



HP 5900 Switch Series

Data sheet

Product overview

The HP 5900 Switch Series is a family of high-density 10 GbE ultra-low latency top-of-rack (ToR) switches. The 5900 series is part of the HP FlexFabric solution module of the HP FlexNetwork architecture. The 5900 switch is ideally suited for deployment at the server access layer of large enterprise data centers and is 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 ToR switch 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.

Key features

- Cut-through design for ultra-low 10 GbE latency
- HP IRF for virtualization/two-tier architecture
- High 10 GbE ToR port density with 40 GbE uplink
- IPv6 support in ToR with full L2/L3 features
- Convergence ready for DCB and FCoE



Features and benefits

Quality of Service (QoS)

- **Powerful QoS feature:** 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, or remark; supports the following congestion actions: strict priority (SP) queuing, weighted random early discard (WRED), weighted deficit round robin (WDRR), and SP+WDRR

Data center optimized

- **Flexible 10 GbE high port density:** the 5900AF switch enables customers to scale their server-edge 10 GbE ToR deployments to new heights with high-density 48 x 10 GbE ports delivered in a 1RU design; the high server port density is backed by 4 x 40 GbE uplinks to deliver availability of needed bandwidth for demanding applications; the 5900AF switch can also be configured as a 64 x 10 GbE port device by using a 40G-to-10 GbE splitter cable that turns each 40 GbE port into four 10-GbE ports
- **High-performance 10 GbE switching:** the 5900AF switch's 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:** HP Intelligent Resilient Framework (IRF) technology radically simplifies the architecture of server access networks; the HP 5900AF family can deliver unmatched scalability of virtualized access layer switches; in addition, the HP series delivers FlexFabric flatter, two-tier networks using IRF that reduce cost and complexity
- **Advanced modular operating system:** modular design and multiple processes bring native high stability and independent process monitoring and restart; the OS also allows the upgrading of individual software modules for higher availability, as well as supports enhanced serviceability functions
- **TRILL and VEPA-ready:** TRILL and VEB/VEPA-ready for virtualized networks and data center convergence
- **Reversible airflow:** enhanced for DC hot-cold isle 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

Management

- **IEEE 802.1ab LLDP discovery:** advertises and receives management information from adjacent devices on a network
- **USB support:**
 - **File copy:** allows users to copy switch files to and from a USB flash drive
- **Multiple configuration files:** can be stored 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 consistent timekeeping among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time
- **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
- **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)

Connectivity

- **Jumbo frames:** on Gigabit Ethernet and 10-Gigabit ports, they allow high-performance remote backup and disaster-recovery services

Performance

- **Hardware-based wire-speed access control lists (ACLs):** feature-rich ACL implementation (TCAM-based) helps ensure high levels of security and ease of administration without impacting network performance

Resiliency and high availability

- **Intelligent Resilient Framework (IRF):** the 5900AF switch fully supports HP IRF technology, which enables HP FlexFabric to deliver resilient, scalable, and secured data center networks for physical and virtualized environments; up to four 5900AF 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

Manageability

- **Full-featured console:** provides complete control of the switch with a familiar command-line interface (CLI)
- **Troubleshooting:**
 - **Ingress and egress port monitoring:** enable network problem solving
 - **Tracert and Ping:** enable testing of network connectivity
 - **Virtual Cable Tests:** provide visibility to cable problems

Layer 2 switching

- **4,094 port-based VLANs:** provide security between workgroups
- **Gigabit Ethernet port aggregation:** allows grouping of ports to increase overall data throughput to a remote device
- **10 GbE port aggregation:** allows grouping of ports to increase overall data throughput to a remote device
- **Spanning Tree/MSTP, RSTP, and STP Root Guard:** prevent network loops

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

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, and BGP

Additional information

- **Green IT and power:** use the latest advances in silicon development, shut off unused ports, and use variable-speed fans to improve energy efficiency
- **Low power consumption:** is rated to have one of the lowest power usages in the industry by Miercom independent tests

Warranty and support

- **1-year warranty:** with advance replacement and 10-calendar-day delivery (available in most countries)
- **Electronic and telephone support:** limited electronic and telephone support is available from HP; to reach our support centers, refer to www.hp.com/networking/contact-support; for details on the duration of support provided with your product purchase, refer to www.hp.com/networking/warrantysummary
- **Software releases:** to find software for your product, refer to www.hp.com/networking/support; for details on the software releases available with your product purchase, refer to www.hp.com/networking/warrantysummary

HP 5900 Switch Series

Specifications



HP 5900AF-48XG-4QSFP+ Switch (JC772A)

Ports	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
Power supplies	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.
Physical characteristics	
Weight	17.32(w) x 25.98(d) x 1.72(h) in (43.99 x 65.99 x 4.37 cm) 28.66 lb (13 kg), Fully loaded
Memory and processor	512 MB flash, 2 GB SDRAM; packet buffer size: 9 MB
Performance	
10 Gbps Latency	< 1.5 μ s (64-byte packets)
Throughput	952 million pps
Routing/Switching capacity	1280 Gbps
Routing table size	16000 entries
MAC address table size	128000 entries
Environment	
Operating temperature	32°F to 113°F (0°C to 45°C)
Operating relative humidity	10% to 90%, noncondensing
Acoustic	Low-speed fan: 65.7 dB, High-speed fan: 70.6 dB
Electrical characteristics	
Maximum heat dissipation	887 BTU/hr (935.79 kJ/hr)
Voltage	100-240 VAC
DC voltage	-36 to -72 VDC
Idle power	200 W
Maximum power rating	260 W
Frequency	50/60 Hz
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; 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
Emissions	VCCI Class A; EN 55022 Class A; ICES-003 Class A; ANSI C63.4 2003; AS/NZS CISPR22 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
EN	EN 55024:1998+ A1:2001 + A2:2003
ESD	EN 61000-4-2; IEC 61000-4-2
Radiated	EN 61000-4-3; IEC 61000-4-3
EFT/Burst	EN 61000-4-4; IEC 61000-4-4
Surge	EN 61000-4-5; IEC 61000-4-5
Conducted	EN 61000-4-6; IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8; EN 61000-4-8
Voltage dips and interruptions	EN 61000-4-11; IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3
Management	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.
Services	Refer to the HP website at www.hp.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 HP sales office.

Specifications (continued)

HP 5900AF-48XG-4QSFP+ Switch (JC772A)

Standards and protocols (applies to all products in series)

BGP

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 1305 NTPv3

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 (LAG)
 IEEE 802.3ae 10-Gigabit Ethernet
 RFC 768 UDP
 RFC 791 IP
 RFC 792 ICMP
 RFC 793 TCP
 RFC 826 ARP
 RFC 854 TELNET
 RFC 856 TELNET
 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 1191 Path MTU discovery
 RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
 RFC 1350 TFTP Protocol (revision 2)
 RFC 1624 Incremental Internet Checksum
 RFC 1812 IPv4 Routing
 RFC 2131 DHCP
 RFC 2453 RIPv2

RFC 2581 TCP Congestion Control
 RFC 2644 Directed Broadcast Control
 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

IPv6

RFC 2460 IPv6 Specification
 RFC 2711 IPv6 Router Alert Option
 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

HP 5900 Switch Series accessories

Transceivers

HP X120 1G SFP LC LH40 1550nm Transceiver (JD062A)
HP X120 1G SFP LC BX 10-U Transceiver (JD098B)
HP X120 1G SFP LC BX 10-D Transceiver (JD099B)
HP X120 1G SFP LC LX Transceiver (JD119B)
HP X120 1G SFP RJ45 T Transceiver (JD089B)
HP X120 1G SFP LC SX Transceiver (JD118B)
HP X125 1G SFP LC LH40 1310nm Transceiver (JD061A)
HP X125 1G SFP LC LH70 Transceiver (JD063B)
HP X130 10G SFP+ LC SR Transceiver (JD092B)
HP X130 10G SFP+ LC LRM Transceiver (JD093B)
HP X130 10G SFP+ LC LR Transceiver (JD094B)
HP X130 10G SFP+ LC ER 40km Transceiver (JG234A)
HP X140 40G QSFP+ MPO SR4 Transceiver (JG325A)
HP X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable (JD095C)
HP X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable (JD096C)
HP X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (JD097C)
HP X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable (JG081C)
HP X240 40G QSFP+ to QSFP+ 1m Direct Attach Copper Cable (JG326A)

HP X240 40G QSFP+ to QSFP+ 3m Direct Attach Copper Cable (JG327A)

HP X240 40G QSFP+ to QSFP+ 5m Direct Attach Copper Cable (JG328A)

HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable (JG329A)

HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable (JG330A)

HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable (JG331A)

Power Supply

HP 58x0AF 650W AC Power Supply (JC680A)

HP 58x0AF 650W DC Power Supply (JC681A)

Fan Tray

HP 58x0AF Back (power side) to Front (port side) Airflow Fan Tray (JC682A)

HP 58x0AF Front (port side) to Back (power side) Airflow Fan Tray (JC683A)

To learn more, visit www.hp.com/networking

© Copyright 2012 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

4AA3-8996ENW, Created February 2012; Updated May 2012, Rev. 1

