DATA SHEET

ARUBA CX 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. The Aruba CX 8400 campus core and aggregation switch is 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 Aruba CX 8400 also serves as a data center switch in either a core/aggregation or a leaf/spine topology.

The 8400 provides carrier class high availability with industry-leading line rate 10GbE/25GbE/40GbE/100GbE connectivity in a compact 8 slot chassis. It provides up to 19.2 Tbps of switching capacity based on a fully resilient design that includes redundant fabric, management, power and fans to create a resilient, highly available network that is ideal for the most demanding campus core and data center networks.

PRODUCT DIFFERENTIATORS
AOS-CX - a modern software system
The Aruba CX 8400 Switch Series is based on AOS-CX, a modern, database-driven operating system that automates and simplifies many critical and complex network tasks. A built-in time series database enables customers and developers to utilize software scripts for historical troubleshooting, as well as analysis of past trends. This helps predict and avoid future problems due to scale, security, and performance bottlenecks.

Our AOS-CX software also includes Aruba Network Analytics Engine (NAE) and support for Aruba NetEdit. Because AOS-CX is built on a modular Linux architecture with a stateful database, our operating system provides the following unique capabilities:

- Easy access to all network state information allows unique visibility and analytics
- REST APIs and Python scripting for fine-grained programmability of network tasks
- A micro-services architecture that enables full integration with other workflow systems and services
- Continual state synchronization that provides superior fault tolerance and high availability

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
- AOS-CX enables automation and programmability using built-in REST APIs and Python scripts
- Intelligent monitoring, visibility, and remediation with Aruba Network Analytics Engine
- One touch deployment with the Aruba CX Mobile App
- Aruba NetEdit support for automated configuration and verification
- Advanced Layer 2/3 feature set includes BGP, EVPN, OSPF, VRF, and IPv6
- Compact 8U chassis with high density, line rate 10GbE/25GbE/40GbE/100GbE connectivity

- All software processes communicate with the database rather than each other, ensuring near real-time state and resiliency and allowing individual software modules to be independently upgraded for higher availability

Aruba Network Analytics Engine - advanced monitoring and diagnostics
For enhanced visibility and troubleshooting, Aruba’s Network Analytics Engine (NAE) automatically interrogates and analyzes events that can impact a networks health. Advanced telemetry and automation provide the ability to easily identify and troubleshoot network, system, application and security related issues easily, through the use of python agents and REST APIs.
The Time Series Database (TSDB) stores configuration and operational state data, making it available to quickly resolve network issues. The data may also be used to analyze trends, identify anomalies and predict future capacity requirements.

**Aruba NetEdit – automated switch configuration and management**

The entire Aruba CX portfolio empowers IT teams to orchestrate multiple switch configuration changes for smooth end-to-end service rollouts. Aruba NetEdit introduces automation that allows for rapid network-wide changes, and ensures policy conformance post network updates. Intelligent capabilities include search, edit, validation (including conformance checking), deployment and audit features. Capabilities include:

- Centralized configuration with validation for consistency and compliance
- Time savings via simultaneous viewing and editing of multiple configurations
- Customized validation tests for corporate compliance and network design
- Automated large-scale configuration deployment without programming
- Network health and topology visibility via Aruba NAE integration

Note: A separate software license is required to use Aruba NetEdit.

**Aruba CX Mobile App – unparalleled deployment convenience**

An easy to use mobile app simplifies connecting and managing Aruba CX switches for any size project. Switch information can also be imported into Aruba NetEdit for simplified configuration management and to continuously validate the conformance of configurations anywhere in the network. The Aruba CX Mobile App is available for download.

**Aruba Virtual Switching Extension (VSX)**

The ability of AOS-CX to maintain synchronous state across dual control planes allows a simplified carrier-class high availability solution called Aruba Virtual Switching Extension (VSX). Designed using the best features of existing high availability technologies such as Multi-chassis Link Aggregation (MC LAG), Aruba VSX enables a distributed architecture that is highly available during upgrades or control plane events. Features include:

- Continuous configuration synchronization via AOS-CX
- Flexible active-active network designs at Layers 2 and 3
- Operational simplicity and usability for easy configuration
- High availability by design during upgrades including support for VSX Live Upgrade with LACP traffic draining

**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, including a 32-port 10 Gigabit Ethernet with MACsec in hardware (not software), an 8-port 40 Gigabit Ethernet, a 6-port 40/100 Gigabit Ethernet module and a 32 port 25GbE 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 increased 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
- **Packet storm protection**
  Protects against unknown broadcast, unknown multicast, or unicast storms with user-defined thresholds

**Quality of Service (QoS)**

Supports the following congestion actions: strict priority (SP) queuing and Deficit Weighted Round Robin (DWRR)

**Resiliency and high availability**

- **AOS-CX software resiliency with VSX**
- **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
- **Passive design system**
  All active chassis components are field replaceable for increased reliability
Separate data and control paths
Separates control from services and keeps service processing isolated; increases security and performance

Data Center Bridging (DCB)
Supports lossless Ethernet networks with standard PFC, ETS, and DCBx

Bidirectional Forward Detection (BFD)
Enable sub-second failure detection for rapid routing protocol re-balancing

Virtual Router Redundancy Protocol (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 CX 8400 and adding two more gives the solution N+N power redundancy

Management
In addition to the Aruba CX Mobile App, Aruba NetEdit and Aruba Network Analytics Engine, the 8400 series offers the following:

- Built-in programmable and easy to use REST API interface
- IPSLA
  Monitor the network for degradation of various services, including monitoring voice. Monitoring is enabled via the NAE for history and for automated gathering of additional information when anomalies are detected.
- 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. Can serve as the NTP server in a customer network

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

- VLAN Translation
  Remaps VLANs during transit across a core network.

- 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)

• **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

• **IP Directed Broadcast**
  Supports directed broadcast on configured network subnets

• **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**

• **Policy Based Routing (PBR)**
  Enables using a classifier to select traffic that can be forwarded based on policy set by the network administrator

• **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

• **Multiprotocol BGP (MP-BGP) with IPv6 Address Family**
  Enables sharing of IPv6 routes using BGP and connections to BGP peers using IPv6.

• **IPv6 Multicast Routing**
  Provides capability to enable routing of IPv6 multicast traffic. Supports multicast listener discovery (MLD), MLD Snooping, and PIM-SM IPv6 Routing.

• **6in4 tunnels**
  Supports the tunneling of IPv6 traffic in an IPv4 network.

• **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

• **Generic Routing Encapsulation**
  Enables tunneling from site to site over a Layer 3 path

**Security**

• **TAA Compliance**
  The Aruba CX 8400, a TAA compliant product, with the AOS-CX uses FIPS 140-2 validated cryptography for protection of sensitive information

• **Access control list (ACL) Features**
  Supports powerful ACLs for both IPv4 and IPv6. Supports creation of object groups representing sets of devices like IP addresses. For instance, IT management devices could be grouped in this way. ACLs can also support protecting control plane services such as SSH, SNMP, NTP or web servers
• 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
  AOS-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
• Anycast RP
  Two or more RPs configured with same /32 Host IP
  address on loopback interfaces. All the downstream
  routers will be configured to point to Anycast RP address
  for multicast routes. Device will automatically select the
  closest RP for each source and receiver. If equal costs
  routes exist, the process of registering the sources will be
  shared equally by all the RPs in the network.
• MSDP Mesh Groups
  MSDP used for Anycast RP is an intradomain feature
  that provides redundancy and load-sharing capabilities.
  When MSDP mesh groups are used, SA messages are not
  flooded to other mesh group peers. When MSDP peer in
  group receives SA message from another MSDP peer in
  the group, it assumes that this SA message was sent to all
  the other MSDP peers in the group. It also eliminates RPF
  checks on arriving SA messages. With MSDP mesh group
  configured, SA messages are always accepted from mesh
  group peer
• PIM-Dense Mode
  Floods multicast traffic to every corner of the network
  (push-model). Method is for delivering data to receivers
  without receivers requesting the data. Can be efficient in
  certain deployments in which there are active receivers
  on every subnet in the network. Branches without
  downstream receivers are pruned from the forwarding
  trees.
• FastLeave (FL) and Forced-FastLeave (FFL) for IGMP
  FL and FFL for IGMP/MLD speed up the process of
  blocking unnecessary Multicast traffic to a switch port that
  is connected to end nodes. They help to eliminate the
  CPU overhead of having to generate an IGMP/MLD Group-
  Specific Query message.
• Support for Microsoft Network Load Balancer (NLB) for
  server applications
• 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) and PIM Dense Mode (DM)
• 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, services and support
• Limited Lifetime Warranty
  See https://www.arubanetworks.com/support-
  services/product-warranties/ for warranty and support
  information included with your product purchase.
• For Software Releases and Documentation,
  refer to https://asp.arubanetworks.com/downloads
• For support and services information,
  visit https://www.arubanetworks.com/support-services/
arubacare/

SPECIFICATIONS
Line modules and slots
• Supports a maximum of 256 10GbE (SFP/SFP+) or 25G
  (SFP/SFP+/SFP28) ports, or 64 40GbE (QSFP+) ports, or 48
  ports 40/100GbE (QSFP28) combination
• Eight slots for line modules

Module VoQ
• 4GB for JL687A
• 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

**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**
- 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; IEC-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+ A1:2003; 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 61000-4-8
- 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

**STANDARDS AND PROTOCOLS**
The following standards and protocols are supported.
- IEEE 802.1AB-2009
- IEEE 802.1ak-2007
- IEEE 802.1t-2001
- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering
- 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 802.3x Flow Control
- IEEE 802.3z Gigabit Ethernet
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3ba 40 Gigabit Ethernet Architecture
- RFC 768 UDP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 768 User Datagram Protocol
BUNDLES, MODULES AND ACCESSORIES

Aruba CX 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)
Consult the ArubaOS-Switch and AOS-CX Transceiver Guide in the Aruba Support Portal for the minimum required software releases to support these transceivers.

Maximum of 12 10GBASE-T transceivers per JL363A module. Only supported for use in ports 1-12.

JL687A supports 1G and 10G transceivers. See Aruba Transceiver manuals for details.

1 Consult the ArubaOS-Switch and AOS-CX Transceiver Guide in the Aruba Support Portal for the minimum required software releases to support these transceivers.
2 Maximum of 12 10GBASE-T transceivers per JL363A module. Only supported for use in ports 1-12.
3 JL687A supports 1G and 10G transceivers. See Aruba Transceiver manuals for details.