26.01.2023.

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Aruba Tehnološi doručak

Đorđe Nedeljković – Presales Consultant

AGENDA

1. Trends 6E
2. Redundancy and high throughput
3. Trends - IoT
4. Aruba WiFi 6E
5. Aruba WiFi Solutions
6. Aruba InstantOn
7. Aruba Central
8. ArubaOS 10
9. Aruba CX Portfolio
10. Aruba ClearPass
11. Aruba UXI

Aruba WiFi 6E

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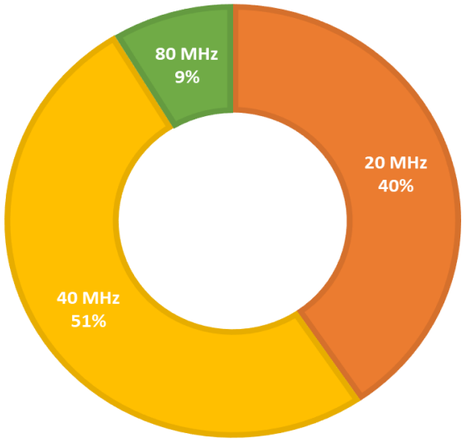
TODAY'S WIRELESS NETWORKS ARE LIMITED BY AVAILABLE SPECTRUM



91% CHANNELS

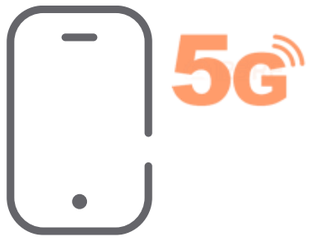
DEPLOYED ARE <80 MHZ

Source: HPE, customer study

9.2B CLIENT DEVICES

WILL BE IN USE THIS YEAR

Source: Gartner



63% TRAFFIC

FROM MOBILE IS OFFLOADED TO WI-FI

Source: Wi-Fi Alliance

Wi-Fi je pomoćna mreža i mreža za mobilne telefone ?

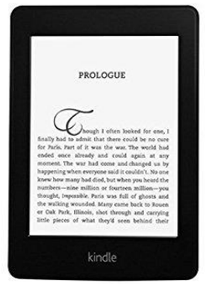
Audio Systems
(Credits:BOSE)

xCast
(Credits:Google)

Smart Assistants.
(Credits:Amazon)

Smart TV
(Credits:Samsung)

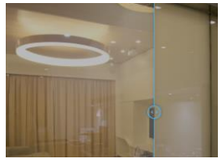
Laptops w/o Eth.
(Credits:Apple)



Books
(Credits:Amazon)

Baby monitors
(Credits:Motorola)

AC
(Credits:LG)



Windows
(Credits:SONTE)

Lock
(Credits:LockState)

Lights
(Credits:Philips)

Printers.
(Credits:HP Inc)

NTP Sync. Clocks.
(Credits:American-Time)

Garden Watering.
(Credits:Gardena)

Smart Home GW
(Credits:XIAOMI)

Water Sensor
(Credits:D-Link)

CCTV
(Credits:AXIS)

Refridgerator
(Credits:LG)

Oven
(Credits:LG)

Toilets
(Credits:XIAOMI)

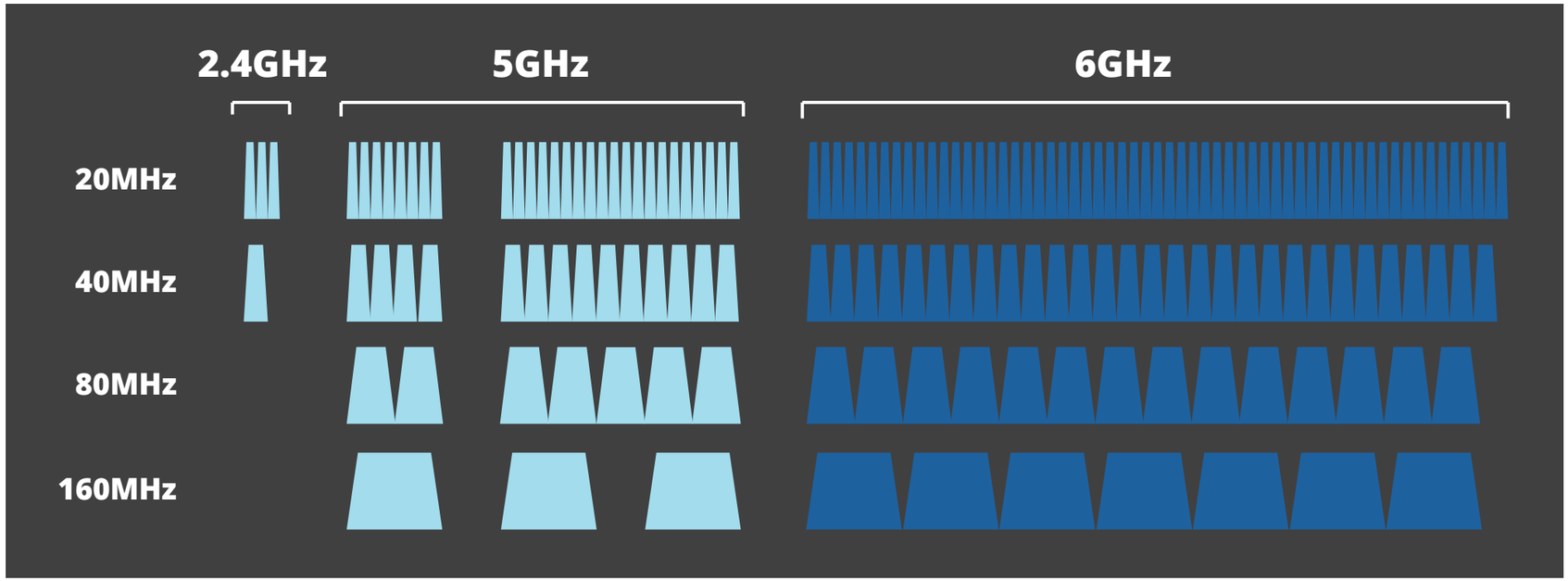
WiFi Scale.
(Credits:FitBit)

INTRODUCING WI-FI 6E
WI-FI 6 IN THE 6 GHZ BAND

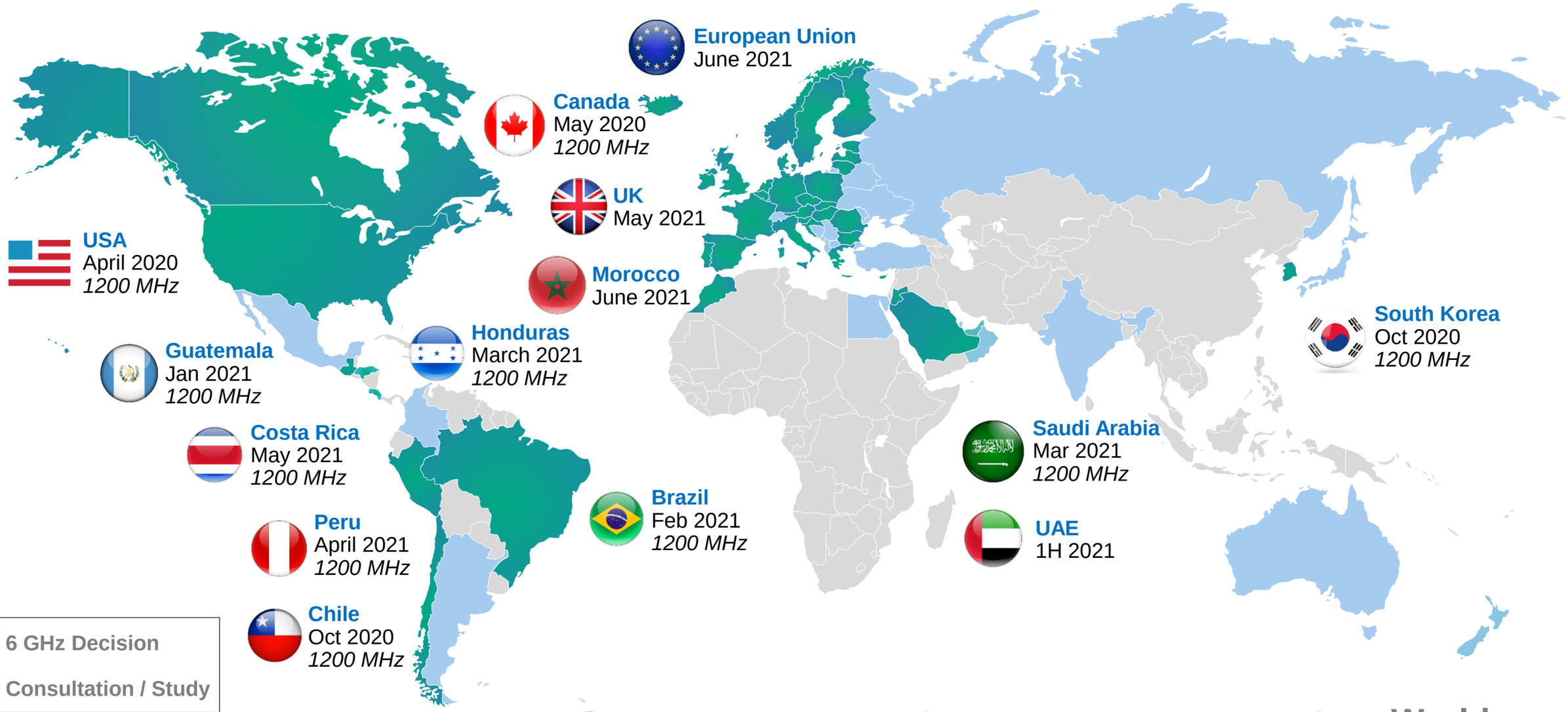
WI-FI 6 EXTENDED

MORE CAPACITY
WIDER CHANNELS
CONTIGUOUS SPECTRUM
LESS INTERFERENCE

	European Model	Americas Model
20 MHz	24	58
40 MHz	12	29
80 MHz	6	14
160 MHz	3	7



Powerful 6 GHz Global Momentum



42 Countries *As of 7 July 2021*

1.3B Citizens

17% World Population

https://www.wi-fi.org/countries-enabling-wi-fi-6e

Redundancy and high throughput

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Redundancy in Wi-Fi environment

- Typically we start thinking about redudancy when there is a failure

- In most cases redundant solution will include
  - redudant controllers,
  - redundant Internet links,
  - redundant connection between controllers and wired network

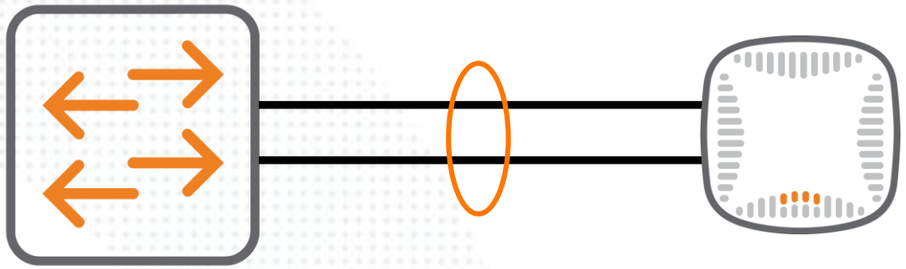
- There are customers and scenarios where Wi-Fi coverage has critical importance such as :
  - Warehouses
  - Conference halls
  - TV Studios
  - Hospitals
  - IoT environment (door locks…)
  - Etc.

- Can we do something more regarding access layer ? Can we increase overall availability of Wi-Fi systems ?

Trends - Speed

Speed of wired interface

- With introduction of newer higher end APs (555/635) 1Gbps speed of wired interface is becoming bottleneck
- This can be address in few ways:
  - By introducing Multi Rate Ethernet (2.5/5 Gbps/10Gbps)
  - By aggregating multiple wired interfaces (LACP)



Band	Channel bandwidth	Peak data rate
6GHz	160MHz	4.8Gbps
5GHz	80MHz	2.4Gbps
2.4GHz	20MHz	574Mbps
Total		**7.8Gbps**

Source: Aruba 655 datasheet

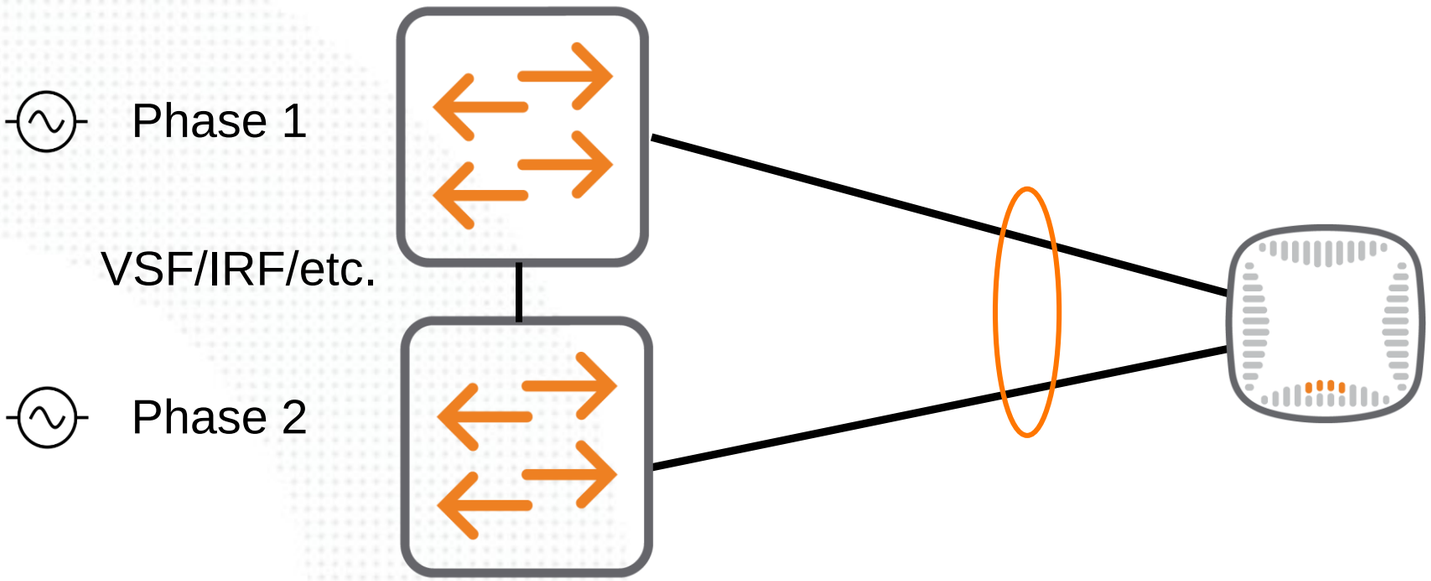
Trends – PoE source redundancy

Dual PoE

- Higher end APs can be powered by two power sources simultaneously
- This protects from failures of power source (phase), Access Switch and cabling

Still, both links can be used for increased throughput using LACP (2x1Gbps, 2x2.5Gbps)
Switches needs to support true stacking.

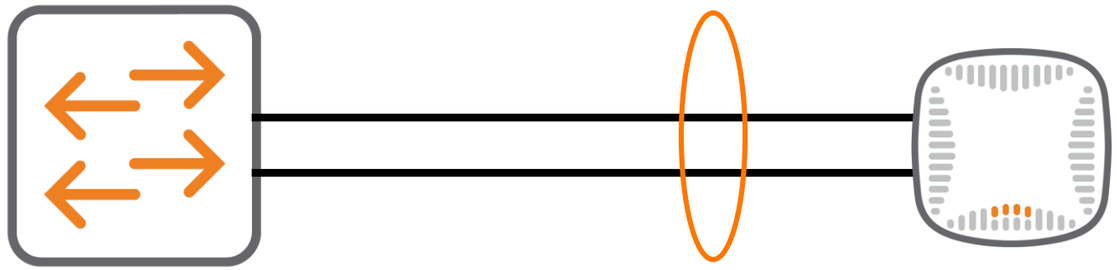
AP operation can be uninterrupted in case or failure of one PoE source or would result in reboot – depending on AP capabilities.



Use cases:
- warehouses
- conference rooms
- VIP rooms etc.

Trends – High power PoE

- 802.3af (15.4W), 802.3at (30/25.5W), 802.3bt (60/51W).
- There is a wave of devices supporting 802.3bt (High end APs, LED lights etc.).
- High power PoE can be also achieved by dual 802.3at - but at the cost of redundancy (e.g. AP555).

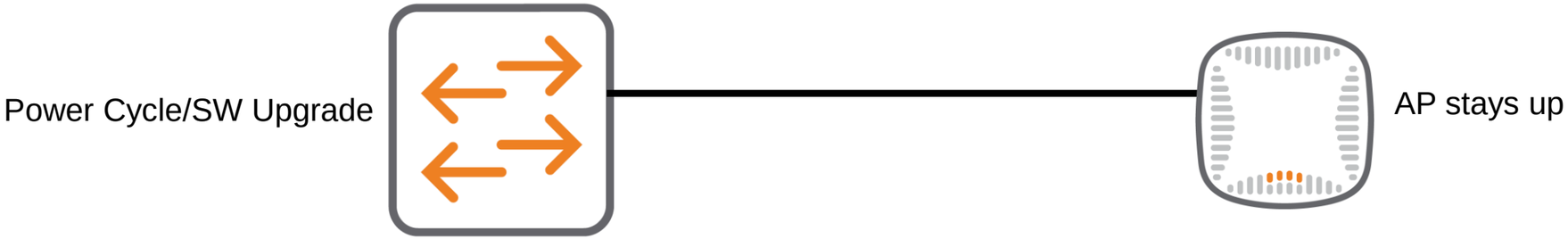


- Operating the AP with an 802.3af (class 3 or lower) POE source is not supported.
- Maximum (worst-case) power consumption (dual-radio operation):
  - DC powered: 32.6W
  - POE powered (802.3bt or dual 802.3at): 38.2W
  - POE powered (802.3at, IPM disabled): 25.1W
  - All numbers above are without an external USB device connected. When sourcing the full 5W power budget to such a device, the incremental (worst-case) power consumption for the AP is up to 6.0W (POE powered) or 5.4W (DC powered).

Source: Aruba 555 datasheet

Trends – Always on PoE

- Typically – when switch is rebooted or connected to power source – PoE is enabled on port after switch is fully booted and configuration loaded
- If AP is connected to switch, it could also take few minutes for AP to boot – this will introduce additional delay in service operation.
- Depending on switch platform and size this can take from 2 to even 10 minutes
- Always-on PoE allows PoE power to continue to be delivered on the switch during upgrades so IoT devices, access points can stay powered on all the time



Powe consumption and number/speed of ports

	AP 505	AP 503/5H	AP 515	AP 535	AP555	AP565	AP575	AP585
Max PoE requirements	11.0W / 16.5W	12W / 50W (505H)	20.8W	30W	38.2W	15.6W	25.6W	49.5W
Number / speed of ports	1x 1Gbs	1x 1/2.5Gbs	1x 1/2.5Gbs 1x 1Gbs	2x 1/2.5/5Gbs	2x 1/2.5/5Gbs	1x 1Gbs	1x 1/2.5Gbs 1x 1Gbs	1x 1/2.5/5Gbs 1x 10Gb SPF+ 1x 1Gbs
Redundant PoE ports	x	x	x	yes	yes	x	x	x
LACP support	x	x	yes	yes	yes	x	yes	x

	AP 615	AP 635	AP 655
Max PoE requirements	14.7W	29.4W	40.3W
Number / speed of ports	1x 2.5Gbs	2x 1/2.5Gbs	2x 1/2.5/5Gbs
Redundant PoE ports	x	yes*	yes
LACP support	x	yes	yes

*no combining of PoW power source -> active/standby

IoT

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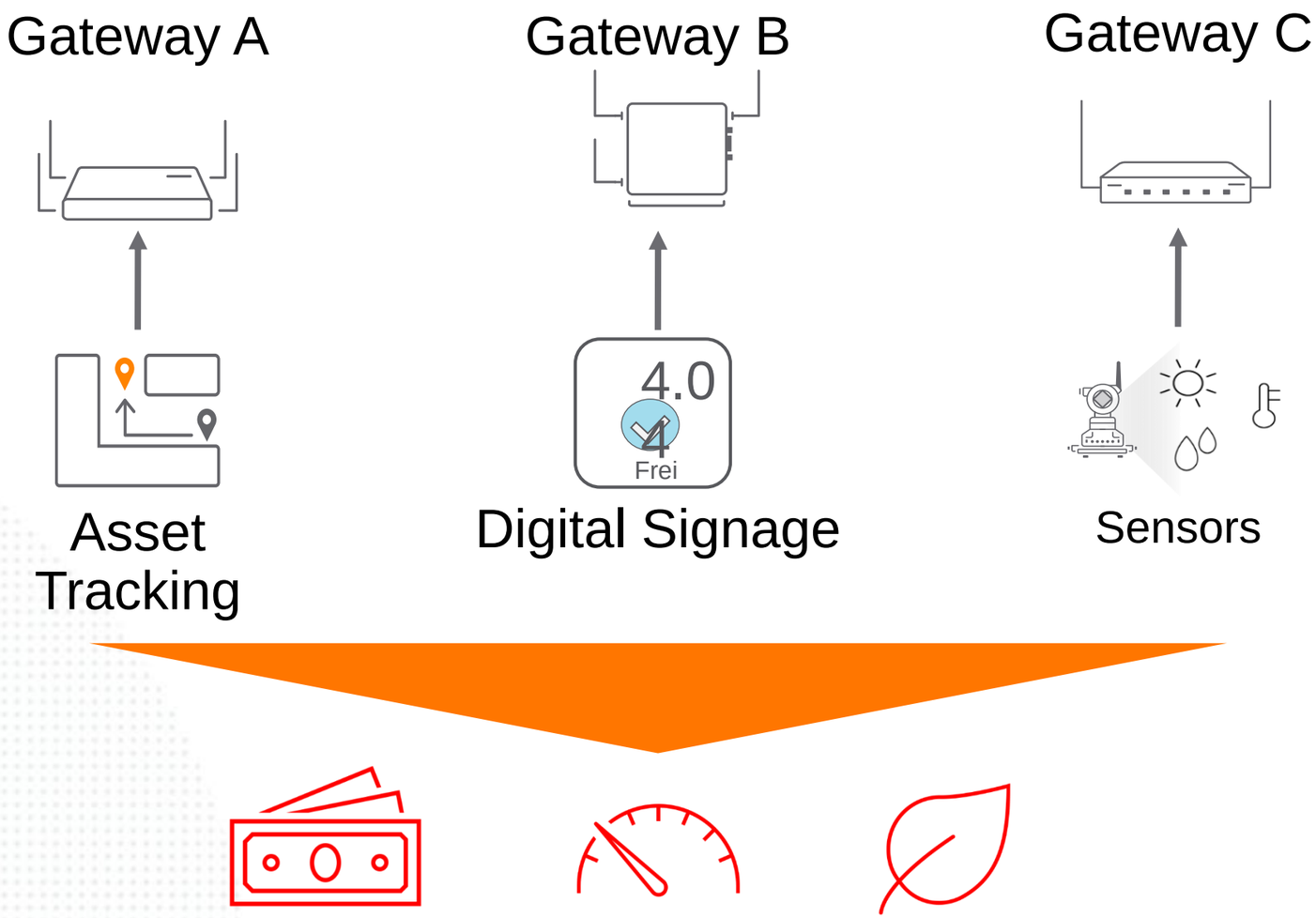
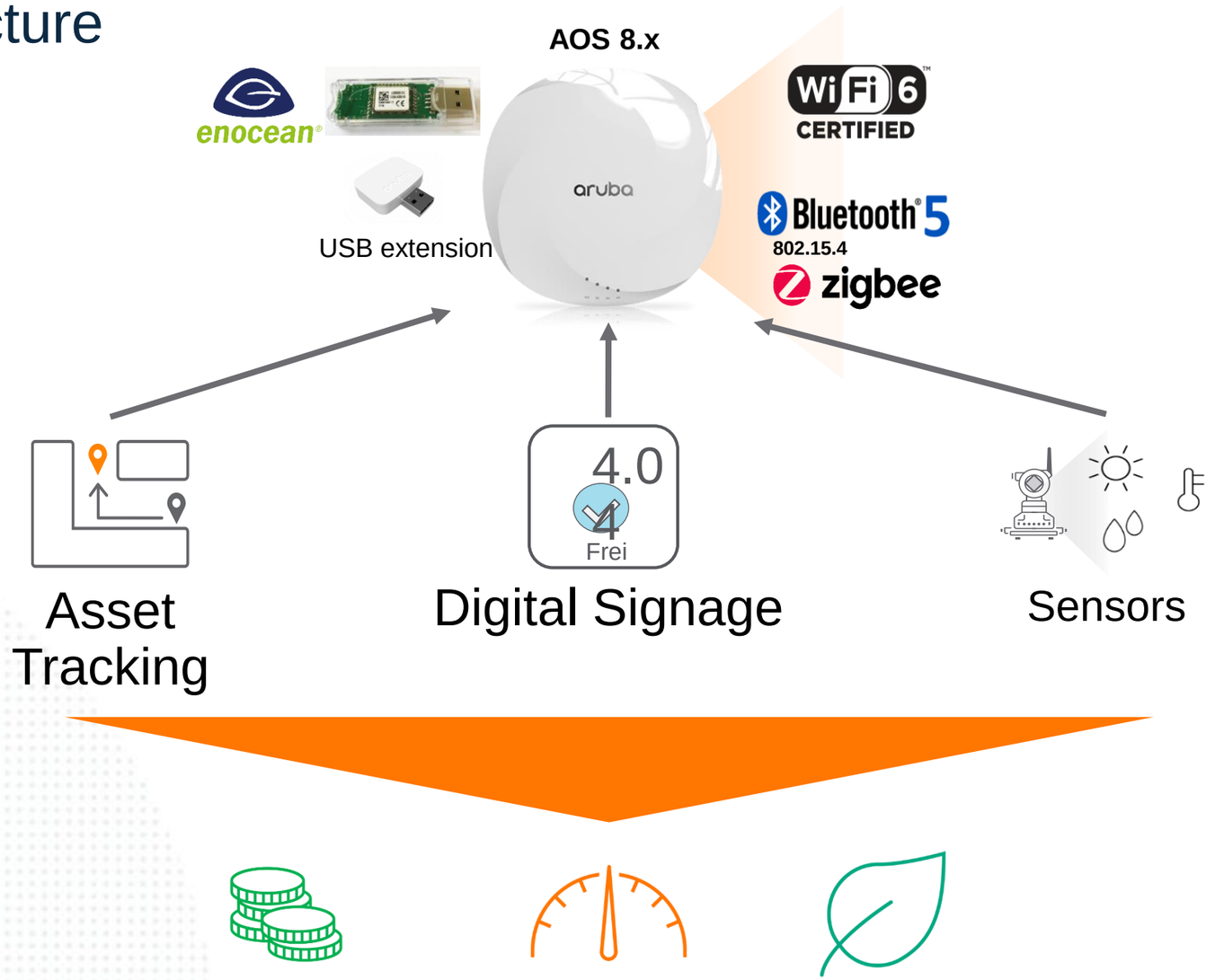
Challenges of IoT connectivity

Parallel infrastructures



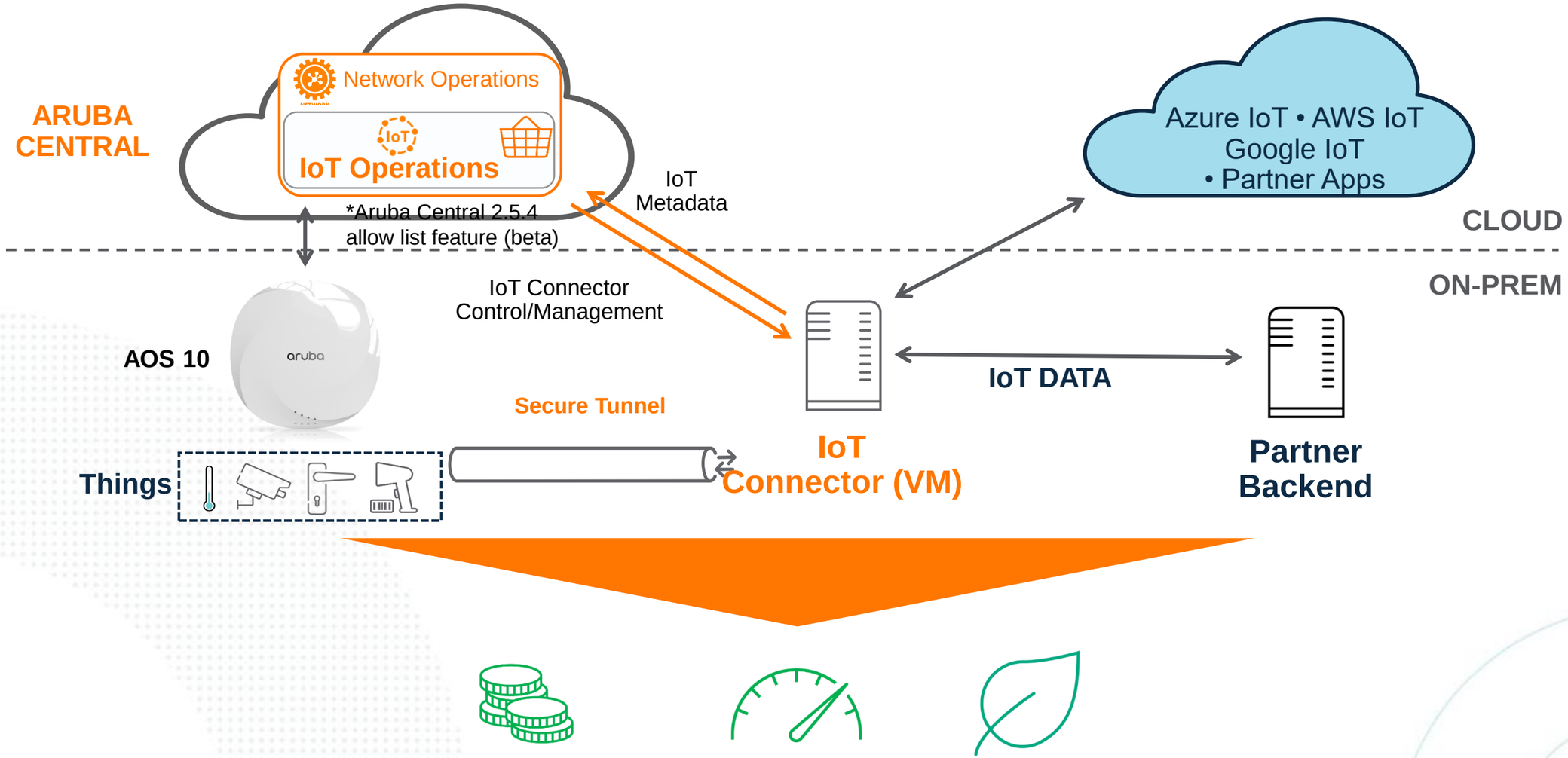
Aruba Access Point as the connectivity platform

Unified Infrastructure



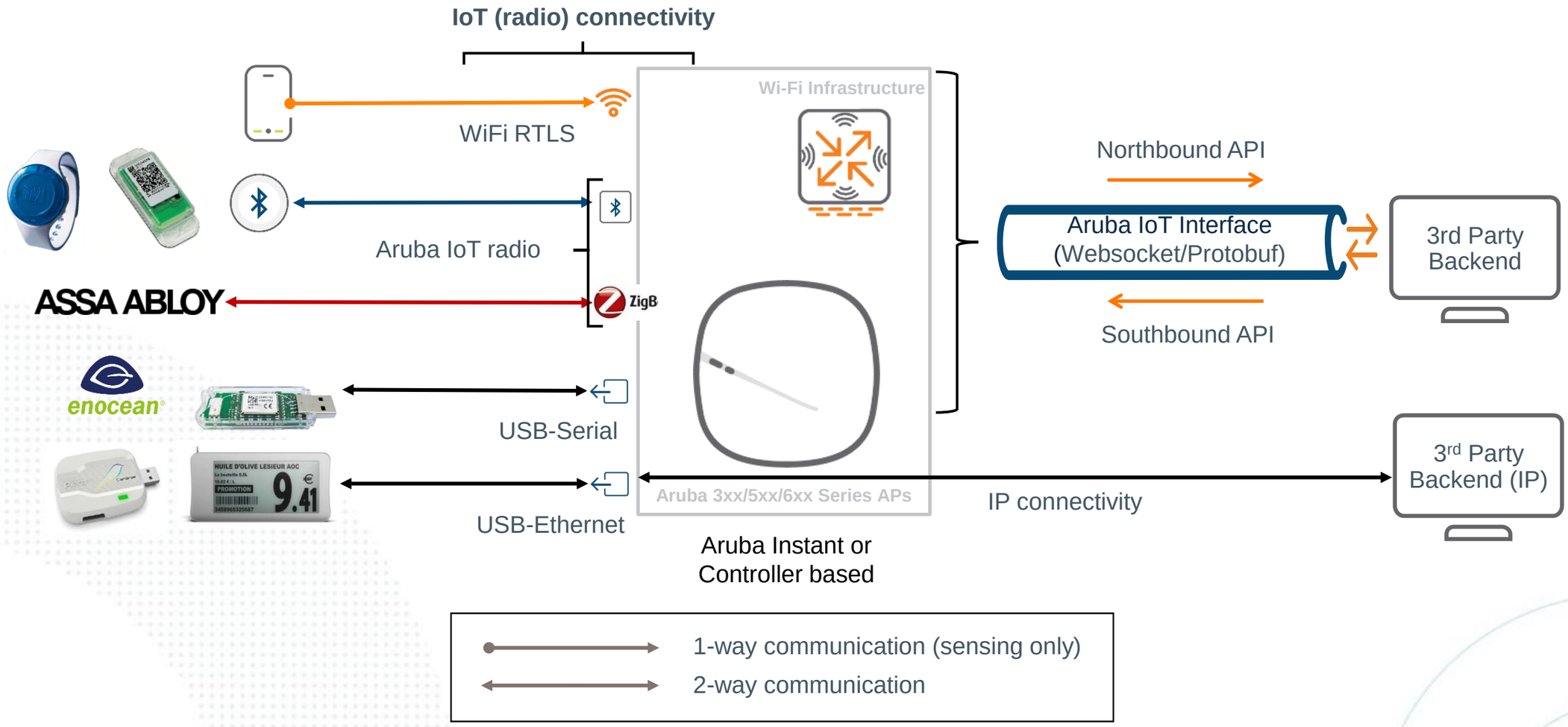
IoT Operations – AOS 10

Connectivity as a Service



Aruba IoT architecture – AOS 8.6 or higher

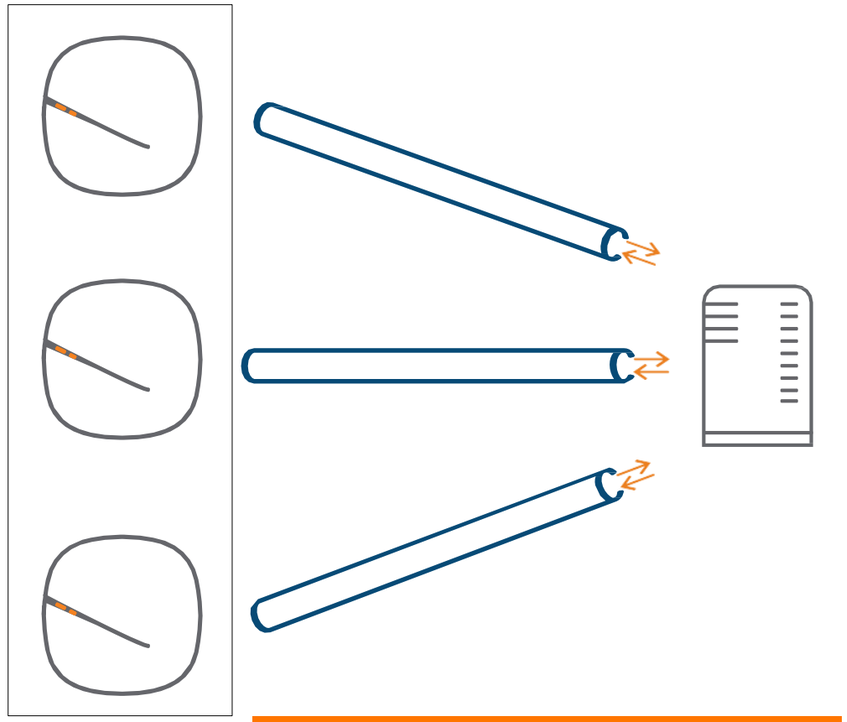
Connectivity as a Service



Aruba IoT server interface

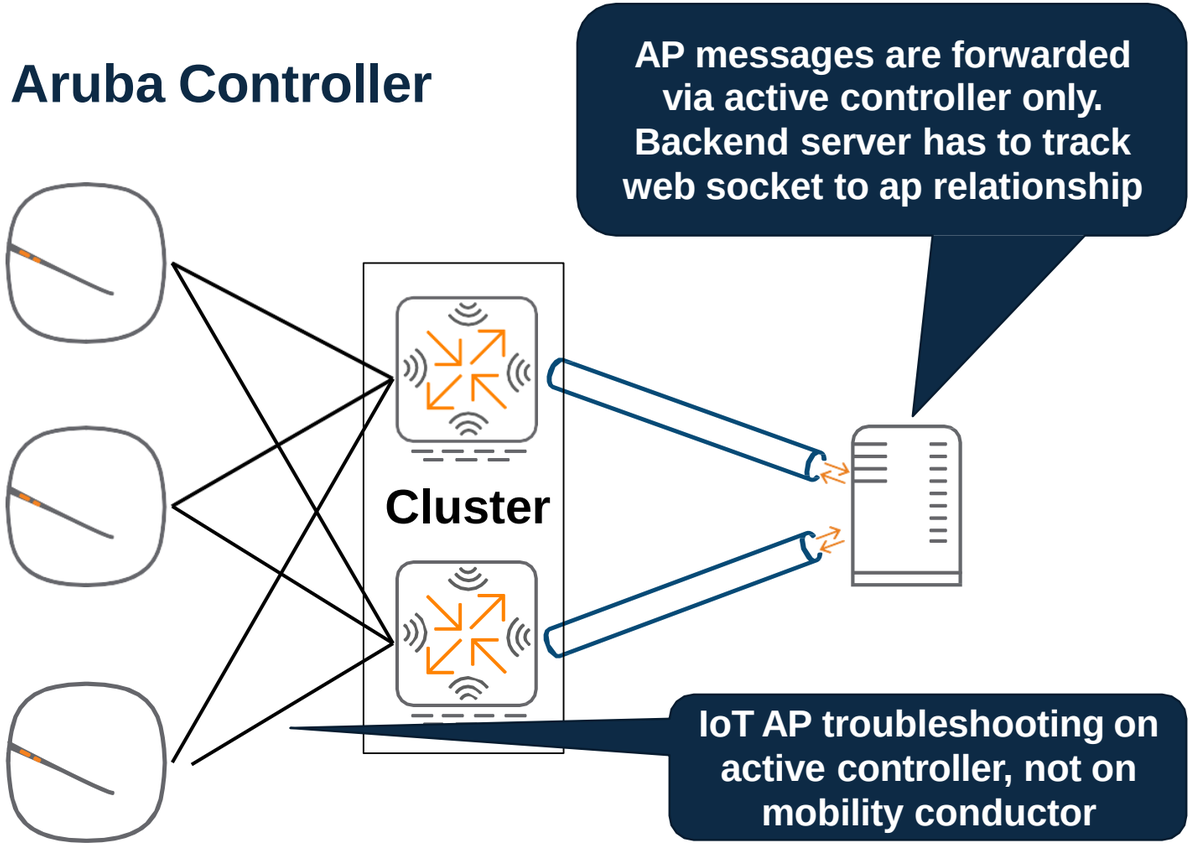
IoT connection management

Aruba Instant



Number ws connections = Number of APs

Aruba Controller

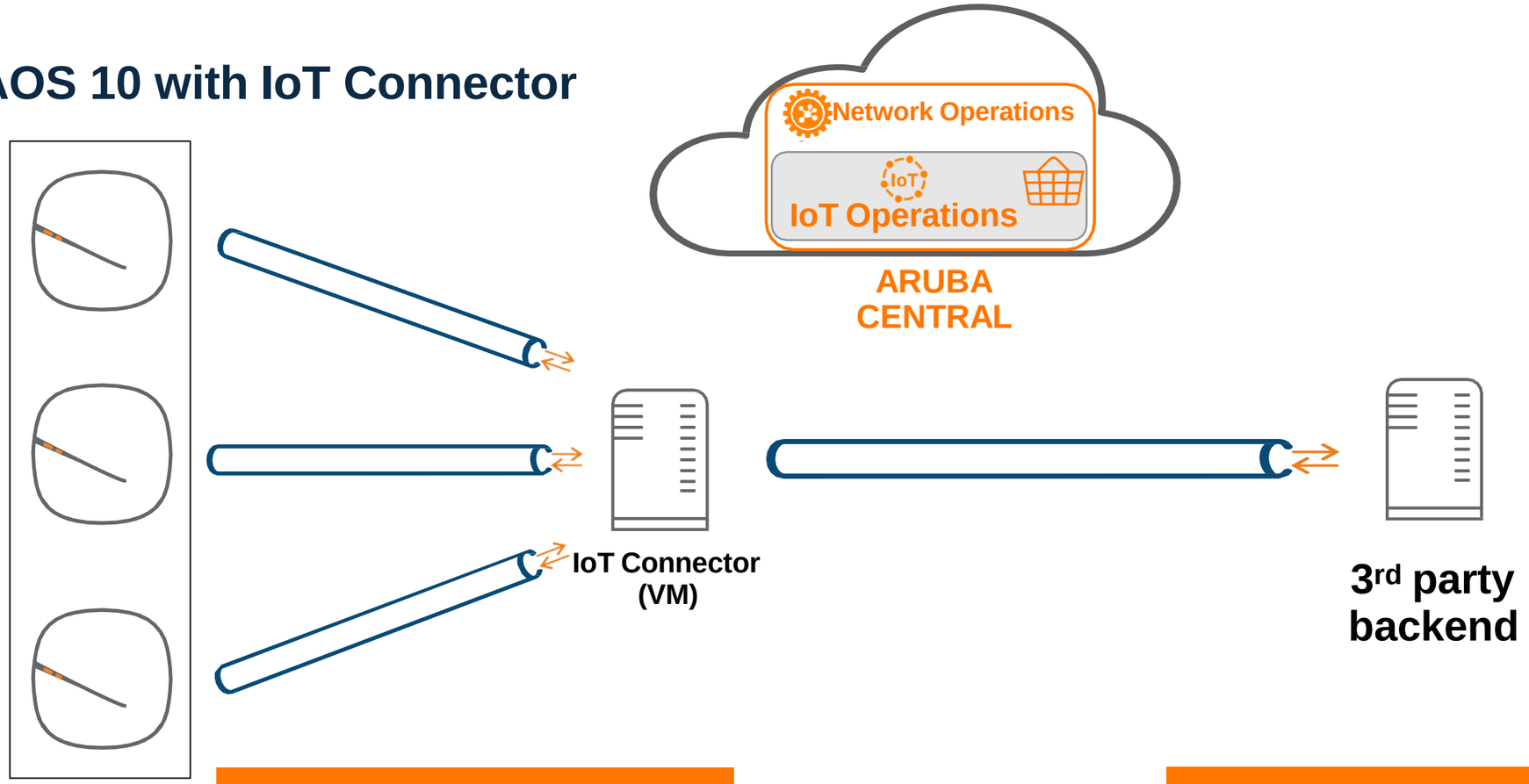


Number ws connections = Number of controllers

Aruba IoT server interface

IoT connection management

AOS 10 with IoT Connector



Number ws connections to IoT connector = Number of APs

Number ws connections = Number of IoT Connectors

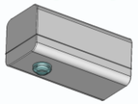
SMART SPACES

Smart Workplace (Room Booking, Desk Sharing, Space Utilization)

25% space savings usually by shared desks

Room Occupancy, People Activity

Desk Utilization



People Counting

Desk / Room Status

Energy Saving

Up to 30% energy savings by single room control

Heating Valve (thermal powered)

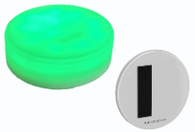
Presence & Window Status

Room Thermostat

Switching, Dimming & Power Measurement

Health & Cleaning

15% higher employee productivity by healthy environment



Air Quality: CO2, VOC, Noise

Utilization of Room/Table/Device

Dispenser Level

Service Call

PEOPLE COUNTING

Benefit & Devices

No cables needed (ideal for retrofit, no cabling cost),
No issues regarding the European GDPR (no camera used)

Desk Utilization
(desk or chair mounted)

Multisensor
(Vibration / T / rH / Lux)

Activity Sensor
(ceiling mounted)

# of movements per time
(passive infrared)

People Counting
(door mounted)

# of door activations
(contact switch)

People Counting
(entrance)

# of people passing
(in and out)

SMART CLEANING

Benefit & Devices

Service transparency, **20%** cost savings (demand oriented cleaning)

Source: https://www.thing-it.com/

Office Rooms / Lounges

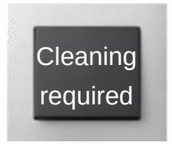
People activity

Table / device utilization

Door status / people count

Restrooms / Washrooms

People count



Service button

Status sign (cleaning needed)

ENERGY SAVING

Benefit & Devices

Up to **30%** energy saving via single room control *)

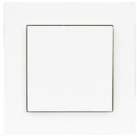
Heating valve controler (thermal powered)

Smart Metering & Switching Plug

Thermostat

Presence detection

Window status



Switch

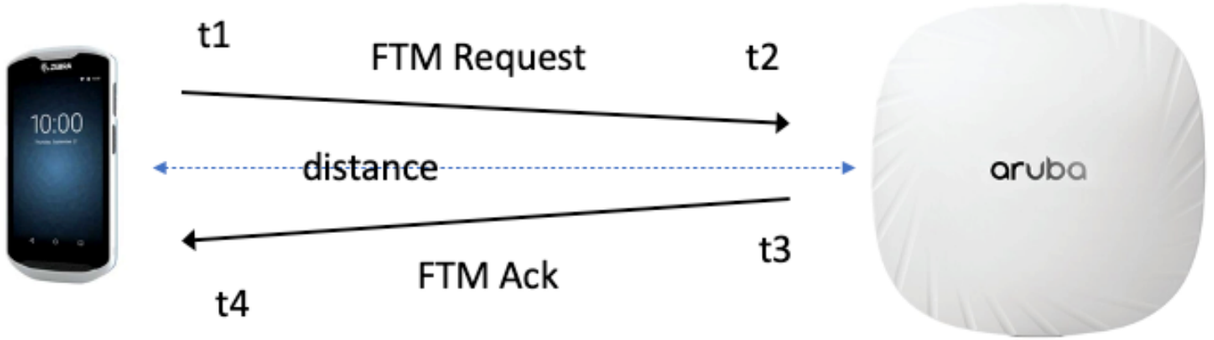
Use Cases:

- Room heating automation based on automatic heating plans per room and day of week
- Heating inactivation when windows are open or no human activity is detected in the room
- Automated lighting
- Smart Meter visualization and data analysis
- Security monitoring

*) Source: https://iolite.de/en/projects/lp16_en.html

802.11mc Location Using RTT (Round Trip Time)

- Aruba and Zebra are the first to support 802.11mc Wi-Fi based location in the enterprise
- Initial joint support in Feb 2021
- boosting accuracy to within 1-2 meters
- ArubaOS 8.8 will include support for the complete line of Aruba Wi-Fi 6 APs

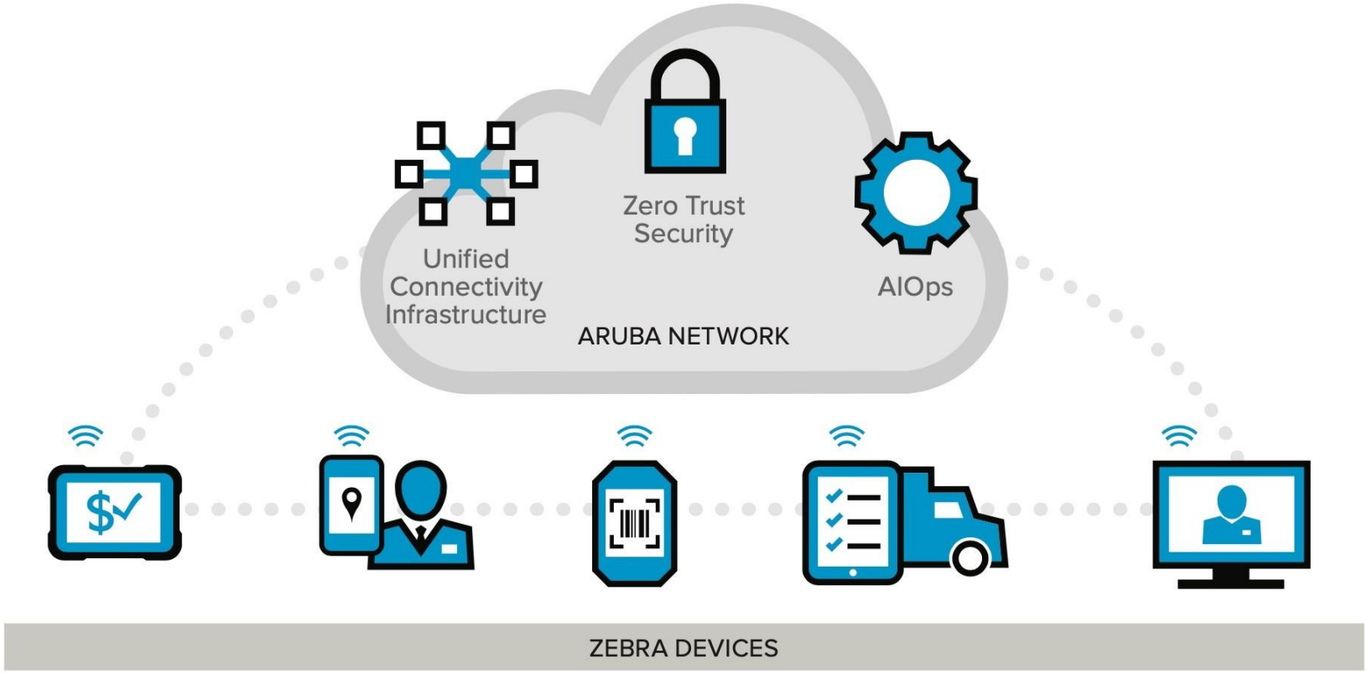


time = (t4-t1)-(t3-t2)
distance = c * (time / 2)

Blog: bit.ly/aruba-80211mc

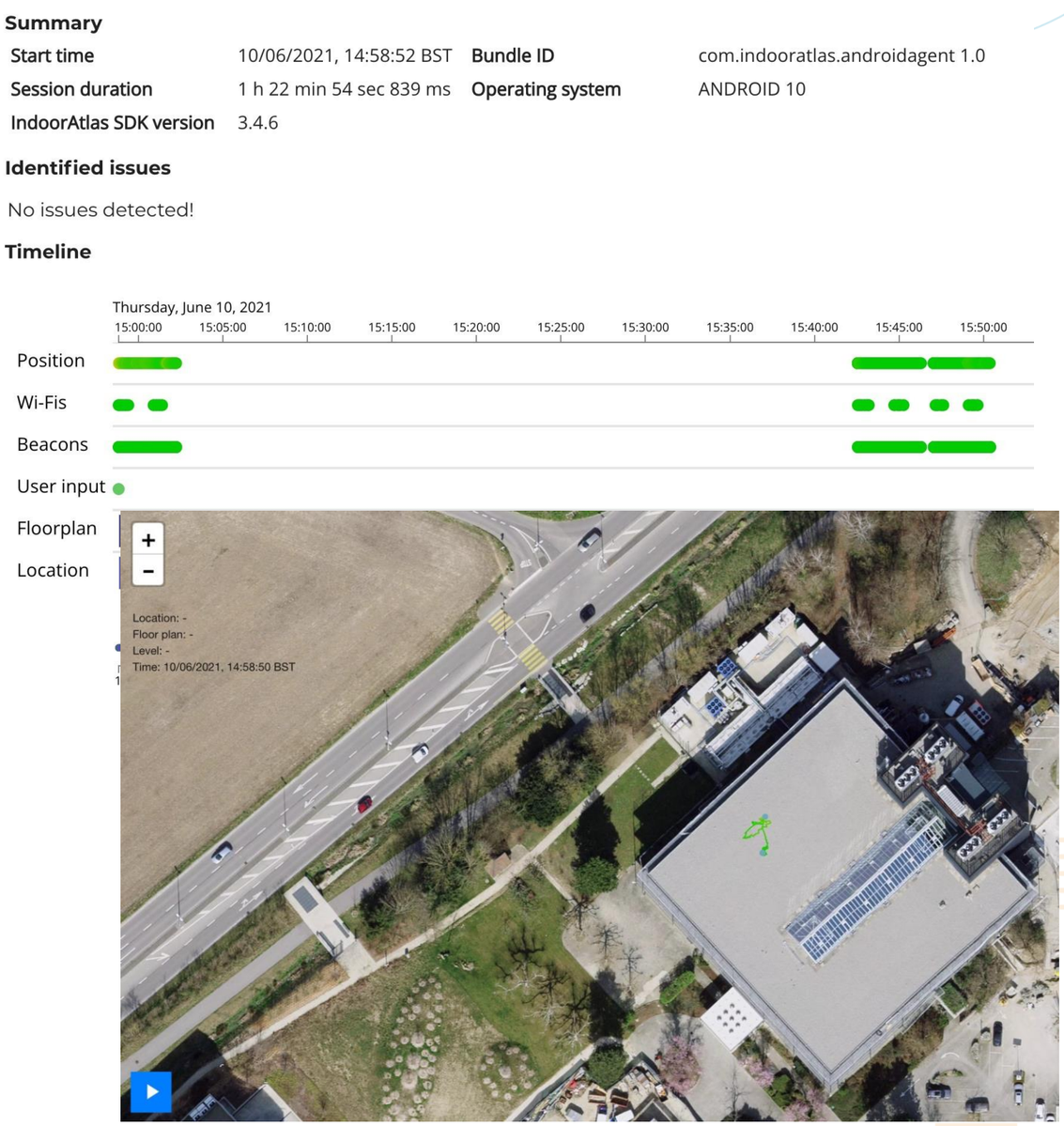
Zebra Integration

- **The integrated Zebra and Aruba solution allows retailers to precisely pinpoint the location of a mobile device or wireless IoT sensor within one to two meters. With this increased accuracy, retailers can improve staff management and create more personalized shopper experiences for every customer on every visit. And on the fulfillment side, 802.11mc enables warehouse and fulfillment center managers to quickly and cost-effectively pinpoint the presence of workers and redeploy them based on real-time needs.**



Zebra Device Tracking with Indoor Atlas

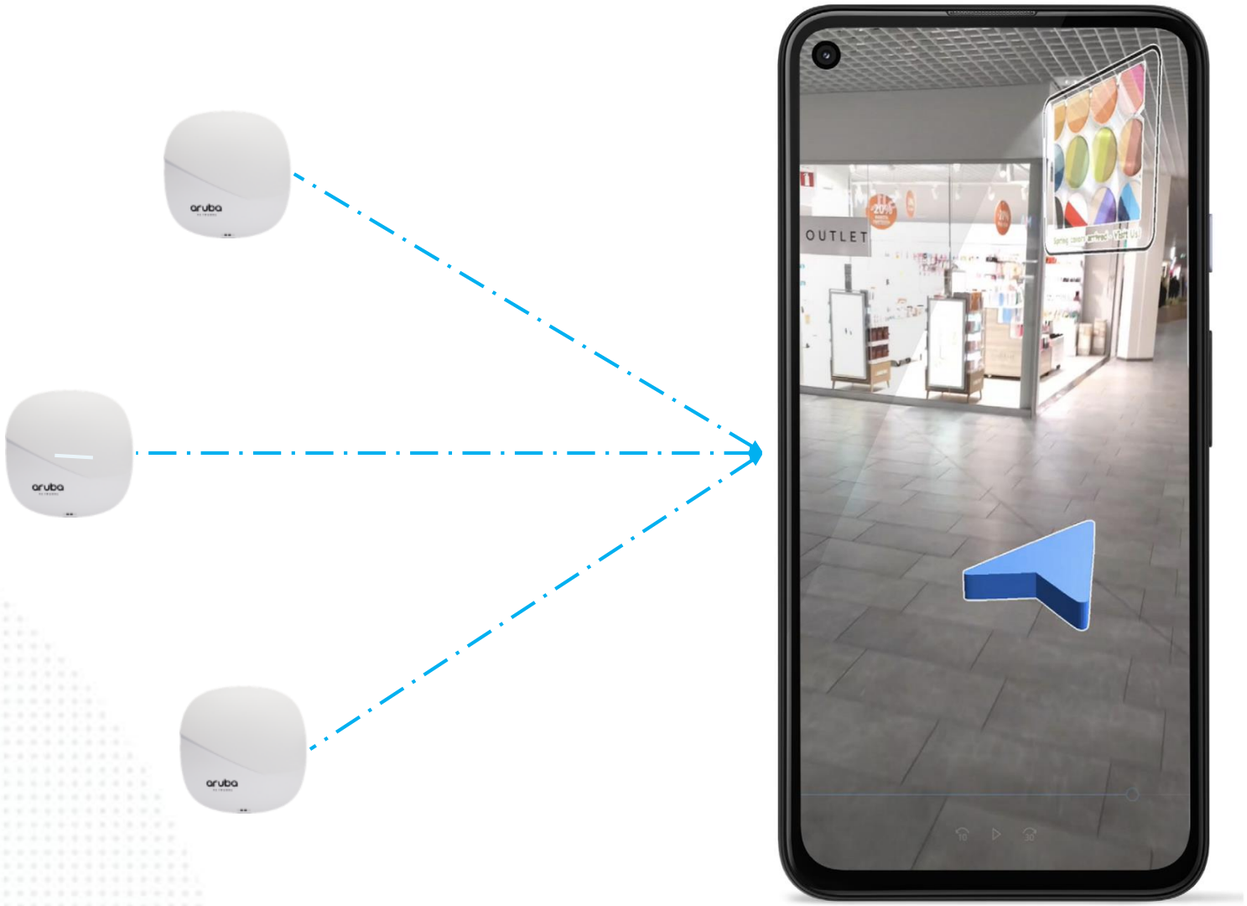
- **Uses Wifi6 Aruba APs to triangulate and track Zebra devices.**
- **Find lost customer Scan & Shop devices, back end operational TC52 or logistic devices.**
- **See Wifi, BLE, GPS and user input tracing.**
- **Playback the entire weeks device routing on a map.**



Bluetooth Low Energy (BLE) Solutions

Use Case: Indoor Navigation

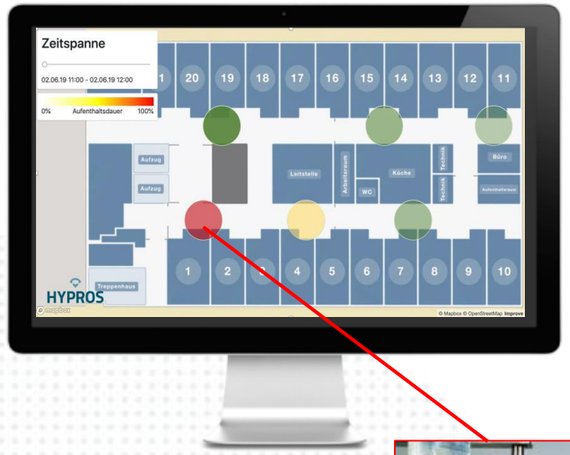
How it works



IoT use case: Asset Tracking

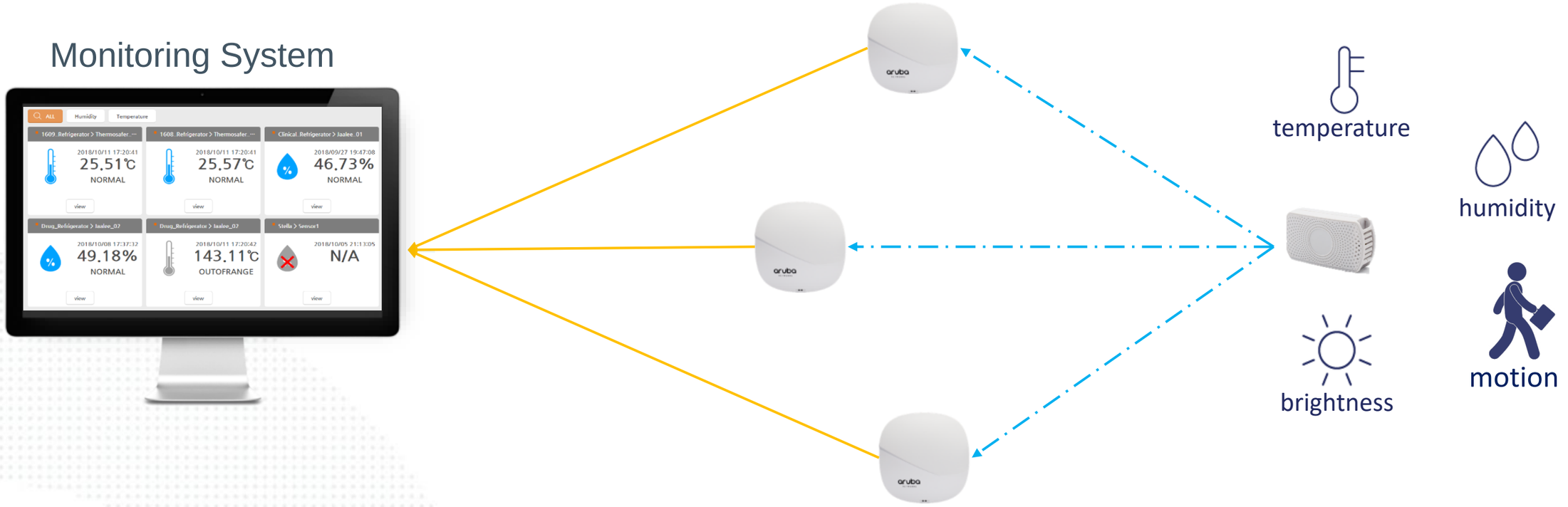
How it works

Location Engine
Asset Management System



IoT use case: Sensor Monitoring

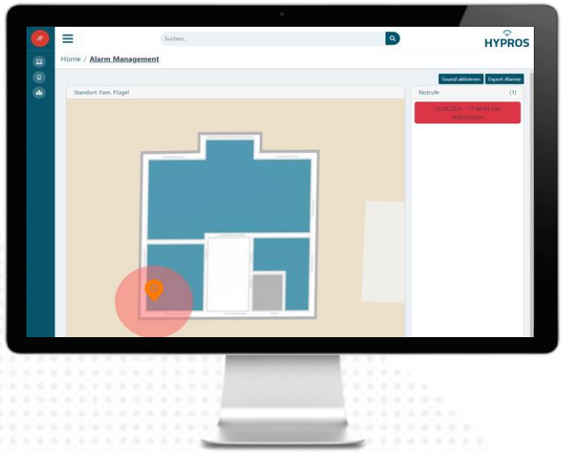
How it works

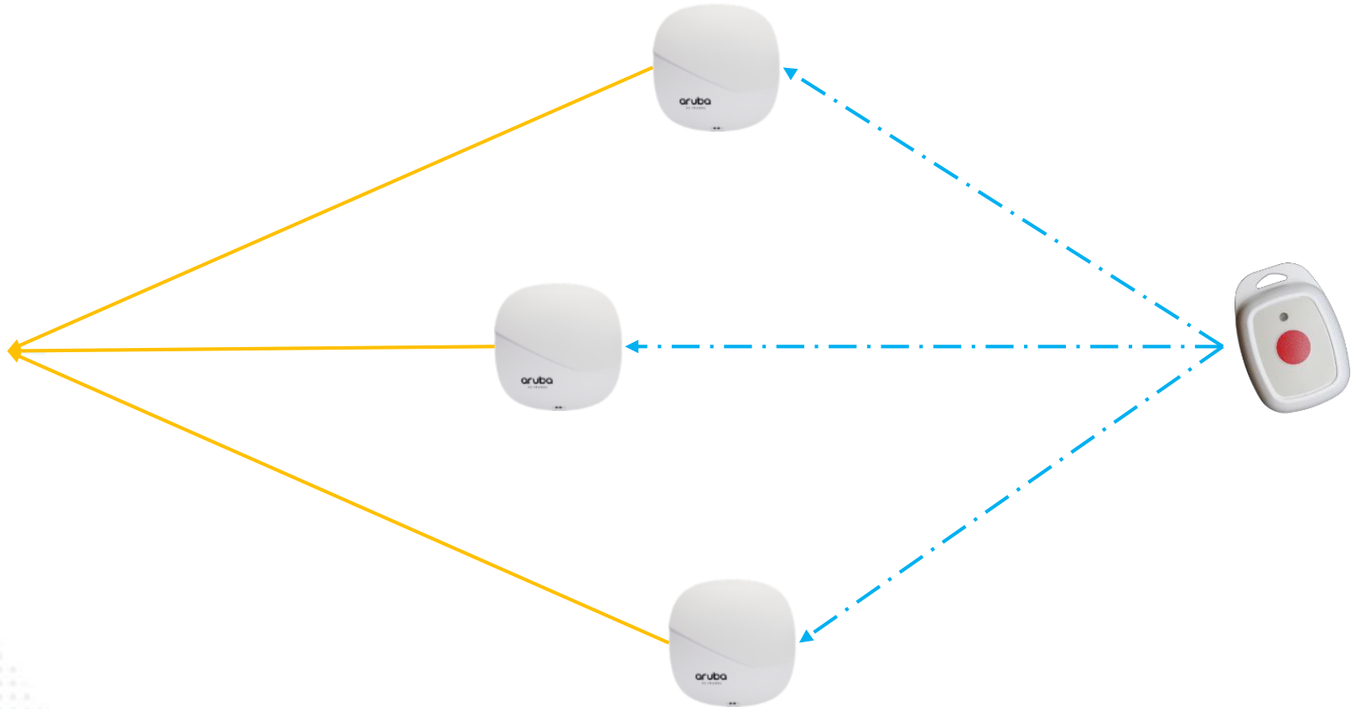


IoT use case: Alarming

How it works

Alarm Management System





Energy Harvesting

The secret ingredient

Ideal For Retrofit

Maintenance Free

Kinetic Energy

Electrodynamic generator

Solar Energy

Module with energy store

Thermal Energy

Energy via temperature differences

Magnetic Field Energy

The World Leader In Energy Harvesting

EnOcean
Self-powered IoT

- Self-powered IoT solutions
- Standardized wireless protocols
- Millions of products shipped
- Worldwide activity
- Over 100 patents

Aruba and EnOcean – A strategic partnership

Combining core technologies for easy to deploy IoT projects

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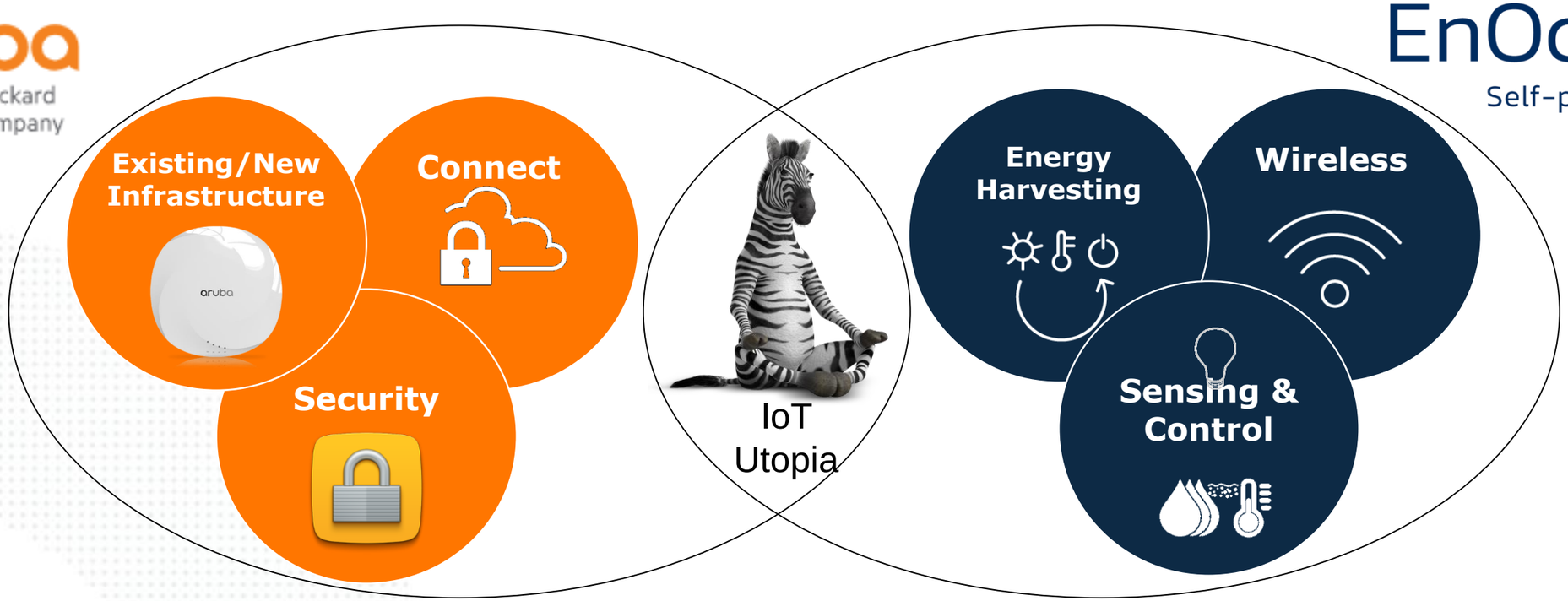


EnOcean
Self-powered IoT

- Energy harvesting sensors do the work without batteries
- EnOcean Sensors provide data that cloud services demand
- Aruba access points eliminate the challenge of installing separate gateways

Aruba Access Points as Area Radio

EnOcean
Self-powered IoT

PIR

People Activity Counter

Window Contact

Multisensor

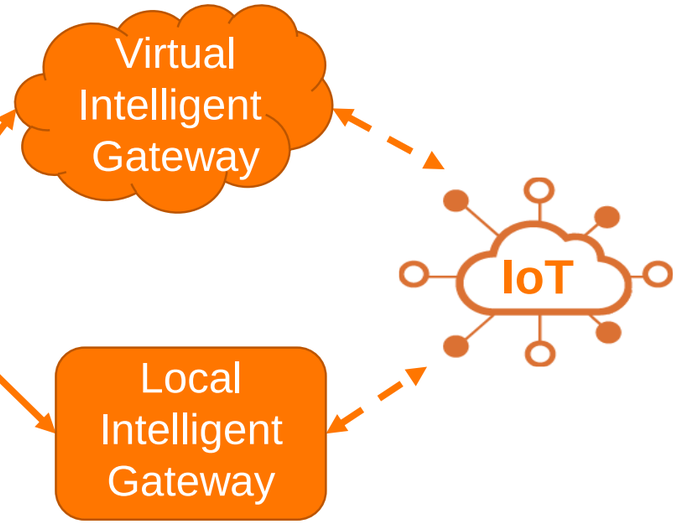
Light Switch

Temp/ Humidity

EnOcean USB300/500x

Aruba Access Point

Minimum SW versions: AOS/Instant: 8.7.0.0



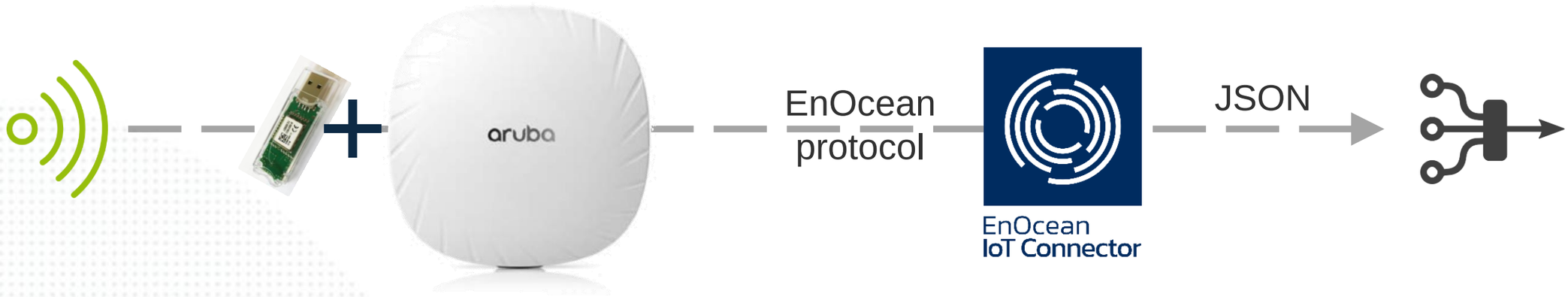
enocean alliance
Building Smarter Connectivity

1000's of sensors are also available from manufacturers in the EnOcean Alliance

EnOcean IoT Connector

Achieve lowest connectivity cost

EnOcean
Self-powered IoT



Aruba IoT Partner Solutions

https://www.arubanetworks.com/partners/programs/partner-finder/

Aruba WiFi 6E

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610/630/650 Series Campus Access Points

High-end Wi-Fi 6E 802.11ax tri-radio

610 Series Campus Access Points

Some key specifications

- Wi-Fi Radio Specifications
  - Dual-radio, configured to support any two out of three concurrently:
    - 6GHz radio (5.850 – 7.125 GHz): 2x2 MIMO, 20/40/80/160MHz, 802.11ax. **Peak datarate: 2.4Gbps**
    - 5GHz radio (5.150 – 5.895 GHz)*: 2x2 MIMO, 20/40/80MHz, 802.11a/n/ac/ax. Peak datarate: 1.2Gbps
    - 2.4GHz radio (2.400 – 2.4835 GHz): 2x2 MIMO, 20/40MHz, 802.b/g/n/ax. Peak datarate: 287Mbps (574Mbps @ 40MHz)
  - Aggregate peak datarate: **3.6Gbps when configured for 5GHz + 6GHz operations**
  - Up to 512 associated clients per radio (hard limit; 100 limit for active clients recommended)
  - Max number of 802.11ax OFDMA Resource Units: 8 (37 for 6GHz)
  - **Up to 16 BSSIDs per radio** (4 only for 6GHz initially*)
  - Transmit power up to 18dBm, receive sensitivity down to -95dBm (conducted per chain)
  - **No MU-MIMO enabled** (no added value on 2x2 radios)
- Ethernet (E0): 2.5Gbps Smart Rate port with POE support
  - **Maximum power consumption (excluding USB): 12.5W (DC) or 14.7W (POE)**
    - **Maximum consumption when idle: 5.6W (DC) or 6.9W (POE)**

* The U-NII-4 5GHz band is disabled (only) when AP-615 is configured for 5GHz + 6GHz operation

610 Series Campus Access Points

Some key specifications

Deep-sleep mode support for Green AP system feature
- Max power consumption in deep-sleep: 1.0W (DC) or 1.8W (POE)

– E0: Smart Rate Ethernet port
- 100Mbps, 1Gbps and 2.5Gbps link speeds
- 802.3af (class 3) and 802.3at (class 4) support

– Other Platform Specifications
- Integrated BLE5.0 & 802.15.4 (Zigbee) radio, for locationing, IOT
- Integrated GNSS (GPS) receiver and support for 802.11mc FTM to support Aruba's self-locating AP capability

610 Series Campus Access Points

Flex Dual Radio

610 Series Campus Access Points

Tri-band coverage using the Aruba AP-615 dual-radio AP

- The “**Any-Two-Out-Of-Three**” radios of the AP-615 can be configured in three modes:
  - 2.4GHz + 5GHz coverage, 2.4GHz + 6GHz coverage, 5GHz + 6GHz coverage
  - Either or both radios can be configured to operate in any of the typical operating modes (access, monitor, mesh)

- A single AP-615 cannot deliver concurrent tri-band coverage, but a set of them can
  - In a typical enterprise deployment, AP density is driven by capacity, and there’s lots of overlapping coverage
  - Typically, the signal form the “next AP over” is still excellent and good enough to ensure a connection at a high MCS rate
  - **AP-615 takes advantage of that. By sacrificing a bit of total system capacity, it delivers a compact, low-power, low-cost 6E AP platform**

- **Configuration of AP-615 mode of operation can be done manually, or by relying on Aruba AirMatch**
  - Manual configuration is only practical for very small systems or if tri-band coverage is not needed (2.4GHz or 6GHz band disabled throughout the system)
  - Rely on AirMatch to optimize each AP-615 config for local conditions and coverage from surrounding APs

630 Series Campus Access Points

Some key specifications

Wi-Fi Radio Specifications

- 6GHz radio: 2x2 MIMO, 20/40/80/160MHz, 802.11ax. **Peak datarate: 2.4Gbps** (2.9Gbps with 4096-QAM)
- 5GHz radio: 2x2 MIMO, 20/40/80MHz, 802.11a/n/ac/ax. Peak datarate: 1.2Gbps
- 2.4GHz radio: 2x2 MIMO, 20/40MHz, 802.b/g/n/ax. Peak datarate: 287Mbps (574Mbps @ 40MHz)
- **Aggregate peak datarate: 3.9Gbps**
- **Up to 512 associated clients per radio (hard limit; 100 limit for active clients recommended)**
- Max number of 802.11ax OFDMA Resource Units: 8
- Up to 16 BSSIDs per radio (4 only for 6GHz initially)
- Transmit power up to 18dBm, receive sensitivity down to -92dBm (conducted per chain)
- **No MU-MIMO (limited/no added value on 2x2 radios)**

Ethernet: two 2.5Gbps Smart Rate ports (E0, E1) Power options: DC power 12Vdc or POE power (802.3at / 802.3bt)

- **Maximum power consumption (excluding USB): 20.7W (DC) or 23.8W (POE)**
  - **Maximum consumption when idle: 8.7W (DC) or 11.7W (POE)**

Ethernet: two 2.5Gbps Smart Rate ports (E0, E1)

- **Both support POE (active/standby)**

650 Series Campus Access Points

Some key specifications

- Wi-Fi Radio Specifications
  - 6GHz radio: 4x4 MIMO, 20/40/80/160MHz, 802.11ax. **Peak datarate: 4.8Gbps**
  - 5GHz radio: 4x4 MIMO, 20/40/80MHz, 802.11a/n/ac/ax. Peak datarate: 2.4Gbps
  - 2.4GHz radio: 4x4 MIMO, 20/40MHz, 802.b/g/n/ax. Peak datarate: 574Mbps (1,147Mbps @ 40MHz)
  - Aggregate peak datarate: 7.8Gbps
  - **Up to 1024 associated clients per radio (hard limit; 150 limit for active clients recommended)**
  - Max number of 802.11ax OFDMA Resource Units: 37
  - Up to 16 BSSIDs per radio (4 only for 6GHz initially*)
  - Transmit power up to 18dBm, receive sensitivity down to -92dBm (conducted per chain)
    - Excludes MIMO/MRC gain (3dB), antenna gain
  - **Both down- and uplink MU-MIMO**
- Power options: DC power 12Vdc or POE power (802.3af / 802.3at / 802.3bt*)
  - **Maximum power consumption (excluding USB): 36.0W (DC) or 40.3W (POE)**
    - **Maximum consumption when idle: 14.3W (DC) or 16.9W (POE)**
- **Ethernet: two 5Gbps Smart Rate ports (E0, E1)**
  - **Both support POE (active/active)**

Aruba WiFi Solutions

aruba
a Hewlett Packard Enterprise company

WI-FI 6 & 6E CERTIFIED COMPLETE INDOOR PORTFOLIO

500 Series
Medium-density offices, schools or retail spaces

510 Series
Mid-range campus deployments

530 Series
High-density mobile and IoT deployments

550 Series
Extreme-density mobile and IoT deployments

500H Series
High-performance hospitality, branch and teleworker

610/630/655 Series
1st enterprise-grade Wi-Fi 6E APs

ALL BACKED BY A LIMITED LIFETIME WARRANTY

WI-FI CERTIFIED HARDENED AND OUTDOOR PORTFOLIO

518 Series
Multi-Gigabit
Ruggedized
Indoor/Outdoor

560 Series
Small form factor
Outdoor

560EX Series
Small form factor
HazLoc Certified

570/580 Series
Extreme Density
Outdoor

570EX/580EX Series
Extreme Density
HazLoc Certified

387 Series
Multi-Gigabit
Point to Point
802.11ad

ALL BACKED BY A LIMITED LIFETIME WARRANTY

APS AS AN IOT PLATFORM

No need to add overlay infrastructure to support IoT connectivity requirements

Wi-Fi 6 Radios

802.11ax network access
Asset tracking tags
Personnel location badges
Smart wrist bands with telemetry sensors
Worker safety smart helmets
Sensors, actuators, and smart lighting systems
Bar code scanners and mobile printers

802.15.4/ZigBee Radio

Food safety sensors
Cooking and refrigeration sensors
Heating, air quality, presence, security, panic, call, button, lighting, leak sensors
Load controls and actuators
Door locking and access systems

Bluetooth 5 Radio

Wayfinding and geofencing
Energy harvesting heating, air quality, presence, security, panic call button, lighting, leak sensors
Load controls and actuators
Door locking and access systems
High accuracy industrial and personnel location tags

USB Port

Cellular interfaces
Electronic shelf labels
Gun shot detectors
Retrofit ZigBee interface for existing deployments
Custom interfaces

Aruba InstantON Solutions

aruba
a Hewlett Packard Enterprise company

INSTANT ON END-TO-END NETWORKING SOLUTION CLOUD FEATURE-SET

Single Pane of Glass

Common user experience for Instant On switches and Access Points

Managed Firmware Updates

Automatic distribution/ installation of maintenance software for bug fixes/ security enhancements

Common Workflows

Automatic configuration of VLANs across APs and switches

Topology View

Intuitive map of all Instant On devices deployed in a network

Remote Management

Remote monitoring and management of your network **– 50 devices per site**

aruba Instant On

INTRODUCING THE NEWEST MEMBER TO THE WIRELESS PORTFOLIO

Instant On AP11
2x2:2 802.11ac
Wave 2

Instant On AP12
3x3:3 802.11ac
Wave 2

Instant On AP25
4x4:4 802.11ax

Instant On AP22
2x2:2 802.11ax

Wi Fi 6 CERTIFIED

INDOOR ACCESS POINTS

Instant On AP15
4x4:4 802.11ac Wave 2

Instant On AP11D
Desk/Wall
2x2:2 802.11ac
Wave 2

DESK-MOUNTED ACCESS POINTS

Instant On AP17
2x2:2 802.11ac
Wave 2

OUTDOOR ACCESS POINTS

ARUBA INSTANT ON WIRELESS PORTFOLIO

	AP11	AP12	AP22	AP25	AP15	AP11D	AP17
Ideal deployment	SOHOs, boutiques, retail shops	Medical offices, Cafés, restaurants or boutique hotels	hotels, independent schools*, restaurants, small offices	Gaming, tech start-ups, boutique hotels, professional offices	Animation firms, tech start-ups	Boutique hotels, SOHO, Medical offices	Outdoor cafés, poolside, or open-air restaurants
Peak throughput	867 Mbps in 5 GHz frequency band, 300 Mbps in 2.4 GHz frequency band	1.3 Gbps in 5 GHz frequency band, 300 Mbps in 2.4 GHz frequency band	1.2 Gbps in 5 GHz frequency band, 574 Mbps in 2.4 GHz frequency band	5374 Mbps in 5 GHz frequency band 2.5Gb Ethernet port	1.7 Gbps in 5 GHz frequency band, 300 Mbps in 2.4 GHz frequency band	867 Mbps in 5 GHz frequency band, 300 Mbps in 2.4 GHz frequency band	867 Mbps in 5 GHz frequency band, 300 Mbps in 2.4 GHz frequency band
# Active clients	50	75	75	100+	100	50	50
Mmax worst-case power consumption	10.1W PoE	13W PoE	10.6W PoE	20.1W PoE	14.4 W PoE	10.1W PoE	13.5W PoE
MIMO	2X2	3X3	2X2	4x4	4X4	2X2	2X2
Radios	2.4 Ghz 802.11n (Wi-Fi 4) 5 Ghz 802.11ac (Wi-Fi 5 Wave 2)	2.4 Ghz 802.11n (Wi-Fi 4) 5 Ghz 802.11ac (Wi-Fi 5 Wave 2)	2.4 GHz 802.11ax (Wi-Fi 6) 5 GHz 802.11ax 2x2 (Wi-Fi 6)	2.4 GHz 802.11ax (Wi-Fi 6) 5 GHz 802.11ax 4x4 (Wi-Fi 6)	2.4 Ghz 802.11n (Wi-Fi 4) 5 Ghz 802.11ac (Wi-Fi 5 Wave 2)	2.4 Ghz 802.11n (Wi-Fi 4) 5 Ghz 802.11ac (Wi-Fi 5 Wave 2)	2.4 Ghz 802.11n (Wi-Fi 4) 5 Ghz 802.11ac (Wi-Fi 5 Wave 2)

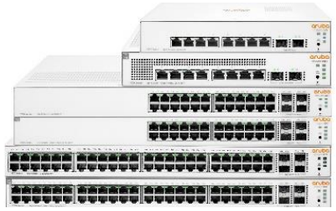
aruba Instant On

Expanding the Small Business Wired Portfolio

Functionality

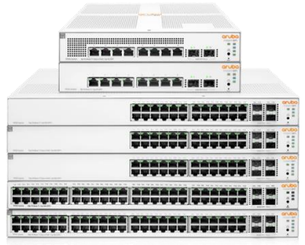
Features

Unmanaged Switch



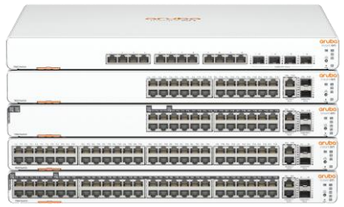
Instant On 1430 Switch Series

Instant On 1830 Switch Series
Cloud Managed and Local Web GUI



Instant On 1930 Switch Series
Cloud Managed and Local Web GUI
10G uplinks

Smart-Managed Switch



Instant On 1960 Switch Series
Class 4 & Class 6 PoE
Stacking
10G Copper and Fiber uplinks / Aggregator
Cloud Managed and Local Web GUI

Smart-Managed, Stackable Switch

aruba Instant On

Aruba Instant On Wired Portfolio

	Aruba Instant On 1960 Switches	Aruba Instant On 1930 Switches	Aruba Instant On 1830 Switches
Port Size	24-/48- port PoE and Non-PoE models, 12-port Aggregator	8-/24-/48- port PoE and Non-PoE models	8-/24-/48- port PoE and Non-PoE models
PoE	**Class 4 and Class 6 PoE support**	**Class 4 PoE support**	**Class 4 PoE support, Partial PoE support (first half of ports support PoE) on PoE models.**
Stacking	**Yes, True Stacking* (local, cloud-managed, Hybrid)**	**No**	**No**
Uplinks	**10GBase-T and SFP+ uplinks**	**SFP+ uplinks**	**SFP uplinks**
Switching	**Light L3 Static Routing**	**Light L3 Static Routing**	**Layer 2**
Advanced features	ACL, DHCP snooping, ARP protection, 802.1X access control, ingress rate limit	ACL, DHCP snooping, ARP protection, 802.1X access control, ingress rate limit	8-port switch can be powered by POE
Use-cases	Growing small businesses looking for 10G connectivity with different wired devices like surveillance cameras, VoIP phones and wireless access points (APs) and high-end servers and storage	Small businesses looking to connect wired devices within their network like wireless APs, printers, surveillance cameras and PoS systems.	Cost-efficient small business environments that require both PoE (power and connectivity to surveillance cameras, access points) and non-PoE support (connectivity to PCs and laptops)
Ideal deployment	Boutique hotels, high-powered tech-startups, small nursing homes, Training facilities.	Small café, retail stores, medical offices, professional offices.	Home offices, retail stores and small professional offices

aruba Instant On

*True Stacking allows for redundancy while simplifying administration. we can also say upto 4H stacking and stacking bandwidth increase to 80G.

Aruba Instant On transceivers

For simplicity and quality insurance

- **Eliminate guesswork** during installations with Instant On branded transceivers
- **Tested and 100% validated** to work with all Instant On switches (1830, 1930 and 1960) and with the following HPE OfficeConnect switches (1420, 1820, 1950).
- **Connect Instant On switches with servers / storage / other switches** with 10G SR (500m) transceivers or 1G SX transceivers (up to 300m)
- **Warranty: 3 Years.** Foundation Care for 3 or 5 years on switch covers Instant On Transceivers. Hardware Replacement: 10 days
- NOT supported on third-party switches including Aruba switches

SKU #	Product Description	LP (€)	LP (USD)
R9D16A	Aruba Instant On 1G SFP LC SX 500m OM2 MMF Transceiver	47 €	$ 52
R9D18A	Aruba Instant On 10G SFP+ LC SR 300m OM3 MMF Transceiver	95 €	$ 106

aruba Instant On

Aruba Central

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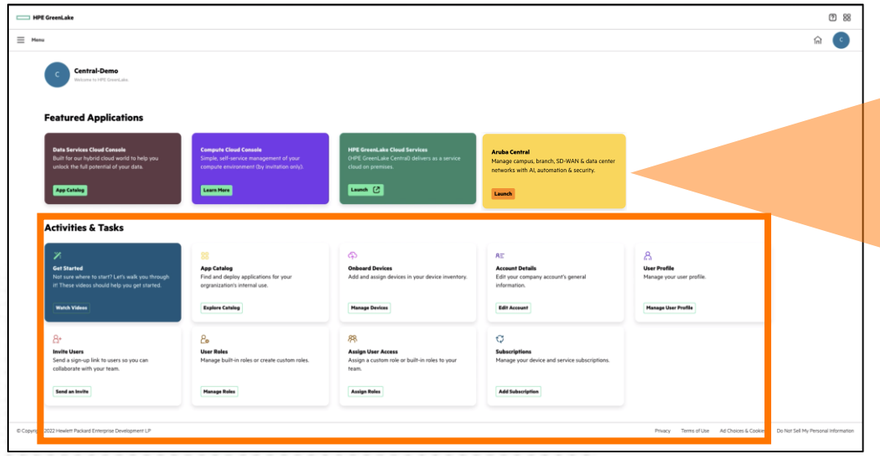
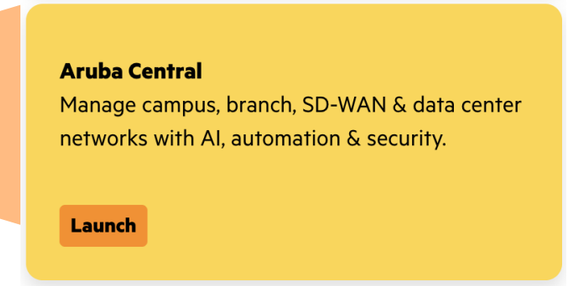
a Hewlett Packard Enterprise company

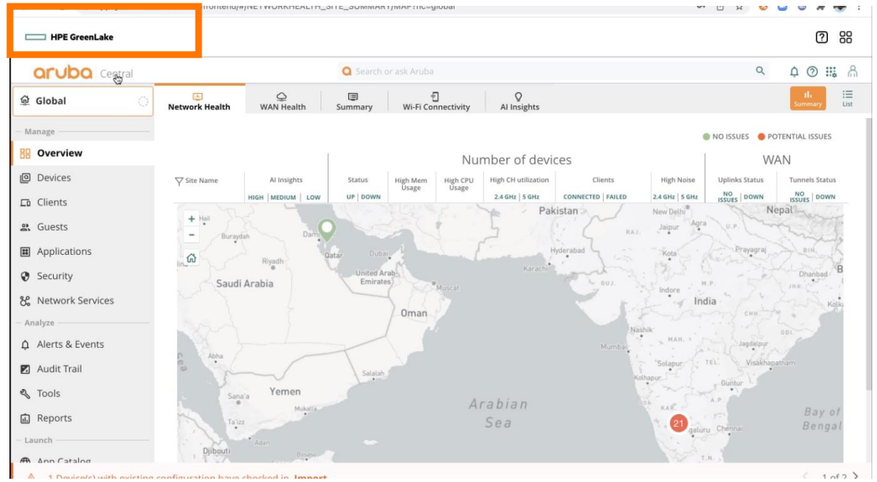
New Aruba Central Customer Experience

Within HPE GreenLake





New “HPE GreenLake” common header



Account management functions such as assigning user roles and managing subscriptions are done within HPE GreenLake

Cross-launch primary Central network management UI from the application catalogue

Remainder of Central UI is the same, including the underlying network management menus and workflows

ARUBA ESP ARCHITECTURE

ENTERPRISE WIRELESS CONNECTIVITY AS THE FOUNDATION OF ESP

ARUBA CENTRAL

3 ANALYZE AND ACT

AI-Powered features identify issues before they impact business and help IT resolve issues more quickly — **AIOPS**

2 PROTECT

Applying principles of Zero Trust to increase protection levels while simplifying operations — **ZERO TRUST SECURITY**

1 CONNECT

Unify network operations across all domains and locations — **UNIFIED INFRASTRUCTURE**

As a Service

ESP = Edge Service Platform

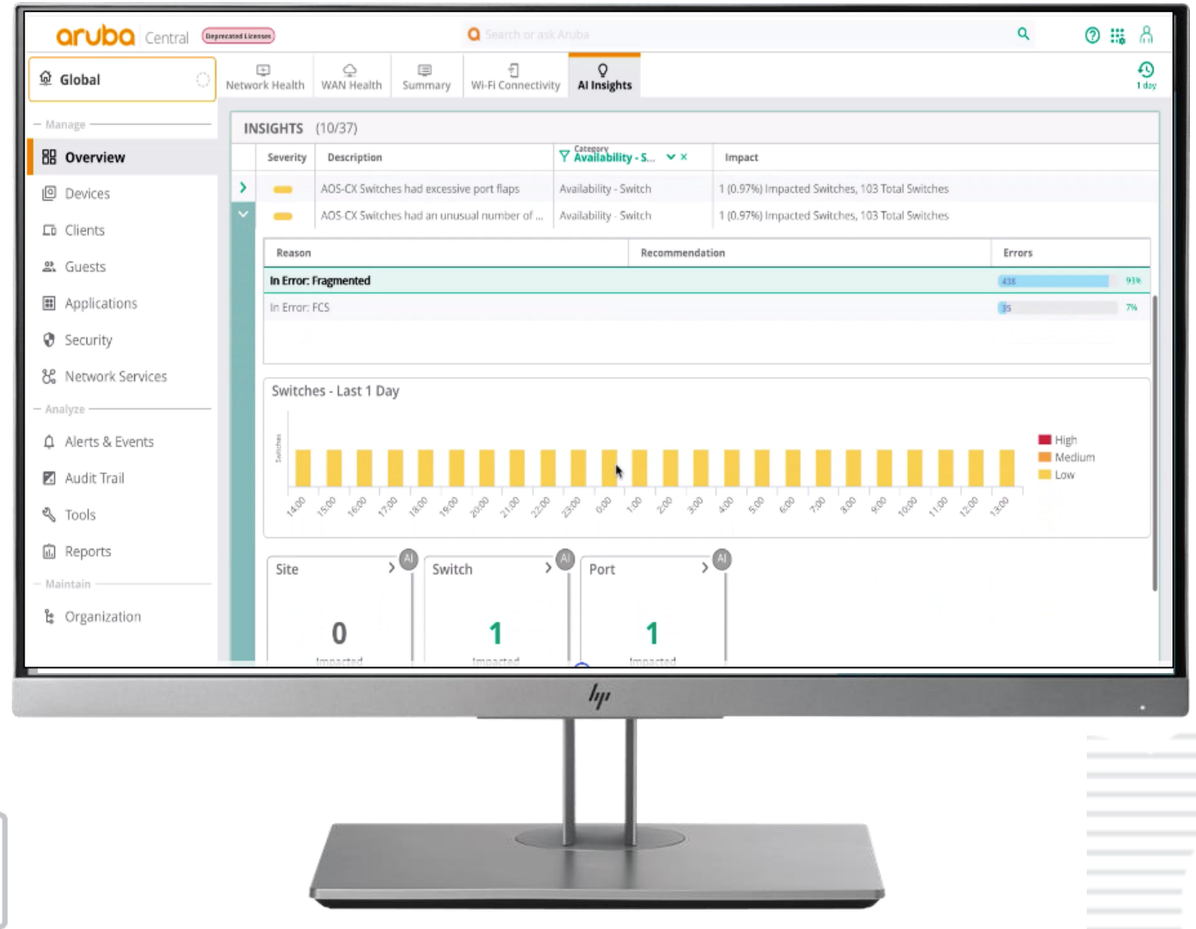
Simplify Daily Operations with a Unified Infrastructure

Aruba Central

Cloud-native single-pane-of-glass console

Single architecture across campus, branch and data center

Monitor and manage wired, wireless and SD-WAN; campus, branch, remote worker and data center



UNIFIED INFRASTRUCTURE

Aruba Central SaaS

Simple, consistent framework for all areas of networking

CENTRAL FOUNDATION LICENSE	Primary enterprise features and functionality for campus, branch, remote, and data center networks
CENTRAL ADVANCED LICENSE	Adds enhanced security, analytics and premium network features

Single license per device

Consistent structure for Wi-Fi, Switching, and SD-Branch

Common license structure for cloud and on-prem

24x7 technical support and software updates

1-, 3-, 5-, 7- and 10-year options

Aruba Central Breaks Down Network Siloes

Cloud-native, single pane of glass management

Higher-Scale Network Operations for:
Campus, Branch, Remote Work, VPN, Data Center, and Public Cloud Infrastructure

Simplified Network Services Delivery with:
Mobile onboarding, centralized licensing, and cloud-native provisioning and deployment

Unified Management and Orchestration for:
Wireless, Switching, SD-WAN, VPN, Data Center Networking, and Indoor Cellular Roaming

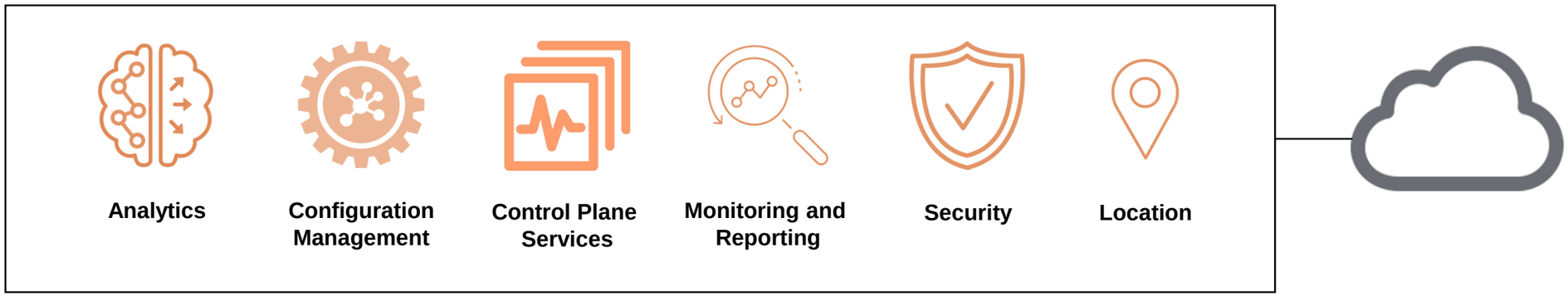
Cloud-grade Resiliency and Availability:
Web-scale design for better performance; redundant hosting and microservices architecture for high fault tolerance

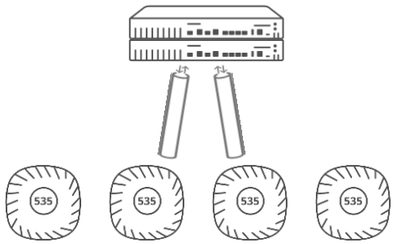
Investment Protection with:
Instant access to new features and licensing flexibility with 1-, 3-, 5-, 7-, and 10-year options

AOS 10 POWERED BY CENTRAL

CONSISTENT APPROACH ACROSS CAMPUS, BRANCH, AND REMOTE WORK

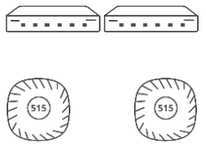
- Enhanced scalability
- AI-Powered insights
- Workflow automation
- Robust security
- Unified wired, wireless, and SD-WAN



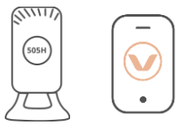


Large Campus

Small & Medium Campus



Branch



Remote Work

ArubaOS 10

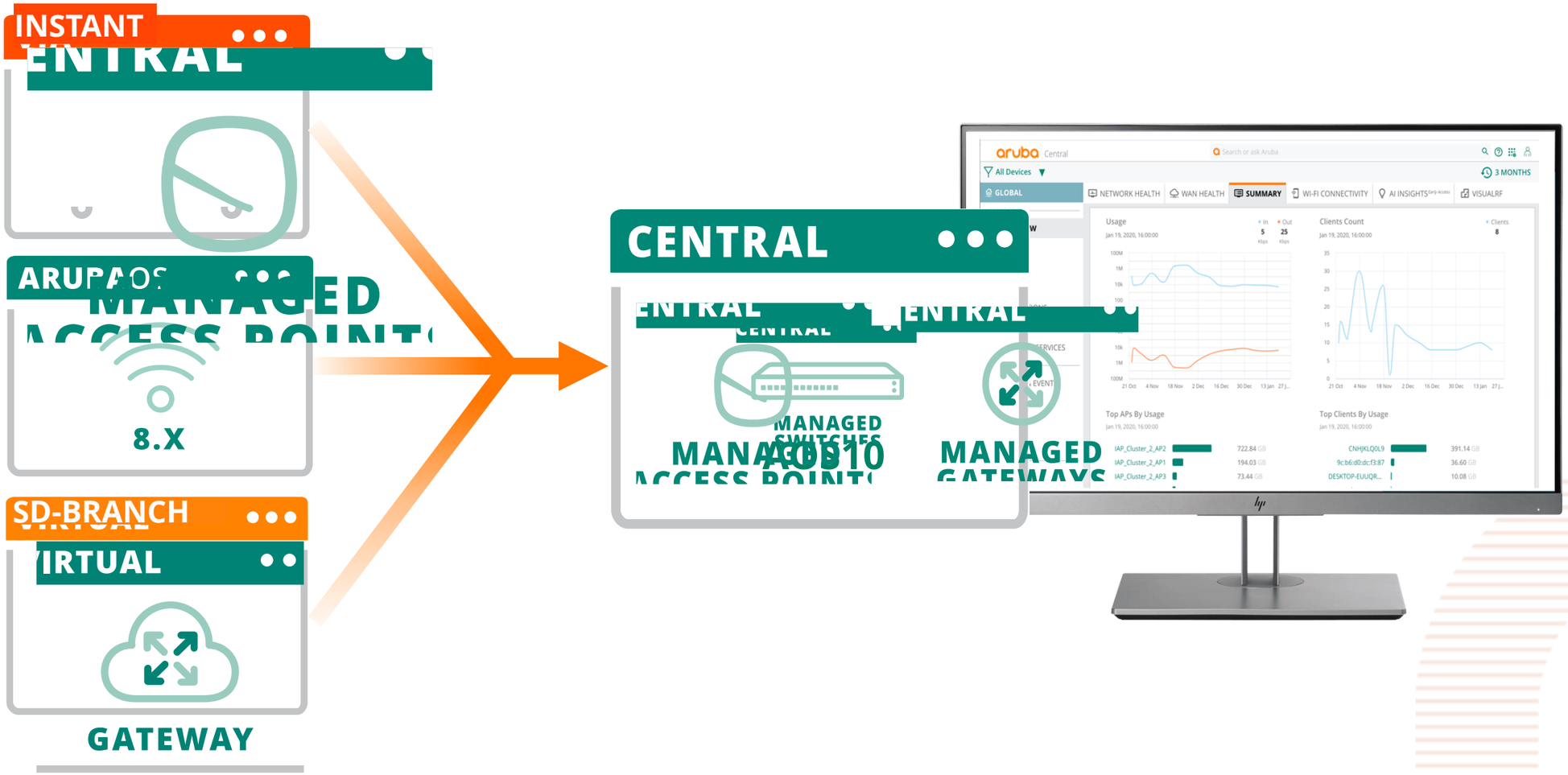
aruba
a Hewlett Packard
Enterprise company

Instant + AOS 8 + SD-WAN → Cloud-native AOS 10

Aruba Instant (Controller-less WLANs)

Mobility Conductor and Controller-based WLANs

Branch and Headend Gateways



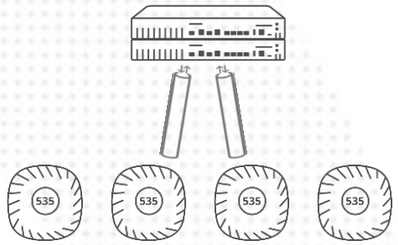
ArubaOS 10 Overview

CLOUD-NATIVE

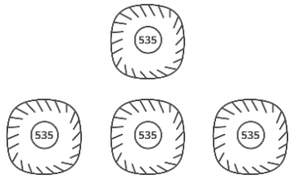
SCALABLE

Powered By Central

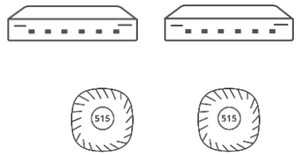
- Control Plane Services
- Configuration Management
- Security
- Monitoring and Reporting
- Analytics
- Location



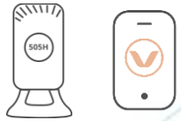
Large Campus



Small & Medium Campus



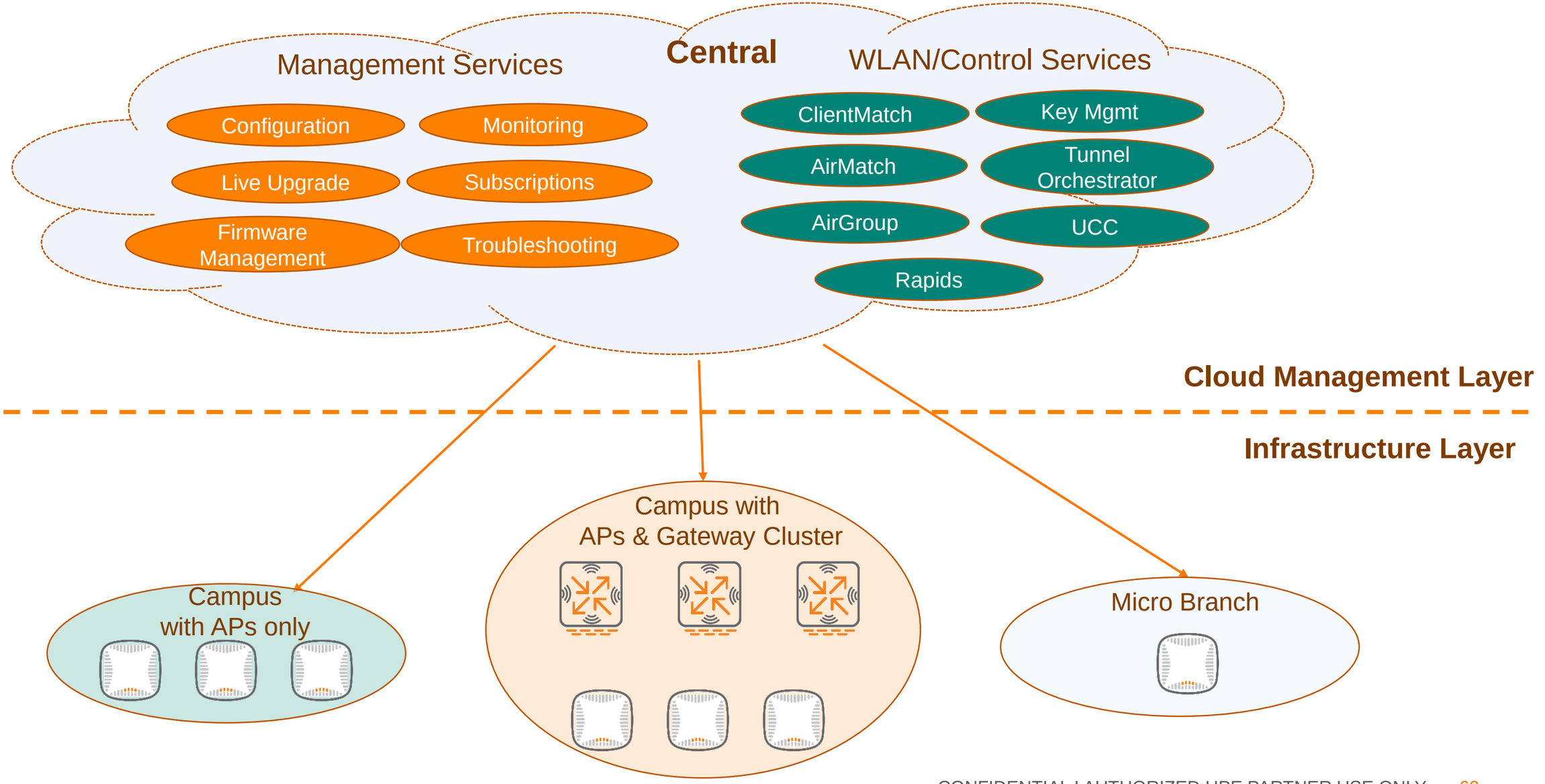
Branch



Hybrid Workplace

UNIFIED ARCHITECTURE FOR REMOTE, BRANCH, CAMPUS AND HYBRID WORKPLACE

AOS 10 Architecture



WHAT AOS 10 MEANS FOR YOUR CUSTOMERS

Simplifying Operations and Enhancing User Experience

SCALABILITY

Scale to Meet Enterprise Needs

CLOUD-NATIVE

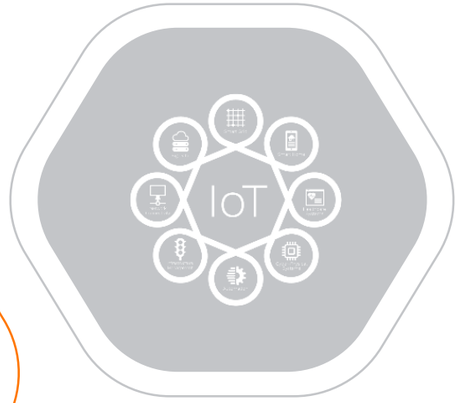
Better align with Enterprise Cloud Strategy

UNIFIED MANAGEMENT

Unified Wi-Fi and SD-WAN Architecture

REMOTE CONNECTIVITY

Simplifies how IT deploys, secures, and monitors connectivity for the hybrid workforce



IoT ADOPTION

Allows customers to leverage APs as an IoT platform

Aruba CX Switching

aruba
a Hewlett Packard Enterprise company

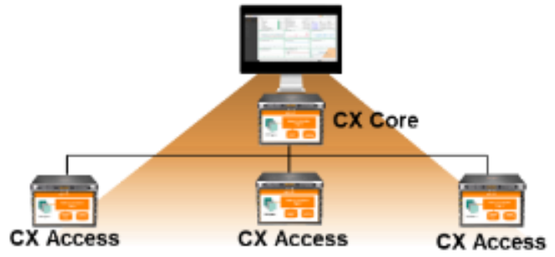
Aruba CX Switching

Next-gen switching designed for the network operator

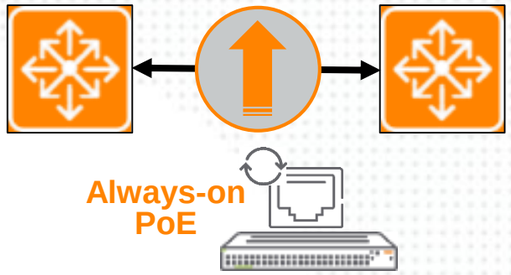
Simplicity from access to data center with AOS-CX

Unified mgmt and intelligent configs with Aruba Central

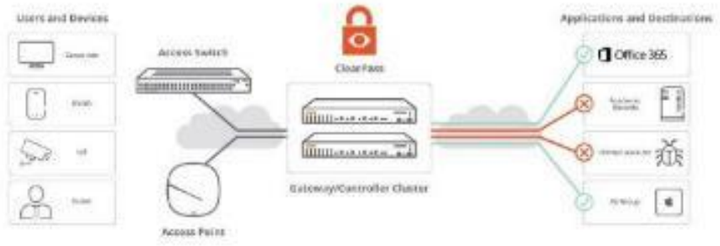
Visibility with analytics built-in with Aruba NAE



High Availability with Aruba VSX Live Upgrades



IoT and User Security Aruba Dynamic Segmentation



Data center class performance with Gen7 ASIC

No switch software licensing or subscription costs

Simplify Operations with a Unified Infrastructure

Unique switch architecture provides management choice

Web GUI

Web interface for single switch network management

CLI

NetEdit

for AOS-CX

COP

On-prem
wired + wireless access network management

Fabric Composer

Software-defined orchestration solution for enterprise data center networks

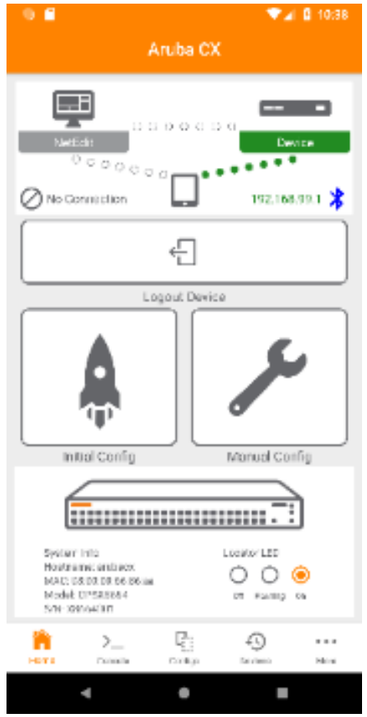
Central

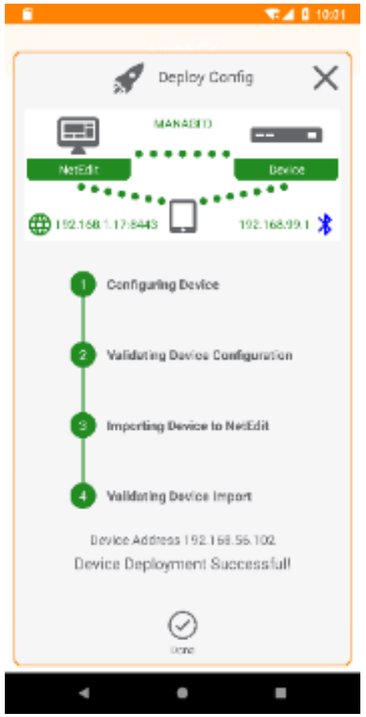
Cloud-based wired + wireless network management

Simplified Install and Configuration

Aruba CX Mobile App

Aruba CX Mobile App





Visibility and convenience for today's IT

- Configure, view and manage configurations
- Simple to use built-in templates save time and cut down on errors
- Integration with Aruba NetEdit allows for intelligent and validated configuration conformance
- Quickly check the PoE budget and utilization on switches from the CX Mobile app home screen to see available PoE
- Auto-detection of potential stack members and stack links makes it go from independent switches to a virtualized stack with just a few taps
- Connectivity via Bluetooth or Wi-Fi makes setting up switches quick and easy
- Supported on the CX 6200, 6300, 6400, 8320, 8325, 8360 and 8400)

The Aruba CX Mobile App is subscription free and is available to download at https://www.arubanetworks.com/products/networking/switches/cx-mobileapp/

Aruba CX Switching portfolio

Core

Aggregation

Access

Data Center

4 new models

Aruba CX 6400

Aruba CX 10000

Aruba CX 8300

Aruba CX 8400

Aruba CX 9300

Aruba CX 6300

Aruba CX 6200

Aruba CX 6100

Aruba CX 6000

Ruggedized

Aruba CX 4100i

End-to-End Portfolio for the Enterprise

Aruba CX 4100i Switch Series

Ruggedized, secure, and smart Ethernet switches

AC-DC 480W

AC-DC 240W

DC-DC 240W

12 port fan less DIN rail mount
with 2 x 1/10GbE uplinks and 3 PSU choices

24 port fan less rack mount
with 4 x 1/10GbE uplinks and built-in PSU

Ruggedized L2 Ethernet	DIN rail mount Rack mount
	Extended temperatures (-40C to 70C[1]) and IP30
IoT ready	30W and 60W PoE (360W) with high-speed uplinks
	Unified role-based access with Dynamic Segmentation
Operational simplicity	Manage via single pane of glass with Aruba Central
	Advanced configuration and programmability with CX

[1]Temperature derated to 50C if non-industrial temperature transceivers are used.

Aruba Switch End of Sale product replacements

Entry level L2 access switching

SKU #	Aruba 2530	SKU #	Aruba CX 6000
J9772A	Aruba 2530 48G PoE+ Switch	R8N85A	Aruba 6000 48G CL4 4SFP Switch
J9773A	Aruba 2530 24G PoE+ Switch (195W)	R8N87A	Aruba 6000 24G CL4 4SFP Switch (370W)
J9774A	Aruba 2530 8G PoE+ Switch	R8N89A	Aruba 6000 12G Class4 PoE 2G/2SFP 139W Switch
J9775A	Aruba 2530 48G Switch	R8N86A	Aruba 6000 48G 4SFP Switch
J9776A	Aruba 2530 24G Switch	R8N88A	Aruba 6000 24G 4SFP Switch
J9777A	Aruba 2530 8G Switch	*R8N89A*	*Aruba 6000 12G Class4 PoE 2G/2SFP 139W Switch*

Aruba CX 6000

- L2 Ethernet Switches
- Comparable features
- Comparable price
- Additional benefits:
  - More PoE
  - Static routing
  - AOS-CX features

SKU #	Aruba 2540	SKU #	Aruba CX 6100
JL357A	Aruba 2540 48G PoE+ 4SFP+ Switch	JL675A	Aruba 6100 48G CL4 4SFP+ Switch
JL356A	Aruba 2540 24G PoE+ 4SFP+ Switch	JL677A	Aruba 6100 24G CL4 4SFP+ Switch
JL355A	Aruba 2540 48G 4SFP+ Switch	JL676A	Aruba 6100 48G 4SFP+ Switch
JL354A	Aruba 2540 24G 4SFP+ Switch	JL678A	Aruba 6100 24G 4SFP+ Switch
-		JL679A	Aruba 6100 12G Class4 PoE 2G/2SFP 139W Switch

Aruba CX 6100

- L2 Ethernet Switches with 10GbE uplinks
- Comparable features
- Comparable price
- Additional benefits:
  - Compact 12 port
  - AOS-CX features

Aruba CX 6300 Switch Series

Powerful Layer 3 stackable switches ready for demanding environments

4	4	2880W
Fixed power switches	Modular power switches	90W PoE

10 member
VSF stacking

- Flexible growth with **stackable** gigabit connectivity and fast 1/10G to 25/50GbE[1] uplinks
- Built for IoT and Wi-Fi 6 with up to **2880W of always on Class6** to Class8 PoE and HPE Smart Rate multi-gigabit Ethernet
- Real-time monitoring and troubleshooting with **Aruba Network Analytics Engine (NAE)**
- Simple and secure access with **Dynamic Segmentation**; campus and branch fabric with VXLAN and BGP EVPN
- Manage via single pane of glass with **Aruba Central** across wired, wireless, and WAN
- **Power-to-port airflow** for cost-effective 1GbE ToR and OOBM data center deployments

[1] 50G capability is for use with 50G DACs for both interconnect and VSF stacking. 50G SR transceivers have been added with a minimum software of 10.09.1010. VSF stacking not supported on 1G ports.

Aruba CX 6300

FLEXIBLE, STACKABLE SWITCHES BUILT FOR THE FUTURE

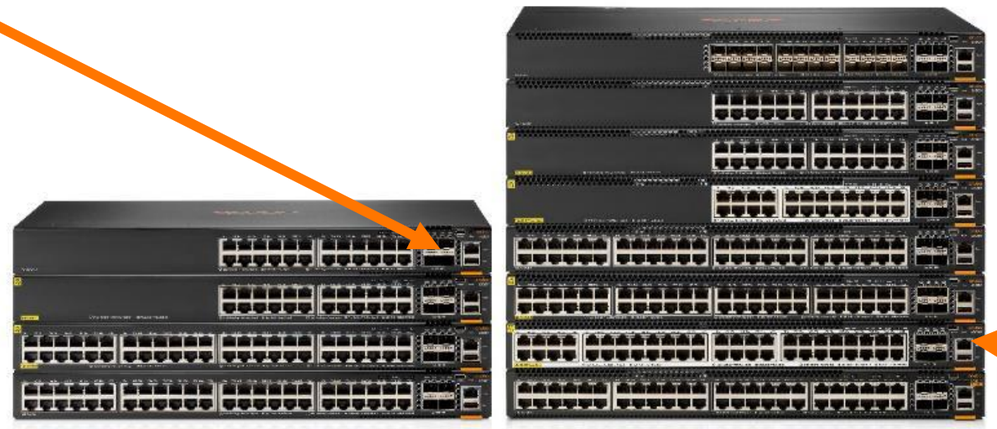
Management Ports include USB-C Console Port, OOBM port and USB Type A Host port. Included is a Bluetooth dongle to be used with Aruba CX Mobile App.

10-Unit VSF Stacking with flexibility to mix modular 6300M and fixed 6300F models in a single stack

High performance switching with 880 Gbps system switching capacity, 660 MPPS of system throughput and up to 200 Gbps stacking bandwidth

High availability with VSF and redundant power supplies and fans

High density 24 port SFP+ model is ideal for aggregation



Built for Wi-Fi 6 with 24 and 48 ports of Smart Rate Multi-gigabit (1/2.5/5/10GbE) supporting high power IEEE 802.3bt up to Class 8 (90W)

Four built-in 50G SFP ports support speeds of 1GbE, 10GbE, 25GbE and 50GbE[1]

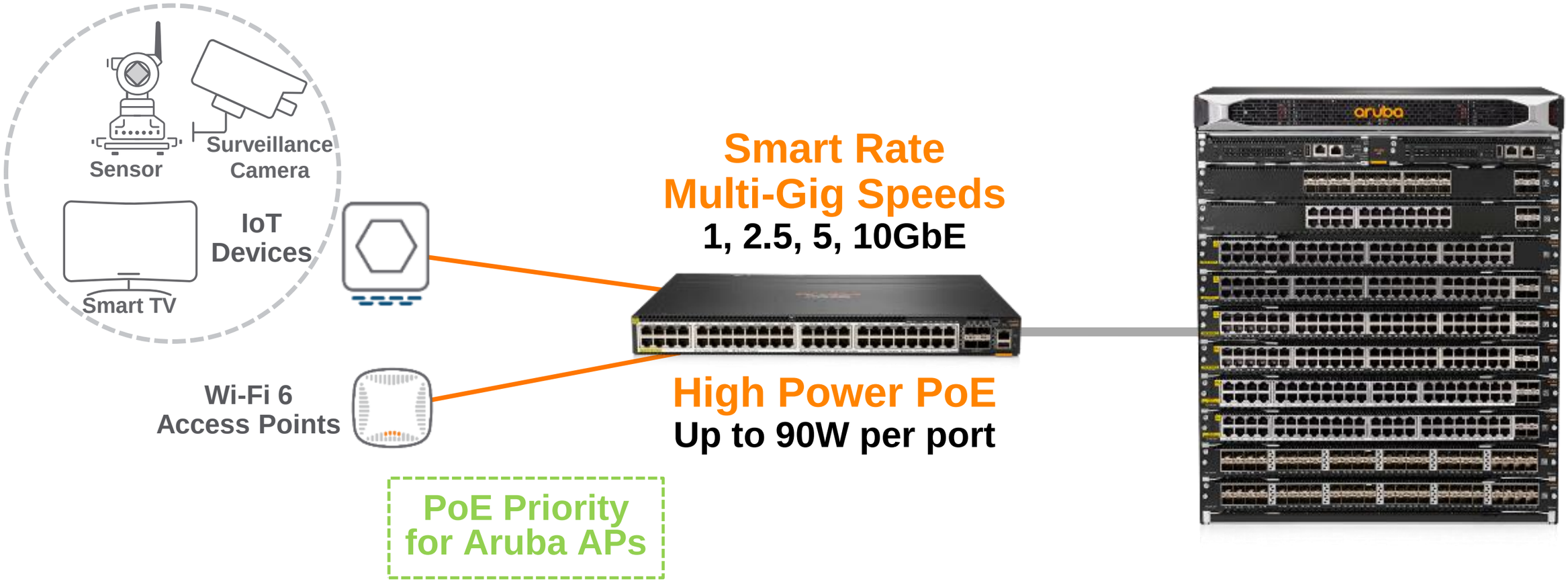
CX 6300F
with Fixed Power and Fans

CX 6300M
with Modular Power and Fans supports Always-on PoE

Power-to-Port bundle with back to front airflow is ideal for 1GbE ToR and OOBM data centers

[1] 50G capability is for use with 50G DACs for both interconnect and VSF stacking. 50G SR transceivers have been added with a minimum software of 10.09.1010. VSF stacking not supported on 1G ports.

Future-Ready Power and Speed at the Access Layer



Wi-FI 6 Ready	Use existing cabling	Always-on PoE

Aruba CX 6300M Switches (New Aug 15 2022)

Aruba CX 6300M 24p HPE Smart Rate 1G/2.5G/5G/10G Class 6 PoE and 2p 50G and 2p 25G Switch (R8S89A)

Aruba CX 6300M 48p HPE Smart Rate 1G/2.5G/5G Class 8 PoE and 2p 50G and 2p 25G Switch (R8S90A)

Aruba CX 6300M 12p Class8 PoE and 36p Class6 PoE HPE Smart Rate 1G/2.5G/5G and 2p 50G and 2p 10G LRM Support Switch (R8S91A)

Aruba CX 6300M 24p SFP+ LRM/MACsec support and 2p 50G and 2p 25G MACSec Switch (R8S92A)

Aruba CX 9300

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Aruba CX 9300-32D Overview

High speed connectivity

32-port 10/25/100/200/400G

High performance 25.6 Tbps switching

Redundant Fan and Power Supplies

N+1 for hot swappable, redundant power supplies and F-to-B (and B-to-F) bundles

Convenient bundle (2) to simplify ordering

- Aruba 9300-32D 32-port 100/200/400G QSFP-DD (double density) 2-port 10G SFP+ Front-to-Back 6 Fans 2 AC PSU Bundle
- Aruba 9300-32D 32-port 100/200/400G QSFP-DD (double density) 2-port 10G SFP+ Back-to-Front 6 Fans 2 AC PSU Bundle

Compact 1U form factor

Management

OOBM, console management ports

Status LEDs for fans, power supplies

25.6 Tbps switching capacity to fully support 32x 400G	1U form factor for convenient deployment	Seamless L3 SW upgrade over OOBM ★	Advanced Layer 3 including OSPF, BGP, VXLAN, VSX, et al	High hardware scale up to 1.24M IPv4, including full Internet routing ★	High speed, line rate 400G, including 100G and below
Full AFC and Central support ★	N+1 redundant, hot swappable power supplies	All bundles include hot-swappable, removable fan and power supplies	REST for distributed or centralized orchestration	Database-driven ArubsOS-CX architecture for HA and fault tolerance	Ports speeds: 400G PAM4, 2x200G PAM4, 4x100G PAM4, 2x100G NRZ, and 4[1]x25G NRZ ★

Aruba CX 10000

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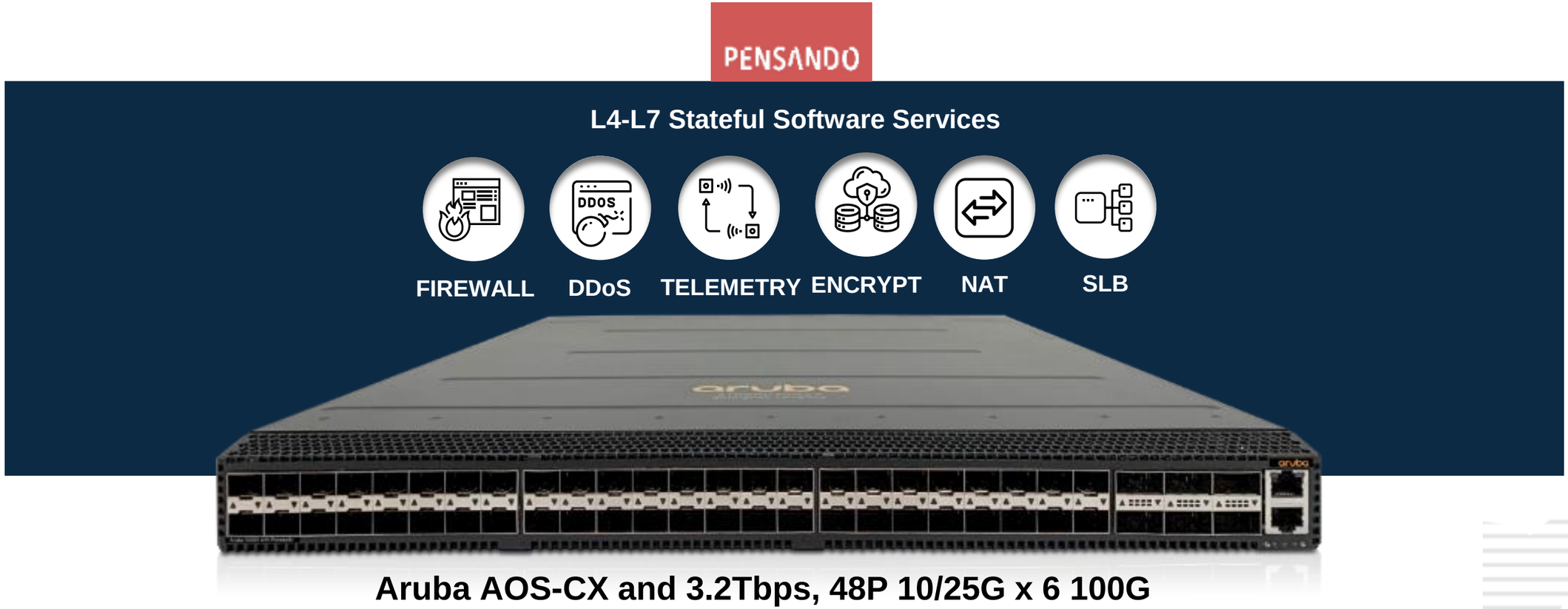
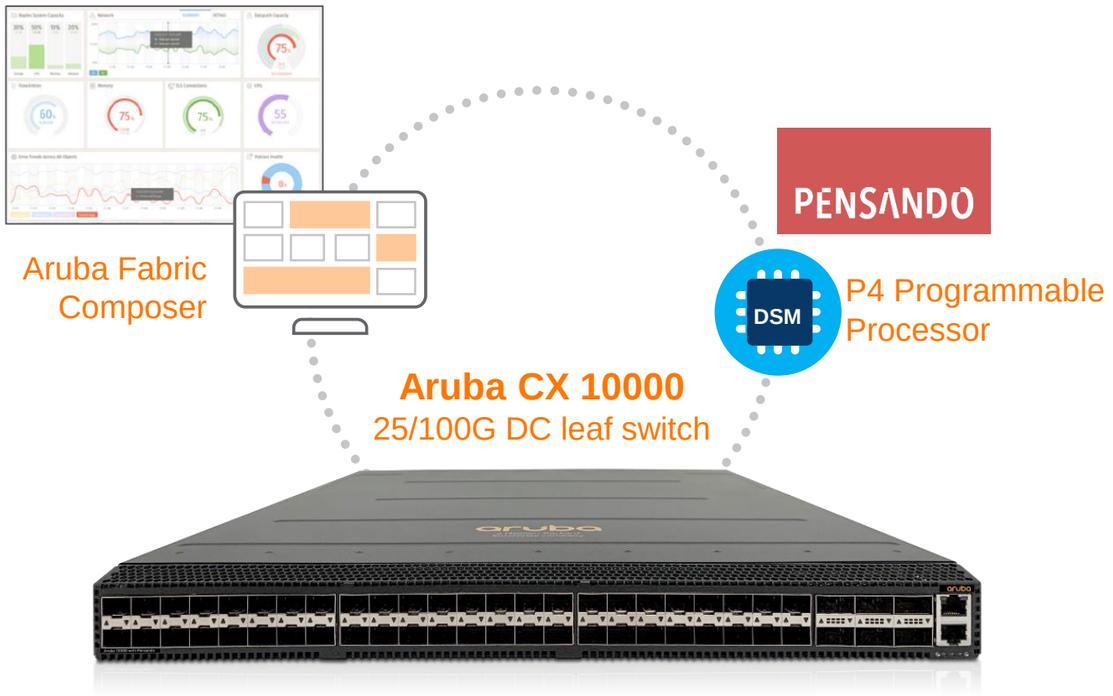
Aruba CX 10000 Distributed Services Switch



Aruba AOS-CX and 3.2Tbps, 48P 10/25G x 6 100G

Full protocol stack, centrally managed at scale

Aruba CX 10000 Distributed Services Switch

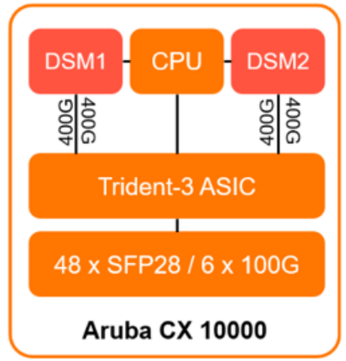


1RU Fixed Switch Form Factor:

- **T3 Switching ASIC - 3.2 Tbps, 32MB Buffer (shared)**
  - **Used for forwarding/routing/other features**
- **2 x Pensando DSM (7nm) Programmable Processor**
  - **Used for smart stateful services (all forwarding performed by T3)**
- 2 x Redundant Power Supplies (N+1)
- AOS-CX Network OS, full protocol stack support

Port Configuration:

- 48 x 1/10G/25G SFP28, 6 x 100G QSFP
- 1 x 1G RJ45 management, 1 x RJ45 console port, 1 x USB



DSM = Distributed Services Module

Aruba CX Switching

	CX 4100i	CX 6000	CX 6100	CX 6200	CX 6300	CX 6400	CX 8320	CX 8325	CX 8360	CX 8400	CX 9300	CX 10000
												
Speeds	1/10G	1G	1/10G	1/10G	1/10/25/50G	1/10/25/40/100G	1/10/40G	1/10/25/40/100G	10/25/50/100G	1/10/25/40/100G	100/200/400G	1/10/25/40/100G
Form Factor			Compact 1 U models	Compact 1 U models with stacking (8)	Compact 1 U models with stacking (10)	Efficient 5 and 10 slot (7-12 U) chassis	Compact 1U models	Compact 1U models	Compact 1U models	Efficient 8 slot (8U) chassis	Compact 1U	Compact 1U
Deployment	Ruggedized access IOT, Harsh environments	Access	Access	Access	Aggregation, Access Data Center: ToR (1 GbE)	Core, Agg, Access Data Center: EoR/MoR	Small Campus Core DC: Leaf/Spine	Core, Aggregation DC Leaf/Spine	Core, Aggregation DC Leaf/Spine	Core and Aggregation Data Center: EoR/MoR	Core, Aggregation DC: Leaf/Spine	Core and Aggregation DC: Leaf w/FW
Onboard Analytics (NAE)				●	●	●	●	●	●	●	●	●
API-driven Orchestration (NetEdit)	●	●	●	●	●	●	●	●	●	●	●	●
REST APIs, Python Scripting	●	●	●	●	●	●	●	●	●	●	●	●
Stacking (VSF), Virtualization (VSX)				VSF ●	VSF ●	VSX ●	VSX ●	VSX ●	VSX ●	VSX ●	VSX ●	VSX ●
VSX Live Upgrade						●	●	●	●	●	●	●
Carrier-class HA, deep buffers, large tables										●	●	
Dynamic Segmentation	UBT/ LUR ●			●	●	●						
Wi-Fi 6 Ready with always on PoE*	30/ 60W ●	30W ●	30W ●	30W ●	90W ●	60W ●						
Hot swappable, redundant power supplies					●	●	●	●	●	●	●	●
Smart Rate: Multi-gigabit Ethernet					●	●						
Aruba Fabric Composer Support					●	●	●	●	●	●	●	●
E-W Firewall/Micro-Seg Functionality												●

Aruba ClearPass

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AUTOMATED, CLOSED-LOOP NETWORK SECURITY

ClearPass Device Insight
Discovery and Profiling

ClearPass Policy Manager
Dynamic Segmentation

ClearPass Policy Manager
Adaptive Access and Response

CLEARPASS POLICY MANAGER
AUTOMATING SECURE ACCESS

ClearPass Device Insight
ENHANCED DISCOVERY / PROFILING

Bi-Directional
Data Exchange

ClearPass Policy Manager
AUTOMATED SEGMENTATION AND ENFORCEMENT

Internet of Things
(IoT)

BYOD and Corporate
Owned

paloalto NETWORKS servicenow
Carbon Black. Check Point SOFTWARE TECHNOLOGIES LTD.
CYLANCE okta

150+ Partners

Multi-Vendor
WLANs

Multi-Vendor
Switching

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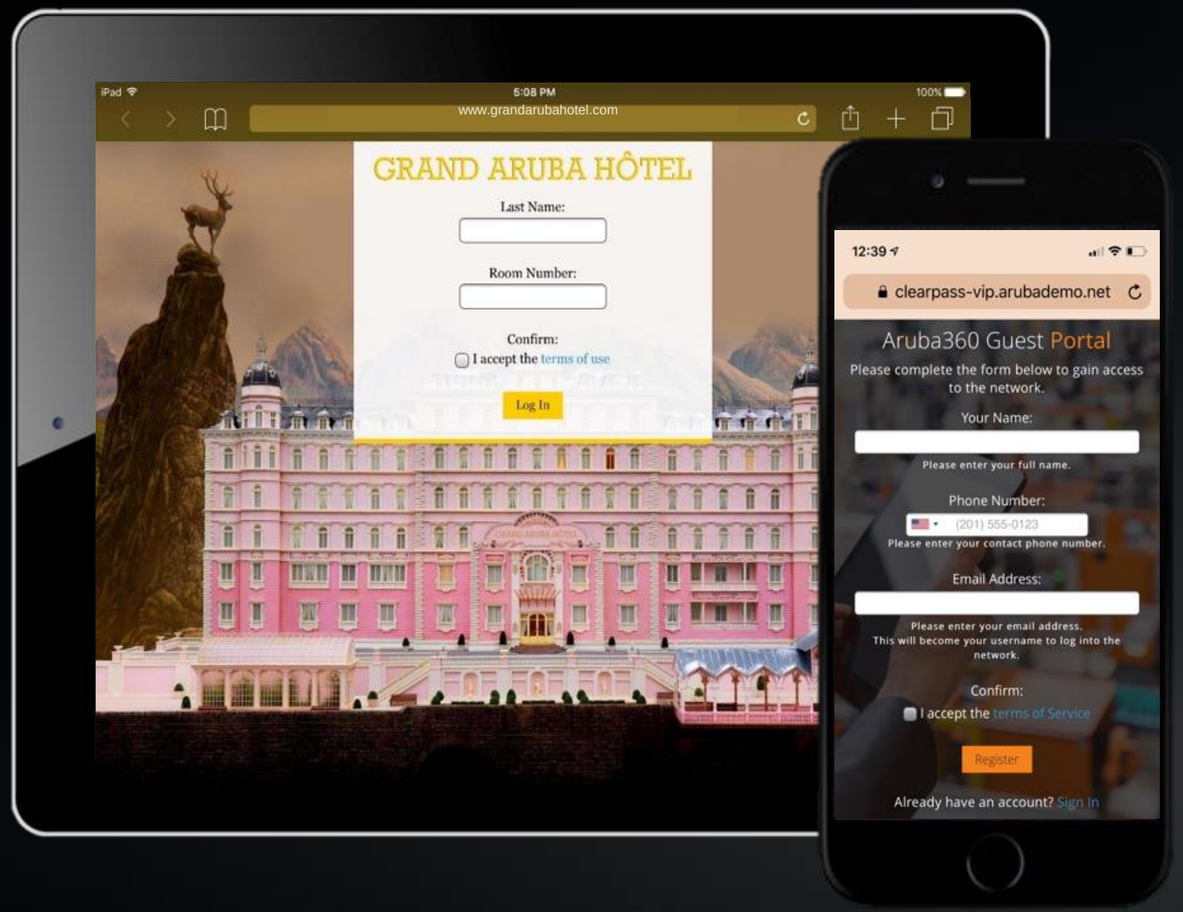
CLEARPASS: COMPLETE POLICY MANAGEMENT IN A SINGLE SOLUTION

Guest	Policy Engine	Flexible Enforcement	3rd Party Integrations	Reporting	Network Device Admin

Onboard Device provisioning and privileges	**OnGuard** Device posture assessment

CLEARPASS GUEST ACCESS

HELPING CUSTOMERS BUILD CUSTOMIZED, SECURE GUEST EXPERIENCES



Fully customizable and brandable guest access capabilities

Integrations with key property management, billing and visitor management systems

Provides a platform to reach customers and capture valuable end-user information

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ENFORCED BY
DYNAMIC SEGMENTATION

PORT-BASED

Manual configuration
of ACLs, VLANs, QoS

Hard to scale for device type and
quantity across multiple sites

DYNAMIC ROLE-BASED

Automate configurations
with context

Flatten configurations at high
scale based on user, device, app

Aruba UXI

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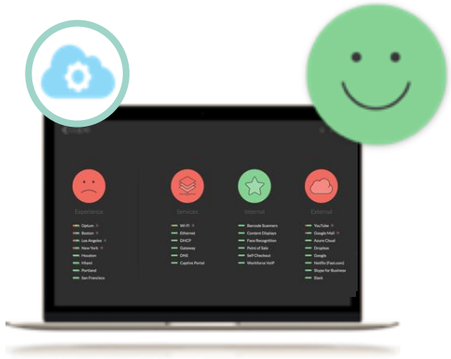
How to address these challenges with Aruba UXI

Aruba User Experience Insight (UXI) helps customers achieve the best user-experience through insights, recommendations and automation, delivered in a simple-to use and understandable way on ANY vendors' network.

Aruba User Experience Insight in 1 min



Onboards like a user

- Installed near users or on zebra device
- Logs in testing applications and services like a user
- No cable run required

Onboard ANY network

- Wireless or wired testing
- Measure DHCP, DNS, DORA
- Logs into captive portal

Test your environment from the EDGE

- Are services & app's working?
- Zebra: Roaming, SIP call & low impact synthetic testing
- Sensor: Test throughput, and through the network.
- Triage troubleshoot back in time

Provides actionable insights

- Real-time alerts globally
- Trend and baseline
- Root cause analytics
- Integration to your NOC
- Stream to reporting tools

Aruba UXI Sensors

Powerful Linux machines

Aruba G Series UXI Sensor

1. **Continuously test and monitor end-user experience on your wired, Wi-Fi, and WAN networks**
2. **Zero touch deployment**
3. **Looks great in all infrastructure settings**

Zero-Touch deployment is as easy As 1, 2, 3

In the office, branch, or anywhere

Aruba G Series UXI Sensor

1

Place or mount

1 sensor for every 5-10 Aps

at end-user locations

2

Connect to power

AC adapter or PoE

3

Login to dashboard

View real-time status

UXI Sensor portfolio

Synthetic client devices that analyze and test the network

Sensor platform lineage:

	Model	UX-F4	UX-G5	UX-G5C	UX-G6	UX-G6C
Chipsets	Arm CPU	1.8GHz	1.3GHz	1.3GHz	**2.0**GHz	**2.0**GHz
	Wi-Fi 2G/5G Radio	.11ac	.11**ac**	.11**ac**	.11**ax**	.11**ax**
	BLE	Yes	Yes	Yes	Yes	Yes
	Cellular as back-haul	-	-	Yes	-	Yes
Storage	eMMC	8GB	4GB	4GB	**8GB**	**8GB**
	RAM	1GB	1GB	1GB	**2GB**	**2GB**
Power	TPM2.0	0	1	1	1	1
	1GBE PHY	1	1	1	1	1
	PoE 802.3af	1	1	1	1	1
	Power Backup	≥30s	-	30s	-	≥30s
	Power Consumption (limit)	12W	12W	12W	12W	12W
	Ambient T & V sensing	1	0	0	1	1
SKU		*Eos*	R3R67A	R3R69A	**R7H75A**	**R7H76 A**

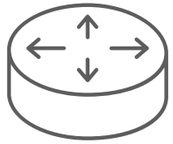
- Ship to any country and plug into power and it will self-configure. No technical person needed on site.
- Supports out of band connectivity

Parameters tested with UXI

Thorough testing To and Through your network

Wi-Fi

- ❑ Scan
- ❑ Association
- ❑ Packet capture
- ❑ Measure KPIs (RSSI, Util, etc.)
- ❑ Captive portal



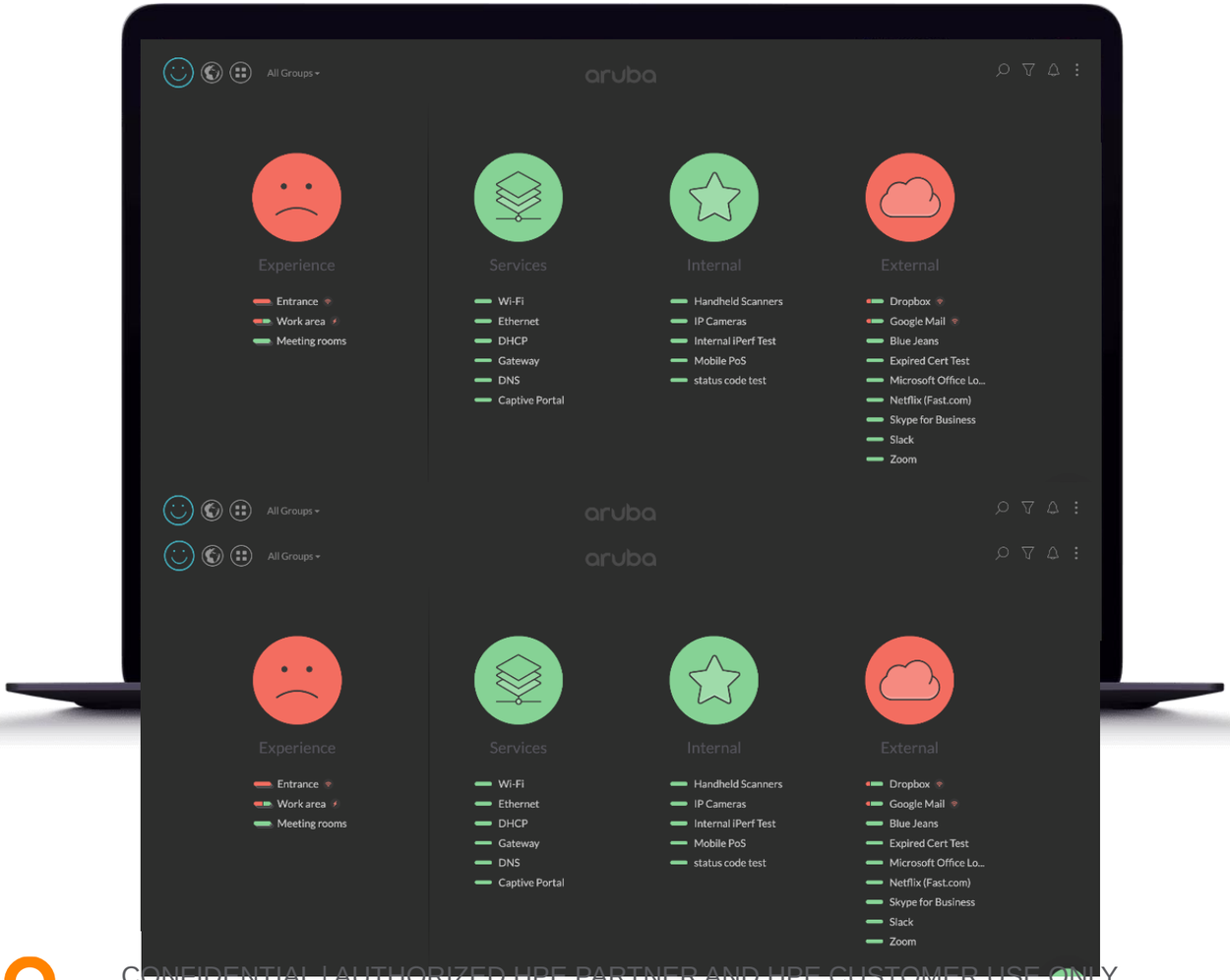
Network

- ❑ Authentication
- ❑ Gateway
- ❑ DNS
- ❑ DHCP
- ❑ Iperf3/Iperf2/LibreSpeed
- ❑ Ping/Hping
- ❑ HTTPGet / Curl
- ❑ Telnet

Library of Apps

- ❑ Test any Web Application (easy recording/script)
- ❑ Office 365, Gmail, AWS (w customer login)
- ❑ Dropbox (w customer login)
- ❑ Slack (w customer login)
- ❑ Skype for Business, Blue jeans and other VoIP services
- ❑ Netflix
- ❑ YouTube`

Aruba UXI dashboard – Brief

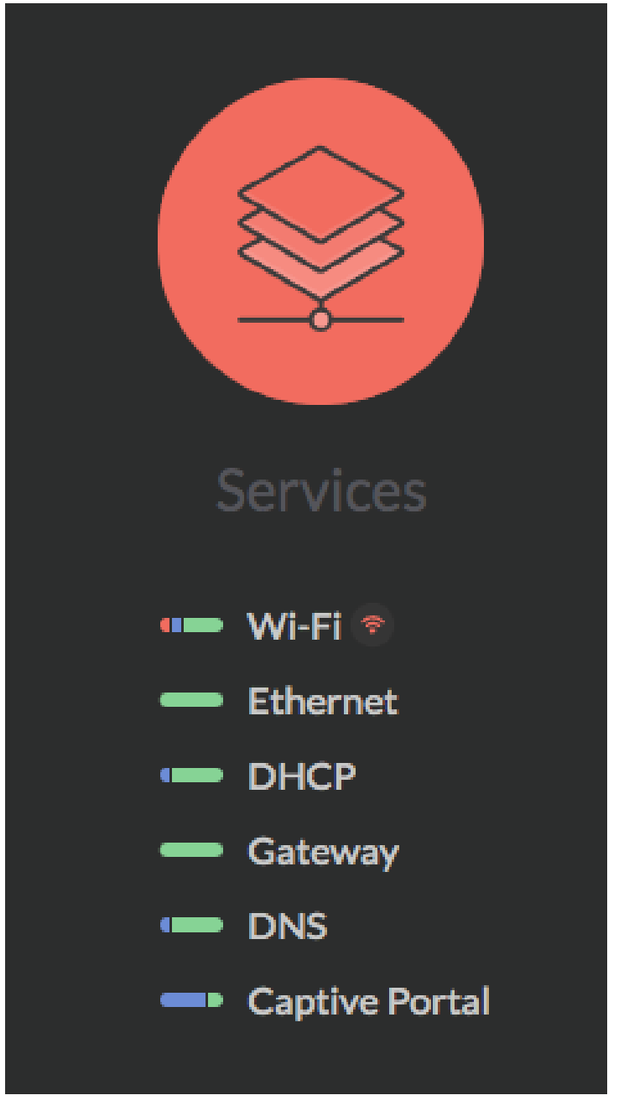


- UXI dashboard is an AI-powered visualization of user experience
- Easy to understand and navigate
- Automatic triage to pinpoint root cause
- AI powered alerts to keep IT proactive
- **Stores 30 days data – help with validating changes**
- Provides PCAP file

Testing Core Tests

Check the network environment, network services, and external connectivity in **every test cycle**.

- **AP Scan:** Sensor WIFI environment (SSIDs, BSSIDs, and RSSI values).
- **SSID Check:** Are configured network SSIDs are available
- **AP Association:** Determine association time to an access point.
- **External Connectivity:** http://cdn.capenetworks.io/connectivity-check
- **DHCP:** Is sensor able to obtain a DHCP address
- **Gateway:** Is the gateway reachable within the DORA (Discover, Offer, Request, Acknowledgement) process
- **Primary DNS:** Primary nameserver able to resolve cdn.capenetworks.io
- **Secondary DNS:** Secondary nameserver able to resolve
- **Captive Portal:** measure load and redirect times of the captive portal.



UXI Triage – Issue Detection

Threshold Violations

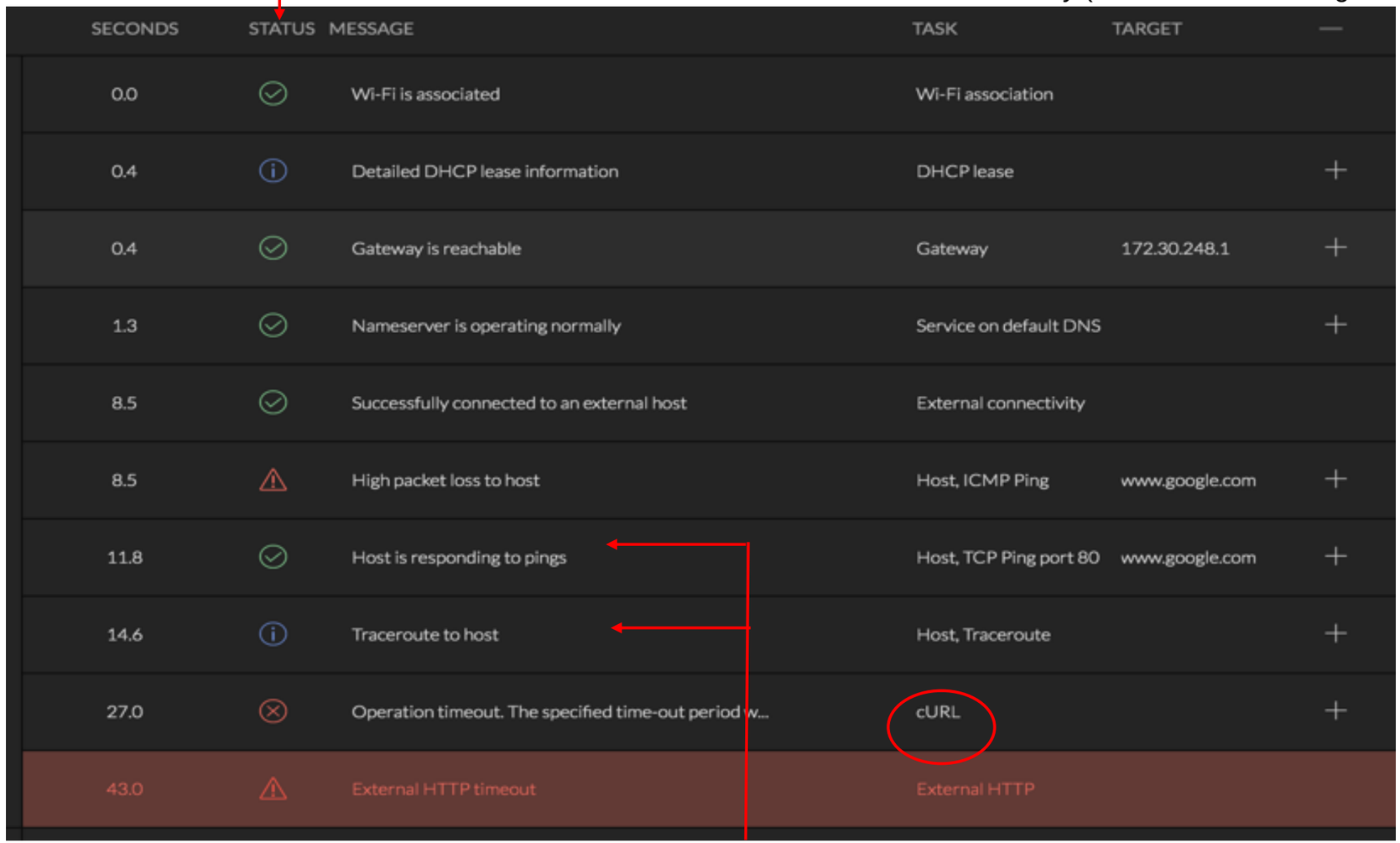
- Sensor runs a successful test.
- Measured value is reported to the dashboard.
- Threshold issues are generated based on a rolling average of the test results across that defined threshold.
- *Example: High DHCP response time, Hight DNS lookup time.*

Test Failure

- Sensor runs a test with an unsuccessful result.
- Sensor attempts to diagnose why the test failed in automatic triage mode.
- Triage mode runs a set of predefined troubleshooting test to understand the test failures root cause.
- *Example: Gateway unreachable. Primary DNS failing. No response from DHCP server.*

UXI Triage – Reading the output

Status or severity (informational/warning/error)



SECONDS	STATUS	MESSAGE	TASK	TARGET
0.0	✓	Wi-Fi is associated	Wi-Fi association	
0.4	ⓘ	Detailed DHCP lease information	DHCP lease	
0.4	✓	Gateway is reachable	Gateway	172.30.248.1
1.3	✓	Nameserver is operating normally	Service on default DNS	
8.5	✓	Successfully connected to an external host	External connectivity	
8.5	⚠	High packet loss to host	Host, ICMP Ping	www.google.com
11.8	✓	Host is responding to pings	Host, TCP Ping port 80	www.google.com
14.6	ⓘ	Traceroute to host	Host, Traceroute	
27.0	⊗	Operation timeout. The specified time-out period w...	cURL	
43.0	⚠	External HTTP timeout	External HTTP	

Reveals which part of any particular service is not responsive or failed

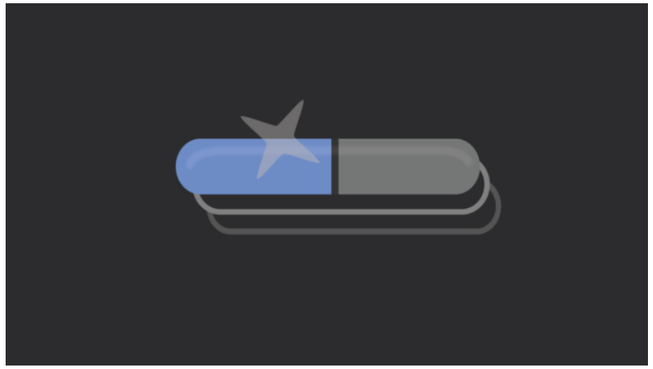
cURL: informational details about the handshake

DNS: *Default DNS is DNS query sent to all the DNS servers in the network*

- *In the DiG sent no IP address is specified. If the DiG to Default DNS servers fails the sensor will individualy test the Primary and Secondary DNS server.*
- *Primary and secondary DNS servers are tested to confirm the issue*

What happened to YELLOW?

- Anomalous issue **appear red in the dashboard** letting you know this is set of issues is above and beyond the normal bad and might need immediate attention.
- Notifications will only be sent for issues that are classified as incidents (**red**) on the dashboard.



Click to add tex

- When an issue is detected and the timing of the arrival of the issue in relation to other issues conforms to the model, the issue will **appear blue to indicate it is informational.**
- You will not receive email or webhook alerts for these.

UXI Incident Detection

1. Sensors test in a continuous round-robin sequence.
2. Missed KPI's generate an **issue**.
3. **Incident Detection system** identifies issues that are significantly different from typical issue profile.
   - Retrained weekly to account for shifts
   - Takes into account daily seasonality
4. Baselined across:
   - customer's own historical data
   - each kind of issue (e.g. DNS failure)
   - each network
   - each service or application test

An incident is a collection of related anomalous issues.

UXI Workflow Integrations

Webhooks

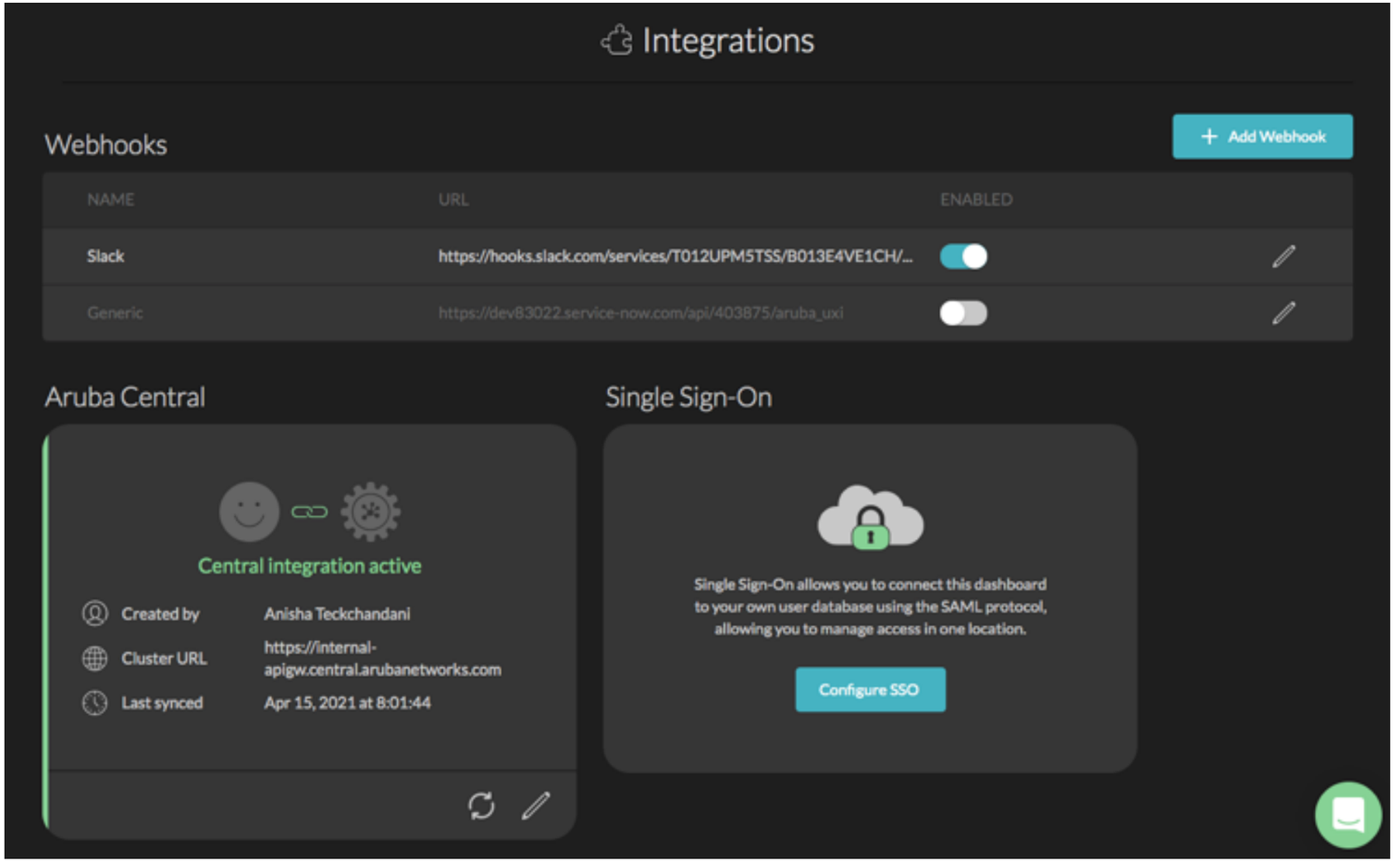
- Send real-time incident data to a 3rd party service when an action or event happens.

Aruba Central Integration

- API based integration lets you monitor a high-level summary of UXI alerts on the Central Network Health Dashboard.

SAML Single Sign-On

- Every login attempt using your email domain will be sent to your SSO identity provider login page.



Data Push Destinations

Direct data push from User Experience Insight to a customer destination…

Unified Schema

UXI Data
- Test Results
- Issues*
- Situations*

Google BigQuery

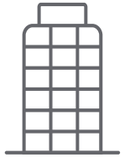
- Access the data via SQL in a relational database
- Ideal for building reports and troubleshooting

Amazon S3

- Access the data via S3 APIs either as CSV or newline delimited JSON
- Ideal for custom analysis

- Ideal for custom applications

Real life use cases



Use Case - IT team at a big Enterprise is looking to reduce MTTR/MTTI.

Solution - UXI identifies abnormal network behaviour real time for quick NOC resolution.

Use Case – A leading university is looking to validate network upgrade changes.

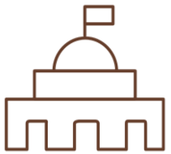
Solution - UXI provides a visual network change validation by comparing ‘before’ and ‘after’ performance.

Use Case – A big retailer wants to measure customer experience on the network.

Solution - UXI acts as an end user on the network and reports the network performance from an edge perspective.

Use Case – A large hospital wants to ensure that critical apps are always reachable.

Solution – UXI tests the reachability of critical apps and using AIOps alert IT in case of any issues.



Use Case – IT team at a critical Government headquarter wants to ensure that Network performance SLAs are met.

Solution – UXI’s ‘At A Glance’ dashboard provides summary of network performance.

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