



Aruba Campus Switching

Aruba 5400R Switch Series
Customer Presentation

aruba
a Hewlett Packard
Enterprise company

Agenda

1

Introduction

2

Product overview

3

Deployment models

4

Ordering information

5

Resources

Digital Disruption... Creating New Pressures on IT

MOBILE AND CLOUD

More business and mobile apps are business critical, prioritization and segmentation required



IOT

Growth in connections, different protocols, new traffic patterns, more exposure



DATA

Too many data sources, integration challenges, difficult to gain insights



IT Challenges – Old infrastructure is **Not Ready**

PROPRIETARY

INFLEXIBLE

MONOLITHIC

HARD-CODED

MANUAL



Mandatory 24x7



**Many tools, devices
and policies**



**More capacity
demands at the
edge**

The Changing Role of Network Switches



Traditional Wired Connectivity
+ Wireless Aggregation
+ Wired IoT



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Enterprise company

Gartner has named HPE (Aruba) a Leader for Wired and WLAN Access Infrastructure based on its ability to execute and completeness of vision.

Figure 1. Magic Quadrant for the Wired and Wireless LAN Access Infrastructure



Source: Gartner (July 2018)

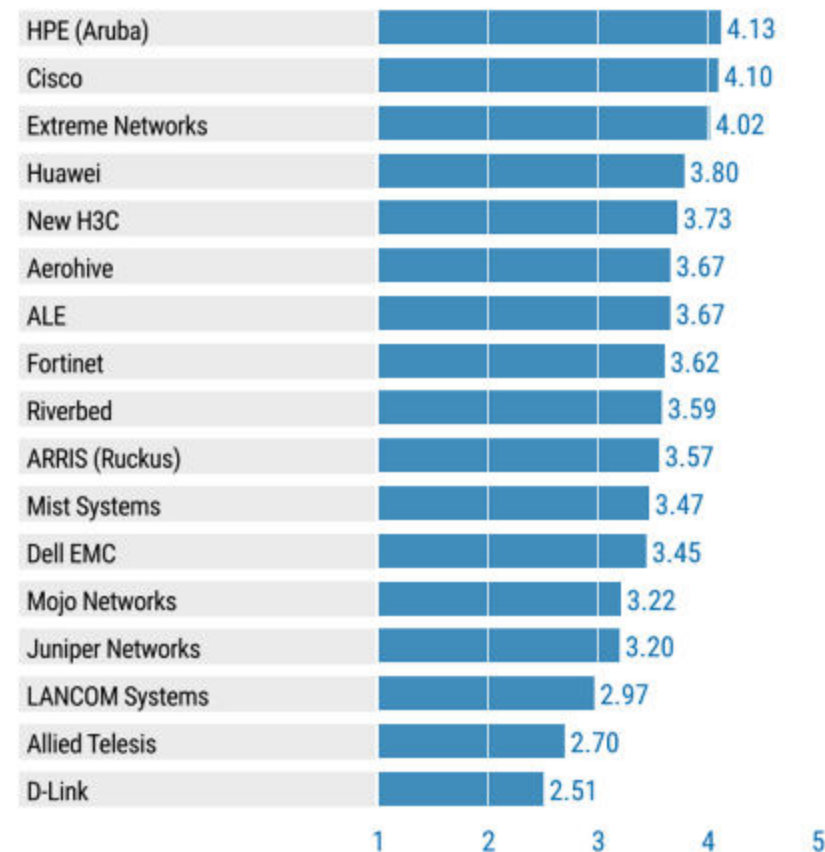


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Enterprise company

HPE (Aruba) Receives the Highest Score in 5 out of 6 Gartner Critical Capabilities Use Cases

Figure 1. Vendors' Product Scores for Unified Wired and WLAN Access Use Case

Product or Service Scores for Unified Wired and WLAN Access



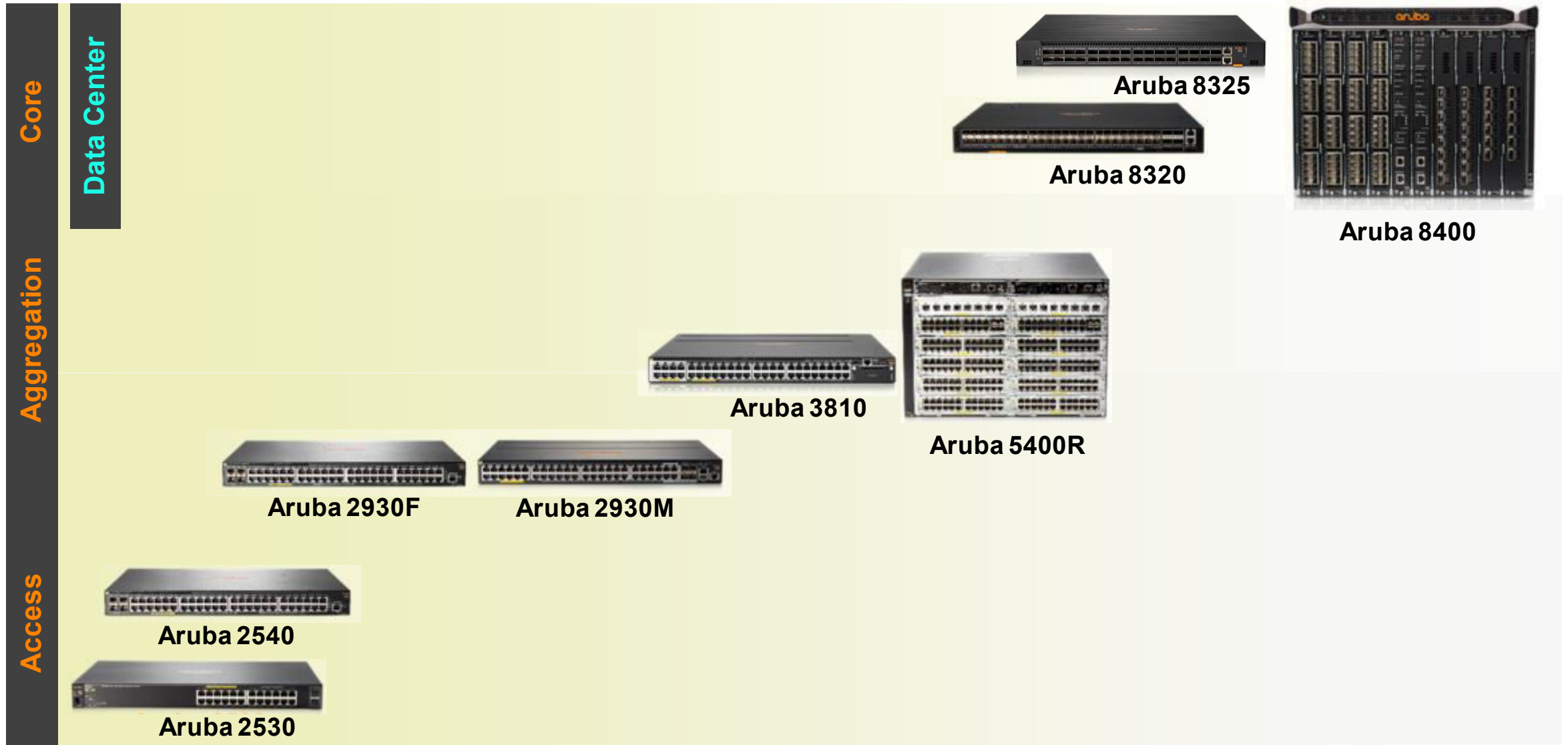
As of August 2018

© Gartner, Inc

HPE = Hewlett Packard Enterprise

Source: Gartner (August 2018)

Aruba Switching Portfolio



Aruba 5400R Switch Series



Aruba 5400R

- **High performance advanced modular Layer 3 switches** ideal for wireless aggregation with low latency and fast 10/40GbE uplinks
- **Scalable** and resilient stacking
- **Redundant and resilient** with hot swappable power, redundant mgmt.
- **AirWave and ClearPass** Policy Manager integration
- **Cloud manageable** with Aruba Central
- Ready for the software defined network with **REST APIs**
- **Smart Rate** for future proof high speed multi-gigabit capacity

Cloud manageable with
Aruba Central

Full 30W PoE on all ports for
IoT, APs and cameras

Fast 10GbE and 40GbE
uplinks for more capacity

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Aruba 5400R Switch Series



Full featured compact Layer 3 modular switch has 2 Tbps backplane and low 2.1 us latency with versatile modules for virtualization and optimized deployment

Powerful advanced layer 3 features for the most demanding networks in the enterprise.

HPE Smart Rate multi-gigabit Ethernet ports and 40GbE ports deliver high capacity connectivity

Ready for the high speed mobile environment. Better together: Aruba 5400R and Aruba Access points and software.

Redundant management, redundant power supplies, Fast Software Upgrade and VSF stacking

Resiliency, performance and scalability to maximize uptime and provide a better user experience.

Supported by advanced security and management tools like Aruba ClearPass Policy Manager and Aruba AirWave

Simplify with unified and consistent policy and management for wired/wireless users for Aruba switches, APs and software.

ZTP with Activate and cloud-based Aruba Central

Faster, easier deployment at remote sites with few or no IT resources

Energy Efficient Ethernet, demand based dynamic ASIC power consumption, 80Plus certified power supplies

Green features save power and reduce OPEX.

HPE Limited Lifetime Warranty

Industry leading warranty that you can rely on.

Aruba 5400R Switch Series



High performance 2T backplane and low 2.1us latency built on ProVision ASIC

Versatile connectivity
– 10GBASE-T, Smart Rate, SFP, SFP+, 40GbE QSFP+, 1GbE, combo modules

Dynamic Segmentation
Convenient bundles ordering options

Dual redundant management modules for hitless failover
– OOBM, console management ports
– Status LEDs for fans, power supplies and modules

Redundant Power supplies
– 2 or 4 slots for hot swappable, redundant power supplies
– Energy efficient 80Goldplus supplies
– Up to 9250W of internal PoE+

6 and 12 slot compact chassis models

Secure with ClearPass Policy Manager support

Redundant management for hitless failover

VSF stacking and Fast Software Upgrade

Advanced Layer 3 with industry standard MACsec

IEEE 802.3bz HPE Smart Rate (1, 2.5, 5, 10GBASE-T) support

High speed, line rate 10GbE and 40GbE uplinks

On prem management with AirWave support

Dual redundant hot swappable power supplies

Up to 288 ports of PoE+

SDN support with REST APIs and OpenFlow

License free ArubaOS-Switch software

Leading support with HPE Limited Lifetime Warranty

Future Proof With More Speed and PoE



Faster

Simple

Future proof

Be prepared for tomorrow with HPE **Smart Rate Multi-gigabit** Ethernet (IEEE 802.3bz)

HPE Smart Rate Switch Ports Features & Benefits

HPE Smart Rate Feature	Customer Benefit
Multi-rate 1 Gbps, 2.5 Gbps, 5 Gbps and 10 Gbps** IEEE 802.3bz* with auto negotiation and on a single port with support for operation over twisted-pair cabling.	Provides customers the ability to absorb additional bandwidth required by the increasing demand in the mobile campus now and in the future.
Higher-speed Ethernet on existing cabling infrastructure	Provides the customer with the ability to utilize existing cabling infrastructure while providing added bandwidth to emerging data intensive access applications. Uplink at 5G over cat 5e or better.
IEEE 802.3at capable 1 Gbps and 10 Gbps modes interoperate with existing 1 Gbps and 10 Gbps ports.	Investment protection in existing switch to switch infrastructure while providing the flexibility to move to 2.5 Gbps or 5 Gbps when needed.
MACsec enabled on all HPE Smart Rate switch ports.	Provides the customer industry standard secure link-level encryption between two points of their twisted pair links.
IEEE 802.3at capable 30W Power over Ethernet on all link speeds	Allows the customer to continue to power existing and future access points and accessories regardless of their bandwidth and link speed requirement.
IEEE 802.3bt capable 60W Power over Ethernet on all link speeds (select 2930M models)	Backwards compatibility with existing PoE/PoE+ devices allows customers to continue to power existing APs and accessories. Provides future proofing of PoE and data bandwidth needs for the next generation APs and powered accessories.

*Requires ArubaOS-Switch 16.04 software release

** Not all Smart Rate ports support 10Gbps. See product datasheets for detail.

Resiliency and scalability with Aruba Virtual Switching Framework

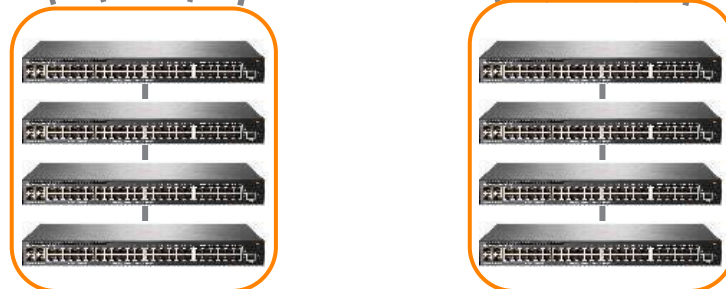
5400R with VSF



5400R with VSF



2930F with VSF



VSF stacking

- ✓ Simplify network operations
- ✓ Scalable performance
- ✓ Increases resiliency

Available on Aruba 5400R and 2930F

- Aruba 5400R
 - Up to 2 members
 - Chain topology
- Aruba 2930F (requires AOS-Switch 16.06)
 - Up to 8 members*
 - Chain and Ring topologies

Aruba Dynamic Segmentation

Automated Policy



Segmented Policy



Centralized Policy

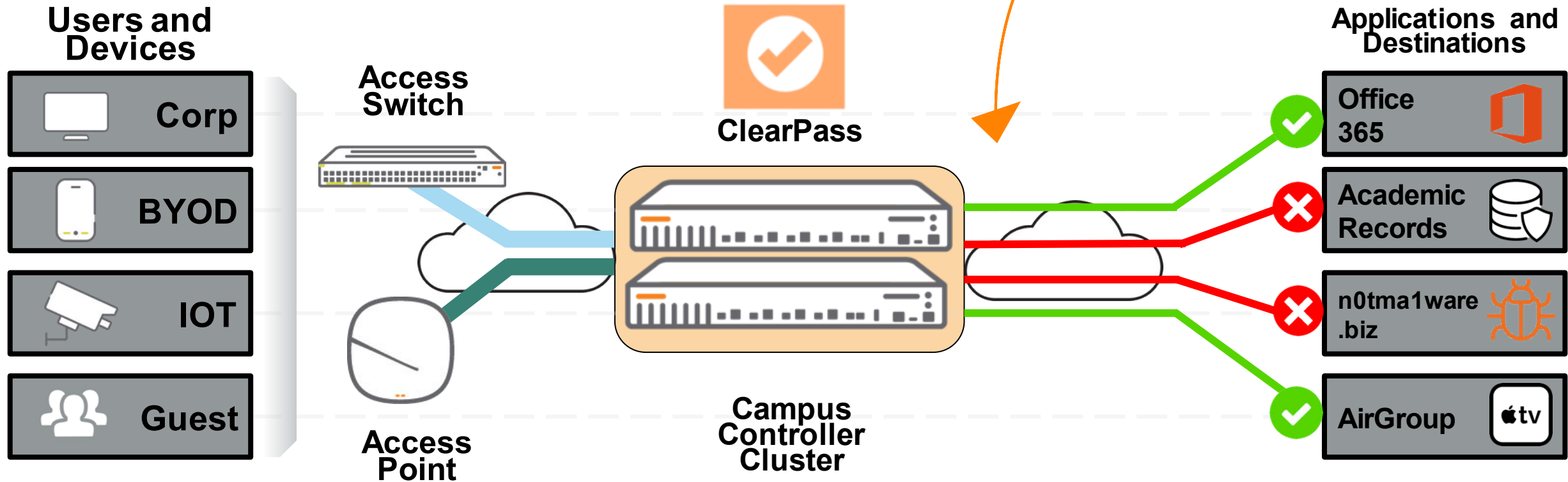


No more help desk calls to move devices from one port to another

Fast and Simple Security for Any Device

Roles are
"Dynamic"

"Segmentation"
refers to the separation
of traffic



Dynamic Segmentation

Secured and flexible control of access layer

- Use Aruba ClearPass authentication and switch's User Role to tunnel selective user/device to the Aruba Controllers
- Policies (e.g. QoS, ACL, VLAN, rate-limit) can be enforced at Tunneled Node ports

Access to Controller's applications

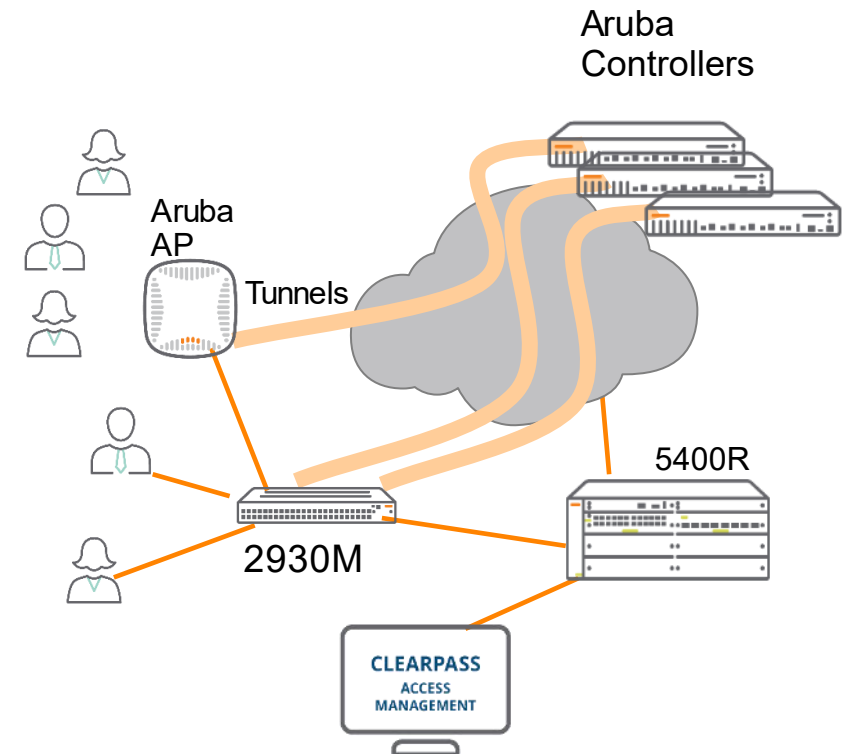
- Users can access Controller's applications such as stateful firewall and Aruba AppRF

Higher availability and scalability

- Load balance to multiple controllers for high scalability
- Stateful failover to standby management module for high availability
- Sticky controller: avoid bouncing tunneled sessions between different controllers

Available on the Aruba 5400R with v3, 3810, 2930F, 2930M

- Requires AOS 8.1 or later in the controllers



Downloadable User Roles

Single point of policy management

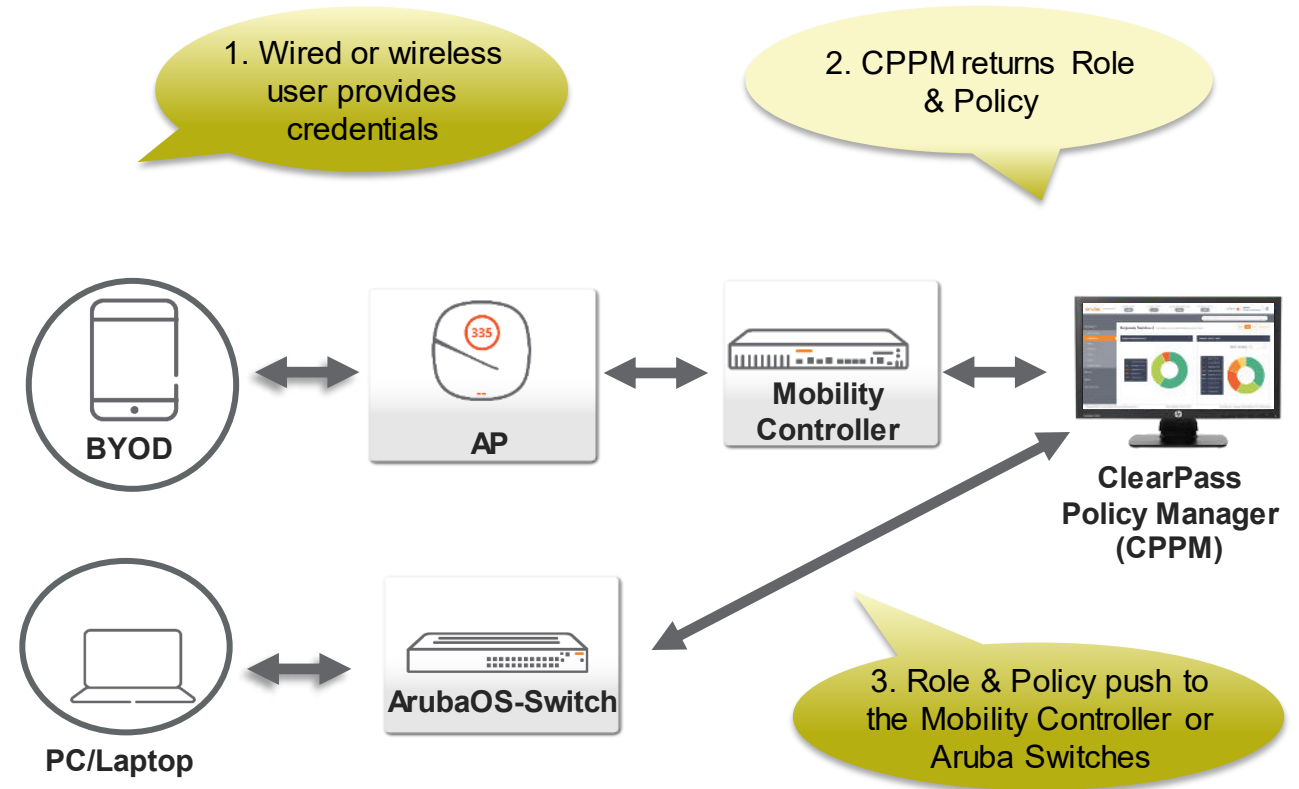
- Dynamically assigned by ClearPass at the time of authentication

Builds on top of the existing local User Roles

- Every user/device is assigned a User Role
- User Role policies include QoS, VLAN, ACL, Rate Limits

Consistent wired/wireless policy management

- Same as WLAN AP, simplify policy configuration and management



*Requires ArubaOS-Switch 16.04 software release

Protect your network with Control Plane Policing

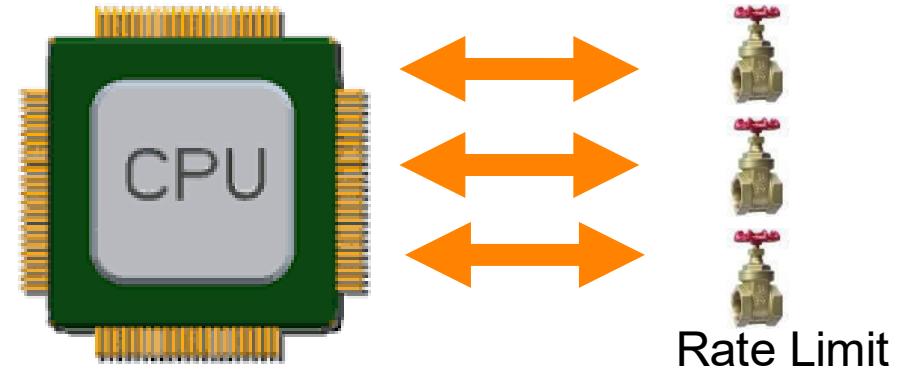
Limit traffic going to switch CPU

- Control and protocol traffic such as MSTP, unicast and multicast control packet

Prevent overloading of CPU, protect against

- Denial-of-Service attack
- Misconfiguration
- Problems in the network

User configurable rate limit



*Requires ArubaOS-Switch 16.04 software release

Flexible Management

Unique Flexibility to change management with same access switch

Web GUI



Web interface

single switch management

Great for small business,
events

Central



Cloud-based

wired + wireless

Great for remote IT teams,
growing businesses, retail,
hospitality, cloud initiatives

AirWave



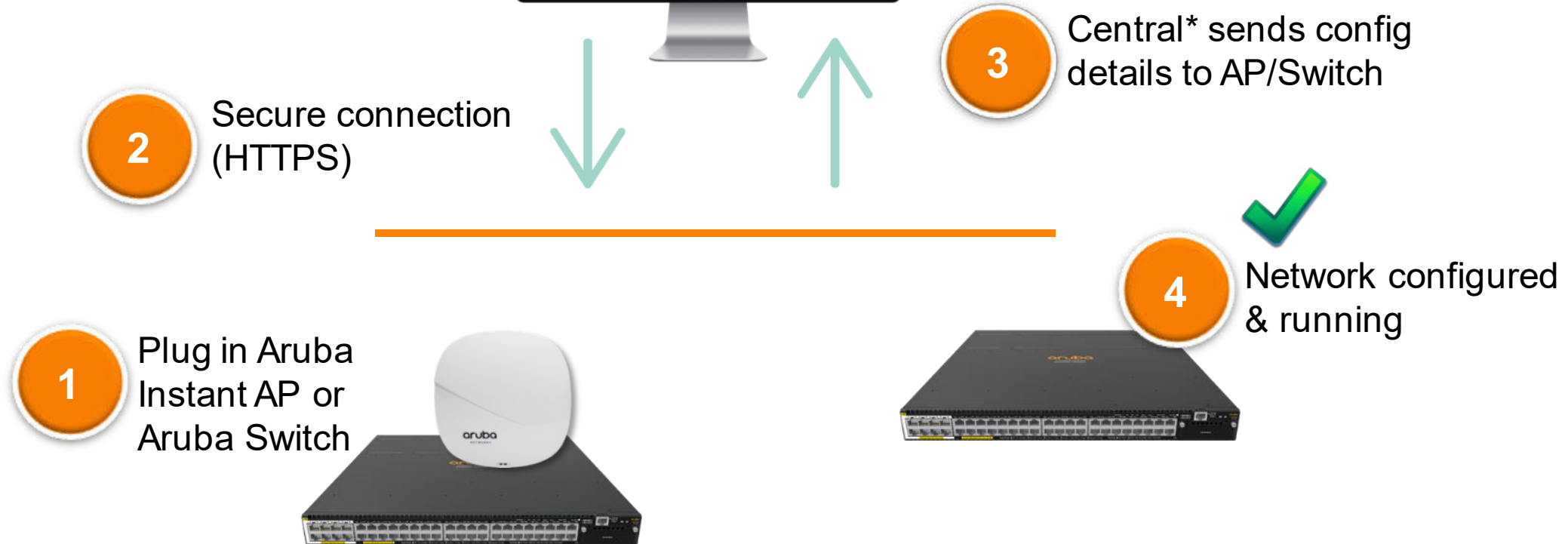
On-Prem multivendor

wired + wireless

Great for larger midsize and
enterprise businesses,
multiple campuses, scale

Simple And Fast Network Deployment

Zero-Touch Provisioning
No On-Site Expert Needed
APs and Switches

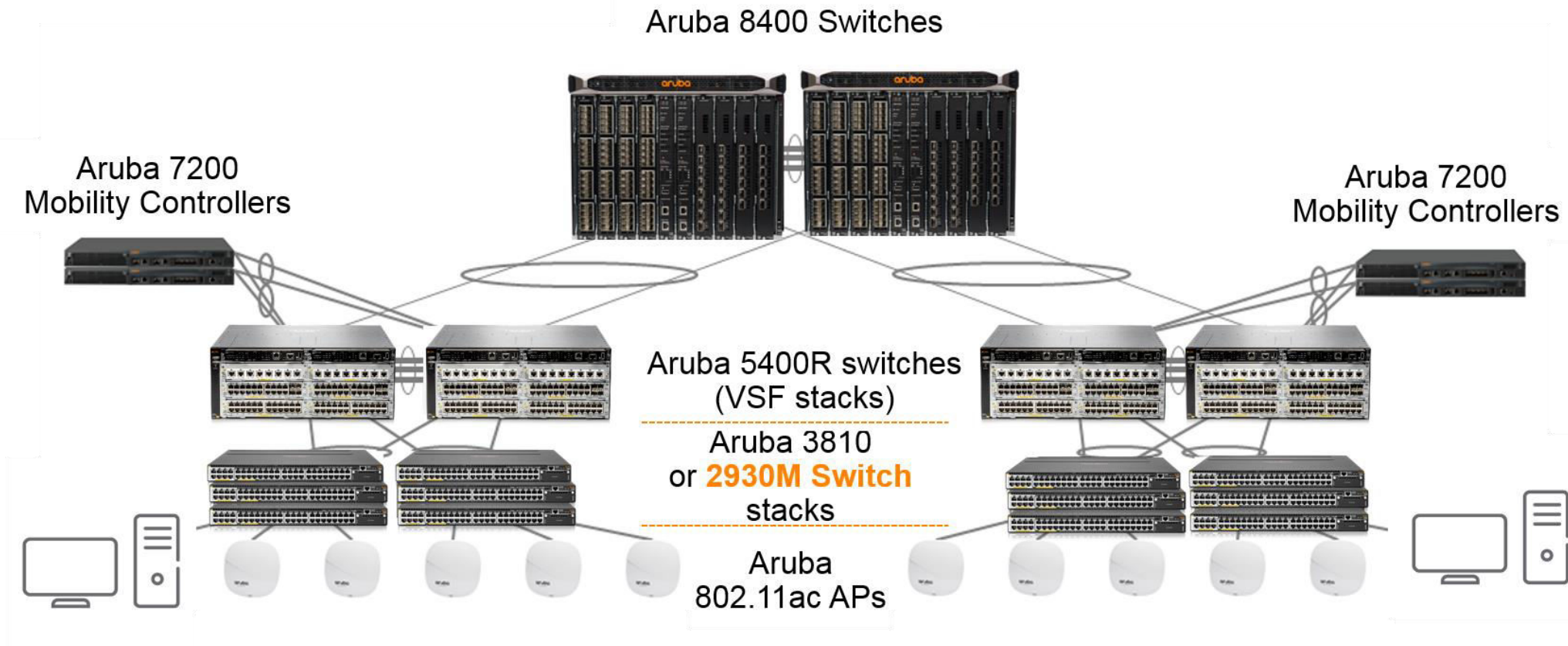


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- 3 Deployment models**
- 4 Ordering information
- 5 Resources

Target Deployment

Large enterprise campus with HPE Smart Rate access

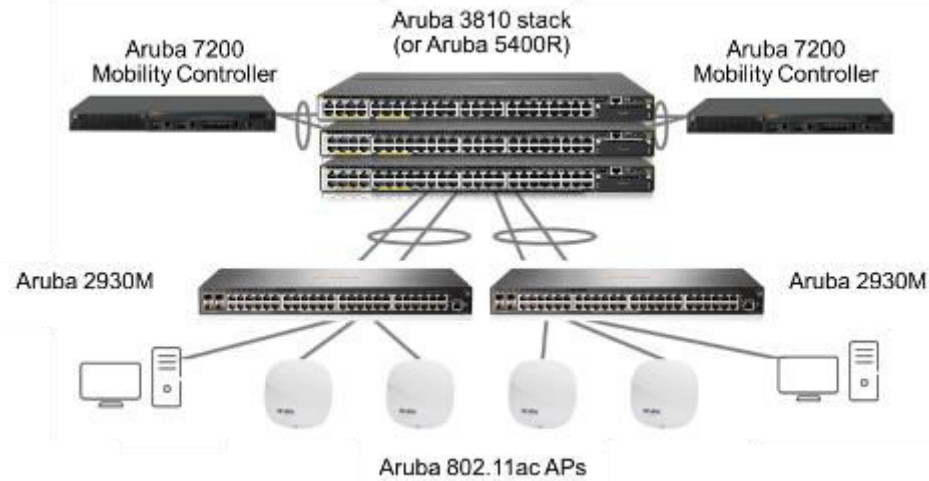


Target Deployment

Large enterprise campus



Medium enterprise campus



Enterprise, Midsize and Branch

Use Case: Sunnycrest Manor

Aruba Solution Benefits

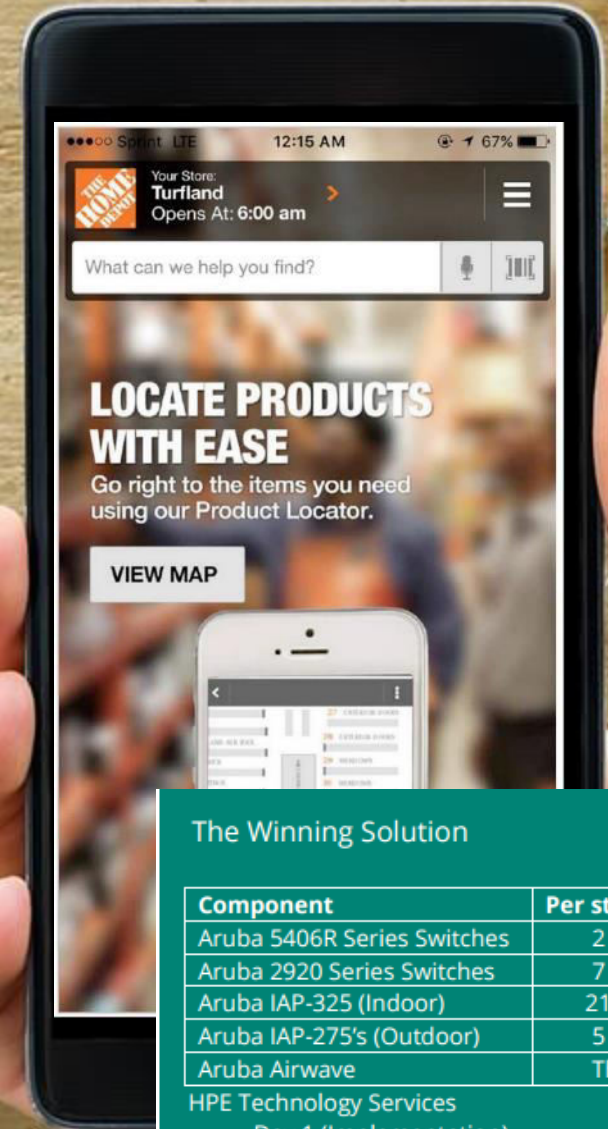
- Reduced resident healthcare recordkeeping time by a third.
- Raised video camera security and resident quarters mobile connectivity from none to fully covered.
- Decreased Wi-Fi help desk calls by 95% and switch troubleshooting – from dozens of hours to zero.
- Eliminated network downtime due to switch licensing issues.

ENHANCING DIGITAL ENGAGEMENT FOR SHOPPERS



Wi-Fi analytics to monitor shopper
engagement and in-store dwell times

Stable, secure Wi-Fi access for
employees and customers



The Winning Solution

Component	Per store	Total
Aruba 5406R Series Switches	2	4,326
Aruba 2920 Series Switches	7	14,924
Aruba IAP-325 (Indoor)	21	45,924
Aruba IAP-275's (Outdoor)	5	10,815
Aruba Airwave	Throughout	

HPE Technology Services

Day 1 (Implementation)

Day 2 (Support) services

Aruba Campus Access Switch portfolio

Gigabit Access



Aruba 2530



Aruba 2540



Aruba 2930F

Multi-Gig Access



Aruba 2930M



Aruba 3810



Aruba 5400R

	Aruba 2530	Aruba 2540	Aruba 2930F	Aruba 2930M	Aruba 3810	Aruba 5400R
Switching	L2	L2 + RIP/static	L3 + RIP, Access OSPF	L3 + RIP, Access OSPF	Advanced L3	Advanced L3
Modular Power & Uplinks				●	●	●
Smart Rate Multi-Gig Ports				●	●	●
Dynamic Segmentation			●	●	●	●
Stacking			VSF	●	●	VSF
REST APIs	●	●	●	●	●	●
AirWave, ClearPass, Central	●	●	●	●	●	●
PoE/PoE+	●	●	●	●	●	●
PoE Class 6 (60W)				●		

Depend On Our Industry Leading Warranty

CAMPUS ACCESS SWITCHES

Hardware Warranty

Original Owner Lifetime

Replacements

NBD Shipment

Software Updates

Posted Releases

Phone Support

(Best Effort, Product Conformance)

24x7 for 90 Days

8x5 for Lifetime

CAMPUS CORE SWITCHES

Hardware Warranty

5 year

Replacements

10 day shipment

Software Updates

Posted Releases

Phone Support

(Best Effort, Product Conformance)

8x5 for 90 days

No software licensing required

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Aruba 5400R v3 zl2 Modules

Product number	Product name	Features
J9986A	Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 zl2 Module	Gig-T, PoE+, MACsec, Full Line Rate
J9987A	Aruba 24-port 10/100/1000BASE-T MACsec v3 zl2 Module	24 Gig-T, MACsec, Full Line Rate
J9988A	Aruba 24-port 1GbE SFP MACsec v3 zl2 Module	SFP, MACsec, Full Line Rate
J9989A	Aruba 12-port 10/100/1000BASE-T PoE+/12-port 1GbE SFP MACsec v3 zl2 Module	Combo Gig-T and SFP, MACsec, Full Line Rate
J9990A	Aruba 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 zl2 Module	Combo Gig-T and SFP/SFP+, MACsec, Full Line Rate
J9991A	Aruba 20-port 10/100/1000BASE-T PoE+/4p 1/2.5/5/10GBASE-T PoE+ MACsec v3 zl2 Module	Combo Gig-T and HP Smart Rate 1,2.5,5,10GT, PoE+, MACsec ¹ , Full Line Rate
J9992A	Aruba 20-port 10/100/1000BASE-T PoE+ MACsec/1-port 40GbE QSFP+ v3 zl2 Module	Combo Gig-T and 40GbE QSFP+, PoE+, MACsec, Full Line Rate
J9993A	Aruba 8-port 1G/10GbE SFP+ MACsec v3 zl2 Module	SFP/SFP+, MACsec, Full Line Rate*
J9995A	Aruba 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 zl2 Module	HPE Smart Rate 1,2.5,5,10GT, PoE+, MACsec ¹ , Full Line Rate*
J9996A	Aruba 2-port 40GbE QSFP+ v3 zl2 Module	40GbE QSFP+, Full Line Rate*
JL001A	Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 zl2 Switch	12 slot chassis, Gig-T, PoE+, SFP/SFP+, MACsec, Full Line Rate, Bundle
JL002A	Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 zl2 Switch	6 slot chassis, HPE Smart Rate, PoE+, SFP/SFP+, MACsec ¹ , Full Line Rate, Bundle
JL003A	Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 zl2 Switch	6 slot chassis, Gig-T, PoE+, SFP/SFP+, MACsec, Full Line Rate, Bundle
JL095A	Aruba 5406R 16-port SFP+ (No PSU) v3 zl2 Switch	6 slot chassis, SFP/SFP+, MACsec, Full Line Rate, Bundle

Aruba 5400R v3 zl2 modules with HPE Smart Rate

**Aruba 20-port 10/100/1000BASE-T PoE+/4p
1/2.5/5/10GBASE-T PoE+ MACsec v3 zl2 Module
(J9991A)**



Features: Combo Gig-T and HPE Smart Rate
1,2.5,5,10GT, PoE+, MACsec, Full Line Rate¹

**Aruba 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 zl2
Module (J9995A)**



Features: HPE Smart Rate 1,2.5,5,10GT, PoE+,
MACsec, Full Line Rate¹

¹ Minimum threshold packet size applies

Aruba 5400R v3 zl2 modules with 40GbE

Aruba 20-port 10/100/1000BASE-T PoE+ MACsec/1-port 40GbE QSFP+ v3 zl2 Module (J9992A)



Features: Combo Gig-T and 40GbE QSFP+, PoE+, MACsec, Full Line Rate ¹

Aruba 2-port 40GbE QSFP+ v3 zl2 Module (J9996A)



Features: 40GbE QSFP+, Full Line Rate ¹

¹ Minimum threshold packet size applies

Aruba 5400R v3 zl2 modules with PoE+

Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 zl2 Module (J9986A)



Features: Gig-T, PoE+, MACsec, Full Line Rate¹

Aruba 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 zl2 Module (J9990A)



Features: Gig-T, 10GbE, PoE+, MACsec, Full Line Rate¹

Aruba 12-port 10/100/1000BASE-T PoE+/12-port 1GbE SFP MACsec v3 zl2 Module (J9989A)



Features: Combo Gig-T and SFP, PoE+, MACsec, Full Line Rate¹

¹ Minimum threshold packet size applies

Aruba 5400R v3 zl2 modules

Aruba 24-port 10/100/1000BASE-T MACsec v3 zl2 Module (J9987A)



Features: 24 Gig-T, MACsec, Full Line Rate ¹

Aruba 8-port 1G/10GbE SFP+ MACsec v3 zl2 Module (J9993A)



Features: SFP/SFP+, MACsec, Full Line Rate ¹

Aruba 24-port 1GbE SFP MACsec v3 zl2 Module (J9988A)



Features: SFP, MACsec, Full Line Rate ¹

Aruba 5400R zl2 Switch Series power supplies

80Plus Gold Certified Power Supplies

Configuration	Aruba 5406R PoE budget	No. of ports at 30 W	Aruba 5412R PoE budget	No. of ports at 30 W
Low Power (1100W)				
1 x J9829A	900 W	28	900 W	28
2 x J9829A	1665 W	52	1665 W	52
3 x J9829A	N/A	N/A	2498 W	78
4 x J9829A	N/A	N/A	3330 W	104
Base Power (700W)				
1 x J9828A	275 W	8	275 W	8
2 x J9828A	509 W	15	509 W	15
3 x J9828A	N/A	N/A	763 W	23
4 x J9828A	N/A	N/A	1018 W	31
High Power (2750W)				
1 x J9830A (main only)	1100 W	34	1100 W	34
2 x J9830A (main only)	2035 W	63	2035 W	63
3 x J9830A (main only)	N/A	N/A	3053 W	95
4 x J9830A (main only)	N/A	N/A	4070 W	127
1 x J9830A (main + aux)	2500 W	78	2500 W	78
2 x J9830A (main + aux)	4625 W	144	4625 W	144
3 x J9830A (main + aux)	N/A	N/A	6938 W	216
4 x J9830A (main + aux)	N/A	N/A	9250 W	288

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Aruba Campus Switching Differentiators

Complete campus core to edge portfolio

Automated and Simple



Zero Touch Provisioning

Auto-config for VLAN, QoS, PoE priority

Full, open **REST APIs**

Aruba **Network Analytics Engine** at the core

Secure and Unified



Dynamic Segmentation

secures with Aruba Controllers, Services and ClearPass

Unified Policy with Unique Aruba ClearPass Integration with User Role and Captive Portal

Flexible Single View



Multi-vendor Aruba AirWave for config., mgmt. and monitoring

Cloud-based Aruba Central for single view of WLAN and switching

Flexible management choice with same hardware

Industry leading TCO with no software licensing

Resources

Learn more about..

- Aruba campus switches and the Aruba 5400R Switch Series
- Aruba campus switches solution brief
- Aruba's multi-gigabit Ethernet solutions
- Networking services from HPE Pointnext

Aruba Switch Software

- <https://www.arubanetworks.com/products/networking/switches/software/>

Aruba Support Portal for Software, Documentation and more

- <https://asp.arubanetworks.com/>



a Hewlett Packard
Enterprise company

Thank you

HPE Smart Rate Delivers Faster Speeds on Existing Cabling

2.5-5 times more bandwidth from **existing cable** infrastructure **without expensive** and disruptive cable upgrades.

Mode	Cable type	Cable length
1 Gbps (1000BASE-T)	CAT5e/Class D or better	Up to 100 meters
2.5 Gbps Available when link partner is HPE Smart Rate or compatible vendor	CAT5e/Class D or better	Up to 100 meters
	CAT5e/Class D	Up to 55 meters in a high Alien noise environment
		Up to 100 meters in a low Alien noise environment
	Shielded CAT5e/Class D	Up to 100 meters
5 Gbps Available when link partner is HPE Smart Rate or compatible vendor	CAT6/Class E or better	Up to 100 meters
	CAT6/Class E	Up to 55 meters
	CAT6A/Class E _A	Up to 100 meters
10 Gbps (10GBASE-T)		

HPE Smart Rate Speeds:

- Aruba 5400R Module, 3810 Switch, 3810/2930M module, 2930M (JL323A and R0M67A) Switches – 1, 2.5, 5, 10GbE
- Aruba 2930M (JL324A and R0M68A) – 1, 2.5, 5GbE fixed ports (no 10GbE)
- Aruba 330 Series APs – 1, 2.5, 5GbE

Aruba 5400R Switch Series – Rear View

Aruba 5406R

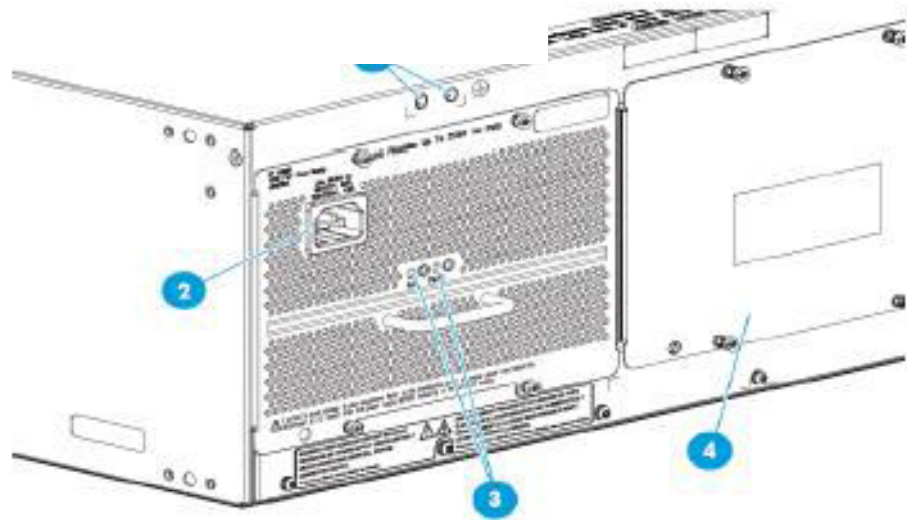
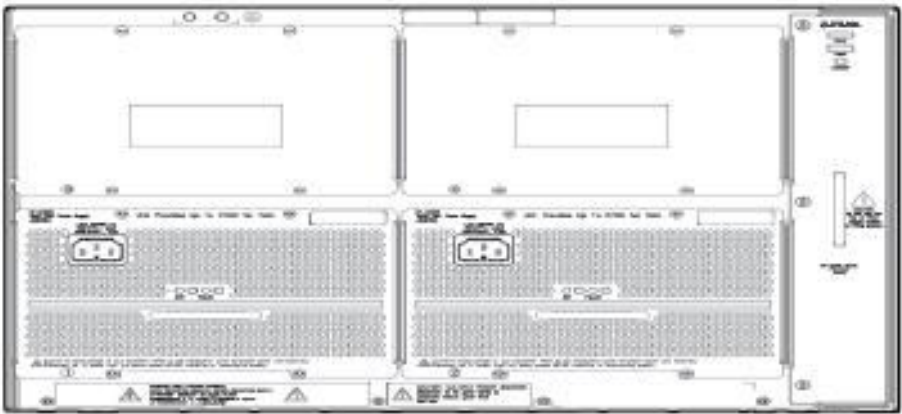


Figure 1-5. Back of a 5406R z12 switch with one power supply

1	Ground lug mounting holes
2	AC power connector
3	Power and Fault LEDs
4	Slot for installing optional redundant power supply



Aruba 5412R

Aruba 5400R Switch Series

MACsec

Where it works

Industry-standard MACsec will be available on the following Aruba 3810 ports:

- All twisted pair 1000Base-T ports
- All HPE Smart Rate Multi-Gigabit 1Gbps, 2.5 Gbps, 5 Gbps, 10 Gbps ports
- All 1GbE/10GbE SFP/SFP+ fiber ports

NOT available on 40GbE QSFP+ ports

The security benefits

Connectionless data integrity

- Frame received is identical to the frame transmitted

Data origin authenticity

- Frame received is from the source indicated

Confidentiality

- User data is encrypted

Replay protection

- Frame received has not been duplicated as part of a denial of service attack

Bounded receive delay (Timeliness)

- Known and predictable bounds on the latency added to each frame for security

Certain denial of service attacks

- Passive wiretapping, Man-in-the-middle, Masquerading, Bit-flipping

MACsec does not:

- Provide non-repudiation
- Protect against traffic analysis

Product compatibility

Module Version	5400 zl	8200 zl	5400R zl2
v1 zl modules	✓	✓	
v2 zl modules	✓	✓	✓
v3 zl2 modules			✓

Legacy and future support:

- v3 modules will only be supported on the 5400R zl2 Switch Series
- v3 modules will not be supported by the 5400 zl Switch Series chassis
- v3 modules will not be supported by the 8200 zl Switch Series chassis
- The use of v1 modules not supported on the 5400R zl2 Switch Series
- The use of v2 zl modules and v3 zl2 modules on the same 5400R zl2 Switch Series is supported*

* Some v3 features may be limited in “mixed mode”. Additional details will be available soon.