



Wireless Innovations

Catalyst 9800 controllers

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Housing Rules



Mute yourself



Unmute at
the end for
QA



Camera for
Best User
Experience



30min
with Q&A



Take a snack,
sit down,
relax & listen



Chat with
presenter
possible



Feedback

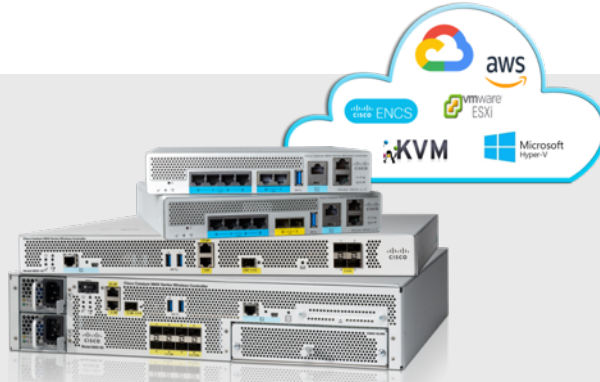


Slides will be
shared

Introducing Next-generation Cisco Wireless Stack



Catalyst 9100
Access Points



Catalyst 9800
Wireless Controllers



DNA Automation &
Assurance



DNA Spaces

Resilient, Secure, Intelligent
with Innovations in Performance, Security and Analytics

Next-generation Cisco Catalyst wireless access

Ecosystem partnerships with Apple, Samsung, Intel, and Microsoft



Cisco Catalyst 9800 Series
Wireless Controllers

*Powered by Cisco IOS® XE
Open and programmable*



Cisco Catalyst 9100
Access Points

*Powered by Wi-Fi 6 technology
Superior RF experience*

Resilient



- Zero downtime with Software updates and upgrades
 - WLC SMU
 - AP Service and Device Pack
 - Intelligent Rolling AP Upgrade
- Deterministic capacity at scale
- Superior battery life for IoT and mobile devices

Leadership in Wireless networking

Secure



- Detect encrypted threats with Encrypted Traffic Analytics (ETA)
- RF Snapshots, WPA3, Trustworthy systems
- Automated macro and micro segmentation with SD-Access

Extending Cisco's
intent-based network

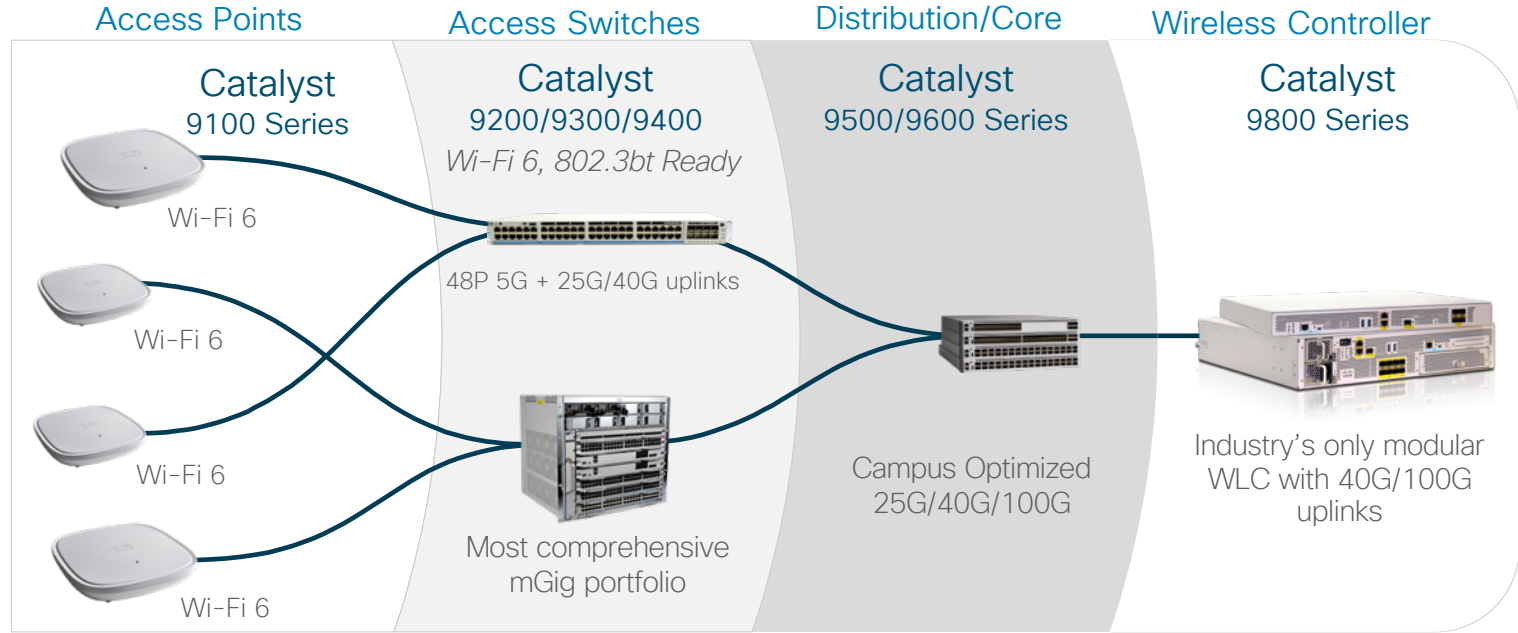
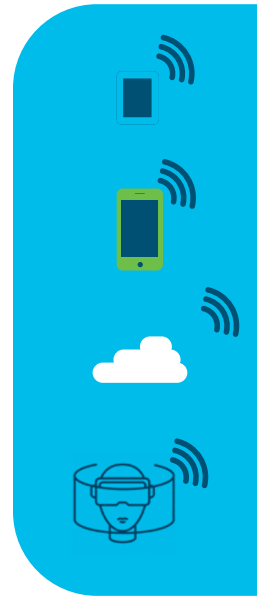
Intelligent



- Enhanced analytics with Cisco DNA Center Assurance
- Programmable network processor and IOx infra support
- Multi-lingual AP to enable enterprise IoT
- Deploy in infrastructure of choice and cloud of choice

Innovation Beyond
the Standard

Best Access Experience for IT and IoT starts with the Catalyst Access Network



← Fully Integrated End to End →

Built for intent-based networking



Automation



Security



Analytics

It's a full stack Migration



MSE



ISE

Services



ISE



Prime

Network Management



Cisco DNA Center



AireOS

Wireless LAN Controller



C9800



Access Points



Wi-Fi 6



Clients and Sensors



Overall Migration Strategy – three phases



Evaluate

- The advantages of NG stack
- Build the knowledge of NG stack
- Verify platform support
- Evaluate feature gaps
- Evaluate new licensing model



Design

- Select the C9800 and AP platform and chose the deployment mode
- Design for C9800 vs. AireOS WLC coexistence
- Design for AP migration areas
- Understand the caveats
- Choose a Management Platform



Implement

- Check the Site Survey & Heat Map
- Replace the legacy APs
- Check switch PoE
- Lab validation
- Go-Live and Day 2 Support

Catalyst 9800 Controller Migration



AireOS

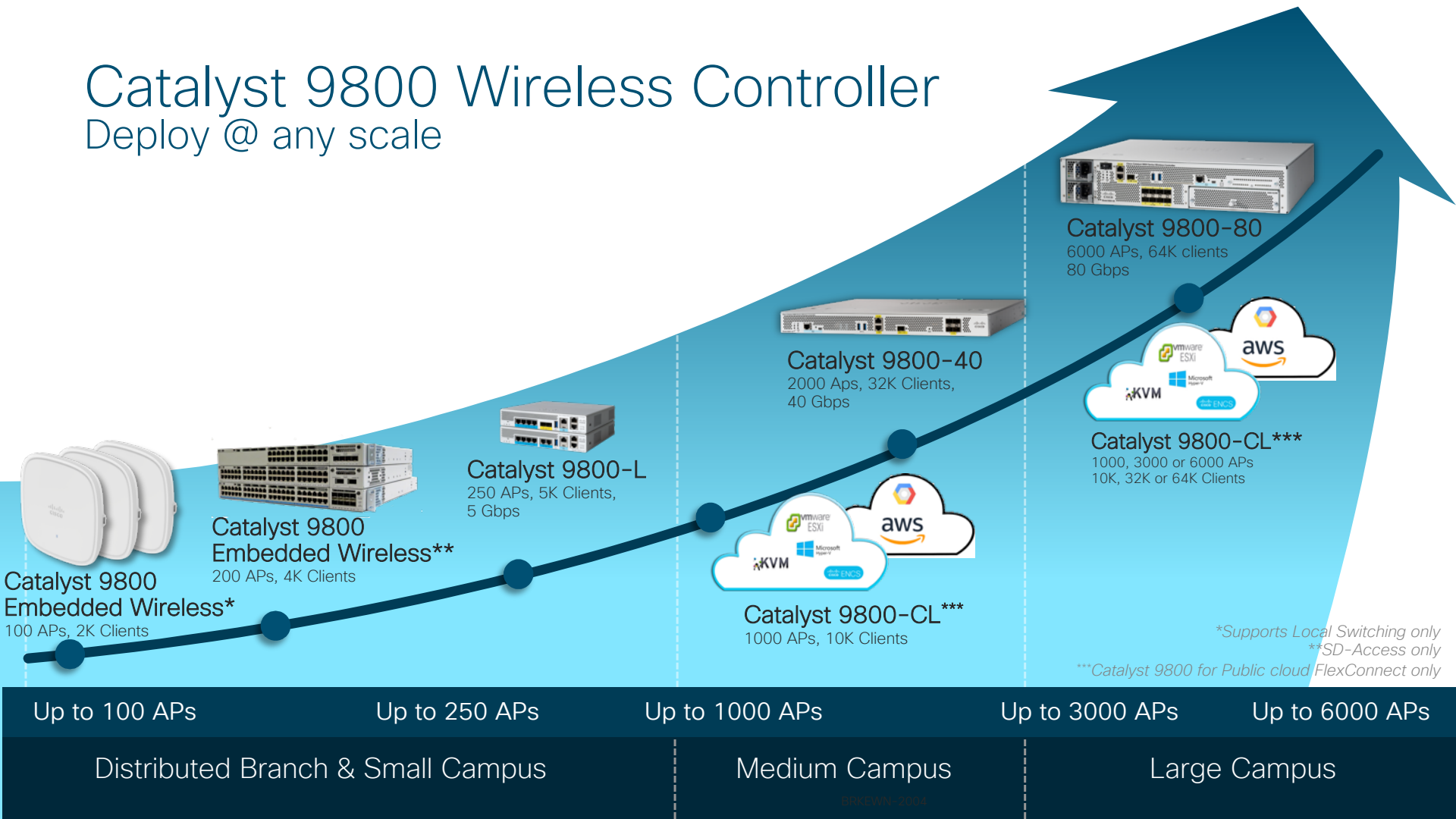
Wireless LAN
Controller



C9800

Catalyst 9800 Wireless Controller

Deploy @ any scale



Catalyst 9800 Embedded Wireless*
100 APs, 2K Clients



Catalyst 9800 Embedded Wireless**
200 APs, 4K Clients



Catalyst 9800-L
250 APs, 5K Clients, 5 Gbps



Catalyst 9800-40
2000 Aps, 32K Clients, 40 Gbps



Catalyst 9800-CL***
1000 APs, 10K Clients



Catalyst 9800-80
6000 APs, 64K clients 80 Gbps



Catalyst 9800-CL***
1000, 3000 or 6000 APs
10K, 32K or 64K Clients

Up to 100 APs

Up to 250 APs

Up to 1000 APs

Up to 3000 APs

Up to 6000 APs

Distributed Branch & Small Campus

Medium Campus

Large Campus

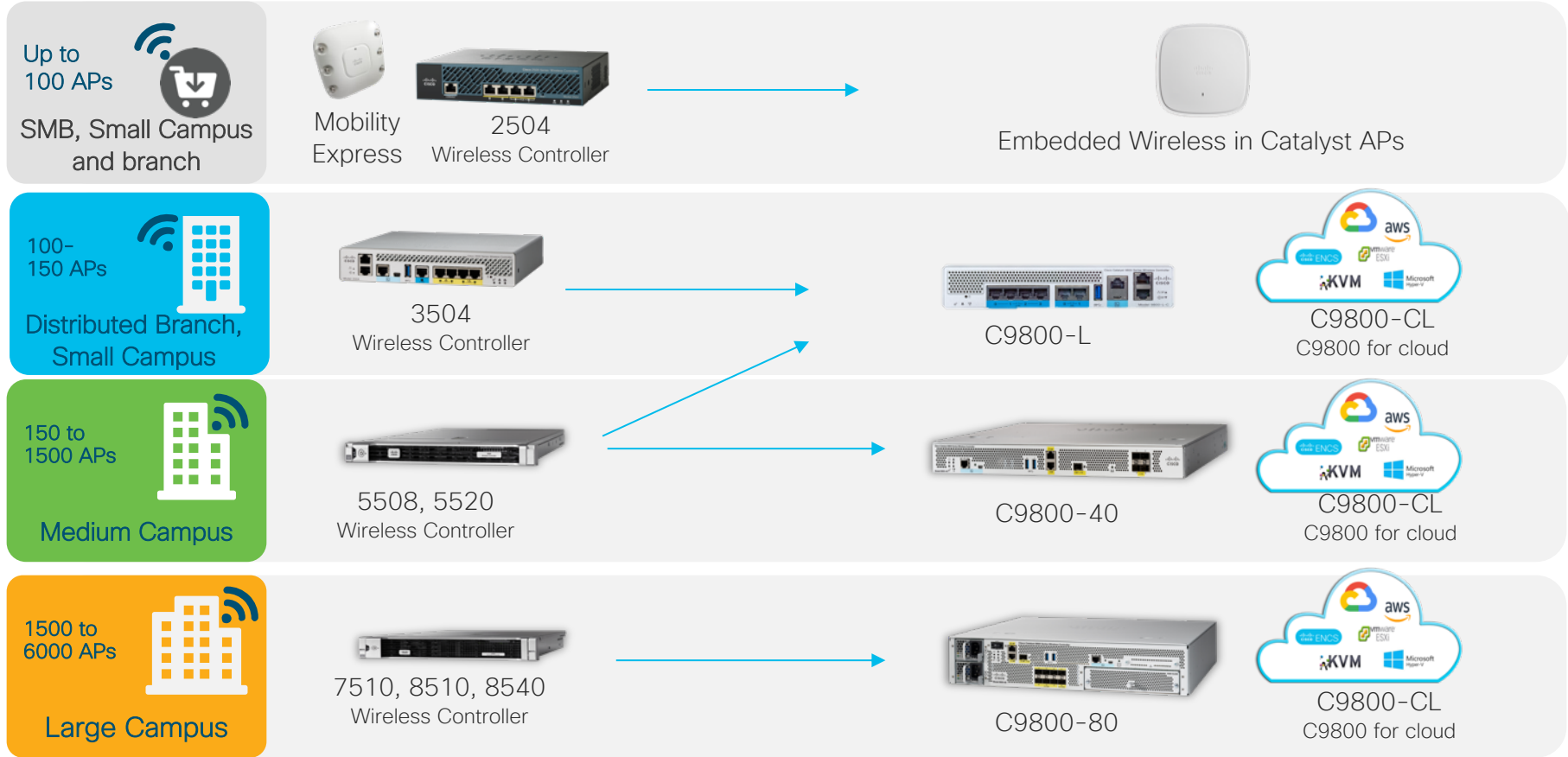
**Supports Local Switching only*

***SD-Access only*

****Catalyst 9800 for Public cloud FlexConnect only*

Wireless Controller Positioning and Transition

Refresh old 2504, 5508, 8510 to 9800 and position 9800 in new opportunities



9800-L Performance License strategy (SKU LIC-C9800L-PERF=)



Performance
License*



250 APs
5k Clients
Max Throughput (*): 5Gbps

500 APs
10K Clients
Max Throughput (*): 10 Gbps

- ✓ Same device can scale up to higher no. of APs and higher throughput
- ✓ Ability to upgrade at any point without having to buy new hardware
- ✓ Complete investment protection
- ✓ It supports smart licensing and for HA SSO it should be present on both boxes

(*) Max throughput is calculated with large packets, with IMIX traffic and small packets the numbers will be lower

C9800-CL for Private Cloud vs. AireOS vWLC

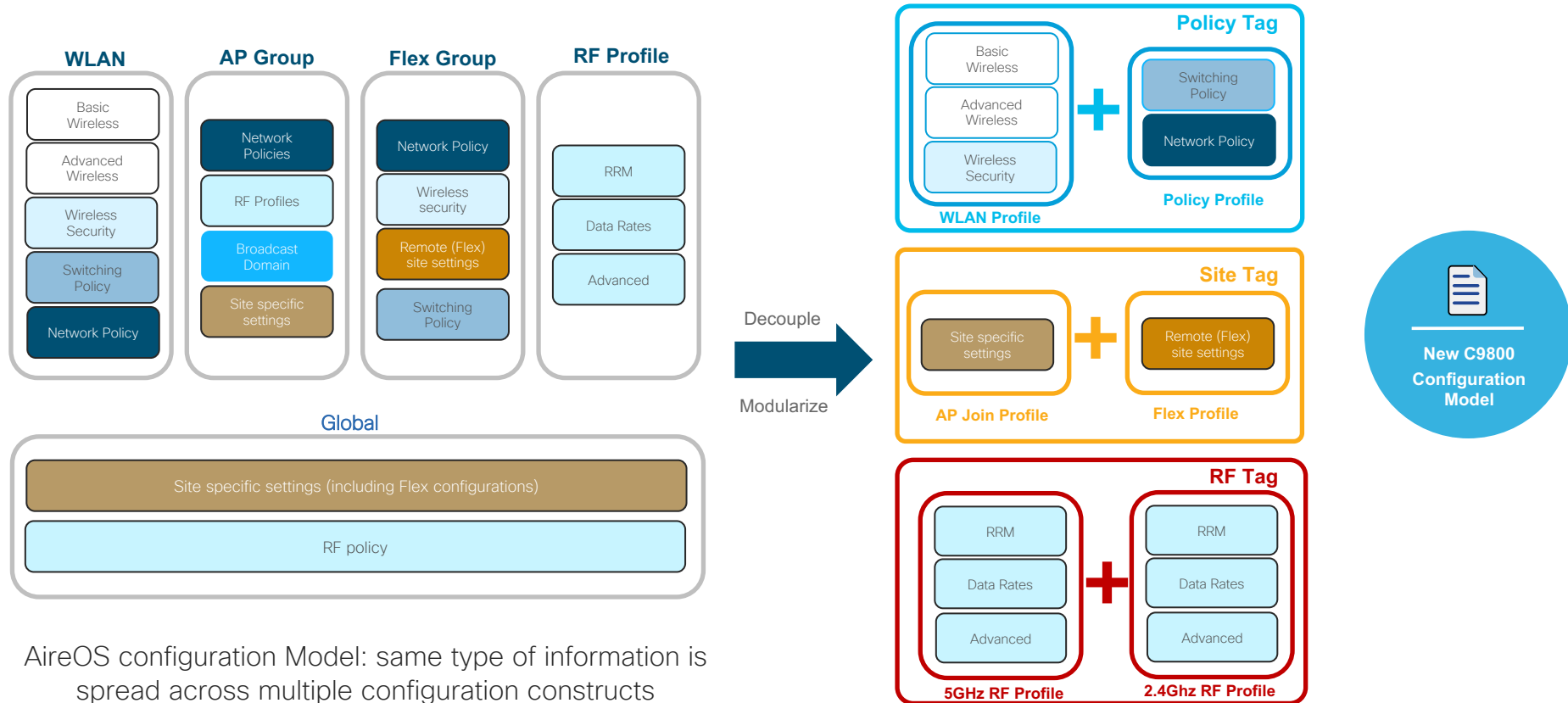
	AireOS vWLC	C9800-CL
SSO High Availability	No	Yes
Deployment Modes	Flex Only	Flex, Local, Fabric
Guest Anchor	No	Yes
DNA-C Automation & Assurance	No	Yes
Max central throughput	500 Mbps	1.7 Gbps
Max AP and Client Scale	3k APs, 32k Clients	6k APs, 64k Clients
Installation Image	Multiple	Single for any scale

Please Note!

Profiles, Tags...don't you love them already?

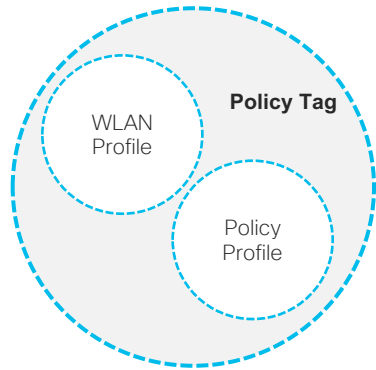
Catalyst 9800 vs. AireOS Configuration Model

Modularized model with logical decoupling of configuration entities



AireOS configuration Model: same type of information is spread across multiple configuration constructs

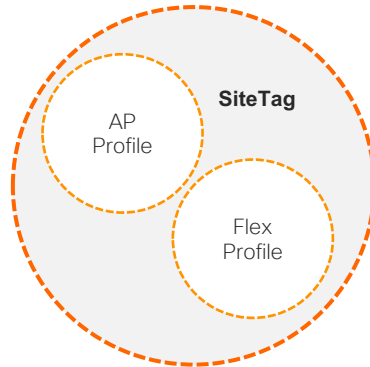
Catalyst 9800 Config Model



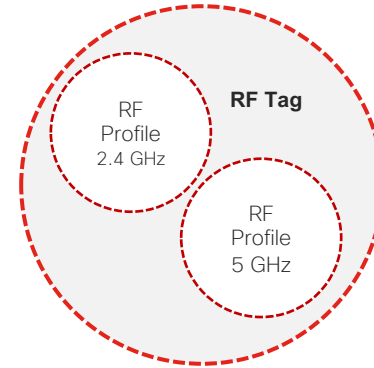
- Defines the **Broadcast domain** (list of WLANs to be broadcasted) with the policies of the respective SSIDs
- “Equivalent” to AP Group in AireOS



Access Points



- Defines the properties of the central/remote sites
- Defines the **roaming domain for Flex APs**
- “Equivalent” to Flex Groups in AireOS but only for Flex APs
- Max Flex APs per site tag is 100 for seamless roaming






- Defines the RF properties of the group of APs

Catalyst 9800 Config Model

Access Points

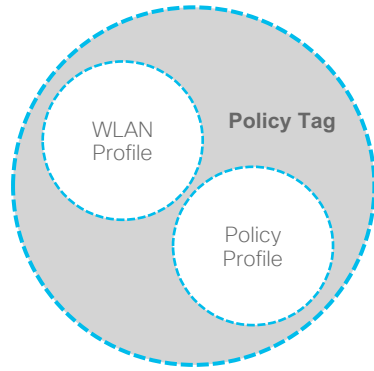


-  RF Tag
-  Policy Tag
-  Site Tag

Profiles and Tags benefits:

- Modular and reusable config constructs
- Flexible in assigning configuration just a group of APs
- Easy to manage site specific configuration across geo-distributed locations
- No reboot needed when applying config changes via tags (remember AP groups?)

Components of Policy Tag



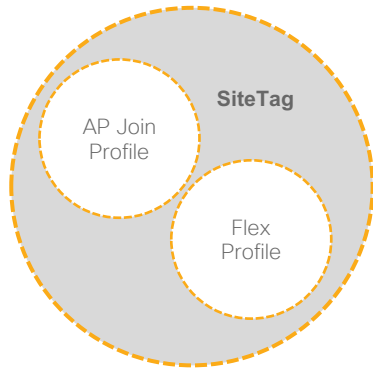
Components of WLAN Profile

- Profile Name
- Status
- WLAN ID
- SSID
- Broadcast SSID
- L2 Security
- L3 Security
- AAA Servers
- Coverage Hole detection
- Aironet IE
- Diagnostic Channel
- P2P blocking
- Max Client connections
- 11v BSS transition
- 802.11k
- Off channel Scan defer
- Load Balance
- Band Select

Components of Policy Profile

- Status
- Local switching
- Central switching
- Central DHCP
- Central Association
- Central Authentication
- Client VLAN
- Multicast VLAN
- WLAN/URL ACL
- Local profiling
- AVC profile
- Netflow
- Client Qos (input and output)
- BSSID Qos (input and output)
- Fabric
- ETA
- CTS Policy
- Umbrella policy
- AAA policy
- Session timeout - 1800
- Idle time out - 300

Components of Site Tag



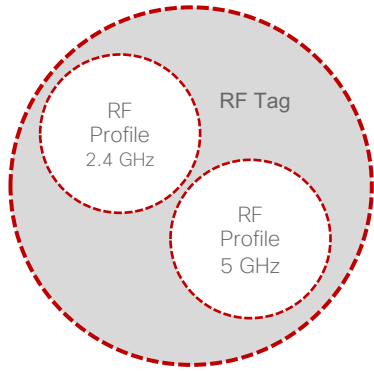
AP Join Profile - defaults

- LED state - Enable
- Heartbeat timer - 30 secs
- Primary discovery timer - 120 sec
- Primed join timeout - 0 seconds
- Discovery timeout - 10 secs
- Fast heart beat timer - 1 sec
- Fast heart beat - disabled
- TCP/MSS - enabled (set to 1250)
- Retransmit count - 5 secs
- Retransmit interval - 15 secs
- Dot1x authentication - disabled
- UDP lite - disabled
- 11u venue group - unspecified
- Username/password - "current default"
- Preferred mode - IPV4
- 11u venue type - unspecified
- Client QinQ - disabled
- DHCP QinQ - disabled
- Reset - Disable
- Static nameserver/domain name -
- Backup primary/secondary
- Core dump -
- Syslog
- Hyperlocation

Components of Flex Profile

- Native VLAN ID
- HTTP Proxy Port
- HTTP Proxy IP Address
- Fallback Radio
- ARP Caching
- Efficient Image Upgrade
- Local Authentication
- Local Auth Users
- Policy ACL
- VLAN Name and ID

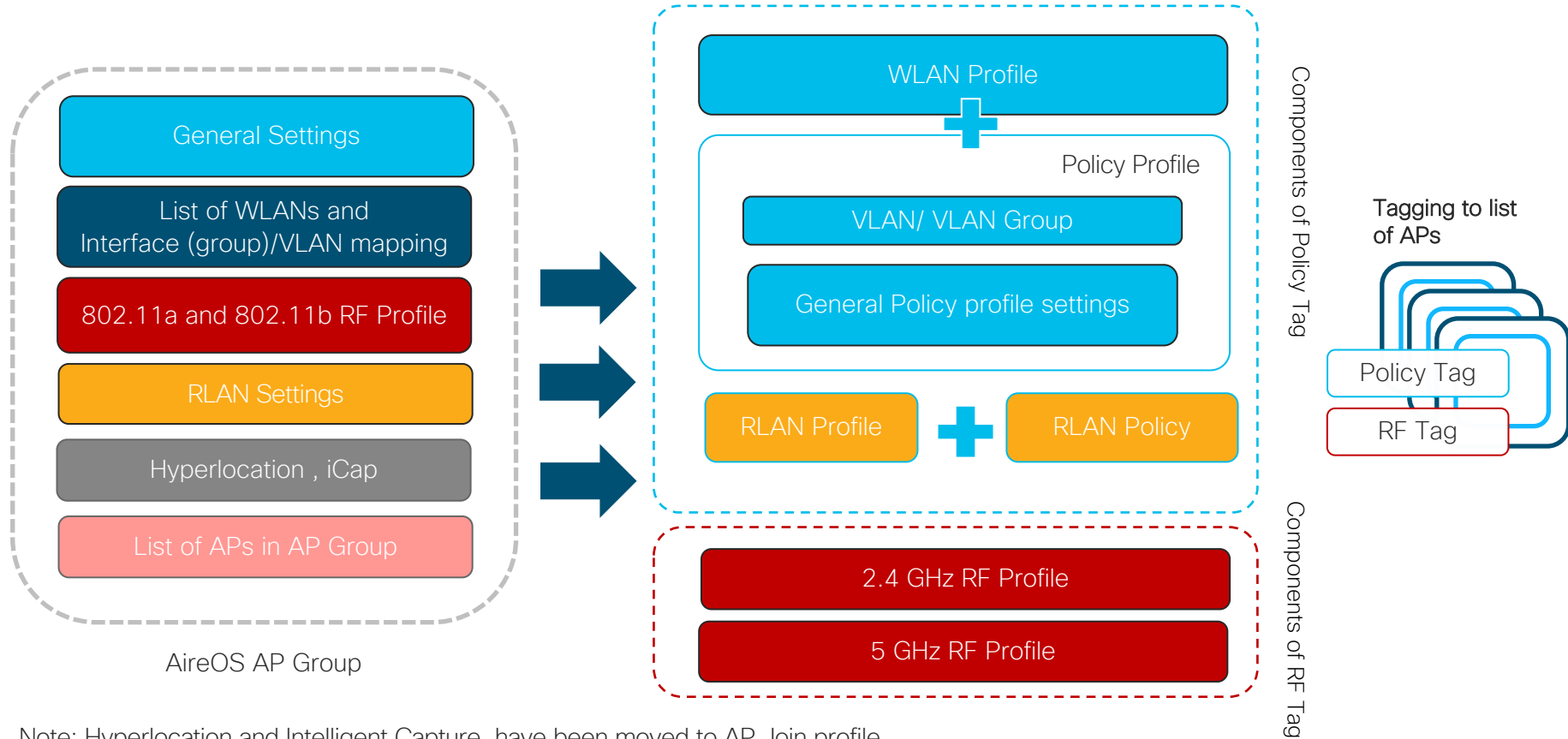
Components of RF Tag



Components of RF Profile

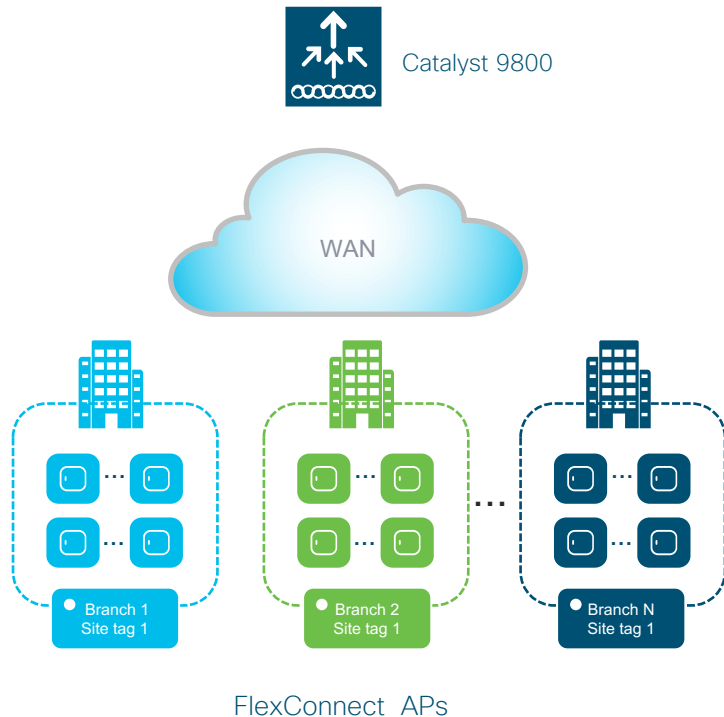
- Data Rates
- MCS Settings
- Maximum and Minimum Power Level Assignment
- Power Threshold v1/v2
- DCA Channel Width
- DCA Foreign AP Interference Avoid Enable
- DCA Channel list
- Coverage Hole Detection Parameters
- Profile Threshold for Traps
 - Maximum Clients
- Multicast Data Rates
- Rx Sop Threshold
- Load Balancing (window & denial)
- Band Select Parameters

AP Group translates to Policy Tag and RF Tag



Note: Hyperlocation and Intelligent Capture have been moved to AP Join profile

Site Tag for FlexConnect Deployments



Important facts:

- For a site with FlexConnect APs, configure the Site Tag to be a non-Local Site (disable Local site)

The screenshot shows the 'Edit Site Tag' configuration page. The fields are: Name* (simo-site), Description (simo-lab), AP Join Profile (default-ap-profile), Flex Profile (simo-flex), and Control Plane Name. The 'Enable Local Site' checkbox is unchecked.

- In this case the Site Tag is equivalent to the FlexConnect Group in AireOS
- As with AireOS, there is a limit of **100 APs** per **Flex Site Tag** for supporting seamless roaming
- Roaming across Site Tags for Flex APs will result in a client full re-authentication

Config model introductory videos



— [Video](#) introduction to c9800 and config models



— [Video](#) on C9800 new config model



— [Video](#) specifically on AP site tags in C9800

Cisco Recommended Releases

Access Points	IOS-XE	AireOS	DNA-C	Prime	CMX	ISE
C9115AX, C9117AX, C9120AX, 9130AX	16.12.3	8.10.121	1.3.3	3.8	10.6.2	2.4 2.6
C9130AX-E	17.2	8.10.121	1.3.3.x*	3.8	10.6.2.x*	2.4 2.6
Wave 2	16.12.3	8.5.164.0	1.3.3	3.7 + device pack 1	10.6.2	2.4 2.6
Wave 2 4800 APs	16.12.3	8.8.130.0	1.3.3	3.7 + device pack 1	10.6.2	2.4 2.6

* To be posted soon

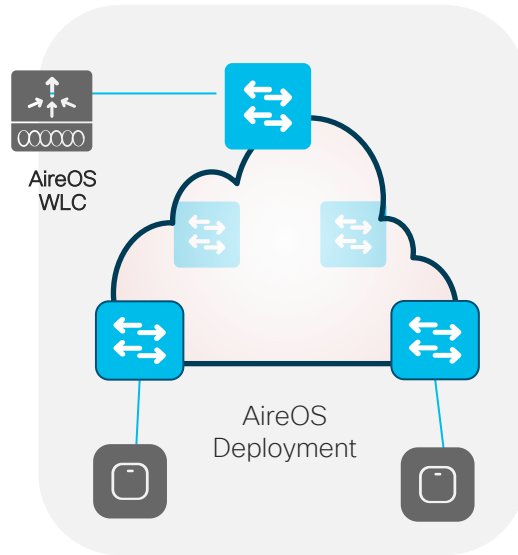
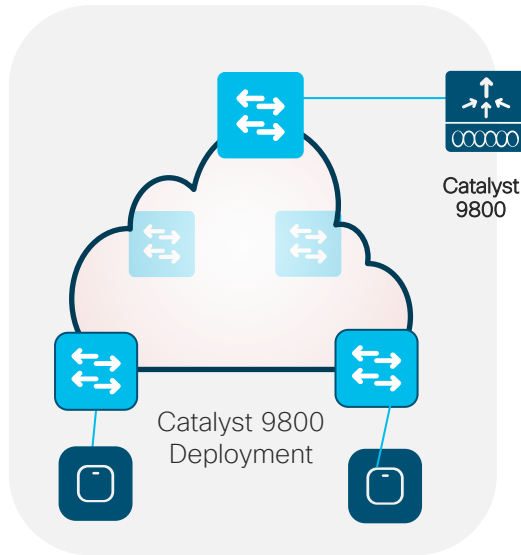
Please check these links for the latest info

<https://www.cisco.com/c/en/us/support/docs/wireless/catalyst-9800-series-wireless-controllers/214749-tac-recommended-ios-xe-builds-for-wirele.html>

<https://www.cisco.com/c/en/us/support/docs/wireless/wireless-lan-controller-software/200046-tac-recommended-aires.html>

Design -
AireOS / C9800 coexistence

How to migrate from Cisco AireOS Controllers to Catalyst 9800?

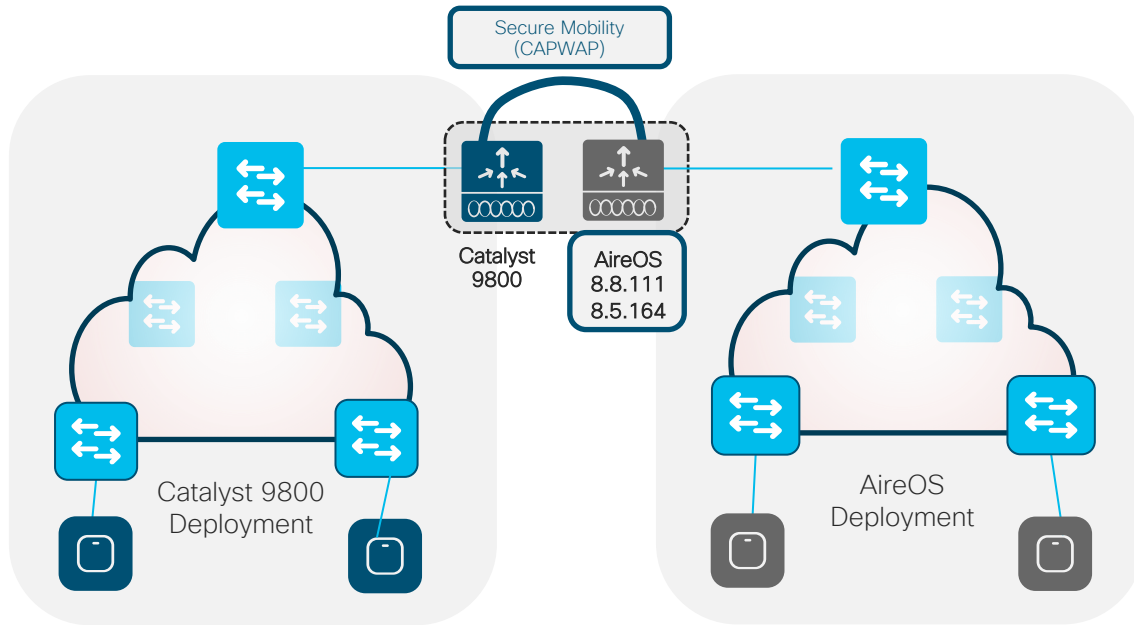


Primary questions:

- Is **seamless roaming** needed?
- Is a unique Dynamic Channel and Power plan needed across Controllers (Cisco **RRM***)?
- Is **Guest Anchor** deployed?

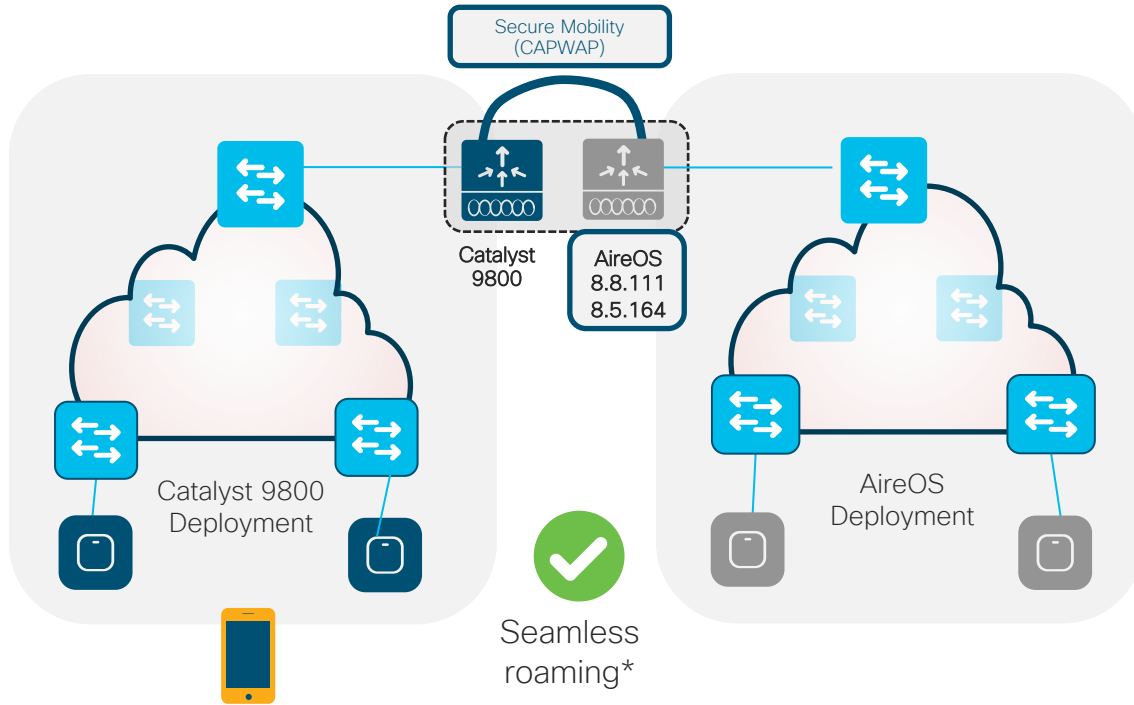
*Radio Resource Management

AireOS to C9800 migration - Roaming



- Mobility Group provides seamless roaming between wireless controllers
- Mobility Group between AireOS and IOS-XE WLCs is only supported on:
 - 3504, 5520, 8540 with 8.8.111 and higher
 - 5508 and 8510 with 8.5.164 special
- This is because C9800 only support CAPWAP based mobility tunnels (Secure Mobility)
- **Note: Secure Mobility is NOT supported on WISM2, 7510, 2500**

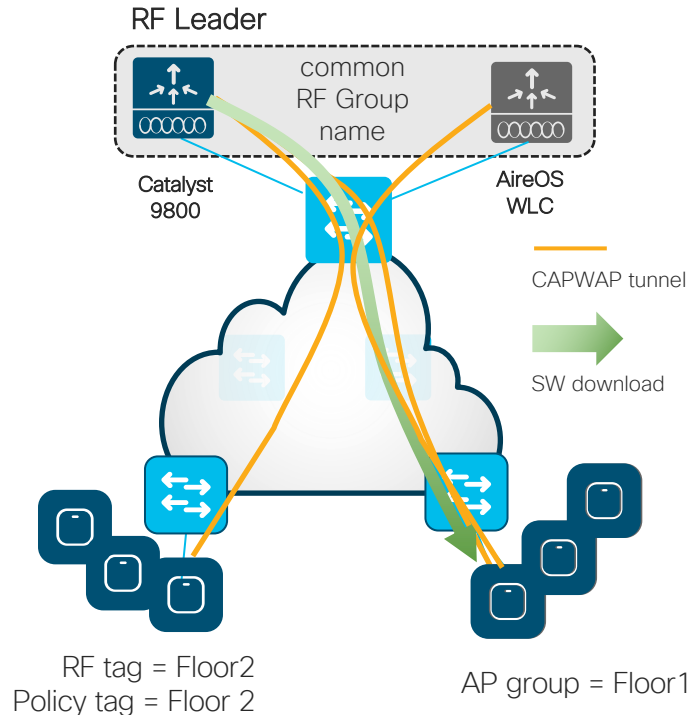
AireOS to C9800 migration - Roaming



- All client roaming between AireOS WLC and C9800 are **L3 roaming**
- The client session will be anchored to the first WLC that the client has joined

AireOS to C9800 migration

Moving APs between Controllers



Things to keep in mind:

- AP migration should happen in chunks (floor or roaming domain/building)
- Make sure the AP can join the C9800 (W1/W2/AX APs)
- The first time you move an AP from AireOS to C9800 (or vice versa), the AP will download the new image, reboot and join the new controller
- If the AP has the image as a backup because had already joined that controller, then there is no download
- When AP joins the C9800 it will get the default Tags. If user wants to assign custom tags, then this can be done using filter or statically assigning the AP to a tag
- To move the AP from AireOS to C9800, two options
 - Manually using Web GUI or CLI commands
 - Prime Templates

Evaluate feature gaps

C9800 Configuration Migration Tool

- Import AireOS configuration to verify if there are any feature gaps
- Migration tool managed by TAC: <https://cway.cisco.com/wlc-config-converter/>

The screenshot shows the Cisco TAC Tool Beta Tool interface. At the top, it says "Tools Catalog / Beta Tool" and "Cisco TAC Tool". The main heading is "Beta Tool BETA" with a sub-heading "Migrating wireless controllers to or from access any of these platforms: 2500/5500/7500/8500/WISM2/3650/3850/4500 S8E/5760/Catalyst". Below this, it asks the user to upload configuration files, providing instructions for AireOS and Converged Access. A file named "config_wlc.txt" (185.7 KB) is shown as uploaded. At the bottom, there is a dropdown menu for platform migration, currently set to "AirOS-->C9800". A callout box points to this dropdown with the text "Choose the AireOS to C9800 converter and hit run". A "Run" button is located at the bottom left.

Drop the AireOS config file:

- Upload it from directly from GUI:



or

- use the "show run-config command" output and put it in a .txt file

C9800 Configuration Migration Tool

- Import your AireOS configuration to verify if there are any feature gaps

The screenshot displays the Cisco TAC Tool interface for migrating configuration from AireOS to C9800. The tool is titled "Tools Catalog / Beta Tool Cisco TAC Tool". The main heading is "AirOS-->C9800". Below this, there is a "Run" button and a section titled "Converted Config Lines". This section contains four expandable categories: "+ Translated Config", "+ Unsupported Config", "+ Not Applicable Config", and "+ Unmapped Config". The "Translated Config" category is expanded, showing a list of configuration lines. The first line is "! Interface Configuration", followed by a separator line. The next line is "! config interface vlan management 113". The following line is "! config interface address management 207.129.102.249 255.255.255.0 207.129.102.254". The next line is "vlan 113", followed by "name 'management'", "no shutdown", "interface vlan 113", "description 'management'", "ip address 207.129.102.249 255.255.255.0", and "no shutdown". Two blue arrows point from the text on the right to the "!" symbols at the start of the configuration lines.

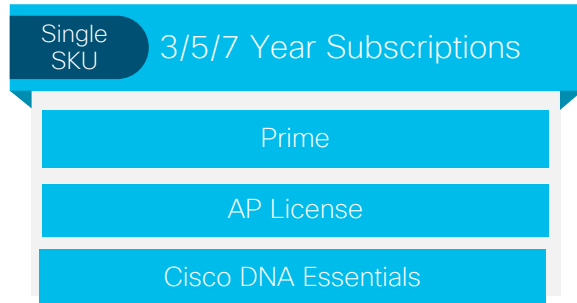
Tool provides following config:

- **Translated** (translated in IOS-XE)
- **Unmapped** (supported but not translated)
- **Unsupported** (not supported in C9800)
- **Not Applicable** (deprecated)
- AireOS CLIs and the correspondent translated IOS-XE commands
- Always recommended to analyze the translated config before paste it

License

Wireless Subscription Offer Structure

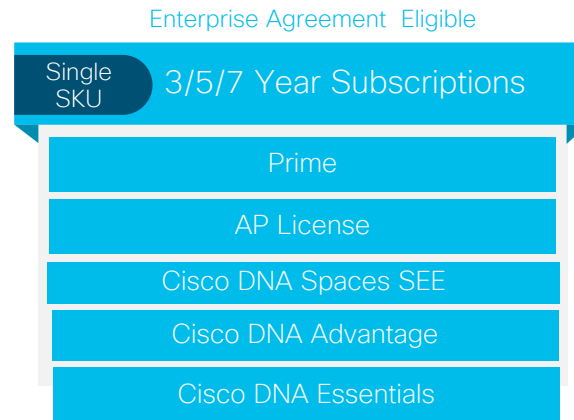
Cisco DNA Essentials



Base Automation



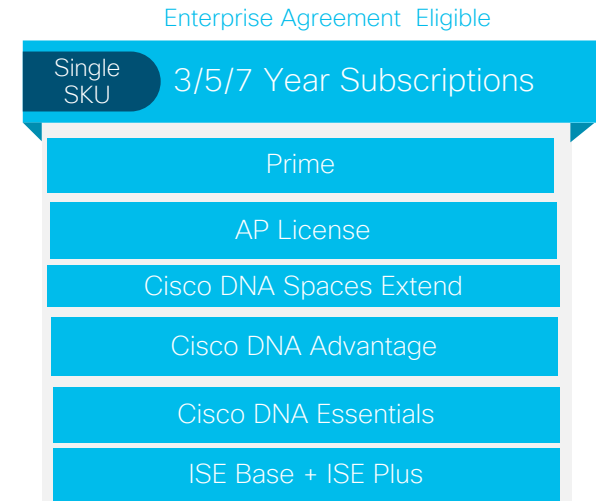
Cisco DNA Advantage



Automation and Assurance



Cisco DNA Premier



Automation, Assurance, SDA, security and location

*Customers can also get Cisco DNA software on 3504/5520/8540

Software Support Service (SWSS) included in all subscriptions

Catalyst Wireless License Packaging

Advantage

DNA Advantage (Inclusive of DNA Essentials)

3,5,7 Year Terms

Advanced Automation

- SD-Access
- Location Plug and Play
- Automated ISE integration for guest
- 3rd party API integration

Enhanced Security & IoT

- Encrypted Traffic Analytics
- AWIPS*

Policy Based Workflows

- EasyQoS configuration
- EasyQoS monitoring
- Policy-based Automation

Element Management

- Patch Lifecycle Management

Assurance & Analytics

- Guided Remediation
- Apple iOS Insights
- Proactive issue Detection
 - Aironet Active Sensor Tests
 - Intelligent capture
 - Client Location Heatmaps
 - Spectrum Analyzer
- Application performance (Packet Loss, Latency and Jitter),
- App 360, AP 360, Client 360 and WLC 360
- Custom Reports*



WiFi 6 Features

- Docker Container Support*
- Advanced WIPS

Essentials

DNA Essentials

3,5,7 Year Terms

Basic Automation

- PnP Application
- Network Site Design and Device Provisioning

Element Management

- Software Image Management
- Discovery, Network Topology
- AVC

Telemetry

- Flexible NetFlow

Basic Assurance

- Health dashboard (Network, Client and Application)
- AP Floorplan and Coverage map
- Pre-defined Reports

Base Security

- Basic WIPS*

Network Advantage (Inclusive of Network Essentials)

Perpetual

High Availability & Resiliency

- ISSU, Process Restart,
- Rolling AP Upgrades,
- Patching (CLI)
- AP service pack/AP device pack

Flexible Network Segmentation

- VXLAN

Network Essentials

Perpetual

Essential Wireless Capabilities

- 802.1x authentications, Guest access, device onboarding, Infra and client IPv6, ACLs, QoS, Videostream, Smart defaults, RRM, Spectrum intelligence, BLE, Zigbee, USB, TrustSec SXP, AP and client SSO, Dynamic QoS, Analytics, ADP, OpenDNS, mDNS, IPsec, Rogue Management and Detection, Mobility

Optimized RF

- FRA, Client link, ClearAir Advanced,
- NG-HDX, Predictive/Proactive RRM

DevOps Integration

- PnP Agent
- NETCONF, RESTCONF*, gNMI*,
- Yang Data Models
- GuestShell (On-Box Python)*

IoT Optimized

- Identity PSK, Enhanced Device profilers

Telemetry & Visibility

- Model-driven Telemetry
 - NETCONF dial-in, gRPC dial out*

Federal Certifications*

- FIPS, CC, UCAPL, USGV6

Software Support Service (SWSS) included in all subscriptions

Next Steps



Register to other Brainsnacks on
<https://cs.co/daily-brainsnack>

All Cisco BeLux events
<http://cs.co/belux-events>

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