

## DATA SHEET

# ARUBA 5400R ZL2 SWITCH SERIES

## PRODUCT OVERVIEW

The Aruba 5400R zL2 Switch Series delivers enterprise-class resiliency with innovative flexibility and scalability for customers creating smart digital workplaces that are optimized for mobile users with an integrated wired and wireless approach. This modular 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, Dynamic Segmentation, robust QoS and policy-based routing with no software licensing required.

Based on a powerful ProVision ASIC, the Aruba 5400R zL2 Switch Series has a high-speed, high-capacity architecture with 2 Tbps crossbar switching fabric with low 2.1µ latency, robust feature support, and value with flexible programmability for the latest applications. This series offers flexible connectivity options with 6- or 12-slot compact chassis, line rate 40GbE, up to 96 line rate Smart Rate multigigabit or 10GbE ports and up to 288 ports of PoE+ for powering access points, cameras and IoT devices.

The 5400R is easy to deploy, use and manage using Aruba AirWave or Aruba Central. Aruba ClearPass offers centralized security and external captive portal support. The switches include a Limited Lifetime Warranty.

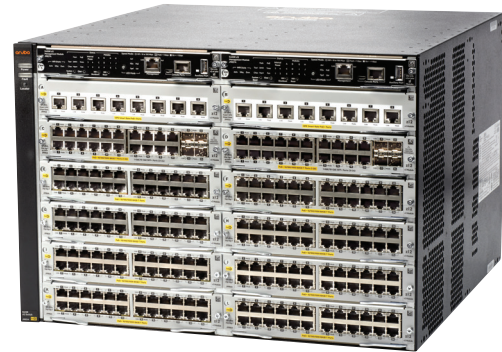
## ENHANCED CAPABILITIES

### Software-defined networks

- Supports multiple programmatic interfaces, including REST APIs and Openflow 1.0 and 1.3, to enable automation of network operations, monitoring, and troubleshooting

### Unified Wired and wireless support

- Supports unified wired and wireless policies using Aruba ClearPass Policy Manager
- Switch auto-configuration automatically configures switch for different settings such as VLAN, CoS, PoE max power, and PoE priority when an Aruba access point is detected
- User Role defines 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-based local user role or download from ClearPass



## KEY FEATURES

- Powerful Aruba Layer 3 modular switch series with VSF stacking, Dynamic Segmentation, low latency and resiliency
  - HPE Smart Rate for high-speed multi-gigabit bandwidth (IEEE 802.3bz) and PoE+ power
  - Resilient with redundant management and hot swappable power supplies
  - Up to 288 ports of PoE+
  - Scalable line rate 40GbE for wireless traffic aggregation
  - Software defined ready with REST APIs and OpenFlow support
  - Advanced security and network management via Aruba ClearPass Policy Manager, Aruba AirWave and Aruba Central
- 
- For improved network simplicity and security, Aruba Dynamic Segmentation automatically enforces user, device and application-aware policies on Aruba wired and wireless networks. Automated device profiling, role-based access control, and Layer 7 firewall features deliver enhanced visibility and performance for a better overall experience for both IT and end-users alike
  - Dynamic Segmentation provides a secure tunnel that transports network traffic on a per-port or per-user role basis to an Aruba Controller. In a per-user role Tunnel Node, users are authenticated by the ClearPass Policy Manager which directs traffic to be tunneled to an Aruba controller or switch locally
  - Static IP Visibility allows ClearPass to do accounting for clients with static IP addresses

### 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
  - Supports 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
- Unknown Unicast Rate Limiting throttles unicast packets with unknown destination addresses and limits flooding on the VLAN

### Simplified configuration and management

- Aruba Central cloud-based management platform offers simple, secure, and cost effective way to manage switches
- Zero Touch ProVisioning (ZTP) simplifies installation of the switch infrastructure using Aruba Activate or DHCP-based process with AirWave and Central Network Management
- Flexible management – Supports both cloud-based Central and on-premise AirWave without ripping and replacing switching infrastructure
- IP SLA for Voice monitors quality of voice traffic using the UDP Jitter and UDP Jitter for VoIP tests (requires v3 modules)
- Built-in programmable and easy to use REST API interface provides configuration automation for campus networks
- 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 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

- Unidirectional link detection (UDLD) monitors the link between two switches and blocks the ports on both ends of the link if the link goes down at any point between the two devices
- 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

### 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 802.3at Power over Ethernet (PoE+) provides up to 30 W per port that allows support of the latest PoE+ capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments
- Support for pre-standard PoE detects and provides power to pre-standard 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, 96 10GbE ports or 96 Smart Rate multi-gigabit ports per system
- Jumbo frames on Gigabit Ethernet and 10-Gigabit Ethernet support 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 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 traffic

- IPv6 routing supports static, RIPng, 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)
- 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 with zl-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
- SmartLink 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 static route, 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 RIPng 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

- Control Plane Policing sets rate limit on control protocols to protect CPU overload from DOS attacks
- 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
  - Uses an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server to authenticate in accordance with industry standards
  - Web-based authentication provides a browser-based environment, similar to IEEE 802.1X, to authenticate clients that do not support IEEE 802.1X
  - Supports MAC-based client authentication
  - Concurrent IEEE 802.1X, Web, and MAC authentication schemes per 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

- Radius over TLS (RadSec) allows users to use a more secure and reliable mode of communications between switch and radius servers over unsecure networks
- Secure FTP allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Open Authentication Role simplifies first-time deployment of AAA in brownfield deployments by allowing full network access for failed clients and provides instant connectivity as soon as a client is plugged-in
- Critical Authentication Role ensures that important infrastructure devices such as IP phones are allowed network access even in the absence of a RADIUS server
- MAC Pinning allows non-chatty legacy devices to stay authenticated by pinning client MAC addresses to the port until the clients logoff or get disconnected
- 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 (1Gbps or 10Gbps) using standard encryption and authentication (requires v3 modules)
- Enrollment over Secure Transport (EST) enhances the switch PKI infrastructure with a simpler, scalable and more secure method of certificate provisioning, re-enrollment and renewal
- 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 [www.hpe.com/networking/warrantysummary](http://www.hpe.com/networking/warrantysummary) for warranty and support information included with your product purchase.
- Software releases to find software for your product, refer to [www.hpe.com/networking/support](http://www.hpe.com/networking/support); for details on the software releases available with your product purchase, refer to [www.hpe.com/networking/warrantysummary](http://www.hpe.com/networking/warrantysummary)
- Services  
Refer to the Hewlett Packard Enterprise website at [www.hpe.com/networking/services](http://www.hpe.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

### 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
- Protocol Independent Multicast for IPv6 supports one-to-many and many-to-many media casting use cases such as IPTV over IPv6 networks
- 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

<b>SPECIFICATIONS</b>		
	<b>Aruba 5406R zL2 Switch (J9821A)</b>	<b>Aruba 5412R zL2 Switch (J9822A)</b>
<b>Included accessories</b>		
	1 Aruba 5400R zL2 Management Module (J9827A) 1 Aruba 5406R zL2 Switch Fan Tray (J9831A)	1 Aruba 5400R zL2 Management Module (J9827A) 1 Aruba 5412R zL2 Switch Fan Tray (J9832A)
<b>I/O ports and slots</b>		
	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
<b>Power supplies</b>		
	2 power supply slots 1 minimum power supply required (ordered separately)	4 power supply slots 2 minimum power supplies required (ordered separately)
<b>Fan tray</b>		
	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9832A 1 fan tray slot
<b>Physical characteristics</b>		
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)
Weight	24.5 lb (11.11 kg)	38.1 lb (17.28 kg)
<b>Memory and processor</b>		
v3 Gigabit Module v2 Gigabit Module v3 10G Module v2 10G Module v3 40G Module Management Module	Dual ARM® Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 450 MHz; Packet buffer size: 18 MB internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 550 MHz; Packet buffer size: 18 MB internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 450 MHz; Packet buffer size: 18 MB internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 550 MHz; Packet buffer size: 18 MB internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM
<b>Mounting and enclosure</b>		
	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
<b>Performance</b>		
	IPv6 Ready Certified	IPv6 Ready Certified
1000 Mb Latency	< 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)
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 1142.8 Mpps
Routing/Switching capacity	960 Gbps	1920 Gbps
Switch fabric speed	1015 Gbps	2030 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries



<b>SPECIFICATIONS</b>		
	<b>Aruba 5406R zL2 Switch (J9821A)</b>	<b>Aruba 5412R zL2 Switch (J9822A)</b>
<b>Environment</b>		
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: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296
<b>Electrical characteristics</b>		
Frequency	50/60 Hz	50/60 Hz
80plus.org Certification	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.
Maximum heat dissipation	2450 BTU/hr (2584 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7,807 kJ/hr) (max. using PoE)
Voltage	100 - 127/200 - 240 VAC, rated (depending on power supply chosen)	100 - 127/200 - 240 VAC, rated (depending on power supply chosen)
Idle power		
Notes	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R zL2 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R zL2 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.
<b>Safety</b>		
	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
<b>Emissions</b>		
	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A

<b>SPECIFICATIONS</b>		
	<b>Aruba 5406R zL2 Switch (J9821A)</b>	<b>Aruba 5412R zL2 Switch (J9822A)</b>
<b>Immunity</b>		
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 61000-4-5; 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
Conducted	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
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
<b>Management</b>		
	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of band; Out-of-band management (serial RS-232c or micro usb)
<b>Notes</b>		
	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).
<b>Services</b>		
	Refer to the Hewlett Packard Enterprise website at <a href="http://www.hpe.com/networking/services">www.hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://www.hpe.com/networking/services">www.hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.



<b>SPECIFICATIONS</b>		
	<b>Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)</b>	<b>Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)</b>
<b>Included accessories</b>		
	1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5412R z12 Switch Fan Tray (J9832A) 3 Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 z12 Module (J9986A) 1 Aruba 20-port 10/100/1000BASE-T PoE+ / 4-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9990A)	1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5406R z12 Switch Fan Tray (J9831A) 1 Aruba 8-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9993A) 1 Aruba 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 z12 Module (J9995A)
<b>I/O ports and slots</b>		
	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 (100M, 1/2.5/5GBaseT and 10GBaseT)  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
<b>Power supplies</b>		
	4 power supply slots 2 minimum power supplies required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)
<b>Fan tray</b>		
	Includes: 1 x J9832A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot
<b>Physical characteristics</b>		
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)
Weight	45.19 lb (20.5 kg)	28.11 lb (12.75 kg)
<b>Memory and processor</b>		
v3 Gigabit Module v2 Gigabit Module v3 10G Module v2 10G Module v3 40G Module Management Module	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM 11 @ 450 MHz; Packet buffer size: 18 Mb internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal  Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM
<b>Mounting and enclosure</b>		
	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

<b>SPECIFICATIONS</b>		
	<b>Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)</b>	<b>Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)</b>
<b>Performance</b>		
1000 Mb Latency	< 2.8 $\mu$ s (FIFO 64-byte packets)	< 2.8 $\mu$ s (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 $\mu$ s (FIFO 64-byte packets)	< 1.8 $\mu$ s (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 $\mu$ s (FIFO 64-byte packets)	< 1.5 $\mu$ s (FIFO 64-byte packets)
Throughput	up to 1142.8 Mpps	up to 571.4 Mpps
Routing/Switching capacity	1920 Gbps	960 Gbps
Switch fabric speed	2030 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
<b>Environment</b>		
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: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296
<b>Electrical characteristics</b>		
Frequency	50/60 Hz	50/60 Hz
80plus.org Certification	Gold	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.	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	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)
Voltage	110 - 127/200 - 240 VAC, rated (depending on power supply chosen)	110 - 127/200 - 240 VAC, rated (depending on power supply chosen)
Idle power	312 W	215 W
Notes	Idle power is the actual power consumption of the device with no ports connected.  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.	Idle power is the actual power consumption of the device with no ports connected.  Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.

SPECIFICATIONS		
	Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)	Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)
<b>Safety</b>		
	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
<b>Emissions</b>		
	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A
<b>Immunity</b>		
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 61000-4-5; 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
Conducted	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
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
<b>Management</b>		
	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)
<b>Notes</b>		
	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
<b>Services</b>		
	Refer to the Hewlett Packard Enterprise website at <a href="http://www.hpe.com/networking/services">www.hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://www.hpe.com/networking/services">www.hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

<b>SPECIFICATIONS</b>		
	<b>Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)</b>	<b>Aruba 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)</b>
<b>Included accessories</b>		
	1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5406R z12 Switch Fan Tray (J9831A) 1 Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 z12 Module (J9986A) 1 Aruba 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9990A)	1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5406R z12 Switch Fan Tray (J9831A) 2 Aruba 8-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9993A)
<b>I/O ports and slots</b>		
	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
<b>Power supplies</b>		
	2 power supply slots 1 minimum power supply required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)
<b>Fan tray</b>		
	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot
<b>Physical characteristics</b>		
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)
<b>Memory and processor</b>		
v3 Gigabit Module v2 Gigabit Module v3 10G Module v2 10G Module v3 40G Module Management Module	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal Dual ARM Cortex A9 @ 1; Packet buffer size: 13.5 MB internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM
<b>Mounting and enclosure</b>		
	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

<b>SPECIFICATIONS</b>		
	<b>Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)</b>	<b>Aruba 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)</b>
<b>Performance</b>		
1000 Mb Latency	< 2.8 $\mu$ s (FIFO 64-byte packets)	< 2.8 $\mu$ s (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 $\mu$ s (FIFO 64-byte packets)	< 1.8 $\mu$ s (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 $\mu$ s (FIFO 64-byte packets)	< 1.5 $\mu$ s (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
<b>Environment</b>		
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
<b>Electrical characteristics</b>		
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 (depending on power supply chosen)	110 - 127/200 - 240 VAC, rated (depending on power supply chosen)
Idle power	215 W	215 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
<b>Safety</b>		
	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
<b>Emissions</b>		
	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A

<b>SPECIFICATIONS</b>		
	<b>Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)</b>	<b>Aruba 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)</b>
<b>Immunity</b>		
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, 1kV signal, 0.5 kV DC	IEC 61000-4-5; 1 kV/2 kV AC, 1kV 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
<b>Management</b>		
	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)
<b>Notes</b>		
	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).
<b>Services</b>		
	Refer to the Hewlett Packard Enterprise website at <a href="http://www.hpe.com/networking/services">www.hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://www.hpe.com/networking/services">www.hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## 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 (SMIv2 Text Conventions)
- RFC 2580 (SMIv2 Conformance)
- RFC 3416 (SNMP Protocol Operations v2)

### 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 802.3az Energy Efficient Ethernet
- IEEE 802.3bz 2.5 Gbps and 5 Gbps interfaces
- 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 RIPv6 for IPv6
- RFC 2081 RIPv6 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

### 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
- 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 2698 A Two Rate Three Color Marker
- 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
- RFC 7030 Enrollment over Secure Transport
- RFC 6614 Transport Layer Security (TLS) Encryption over Radius (RadSec)

## ARUBA 5400R ZL2 SWITCHES AND ACCESSORIES

### Switch Models

- Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 zl2 Switch (JL001A)
- Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 zl2 Switch (JL002A)
- Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 zl2 Switch (JL003A)
- Aruba 5406R 16-port SFP+ (No PSU) v3 zl2 Switch (JL095A)

### v2 Modules

- HPE 8-port 10GBASE-T v2 zl Module (J9546A)
- HPE 8-port 10GbE SFP+ v2 zl Module (J9538A)
- HPE 12-port Gig-T PoE+/12-port SFP v2 zl Module (J9637A)
- HPE 20-port Gig-T/4-port SFP v2 zl Module (J9549A)
- HPE 20-port Gig-T/2-port 10GbE SFP+ v2 zl Module (J9548A)
- HPE 20-port Gig-T PoE+/2-port 10GbE SFP+ v2 zl Module (J9536A)
- HPE 20-port Gig-T PoE+/4-port SFP v2 zl Module (J9535A)
- HPE 24-port 10/100 PoE+ v2 zl Module (J9547A)
- HPE 24-port Gig-T v2 zl Module (J9550A)
- HPE 24-port Gig-T PoE+ v2 zl Module (J9534A)
- HPE 24-port SFP v2 zl Module (J9537A)
- HPE Advanced Services v2 zl Module with HDD (J9857A)
- HPE Advanced Services v2 zl Module with SSD (J9858A)

### v3 Modules

- Aruba 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 zl2 Module (J9995A)
- Aruba 8-port 1G/10GbE SFP+ MACsec v3 zl2 Module (J9993A)
- Aruba 12-port 10/100/1000BASE-T PoE+/12-port 1GbE SFP MACsec v3 zl2 Module (J9989A)
- Aruba 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 zl2 Module (J9990A)
- Aruba 20-port 10/100/1000BASE-T PoE+/4p 1/2.5/5/10GBASE-T PoE+ MACsec v3 zl2 Module (J9991A)
- Aruba 20-port 10/100/1000BASE-T PoE+ MACsec/1-port 40GbE QSFP+ v3 zl2 Module (J9992A)
- Aruba 24-port 10/100/1000BASE-T MACsec v3 zl2 Module (J9987A)
- Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 zl2 Module (J9986A)
- Aruba 24-port 1GbE SFP MACsec v3 zl2 Module (J9988A)
- Aruba 2-port 40GbE QSFP+ v3 zl2 Module (J9996A)
- Aruba 5400R zl2 Management Module (J9827A)

### Management Module

- Aruba 5400R zl2 Management Module (J9827A)

### Transceivers

- Aruba 100M SFP LC FX 2km MMF XCVR (J9054D)
- Aruba 1G SFP RJ45 T 100m Cat5e XCVR (J8177D)
- Aruba 1G SFP LC SX 500m MMF XCVR (J4858D)
- Aruba 1G SFP LC LX 10km SMF XCVR (J4859D)
- Aruba 1G SFP LC LH 70km SMF XCVR (J4860D)
- Aruba 10G SFP+ LC SR 300m MMF XCVR (J9150D)
- Aruba 10G SFP+ LC LR 10km SMF XCVR (J9151D)
- Aruba 10G SFP+ LC LRM 220m MMF XCVR (J9152D)
- Aruba 10G SFP+ LC ER 40km SMF XCVR (J9153D)
- Aruba 10G SFP+ to SFP+ 1m DAC Cable (J9281D)
- Aruba 10G SFP+ to SFP+ 3m DAC Cable (J9283D)
- Aruba 10G SFP+ to SFP+ 7m DAC Cable (J9285D)
- Aruba 40G QSFP+ LC BiDi 150m MMF XCVR (JL308A)
- 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 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)

### Cables

- Aruba X2C2 RJ45 to DB9 Console Cable (JL448A)
- 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)

### Power Supply

- 5400R 700W PoE+ zL2 Power Supply (J9828A)
- 5400R 1100W PoE+ zL2 Power Supply (J9829A)
- 5400R 2750W PoE+ zL2 Power Supply (J9830B)

### Mounting Kit

- HPE X450 4U/7U Universal 4-Post Rack Mounting Kit (J9852A)