



You make **possible**



Next Generation Wireless

Sarath Gorthi
Technical Marketing Engineer, EN

BRKEWN-2010

CISCO *Live!*

Barcelona | January 27-31, 2020



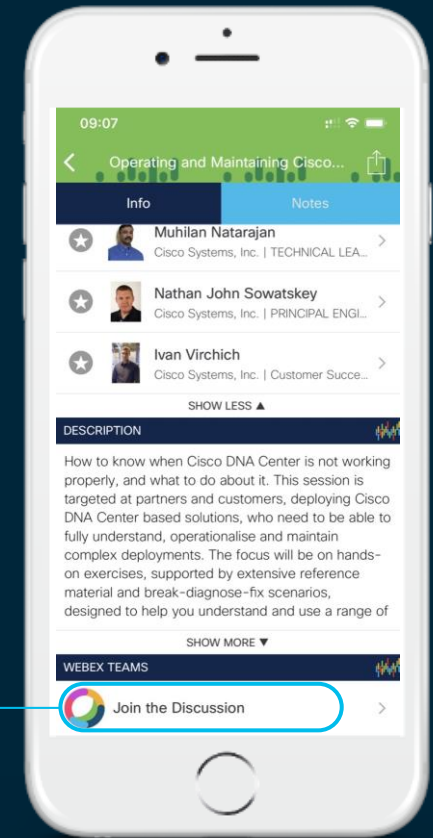
Cisco Webex Teams

Questions?

Use Cisco Webex Teams to chat with the speaker after the session

How

- 1 Find this session in the Cisco Events Mobile App
- 2 Click “Join the Discussion”
- 3 Install Webex Teams or go directly to the team space
- 4 Enter messages/questions in the team space



It's Time to Think Differently about Mobility



Agenda

- Next Generation Wireless Stack
- Wi-Fi 6 and Cisco Catalyst 9100 Access Points BRKEWN-2017
- Cisco Catalyst 9800 Controller and IOS-XE BRKEWN-2670
- Cisco DNA Center
 - Assurance BRKEWN-2034
 - Automation BRKEWN-2026
- Cisco DNA Spaces and CMX BRKEWN-2012
- Campus of the Future

Next Generation Wireless Stack

It's Time to Think Differently about Mobility



Immersive Experiences



Mobility for IoT



Technology Transitions

Basic Data Connectivity



Streaming Video 4K / 8K
AR / VR / LBS

Superior HD connectivity and
user experience

Industrial IoT



Autonomous Vehicles & Machines
Physical Access / Medical Equipment
Vending Machines / Sensors

Classification and rapid threat
containment

Cellular | Wi-Fi

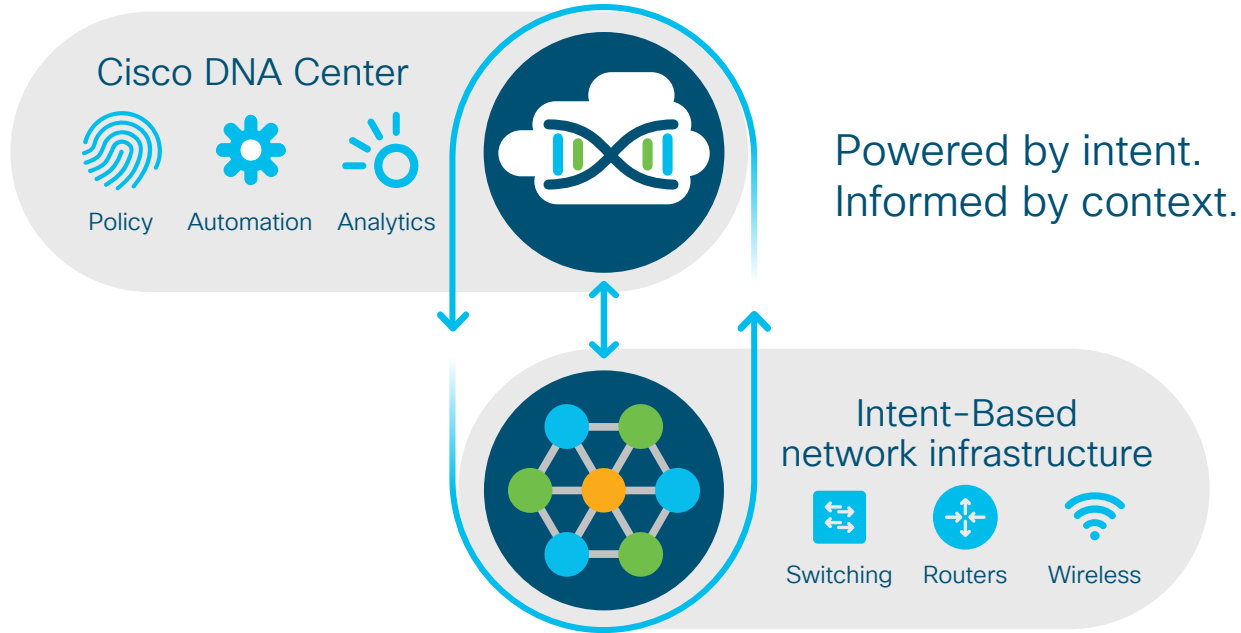


Seamless
5G + Wi-Fi 6

Beyond Wi-Fi, drive digital
business forward

It's Time to Think Differently about Networking

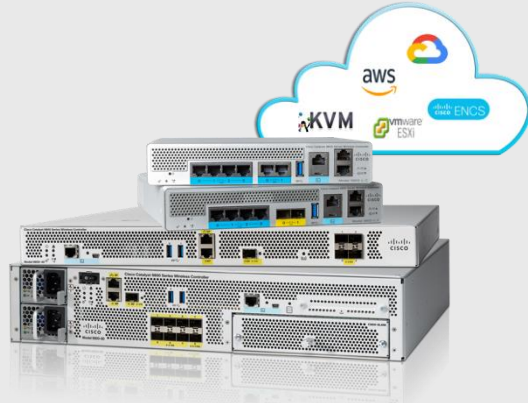
Intent-Based Networking



Cisco Next Generation Wireless Stack



Catalyst 9100
Access Points



Catalyst 9800
Wireless Controllers



Cisco DNA
Assurance &
Automation



Cisco DNA
Spaces

Resilient, Secure, Intelligent

A decorative pattern at the top of the slide consists of vertical bars and circles of varying heights and widths, arranged in a rhythmic, wave-like sequence across the width of the page.

An Introduction to Wi-Fi 6 and Cisco Catalyst 9100 Access Points

6 for 6



Increased
Speed



Higher
Density
& Capacity



Improved
Security



Reduced
Latency

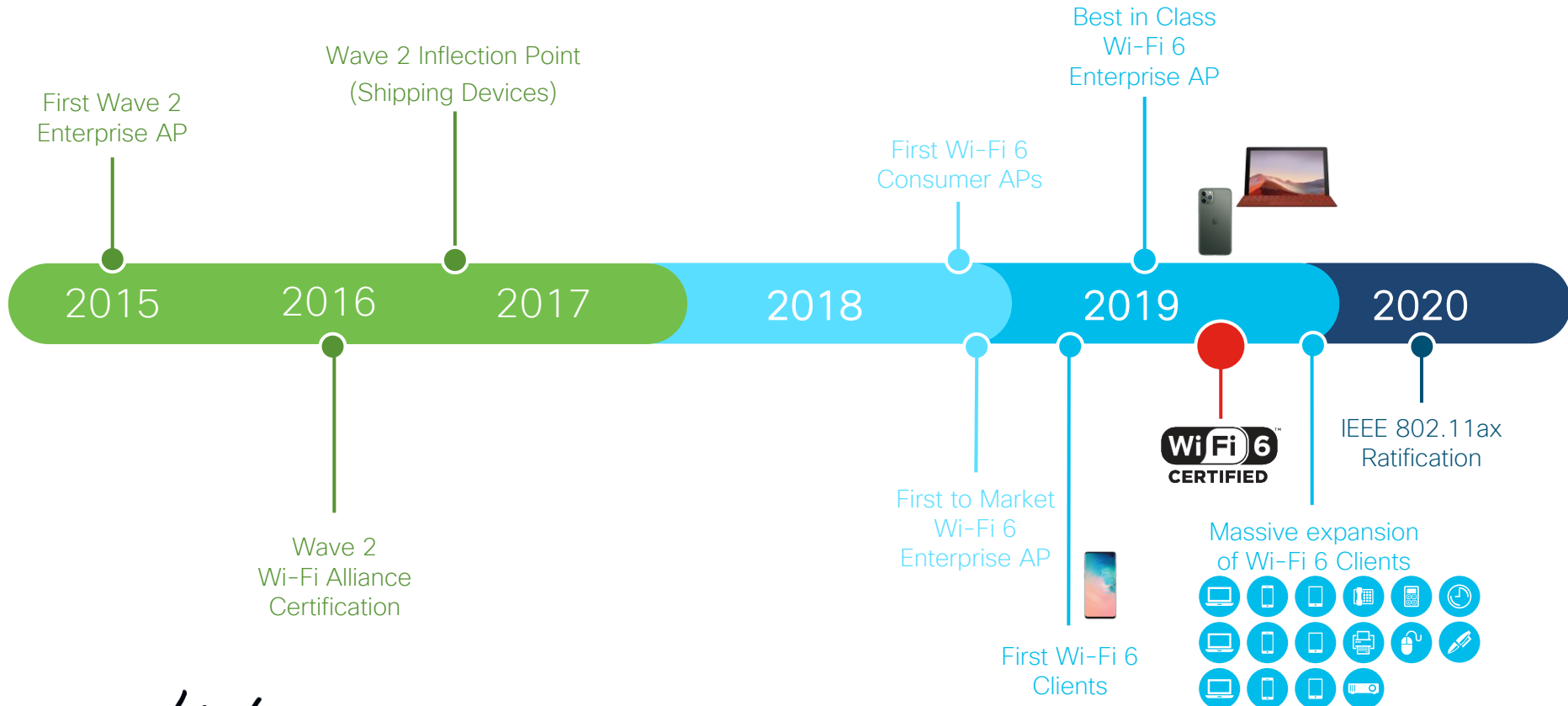


Greater
Range



Power
Efficient

Wi-Fi Evolution



Cisco is Making Wi-Fi 6 Even Better

Innovation Beyond the Standard



Cisco
RF
ASIC

Spectrum Intelligence
Interference and
Rogue Detection



AI/ML Assurance
RF Analytics
Location Analytics

Built for IoT & Security



Multilingual Radio



RF Snapshot



IoT Segmentation

Wireless Ecosystem



Device
Interoperability



Google and
Facebook
Wi-Fi



OpenRoaming

Powered by Next Generation Cisco Catalyst Wireless Access

New Cisco Catalyst 9100 Series access points

Ideal for small to medium-sized deployments >

Mission critical and scale deployment >



9115AX

- 4x4 + 4x4
- MU-MIMO, OFDMA
- Spectrum Intelligence
- 1 x 2.5 mGig
- TWT



9117AX

- 8x8 + 4x4
- MU-MIMO, OFDMA (only DL)
- Spectrum intelligence
- 1 x 5 mGig
- TWT
- Integrated Antenna only



Powered by
Cisco RF ASIC

9120AX

- 4x4 + 4x4
- Cisco RF ASIC for Next Gen CleanAir
- Dual 5GHz, Next Gen HDX
- RF signature capture
- IoT ready (Zigbee)
- Application Hosting
- 1 x 2.5 mGig
- TWT



Powered by
Cisco RF ASIC

9130AX

- 8x8 + 4x4; 4x4 + 4x4 + 4x4
- Tri-radio: Dual 5GHz + 2.4GHz
- Cisco RF ASIC for Next gen CleanAir
- Full iCap with data packets
- Dual 5GHz, Next Gen HDX
- RF signature capture, TWT
- Smart Antennas supporting up to 8x8
- IoT ready (Zigbee)
- Application Hosting
- 1 x 5 mGig
- First 8x8 AP with external antennas

Cisco DNA Assurance with iCAP

Bluetooth 5

USB

Integrated or external antenna SKUs

CISCO *Live!*

Cisco Catalyst 9120 Powered by Cisco RF ASIC

Cisco RF ASIC



RF Signature Capture,
Spectrum Intelligence

Clean Air, Off-channel
RRM, FRA

Dual Filter DFS,
Zero-Wait DFS

Fast Locate w/o
performance impact

WIPS/WIDS/Rogue
Detection

Optimised Roaming
for mobile devices



Cisco Catalyst 9800 Controller and IOS-XE

Next Generation Wireless Architecture

Catalyst 9800 Next Generation Wireless Controller



Built for Intent-based Networking | Powered by IOS XE | Deploy Anywhere

The Most Deployed Controller

RF excellence | Device ecosystem | Wireless assurance



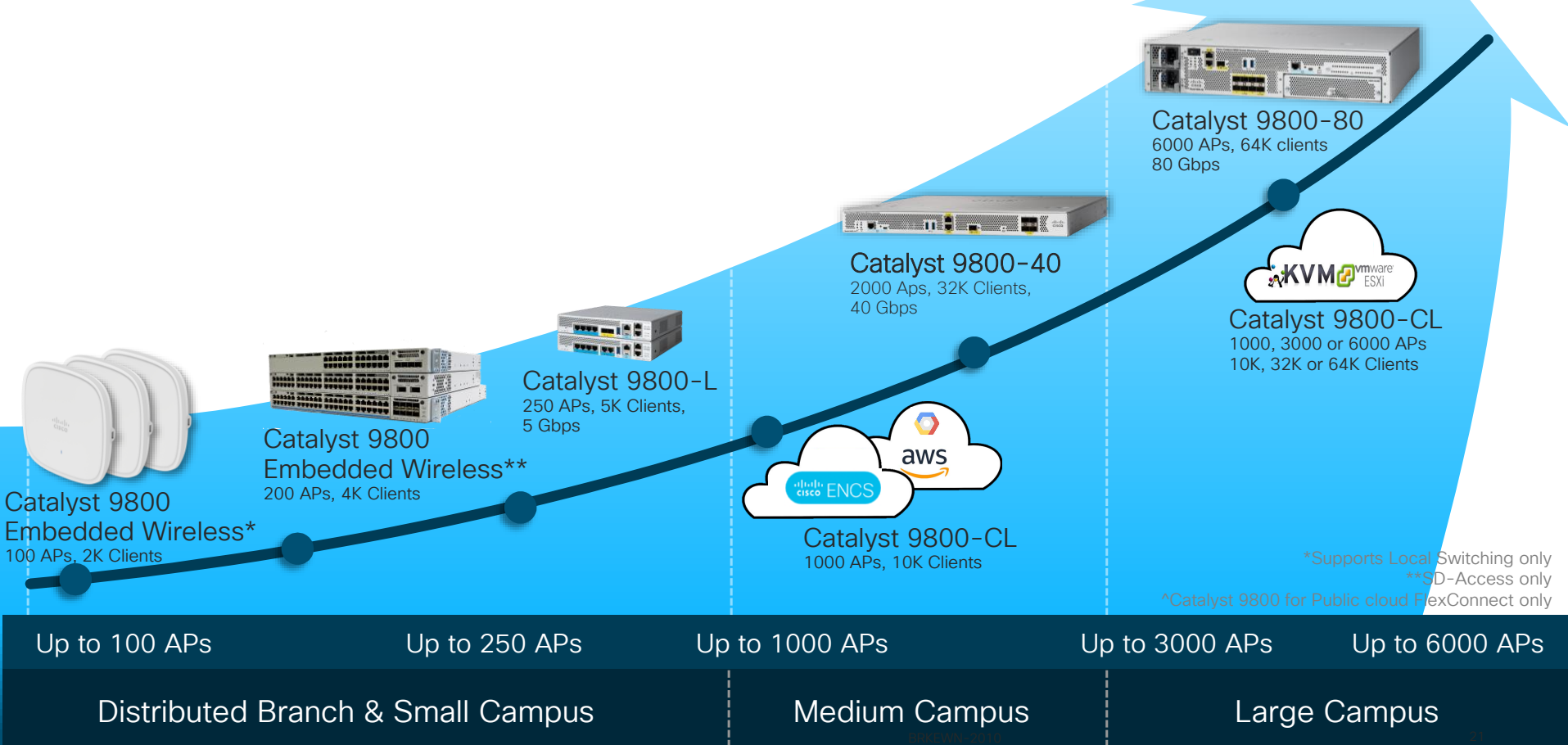
A Modern Modular OS

High Availability | Programmability | Scale

CISCO *Live!*

Bringing together network leadership with RF Innovation

Flexible Deployment Options

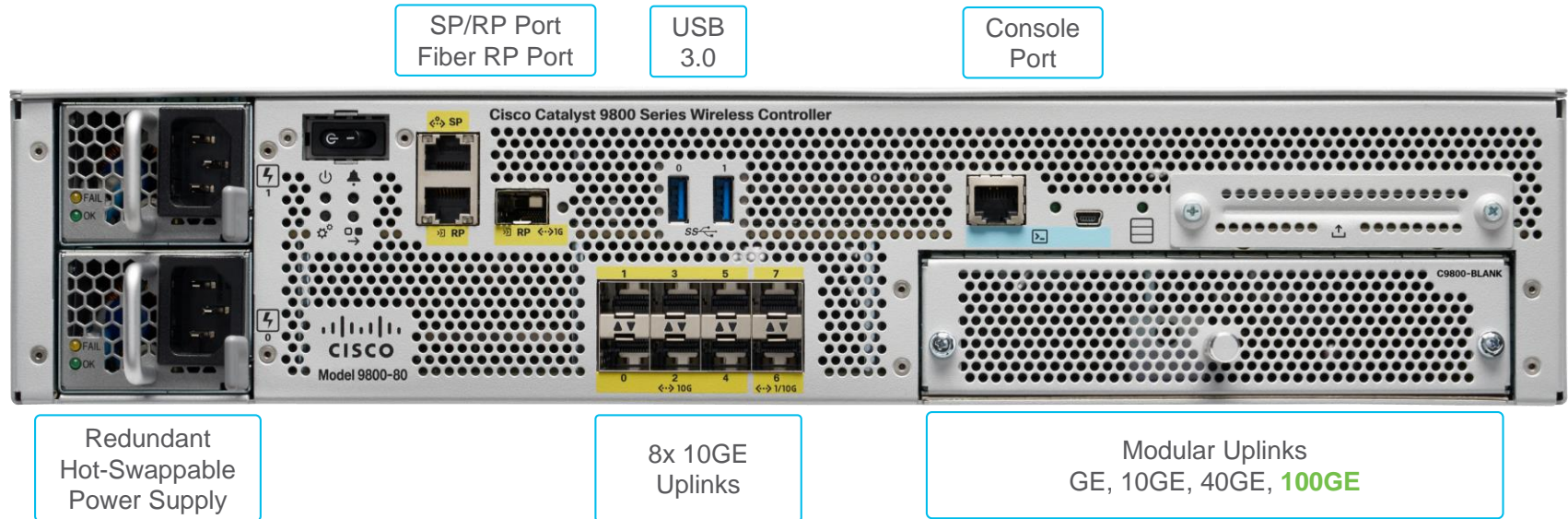


Cisco Catalyst 9800-80

Up to 6,000 APs

Up to 64,000 Clients

80 Gbps



Cisco Catalyst 9800-40

Up to 2,000 APs

Up to 32,000 Clients

40 Gbps



Console Port

USB 3.0

SP/RP Ports

Fiber RP Port

4x 1GE/10GE Ports

Redundant Hot-Swappable Power Supply

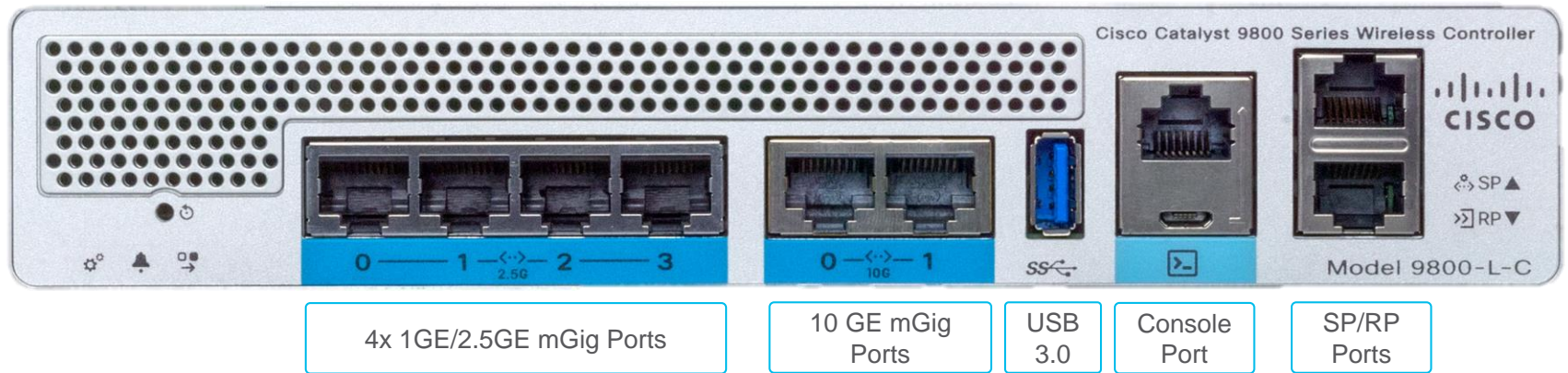


Cisco Catalyst 9800-L

Up to 250 APs

Up to 5,000 Clients

5 Gbps



Cisco Catalyst 9800-CL



Catalyst 9800 for Private Cloud

Scale to 6,000 APs and 64,000 Clients[^]

Centralised, FlexConnect, SDA Fabric

Open and Programmable



Catalyst 9800 for Public Cloud

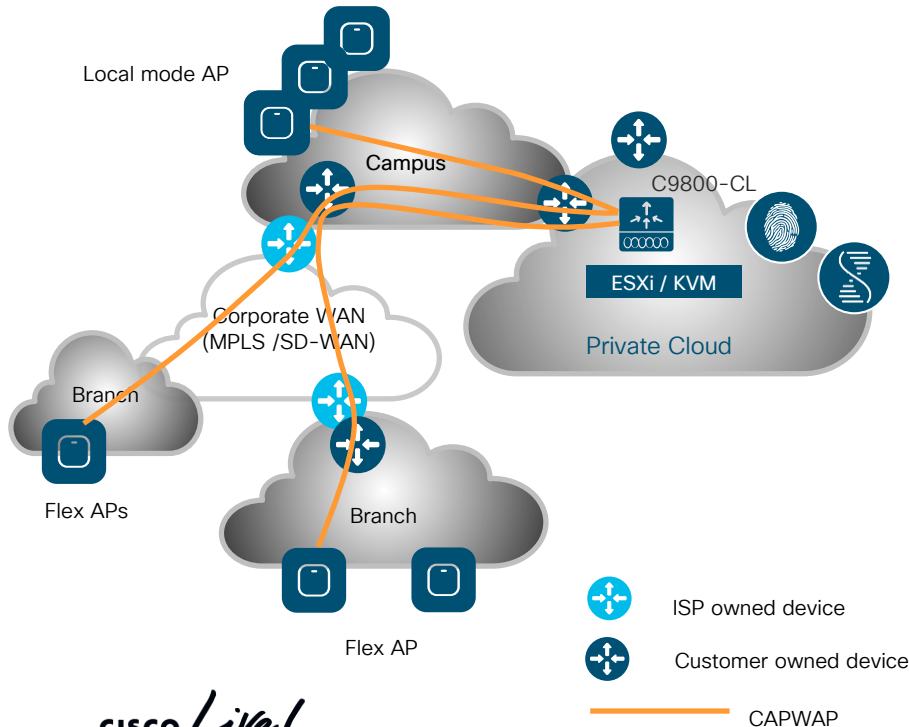
Scale to 1,000 APs and 10,000 Clients

FlexConnect Local Switching

Open and Programmable

Catalyst 9800 Private Cloud Deployment

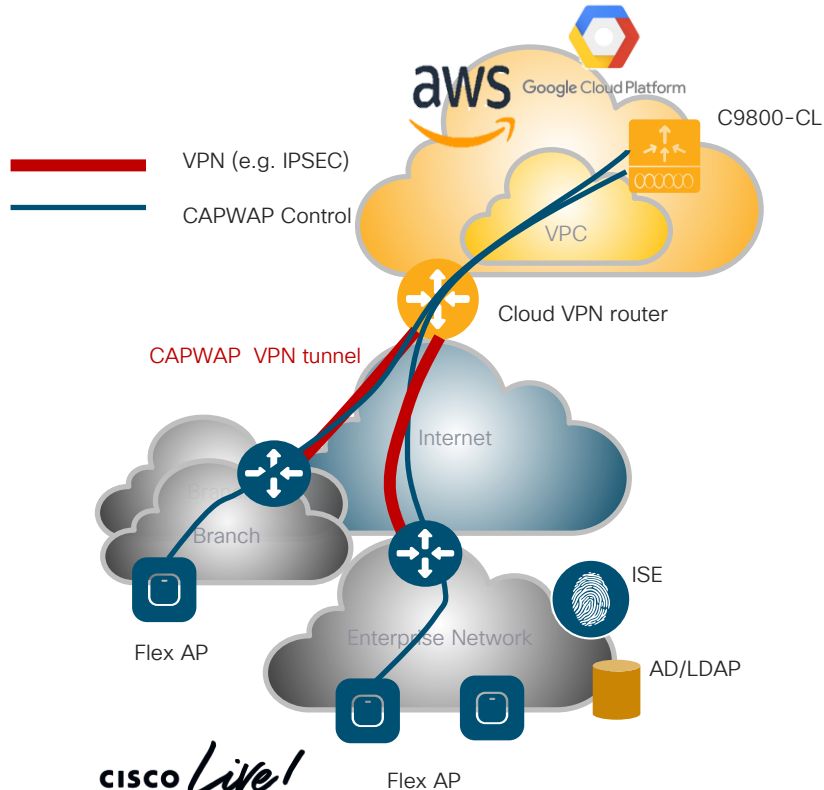
Wireless Infrastructure Virtualisation



- VMware ESXi , KVM and ENCS
 - ESXi vCenter or KVM Virt-Mgr for VM provisioning
 - Automated VM bootstrap flow (ESXi vCenter only)
- Support all AP modes and deployment models
 - Design for centrally switched traffic < 2.5 Gbps

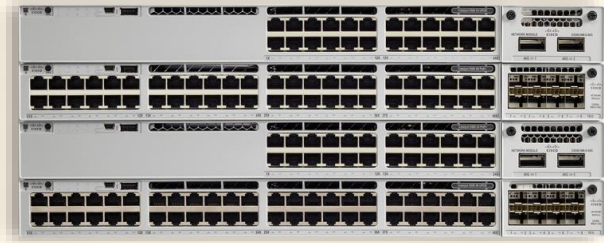
Catalyst 9800-CL Public Cloud Deployment

Wireless Infrastructure as a Service



- VM provisioned via AWS and GCP web console
 - AWS CloudFormation template to ease the initial setup
- Supports N+1 HA
- Flex central authentication and local switching
 - ISE and AD typically on-premise
- **VPN recommended**
 - **Reduces risk of publicly exposed network infrastructure**

Cisco Catalyst 9800 Embedded Wireless



Catalyst 9800 for Catalyst Switch

Scale to 200 APs and 4,000 Clients

SDA Fabric

Supported on Catalyst 9300, 9400
and 9500 Series switches



new

Catalyst 9800 for Catalyst Access Point

Scale to 100 APs and 2000 Clients[^]

FlexConnect Local Switching

Support on Catalyst 9100 Series
access points

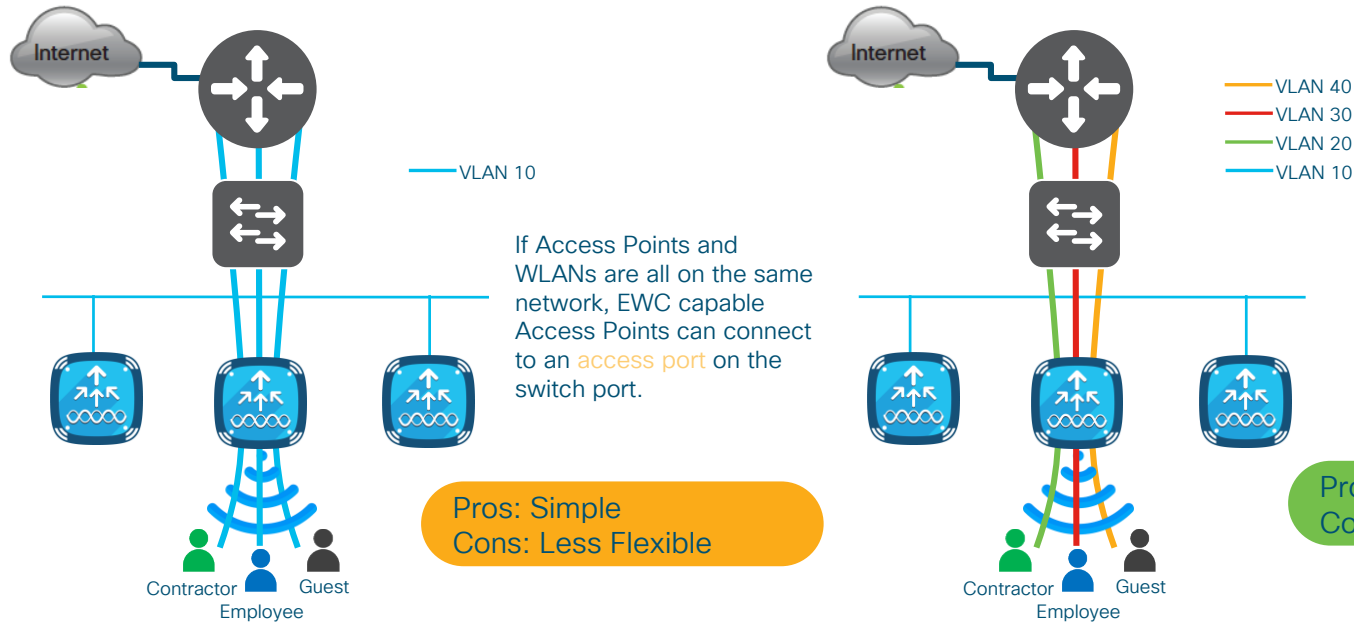
CISCO *Live!*

[^]50 Aps and 1000 Client on 9115/9117

Deploying Cisco Embedded Wireless Controller

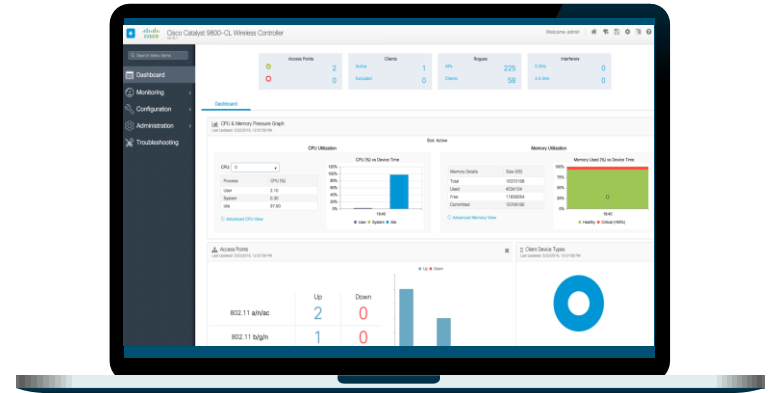
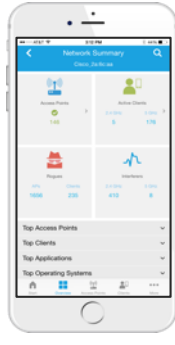
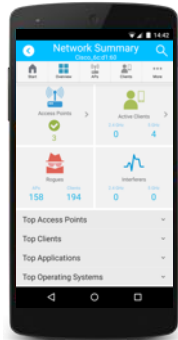
Embedded Wireless Controller for Catalyst 9100 Series

- EWC capable Access Points can be connected to an **access port** or a **trunk port** on the switch depending on the deployment method
 - Management traffic is always untagged



Over-The-Air Provisioning

Embedded Wireless Controller for Catalyst 9100 Series



Cisco Wireless Mobile App

WebUI



Embedded wireless controller ready for mid-market & enterprise branch deployments

Resilient



Redundancy with active and standby controllers on two AP's & serving clients at the same time

<10 seconds

Active to standby switchover in a few seconds



SMU (patching) support for both controller and access point

Secure



aWIPS,* rogue detection, identification, and mitigation



Walled garden and DNS blocking



Cloud-delivered enterprise security with Cisco Umbrella™*

Intelligent, with IT simplicity



Simplified WebUI for monitoring, provisioning, and day-N operations



Cisco DNA Center Plug and Play (PnP), Automation, and Assurance



Open standards-based programmability with NETCONF and YANG

Embedded Wireless Controller on Catalyst 9100 Access Points

Ideal for single or multisite small to medium-sized enterprise deployments



C9115AX-EWC-x

- 50 access point, 1000 clients
- 4x4 + 4x4
- MU-MIMO, OFDMA
- Spectrum intelligence
- Bluetooth 5
- 1 x 2.5 mGig
- USB
- Integrated or external antenna



C9117AX-EWC-x

- 50 access point, 1000 clients
- 8x8 + 4x4
- MU-MIMO, OFDMA (only DL)
- Spectrum intelligence
- Bluetooth 5
- 1 x 5 multigigabit
- USB
- Integrated antenna only

Mission critical

Best suited for high density enterprise branch deployments



Powered by
Cisco® RF ASIC

C9120AX-EWC-x

- 100 access point, 2000 clients
- 4x4 + 4x4
- MU-MIMO, OFDMA
- Cisco RF ASIC
- Dual 5GHz, HDX
- RF signature capture
- 1 x 2.5 multigigabit
- Integrated or external antenna



Powered by
Cisco RF ASIC

C9130AX-EWC-x

- 100 access point, 2000 clients
- 8x8 + 4x4 or 4x4 + 4x4 + 4x4
- Tri-radio (Dual 5GHz + 2.4GHz), HDX
- Cisco RF ASIC
- RF signature capture
- Decrypted data packet ICAP
- 1 x 5 multigigabit
- 8 port smart antennas

Software feature parity
across APs

Supports up to 100 APs,
2000 clients

Supports Wave 2 APs as
client serving

Cisco DNA Assurance
with ICAP

CISCO *Live!*

What about 802.11ac Wave 2 access points?

All Wave2 Access Points supported in client serving mode

Ideal for small to medium-sized deployments >

Mission critical >

Indoor



1815w



1815i,
1815m



1832



1842



1852



2802



3802



4800

Outdoor



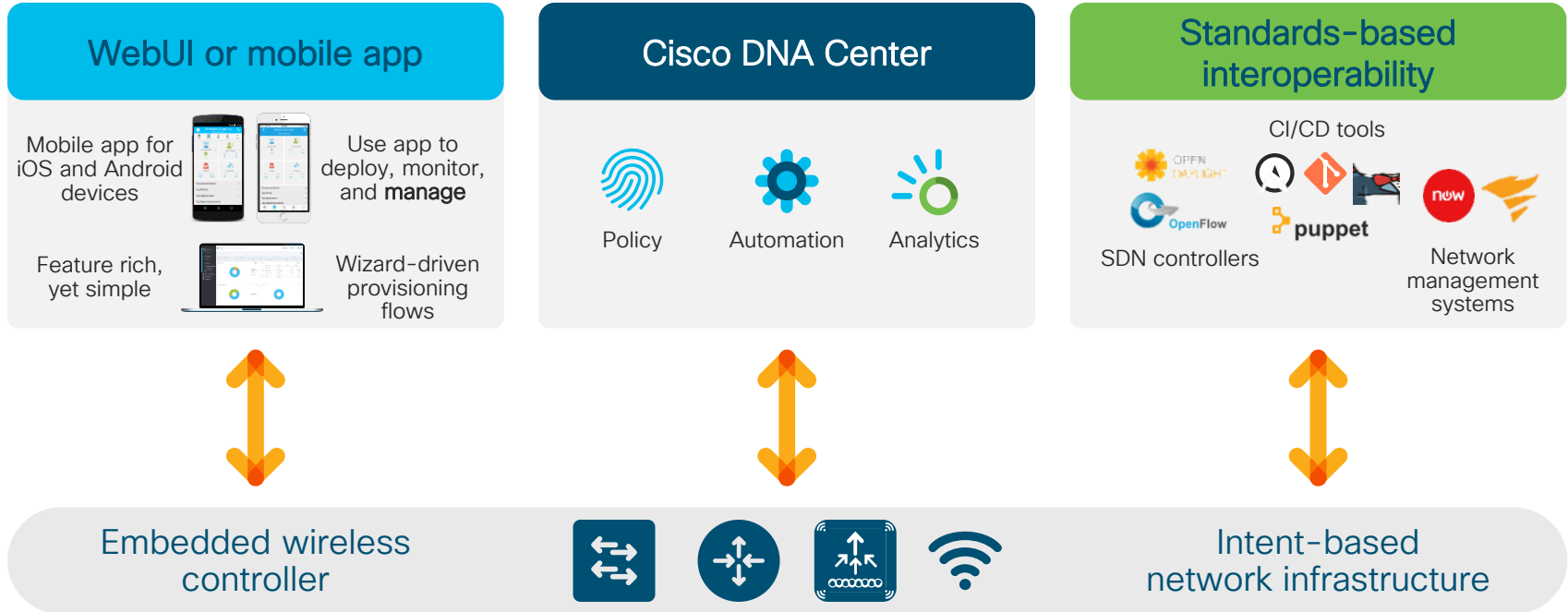
1540



1560

ALL 802.11ac Wave 2 access points can connect to the embedded wireless controller

Embedded Wireless Controller – Flexible management options



Day-0 provisioning – What's new?

- All APs join to EWC-AP in day 0
- Single “CiscoAirprovision-<ABCD>” PSK SSID
- mywifi.cisco.com URL for accessing EWC-AP WebUI
- Mobile app provisioning
- No need for static management IP
- No reboot of EWC-AP after day-0 configuration



Catalyst 9800 High Availability

Unplanned Events

Device and network interruptions

- ✓ Stateful Switch Over with an active standby
- ✓ N+1 redundancy for always-on network, services and clients

Infrastructure Updates

Software maintenance & AP updates

- ✓ Seamless software updates for wireless controllers and APs
- ✓ AP device pack and flexible per-site updates contain impact area

Software Image Upgrades

Wireless controller image upgrades

- ✓ N+1 rolling AP upgrades ensure seamless client connectivity
- ✓ Radio resource management automates group creation



Contain impact within release

Fixes for defects and security issues without need to requalify a new release



Faster resolution to critical issues

Provide fixes to critical issues found in network devices that are time-sensitive

Unplanned Events

Catalyst 9800 High Availability



Always on **Network**

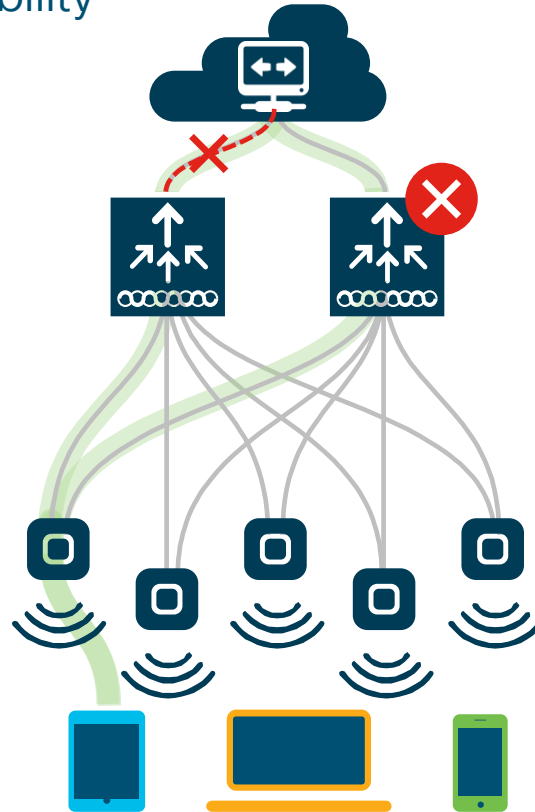
APs continue to stay associated

Always on **Services**

Uninterrupted voice, video and data services

Always on **Clients**

Users and end-points continue to stay connected



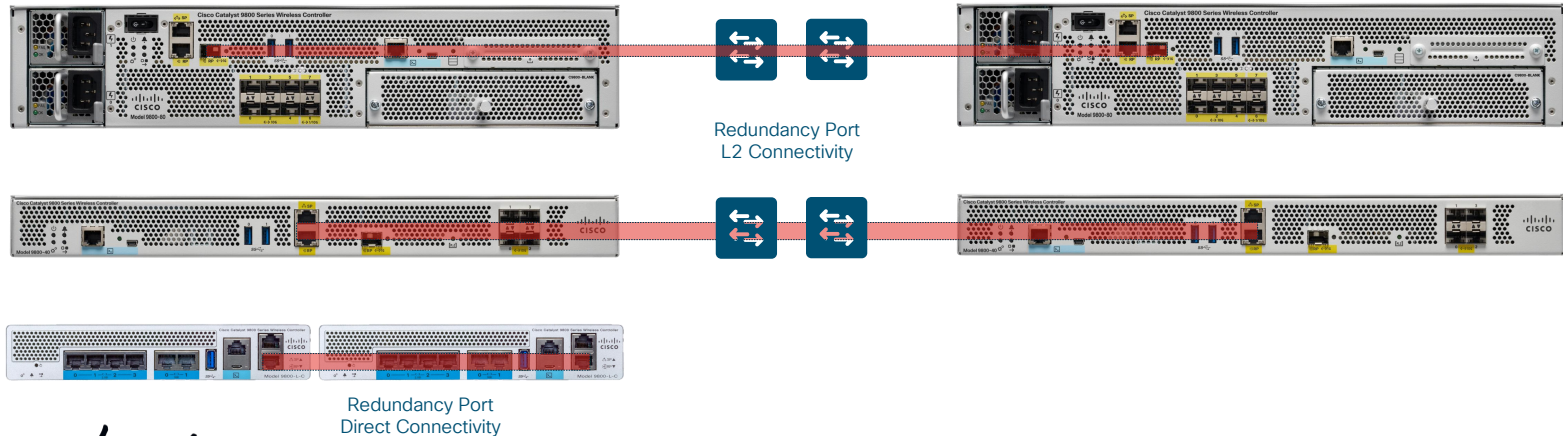
How it Works

- ✓ Upstream device and network interruptions trigger a switchover to maintain end-point connectivity
- ✓ Hot standby controller takes over in case of failure of an active controller
- ✓ Seamless connectivity with Stateful Switchover (SSO) for end-points

High Availability

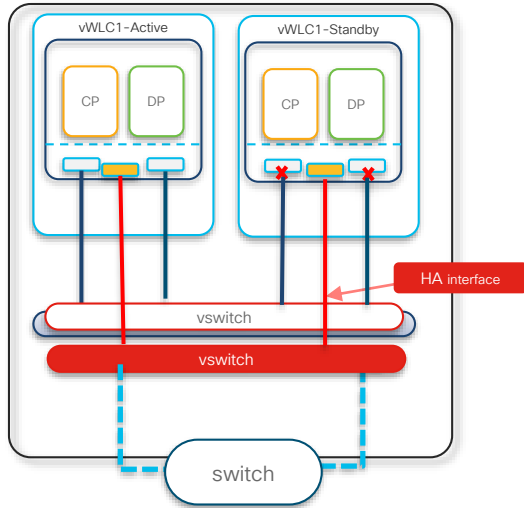
Catalyst 9800 Physical Appliance

- A direct physical connection between Active and Standby Redundant Ports or Layer 2 connectivity is required to provide stateful redundancy within or across datacenters
- Sub-second failover with no SSID outage

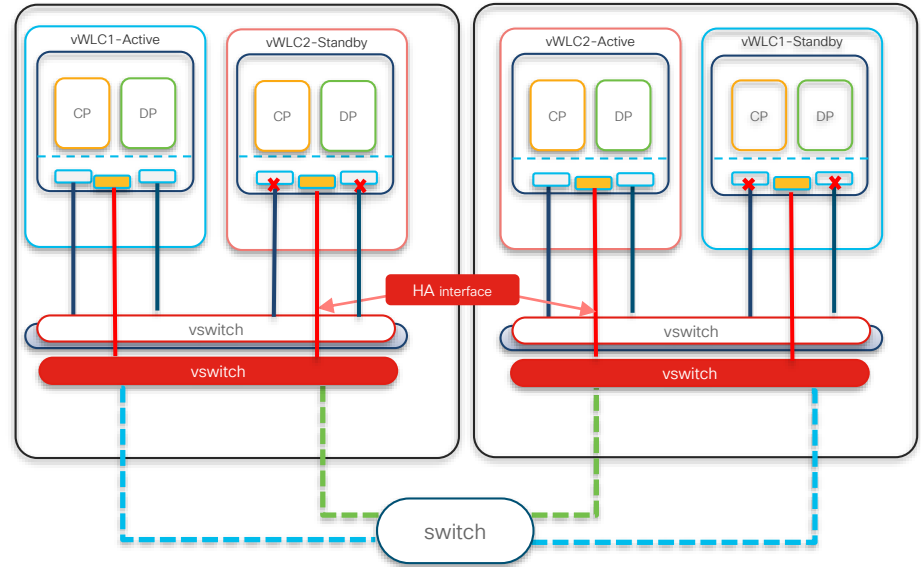


High Availability

Catalyst 9800 Virtual Appliance



Redundancy Port
Direct Connectivity

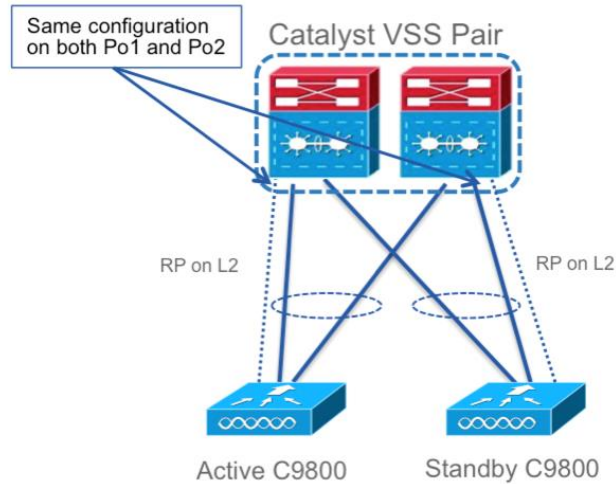


Redundancy Port
L2 Connectivity

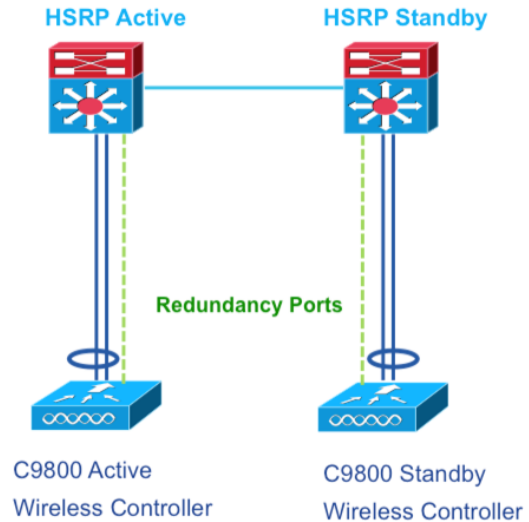
High Availability

Campus and Branch Network Design

Virtual Switching System



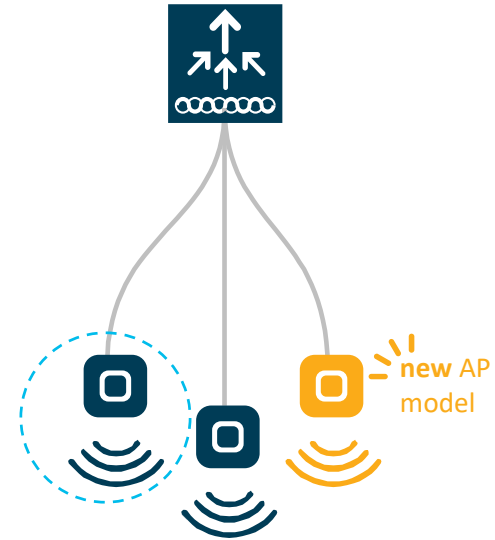
Hot Standby Routing Protocol



Infrastructure Updates

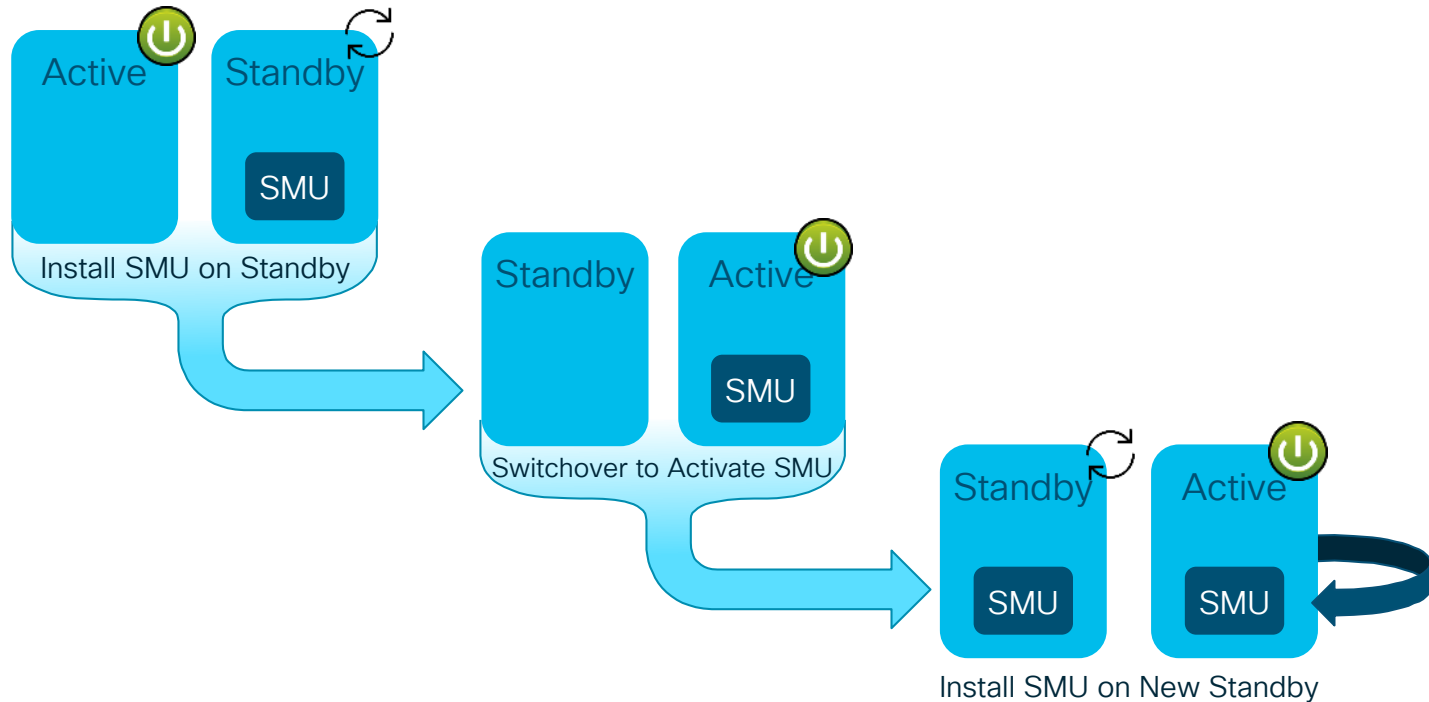
Catalyst 9800 High Availability

- Software Maintenance Updates (SMU)
 - Hot patch controllers without client downtime
 - Cold patch controllers with N+1 Hitless Rolling AP Update
- AP Service Pack (APSP)
 - Service updates for specific Access Point models without impacting other models
- AP Device Pack (APDP)
 - Introduce new AP models in your network without any downtime and without impacting other APs



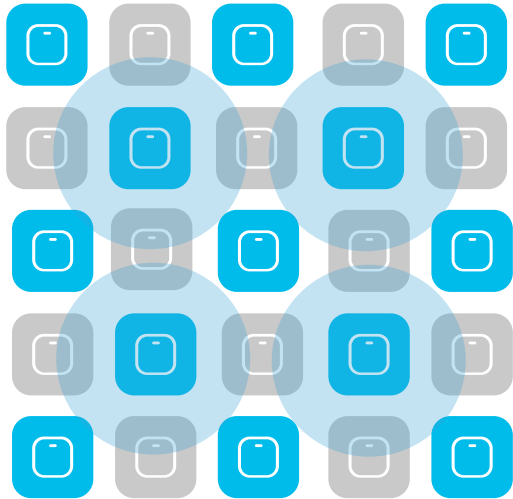
Software Image Upgrades

Catalyst 9800 High Availability



N+1 Hitless Rolling AP Upgrade

Software Image Upgrades



25%

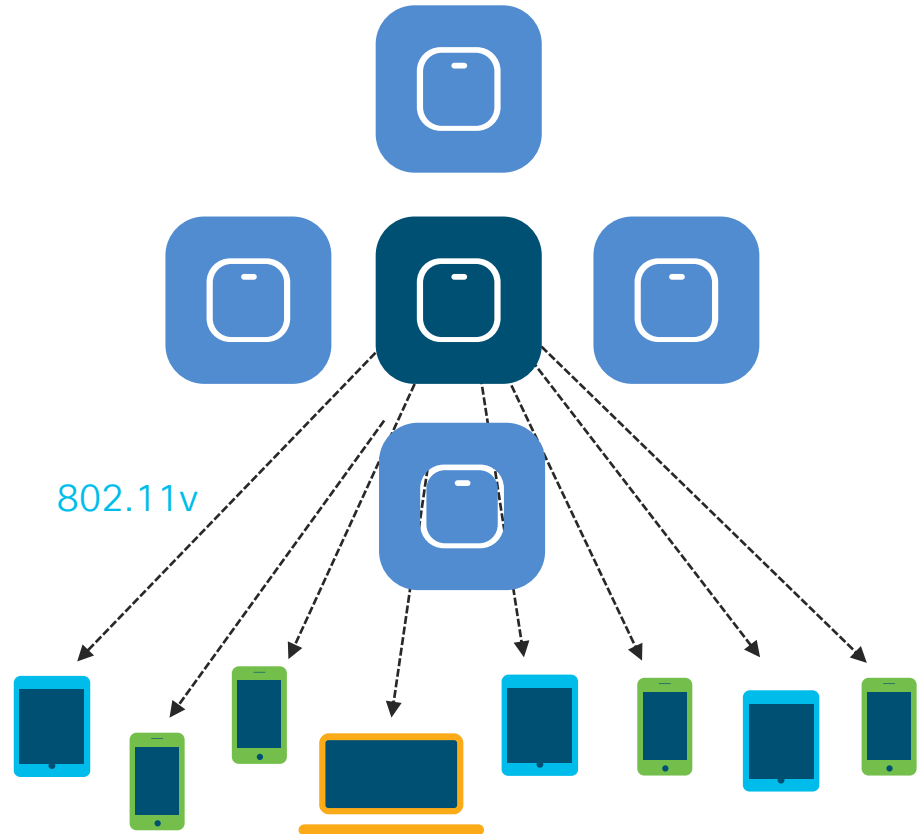
15%

5%

Client Steering

N+1 Hitless Rolling AP Upgrade

- Clients steered from candidate APs to non-candidate APs
 - 802.11v BSS Transition Request
 - Dissociation Imminent
 - Non-802.11v clients will be de-authenticated before AP reload



Flexible Management Options

DNA Center



Policy



Automation



Analytics

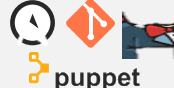


Standards Based Interoperability

CI/CD Tools



SDN Controllers



puppet



NMS Systems

Custom Development

Model Driven Programmability

Zero Touch Provisioning



App Hosting

YANG Data Models

Guest Shell (On Box Python)



Prime Infrastructure



Native Controller UI



Catalyst 9800
Wireless Controllers



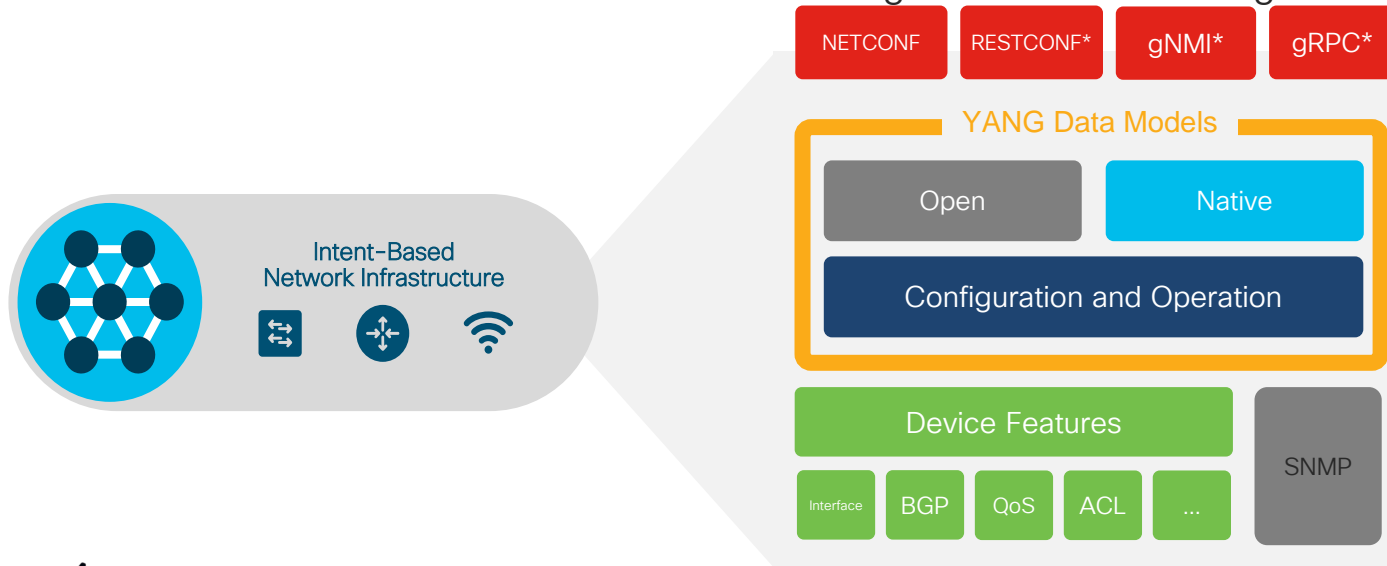
Intent-Based
Network Infrastructure

Wireless Programmability Stack

Cisco IOS-XE

The NETCONF, RESTCONF, gNMI and gRPC are programmatic interfaces that provide additional methods for interfacing with the device

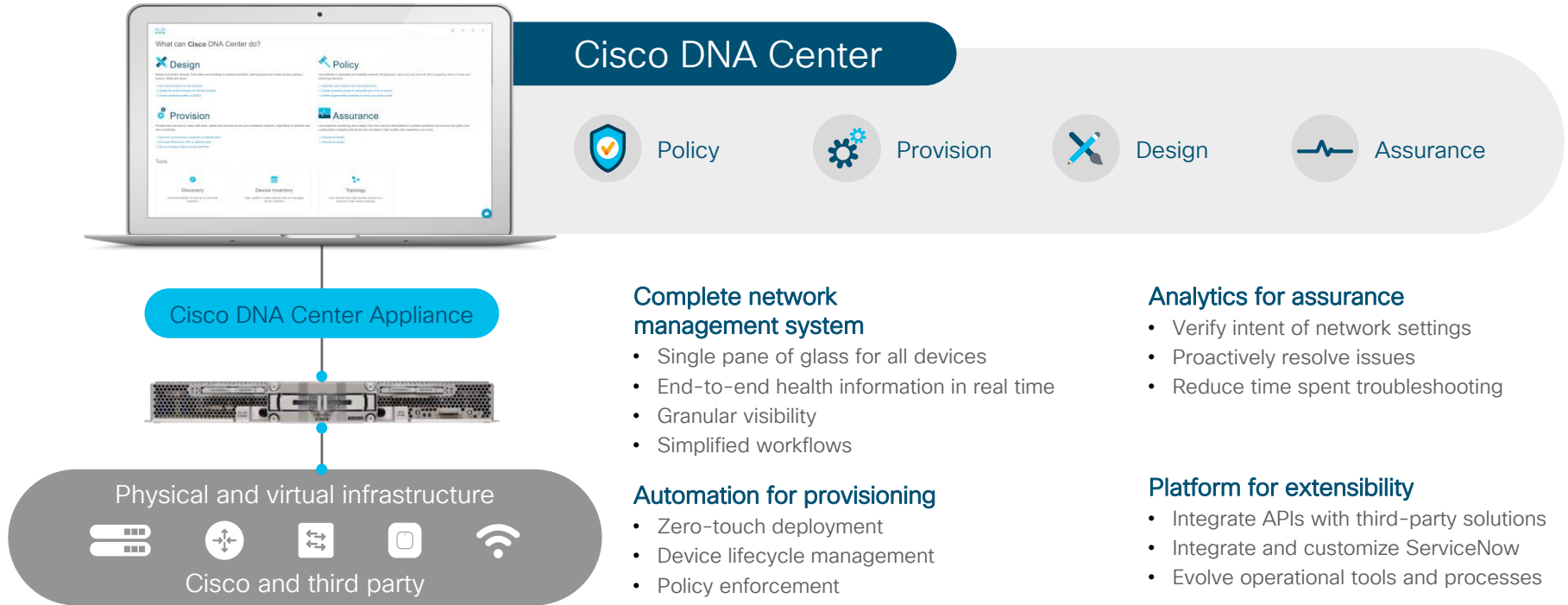
YANG data models define the data that is available for configuration and streaming telemetry





Cisco DNA Center and Assurance and Automation

Cisco DNA Center



What is Assurance?

The guarantee that the infrastructure is doing what you intended it to do



Continuous
verification

Configurations, changes,
routing, security, services,
VMs, compliance, audits

Successful IT rollouts



Insights and
visibility

Visibility, context,
historical insights, prediction

Reduced downtime,
increased user productivity



Corrective
actions

Guided remediation,
automated updates, system
optimization

IT productivity

Cisco DNA Assurance

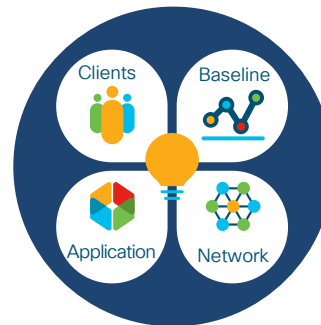
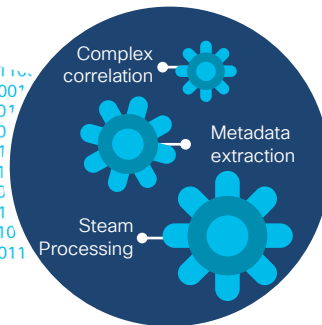
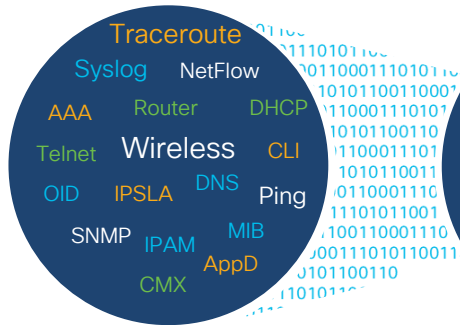
From network data to business insights

Network telemetry
contextual data

Complex event
processing

Correlated
insights

Suggested
remediation



Everything as a sensor

Over 150 actionable insights

Clients | Applications | Wireless | Switching | Routing

Network Health

Cisco DNA Center DESIGN POLICY PROVISION ASSURANCE

Dashboards Insights And Trends Manage

Network Health

Healthy Percent

Location: Global

LATEST TREND

Network Devices

75% 📈

Healthy Network Devices

TOTAL DEVICES 16

- Monitored 16
- Healthy 12
- Unhealthy 4
- Unmonitored 0

Cisco DNA Center DESIGN POLICY

Dashboards Insights And Trends

Client Health

Healthy Percent

Location: Global

LATEST TREND

Wireless Clients

73% 📈

TOTAL: 41

Active: 37 | Inactive: 1 | New: 3

2 Not Onboarded

35 Onboarded

13 Connected Clients

13 Onboarded

Good Connectivity 100%

View Details

Intelligent Capture: 5C:5F:67:CD:D3:C7

Run Data Packet Capture Download Start Live Capture

1 hour

9:45p PCAP 10:00p 10:05p 10:10p 10:15p 10:20p 10:25p 10:30p 10:35p 10:40p 10:45p

Onboarding Events

LIVE

All Anomaly PCAP Export PCAP

Time	Duration
Onboarding -- Incomplete	10:42:49 pm 60 ms
Authentication Done	10:42:19 pm 30 ms
Client Deauthenticated	10:42:19 pm
Authentication Done	10:42:19 pm
Authentication Start	10:42:19 pm
Onboarding -- Incomplete	10:40:49 pm 60 ms
Onboarding -- Incomplete	10:40:31 pm < 1 ms
Delete	10:40:30 pm
Onboarding -- Incomplete	10:38:18 pm 90 ms
Authentication Done	10:38:18 pm < 1 ms

Authentication Done

Oct 3, 2019, 10:42:19.199 pm

Client 5C:5F:67:CD:D3:C7 failed to connect because client did not respond on EAP ID request

Show: IPv4 and IPv6 Download Packets

802.11 Open Auth Association

802.1x/EAP

DHCP

Data

802.11k/11v Associated AP

Interpacket Gap (µs)

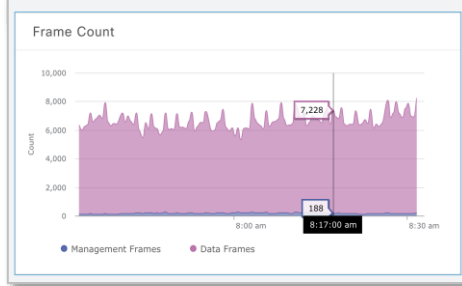
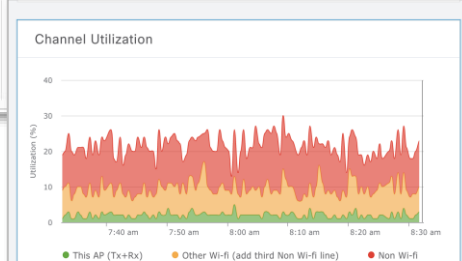
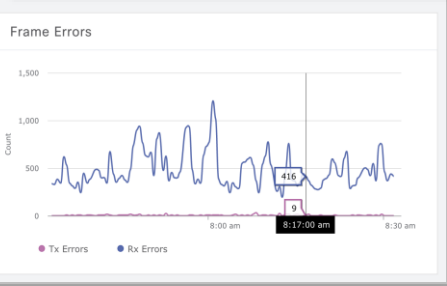
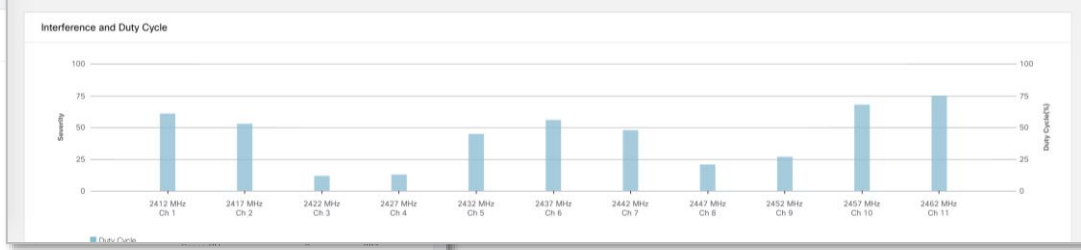
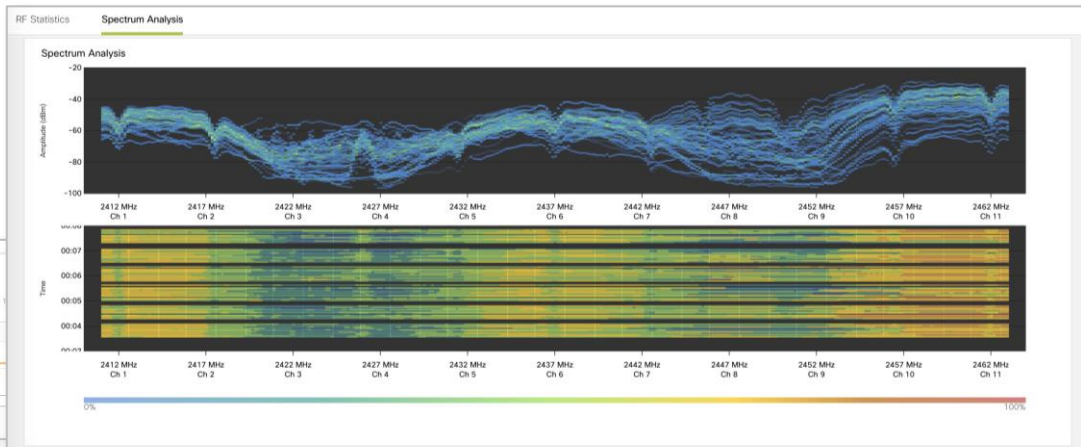
RSSI (dBm)

PACKET

- ▲ From Client
- ▼ From AP
- Interpacket Gap
- RSSI (dBm)



Wireless Assurance



6710 * AP AP4800.606E

Device Model: AP-AP4800-B-K9 | IP Address: 10.13.5.130 | Location: Global / San Francisco / One Bush St / F913 | Software Version: 8.8.120.6 | Mode: local | Uptime: 8 days 1

8:30 pm - 8:30 pm

Jun 12, 2019 5:30 pm
Device Health: 6

*Device Health is the minimum of all KPI Health Score.



Client Health

Client Onboarding Times

Association
0% attempts >= 5s

AAA
No data available

DHCP
No data available

Displaying data based on selection: *Aug 06, 3

Filter

Identifier IP Address

- anandg 20.21.10.6
- nate 20.21.10.157

Cisco DNA Center

DESIGN POLICY PROVISION ASSU

Intelligent Capture: DESKTOP-MBNGUKF

1 hour

PCAP May 08 1:04a

Onboarding Events **LIVE**

All Anomaly PCAP Export PCAP

May 8, 2019	Time	Duration
Onboarding	1:50:26 am	90,160 ms
Onboarding	1:50:26 am	90,160 ms
Onboarding	1:48:55 am	90,150 ms
Onboarding	1:47:23 am	90,164 ms
Onboarding	1:45:52 am	90,236 ms
Onboarding	1:44:21 am	90,233 ms
Onboarding	1:42:51 am	90,248 ms
Onboarding	1:41:20 am	90,254 ms
Broadcast Rekey	1:40:46 am	33,676 ms
Onboarding -- Incompl...	1:39:50 am	57 ms
Onboarding	1:38:19 am	90,169 ms



Onboarding

May 8, 2019, 1:50:26.164 am - May 8, 2019, 1:51:56.324 am

Client DESKTOP-MBNGUKF failed to connect because client did not respond on EAP ID request

Auto Packet Analyzer

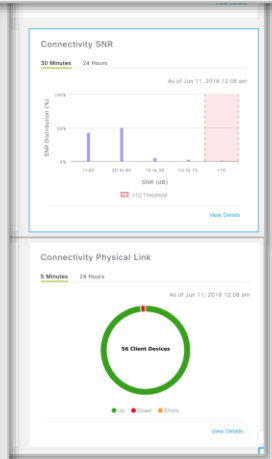
Show: IPv4 and IPv6

802.11 Open Auth Association
802.1x/EAP
DHCP
Data
802.11k/11v Associated AP: AP4800-8DCE

Expert Info: **Consecutive and codirectional EAPOL packets**
Packet #: 17

Interpacket Gap (µs) vs RSSI (dBm) graph showing a 2.509ms gap at -48 dBm.

PACKET: ▲ From Client ▼ From AP ■ Interpacket Gap



Wireless Active Sensor

1800S Active Sensor



Client Wireless Performance and Network Readiness Test



- Desktop mount
- Client Wi-Fi Performance (2x2 with 2 SS)
- Multiple powering options

Onboarding

- Assoc.
- Auth.
- DHCP
- 802.1x EAPTLS, PEAP

Network Services

- DNS
- RADIUS

Performance

- IP SLA: Packet Loss, Jitter, Latency for UDP based apps
- Speed Tests from network to cloud

App Connectivity

- Web: HTTP
- Email: POP3, IMAP, Outlook
- Host Reachability
- File Transfer: FTP

RF Assessment

- Active RF scan: RSSI, SNR, Data rate
- AP Discoverability

Configure Tests Remotely

Onboarding & Network Services Tests

App Connectivity and RF Assessment

Sensor Dashboard for SLA monitoring

Global Issue Creation

Test Your Network Anywhere at Any time from a Real-world Client perspective

Sensor Tests

Cisco DNA Center DESIGN POLICY PROVISION ASSURANCE PLATFORM

Define Sensor Test Category Details

Specify the Sensor Test Category Details to see results for

SSID: @CorpSSID

- Onboarding
 - Association
 - Authentication
 - DHCP
- Performance Tests
 - Speed Test
 - IP SLA
- Application Tests
 - Host Reachability
 - Web
 - FTP
- RF Assessment
 - Data Rate
 - SNR
- Network Services Tests
 - DNS
 - Radius
- Email
 - Pop3
 - IMAP
 - Outlook Web Access

Test Results Mar 24, 2018 10:00am to Mar 24, 2018 pm 10:30am

LATEST TREND

Find the most problematic: Floors by All Test

Worst Location
Location: ../SJC 04/Floor3
Reason: 55% Network Services: RADIUS failure

Largest Health Drop by Location
Location: ../SF 02/Floor2
Reason: Network Services: DNS Failure

Most Common Test Failure
Reason: Poor AP Discoverability
Test: RADIUS

Show Data for Impacted Top 5

Search and Filter Heatmap by Location

	Onboarding	Association	Authentication	DHCP	Web	RF Assessment	Data Rate	SNR	Host Reachability	Web	FTP	Email	Pop3/IMAP	Outlook
Global	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SJC 04/Floor 3	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SJC 04/Floor 2	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SJC 24/Floor 1	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SJC 12/Floor 3	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SF/Floor 6	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SF/Floor 2	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SF/Floor 5	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SF/Floor 7	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SJC 02/Floor 1	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
../SJC 01/Floor 2	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red

● > 30% Failure
 ● 5% - 30% Failure
 ● 1-5% Failure
 ● < 1% Failure
 ● No Data

Sorting based on the result of (overall failed test count)/(overall test count) in the whole time range

DHCP

3% Failure of 729 Tests
Top Impacted Site: Global/Sa

Time (ms) vs Time (hrs/day)

Legend: Average (blue), Top (purple), Bottom (yellow), Slow Threshold (red dashed line)

No Global Issues

Time (r) vs Time (hrs/day)

Legend: Average (blue), Top (purple), Bottom (yellow), Slow Threshold (red dashed line)

No Global Issues

Time (r) vs Time (hrs/day)

Legend: Average (blue), Top (purple), Bottom (yellow), Slow Threshold (red dashed line)

No Global Issues

iOS and Samsung Analytics

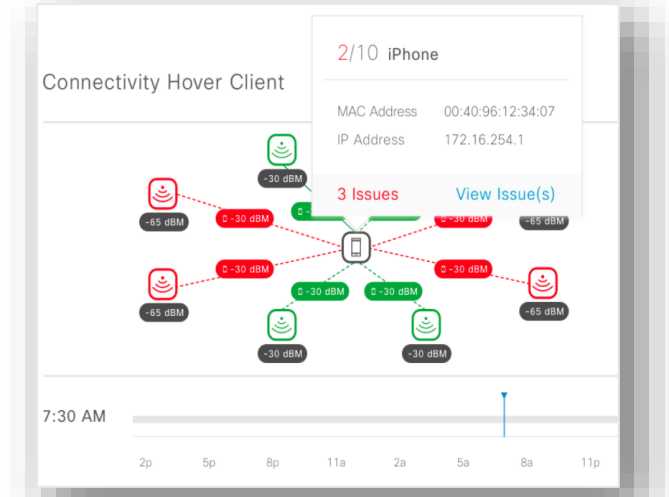
Wireless Client Insights

- Samsung

- S10 Series (S10e/S10/S10+/S10 5G), Note10, Galaxy Fold
- Galaxy M10, M20, Galaxy Tab S5e, A10.1(2019)

- Apple

- iPhone 7
- iPad Pro 2017
- iOS 10



Device Profile

Client shares these details

1. Model
2. OS version

Wi-Fi analytics

Client shares these details

1. BSSID
2. RSSI
3. Channel number

Assurance

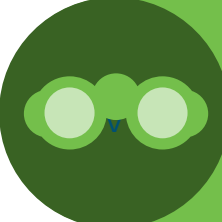
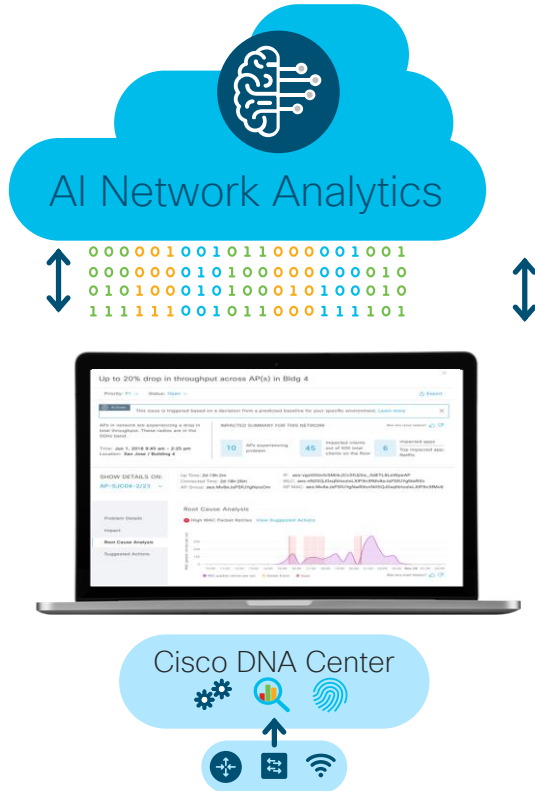
Client provides disassociation reason code

Support per-device-group policies and analytics


Insights into the client's view of the network

Clarity into the reliability of connectivity

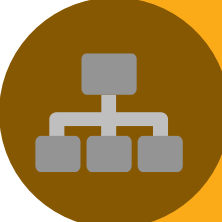
Cisco AI Network Analytics



Visibility: Personalized Baseline
Intelligently define personalized "network normal" using unified global telemetry collected



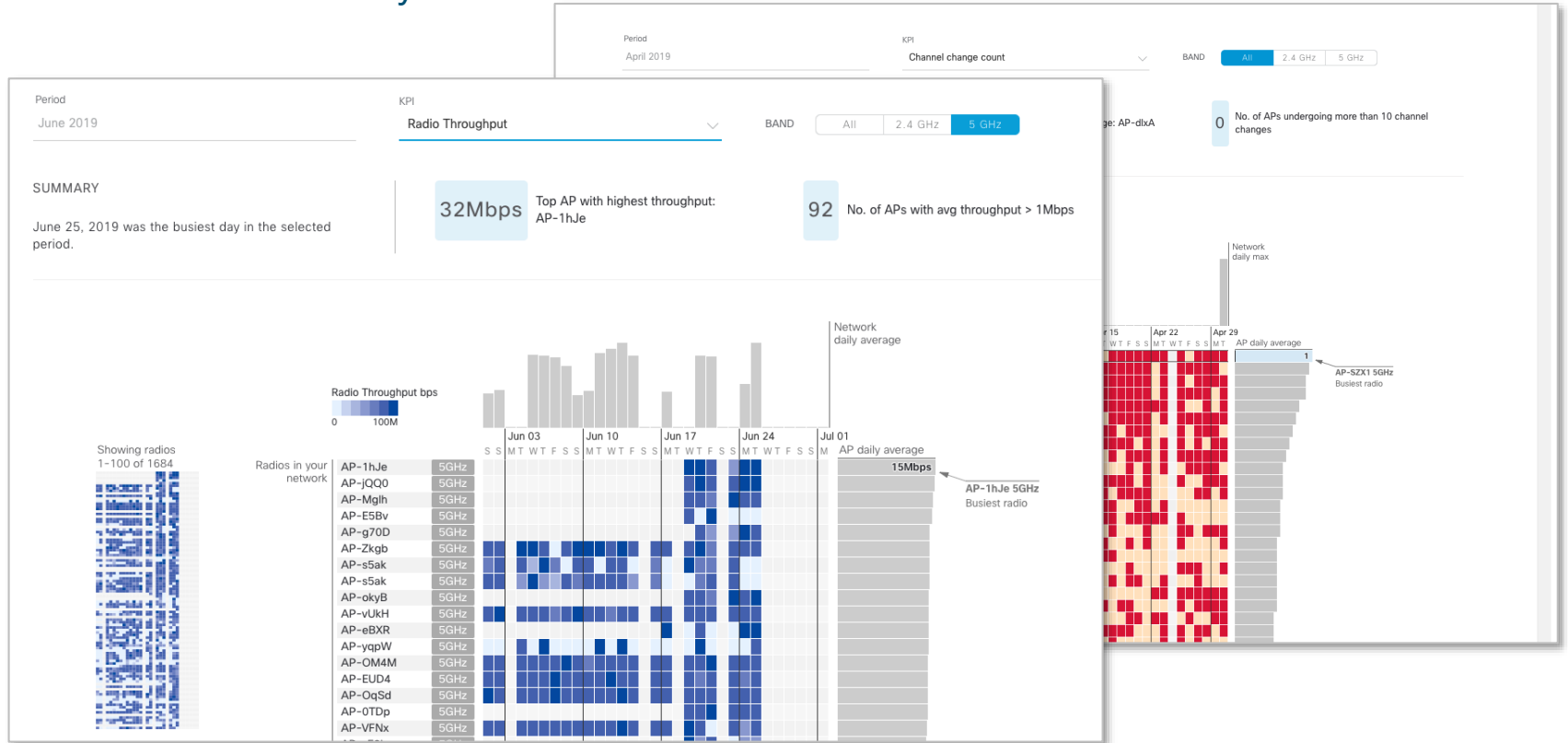
Insight: Intelligent Analysis
Increase signal-to-noise, improve issue relevancy, and accurately identify trends and root causes



Action: Accelerated Remediation
Create automated resolution options for IT to act on based on machine reasoning algorithms

Network Heatmaps

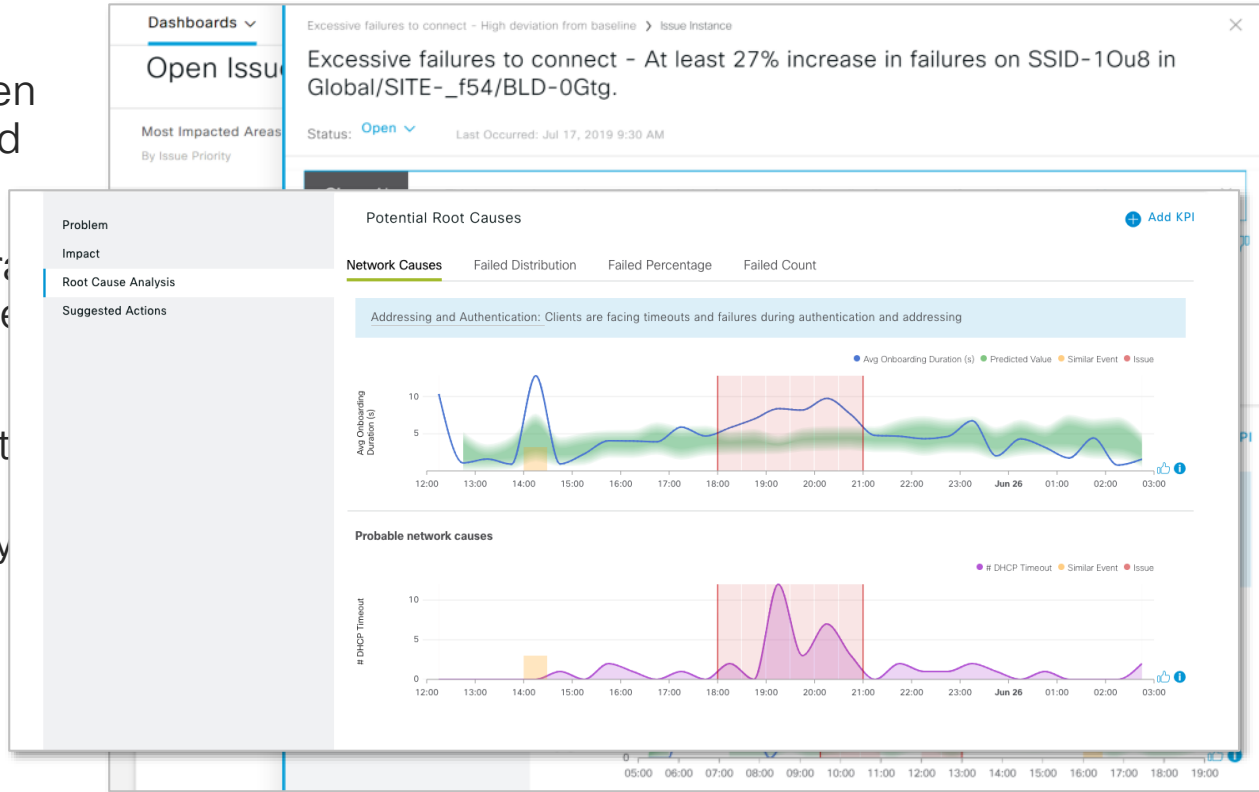
Cisco AI Network Analytics



Predictive Modelling

Cisco AI Network Analytics

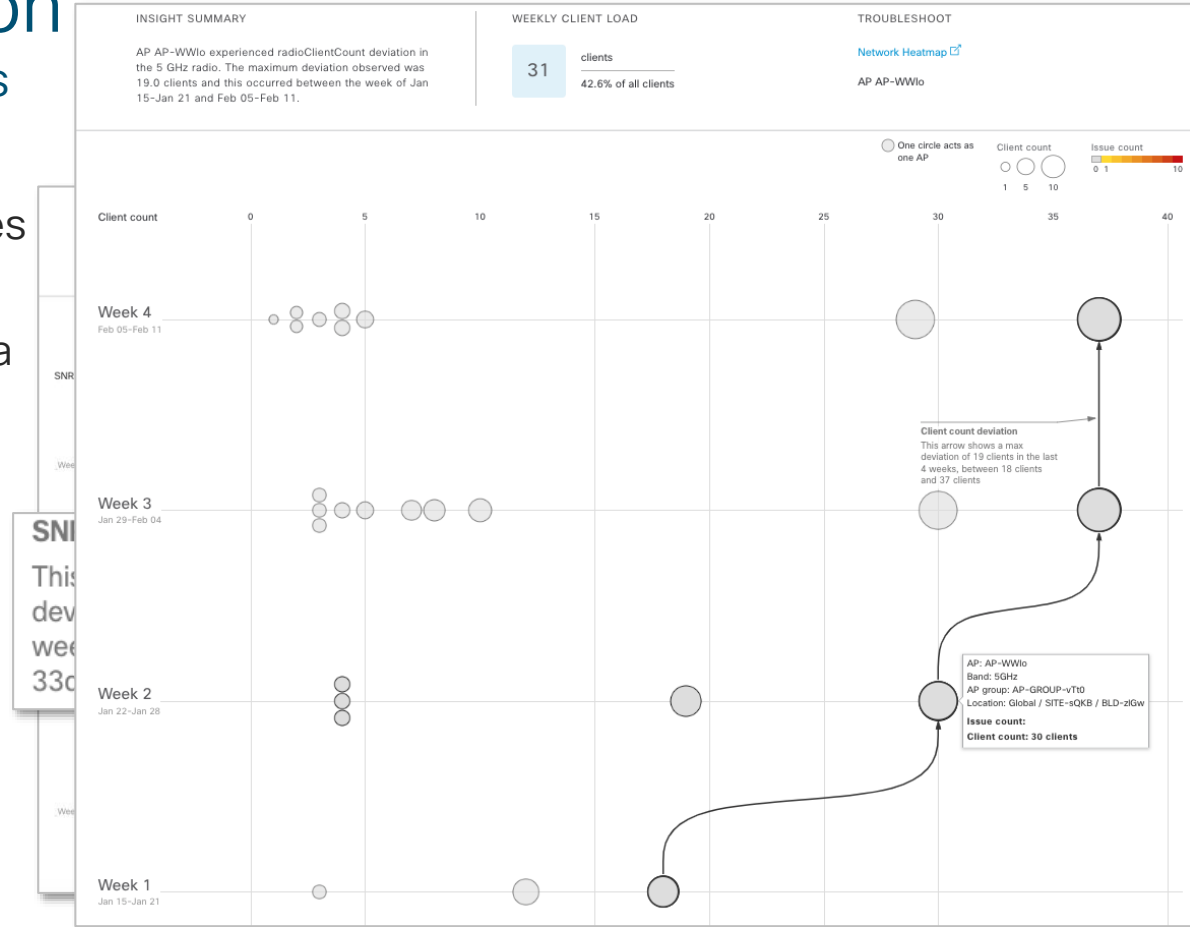
- Static thresholds can often lead to false positives and negatives
- Dynamic threshold generated based on predictive modeling
 - Improves alert quality
- Correlation with other network issues
 - potential root cause analysis



Anomaly Detection

Cisco AI Network Analytics

- Analyses trends and identifies changes in behaviour
- Automatically generated on a weekly basis
 - Illustrates weekly trends over the previous month
- Links back to Network Heatmap and AP360 for additional contextual information



Cisco DNA Automation

Reduce the time and complexity involved in getting your network connected and doing what you intended it to do.



Deploy

Policy, design, provision,
integrate platforms

Successful IT rollouts



Manage

Software image
management, changes,
routing, security, compliance

Reduced downtime,
increased user productivity



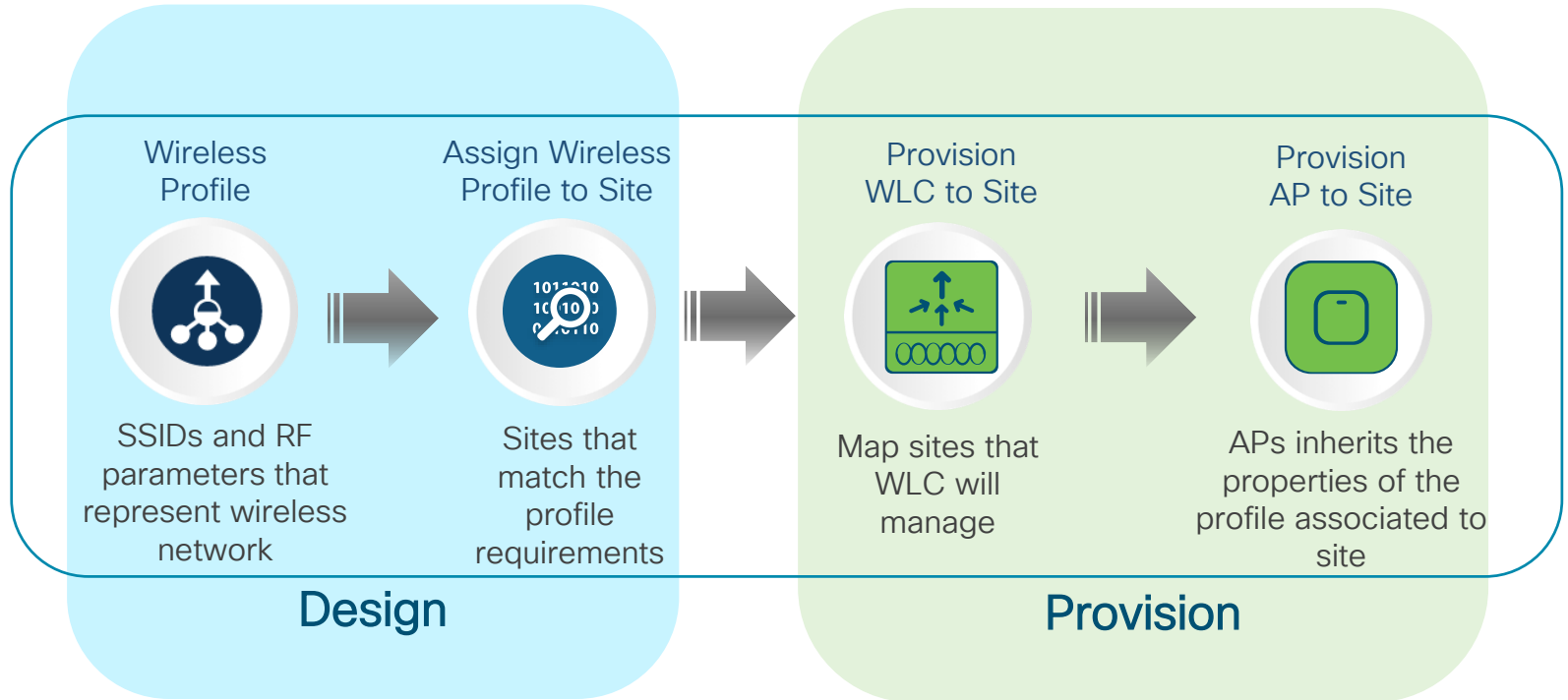
Assure

Guided remediation,
automated updates, system
optimization

Network intent
IT productivity

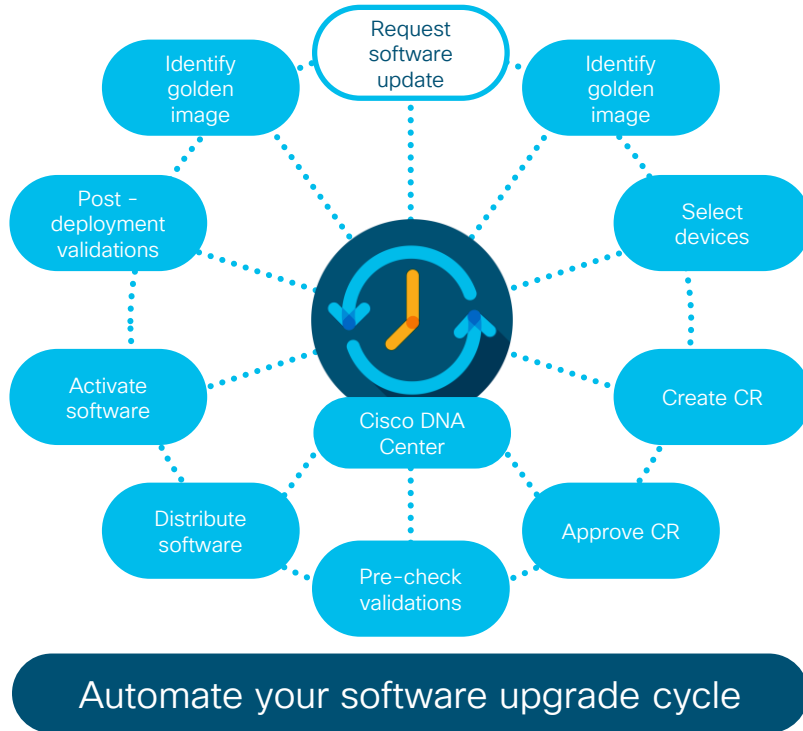
Wireless Network Deployment Automation

Cisco DNA Automation



Software Image Management

Cisco DNA Automation



Intent-based network upgrades

Capture your upgrade intent to automate process and drive consistency



Streamlined upgrade process

Upgrade base image, and install patches and other add-ons in one single flow



Trustworthiness integration

Assure that device images are not compromised in any way



Patching support

Pre and post checks help ensure that updates do not adversely affect the network

Integrating Cisco Security

End-to-End Wireless Network Security



Air



Devices



Users



Rogue intrusion detection and prevention /WIPs



Enhanced threat detection with ETA



Seamless BYOD onboarding with ISE



Standards compliance with WPA3

- Enhanced security on open Wi-Fi
- Robust password protection
- Superior data protection
- Seamless customer migration



Secure device management with iPSK



Identity-Based segmentation with SD-Access

Cisco DNA Spaces and CMX

It's Time to Think Differently about Mobility

Wireless is more than simple connectivity

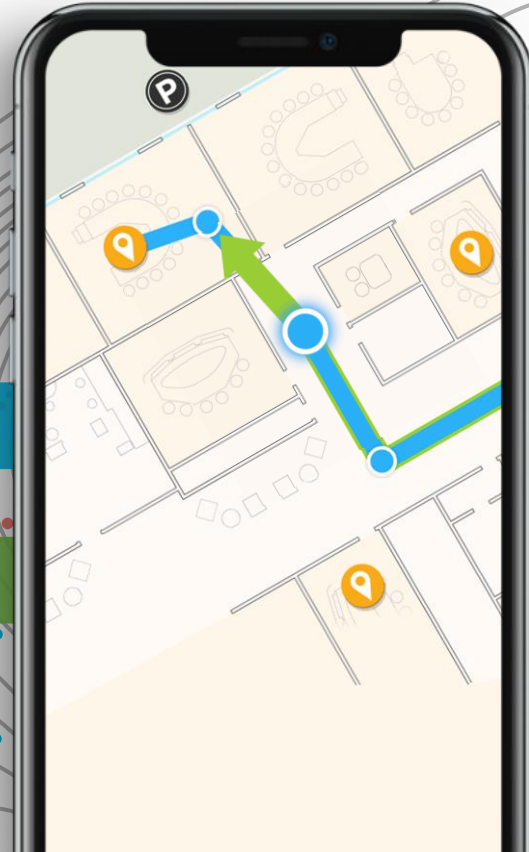
Wireless can provide insights and enable experiences

Users

Devices

Apps

Data



Digitising Spaces, People and Things



Providing Insights and Enabling Experiences

Line of Business



Understand Visitor Behavior



Improve Experience



Customer Acquisition & Loyalty



Boost Satisfaction

Operations



Optimize Operations



Employee Productivity



Drive Efficiencies



Reduce manual processes and save cost

IT



Enterprise Integrations and Data Export



Centralized Management

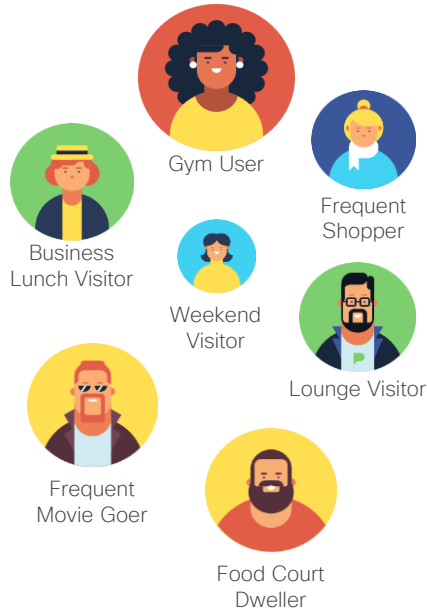


Compliance



End-to-End Monitoring and SLAs

Location Personas Enable Actionable Insights



Personas	Rules
Business Lunch Visitor	IF user enters Food Court Zone between 11am and 1pm on Mondays to Fridays, TAG as “Corporate Lunch Visitor”
Gym User	IF user enters Gym Zone, TAG as Gym User
Weekend Visitor	IF user enters Site on Saturday or Sunday, TAG as “Weekend Visitor”
Food Court Dweller	IF user dwell time in Food Court Zone >45 minutes, TAG as “Food Court Dweller”
Lounge Visitor	IF user enters Lounge Zone from 4pm to 6pm on Mondays to Fridays, TAG as “Lounge Visitor”
Frequent Movie Goer	IF user enters Movie Zone more than 2x in 30 day period, TAG as “Frequent Movie Goer”

Create personas meaningful to locations to understand user behaviour

Smart Captive Portals



Business Lunch Visitor

← Create Captive Portal Rule RULE NAME: Mall Food Court

1 SENSE

When a user is on **WIFI** and connected to **CMX Engage Demo**

2 LOCATIONS - Where do you want the rule to fire?

At any of the following locations

- + Add Locations
- West Coast Region

Filter by Metadata

3 IDENTIFY - Who do you want the rule to apply?

Filter by Opt In Status

Filter by Tags

Include - Only show to user associated with the following tags.

- + Add Tags
- BusinessLunchVisitor

Exclude - Do not show to user associated with the following tags.

- + Add Tags
- Employee

5 ACTIONS

- Show Captive Portal
Choose a Portal to be displayed to Users when they connect to the wifi.
Mall Food Court
- Seamlessly Provision Internet
Directly provision internet without showing any authentication
- Deny Internet
Stop users from accessing the internet

Tags these users as

Choose - Associate/Disassociate users to chosen tags.

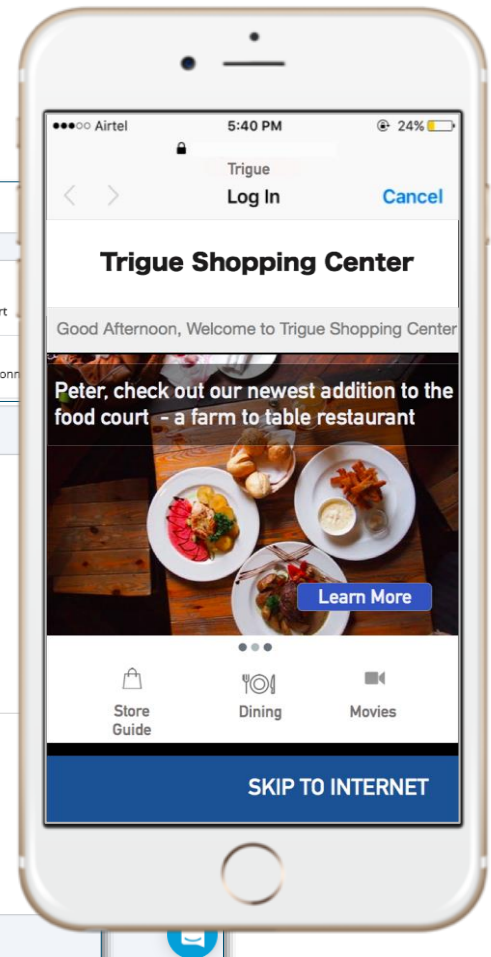
- + Add Tags
- Trigger API

Save and Publish

SUMMARY

RULE NAME
Mall Food Court

SENSE
When user is con

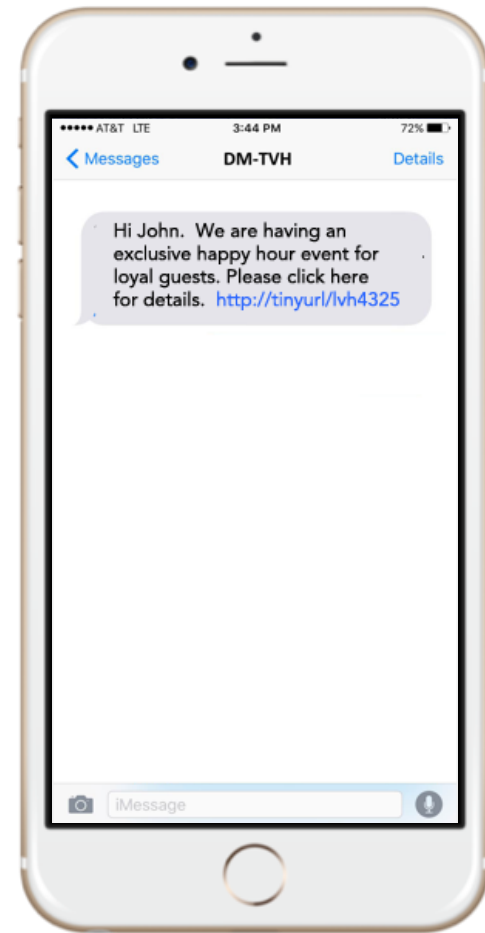


Omni-Channel Engagement



Lounge Visitor

- IF guest tagged as “loyalty member”
- AND “lounge visitor”
- AND is in the hotel between 4pm and 6pm
- THEN send Happy Hour Promotion notification
 - Push Notification for App Users
 - SMS for Non-App Users



Operational Insights

Information

Name, Description
Priority

The screenshot shows the 'Operational Insights' interface. At the top, it says 'Operational Insights' and '820 Alerts'. Below that, there's a 'Cancel' and 'Save' button. The main area is titled 'Information' and shows a rule named 'My Rule' updated on February 10th, 2018. The description is 'My rule checks that battery is above 10% and temperature is above 40 C for all assets.' The priority is set to 'Low', and the rule is 'Enabled'. There is also an 'Advanced' toggle which is currently off.

Set Conditions

Location, Attribute
Battery Level,
Button Press,
Telemetry

The screenshot shows the 'CONDITIONS' section of the rule configuration. It features a grid of buttons for selecting conditions: Location, Attribute, Battery, Temperature, Humidity, and Missing. Below this grid, there are additional buttons for Motion and Button press.

Select Triggers

This screenshot shows a smaller view of the 'CONDITIONS' section, highlighting the 'Location', 'Attribute', 'Battery', 'Temperature', 'Humidity', and 'Missing' buttons.

ACTIONS

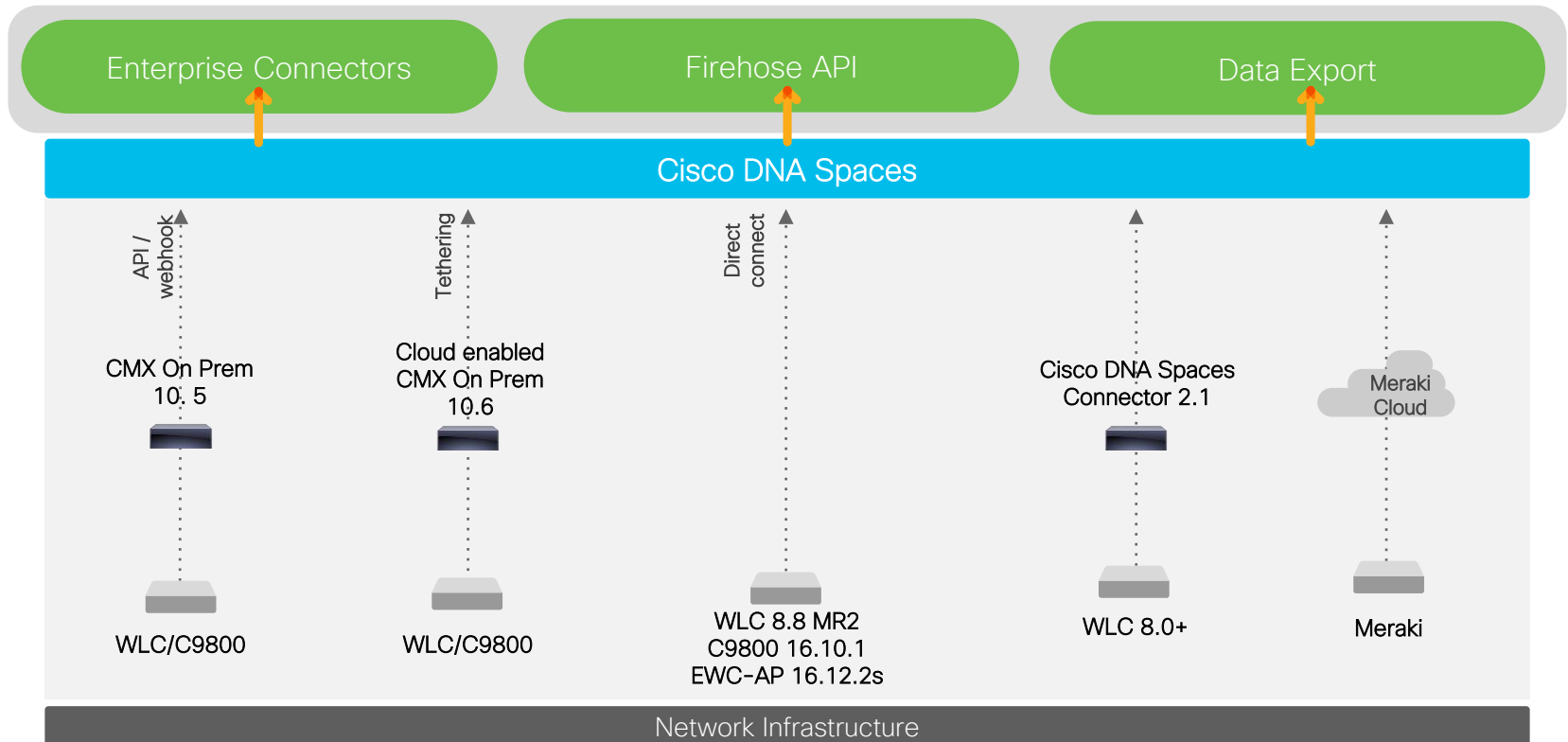
The screenshot shows the 'ACTIONS' section of the rule configuration. It features a row of buttons for selecting actions: Email, SMS, HTTP, and Attribute update.

Take Action

E-Mail, SMS
HTTP POST
Attribute Update

This screenshot shows a smaller view of the 'ACTIONS' section, highlighting the 'Email', 'SMS', 'HTTP', and 'Attribute update' buttons.

Supports all Cisco Wireless Topologies



Eco-System Partners

Cisco DNA Spaces



cisco *Live!*



Workspaces **MazeMap**

- Room Utilization
- Employee Experience

Search

Building 10

2

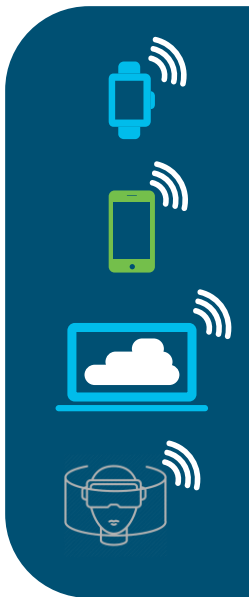
1

Room availability data from floor plan:

City	Status
Tokyo	Booked
London	Available
Mexico City	Available
X1 Fishbowl	Available
Toronto	Booked
Beijing	Available
Moscow	Booked
New York	Booked
Buenos Aires	Booked
Sydney	Available
Munich	Booked

Campus of the Future

Campus of the Future



Access Points

Catalyst
9100 Series



Wi-Fi 6

Wi-Fi 6

Wi-Fi 6

Wi-Fi 6

Access Switches

Catalyst
9200/9300/9400

Wi-Fi 6, 802.3bt Ready



48P 5G + 25G/40G uplinks



Most comprehensive
mGig portfolio

Core Switches

Catalyst
9500/9600 Series



Campus Optimized
25G/40G/100G

Wireless Controller

Catalyst
9800 Series



Industry's only modular
WLC with 40G/100G
uplinks



Cisco Catalyst Networking



Built for Intent-Based
Networking



Automation



Security



Analytics

Full Stack Migration



MSE



ISE

Services



ISE



Prime

Network Management



Cisco DNA Center



AireOS

Wireless LAN Controller



C9800



Access Points



Wi-Fi 6

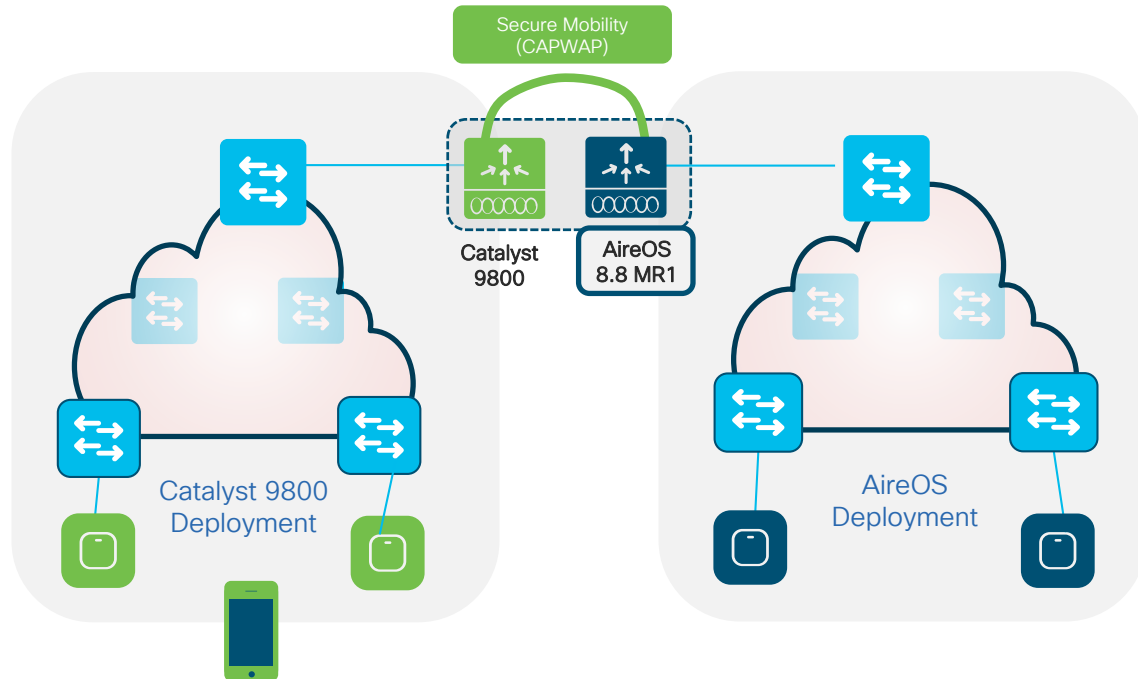


Clients and Sensors



Inter-Release Controller Mobility (IRCM)

AireOS and Catalyst 9800 Seamless Layer 3 Roaming



Catalyst 9800 AireOS Config Translator

The screenshot shows the Catalyst 9800 AireOS Config Translator interface. The left sidebar contains navigation options: Dashboard, Monitoring, Configuration, Administration, and Troubleshooting. The main content area is titled "AireOS Config Translator" and includes a "Select and Upload the AireOS Config file" button, a file upload area showing "air1252g-config.dms", and a "Translated Config" section displaying network configuration commands. A pie chart on the right shows the breakdown of translated vs. untranslated configurations.

Upload the AireOS configuration file on the tool

The pie chart on the right shows the breakdown of translated vs. untranslated configs

Translated configuration in the form of a CLI output with the translated configuration and the corresponding AireOS configuration (preceded by a '!' sign) can be Exported or Applied

Category	Percentage	Count (CLIs)
Translated CLIs	82.46%	4306
Untranslated CLIs	17.54%	916

Prime Infrastructure AireOS Config Translator

Prime Infrastructure

Configuration / Wireless Technologies / AireOS Config Translator

Choose Source

Verify and Update Config

Select a Source AireOS Device

Device Name	Device IP Address	Product Type	Software Version
admin	9.60.61.20	Cisco 3504 Wireless...	8.8.1.99
5520-WLC	10.225.117.131	Cisco 5520 Series ...	8.5.135.0

Select a Target eWLC Device

Controller Running Config Review

```
(Controller_Prompt)-exit
(Controller_Prompt)-show run-config commands
show run-config commands
802.11a 11nSupport a-mpdu tx scheduler enable
802.11a 11nSupport a-mpdu tx scheduler timeout rt 10
802.11a 11nSupport a-mpdu tx scheduler timeout nrt 200
802.11a 11nSupport a-msdu max-subframes 3
802.11b 11nSupport a-msdu max-subframes 3
802.11a 11nSupport a-msdu max-length 8k
802.11b 11nSupport a-msdu max-length 8k
802.11a 11nSupport mcs tx 8 disable
802.11a 11nSupport mcs tx 9 disable
802.11a beacon range 0
802.11a rx-sop threshold default default
802.11a cca threshold 0 default
802.11a multicast buffer 0
802.11a multicast data-rate 0 default
```

Translation Summary

Supported - 45%
Unsupported - 55%

Supported | Unsupported

```
! RF Tag Configuration
=====
! Flex Profile Configuration
=====
flexconnect group default-flex-group add
flexconnect group default-flex-group radius ap authority id 43697363610000000000000000000000
flexconnect group default-flex-group radius ap authority info Cisco
flexconnect group default-flex-group radius ap server-key -hidden-
gap method fast profile EF,default-flex-group
description "Eap:Fast profile: fc-grp-default-flex-group"
authority-id identity 43697363610000000000000000000000
authority-id information Cisco

wireless profile flex default-flex-group
description default-flex-group
no local-auth ap gap:fast EF,default-flex-group
!

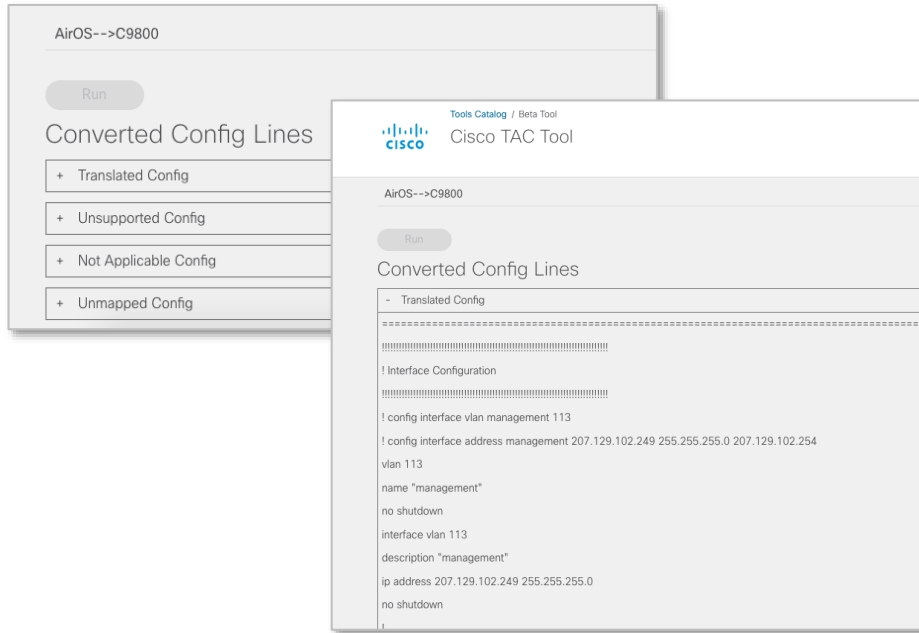
! AP Profile Configuration
=====
! Site Tag Configuration
=====
! Attaching tags to AP
```

Accept to deploy the Supported config to eWLC device.

Deploy

AireOS Migration Tool

TAC Supported

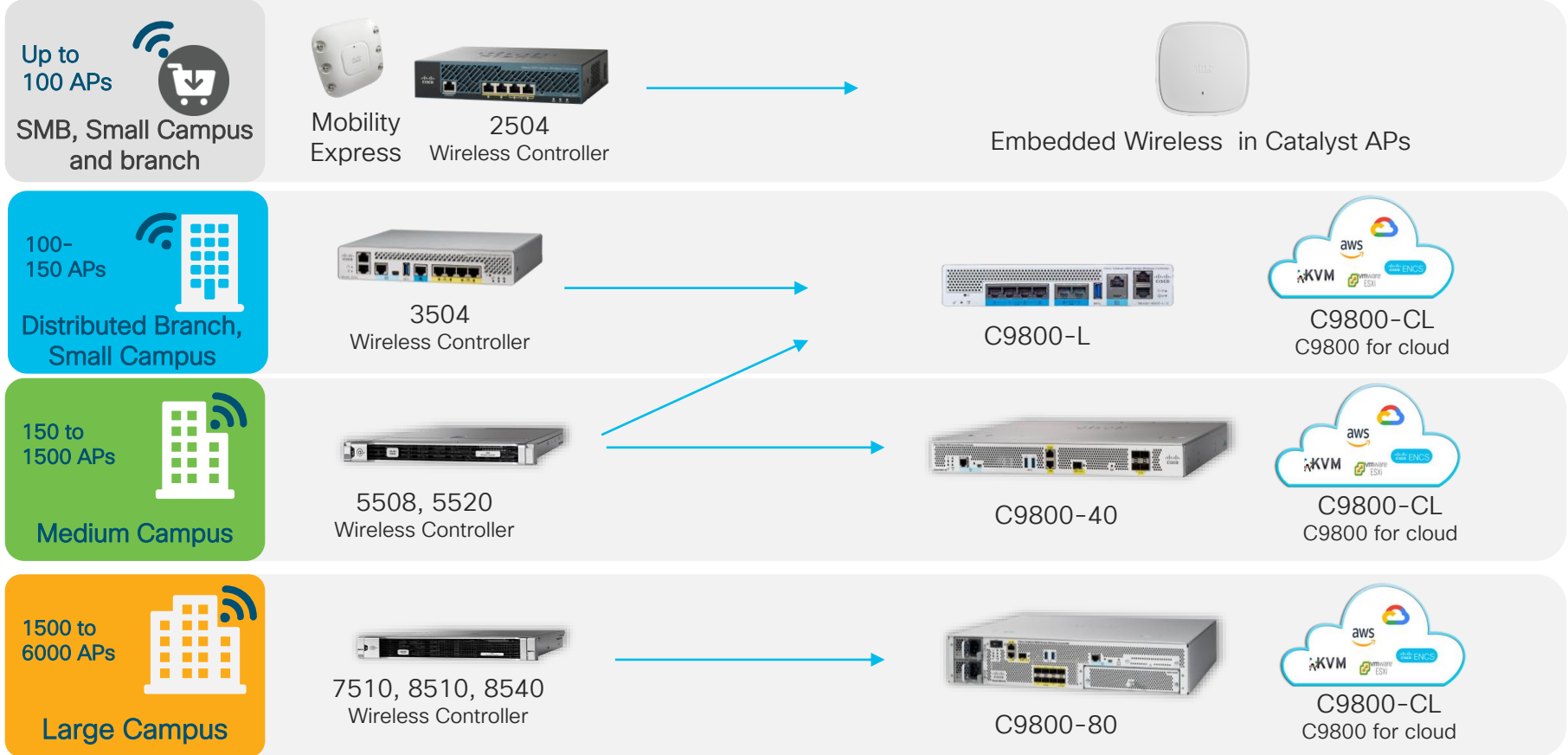


- Four Output Scenarios
 - Translated
 - Unmapped
 - Unsupported
 - Not Applicable
- Output is the original AireOS configuration with the corresponding IOS-XE commands
- Always review the translated config

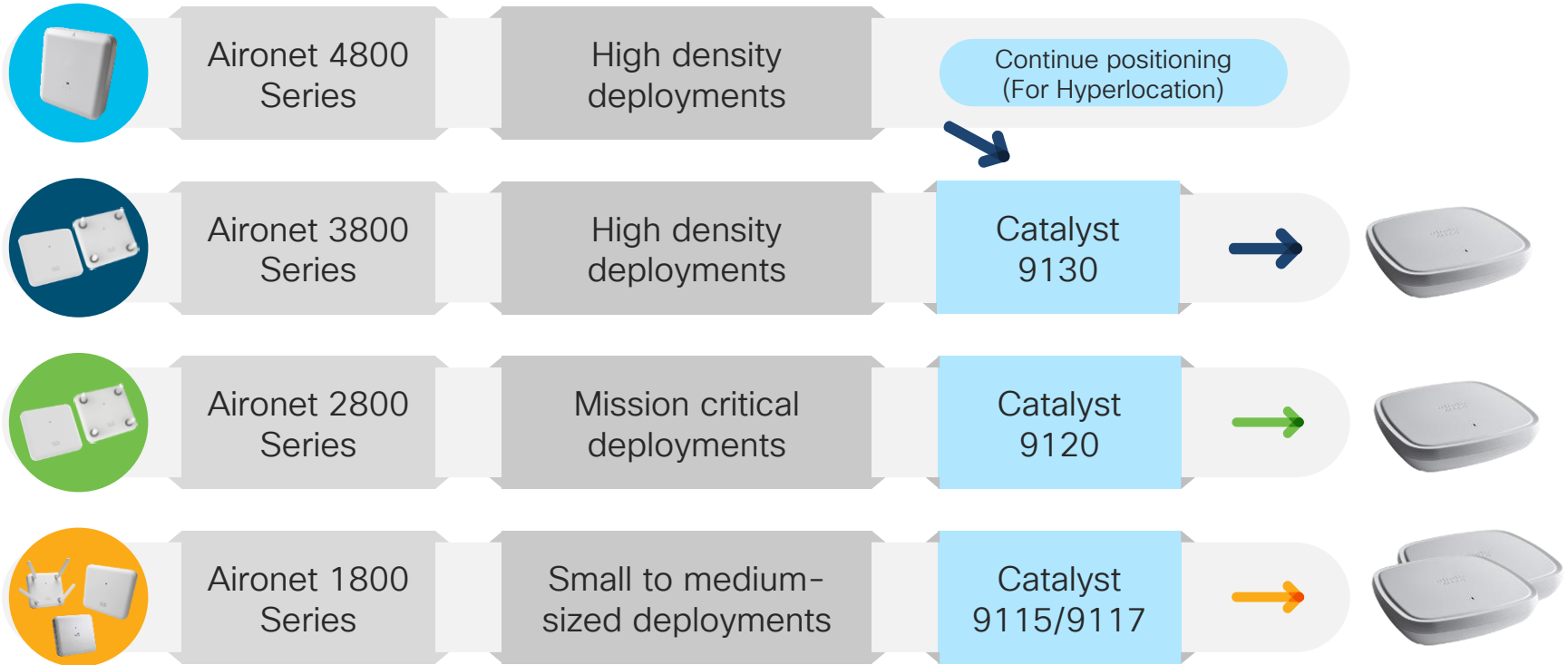
<https://cway.cisco.com/tools/WirelessConfigConverter/>



Wireless Controller Transition



Wireless Access Point Transitions



Cisco Recommended Releases

Catalyst 9800 and 3504/5520/8540 AireOS Wireless Controllers



Access Points	IOS-XE	AireOS	DNA-C	Prime	CMX	ISE
C9115AX, C9117AX, C9120AX	16.12.1s	8.10	1.3.1.2	3.7	10.6.2	2.4 2.6
C9130AX	16.12.1s with AP DP	No support for APDP in AireOS	1.3.1.2	3.7	10.6.2	2.4 2.6
C9120AX-E, C9130AX-E	16.12.2	8.10	1.3.2	3.7	10.6.2	2.4 2.6
Wave 2 APs	16.12.1s	8.5MR5	1.3.1.2	3.7	10.6.2	2.4 2.6

Please check these links for the latest info

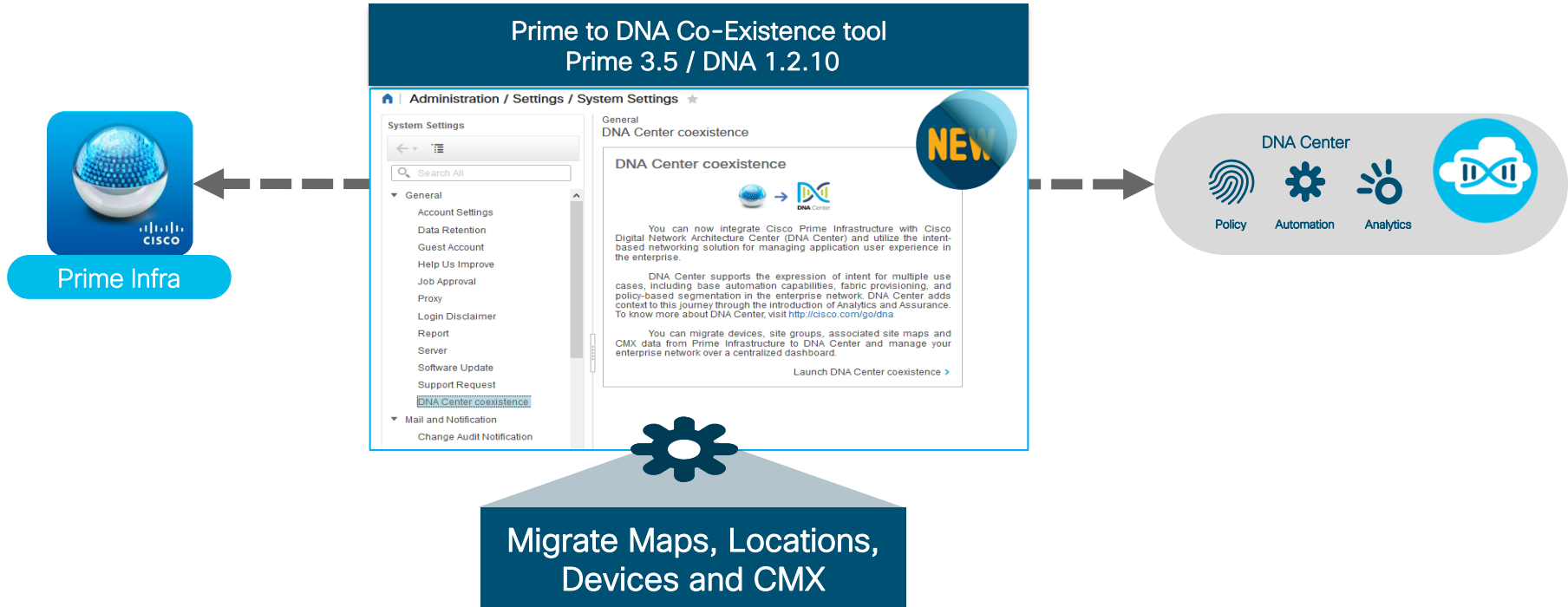
<https://www.cisco.com/c/en/us/support/docs/wireless/catalyst-9800-series-wireless-controllers/214749-tac-recommended-ios-xe-builds-for-wirele.html>

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



DNA Center coexistence tool

Migrate Data, Site and Services from Prime to Cisco DNA Center



Next Generation Wireless



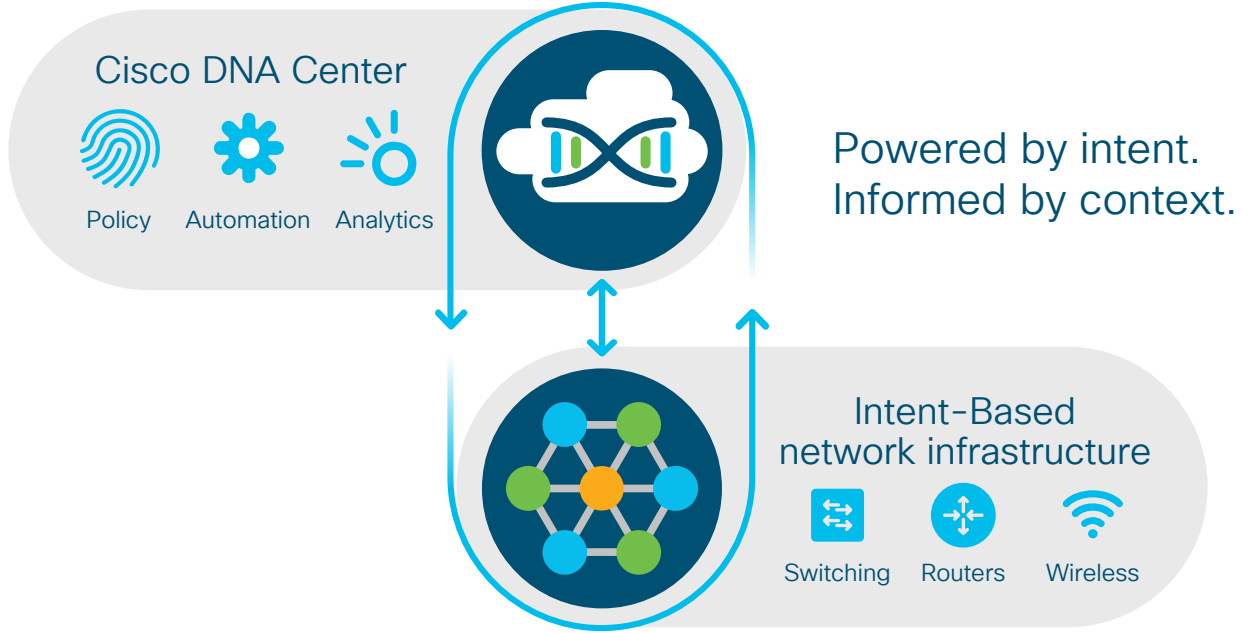
You make customer experience **possible**

It's Time to Think Differently about Mobility

 Immersive Experiences

 Mobility for IoT

 Technology Transitions

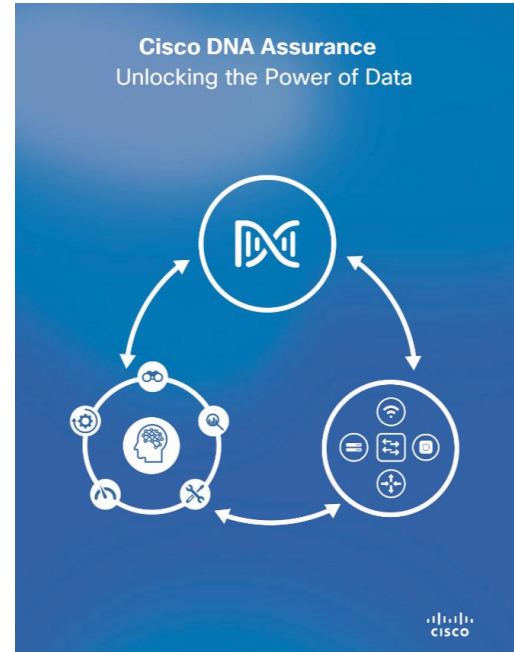


Recommended Reading

Cisco Enterprise Wireless & Cisco DNA Assurance



<http://cs.co/wirelessbook>



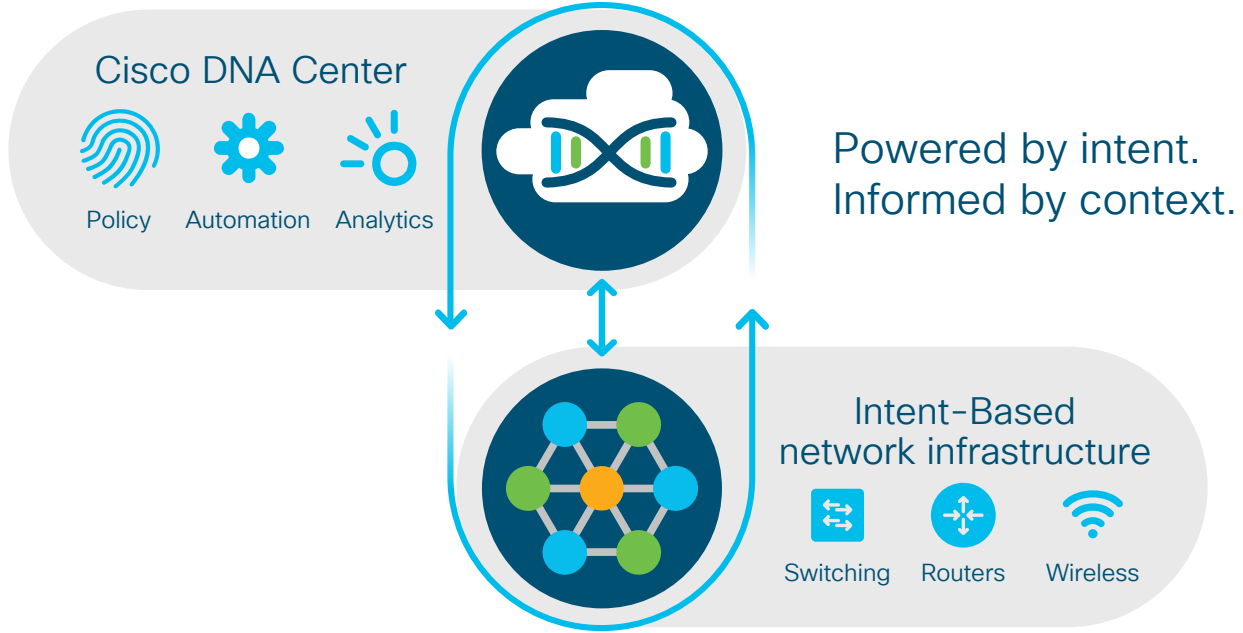
<http://cs.co/assurancebook>

It's Time to Think Differently about Mobility now!

 Immersive Experiences

 Mobility for IoT

 Technology Transitions



Complete your online session survey



- Please complete your session survey after each session. Your feedback is very important.
- Complete a minimum of 4 session surveys and the Overall Conference survey (starting on Thursday) to receive your Cisco Live t-shirt.
- All surveys can be taken in the Cisco Events Mobile App or by logging in to the Content Catalog on ciscolive.com/emea.

Cisco Live sessions will be available for viewing on demand after the event at ciscolive.com.

Continue your education



Demos in the
Cisco campus



Walk-in
self-paced labs



Meet the engineer
1:1 meetings



Related sessions



Thank you





You make **possible**