DATA SHEET

ARUBA 8400X 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 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 8400X is based on the new ArubaOS-CX, a modern software system for the core that automates and simplifies many critical and complex network tasks. Its unique Aruba Network Analytics Engine provides the ability to monitor and troubleshoot the network, system, application and security-related issues easily, through simple python agents and REST APIs. The Network Analytics Engine capability comes with a built-in time series database that enables customers and developers to develop software modules that allow historical troubleshooting, as well as analysis of historical trends, to predict and avoid future problems due to scale, security and performance bottlenecks.

The 8400X provides industry-leading line rate 10GbE/40GbE/100GbE port density, very low latency, and scalability for support of full Internet routes. The Aruba 8400X rounds out Aruba's Mobile First switching portfolio with an enterprise core and aggregation solution that ensures higher performance and higher uptime.

KEY FEATURES

- High performance 19.2 terabits per second switching (1.2Tbps/slot) capacity
- Carrier-class high availability with redundant management, power and fabric
- ArubaOS-CX enables automation and usability 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
- Multi-chassis link aggregation

FEATURES AND BENEFITS

Product architecture

- ArubaOS-CX
  Built with OVSDB to support a database-centric operating system to ensure higher availability, dynamic software process changes for reduced downtime, and more importantly, built with Linux as its underpinning.

  - Includes stability, independent monitoring and restart of individual software modules, and enhanced software process serviceability functions; allows individual software modules to be upgraded for higher availability; supports enhanced serviceability functions.
  - Distributed architecture with separation of data and control planes.
  - Delivers enhanced fault tolerance and facilitates nearly continuous operation and zero-service disruption during planned or unplanned control-plane events.

- Network Analytics Engine
  A first of a kind built-in framework for network assurance and remediation. Combining the full automation and deep visibility capabilities of the Aruba0S-CX, this unique framework allows monitoring, troubleshooting and easy network data collection by using simple scripting agents.

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 I/O 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**
  Offers up to 8 interface module; a 32-port 10 Gigabit Ethernet with MACsec in HW, 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
- **Loopback**
  Supports internal loopback testing for maintenance purposes and an increase in availability; loopback detection protects against incorrect cabling or network configurations and can be enabled on a per-port or per-VLAN basis for added flexibility
- **Ethernet operations, administration, and maintenance (OAM)**
  Detects data link layer problems that occurred in the "last mile" using the IEEE 802.3ah OAM standard; monitors the status of the link between 2 devices
- **Flexible port selection**
  Provides a combination of fiber and copper transceiver to support 1000BASE-T and 10GBASE-T copper solution
- **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 weighted round robin

Resiliency and high availability

- **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**
  Delivers increased system reliability as the backplane has no active components
- **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 trunks, each with eight links per trunk; 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 8400X and adding two more gives the solution N+N power redundancy

Virtual private network (VPN)

- **Generic Routing Encapsulation (GRE)**
  Transports Layer 2 connectivity over a Layer 3 path in a secured way; enables these aggregation of traffic from site to site
- **Manual or automatic Internet Key Exchange (IKE)**
  Provides both manual or automatic key exchange required for the algorithms used in encryption or authentication; auto-IKE allows automated management of the public key exchange, providing the highest levels of encryption

Management

- **Management interface control**
  Enables or disables each of the following interfaces depending on security preferences: console port, telnet port, or reset button
- **Industry-standard CLI with a hierarchical structure**
  Reduces training time and expenses, and increases productivity in multivendor installations

- **Management security**
  Restricts access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide telnet and SNMP access; local and remote syslog capabilities allow logging of all access
- **SNMP v2c**
  Support for SNMP; provides full support of industry-standard Management Information Base (MIB) plus 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
- **FTP, TFTP, and SFTP support**
  Offers different mechanisms for configuration updates; FTP allows bidirectional transfers over a TCP/IP network; trivial FTP (TFTP) is a simpler method using User Datagram Protocol (UDP); 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
- **Multiple configuration files**
  Stores easily to the flash image

Layer 2 switching

- **VLAN**
  Supports up to 4,096 port-based or IEEE 802.1Q-based VLANs; and supports MAC-based VLANs, protocol-based VLANs, and IP-subnet-based VLANs for added flexibility
- **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 local or remote 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) and Multicast Listener Discovery (MLD) protocol snooping**
  Controls and manages the flooding of multicast packets in a Layer 2 network
- **Per-VLAN spanning tree plus**
  Allows each VLAN to build a separate spanning tree to improve link bandwidth usage in network environments with multiple VLANs
- **Isolation at data link layer with private VLANs**
  Provides, through a two-tier VLAN structure, an additional layer of protection, simplifying network configuration while saving VLAN resources

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 and server; 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
- **Policy-based routing**
  Makes routing decisions based on policies set by the network administrator
- **IP performance optimization**
  Provides a set of tools to improve the performance of IPv4 networks; includes directed broadcasts, customization of TCP parameters, support of ICNP error packets, and extensive display capabilities
- **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**
  Provides OSPF support for IPv6
- **BGP+**
  Extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing
- **Equal-Cost Multipath (ECMP)**
  Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth
- **IPv6 tunneling**
  Provides an important element for the transition from IPv4 to IPv6; allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured 6-to-4 intra-site-automatic-tunnel-addressing-protocol (ISATAP) tunnels, and IPv6 VPN provider-edge router tunnel

Security

- **Access control list (ACL)**
  Supports powerful ACLs for both IPv4 and IPv6; ACLs are used for filtering traffic to prevent unauthorized users from accessing the network, or for controlling network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on a Layer 2 header or a Layer 3 protocol header; rules can be set to operate on specific dates or times
- **Remote Authentication Dial-In User Service (RADIUS)**
  Eases 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 logon security**
  Helps secure CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- **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

Convergence

- **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
- **Protocol Independent Multicast (PIM)**
  Defines modes of IPv4 and IPv6 multicasting to allow one-to-many and many-to-many transmission of information; supports PIM Dense Mode (DM), Sparse Mode (SM), and Source-Specific Multicast (SSM)
- **Internet Group Management Protocol (IGMP)**
  Utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3
- **Multicast Listener Discovery (MLD) protocol**
  Establishes, maintains, and manages IPv6 multicast groups and networks; supports v1 and v2 and utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM)
- **Multicast VLAN**
  Allows multiple VLANs to receive the same IPv4 or IPv6 multicast traffic, lessening network bandwidth demand by reducing multiple streams to each VLAN

Additional information

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

Warranty and support

- **1-year 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.

SPECIFICATIONS

I/O ports and slots 8 I/O module slots

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

Module VoQ

- 1.5GB for JL363A and JL365A
- 3GB for JLH366A

Additional ports and slots

- 2 Management Module slots
- 3 Fabric Module slots
- 4 Power Supply slots
- JL376A, the "redundant" bundle, includes 2 Fabric Modules, 1 Management Module, 3 Power Supplies for N+1 Power Supply

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

MTBF (Hours)

- 271,844, Aruba 8400X 32-port 10GbE SFP/SFP+ with MACsec Advanced Module (JL363A)
- 370,024, Aruba 8400X 8-port 40GbE QSFP+ Advanced Module (JL365A)
- 301,837, Aruba 8400X 6-port 40GbE/100GbE QSFP28 Advanced Module (JL366A)
- 354, 650, Aruba 8400X 7.2Tbps Fabric Module (JL367A)
- 500,465, Aruba 8400 Management Module (JL368A)
- 10,560,922, Aruba X731 Fan Tray (JL369A)
- 3,571,429, Aruba 8400 Fan for X731 Fan Tray (JL370A)
- 2,668,882, Aruba 8400 1 Fan Tray and 6 Fans Bundle (JL371A)

Management

- Out-of-band management (serial RS-232C); SNMP Manager; Telnet; terminal interface (serial RS-232C); modem interface; IEEE 802.3 Ethernet MIB; Ethernet Interface MIB

Services

- Refer to the Hewlett Packard Enterprise website at 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 802.3x Flow Control
- IEEE 802.3z 1000BASE-X
- RFC 768 UDP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- 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)
- draft-ietf-idr-bgp4-mib-15 Peer TableObjects

BUNDLES, MODULES AND ACCESSORIES

Aruba 8400 Bundles

- Aruba 8400 8-slot Chassis/3xFan Trays/18xFans/Cable Manager/X462 Bundle (JL375A)
- Aruba 8400 8-slot chassis, 1x Management Module, 3x PS, 2x 8400X Fabric Modules, 1x 32-port 10G Module, and 1x 6-port 40/100G Module (JL376A)

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 2750W AC Power Supply (JL372A)

Mounting kit

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

Transceivers

- HPE X121 1G SFP LC SX Transceiver (J4858C)
- HPE X121 1G SFP LC LX Transceiver (J4859C)
- HPE X121 1G SFP LC LH Transceiver (J4860C)
- HPE X121 1G SFP RJ45 T Transceiver (J8177C)
- HPE X111 100M SFP LC FX Transceiver (J9054C)
- 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 X132 10G SFP+ LC ER Transceiver (J9153A)
- HPE X242 10G SFP+ to SFP+ 1m DAC Cable (J9281B)
- HPE X242 10G SFP+ to SFP+ 3m DAC Cable (J9283B)
- HPE X242 10G SFP+ to SFP+ 7m DAC Cable (J9285B)
- HPE X244 10G XFP SFP+ 1m DAC Cable (J9300A)
- HPE X244 10G XFP SFP+ 3m DAC Cable (J9301A)
- 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)
- HPE X241 100G QSFP28-QSFP28 5m DAC Cable (JL307A)
- HPE X141 40G QSFP+ LC BiDi 150m MMF XCVR (JL308A)
- HPE X151 100G QSFP28 MPO SR4 MMF XCVR (JL309A)
- HPE X151 100G QSFP28 LC LR4 SMF XCVR (JL310A)

a Hewlett Packard Enterprise company

3333 SCOTT BLVD | SANTA CLARA, CA 95054
1.844.473.2782 | T: 1.408.227.4500 | FAX: 1.408.227.4550 | INFO@ARUBANETWORKS.COM

www.arubanetworks.com