

## DATA SHEET

# ARUBA 8400 SWITCH SERIES

## PRODUCT OVERVIEW

The past several decades in networking have been defined by static, closed networking solutions designed for the client-server era. Aruba is introducing the Aruba 8400 campus core and aggregation switch, a game-changing solution offering a flexible and innovative approach to dealing with the new application, security and scalability demands of the mobile-cloud and IoT era.

The 8400 provides industry-leading line rate 10GbE/40GbE/100GbE connectivity in a compact 8 slot chassis. Together with the compact 1U Aruba 8320 Switch Series, the 8400 rounds out Aruba's Mobile First switching portfolio with an enterprise core and aggregation solution that ensures higher performance and higher uptime.

The 8400 is based on the new ArubaOS-CX, a modern software system for the enterprise core that automates and simplifies many critical and complex network tasks, delivers enhanced fault tolerance and facilitates zero-service disruption during planned or unplanned control-plane events. The key innovations in ArubaOS-CX are its micro-services style modular architecture, REST APIs, Python scripting capabilities, Aruba Network Analytics Engine and Aruba Virtual Switching Extension (VSX).

ArubaOS-CX is based on a modular architecture that allows individual process re-startability and upgrades. Its REST APIs and Python scripting enables fine-grained programmability of the switch functions and its unique Aruba Network Analytics Engine provides the ability to monitor and troubleshoot the network easily.

Aruba's new virtualization technology, Aruba VSX, takes advantage of the ArubaOS-CX modern architecture, and delivers best in class high availability required by campus core and aggregation solutions.

The Network Analytics Engine framework is made up of a time series database and associated REST APIs.



## KEY FEATURES

- High performance 19.2 terabits per second switching (1.2Tbps/slot) capacity
- Carrier-class high availability with Aruba Virtual Switching Extension (VSX), redundant management, power, and fabric
- ArubaOS-CX enables automation and programmability using built-in REST APIs and Python scripts
- Intelligent monitoring and visibility with Aruba Network Analytics Engine
- Advanced Layer 2/3 feature set includes BGP, OSPF, VRF, and IPv6
- Compact 8U chassis with high density, line rate 10GbE/40GbE/100GbE connectivity

The time series database may be used to store configuration and operational state. Customers can use ArubaOS-CX REST APIs, Python scripting capabilities and time series data to write software modules for trouble shooting problems. The time series data may also be used to analyze trends, identify anomalies and predict future capacity requirements.

## FEATURES AND BENEFITS

### Product architecture

- ArubaOS-CX
  - Modular, Linux based and built with OVSDB to support a database-centric operating system.
  - Distributed architecture with separation of data and control planes.
  - Includes independent monitoring and restart of individual software modules, and enhanced software process serviceability functions.
  - Allows individual software modules to be upgraded for higher availability.
- Aruba Network Analytics Engine  
A first of a kind built-in framework for monitoring, troubleshooting and capacity planning. NAE provides automatic base-lining to automatically generate thresholds for alerts which eliminates manual configuration of thresholds.

### Performance

- **High-speed fully distributed architecture**  
Provides up to 19.2 Tbps switching capacity with up to 7.142 billion packets per second (BPPS) for throughput; all switching and routing is performed in the line modules; meets the demands of bandwidth-intensive applications today and in the future
- **Scalable system design**  
Provides investment protection to support future technologies and higher-speed connectivity

### Connectivity

- **High-density port connectivity**  
Supports up to 8 line modules; a 32-port 10 Gigabit Ethernet with MACsec in hardware (not software), an 8-port 40 Gigabit Ethernet, and a 6-port 40/100 Gigabit Ethernet module.
- **Jumbo frames**  
Allows high-performance backups and disaster-recovery systems; provides a maximum frame size of 9K bytes
- **Packet storm protection**  
Protects against unknown broadcast, unknown multicast, or unicast storms with user-defined thresholds

### Quality of Service (QoS)

- **Powerful QoS feature**  
Supports the following congestion actions: strict priority (SP) queuing and Deficit Weighted Round Robin (DWRR)

### Resiliency and high availability

#### High availability for campus core

Aruba Virtual Switching Extension\* (VSX) is a high availability technology solution designed using the best features of existing HA technologies such as Multi-chassis Link Aggregation (MC-LAG) and Virtual Switching Framework (VSF). Aruba VSX enables a distributed and redundant architecture that is highly available during upgrades inherently by architecture design. High availability is delivered through redundancy gained by deploying two chassis in the core with each chassis maintaining its independent control yet staying synchronizing information via the ArubaOS-CX unique database architecture.

#### Redundant and load-sharing fabrics, management, fan assemblies, and power supplies

Increases total performance and power availability while providing hitless, stateful failover

- **All hot-swappable modules**  
Allows replacement of modules without any impact on other modules
- **Separate data and control paths**  
Separates control from services and keeps service processing isolated; increases security and performance
- **Passive design system**  
All active chassis components are field replaceable for increased reliability
- **Bidirectional Forward Detection (BFD)**  
Enable sub-second failure detection for rapid routing protocol re-balancing
- **VRRP**  
Allows groups of two routers to dynamically back each other up to create highly available routed environments
- **Unidirectional Link Detection (UDLD)**  
Monitors link connectivity and shuts down ports at both ends if unidirectional traffic is detected, preventing loops in STP-based networks
- **IEEE 802.3ad LACP**  
Supports up to 128 LAGs (Link Aggregation Groups), each with eight links per LAG; and provides support for static or dynamic groups and a user-selectable hashing algorithm
- **Multiple internal power supplies**  
Provides high reliability, requiring only two power supplies to support a fully populated Aruba 8400 and adding two more gives the solution N+N power redundancy

\*Requires ArubaOS-CX 10.1 release.

### Virtual private network (VPN)

- **Generic Routing Encapsulation (GRE)**  
Enables tunneling traffic from site to site over a Layer 3 path

### Management

- **Management interface control**  
Enables or disables each of the following interfaces depending on security preferences: console port, or reset button
- **Industry-standard CLI with a hierarchical structure**  
Reduces training time and expenses, and increases productivity in multivendor installations
- **Management security**  
Restricts access to critical configuration commands; offers multiple privilege levels with password protection; local and remote syslog capabilities allow logging of all access
- **SNMP v2c/v3**  
Provides SNMP read and trap support of industry standard Management Information Base (MIB), and private extensions
- **sFlow® (RFC 3176)**  
Provides scalable ASIC-based wire speed network monitoring and accounting with no impact on network performance; this allows network operators to gather a variety of sophisticated network statistics and information for capacity planning and real-time network monitoring purposes
- **Remote monitoring (RMON)**  
Uses standard SNMP to monitor essential network functions and supports events, alarms, history, and statistics groups as well as a private alarm extension group
- **TFTP and SFTP support**  
Offers different mechanisms for configuration updates; trivial FTP (TFTP) allows bidirectional transfers over a TCP/IP network; Secure File Transfer Protocol (SFTP) runs over an SSH tunnel to provide additional security
- **Debug and sampler utility**  
Supports ping and traceroute for both IPv4 and IPv6
- **Network Time Protocol (NTP)**  
Synchronizes timekeeping among distributed time servers and clients; keeps timekeeping consistent among all clock-dependent devices within the network so the devices can provide diverse applications based on the consistent time

- **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
- **Dual flash images**  
Provides independent primary and secondary operating system files for backup while upgrading

### Layer 2 switching

- **VLAN**  
Supports up to 4,094 port-based or IEEE 802.1Q-based VLANs
- **Bridge Protocol Data Unit (BPDU) tunneling**  
Transmits STP BPDUs transparently, allowing correct tree calculations across service providers, WANs, or MANs
- **Port mirroring**  
Duplicates port traffic (ingress and egress) to a monitoring port; supports 4 mirroring groups, with an unlimited number of ports per group
- **STP**  
Supports standard IEEE 802.1D STP, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- **Internet Group Management Protocol (IGMP)**  
Controls and manages the flooding of multicast packets in a Layer 2 network
- **Rapid Per-VLAN spanning tree plus (RPVST+)**  
Allows each VLAN to build a separate spanning tree to improve link bandwidth usage in network environments with multiple VLANs

### Layer 3 services

- **Address Resolution Protocol (ARP)**  
Determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network
- **UDP helper**  
Redirects UDP broadcasts to specific IP subnets to prevent server spoofing
- **Dynamic Host Configuration Protocol (DHCP)**  
Simplifies the management of large IP networks and supports client; DHCP Relay enables DHCP operation across subnets
- **Domain Name System (DNS)**  
Provides a distributed database that translates domain names and IP addresses, which simplifies network design; supports client and server

### Layer 3 routing

- **Static IPv4 routing**  
Provides simple manually configured IPv4 routing
- **Open shortest path first (OSPF)**  
Delivers faster convergence; uses link-state routing Interior Gateway Protocol (IGP), which supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
- **Border Gateway Protocol 4 (BGP-4)**  
Delivers an implementation of the Exterior Gateway Protocol (EGP) utilizing path vectors; uses TCP for enhanced reliability for the route discovery process; reduces bandwidth consumption by advertising only incremental updates; supports extensive policies for increased flexibility; scales to very large networks
- **IP performance optimization**  
Provides a set of tools to improve the performance of IPv4 networks; includes directed broadcasts, customization of TCP parameters, support of ICMP error packets, and extensive display capabilities
- **Static IPv6 routing**  
Provides simple manually configured IPv6 routing
- **Dual IP stack**  
Maintains separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design
- **OSPFv3 for IPv6**  
Delivers faster convergence; uses link-state routing Interior Gateway Protocol (IGP), which supports ECMP, NSSA, and IPSEC authentication for increased security and graceful restart for faster failure recovery
- **Equal-Cost Multipath (ECMP)**  
Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth

### Security

- **TAA Compliance**  
The Aruba 8400, a TAA compliant product, with the ArubaOS-CX uses FIPS 140-2 validated cryptography for protection of sensitive information
- **Access control list (ACL)**  
Supports powerful ACLs for both IPv4 and IPv6; ACLs are used for filtering traffic to prevent unauthorized users from accessing the network, or for controlling network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on a Layer 2 header or a Layer 3 protocol header

- **Remote Authentication Dial-In User Service (RADIUS)**  
Eases security access administration by using a password authentication server
- **Terminal Access Controller Access-Control System (TACACS+)**  
Delivers an authentication tool using TCP with encryption of the full authentication request, providing additional security
- **Management access security**  
Aruba OS CX provides for both on-box as well as off-box authentication for administrative access. RADIUS or TACACS+ can be used to provide encrypted user authentication. Additionally, TACACS+ can also provide user authorization services
- **Secure shell (SSHv2)**  
Uses external servers to securely log in to a remote device; with authentication and encryption, it protects against IP spoofing and plain-text password interception; increases the security of Secure FTP (SFTP) transfers

### Multicast

- **IGMP Snooping**  
Allows multiple VLANs to receive the same IPv4 multicast traffic, lessening network bandwidth demand by reducing multiple streams to each VLAN
- **Protocol Independent Multicast (PIM)**  
Defines modes of IPv4 multicasting to allow one-to-many and many-to-many transmission of information; supports PIM, Sparse Mode (SM)
- **Internet Group Management Protocol (IGMP)**  
Utilizes Any-Source Multicast (ASM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3

### Additional information

- **Green initiative support**  
Provides support for RoHS and WEEE regulations

### Warranty and support

- **5-year Warranty**  
See [hpe.com/networking/warrantysummary](http://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](http://hpe.com/networking/support); for details on the software releases available with your product purchase, refer to [hpe.com/networking/warrantysummary](http://hpe.com/networking/warrantysummary).

## SPECIFICATIONS

### Line modules and slots

- Supports a maximum of 256 10GbE (SFP/SFP+) ports, or 64 40GbE (QSFP+) ports, or 48 ports 40/100GbE (QSFP28) combination
- Eight slots for line modules

### Module VoQ

- 1.5GB for JL363A and JL365A
- 3GB for JL366A

### Additional ports and slots

- 2 Management Module slots
- 3 Fabric Module slots
- 4 Power Supply slots

### Power supplies

- 4 power supply slots
- 2 minimum power supply required for a fully loaded chassis (or with 8 Line Modules)

### Fan tray

- Included with JL376A

### Physical characteristics

- Dimensions: 17.4(w) x 26(d) x 13.8(h) in. (44.1 x 66.0 x 35.1 cm) (8U height)
- Weight
  - Empty configuration weight: 76 lbs (34 kg)
  - JL376A weight: 164 lbs (74 kg)
  - Full configuration weight: 241 lbs (109 kg)

### Mounting and enclosure

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

### Reliability

- 99.999%

### Environment

- Operating: 32°F to 104°F (-0°C to 40°C) with 5% to 95%, non-condensing
- Non-Operating: -40°F to 158°F (-40°C to 70°C) with 5% to 95%, non-condensing
- Max Operating Altitude: Up to 10,000ft (3.048 Km)
- Max Non-Operating Altitude: Up to 30,000ft (9.144 Km)
- Acoustics
  - Sound Power (LWAd) 7.3 Bel
  - Sound Pressure (LpAm) (Bystander) 55.6 dB

### Electrical characteristics

- Frequency: 47-63 Hz
- AC voltage: 90 – 140/180 – 264 VAC
- DC voltage
- Current: 16 A
- Power output: 2750 W

### Safety

- EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013
- EN62368-1:2014
- IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013
- IEC62368-1, Ed. 2
- IEC60825:2007 (Applies to products with lasers)
- UL60950-1, CSA 22.2 No 60950-1
- UL62368-1 Ed. 2

### Emissions

- VCCI Class A; EN 55022 Class A; CISPR 22 Class A; IEC/EN 61000-3-2;
- IEC/EN 61000-3-3; ICES-003 Class A; AS/NZS CISPR 22 Class A; FCC
- (CFR 47, Part 15) Class A; GB9254
- EN55032:2012 Class A
- CISPR32:2012 Class A

### Immunity

- Generic: Directive 2014/35/EU
- EN: EN 55024:2010+ A1:2001 + A2:2003; ETSI EN 300 386 V1.3.3
- ESD: EN 61000-4-2
- Radiated: EN 61000-4-3
- EFT/Burst: EN 61000-4-4
- Surge: EN 61000-4-5
- Conducted: EN 61000-4-6
- Power frequency magnetic field: IEC 61000-4-8
- Voltage dips and interruptions: EN 61000-4-11
- Harmonics: EN 61000-3-2, IEC 61000-3-2
- Flicker: EN 61000-3-3, IEC 61000-3-3

### Management

- SNMP
- RJ45 for Serial Console
- USB-Type A for file management only
- RJ45 Ethernet for OOBM

## Services

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

- 802.1AB-2009
- 802.1AE
- 802.1ak-2007
- 802.1t-2001
- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3ae 10-Gigabit Ethernet
- IEEE 802.3ba 40 and 100 Gigabit Ethernet Architecture
- IEEE 802.3z 1000BASE-X
- RFC 768 UDP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 768 User Datagram Protocol
- RFC 813 Window and Acknowledgement Strategy in TCP
- RFC 815 IP datagram reassembly algorithms
- RFC 879 TCP maximum segment size and related topics
- RFC 896 Congestion control in IP/TCP internetworks
- RFC 917 Internet subnets
- RFC 919 Broadcasting Internet Datagrams
- RFC 922 Broadcasting Internet Datagrams in the Presence of Subnets (IP\_BROAD)
- RFC 925 Multi-LAN address resolution
- RFC 1215 Convention for defining traps for use with the SNMP
- RFC 1256 ICMP Router Discovery Messages
- RFC 1393 Traceroute Using an IP Option
- RFC 1591 Domain Name System Structure and Delegation
- RFC 1981 Path MTU Discovery for IP version 6
- RFC 1997 BGP Communities Attribute
- RFC 1998 An Application of the BGP Community Attribute in Multi-home Routing
- RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
- RFC 2787 Definitions of Managed Objects for the Virtual Router Redundancy Protocol
- RFC 2918 Route Refresh Capability for BGP-4
- RFC 2934 Protocol Independent Multicast MIB for IPv4
- RFC 3137 OSPF Stub Router Advertisement
- RFC 3176 InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks
- RFC 3509 Alternative Implementations of OSPF Area Border Routers
- RFC 3623 Graceful OSPF Restart
- RFC 4486 Subcodes for BGP Cease Notification Message
- RFC 4724 Graceful Restart Mechanism for BGP
- RFC 4940 IANA Considerations for OSPF
- RFC 5187 OSPFv3 Graceful Restart
- RFC 6987 OSPF Stub Router Advertisement
- RFC 7047 The Open vSwitch Database Management Protocol
- RFC 4251 The Secure Shell (SSH) Protocol
- RFC 4271 A Border Gateway Protocol 4 (BGP-4)
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4292 IP Forwarding Table MIB
- RFC 4293 Management Information Base for the Internet Protocol (IP)

## BUNDLES, MODULES AND ACCESSORIES

### Aruba 8400 Bundles

- JL375A Aruba 8400 Bundle includes: Aruba 8400 8-slot chassis, 3 x Fan Trays, 18 x Fans, Cable Manager, X462 2-post Rack Rail Kit
- JL376A Aruba 8400 Bundle includes: Aruba 8400 8-slot chassis bundle (JL375A), 1 x Management Module, 3 x Power Supplies, 2 x 8400X Fabric Modules, 1 x 32-port 10G Module, 1 x 8-port 40G Module

### Modules

- Aruba 8400X 32-port 10GbE SFP/SFP+ with MACsec Advanced Module (JL363A)
- Aruba 8400X 8-port 40GbE QSFP+ Advanced Module (JL365A)
- Aruba 8400X 6-port 40GbE/100GbE QSFP28 Advanced Module (JL366A)
- Aruba 8400X 7.2Tbps Fabric Module (JL367A)
- Aruba 8400 Management Module (JL368A)

### Accessories

- Aruba X731 Fan Tray (JL369A)
- Aruba 8400 Fan for X731 Fan Tray (JL370A)
- Aruba 8400 1 Fan Tray and 6 Fans Bundle (JL371A)

### Power supply

- Aruba X382 54VDC 2700W AC Power Supply (JL372A)

### Mounting kit

- Aruba X464 4-post Rack Rail Kit (JL373A)
- Aruba X462 2-post Rack Rail Kit (JL374A)

### Console Cable

- Aruba X2C2 RJ45 to DB9 Console Cable (JL448A)

### Transceivers

- 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 1G SFP RJ45 T 100m Cat5e XCVR (J8177D)
- Aruba 10G SFP+ LC SR 300m MMF XCVR (J9150D)
- Aruba 10G SFP+ LC LRM 220m MMF XCVR (J9152D)
- Aruba 10G SFP+ LC LR 10km SMF XCVR (J9151D)
- Aruba 10G SFP+ LC ER 40km SMF XCVR (J9153D)
- Aruba 10G SFP+ to SFP+ 1m DAC Cable (J9281D)
- Aruba 10GBASE-T SFP+ RJ45 30m Cat6A XCVR (JL563A)<sup>1, 2</sup>
- 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)
- Aruba 40G QSFP+ LC ER4 40km SMF XCVR (Q9G82A)<sup>2</sup>
- 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)
- Aruba 100G QSFP28-QSFP28 3m DAC Cable (JL307A)
- Aruba 100G QSFP28 MPO SR4 MMF XCVR (JL309A)
- Aruba 100G QSFP28 LC LR4 SMF XCVR (JL310A)

<sup>1</sup> Maximum of 12 10GBASE-T transceivers per module (JL363A)

<sup>2</sup> Available in CY18Q2



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