Hewlett Packard Enterprise

Data sheet

HPE 5900 TAA-compliant Switch Series

Key features

- Cut-through/low-latency and large buffer options
- HPE Intelligent Resilient Framework (IRF) for virtualization/two-tier architecture
- High 1/10GbE ToR port density with 40GbE uplink
- IPv6 support in ToR with full L2/L3 features
- Convergence-ready with DCB and FCoE

Product overview

The HPE 5900 TAA-compliant Switch Series is a family of high-density, ultra-low latency, top-of-rack (ToR) switches. It is part of the Hewlett Packard Enterprise FlexNetwork architecture's HPE FlexFabric solution.

Ideally suited for deployment at the server access layer of large enterprise data centers, HPE 5900 TAA-compliant Switch Series are also designed for deployment at the data center core layer of medium-sized enterprises. With the increase in virtualized applications and server-to-server traffic, customers now require a ToR switch, like the HPE 5900 TAA-compliant Switch Series, with innovations that will meet their needs for higher-performance server connectivity, convergence of Ethernet and storage traffic, the capability to handle virtual environments, and ultra-low latency, all in a single device.

Features and benefits

Quality of service (QoS)

- Powerful QoS features
  - Flexible classification
    Creates traffic classes based on access control lists (ACLs), IEEE 802.1p precedence, IP, and DSCP or Type of Service (ToS) precedence; supports filter, redirect, mirror, remark, and logging
  - Feature support
    Provides support for strict priority queuing (SP), weighted fair queuing (WFQ), weighted deficit round robin (WDRR), SP+WDRR together, configurable buffers, Explicit Congestion Notification (ECN), and weighted random early detection (WRED)

Data center-optimized

- Flexible 10GbE high port density
  HPE 5900 Switch Series enables you to scale your server edge 10GbE ToR deployments to new heights with high-density 48 x 10GbE SFP+ ports delivered in a 1RU design; the high-server port density is backed by 4 x 40GbE QSFP+ uplinks to deliver availability of needed bandwidth for demanding applications; the switch can also be configured as a 64 x 10GbE port device by using a 40GbE-to-10GbE splitter cable that turns each QSFP+ port into four 10GbE ports
- High-performance 10GbE switching
  Cut-through and nonblocking architecture delivers industry-leading low latency (~1 microsecond) and very demanding enterprise applications; the switch delivers a 1.28 Tbps switching capacity and 952.32 Mpps packet forwarding rate in addition to incorporating 9 MB of packet buffers
- Higher scalability
  HPE Intelligent Resilient Framework (IRF) technology simplifies the architecture of server access networks; up to four HPE 5900 switches can be combined to deliver unmatched scalability of virtualized access layer switches and flatter, two-tier networks using IRF, which reduces cost and complexity
- Advanced modular operating system
  Comware v7 software's modular design and multiple processes bring native high stability, independent process monitoring, and restart; the OS also allows individual software modules to be upgraded for higher availability, and supports enhanced serviceability functions like hitless software upgrades with single-chassis In-Services Software Upgrade (ISSU)
- TRILL and EVB/VEPA
  TRansparent Interconnection of Lots of Links (TRILL) is supported to increase the scale of enterprise data centers; EVB/VEPA provides connectivity into the virtual environment for a data center-ready environment

- Reversible airflow
  Enhanced for data center hot-cold aisle deployment with reversible airflow—for either front-to-back or back-to-front airflow
- Redundant fans and power supplies
  1+1 internal redundant and hot-pluggable power supplies and dual fan trays enhance reliability and availability
- Lower OPEX and greener data center
  Provide reversible airflow and advanced chassis power management
- Data Center Bridging (DCB) protocol
  Supports IEEE 802.1Qbb Priority Flow Control (PFC), Data Center Bridging Exchange (DCBX), and IEEE 802.1Qaz Enhanced Transmission Selection (ETS) for converged applications
- FCoE support
  Provides support for FCoE, including expansion, fabric, trunk VF, and N ports, and aggregation of E-port and N-port virtualization; fabric services such as name server, registered state change notification, and login services; per-VSAN fabric services, FSPF, soft and hard zoning, Fibre Channel traceroute, ping, debugging, and FIP snooping
- Jumbo frames
  With frame sizes of up to 10,000 bytes on Gigabit Ethernet and 10-Gigabit ports, high-performance remote backup and disaster-recovery services can be enabled

Manageability

- Full-featured console
  Provides complete control of the switch with a familiar CLI
- Troubleshooting
  - Ingress and egress port monitoring
    Enable network problem solving
  - Traceroute and ping
    Enable testing of network connectivity
- Multiple configuration files
  Allow multiple configuration files to be stored to a flash image
- sFlow® (RFC 3176)
  Provides wirespeed traffic accounting and monitoring
- SNMP v1, v2c, and v3
  Facilitate centralized discovery, monitoring, and secure management of networking devices
- Out-of-band interface
  Isolates management traffic from user data plane traffic for complete isolation and total reachability, no matter what happens in the data plane

- Remote configuration and management
  Is available through a secure command-line interface (CLI) over Telnet and SSH; Role-Based Access Control (RBAC) provides multiple levels of access; configuration rollback and multiple configurations on the flash provide ease of operation; remote visibility is provided with sFlow and SNMP v1/v2/v3, and is fully supported in HPE Intelligent Management Center (IMC)
- ISSU and hot patching
  Provides hitless software upgrades with single-unit In-Services Software Upgrade (ISSU) and hitless patching of modular OS
- Auto-configuration
  Provides automatic configuration via DHCP auto-configuration
- Network Time Protocol (NTP) and Secure Network Time Protocol (SNTP)
  Synchronize timekeeping among distributed time servers and clients; keep consistent timekeeping among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time

Resiliency and high availability

- Intelligent Resilient Framework (IRF)
  HPE IRF technology enables an HPE FlexFabric to deliver resilient, scalable, and secured data center networks for physical and virtualized environments; up to four 5900 switches can be grouped together in an IRF configuration, which allows them to be configured and managed as a single switch with a single IP address; this simplifies ToR deployment and management, reducing data center deployment and operating expenses
- IEEE 802.1w Rapid Convergence Spanning Tree Protocol
  Increases network uptime through faster recovery from failed links
- IEEE 802.1s Multiple Spanning Tree
  Provides high link availability in multiple VLAN environments by allowing Multiple Spanning Trees
- Virtual Router Redundancy Protocol (VRRP)
  Allows groups of two routers to back each other up dynamically to create highly available routed environments
- Hitless patch upgrades
  Allows patches and new service features to be installed without restarting the equipment, increasing network uptime and facilitating maintenance
- Ultrafast protocol convergence (< 50 ms) with standard-based failure detection—Bidirectional Forwarding Detection (BFD)
  Enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF

- Device Link Detection Protocol (DLDP)
  Monitors link connectivity and shuts down ports at both ends if unidirectional traffic is detected, preventing loops in STP-based networks
- Graceful restart
  Allows routers to indicate to others their capability to maintain a routing table during a temporary shutdown and significantly reduces convergence times upon recovery; supports OSPF, BGP, and IS-IS

Layer 2 switching

- MAC-based VLAN
  Provides granular control and security; uses RADIUS to map a MAC address/user to specific VLANs
- Address Resolution Protocol (ARP)
  Supports static, dynamic, and reverse ARP and ARP proxy
- Flow control
  IEEE 802.3x Flow Control provides intelligent congestion management via PAUSE frames
- Ethernet link aggregation
  IEEE 802.3ad Link Aggregation of up to 128 groups of 16 ports; support for Link Aggregation Control Protocol (LACP), LACP Local Forwarding First, and LACP Short-time provide a fast, resilient environment that is ideal for the data center
- Spanning Tree Protocol (STP)
  STP (IEEE 802.1D), Rapid STP (RSTP, IEEE 802.1w), and Multiple STP (MSTP, IEEE 802.1s)
- VLAN support
  Provides support for 4,096 VLANs based on port, MAC address, IPv4 subnet, protocol, and guest VLAN; supports VLAN mapping
- IGMP support
  Provides support for IGMP Snooping, Fast-Leave, and Group-Policy; IPv6 IGMP Snooping provides Layer 2 optimization of multi-cast traffic
- DHCP support at Layer 2
  Provides full DHCP Snooping support for DHCP Snooping Option 82, DHCP Relay Option 82, DHCP Snooping Trust, and DHCP Snooping Item Backup

Layer 3 services

- Address Resolution Protocol (ARP)
  Determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network
- Dynamic Host Configuration Protocol (DHCP)
  Simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets
- Operations, administration, and maintenance (OAM) support
  Provides support for Connectivity Fault Management (IEEE 802.1AG) and Ethernet in the First Mile (IEEE 802.3AH); provides additional monitoring that can be used for fast fault detection and recovery

Layer 3 routing

- Virtual Router Redundancy Protocol (VRRP) and VRRP Extended
  Allow quick failover of router ports
- Policy-based routing
  Makes routing decisions based on policies set by the network administrator
- Equal-Cost Multipath (ECMP)
  Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth
- Layer 3 IPv4 routing
  Provides routing of IPv4 at media speed; supports static routes, RIP and RIPv2, OSPF, BGP, and IS-IS
- Open Shortest Path First (OSPF)
  Delivers faster convergence; uses this link-state routing Interior Gateway Protocol (IGP), which supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
- Border Gateway Protocol 4 (BGP-4)
  Delivers an implementation of the Exterior Gateway Protocol (EGP) utilizing path vectors; uses TCP for enhanced reliability for the route discovery process; reduces bandwidth consumption by advertising only incremental updates; supports extensive policies for increased flexibility; scales to very large networks
- Intermediate system to intermediate system (IS-IS)
  Uses a path vector Interior Gateway Protocol (IGP), which is defined by the ISO organization for IS-IS routing and extended by IETF RFC 1195 to operate in both TCP/IP and the OSI reference model (Integrated IS-IS)
- Static IPv6 routing
  Provides simple manually configured IPv6 routing
- Dual IP stack
  Maintains separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design
- Routing Information Protocol next generation (RIPng)
  Extends RIPv2 to support IPv6 addressing
- OSPFv3
  Provides OSPF support for IPv6
- BGP+
  Extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing

- IS-IS for IPv6
  Extends IS-IS to support IPv6 addressing
- IPv6 tunneling
  Allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured, 6 to 4, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels; Is an important element for the transition from IPv4 to IPv6
- Policy routing
  Allows custom filters for increased performance and security; supports ACLs, IP prefix, AS paths, community lists, and aggregate policies
- Bidirectional Forwarding Detection (BFD)
  Enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF
- Multicast Routing PIM Dense and Sparse modes
  Provides robust support of multi-cast protocols
- Layer 3 IPv6 routing
  Provides routing of IPv6 at media speed; supports static routing, RIPng, OSPFv3, BGP4+ for IPv6, and IS-ISv6

Additional information

- Green IT and power
  Improves energy efficiency through the use of the latest advances in silicon development; shuts off unused ports and utilizes variable-speed fans, reducing energy costs
- Low power consumption
  Is rated to have one of the lowest power usages in the industry by Miercom independent tests

Management

- USB support
  - File copy
    Allows users to copy switch files to and from an USB flash drive
- Multiple configuration files
  Stores easily to the flash image
- SNMPv1, v2c, and v3
  Facilitate centralized discovery, monitoring, and secure management of networking devices
- Network Time Protocol (NTP)
  Synchronizes timekeeping among distributed time servers and clients; keeps timekeeping consistent among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time

- Port mirroring
  Enables traffic on a port to be simultaneously sent to a network analyzer for monitoring
- Remote configuration and management
  Is available through a command-line interface (CLI)
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
  Advertises and receives management information from adjacent devices on a network, facilitating easy mapping by network management applications
- sFlow (RFC 3176)
  Provides scalable ASIC-based wirespeed network monitoring and accounting with no impact on network performance; this allows network operators to gather a variety of sophisticated network statistics and information for capacity planning and real-time network monitoring purposes
- Command authorization
  Leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity
- Dual flash images
  Provides independent primary and secondary operating system files for backup while upgrading
- Command-line interface (CLI)
  Provides a secure, easy-to-use CLI for configuring the module via SSH or a switch console; provides direct real-time session visibility
- Logging
  Provides local and remote logging of events via SNMP (v2c and v3) and syslog; provides log throttling and log filtering to reduce the number of log events generated
- Management interface control
  Provides management access through a modem port and terminal interface, as well as in-band and out-of-band Ethernet ports; provides access through terminal interface, Telnet, or secure shell (SSH)
- Industry-standard CLI with a hierarchical structure
  Reduces training time and expenses, and increases productivity in multi-vendor installations
- Management security
  Restricts access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide Telnet and SNMP access; local and remote syslog capabilities allow logging of all access
- Information center
  Provides a central repository for system and network information; aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules

- Network management
  HPE Intelligent Management Center (IMC) centrally configures, updates, monitors, and troubleshoots
- Remote intelligent mirroring
  Mirrors ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port anywhere on the network

Security

- Access control lists (ACLs)
  Provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number
- RADIUS/TACACS+
  Eases switch management security administration by using a password authentication server
- Secure shell
  Encrypts all transmitted data for secure remote CLI access over IP networks
- IEEE 802.1X and RADIUS network logins
  Controls port-based access for authentication and accountability
- Port security
  Allows access only to specified MAC addresses, which can be learned or specified by the administrator

Convergence

- LLDP-MED (Media Endpoint Discovery)
  Defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to configure network devices such as IP phones automatically

Warranty and support

- 1-year warranty
  See **hpe.com/networking/warrantysummary** for warranty and support information included with your product purchase.
- Software releases
  To find software for your product, refer to **hpe.com/networking/support**; for details on the software releases available with your product purchase, refer to **hpe.com/networking/warrantysummary**.

HPE 5900 TAA-compliant Switch Series

Specifications

			
	HPE 5900AF-48XG-4QSFP+ TAA-COMPLIANT SWITCH (JG554A)	**HPE 5900AF-48G-4XG-2QSFP+ TAA-COMPLIANT SWITCH (JH038A)**	**HPE 5900AF-48XGT-4QSFP+ TAA-COMPLIANT SWITCH (JH037A)**
I/O ports and slots	48 fixed 1000/10000 SFP+ ports 4 QSFP+ 40-GbE ports 1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 USB 2.0	48 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 fixed 1000/10000 SFP+ ports 2 QSFP+ 40-GbE ports	48 RJ-45 1/10GbE ports (IEEE 802.3an-2006 Type 10GBASE-T and IEEE 802.3ab-2008 Type 1000BASE-T) 4 QSFP+ 40-GbE ports
Additional ports and slots		1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 USB 2.0	1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 USB 2.0
Power supplies	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	2 fan tray slots The customer must order fan trays, as fan trays are not included with the switch. This system requires two same-direction airflow fan trays to function properly. The system should not be operated with only one fan tray for more than 24 hours. The system should not be operated without a fan tray for more than two minutes. The system should not be operated outside of the temperature range of 32°F (0°C) to 113°F (45°C). Failure to comply with these operating requirements may void the product warranty.	2 fan tray slots The customer must order fan trays, as fan trays are not included with the switch. This system requires two same-direction airflow fan trays to function properly. The system should not be operated with only one fan tray for more than 24 hours. The system should not be operated without a fan tray for more than two minutes. The system should not be operated outside of the temperature range of 32°F (0°C) to 113°F (45°C). Failure to comply with these operating requirements may void the product warranty.	2 fan tray slots The customer must order fan trays, as fan trays are not included with the switch. This system requires two same-direction airflow fan trays to function properly. The system should not be operated with only one fan tray for more than 24 hours. The system should not be operated without a fan tray for more than two minutes. The system should not be operated outside of the temperature range of 32°F (0°C) to 113°F (45°C). Failure to comply with these operating requirements may void the product warranty.
Physical characteristics			
Dimensions	17.32(w) x 25.98(d) x 1.72(h) in. (43.99 x 65.99 x 4.37 cm)	17.32(w) x 18.11(d) x 1.72(h) in. (43.99 x 46.0 x 4.37 cm) (1U height)	17.32(w) x 25.98(d) x 1.72(h) in. (43.99 x 65.99 x 4.37 cm)
Weight	28.66 lb (13 kg) shipping weight	28.66 lb (13 kg) shipping weight	28.66 lb (13 kg) shipping weight

	HPE 5900AF-48XG-4QSFP+ TAA-COMPLIANT SWITCH (JG554A)	HPE 5900AF-48G-4XG-2QSFP+ TAA-COMPLIANT SWITCH (JH038A)	HPE 5900AF-48XGT-4QSFP+ TAA-COMPLIANT SWITCH (JH037A)
Memory and processor	512 MB flash, 2 GB SDRAM; packet buffer size: 9 MB	512 MB flash, 2 GB SDRAM; packet buffer size: 9 MB	512 MB flash, 2 GB SDRAM; packet buffer size: 9 MB
Performance			
10 Gbps Latency	< 1.5 µs (64-byte packets)	< 1.5 µs (64-byte packets)	< 1.5 µs (64-byte packets)
Throughput	up to 952 million pps 1	up to 250 million pps (64-byte packets)	up to 952 million pps
Routing/Switching capacity	280 Gbps	336 Gbps	1280 Gbps
Routing table size	16000 entries (IPv4), 8000 entries (IPv6)	16000 entries (IPv4), 8000 entries (IPv6)	16000 entries (IPv4), 8000 entries (IPv6)
MAC address table size	128000 entries	128000 entries	128000 entries
Environment			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	10% to 90%, noncondensing	10% to 90%, noncondensing	10% to 90%, noncondensing
Acoustic	Low-speed fan: 65.7 dB, High-speed fan: 70.6 dB	Low-speed fan: 65.7 dB, High-speed fan: 70.6 dB	Low-speed fan: 65.7 dB, High-speed fan: 70.6 dB
Electrical characteristics			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum heat dissipation	887 BTU/hr (935.79 kJ/hr)	887 BTU/hr (935.79 kJ/hr)	887 BTU/hr (935.79 kJ/hr)
AC voltage	100-240 VAC	100-240 VAC	100-240 VAC
Maximum power rating	260 W	260 W	260 W
Idle power	200 W	200 W	200 W
	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.	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.	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; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; Anatel; ULAR; GOST; EN 60950-1/A11; FDA 21 CFR Subchapter J; NOM; ROHS Compliance	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; Anatel; ULAR; GOST; EN 60950-1/A11; FDA 21 CFR Subchapter J; NOM; ROHS Compliance	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; Anatel; ULAR; GOST; EN 60950- 1/A11; FDA 21 CFR Subchapter J; NOM; ROHS Compliance

	HPE 5900AF-48XG-4QSFP+ TAA-COMPLIANT SWITCH (JG554A)	HPE 5900AF-48G-4XG-2QSFP+ TAA-COMPLIANT SWITCH (JH038A)	HPE 5900AF-48XGT-4QSFP+ TAA-COMPLIANT SWITCH (JH037A)
Emissions	VCCI Class A; EN 55022 Class A; ICES-003 Class A; ANSI C63.4 2003; AS/NZS CISPR 22 Class A; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A	VCCI Class A; EN 55022 Class A; ICES-003 Class A; ANSI C63.4 2003; AS/NZS CISPR 22 Class A; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A	VCCI Class A; EN 55022 Class A; ICES-003 Class A; ANSI C63.4 2003; AS/NZS CISPR 22 Class A; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A
Immunity			
Generic	ETSI EN 300 386 V1.3.3	ETSI EN 300 386 V1.3.3	ETSI EN 300 386 V1.3.3
EN	EN 55024:1998+ A1:2001 + A2:2003	EN 55024:1998+ A1:2001 + A2:2003	EN 55024:1998+ A1:2001 + A2:2003
ESD	EN 61000-4-2; IEC 61000-4-2	EN 61000-4-2; IEC 61000-4-2	EN 61000-4-2; IEC 61000-4-2
Radiated	EN 61000-4-3; IEC 61000-4-3	EN 61000-4-3; IEC 61000-4-3	EN 61000-4-3; IEC 61000-4-3
EFT/Burst	EN 61000-4-4; IEC 61000-4-4	EN 61000-4-4; IEC 61000-4-4	EN 61000-4-4; IEC 61000-4-4
Surge	EN 61000-4-5; IEC 61000-4-5	EN 61000-4-5; IEC 61000-4-5	EN 61000-4-5; IEC 61000-4-5
Conducted	EN 61000-4-6; IEC 61000-4-6	EN 61000-4-6; IEC 61000-4-6	EN 61000-4-6; IEC 61000-4-6
Power frequency magnetic field	EN 61000-4-8; IEC 61000-4-8	EN 61000-4-8; IEC 61000-4-8	EN 61000-4-8; IEC 61000-4-8
Voltage dips and interruptions	EN 61000-4-11; IEC 61000-4-11	EN 61000-4-11; IEC 61000-4-11	EN 61000-4-11; IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
Management	IMC—Intelligent Management Center; command-line interface; out-of-band management; SNMP Manager; Telnet; FTP	IMC—Intelligent Management Center; command-line interface; out-of-band management; SNMP Manager; Telnet; FTP	IMC—Intelligent Management Center; command-line interface; out-of-band management; SNMP Manager; Telnet; FTP
Notes	The customer must order a power supply, as the device does not come with one. At least one JC680A or JC681A is required.	The customer must order a power supply, as the device does not come with one. At least one JC680A or JC681A is required.	The customer must order a power supply, as the device does not come with one. At least one JC680A or JC681A is required.
Services	Refer to the HPE 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 HPE sales office.	Refer to the HPE 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 HPE sales office.	Refer to the HPE 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 HPE sales office.

STANDARDS AND PROTOCOLS
(applies to all products in series)

BGP	RFC 1163 Border Gateway Protocol (BGP) RFC 1771 BGPv4 RFC 1997 BGP Communities Attribute RFC 2918 Route Refresh Capability	RFC 3392 Capabilities Advertisement with BGP-4 RFC 4271 A Border Gateway Protocol 4 (BGP-4) RFC 4360 BGP Extended Communities Attribute	RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP) RFC 4760 Multiprotocol Extensions for BGP-4
Device management	RFC 1157 SNMPv1/v2c RFC 1305 NTPv3 RFC 1591 DNS (client) RFC 1902 (SNMPv2)	RFC 1908 (SNMP v1/2 Coexistence) RFC 2573 (SNMPv3 Applications) RFC 2576 (Coexistence between SNMP V1, V2, V3)	Multiple Configuration Files Multiple Software Images SSHv1/SSHv2 Secure Shell TACACS/TACACS+
General protocols	IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3ae 10-Gigabit Ethernet IEEE 802.3ag Ethernet OAM IEEE 802.3ah Ethernet in First Mile over Point to Point Fiber - EFMF IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 791 IP RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 856 TELNET RFC 868 Time Protocol RFC 896 Congestion Control in IP/TCP Internetworks RFC 950 Internet Standard Subnetting Procedure RFC 1027 Proxy ARP	RFC 1058 RIPv1 RFC 1091 Telnet Terminal-Type Option RFC 1141 Incremental updating of the Internet checksum RFC 1142 OSI IS-IS Intra-domain Routing Protocol RFC 1191 Path MTU discovery RFC 1213 Management Information Base for Network Management of TCP/IP-based internets RFC 1253 (OSPF v2) RFC 1531 Dynamic Host Configuration Protocol RFC 1533 DHCP Options and BOOTP Vendor Extensions RFC 1534 DHCP/BOOTP Interoperation RFC 1541 DHCP RFC 1591 DNS (client only) RFC 1624 Incremental Internet Checksum RFC 1723 RIP v2 RFC 1812 IPv4 Routing RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2236 IGMP Snooping RFC 2338 VRRP RFC 2453 RIPv2	RFC 2581 TCP Congestion Control RFC 2644 Directed Broadcast Control RFC 2767 Dual Stacks IPv4 & IPv6 RFC 3046 DHCP Relay Agent Information Option RFC 3768 Virtual Router Redundancy Protocol (VRRP) RFC 4250 The Secure Shell (SSH) Protocol Assigned Numbers RFC 4251 The Secure Shell (SSH) Protocol Architecture RFC 4252 The Secure Shell (SSH) Authentication Protocol RFC 4253 The Secure Shell (SSH) Transport Layer Protocol RFC 4254 The Secure Shell (SSH) Connection Protocol RFC 4364 BGP/MPLS IP Virtual Private Networks (VPNs) RFC 4419 Diffie-Hellman Group Exchange for the Secure Shell (SSH) Transport Layer Protocol RFC 4594 Configuration Guidelines for DiffServ Service Classes RFC 4941 Privacy Extensions for Stateless Address Autoconfiguration in IPv6

STANDARDS AND PROTOCOLS
(applies to all products in series)

IPv6	RFC 2080 RIPng for IPv6 RFC 2460 IPv6 Specification RFC 2461 IPv6 Neighbor Discovery RFC 2462 IPv6 Stateless Address Auto-configuration RFC 2463 ICMPv6 RFC 2464 Transmission of IPv6 over Ethernet Networks	RFC 2473 Generic Packet Tunneling in IPv6 RFC 2545 Use of MP-BGP-4 for IPv6 RFC 2563 ICMPv6 RFC 2711 IPv6 Router Alert Option RFC 2740 OSPFv3 for IPv6 RFC 2767 Dual stacks IPv4 & IPv6	RFC 3315 DHCPv6 (client and relay) RFC 4291 IP Version 6 Addressing Architecture RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
MIBs	RFC 1213 MIB II RFC 1907 SNMPv2 MIB RFC 2571 SNMP Framework MIB RFC 2572 SNMP-MPD MIB	RFC 2573 SNMP-Notification MIB RFC 2573 SNMP-Target MIB RFC 2574 SNMP USM MIB RFC 2737 Entity MIB (Version 2)	RFC 3414 SNMP-User based-SM MIB RFC 3415 SNMP-View based-ACM MIB LLDP-EXT-DOT1-MIB LLDP-EXT-DOT3-MIB LLDP-MIB
Network management		RFC 3164 BSD syslog Protocol	
OSPF	RFC 1587 OSPF NSSA RFC 2328 OSPFv2 RFC 3101 OSPF NSSA	RFC 3137 OSPF Stub Router Advertisement RFC 3623 Graceful OSPF Restart RFC 4577 OSPF as the Provider/Customer Edge Protocol for BGP/MPLS IP Virtual Private Networks (VPNs)	RFC 4811 OSPF Out-of-Band LSDB Resynchronization RFC 4812 OSPF Restart Signaling RFC 4813 OSPF Link-Local Signaling
QoS/CoS	IEEE 802.1P (CoS) RFC 2475 DiffServ Architecture RFC 2597 DiffServ Assured Forwarding (AF)	RFC 3247 Supplemental Information for the New Definition of the EF PHB (Expedited Forwarding Per-Hop Behavior)	RFC 3260 New Terminology and Clarifications for DiffServ
Security	Access Control Lists (ACLs)	SSHv2 Secure Shell	

HPE 5900 TAA-compliant Switch Series accessories

Transceivers	HPE X120 1G SFP LC LH40 1550nm Transceiver (JD062A) HPE X120 1G SFP LC BX 10-U Transceiver (JD098B) HPE X120 1G SFP LC BX 10-D Transceiver (JD099B) HPE X120 1G SFP LC LX Transceiver (JD119B) HPE X120 1G SFP RJ45 T Transceiver (JD089B) HPE X120 1G SFP LC SX Transceiver (JD118B) HPE X125 1G SFP LC LH40 1310nm Transceiver (JD061A) HPE X125 1G SFP LC LH70 Transceiver (JD063B) HPE X130 10G SFP+ LC SR Transceiver (JD092B) HPE X130 10G SFP+ LC LRM Transceiver (JD093B) HPE X130 10G SFP+ LC LR Transceiver (JD094B) HPE X130 10G SFP+ LC ER 40km Transceiver (JG234A) HPE X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable (JD095C) HPE X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable (JD096C) HPE X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (JD097C) HPE X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable (JG081C) HPE X240 40G QSFP+ to QSFP+ 1m Direct Attach Copper Cable (JG326A) HPE X240 40G QSFP+ to QSFP+ 3m Direct Attach Copper Cable (JG327A) HPE X240 40G QSFP+ to QSFP+ 5m Direct Attach Copper Cable (JG328A) HPE X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable (JG329A) HPE X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable (JG330A) HPE X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable (JG331A) HPE X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable (JC784C) HPE X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver (JG661A) HPE X140 40G QSFP+ MPO SR4 Transceiver (JG325B) HPE X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver (JG709A) HPE X130 10G SFP+ LC LH 80km Transceiver (JG915A)
Power Supply	HPE 58x0AF 650W AC Power Supply (JC680A) HPE 58x0AF 650W DC Power Supply (JC681A) HPE 58x0AF Back (Power Side) to Front (Port Side) Airflow 300W AC Power Supply (JG900A) HPE 58x0AF Back (Power Side) to Front (Port Side) Airflow 300W DC Power Supply (JG901A)
Fan Tray	HPE 58x0AF Back (power side) to Front (port side) Airflow Fan Tray (JC682A) HPE 58x0AF Front (port side) to Back (power side) Airflow Fan Tray (JC683A)
HPE 5900AF-48XG-4QSFP+ TAA-compliant Switch (JG554A)	HPE 5900AF-48XG-4QSFP+ Switch Opacity Shield Kit (JG719A)
HPE 5900AF-48G-4XG-2QSFP+ TAA-Compliant Switch (JH038A)	HPE X711 Front (port side) to Back (power side) Airflow High Volume Fan Tray (JG552A) HPE X712 Back (power side) to Front (port side) Airflow High Volume Fan Tray (JG553A) HPE 58x0AF Back (power side) to Front (port side) Airflow Fan Tray (JC682A) HPE 58x0AF Front (port side) to Back (power side) Airflow Fan Tray (JC683A) HPE 5900AF-48G-4XG-2QSFP+ Switch Opacity Shield Kit (JH063A)
HPE 5900AF-48XGT-4QSFP+ TAA-Compliant Switch (JH037A)	HPE X711 Front (port side) to Back (power side) Airflow High Volume Fan Tray (JG552A) HPE X712 Back (power side) to Front (port side) Airflow High Volume Fan Tray (JG553A) HPE 5900AF-48XG-4QSFP+ Switch Opacity Shield Kit (JG719A)

Learn more at
hpe.com/networking

Sign up for updates

★ Rate this document

Hewlett Packard Enterprise

4AA5-5969ENW, May 2016, Rev. 1