Aruba 8360 Switch Series

Presenters:

- Steve Baker
- Ruben Iglesias
- Matt Fern









- 2 Use Cases
- 3 Operation
- 4 Troubleshooting



a Hewlett Packard Enterprise company

Overview

CX 8360 Switch Series





Power Supplies

FRUs (Field Replaceable Units)

Characteristics

- Redundancy: N+1 operation
- Hot swappable
- Max power: 500W
- Inlet Socket: C14
- Airflow direction: color coded

JL600A

- Aruba 8360 550W Port-to-Power 100-240VAC Power Supply
- RED: hot aisle

JL712A

- Aruba 8360 550W Power-to-Port 100-240VAC Power Supply
- BLUE: cold aisle







If one PSU fails

 The failed PSU must stay in the switch (unplugged) until replaced to prevent air "leaking" and preserve the correct flow



FRUs (Field Replaceable Units)

All PSUs and Fans MUST provide the same airflow direction



Fan 1 Fan 2 Fan 3

JL714A

- Aruba 8360 Port-to-Power Fan
- RED: hot aisle

JL715A

- Aruba 8360 Power-to-Port Fan
- BLUE: cold aisle





Airflow direction label

If one FAN fails

- The other fans will operate at 100% speed indefinitely
- The failed FAN must stay in the switch until replaced to prevent air "leaking" and preserve the correct flow

System Airflow

Normal Operation

- Configured automatically at every boot-up
 - Is not runtime reconfigurable
- Matches PS1 hardware
 - Or PS2 if PS1 is not powered
 - If PSU or Fan does not match airflow, CX will disable it
- Changing the airflow direction requires
 - New PSUs and Fans
 - A full shutdown

8360 Switch SKUs

Base (Chassis)	Front to Back	Back to Front	
JL721A	JL708A	JL709A	
JL717A	JL700A	JL701A	
JL718A	JL702A	JL703A	
JL720A	JL706A	JL707A	
JL722A	JL710A	JL711A	_
	Base (Chassis) JL721A JL717A JL718A JL720A JL722A	Base (Chassis)Front to BackJL721AJL708AJL717AJL700AJL718AJL702AJL720AJL706AJL722AJL710A	Note the second of the second

Breakout Cables

- Available on:
 - All QSFP28 Ports
- Caveats
 - 8360-48XT4C does not support splitting (at all)
 - Reboot required to transition between split and unsplit configurations

8360(config)# interface 1/1/33
8360(config-if)# split
8360(config-if)# interface 1/1/33:1
8360(config-if)# no shutdown

<reboot switch>

8360(confi	g-if)#	show int	terface brief	include	1/1/33		
1/1/33:1		routed	QSFP+DA3x4	yes	up		10000
1/1/33:2		routed	QSFP+DA3x4	no	down	Administratively down	
1/1/33:3		routed	QSFP+DA3x4	no	down	Administratively down	
1/1/33:4		routed	QSFP+DA3x4	no	down	Administratively down	

8360(config-if)# show interface transceiver | include 1/1/33 1/1/33 QSFP+DA3x4 721064-B21 833230642 6400-093a

10



The CX 8360 bundles do not include rack kits so one of the following must be ordered separately:

- 2-post Rack-Mount Kit (JL602A)
- 4-post Rack-Mount Kit (J9583B)





Aruba X544 Universal 4-post Duct Kit (JL716A)

- Once mounted, Power to Port scenarios have power side facing cold aisle positioned 'inside' rack.
 - Hot air rising from racked equipment enters switch increasing overall temperature.
- Recommended (but not mandatory) for 4 post Power to Port airflow deployment scenarios.
 - Air duct allows cold air intake as kit will be aligned with front (cold side) of rack.
 - Helps to optimize the airflow through the switch.
- Port to Power airflow direction, hot air will release 'mid rack' and air duct could be useful to guide hot air all way to the hot aisle (optional).
- 4-post rack (revision B) mount kit must be ordered separately.
- Can also be used with the Aruba 6300M 48G Pwr2Prt 2F 1PS Bundle (JL762A)



CX 8360 - BaseT

8360-48XT4C

- 100M ports
 - Don't support half duplex
 - Will parallel detect to 100FDx and not 100HDx
 - Don't support setting forced mode.
- 100M & 1G configured ports
 - FC counters will not be accurate (Tele 1 issue possibly addressed later in Tele 2)

– <u>BaseT Optics</u>

- Aruba 10GBASE-T SFP+ RJ45 30m Cat6A XCVR (JL563A)
- Aruba 1G SFP RJ45 T 100m Cat5e XCVR (J8177D)
- Do not support setting forced mode: auto negotiation only (8360-32Y4C, 8360-16Y2C)
- 10G only on MACsec port 1-4 (8360-32Y4C) 1G not supported
- Only a single speed is supported specific to the xcvr purchased (All 8360 Models)
- Link Level Flow Control is not supported (All 8360 Models)







CX 8360 Transceivers/Cables

- The Aruba CX 8360 Series Switches do not support the use of 10G LRM (J9152D) or 7M 10G DAC (J9285D).
- Splitting ports:
 - All ports can set speed independently expect 1 port group on 8360-32Y4C
 - 8360-32Y4C ports 1-4 are MACsec capable and all must operate at the same speed setting (System Interface Group 1)
 - A reboot is required to transition between split and unsplit configurations (10.7 is planned to fix and allow us to split without a reboot)
 - The Aruba CX 8360-48XT-4C switch does not support split ports
 - HIT Split Cables are supported
- Unsupported Transceiver mode is supported
 - Applies to Transceivers and DACs
 - 1G and 10G only
 - Unsupported 25/40/100G are still LOCKED OUT
 - Supported list on Aruba documentation
 - Nothing is guaranteed (Differences in DAC characteristics loss, levels most relevant to issues)
 - For Transceivers:
 - 3rd party transceivers that adhere to MSA standard (+ properly programmed MSA-dictated EEPROM locations) should work without issue
 - I.E. Other vendors may violate those practices and put information in different locations or leave it out entirely
 - We don't support LX4, ZR (not an IEEE standard)
 - 3rd party AOCs that "properly" mimic a 10G SR should also work without issue.









a Hewlett Packard Enterprise company

Use Cases

Use cases

- Datacenter
 - Spine and Leaf
 - Leaf
 - Small spine
 - RoCEv2
- EVPN/VTEP Functionality
 - DCN or Campus (VNBT)

- MACsec
 - Securing DCI
 - Securing Campus Bldg to Bldg traffic
 - Securing Campus Traffic between Bldg floors

Layer 3 Spine and Leaf



RoCE Use Cases	Description	Platforms	Comments		
1-tier Core RoCEv1	 Initiators/targets connected to DC Core (VSX Pair) Pure L2 solution 	 8325/8360 8400 PFC only on 25G, 40G, and 100G cards No PFC on split interfaces 	 Supports PFC, ETS, DCBx Target = Secondary Storage Aruba will provide support for switches deployed using these protocols – 		
2-tier Layer2 RoCEv1	 Initiators/targets connected to access switches VSX LAGs southbound to servers, northbound to L2 Core Pure L2 solution 		Aruba TAC would work with PointNext/Storage if necessary From storage team perspective they will not state the end to end solution is supported until Aruba is in SPOCK		
Spine and Leaf – Underlay RoCEv2	 Initiators/targets connected to Leaf switches Leaf switches have VSX LAGs southbound to servers, northbound to L2 Core L3 solution 	 8360 8400 PFC only on 25G, 40G, and 100G cards No PFC on split interfaces 	 Supports PFC, ETS, DCBx, IP ECN, ECN + PFC same port Target = Secondary Storage Aruba will provide support for switches deployed using these protocols – Aruba TAC would work with PointNext/Storage if necessary From storage team perspective they will not state the end to end solution is supported until Aruba is in SPOCK 		



a Hewlett Packard Enterprise company

Operation

Management Interfaces

Device Management

- Front panel
 - OOBM: 1GbE host Port
 - AUX: USB-A Port
 - Supports Bluetooth adapter
 - Console: USB-c Port
- Rear panel
 - Console: RJ-45 Serial Port
- If both console ports are connected at the same time
 - USB-c will be enabled for command entry
 - RJ-45 will mirror CLI output



Luggage Tag

Device Management



USB Type-A Port Definition

- Use Cases

- Use with Aruba CX Mobile App to manage switch over Bluetooth*
- Transfer Switch Software Images without Network Connectivity
- Save and Apply Configs

*Requires Aruba Bluetooth accessory and Aruba-CX app



8 Bluetooth



20

Accessing a USB-A drive

- a. Insert your USB Device into the USB Port
 - i. Must be FAT32 format
- b. In SVOS
 - i. Mount the USB device: SVOS> mount usb
 ii. Before removing unmount the USB device: SVOS> umount usb
 iii. To view files on the USB device: SVOS> ls /mnt/usb
 iv. Update AOS-CX from USB device: SVOS> update prim |sec /mnt/usb/<image.swi>
- c. In AOS-CX
 - i. Enable USB Port:
 - ii. Mount USB Device:
 - iii. Copy Config to USB Device:
 - iv. Copy Config from USB Device:

switch (config) # usb
switch (config) # usb mount
switch# copy running-config usb
switch# copy usb running-config



USB-C Use Cases

- 1. CLI access (same as serial console)**
- 2. Only 1 console can be used at a time. System will output to both consoles simultaneously, but system will only accept input from 1 console port.

USB-C has priority if both are in use.

**Requires User to download and install standard USB driver.

Driver is available from HPE-Aruba: https://support.arubanetworks.com/ToolsResources/tabid/76/DMX Module/514/Default.aspx?EntryId=27916



Status Indicators

Device Management

- Front panel
 - Global Status
 - UID (Locator LED)
 - Speed
 - Usr1
 - Usr2
- Rear Panel
 - Global Status
 - UID (Locator LED)
 - Fan Trays
 - Power Supplies





Console

Global Status Indicator

- a. Global Status Indicator ("Heartbeat")
 - i. Startup Behavior:
 - 1.In SVOSFLASH Green
 - 2. In AOS-CX FLASH Green Self Test In Progress

ii. Normal Behavior:

In SVOS FLASH Green
 In AOS-CX ON Green = Self Test PASS, Fans & PSUs OK

iii. Fault Behavior:

- 1. In SVOS
- 2. In AOS-CX:

No Fault Defined (System Not Monitored) FLASH Amber synchronously with Fault Port FLASH Amber FAN or PSU Fault or Illegal config FLASH Amber Fatal Hardware Fault/Issue



UID (Unit Identification LED/Locator LED)

a. Global Status Indicator ("Heartbeat")

- b. UID (Unit Identification LED/Locator LED)
 - i. Startup Behavior: OFF
 - ii.Normal Behavior:OFF, Unless Defined by User: ON or FLASH
ON Blue for 30 Minutes by Default
FLASH Blue for 30 Minutes by Default
 - iii. Fault Behavior: No Fault Defined

led locator ?

- fast blink Fast blink the LED
- flashing Blink the LED
- half_bright Set LED intensity to half brig
- off Switch off the LED(Default)
- on Switch on the LED





h

Back Status Indicator

- c. Back Status Indicator
 - i. Startup Behavior: OFF
 - ii. Normal Behavior: ON Green
 - iii. Fault Behavior:
- Slow FLASH Amber

fault in one of the modules in the back of the chassis (Health LED Slow FLASH Amber synchronously)



Fan Status

- a. Fan Slot Identifier***
 - *** Fan status of all 3 Fan Tray Slots can be viewed in AOS-CX using CLI command "show environment fan"

b. Fan Status LED

- i. Normal Behavior:
- In SVOS
 ON Green, Fan inserted*
 In AOS-CX
 ON Green, Fan inserted***
- ii. Fault Behavior:
 - 1. In SVOS ON Amber, illegal fan, or other fault*
 - 2. In AOS-CX ON Amber, illegal fan, or other fault**
 - * System performs a one-time service to check for System Airflow conflicts (illegal fan inserted). Due to this, the status of the fans will not be monitored by SW. It's recommended to make any changes to Fan installations in AOS-CX.
 - ** All fault events that occur in AOS-CX will correspond to a warning available in the Event Log.



Port LED Behavior (SFP Ports)

SFP28 Link/Activity LED

- i. Startup Behavior:
 - 1. In SVOS OFF
 - 2. In AOS-CX OFF (Before Valid Link)
- ii. Normal Behavior:
 - 1. In AOS-CX OFF Half-Bright Green FLASHING, full bright, Green
- iii. Fault Behavior:
 - 1. In AOS-CX

OFF, No Fault FLASHING Amber, Top Port Bottom Port

No Valid Link Valid Link Indication Indicator of traffic activity



Fault (Blink Synchronously with Health LED)

Port LED Behavior (QSFP Ports)

QSFP Link/Activity LEDs

• 4 LEDs/port

1.

- 100G/40G all 4 LEDs blink in unison
- Split port mode, 1 LED/sub-port*
- i. Startup Behavior:
 - 1. In SVOS OFF
 - 2. In AOS-CX OFF (Before Valid Link)
- ii. Normal Behavior:
 - In AOS-CX OFF Half-Bright Green FLASHING, full bright, Green
- iii. Fault Behavior:
- 1. In AOS-CX

OFF, No Fault FLASHING Amber

Fault (Blink Synchronously with Health LED)

No Valid Link

Valid Link Indication

Indicator of traffic activity





31

OOBM LED Behavior

- i. Startup Behavior:
 - 1. In SVOS OFF (Before Valid Link)
 - 2. In AOS-CX OFF (B
- OFF (Before Valid Link)
- ii. Normal Behavior:

1.

- In SVOSOFFNo Valid LinkHalf-Bright GreenValid Link IndicationFLASHING, full bright, Green Indicator of traffic activity
- 2. In AOS-CX OFF No Valid Link Half-Bright Green Valid Link Indication FLASHING, full bright, Green Indicator of traffic activity

OOBM Link/Act



Q

AUX LED Behavior

- i. Startup Behavior:
 - 1. In SVOS OFF
 - 2. In AOS-CX OFF
- ii. Normal Behavior:
 - 1. In SVOS
- OFF Green FLASHING Green
- No Client installed Valid Link Indication Indicator of transfer activity

2. In AOS-CX

- OFF Half-Bright Green FLASHING Green
- No Client installed Valid Link Indication Indicator of transfer activity



FRU LEDs - PSUs

JL632A and JL633A PSU Status LED [a]

- i. Startup Behavior: ON Green
- ii. Normal Behavior: ON Green
- iii. Fault Behavior: ON or Flashing Amber
- iv. Unpowered* Behavior: OFF

*Unpowered = Inserted in switch but no AC power connected





a Hewlett Packard Enterprise company

System and Troubleshooting

System Environment

- 8360 System Environment consists of 4 major components:
 - uBoot Bootloader, basic instructions for CPU prior to ServiceOS execution
 - ServiceOS (SVOS) System maintenance and Auto-ISP functionality
 - AOS-CX Fully programmable switch software environment
 - Bash Linux shell available in SVOS and AOS-CX for debugging and troubleshooting



Power-On and Boot Process

- One PSU required for operation
 - System airflow direction is determined at boot by PS1 (or PS2 if PS1 not installed and supplying power) and cannot be reconfigured during switch operation
 - Switch must be powered off and power supplies/fans swapped to change system airflow direction
- Minimum of 3 operational fans
 - Fan fault will be logged by **fand** (fan daemon) and a warning message will be printed to screen if minimum is not satisfied
 - Installed fans must match system airflow direction; fans in conflict will be disabled and do not count toward minimum
- Global Status LED will flash green until AOS-CX successfully passes self-test initialization



Q

Reboot Types

- "Cold Boot" - Powering on

- Cold Boot occurs only after a power cycle:
 - Remove AC power from all installed power supplies, reconnect after 30 seconds
 - While power supplies are hot-swappable, do not insert a power supply while it is connected to AC power

- "Warm Boot" - Software-initiated reboot

- Warm boot can be accomplished in the following ways:
 - In SVOS: reboot
 - May be entered from the SVOS shell or login prompt
 - In AOS-CX: boot system [primary | secondary | serviceos]
 - If no boot target is specified, uses the current default boot image (primary or secondary)
 - Auto-ISP: Automatic (reboot after each component is updated)

Command Line Interface

Serial Console CLI Access (RJ45 or USB-C)

- For serial console CLI access, either an RJ45 serial console adapter/cable or a USB-C cable is required. See "accessories and kits"
- Baud rate on serial console is fixed at 115200
 - In AOS-Switch products, baud rate is "auto-sensed" at connection time or manually configured between 9600 and 115200
- Note that the RJ45 serial console port is located on at the rear of the chassis, while the USB-C port is located on the front
- The USB-C console port takes priority over the RJ45 console port if both are in use simultaneously

OOBM CLI Access

- OOBM is a dedicated network port for switch management
- OOBM supports 10/100/1000Mbps
- To enable the OOBM port, user must have network connection and configure the port for DHCP or static IP

8360 Troubleshooting: Evaluation – system environment

1. Evaluate the system environment experiencing the issue

- Is the issue in uBoot, ServiceOS, or AOS-CX?
 - uBoot Device does not ever display SVOS information or no console output
 - ServiceOS Device is not able to launch or execute AOS-CX
 - AOS-CX

uBoot

- SW behaving not as expected, unexpected output
- SW feature is not working as expected

- Abbreviations and Description for System Software Environment

- Boot Loader / Basic Instructions for CPU prior to SVOS
- SVOS or ServiceOS
 Light weight OS to support Auto-ISP and zeroization
- AOS-CX or AOS-CX Fully Programmable Switch Software Environment
- Bash Shell

- Linux Bash Shell for debug purposes; available in SVOS and AOS-CX
- Auto-ISP (In-System Programming)
- Feature that updates all system programmable devices (uBoot, SVOS, component firmware)

8360 Troubleshooting: Programmable device updates

2. Verify that all ISP updates are enabled

- AOS-CX update images contain programmable device update packages that are checked and applied at boot time by the ServiceOS
- Check for available programmable device updates before rebooting

show needed-updates next-boot [primary | secondary]

- Checks for SVOS, uBoot, AOS-CX, FPGAs and PHY firmware updates contained in the specified image (primary or secondary)
- Some updates, including uBoot, require temporarily enabling "unsafe" updates; interrupting these updates before they are complete may render the switch unusable

switch(config)# allow-unsafe-updates 10

This command will enable non-failsafe updates of programmable devices for the next 1 minutes. You will first need to wait for all line and fabric modules to reach the ready state, and then reboot the switch to begin applying any needed updates. Ensure that the switch will not lose power, be rebooted again, or have any modules removed until all updates have finished and all line and fabric modules have returned to the ready state.

WARNING: Interrupting these updates may make the product unusable!

Continue (y/n)? y

Unsafe updates : allowed (less than 1 minute(s) remaining)

8360 Troubleshooting: General Troubleshooting

3. LED Behavior

- -What is the LED behavior when issue is present?
 - Cross reference with expected LED behavior to identify possible causes

4. Check installation method

- -Where and how is the device installed?
 - Cross reference against system installation requirements, environment requirements, air flow, etc.

5. Last option zeroize device to remove all customer variance

- -Customer may have applied configuration settings or system alterations via bash shell
 - Zeroize the device to remove all customer variance, if acceptable for customer
 - See "zeroization steps" slide for details
 - All unit configuration (including checkpoints) and history (boot/event logs) will be lost
 - Zeroization should only be performed as a last resort

8360 Troubleshooting : Zeroization

Securely erase and restore all customer data

Zeroization is used to securely erase all customer data and restore SW environment to factory default.

- May be executed by an admin from AOS-CX (erase all zeroize) or ServiceOS (erase zeroize)
- If run from AOS-CX, switch reboots to ServiceOS to zeroize the switch
- AOS-CX software images are backed up to RAM and restored after zeroization is complete
- All bits undergo 0→1→0 transition to completely "zeroize" customer data (data not recoverable)
- Switch **must not** be powered off until zeroization is complete and software images are restored
- Zeroization process takes approximately 2 minutes
- NOTE: all logs and data are lost in zeroization... collect all applicable data <u>before</u> performing zeroization!

SVOS≻ erase zeroize

Continue (y/n)? y reboot: Restarting system

Looking for SVOS.

Primary SVOS: Checking...Loading...Finding...Verifying...Booting...

ServiceOS Information:

ersion:	LL.01.07.0002-internal
uild Date:	2020-08-06 15:28:29 PDT
uild ID:	Service0S:LL.01.07.0002-internal:dda876520fb4:202008061528
HA:	dda876520fb40eaa156e78150d6ef1e6b23fcc39

8360 Troubleshooting : Logs

Types of Logs in AOS-CX

- 1. Event Log All System Events with Time Stamp
 - Use Case
 Check for specific events related to failure/issue
 - Can add filtering to search for types of failures
 - Example switch# show events

switch# show events | include "filter"

- 2. hpe-isp log System ISP Update History
 - Use Case
 Confirm customer received switch from MFG in expected state
 - Check for any failed updates
 - Example switch# show tech
 switch# show tech update
- 3. Support files Collect all system and debug logs
 - Use Case
 Gathering data when opening a ticket and involving lab support
 - Example switch# copy support-files all sftp://user@1.2.3.4//file.tar.gz vrf mgmt

8360 Troubleshooting: Transceivers and DACs

–Detection or Enablement Issues

- Is the issue related to Transceivers or DACs being detected by the system?
- Check output of "show interface brief" and "show interface transceiver" for clues.
- Confirm the accessories in question are being properly identified

–Accessories Support Issues

- Is proper Accessories being used with 8360 switch?
- Third-party transceivers will report "unknown" or "unsupported" under transceiver status. These accessories will not be able to link or pass traffic
- Confirm configs/setup don't cause "incompatible" interface status
 - -interface-group speed
 - -10GBase-T conflict

–Link or Traffic Issues

- Does the link status change, or does traffic degrade (including dropped packets)?
- Use event log to check for link status changes
- Check the configuration to ensure there are no config conflicts
- _ Does the suspect issue correspond to any particular event, time of day, transceiver/DAC, or L2/L3 feature?



a Hewlett Packard Enterprise company

Demo





a Hewlett Packard Enterprise company