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# Ask the Experts (ATX): Productive and Predictive Networking with Cisco DNAC and CX

Peter Malic, CSS
Juan Cazila, CSS

PSOEN-2282

cisco Live!
Barcelona | January 27–31, 2020

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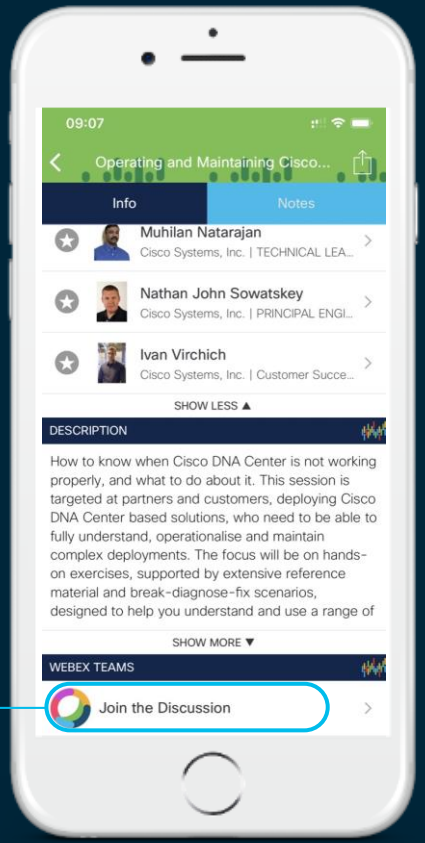



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# Agenda

- Introduction
- One of many troubleshooting approaches
- Cisco DNA Center Assurance
- Sensors
- Intelligent capture
- Conclusion


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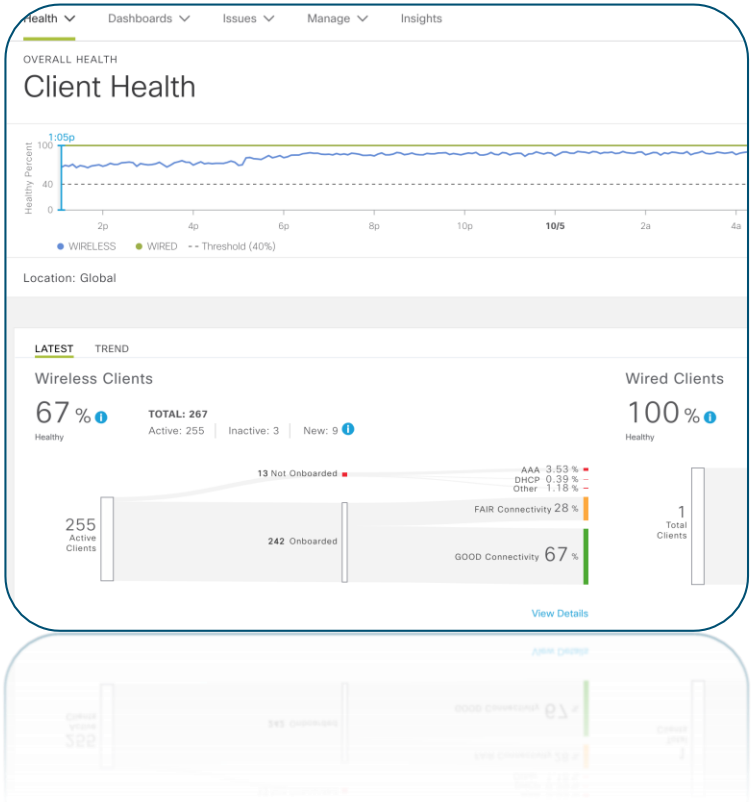
# Goal of this session

# Mission for this session

- See one of many approaches for wireless troubleshooting
- See how Cisco DNA Center Assurance works
- See what key features it offers
- Understand how we can use those features daily





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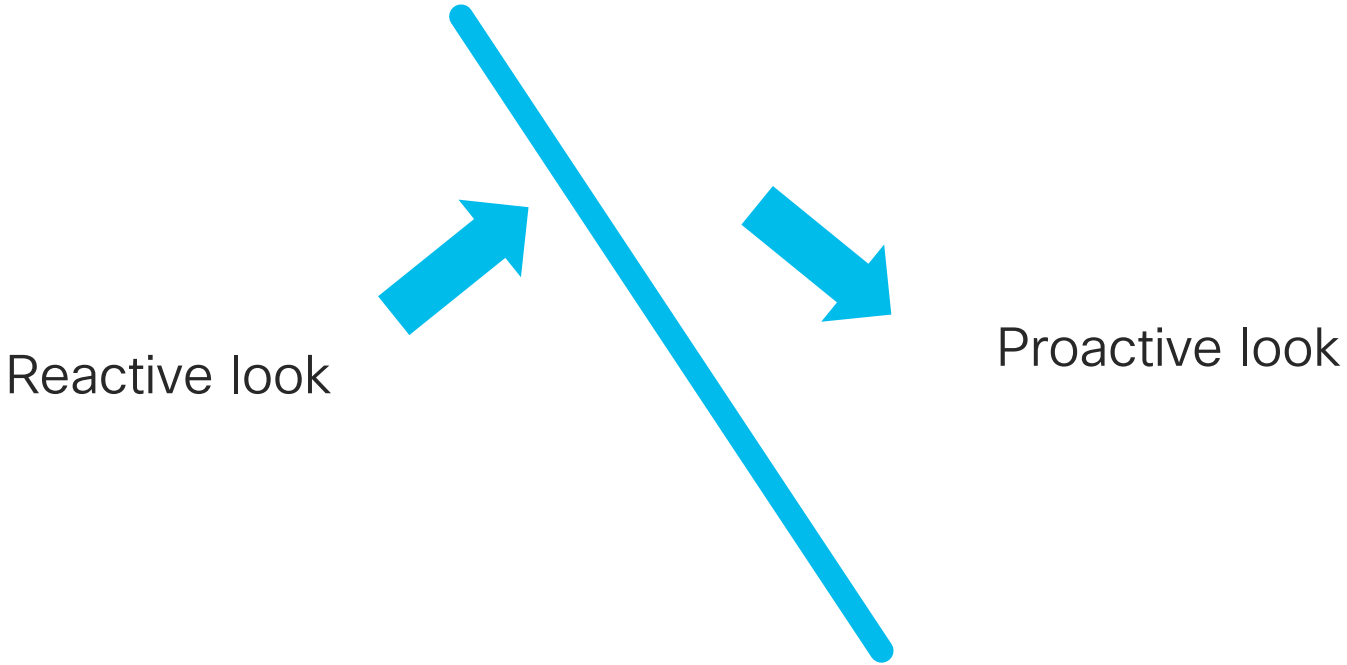
# Connecting to corporate network

# There are two sides of the coin





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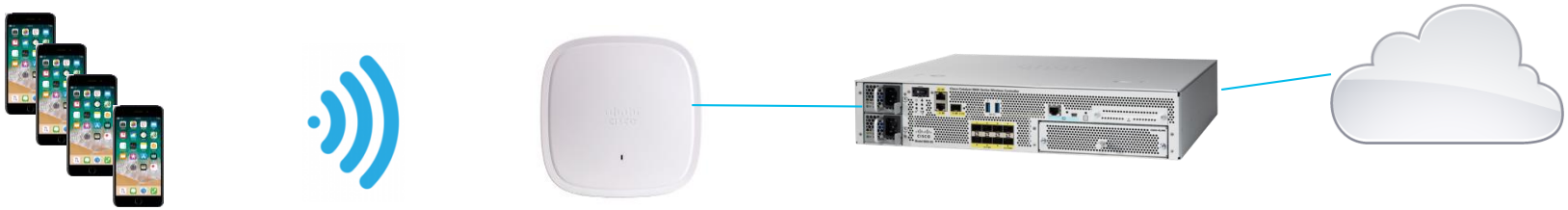
# Connecting to the network



What can possibly happen ?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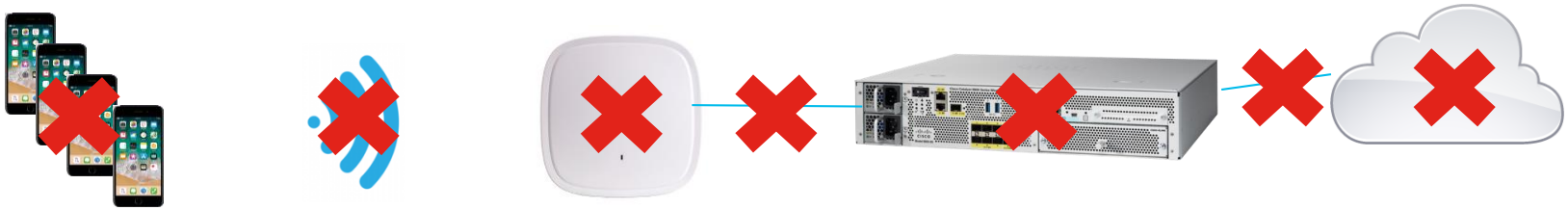
# Whatever you can imagine

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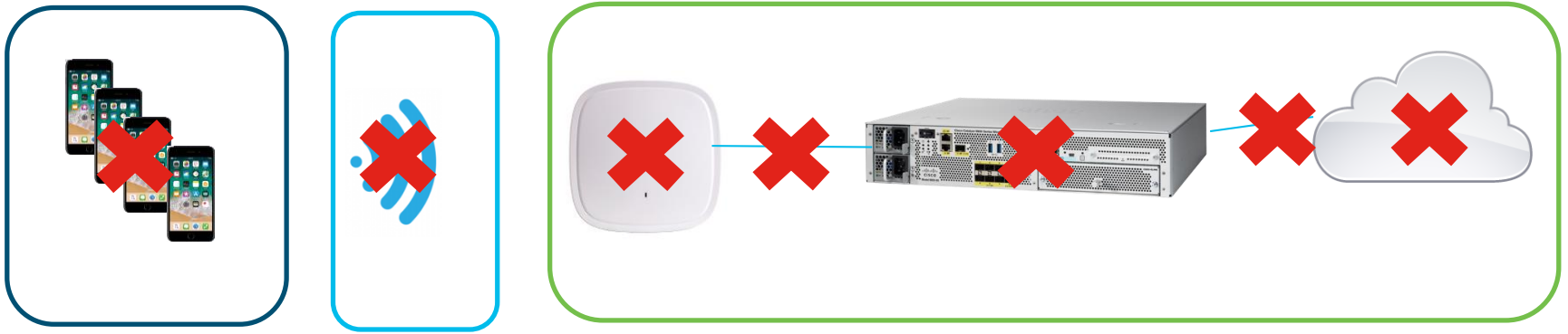
# Let's break this down



- Client related issues
- RF related issues
- AP & WLC related problems / infrastructure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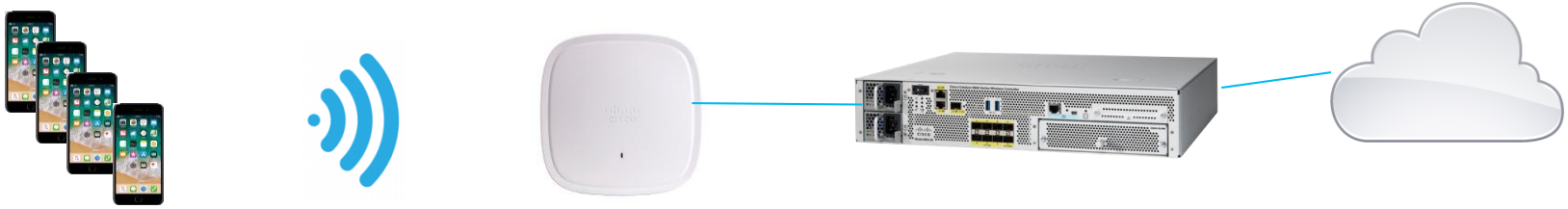
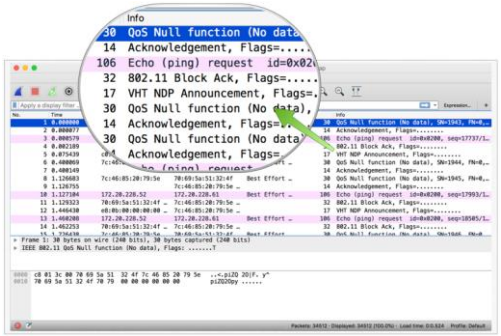
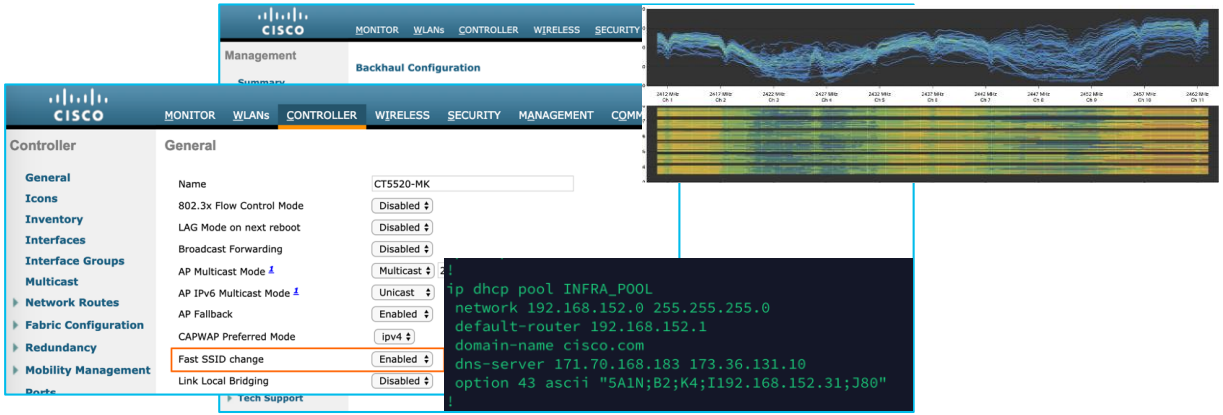
# Where are we spending majority of our time?



- Bob: “hey I cannot connect to the network!”







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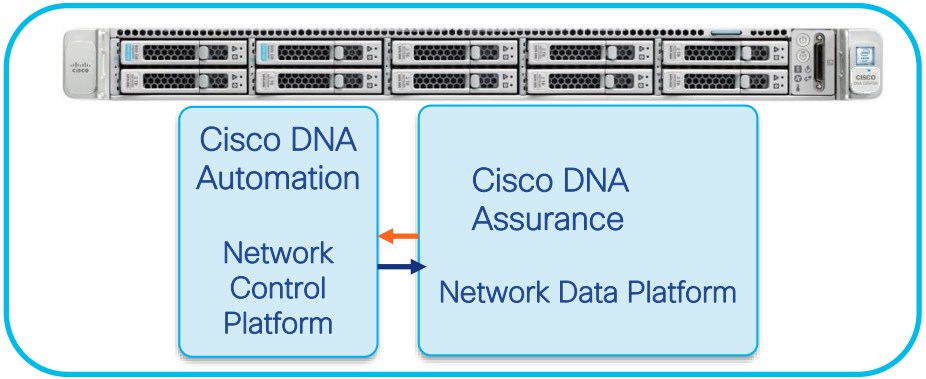
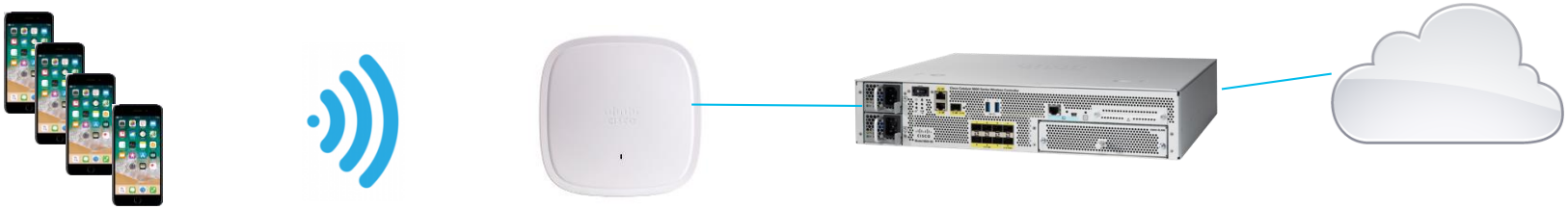
# Cisco DNA Center Assurance




User Interface

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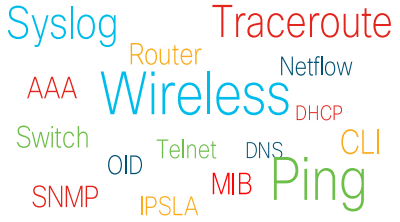
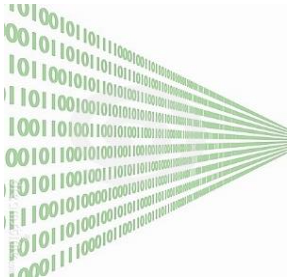
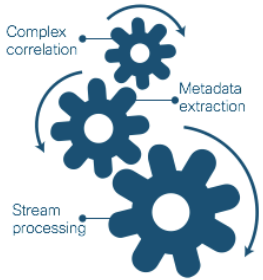
# How it works?

# Cisco DNA Center Assurance

Data collection → Correlation Complex Event Processing → Insights, Visibility & Intent → Issue remediation → Auto Fix It - Future





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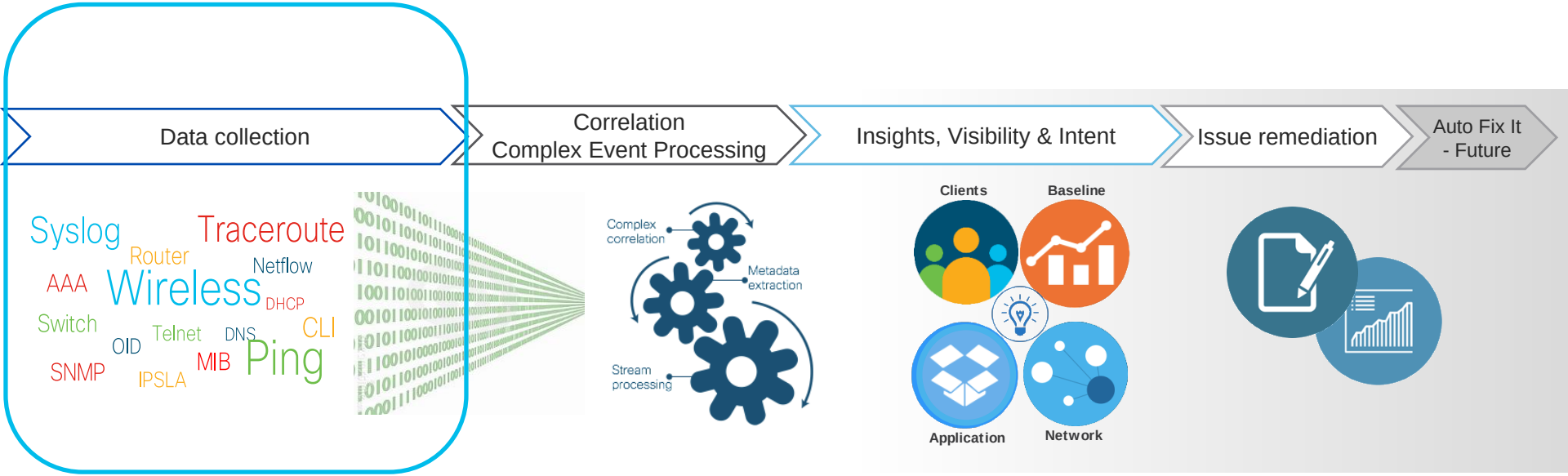



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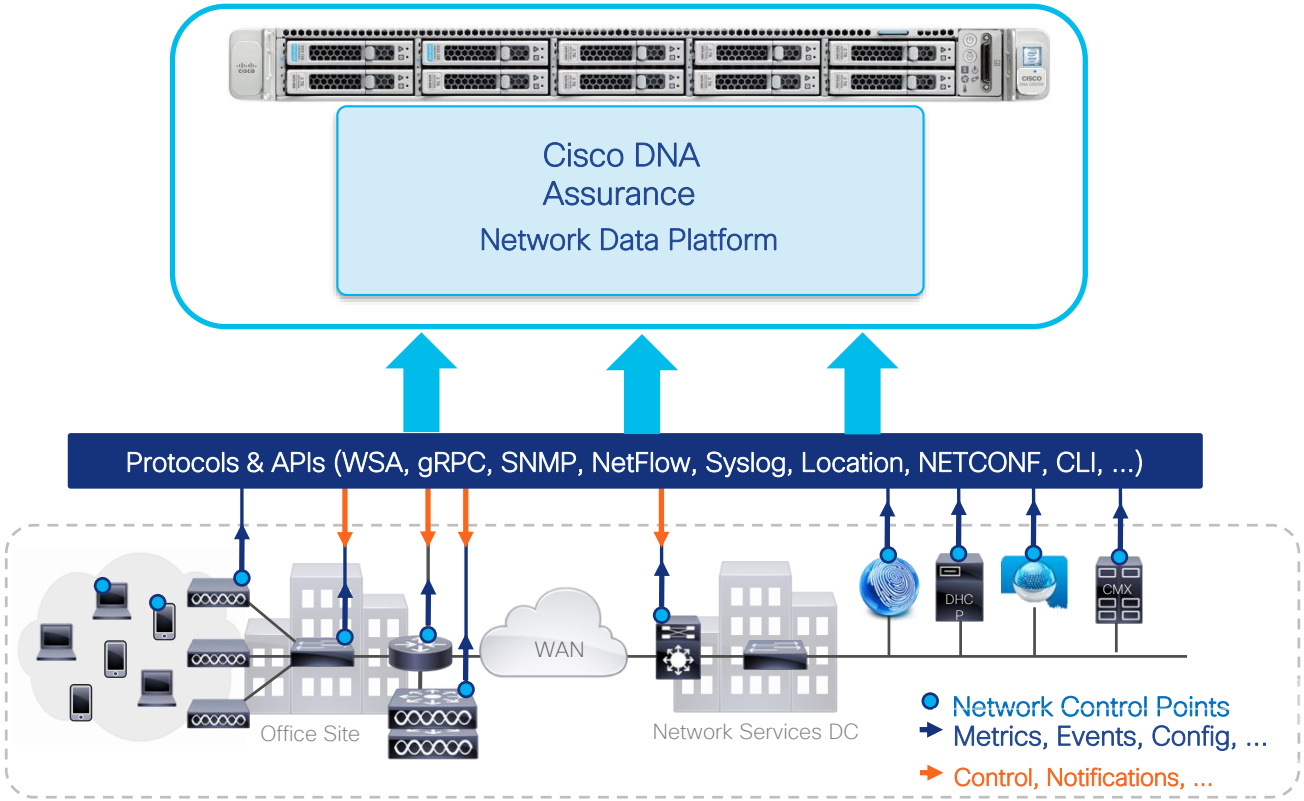
# How do we get data into Assurance?





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# How do we get wireless specific data into Assurance?


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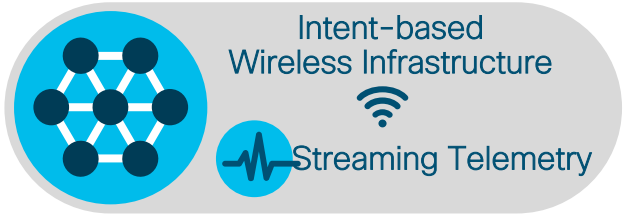
# Using streaming telemetry




Periodic or On-Change

Structured Data

Scalable

Reduced CPU Load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# What is streaming telemetry?

*Available with 16.10.1s
and Cisco DNA Center 1.2.8 or later

Cisco DNA
Assurance
Network Data Platform

gRPC/Protobuf

https/JWT

TLS/TDL

AP WSA/JWT

## AP2/3/4800K

- HTTP 2.0/gRPC based
- Anomaly Event, RF Stat, PCAP, Spectrum
- Scheduled and Automated

## ME, WLC3504/5520/8540

- Supported from AireOS 8.5
- Real-Time client event
- 256 types of Client Onboard Events

## Catalyst 9800 Series


- KPI Parity with AireOS
- Immediate Event Update
- Embedded Wireless in Cat9300

## Active Sensor AP1800S

- HTTPS for Automation and reporting
- PnP-based Provisioning
- Fully Managed by Cisco DNA Center


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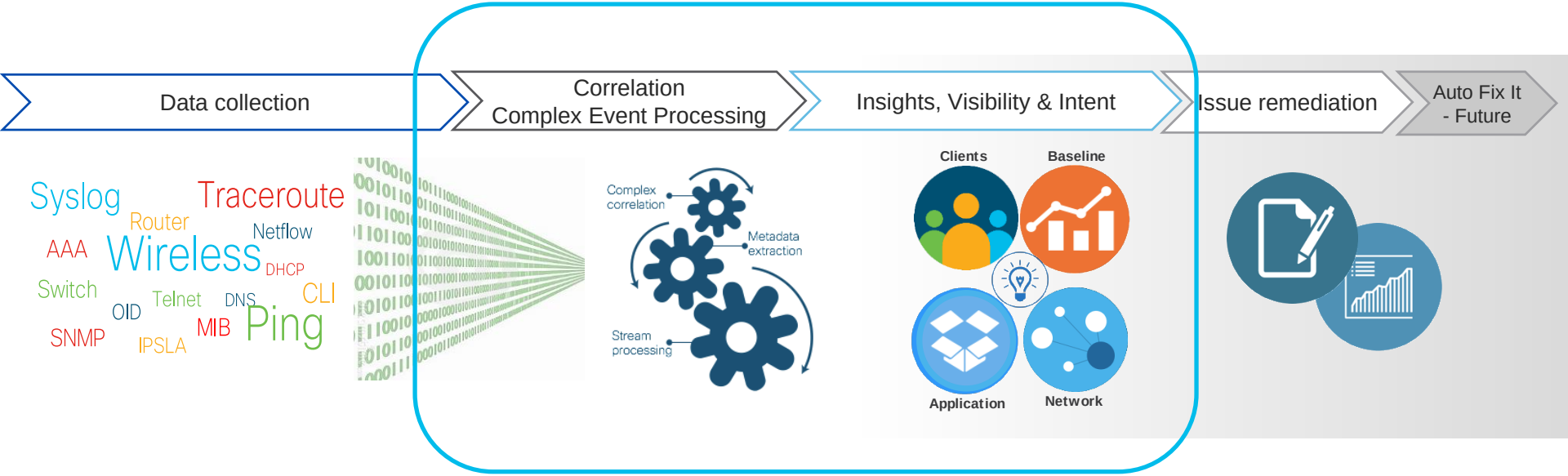
# Cisco DNA Center Assurance





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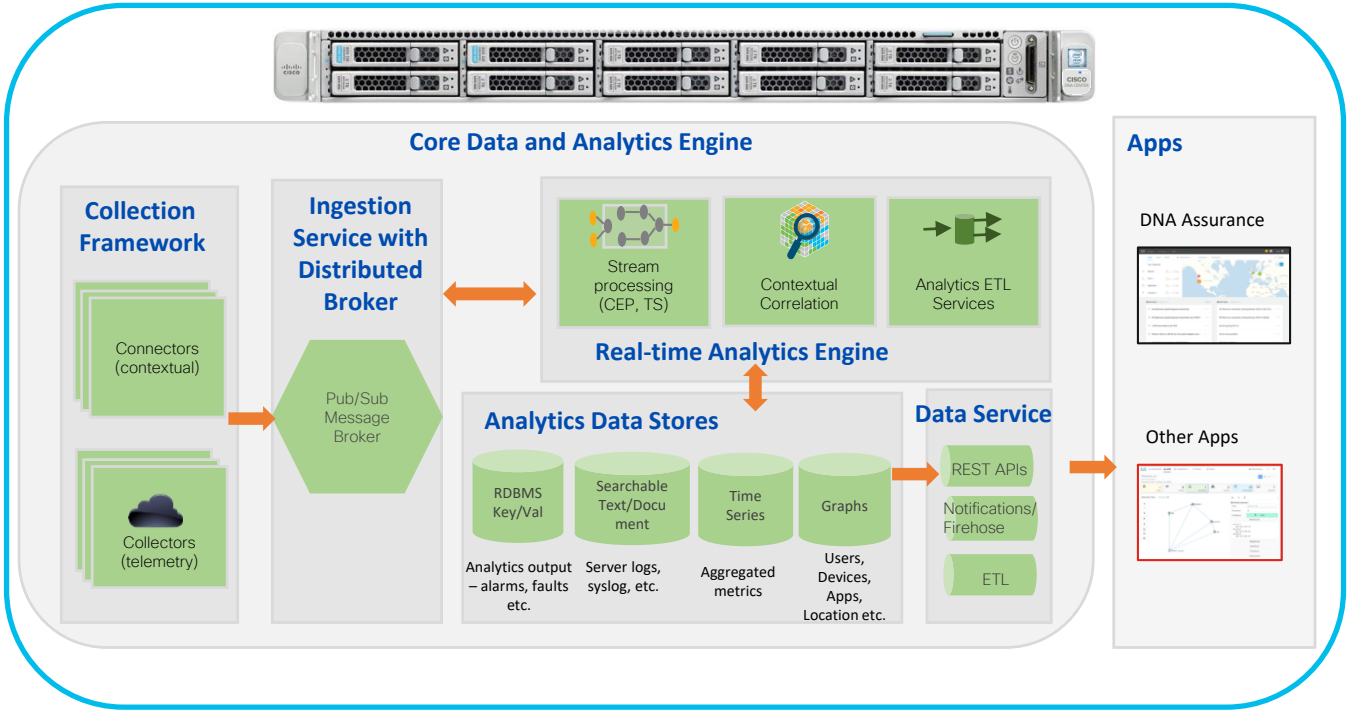
# Cisco DNA Center Assurance




Insights, Visibility & Intent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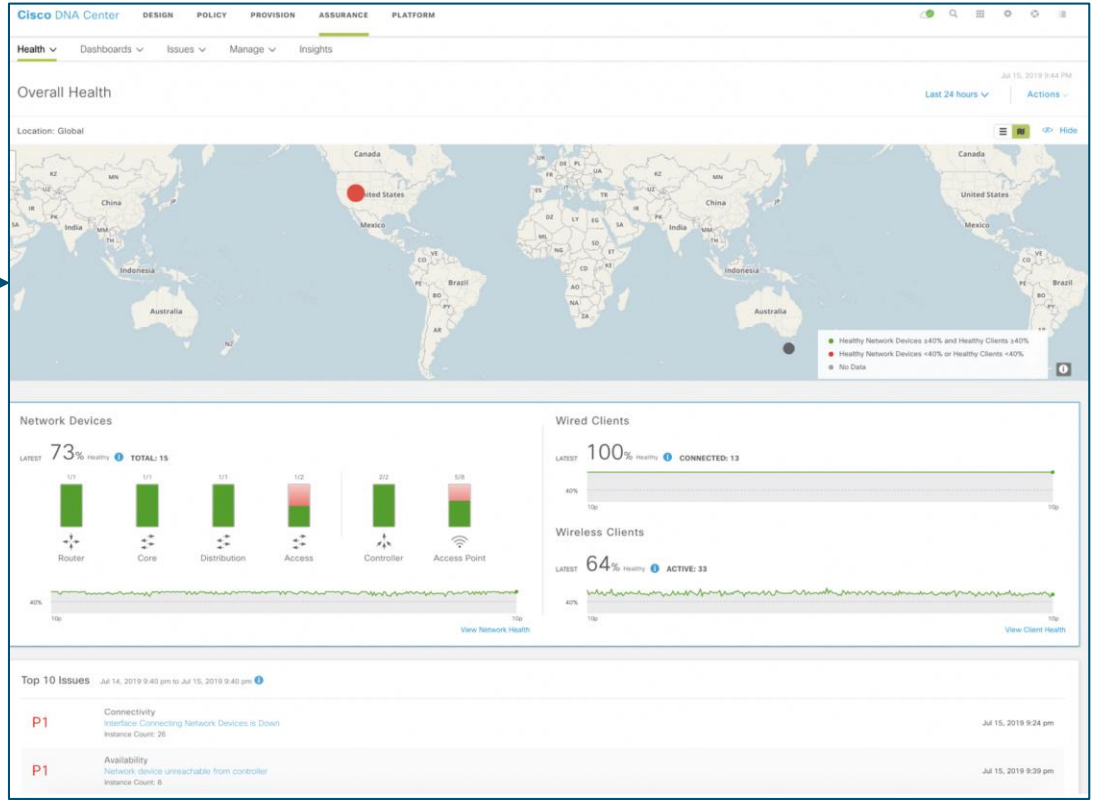
# Cisco DNA Center Assurance

Graphical representation of multiple KPI within a health score metric ranging from 1 to 10, through green, amber and red.





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# Cisco DNA Center Assurance

Why not just displaying actual values ?

- For example RSSI value of -70dBm

Is that good value or not ?


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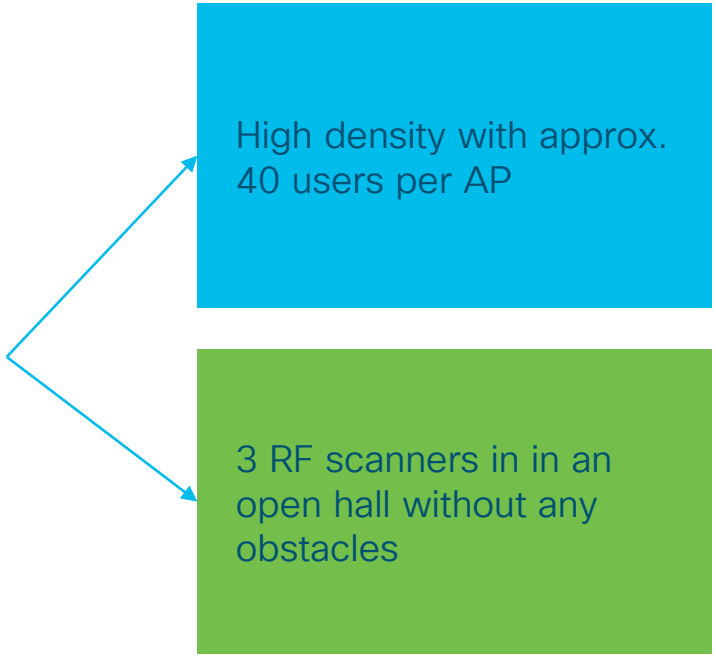



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# Cisco DNA Center Assurance

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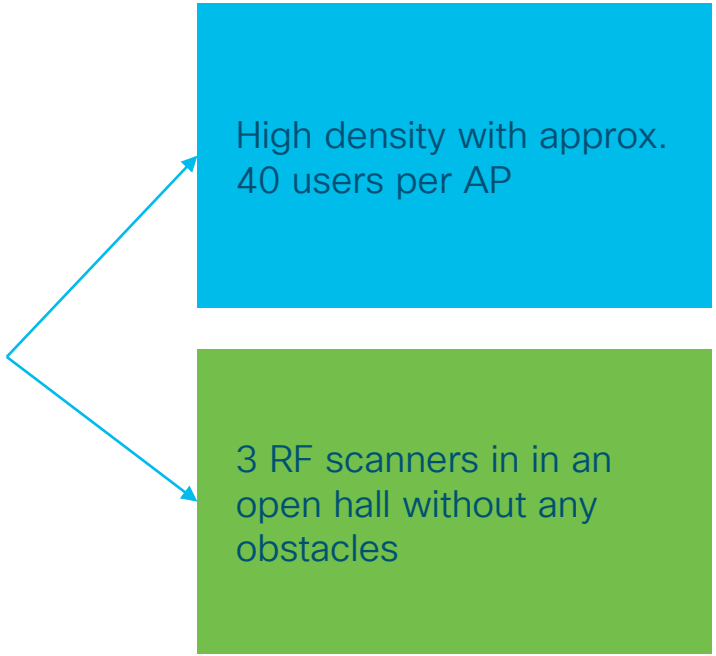


Intent is the key


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# Demo 1 – let’s turn this on

# What are key features and how to use them ?

# Key features

## Network Experience

**Network Health:**
Monitor and troubleshoot the overall health of network devices

**Device 360:**
Comprehensive view to troubleshoot device issues

**Time Travel:**
Contextual Analysis of historical problems going back up to 14 days in time

## Client Experience

**Client Health:**
Provide visibility into clients connected to the network and their experience

**Client 360:**
Comprehensive view of client issues, onboarding, event viewer and connectivity status

**Intelligent Capture:**
Provide packet capture data, AP and Client statistics, and spectrum data

## Sensor based SLA Monitoring

**1800s Active Sensor:**
Proactively test the network and end user experience

**Active Testing:**
12+ types to onboarding and network performance tests

**SLA Dashboard:**
Onboarding, Network Services and App Connectivity

## Application Experience

**Health Score Dashboard:**
Monitor App Health score of business critical apps

**App 360:**
Troubleshoot App issues with a view on performance metrics

**Client 360:**
Troubleshoot specific clients facing app experience issues


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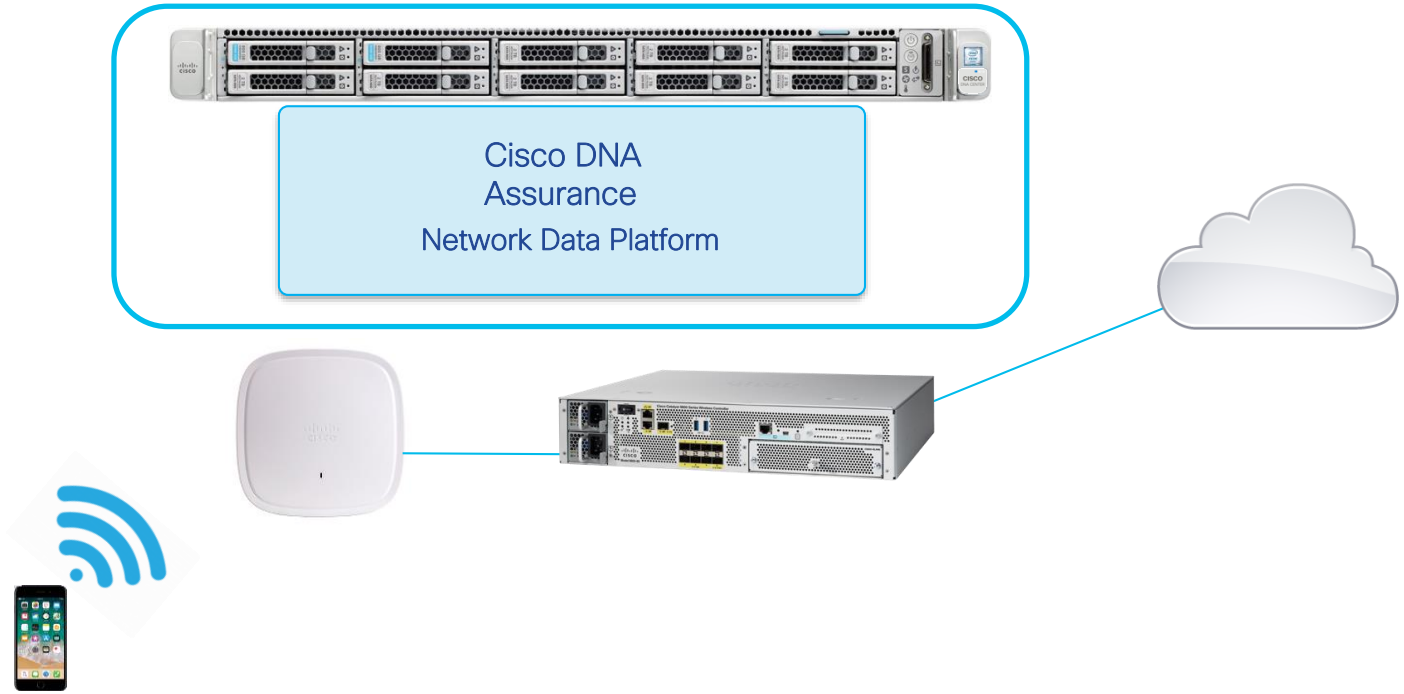
# Let’s get back to Bob





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# Demo 2 – Where to look first? Narrow down the problem

# Capturing more data

# Prepare to capture more data

## Prerequisites

- DNAC 1.2.8 or later
- iCap is BETA prior to Cisco DNA Center 1.3
- WLC w/ AireOS 8.8.111.0+
- AP2800/3800/4800

## Day-1 Config

1. Add WLC to DNAC (Discovery or Inventory)
2. Hyperlocation (Optional)
3. Add CMX and vNAM to DNAC (Optional)

Cisco DNAC automates all of the necessary WLC and AP configs


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# What types of capture we have

| Capture Type | Description | Where To Find It |
|---|---|---|
| Anomaly Capture | WiFi Onboarding packets for failure events only, not all onboarding events. This is for all clients hitting these APs. | • **Assurance>Manage>AP Intelligent Capture>Anomaly Capture**<br>• Enable for select APs or all capable APs |
| Client Scheduled Capture | All WiFi onboarding packets for all onboarding events, both failure and non-failure. Targeted to specified clients. | • **Assurance>Manage>Client Intelligent Capture>Schedule Client Capture** |
| Client Live Capture | All WiFi onboarding packets for all onboarding events, both failure and non-failure. Creates a scheduled capture for default of 3 hours for that particular client. | • Client 360 For a **Device>Intelligent Capture>Start Live Capture Button** |
| Client Full Data Capture | All WiFi packets including data packets for that particular client. Concurrently, also captures wired packets. | • Client 360 For a **Device > Intelligent Capture > Run Data Packet Capture** |


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# Available packet type per capture

| PCAP Type | How to trigger | Media Type | Captured Protocol | Features | Supported AP and capture method |
|---|---|---|---|---|---|
| Full PCAP | On-demand | • Wireless PCAP w/ radio header<br>• Wired PCAP w/ ethernet header | • 802.11 with Radio Header (Mgmt, Control, Data Frame)<br>• 802.3 with Ethernet Header | • Application Analyzer,<br>• Wireless Delay, Wireless Packet Loss Chart<br>• Jitter chart using RTP (Wired & Wireless)<br>• Data Packet auto decryption | AP4800 – 3rd Radio w/ Self-Sniffing feature |
| Partial PCAP | On-demand or Scheduled or Automated | • Wireless PCAP | 802.11 mgmt. (Auth, Assoc)<br>Data – (802.1x/EAP, DHCP, DNS, ARP, ICMP) | • Auto Packet Analyzer<br>• Downloadable from anywhere using Web browser<br>• Automated Onboard Failure PCAP up to 100 packest per session<br>• Data Packet auto decryption | AP2800/3800/4800 – Inline-based Packet capture |


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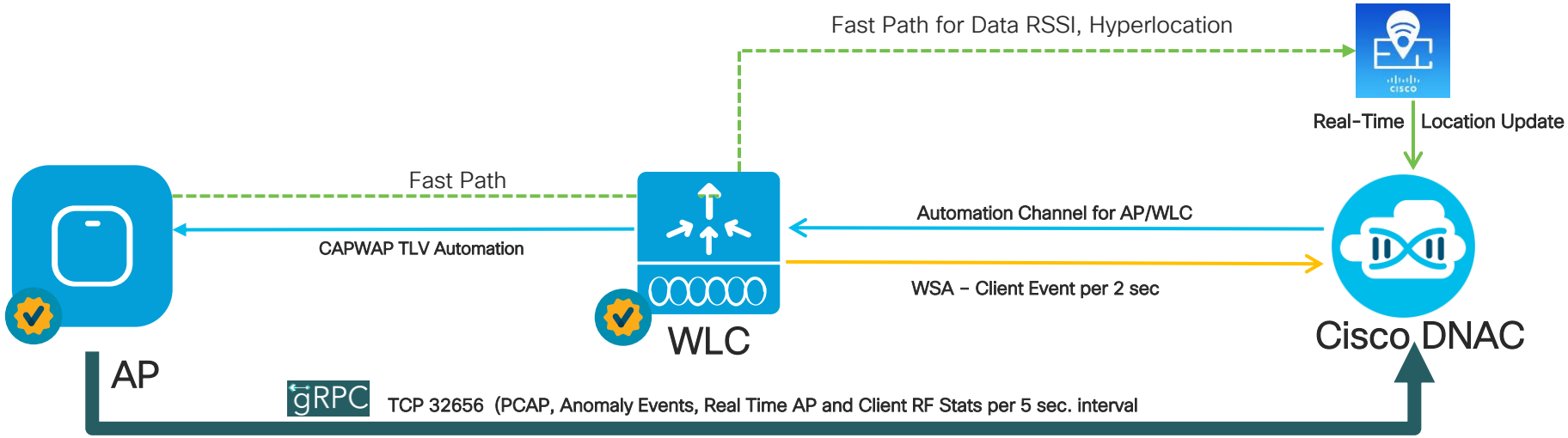
# Data flow




- AP sends telemetry directly to Cisco DNA Center using gRPC channel
  - Real time Client RF stats and AP stats (programmable up to 5 sec freq.)
  - Anomalies-based PCAP, Anomaly Events, Spectrum Data
- From WLC – Client Event from real time filtered channel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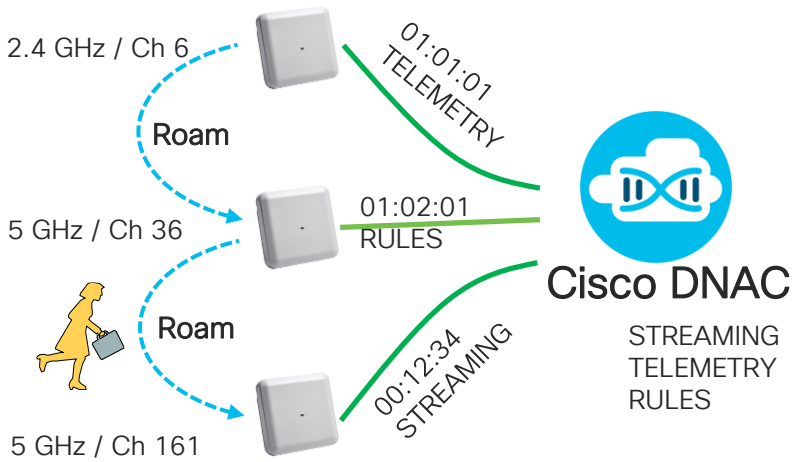
# What if client is moving?




- Multiple APs tracking clients during packet capture
- Single PCAP generated upon Multiple AP roaming scenarios
- Applicable to all types of Intelligent Capture type
  - Automated Packet Capture
  - On-demand Packet Capture
  - Scheduled Packet Capture
- Auto Decrypted Data Packet
- Capture Across AP, across Floor, across channel and band
- Zero Packet Loss during Client Roam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# Demo 3 – Intelligent capture

# Another pair of eyes in your network

# Two types, two use cases

Test Your Network Anywhere at Any Time at Real-world Client Level

## Aironet 1800S Active Sensor

### Client Wireless Performance

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

## AP as a Sensor (1800/2800/3800/4800)

### Network and Service Availability

- Ceiling or Wall Mount
- Larger coverage than actual client
- Use regular AP runs as Sensor mode


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# Where to place sensors – some tips

- General Rule of Thumb: 1 sensor per 5 APs
- Place close to where client devices would be (i.e., desk)
  - It is not recommended to mount the sensors on ceilings or in other areas where client devices would not be located normally
- Place in key/critical areas or known problematic areas
  - Examples: Conference rooms, executive areas, dense workspaces, etc.
- Wired backhaul recommended
  - While wireless backhaul is an option which can and should be used where PoE is not available, PoE is the preferred choice for sensor deployment. With PoE, the test results are sent over the wire instead of over the air.


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# Sensor tips

- 802.11r/FT support – Needs Sensor version 8.8.261.0 or higher. Otherwise, Sensor will not connect to an SSID with 802.11r/FT enabled
- Typically recommended to upgrade the 1800s Sensors to the **latest version** on Cisco.com
- 1800S Sensors need to be able to communicate directly to DNAC; they DO NOT join a WLC like a typical AP would


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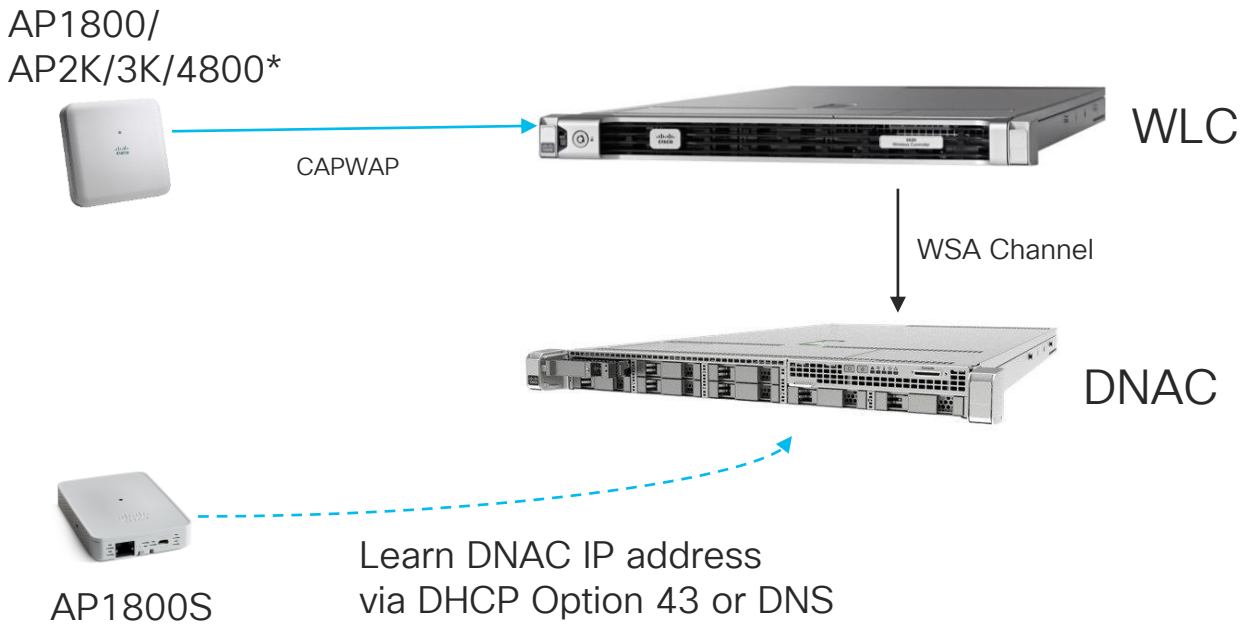
# Discovering Sensors – 2 types





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# Sensor provisioning workflow

## 1. Create sensor backhaul SSID

- This setting is for sensor in DNAC. Not for WLC
- Still required even if used preferred wired backhaul connection

## 2. Change sensor name

- Before claiming sensor change name to desired

## 3. Claim sensor

- Under PnP workflow in DNAC locate discovered sensor in unclaimed devices and claim it
- Assign to site and assign created sensor profile with backhaul SSID

## 4. Place sensor

- Place sensor in actual location on the map

## 5. Set up tests and see results

- See results in Sensor dashboard


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# Tests recommendations

- 802.11r/FT support – Need Sensor version 8.8.261.0 or higher. Otherwise, Sensor will not connect to an SSID with 802.11r/FT enabled
- For 802.1x SSIDs, Sensors will need the necessary credentials for authentication, so plan for those from the start
- Granular Sensor Tests should be created for key/critical areas or known problematic areas or at a per floor level
  - Examples: Conference rooms, executive areas, dense workspaces, etc.
  - Allows for quicker visual inspection of issues with specific tests in specific areas
  - Sensor Tests which encompass large areas (such as an entire building) can cause difficulty when using the Sensor Dashboard to visualize issues arising only in specific locations


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# Demo 4 – Sensor tests

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