffic classification based on source MAC address, destination MAC address, source IP address, destination IP address, TCP/UDP port number, protocol type, and VLAN
- Supports committed access rate (CAR) and line rate for anomaly detection and troubleshooting
- Provides extensive traffic prioritization with strict priority (SP) queuing, weighted round robin (WRR), SP+WRR, WFQ, and SP+WFQ

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Segment Routing

- SRv6* is a future-oriented new-generation protocol. It naturally supports IPv6 and satisfies access to massive address spaces. SRv6 can identify applications and tenants, realize intelligent routing based on index such as delay and bandwidth, and ensure SLA. At the same time, SRv6 implements a unified protocol, which simplifies configuration.
- SRv6 uses segments with a length of 128 bits to define network functions, and then by arranging the segments, a series of forwarding and processing behaviors of network devices can be implemented to complete service orchestration. Compared with MPLS SR protocol, it has stronger scalability and better compatibility with SDN controller, which is more conducive to deploying applications in DCI, MAN and other scenarios.
- The notable feature of SRv6 is that the forwarding plane adopts IPv6. Based on the reachability of IPv6, it is easier to realize the interconnection of different networks. SRv6 is used for forwarding within a domain, and only ordinary IPv6 forwarding is required between domains. It does not need to be like MPLS which needs to convert MPLS to IP and do a lot of complicated configurations.

Improved visibility and simplified management

- The HPE Networking Comware 5960 Switch Series supports operations, administration, and maintenance (OAM) for improved manageability
- These switches can send real-time information, statistics, and RDMA notifications to the data center operation and maintenance platform through ERSPAN and gRPC protocols, thereby, enabling improved visibility
- Supports real-time analysis, troubleshooting, and risk warning to improve network performance and ensure business continuity
- Uses multiple access methods including SNMPv1/v2c/v3, Telnet, SSH 2.0, SSL, and FTP to monitor essential network functions; and supports events, alarm, history, and statistics group plus a private alarm extension group
- Supports centralized configuration, compliance and policy management, monitoring, and troubleshooting with HPE IMC to provide a consistent network manageability experience; for DC fabric orchestration and application telemetry, this switch supports HPE IMC Orchestrator and Analyzer

SKU specifications

- HPE Networking Comware 5960 32 Port 400G QSFP-DD Data Center Switch (R9Y13A)
- HPE Networking Comware 5960 24 Port 100/200G QSFP56 + 8 Port 400G QSFP-DD Data Center Switch (R9Y12A)
- HPE Networking Comware Data Center Switch 48p QSFP28 100G 6p QSFP-DD 400G 5960R (S4J82A)



Technical specifications



HPE NW CW 5960 32x400G QSFP-DD Sw (R9Y13A)



HPE NW CW 5960 24x100G/200G+ 8x400GQDD Sw (R9Y12A)



HPE NW CW Sw 48C 6D 5960R (S4J82A)

I/O ports and slots	1 I/O module slot Supports a max of 32 400G QSFP-DD ports and 2 SFP+ ports	1 I/O module slot Supports a max of 24x100G/200G QSFP56/QSFP28 ports, 8x400G QDD ports	1 I/O module slot Supports a max of 48x100G QSFP28 (24x200G QSFP56)** 6 QSFP-DD ports
Additional ports and slots	1 console port, 1 out of band management port, 1 USB port	1 console port, 1 out of band management port, 1 USB port	1 console port, 1 out of band management port-copper, 1 USB port, 1 PPS/ToD time synchronization port
Power modules and slots	2 power supply slots. 1 minimum power supply required (ordered separately)	2 power supply slots. 1 minimum power supply required (ordered separately)	2 power supply slots. 1 minimum power supply required (ordered separately)
Fan tray	6 hot swappable fans	6 hot swappable fans	6 hot swappable fans
Physical characteristics			
Dimensions (HxWxD)	44 mm x 440 mm x 660 mm	44 mm x 440 mm x 460 mm	65.5 mm x 440 mm x 660 mm
Weight	≤ 12.2 kg	≤ 13.5 kg	≤ 20 kg
Memory and processor	D-1627 @2.9 GHz, 16G DDR4, 240G SSD	D-1627 @2.9 GHz, 16G DDR4, 240G SSD	2.2 GHz @4Core, 32G DDR4 Memory, 4GB NAND FLASH (eMMC)
Mounting and enclosure	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); horizontal surface mounting only	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); horizontal surface mounting only	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); horizontal surface mounting only
Performance			
Latency	<1.2 μs	<1.2 μs	5~6 μs (64-byte packets)
Switching capacity	25.6 Tbps	16 Tbps	14.4 Tbps
Forwarding capacity	5.3 Bpps	2.7 Bpps	2700 Mpps
MAC address table size	Routing-32K Maximum—224K	Routing-32K Maximum—224K	Normal—500K Routing—155K
Routing table size	1M FIB IPv4/500K IPv6	1M FIB IPv4/500K IPv6	2.5M IPV4/2.5M IPV6
Dynamic ARP	ARP Entries—Upto 88K MAC Entries—Upto 224K	ARP Entries—Upto 88K MAC Entries—Upto 224K	ARP Entries—Upto 88K MAC Entries—Upto 500K

** 24x200G QSFP56 only port 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 43, 45



Technical specifications (continued)

	HPE NW CW 5960 32x400G QSFP-DD Sw (R9Y13A)	HPE NW CW 5960 24x100G/200G+ 8x400GQDD Sw (R9Y12A)	HPE NW CW Sw 48C 6D 5960R (S4J82A)
Environment			
Operating temperature	0°C to 40°C	0°C to 40°C	0°C to 40°C
Operating relative humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Non-operating/storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Non-operating/storage relative humidity	5% to 95%, noncondensing	5% to 95%, noncondensing	5% to 95%, noncondensing
Acoustic	60.3 dB at 40% Fan Speed 73.2 dB at 70% Fan Speed 78.9 dB at 100% Fan Speed	59.5 dB at 40% Fan Speed 72.3 dB at 70% Fan Speed 79.6 dB at 100% Fan Speed	
Airflow direction	From front to rear	From front to rear	From front to rear
Electrical characteristics			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum heat dissipation	3890 BTU/hr	2552 BTU/hr	2112 BTU/hr
Current	70A (12V)	70A (12V)	52A (12V)
Voltage	DC—Input Voltage 180V to 320V; AC—Input Voltage 100V to 240V	DC—Input Voltage 180V to 320V; AC—Input Voltage 100V to 240V	DC—Input Voltage 180V to 320V; AC—Input Voltage 100V to 240V
Maximum power rating	1140W (Max)	748W (Max)	1600W (Max)
Idle power	Dual AC 168W	Dual AC 146W	Single power supply—218W Dual power supplies—229W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.		
Safety	UL 60950-1 CAN/CSA C22.2 No 60950-1 IEC 60950-1 AS/NZS 60950-1 FDA 21 CFR Subchapter J GB 4943.1 UL 62368-1 CAN/CSA C22.2 No 62368-1 IEC 62368-1 EN 62368-1 AS/NZS 62368-1	UL 60950-1 CAN/CSA C22.2 No 60950-1 IEC 60950-1 AS/NZS 60950-1 FDA 21 CFR Subchapter J GB 4943.1 UL 62368-1 CAN/CSA C22.2 No 62368-1 IEC 62368-1 EN 62368-1 AS/NZS 62368-1	UL 60950-1 CAN/CSA C22.2 No 60950-1 IEC 60950-1 AS/NZS 60950-1 FDA 21 CFR Subchapter J GB 4943.1 UL 62368-1 CAN/CSA C22.2 No 62368-1 IEC 62368-1 EN 62368-1 AS/NZS 62368-1



Technical specifications (continued)

	HPE NW CW 5960 32x400G QSFP-DD Sw (R9Y13A)	HPE NW CW 5960 24x100G/200G+ 8x400GQDD Sw (R9Y12A)	HPE NW CW Sw 48C 6D 5960R (S4J82A)
Emissions	FCC Part 15 Subpart B Class A ICES-003 Class A VCCI Class A CISPR 32 Class A EN 55032 Class A AS/NZS CISPR 32 Class A CISPR 35 EN 55035 EN 61000-3-2 EN 61000-3-3 ETSI EN 300 386	FCC Part 15 Subpart B Class A ICES-003 Class A VCCI Class A CISPR 32 Class A EN 55032 Class A AS/NZS CISPR 32 Class A CISPR 35 EN 55035 EN 61000-3-2 EN 61000-3-3 ETSI EN 300 386	FCC Part 15 Subpart B Class A ICES-003 Class A VCCI Class A CISPR 32 Class A EN 55032 Class A AS/NZS CISPR32 Class A CISPR 35 EN 55035 EN 61000-3-2 EN 61000-3-3 ETSI EN 300 386
Management	IMC; CLI; out-of-band management; SNMP Manager; Telnet; FTP. Notes: The customer must install a minimum of one power supply, as the device does not come with one. The customer must install 6 fan kits, as the device does not come with one.		
Services	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office		

Standards and protocols

Item	Standards
Forwarding mode	Store-forward
Virtualization	Distributed device management Distributed link aggregation Distributed resilient routing
Link aggregation	100GbE/200GbE/400GbE port aggregation Static aggregation, dynamic aggregation
Data center	VXLAN VXLAN DCI 802.1Qbb PFC, 802.1Qaz ETS, ECN, DCBX Multiple types of OpenFlow controllers EVPN distributed gateway NETCONF, Python RDMA, RoCE
Jumbo frame	Supported
MAC address table	Static MAC address MAC address
VLAN	Port-based VLAN (quantity: 4094) Default VLAN
Traffic monitoring	sFlow®/NetStream



Standards and protocols (continued)

Item	Standards
DHCP	DHCP client DHCP snooping/DHCP relay DHCP snooping support for Option 82/DHCP relay agent support for Option 82 IPv6 DHCP client DHCP relay
ARP	Gratuitous ARP Dynamic ARP source-suppression ARP
IP routing	Static routing, OSPFv1/v2/v3, BGP, IS-IS ECMP, VRRP, policy-based routing BGP4+ for IPv6, VRRP, IPv6 policy-based routing, OSPFv3, ISISv6
IPv6	IPv6 ND ICMPv6, Telnetv6, SFTPv6, SNMP over IPv6, BFDv6, VRRPv3 IPv6 tunnel
Zero touch provisioning (ZTP)	Auto-config
MPLS	L3VPN VPLS MPLS L3VPN MPLS L2VPN (Martini, Kompella) MPLS OAM, MCE LDP VPLS QinQ, Supports P/PE Function
Segment Routing	MPLS SR, TI-LFA FRR MPLS TE policy, SRv6* EVPN VPLS over SRv6* EVPN VPWS over SRv6* MPLS L3VPN over SRv6* EVPN L3VPN over SRv6*
MSTP	STP/RSTP/MSTP PVST+/RPVST+ STP root guard BPDU guard
QoS/ACL	Inbound and outbound traffic rate limit Committed Access Rate (CAR) Eight output queues on each port Flexible port and queue-based queuing and scheduling algorithms SP, WRR, WFQ, SP+WRR, and SP+WFQ queuing 802.1p and DSCP priority remarking Packet filtering at Layer 2 to Layer 4 Traffic classification based on source MAC address, destination MAC address, source IPv4/IPv6 address, destination IPv4/IPv6 address, port number, protocol type, and VLAN Time range-based ACL Bi-directional ACLs (inbound and outbound) ACLs VLAN-based ACL assignment WRED

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Standards and protocols (continued)

Item	Standards
Mirroring	Traffic mirroring N:4 port mirroring Local port mirroring, remote port mirroring Multiple remote mirroring ports (reflector port)
LACP	LACP LACP local forwarding first LACP short time LACP stack split detection
Security	Hierarchical user management and password protection AAA/RADIUS/HWTACACS MACsec SSH 2.0 HTTPS/SSL PKI
LLDP	LLDP LLDP-MED
Loading and upgrading	Loading/upgrading through the XMODEM protocol Loading/upgrading through FTP and TFTP
Management and maintenance	Configuration via CLI, Telnet, and console port scheduled job SNMPv1/v2c/v3 Telemetry gRPC HPE IMC System logs Hierarchical alarms NTP, SNTP Power, fan, and temperature alarms Debugging information output Ping and traceroute File uploading and downloading through the USB port
Safety	UL 60950-1 CAN/CSA C22.2 No. 60950-1 IEC 60950-1, EN 60950-1 AS/NZS 60950-1 FDA 21 CFR Subchapter J GB 4943.1
EMC	FCC Part 15 Subpart B Class A ICES-003 Class A VCCI Class A CISPR 32 Class A EN 55032 Class A AS/NZS CISPR 32 Class A CISPR 24 EN 55024 EN 61000-3-2 EN 61000-3-3 ETSI EN 300 386 GB/T 9254 YD/T 993



Accessories

SFP transceivers*	HPE X120 1G SFP RJ45 T Transceiver	JD089B
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X120 1G SFP LC LH100 Transceiver	JD103A
SFP+ transceivers*	HPE X130 10G SFP+ LC BiDi 10km-Uplink Transceiver	JL737A
	HPE X130 10G SFP+ LC BiDi 10km-Downlink Transceiver	JL738A
	HPE X130 10G SFP+ LC BiDi 40km-Uplink Transceiver	JL739A
	HPE X130 10G SFP+ LC BiDi 40km-Downlink Transceiver	JL740A
	HPE X130 10G SFP+ LC SR Transceiver	JD092B
	HPE X130 10G SFP+ LC LR Transceiver	JD094B
	HPE X130 10G SFP+ LC ER 40km XCVR	JG234A
	HPE X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
	HPE X240 10G SFP+ SFP+ 0.65m DA Cable	JD095C
	HPE X240 10G SFP+ SFP+ 1.2m DA Cable	JD096C
	HPE X240 10G SFP+ SFP+ 3m DA Cable	JD097C
	HPE X240 10G SFP+ SFP+ 5m DA Cable	JG081C
	QSFP+ transceivers	HPE X140 40G QSFP+ MPO SR4 Transceiver
HPE X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver		JG709A
HPE X140 40G QSFP+ LC BiDi 100m MM Transceiver		JL251A
HPE X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver		JG661A
HPE X140 40G QSFP+ LC LR4L 2km SM Transceiver		JL286A
HPE X140 40G QSFP+ LC ER4 40km SM XCVR		JL306A
HPE X2A0 40G QSFP+ to QSFP+ 7m Active Optical Cable		JL287A
HPE X2A0 40G QSFP+ to QSFP+ 10m Active Optical Cable		JL288A
HPE X2A0 40G QSFP+ to QSFP+ 20m Active Optical Cable		JL289A
HPE X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable		JG326A
HPE X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable		JG327A
HPE X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable		JG328A
HPE X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable		JG329A ^Δ
HPE X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable		JG330A ^Δ
HPE X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable		JG331A ^Δ

* Supported with HPE Networking Comware 5960 (R9Y13A) model only.

Δ Supported with HPE Networking Comware 5960 (R9Y12A and S4J82A) models only.



Accessories (continued)

QSFP28 transceivers	HPE X150 100G QSFP28 MPO SR4 100m MM Transceiver	JL274A
	HPE X150 100G QSFP28 SWDM4 100m MM XCVR	JH419A
	HPE X150 100G QSFP28 BiDi 100m MM XCVR	JQ344A
	HPE X150 100G QSFP28 eSR4 300m MM XCVR	JH672A
	HPE X150 100G QSFP28 MPO PSM4 500m SM Transceiver	JH420A#
	HPE X150 100G QSFP28 LC LR4 10km SM Transceiver	JL275A
	HPE X150 100G QSFP28 CWDM4 2km SM Transceiver	JH673A
	HPE X2A0 100G QSFP28 to QSFP28 7m Active Optical Cable	JL276A
	HPE X2A0 100G QSFP28 to QSFP28 10m Active Optical Cable	JL277A
	HPE X2A0 100G QSFP28 to QSFP28 20m Active Optical Cable	JL278A
	HPE X240 100G QSFP28 to QSFP28 1m Direct Attach Copper Cable	JL271A
	HPE X240 100G QSFP28 to QSFP28 3m Direct Attach Copper Cable	JL272A
	HPE X240 100G QSFP28 to QSFP28 5m Direct Attach Copper Cable	JL273A
	HPE X240 QSFP28 4xSFP28 1m DAC Cable	JL282A#
	HPE X240 QSFP28 4xSFP28 3m DAC Cable	JL283A#
	HPE X240 QSFP28 4xSFP28 5m Direct Attach Copper Cable	JL284A#
	HPE NW CW 100G FR1 QSFP28 LC 2km XCVR	S2P29A
	HPE X2A0 100G QSFP28 5m AOC Cable	JL796A
	HPE X2A0 100G QSFP28 30m AOC Cable	JL795A
	QSFP-DD transceivers	HPE X1E0 400G QSFP-DD SR8-MM850 XCVR
HPE X1E0 400G QSFP-DD FR4-WDM1300 XCVR		R9J30A
HPE X1E0 400G QSFP-DD D-D 2m DAC Cable		R9J28A
HPE Networking Comware 1xQSFP-DD 400G to 4xQSFP56 100G 2x50G PAM4 2.5m Split Direct Attach Cable		S0E49A
HPE Networking Comware 1xQSFP-DD 400G to 8xSFP56 50G 2.5m Split Direct Attach Cable		S0P73A
Internal power supplies	HPE Networking Comware 5960 400G 1600W AC Power Supply Unit	R9Y18A
	HPE Networking Comware 5960 400G 2400W 48V DC Power Supply Unit	R9Y19A
Fan trays	HPE Networking Comware 5960 400G Port Side to Power Supply Side Airflow Fan Module	R9Y16A
	HPE Networking Comware 5960 400G Power Supply Side to Port Side Airflow Fan Module	R9Y17A

* Supported with HPE Networking Comware 5960 (R9Y13A and R9Y12A) models only.

Learn more at

[HPE.com/us/en/networking/Comware.html](https://hpe.com/us/en/networking/Comware.html)

