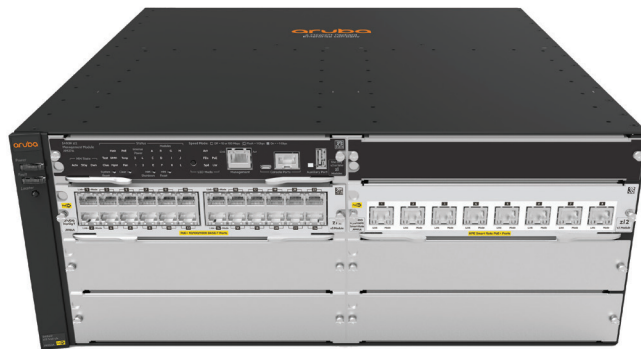




Aruba 5400R z12 Switch Series



Key features

- High performance advanced Layer 3 modular switch with VSF stacking, low latency and resiliency.
- HPE Smart Rate for high-speed multi-gigabit bandwidth and PoE+ power.
- Scalable line rate 40GbE for wireless traffic aggregation.
- Optimized for innovative SDN applications with OpenFlow support.
- Security and network management tools with ClearPass Policy Manager and AirWave support.

Product overview

The Aruba 5400R z12 Switch Series is an industry-leading mobile campus access solution with HPE Smart Rate multi-gigabit ports for high-speed 802.11ac devices. It delivers enterprise-class resiliency with innovative flexibility and scalability for customers creating digital workplaces that are optimized for mobile users with an integrated wired and wireless approach. This series brings scalable aggregation with Virtual Switching Framework (VSF) stacking technology, hitless failover, and Fast Software Upgrade for 5400R VSF stacks. The advanced Layer 2 and 3 feature set includes OSPF, IPv6, IPv4 BGP, Tunneled Node, robust QoS and policy-based routing with no software licensing required.

Based on a powerful ProVision ASIC, the Aruba 5400R z12 Switch Series has a high-speed, high-capacity architecture with 2 Tbps crossbar switching fabric with low 2.1 μ latency, unprecedented programmability, and supports innovative SDN applications. This series offers flexible connectivity options with 6- or 12-slot compact chassis, line rate 40GbE, up to 96 line rate 10GbE ports and up to 288 ports of PoE+. The 5400R is SDN optimized with OpenFlow support and is easy to deploy and manage with advanced security and network management tools like Aruba ClearPass Policy Manager and Aruba AirWave.

Features and benefits

Software-defined networking

- OpenFlow

Supports OpenFlow 1.0 and 1.3 specifications to enable SDN by allowing separation of the data (packet forwarding) and control (routing decision) paths

- Fully flexible OpenFlow

Creates custom OpenFlow pipelines (processing stages) on-demand to support new SDN applications (requires v3 modules)

Unified Wired and Wireless

- ClearPass Policy Manager

Supports unified wired and wireless policies using Aruba ClearPass Policy Manager

- HTTP redirect function

Supports HPE Intelligent Management Center (IMC) bring your own device (BYOD) solution

- Switch auto-configuration

Automatically configures switch for different settings such as VLAN, CoS, PoE max power, and PoE priority when Aruba AP is detected

- User Role

A set of switch-based policies in areas such as security, authentication, and QoS. A User Role can be assigned to a group of users or devices, using switch configuration or ClearPass

- Per-port Tunneled Node

Provide secured tunnel to transport network traffic on a per-port basis to Aruba Controller. Authentication and network policies will be applied and enforced at the Controller

- **New** Static IP Visibility

Allows ClearPass to do accounting for clients with static IP address

Quality of Service (QoS)

- Advanced classifier-based QoS

Classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per VLAN basis

- Traffic prioritization

Allows real-time traffic classification into eight priority levels mapped to eight queues

- 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
- Class of Service (CoS)
 - Sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ

Management

- Zero-Touch Provisioning (ZTP)
 - Simplifies installation of the switch infrastructure using Aruba Activate-based or DHCP-based process with AirWave Network Management
- **New** IP SLA for Voice
 - Monitor quality of voice traffic with UDP Jitter and UDP Jitter for VoIP (requires v3 modules)
- Remote intelligent mirroring
 - Mirrors selected ingress/egress traffic based on ACL, port, MAC address, or VLAN to a local or remote HPE 8200 zl, 6600, 6200 yl, 5400 zl, 5400R, 3500, or 3800 Switch located anywhere on the network
- RMON, XRMON, and sFlow® v5
 - Provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- 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
- Uni-Directional Link Detection (UDLD)
 - Support Hewlett Packard Enterprise (HPE) UDLD and DLDP protocols to monitor a cable between two switches and shut down the ports on both ends if the cable is broken
- Management simplicity
 - Provides common software features and CLI implementation across all HPE ProVision-based switches (including the zl and yl switches)
- Command authorization
 - Leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity

- Friendly port names
 - Allows assignment of descriptive names to ports
- Dual flash images
 - Provides independent primary and secondary operating system files for backup while upgrading
- Multiple configuration files
 - Stores easily to the flash image
- Comware CLI
 - Comware-compatible CLI
 - bridges the experience of HPE Comware CLI users who are using the HPE ProVision software CLI
 - Display and fundamental Comware CLI commands
 - are embedded in the switch CLI as native commands; display output is formatted as on Comware-based switches, and fundamental commands provide a Comware-familiar initial switch setup
 - Configuration Comware CLI commands
 - when Comware commands are entered, CLI help is elicited to formulate the correct ProVision software CLI command

Connectivity

- IEEE 802.3az Energy Efficient Ethernet
 - Lowers power consumption in periods of low link usage (supported on v2 zl 10/100/1000 and 10/100 modules)
- IEEE 802.3af Power over Ethernet (PoE)
 - Provides up to 15.4 W per port to IEEE 802.3af-compliant PoE-powered devices such as IP phones, wireless access points, and security cameras
- IEEE 802.3at Power over Ethernet Plus
 - Provides up to 30 W per port, for up to 288 ports simultaneously, for PoE- and PoE+-powered devices, such as video IP phones, IEEE 802.11n wireless access points, and advanced pan/zoom/tilt security cameras
- Prestandard PoE support
 - Detects and provides power to prestandard PoE devices

- High-density port connectivity

Provides up to 12 interface module slots and up to 288 wire-speed 10/100/1000 PoE-enabled ports or 96 10GbE ports per system

- Jumbo frames

On Gigabit Ethernet and 10-Gigabit Ethernet ports, jumbo frames allow high-performance remote backup and disaster-recovery services

- Auto-MDIX

Provides automatic adjustments for straight-through or crossover cables on all 10/100 and 10/100/1000 ports

- IPv6

- IPv6 host

enables switches to be managed in an IPv6 network

- Dual stack (IPv4 and IPv6)

transitions from IPv4 to IPv6, supporting connectivity for both protocols

- MLD snooping

forwards IPv6 multicast traffic to the appropriate interface

- IPv6 ACL/QoS

supports ACL and QoS for IPv6 network traffic

- IPv6 routing

supports static, RIPng, and OSPFv3 routing protocols

- 6in4 tunneling

supports encapsulation of IPv6 traffic in IPv4 packets

- Security

provides RA guard, DHCPv6 protection, dynamic IPv6 lockdown, and ND snooping

Performance

- High-speed, high-capacity architecture

2 Tbps crossbar switching fabric provides intra-module and inter-module switching with 785.7 million pps throughput on the purpose-built ProVision ASICs

- Selectable queue configurations

Allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications

Resiliency and high availability

- Virtual Switching Framework (VSF)

Creates one virtual resilient switch from two switches; servers or switches can be attached using standard LACP for automatic load balancing and high availability; simplify network operation by reduce the need for complex protocols like Spanning Tree Protocol (STP), Equal-Cost Multipath (ECMP), and VRRP (requires v3 modules)

- **New** Fast Software Upgrade

Reduces downtime of the VSF stack during an upgrade by sequentially upgrading the members in the stack shrinking the downtime to a few seconds (requires v3 modules)

- Virtual Router Redundancy Protocol (VRRP)

Allows groups of two routers to dynamically back each other up to create highly available routed environments for IPv4 and IPv6 networks

- Nonstop switching

Improves network availability to better support critical applications such as unified communication and mobility; interface and fabric modules continue switching traffic during failover from active to standby management module

- Nonstop routing

Enhances Layer 3 high availability; OSPFv2/v3 and VRRP will continue to operate and route network traffic during failover from an active to a standby management module

- Redundant management and power

Provide enhanced system availability and continuity of operations

- IEEE 802.1s Multiple Spanning Tree Protocol

Provides high link availability in multiple VLAN environments by allowing multiple spanning trees; encompasses IEEE 802.1D Spanning Tree Protocol and IEEE 802.1w Rapid Spanning Tree Protocol

- IEEE 802.3ad Link Aggregation Control Protocol (LACP) and HPE port trunking

Support up to 144 trunks, each with up to eight links (ports) per trunk

- Distributed trunking

Enables loop-free and redundant network topology without using Spanning Tree Protocol; allows a server or switch to connect to two switches using one logical trunk for redundancy and load sharing

- Optional redundant power supply

Provides uninterrupted power and allows hot-swapping of the redundant power supplies when installed

- Hot-swappable modules

Allows dissimilar modules, and power supplies in a redundant power supply configuration to be added or swapped without interrupting the network

- Sparing simplicity

HPE z1-common accessories (interface modules and power supplies)

- Uplink Failure Detection

Provides active-standby network path redundancy for servers that are configured for active-standby NIC teaming

- Smart Link

Provides easy-to-configure link redundancy of active and standby links

Layer 2 switching

- VLAN support and tagging

Supports the IEEE 802.1Q standard and 4,094 VLANs simultaneously

- IEEE 802.1v protocol VLANs

Isolate select non-IPv4 protocols automatically into their own VLANs

- VxLAN

Encapsulation (tunneling) protocol for overlay network that enables a more scalable virtual network deployment (requires v3 modules)

- GVRP and MVRP

Allows automatic learning and dynamic assignment of VLANs

- IEEE 802.1ad Q-in-Q

Increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on a high-speed campus or metro network

- MAC-based VLAN

Provides granular control and security; uses RADIUS to map a MAC address/user to specific VLANs (requires v2 or higher modules)

- Rapid Per-VLAN Spanning Tree (RPVST+)

Allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+

- HPE switch meshing

Dynamically load balances across multiple active redundant links to increase available aggregate bandwidth; allows concurrent Layer 3 routing with v2 or higher modules

Layer 3 services

- Bidirectional Forwarding Detection (BFD)

Enables link connectivity monitoring and reduces network convergence time for OSPFv2 and VRRP (requires v3 modules)

- User Datagram Protocol (UDP) helper function

Allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses and prevents server spoofing for UDP services such as DHCP

- Loopback interface address
Defines an address in Routing Information Protocol (RIP) and Open Standard Path First (OSPF), improving diagnostic capability
- Route maps
Provide more control during route redistribution; allow filtering and altering of route metrics
- DHCP server
Centralizes and reduces the cost of IPv4 address management

Layer 3 routing

- Static IP routing
Provides manually configured routing for both IPv4 and IPv6 networks
- Routing Information Protocol (RIP)
Provides RIPv1, RIPv2, and RIPv6 routing
- OSPF
Provides OSPFv2 for IPv4 routing and OSPFv3 for IPv6 routing
- Policy-based routing
Uses a classifier to select traffic that can be forwarded based on policy set by the network administrator (requires v2 or higher modules)
- Border Gateway Protocol (BGP)
Provides IPv4 Border Gateway Protocol routing, which is scalable, robust, and flexible

Security

- Access control lists (ACLs)
Provide filtering based on the IP field, source/destination IP address/subnet, and source/destination TCP/UDP port number on a per-VLAN or per-port basis
- Multiple user authentication methods
 - IEEE 802.1X users per port
provides authentication of multiple IEEE 802.1X users per port
 - Web-based authentication
authenticates from a web browser for clients that do not support IEEE 802.1X supplicant
 - MAC-based authentication
client is authenticated with the RADIUS server based on the client's MAC address
 - Concurrent IEEE 802.1X, web, and MAC authentication schemes per port
switch port accepts up to 32 sessions of IEEE 802.1X, web, and MAC authentications

- Private VLAN
 - Provides network security by restricting peer-to-peer communication to prevent a variety of malicious attacks; typically a switch port can only communicate with other ports in the same community and/or an uplink port, regardless of VLAN ID or destination MAC address
- DHCP protection
 - Blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Secure management access
 - Delivers secure encryption of all access methods (CLI, GUI, or MIB) through SSHv2, SSL, and/or SNMPv3
- Switch CPU protection
 - Provides automatic protection against malicious network traffic trying to shut down the switch
- ICMP throttling
 - Defeats ICMP denial-of-service attacks by enabling any switch port to automatically throttle ICMP traffic
- Identity-driven ACL
 - Enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- STP BPDU port protection
 - Blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- Dynamic IP lockdown
 - Works with DHCP protection to block traffic from unauthorized hosts, preventing IP source address spoofing
- Dynamic ARP protection
 - Blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- STP root guard
 - Protects the root bridge from malicious attacks or configuration mistakes

- Detection of malicious attacks
Monitors 10 types of network traffic and sends a warning when an anomaly that potentially can be caused by malicious attacks is detected
- Port security
Allows access only to specified MAC addresses, which can be learned or specified by the administrator
- MAC address lockout
Prevents particular configured MAC addresses from connecting to the network
- Source-port filtering
Allows only specified ports to communicate with each other
- RADIUS/TACACS+
Eases switch management security administration by using a password authentication server
- Secure Shell
Encrypts all transmitted data for secure remote CLI access over IP networks
- Secure Sockets Layer (SSL)
Encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- Secure FTP
Allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Management Interface Wizard
Helps secure management interfaces such as SNMP, telnet, SSH, SSL, web, and USB at the desired level
- Switch management logon security
Helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- Security banner
Displays a customized security policy when users log in to the switch
- IEEE 802.1AE MACsec
Provides security on a link between two switch ports (1 Gbps or 10 Gbps) using standard encryption and authentication (requires v3 modules)

Convergence

- IP multicast routing
 - Includes PIM Sparse and Dense modes to route IP multicast traffic
- IP multicast snooping (data-driven IGMP)
 - Prevents flooding of IP multicast traffic
- LLDP-MED (Media Endpoint Discovery)
 - Defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones
- PoE allocations
 - Supports multiple methods (automatic, IEEE 802.3af class, LLDP-MED, or user-specified) to allocate PoE power for more efficient energy savings
- Auto VLAN configuration for voice
 - RADIUS VLAN
 - uses a standard RADIUS attribute and LLDP-MED to automatically configure a VLAN for IP phones
 - CDPv2
 - uses CDPv2 to configure legacy IP phones
- Local MAC Authentication
 - Assigns attributes such as VLAN and QoS using locally configured profile that can be a list of MAC prefixes

Warranty and support

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

HPE 5400R z12 Switch Series

Specifications

	HPE 5406R z12 Switch (J9821A)	HPE 5412R z12 Switch (J9822A)	HPE 5406R-44G-PoE+/2SFP+ (No PSU) v2 z12 Switch (J9823A)
Included accessories	1 HPE 5400R z12 Management Module (J9827A) 1 HPE 5406R z12 Switch Fan Tray (J9831A)	1 HPE 5400R z12 Management Module (J9827A) 1 HPE 5412R z12 Switch Fan Tray (J9832A)	1 HPE 5400R z12 Management Module (J9827A) 1 HPE 5406R z12 Switch Fan Tray (J9831A) 1 HPE 24-port Gig-T PoE+ v2 z1 Module (J9534A) 1 HPE 20-port Gig-T PoE+/2-port 10GbE SFP+ v2 z1 Module (J9536A)
I/O ports and slots	6 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination	12 open module slots Supports a maximum of 288 autosensing 10/100/1000 ports or 288 SFP ports or 96 SFP+ ports or 96 HPE Smart Rate Multi-Gigabit or 24 40GbE ports, or a combination	44 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	4 power supply slots 2 minimum power supplies required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)
Fan tray	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9832A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot
Physical characteristics			
Dimensions	17.5(w) x 17.75(d) x 6.9(h) in. (44.45 x 45.09 x 17.53 cm) (4U height)	17.5(w) x 17.75(d) x 12.1(h) in. (44.45 x 45.09 x 30.73 cm) (7U height)	17.5(w) x 17.75(d) x 6.9(h) in. (44.45 x 45.09 x 17.53 cm) (4U height)
Weight	24.5 lb (11.11 kg)	38.1 lb (17.28 kg)	28.11 lb (12.75 kg)
Memory and processor			
v3 Gigabit Module	Dual ARM® Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 Gigabit Module	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal
v3 10G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 10G Module	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
v3 40G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
Management Module	Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM

	HPE 5406R z12 Switch (J9821A)	HPE 5412R z12 Switch (J9822A)	HPE 5406R-44G-PoE+/2SFP+ (No PSU) v2 z12 Switch (J9823A)
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only
Performance	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1000 Mb Latency	< 2.8 μs (FIFO 64-byte packets)	< 2.8 μs (FIFO 64-byte packets)	< 2.8 μs (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 μs (FIFO 64-byte packets)	< 1.8 μs (FIFO 64-byte packets)	< 1.8 μs (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 μs (FIFO 64-byte packets)	< 1.5 μs (FIFO 64-byte packets)	< 1.5 μs (FIFO 64-byte packets)
Throughput	Up to 571.4 Mpps	Up to 1142.8 Mpps	Up to 571.4 Mpps
Routing/Switching capacity	960 Gbps	1920 Gbps	960 Gbps
Switch fabric speed	1015 Gbps	2030 Gbps	1015 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries	64000 entries
Environment			
Operating temperature	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed
Operating relative humidity	15% to 95% @ 113°F (45°C), noncondensing	15% to 95% @ 113°F (45°C), noncondensing	15% to 95% @ 113°F (45°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing
Altitude	Up to 10,000 ft (3 km)	Up to 10,000 ft (3 km)	Up to 10,000 ft (3 km)
Acoustic	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296	Power: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296
Electrical characteristics			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
80plus.org Certification	Gold	Gold	Gold
Description	Does not come with power supply. Two power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Does not come with power supply. Four power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	2450 BTU/hr (2584 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr), (max. using PoE)	4900 BTU/hr (5169 kJ/hr), (max. non-PoE); 7400 BTU/hr (7,807 kJ/hr), (max. using PoE)	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr), (max. using PoE)
Voltage	100–127/200–240 VAC, rated (Power supply dependent)	100–127/200–240 VAC, rated (Power supply dependent)	110–127/200–240 VAC, rated (Power supply dependent)
Notes	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.

	HPE 5406R z12 Switch (J9821A)	HPE 5412R z12 Switch (J9822A)	HPE 5406R-44G-PoE+/2SFP+ (No PSU) v2 z12 Switch (J9823A)
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
Emissions	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A
Immunity			
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002
Radiated EFT/Burst	IEC 61000-4-3; 3 V/m IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-3; 3 V/m IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-3; 3 V/m IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC
Surge Conducted	IEC 61000-4-6; 3 Vrms IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-6; 3 Vrms IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-6; 3 Vrms IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Power frequency magnetic field	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics Flicker	EN 61000-3-2, IEC 61000-3-2 EN 61000-3-3, IEC 61000-3-3	EN 61000-3-2, IEC 61000-3-2 EN 61000-3-3, IEC 61000-3-3	EN 61000-3-2, IEC 61000-3-2 EN 61000-3-3, IEC 61000-3-3
Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management
Notes	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)
Services	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

HPE 5400R z12 Switch Series

Specifications (continued)

	HPE 5412R-92G-PoE+/2SFP+ (No PSU) v2 z12 Switch (J9825A)	HPE 5406R-44G-PoE+/4SFP (No PSU) v2 z12 Switch (J9824A)	HPE 5412R-92G-PoE+/4SFP (No PSU) v2 z12 Switch (J9826A)
Included accessories	1 HPE 5400R z12 Management Module (J9827A) 1 HPE 5412R z12 Switch Fan Tray (J9832A) 3 HPE 24-port Gig-T PoE+ v2 z1 Module (J9534A) 1 HPE 20-port Gig-T PoE+/2-port 10GbE SFP+ v2 z1 Module (J9536A)	1 HPE 5400R z12 Management Module (J9827A) 1 HPE 5406R z12 Switch Fan Tray (J9831A) 1 HPE 24-port Gig-T PoE+ v2 z1 Module (J9534A) 1 HPE 20-port Gig-T PoE+/4-port SFP v2 z1 Module (J9535A)	1 HPE 5400R z12 Management Module (J9827A) 1 HPE 5412R z12 Switch Fan Tray (J9832A) 3 HPE 24-port Gig-T PoE+ v2 z1 Module (J9534A) 1 HPE 20-port Gig-T PoE+/4-port SFP v2 z1 Module (J9535A)
I/O ports and slots	92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 open 10GbE SFP+ transceiver slots 8 open module slots Supports a maximum of 288 autosensing 10/100/1000 ports or 288 SFP ports or 96 SFP+ ports or 96 HPE Smart Rate Multi-Gigabit or 24 40GbE ports, or a combination	44 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 open mini-GBIC (SFP) slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination	92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 open mini-GBIC (SFP) slots 8 open module slots Supports a maximum of 288 autosensing 10/100/1000 ports or 288 SFP ports or 96 SFP+ ports or 96 HPE Smart Rate Multi-Gigabit or 24 40GbE ports, or a combination
Power supplies	4 power supply slots 2 minimum power supplies required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)	4 power supply slots 2 minimum power supplies required (ordered separately)
Fan tray	Includes: 1 x J9832A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9832A 1 fan tray slot
Physical characteristics			
Dimensions	17.5(w) x 17.75(d) x 12.1(h) in. (44.45 x 45.09 x 30.73 cm) (7U height)	17.5(w) x 17.75(d) x 6.9(h) in. (44.45 x 45.09 x 17.53 cm) (4U height)	17.5(w) x 17.75(d) x 12.1(h) in. (44.45 x 45.09 x 30.73 cm) (7U height)
Weight	45.19 lb (20.5 kg)	26.19 lb (11.88 kg)	45.4 lb (20.59 kg)
Memory and processor			
v3 Gigabit Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 Gigabit Module	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal
v3 10G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 10G Module	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
v3 40G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
Management Module	Freescale P2020 dual core @ 1.2 MHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM

	HPE 5412R-92G-PoE+/2SFP+ (No PSU) v2 z12 Switch (J9825A)	HPE 5406R-44G-PoE+/4SFP (No PSU) v2 z12 Switch (J9824A)	HPE 5412R-92G-PoE+/4SFP (No PSU) v2 z12 Switch (J9826A)
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only
Performance	IPv6 Ready Certified 1000 Mb Latency < 2.8 μs (FIFO 64-byte packets) 10 Gbps Latency < 1.8 μs (FIFO 64-byte packets) 40 Gbps Latency < 1.5 μs (FIFO 64-byte packets) Throughput Up to 1142.8 Mpps Routing/Switching capacity 1920 Gbps Switch fabric speed 2030 Gbps Routing table size 10000 entries (IPv4), 5000 entries (IPv6) MAC address table size 64000 entries	IPv6 Ready Certified 1000 Mb Latency < 2.8 μs (FIFO 64-byte packets) 10 Gbps Latency < 1.8 μs (FIFO 64-byte packets) 40 Gbps Latency < 1.5 μs (FIFO 64-byte packets) Throughput Up to 571.4 Mpps Routing/Switching capacity 960 Gbps Switch fabric speed 1015 Gbps Routing table size 10000 entries (IPv4), 5000 entries (IPv6) MAC address table size 64000 entries	IPv6 Ready Certified 1000 Mb Latency < 2.8 μs (FIFO 64-byte packets) 10 Gbps Latency < 1.8 μs (FIFO 64-byte packets) 40 Gbps Latency < 1.5 μs (FIFO 64-byte packets) Throughput Up to 1142.8 Mpps Routing/Switching capacity 1920 Gbps Switch fabric speed 2030 Gbps Routing table size 10000 entries (IPv4), 5000 entries (IPv6) MAC address table size 64000 entries
Environment	Operating temperature 32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed Operating relative humidity 15% to 95% @ 113°F (45°C), noncondensing Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C) Nonoperating/Storage relative humidity 15% to 95% @ 149°F (65°C), noncondensing Altitude Up to 10,000 ft (3 km) Acoustic Power: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296	Operating temperature 32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed Operating relative humidity 15% to 95% @ 113°F (45°C), noncondensing Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C) Nonoperating/Storage relative humidity 15% to 95% @ 149°F (65°C), noncondensing Altitude Up to 10,000 ft (3 km) Acoustic Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296	Operating temperature 32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed Operating relative humidity 15% to 95% @ 113°F (45°C), noncondensing Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C) Nonoperating/Storage relative humidity 15% to 95% @ 149°F (65°C), noncondensing Altitude Up to 10,000 ft (3 km) Acoustic Power: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296
Electrical characteristics	Frequency 50/60 Hz 80plus.org Certification Gold Description Does not come with power supply. Four open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Frequency 50/60 Hz 80plus.org Certification Gold Description Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Frequency 50/60 Hz 80plus.org Certification Gold Description Does not come with power supply. Four open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr), (max. using PoE)	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr), (max. using PoE)	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr), (max. using PoE)
Voltage	110–127/200–240 VAC, rated (Power supply dependent)	110–127/200–240 VAC, rated (Power supply dependent)	110–127/200–240 VAC, rated (Power supply dependent)
Notes	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.

	HPE 5412R-92G-PoE+/2SFP+ (No PSU) v2 z1z2 Switch (J9825A)	HPE 5406R-44G-PoE+/4SFP (No PSU) v2 z1z2 Switch (J9824A)	HPE 5412R-92G-PoE+/4SFP (No PSU) v2 z1z2 Switch (J9826A)
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
Emissions	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A
Immunity			
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC
Surge	IEC 61000-4-6; 3 Vrms	IEC 61000-4-6; 3 Vrms	IEC 61000-4-6; 3 Vrms
Conducted	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Power frequency magnetic field	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management
Notes	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)
Services	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

HPE 5400R zL2 Switch Series

Specifications (continued)

	HPE 5406R-8XGT/8SFP+ (No PSU) v2 zL2 Switch (J9868A)	HPE 5412R 92GT PoE+/4SFP+ (No PSU) v3 zL2 Switch (JL001A)	HPE 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 zL2 Switch (JL002A)
Included accessories	1 HPE 5400R zL2 Management Module (J9827A) 1 HPE 5406R zL2 Switch Fan Tray (J9831A) 1 HPE 8-port 10GbE SFP+ v2 zL2 Module (J9538A) 1 HPE 8-port 10GBASE-T v2 zL2 Module (J9546A)	1 HPE 5400R zL2 Management Module (J9827A) 1 HPE 5412R zL2 Switch Fan Tray (J9832A) 3 HPE 24-port 10/100/1000BASE-T PoE+ MACsec v3 zL2 Module (J9986A) 1 HPE 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 zL2 Module (J9990A)	1 HPE 5400R zL2 Management Module (J9827A) 1 HPE 5406R zL2 Switch Fan Tray (J9831A) 1 HPE 8-port 1G/10GbE SFP+ MACsec v3 zL2 Module (J9993A) 1 HPE 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 zL2 Module (J9995A)
I/O ports and slots	8 RJ-45 10GbE ports (IEEE 802.3an-2006 Type 10GBASE-T) 8 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination	92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 open 10GbE SFP+ transceiver slots 8 open module slots Supports a maximum of 288 autosensing 10/100/1000 ports or 288 SFP ports or 96 SFP+ ports or 96 HPE Smart Rate Multi-Gigabit or 24 40GbE ports, or a combination	8 RJ-45 HPE Smart Rate Multi-Gigabit ports 8 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	4 power supply slots 2 minimum power supplies required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)
Fan tray	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9832A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot
Physical characteristics			
Dimensions	17.5(w) x 17.75(d) x 6.9(h) in. (44.45 x 45.09 x 17.53 cm) (4U height)	17.5(w) x 17.75(d) x 12.1(h) in. (44.45 x 45.09 x 30.73 cm) (7U height)	17.5(w) x 17.75(d) x 6.9(h) in. (44.45 x 45.09 x 17.53 cm) (4U height)
Weight	28.11 lb (12.75 kg)	45.19 lb (20.5 kg)	28.11 lb (12.75 kg)
Memory and processor			
v3 Gigabit Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 Gigabit Module	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal
v3 10G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 10G Module	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
v3 40G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
Management Module	Freescall P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Freescall P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Freescall P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM

	HPE 5406R-8XGT/8SFP+ (No PSU) v2 z12 Switch (J9868A)	HPE 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)	HPE 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only
Performance	IPv6 Ready Certified 1000 Mb Latency < 2.8 μ s (FIFO 64-byte packets) 10 Gbps Latency < 1.8 μ s (FIFO 64-byte packets) 40 Gbps Latency < 1.5 μ s (FIFO 64-byte packets) Throughput Up to 571.4 Mpps Routing/Switching capacity 960 Gbps Switch fabric speed 1015 Gbps Routing table size 10000 entries (IPv4), 5000 entries (IPv6) MAC address table size 64000 entries	IPv6 Ready Certified 1000 Mb Latency < 2.8 μ s (FIFO 64-byte packets) 10 Gbps Latency < 1.8 μ s (FIFO 64-byte packets) 40 Gbps Latency < 1.5 μ s (FIFO 64-byte packets) Throughput Up to 1142.8 Mpps Routing/Switching capacity 1920 Gbps Switch fabric speed 2030 Gbps Routing table size 10000 entries (IPv4), 5000 entries (IPv6) MAC address table size 64000 entries	IPv6 Ready Certified 1000 Mb Latency < 2.8 μ s (FIFO 64-byte packets) 10 Gbps Latency < 1.8 μ s (FIFO 64-byte packets) 40 Gbps Latency < 1.5 μ s (FIFO 64-byte packets) Throughput Up to 571.4 Mpps Routing/Switching capacity 960 Gbps Switch fabric speed 1015 Gbps Routing table size 10000 entries (IPv4), 5000 entries (IPv6) MAC address table size 64000 entries
Environment	Operating temperature 32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed Operating relative humidity 15% to 95% @ 113°F (45°C), noncondensing Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C) Nonoperating/Storage relative humidity 15% to 95% @ 149°F (65°C), noncondensing Altitude Up to 10,000 ft (3 km) Acoustic Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296	Operating temperature 32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed Operating relative humidity 15% to 95% @ 113°F (45°C), noncondensing Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C) Nonoperating/Storage relative humidity 15% to 95% @ 149°F (65°C), noncondensing Altitude Up to 10,000 ft (3 km) Acoustic Power: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296	Operating temperature 32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed Operating relative humidity 15% to 95% @ 113°F (45°C), noncondensing Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C) Nonoperating/Storage relative humidity 15% to 95% @ 149°F (65°C), noncondensing Altitude Up to 10,000 ft (3 km) Acoustic Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296
Electrical characteristics	Frequency 50/60 Hz 80plus.org Certification Gold Description Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications. Maximum heat dissipation 2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr), (max. using PoE) Voltage 110–127/200–240 VAC, rated (Power supply dependent) Notes Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Frequency 50/60 Hz 80plus.org Certification Gold Description Does not come with power supply. Four open power supply slots are available; three different power supplies are available. See power supply products for additional specifications. Maximum heat dissipation 4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr), (max. using PoE) Voltage 110–127/200–240 VAC, rated (Power supply dependent) Notes Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Frequency 50/60 Hz 80plus.org Certification Gold Description Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications. Maximum heat dissipation 2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr), (max. using PoE) Voltage 110–127/200–240 VAC, rated (Power supply dependent) Notes Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.

	HPE 5406R-8XGT/8SFP+ (No PSU) v2 z12 Switch (J9868A)	HPE 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)	HPE 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
Emissions	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A
Immunity			
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002
Radiated EFT/Burst	IEC 61000-4-3; 3 V/m IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-3; 3 V/m IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-3; 3 V/m IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC
Surge Conducted	IEC 61000-4-6; 3 Vrms IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-6; 3 Vrms IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-6; 3 Vrms IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Power frequency magnetic field	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics Flicker	EN 61000-3-2, IEC 61000-3-2 EN 61000-3-3, IEC 61000-3-3	EN 61000-3-2, IEC 61000-3-2 EN 61000-3-3, IEC 61000-3-3	EN 61000-3-2, IEC 61000-3-2 EN 61000-3-3, IEC 61000-3-3
Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management	IMC—Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management
Notes	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C)	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C)	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C) HPE Smart Rate Multi-Gigabit Cabling; 1000BASE-T, 2.5 Gigabit, and 5 Gigabit Ethernet: Category 5e or better UTP or STP; 10GBASE-T: Category 6 or better (CAT6A recommended) UTP or STP
Services	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

HPE 5400R zL2 Switch Series

Specifications (continued)

	HPE 5406R 44GT PoE+/4SFP+ (No PSU) v3 zL2 Switch (JL003A)	HPE 5406R 16-port SFP+ (No PSU) v3 zL2 Switch (JL095A)
Included accessories	1 HPE 5400R zL2 Management Module (J9827A) 1 HPE 5406R zL2 Switch Fan Tray (J9831A) 1 HPE 24-port 10/100/1000BASE-T PoE+ MACsec v3 zL2 Module (J9986A) 1 HPE 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 zL2 Module (J9990A)	1 HPE 5400R zL2 Management Module (J9827A) 1 HPE 5406R zL2 Switch Fan Tray (J9831A) 2 HPE 8-port 1G/10GbE SFP+ MACsec v3 zL2 Module (J9993A)
I/O ports and slots	44 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination	16 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)
Fan tray	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot
Physical characteristics		
Dimensions	17.5(w) x 17.75(d) x 6.9(h) in. (44.45 x 45.09 x 17.53 cm) (4U height)	17.5(w) x 17.75(d) x 6.9(h) in. (44.45 x 45.09 x 17.53 cm) (4U height)
Weight	28.11 lb (12.75 kg)	28.11 lb (12.75 kg)
Memory and processor		
v3 Gigabit Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 Gigabit Module	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal
v3 10G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
v2 10G Module	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
v3 40G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal
Management Module	Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only

	HPE 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)	HPE 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)
Performance		
1000 Mb Latency	IPv6 Ready Certified < 2.8 μs (FIFO 64-byte packets)	IPv6 Ready Certified < 2.8 μs (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 μs (FIFO 64-byte packets)	< 1.8 μs (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 μs (FIFO 64-byte packets)	< 1.5 μs (FIFO 64-byte packets)
Throughput	Up to 571.4 Mpps	Up to 571.4 Mpps
Routing/Switching capacity	960 Gbps	960 Gbps
Switch fabric speed	1015 Gbps	1015 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries
Environment		
Operating temperature	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed
Operating relative humidity	15% to 95% @ 113°F (45°C), noncondensing	15% to 95% @ 113°F (45°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing
Altitude	Up to 10,000 ft (3 km)	Up to 10,000 ft (3 km)
Acoustic	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296
Electrical characteristics		
Frequency	50/60 Hz	50/60 Hz
80plus.org Certification	Gold	Gold
Description	Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr), (max. using PoE)	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr), (max. using PoE)
Voltage	110–127/200–240 VAC, rated (Power supply dependent)	110–127/200–240 VAC, rated (Power supply dependent)
Notes	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.

	HPE 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)	HPE 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
Emissions	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A
Immunity		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC
Conducted	IEC 61000-4-6; 3 Vrms	IEC 61000-4-6; 3 Vrms
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
Management	IMC–Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management	IMC–Intelligent Management Center; Command-line interface; web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); SNMP Manager; Out-of-band management (serial RS-232C or micro USB) AirWave Network Management
Notes	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)	Supported 1G SFP transceivers are revision “B” or later (product number ends with the letter “B” or later; for example, J9142B, J8177C)
Services	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

Standards and Protocols

(applies to all products in series)

BGP	RFC 1997 BGP Communities Attribute RFC 2918 Route Refresh Capability RFC 4271 A Border Gateway Protocol 4 (BGP-4)	RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)	RFC 5492 Capabilities Advertisement with BGP-4
Device management	RFC 1591 DNS (client)	HTML and telnet management	RFC 2576 (Coexistence between SNMP v1, v2, v3) RFC 2579 (SMIPv2 Text Conventions) RFC 2580 (SMIPv2 Conformance) RFC 3416 (SNMP Protocol Operations v2) RFC 3417 (SNMP Transport Mappings)
General protocols	IEEE 802.1ad Q-in-Q IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control	RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR	RFC 1542 BOOTP Extensions RFC 1918 Address Allocation for Private Internet RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3575 IANA Considerations for RADIUS RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP RFC 4675 RADIUS VLAN & Priority UDLD (Uni-Directional Link Detection) RFC 5880 BFD RFC 5905 NTP Client
IP multicast	RFC 3376 IGMPv3	RFC 3973 PIM Dense Mode	RFC 4601 PIM Sparse Mode
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address RFC 2080 RIPng RFC 2081 RIPng Protocol Applicability RFC 2082 RIP-2 MD5 Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6	RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 for IPv6 RFC 4022 MIB for TCP RFC 4087 IP Tunnel MIB RFC 4113 MIB for UDP RFC 4213 Basic Transition Mechanisms for IPv6 Hosts and Routers RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP	RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5519 Multicast Group Membership Discovery MIB (MLDv2 only) RFC 5722 Handling of Overlapping IPv6 Fragments RFC 6620 FCFS SAVI draft-ietf-savi-mix

**Standards and Protocols
(continued)**

(applies to all products in series)

MIBs	IEEE 802.1ap (MSTP and STP MIB's only) IEEE 8021-Bridge-MIB (2008) IEEE 8021-Q-Bridge-MIB (2008) RFC 1155 Structure & ID of Mgmt Info for TCP/IP Internets RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB	RFC 2578 Structure of Management Information Version 2 (SMIv2) RFC 2613 SMON MIB 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 2737 Entity MIB (Version 2)	RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB RFC 2932 IP (Multicast Routing MIB) RFC 2933 IGMP MIB RFC 4292 IP Forwarding Table MIB RFC 4836 Managed Objects for 802.3 Medium Attachment Units (MAU) RFC 7331 BFD MIB
Network management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) 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 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP) RFC 3413 Simple Network Management Protocol (SNMP) Applications RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3) RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP) RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP) RFC 5424 Syslog Protocol ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)	SNMPv1/v2c/v3 XRMON
OSPF	RFC 2328 OSPFv2	RFC 3101 OSPF NSSA	RFC 5340 OSPFv3 for IPv6
QoS/CoS	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2475 DiffServ Architecture	RFC 2597 DiffServ Assured Forwarding (AF)	RFC 2598 DiffServ Expedited Forwarding (EF)
Security	IEEE 802.1AE MAC Security Standard (MACsec) IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+	RFC 1321 The MD5 Message-Digest Algorithm RFC 2818 HTTP Over TLS RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)	Secure Sockets Layer (SSL) SSHv2 Secure Shell

HPE 5400R z12 Switch Series accessories

Modules

HPE 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 z12 Module (J9995A)
 HPE 8-port 10GBASE-T v2 z12 Module (J9546A)
 HPE 8-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9993A)
 HPE 8-port 10GbE SFP+ v2 z12 Module (J9538A)
 HPE 12-port 10/100/1000BASE-T PoE+/12-port 1GbE SFP MACsec v3 z12 Module (J9989A)
 HPE 12-port Gig-T PoE+/12-port SFP v2 z12 Module (J9637A)
 HPE 20-port Gig-T/4-port SFP v2 z12 Module (J9549A)
 HPE 20-port Gig-T/2-port 10GbE SFP+ v2 z12 Module (J9548A)
 HPE 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9990A)
 HPE 20-port Gig-T PoE+/2-port 10GbE SFP+ v2 z12 Module (J9536A)
 HPE 20-port Gig-T PoE+/4-port SFP v2 z12 Module (J9535A)
 HPE 20-port 10/100/1000BASE-T PoE+/4p 1/2.5/5/10GBASE-T PoE+ MACsec v3 z12 Module (J9991A)
 HPE 20-port 10/100/1000BASE-T PoE+ MACsec/1-port 40GbE QSFP+ v3 z12 Module (J9992A)
 HPE 24-port 10/100 PoE+ v2 z12 Module (J9547A)
 HPE 24-port 10/100/1000BASE-T MACsec v3 z12 Module (J9987A)
 HPE 24-port Gig-T v2 z12 Module (J9550A)
 HPE 24-port 10/100/1000BASE-T PoE+ MACsec v3 z12 Module (J9986A)
 HPE 24-port Gig-T PoE+ v2 z12 Module (J9534A)
 HPE 24-port 1GbE SFP MACsec v3 z12 Module (J9988A)
 HPE 24-port SFP v2 z12 Module (J9537A)
 HPE 2-port 40GbE QSFP+ v3 z12 Module (J9996A)
 HPE Advanced Services v2 z12 Module with HDD (J9857A)
 HPE Advanced Services v2 z12 Module with SSD (J9858A)
 HPE 5400R z12 Management Module (J9827A)

Transceivers

HPE X111 100M SFP LC FX Transceiver (J9054C)
 HPE X131 10G X2 SC LR Transceiver (J8437A)
 HPE X132 10G SFP+ LC SR Transceiver (J9150A)
 HPE X132 10G SFP+ LC LR Transceiver (J9151A)
 HPE X132 10G SFP+ LC LRM Transceiver (J9152A)
 HPE X121 1G SFP LC LH Transceiver (J4860C)
 HPE X121 1G SFP LC SX Transceiver (J4858C)
 HPE X121 1G SFP LC LX Transceiver (J4859C)
 HPE X121 1G SFP RJ45 T Transceiver (J8177C)
 HPE X122 1G SFP LC BX-D Transceiver (J9142B)
 HPE X122 1G SFP LC BX-U Transceiver (J9143B)
 HPE X132 10G SFP+ LC ER Transceiver (J9153A)
 HPE X142 40G QSFP+ MPO SR4 Transceiver (JH231A)
 HPE X142 40G QSFP+ LC LR4 SM Transceiver (JH232A)
 HPE X142 40G QSFP+ MPO eSR4 300M XCVR (JH233A)

HPE 5400R z12 Switch Series accessories (continued)

Cables	<p>HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable (J9281B) HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (J9283B) HPE X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable (J9285B) HPE X244 10G XFP to SFP+ 1m Direct Attach Copper Cable (J9300A) HPE X244 10G XFP to SFP+ 3m Direct Attach Copper Cable (J9301A) HPE X244 10G XFP to SFP+ 5m Direct Attach Copper Cable (J9302A) HPE 0.5 m Multimode OM3 LC/LC Optical Cable (AJ833A) HPE 1 m Multimode OM3 LC/LC Optical Cable (AJ834A) HPE 2 m Multimode OM3 LC/LC Optical Cable (AJ835A) HPE 5 m Multimode OM3 LC/LC Optical Cable (AJ836A) HPE 15 m Multimode OM3 LC/LC Optical Cable (AJ837A) HPE 30 m Multimode OM3 LC/LC Optical Cable (AJ838A) HPE 50 m Multimode OM3 LC/LC Optical Cable (AJ839A) HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable (QK732A) HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable (QK733A) HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable (QK734A) HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A) HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A) HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A) HPE X242 40G QSFP+ to QSFP+ 1m DAC Cable (JH234A) HPE X242 40G QSFP+ to QSFP+ 3m DAC Cable (JH235A) HPE X242 40G QSFP+ to QSFP+ 5m DAC Cable (JH236A)</p>
Power supply	<p>HPE 5400R 700W PoE+ z12 Power Supply (J9828A) HPE 5400R 1100W PoE+ z12 Power Supply (J9829A) HPE 5400R 2750W PoE+ z12 Power Supply (J9830A)</p>
Mounting kit	<p>HPE X450 4U/7U Universal 4-Post Rack Mounting Kit (J9852A)</p>
WLAN	<p>HPE MSM775 z1 Premium Controller Module (J9840A)</p>

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