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Mobile First Networks

Product Overview

Gartner Magic Quadrant for the Wired and Wireless LAN Access Infrastructure

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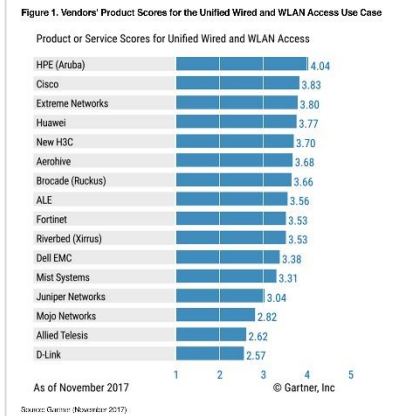

Gartner once again positions HPE Aruba in the Leaders Quadrant of the latest Wired and Wireless LAN Access Infrastructure Magic Quadrant

HPE Aruba feels this should be considered further validation that HPE Aruba is redefining the intelligence edge and a leader in connecting the world with intelligence mobility

HPE Aruba receives highest product scores in <u>6 out of 6</u> use cases in *Gartner's Critical Capabilities Report**
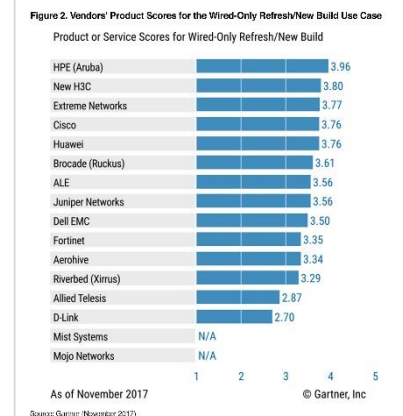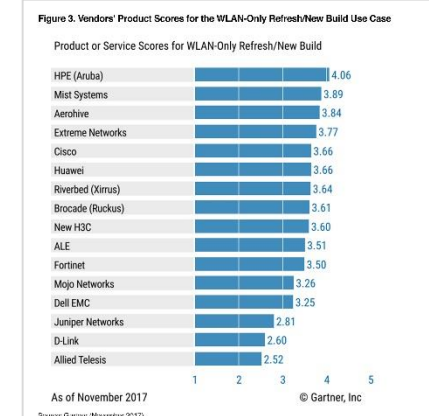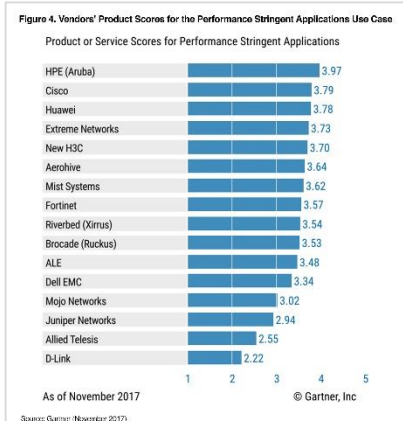
1 **Unified Wired and WLAN Access**

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

Product or Service Scores for Unified Wired and WLAN Access

Vendor	Score
HPE (Aruba)	4.04
Cisco	3.83
Extreme Networks	3.80
Huawei	3.77
New H3C	3.70
Aerohive	3.68
Brocade (Ruckus)	3.66
ALE	3.56
Fortinet	3.53
Riverbed (Xirrus)	3.53
Dell EMC	3.38
Mist Systems	3.31
Juniper Networks	3.04
Mojo Networks	2.82
Allied Telesis	2.62
D-Link	2.57

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Source: Gartner (November 2017)

2 **Wired-Only Refresh/New Build**

Figure 2. Vendors' Product Scores for the Wired-Only Refresh/New Build Use Case

Product or Service Scores for Wired-Only Refresh/New Build

Vendor	Score
HPE (Aruba)	3.96
New H3C	3.80
Extreme Networks	3.77
Cisco	3.76
Huawei	3.76
Brocade (Ruckus)	3.61
ALE	3.56
Juniper Networks	3.56
Dell EMC	3.50
Fortinet	3.35
Aerohive	3.34
Riverbed (Xirrus)	3.29
Allied Telesis	2.87
D-Link	2.70
Mist Systems	N/A
Mojo Networks	N/A

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Source: Gartner (November 2017)

3 **WLAN Only Refresh/New Build**

Figure 3. Vendors' Product Scores for the WLAN-Only Refresh/New Build Use Case

Product or Service Scores for WLAN-Only Refresh/New Build

Vendor	Score
HPE (Aruba)	4.06
Mist Systems	3.89
Aerohive	3.84
Extreme Networks	3.77
Cisco	3.66
Huawei	3.66
Riverbed (Xirrus)	3.64
Brocade (Ruckus)	3.61
New H3C	3.60
ALE	3.51
Fortinet	3.50
Mojo Networks	3.26
Dell EMC	3.25
Juniper Networks	2.81
D-Link	2.60
Allied Telesis	2.52

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4 **Performance Stringent Applications**

Figure 4. Vendors' Product Scores for the Performance Stringent Applications Use Case

Product or Service Scores for Performance Stringent Applications

Vendor	Score
HPE (Aruba)	3.97
Cisco	3.79
Huawei	3.78
Extreme Networks	3.73
New H3C	3.70
Aerohive	3.64
Mist Systems	3.62
Fortinet	3.57
Riverbed (Xirrus)	3.54
Brocade (Ruckus)	3.53
ALE	3.48
Dell EMC	3.34
Mojo Networks	3.02
Juniper Networks	2.94
Allied Telesis	2.55
D-Link	2.22

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5 **Multivendor Networking Environment**

Figure 5. Vendors' Product Scores for the Multivendor Networking Environment Use Case

Product or Service Scores for Multivendor Networking Environment

Vendor	Score
HPE (Aruba)	3.91
Extreme Networks	3.60
New H3C	3.56
Aerohive	3.42
Huawei	3.40
ALE	3.37
Riverbed (Xirrus)	3.35
Brocade (Ruckus)	3.32
Dell EMC	3.30
Juniper Networks	3.23
Cisco	3.18
Fortinet	3.13
Mist Systems	2.99
Mojo Networks	2.66
Allied Telesis	2.65
D-Link	2.47

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Source: Gartner (November 2017)

6 **Remote Branch Office With Corporate HQ**

Figure 6. Vendors' Product Scores for the Remote Branch Office With Corporate HQ Use Case

Product or Service Scores for Remote Branch Office With Corporate HQ

Vendor	Score
HPE (Aruba)	4.01
Cisco	3.81
Huawei	3.78
Extreme Networks	3.77
New H3C	3.69
Aerohive	3.67
Brocade (Ruckus)	3.58
Fortinet	3.58
Mist Systems	3.57
Riverbed (Xirrus)	3.53
ALE	3.50
Dell EMC	3.36
Mojo Networks	3.04
Juniper Networks	2.95
Allied Telesis	2.53
D-Link	2.30

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Source: Gartner (November 2017)

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*Gartner, Critical Capabilities for Wired and Wireless LAN Access Infrastructure, Menezes, Canales, Zimmerman, November 2017

Wireless & Wired Network Infrastructure

Aruba Mobile First Platform Components

ArubaOS 8.0 (AOS8)
New REST APIs and custom app signatures

Aruba ClearPass
New unified API library, extensions repository and OnConnect for secure IoT

Aruba AirWave
Northbound XML APIs to consume monitoring and reporting data

Aruba Central
New REST APIs, wired/WAN support and network analytics

Aruba Meridian
Mobile app SDK for indoor location services, incl. the new location sharing and the new Meridian Goals

Aruba Analytics & Location Engine (ALE)
Northbound REST APIs to consume user, device, app, location context

Redefining the campus wireless LANs with virtualization

Autonomous APs

2002

Controller based WLANs to enable seamless mobility, ease of management and improved security

2016

Virtual Mobility Master

ARUBAOS

Virtual Mobility Controller
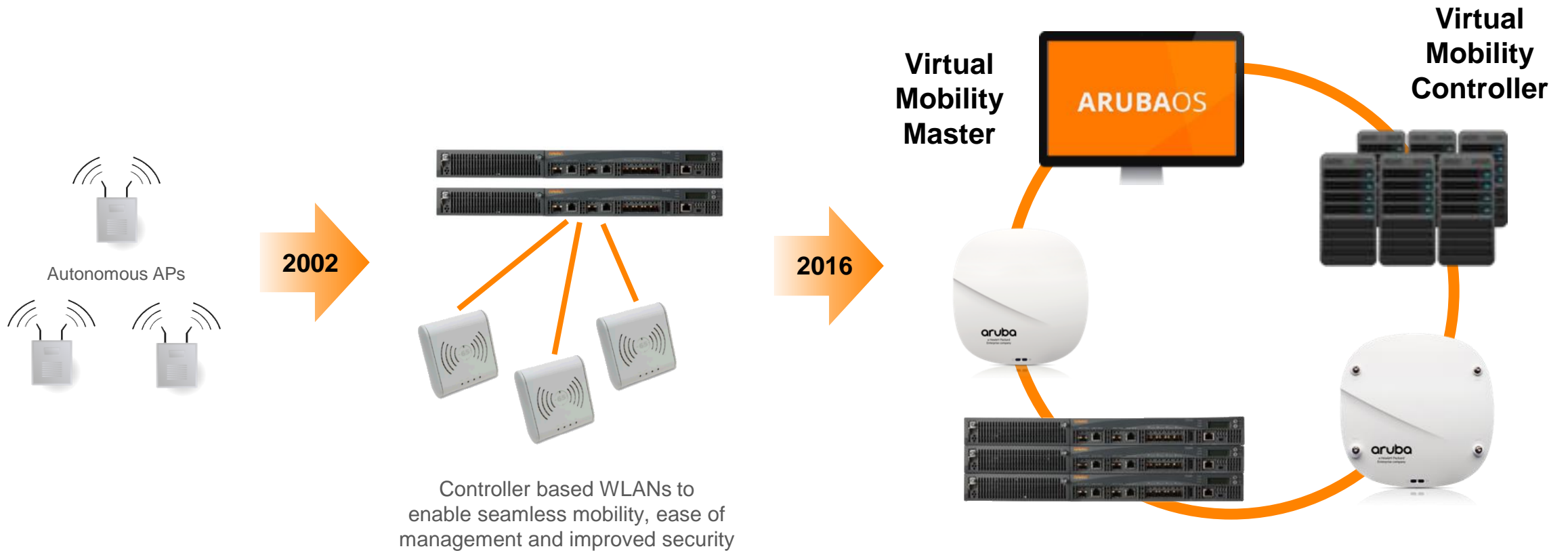
Improved reliability and ease of operations with virtualization

Virtual Mobility Master

Virtual Mobility Controller

ARUBAOS

Virtualized servers or hardened appliances for mobility controllers operating as a cluster

Mobility Controller
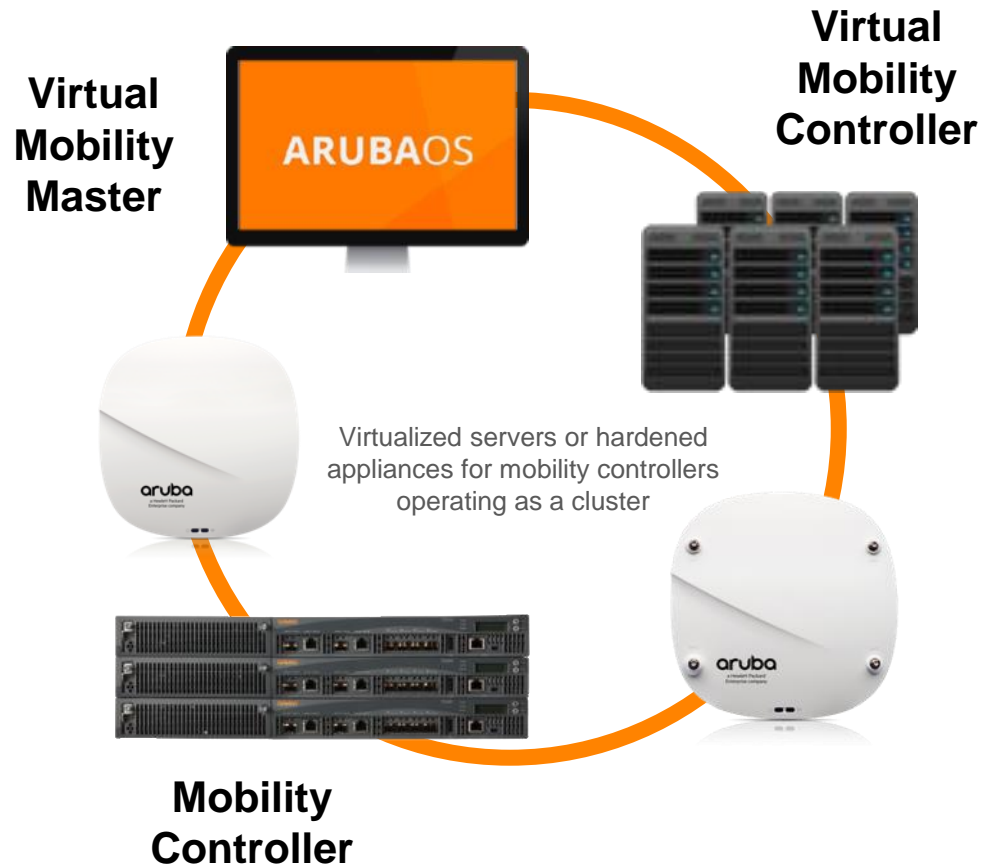
- *Hitless failovers* during controller failures within a cluster, without disruption to real-time voice and video apps
- Automated *user & AP load-balancing* with congestion across the members of the controller cluster
- *Multiple OS releases* across different clusters within the same network, easing the migration from old to new
- *In-service upgrades* for major features and functions, such as NB APIs, AirGroup, AppRF, ClientMatch

Virtualized Controllers: Use Cases and Benefits

New opportunities where virtualization in the data center, campus and branch is a priority for your customers

Ease of moves, adds, changes: no need to ship new hardware to expand the reach of controller-based WLANs

Support for mission critical networks with highest levels of service level agreement (SLA) requirements

Customers move to new ArubaOS releases faster: increasing their ability to adapt latest AP hardware

Simplified operations with centralized licensing

University
500 license

Chemistry
300 license

Mathematics
200 license

- Centralized licensing managed from the Mobility Master, managed across different clusters of "local" mobility controllers
- Optional segmentation of license pools across different departments within the same organization

8

Centralized Licensing: Use Cases and Benefits

Significantly simplified operations for controller-based WLANs, increasing the speed of adoption for new feature licenses

Proper utilization of all licenses across the network, without wasting any available resources

Ease of ordering for customers and IT support for partner engineers during moves and changes

Predictive performance monitoring with Aruba Clarity
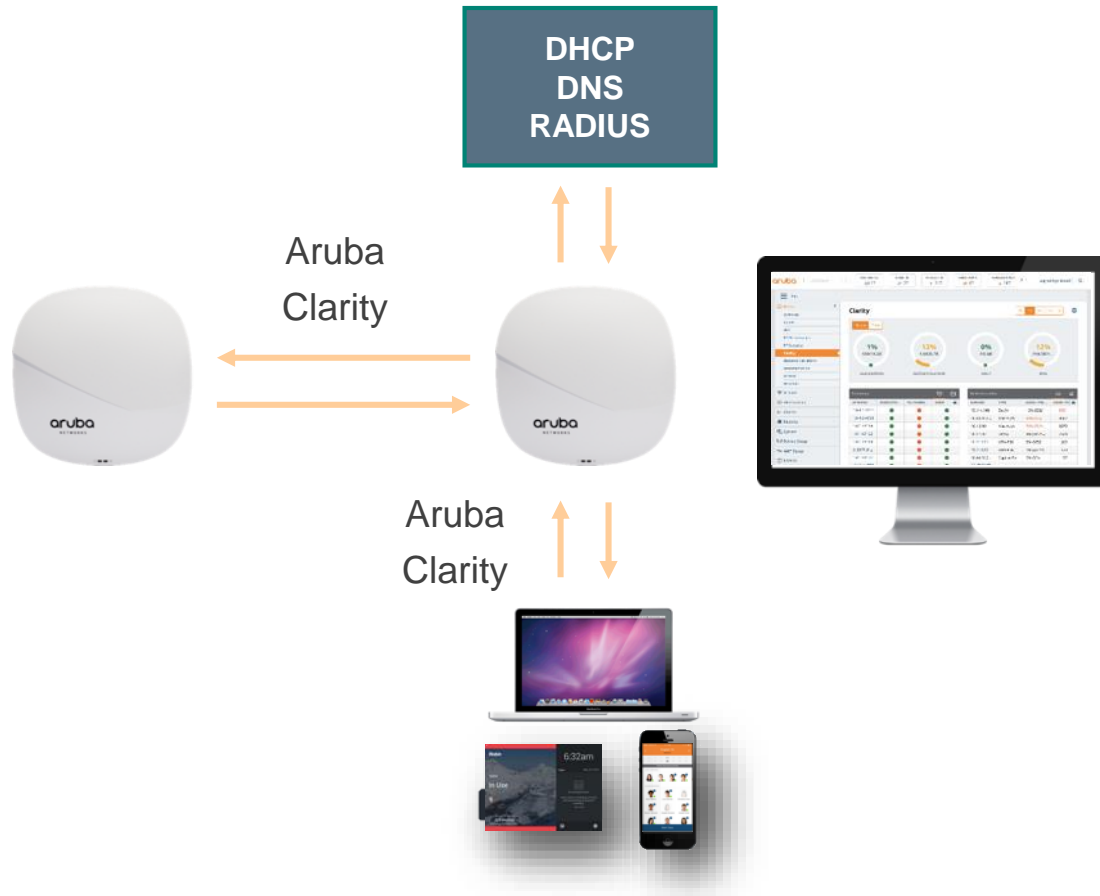
- ✓ Wi-Fi connectivity with Aruba Clarity
  - • Live monitoring of client association and roaming
  - • On-demand and scheduled simulated client tests from APs
  - • Threshold-based alerts and visualization
- ✓ Wi-Fi coverage with AirWave VisualRF
  - • Time-lapse visualization for up to 24 hours
- ✓ Wi-Fi bandwidth consumption with AppRF
  - • Web traffic metrics per content category and reputation

Automated high density RF controls with AirMatch

NEW

- Requires Mobility Master and AOS8

- Centralized RF automation for power, channel and channel width assignments

- Designed to achieve long term network stability and performance via machine learning

- RF settings are updated every 24 hours by default; frequency can be adjusted by IT
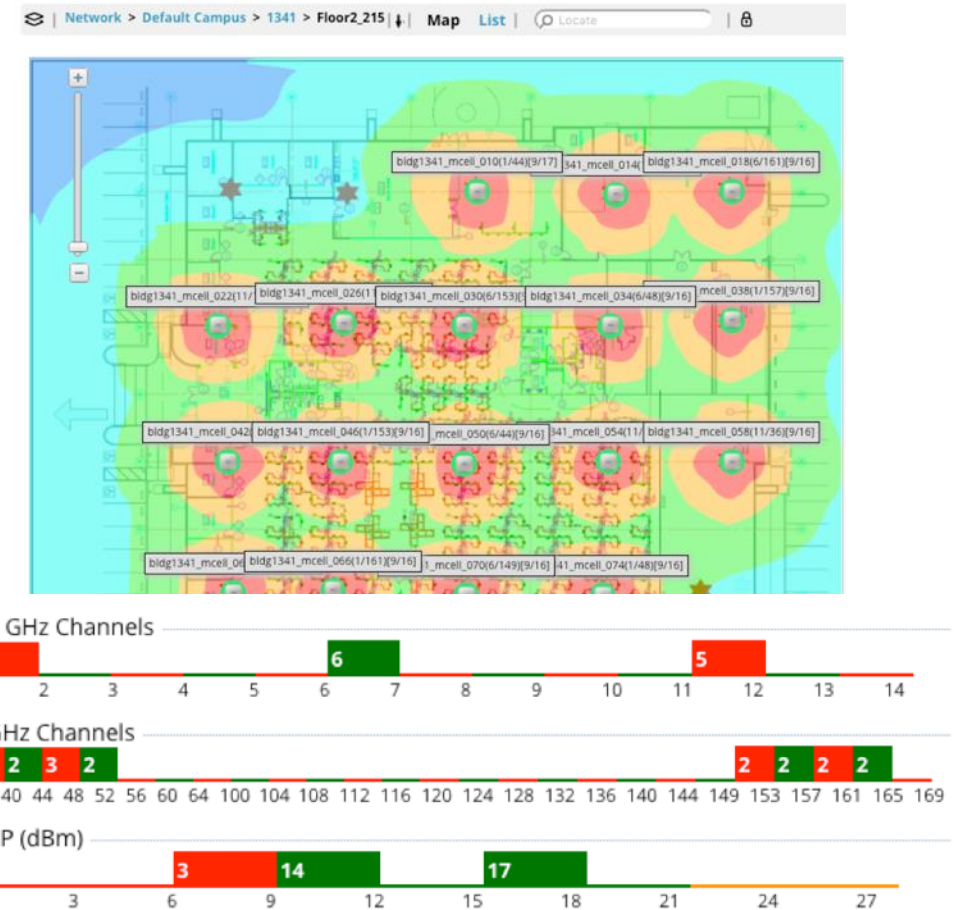
Multiple tenants on the same access point with MultiZone

Network A

Network B

Aruba 7200
Mobility Controller

Aruba 7200
Mobility Controllers

NEW
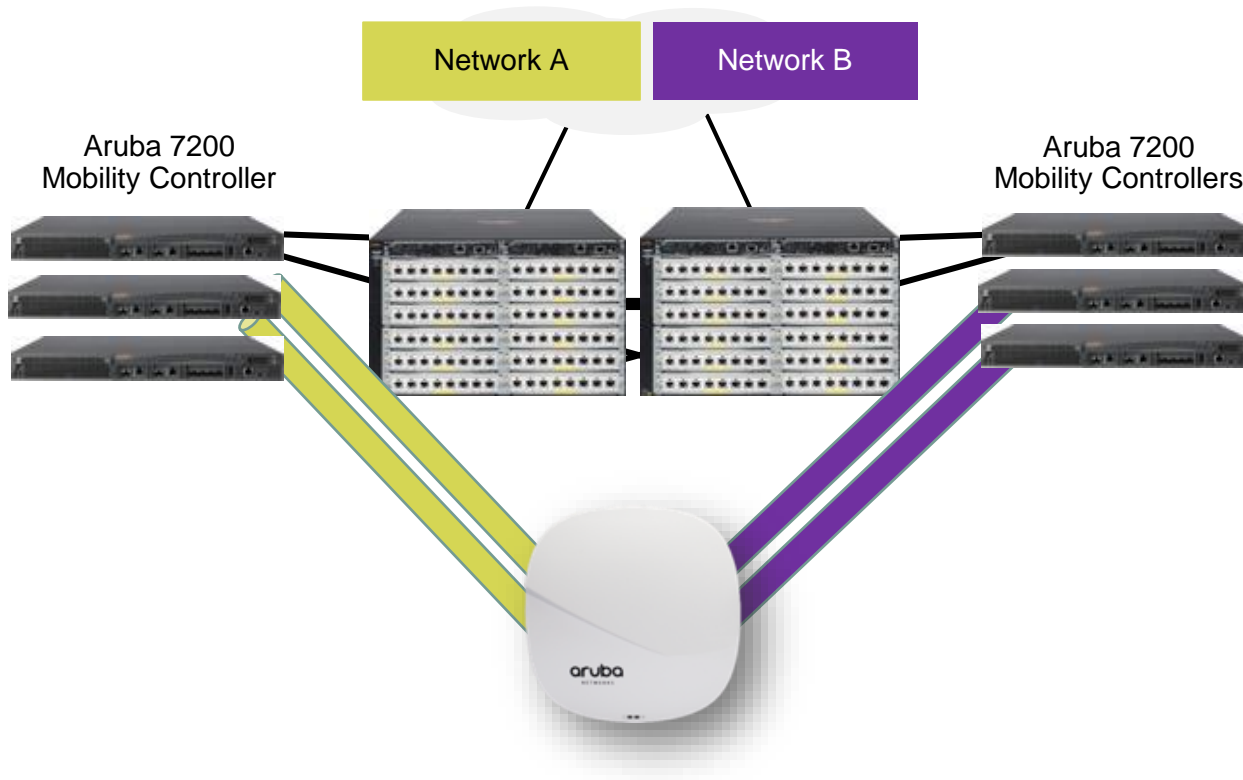
- Requires Mobility Master and AOS8
- SSIDs terminate on different controllers to ensure physical separation of traffic flows
- Efficient use of Wi-Fi resources and reduced cost of AP hardware deployment

MultiZone: Use Cases and Benefits

Airport

British Airways Wi-Fi

United Airlines Wi-Fi

Security Wi-Fi

Public Wi-Fi

Air France Wi-Fi

Singapore Airlines Wi-Fi

Shopping Mall

Shopping Mall public Wi-Fi

Uniqlo Private Wi-Fi

H&M Private Wi-Fi

Levi's Wi-Fi

Offer significant cost savings to operators of public venues, by eliminating use of separate Wi-Fi systems

Give additional Wi-Fi sponsorship opportunities to your existing customers in public venues
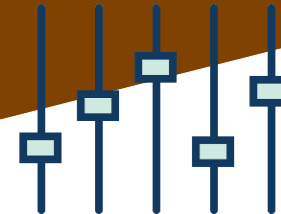
Awareness for Wi-Fi Calling, Cisco Jabber and custom apps

- Custom AppRF definitions beyond the 2500 that's automatically identified by AOS
- Update signatures without an AOS upgrade
- Automatic classification, health metrics for Wi-Fi calling, Skype for Business, Apple Facetime, Cisco Jabber/Spark, and more
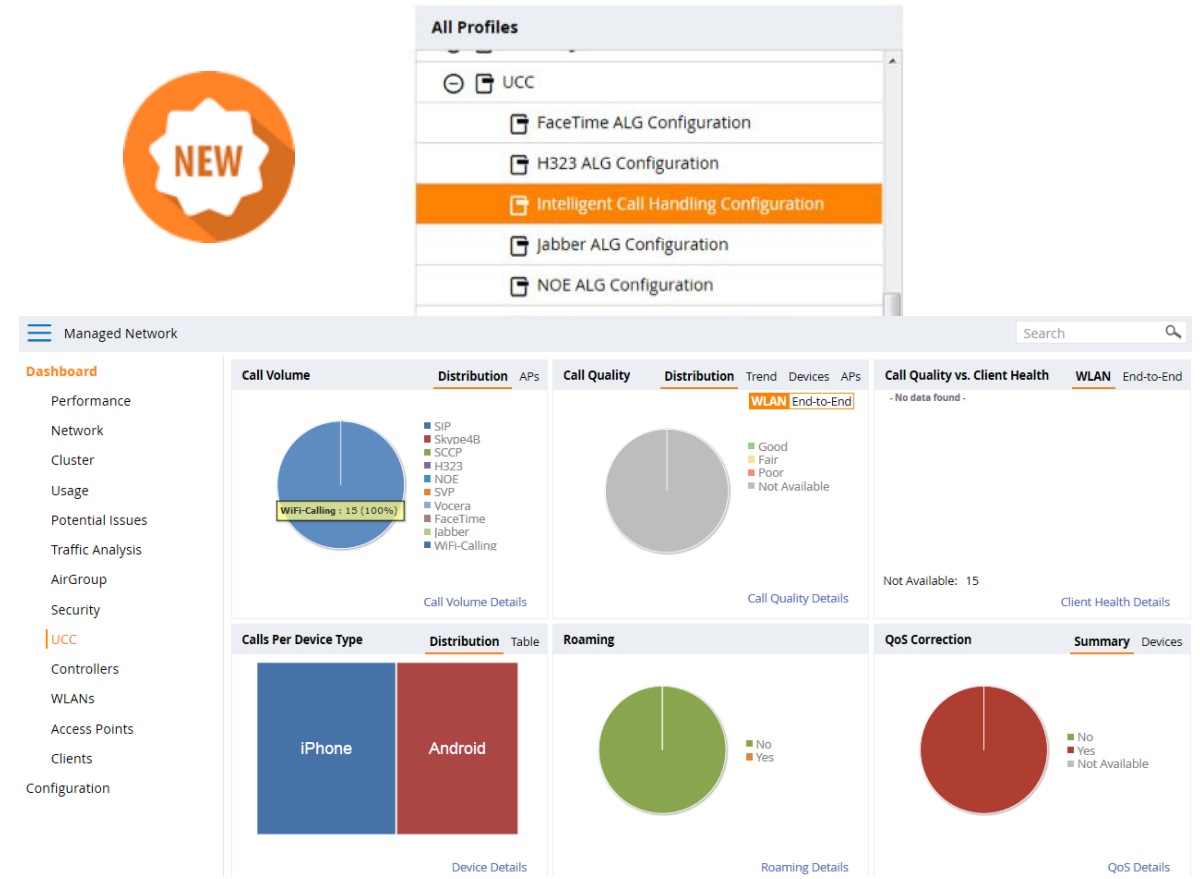
Intelligent bandwidth management on the WAN

- Class of traffic defined by contextual policies
- Monitor in real-time maximum bandwidth availability on the WAN links upstream
- Enforce bandwidth controls based on multiple levels of priority, across four weighted queues

App Awareness: Use Cases and Benefits

Become a strategic adviser for your customers by enabling them to quickly adopt new mobile and IoT apps

Simplify extension of business applications to remote sites without significant WAN investments

Offer quality of service and policy enforcement for customers who deploy Cisco mobile UC solutions

Improving affordability for wired and Wi-Fi access

304/305 Wave 2   **207 Wave 1**

2930F

Aruba 802.11ac
W2: 310, 320, 330
W1: 200 series

Aruba Switches
3810, 2920, 2530,
5400R series

Dual-radio 304/305 series Wave 2

- 5GHz 3x3, 80MHz channels, 2 MU-MIMO
- 1GbE uplink, 802.3af/at support
- USB interface, integrated BLE

Dual-radio 207 series Wave 1

- 5GHz 2x2, 80MHz, 1GbE, 802.3af, BLE

Aruba 2930F series

- Affordable L3 access switch with 8/24/48 ports
- Fixed 1/10GbE uplinks, 370W of PoE+ power
- ArubaOS-Switch 16.2 support (available now)
  - Tunneled ports to mobility controller for unified policy
  - Role based access control at the edge with ClearPass
  - Zero touch deployment and provisioning with AirWave/Activate
  - Automatic VLAN and QoS assignment for Aruba Instant APs

207 Series Access Points
Making fast 802.11ac affordable for everyone

- Dual radio 2x2:2SS VHT80
  - 5GHz: 867Mbps max, 2.4GHz: 400Mbps max
  - Support for approved 5GHz bands in the future
  - Transmit Beamforming and Advanced Cellular Coexistence
- Integrated BLE radio: locationing, beacon management
- Temperature range: 0C to +50C
- 1x GbE, 802.3af POE / 12Vdc, ~12W max
- Same size as 205 series (150mm x 150mm x 40mm)

300 Series Access Points
Entry level 802.11ac Wave 2

NEW

- Dual radio with internal (305) and external (304) antennas
    - 5GHz 3x3:3SS: 1300Mbps max (3SS VHT80 clients)
    - 2.4GHz: 400Mbps max (2SS VHT40 clients)
    - Up to two MU-MIMO clients on 5GHz
    - Support for approved 5GHz bands in the future
    - Transmit Beamforming and Advanced Cellular Coexistence
    - AP-304/IAP-304: 3 x RP-SMA connectors for dual-band antennas
- Integrated BLE radio: locationing, console access
- Temperature range: 0C to +50C
- USB host interface, 1x GbE, 802.3af/at POE / 12Vdc
    - New: Ethernet and power interfaces oriented parallel with back surface (instead of perpendicular)
- ~12.9W normal operation, 19.2W with full USB load
- Slight larger size than 205 series (165mm x 165mm x 45mm)

310 Series Access Points: Mid-range 11ac Wave 2

- **Delivering the full value of 802.11ac Wave 2 at an aggressive price**
  - Same 5GHz radio capabilities as new flagship 330 Series
  - Single (Gb) Ethernet port, 2x2:2SS 2.4GHz radio
- **Dual radio, 802.11ac 4x4:4SS VHT160 and integrated BLE**
- 5GHz: 802.11ac 4x4:4SS MU-MIMO
  - 1,733Mbps peak datarate, and up to 3 simultaneous MU-MIMO client devices
- 2.4GHz: 802.11n/ac 2x2:2SS
  - 400Mbps peak datarate (2SS/VHT40), 300Mbps at 2SS/HT40 and 144Mbps at 2SS/HT20
- Other: ACC feature for interference immunity, TPM for security, USB interface
- Power: 802.3af/at POE or 12Vdc, 20.8W max (14.4W without USB)
- New: Intelligent Power Monitoring (IPM) to monitor and optimize power consumption
- Size: smaller than AP-325, similar to AP-215: 182mm x 180mm x 48mm
- Availability:
  - Controller-base (AP): May price list, June shipping
  - Controller-less (IAP): August price list & shipping

330 Series Access Points: Flagship 11ac Wave 2

- **Flagship AP, Wave 2 without restrictions or compromises**
  - Adding VHT160 and 2.5Gbps (Smart Rate) Ethernet to 320 Series
  - Hitless POE failover, antenna polarization diversity (5GHz radio)
- **Dual radio, 802.11ac 4x4:4SS VHT160 and integrated BLE**
- 5GHz: 802.11ac 4x4:4SS MU-MIMO
  - 1,733Mbps peak datarate, and up to 3 simultaneous MU-MIMO client devices
- 2.4GHz: 802.11n/ac 4x4:4SS
  - 800Mbps peak datarate (4SS/VHT40), 450Mbps at 3SS/HT40 and 144Mbps at 2SS/HT20
- Other: ACC feature for interference immunity, TPM for security, USB interface
- Power: 802.3af/at POE or 48Vdc, 25.5W max from POE (25.3W without USB), 30.9W (25W) from DC
- New: Intelligent Power Monitoring (IPM) to monitor and optimize power consumption
- Size: ~10% larger than AP-325: 225mm x 224mm x 52mm

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Positioning Multi-gigabit Ethernet with AP-330 Series

330 Series (Wave 2)

Supports HPE SmartRate; NBASE-T
Transmit 4SS to **3** Wave 2 clients

Upgrade to SmartRate capable switches to maximize Wi-Fi experience

Wired refresh cycles are longer than Wi-Fi. Future-proof with HPE SmartRate.

2.5GbE   1GbE
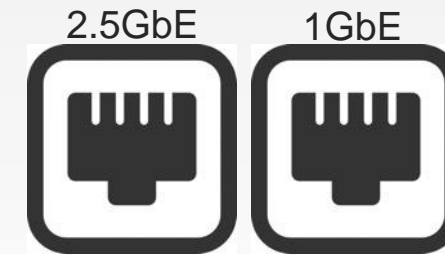
Ensure AP power redundancy with hitless PoE failover in case of primary link disruption

Comprehensive 802.11ac Portfolio

330, 320, 220
Series

Lecture Halls, Venues, Warehouses
High Performance & Density, Extended Temp

310, 210
Series

Carpeted Space
High Performance, Moderate Density

200
Series

K-12, Hospitality & Retail
Moderate Performance & Density

270 Series

Outdoor Environments
Moderate Performance & Density

Leading product line for 802.11ac

ARM with ClientMatch

Say goodbye to sticky clients

Multi-vendor management
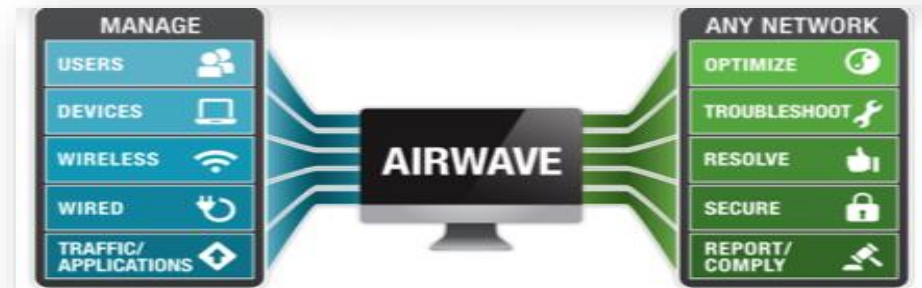
Manage Wi-Fi end to end

Proven for High Density

AppRF technology
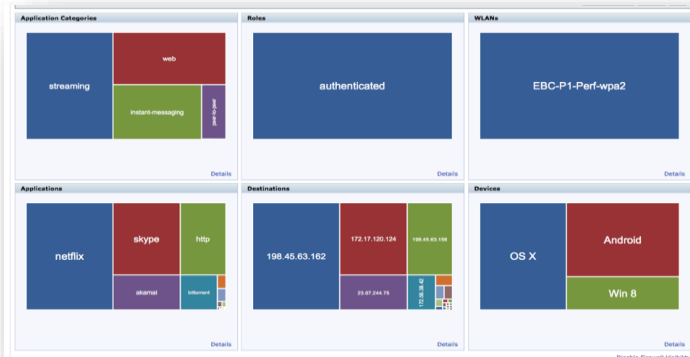
Policy enforcement leveraging context

Real-time control of airtime

Protects 11ac mobile devices from older generation

Role Based Security Architecture
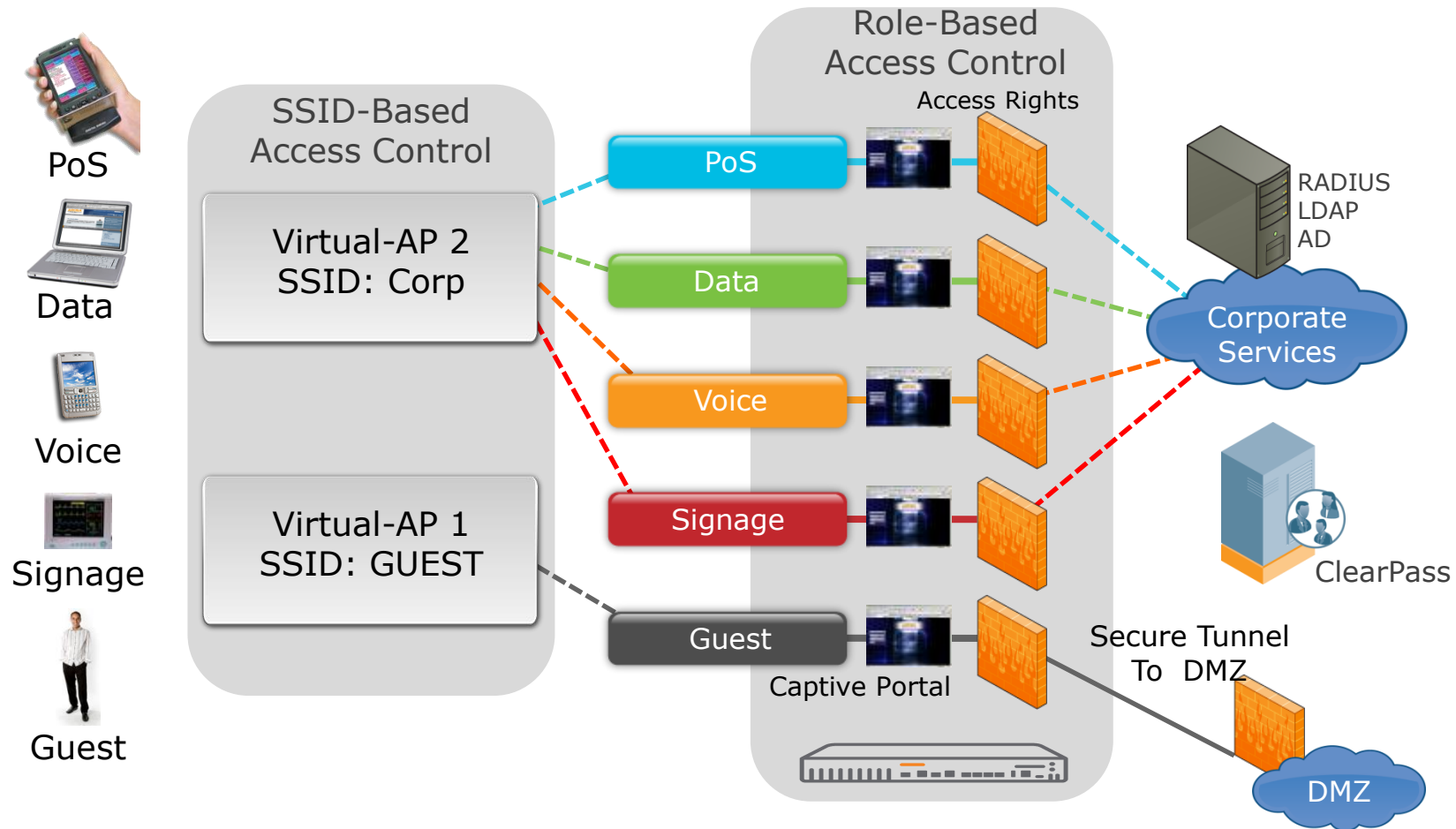
Eliminating VLANs for policy enforcement with Aruba PEF
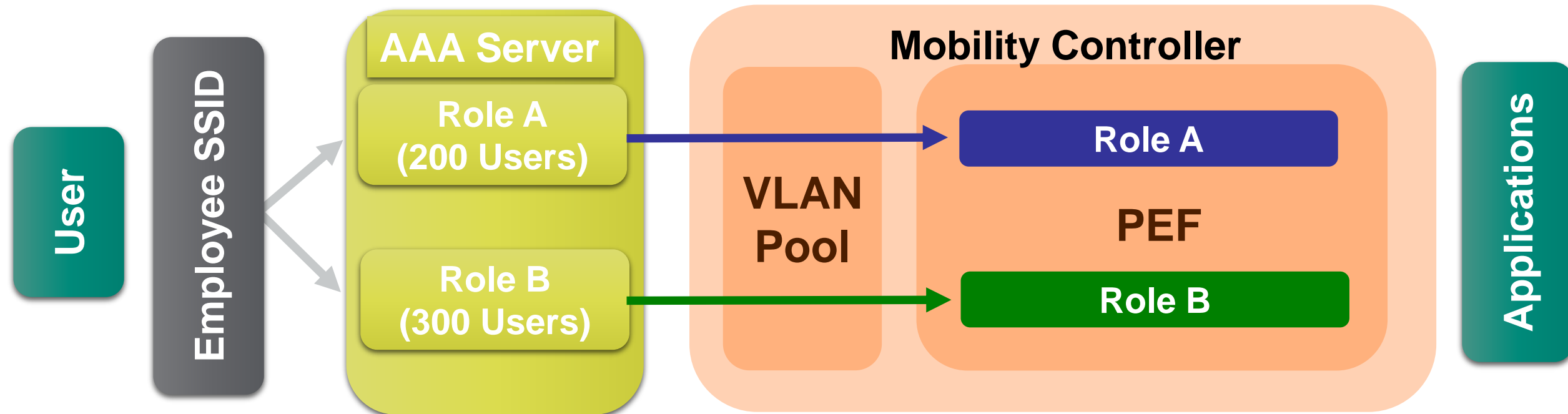
AppRF with Policy Enforcement Firewall
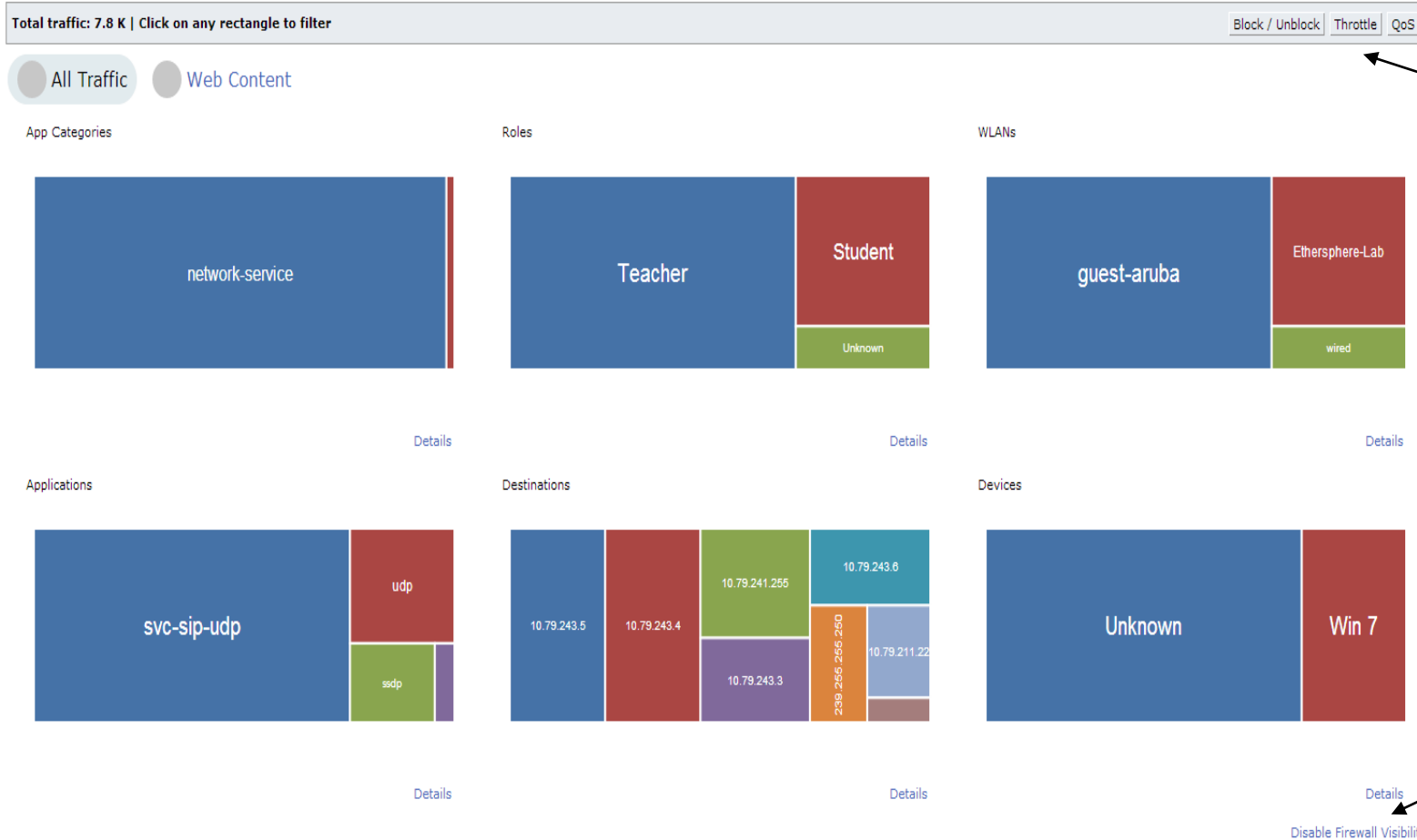
Block/Unblock, Throttle, QoS

- AppRF 2.0 is supported on 72xx and higher controller models.

- At present, Split Tunnel and Bridge mode traffic cannot take advantage of AppRF.

- Global knob to enable/disable content analysis

Enable/Disable Firewall Visibility

Challenges with UC over Wireless
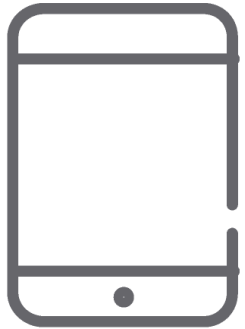
- Diversity of clients
- App incompatibility

- AP placement
- Channel Capacity
- AP Capacity
- Tx/Rx Characteristics
- Interference
- Mobility

- QoS on wireless
- QoS on wire
- Queue overflows/drops
- Routing/path changes
- WAN
- UC server monitoring

Web Content Classification with AppRF
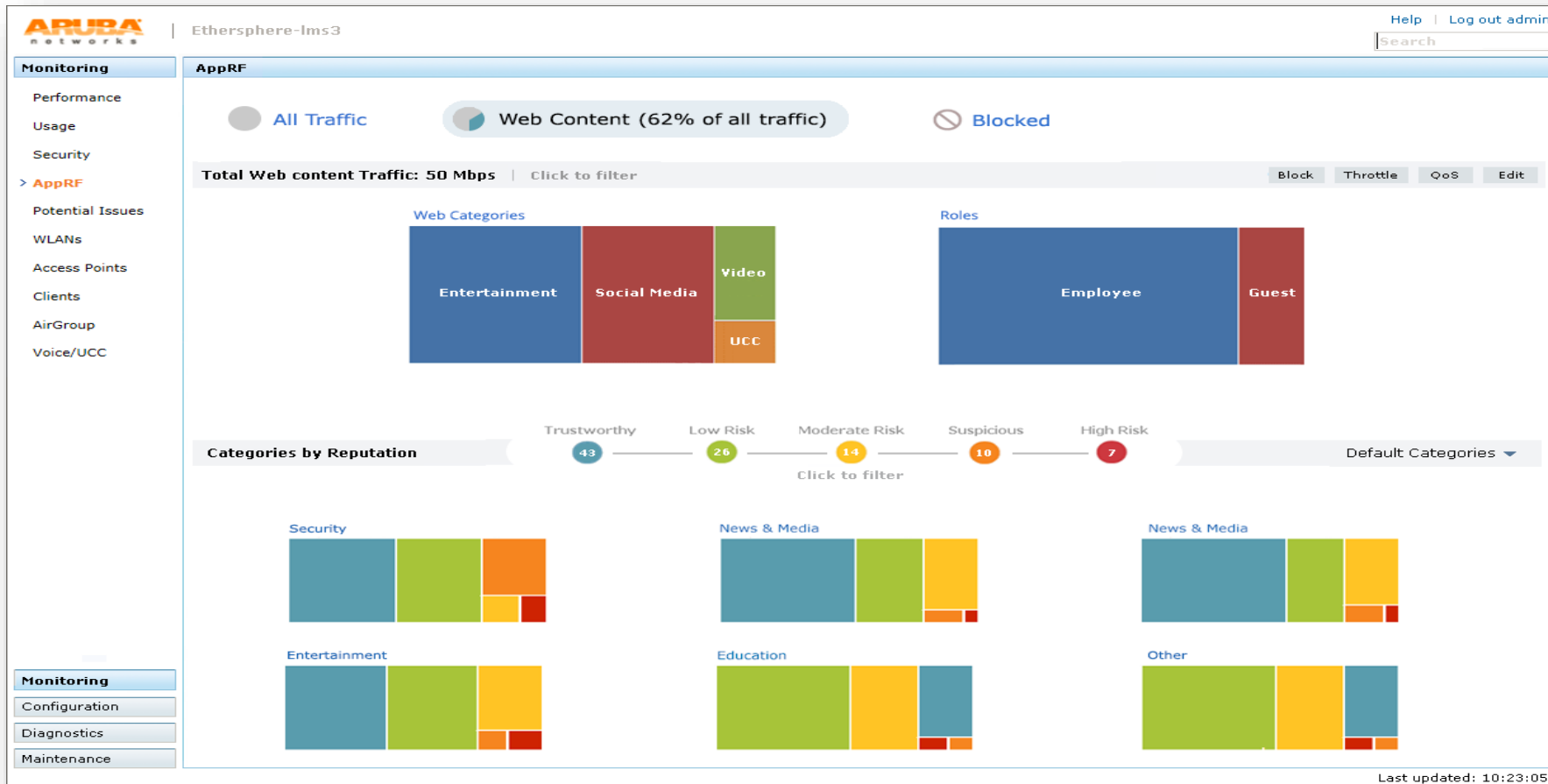
Deployment flexibility for access points

Controller Based

Centralized encryption/switching

Larger mobility domains

Same AP hardware

Controllerless (Instant)

Many individual remote sites

One user interface per cluster

CONTROLLER INSTANT

AirWave

Large sites, many branches

Multi-vendor controller and switch support

End to end diagnostics and health checks

Same workflows

INSTANT

Central

Cloud-based management

Many independent branches

Controllers scale from branch to campus

7240

7220

7210

Large Campus
High performance, redundant power/fan
512 – 2048 APs, up to 40Gbps throughput

7205

Midsize Campus
High performance, fixed form factor
Up to 256 APs, 12 Gbps throughput

7030

Large branch
Up to 64 APs and up to 8Gbps throughput

7024 (24 PoE+)

7010 (12 PoE+)

Midsize branch with integrated switch
12 or 24 ports of PoE+ for unified branches
Up to 32 APs

VMC-TACT (8/16 AP)

7005/7008 (16 AP)

Small branch
Virtualized or PoE-powered controllers

Branch

Campus

Branch Networks Need to Move at the Speed of Mobile & Cloud

LEGACY WAN CONNECTIVITY

ETHERNET AND 3G/4G

LOCAL APP SERVERS

CLOUD APPS

DEDICATED SECURITY APPLIANCES

CLOUD SECURITY ARCHITECTURES
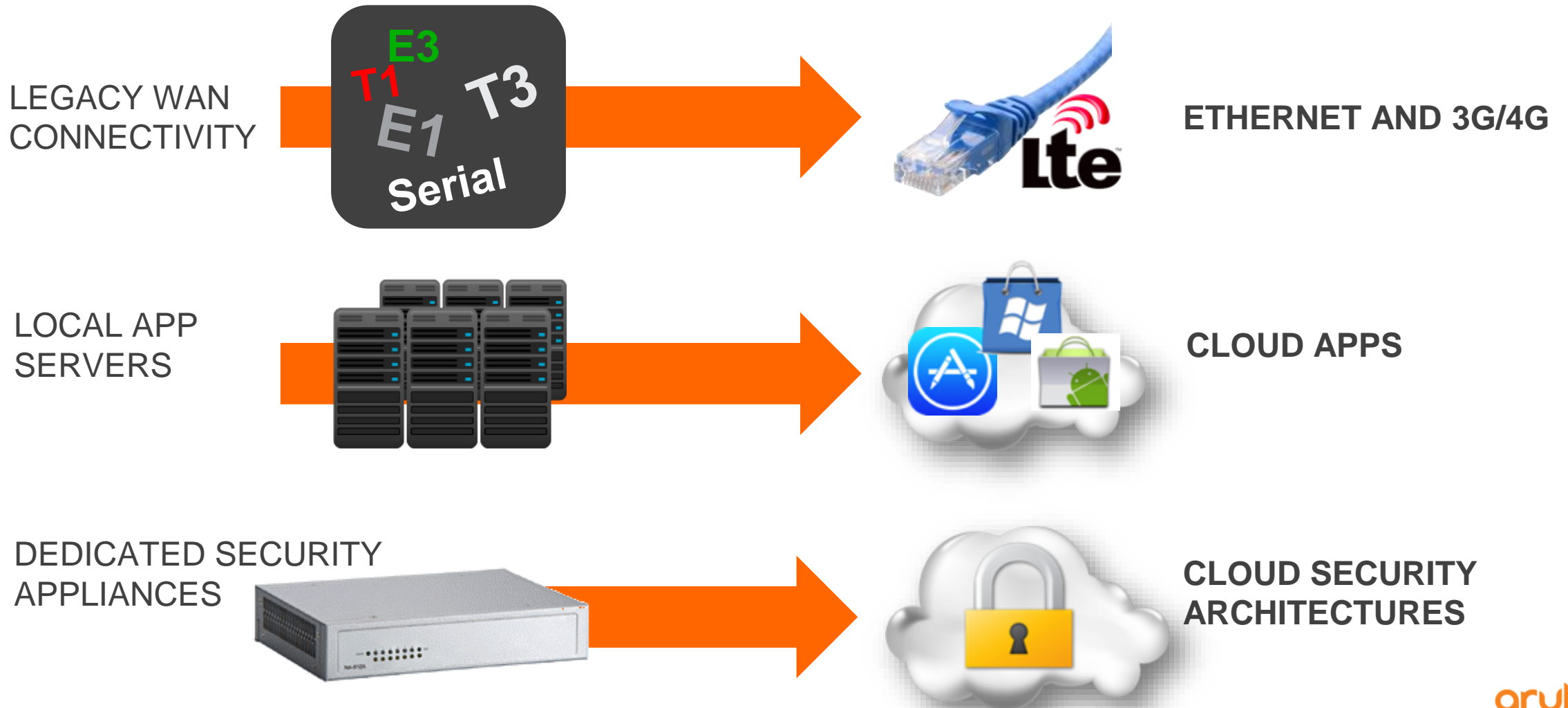
New Requirements for IT

– **Hybrid WAN** to secure private traffic and offload Internet services

– **DIA,** or Direct Internet Access, to boost performance for external applications

– **Converged Infrastructure** to streamline management

– **Cloud services** to rapidly deploy to branch sites

– **Security** for corporate and guest networks

– **Simplicity** with zero-touch provisioning

– **WAN survivability** in case of primary service disruption
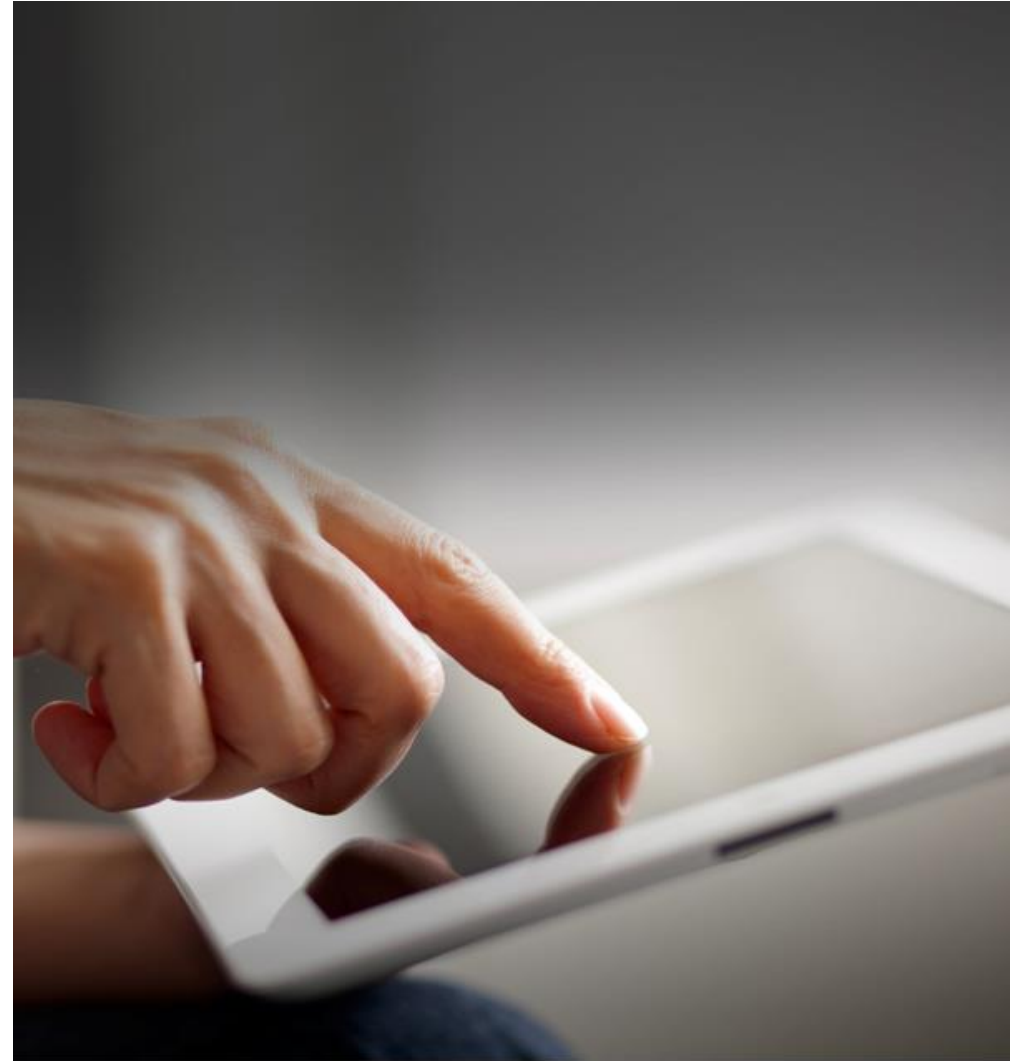
Flexible WLAN architecture supports both a centralized as well as a distributed controllerless (Instant) deployment mode

**Remote APs,
VIA Mobile/Laptop Client**

**Distributed, controllerless
WLAN with Aruba Instant**

**Controller-based
WLAN with ArubaOS**

Small, temporary &
home office Wi-Fi

Simplified branch
deployment with clusters

Centralized encryption with
advanced services at scale

SINGLE ACCESS POINT PRODUCT PORTFOLIO

Secure VPN with Aruba VIA™

– Seamless corporate access on-the-go

– IPsec/SSL VPN

– Centrally managed and configured

– Supports Suite B military-grade encryption

Extending Your Enterprise with Remote APs

– Light up a remote office with simple plug-and-play

– Extends corporate Wi-Fi, wired, VPN and firewall

– Easily connect printers and power VoIP phones

– Enhanced failover options with a 2nd ISP or cellular handoff

Branch Overlay With Aruba Instant™

– Bring up an enterprise network in minutes

– Deploy over existing wired and WAN infrastructure

– Access corporate resources with secure VPN

– Cloud guest services and network management with Central

High performance Wi-Fi with Aruba Instant

VIRTUALIZED CONTROLLER

**Enterprise grade
and all inclusive**

BUILT-IN RF MANAGEMENT

- Adaptive Radio Management
- ClientMatch

BUILT-IN SECURITY

- Firewall/role-based access
- Intrusion prevention and detection
- App visibility and compliance

BUILT-IN RESILIENCY

- Site survivability
- Uplink redundancy

Broad 802.11ac Aruba Instant Portfolio

	Model	Location	Performance	Density	Vertical
	200 Series	Indoor	Moderate	Moderate (50 active)	K-12 Retail Hospitality
	210 Series	Indoor	High	Moderate (75 active)	Carpeted space Hospitality - Lobby
	220 Series	Indoor	High	High (125+ active)	Lecture Halls Venues
COMING SOON!	310 Series	Indoor	High	Moderate (75 active)	Carpeted space across verticals
	320 Series	Indoor	High	High (125+ active)	Higher Ed Venues
COMING SOON!	330 Series	Indoor	Very High	High (125+ active)	Higher Ed Venues
	270 Series	Outdoor	High	High (125+ active)	Outdoor

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How Aruba Instant works

Instant APs

First Access Point configured

Ready …

It becomes the "master" & performs firewall and controller functions

Set …

New APs automatically connect to the "master" & download configuration

Go!!

- ✓ **NO ONSITE IT NEEDED**
- ✓ **NETWORK SURVIVABILITY**

Intelligent traffic control with application visibility

On-Board DPI
- − Depth - common apps
- − Enterprise traffic

Cloud-Based Web Policy Enforcement
- − Breadth - less common apps
- − Web traffic

GRANULAR VISIBILITY & CONTROL

- ❑ App category
- ❑ Individual app
- ❑ Web category
- ❑ Web reputation

- ❑ Allow/deny
- ❑ QoS
- ❑ Throttle
- ❑ Log
- ❑ Blacklist

☑ Prioritize business critical apps

☑ Block inappropriate content

☑ Enforce per user/device/location

Aruba 7000 Series Cloud Services Controllers for Branch
7005, 7008, 7010, 7024, 7030

- **Rapidly deploy to any location with zero touch**

- **Extend the digital experience to every branch office**

- **Optimize and secure apps while reducing cost**

Features since 6.4.3

Zero touch provisioning	Secure, wired access
WAN opt. (compression)	Policy-based WAN routing
WAN survivability	Context based firewall
WAN health checks	3rd party integration

Comparing the 7000 Series
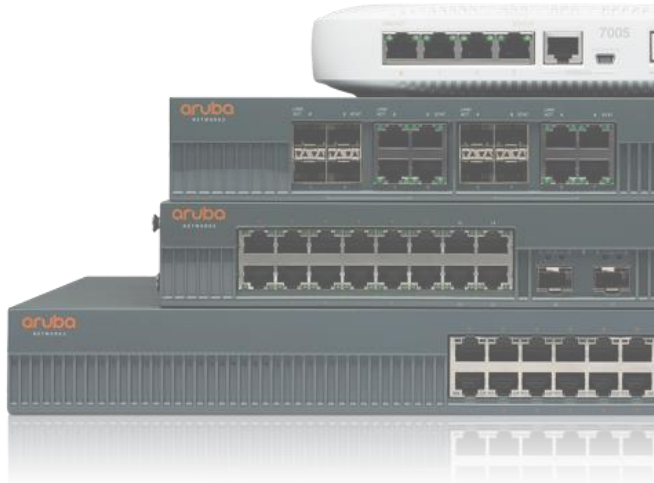
	7005	7008	7010	7024	7030
AP licenses	16	16	32	32	64
Auto-negotiating 10/100/1K BASE-T ports	4	8	16	24	8
Power Budget/ Consumption	--/16.6W	100W/ 126W	/190W	400W/ 450W	--/55W
Firewall throughput	2Gbps	2Gbps	4Gbps	4Gbps	8Gbps
USB 2.0	Yes; 1	Yes; 2	Yes; 2	Yes; 1	Yes; 1
Fanless	Yes	Yes	No	No	No

Campus networks are the breaking point

"I have multiple tools to manage different parts of my network, maintenance & troubleshooting are difficult"

Complexity is stifling innovation

"My network is full of bottlenecks and cannot keep up with new applications"

Constrained apps limit productivity

"The cost of fork-lift hardware upgrades, licensing, and support contracts to keep my network running limit my organizations ability to invest"

Cost of running the business is high

Legacy networks are complex, constrained and costly

Aruba Campus Switch Portfolio

Core

Aggregation

Access

Aruba 3810

Aruba 5400R

Aruba 8400

NEW

Aruba 2930F

Aruba 2930M

Aruba 2540

Aruba 2530

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Switching for the Mobile-First Campus

Gigabit Access

Multi-Gig Access

	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				●	●	●
Stacking			VSF	●	●	VSF
SDN Optimized			●	●	●	●
Central		●	●	●	●	
AirWave & ClearPass	●	●	●	●	●	●
POE+	●	●	●	●	●	●

Supporting faster Wi-Fi on existing cabling
HPE Smart Rate Multi-gigabit Ethernet

MEMBER
NBASE-T
ALLIANCE℠

802.11n

802.11ac
Wave 2

1GbE
2.5GbE

10GbE

40GbE

APs

Wired edge

Aggregation/core

- NBASE-T: basis for IEEE 802.3bz standard
- Update to ArubaOS-Switch 16.04 for new IEEE 802.3bz standard

Faster	Simple	Leading

HPE Smart Rate Speeds:
Aruba 5400R Module, 3810 Switch, 3810/2930M module, JL323A 2930M Switch – 1, 2.5, 5, 10GbE
Aruba 2930M 24 port Smart Rate Switch (JL324A) – 1, 2.5, 5GbE fixed ports (no 10GbE)
Aruba 330 Series APs – 1, 2.5, 5GbE

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Tunneled Node: unified policy enforcement for wired and wireless clients

Consistent wireless-wired network architecture

Centralized role-based policy enforcement

Access to Aruba controller's security features such as Firewall, packet inspection and finger printing

Enhanced security with traffic separated by tunnels

Redundant controllers supported

Aruba AP

Aruba Mobility Controller

Tunnels

ArubaOS-Switch

Core switch

* Tunneled Node is <u>not</u> supported in 2540/2530/2620.

Use case: Unified Policy Enforcement
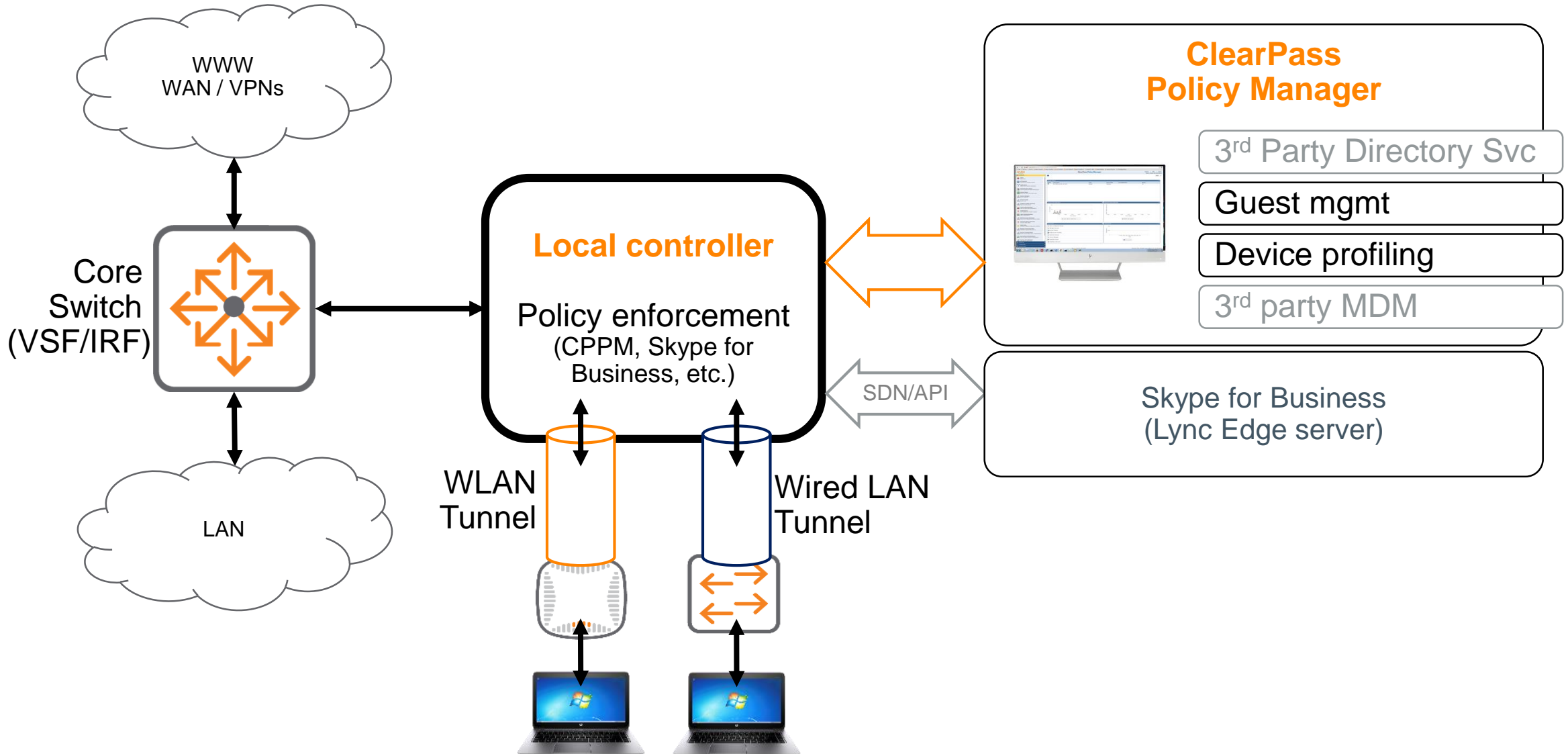
Per User Tunneled Node

- Secured and flexible control of access layer
  - With ClearPass or switch configuration, only traffic from a specific user/device role is sent to the mobility controller
  - Policies (e.g., QoS, ACL, rate-limit) can be enforced at Tunneled Node ports or at the controller

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

- Higher availability and scalability
  - Load balance to multiple controllers for high scalability
  - Stateful failover to standby management module for high availability

- Support on 5400R/v3, 3810, and 2930F/M. Requires AOS 8.1 or later in the controllers
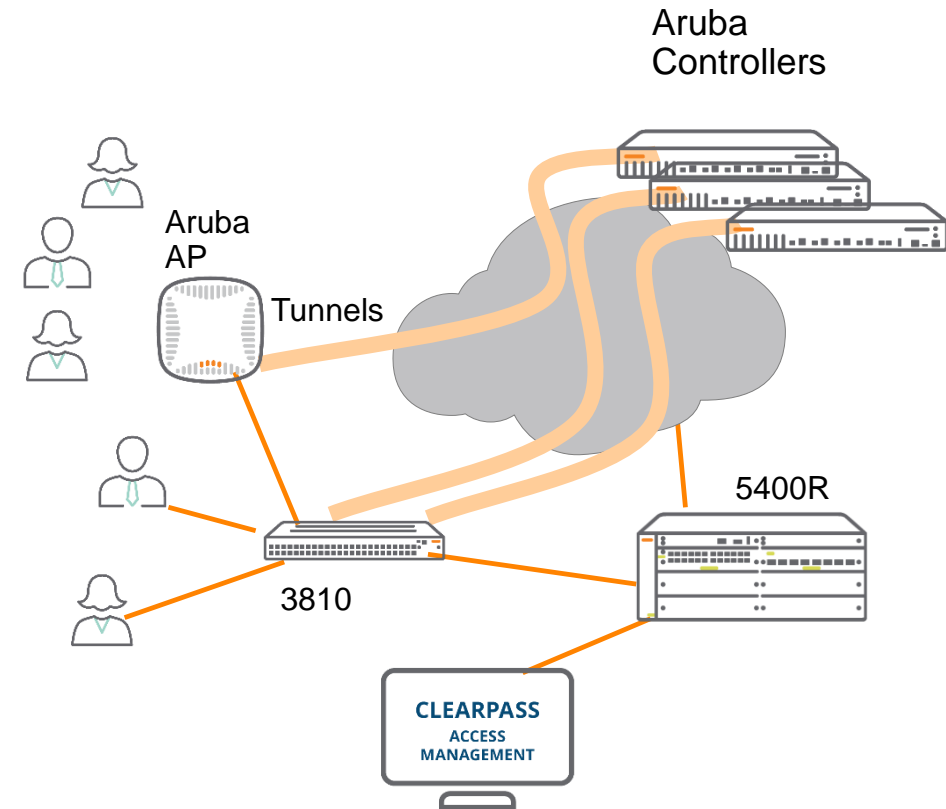
Downloadable User Roles

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
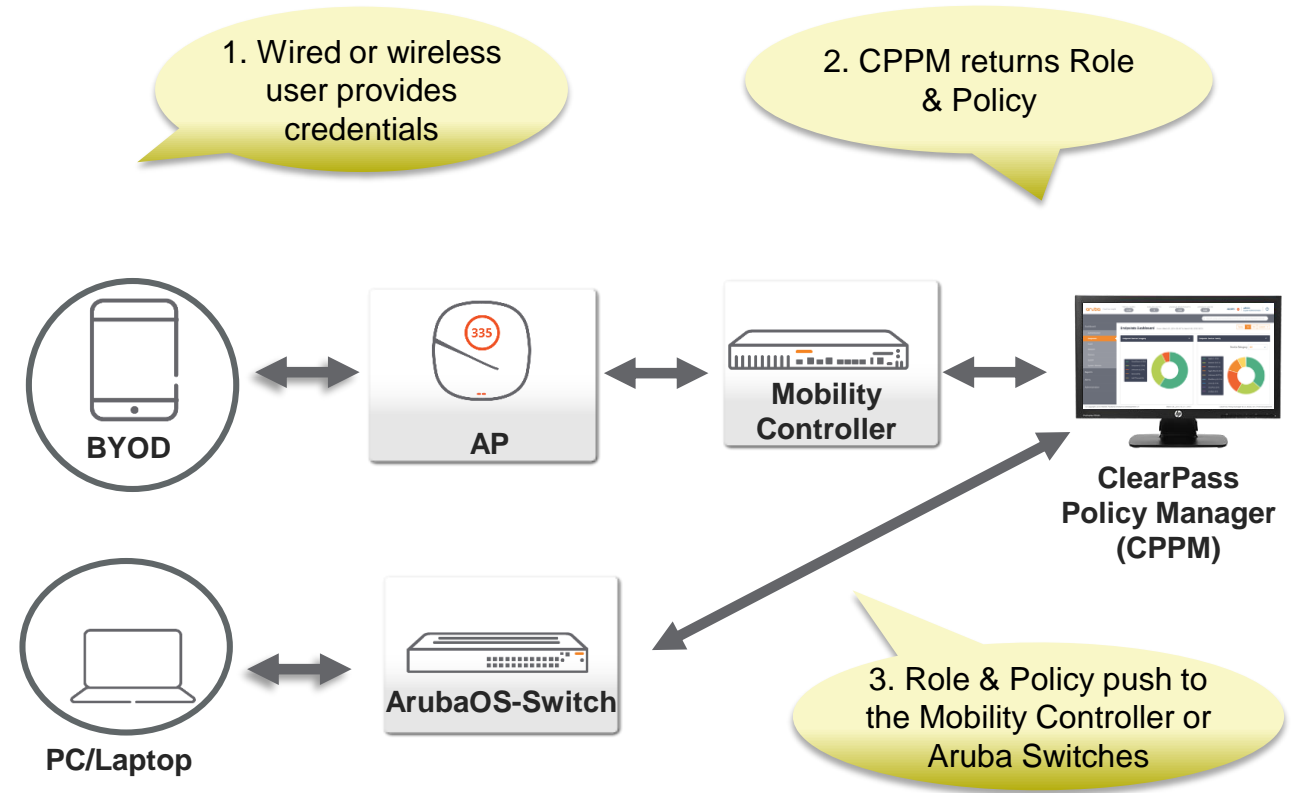
*Requires ArubaOS-Switch 16.04 software release

1. Wired or wireless user provides credentials

2. CPPM returns Role & Policy

3. Role & Policy push to the Mobility Controller or Aruba Switches

BYOD

AP

Mobility Controller

ClearPass Policy Manager (CPPM)

PC/Laptop

ArubaOS-Switch

Simplify and speed deployment with Zero Touch Provisioning

2 Secure connection (HTTPS)

3 Central sends configuration details to AP/Switch

1 Plug in Aruba Instant AP or Aruba switch

4 Network configured & running
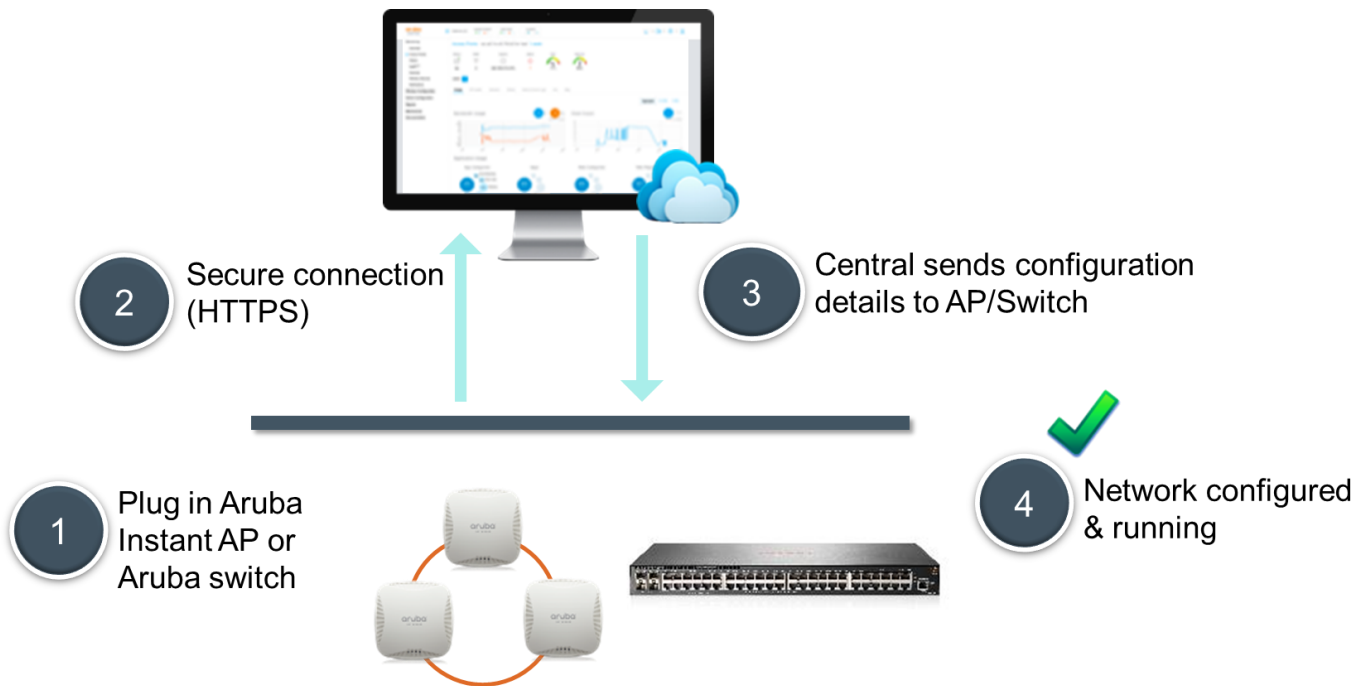
Why?
- ✓ **No onsite expert needed**
- ✓ **For Aruba APs and switches**
- ✓ **Uses Aruba Central or Activate**

Choice of switch management

Cloud-based Aruba Central
- 2540, 2920, 2930F, 2930M, 3810

On premise Aruba AirWave
- 2530, 2540, 2920, 2930F, 2930M, 3810, 5400R

Flexibility to move from cloud to on-premise

Central

Cloud-based
wired + wireless access
network management

AirWave

Unified multi-vendor
wired + wireless access
network management

IMC

Advanced wired topology
management for the core

Extending the Mobile First Architecture to Aggregation & Core

Aruba 8400

Optimized form factor & cost, carrier class availability, 10/25/40/100 GbE
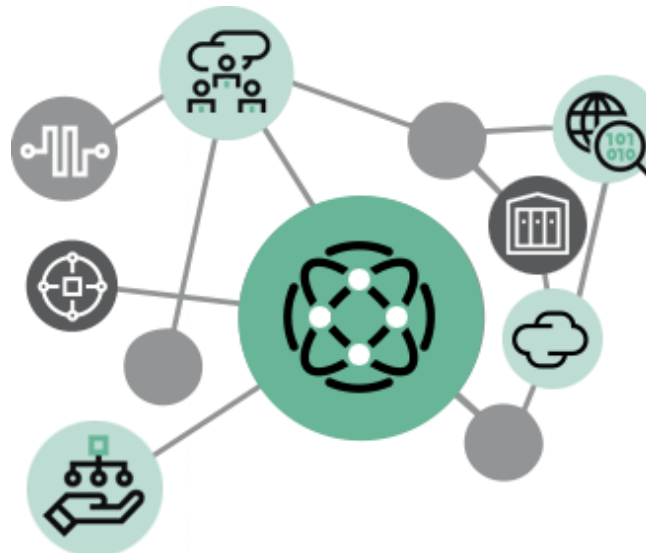
ArubaOS-CX

Programmable next-gen OS for switching, with massive Open Source leverage, and analytics to automate troubleshooting

Network Analytics Engine

Tightly integrated to policy management, analytics and management services

Game Changing Innovation
Modernizing campus core and aggregation

Aruba 8400 and ArubaOS-CX

ArubaOS-CX: next-gen OS with open source leverage and API-centric

Programmability for simple automation and integration

Network Analytics Engine

19.2 Tbps system with high speed, high density interfaces, carrier-class HA

ArubaOS-CX meets the challenge with innovation

Wired & Wireless Network Management

Aruba Mobile First Platform Components

ArubaOS 8.0 (AOS8)
New REST APIs and
custom app signatures

Aruba ClearPass
New unified API library, extensions
repository and OnConnect for secure IoT
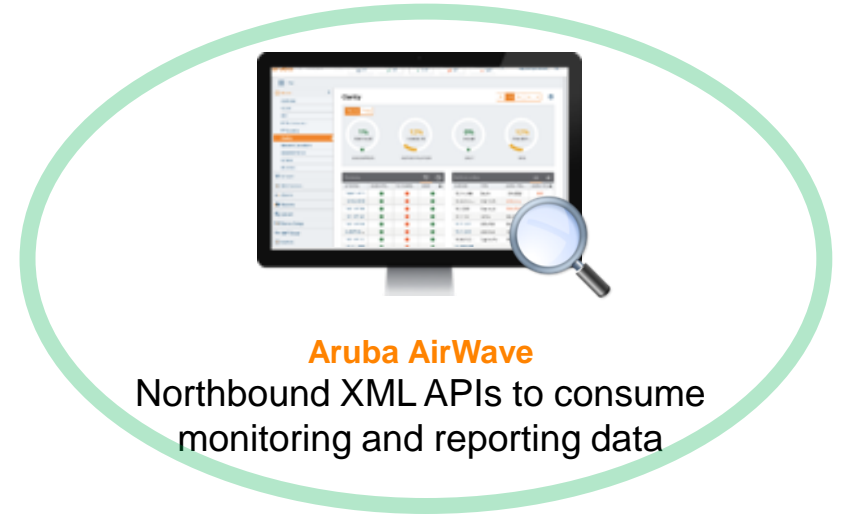
Aruba AirWave
Northbound XML APIs to consume
monitoring and reporting data

Aruba Central
New REST APIs, wired/WAN support
and network analytics

Aruba Meridian
Mobile app SDK for indoor location
services, incl. the new location sharing
and the new Meridian Goals

Aruba Analytics & Location Engine (ALE)
Northbound REST APIs to consume
user, device, app, location context

Wi-Fi?!!

bad coverage?

user device?

RF capacity?

infrastructure?

authentication?

network services?

Today bad connectivity and slower resolution have a higher business cost

IT requires management tools designed for mobile-first networks

Performance
for mobile users

Reliability
for critical apps

Unified
wired & wireless

Aruba for managing mobile-first networks

Aruba AirWave
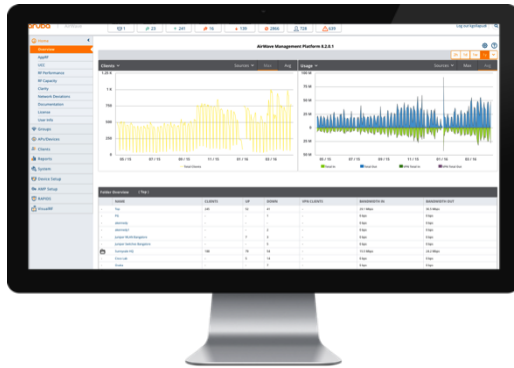
Multivendor
wired + wireless
network management

Aruba Central

Cloud platform
for network management
+ services

Aruba AirWave
Management and monitoring designed for mobile-first networks

Performance for mobile
- Live RF & client monitoring, VisualRF
  Aruba Clarity: live user monitoring & synthetic testing

Reliability for critical apps
- App & web analytics
- MobileUC visibility

Multivendor management

Deliver outstanding network performance and user experience
Powerful end-to-end monitoring with granular insight
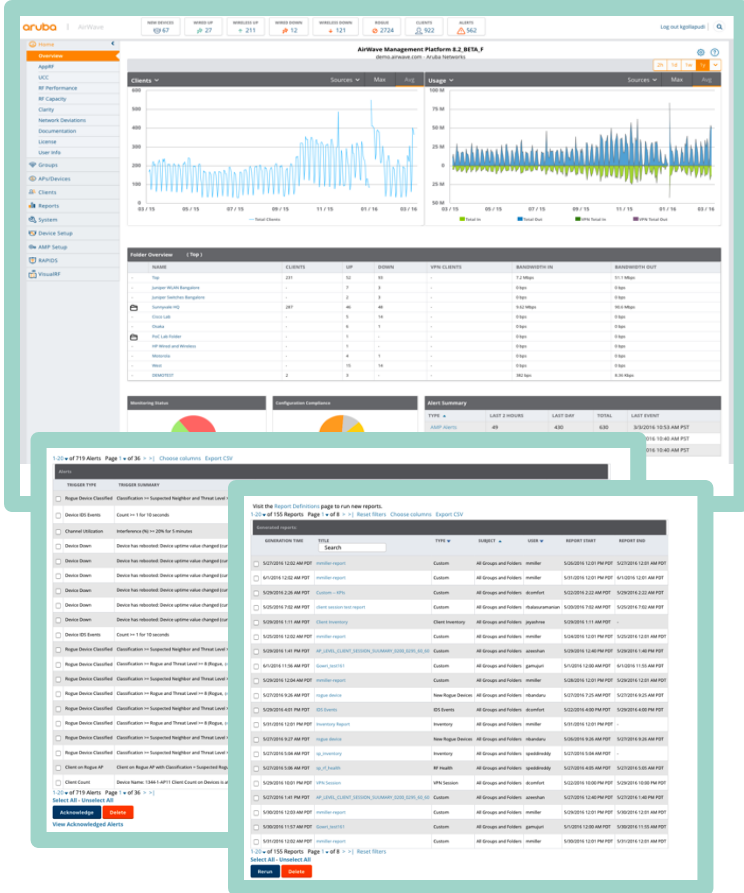
Complete network insight
- RF performance, coverage, usage statistics & client health
- Users, clients, wireless & wired devices, applications & network services

Proactive alerting
- Real-time, customizable
- Over 30 identifiable events

Rich historical reporting
- Network trends, security & compliance
- Customizable + 20 pre-defined

Identify problems before they impact users
Introducing Aruba Clarity, a new module in AirWave

Complete visibility into end-user experience… beyond RF.

LIVE
real-time user experience

SYNTHETIC*
proactive testing
APs/Sensors** as clients

*8.3, **post 8.3

Clarity Live
Monitoring live client data flow

Visualize:

– Radio Association

– Authentication

– DHCP

– DNS
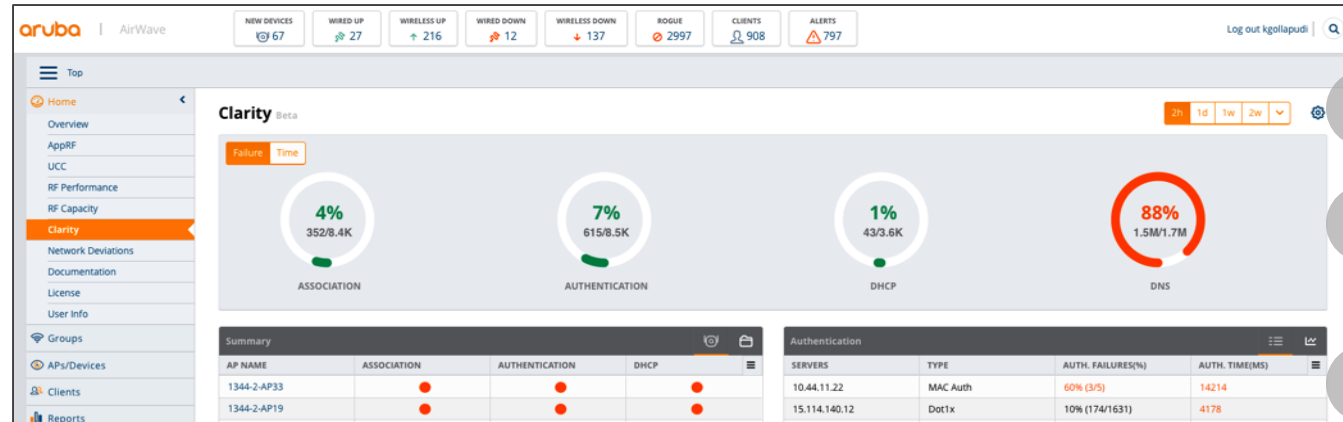
Customizable thresholds & timelines

View failure rates & response times

Drilldown widgets
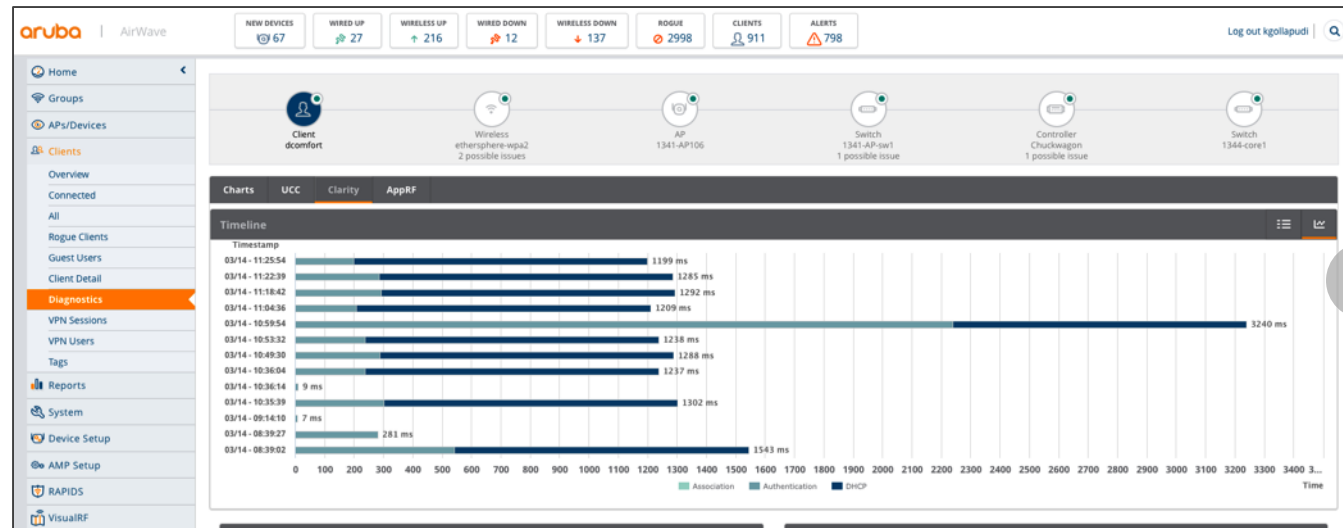
Holistic network view

Ensure reliability for business critical applications

App & Web
Analytics

UCC
Performance
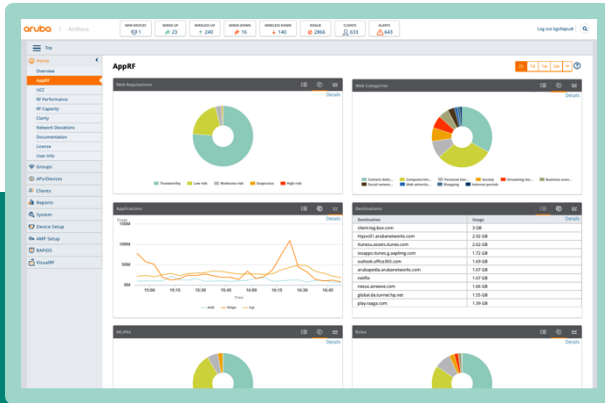
View common app/web
usage and performance

Troubleshoot app
performance in real time
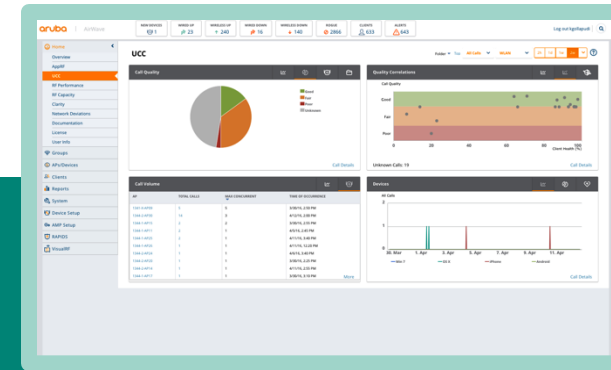
View call quality, client health
correlation & call volume

Identify root cause &
resolve issues faster

Analyze and troubleshoot faster
Visualize performance and coverage with VisualRF™
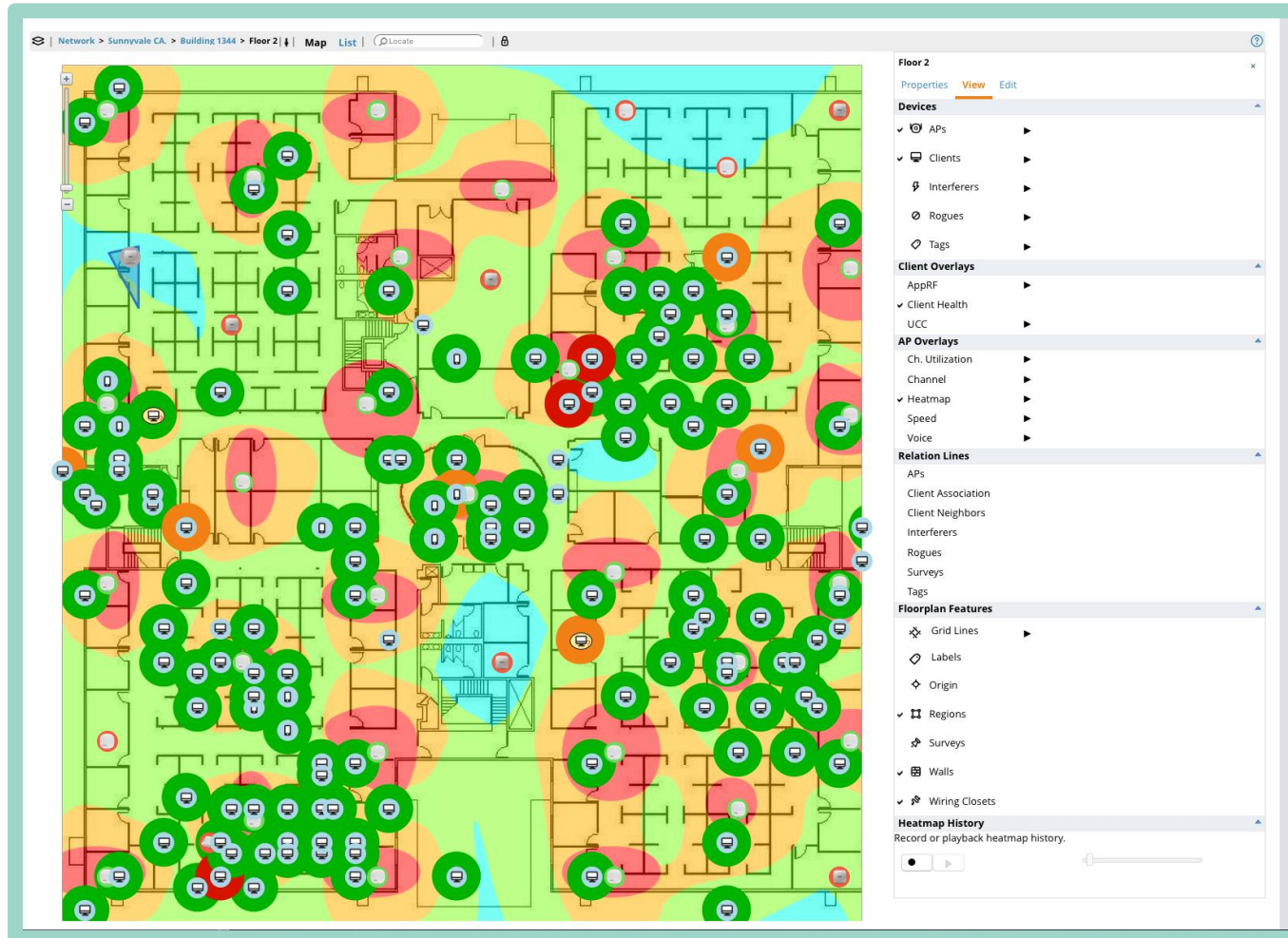
- Network wide mapping: Clients, devices, rouges, non Wi-Fi interferences

- Context overlays: AppRF, Client Health, UCC, Voice, Channel, Channel Utilization, Speed, Heatmap

- Location tracking

- Heatmap history/playback

- Site planning

Take control of wireless security

Keep out rogue devices with AirWave RAPIDS™
- automated detection & containment

Scan Wireless + Wired Networks	Aggregate & Correlate Results	Classify Threats	Alert & Report	Contain
Identify all connected devices	Reduce false-positives	Define & customize rules	Alert Security team Compliance	Automated or manual
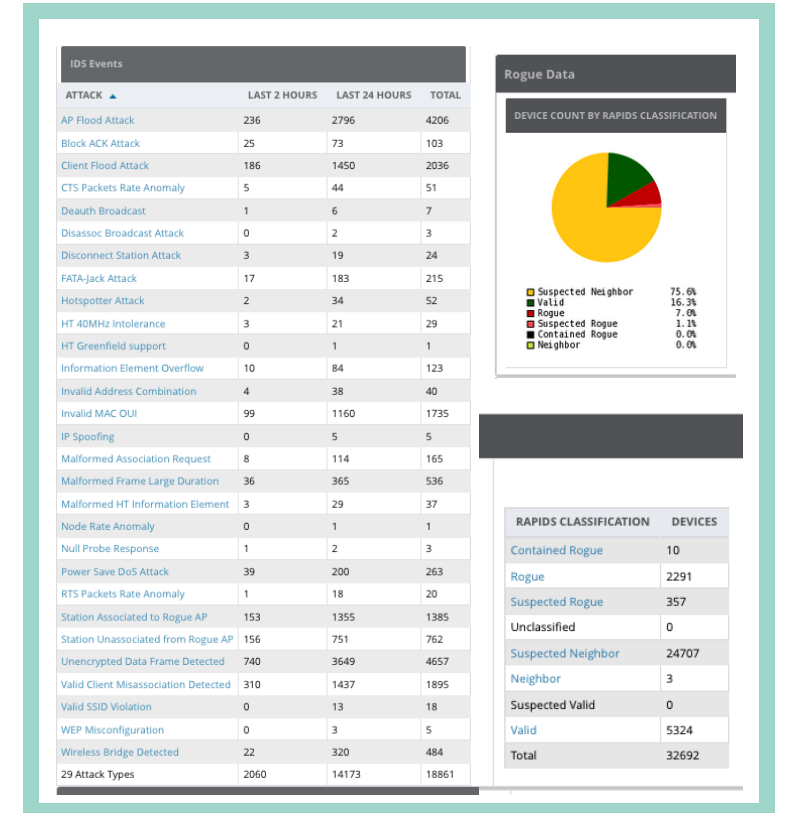
Simplify multivendor networks

Wireless + Wired

Aruba + 3rd Party

Multiple Generations

Centralized management
- Configuration, firmware distribution
- ZTP for Aruba Instant & ArubaOS Switches (w/Activate or DHCP)

Comprehensive visibility
- Device discovery, classification and diagnosis
- Reporting and analysis

Access Network Management with AirWave

Common WLAN use cases

Monitoring & Config
Client Troubleshooting
Application Visibility
RF Visualization
Rogue AP Detection
UCC Voice Visibility

Common Wired LAN use cases

Discovery
Topology Views
Backup & Recovery
Firmware Upgrade
Basic Monitoring
Zero touch provisioning

Product Strategy

- Multivendor model continues

- Wired and wireless Integration

- Top priorities: Integration, usability and scale

AirWave 8.0 – 8.2

- Quality reports for mobile UC with VisualRF

- Usage reports for mobile apps with VisualRF

- Performance and scale improvements

- Simplified licensing model

- New, improved workflows and unified design between Controller, Cloud, ClearPass and Meridian

Going Cloud?

Aruba Mobile First Platform Components

ArubaOS 8.0 (AOS8)
New REST APIs and
custom app signatures

Aruba ClearPass
New unified API library, extensions
repository and OnConnect for secure IoT

Aruba AirWave
Northbound XML APIs to consume
monitoring and reporting data

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Aruba Meridian
Mobile app SDK for indoor location
services, incl. the new location sharing
and the new Meridian Goals

Aruba Analytics & Location Engine (ALE)
Northbound REST APIs to consume
user, device, app, location context

Rise in businesses choosing cloud-based Solutions

95% of Respondents Are Using Cloud

Public Cloud Only — 18% — 71% Hybrid — 6% — Private Cloud Only

Public = 89%   Private = 77%

Source: RightScale 2016 State of the Cloud Report
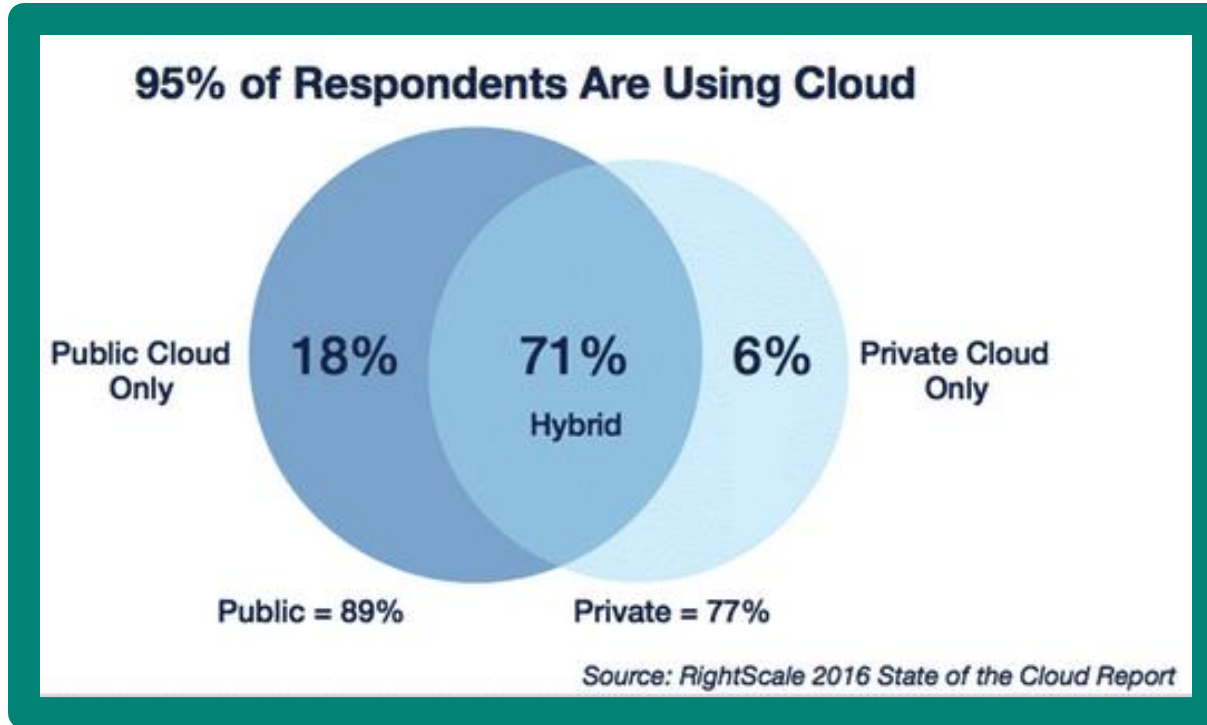
- ✓ As-a-Service
- ✓ Elasticity
- ✓ Reliability

Key components of cloud-managed networks

ROBUST WI-FI
- ✓ Performance
- ✓ Reliability
- ✓ Scalability

RICH MANAGEMENT
- ✓ Monitoring
- ✓ Configuration
- ✓ High Availability

CLOUD ADVANTAGE
- ✓ Ubiquitous Access
- ✓ On-going Innovation
- ✓ No Hardware, No Software

High performance Wi-Fi with Aruba Instant

VIRTUALIZED CONTROLLER

**Enterprise grade
and all inclusive**

BUILT-IN RF MANAGEMENT

- Adaptive Radio Management
- ClientMatch

BUILT-IN SECURITY

- Firewall/role-based access
- Intrusion prevention and detection
- App visibility and compliance

BUILT-IN RESILIENCY

- Site survivability
- Uplink redundancy

Support for Wi-Fi, wired and WAN

- Aruba Instant APs, Aruba 2540/2920/2930F switches, Aruba 7000 controllers
- Zero-touch provisioning, guest Wi-Fi management, WAN routing management, predictive monitoring and troubleshooting (Aruba Clarity), and wireless IDS
- QoS enforcement on Wi-Fi, wired and WAN based on context

Network management on the go
There's an app for that!

Download
Aruba Central…
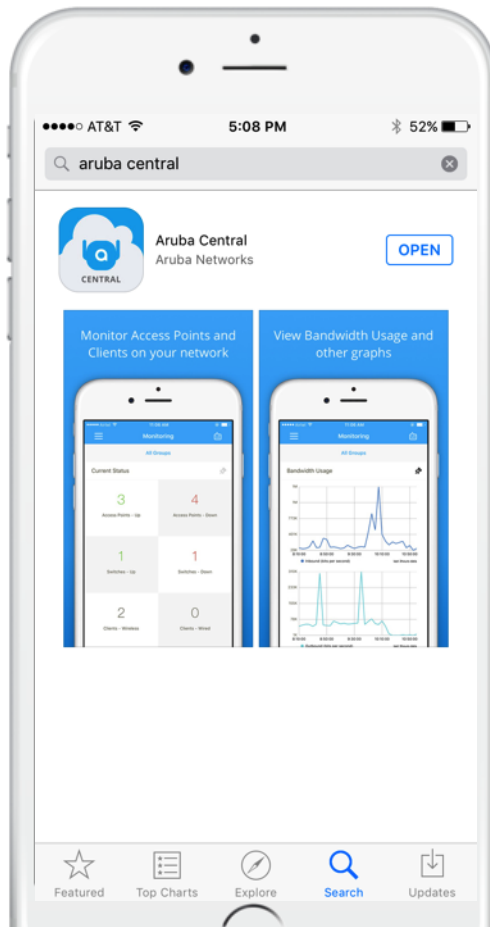
Monitor,
get alerts…

Scan APs for 1-touch
onboarding…

See value
instantly!
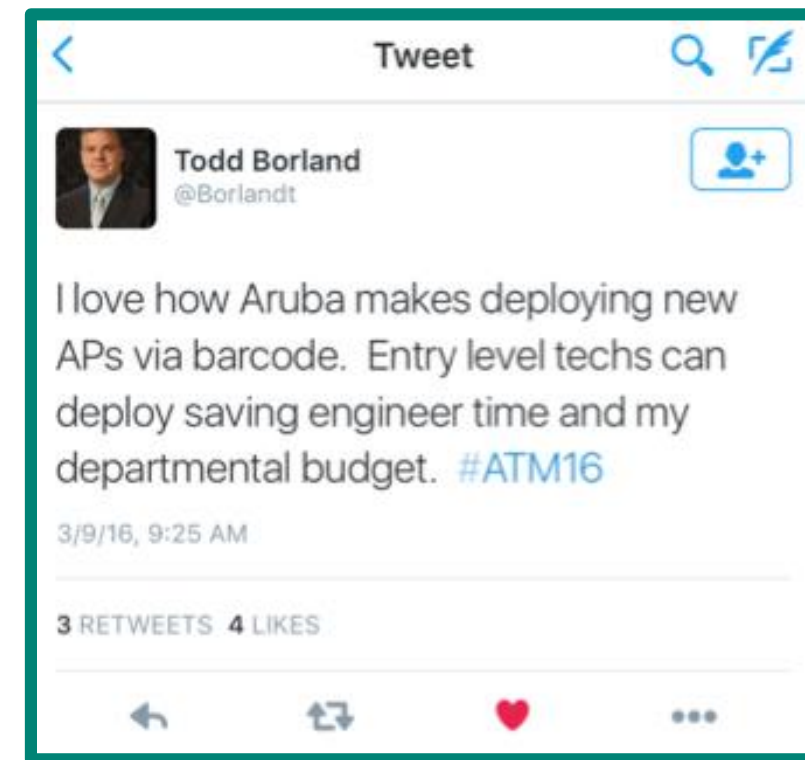
Presence-based analytics, primarily targeting retail and venues

- Measurements on visitor traffic and engagement on mobile devices
- Time and location-based metrics for display, merchandising and staffing decisions

How many passerbys?

How many entered?

How many stayed? For how long?

Application and web traffic analytics

- View app usage and web traffic
- Classify and prioritize business apps
- Block inappropriate content
- Enforce per user, device, location
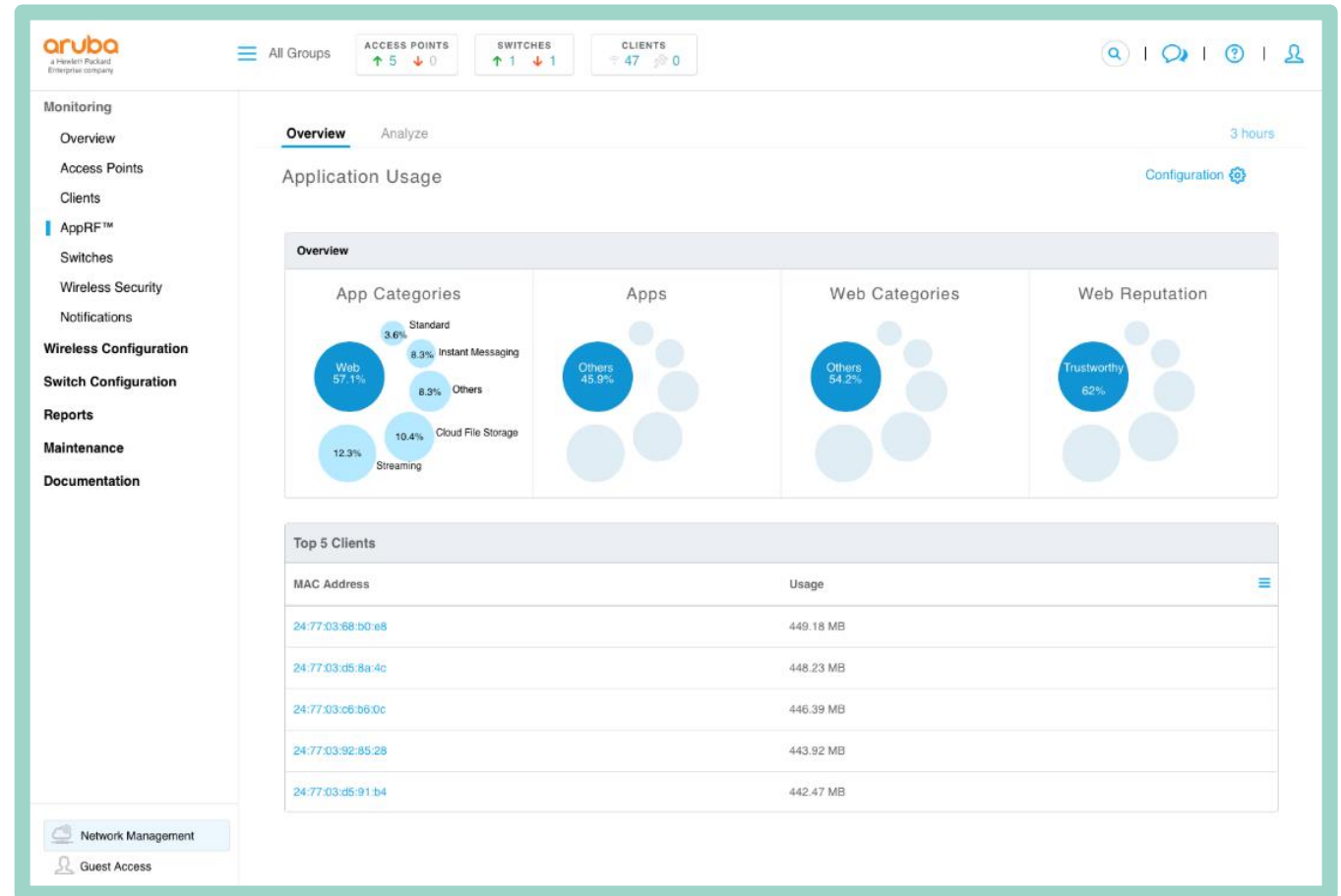
Cloud networking as a service for Wi-Fi, wired and WAN

NEW

Partners deliver add-on services with Central	Service Providers own hardware & Central	Mid-large enterprises centralize IT services and purchasing
Small/Midsize enterprises own hardware	Small/Midsize enterprises offload investment	Local ops
Resellers	**Service Providers**	**K-12, Retail, Hospitality**
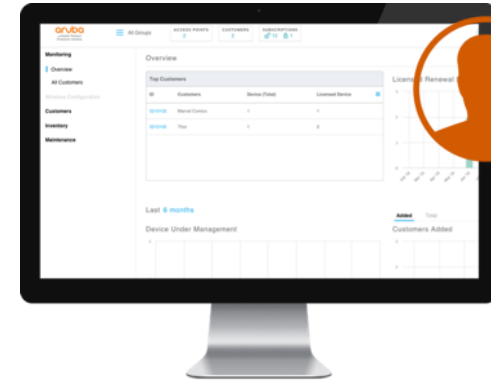
Resellers & SPs

Manage multiple accounts

- Single pool of devices & subscriptions
- Flexible subscription, device, configurataion assignments
- Single monitoring dashboard

Customers

- Visibility to assigned networks
- Select controls

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Rich management and monitoring

Configuration & Firmware

Simplified configuration
- Group by location or Instant networks

Easy maintenance
- One-click or scheduled updates, License management, Admin access management
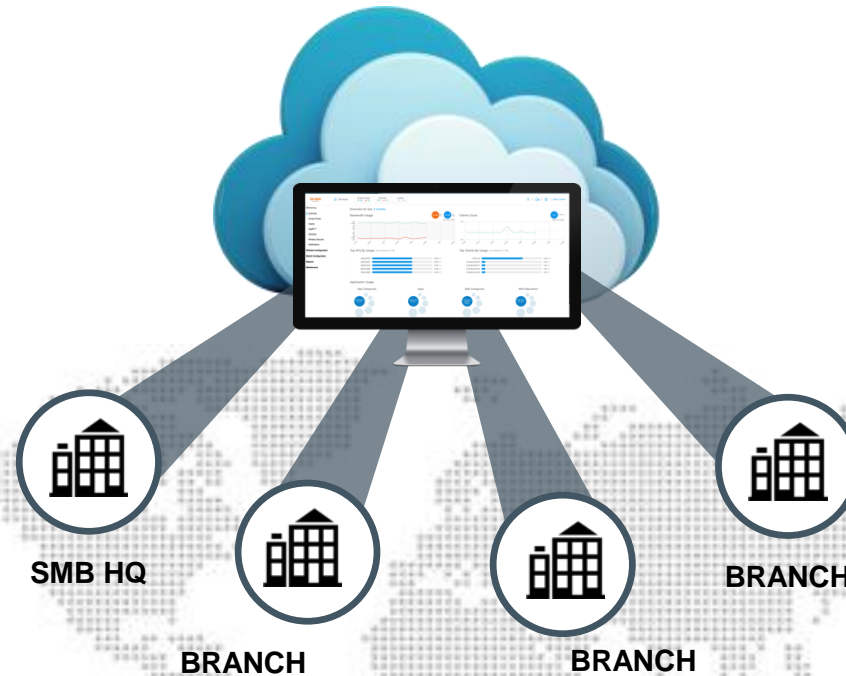
Monitoring & Troubleshooting

Intuitive dashboard
- Summary view with easy drill down, mobile-friendly

Easy problem isolation
- AP/switch/client troubleshooting, command line interface option

SMB HQ

BRANCH

BRANCH

BRANCH

BRANCH

Reporting

Network and security
- Rouge & intrusion detection, Devices, Data usage, PCI compliance

Low effort monitoring
- Predefined snapshots & scheduled reports

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Fastest network deployment

ZERO-TOUCH PROVISIONING
NO ON-SITE EXPERT NEEDED

3 Central sends config details to AP/Switch

2 Secure connection (HTTPS)

4 Network configured & running

1 Plug in Aruba Instant AP/Switch

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83
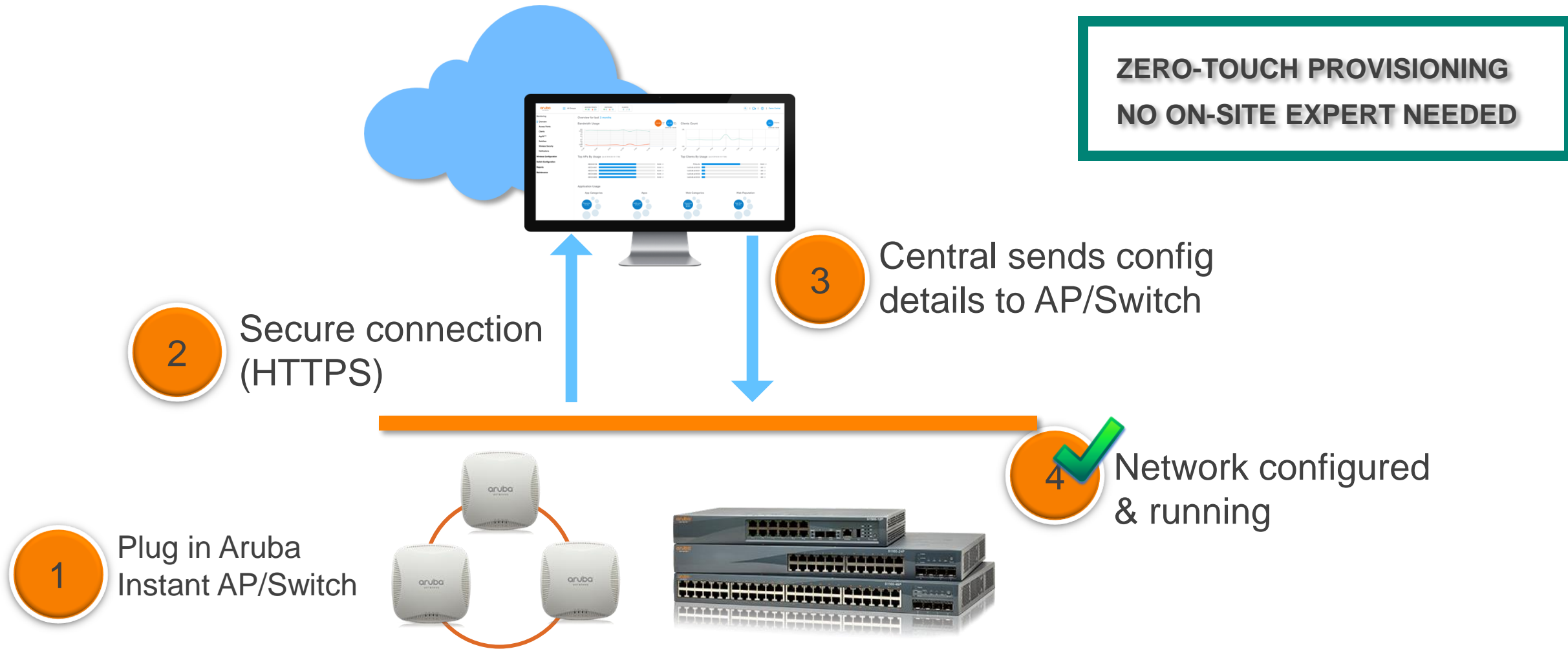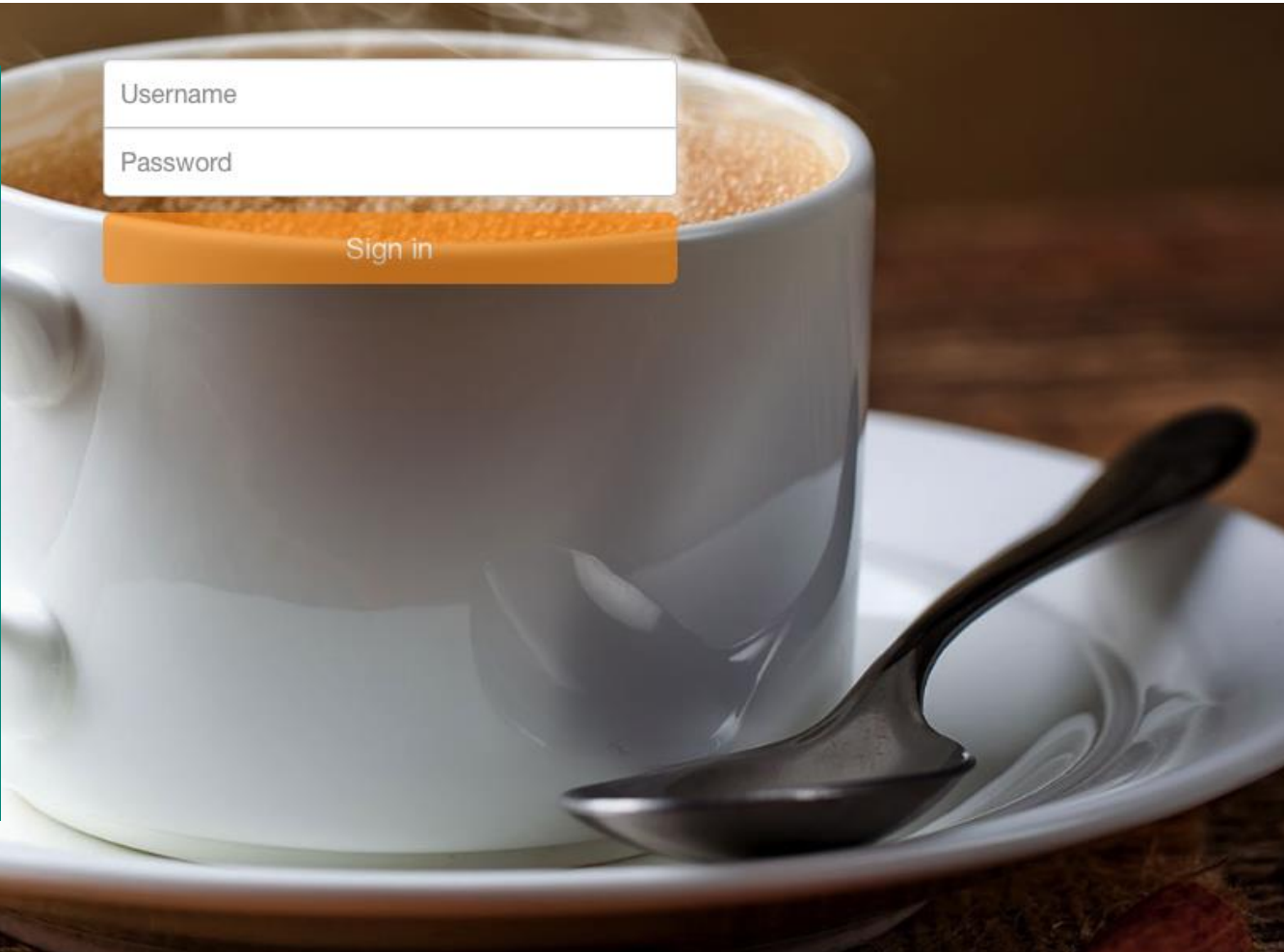
Guest Wi-Fi management

Guest authenticatoin options

- Anonymous login
- Self-registration
- Social login
- Facebook Wi-Fi

Custom captive portals

- Logo, background, colors, image, welcome message, terms & conditions, in-page ads

Username

Password

Sign in

Try Central today

FREE 90-DAY TRIAL

http://www.arubanetworks.com/
central/eval/

GLOBAL OFFER

5 IAP Licenses +
2 MAS Licenses

Wired & Wireless Policy Management

Aruba Mobile First Platform Components

ArubaOS 8.0 (AOS8)
New REST APIs and custom app signatures

Aruba ClearPass
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Aruba Analytics & Location Engine (ALE)
Northbound REST APIs to consume user, device, app, location context

Evolution of Access Management and Control

THEN

- Desktops & Wired
- Windows Vulnerabilities
- Basic AAA with User/Port Control
- Perimeter security via platform silos
- High touch IT model

NOW

- Mobile Devices, BYOD & Wireless
- Multiple Attack Vectors
- Multi-factor policy control with visibility
- Cooperative trust via context sharing
- Self Service, automated process

Today's Security Reality

Traditional security perimeter is broken

Mobility threats now originate from within

Time For A New Mobility Defense Model

Static Perimeter Defense

Anti/Virus

Firewalls

IDS/IPS

Web gateways

Physical Components

Adaptive Trust Defense

Security and Policy for each user or group
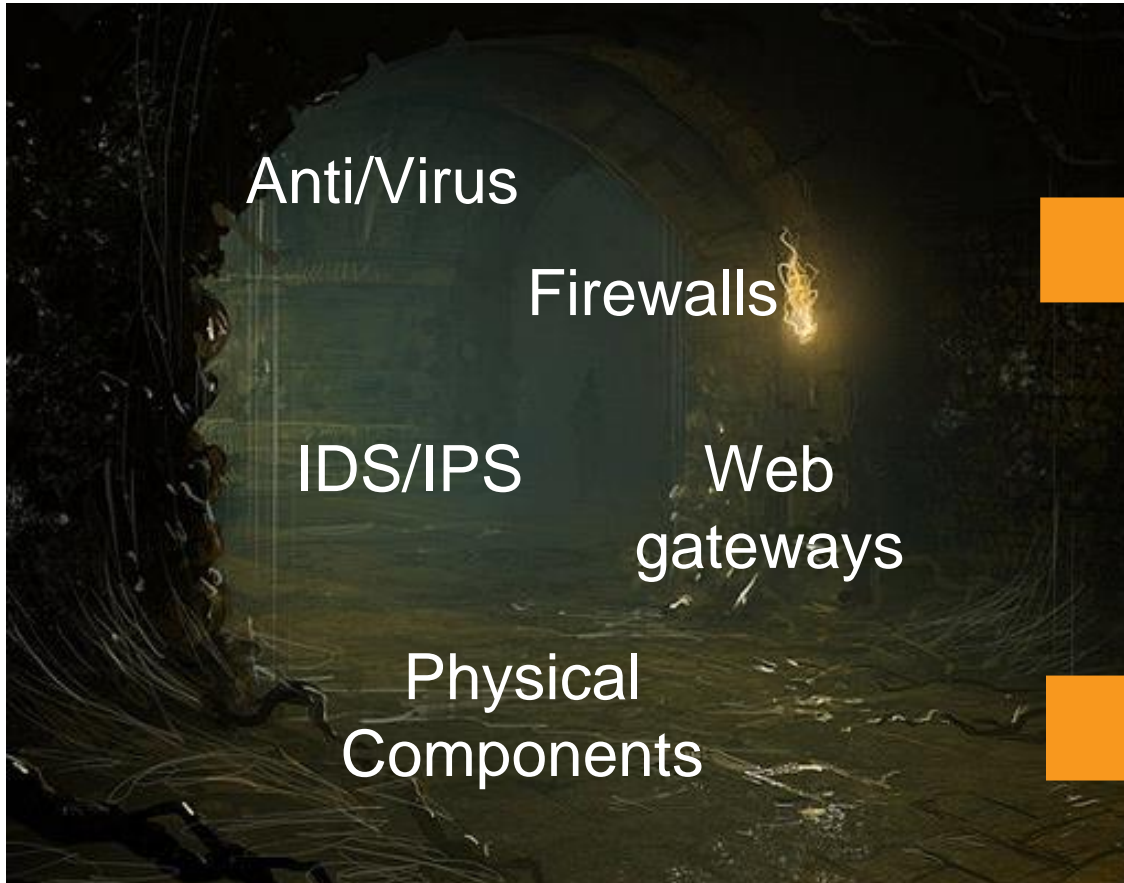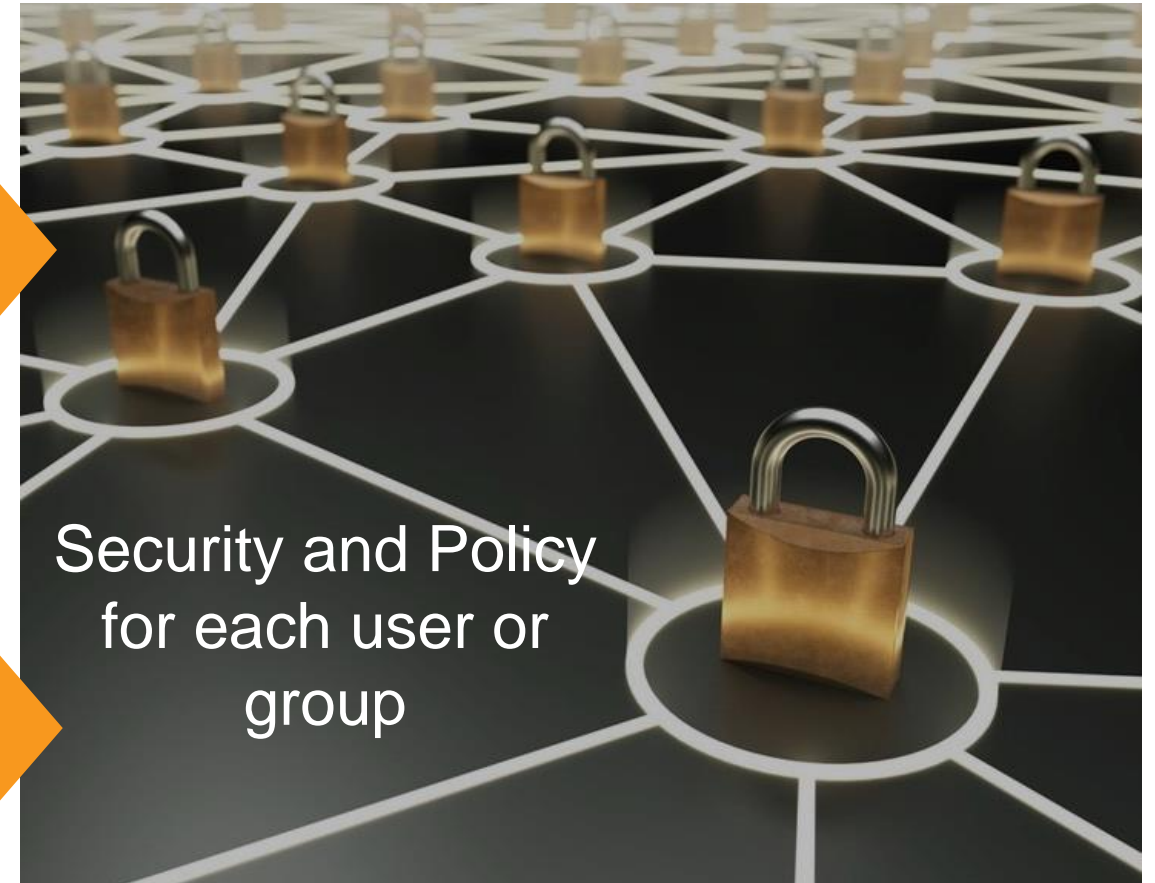
Top IT NAC Business Drivers

Authentication and Authorization

NAC Services Deployment

Architecture and Coverage

Management and Visibility

- Provide secure wired and wireless access
- Enhance mobile and cloud app access via multi- and two-factor auth

- Offer differentiated access (IT-owned, BYOD, IoT)
- Deliver managed and reliable guest access

- Provide consistent privileges regardless of location
- Leverage 3rd-party security solutions for end-to-end defense

- Enable user friendly workflows via automation
- Enhance Visibility and reporting intelligence

Top IT BYOD Concerns

Authentication and Authorization

Deployment Services

Consistent Policy and Coverage

- BYOD AAA challenge
- Role-based network and app policies
- Use of certificates

- IT-controlled access
- Automated workflows
- Simplicity

- Expected privileges
- Visibility
- 3rd-party integration

ClearPass Policy Manager and NAC Solution

CLEARPASS POLICY MGR

Built-in:
- Policy Engine
- RADIUS/CoA/TACACS
- Profiling
- Accounting/reports
- Identity store

REMOTE LOCATION
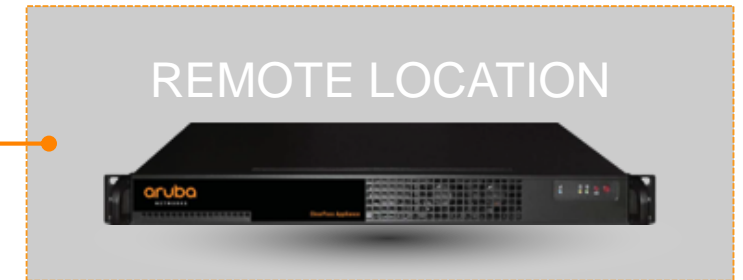
Expandable Applications

- BYOD onboarding
- Simple guest access
- Health assessments

Onboard   Guest   OnGuard

ClearPass Core Functionality

What's Inside

VISIBILITY	WORKFLOW	RULES
Device Profiling	**Onboarding and Self-Registration**	**Context based**
Troubleshooting	**Guest Management**	**Device Posture Checks**
Per Session Tracking	**MDM/EMM Integration**	**Built-in Certificate Authority**
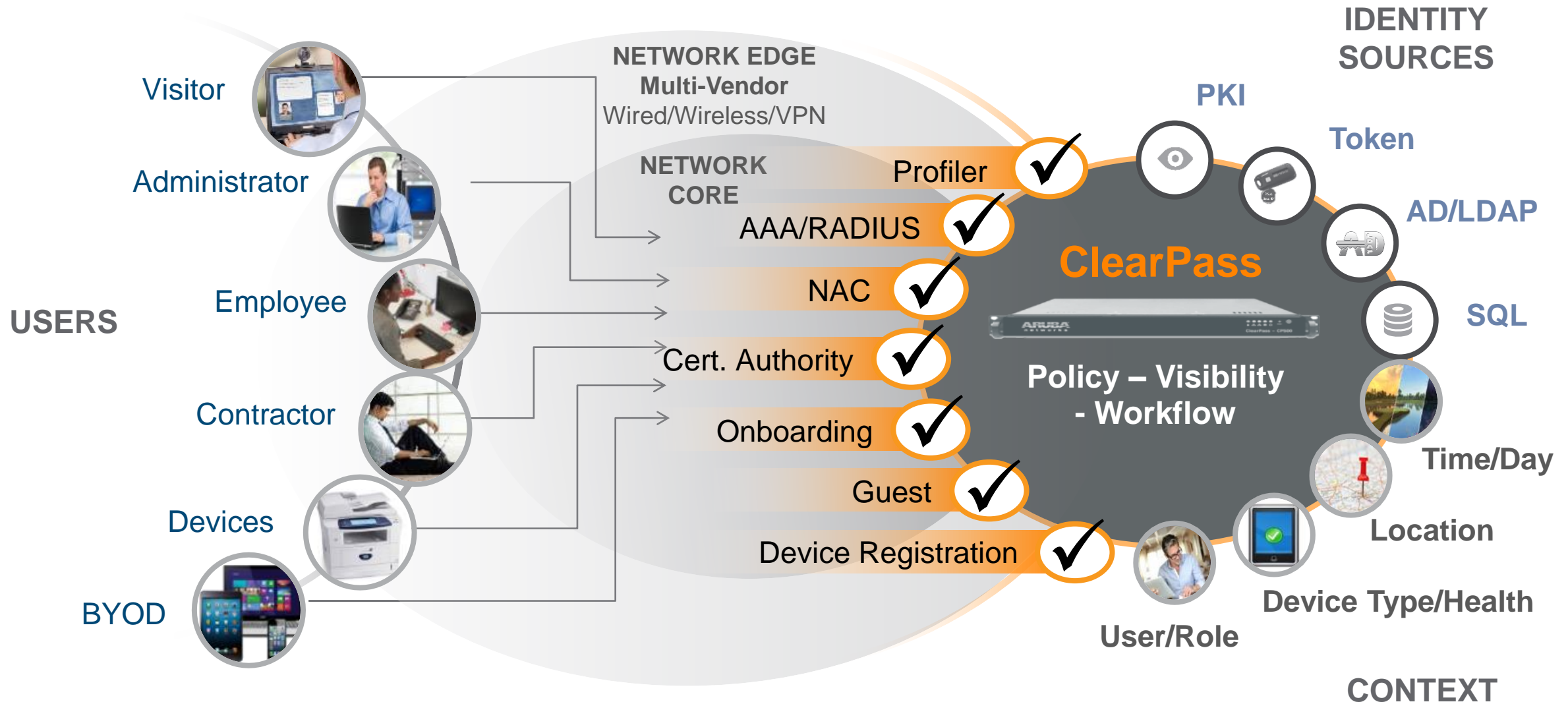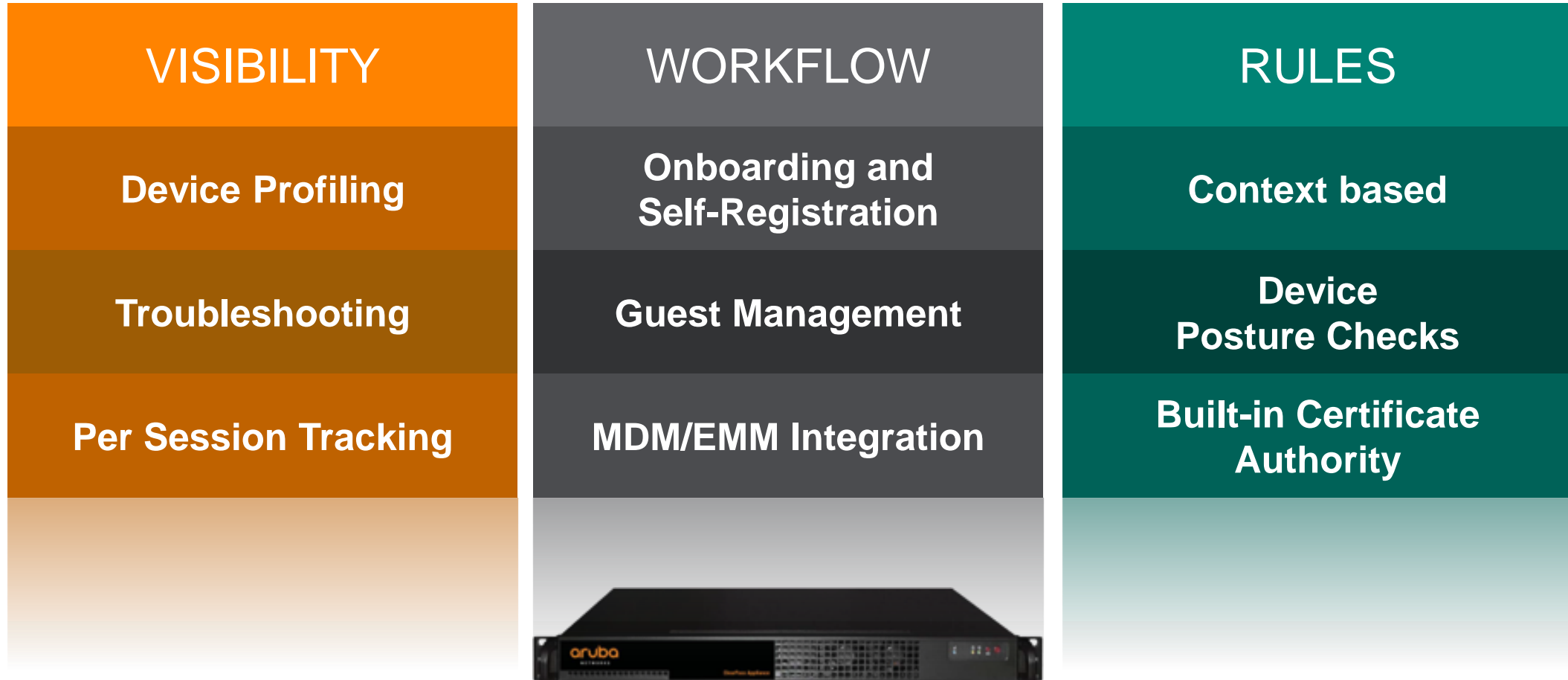
ClearPass Exchange

Adaptive Trust for end-to-end policy

Users, Device and App traffic

ClearPass

airwatch™

MobileIron®

Google

paloalto
NETWORKS

JUNIPER
NETWORKS

Check Point®
SOFTWARE TECHNOLOGIES LTD

aruba
a Hewlett Packard
Enterprise company

splunk>

DUO

ArcSight
An HP Company

Hewlett Packard
Enterprise

CISCO™

Best of breed security and productivity systems

AAA

Authentication

Authorization

Accounting

1. **Compares** user credentials versus those stored in a database.

2. **Enforces** privileges or services that a user can perform.

3. **Measures** usage for authz control, billing, analysis.

4. Usually uses **RADIUS** to perform authentication

5. Leverages **802.1X** security

Value of a Policy Engine vs. AAA

OLD WAY:
Without advanced policy, separate traffic by SSIDs
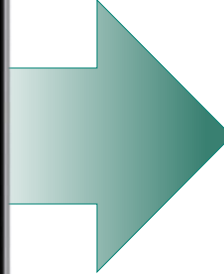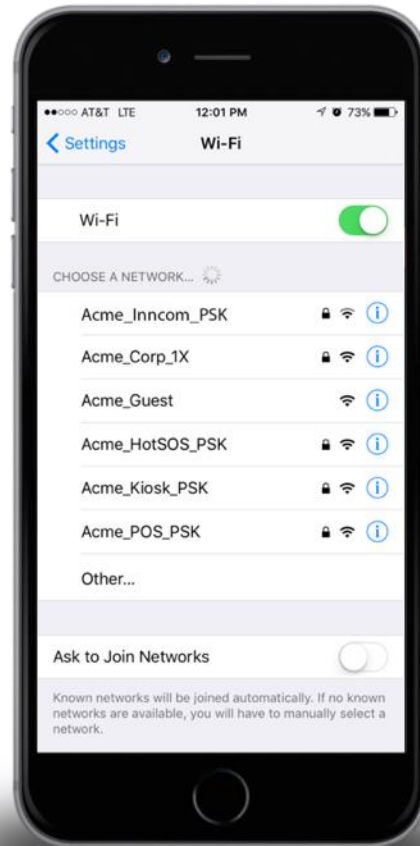
NEW WAY:
Simplify with ClearPass, separate traffic dynamically
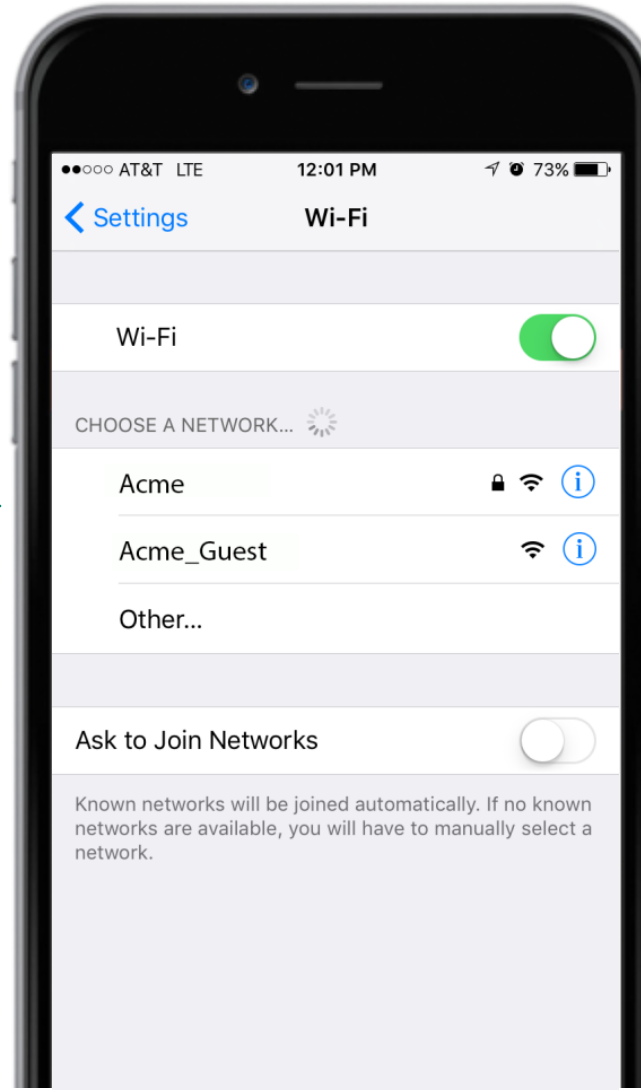
Certificate Distribution for BYOD

VA — Validation Authority

CA — Certificate Authority

RA — Registration Authority

AD — Active Directory

IT-Managed Devices

- Domain
- Key & Certificate

+

CA — Certificate Authority

Personal Devices

- Domain
- User
- Device
- Key & Unique Certificate
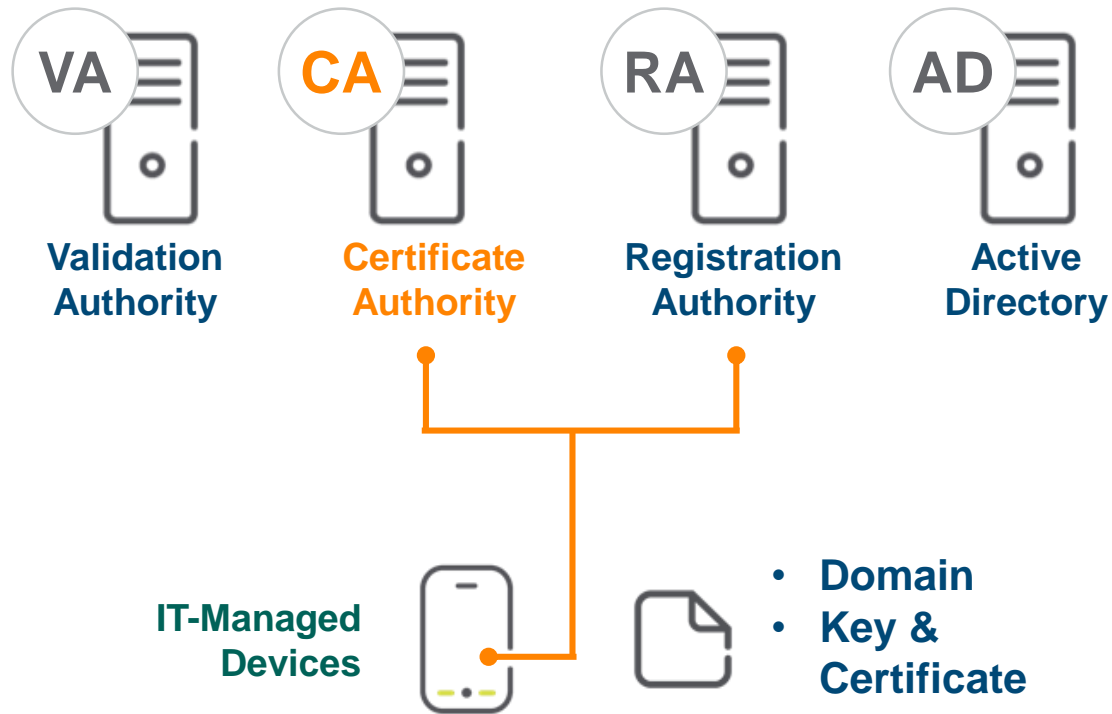
Enterprise PKI and CA
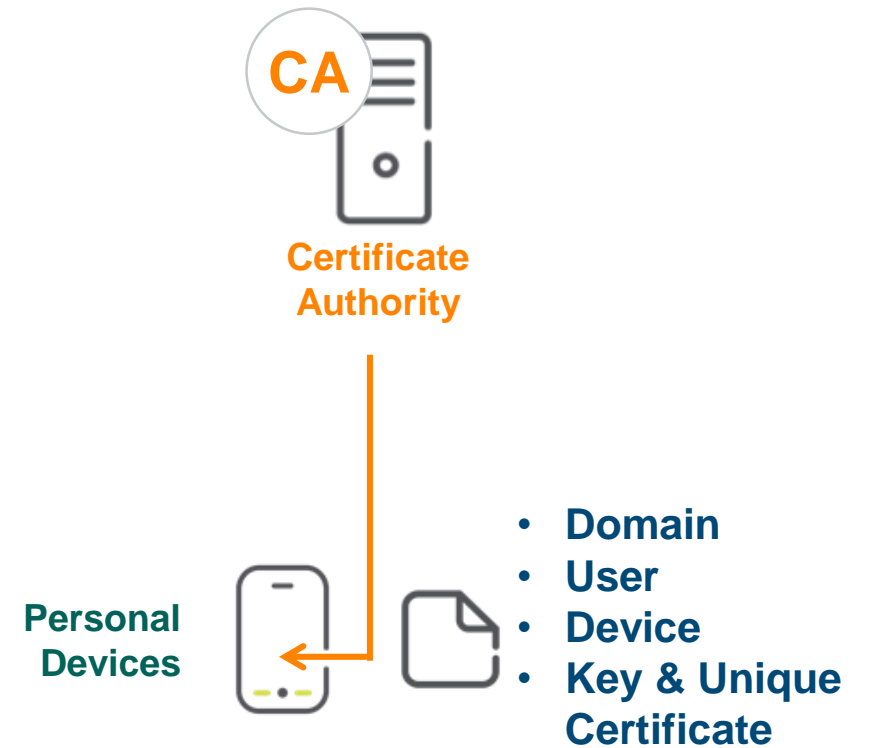
Built-in ClearPass CA

Network Access Security with ClearPass 6.6

Greater visibility and real-time policy enforcement for wired and Wi-Fi

- **Custom fingerprinting for IoT/smart devices:** Create/alter policies based on accurate device types

- **Multifactor authentication (MFA) partners:** Secondary challenges for greater network and app level security (e.g. DUO, Imageware Systems)

- **Bidirectional context and message exchange:** Automatic protection based on real-time user, device and threat detection

- **Network discovery and profiling:** Enhanced switch, controller and device discovery

Implement adaptive policies for IoT and mobile
Powered by ClearPass and Ecosystem Partners

Real-time threat prevention for IoT / mobile

Multi-factor authentication for mobile

Aruba ClearPass

Five steps with Aruba ClearPass 6.6

1. Classify unknown devices with custom profiling

2. Onboard mobile devices with multi-factor auth

3. Segment network per role and/or device type

4. Exchange context with security systems in real-time

5. Gain deep visibility with ClearPass Insights

ClearPass Insight 2.0

ClearPass Insight

TOTAL AUTH
8.84K

FAILED AUTH
461

UNIQUE ENDPOINTS
7.09K

UNIQUE USERS
7.08K

ALERTS 453

admin
Super Administrator

Search using Username/Endpoint/ClearPass Server/Network Device

Dashboard

- Authentication
- Endpoints
- Guest
- Network
- Posture
- System
- System Monitor

Reports

Alerts

Administration

Dashboard From: April 07, 2016 00:00 To: April 19, 2016 23:59

Today | 1w | 1m | **Custom** ∨

Authentication Trend Total | **Success vs Failed** ∨

ClearPass Server | All

Count (K)

15

10

5

0

04/07 04/08 04/09 04/10 04/11 04/12 04/13 04/14 04/15 04/16 04/17 04/18 04/19

Time

Total Authentications

New standard for usability
- Complete revamp of UI, workflows, search, output
- Addition of new dashboard elements
- Modifications to alert capabilities
- Enhanced use of context for reporting – Guest/Social
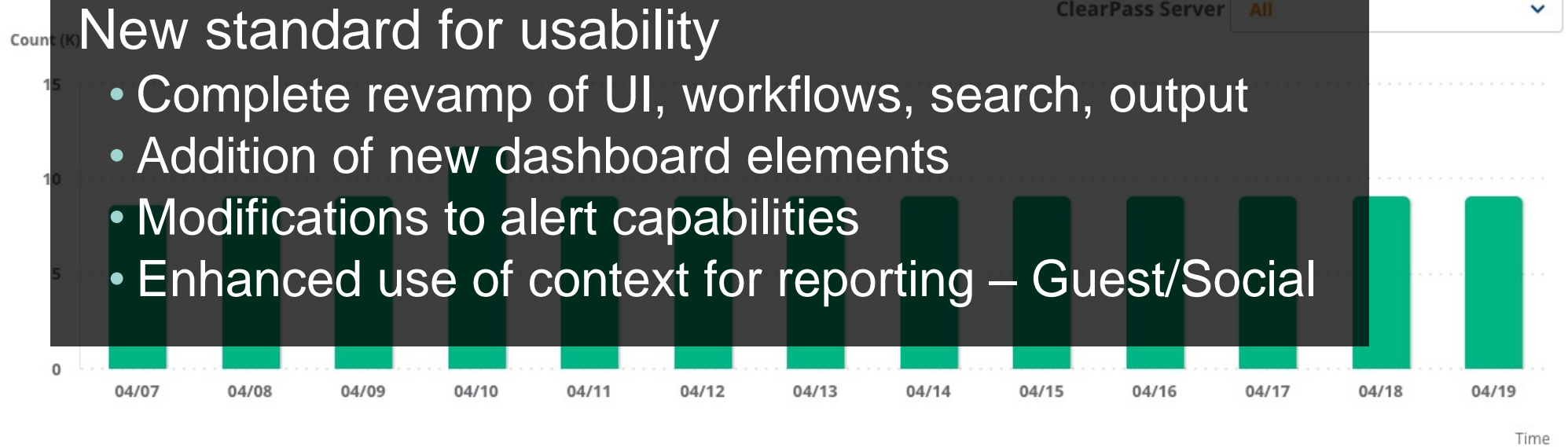
Ingress Engine Third-party Threat Protection

1 User connects and uploads threat

2 NGFW/IPS sends event to ClearPass

3 ClearPass isolates client

** Firewall / IPS

CLEARPASS

LAN/WLAN
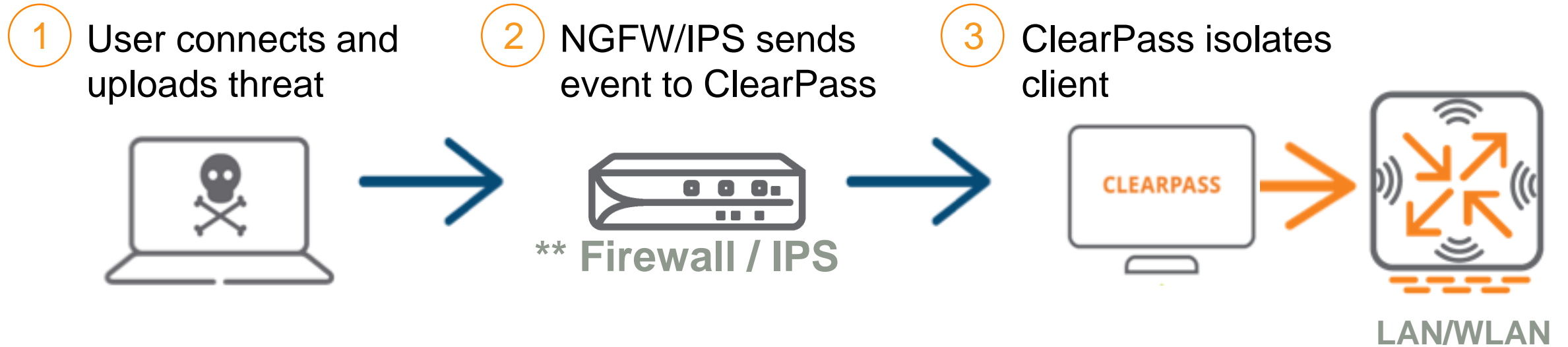
Adaptive Trust Defense based on real-time threat detection

- Offers enhanced user experience as ClearPass can initiate user notifications, help-desk tickets, and update third-party security solutions
- ** Device in step 2 can be MDM/EMM, SIEM, etc.

More Ways to Talk To ClearPass
ClearPass 6.6 has double the APIs

API Explorer

API	Services	
ApiFramework	ApiClient	
Authentication	AuthMethod	
GuestManager	ActiveSession, ActiveSessionDisconnect, ActiveSessionReauthorize,	
Identity	Endpoint, LocalUser, Role, StaticHostList	
Insight	Endpoint	
Network	NetworkDevice, NetworkDeviceGroup, ProxyTarget	
Onboard	Certificate, CertificateChain, CertificateExport, CertificateImport, CertificateNew, CertificateReject, CertificateRequest, CertificateRevoke, CertificateSign, Device, User	v1
OperatorLogins	ApiAuthentication, GetAccount, GetPrivileges, ListAllPrivileges, OperatorProfile	v1
Platform	ClusterDbSync, ServerConfiguration	v1
SmsServices	SmsSend	v1
UsersAndPrivileges	AdminPrivilege, AdminUser	v1

AuthMethod : Manage authentication methods — Show/Hide | List Operations | Expand Operations

GET	/auth-method	Get a list of authentication methods
POST	/auth-method	Create a new authentication method
GET	/auth-method/{auth_method_id}	Get an authentication method
PATCH	/auth-method/{auth_method_id}	Update some fields of an authentication method
PUT	/auth-method/{auth_method_id}	Replace an authentication method
DELETE	/auth-method/{auth_method_id}	Delete an authentication method
GET	/auth-method/name/{name}	Get an authentication method by name
PATCH	/auth-method/name/{name}	Update some fields of an authentication method by name
PUT	/auth-method/name/{name}	Replace an authentication method by name
DELETE	/auth-method/name/{name}	Delete an authentication method by name

Network Discovery and Profiling

Network Discovery

+ Start Network Discovery Scan
📱 View Endpoints
🗄 View Discovered Devices

Filter: [Seed Devices ▾] [contains ▾] [_____] [+] [Go] [Clear Filter]   Show [10 ▾] records

#	Seed Devices	CPPM Server	Start Time ▽	End Time	Endpoints	Devices	Status	Action
1.	10.2.51.202	Naresh-Trunk	2015-10-07 22:02:56	2015-10-07 22:03:19	1	3	Completed	🟢
2.	10.2.51.1	Naresh-Trunk	2015-10-07 21:48:28	2015-10-07 21:48:50	14	14	Completed	🟢
3.	10.2.51.1	Naresh-Trunk	2015-10 21:43:54					
4.	10.2.48.1	Naresh-Trunk	2015-10 21:43:04					
5.	10.2.51.202	Naresh-Trunk	2015-10 21:37:4					

Automated network access device (NAD) mapping
– Compiles vendor and SW versions
– Allows for import of discovered NAD devices

Granular Endpoint Fingerprinting and Customization
– NAD data expedites discovery of endpoints
– SSH and WMI support for granular endpoint profiling
– Customers can *NOW* define custom fingerprints
  ❑ Quick policy definition of new devices
     (e.g. IoT, retail, medical devices)

Detailed Visibility for Simplifying Deployments

Network Device Details ⊗

Sys Name:	Cisco-switch-51.202
Vendor:	Cisco
Sys Location:	#1344#ROW2#Rack1""
Sys Contact:	dl-cppm-qa@arubanetworks.com
Sys Description:	Cisco IOS Software, C3750E Software (C3750E-UNIVERSALK9-M), Version 15.2(1)E, RELEASE SOFTWARE (fc3)

Status:	
Update Time:	
IP Address:	

Neighbour Device

#	IP Address
1.	0.0.0.0
2.	10.1.93.20

Filter: Name ▼ contains ⬍ [_____] ⊞ **Go** **Clear Filter**   Show 10 ▼ records

#	☐	Name △	IP Address	Vendor	Status	Update Time
1.	☐	ArubaController-51.241	10.2.51.241 ▼	Aruba	New	2015-10-07 21:48:46
2.	☐	ArubaController-51.243	10.2.51.243 ▼	Aruba	New	2015-10-07 21:48:46
3.	☐	ArubaSwitch-10.2.51.244	10.2.51.244 ▼	Aruba	New	2015-10-07 21:48:46
4.	☐	Arubaswitch-50.4	10.2.50.4 ▼	Arub	New	2015-10-07 21:48:46
5.	☐	Arubaswitch-51.242	10.2.51.242 ▼	Aruba	New	2015-10-07 21:48:46
6.	☐	Aruba-Switch-51.254	10.2.51.254 ▼	Aruba	New	2015-10-07 21:48:46
7.	☑	Cisco-Switch-48.1	10.1.93.20 ▼	Cisco	New	2015-10-07 22:03:09
8.	☑	Cisco-Switch-48.250	10.2.48.250 ▼	Cisco	New	2015-10-07 21:48:46
9.	☑	Cisco-Switch-51.201	10.2.50.201 ▼	Cisco	New	2015-10-07 21:48:46
10.	☑	Cisco-switch-51.202	10.2.51.202 ▼	Cisco	New	2015-10-07 22:03:09

Showing 1-10 of 15 ▶ ▶|

Import | **Ignore**

Enhanced Profiling and Policy – Solving IoT Issues

OLD WAY:

Wait for new Fingerprints to be made and/or manually override devices 1:1

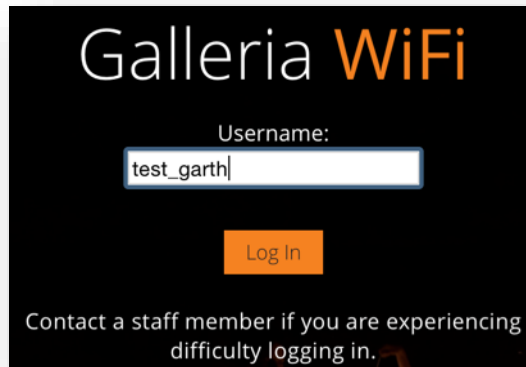
NEW WAY:

Create your own Fingerprints!

Multi-Factor Authentication

Multi-Factor Authentication
Require a secondary factor when authenticating.

Provider: Duo Security - Two Factor Authentication

Authentication Order: Credentials and then device

Provider: Duo Security - Two Factor Authentication

Authentication Order: Credentials and then device
- Credentials and then device
- Device and then credentials

* Duo AKEY: Your akey is a string that you should generate and keep secret from Duo. It should be at least 40 characters long. Reference the Duo website for tips on generating this key.

* Duo Integration Key:

* Duo Secret Key: ••••••••

* Duo API Hostname:

– Captive Portal Login
  – Bring MFA to captive portal logins
  – Leverage built in database or external identity stores

– Onboard Login
  – Support MFA for initial Onboarding

– Vendor Support
  – DUO
  – ZOOM
  – Imageware
  – More to come!

Multi-Factor Authentication (DUO Workflow)

Step 1 – Who are you?
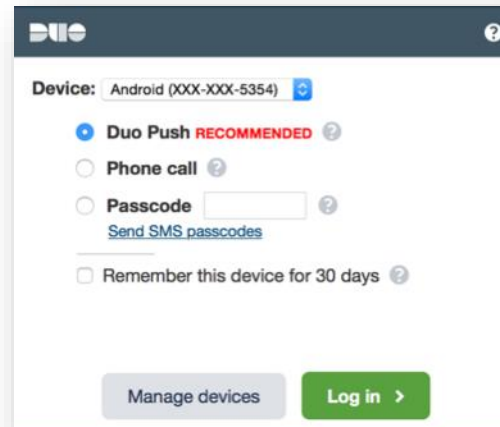
Step 2 – 1st Factor
Something You Have
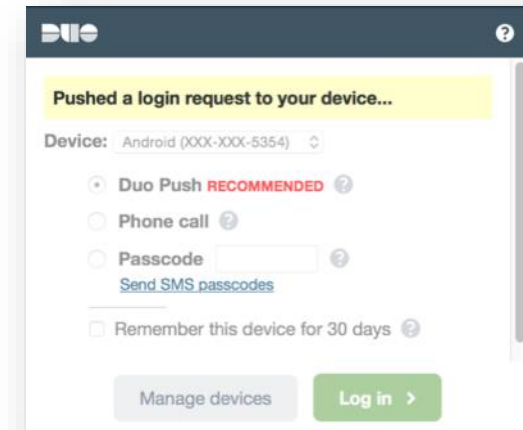
Step 3 – Request Approval
from Known Device
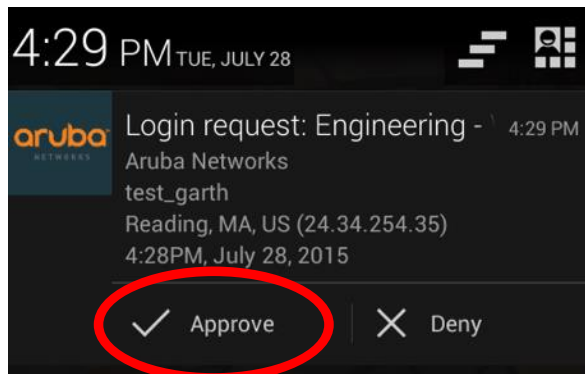
Step 4 – Approve from
Known Device

Step 5 – 2nd Factor
Something You Know

Step 6 – Logging in!

OnGuard Is Better Than Ever

– Better Policy Manipulation

  – Support for regular expressions (RegEx) in registry and installed application health classes.

– Better OS Support

  – Persistent agent can now run as a system service on Windows

  – Native dissolvable agent auto upgrade support

  – OnGuard can now check if Mac OSX clients are missing any patches or not and if auto-remediation is enabled install missing patches.

– Better Visibility

  – Access Tracker visibility for posture classes and host agent details

  – New system tray icons

Request Details

Summary	Input	**Output**

Enforcement Profiles:	Agent-Unhealthy
System Posture Status:	QUARANTINE (20)
Audit Posture Status:	UNKNOWN (100)

Posture Response

AntiSpyware:HealthStatus	Not Healthy
AntiVirus:HealthStatus	Not Healthy
Avenda:MacSHV:Application-Posture-Token	20
ClientVersion:HealthStatus	Healthy
DiskEncryption:HealthStatus	Not Healthy
FileCheck:HealthStatus	Not Healthy
Firewall:HealthStatus	Not Healthy
InstalledApplicaton:HealthStatus	Not Healthy
NetworkConnection:HealthStatus	Healthy
P2PApplicaton:HealthStatus	Healthy
PatchAgent:HealthStatus	Not Healthy
Processes:HealthStatus	Not Healthy

Showing 2 of 1-18 records | Change Status | Show Configuration | Export | Show Logs | Close

Upgrades/Updates Are Easier Than Ever
Automated Cluster Upgrades/Updates with Admin Visibility

Publisher
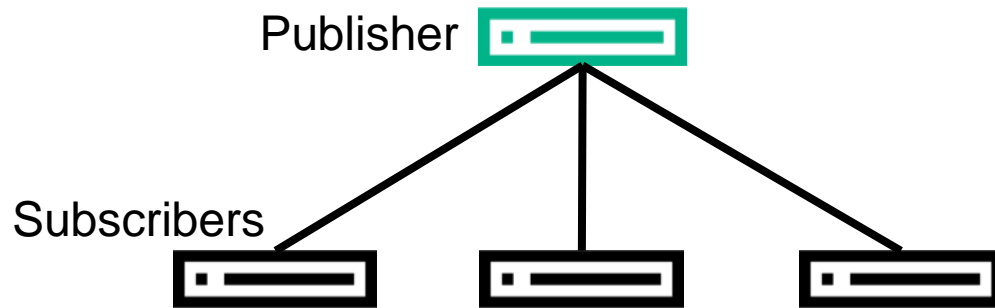
Subscribers

ClearPass 6.5.x to ClearPass 6.6.0

NEW

ClearPass 6.6.0 to ClearPass 6.6.3

Logs

Server

Server Name:	CPPM-AH-02
Management IP:	192.168.100.41
Version:	6.5.0.71095
Cluster Role:	Subscriber
Zone:	default
Insight(Size):	Disabled (0.01 GB)

Tasks

Name	Status	Time taken(HH:MM:SS)
Patch	Completed	00:01:09
Download	Completed	00:03:00
Upgrade	Completed	00:10:42
Reboot + data migration	Completed	00:17:03
Onboot	Completed	00:02:05

Patch **Download** **Upgrade** **Reboot** **Onboot**

```
INFO: Copied file 94-update-ui-properties-onboot.sh
INFO: - Adding PCIE entry
INFO: /second[DIR]/local exists. Files under this dir are -
INFO: /second[DIR]/local found. Files under this dir are -
INFO: Installing kernel-update patch in /second
INFO: - CPPM-x86_64-20150526-update-kernel-aruba-65-patch.signed.bin is signed
INFO: Preparing ...
INFO: Running pre-install scripts ...
INFO: Applying patch ...
INFO: Recording patch ...
INFO: Running post-install scripts ...
INFO: Updating kernel...
INFO: Please reboot now for the changes to take effect.
INFO: Patching complete with status - 0
INFO: Removing symlink...
INFO: Patching complete with status - 0
Exiting with 0


Node is reachable.
```

Close

ClearPass Extensions - New 3rd Party Integration Option
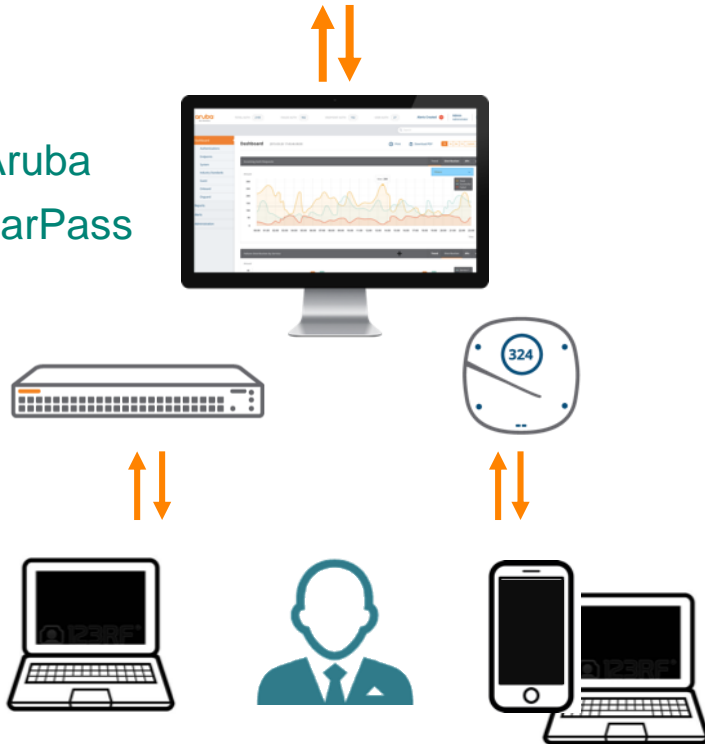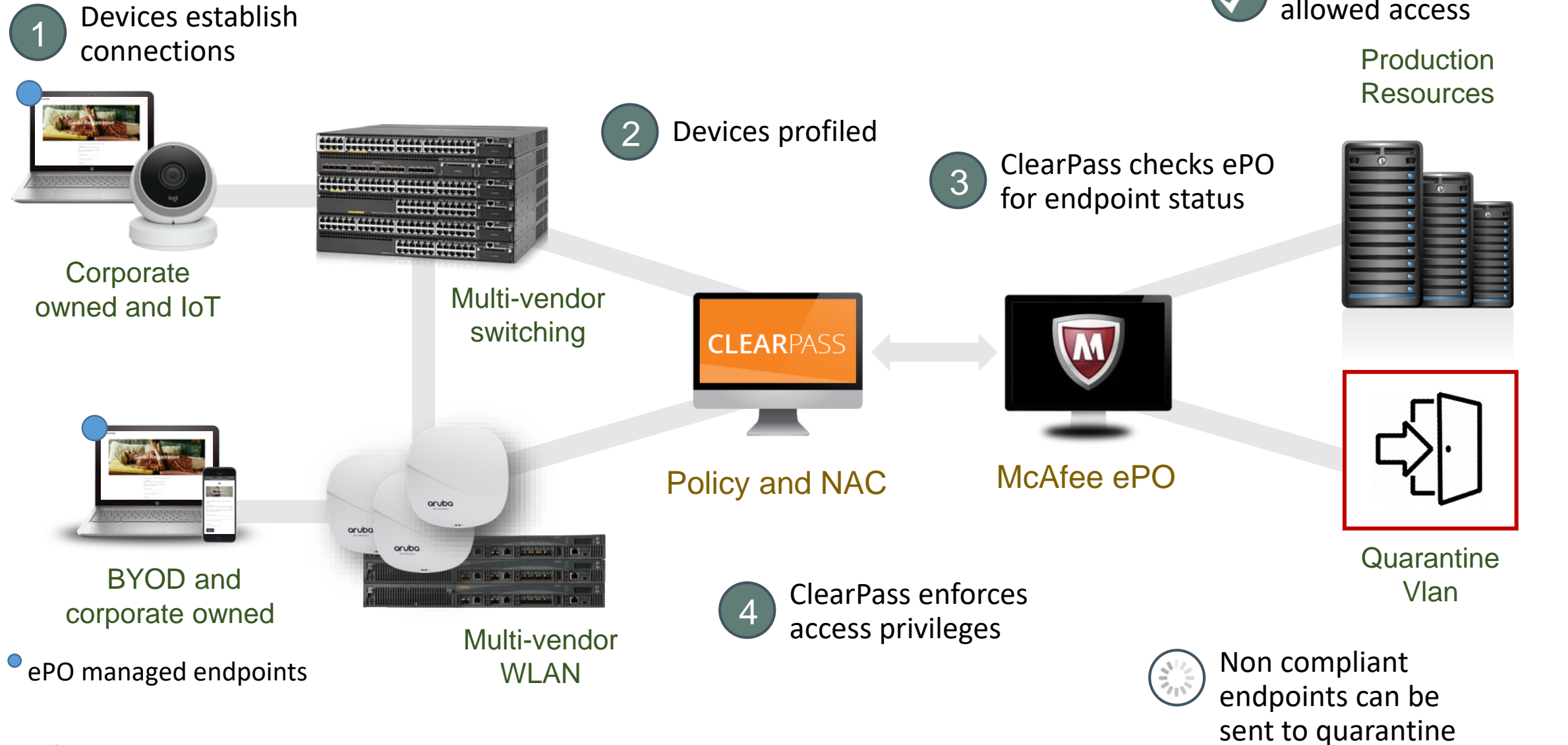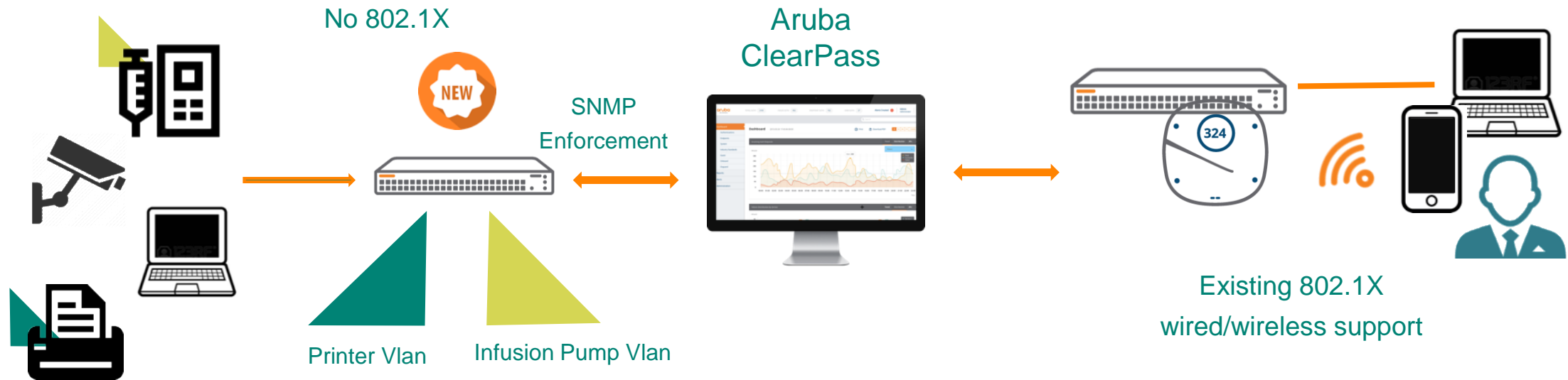
Extensions Repository

Aruba ClearPass

- Opens doors for new Exchange partnerships
    - Device authorization, MFA, visitor registration, EMM/MDM and more…

- Extends use of existing security, productivity solutions

- Fast, no heavy lifting integration model.

Extensions for Intel Security - McAfee ePO

1 Devices establish connections

Corporate owned and IoT

2 Devices profiled

Multi-vendor switching

CLEARPASS

Policy and NAC

3 ClearPass checks ePO for endpoint status

McAfee ePO

Compliant endpoints allowed access

Production Resources

BYOD and corporate owned

Multi-vendor WLAN

4 ClearPass enforces access privileges

Quarantine Vlan

ePO managed endpoints

Non compliant endpoints can be sent to quarantine

aruba
a Hewlett Packard
Enterprise company

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ClearPass OnConnect for Easy Wired NAC Enforcement

- Built-in device-centric security for all non-AAA ready customers
- Easy to configure on legacy multivendor switches
- Leverages ClearPass profiling for wired/wireless - IoT, laptops, mobile phones.

Aruba Mobile First Platform Components

ArubaOS 8.0 (AOS8)
New REST APIs and
custom app signatures

Aruba ClearPass
New unified API library, extensions
repository and OnConnect for secure IoT

Aruba AirWave
Northbound XML APIs to consume
monitoring and reporting data

Aruba Central
New REST APIs, wired/WAN support
and network analytics

Aruba Meridian
Mobile app SDK for indoor location
services, incl. the new location sharing
and the new Meridian Goals

Aruba Analytics & Location Engine (ALE)
Northbound REST APIs to consume
user, device, app, location context

Aruba Mobile Engagement 2.0

Partnership program with CADA and ISVs

Self-registration, app delivery, personalized advertising in the browser

Multi-vendor Wi-Fi

Aruba ClearPass

Remote beacon management

Beacon and sensor management
Beacon and app analytics

Indoor blue dot and location-based event triggers

Aruba Beacons

Aruba Sensor

Aruba Meridian
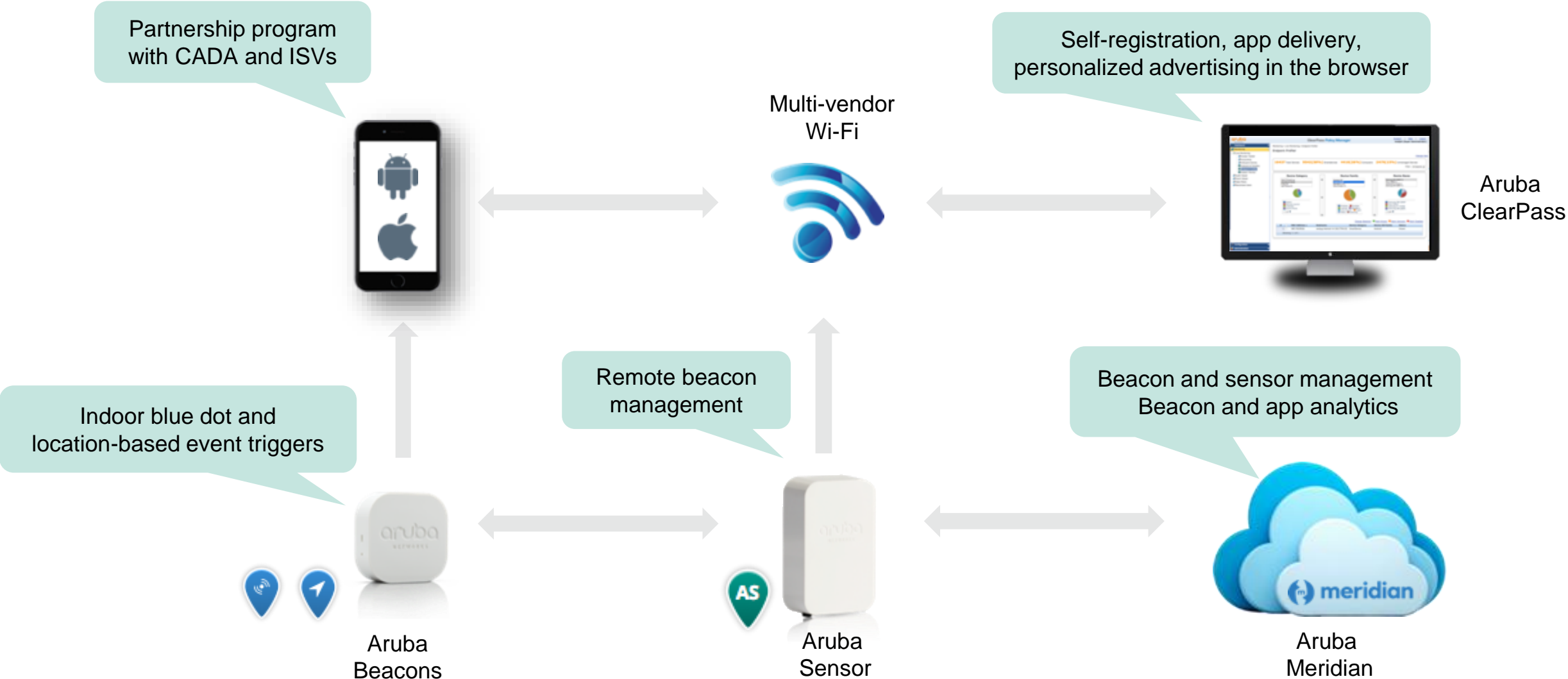
Initial Use Cases for Aruba Mobile Engagement

Increase visitor satisfaction
Personal tour guides with turn-by-turn directions

Increase retail sales
Enable shoppers to locate individual products in-store

Improve fan engagement
Bring indoor venue services to where the fans are

Mobile
WhiteLabel

White Label

Drag and drop simplicity

All SDK Features + end to end builder.
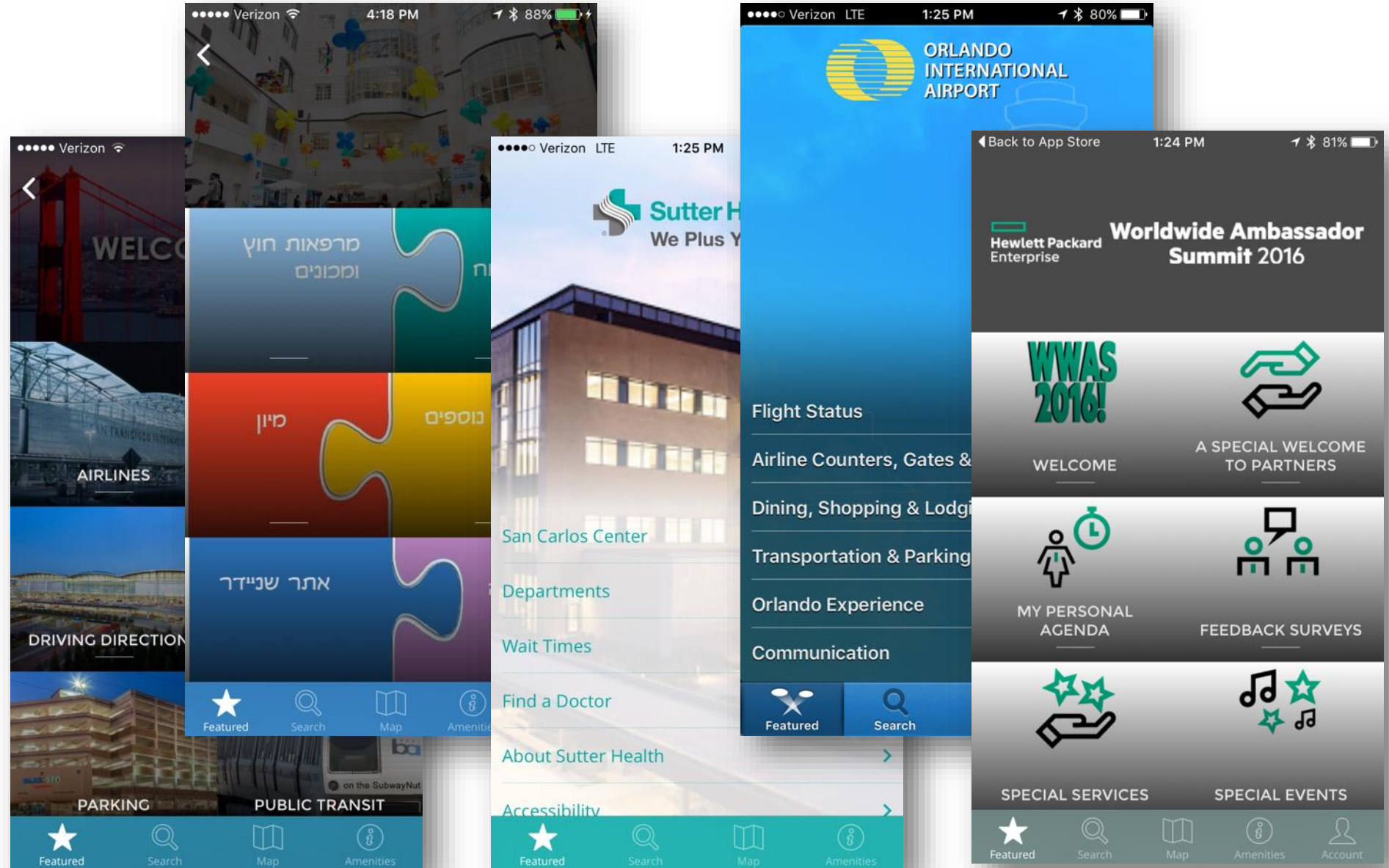
Mobile
SDK

SDK

Powerful location framework:

- Maps
- Routing
- Notifications
- Location
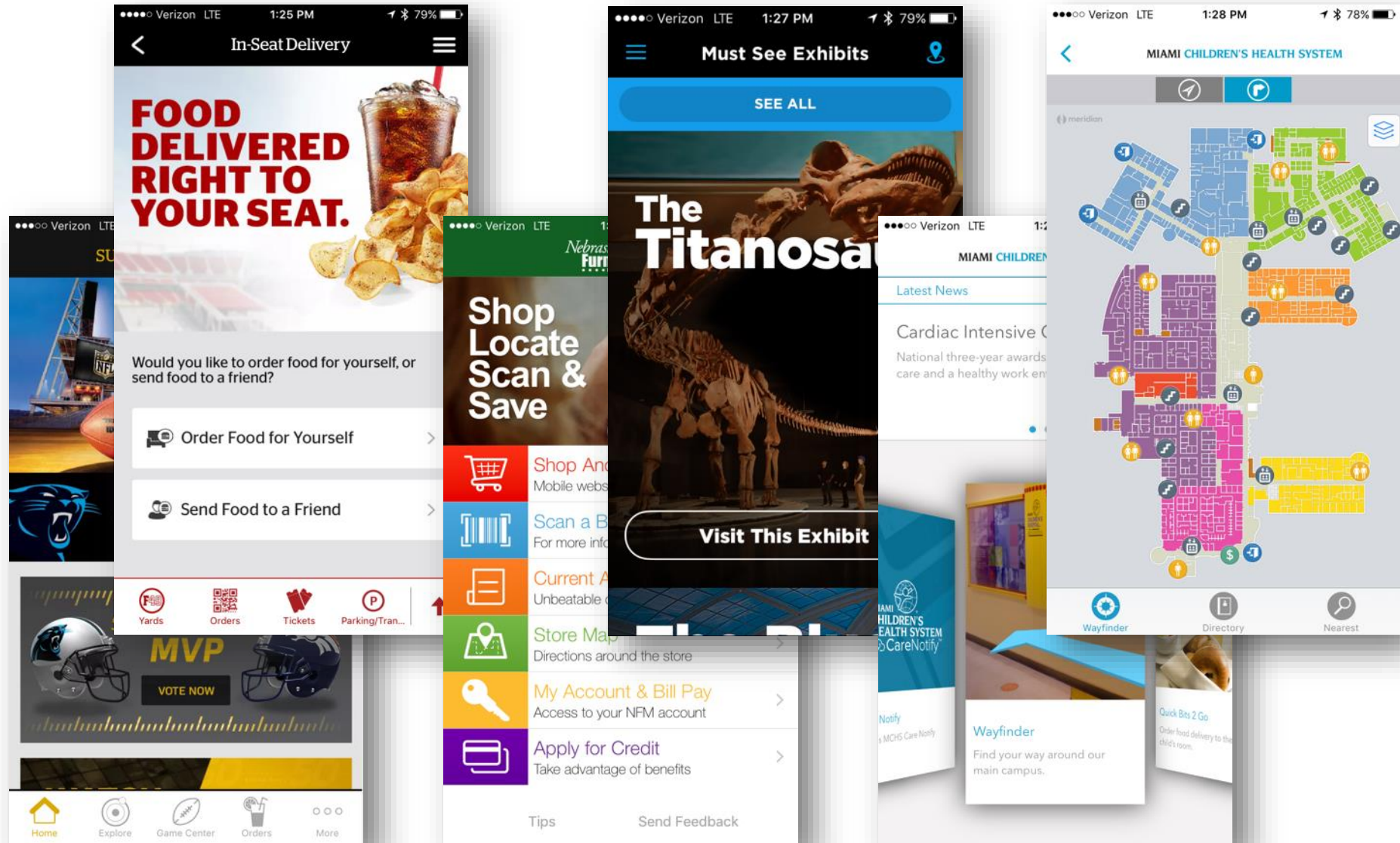
Location-based Services
Location sharing

- Available in Meridian white-label apps and via Meridian SDK

- Reciprocal sharing to ensure privacy: both users must share for app to work

- Sharing constrained to venue location which users can turn on/off.

Featured Partners

Aruba Classroom
concept mobile app

Hospital app
(confidential until release)

Stadium app for fan
engagement

IoT and mobile app for
meeting room booking

im·pek·a·ble

Forge

VENUENEXT

Robin

Custom App Development
Agencies (CADA)

Independent Software
Vendors (ISV)

aruba
a Hewlett Packard
Enterprise company

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Location Hardware
Beacons + Sensors + APs

USB Beacons

Used for location + notifications + Management

Aruba Beacons

Blue dot directions and notifications based on real-time position

Aruba AP w/ integrated Beacon

Communicates with Aruba Beacons and Meridian Platform

Aruba Sensor

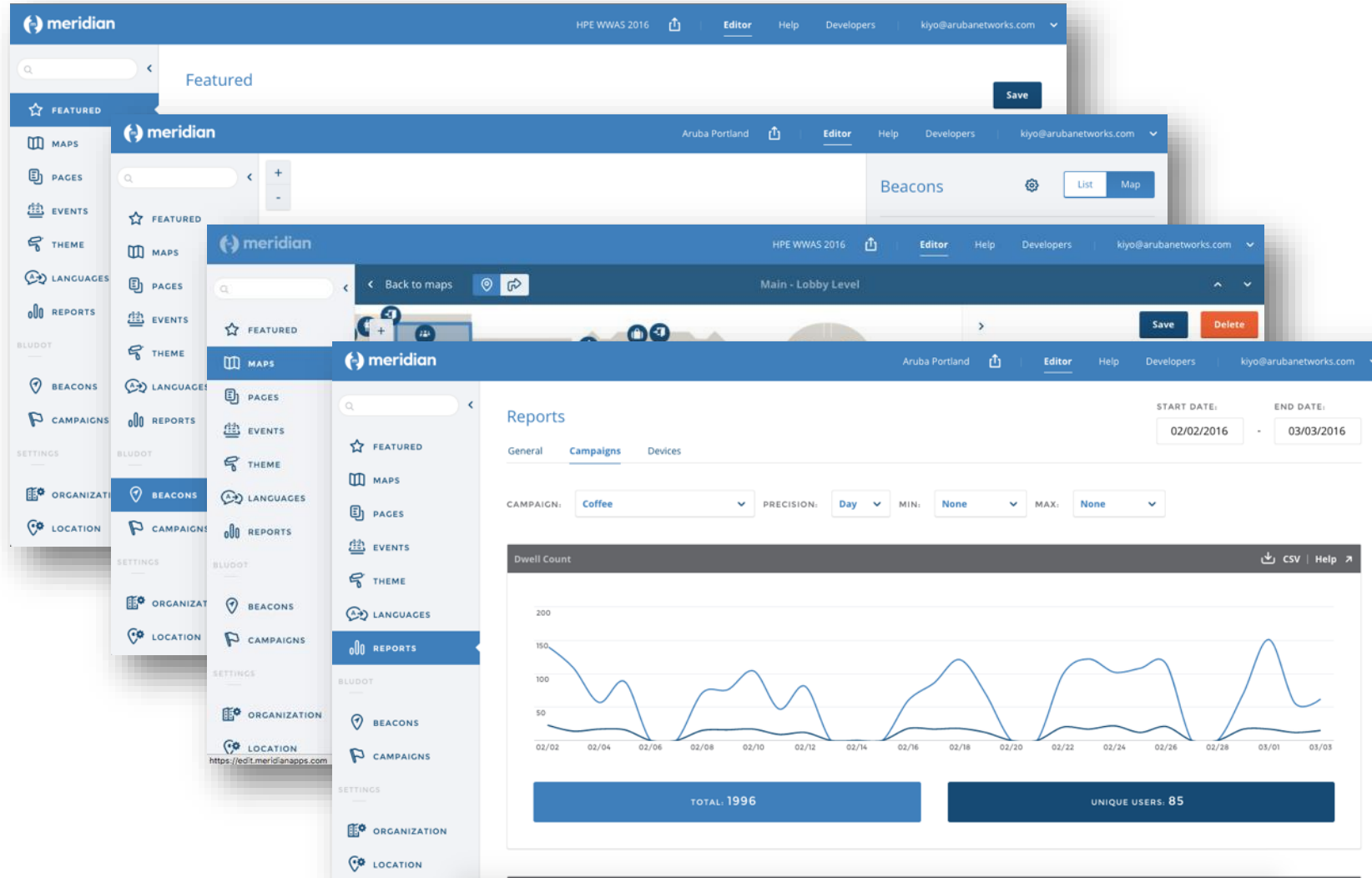Used for location + notifications + Management on ANY network

Location
How does this work?
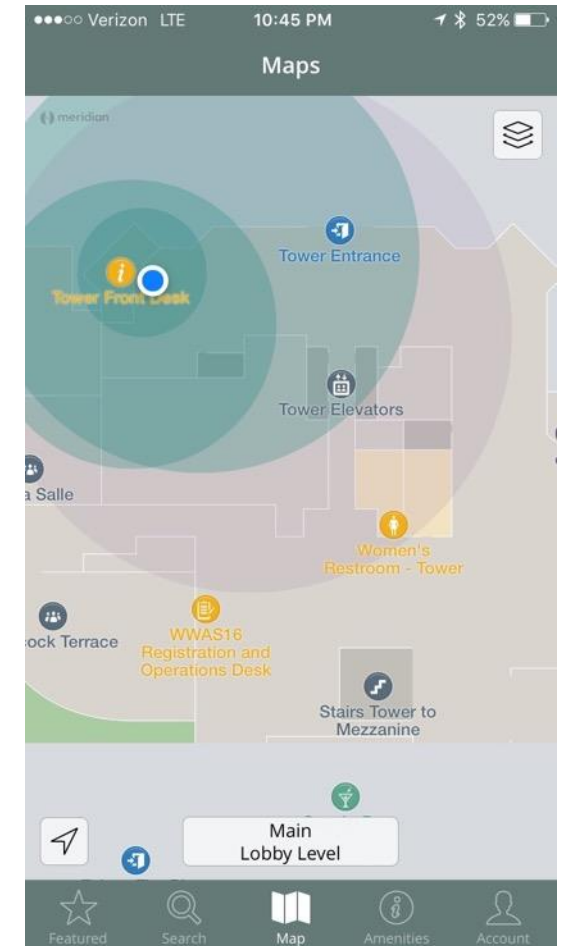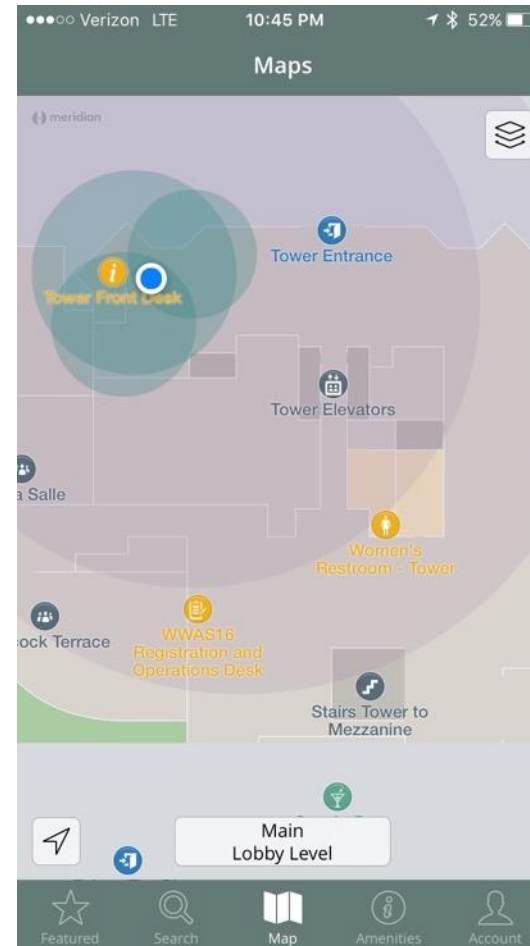
Cloud
Manage all content + beacons, analytics, etc.

Aruba Sensor

- Manage Aruba Beacons on any Wi-Fi network
  - Est. time savings is 48+ hours for a deployment of 1000 beacons, for each maintenance window

- IoT device with Wi-Fi and Bluetooth Low Energy (BLE) radio, centrally managed
  - Dual band 802.11n 1x1 client radio for network connectivity and remote management access
  - Bluetooth Low-Energy (BLE) radio for indoor positioning and provisioning
  - Advanced Cellular Coexistence (ACC)

- Direct AC power plug-in with option to power over USB, with international plugs included
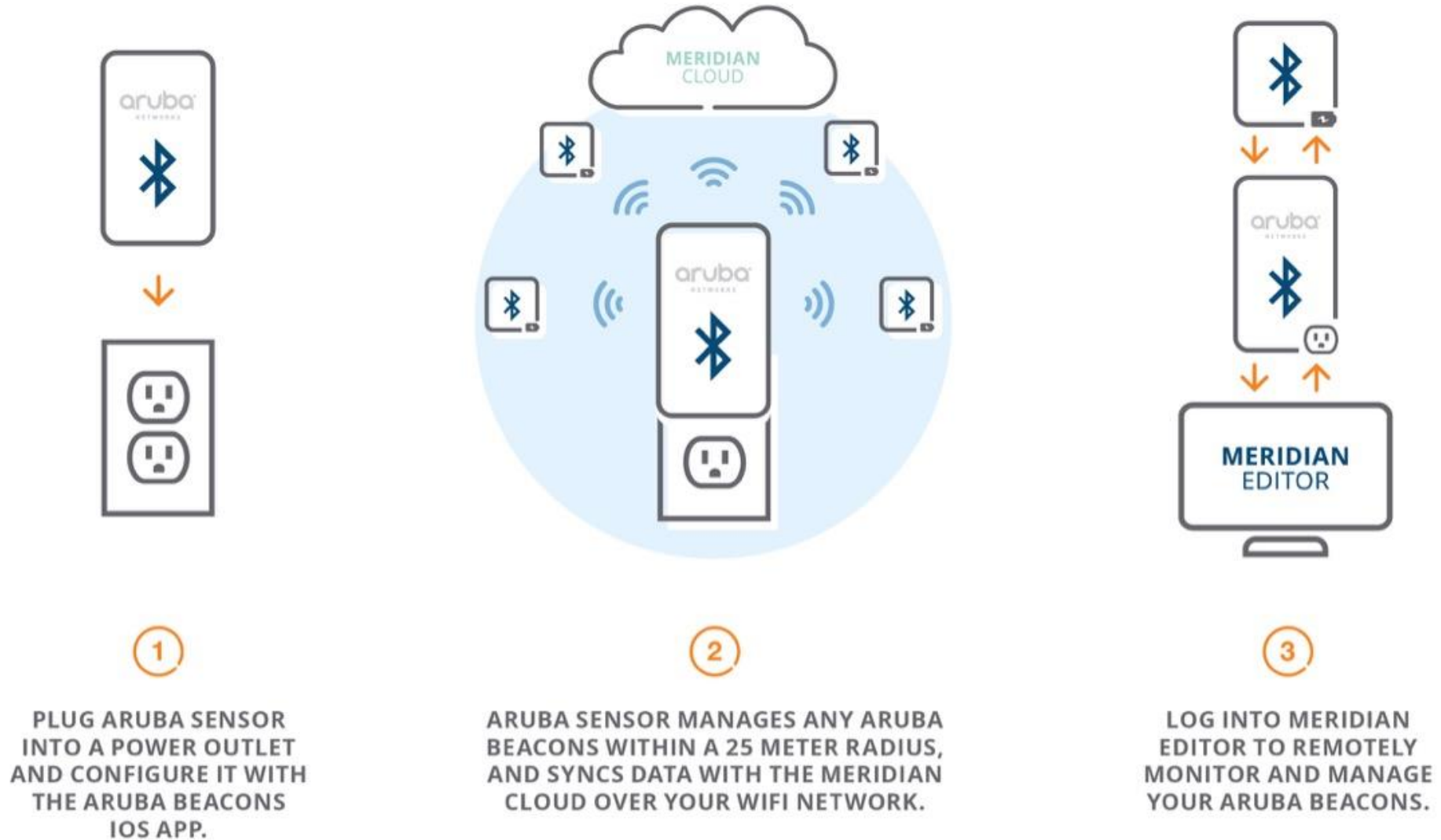 - Optional kits for secure mounting

Easily Deploy and Configure Aruba Sensors

Deploy a Beacon
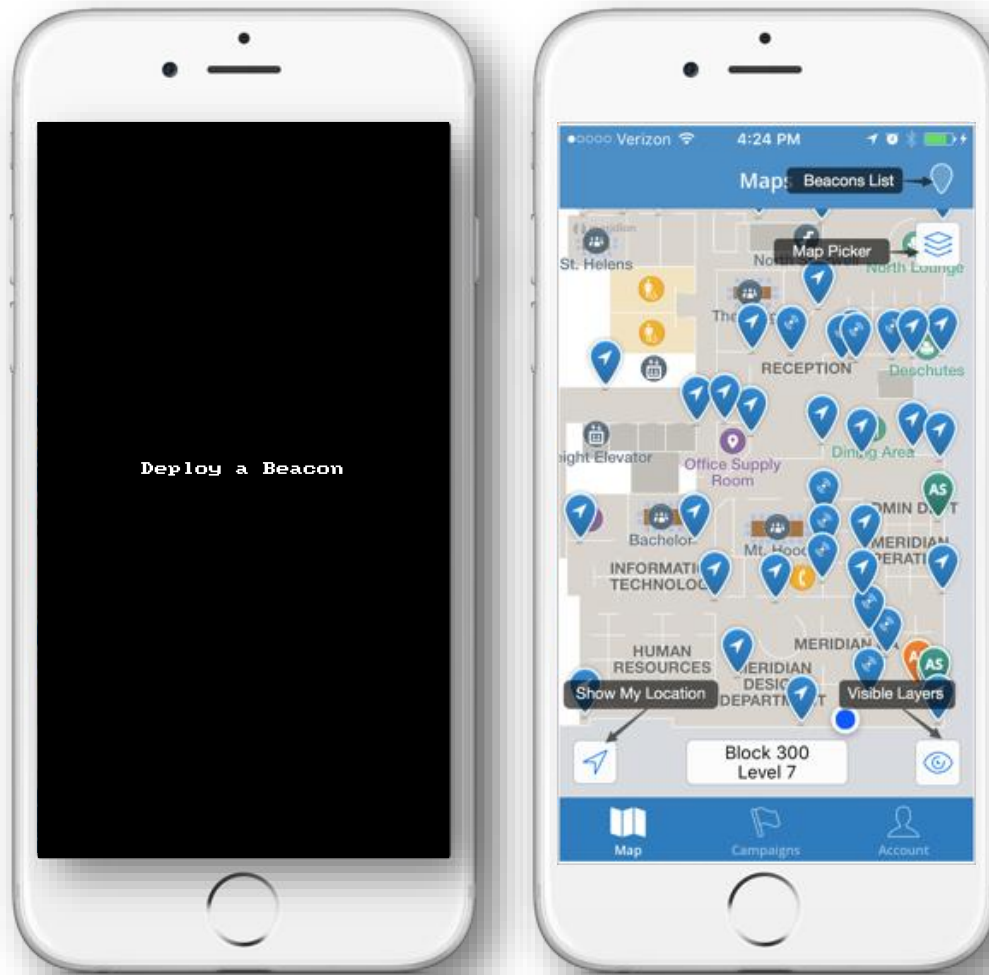
- Configure Wi-Fi settings using the Meridian app platform
- Place Aruba Sensor on the digital map and download the Wi-Fi configuration using the Aruba Beacons app
- Monitor status & maintain configuration using the Meridian app platform

How does Aruba Sensor manage Aruba Beacons?

①

PLUG ARUBA SENSOR
INTO A POWER OUTLET
AND CONFIGURE IT WITH
THE ARUBA BEACONS
IOS APP.

②

ARUBA SENSOR MANAGES ANY ARUBA
BEACONS WITHIN A 25 METER RADIUS,
AND SYNCS DATA WITH THE MERIDIAN
CLOUD OVER YOUR WIFI NETWORK.

③

LOG INTO MERIDIAN
EDITOR TO REMOTELY
MONITOR AND MANAGE
YOUR ARUBA BEACONS.

Aruba Sensor Deployments

Stress free travel experience

1000+ Aruba Beacons deployed

38 million passengers per year

2600 downloads in the first 3 weeks

Find your way to more learning

Thousands of content pieces in the library

Trial deployment before rolling out location-based services campus wide

Deployment and Management Tools for Enterprise IT

1. Configure Wi-Fi settings on sensors using the Meridian platform

2. Place Aruba Sensor on the digital map and download the Wi-Fi configuration using the Aruba Beacons app

3. For Aruba Beacons, use the same app

4. Monitor status & maintain configuration of beacons using the Meridian platform

Beacon and App Analytics
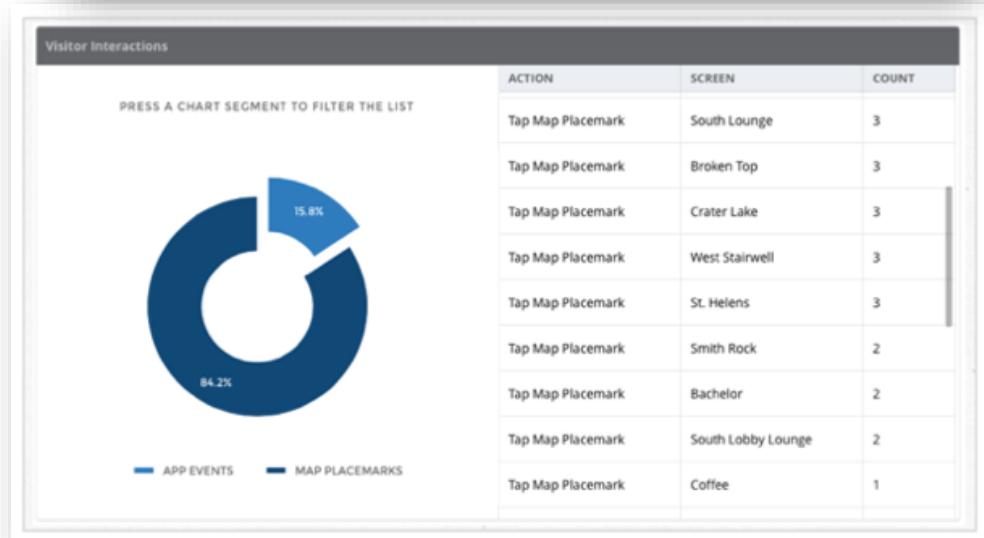
- Augment IoT analytics
  - Mobile device type and OS
  - Trigger count and average dwell time for beacons that trigger interactions with IoT devices
- Augment marketing analytics to measure fan engagement
  - Total # of fans, average screen views per fan, aggregated results on navigation and content search
  - Privacy-friendly: user must download app and opt in

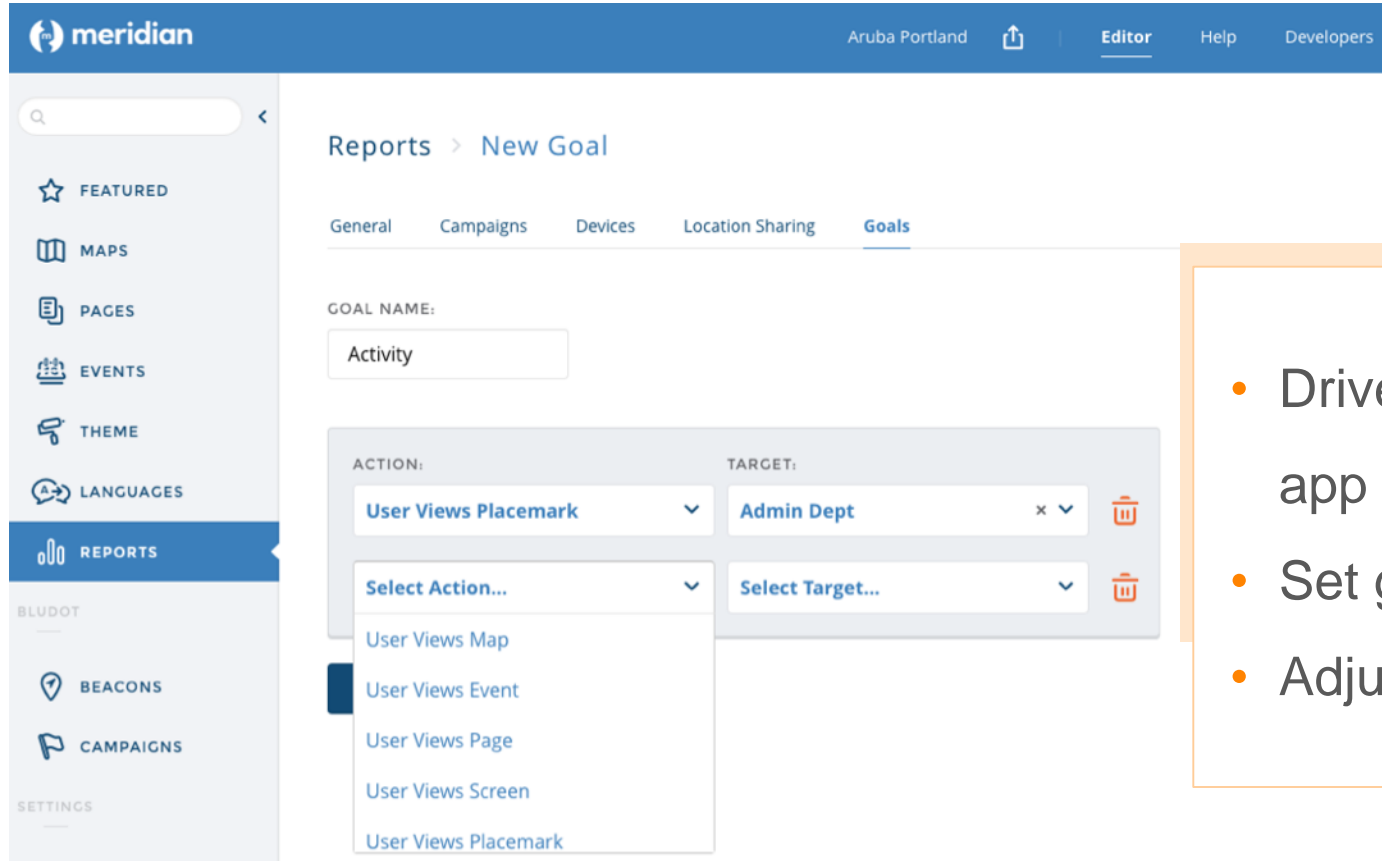# Improve Campaigns with Beacon and App Analytics
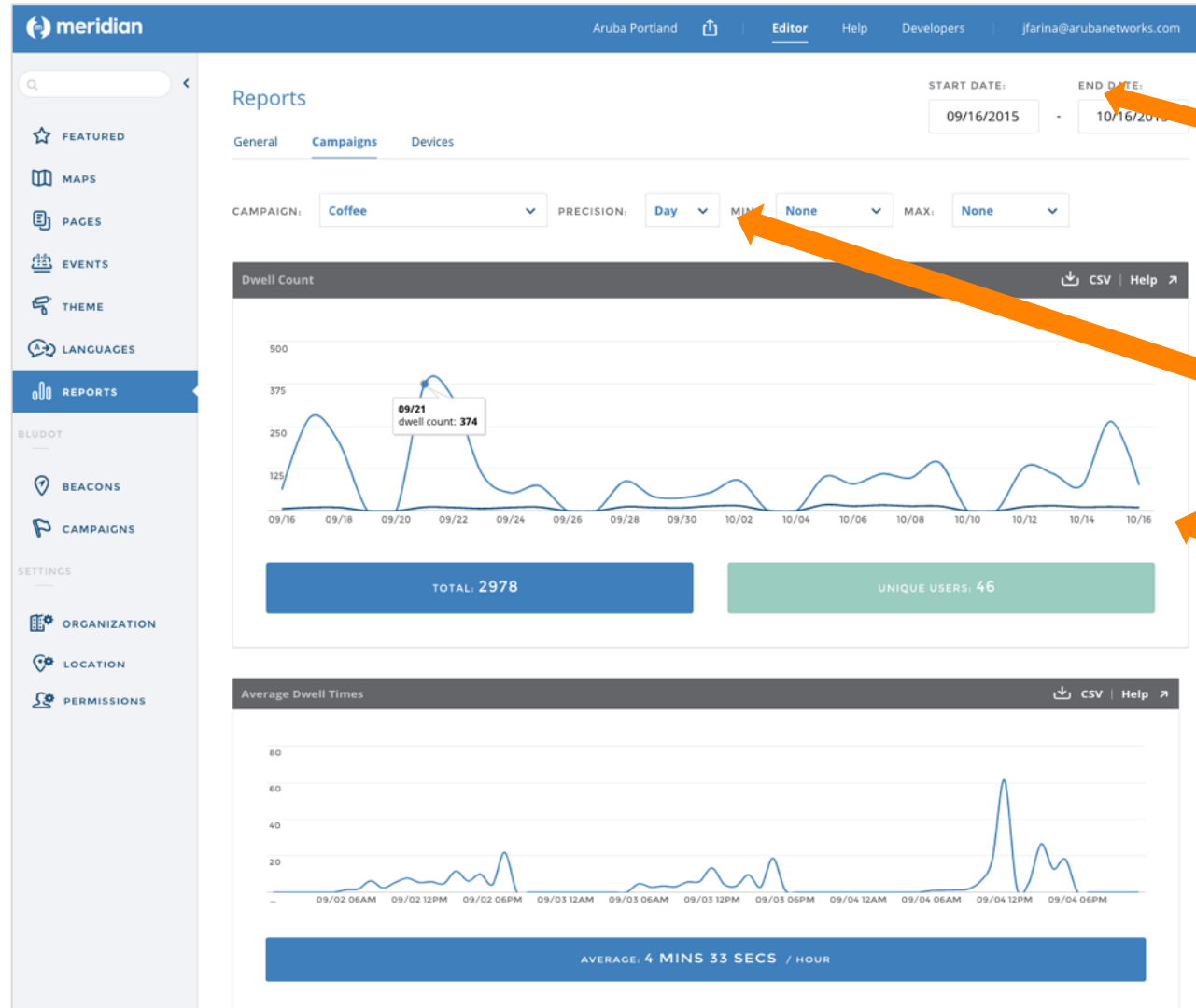
Custom Date Range

Hourly or Daily Data

Number of Times the Campaign Triggered

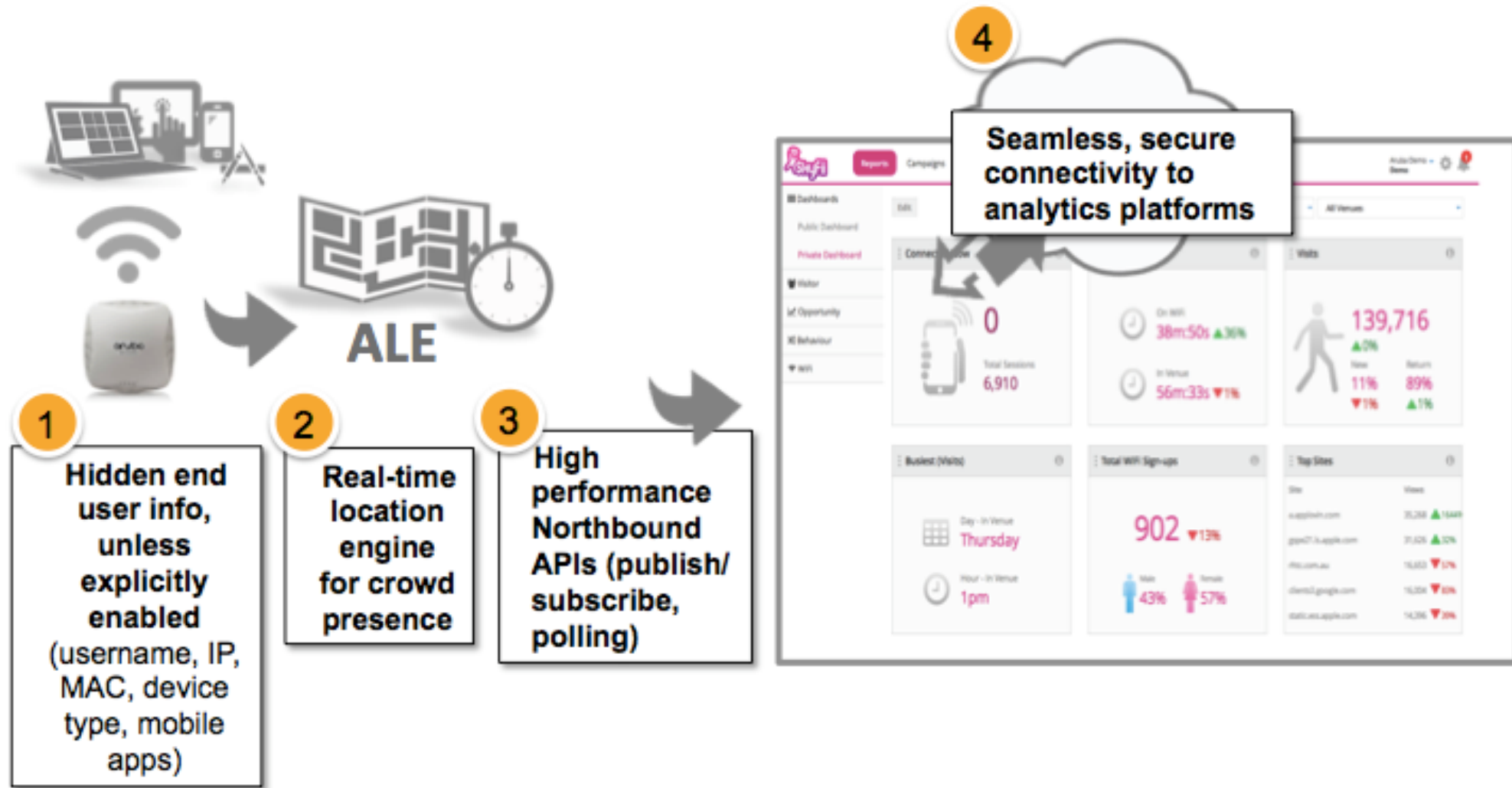Average Dwell Times

Location-based Services
Meridian Goals

- Drives insights for location-based mobile app notification campaigns
- Set goals per location, offer type
- Adjust offers based on real-time data

Wi-Fi Analytics: How It Works

4

Seamless, secure connectivity to analytics platforms

1 Hidden end user info, unless explicitly enabled (username, IP, MAC, device type, mobile apps)

2 Real-time location engine for crowd presence

3 High performance Northbound APIs (publish/ subscribe, polling)

Context Data Collected and Exposed by ALE

Presence feed

–Indicating a device has been detected in range of WLAN

Geofence events

–Entering or leaving a zone

Device information

–Model, OS (from DHCP and browser user-agent)

User information from network auth:

–Type of authentication, username

Applications visibility

–As detected by monitoring data-plane traffic from the device

Destination URLs

–By monitoring data-plane traffic from the device

Unlocking Value of Network with ALE

Traffic Patterns, Engagement in Public Venues

Enterprise: Workspace Optimization

Location Based Security Policies

SDN Enablement (Context APIs)

Smart Energy Management

Integration with Machine Data Systems

Wi-Fi Analytics: ALE Integrates with Partners

Partners

ShopperTrak

RETAILNEXT

beabloo

Skyfii

rifiniti

software AG

Aislelabs

… Others

Store Visitor Summary
comparison to previous week

Opportunity	19497 visitors (-2%)
Draw Rate	avg 100 % (0%)
Abandonment Rate	7.3 % of converted flow (+16%)
Loyalty	2.5 visits per customer (+33%)
Dwell Time in Store	avg 28.7 minutes (+23%)
Traffic	19497 visitors (-2%)
Gross Shopping Hours	9340 hours (+21%)

ShopperTrak Sample Report (Generated for a Retail Store in Spain; integrating with ALE)

Thank you