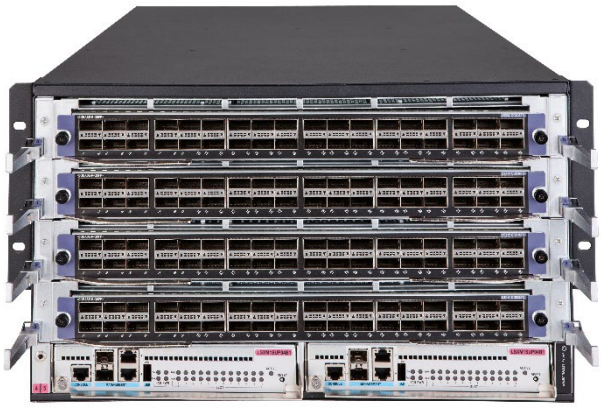
Overview

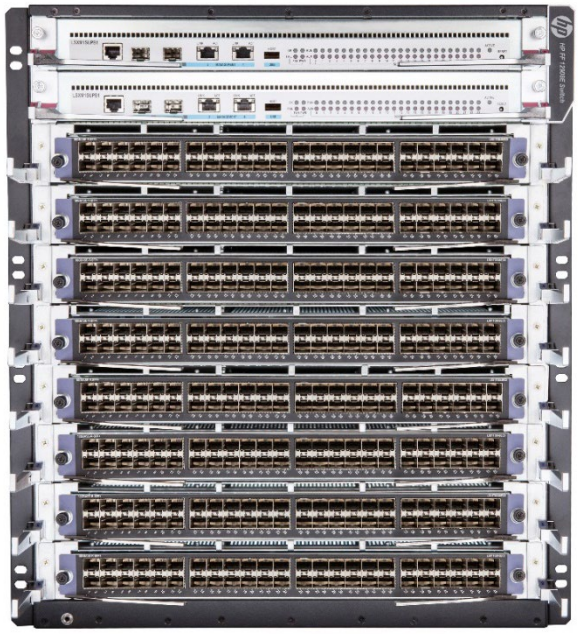
HPE Networking Comware Switch Series 12900E

The HPE Networking Comware Switch Series 12900E is a next-generation modular data center core switch designed to support virtualized data centers and the evolving needs of private and public cloud deployments.

The HPE Networking Comware 12900E Switch delivers unprecedented levels of performance, buffering, scale, and availability with high-density GbE, 10GbE, 40GbE 100GbE and 400GbE connectivity. The HPE Networking Comware Switch Series 12900E includes 16-, 10-, 8- 4-, 2-, and 1-slot chassis.

The switch supports full Layer 2 and 3 features, including advanced features such as Virtual Extensible LAN (VXLAN), Distributed Resilient Network Interconnect (DRNI) and Intelligent Resilient Fabric (IRF), which provide the ability to build large, resilient switching fabrics. The HPE Networking Comware Switch Series 12900E also supports fully redundant and hot-swappable components to complement its other enterprise-class capabilities.





HPE Networking Comware Switch Series 12900E

Models

HPE Networking Comware Switch Chassis 12916E	JH103A
HPE Networking Comware Switch Chassis 12908E	JH255A
HPE Networking Comware Switch Chassis 12904E	JH262A
HPE Networking Comware Switch Chassis 12902E	JH345A
HPE Networking Comware Switch Chassis 12901E	JH951A

Overview

Key features

- Introducing next generation, high performance 400G/100G H2 modules with deep buffer, increased routing scale, SR capability, up to 2000 hardware assisted BFD sessions ideal for telcos, Cloud Service Providers and large enterprises
- Type X modules that offer application telemetry support, automation capabilities with HPE IMC Orchestrator and Analyzer and up to 16K multicast group support.
- High density 10GbE, 40GbE, 100GbE and 400GbE connectivity with nonblocking wirespeed performance. (H2 modules supports 100GbE/400GbE with Comware v9)
- New gen OS-Comware v9 available with H2 modules offers enhanced software features such as Segment Routing-MPLS, egress ACL and others for highly distributed environments.
- HB/HF, Type X and H2 modules support the same chassis, fan tray and power supply resulting in investment protection for customer
- Nonblocking, lossless Clos architecture
- VXLAN, IRF, and DRNI support for virtualized and cloud deployments
- Enhanced modularity with control and data plane separation

Standard Features

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**
  Comware switches support a common OS across DC, campus and WAN for operational consistency, simplified training and support requirements. Networks must adapt to operate in a hybrid environment as applications become more distributed and automated. To meet the demands of next-gen networks, a new version of OS—Comware v9 has been introduced that provides rich new features built on a modular and open architecture, supports containerized deployment and can run third-party software applications. This OS is currently available in HPE Networking Comware Switch Series 12900E with H2 modules only and all the other modules continue to support Comware v7.
- **In-Service Software Upgrade (ISSU)**
  Provides an IRF-based upgrade for seamless maintenance with minimal disruption
- **Multitenant Device Context (MDC)**
  Virtualizes a physical switch into multiple logical devices, with each logical switch having its own processes, configuration, and administration

Performance

- **High-performance fully distributed architecture**
  Delivers up to 184 Tbps (bi-directional) switching capacity and 92.16 Bpps throughput with non-blocking wire speed performance
- **High-density 1, 10, 40,100, 400GbE interface connectivity**
  Offers up to 16 interface module slots to scale up to 768 1/10/40GbE, 576 100GbE ports, 192 400GbE ports or a combination
- **Low latency and consistent performance**
  Under 5 microsecond latency (64-byte packets) and consistent performance for broad range of applications typical of a data center including mixed traffic loads of real-time, multicast, and storage traffic
- **Distributed scalable fabric architecture**
  Offers up to six fabric modules to deliver up to 28.8 Tbps per chassis backplane capacity

Data center optimized

- **Virtual Extensible LAN (VXLAN)**
  Provides wire-rate support for seamless Layer 2 connectivity across Layer 3 networks enabling virtual machine mobility and cloud deployments
- **Scalable Layer 2 fabrics**
  Builds flexible, resilient, and scalable Layer 2 fabrics with DRNI and Hewlett Packard Enterprise IRF
- **Data Center Bridging (DCB) protocols**
  Provides support for IEEE 802.1Qaz Data Center Bridging Exchange (DCBX), Enhanced Transmission Selection (ETS), and IEEE 802.1Qbb Priority Flow Control (PFC) for converged fabrics
- **Fibre Channel over Ethernet (FCoE) features**
  Delivers FCoE using 5930 modules with converged ports, including expansion, fabric, trunk VF and N ports, and aggregation of E-port and N-port virtualization
- **Front-to-back airflow chassis available**
  Accommodates deployment in data centers utilizing hot-cold aisles

Standard Features

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; switches do not have to be co-located and can be part of a disaster-recovery system; servers or switches can be attached using standard LACP for automatic load balancing and high availability; can eliminate the need for complex protocols like Spanning Tree Protocol, Equal-Cost Multipath (ECMP), or VRRP, thereby simplifying network operation
- **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 back each other up dynamically 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
- **Hitless patch upgrades**
  Allows patches and new service features to be installed without restarting the equipment, increasing network uptime and facilitating maintenance
- **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
- **Passive design system**
  Delivers increased system reliability as the backplane has no active components
- **Ultrafast protocol convergence (sub-second) 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

Layer 2 switching

- **VLAN**
  Supports up to 4,094 port-based or IEEE 802.1Q-based VLANs
- **Bridge Protocol Data Unit (BPDU) tunneling**
  Transmits Spanning Tree Protocol BPDUs transparently, allowing correct tree calculations across service providers, wans, or mans
- **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
- **Multiple VLAN Registration Protocol (MVRP)**
  Helps to maintain VLAN configuration dynamically based on current network configurations
- **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
- **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)

Standard Features

- **IEEE 802.1ad QinQ and selective QinQ**
  Increase the scalability of an Ethernet network by providing a hierarchical structure; connect multiple LANs on a high-speed campus or metro network.

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 network
- **Multiprotocol Label Switching (MPLS)**
  Uses BGP to advertise routes across Label Switched Paths (LSPs), but uses simple labels to forward packets from any Layer 2 or Layer 3 protocol, which reduces complexity and increases performance; supports graceful restart for reduced failure impact; supports LSP tunneling and multilevel stacks
- **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
- **Equal-Cost Multipath (ECMP)**
  Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth
- **Policy-based routing**
  Makes routing decisions based on policies set by the network administrator
- **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)**
  limits erroneous or malicious traffic in accordance with RFC 3074
- **Static IPV6 routing**
  Provides simple manually configured IPV6 routing
- **Routing Information Protocol next generation (RIPng)**
  Extends rIPV2 to support IPV6 addressing
- **Ospfv3**
  Provides OSPF support for IPV
- **IS-IS for IPV6**
  Extends IS-IS to support IPV6 addressing
- **BGP+**
  Extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPV6 addressing
- **Multiprotocol Label Switching (MPLS) Layer 3 VPN**
  Allows Layer 3 VPNs across a provider network; uses MP-BGP to establish private routes for increased security; supports RFC 2547bis multiple autonomous system VPNs for added flexibility
- **Multiprotocol Label Switching (MPLS) Layer 2 VPN**
  Establishes simple Layer 2 point-to-point VPNs across a provider network using only MPLS Label Distribution Protocol (LDP); requires no routing and therefore decreases complexity, increases performance, and allows VPNs of non-routable

Standard Features

protocols; uses no routing information for increased security; supports Circuit Cross Connect (CCC), Static Virtual Circuits (SVCS), Martini draft, and Kompella-draft technologies.

- **Virtual Private LAN Service (VPLS)**
  Establishes point-to-multipoint Layer 2 VPNs across a provider network
- **IPV6 tunneling**
  Provides an important element for the transition from IPV4 to IPV6; allows IPV6 packets to traverse IPV4-only networks by encapsulating the IPV6 packet into a standard IPV4 packet; supports manually configured, 6to4, Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels, and IPV6 on VPN to Provider Edge (6VPE) router tunnel

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
- **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, Explicit Congestion Notification (ECN), and Weighted Random Early Detection (WRED)
- **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.

Standard Features

- **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 for both IPV4 and IPV6
- **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
- **IMC Orchestrator and Analyzer support**
  Type X modules support application telemetry and can also take advantage of the orchestration, automated provisioning and analytical capabilities offered by IMC Orchestrator and Analyzer.
- **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
- **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

Connectivity

- **Jumbo frames**
  Allows high-performance backups and disaster-recovery systems with frame sizes of up to 9964 bytes in H2 modules
- **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
- **Ethernet operations, administration and maintenance (OAM)**
  Detects data link layer problems that occurred in the "last mile" using the IEEE 802.3ah OAM standard; monitors the status of the link between two devices
- **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

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 Internet IPV4 and IPV6 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

Standard Features

Security

- **Access control list (ACL)**
  Supports powerful ACLs for both IPV4 and IPV6; ACLs are 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
- **Terminal Access Controller Access-Control System (TACACS+)**
  Delivers an authentication tool using TCP with encryption of the full authentication request, providing additional security
- **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
- **Port security**
  Allows access only to specified MAC addresses, which can be learned or specified by the administrator

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**

Standard Features

Type X and Type HB/HF LPU Modules

The following table provides a feature comparison of the Type X modules and the Type HB/HF modules supported on the 12900E Switch series:

Feature	Type X Modules	Type HB/HF Modules	Type H2 Modules
Compatibility	HPE FlexFabric 12908E Switch Chassis (JH255A) HPE FlexFabric 12904E Switch Chassis (JH262A)	All models	HPE FlexFabric 12908E Switch Chassis (JH255A) HPE FlexFabric 12904E Switch Chassis (JH262A)
Layer 2	Yes	Yes	Yes
Layer 2 PVLAN	Yes	No	No
Layer 2 QinQ	Yes	No	No
IPv6 4 over 6 tunnel	Yes	No	No
IPv6 6 over 6 tunnel	Yes	No	No
Multicast Bidirectional PIM	Yes	No	No
Multicast (IGMP V1/V2/V3)	Yes	Yes	No
Multicast IGMP/PIM DM/SM/SSM	Yes	Yes	No
Ingress Access Control List (ACL)	Yes	Yes	Yes
Egress Access Control List (ACL)	Yes	Yes	Yes
Multiprotocol Label Switching (MPLS)	Yes	Yes	Yes
Virtual Extensible LAN (VXLAN) L2/L3	Yes	Yes	No, planned in road map
BGP Ethernet VPN (EVPN) VXLAN	Yes	Yes	No, planned in road map
Data Center Interconnect (DCI)	Yes	Yes	No
Data Center Bridging (DCB) protocols	Yes	Yes	No
Fibre Channel over Ethernet (FCoE)	Yes	Yes	No
Distributed Resilient Network Interconnect (DRNI)	Yes	Yes	Yes
Intelligent Resilient Fabric (IRF)	Yes	Yes	No
Open Shortest Path First (OSPF) (IPv4/IPv6)	Yes	Yes	Yes
Intermediate System to Intermediate System (ISIS) (IPv4/IPv6)	Yes	Yes	Yes
Policy Based Routing (PBR)	Yes	Yes	Yes
OpenFlow	Yes	Yes	Yes
Lossless Data Center Bridging (DCB)	Yes	Yes	No
Multitenant Device Context (MDC)	Yes	Yes	No
IPv4 Forwarding information base (FIB)	360K	250K/2M	2.5M
IPv6 Forwarding information base (FIB)	128K	128K/512K	2M
MAC Address	288K	750K	500k
IPv4 Multicast	16K	8K	No, planned in roadmap
IPv6 Multicast	8K	1K	No, planned in roadmap
Buffer size per chip	32MB	4GB	8 GB
BFD mas sessions	256	256/400	2000

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.

BTO Models

Remarks	Description	SKU
	HPE Networking Comware Switch Chassis 12901E • Integrated MPU • 1 - Integrated Fabric Module (No separate Fabric Module required) • 1 - I/O module slots • Must select Min 1 Power Supply • Must select Min 2 Fan Trays • 2U Height Rack	JH951A
	HPE Networking Comware Switch Chassis 12902E • 2 - MPUx (Management Ports) • 2 - I/O module slots • 2 - Integrated Fabric modules (No separate Fabric Module required) • Must select min 1 Management Module • Must select min 2 Power Supplies • Must select Min 2 Fan Trays • 3U Height Rack	JH345A
	HPE Networking Comware Switch Chassis 12904E • 2 - MPUx (Management Ports) • 4 - I/O module slots • 6 - Fabric module slots • Must select min 1 Management Module • Must select min 2 Power Supplies • Must select Min 1 Fabric Module • Must select Min 2 Fan Trays • 6U Height Rack	JH262A
	HPE Networking Comware Switch Chassis 12908E • 2 - MPUx (Management Ports) • 8 - I/O module slots • 6 - Fabric module slots • Must select min 1 Management Module • Must select min 2 Power Supplies • Must select Min 1 Fabric Module • Must select Min 2 Fan Trays • 12U Height Rack	JH255A
	HPE Networking Comware Switch Chassis 12916E • 2 - MPUx (Management Ports) • 16 - I/O module slots • 6 - Fabric module slots • Must select min 1 Management Module • Must select min 2 Power Supplies • Must select Min 1 Fabric Module • Must select Min 2 Fan Trays • 21U Height Rack	JH103A
Notes:	OCA Only Model Selection Form - HPE Offering > HPE Aruba Networking > Switches > HPE Networking Comware > Core: HPE Networking Comware Switch Series 12900E	

Configuration Information

Modules

Management Modules

System (std 0 // max 2) User Selection (min 1 // max 2) per Switch

Rule #	Description	SKU
5	HPE Networking 12902E Main Processing Unit	JH346A
	• No supported Transceivers	
4	HPE Networking 12904E v2 Main Processing Unit	JH668A
	• No supported Transceivers	
4, 6	HPE Networking 12904E Type H2 Main Processing Unit	R9F17A
	• Min=0 \ max=1 SFP Transceivers	
3	HPE Networking 12900E v2 Main Processing Unit	JH669A
	• Min=0 \ max=1 SFP Transceivers	
4, 6	HPE Networking 12904E Type X Main Processing Unit	JL844A
	• No supported Transceivers	
2, 6	HPE Networking 12900E Type X Main Processing Unit	JL845A
	• Min=0 \ max=1 SFP Transceivers	
3, 6	HPE Networking 12900E Type H2 Main Processing Unit	R9F18A
	• Min=0 \ max=2 SFP Transceivers	

Configuration Rules

Rule #	Description	SKU
2	The following Switches support this Module:	
	HPE Networking Comware Switch Chassis 12908E	JH255A
3	The following Switches support this Module:	
	HPE Networking Comware Switch Chassis 12908E	JH255A
	HPE Networking Comware Switch Chassis 12916E	JH103A
4	The following Switches support this Module:	
	HPE Networking Comware Switch Chassis 12904E	JH262A
5	The following Switches support this Module:	
	HPE Networking Comware Switch Chassis 12902E	JH345A
6	This module supports the following transceiver modules:	
	HPE Networking X120 1G SFP LC SX Transceiver	JD118B
	HPE Networking X120 1G SFP LC LX Transceiver	JD119B
	HPE Networking X120 1G SFP RJ45 T Transceiver	JD089B
	HPE Networking X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE Networking X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE Networking X120 1G SFP LC LH100 Transceiver	JD103A

Fabric Modules

JH262A, JH255A, JH103A System (std 0 // max 6) User Selection (min 1 // max 6) per switch enclosure.
JH345A System (std 2 // max 2) User Selection (min 0 // max 0) per switch enclosure

Rule #	Description	SKU
1, 4, 7, 9	HPE Networking 12904E 7.2Tbps Type H Fabric Module	JH364A
1, 4, 8, 12	HPE Networking 12904E Type X Fabric Module	JL841A
1, 4, 14, 15	HPE Networking 12904E Type H2 Fabric Module	R9F14A
1, 5, 8, 13	HPE Networking 12908E Type X Fabric Module	JL842A
1, 5, 7, 10	HPE Networking 12908E 14.4Tbps Type H Fabric Module	JH362A
1, 5, 14, 16	HPE Networking 12908E Type H2 Fabric Module	R9F15A
1, 6, 7, 11	HPE Networking 12916E 21.6Tbps Type H Fabric Module	JH361A

Configuration Information

1, 6, 7, 11	HPE Networking 12916E 43 2Tps Type H Fabric Module	JH435A

Configuration Rules

Rule #	Description	SKU
1	If more than 1 Fabric Module is selected, they must be of the same Type.	
3	This Fabric Module is only supported on switch	
4	This Fabric Module is only supported on switch	
	HPE Networking Comware Switch Chassis 12904E	JH262A
5	This Fabric Module is only supported on switch	
	HPE Networking Comware Switch Chassis 12908E	JH255A
6	This Fabric Module is only supported on switch	
	HPE Networking Comware Switch Chassis 12916E	JH103A
7	Only H Series I/O Modules are supported	
8	Only X Series I/O Modules are supported	
9	If a 12904E Switch Chassis is configured with a Type H Fabric Module, then qty 2 of the following High-Speed Fan Tray must be selected:	
	HPE Networking 12904E High Speed Fan Tray	JH448A
10	If a 12908E Switch Chassis is configured with a Type H Fabric Module, then qty 2 of the following High-Speed Fan Tray must be selected:	
	HPE Networking 12908E High Speed Fan Tray	JH424A
11	If a 12916E Switch Chassis is configured with a Type H Fabric Module, then qty 2 of the following High-Speed Fan Tray must be selected:	
	HPE Networking 12916E High Speed Fan Tray	JH423A
12	If a 12904E Switch Chassis is configured with a Type X Fabric Module, then qty 2 of the following High Speed Fan Tray must be selected:	
	HPE Networking 12904E High Speed Fan Tray	JH448A
13	If a 12908E Switch Chassis is configured with a Type X Fabric Module, then qty 2 of the following High Speed Fan Tray must be selected:	
	HPE Networking 12908E High Speed Fan Tray	JH424A
14	Only Type H2 I/O Modules and Type H2 MPU are supported	
15	If a 12904E Switch Chassis is configured with a Type H2 Fabric Module, then qty 2 of the following High Speed Fan Tray must be selected:	
	HPE Networking 12908E High Speed Fan Tray	JH424A
16	If a 12908E Switch Chassis is configured with a Type H2 Fabric Module, then qty 2 of the following High Speed Fan Tray must be selected:	
	HPE Networking 12908E High Speed Fan Tray	JH424A

I/O Modules

JG619A (std 0 // max 10) User Selection (min 1 // max 10)
12904E (std 0 // max 4) User Selection (min 1 // max 4) per switch enclosure
12908E (std 0 // max 8) User Selection (min 1 // max 8) per switch enclosure
12916E (std 0 // max 16) User Selection (min 1 // max 16) per switch enclosure
JH345A (std 0 // max 2) User Selection (min 1 // max 2) per switch enclosure
JH951A (std 0 // max 1) User Selection (min 0 // max 1) per switch enclosure

Rule #	Description	SKU
1, 8, 9, 22	HPE Networking Comware Module 48-Port 10GbE SFP+ Type X 12900E • Min 0 // Max 48 SFP/SFP+ 1G/10G Transceivers	JL846A
3,6,11,14,16, 19	HPE Networking 12900E 36p 100GbE QSFP28 HB Module • Min 0 // Max 36 QSFP+/QSFP28 Transceivers	JH357A
8, 9, 15, 19, 25	HPE Networking Comware Module 36-Port 100GbE QSFP28 Type X 12900E	JL848A

Configuration Information

	• Min 0 // Max 36 QSFP+/QSFP28 Transceivers	
3,10,11,16	HPE Networking Comware Module 48-port 40GbE QSFP+ HB 12900E	JH359A
	• Min 0 // Max 48 QSFP+ Transceivers	
1, 2, 10, 11, 13, 14, 15, 16, 19	HPE Networking 12900E 48p 10G 2p 100G HB Module	JH360A
	• Min 0 // Max 2 QSFP+/QSFP28 Transceivers • Min 0 // Max 48 SFP/SFP+ Transceivers	
3, 10, 11, 14, 16, 19	HPE Networking 12900E 18p 100G/18p 40G HB Module	JH422A
	• Min 0 // Max 18 QSFP28 100G Transceivers • Min 0 // Max 18 QSFP+ 40G Transceivers	
3, 10, 11, 14, 16	HPE Networking 12900E 18p 100G/18p 40G HF Module	JH425A
	• Min 0 // Max 18 QSFP28 100G Transceivers • Min 0 // Max 18 QSFP+ 40G Transceivers	
1, 10, 11, 13, 15, 16, 17, 22	HPE Networking 12900E 24p 10G/2p 40G HB 59xx Module	JH953A
	• Min 0 // Max 1 59XX Module • Min 0 // Max 24 SFP+ 10G Transceivers • Min 0 // Max 2 QSFP+ 40G Transceivers	
10, 11,16,22	HPE Networking 12900E 48p 10GbE SFP+ HF Module	JQ061A
	• Min 0 // Max 48 SFP+ 10G Transceivers	
8, 9, 15, 24	HPE Networking Comware Module 36-Port 40GbE QSFP+ Type X 12900E	JL847A
	• Min 0 // Max 36 QSFP+ Transceivers	
1, 10, 11, 13, 14, 16, 18, 22	HPE Networking 12900E 24p 10G/4p 100G HD 59xx Module	JH954A
	• Min 0 // Max 1 59XX Module • Min 0 // Max 24 SFP/SFP+ Transceivers • Min 0 // Max 4 QSFP28 Transceivers	
3, 9, 14, 15, 19, 26, 28, 29	HPE Networking Comware Module 48-Port 100GbE QSFP28 Type H2 12900E	R9F20A
	• Min 0 // Max 48 QSFP28 100G Transceivers • Min 0 // Max 44 QSFP+ 40G Transceivers, Not supported in ports 17, 20, 27 and 30	
9, 26, 27	HPE Networking Comware Module 24-Port 400GbE QSFP-DD Type H2 12900E	R9F19A
	• Min 0 // Max 24 QSFP-DD 400G Transceivers	

Configuration Rules

Rule #	Description	SKU
1	The following Transceivers install into this Module:	
	HPE Networking X120 1G SFP LC LH100 Transceiver	JD103A
	HPE Networking X120 1G SFP RJ45 T Transceiver	JD089B
	HPE Networking X120 1G SFP LC SX Transceiver	JD118B
	HPE Networking X120 1G SFP LC LX Transceiver	JD119B
	HPE Networking X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE Networking X120 1G SFP LC BX 10-D Transceiver	JD099B

Rule #	Description	SKU
2	The following Transceivers install into this Module:	
	HPE Networking X130 10G SFP+ LC BiDi 10km-Uplink Transceiver	JL737A
	HPE Networking X130 10G SFP+ LC BiDi 10km-Downlink Transceiver	JL738A

Configuration Information

	HPE Networking X130 10G SFP+ LC BiDi 40km-Uplink Transceiver	JL739A
	HPE Networking X130 10G SFP+ LC BiDi 40km-Downlink Transceiver	JL740A
	HPE Networking X130 10G SFP+ LC SR Transceiver	JD092B
	HPE Networking X130 10G SFP+ LC LR Transceiver	JD094B
	HPE Networking X240 10G SFP+ SFP+ 0.65m DAC Cable	JD095C
	HPE Networking X240 10G SFP+ SFP+ 1.2m DAC Cable	JD096C
	HPE Networking X240 10G SFP+ SFP+ 3m DAC Cable	JD097C
	HPE Networking X240 10G SFP+ SFP+ 5m DAC Cable	JG081C
	HPE Networking X240 10G SFP+ 7m DAC Cable	JC784C
	HPE Networking X130 10G SFP+ LC ER 40km Transceiver	JG234A
	HPE Networking X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE Networking X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE Networking X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE Networking X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
3	The following 40G Transceivers install into this Module:	
	HPE Networking X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
	HPE Networking X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
	HPE Networking X140 40G QSFP+ MPO SR4 Transceiver	JG325B
	HPE Networking X140 40G QSFP+ CSR4 300m Transceiver	JG709A
	HPE Networking X140 40G QSFP+ LC ER4 40km SM Transceiver	JL306A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A
	HPE Networking X140 40G QSFP+ LC LR4L 2km SM Transceiver	JL286A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 7m Active Optical Cable	JL287A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 10m Active Optical Cable	JL288A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 20m Active Optical Cable	JL289A
6	FC/FX Modules If (JG889B, , JH121A, JH117A,JH118A, JH119A, JH120A, or) are selected, Then cannot be used in conjunction with EA, EB or EC Modules JG855A, JG856A, JG624A, JG626A, JG625A, JG857A, or JG858A.)	
8	X Type Modules are only compatible with Type X Fabric Modules and vice versa:	
	HPE Networking 12904E Type X Fabric Module	JL841A
	HPE Networking 12908E Type X Fabric Module	JL842A
9	The following switches are supported by this module:	
	HPE Networking Comware Switch Chassis 12904E	JH262A
	HPE Networking Comware Switch Chassis 12908E	JH255A
10	HB Type Modules are only compatible with Type H Fabric Modules and vice versa:	
	HPE Networking 12904E 7.2Tbps Type H Fabric Module	JH364A
	HPE Networking 12908E 14.4Tbps Type H Fabric Module	JH362A
	HPE Networking 12916E 21.6Tbps Type H Fabric Module	JH361A
	HPE Networking 12916E 43 2Tps Type H Fabric Module	JH435A

Configuration Information

Rule #	Description	SKU
11	The following switches only support these modules: (FX, FE line cards modules)	
	HPE Networking Comware Switch Chassis 12904E	JH262A
	HPE Networking Comware Switch Chassis 12908E	JH255A
	HPE Networking Comware Switch Chassis 12916E	JH103A
14	The following QSFP28 Transceivers install into this switch:	
	HPE Networking X150 100G QSFP28 LC BiDi 100m MM Transceiver	JQ344A
	HPE Networking X150 100G QSFP28 eSR4 300m MM Transceiver	JH672A
	HPE Networking X150 100G QSFP28 MPO SR4 100m MM Transceiver	JL274A
	HPE Networking X150 100G QSFP28 LC LR4 10km SM Transceiver	JL275A
	HPE Networking X150 100G QSFP28 PSM4 500m SM Transceiver	JH420A
	HPE Networking X240 100G QSFP28 1m DAC Cable	JL271A
	HPE Networking X240 100G QSFP28 3m DAC Cable	JL272A
	HPE Networking X2A0 100G QSFP28 to QSFP28 7m Active Optical Cable	JL276A
	HPE Networking X2A0 100G QSFP28 to QSFP28 10m Active Optical Cable	JL277A
	HPE Networking X2A0 100G QSFP28 to QSFP28 20m Active Optical Cable	JL278A
	HPE Networking X2A0 100G QSFP28 5m Active Optical Cable	JL796A
	HPE Networking X240 100G QSFP28 5m DAC Cable	JL273A
	HPE Networking X150 100G QSFP28 CWDM4 2km SM Transceiver	JH673A
15	The following 40G Transceivers install into this Module:	
	HPE Networking X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
	HPE Networking X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
	HPE Networking X140 40G QSFP+ MPO SR4 Transceiver	JG325B
	HPE Networking X140 40G QSFP+ CSR4 300m Transceiver	JG709A
	HPE Networking X140 40G QSFP+ LC ER4 40km SM Transceiver	JL306A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
	HPE Networking X140 40G QSFP+ LC LR4L 2km SM Transceiver	JL286A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 7m Active Optical Cable	JL287A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 10m Active Optical Cable	JL288A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 20m Active Optical Cable	JL289A
16	The following switch only supports this module:	
	HPE Networking Comware Switch Chassis 12902E	JH345A
	HPE Networking Comware Switch Chassis 12901E	JH951A
17	This module can have the following 5930/5940 I/O Module installed into it:	
	HPE Networking 5930 24p SFP+ and 2p QSFP+ Module	JH180A
	HPE Networking 5930 24p SFP+/2p QSFP+ w/Msec Module	JH181A
	HPE Networking 5930 24p 10GBASE-T/2p MCsc QSFP+ Module	JH182A
	HPE Networking 5930 8-port QSFP+ Module	JH183A
	HPE Networking 5930 24-port Converged Port and 2-port QSFP+ Module	JH184A
18	This module can have the following 5950 I/O Module installed into it:	
	HPE Networking 5950 8-port QSFP28 Module	JH406A
	HPE Networking 5950 16-port QSFP+ Module	JH405A
	HPE Networking 5950 24p SFP28 and 2p QSFP28 Module	JH450A
	HPE Networking 5950 8-port QSFP28 MACsec Module	JH957A
19	The following QSFP28 Transceivers install into this switch:	
	HPE Networking X150 100G QSFP28 MPO SR4 100m MM Transceiver	JL274A

Configuration Information

	HPE Networking X150 100G QSFP28 eSR4 300m MM Transceiver	JH672A
	HPE Networking X150 100G QSFP28 LC LR4 10km SM Transceiver	JL275A
	HPE Networking X150 100G QSFP28 PSM4 500m SM Transceiver	JH420A
	HPE Networking X150 100G QSFP28 LC SWDM4 100m MM Transceiver	JH419A
	HPE Networking X150 100G QSFP28 CWDM4 2km SM Transceiver	JH673A
	HPE Networking X240 100G QSFP28 1m DAC Cable	JL271A
	HPE Networking X240 100G QSFP28 3m DAC Cable	JL272A
	HPE Networking X240 100G QSFP28 5m DAC Cable	JL273A
	HPE Networking X2A0 100G QSFP28 to QSFP28 7m Active Optical Cable	JL276A
	HPE Networking X2A0 100G QSFP28 to QSFP28 10m Active Optical Cable	JL277A
	HPE Networking X2A0 100G QSFP28 to QSFP28 20m Active Optical Cable	JL278A
21	The following Transceivers install into this Module:	
	HPE Networking X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE Networking X120 1G SFP LC BX 10-D Transceiver	JD099B
22	The following Transceivers install into this Module:	
	HPE Networking X130 10G SFP+ LC BiDi 10km-Uplink Transceiver	JL737A
	HPE Networking X130 10G SFP+ LC BiDi 10km-Downlink Transceiver	JL738A
	HPE Networking X130 10G SFP+ LC BiDi 40km-Uplink Transceiver	JL739A
	HPE Networking X130 10G SFP+ LC BiDi 40km-Downlink Transceiver	JL740A
	HPE Networking X130 10G SFP+ LC SR Transceiver	JD092B
	HPE Networking X130 10G SFP+ LC LR Transceiver	JD094B
	HPE Networking X240 10G SFP+ SFP+ 0.65m DAC Cable	JD095C
	HPE Networking X240 10G SFP+ SFP+ 1.2m DAC Cable	JD096C
	HPE Networking X240 10G SFP+ SFP+ 3m DAC Cable	JD097C
	HPE Networking X240 10G SFP+ SFP+ 5m DAC Cable	JG081C
	HPE Networking X240 10G SFP+ 7m DAC Cable	JC784C
	HPE Networking X130 10G SFP+ LC ER 40km Transceiver	JG234A
	HPE Networking X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE Networking X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE Networking X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE Networking X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
24	The QSFP+ Ports on this switch cannot be split into four 10G SFP+ Ports at this time	
25	The following Splitter Cables install into this Module and should only be used with ports 1 - 9, 11 - 16, 18 - 27, 29 - 34, and 36:	
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A
	HPE Networking X240 QSFP28 4xSFP28 1m Direct Attach Copper Cable	JL282A
	HPE Networking X240 QSFP28 4xSFP28 3m Direct Attach Copper Cable	JL283A
	HPE Networking X240 QSFP28 4xSFP28 5m Direct Attach Copper Cable	JL284A
26	Type H2 Modules are only compatible with Type H2 Fabric Modules and vice versa:	
	HPE Networking 12904E Type H2 Fabric Module	R9F14A
	HPE Networking 12908E Type H2 Fabric Module	R9F15A
27	The following Transceivers install into this Module:	
	HPE Networking X1E0 400G QSFP-DD FR4-WDM1300 2km LC Transceiver	R9J30A
	HPE Networking X1E0 400G QSFP-DD SR8 MM850 100m OM4 MPO16/APC Transceiver	R9J29A

Configuration Information

	HPE Networking X1E0 400G QSFP-DD to QSFP-DD 2m Passive Cable	R9J28A
28	ports 17, 20, 27, and 30 not supported 40G Transceivers	
29	The following Splitter Cables install into this Module and should only be used with ports 2, 4, 5, 7, 10, 11, 13, 16, 17, 19, 22, 24, 26, 27, 29, 32, 33, 35, 38, 39, 41, 44, 46, 48:	
	HPE Networking X240 QSFP28 4xSFP28 1m Direct Attach Copper Cable	JL282A
	HPE Networking X240 QSFP28 4xSFP28 3m Direct Attach Copper Cable	JL283A
	HPE Networking X240 QSFP28 4xSFP28 5m Direct Attach Copper Cable	JL284A

Notes:

- The 12900E Switch software image for FX/FC LPUs does not support EA, EB & EC LPUs and vice versa.
- For JH425A I/O Module, High Speed Fan Trays are the recommended accessory.

59XX Modules

Rule #	Description	SKU
	HPE Networking 12900E 24p 10G/2p 40G HB 59xx Module (std 0 // max 1) User Selection (min 0 // max 1)	JH953A
	HPE Networking 12900E 24p 10G/4p 100G HD 59xx Module	JH954A
1, 3, 4, 5, 14	HPE Networking 5930 24p SFP+ and 2p QSFP+ Module • Can install into JH953A • 24 10G SFP+ ports (min=0 \ max=24) • 2 40G QSFP+ ports (min=0 \ max=2)	JH180A
1, 3, 4, 5, 14	HPE Networking 5930 24p SFP+/2p QSFP+ w/Msec Module • Can install into JH953A • 24 10G SFP+ ports (min=0 \ max=24) • 2 40G QSFP+ ports (min=0 \ max=2)	JH181A
3, 5	HPE Networking 5930 24p 10GBASE-T/2p MCsc QSFP+ Module • Can install into JH953A • 24 1/10GBase-T ports • 2 40G QSFP+ ports (min=0 \ max=2)	JH182A
3, 5	HPE Networking 5930 8-port QSFP+ Module • Can install into JH953A • 8 40G QSFP+ ports (min=0 \ max=8)	JH183A
1, 3, 5, 14	HPE Networking 5930 24-port Converged Port and 2-port QSFP+ Module • Can install into JH953A • 24 Converged SFP+/FC ports (min=0 \ max=24) • 2 40G QSFP+ ports (min=0 \ max=2)	JH184A
3	HPE Networking 5950 16-port QSFP+ Module • Can install into JH954A • 16 40G QSFP+ ports (min=0 \ max=16)	JH405A
2, 5, 8, 13	HPE Networking 5950 8-port QSFP28 Module • Can install into JH954A • 8 40G/100G QSFP+/QSFP28 ports (min=0 \ max=8)	JH406A
1, 2, 5, 8, 9, 13	HPE Networking 5950 24p SFP28 and 2p QSFP28 Module • Can install into JH954A • 24 10G/25G SFP+/SFP28 ports (min=0 \ max=24) • 2 40G/100G QSFP+/QSFP28 ports (min=0 \ max=2)	JH450A
2, 5, 8	HPE Networking 5950 8-port QSFP28 MACsec Module • Can install into JH954A • 8 40G/100G QSFP+/QSFP28 ports (min=0 \ max=8)	JH957A

Configuration Information

Configuration Rules		
Rule #	**Description**	**SKU**
1	The following SFP+ Transceivers install into this Module's SFP+ Ports: (Use #0D1 or #B01 if switch is CTO) - if applicable	
	HPE Networking X130 10G SFP+ LC BiDi 10km-Uplink Transceiver	JL737A
	HPE Networking X130 10G SFP+ LC BiDi 10km-Downlink Transceiver	JL738A
	HPE Networking X130 10G SFP+ LC BiDi 40km-Uplink Transceiver	JL739A
	HPE Networking X130 10G SFP+ LC BiDi 40km-Downlink Transceiver	JL740A
	HPE Networking X130 10G SFP+ LC SR Transceiver	JD092B
	HPE Networking X130 10G SFP+ LC LR Transceiver	JD094B
	HPE Networking X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE Networking X130 10G SFP+ LC ER 40km Transceiver	JG234A
	HPE Networking X240 10G SFP+ SFP+ 0.65m DAC Cable	JD095C
	HPE Networking X240 10G SFP+ SFP+ 1.2m DAC Cable	JD096C
	HPE Networking X240 10G SFP+ SFP+ 3m DAC Cable	JD097C
	HPE Networking X240 10G SFP+ SFP+ 5m DAC Cable	JG081C
	HPE Networking X240 10G SFP+ 7m DAC Cable	JC784C
	HPE Networking X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE Networking X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE Networking X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A

Configuration Rules		
Rule #	**Description**	**SKU**
2	The following 40G Transceivers install into this Module's QSFP+ Ports: (Use #0D1 or #B01 if switch is CTO) - if applicable	
	HPE Networking X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
	HPE Networking X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
	HPE Networking X140 40G QSFP+ MPO SR4 Transceiver	JG325B
	HPE Networking X140 40G QSFP+ LC ER4 40km SM Transceiver	JL306A
	HPE Networking X140 40G QSFP+ CSR4 300m Transceiver	JG709A
	HPE Networking X140 40G QSFP+ LC LR4L 2km SM Transceiver	JL286A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A
3	The following 40G Transceivers install into this Module's QSFP+ Ports: (Use #0D1 or #B01 if switch is CTO) - if applicable	
	HPE Networking X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
	HPE Networking X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
	HPE Networking X140 40G QSFP+ LC ER4 40km SM Transceiver	JL306A
	HPE Networking X140 40G QSFP+ MPO SR4 Transceiver	JG325B
	HPE Networking X140 40G QSFP+ CSR4 300m Transceiver	JG709A
	HPE Networking X140 40G QSFP+ LC LR4L 2km SM Transceiver	JL286A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A

Configuration Information

	HPE Networking Comware X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
4	The following 10G Transceivers install into this Module's SFP+ Ports: (Use #0D1 or #B01 if switch is CTO) - if applicable	
	HPE Networking X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE Networking X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE Networking X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
5	The following 40G Transceivers install into this Module's QSFP+ Ports: (Use #0D1 or #B01 if switch is CTO) - if applicable	
	HPE Networking X2A0 40G QSFP+ to QSFP+ 7m Active Optical Cable	JL287A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 10m Active Optical Cable	JL288A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 20m Active Optical Cable	JL289A
	Configuration Rules	
Rule #	**Description**	**SKU**
8	The following QSFP28 Transceivers install into this Module's QSFP28 Ports: (Use #0D1 or #B01 if switch is CTO) - if applicable	
	HPE Networking X150 100G QSFP28 LC BiDi 100m MM Transceiver	JQ344A
	HPE Networking X150 100G QSFP28 eSR4 300m MM Transceiver	JH672A
	HPE Networking X150 100G QSFP28 MPO SR4 100m MM Transceiver	JL274A
	HPE Networking X150 100G QSFP28 LC LR4 10km SM Transceiver	JL275A
	HPE Networking X2A0 100G QSFP28 to QSFP28 7m Active Optical Cable	JL276A
	HPE Networking X2A0 100G QSFP28 to QSFP28 10m Active Optical Cable	JL277A
	HPE Networking X2A0 100G QSFP28 to QSFP28 20m Active Optical Cable	JL278A
	HPE Networking X2A0 100G QSFP28 5m Active Optical Cable	JL796A
	HPE Networking X150 100G QSFP28 PSM4 500m SM Transceiver	JH420A
	HPE Networking X150 100G QSFP28 CWDM4 2km SM Transceiver	JH673A
	HPE Networking X240 100G QSFP28 1m DAC Cable	JL271A
	HPE Networking X240 100G QSFP28 3m DAC Cable	JL272A
	HPE Networking X240 100G QSFP28 5m DAC Cable	JL273A
9	The following SFP28 Transceivers install into this Module's SFP28 Ports: (Use #0D1 or #B01 if switch is CTO) - if applicable	
	HPE Networking X190 25G SFP28 LC SR 100m MM Transceiver	JL293A
	HPE Networking X240 25G SFP28 to SFP28 1m DAC Cable	JL294A
	HPE Networking X240 25G SFP28 to SFP28 3m DAC Cable	JL295A
	HPE Networking X240 25G SFP28 to SFP28 5m DAC Cable	JL296A
	HPE Networking X2A0 25G SFP28 to SFP28 3m Active Optical Cable	JH955A
	HPE Networking X2A0 25G SFP28 to SFP28 5m Active Optical Cable	JH956A
	HPE Networking X2A0 25G SFP28 to SFP28 7m Active Optical Cable	JL297A
	HPE Networking X2A0 25G SFP28 to SFP28 10m Active Optical Cable	JL298A
	HPE Networking X2A0 25G SFP28 to SFP28 20m Active Optical Cable	JL299A
13	The following QSFP28 Transceivers install into this switch:	
	HPE Networking X150 100G QSFP28 LC SWDM4 100m MM Transceiver	JH419A
Notes:	– These Modules can be installed into the JH953A or JH954A I/O Modules only. – 1G RJ-45 is supported when using JH182A – 1G RJ-45 is supported when using JH180A JH181A JH184A – 1G SFP is not supported when using JH450A HPE 5950 24p SFP28 and 2p QSFP28 Module	

Configuration Information

Transceivers

SFP Transceivers

Rule #	Description	SKU
	HPE Networking X120 1G SFP RJ45 T Transceiver	JD089B
	HPE Networking X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE Networking X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE Networking X120 1G SFP LC LH100 Transceiver	JD103A
	HPE Networking X120 1G SFP LC SX Transceiver	JD118B
	HPE Networking X120 1G SFP LC LX Transceiver	JD119B
Notes:	1G RJ45 transceiver JD089B will be supported on 12900 48p 1/10G FX/FE modules (JH117A,) with the following limitations: • No Support for 100Mbps • Up/down time resulting from any link flap can be as high as 2 secs	

SFP+ Transceivers

	HPE Networking X130 10G SFP+ LC BiDi 10km-Uplink Transceiver	JL737A
	HPE Networking X130 10G SFP+ LC BiDi 10km-Downlink Transceiver	JL738A
	HPE Networking X130 10G SFP+ LC BiDi 40km-Uplink Transceiver	JL739A
	HPE Networking X130 10G SFP+ LC BiDi 40km-Downlink Transceiver	JL740A
	HPE Networking X130 10G SFP+ LC SR Transceiver	JD092B
	HPE Networking X130 10G SFP+ LC LR Transceiver	JD094B
	HPE Networking X130 10G SFP+ LC ER 40km Transceiver	JG234A
	HPE Networking X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE Networking X240 10G SFP+ SFP+ 0.65m DAC Cable	JD095C
	HPE Networking X240 10G SFP+ SFP+ 1.2m DAC Cable	JD096C
	HPE Networking X240 10G SFP+ SFP+ 3m DAC Cable	JD097C
	HPE Networking X240 10G SFP+ SFP+ 5m DAC Cable	JG081C
	HPE Networking X240 10G SFP+ 7m DAC Cable	JC784C
	HPE Networking X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE Networking X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE Networking X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A

SFP28 Transceivers

	HPE Networking X190 25G SFP28 LC SR 100m MM Transceiver	JL293A
	HPE Networking X240 25G SFP28 to SFP28 1m DAC Cable	JL294A
	HPE Networking X240 25G SFP28 to SFP28 3m DAC Cable	JL295A
	HPE Networking X240 25G SFP28 to SFP28 5m DAC Cable	JL296A
	HPE Networking X2A0 25G SFP28 to SFP28 3m Active Optical Cable	JH955A
	HPE Networking X2A0 25G SFP28 to SFP28 5m Active Optical Cable	JH956A
	HPE Networking X2A0 25G SFP28 to SFP28 7m Active Optical Cable	JL297A
	HPE Networking X2A0 25G SFP28 to SFP28 10m Active Optical Cable	JL298A
	HPE Networking X2A0 25G SFP28 to SFP28 20m Active Optical Cable	JL299A

QSFP+ Transceivers

	HPE Networking X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
	HPE Networking X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
	HPE Networking X140 40G QSFP+ MPO SR4 Transceiver	JG325B
	HPE Networking X140 40G QSFP+ CSR4 300m Transceiver	JG709A
	HPE Networking X140 40G QSFP+ LC LR4L 2km SM Transceiver	JL286A
	HPE Networking X140 40G QSFP+ LC ER4 40km SM Transceiver	JL306A

Configuration Information

	HPE Networking Comware X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A
	HPE Networking Comware X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 7m Active Optical Cable	JL287A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 10m Active Optical Cable	JL288A
	HPE Networking X2A0 40G QSFP+ to QSFP+ 20m Active Optical Cable	JL289A
	QSFP28 Transceivers	
	HPE Networking X150 100G QSFP28 LC BiDi 100m MM Transceiver	JQ344A
	HPE Networking X150 100G QSFP28 eSR4 300m MM Transceiver	JH672A
	HPE Networking X150 100G QSFP28 MPO SR4 100m MM Transceiver	JL274A
	HPE Networking X150 100G QSFP28 LC LR4 10km SM Transceiver	JL275A
	HPE Networking X150 100G QSFP28 PSM4 500m SM Transceiver	JH420A
	HPE Networking X150 100G QSFP28 CWDM4 2km SM Transceiver	JH673A
	HPE Networking X150 100G QSFP28 LC SWDM4 100m MM Transceiver	JH419A
	HPE Networking X240 100G QSFP28 1m DAC Cable	JL271A
	HPE Networking X240 100G QSFP28 3m DAC Cable	JL272A
	HPE Networking X240 100G QSFP28 5m DAC Cable	JL273A
	HPE Networking X2A0 100G QSFP28 to QSFP28 7m Active Optical Cable	JL276A
	HPE Networking X2A0 100G QSFP28 to QSFP28 10m Active Optical Cable	JL277A
	HPE Networking X2A0 100G QSFP28 to QSFP28 20m Active Optical Cable	JL278A
	HPE Networking X2A0 100G QSFP28 5m Active Optical Cable	JL796A
*	HPE Networking X240 QSFP28 4xSFP28 1m Direct Attach Copper Cable	JL282A
*	HPE Networking X240 QSFP28 4xSFP28 3m Direct Attach Copper Cable	JL283A
*	HPE Networking X240 QSFP28 4xSFP28 5m Direct Attach Copper Cable	JL284A

Notes:

- *This module is only for use with ports 1 - 9, 11 - 16, 18 - 27, 29 - 34, and 36 of JL848A.
- *This module is only for use with ports 2, 4, 5, 7, 10, 11, 13, 16, 17, 19, 22, 24, 26, 27, 29, 32, 33, 35, 38, 39, 41, 44, 46, 48 of R9F20A.

	QSFP-DD Transceivers	
	HPE Networking X1E0 400G QSFP-DD FR4-WDM1300 2km LC Transceiver	R9J30A
	HPE Networking X1E0 400G QSFP-DD SR8 MM850 100m OM4 MPO16/APC Transceiver	R9J29A
	HPE Networking X1E0 400G QSFP-DD to QSFP-DD 2m Passive Cable	R9J28A

Configuration Information

Cables

MPO Cables

Rule #	Description	SKU
	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

Internal Power Supplies

12901E (std 0 // max 2) User Selection (min 1 // max 2) per switch enclosure
12902E (std 0 // max 4) User Selection (min 2 // max 4) per switch enclosure
12910 (std 0 // max 8) User Selection (min 2 // max 8) per switch enclosure
12916 (std 0 // max 12) User Selection (min 2 // max 12) per switch enclosure
12904E (std 0 // max 4) User Selection (min 2 // max 4) per switch enclosure
12908E (std 0 // max 8) User Selection (min 2 // max 8) per switch enclosure
12916E (std 0 // max 16) User Selection (min 2 // max 16) per switch enclosure

Rule #	Description	SKU
4, 5	HPE Networking 12900E 2400W DC Power Supply Unit	JH269A
6, 7	HPE Networking 12902E 1800W DC Power Supply Unit	JH671A
2, 4, 8	HPE Networking 12900E 2400W AC Power Supply Unit	JH108A
	HPE FlexFabric 12900E 2400W AC Power Supply Unit PDU Cable NA/JP/TW	JH108A#B2B
	HPE FlexFabric 12900E 2400W AC Power Supply Unit PDU Cable ROW	JH108A#B2C
	HPE FlexFabric 12900E 2400W AC Power Supply Unit 220V N.A. - english localized	JH108A#B2E
	HPE FF 12900E 2400W AC PSU	JH108A#AC3
2, 4, 8	HPE Networking 12900E 3000W AC Power Supply Unit	JH348A
	HPE FlexFabric 12900E 3000W AC Power Supply Unit PDU NA, JP or TW	JH348A#B2B
	HPE FlexFabric 12900E 3000W AC Power Supply Unit PDU ROW	JH348A#B2C
	HPE FlexFabric 12900E 3000W AC Power Supply Unit United States 220 volt	JH348A#B2E
	HPE FlexFabric 12900E 3000W AC Power Supply Unit	JH348A#AC3
2, 6, 8	HPE Networking 7900 1800w AC Power Supply Unit	JG840A
	HPE FlexFabric 7900 1800w AC Power Supply Unit PDU Cable NA/JP/TW	JG840A#B2B
	HPE FlexFabric 7900 1800w AC Power Supply Unit PDU Cable ROW	JG840A#B2C
	HPE FlexFabric 7900 1800w AC Power Supply Unit 220V N.A. - english localized	JG840A#B2E
	HPE FF 7900 1800w AC PSU	JG840A#AC3

Configuration Rules

Rule #	Description	SKU
2	Localization (Wall Power Cord) required on orders without #B2B or #B2C (PDU Power Cord). (See Localization Menu)	
4	This Power is only supported on these switches:	
	HPE Networking Comware Switch Chassis 12904E	JH262A
	HPE Networking Comware Switch Chassis 12908E	JH255A
	HPE Networking Comware Switch Chassis 12916E	JH103A
	HPE Networking Comware Switch Chassis 12901E	JH951A
5	One of these cables is required when ordering this power supply:	
	HPE Networking Comware 12900E 48V 3m DC Power Supply Unit Cable	JQ232A
6	This Power Supply is supported on these switches:	
	HPE Networking Comware Switch Chassis 12902E	JH345A
7	One of these cables is required when ordering this power supply:	
	HPE Networking Comware 12902E 48V 15m DC Power Supply Unit Cable	JQ058A
8	When configuring H2 Modules, 220V AC power required	

Notes:

- Drop down under chassis should offer the following options and results:

Configuration Information

- 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 Switch/Router/Power Supply to Wall Power Cord - #B2E Option. (Offered only in North America, Mexico, Taiwan, and Japan)

Switch Enclosure Options

Mounting Kit

Rule #	Description	SKU
1	HPE Networking Comware 12900E Chassis Universal Rack Mount Kit	JQ059A
2	HPE Networking Comware 7910 Bottom Support Rails	JH042A

Configuration Rules

Rule #	Description	SKU
1	If one of the following 4, 8 or 16 Slot Chassis are selected, then Default Qty 1:	
	HPE Networking Comware Switch Chassis 12904E	JH262A
	HPE Networking Comware Switch Chassis 12908E	JH255A
	HPE Networking Comware Switch Chassis 12916E	JH103A
2	If one of the following 1 or 2 Slot Chassis are selected, then Default Qty 1:	
	HPE Networking Comware Switch Chassis 12901E	JH951A
	HPE Networking Comware Switch Chassis 12902E	JH345A

Fans

12904E, 12908E, 12916E (std 0 // max 2) User Selection (min 2 // max 2) per switch enclosure
12902E (std 0 // max 2) User Selection (min 2 // max 2) per switch enclosure
12901E (std 0 // max 3) User Selection (min 2 // max 3) per switch enclosure

Remarks	Description	SKU
	Spare only; Included in Chassis - Supported on, JH113A	
	HPE Networking 12902E High Speed Fan Tray	JH447A
	• Supported on JH345A	
	HPE Networking 12916E High Speed Fan Tray	JH423A
	• Supported on JH103A	
	HPE Networking 12908E High Speed Fan Tray	JH424A
	• Supported on JH255A	
	HPE Networking 12904E High Speed Fan Tray	JH448A
	• Supported on JH262A	
	HPE Networking 12901E Fan Tray	JH952A
	• Supported on JH951A	

Power Supply Cables

(std 0 // max 1) User Selection (min 1 // max 1) per DC Power Supply

Remarks	Description	SKU
	HPE Networking Comware 12900E 48V 3m DC Power Supply Unit Cable	JQ232A
	HPE Networking Comware 12902E 48V 15m DC Power Supply Unit Cable	JQ058A

Configuration Information

Software

Rule#	Orchestrator Description	SKU
1, 2	HPE Networking IMC Orchestrator Base License E-LTU	JL849AAE
1, 3	HPE Networking IMC Orchestrator Analyzer Add-on License E-LTU	JL850AAE
1, 4	HPE Networking IMC Orchestrator Network Node Add-on License E-LTU	JL851AAE
1, 3	HPE Networking IMC Orchestrator Analyzer IP Host Add-on License E-LTU	JL852AAE
	Configuration Rules	
Rule #	**Description**	
1	When configuring 12900 Switch Chassis (JH262A or JL255A), this Orchestrator Service is available when one of the following Type X MPUs is added:	
	HPE Networking 12904E Type X Main Processing Unit	JL844A
	HPE Networking 12900E Type X Main Processing Unit	JL845A
2	IMC Orchestrator Base E-LTU sku must be Qty 1 per solution	
3	If this analyzer E-LTU is selected, then Qty 1 must be added per solution. Additionally, if this Analyzer E-LTU is selected, then IP Host E-LTU must match qty of desired Hosts.	
4	This Network Node Add-on E-LTU must match the switch qty in the solution	

Technical Specifications

HPE FlexFabric 12916E Switch Chassis (JH103A)		
I/O ports and slots	16 I/O module slots	
	Supports a maximum 768 1/10GbE ports or 768 40GbE ports or 576 100GbE ports, or a combination 384 1/10GBase-T ports when using JH953A (HPE FlexFabric 12900E 24-port 10GbE/2-port 40GbE HB 59xx Module) with JH182A (HPE FlexFabric 5930 24p 10GBASE-T/2p MACsec QSFP+ Module)	
Additional ports and slots	2 MPU (for management modules) slots 6 switch fabric slots	
Power supplies	16 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	2 fan tray slots Fan trays are not included.	
Physical characteristics	**Dimensions**	17.32(w) x 33.74(d) x 36.65(h) in (43.99 x 85.7 x 93.1 cm) (21U height)
	Weight	189.82 lb (86.1 kg)
Memory and processor	**Management module**	Quad Core MIPS64 @ 1.2 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 92.1 Bpps (64-byte packets)
	Switching capacity	184 Tbps
Reliability	**Availability**	99.999%
Environment	**Operating temperature**	32°F to 104°F (0°C to 40°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Altitude	up to 13,123 ft (4 km)
	Acoustic	Low-speed fan: 67.8 dB, High-speed fan: 91.2 dB; ISO 7779
	Airflow direction	Front-to-back
Electrical characteristics	**Frequency**	50/60 Hz
	Voltage	100 - 240 VAC, rated -48 to -60 VDC, rated (depending on power supply chosen)
	Current	16 A
	Power output	2400 W
	Frequency	50/60 Hz
	Notes: Based on a common power supply of 2,400 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	

Technical Specifications

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**	EN 55024
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: **https://h10145.www1.hpe.com/support/SupportLookUp.aspx** 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.	

HPE FlexFabric 12908E Switch Chassis (JH255A)		
I/O ports and slots	8 I/O module slots	
	Supports 384 1/10/40/100GbE ports or 192 400GbE ports or a combination 192 1/10GBase-T ports when using JH953A (HPE FlexFabric 12900E 24-port 10GbE/2-port 40GbE HB 59xx Module) with JH182A (HPE FlexFabric 5930 24p 10GBASE-T/2p MACsec QSFP+ Module)	
Additional ports and slots	2 MPU (for management modules) slots 6 switch fabric slots	
Power supplies	8 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	2 fan tray slots Fan trays are not included.	
Physical characteristics	**Dimensions**	17.32(w) x 33.74(d) x 20.91(h) in (43.99 x 85.7 x 53.1 cm) (12U height)
	Weight	103.62 lb (47 kg)
Memory and processor	**Management module**	Quad Core MIPS64 @ 1.2 GHz, 1 GB flash, 8 GB DDR3 SDRAM Quad Core Intel X86 @ 2.2GHz, 8 GB flash, 16 GB DDR3 SDRAM (Type X and H2 modules)
Mounting and enclosure	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); Horizontal surface mounting only	
Performance	**Throughput**	152 Tbps
	Switching capacity	32 Bpps (with H2 modules)
Reliability	**Availability**	99.999%
Environment	**Operating temperature**	32°F to 104°F (0°C to 40°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Altitude	up to 13,123 ft (4 km)
	Acoustic	Low-speed fan: 62.1 dB, High-speed fan: 87.6 dB; ISO 7779
	Airflow direction	Front-to-back
Electrical characteristics	**Frequency**	50/60 Hz
	Voltage	100 - 240 VAC, rated -48 to -60 VDC, rated (depending on power supply chosen)
	Current	16 A
	Power output	2400 W
	Notes: Based on a common power supply of 2,400 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**	EN 55024
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** 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.	

HPE FlexFabric 12904E Switch Chassis (JH262A)		
I/O ports and slots	4 I/O module slots	
	Supports 192 1/10/40/100GbE ports or 96 400GbE ports or a combination	
Additional ports and slots	2 MPU (for management modules) slots 6 switch fabric slots	
Power supplies	4 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	2 fan tray slots Fan trays are not included.	
Physical characteristics	**Dimensions**	17.32(w) x 33.74(d) x 10.39(h) in (43.99 x 85.7 x 26.39 cm) (6U height)
	Weight	79.37 lb (36 kg)
Memory and processor	**Management module**	Quad Core MIPS64 @ 1.2 GHz, 1 GB flash, 8 GB DDR3 SDRAM Quad Core Intel X86 @ 2.2GHz, 8 GB flash, 16 GB DDR3 SDRAM (Type X and H2 modules)
Mounting and enclosure	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); Horizontal surface mounting only	
Performance	**Throughput**	76.8Tbps
	Switching capacity	16 Bpps (with H2 modules)
Reliability	**Availability**	99.999%
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**	EN 55024
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	
Environment	**Operating temperature**	32°F to 104°F (0°C to 40°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Altitude	up to 13,123 ft (4 km)
	Acoustic	Low-speed fan: 67.5 dB, High-speed fan: 85.3 dB; ISO 7779
	Airflow direction	Front-to-back
Electrical characteristics	**Frequency**	50/60 Hz

Technical Specifications

	Voltage	100 - 240 VAC, rated -48 to -60 VDC, rated (depending on power supply chosen)
	Current	16 A
	Power output	2400 W
	Notes: Based on a common power supply of 2,400 W (AC)	
Services	Refer to the Hewlett Packard Enterprise website at: **https://h10145.www1.hpe.com/support/SupportLookUp.aspx** 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.	

HPE FlexFabric 12902E Switch Chassis (JH345A)		
I/O ports and slots	2 I/O module slots	
	Supports a maximum of 48 1/10GBASE-T ports or 96 1/10GbE ports or 96 40GbE ports or 96 100GbE ports or a combination	
Additional ports and slots	2 MPU (for management modules) slots	
Power supplies	4 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	2 fan tray slots Fan trays are not included	
Physical characteristics	**Dimensions**	17.32(w) x 35.24(d) x 5.24(h) in. (44.0 x 89.5 x 13.3 cm) (3U height)
	Weight	52.91 lb (24 kg)
Memory and processor	**Management module**	Quad Core MIPS64 @ 1 GHz, 1 GB flash, 8 GB DDR3 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 11.52 Bpps (64-byte packets)
	Switching capacity	19.2 Tbps
Reliability	**Availability**	99.999%
Environment	**Operating temperature**	32°F to 104°F (0°C to 40°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Altitude	Up to 13,123 ft (4 km)
	Acoustic	Low-speed fan: 73.1 dB, high-speed fan: 87.2 dB; ISO 7779
	Airflow direction	Front-to-back
Electrical characteristics	**Frequency**	50/60 Hz
	Voltage	100–240 VAC, rated -48 to -60 VDC, rated (depending on power supply chosen)
	Current	13 A
	Power output	1800 W
	Notes: Based on a common power supply of 1,800 W (AC/DC)	
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	

Technical Specifications

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**	EN 55024
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: **https://h10145.www1.hpe.com/support/SupportLookUp.aspx** 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.	

HPE FlexFabric 12901E Switch Chassis (JH951A)		
I/O ports and slots	1 I/O module slots	
	Supports a maximum of 48 100GbE, 40GbE or 10GbE ports or a combination	
Additional ports and slots	MPU (for management) modules integrated	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	3 fan tray slots Fan trays are not included	
Physical characteristics	**Dimensions**	17.32(w) x 33.7(d) x 3.4(h) in. (44.0 x 85.6 x 8.8 cm) (2U height)
	Weight	77.16. lb (35 kg)
Memory and processor	**Management module**	Quad Core MIPS64 @ 1.2GHz, 1 GB flash, 16 GB DDR3 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 5.76 Bpps (64-byte packets)
	Switching capacity	9.6 Tbps
Reliability	**Availability**	99.999%
Environment	**Operating temperature**	32°F to 104°F (0°C to 40°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Altitude	Up to 13,123 ft (4 km)
	Acoustic	Low-speed fan: 64.8 dB, high-speed fan: 82.4 dB; ISO 7779
	Airflow direction	Front-to-back
Electrical characteristics	**Frequency**	50/60 Hz
	Voltage	100–240 VAC, rated -48 to -60 VDC, rated (depending on power supply chosen)
	Current	16 A
	Power output	2400 W
	Notes: Based on a common power supply of 2,400 W (AC/DC)	
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

Immunity	**Generic**	EN 55024
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: **https://h10145.www1.hpe.com/support/SupportLookUp.aspx** 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 (Apply to all products in series)

BGP

- RFC 1771 BGPv4
- RFC 1772 Application of the BGP
- RFC 1997 BGP Communities Attribute
- RFC 1998 An Application of the BGP Community Attribute in Multi-home Routing
- 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

General protocols

- IEEE 802.1ad Q-in-Q
- IEEE 802.1ag Service Layer OAM
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- 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)

Technical Specifications

- 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 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 RIPV2
- RFC 2644 Directed Broadcast Control
- RFC 2763 Dynamic Name-to-System ID mapping support
- RFC 2784 Generic Routing Encapsulation (GRE)
- RFC 2865 Remote Authentication Dial In User Service (RADIUS)
- RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS
- RFC 2973 IS-IS Mesh Groups
- 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 ISIS 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

Technical Specifications

- RFC 4486 Subcodes for BGP Cease Notification Message
- RFC 4884 Extended ICMP to Support Multi-Part Messages
- RFC 4941 Privacy Extensions for Stateless Address Auto-configuration in IPV6
- RFC 5130 A Policy Control Mechanism in IS-IS 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
- RFC 4604 Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast
- RFC 4605 IGMP/MLD Proxying
- RFC 4607 Source-Specific Multicast for IP
- RFC 5059 Bootstrap Router (BSR) Mechanism for Protocol Independent Multicast (PIM)

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
- 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
- TACACS/TACACS+
- Web UI

IPV6

- RFC 1886 DNS Extension for IPV6
- RFC 1887 IPV6 Unicast Address Allocation Architecture
- RFC 1981 IPV6 Path MTU Discovery
- RFC 2080 RIPng for IPV6
- RFC 2081 RIPng Protocol Applicability Statement
- RFC 2292 Advanced Sockets API for IPV6
- RFC 2373 IPV6 Addressing Architecture
- RFC 2375 IPV6 Multicast Address Assignments
- RFC 2460 IPV6 Specification

Technical Specifications

- 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 2526 Reserved IPV6 Subnet Anycast Addresses
- RFC 2529 Transmission of IPV6 Packets over IPV4
- RFC 2545 Use of MP-BGP-4 for IPV6
- RFC 2553 Basic Socket Interface Extensions for IPV6
- RFC 2710 Multicast Listener Discovery (MLD) for IPV6
- RFC 2740 OSPFv3 for IPV6
- RFC 2767 Dual stacks IPV46 & IPV6
- RFC 2893 Transition Mechanisms for IPV6 Hosts and Routers
- RFC 3056 Connection of IPV6 Domains via IPV4 Clouds
- RFC 3307 IPV6 Multicast Address Allocation
- RFC 3315 DHCPv6 (client and relay)
- RFC 3484 Default Address Selection for IPV6
- RFC 3513 IPV6 Addressing Architecture
- RFC 3736 Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPV6
- RFC 3810 MLDv2 for IPV6
- RFC 4214 Intra-Site Automatic Tunnel Addressing Protocol (ISATAP)
- RFC 4861 IPV6 Neighbor Discovery
- RFC 4862 IPV6 Stateless Address Auto-configuration

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 1724 RIPV2 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 2233 Interface MIB
- RFC 2452 IPV6-TCP-MIB
- RFC 2454 IPV6-UDP-MIB
- RFC 2465 IPV6 MIB
- RFC 2466 ICMPv6 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

Technical Specifications

- 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 2925 Ping MIB
- RFC 2932IP (Multicast Routing MIB)
- RFC 2933 IGMP MIB
- RFC 2934 Protocol Independent Multicast MIB for IPV4
- RFC 3414 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 3595 Textual Conventions for IPV6 Flow Label
- 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)

MPLS

- RFC 2205 Resource ReSerVation Protocol
- RFC 2209 Resource ReSerVation Protocol (RSVP)
- RFC 2702 Requirements for Traffic Engineering Over MPLS
- RFC 2858 Multiprotocol Extensions for BGP-4
- RFC 2961 RSVP Refresh Overhead Reduction Extensions
- RFC 3031 Multiprotocol Label Switching Architecture
- RFC 3032 MPLS Label Stack Encoding
- RFC 3107 Carrying Label Information in BGP-4
- RFC 3212 Constraint-Based LSP Setup using LDP
- RFC 3479 Fault Tolerance for the Label Distribution Protocol (LDP)
- RFC 3487 Graceful Restart Mechanism for LDP
- RFC 3564 Requirements for Support of Differentiated Service-aware MPLS Traffic Engineering
- RFC 4364 BGP/MPLS IP Virtual Private Networks (VPNs)
- RFC 4379 Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures
- RFC 4447 Pseudowire Setup and Maintenance Using LDP
- RFC 4448 Encapsulation Methods for Transport of Ethernet over MPLS Networks
- RFC 4664 Framework for Layer 2 Virtual Private Networks
- RFC 4665 Service Requirements for Layer 2 Provider Provisioned Virtual Private Networks
- RFC 4761 Virtual Private LAN Service (VPLS) Using BGP for Auto-Discovery and Signaling
- RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling
- RFC 5036 LDP Specification

Technical Specifications

Network management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 1155 Structure of Management Information
- RFC 1157 SNMPv1
- RFC 1448 Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)
- 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)

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)

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 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

Technical Specifications

Security

- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 1334 PPP Authentication Protocols (PAP)
- RFC 1492 TACACS+
- 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)
- Port Security
- SSHv1/SSHv2 Secure Shell

VPN

- RFC 2403 - HMAC-MD5-96
- RFC 2404 - HMAC-SHA1-96
- RFC 2405 - DES-CBC Cipher algorithm
- RFC 2407 - Domain of interpretation
- RFC 2547 BGP/MPLS VPNs
- RFC 2917 A Core MPLS IP VPN Architecture
- RFC 4302 - IP Authentication Header (AH)
- RFC 4303 - IP Encapsulating Security Payload (ESP)

Summary of Changes

Date	Version History	Action	Description of Change
18-Mar-2024	Version 42	Changed	Configuration Information section was updated.
04-Dec-2023	Version 41	Changed	Series name was updated.
06-Sep-2022	Version 40	Changed	Overview, Standard Features, Configuration Information, and Technical Specifications sections were updated.
06-Jul-2021	Version 39	Changed	Overview, Standard Features, Configuration Information, Related Options, and Technical Specifications sections were updated. SKUs added in Configuration Information section.
04-May-2020	Version 38	Changed	Configuration Information and Additional Options sections were updated Obsolete SKUs were removed
03-Sep-2019	Version 37	Changed	Overview, Standard Features, Configuration Information and Related Option sections were updated. Obsolete SKUs were removed New SKUs were added in Related Options.
04-Apr-2019	Version 36	Changed	Standard Features section was updated Obsolete SKUs were removed
03-Dec-2018	Version 35	Changed	Configuration section: Rules on the 59XX Modules were updated
01-Oct-2018	Version 34	Changed	Recommended and Extended markings removed from the document.
04-Sep-2018	Version 33	Changed	Configuration section: Rules on the 59XX Modules were updated
06-Aug-2018	Version 32	Changed	Configuration section updated
07-May-2018	Version 31	Changed	SKUs added: JH419A; JH435A; JH671A; JH954A; JQ058A
04-Dec-2017	Version 30	Changed	Models added: JH951A SKUs added: JH952A, JH953A, JQ059A, JQ061A, JQ232A Document name updated to HPE Networking Comware Switch Series 12900E
03-Jul-2017	Version 29	Changed	Configuration section updated
05-Jun-2017	Version 28	Changed	Model added: JH345A SKUs added: JH346A, JH348A, JH447A, JH423A, JH424A, JH448A, JH668A, JH669A, JH673A
03-Apr-2017	Version 27	Changed	SKUs added: JH422A; JH425A
06-Mar-2017	Version 26	Changed	SKUs added: JL437A; JL438A; JL439A
06-Feb-2017	Version 25	Changed	SKU added: JH420A
07-Nov-2016	Version 24	Changed	SKU added: JL306A
03-Oct-2016	Version 23	Changed	SKU added: JH361A SKUs added on Sept NPI are now supported for the 12916E model: JH103A
05-Sep-2016	Version 22	Changed	SKUs added: JH362A, JH364A, JH357A, JH359A, JH360A, JL271A, JL272A, JL274A, JL275A, JL276A, JL277A, JL278A, JL273A, JL282A, JL283A, JL284A Minor changes made on Features and benefits
01-Aug-2016	Version 21	Changed	SKUs added: JL287A, JL288A, JL289A, JL290A, JL291A, JL292A, JL250A, JL286A Adding #AC3 Option on Configuration section. Technical Specifications updated.
06-Jun-2016	Version 20	Changed	SKUs added: JH269A Technical Specifications and Configuration sections updated
22-Apr-2016	Version 19	Changed	SKUs descriptions updated on the document
16-Feb-2016	Version 18	Changed	SKU added: JL251A Features and benefits, Technical Specifications and Standards and protocols
17-Dec-2015	Version 17	Changed	Technical Specifications updated
01-Dec-2015	Version 16	Changed	SKUs added: JH241A, JH242A, JG882A, JG883A QuickSpecs name changed from HPE Networking Comware Switch Series 12900E to HPE Networking Comware Switch Series 12900E

Summary of Changes

Date	Version History	Action	Description of Change
12-Oct-2015	Version 15	Changed	Features and Benefits updated
02-Oct-2015	Version 14	Changed	Configuration section updated
28-Sep-2015	Version 13	Changed	Models added: JH103A, JH255A, JH262A Changes made on Overview, Technical Specifications and Accessories
01-Jun-2015	Version 12	Changed	SKUs Added: JG881A, JH006A SKUs removed: JG915A Overview and Technical Specifications Updated
30-Mar-2015	Version 11	Changed	Added 5 new accessories: JG888B, JG889B, JH005A, JH007A, JG915A Updated Overview, Technical Specification and Accessories section
26-May-2014	Version 10	Changed	Added 2 new accessories: JG888A and JG889A.
31-Mar-2014	Version 9	Changed	Transceivers were revised.
20-Feb-2014	Version 8	Changed	Removed several new accessories
18-Feb-2014	Version 7	Changed	Made significant changes to the Configuration section.
17-Dec-2013	Version 6	Changed	Made a minor change to the Configuration section.
14-Nov-2013	Version 5	Changed	Removed DC voltage
13-Nov-2013	Version 4	Changed	Made significant changes to the Configuration section.
14-Oct-2013	Version 3	Changed	Made minor changes to the Configuration section.
12-Jul-2013	Version 2	Changed	Made minor changes to the Configuration section.
01-Sep-2013	Version 1	New	New QuickSpecs

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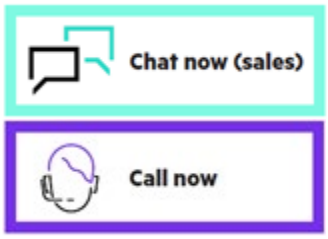

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