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Introduction to Aruba 8400

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8400

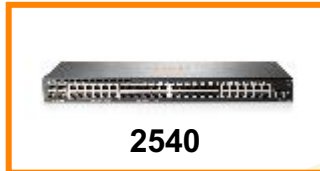
Hardware Overview

Aruba campus edge switch portfolio



2530

- Layer 2
- 8, 24 or 48 ports with 10/100 or Gig
- sFlow, ACLs, IPv6
- Fanless & compact models
- Models with 10GbE uplinks
- PoE+ models



2540

- Layer 2 with static & RIP routing
- 24, 48 ports Gig
- PoE+ models
- Fixed 10GbE Uplinks
- Internal Power supply
- Central support



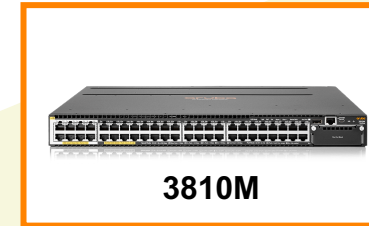
2930F

- Standard Layer 3 with static, RIP routing & Access OSPF
- 4 Unit VSF Stacking
- 8, 24, 48 ports Gig
- PoE+ models
- Fixed 1GbE and 10GbE Uplinks
- Internal Power supply
- OpenFlow
- Central support



2930M

- Standard Layer 3 with static, RIP routing & OSPF
- 10 Unit Backplane Stacking
- Redundant power
- Modular 10GbE and 40GbE uplinks
- OpenFlow
- Central support
- 1440W PoE/Redundant Power



3810M

- Advanced Layer 3
- 24 or 48 port Gig
- Smart Rate multi-gigabit Ethernet
- Wire speed 40GbE
- PoE+ models
- Modular uplinks
- Redundant power
- 10 unit stacking
- OpenFlow

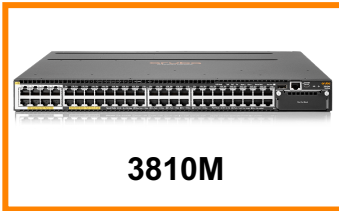


5400R

- Advanced Layer 3
- 6 and 12- slot compact chassis
- Smart Rate multi-gigabit Ethernet
- Wire speed 40GbE
- Redundant mgmt. and power
- 96 10GbE ports, 288 1 GbE ports
- 288 ports full PoE+ capable
- OpenFlow

Campus, branch and SMB networks

Aruba campus core and aggregation switch portfolio



3810M

- Advanced Layer 3 and BGP
- 16 to 24 ports of 10G
- Flexible uplinks using 4 ports of 10G or 2 ports of 40G
- Redundant power
- 10 unit stacking
- OpenFlow



5400R

- Advanced Layer 3 and BGP
- 6 and 12- slot compact chassis
- Smart Rate multi-gigabit Ethernet
- Wire speed 40GbE
- Redundant mgmt. and power
- 96 10GbE ports, 288 1 GbE ports
- 288 ports full PoE+ capable
- OpenFlow



8320

- Advanced Layer 3, including IPv4/IPv6 routing, BGP, and VRF
- 48 ports of 10G to support SFP/SFP+ and 6 ports of 40G to support QSFP+
- Up to 2.5Tbps of switching capacity and 1.9BPPS
- Flexible bundle that includes 2x power supplies, 5x fans, and the unit (JL479A)
- Supports SFP/SFP+ and QSFP+ Transceivers
- Wire speed 10G and 40G
- Redundant fan and power supplies



8400

- Advanced Layer 3, including IPv4/IPv6 routing, BGP, and VRF
- 8-slot chassis with redundant mgmt. module, fan, fabric module, and power
- Up to 19.2Tbps of switching capacity and 7.14 BPPS
- Flexible bundles that includes 32 ports of 10G and 8 ports of 40G (JL376A)
- Line Modules: 32Px10G w/ MACsec, 8Px40G, and 6Px40G/100G
- Wire speed 10, 40, and 100G
- Up to 256 10G ports, 64 40G ports, and 48 ports of 100G ports

Campus core and aggregation solutions

Introducing Aruba 8400: Campus Aggregation & Core



8 RU x 26.0" Depth
240 lbs. populated
8 Line Card Slots
3 Fabric Card Slots
2 Management Slots
4 Power Supplies
18 Fan Modules

***9.6Tb/s of Line Rate
Port Bandwidth***

1.2 Tb/s Ingress + Egress Forwarding per Slot

1.8 Tb/s Fabric Interface In + Out



19.2 Tb/s, VoQ Dynamic Load Balanced Fabric

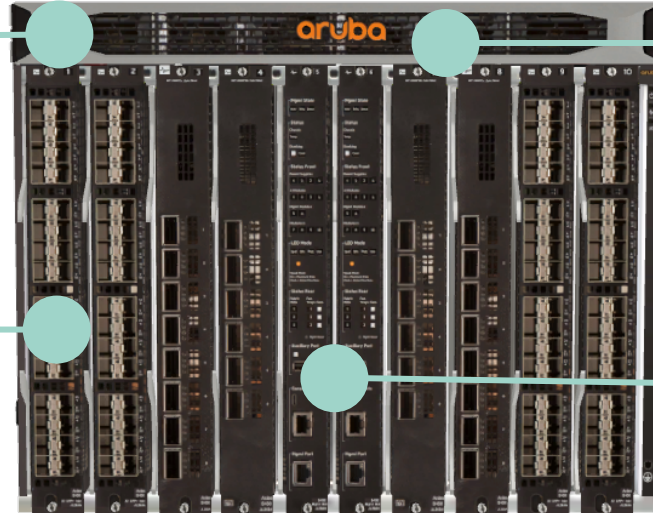
99.999% Available, Redundant Passive Chassis

8400 Hardware Architecture: Built for Scalability & HA

FRONT VIEW

N+N AC Power
Supply
4x2500W PS

8 Line Card Slots
Up to 1.2 Tbps



8 Rack Units.
17.4" W x
13.8" H x
26.0" D

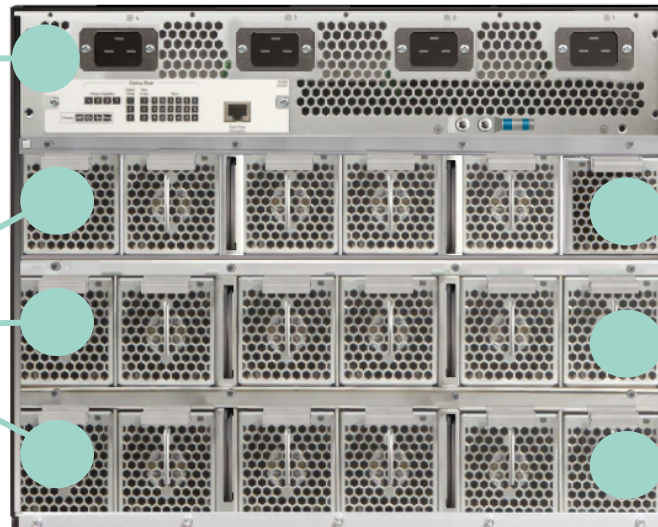
Redundant
Management
Modules with X86
CPU for scalability

- Fully extensible fabric design – allows for seamless upgrades to future bandwidth scale
- Line Cards: 32x10G, 8x40G, 6x100G
- 0 to 40 degrees C
- Front to Back Airflow
- Mountable on 19 inch, 2 post rack

REAR VIEW

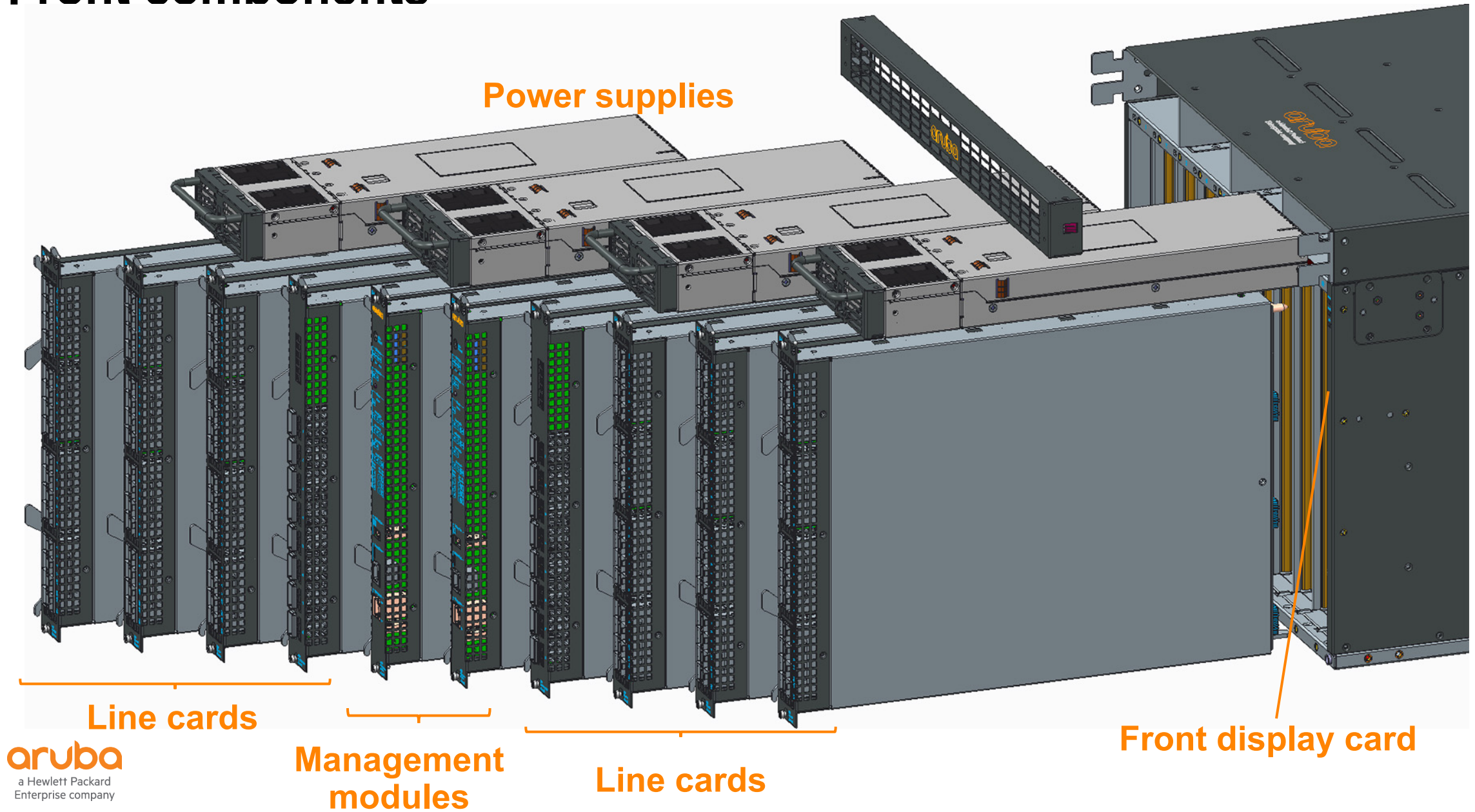
AC Inlets

3 Fabric Modules
w/ N+1
Redundancy

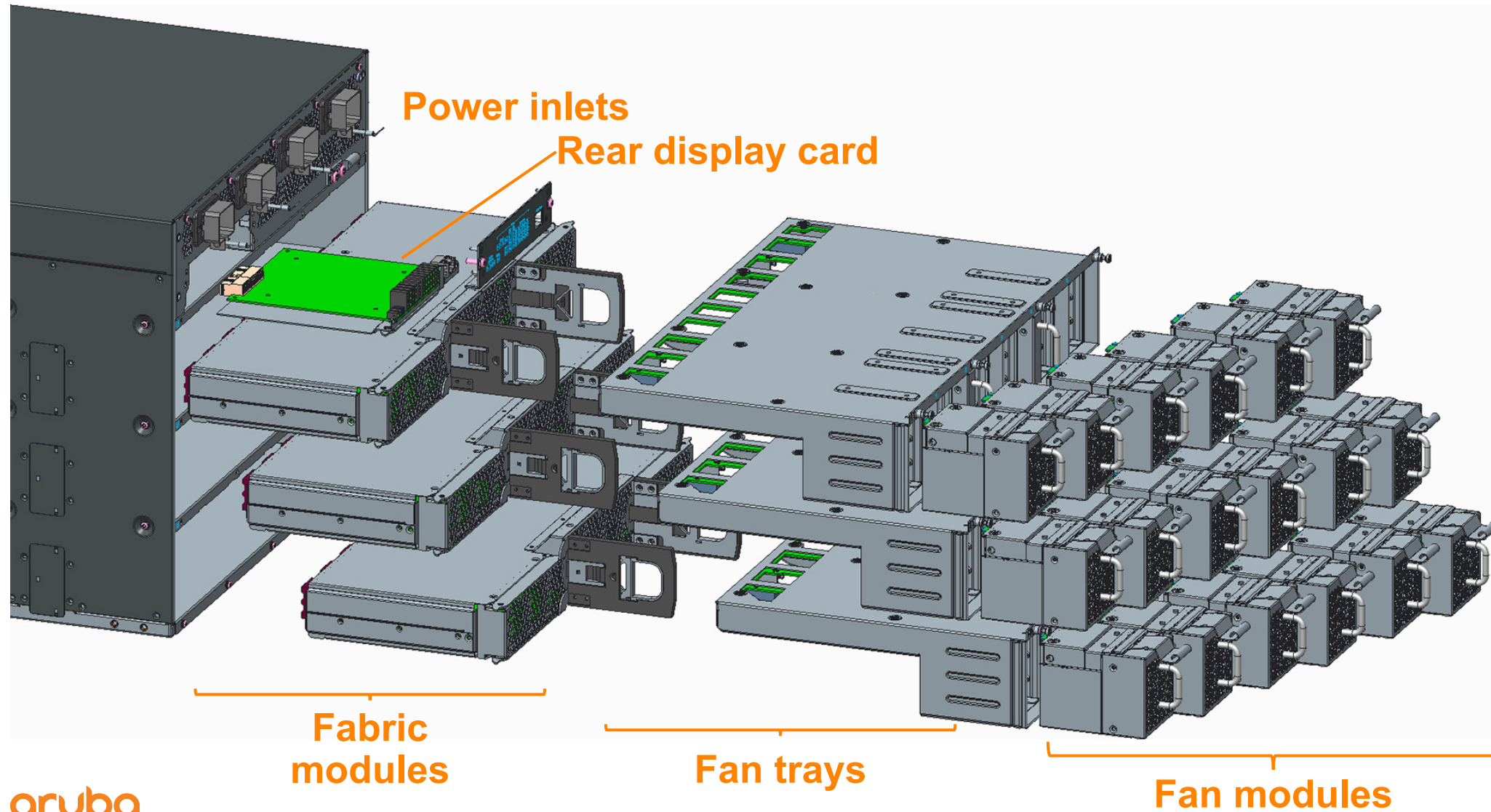


3 Rows of 6 Fans
w/ N+1
Redundancy

Front components



Rear components



Line cards

JL363A - Aruba 8400 32-port 10GbE SFP/SFP+ with MACsec Advanced Module

- 10GbE x 32 SFP+ w/ MACsec
- 1x external TCAM
- Packet buffer: 1.5 GB
 - Note: MACsec not supported on ArubaOS-CX release 1



JL365A - Aruba 8400 8-port 40GbE QSFP+ Advanced Module

- 40GbE x 8 QSFP
- 1x external TCAM
- Packet buffer: 1.5 GB



JL366A - Aruba 8400 6-port 40GbE/100GbE QSFP28 Advanced Module

- 100GbE x 6 QSFP
- 2x external TCAM
- Packet buffer: 3.0 GB
- Requires 3 Fabric for 100% Throughput, estimate 80% with 2 Fabric



Management modules

JL368A - Aruba 8400 Management Module

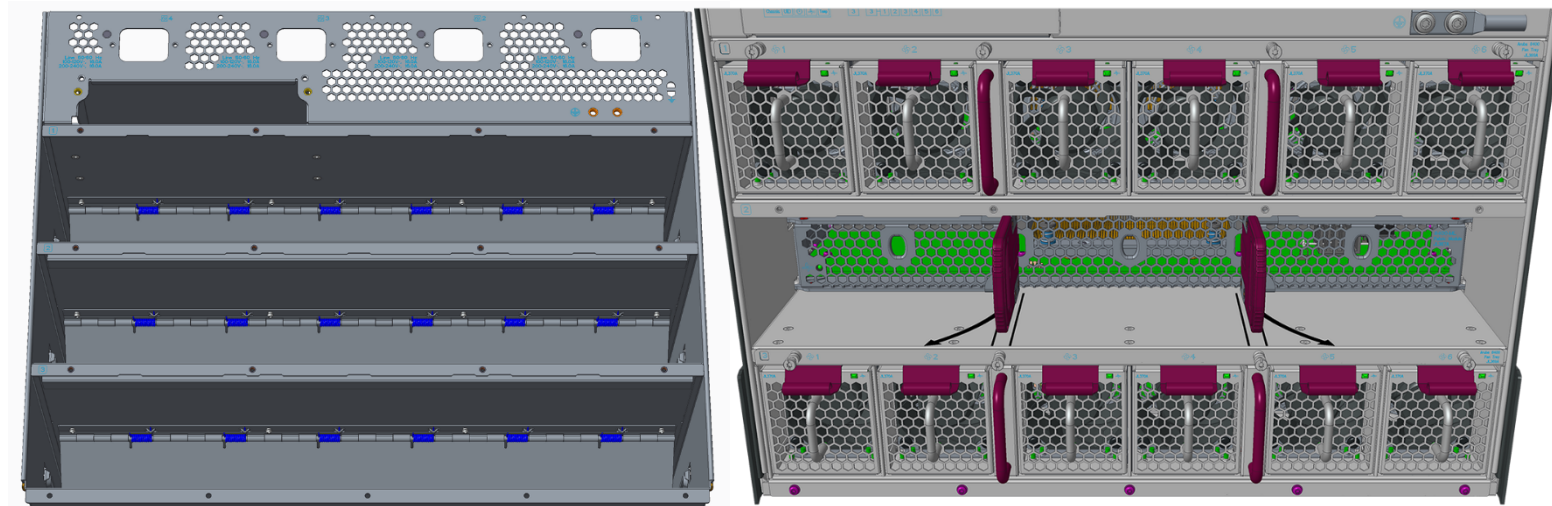
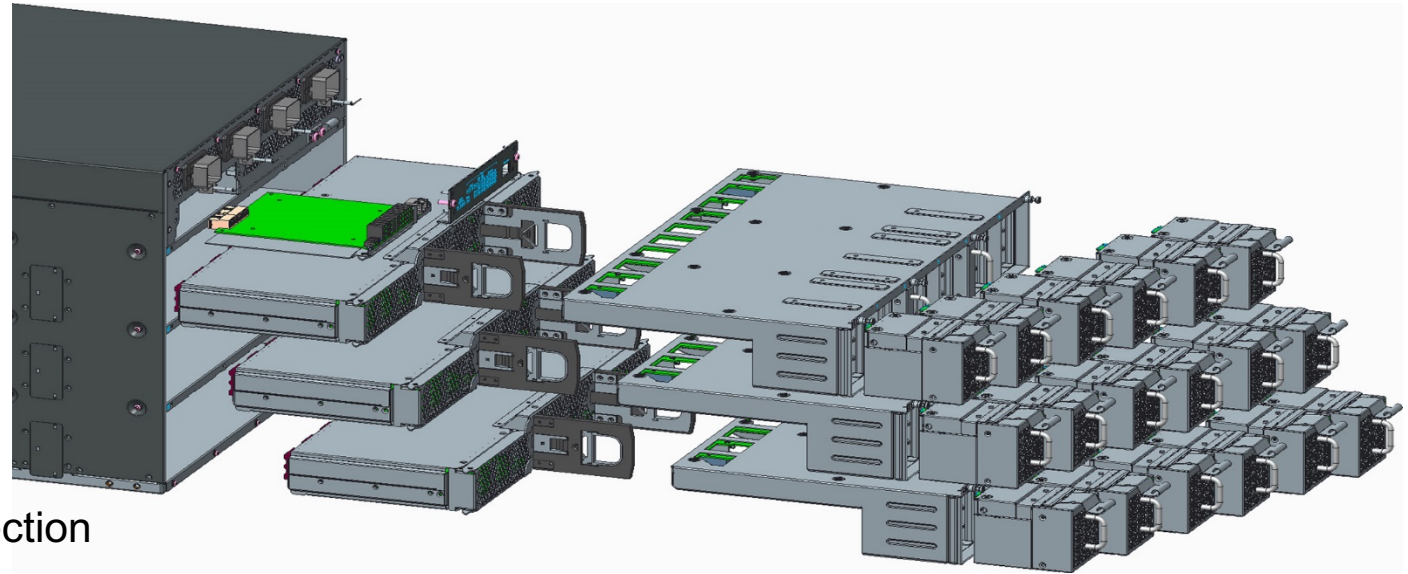
- Runs
 - ArubaOS-CX operating system
 - Management plane + control plane
- 1+1 redundancy
 - Slots 5 and 6
- Detailed status display
 - CPU/memory/storage
 - Intel Broadwell-DE
 - DRAM: 32GB DDR4 DRAM
 - SSD: 120GB
- External connectors
 - Console ports: RJ45 and MicroUSB
 - OOB Ethernet management



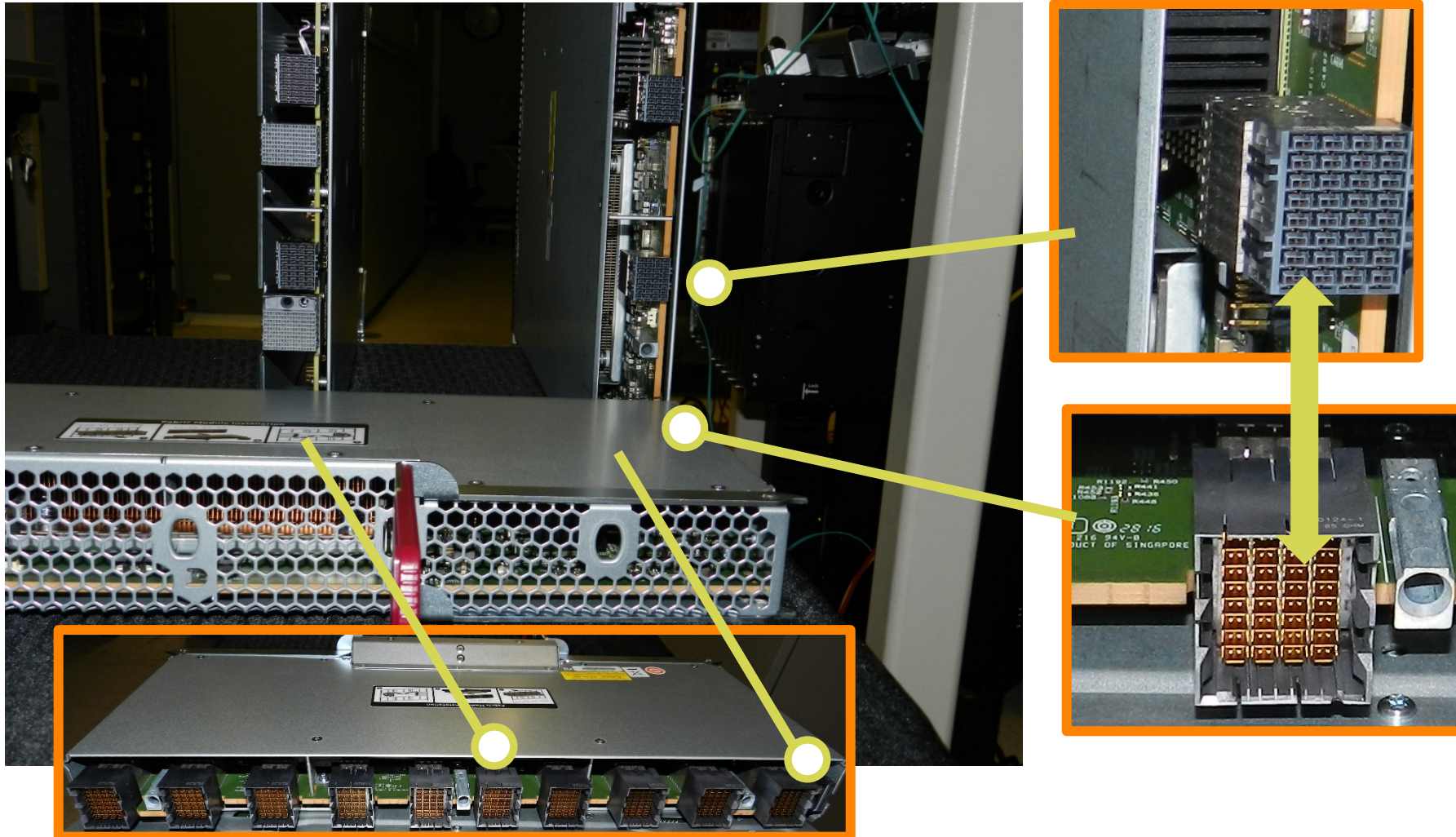
Fabric modules

JL367A - Aruba 8400 Fabric Module

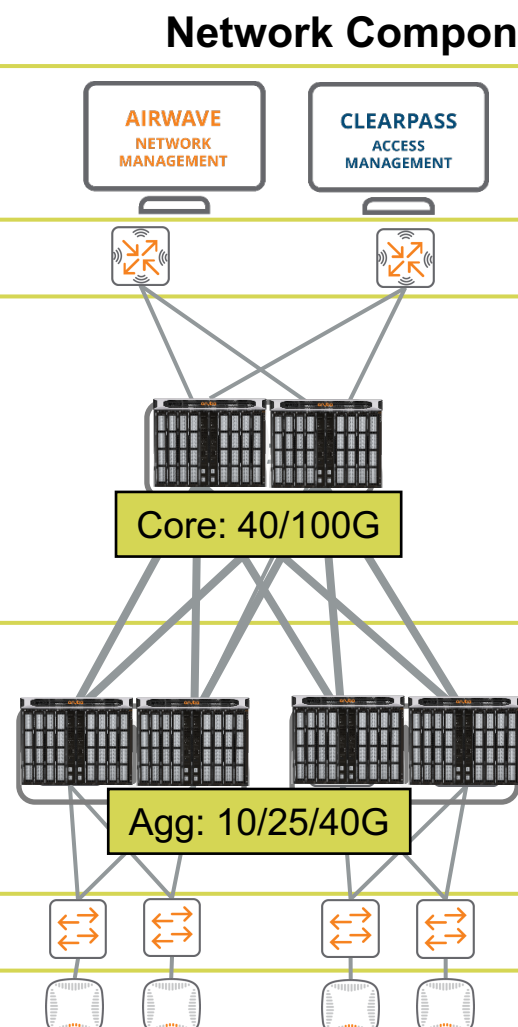
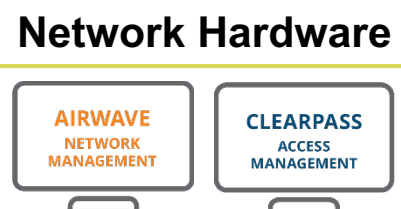
- 3 slots – located behind the fan trays
- Best of Breed Merchant Silicon
- Direct Plug Orthogonal Line Card to Fabric Connection
- 180W / 614 BTU; 16.75 x 6.75 in.



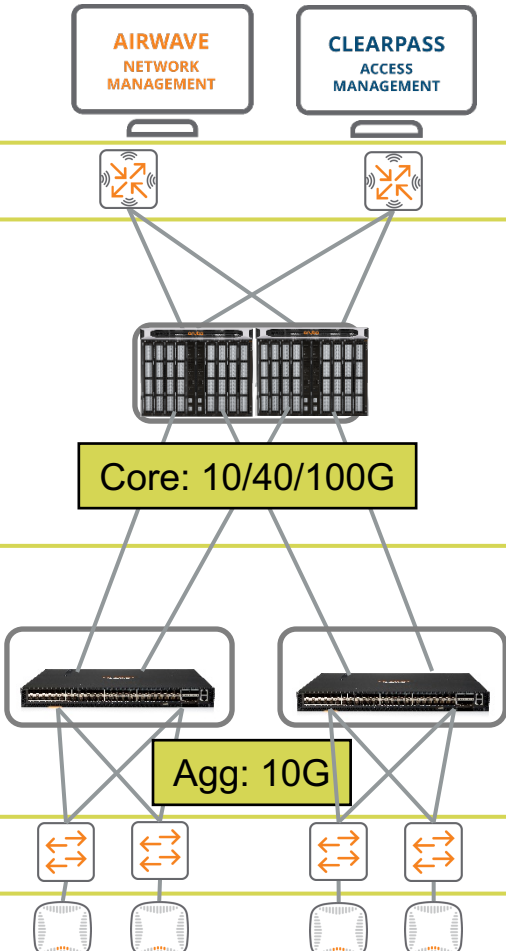

Orthogonal Connections



Aruba 8400 deployment: Campus L3 core and aggregation

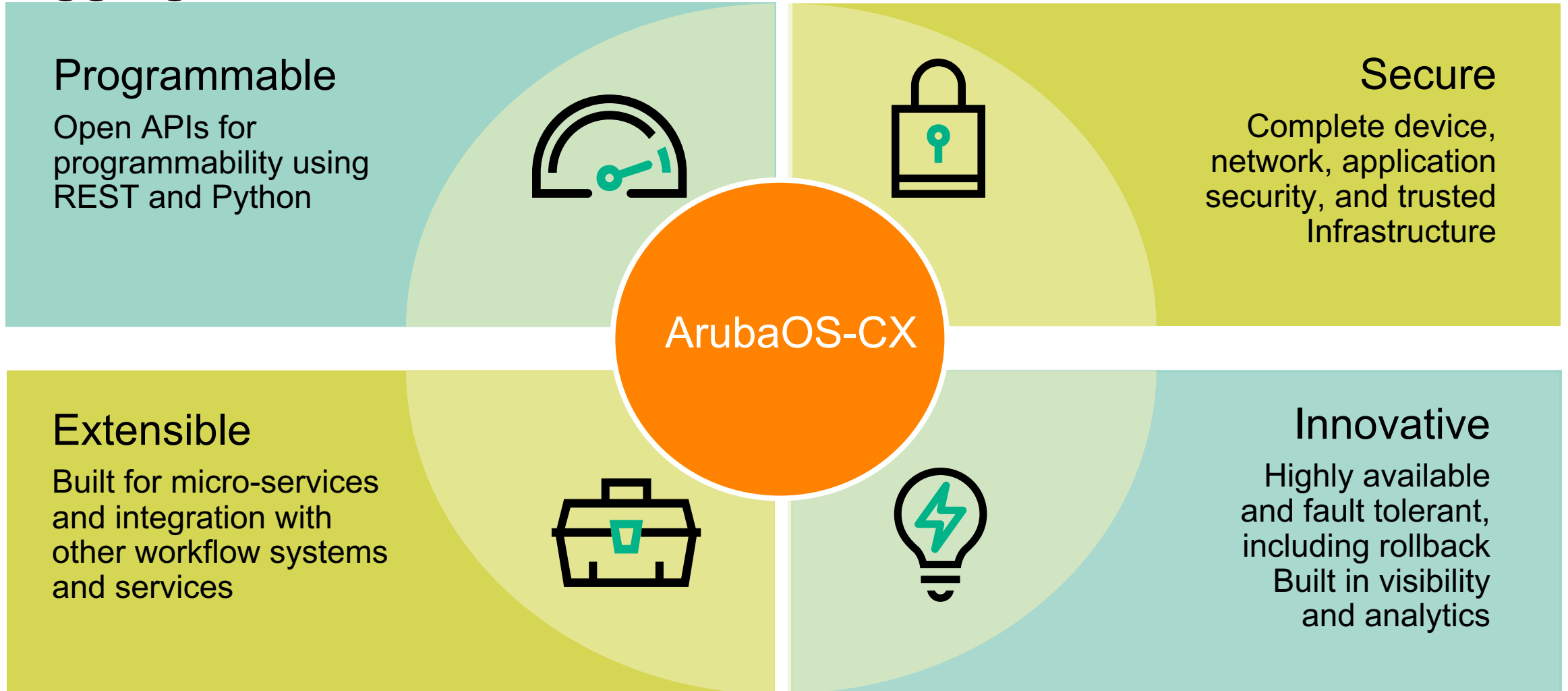
Network Component / Layer	Network Hardware		Network Protocols
	Network Control Plane		
Controller	Aruba Mobility Controller		
Core Solution:8400 <div>Building</div>	ARP > 128K (up to 512K) IPv4,v6 > 256K (up to 1M), 64K ACLs > 64K Multicast > 64K 3-4 Buildings (6-8 Agg Switches)		OSPF, BGP (Internet), MLAG, ACL (policy routing), et al
Aggregation Solution: 8400 <div>2-4 ports/LAG</div>	ARP > 64K (128K LPV) IPv4,v6 > 128K, 32K ACLs > 64K (256K) 24-48 Access (96-192x10G)		OSPF, MLAG, VRF, ACLs (user policy aggregation), et al
Access Switch	Aruba 5400R, 3810, 2930		
AP	Aruba AP 320, AP 330		

Aruba 8400 deployment: Campus L3 core, 8320 in aggregation

Network Component / Layer		Network Hardware	Network Protocols
			
Network Control Plane	Controller	Aruba Mobility Controller	
Core Solution: 8400	Building	ARP > 128K (up to 512K) IPv4,v6 > 256K (up to 1M), 64K ACLs > 64K Multicast > 64K 3-4 Buildings (6-8 Agg Switches)	OSPF, BGP (Internet), MLAG, ACL (policy routing), et al
Aggregation Solution: 8320	2-4 ports/LAG	ARP > 64K (128K LPV) IPv4,v6 > 128K, 32K ACLs > 64K (256K) 24-48 Access (96-192x10G)	OSPF, MLAG, VRF, ACLs (user policy aggregation), et al
Access Switch	AP	Aruba 5400R, 3810, 2930	
		Aruba AP 320, AP 330	

ArubaOS-CX Software Architecture

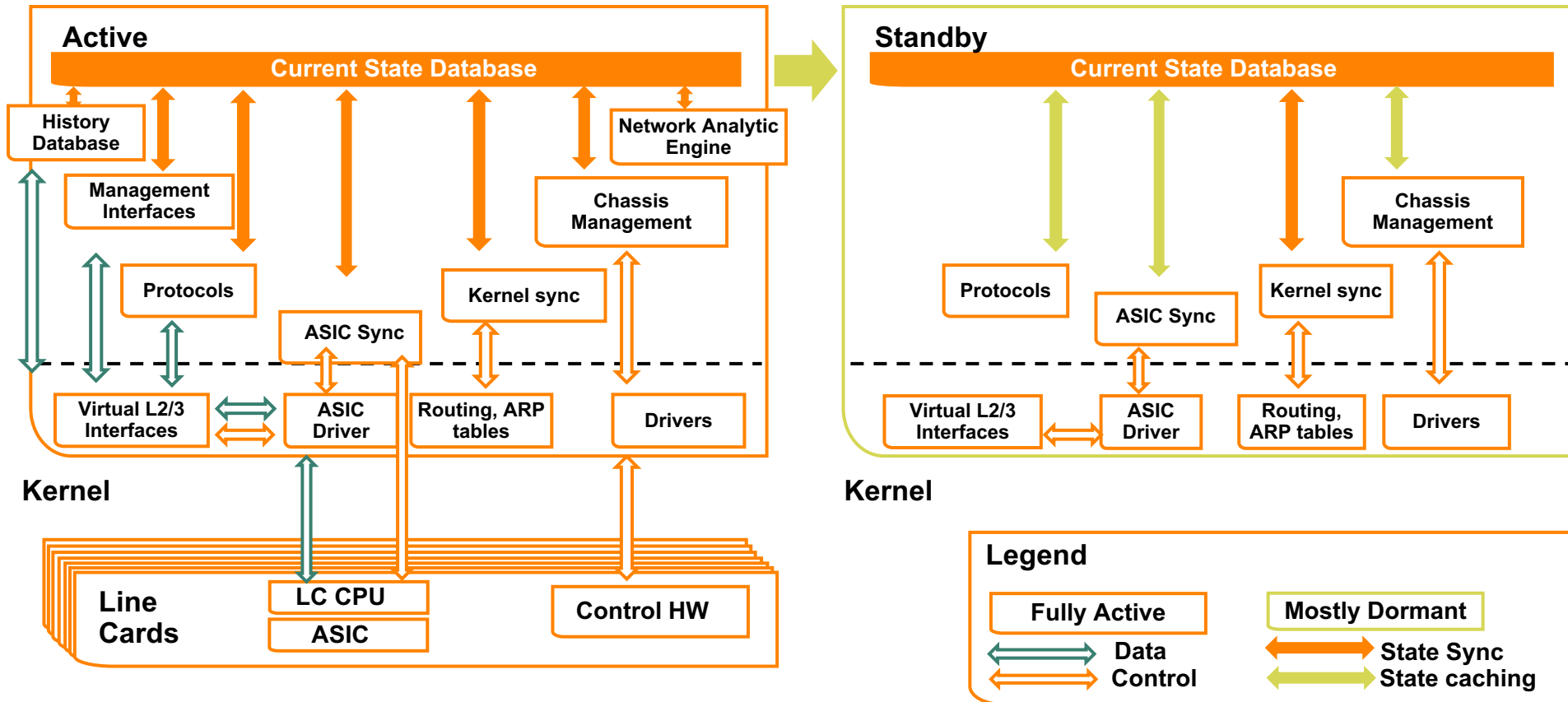
ArubaOS-CX: Heart of Aruba's Campus Core and Aggregation Products



ArubaOS-CX Philosophy

- Database driven
 - All state expressed in an in-memory DB
 - No inter-process communication
- Leverage Linux
 - Take advantage of the richness of open source community
- Fully programmable
 - Everything must be configurable through programmatic API
- Resilient
 - Daemons must be able to restart with the same state as when they went down
- Supportable
 - Rich logging and debugging built in from the start

ArubaOS-CX Software Architecture



Benefits

- High modularity – easy to extend and maintain
- Full visibility – everything is in one place
- Full programmability – everything is modeled
- Resiliency – agent that fails resyncs from the DB
- High availability – easy to sync to standby MM

High Availability: Management Modules

Active

Current State Database

- Almost all logic runs on Active
- Active agents don't know that standby exists
- Current state database synchronizes continuously to standby



Standby

Current State Database

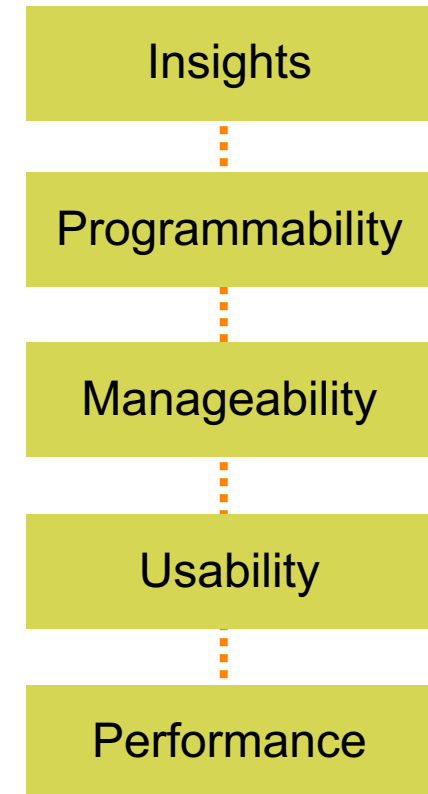
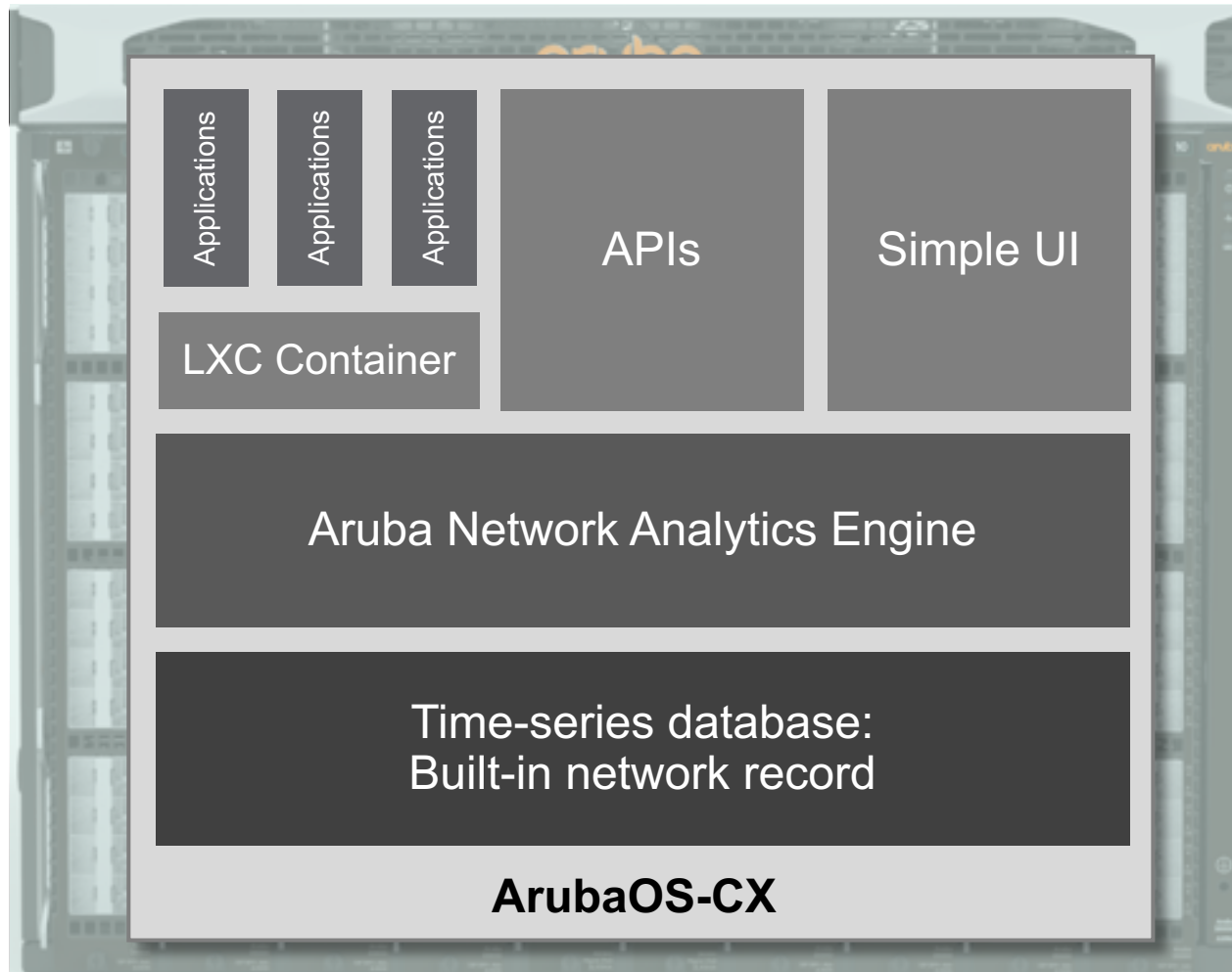
- Standby is mostly syncing current state database
- Kernel tables are synced to speed up failover

Kernel sync

Routing,
ARP tables

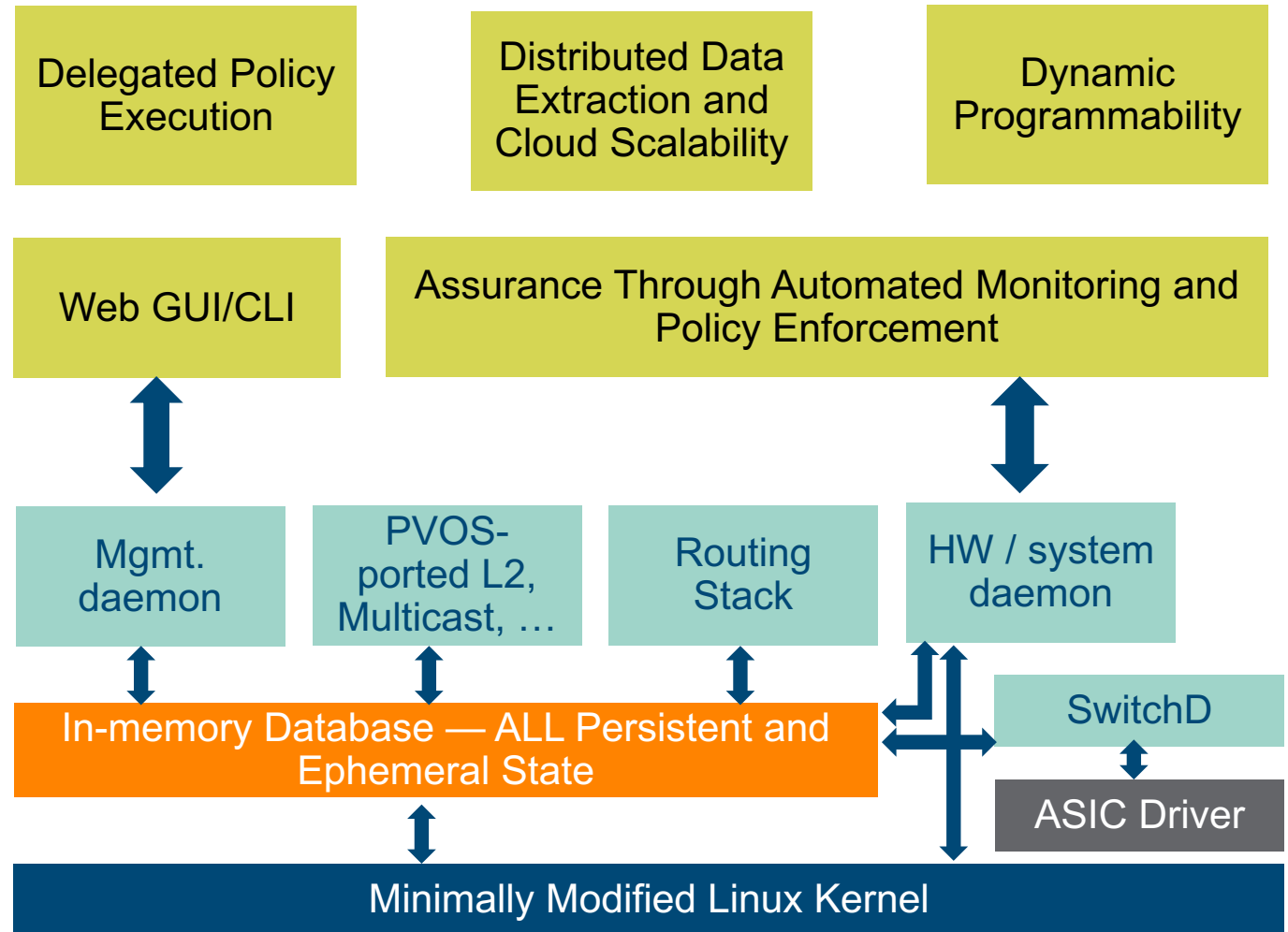
Kernel

ArubaOS-CX Meets the Challenge with Innovation




Fully Open and Programmatic SW Architecture

- Powerful toolsets for automation, assurance, analytics
 - Full programmable using REST API's
 - Enables distributed or centralized analytics using REST to subscribe for information
 - Root Cause analytics
 - 3rd Party customizations
- Robust foundational elements
 - Database driven architecture delivers HA, fault tolerance and configuration roll back
 - Built for scale with best-in-breed sub-systems
 - Designed for feature velocity and easy replication across portfolio
 - Easy to maintain and patch



Swagger API Browser

- Online documentation
- Easy to use
- Simple testing
- Standard tool

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REST API

REST interface for management plane

AAA_Server_Group		Show/Hide List Operations Expand Operations
AAA_Server_Group_Prio		Show/Hide List Operations Expand Operations
ACL		Show/Hide List Operations Expand Operations
GET	/system/acls	Get a list of resources
POST	/system/acls	Create a new resource instance
DELETE	/system/acls/{id1}/{id2}	Delete a resource instance
GET	/system/acls/{id1}/{id2}	Get a set of attributes
PUT	/system/acls/{id1}/{id2}	Update a resource instance
ACL_Entry		Show/Hide List Operations Expand Operations
Aggregate_address		Show/Hide List Operations Expand Operations
BGP_ASPath_Filter		Show/Hide List Operations Expand Operations
BGP_ASPath_Filter_Entry		Show/Hide List Operations Expand Operations

Network Analytic Engine

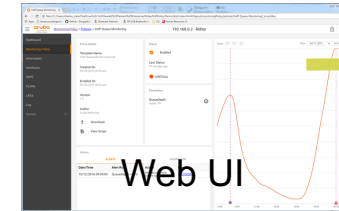
Monitoring & Troubleshooting Made Easy

Complement to AirWave

Complete REST API for integration
Policies can generate Syslog messages for legacy



AirWave and
3rd party tools



Web UI

Web UI & REST API

Auto-generated for each policy script

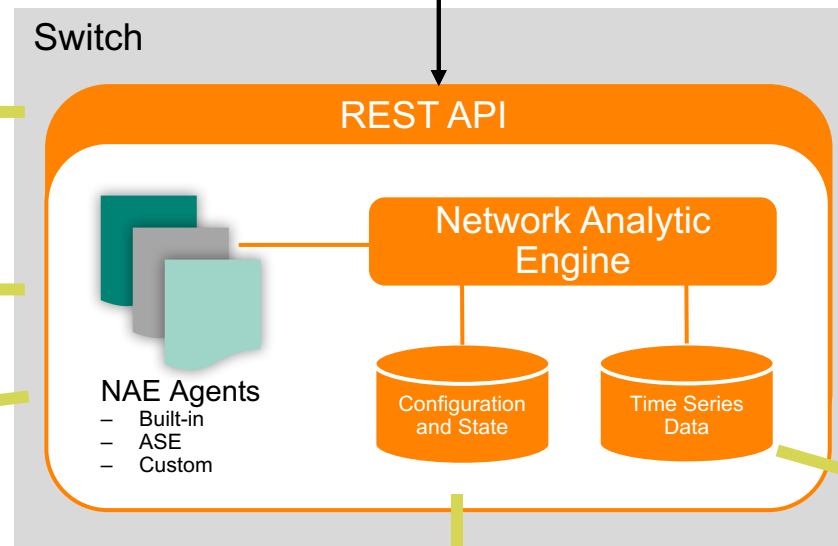
Intelligence and Automation

Full power of Python
Parameters for customization
Variables for persistent policy state

Condition Trigger Language

Flexible Actions

Alert Level
CLI command execution
CLI command output capture
Configuration checkpoint diff capture
Syslog generation
Script function callback



Low system overhead
and sandbox isolation

Scripts upload,
readable, can be
customized

Time series data
recording capability

Wide Monitoring Capabilities

Configuration • Protocol and System State
ASIC Counters • ACL's

Simple: Programmability for Network Operations...Driving Predictability

Network Analytic Engine Accessibility

Easy to Access

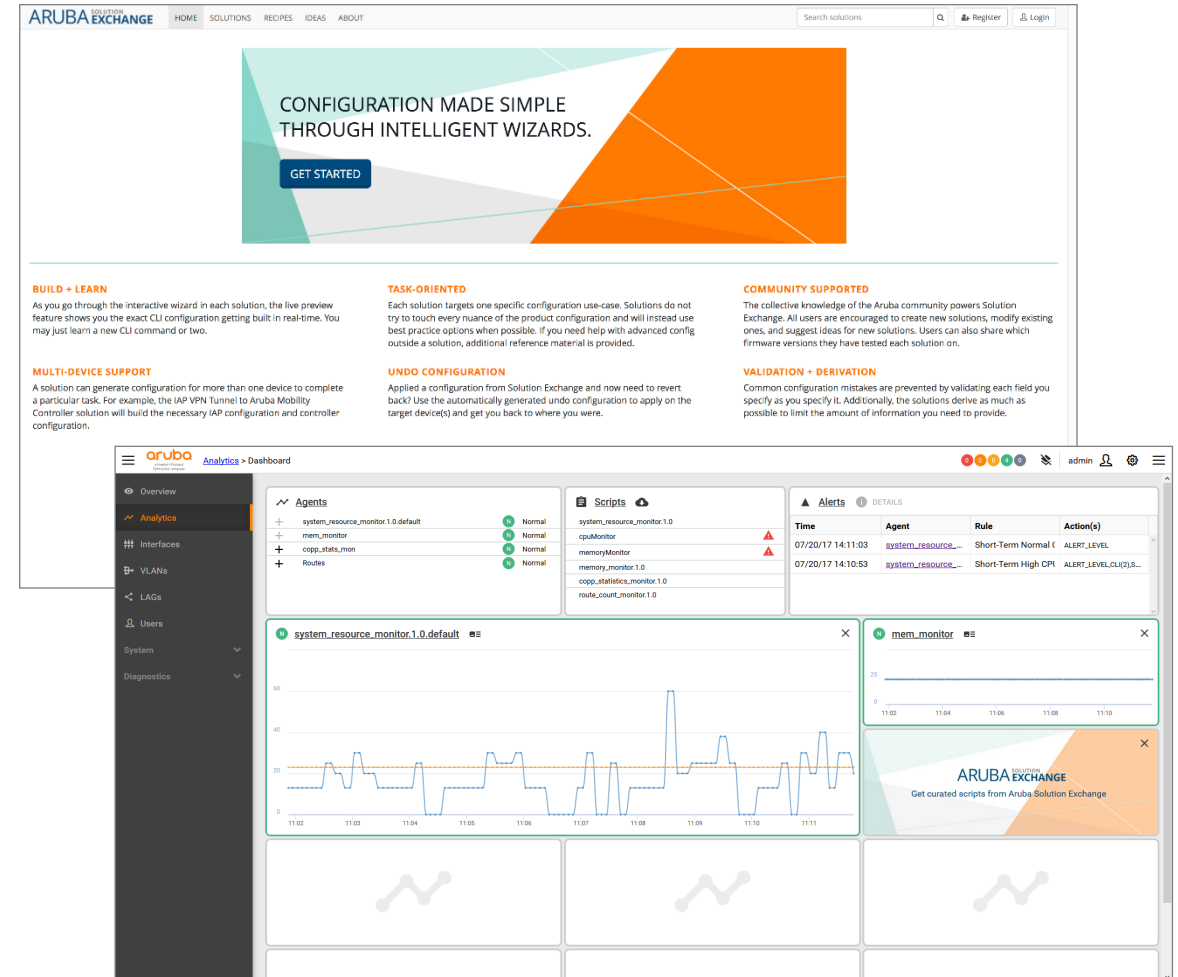
- Aruba Solution Exchange hub for solutions
- Links to useful resources, tutorials and help
- GitHub posting of Aruba NAE Agents

Easy to Use

- Users can modify and enhance Aruba supplied scripts
- Switch GUI to upload scripts and activate agents; pre-loaded and pre-activated
- REST interface to also manage scripts and agents

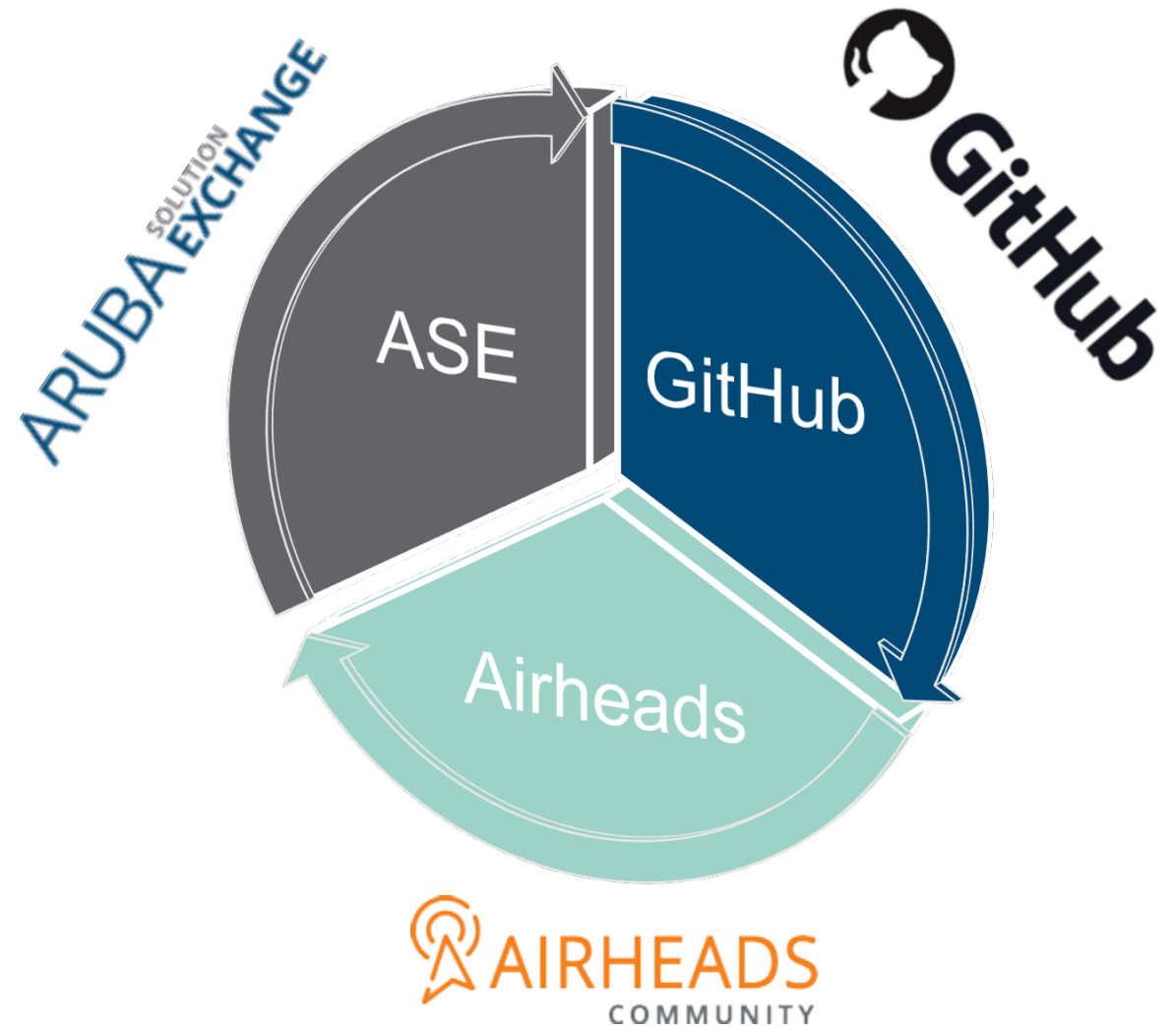
Ramping Up

- Submit requests for scripts like feature requests in the ramp up period
- Training tools



NAE Communities

- Aruba Solution Exchange (ASE)
 - NAE primary script portal
 - Public solutions integrate directly with NAE UI
 - Community can create custom NAE solutions
- GitHub
 - Developer community
 - All Aruba NAE scripts will be posted to GitHub
 - Community can fork and enhance Aruba scripts
 - Global approval for HPE employees posting NAE scripts on GitHub
- Airheads
 - Community to glue components together
 - NAE, Aruba Solutions Exchange and GitHub
- Committed R&D investment in building NAE scripts and helping with community



Analytics

1Critical1Major0Minor

VolP Out of a total of 4 agents

Firmware

Current Version0.1.0 (Build: genericx86-p4-Halon-0.1.0-master_wildcard-20170518190706-dev)Primary VersionTBDSecondary VersionTBD

Config

Most Recent Checkpoint05/17/2017 20:26:50 "CPC20170523005024"Total of 2 checkpoints

Management Modules

Module: Mgmt Module 1ActiveModule: Mgmt Module 2Unassigned

Log

25Critical0Warning

New log entries over the last 15 seconds

CPU

1/5: 21% Utilization

Average across all CPUs of the module

Memory

1/5: 17% Memory Usage

Memory usage of the module

System Info

Uptime7d 0h 31m 33sSerial #1/5SGM2009100Base MACf4:03:43:22:88:00baseSG7ZK2G112

Available Interfaces: 64

Link UpLink Down

Power Supply

3Faults0Warnings

Out of a total of 4 power supplies

Thermal

0Critical

Out of a total of 55 sensors

Fans

0Critical0Warning

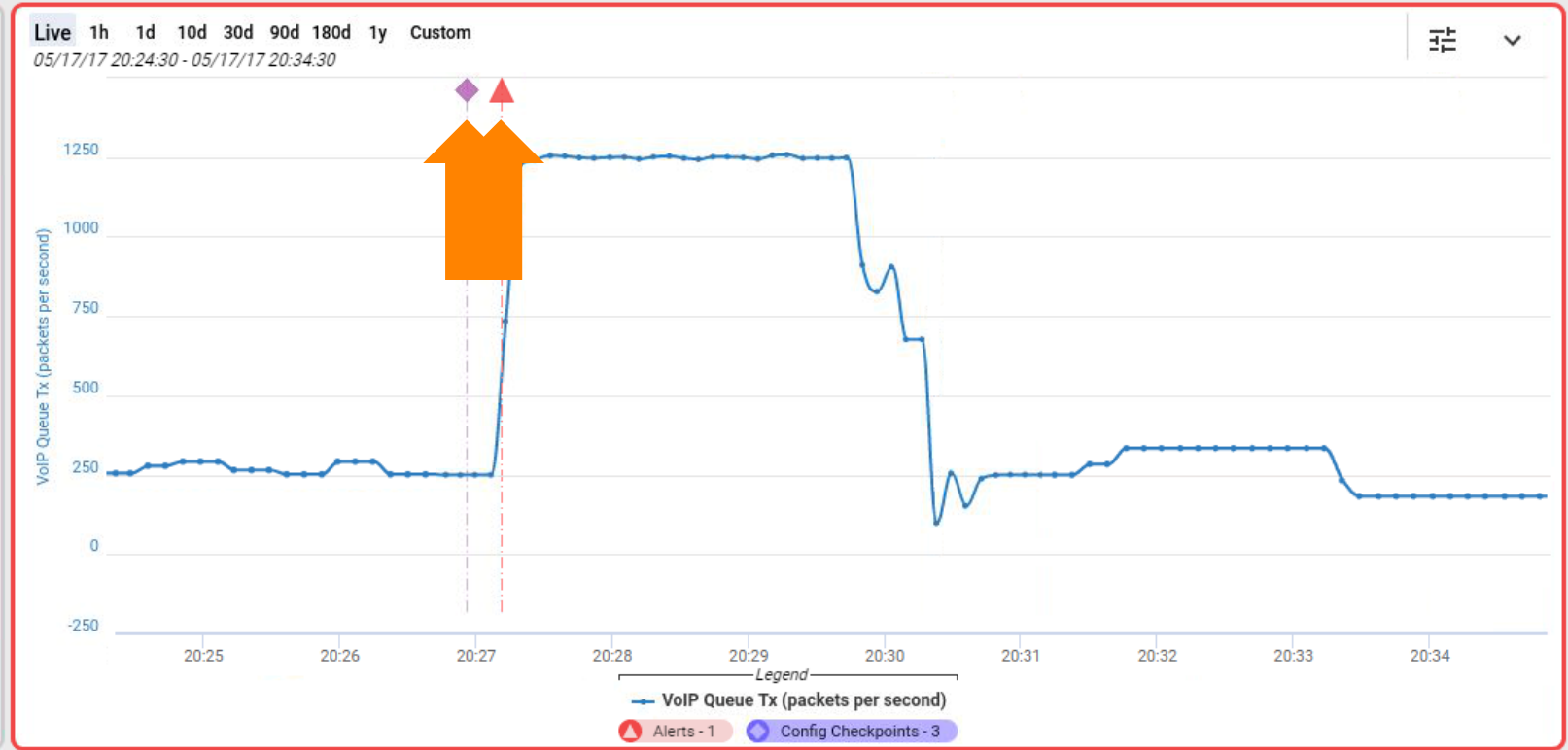
Out of a total of 18 fans

Agent Details

Name
VoIP

Script Name
voip_queue_packets_monitoring.1.0

Version
1.0



Status

C

 Critical

Last Status
a few seconds ago

Parameters

Alert_Pause - 2
Time to pause the alert

Interface_ID - 1/1/2
Interface monitored for VoIP traffic an...

Packets_Threshold - 600
Packets threshold level indicating ano...

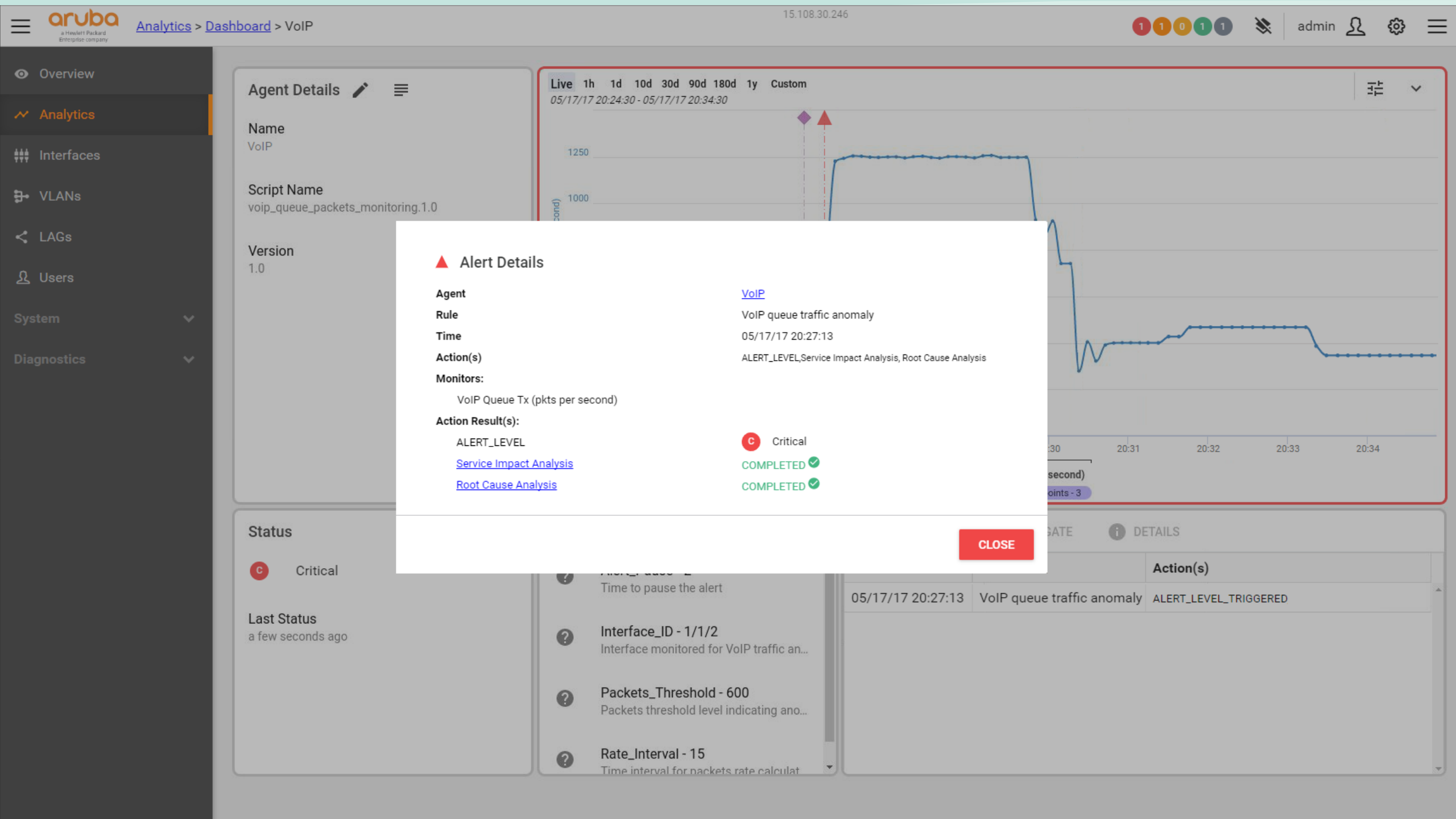
Rate_Interval - 15
Time interval for packets rate calculat

Alerts

NAVIGATE

DETAILS

Time	Rule	Action(s)
05/17/17 20:27:13	VoIP queue traffic anomaly	ALERT_LEVEL_TRIGGERED





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Thank You!