HPE FlexFabric 7900 Switch Series

Overview

Product overview

HPE FlexFabric 7900 Switch Series is the next-generation compact modular data center core switch designed to support virtualized data centers and evolution needs of private and public clouds deployments.

The 7900 delivers unprecedented levels of performance, buffering, scale, and availability with high-density 10GbE, 40GbE and 100GbE interfaces using only a fraction of the footprint used by traditional chassis.

The switch supports full Layer 2 and 3 features along with advanced data center features including TRILL, IRF, VxLAN and open standards-based programmability with OpenFlow support.

Features and benefits

Product architecture

- Modern scalable system architecture
  provides nonblocking, lossless Clos architecture with VOQs and large buffers with the flexibility and scalability for future growth
- Distributed architecture with separation of data and control planes
  delivers enhanced fault tolerance and facilitates continuous operation and zero service disruption during planned or unplanned control-plane events
- Advanced Comware modular operating system
  brings native high stability, independent process monitoring, and restart through the modular design and multiple processes of Hewlett Packard Enterprise Comware v7 software; supports enhanced serviceability functions

Performance

- High-performance fully distributed architecture
  delivers up to 9.6 Tb/s switching capacity and 5.94 Bpps throughput with nonblocking wirespeed performance
- High-density 1/10GbE, 40GbE and 100GbE interface connectivity
Overview

offers up to 10 interface module slots to scale up to 120 40GbE or 20 100GbE or 480 10GbE or 240 1/10GbE interface or a combination

- **Distributed scalable fabric architecture**
  with integrated fabric and management modules to deliver more than 1 Tb per slot bandwidth

Data center optimized

- **Virtual Extensible LAN (VxLAN)**
  VxLAN Routing/Bridging provides wire-rate support to build overlay networks enabling virtual machine mobility and cloud deployments
- **Scalable Layer 2 fabric functionality**
  builds flexible, resilient, and scalable Layer 2 fabrics with TRILL and Hewlett Packard Enterprise IRF
- **Hewlett Packard Enterprise Ethernet Virtual Interconnect (EVI)**
  is an Hewlett Packard Enterprise Virtual Application Network innovation that provides a Layer 2 extension across the data center to simplify the interconnectivity of geographically disperse data centers
- **Front-to-back airflow design**
  accommodates deployment in data centers utilizing hot-cold aisles

Resiliency and high availability

- **Intelligent Resilient Fabric (IRF)**
  creates virtual resilient switching fabrics, where two or more switches perform as a single L2 switch and L3 router; servers or switches can be attached using standard LACP for automatic load balancing and high availability there by eliminating the need for complex protocols and simplifying network operations
- **Redundant/load-sharing fabrics, management, fan assemblies and power supplies**
  increase total performance and power availability while providing hitless, stateful failover
- **Hot-swappable modules**
  allows replacement of modules without any impact on other modules
- **Graceful restart**
  allows routers to indicate to others their capability to maintain a routing table during a temporary shutdown, which significantly reduces convergence times upon recovery; supports OSPF, BGP, and IS-IS
- **Virtual Router Redundancy Protocol (VRRP)**
  allows groups of two routers to dynamically back each other up to create highly available routed environments
- **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
- **IEEE 802.3ad Link Aggregation Control Protocol (LACP)**
  supports up to 1024 trunk groups and up to 16 members per trunk; supports static or dynamic groups and a user-selectable hashing algorithm
- **Bidirectional Forwarding Detection (BFD)**
  ultrafast sub second protocol convergence with standards based failure detection which enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS and VRRP

Layer 2 switching

- **VLAN**
  supports up to 4,094 port-based or IEEE 802.1Q-based VLANs
- **Port mirroring**
  duplicates port traffic (ingress and egress) to a local or remote monitoring port; supports four mirroring groups, with an unlimited number of ports per group
Overview

- **Port isolation**
  increases security by isolating ports within a VLAN while still allowing them to communicate with other VLANs
- **Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping**
  controls and manages the flooding of multicast packets in a Layer 2 network
- **Spanning Tree Protocol (STP)**
  supports standard IEEE 802.1D STP, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)

Layer 3 routing

- **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
- **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)
- **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
- **Equal-Cost Multipath (ECMP)**
  enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth
- **Unicast Reverse Path Forwarding (uRPF)**
  limits erroneous or malicious traffic in accordance with RFC 3074
- **Static IPv4 routing**
  provides simple manually configured IPv4 routing
- **Routing Information Protocol (RIP)**
  uses a distance vector algorithm with UDP packets for route determination; supports RIPv1 and RIPv2 routing; includes loop protection
- **IP performance optimization**
  provides a set of tools to improve the performance of IPv4 networks; includes directed broadcasts, customization of TCP parameters, support of ICNP error packets, and extensive display capabilities
- **Unicast Reverse Path Forwarding (uRPF) for IPv4**
  limits erroneous or malicious traffic in accordance with RFC 3074 for IPv4 traffic

Quality of Service (QoS)

- **IEEE 802.1p prioritization**
  delivers data to devices based on the priority and type of traffic
- **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
- **Bandwidth shaping**
  - Port-based rate limiting
    provides per-port ingress-/egress-enforced increased bandwidth
  - Classifier-based rate limiting
    uses an access control list (ACL) to enforce increased bandwidth for ingress traffic on each port
  - Reduced bandwidth
    provides per-port, per-queue egress-based reduced bandwidth
Overview

- **Broad QoS feature set**
  provides support for Strict Priority Queuing (SP), Weighted Fair Queuing (WFQ), Weighted Deficit Round Robin (WDRR), SP+WDRR together, configurable buffers and Explicit Congestion Notification (ECN)

- **Traffic policing**
  supports Committed Access Rate (CAR) and line rate

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

- **User Datagram Protocol (UDP) helper**
  redirects UDP broadcasts to specific IP subnets to prevent server spoofing

- **Dynamic Host Configuration Protocol (DHCP)**
  simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets

Management

- **Management interface control**
  enables or disables each of the following interfaces depending on security preferences: console port, Telnet port, or reset button

- **Industry-standard CLI with a hierarchical structure**
  reduces training time and expenses, and increases productivity in multivendor installations

- **SNMPv1, v2, and v3**
  provide complete support of SNMP; provide full support of industry-standard Management Information Base (MIB) plus private extensions; SNMPv3 supports increased security using encryption

- **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

- **Remote monitoring (RMON)**
  uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group

- **Debug and sampler utility**
  supports ping and traceroute

- **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

- **Network Quality Analyzer (NQA)**
  analyzes network performance and service quality by sending test packets, and provides network performance and service quality parameters such as jitter, TCP, or FTP connection delays and file transfer rates; allows a network manager to determine overall network performance and to diagnose and locate network congestion points or failures

- **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
QuickSpecs

HPE FlexFabric 7900 Switch Series

Overview

Connectivity

- **Jumbo frames**
  allows high-performance backups and disaster-recovery systems with a maximum frame size of 12288 bytes

- **Loopback**
  supports internal loopback testing for maintenance purposes and an increase in availability; loopback detection protects against incorrect cabling or network configurations and can be enabled on a per-port or per-VLAN basis for added flexibility

- **Monitor link**
  collects statistics on performance and errors on physical links, increasing system availability

- **Packet storm protection**
  protects against unknown broadcast, unknown multicast, or unicast storms with user-defined thresholds

- **Flow control**
  provides back pressure using standard IEEE 802.3x, reducing congestion in heavy traffic situations

Security

- **Access control list (ACL)**
  used for filtering traffic to prevent unauthorized users from accessing the network, or for controlling network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on a Layer 2 header or a Layer 3 protocol header; rules can be set to operate on specific dates or times

- **Remote Authentication Dial-In User Service (RADIUS)**
  eases switch security access administration by using a password authentication server

- **Secure shell (SSHv2)**
  uses external servers to securely log in to a remote device; with authentication and encryption, it protects against IP spoofing and plain-text password interception; increases the security of Secure FTP (SFTP) transfers

- **DHCP snooping**
  helps ensure that DHCP clients receive IP addresses from authorized DHCP servers and maintain a list of DHCP entries for trusted ports; prevents reception of fake IP addresses and reduces ARP attacks, improving security

- **IP Source Guard**
  filters packets on a per-port basis, which prevents illegal packets from being forwarded

- **ARP attack protection**
  protects against attacks that use a large number of ARP requests, using a host-specific, user-selectable threshold

Multicast support

- **Internet Group Management Protocol (IGMP)**
  utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3

- **Protocol Independent Multicast (PIM)**
  defines modes of multicasting to allow one-to-many and many-to-many transmission of information; PIM Dense Mode (DM), Sparse Mode (SM), and Source-Specific Mode (SSM) are supported

Warranty and support

- **1-year warranty**
  See [http://www.hpe.com/networking/warrantysummary](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](http://www.hpe.com/networking/support); for details on the software
Overview

releases available with your product purchase, refer to http://www.hpe.com/networking/warrantysummary
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.

Switch Chassis

HP FF 7910 Switch Chassis
- Must select min 1 Power Supply
- Must select min 1 Fan Tray
- Must select Min 1 Ethernet Module
- Must select Min 1 Fabric/Management Module
- 5U - Height

HP FF 7904 Switch Chassis
- Must select min 1 Power Supply
- Must select min 1 Fan Tray
- Must select Min 1 Ethernet Module
- 2U - Height

Modules

Fabric/Management Modules

HP FF 7910 7.2Tbps Fabric / MPU

HP FF 7910 2.4Tbps Fabric / MPU

Configuration Rules:

Note 1: No mixing of any type of Fabric/Management Modules. Must all be the same sku

Remarks: These modules can only be inserted into Slots 10 and 11.

Ethernet Modules

JG682A - System (std 0 // max 4) User Selection (min 1 // max 4) per enclosure

JG841A - System (std 0 // max 10) User Selection (min 1 // max 10) per enclosure

HP FF 7900 12p 40GbE QSFP+ SA Mod
- min=0 \ max=12 QSFP+ Transceivers

See Configuration NOTE: 1
**Configuration**

HP FF 7900 24p 1/10GbE SFP+ FX Mod
- min=0 \ max=24 SFP+ Transceivers

HP FF 7900 2p 100G/6p 40G/4p 10G FX Mod
- min=0 \ max=2 CXP Transceivers
- min=0 \ max=6 QSFP+ Transceivers
- min=0 \ max=4 SFP+ Transceivers

**Configuration Rules:**

**Note 1**

The following 40G QSFP+ Transceivers install into this Module:

- HP X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver
- HP X140 40G QSFP+ MPO SR4 Transceiver
- HP X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver
- HP X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable
- HP X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable
- HP X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable
- HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable
- HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable
- HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable

**Note 2**

The following SFP Transceivers install into this Module:

- HP X170 1G SFP LC LH70 1550 Transceiver
- HP X170 1G SFP LC LH70 1570 Transceiver
- HP X170 1G SFP LC LH70 1590 Transceiver
- HP X170 1G SFP LC LH70 1610 Transceiver
- HP X170 1G SFP LC LH70 1470 Transceiver
- HP X170 1G SFP LC LH70 1490 Transceiver
- HP X170 1G SFP LC LH70 1510 Transceiver
- HP X170 1G SFP LC LH70 1530 Transceiver
- HP X170 1G SFP LC LH100 Transceiver
- HP X125 1G SFP LC LH40 1310nm Transceiver
- HP X120 1G SFP LC LH40 1550nm Transceiver
- HP X120 1G SFP LC SX Transceiver
- HP X120 1G SFP LC LX Transceiver
- HP X125 1G SFP LC LH70 Transceiver
- HP X120 1G SFP LC BX 10-U Transceiver
- HP X120 1G SFP LC BX 10-D Transceiver
- HP X120 1G SFP RJ45 T Transceiver

**Note 3**

The following SFP+ Transceivers install into this Module:

- HP X130 10G SFP+ LC SR Transceiver
- HP X130 10G SFP+ LC LRM Transceiver
- HP X130 10G SFP+ LC LR Transceiver
Configuration

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 10G SFP+ SFP+ 7m Direct Attach Copper Cable JC784C
HP X130 10G SFP+ LC ER 40km Transceiver JG234A

Note 4 The following CXP Transceivers install into this Module:
HP X150 100G CXP MPO SR 100m Multimode Transceiver JG881A

Transceivers

SFP Transceivers

HP X120 1G SFP RJ45 T Transceiver JD089B
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 LH100 Transceiver JD103A
HP X120 1G SFP LC LH40 1550nm XCVR JD062A
HP X120 1G SFP LC SX Transceiver JD111B
HP X120 1G SFP LC LX Transceiver JD111B
HP X125 1G SFP LC LH40 1310nm XCVR JD061A
HP X125 1G SFP LC LH70 Transceiver JD063B
HP X170 1G SFP LC LH70 1550 Transceiver JD109A
HP X170 1G SFP LC LH70 1570 Transceiver JD110A
HP X170 1G SFP LC LH70 1590 Transceiver JD111A
HP X170 1G SFP LC LH70 1610 Transceiver JD112A
HP X170 1G SFP LC LH70 1470 Transceiver JD113A
HP X170 1G SFP LC LH70 1490 Transceiver JD114A
HP X170 1G SFP LC LH70 1510 Transceiver JD115A
HP X170 1G SFP LC LH70 1530 Transceiver JD116A

SFP+ Transceivers

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 X240 10G SFP+ SFP+ 0.65m DAC Cable JD095C
HP X240 10G SFP+ SFP+ 1.2m DAC Cable JD096C
HP X240 10G SFP+ SFP+ 3m DAC Cable JD097C
HP X240 10G SFP+ SFP+ 5m DAC Cable JG081C
HP X240 10G SFP+ SFP+ 7m DAC Cable JC784C

QSFP+ Transceivers
QuickSpecs

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Configuration

HP X140 40G QSFP+ LC LR4 SM XCVR JG661A
HP X140 40G QSFP+ MPO SR4 XCVR JG676B
HP X140 40G QSFP+ CSR4 300m XCVR JG709A
HP X240 40G QSFP+ QSFP+ 1m DAC Cable JG326A
HP X240 40G QSFP+ QSFP+ 3m DAC Cable JG327A
HP X240 40G QSFP+ QSFP+ 5m DAC Cable JG328A
HP X240 QSFP+ 4x10G SFP+ 1m DAC Cable JG329A
HP X240 QSFP+ 4x10G SFP+ 3m DAC Cable JG330A
HP X240 QSFP+ 4x10G SFP+ 5m DAC Cable JG331A

CXP Transceivers

HP X150 100G CXP MPO SR 100m MM XCVR JG881A
HP X2A0 100G CXP to CXP AOC 10m Cable JG882A
HP X2A0 100G CXP to CXP AOC 30m Cable JG883A

Cables

MPO Cables

HP MPO to 4 x LC 5m Cable K2Q46A
HP MPO to 4 x LC 15m Cable K2Q47A

Internal Power Supplies

JG682A - System (std 0 // max 2) User Selection (min 1 // max 2)
JG841A - System (std 0 // max 4) User Selection (min 1 // max 4)

HP FF 7900 1800w AC F-B PSU JG840A
  • includes 1 x c15, 1800w

See Configuration NOTE: 1

PDU Cable NA/MEX/TW/JP JG840A#B2B
  • C15 PDU Jumper Cord (NA/MEX/TW/JP)

PDU Cable ROW JG840A#B2C
  • C15 PDU Jumper Cord (ROW)

High Volt Switch to Wall Power Cord JG840A#B2E
  • NEMA L6-20P Cord (NA/MEX/JP/TW)

Configuration Rules:
**Configuration**

**Note 1**  Localization (Wall Power Cord) required on orders without #B2B, #B2C (PDU Power Cord) or #B2E. (See Localization Menu)

**Remarks:**  Drop down under power supply should offer the following options and results:
- Switch 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 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)

**Switch Enclosure Options**

**Fan Trays**

JG682A, JG841A - System (std 0 // max 2) User Selection (min 1 // max 2) per switch

HP FF 7904 F-B Fan Tray  JG684A
See Configuration  **NOTE:** 1, 3

HP FF 7904 B-F Fan Tray  JG839A
See Configuration  **NOTE:** 1, 3

HP FF 7910 Frt(Prt)-Bck(Pwr) Fan Tray  JG843A
See Configuration  **NOTE:** 2

**Configuration Rules:**

**Note 1**  Only supported on JG682A

**Note 2**  Only supported on JG841A

**Mounting Kit**

HP X421 Chassis Universal Rck Mntg Kit  JC665A
See Configuration  **NOTE:** 1

HP FF 7910 Bottom-Support Rails  JH042A
See Configuration  **NOTE:** 2

**Configuration Rules:**

**Note 1**  This item is optional and used by customers to allow the chassis to slide in and out of the rack

**Note 2**  Only supported on JG841A

**Remarks:**  Default a quantity of 1 JC665A when Switch JG682A is selected.
Default a quantity of 1 JH042A when Switch JG841 is selected.
Configurator Blue Text:
Configuration

JH042A is recommended for JG841A. JC665A is also supported with JG841A but takes additional 2 RUs rack space.

Cable Management Kit

HP FF 7910 Cable Management Frame

Configuration Rules:

Note 1
Only supported on JG841A

Remarks:
Default a quantity of 1 when Switch is selected.
## Technical Specifications

**HP FlexFabric 7904 Switch Chassis** (JG682A)

**I/O ports and slots**
- 4 I/O module slots
- Supports a maximum of 48 40GbE ports or 192 10GbE ports or 96 1/10GbE ports or 8 100GbE ports, or a combination

**Power supplies**
- 2 power supply slots
- 1 minimum power supply required (ordered separately)

**Fan tray**
- 2 fan tray slots
- JG684A for Front to Back airflow

**Physical characteristics**
- Dimensions: 17.32(w) x 28.35(d) x 3.47(h) in (44 x 72 x 8.81 cm) (2U height)
- Weight: 39.46 lb (17.9 kg)
- Full configuration weight: 87.7 lb (39.78 kg)

**Memory and processor**
- Management module: Dual Core MIPS64 @ 1.2 GHz, 512 MB flash, 4 GB DDR2 SDRAM

**Mounting and enclosure**
- Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); Horizontal surface mounting only

**Performance**
- Throughput: up to 2.3 Bpps (64-byte packets)
- Switching capacity: 3.8 Tbps
- Routing table size: 32768 entries (IPv4)
- MAC address table size: 131072 entries

**Reliability**
- Availability: 99.999%

**Environment**
- Operating temperature: 32°F to 104°F (0°C to 40°C)
- Operating relative humidity: 10% to 95%, noncondensing
- Nonoperating/Storage temperature: -40°F to 158°F (-40°C to 70°C)
- Nonoperating/Storage relative humidity: 5% to 95%, noncondensing
- Altitude: up to 13,123 ft (4 km)
- Acoustic:
  - Low-speed fan: 59.8 dB
  - High-speed fan: 76.3 dB
- Airflow direction: Front-to-back or back-to-front (Determined by fan installed fans)

**Electrical characteristics**
- Voltage: 100 - 120 / 200 - 240 VAC, rated (depending on power supply chosen)
- Current: 16/60 A
- Power output: 1800 W
- Frequency: 50/60 Hz
- Notes: Based on a common power supply of 1,800 W (AC)

**Safety**
- UL 60950-1; CAN/CSA 22.2 No. 60950-1; IEC 60950-1; EN 60950-1; FDA 21 CFR Subchapter J; AS/NZS 60950-1; RoHS Compliance EN 50581

**Emissions**
- VCCI Class A; EN 55022 Class A; CISPR 22 Class A; IEC/EN 61000-3-2; IEC/EN 61000-3-3; ICES-003 Class A; AS/NZS CISPR 22 Class A; FCC (CFR 47, Part 15) Class A; ETSI EN 300 386
## Technical Specifications

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<thead>
<tr>
<th><strong>Immunity</strong></th>
<th><strong>Generic</strong></th>
<th><strong>EN 55024</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management</strong></td>
<td>IMC - Intelligent Management Center; command-line interface; out-of-band management (serial RS-232C); SNMP Manager; Telnet; terminal interface (serial RS-232C); modem interface; IEEE 802.3 Ethernet MIB; Ethernet Interface MIB</td>
<td></td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Refer to the Hewlett Packard Enterprise website at: <a href="http://www.hpe.com/networking/services">http://www.hpe.com/networking/services</a> 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.</td>
<td></td>
</tr>
</tbody>
</table>

### HP FlexFabric 7910 Switch Chassis (JG841A)

<table>
<thead>
<tr>
<th><strong>I/O ports and slots</strong></th>
<th>10 I/O module slots</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supports a maximum of 120 40GbE ports or 480 10GbE ports or 240 1/10GbE ports or 20 100GbE ports, or a combination</td>
</tr>
<tr>
<td><strong>Power supplies</strong></td>
<td>4 power supply slots</td>
</tr>
<tr>
<td></td>
<td>1 minimum power supply required (ordered separately)</td>
</tr>
<tr>
<td><strong>Fan tray</strong></td>
<td>2 fan tray slots</td>
</tr>
<tr>
<td></td>
<td>JG843A for Front to Back airflow</td>
</tr>
</tbody>
</table>

### Physical characteristics

| **Dimensions** | 17.32(w) x 29.92(d) x 8.66(h) in (43.99 x 76 x 22 cm) (5U height) |
| **Weight**     | 63.49 lb (28.8 kg) |
| **Full configuration weight** | 156.97 lb (71.2 kg) |

### Memory and processor

| **Management module** | Dual Core MIPS64 @ 1.0 GHz, 1 GB flash, 8 GB DDR2 SDRAM |

### Mounting and enclosure

| **Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); Horizontal surface mounting only** |

### Performance

| **Throughput** | up to 5.8 Bpps (64-byte packets) |
| **Switching capacity** | 9.6 Tbps |
| **Routing table size** | 32768 entries (IPv4) |
| **MAC address table size** | 131072 entries |

### Reliability

| **Availability** | 99.999% |

### Environment

| **Operating temperature** | 32°F to 104°F (0°C to 40°C) |
| **Operating relative humidity** | 10% to 95%, noncondensing |
| **Nonoperating/Storage temperature** | -40°F to 158°F (-40°C to 70°C) |
| **Nonoperating/Storage relative humidity** | 5% to 95%, noncondensing |
| **Altitude** | up to 13,123 ft (4 km) |
| **Acoustic** | Low-speed fan: 47.9 dB, High-speed fan: 77.9 dB |
| **Airflow direction** | Front-to-back or back-to-front (Determined by fan installed fans) |

### Electrical characteristics

| **Voltage** | 100 - 240 VAC, rated (depending on power supply chosen) |
| **Current** | 13 A |
| **Power output** | 1800 W |
| **Frequency** | 50/60 Hz |
| **Notes** | Based on a common power supply of 1,800 W (AC) |
## Technical Specifications

### Safety
UL 60950-1; CAN/CSA 22.2 No. 60950-1; IEC 60950-1; EN 60950-1; FDA 21 CFR Subchapter J; AS/NZS 60950-1; RoHS Compliance EN 50581

### Emissions
VCCI Class A; EN 55022 Class A; CISPR 22 Class A; IEC/EN 61000-3-2; IEC/EN 61000-3-3; ICES-003 Class A; AS/NZS CISPR 22 Class A; FCC (CFR 47, Part 15) Class A; ETSI EN 300 386

### Immunity
Generic

### Management
IMC - Intelligent Management Center; command-line interface; out-of-band management (serial RS-232C); SNMP Manager; Telnet; terminal interface (serial RS-232C); modem interface; IEEE 802.3 Ethernet MIB; Ethernet Interface MIB

### Services
Refer to the Hewlett Packard Enterprise website at [http://www.hpe.com/networking/services](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

#### BGP
- RFC 1771 BGPv4
- RFC 1772 Application of the BGP
- RFC 1998 An Application of the BGP Community Attribute in Multi-home Routing
- RFC 1998 PPP Gandalf FZA Compression Protocol
- RFC 2385 BGP Session Protection via TCP MD5
- RFC 2439 BGP Route Flap Damping
- RFC 2796 BGP Route Reflection
- RFC 2858 BGP-4 Multi-Protocol Extensions
- RFC 2918 Route Refresh Capability
- RFC 3065 Autonomous System Confederations for BGP
- RFC 3392 Capabilities Advertisement with BGP-4
- RFC 4271 A Border Gateway Protocol 4 (BGP-4)
- RFC 4272 BGP Security Vulnerabilities Analysis
- RFC 4273 Definitions of Managed Objects for BGP-4
- RFC 4274 BGP-4 Protocol Analysis
- RFC 4275 BGP-4 MIB Implementation Survey
- RFC 4276 BGP-4 Implementation Report
- RFC 4277 Experience with the BGP-4 Protocol
- RFC 4360 BGP Extended Communities Attribute
- RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
- RFC 5291 Outbound Route Filtering Capability for BGP-4
- RFC 5292 Address-Prefix-Based Outbound Route Filter for BGP-4

#### Denial of service protection
Automatic filtering of well-known denial-of-service packets

- CPU DoS Protection
- Rate Limiting by ACLs

#### Device management
- RFC 1157 SNMPv1/v2c

#### MIBs
- RFC 1156 (TCP/IP MIB)
- RFC 1157 A Simple Network Management Protocol (SNMP)
- RFC 1215 A Convention for Defining Traps for use with the SNMP
- RFC 1229 Interface MIB Extensions
- RFC 1493 Bridge MIB
- RFC 1573 SNMP MIB II
- RFC 1643 Ethernet MIB
- RFC 1657 BGP-4 MIB
- RFC 1907 SNMPv2 MIB
- RFC 2011 SNMPv2 MIB for IP
- RFC 2012 SNMPv2 MIB for TCP
- RFC 2013 SNMPv2 MIB for UDP
- RFC 2096 IP Forwarding Table MIB
- RFC 2127 ISDN Management Information Base using SMiv2
- RFC 2233 Interface MIB
- RFC 2571 SNMP Framework MIB
- RFC 2572 SNMP-MPD MIB
- RFC 2573 SNMP-Notification MIB
- RFC 2573 SNMP-Target MIB
- RFC 2578 Structure of Management Information Version 2 (SMiv2)
- RFC 2580 Conformance Statements for SMiv2
- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2787 VRRP MIB
- RFC 2819 RMON MIB
- RFC 2924 Ping MIB
- RFC 2932 IP (Multicast Routing MIB)
- RFC 2933 IGMP MIB
- RFC 2934 Protocol Independent Multicast MIB for IPv4
Technical Specifications

**RFC 1305 NTPv3**
**RFC 1902 (SNMPv2)**
**RFC 2579 (SMIv2 Text Conventions)**
**RFC 2580 (SMIv2 Conformance)**
**RFC 2819 (RMON groups Alarm, Event, History and Statistics only)**
**HTTP, SSHv1, and Telnet**
**Multiple Configuration Files**
**Multiple Software Images**
**SSHv1/SSHv2 Secure Shell**

**General protocols**
- IEEE 802.1p Priority
- IEEE 802.10 VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.1X PAE
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ac (VLAN Tagging Extension)
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3ae 10-Gigabit Ethernet
- IEEE 802.3ah Ethernet in First Mile over Point to Point Fiber – EFMF
- IEEE 802.3ba 40 and 100 Gigabit Ethernet Architecture
- IEEE 802.3x Flow Control
- IEEE 802.3z 1000BASE-X
- 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 894 IP over Ethernet
- RFC 925 Multi-LAN Address Resolution
- RFC 950 Internet Standard Subnetting Procedure
- RFC 959 File Transfer Protocol (FTP)
- RFC 1027 Proxy ARP
- RFC 1035 Domain Implementation and Specification
- RFC 1042 IP Datagrams
- RFC 1058 RIPv1
- RFC 1142 OSI IS-IS Intra-domain Routing Protocol
- RFC 1195 OSI ISIS for IP and Dual Environments
- RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
- RFC 1293 Inverse Address Resolution Protocol
- RFC 1305 NTPv3
- RFC 3411 SNMP-User based- SM MIB
- RFC 3415 SNMP-View based- ACM MIB
- RFC 3417 Simple Network Management Protocol (SNMP) over IEEE 802 Networks
- RFC 3418 MIB for SNMPv3
- RFC 3621 Power Ethernet MIB
- RFC 3813 MPLS LSR MIB
- RFC 3814 MPLS FTN MIB
- RFC 3815 MPLS LDP MIB
- RFC 3826 AES for SNMP's USM MIB
- RFC 4133 Entity MIB (Version 3)
- RFC 4444 Management Information Base for Intermediate System to Intermediate System (IS-IS)

**Network management**
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 1155 Structure of Management Information
- RFC 1157 SNMPv1
- RFC 2211 Controlled-Load Network
- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
- RFC 3176 sFlow
- RFC 3411 SNMP Management Frameworks
- RFC 3412 SNMPv3 Message Processing
- RFC 3414 SNMPv3 User-based Security Model (USM)
- RFC 3415 SNMPv3 View-based Access Control Model (VACM)
- ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)

**OSPF**
- RFC 1245 OSPF protocol analysis
- RFC 1246 Experience with OSPF
- RFC 1765 OSPF Database Overflow
- RFC 1850 OSPFv2 Management Information Base (MIB), traps
- RFC 2154 OSPF w/ Digital Signatures (Password, MD-5)
- RFC 2328 OSPFv2
- RFC 2370 OSPF Opaque LSA Option
- RFC 3101 OSPF NSSA
- RFC 3137 OSPF Stub Router Advertisement
- RFC 3623 Graceful OSPF Restart
- RFC 3630 Traffic Engineering Extensions to OSPFv2
- RFC 4061 Benchmarking Basic OSPF Single Router
QuickSpecs

HPE FlexFabric 7900 Switch Series

Technical Specifications

RFC 1350 TFTP Protocol (revision 2)
RFC 1393 Traceroute Using an IP Option
RFC 1519 CIDR
RFC 1531 Dynamic Host Configuration Protocol
RFC 1533 DHCP Options and BOOTP Vendor Extensions
RFC 1591 DNS (client only)
RFC 1624 Incremental Internet Checksum
RFC 1701 Generic Routing Encapsulation
RFC 1721 RIP-2 Analysis
RFC 1723 RIP v2
RFC 1812 IPv4 Routing
RFC 2082 RIP-2 MD5 Authentication
RFC 2091 Trigger RIP
RFC 2131 DHCP
RFC 2138 Remote Authentication Dial In User Service (RADIUS)
RFC 2236 IGMP Snooping
RFC 2338 VRRP
RFC 2453 RIP v2
RFC 2644 Directed Broadcast Control
RFC 2763 Dynamic Name-to-System ID mapping support
RFC 2784 Generic Routing Encapsulation (GRE)
RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS
RFC 2973 IS-IS Mesh Groups
RFC 3022 Traditional IP Network Address Translator (Traditional NAT)
RFC 3277 IS-IS Transient Blackhole Avoidance
RFC 3567 Intermediate System to Intermediate System (IS-IS) Cryptographic Authentication
RFC 3719 Recommendations for Interoperable Networks using Intermediate System to Intermediate System (IS-IS)
RFC 3784 IS-IS TE support
RFC 3786 Extending the Number of IS-IS LSP Fragments Beyond the 256 Limit
RFC 3787 Recommendations for Interoperable IP Networks using Intermediate System to Intermediate System (IS-IS)
RFC 3847 Restart signaling for IS-IS
RFC 4251 The Secure Shell (SSH) Protocol Architecture
RFC 4486 Subcodes for BGP Cease Notification Message
RFC 4884 Extended ICMP to Support Multi-Part Messages
RFC 4941 Privacy Extensions for Stateless Address Autoconfiguration in IPv6
RFC 5130 A Policy Control Mechanism in IS-IS

Control Plane Convergence
RFC 4062 OSPF Benchmarking Terminology and Concepts
RFC 4063 Considerations When Using Basic OSPF Convergence Benchmarks
RFC 4222 Prioritized Treatment of Specific OSPF Version 2 Packets and Congestion Avoidance
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
RFC 4940 IANA Considerations for OSPF

QoS/CoS

IEEE 802.1p (CoS)
RFC 1349 Type of Service in the Internet Protocol Suite
RFC 2211 Specification of the Controlled-Load Network Element Service
RFC 2212 Guaranteed Quality of Service
RFC 2474 DSCP DiffServ
RFC 2475 DiffServ Architecture
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2598 DiffServ Expedited Forwarding (EF)

Security

IEEE 802.1X Port Based Network Access Control
RFC 1321 The MD5 Message-Digest Algorithm
RFC 1334 PPP Authentication Protocols (PAP)
RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
RFC 2082 RIP-2 MD5 Authentication
RFC 2104 Keyed-Hashing for Message Authentication
RFC 2408 Internet Security Association and Key Management Protocol (ISAKMP)
RFC 2409 The Internet Key Exchange (IKE)
RFC 2716 PPP EAP TLS Authentication Protocol
RFC 2865 RADIUS Authentication
RFC 2866 RADIUS Accounting
RFC 2868 RADIUS Attributes for Tunnel Protocol Support
RFC 2869 RADIUS Extensions
Access Control Lists (ACLs)
Guest VLAN for 802.1X
MAC Authentication
SSHv1/SSHv2 Secure Shell
Using Administrative Tags

**IP multicast**
- RFC 2236 IGMPv2
- RFC 2283 Multiprotocol Extensions for BGP-4
- RFC 2362 PIM Sparse Mode
- RFC 3376 IGMPv3
- RFC 3446 Anycast Rendezvous Point (RP) mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP)
- RFC 3973 PIM Dense Mode
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches
- RFC 4601 PIM Sparse Mode
## QuickSpecs

### HPE FlexFabric 7900 Switch Series accessories

### Modules

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
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<tbody>
<tr>
<td>HP FlexFabric 7900 12-port 40GbE QSFP+ FX Module</td>
<td>JG683B</td>
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<tr>
<td>HP FlexFabric 7900 24-port 1/10GbE SFP+ FX Module</td>
<td>JG845A</td>
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<tr>
<td>HP FlexFabric 7900 2-port 100GbE CXP/6-port 40GbE QSFP+/4-port 10GbE SFP+ FX Module</td>
<td>JH002A</td>
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### Transceivers

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>HP X140 40G QSFP+ MPO SR4 Transceiver</td>
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<td>HP X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver</td>
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<td>HP X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver</td>
<td>JG661A</td>
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<td>HP X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable</td>
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<td>HP X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable</td>
<td>JG328A</td>
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<tr>
<td>HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable</td>
<td>JG329A</td>
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<tr>
<td>HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable</td>
<td>JG330A</td>
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<tr>
<td>HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable</td>
<td>JG331A</td>
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<td>HP X150 100G CXP MPO SR 100m Multimode Transceiver</td>
<td>JG881A</td>
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<td>HPE X2A0 100G CXP CXP 10m Active Optical Cable</td>
<td>JG882A</td>
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<td>HPE X2A0 100G CXP CXP 30m Active Optical Cable</td>
<td>JG883A</td>
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<td>HP X130 10G SFP+ LC SR Transceiver</td>
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<td>HP X130 10G SFP+ LC LR Transceiver</td>
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<td>HP X130 10G SFP+ LC ER 40km Transceiver</td>
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<td>HP X130 10G SFP+ LC LH 80km Transceiver</td>
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<td>HP X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable</td>
<td>JD095C</td>
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<td>HP X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable</td>
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<td>HP X170 1G SFP LC LH70 1610 Transceiver</td>
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<td>HP X120 1G SFP LC LH100 Transceiver</td>
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### Power Supply

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<tr>
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<tr>
<td>HP FlexFabric 7900 1800w AC Power Supply Unit</td>
<td>JG840A</td>
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### Mounting Kit

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<th>Description</th>
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### Accessories

<table>
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<tr>
<th>Product Description</th>
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<tr>
<td>HP X421 Chassis Universal 4-post Rack Mounting Kit</td>
<td>JC665A</td>
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<tr>
<td><strong>HP FlexFabric 7904 Switch Chassis_PL (JG682A)</strong></td>
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<tr>
<td>HP FlexFabric 7904 Front (Port Side) to Back (Power Side) Airflow Fan Tray</td>
<td>JG684A</td>
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<tr>
<td>HPE FlexFabric 7904 Back (Power Side) to Front (Port Side) Airflow Fan Tray</td>
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<tr>
<td><strong>HP FlexFabric 7910 Switch Chassis_PL (JG841A)</strong></td>
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<tr>
<td>HP FlexFabric 7910 7.2Tbps Fabric/Main Processing Unit</td>
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<td>HP FlexFabric 7910 2.4Tbps Fabric/Main Processing Unit</td>
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<td>HP FlexFabric 7910 Front (Port Side) to Back (Power Side) Airflow Fan Tray</td>
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<td>HP FlexFabric 7910 Cable Management Frame</td>
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<td>HP FlexFabric 7910 Bottom-Support Rails</td>
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## Summary of Changes

<table>
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<tr>
<th>Date</th>
<th>Version History</th>
<th>Action</th>
<th>Description of Change</th>
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<tbody>
<tr>
<td>17-Dec-2015</td>
<td>From Version 9 to 10</td>
<td>Changed</td>
<td>Technical Specifications updated</td>
</tr>
<tr>
<td>01-Dec-2015</td>
<td>From Version 8 to 9</td>
<td>Added</td>
<td>SKUs added: JG839A, JG882A, JG883A</td>
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<td>Changed</td>
<td>QuickSpecs name changed to HPE FlexFabric 7900 Switch Series</td>
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<tr>
<td>28-Sep-2015</td>
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<td>Updated Overview, Features and Benefits, Technical Specification and Accessories section</td>
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<tr>
<td>01-Jun-2015</td>
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<tr>
<td>17-Feb-2015</td>
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<td>Removed</td>
<td>Removed supported transceivers from the Configuration section</td>
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<tr>
<td>01-Dec-2014</td>
<td>From Version 3 to 4</td>
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<td>Added 1 New model JG841A</td>
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<td></td>
<td>Changed</td>
<td>Updated Key features, Product overview, Features and benefits</td>
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<td>03-Jul-2014</td>
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<td>Changed</td>
<td>Switch Chassis, Internal Power Supplies, and Fan Trays were revised in Configuration.</td>
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<td>26-Jun-2014</td>
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<td>Updated the Power Supply specifications.</td>
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