# QuickSpecs

## Overview

### HPE FlexFabric 5900CP Switch Series

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

Ideally suited for deployment at the server access layer of medium or large enterprise data centers, the HPE FlexFabric 5900CP Switch Series is also powerful enough 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.

The 5900CP has been tested in typical and popular storage configurations with HPE 3PAR storage solutions. Tested and supported deployments include FC, FCoE, iSCSI and NAS storage environments. They also include single and multiple hop configurations as well as connecting to 3rd party FC SANs.The FlexFabric 5900CP is SDN-enabled and supports OpenFlow protocol.



**HPE FlexFabric 5900CP 48XG 4QSFP+ Switch**

### Models

| | |
|---|---|
| HPE FlexFabric 5900CP 48XG 4QSFP+ Switch | JG838A |

### Key Features

- Cut-through with ultra-low-latency and wire speed
- HPE Intelligent Resilient Fabric (IRF) for virtualization and two-tier architecture
- High 1GbE/10GbE and 4Gbps/8Gbps FC ToR port density with 40 GbE uplinks
- IPv4/IPv6 dual stach with full L2/L3 features
- Convergence ready with Native Fiber Channel, DCB, FCoE, and TRILL

**Hewlett Packard Enterprise**

# Standard Features

**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 high port density**
  The HPE 5900CP Switch Series enables scaling of the server edge with 1 GbE and 10GbE as well as 4Gbps and 8Gbps Fiber Channel ToR deployments to new heights with high-density 48-port solutions delivered in a 1RU design; the high server port density is backed by 40 GbE QSFP+ uplinks to deliver the availability of needed bandwidth for demanding applications; each 40 GbE QSFP+ port can also be configured as four 10GbE ports by using a 40-GbE-to-10GbE splitter cable
- **High-performance switching**
  Cut-through and nonblocking architecture delivers low latency (~1 microsecond for 10GbE) for very demanding enterprise applications; the switch delivers high-performance switching capacity and wire-speed packet forwarding
- **Higher scalability**
  HPE Intelligent Resilient Fabric (IRF) technology simplifies the architecture of server access networks; up to nine 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 ISSU
- **TRILL and EVB/VEPA:**
  Transparent Interconnection of Lots of Links (TRILL) is supported to increase the scale of enterprise data centers; Edge Virtual Bridging with Virtual Ethernet Port Aggregator (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) protocols**
  Provides support for 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 Fibre Channel over Ethernet (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, allows high-performance remote backup and disaster-recovery services to 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**

## Standard Features

                 **E**nable testing of network connectivity

- **Multiple configuration files**
  Allow multiple configuration files to be stored to a flash image
- **sFlow (RFC 3176)**
  Pprovides wire-speed traffic accounting and monitoring
- **SNMP v1, v2c and v3**
  Ffacilitate 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 the modular operating system
- **Autoconfiguration**
  Aprovides automatic configuration via DHCP autoconfiguration
- **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

- **HPE Intelligent Resilient Fabric (IRF) technology**
  Enables an HPE FlexFabric to deliver resilient, scalable, and secured data center networks for physical and virtualized environments; groups up to nine HPE 5900 switches in an IRF configuration, allowing them to be configured and managed as a single switch with a single IP address; 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 dynamically back each other up 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**
  Fallows 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**

## Standard Features

Provides IEEE 802.3ad Link Aggregation of up to 128 groups of 16 ports; support for LACP, LACP Local Forwarding First, and LACP Short-time provides 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), Multiple STP (MSTP, IEEE 802.1s) and PVST+

- **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 multicast 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**

## Standard Features

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, 6to4, 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**

  Provides robust support of multicast 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 a 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

- **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)

- **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

## Standard Features

- **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 multivendor 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 automatically configure network devices such as IP phones

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

## Configuration Information

**Build To Order:**

BTO is a standalone unit with no integration. BTO products ship standalone are not part of a CTO or Rack-Shippable solution.

HPE FlexFabric 5900CP 48XG 4QSFP+ Switch                                                            JG838A
- 48 fixed 1000/10000 SFP+ / FC SFP+ ports (min=0 \ max=48)                                  See Configuration
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)                                                      **NOTE:** 1, 2, 3, 4, 6
- Must select min 1 Power Supply
- Must select min 2 Fan Tray
- 1U - Height

HPE FlexFabric 5900CP 48XG 4QSFP+ Front-to-Back AC Switch Bundle                                    JH302A
- 48 fixed 1000/10000 SFP+ / FC SFP+ ports (min=0 \ max=48)                                  See Configuration
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)                                                      **NOTE:** 1, 2, 3, 7, 8
- 1U - Height
- Bundle includes:
  1 - JG838A HPE FlexFabric 5900CP 48XG 4QSFP+ Switch
  2 - JC680A HPE 58x0AF 650W AC Power Supply
  2 - JC683A HPE 58x0AF Front (Port Side) to Back (Power Side) Airflow Fan Tray

PDU Cable NA/MEX/TW/JP (2 Cables)                                                                   JH302A #B2B
- C15 PDU Jumper Cord (NA/MEX/TW/JP) (2 Cables)

PDU Cable ROW (2 Cables)                                                                            JH302A #B2C
- C15 PDU Jumper Cord (ROW) (2 Cables)

High Volt Switch/Router to Wall Power Cord (2 Cables)                                               JH302A #B2E
- NEMA L6-20P Cord (NA/MEX/JP/TW) (2 Cables)

HPE FlexFabric 5900CP 48XG 4QSFP+ Back-to-Front AC Switch Bundle                                    JH303A
- 48 fixed 1000/10000 SFP+ / FC SFP+ ports (min=0 \ max=48)                                  See Configuration
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)                                                      **NOTE:** 1, 2, 3, 7, 8
- 1U - Height
- Bundle includes:
  1 - JG838A HPE FlexFabric 5900CP 48XG 4QSFP+ Switch
  2 - JC680A HPE 58x0AF 650W AC Power Supply
  2 - JC682A HPE 58x0AF Back (Power Side) to Front (Port Side) Airflow Fan Tray

PDU Cable NA/MEX/TW/JP (2 Cables)                                                                   JH303A#B2B
- C15 PDU Jumper Cord (NA/MEX/TW/JP) (2 Cables)

PDU Cable ROW (2 Cables)                                                                            JH303A#B2C
- C15 PDU Jumper Cord (ROW) (2 Cables)

High Volt Switch/Router to Wall Power Cord (2 Cables)                                               JH303A#B2E
- NEMA L6-20P Cord (NA/MEX/JP/TW) (2 Cables)

# Configuration Information

## Configuration Rules:

| Note 1 | The following Transceivers install into this switch: | |
|---|---|---|
| | 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 SR Data Center Transceiver | JL437A |
| | HPE X130 10G SFP+ LC LRM Data Center Transceiver | JL438A |
| | HPE X130 10G SFP+ LC LR Data Center Transceiver | JL439A |
| | HPE X130 10G SFP+ LC ER 40km Transceiver | JG234A |
| | HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable | JD095C |
| | HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable | JD096C |
| | HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable | JD097C |
| | HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable | JG081C |
| | HPE FlexNetwork X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable | JC784C |
| | HPE X125 1G SFP LC LH40 1310nm Transceiver | JD061A |
| | HPE X120 1G SFP LC LH40 1550nm Transceiver | JD062A |
| | HPE X125 1G SFP LC LH70 Transceiver | JD063B |
| | HPE X120 1G SFP RJ45 T Transceiver | JD089B |
| | 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 SX Transceiver | JD118B |
| | HPE X120 1G SFP LC LX Transceiver | JD119B |

| Note 2 | The following 40G Transceivers install into this switch: | |
|---|---|---|
| | 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 FlexNetwork X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable | JG326A |
| | HPE FlexNetwork X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable | JG327A |
| | HPE FlexNetwork X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable | JG328A |
| | HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable | JG329A |
| | HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable | JG330A |
| | HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable | JG331A |

| Note 3 | The following FC Transceivers install into this switch: | |
|---|---|---|
| | HPE StoreFabric 16Gb FC/10GbE 100m SR SFP+ Transceiver | H6Z42A |
| | HPE 8Gb Short Wave Fibre Channel SFP+ 1 Pack | AJ718A |
| | HPE 8Gb Long Wave 10km Fibre Channel SFP+ 1 Pack Transceiver | AW584A |

| Note 4 | The following 40G Transceivers install into this Module: (Use #0D1 or #B01 if switch is CTO) | |
|---|---|---|
| | HPE X140 40G QSFP+ LC BiDi 100m MM Transceiver | JL251A |

| Note 6 | The following 10G/40G Transceivers install into this switch: | |
|---|---|---|
| | 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 X2A0 40G QSFP+ to QSFP+ 7m Active Optical Cable | JL287A |
| | HPE X2A0 40G QSFP+ to QSFP+ 10m Active Optical Cable | JL288A |

## Configuration Information

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|---|---|
| HPE X2A0 40G QSFP+ to QSFP+ 20m Active Optical Cable | JL289A |

**Note 7**      Localization (Wall Power Cord) required on orders without #B2B, #B2C (PDU Power Cord) or #B2E. (See Localization Menu)

**Note 8**      #B2E is Offered only in NA, Mexico, Taiwan and Japan.

## Rack Level Integration CTO Models

### CTO Switch Chassis

HPE FlexFabric 5900CP 48XG 4QSFP+ Switch                                                                JG838A
- 48 fixed 1000/10000 SFP+ / FC SFP+ ports (min=0 \ max=48)                          See Configuration
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)                                                           **NOTE:** 1, 2, 3, 5, 7,
- Must select min 1 Power Supply                                                                                    11
- Must select min 2 Fan Tray
- 1U - Height

Configuration Rules:

**Note 1**      The following Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable

| | |
|---|---|
| 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 SR Data Center Transceiver | JL437A |
| HPE X130 10G SFP+ LC LRM Data Center Transceiver | JL438A |
| HPE X130 10G SFP+ LC LR Data Center Transceiver | JL439A |
| HPE X130 10G SFP+ LC ER 40km Transceiver | JG234A |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable | JD095C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable | JD096C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable | JD097C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable | JG081C |
| HPE FlexNetwork X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable | JC784C |
| HPE X125 1G SFP LC LH40 1310nm Transceiver | JD061A |
| HPE X120 1G SFP LC LH40 1550nm Transceiver | JD062A |
| HPE X125 1G SFP LC LH70 Transceiver | JD063B |
| HPE X120 1G SFP RJ45 T Transceiver | JD089B |
| 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 SX Transceiver | JD118B |
| HPE X120 1G SFP LC LX Transceiver | JD119B |

**Note 2**      The following 40G Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable

| | |
|---|---|
| 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 FlexNetwork X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable | JG326A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable | JG327A |

# Configuration Information

| | |
|---|---|
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable | JG328A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable | JG329A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable | JG330A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable | JG331A |

**Note 3** The following FC Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable

| | |
|---|---|
| HPE StoreFabric 16Gb FC/10GbE 100m SR SFP+ Transceiver | H6Z42A |
| HPE 8Gb Short Wave Fibre Channel SFP+ 1 Pack | AJ718A |
| HPE 8Gb Long Wave 10km Fibre Channel SFP+ 1 Pack Transceiver | AW584A |

**Note 5** The following 40G Transceivers install into this Module: (Use #0D1 or #B01 if switch is CTO)

| | |
|---|---|
| HPE X140 40G QSFP+ LC BiDi 100m MM Transceiver | JL251A |

**Note 7** The following 10G/40G Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable)

| | |
|---|---|
| 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 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 |

**Note 11** If HPE CTO Switch Chassis is selected for Rack Level Integration, Then the Switch needs to integrate (with #0D1) to the Rack.

Enter the following menu selections as integrated to the CTO Model X server above if order is factory built.

## Transceivers

### SFP Transceivers

| | |
|---|---|
| HPE X125 1G SFP LC LH40 1310nm Transceiver | JD061A |
| HPE X120 1G SFP LC LH40 1550nm Transceiver | JD062A |
| HPE X125 1G SFP LC LH70 Transceiver | JD063B |
| HPE X120 1G SFP RJ45 T Transceiver | JD089B |
| 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 SX Transceiver | JD118B |
| HPE X120 1G SFP LC LX Transceiver | JD119B |

### SFP+ Transceivers

| | |
|---|---|
| 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 SR Data Center Transceiver | JL437A |
| HPE X130 10G SFP+ LC LRM Data Center Transceiver | JL438A |
| HPE X130 10G SFP+ LC LR Data Center Transceiver | JL439A |
| HPE X130 10G SFP+ LC ER 40km Transceiver | JG234A |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable | JD095C |

## Configuration Information

| | |
|---|---|
| HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable | JD096C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable | JD097C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable | JG081C |
| HPE FlexNetwork X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable | JC784C |
| 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 |

### FC SFP+ Transceivers

| | |
|---|---|
| HPE StoreFabric 16Gb FC/10GbE 100m SR SFP+ Transceiver | H6Z42A |
| HPE 8Gb Short Wave Fibre Channel SFP+ 1 Pack | AJ718A |
| HPE 8Gb Long Wave 10km Fibre Channel SFP+ 1 Pack Transceiver | AW584A |

### QSFP+ Transceivers

| | |
|---|---|
| HPE X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver | JG661A |
| HPE X140 40G QSFP+ LC BiDi 100m MM Transceiver | JL251A |
| HPE X140 40G QSFP+ MPO SR4 Transceiver | JG325B |
| HPE X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver | JG709A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable | JG326A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable | JG327A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable | JG328A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable | JG329A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable | JG330A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable | JG331A |
| 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 |

## Cables

### MPO Cables

| | |
|---|---|
| HPE Multi Fiber Push On to 4 x Lucent Connector 5m Cable | K2Q46A |
| HPE Multi Fiber Push On to 4 x Lucent Connector 15m Cable | K2Q47A |
| HPE Premier Flex MPO/MPO Multi-mode OM4 12 fiber 10m Cable | QK729A |
| HPE Premier Flex MPO/MPO Multi-mode OM4 8 fiber 50m Cable | QK731A |
| HPE Premier Flex MPO/MPO OM4 100m (12ft) Cable | H6Z30A |

### Internal Power Supplies

(JG838A) System (std 0 // max 2) User Selection (min 1 // max 2) per switch
(JH302A and JH303A) System (std 2 // max 2) User Selection (min 0 // max 0) per switch

| | |
|---|---|
| HPE 58x0AF 650W AC Power Supply | JC680A |
| • includes 1 x c13, 300w | See Configuration<br>**NOTE:** 1, 2, 3 |

| | |
|---|---|
| PDU Cable NA/MEX/TW/JP | JC680A#B2B |
| • C15 PDU Jumper Cord (NA/MEX/TW/JP) | |

| | |
|---|---|
| PDU Cable ROW | JC680A#B2C |

## Configuration Information

- C15 PDU Jumper Cord (ROW)

| | |
|---|---:|
| HPE A58x0AF Back (Power Side) to Front (Port Side) Airflow 300W AC Power Supply | JG900A |
| | See Configuration |
| | **NOTE:** 1, 3, 4 |

- C15 PDU Jumper Cord (NA/MEX/TW/JP)

| | |
|---|---:|
| PDU Cable NA/MEX/TW/JP | JG900A#B2B |

- C15 PDU Jumper Cord (ROW)

| | |
|---|---:|
| High Volt Switch/Router to Wall Power Cord | JG900A#B2E |

- C15 PDU Jumper Cord (ROW)

| | |
|---|---:|
| HPE A58x0AF Back (Power Side) to Front (Port Side) Airflow 300W DC Power Supply | JG901A |
| | See Configuration |
| | **NOTE:** 1, 3, 5 |

| | |
|---|---:|
| HPE FlexFabric Switch 650W 48V Hot Plug NEBS-compliant DC Power Supply | JH336A |
| | See Configuration |
| | **NOTE:** 1, 3 |

Configuration Rules

Note 1          If 2 power supplies are selected they must be the same Sku number.

Note 2          Localization (Wall Power Cord) required on orders without #B2B, #B2C (PDU Power Cord) . (See Localization Menu)
REMARK: When Switches/Routers are Factory Racked, Then #B2B, or #B2C should be the Defaulted Power Cable option on the Switches/Routers.

Note 3          Only supported on JG838A

Note 4          Localization (Wall Power Cord) required on orders without #B2B, #B2C (PDU Power Cord) or #B2E. (See Localization Menu)
REMARK: When Switches/Routers are Factory Racked, Then #B2B, #B2C should be the Defaulted Power Cable option on the Switches/Routers

Note 5          Watson Only - Add "(NEBS)" after the description on the PS table.

Remarks:          Drop down under power supply should offer the following options and results:
Switch/Router/Power Supply to PDU Power Cord -  #B2B in North America, Mexico, Taiwan, and Japan or #B2C ROW. (Watson Default B2B or B2C for Rack Level CTO)
Switch/Router/Power Supply to Wall Power Cord - Localized Option (Watson Default for BTO and Box Level CTO)
High Volt Power Electrical Module to Wall Power Cord -  #B2E Option. (Offered only in North America, Mexico, Taiwan, and  Japan)

NOTE* Switch JG838A should default selection of Power Supply as JC680A but allow selection of JG900A and JG901A.

**Switch Options**

# Configuration Information

## Fan Trays

(JG838A) System (std 0 // max 2) User Selection (min 2 // max 2) per switch
(JH302A and JH303A) System (std 2 // max 2) User Selection (min 0 // max 0) per switch

| | |
|---|---|
| HPE 58x0AF Back (Power Side) to Front (Port Side) Airflow Fan Tray | JC682A<br>See Configuration<br>**NOTE:** 1,3 |
| HPE 58x0AF Front (Port Side) to Back (Power Side) Airflow Fan Tray | JC683A<br>See Configuration<br>**NOTE:** 1,3 |
| HPE X711 Front (Port Side) to Back (Power Side) Airflow High Volume Fan Tray | JG552A<br>See Configuration<br>**NOTE:** 1,4 |
| HPE X712 Back (Power Side) to Front (Port Side) Airflow High Volume Fan Tray | JG553A<br>See Configuration<br>**NOTE:** 1,4 |

Configuration Rules

Note 1     Fan Trays cannot be mixed in the same switch enclosure

Note 3     Only supported on JG838A.

Note 4     Only supported on JG838A.

Remarks: Watson Blue Text:
> If there is any empty space below the switch in a rack when using Back to Front Fan Trays, JC682A or JG553A, the rack will receive an Air Plenum kit that takes up 1U of additional space in the rack. The Air Plenum kit is not required on fully configured racks. This only applies for CTO Rack Level Integration. The Air Plenum Kit is a non-saleable SKU, and is brought in automatically for CTO Factory Rack Level Integration.

## Tamper Evidence Labels

System (std 0 // max 1) User Selection (min 0 // max 1)

| | |
|---|---|
| HPE 12mm x 60mm Tamper Evidence (30) Labels<br>• Supported on JG554A, JH038A | JG585A<br>See Configuration<br>**NOTE:** 1 |

Configuration Rules

Note 1     If selected with a CTO Switch Solution, Quantity 1 of JG719A#B01 must also be ordered.
Remarks  Each JG719A would use 1 of JG585A.

# Additional Options

## HPE FlexFabric 5900CP Switch Series bundles and accessories

### Bundles

| | |
|---|---|
| HPE FlexFabric 5900CP 48XG 4QSFP+ Front-to-Back AC Switch Bundle | JH302A |

Included in this bundle: (1) FlexFabric 5900CP 48XG 4QSFP+ Switch (JG838A), (2) HPE 58x0AF Front (port side) to Back (power side) Airflow Fan Tray (JC683A), and (2) HPE 58x0AF 650W AC Power Supply (JC680A)

| | |
|---|---|
| HPE FlexFabric 5900CP 48XG 4QSFP+ Back-to-Front AC Switch Bundle | JH303A |

Included in this bundle: (1) FlexFabric 5900CP 48XG 4QSFP+ Switch (JG838A), (2) HPE 58x0AF Back (power side) to Front (port side) Airflow Fan Tray (JC682A), and (2) HPE 58x0AF 650W AC Power Supply (JC680A)

### 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 SR Data Center Transceiver | JL437A |
| HPE X130 10G SFP+ LC LRM Transceiver | JD093B |
| HPE X130 10G SFP+ LC LRM Data Center Transceiver | JL438A |
| HPE X130 10G SFP+ LC LR Transceiver | JD094B |
| HPE X130 10G SFP+ LC LR Data Center Transceiver | JL439A |
| HPE X130 10G SFP+ LC ER 40km Transceiver | JG234A |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable | JD095C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable | JD096C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable | JD097C |
| HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable | JG081C |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable | JG326A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable | JG327A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable | JG328A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable | JG329A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable | JG330A |
| HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable | JG331A |
| HPE FlexNetwork 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 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 X2A0 10G SFP+ to SFP+ 7m Active Optical Cable | JL290A |
| HPE X130 10G SFP+ LC LH80 tunable Transceiver | JL250A |
| HPE X2A0 10G SFP+ to SFP+ 10m Active Optical Cable | JL291A |
| HPE X2A0 10G SFP+ to SFP+ 20m Active Optical Cable | JL292A |
| HPE X140 40G QSFP+ LC LR4L 2km SM Transceiver | JL286A |

## Additional Options

**Power Supply**

| | |
|---|---|
| HPE 58x0AF 650W AC Power Supply | JC680A |
| HPE A58x0AF Back (Power Side) to Front (Port Side) Airflow 300W AC Power Supply | JG900A |
| HPE A58x0AF Back (Power Side) to Front (Port Side) Airflow 300W DC Power Supply | JG901A |

**HPE FlexFabric 5900CP 48XG 4QSFP+ Switch (JG838A)**

| | |
|---|---|
| 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 |

# Technical Specifications

## HPE FlexFabric 5900CP 48XG 4QSFP+ Switch (JG838A)

| | |
|---|---|
| **I/O ports and slots** | 48 SFP+ dual-personality ports; Supports 1G/10G Ethernet and 4Gbps/8Gbps Fiber Channel<br>4 QSFP+ 40-GbE ports |
| **Additional ports and slots** | 1 RJ-45 serial console port<br>1 RJ-45 out-of-band management port<br>1 USB 2.0 |
| **Power supplies** | 2 power supply slots<br>1 minimum power supply required (ordered separately) |
| **Fan tray** | 2 fan tray slots<br>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) |
|---|---|---|
| | **Weight** | 28.66 lb (13 kg) shipping weight |
| **Memory and processor** | 512 MB flash; Packet buffer size: 9 MB, 2 GB SDRAM | |
| **Performance** | **10 Gbps Latency** | < 1.5 µs (64-byte packets) |
| | **Throughput** | up to 952 million pps |
| | **Routing/Switching capacity** | 1280 Gbps |
| | **Routing table size** | 16000 entries (IPv4), 8000 entries (IPv6) |
| | **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, rated |
| | **Maximum power rating** | 260 W |
| | **Idle power** | 200 W |
| | **Frequency** | 50/60 Hz |
| | **Notes** | Idle power is the actual power consumption of the device with no ports connected.<br>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 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 |
|---|---|---|
| | **EN** | EN 55024:1998+ A1:2001 + A2:2003 |

## Technical Specifications

| | | |
|---|---|---|
| **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 Hewlett Packard Enterprise website at: **http://www.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** (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+

# Technical Specifications

**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

# Technical Specifications

RFC 4594 Configuration Guidelines for DiffServ Service Classes
RFC 4941 Privacy Extensions for Stateless Address Autoconfiguration in IPv6.

**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 IPv46 & 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

## Summary of Changes

| Date | Version History | Action | Description of Change |
|---|---|---|---|
| 04-Feb-2019 | Version 13 | Changed | Removed Box Level CTO SSP Section and logic from menu and configurators |
| 01-Oct-2018 | Version 12 | Changed | Recommended and Extended markings removed from the document. |
| 06-Aug-2018 | Version 11 | Changed | Configuration section updated |
| 06-Mar-2017 | Version 10 | Added | SKUs added: JL437A; JL438A; JL439A |
| 01-Aug-2016 | Version 9 | Added | SKUs added: JL287A, JL288A, JL289A, JL290A, JL291A, JL292A, JL250A, JL286A |
| 15-Apr-2016 | Version 8 | Changed | SKU descriptions updated on all the document |
| 18-Mar-2016 | Version 7 | Changed | Entire Configuration section revised |
| 16-Feb-2016 | Version 6 | Added | SKU added: JL251A |
|  |  | Changed | Overview and Technical Specifications updated |
| 08-Jan-2016 | Version 5 | Changed | Warranty and support updated |
| 12-Oct-2015 | Version 4 | Added | Added new DC power supply: JH336A |
| 17-Aug-2015 | Version 3 | Added | SKUs added: JH302A, JH303A |
| 12-Dec-2014 | Version 2 | Removed | Deleted SKU JG325A |
| 01-Dec-2014 | Version 1 | New | New QuickSpecs |

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