

CISCO *Live!*

Let's go

#CiscoLiveAPJC



The bridge to possible

# Monitor your Catalyst 9000 switch from Meraki Dashboard

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Technical Solution Architect  
BRKENS-2201

**CISCO** *Live!*

#CiscoLiveAPJC

# Cisco Webex App

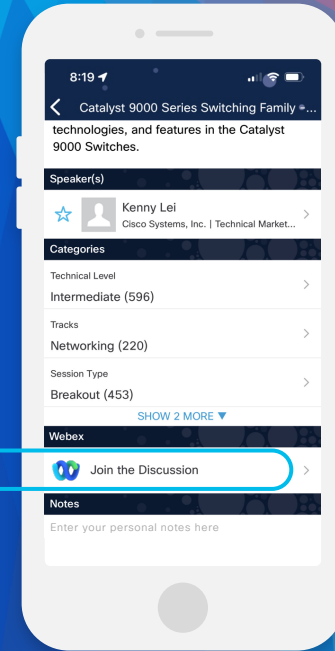
## Questions?

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

## How

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

Webex spaces will be moderated by the speaker until December 22, 2023.



<https://cislive.ciscoevents.com/cislivebot/#BRKENS-2201>

# Agenda

- Getting Started
- Onboarding and Common Pitfalls
- Future

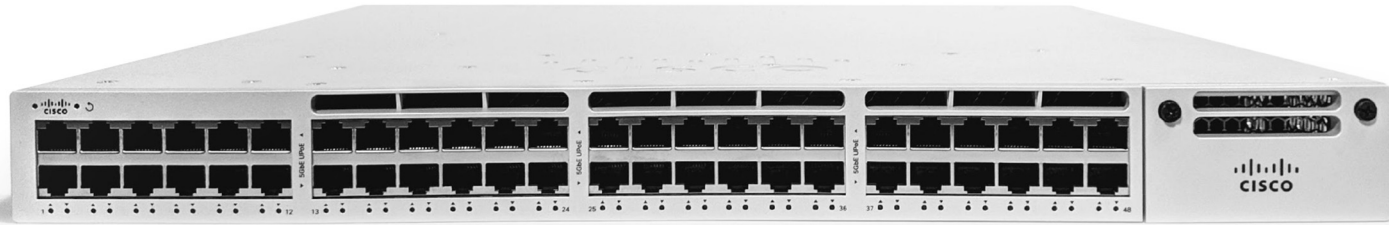


  
**CISCO**  
Catalyst

OR

**Meraki**

# Best of both worlds!



AND

Meraki

# Your IT operation model, your way

## On-Premises

Do-it-Yourself  
Operational Flexibility



Cisco Catalyst Centre

## Cloud

Cloud first IT Transformation  
Operational Simplicity



Cloud Monitoring



Full Management



Meraki

High-Touch

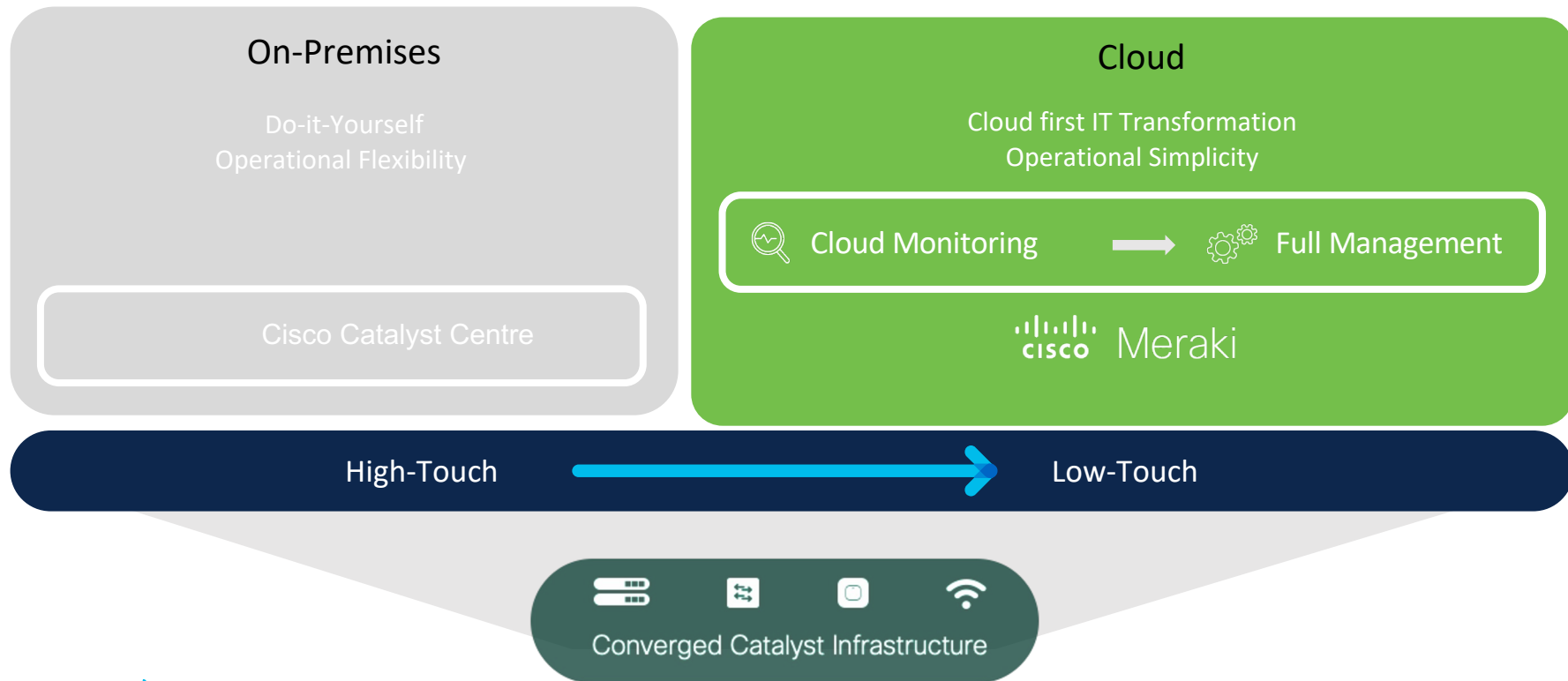


Low-Touch



Converged Catalyst Infrastructure

# Your IT operation model, your way





# Your IT operation model, your way



## Cloud Monitoring



Catalyst  
9200/9300/9500

Management:



CLI

Monitoring:



Meraki Dashboard

License:



DNA Subscription



## Full Management



Catalyst  
9300-M

Management:



Meraki Dashboard

Monitoring:



Meraki Dashboard

License:



Meraki License



Converged Catalyst Infrastructure

# Your IT operation model, your way



## Cloud Monitoring



Catalyst  
9200/9300/9500

Management:



CLI

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Meraki Dashboard

License:



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## Full Management



Catalyst  
9300-M

Management:



Meraki Dashboard

Monitoring:



Meraki Dashboard

License:



Meraki License



Converged Catalyst Infrastructure

# Catalyst Cloud Monitoring

Unified view of Cisco network infrastructure

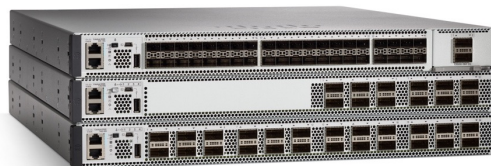
Device health and troubleshooting

Client and traffic information



# Onboarding pre-requisites

# Supported platforms



**Models**  
Catalyst  
9200/L/CX  
9300/L/LM/X  
9500

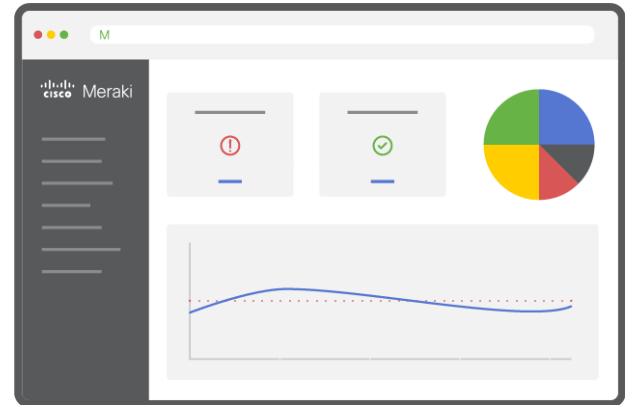
**Firmware**  
IOS-XE  
17.3.1 - 17.9.4

**Licensing**  
DNA Advantage  
DNA Essentials\*

\* DNA Essentials will not provide application or usage data

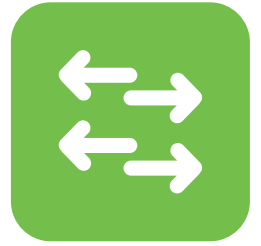
# Account eligibility


- Account at <https://dashboard.meraki.com/>
- Dashboard API access is enabled
- Dashboard API key is generated \*
- The network must be “switch” or “combined” type



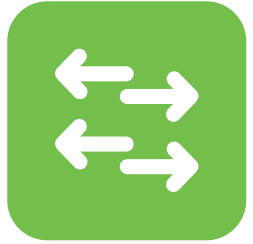
\* SSO cannot generate an API key

# Pre-configuration 1/2



- Connectivity must be provided via a front-panel port
- Only a default VRF is supported
- Default route are in place  `ip route 0.0.0.0 (...)`
- The device must have loopback interface numbers 1000 or 2000 available
- Two unused VTY slots between 16 and 98 must be available

# Pre-configuration 2/2



- DNS and DNS-Lookup are configured → 

```
ip name-server {}  
ip domain lookup
```
- NTP is enabled → 

```
ntp server {}
```
- SSH and Telnet are enabled
- A user used for onboarding is Privilege 15 → 

```
username {} privilege 15
```
- AAA → 

```
aaa new-model
```



# PC to Cloud reachability

A PC on which the Onboarding Application is installed must have reachability to the Dashboard on a TCP port 443:



```
PC~% telnet api.meraki.com 443
Trying 209.206.59.168...
Connected to apj.proxy.k8s.ikarem.io.
Escape character is '^]'.
```

```
PC~% telnet meraki-cloud-monitoring-onboarding-app.s3.amazonaws.com 443
Trying 52.219.193.105...
Connected to s3-us-west-1-w.amazonaws.com.
Escape character is '^]'.
```

# Switch to Cloud reachability

The switch must have the regional gateway reachability on TCP port 443:

APAC: `ap.tlsgw.meraki.com`

AMER: `us.tlsgw.meraki.com`

EMEA: `eu.tlsgw.meraki.com`

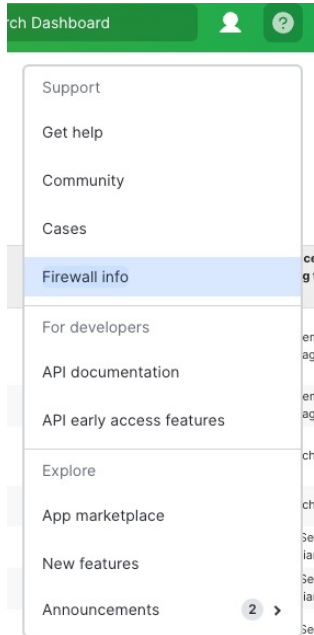
```
Switch# telnet ap.tlsgw.meraki.com 443
```

```
Trying ap.tlsgw.meraki.com (52.74.25.75, 443)... Open
```



# Firewall Rules

Help > FW Info

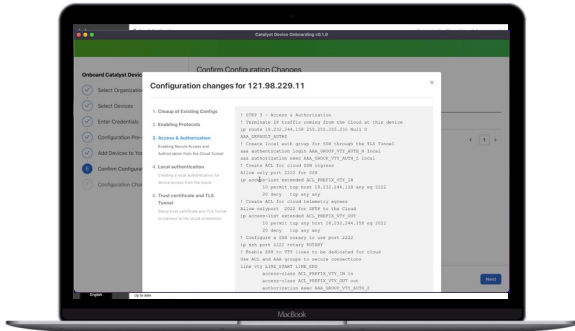
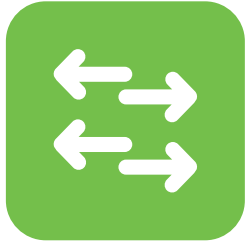


## Firewall Rules

This list is intended to help guide you in creating firewall rules for the Cisco Meraki cloud.

Source IP	Destination IP	FQDN	Ports	Protocol	Direction	Description	Devices using this rule
Your network(s)	170.0.0/8		443, 2195-2196, 5223	TCP	outbound	iOS Systems Manager communication	Systems Manager
Your network(s)	Any		5228-5230	TCP	outbound	Android Systems Manager communication	Systems Manager
Your network(s)	13.214.237.7/32, 52.74.25.75/32, 52.76.81.123/32		443	TCP	outbound	Cloud Monitoring for Catalyst	Switches
Your network(s)	10.0.0.5/32					802.1X with customer-	

# Onboarding Flow – Application



## Set up cloud authentication

- “meraki-user” account and key
- SSH config for port 2222 over tunnel & PKI auth
- ip routing
- netconf-yang
- VTY Lines for auth with ACLs
- AAA

## Create secure tunnel

- loopback
- tunnel interface
- tunnel peer certificate
- null host route for tunnel peer

## Enable network discovery

- CDP/LLDP enable

# Onboarding Flow – Cloud



## Globally

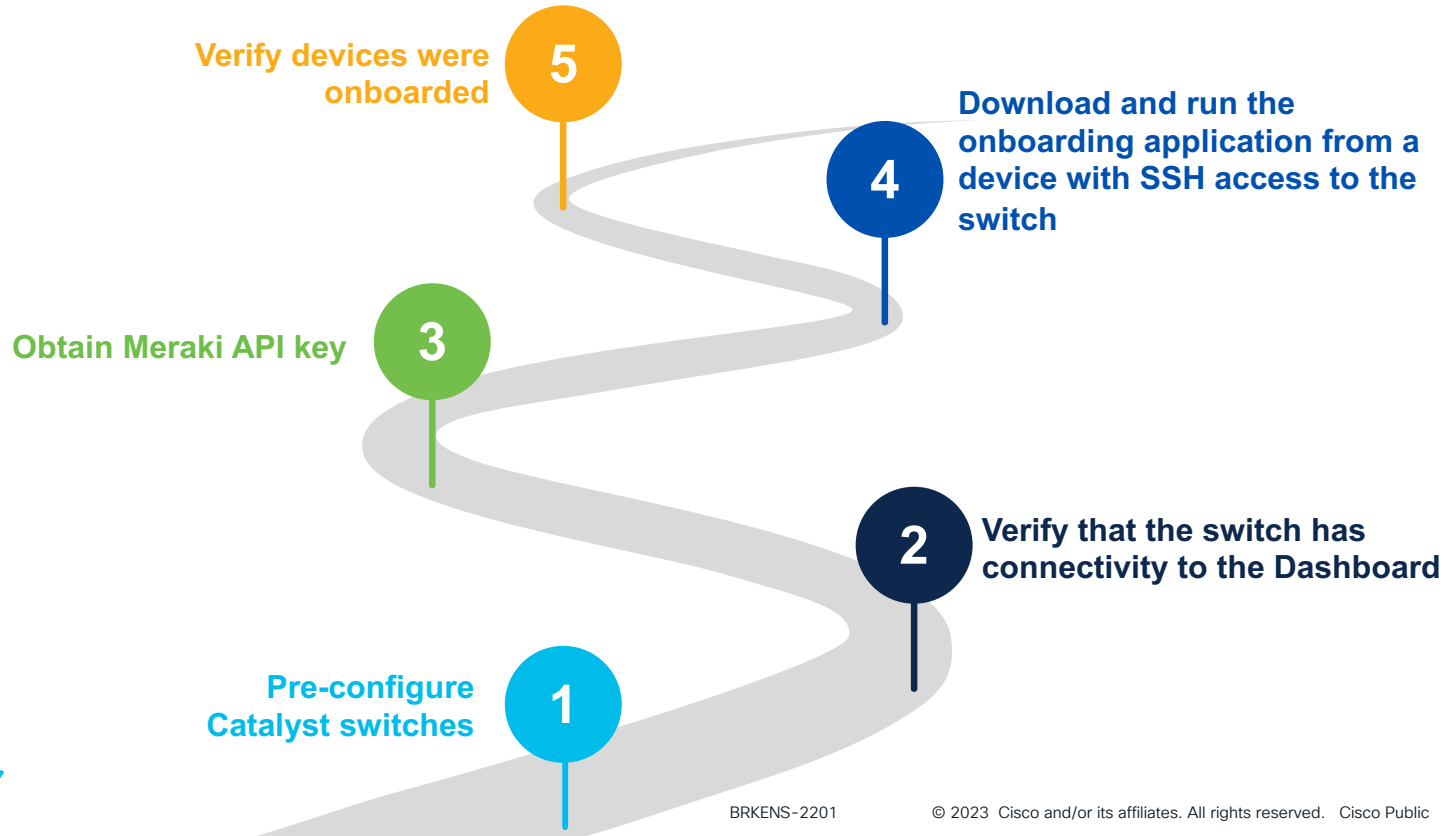
- Subscriptions for telemetry streaming
- Syslog to cloud
- AVC NetFlow recording, exporting to local file, and monitor configuration
- SNMP Community and traps

## On all interfaces

- Device-tracking in glean mode
- AVC NetFlow monitor input and output

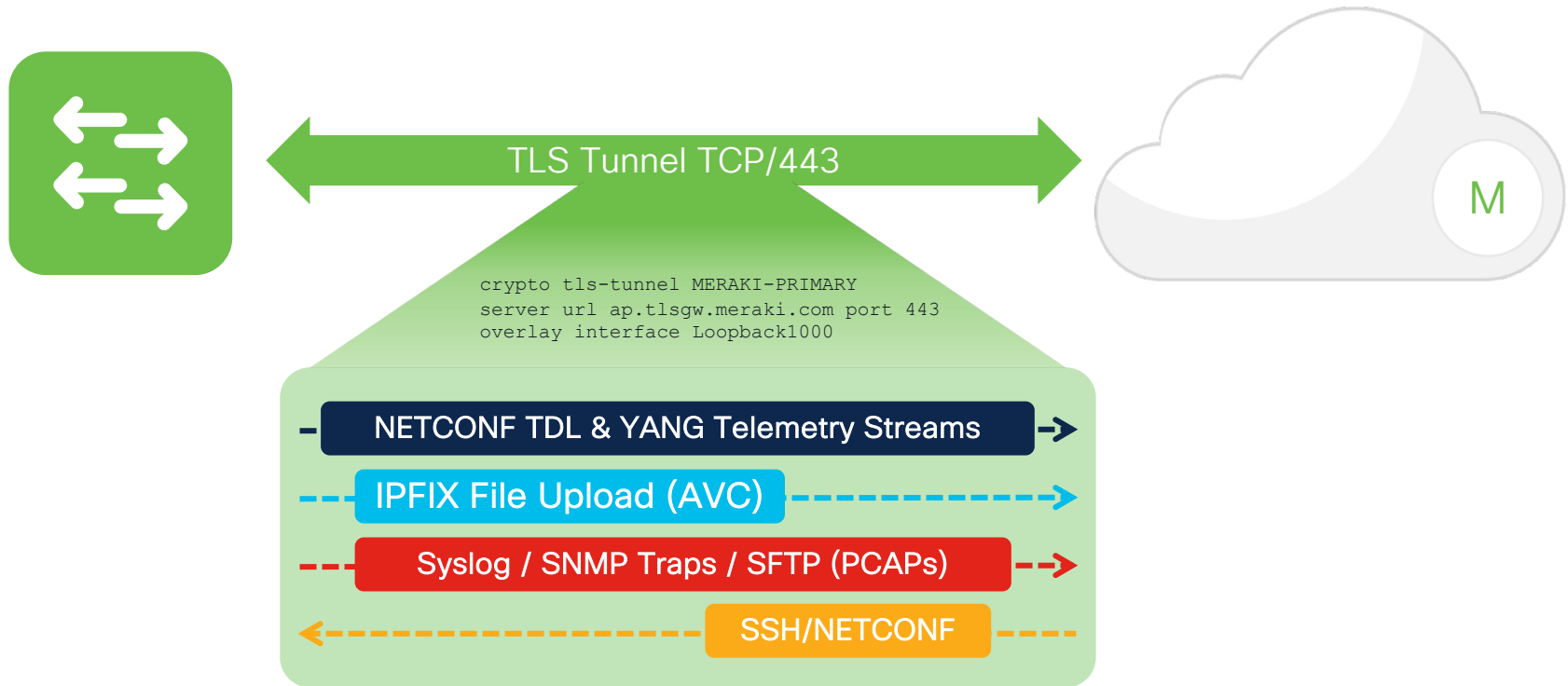
*Note: All logging, telemetry, and other data from the device to the cloud is sent over a TLS-encrypted tunnel.*

# Onboarding Flow – User experience



# Demo

# Cloud monitoring securely streams telemetry





# TLS Tunnel Status

- Heartbeat every 10 seconds DPD
- Upon loss attempt to reestablish every 20 seconds
- TLS reauthenticated every hour (rekey process)

```
Cat9k-Monitor#show crypto tls-tunnel sessions



TLS-Tunnel Session Details
=====
Server   : ap.tlsgw.meraki.com[52.76.81.123]
Config   : MERAKI-PRIMARY                Session Create Time : 02:43:22
                                              Session Up Time     : 02:53:47
Timeouts:                               Time To Rekey       : 13:03:03
  DPD    : 10
  Rekey  : 57411
  Retry  : 20
Tunnel Established: True
Virtual I/F: TLS-VIF0
Datapath State: Up
Remote Prefix: 18.232.244.158/32
Local Prefix: 20.0.88.62
Idb in use: Vlan1
```

# Common pitfalls and how to avoid them

# Current limitations

- Catalyst Centre (formerly DNA Centre) managed devices cannot be onboarded
- HTTPS proxies that perform TLS decryption are not currently supported
- Pre-existing NetFlow configuration will cause traffic and application data to not be available in the Dashboard
- Catalyst 9500 series does not support client analytics, regardless of license

# Common pre-configuration mistakes

- `ip default-gateway`  $\neq$  `ip route 0.0.0.0/0`
- `ip routing` is missing  `show run all | include ip routing`
- RADIUS authentication is in use - it is not supported
- DNA license is NOT enabled  `show version`

Technology-package <b>Current</b>	Type	Technology-package Next reboot
network-advantage <b>None</b>	Smart License Subscription Smart License	network-advantage dna-advantage


# No Application detail data in Dashboard?

## Health


UPLINKS

 1/2 healthy

SECURITY APPLIANCES

 1/1 healthy

SWITCHES

 1/1 healthy

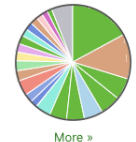
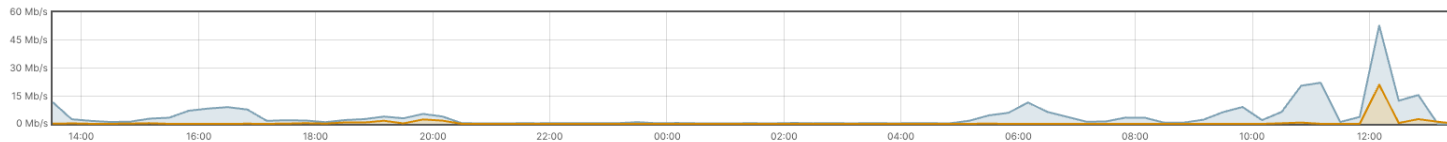
ACCESS POINTS

 4/4 healthy

## Clients all for the last day

41.62 GB (↓ 18.71 GB, ↑ 22.91 GB)

Applications



Network Cisco Live Melb

### Switches

Last day

- Monitor
  - Clients
  - Traffic analytics
  - Topology
  - Packet capture
  - Event log
  - Map & floor plans
- Configure
  - General
  - Administration
  - Alerts
  - Group policies
  - Users
  - Add devices

## Traffic analysis

Traffic analysis

Custom pie chart

- Disabled: do not collect traffic types
- Basic: collect generic traffic categories
- Detailed: collect destination hostnames

No slices specified.

[Add a slice](#)

# Dashboard – Infrastructure

# Switch Info

- Name
- Location
- IP Information
- Serial Number
- Firmware Version
- Port Overview
- Connected Clients
- Bandwidth Usage

## ● C9500SV-CORE-RIO [2]

C9500-24Y4C a0:b4:39:77:64:40

Monitor Only



ADDRESS  
170 W Tasman Dr, San Jose, CA 95134

LAN IP  
10.16.93.44 (statically assigned)

PUBLIC IP  
173.36.197.78

GATEWAY  
10.16.93.42

DNS  
10.16.110

LAN IPV6  
Not configured

TERMINAL  
[Launch Terminal](#)

SERIAL NUMBER  
CAT2345L1R7 (Catalyst)  
Q2ZZ-STB6-WH3A (Meraki)

Summary Ports Event log Location Tools Config

### Ports [View ports on this switch](#)



### Historical device data for the last 2 hours ▾

#### Connectivity



#### Client usage



#### Clients

There have been no connected clients for the selected time range.

# Port Info (1/2)

- Port Usage
- Port configuration
  - VLAN
  - STP
  - POE
  - Speed/Duplex

Port 21: Twe2/0/21 - connected to C9300-M (Stack2) Port 46 !!! [Return to port list](#)

[Learn more](#)



Historical data for the last 2 hours ▾

## Port traffic



## Configuration


Port status	Enabled
Type	Trunk
Native VLAN	1
Allowed VLANs	1,13,918
Link negotiation	Auto negotiate (1 Gbps)
RSTP	Enabled
Port isolation	Disabled
Trusted DAI	Disabled
UDLD	Alert only
Tags	<input type="text" value="core"/>
PoE	n/a
Storm control	Enabled



# Port Info (2/2)

- Traffic Usage
- SFP Information
- CDP/LLDP
- Connected Clients
- PCAP
- Port Statistics
  - Broadcast/Multicast
  - CRC/Frag/Collisions

## Status

Connectivity 

Usage 27.3 MB (11.0 MB sent, 16.4 MB received)

Traffic 17.3 Kbps (17.3 Kbps sent, - received)

CDP/LLDP [C9300-SW2-Stack1 / 46](#) (Meraki C9300-48P Cloud Managed Switch) [raw](#)  
● VLANs Match

SFP module - GE T (Part ABCU-5710RZ-CS5, Serial: AGM192148XT)

## Current clients 2

Description	IP address	VLAN	MAC address	Adaptive Policy Group
<a href="#">70:61:7b:fa:b4:80</a>	10.16.93.117	1	70:61:7b:fa:b4:80	
<a href="#">cc:9c:3e:ec:2a:00</a>	10.16.93.113	1	cc:9c:3e:ec:2a:00	

## Troubleshooting

Packet capture [Run a packet capture on this port](#)

Cycle port  Disable and re-enable this port

**Warning:** PoE powered devices will be temporarily powered down.

## Packets for the last 1 day ▾

	Total	Sent	Received	Rate
Total	2,229,555	972,558	1,256,997	25 pkts/s (11 pkts/s ↑, 14 pkt/s ↓)
Broadcast	476,635	0	476,635	5 pkts/s (0 pkts/s ↑, 5 pkt/s ↓)
Multicast	470,108	0	470,108	5 pkts/s (0 pkts/s ↑, 5 pkt/s ↓)
CRC align errors	0	0	0	-
Fragments	0	0	0	-
Collisions	0	0	0	-
Topology changes	0	0	0	-

# Stacking

- Switch stacks fully supported
- Onboard the single management IP
- Monitoring similar behavior to classic MS switches

## Switch stacks overview

### Configured stacks

Search switch stacks... 2 switch stacks

Stack Name	Stack Members
C9300-SW-Stack	<a href="#">C9300-SW2-Stack1</a> <a href="#">C9300-SW1-Stack1</a>
C9500SV-CORE-RIO <span>Monitor Only</span>	<a href="#">C9500SV-CORE-RIO [2]</a> <a href="#">C9500SV-CORE-RIO [1]</a>



### SWITCH STACKS

**C9500SV-CORE-RIO** Monitor Only

#### Overview

### Members (2) [configure ports in this stack](#)

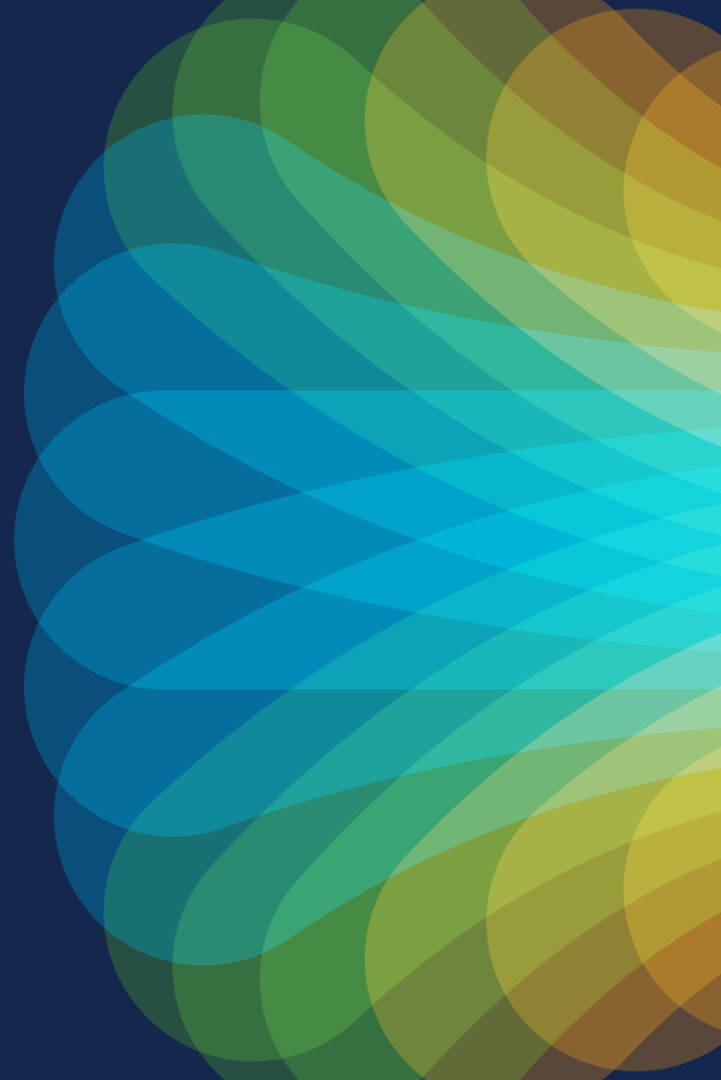
Name: [C9500SV-CORE-RIO \[1\]](#) Status: ● Model: C9500-24Y4C

No module connected

Name: [C9500SV-CORE-RIO \[2\]](#) Status: ● Model: C9500-24Y4C

No module connected

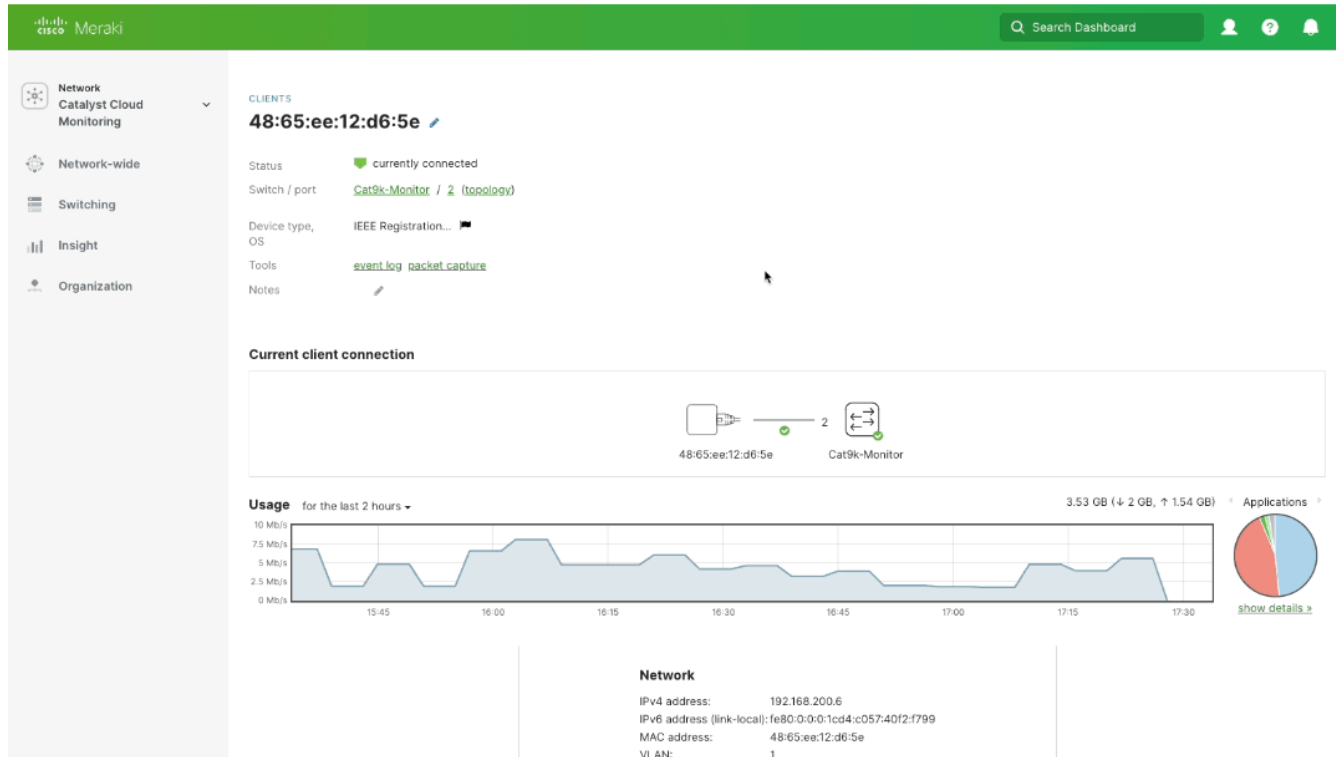
# Dashboard – Clients and Applications



# Topology

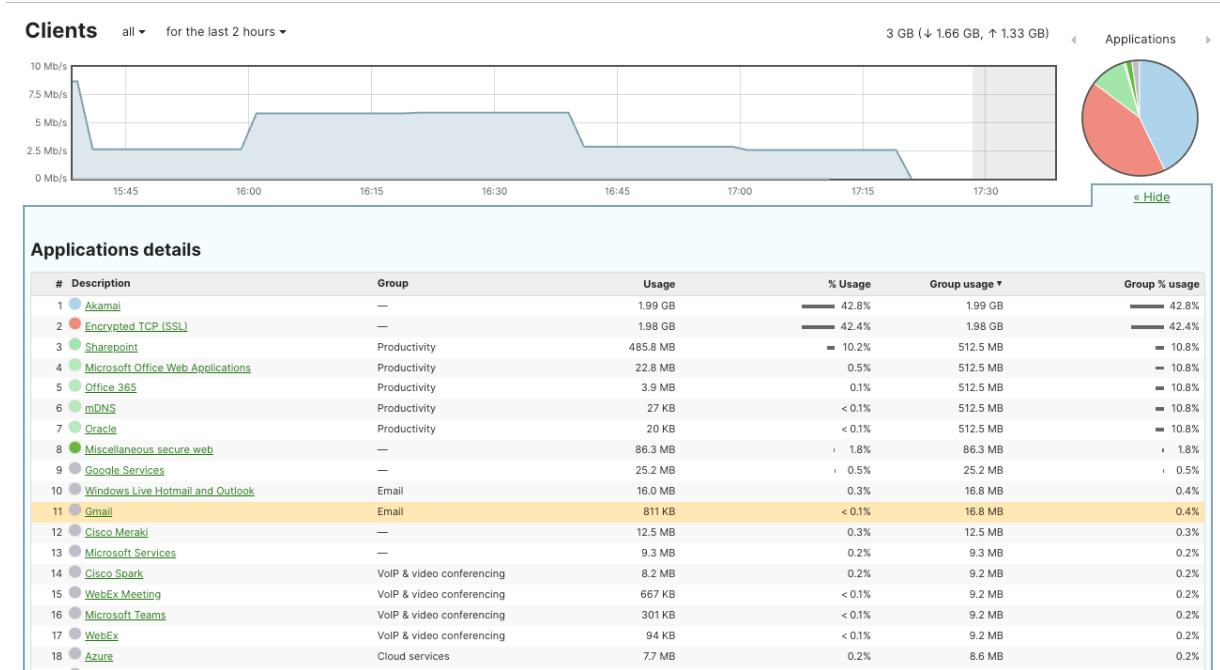
The screenshot displays the Cisco Meraki network management interface. The top navigation bar includes 'Show admin', 'Demo Networks', and a search bar. The left sidebar shows the network hierarchy: Network Tasman Campus CL, Network-wide, Security & SD-WAN, Switching, Wireless, Systems Manager, Cameras, Insight, and Organization. The main content area is titled 'C9500SV-CORE-RIO [1]' and includes a 'Switch location' section with a map and a 'Launch Terminal' button. The map shows the physical location of the switch at 170 W Tasman Dr, San Jose, CA 95134. Below the map, the device's IP address (10.16.93.44) and other configuration details are visible. The bottom of the page shows the URL: https://n123.meraki.com/Tasman-Campus-CL/n123/switches/management/switches/show\_location/location/10.16.93.44/170W-Tasman-Dr-San-Jose-CA-95134

# Client View



# Application Visibility

## Offer Additional Value for Cisco DNA Subscriptions



# Dashboard – Alerts and Troubleshooting



# Alerts

- Combination of Meraki and Catalyst Alerts
  - Switch Offline
  - Port up/down
  - Link Speed
  - Power Supply
  - Usage
  - Temperature

## Meraki and Catalyst

- A switch goes offline for  minutes
- goes down for more than  minutes
- changes link speed
- A power supply goes down
  - Hide additional recipients
  -
- Network usage exceeds  GB in
- A switch is operating at critical temperature ⓘ




The following switch ports in the [Catalyst Cloud Monitoring - switch](#) network were connected.

<a href="#">Cat9k-Monitor / 1 (Gi1/0/1) Access port on VLAN 1</a>	Switch port is up at 1 Gbps	02:56 PM PST on Nov 19
<a href="#">Cat9k-Monitor / 2 (Gi1/0/2) Access port on VLAN 1</a>	Switch port is up at 100 Mbps	02:56 PM PST on Nov 19



# Terminal

**C9500SV-CORE-RIO [2]**  
C9500-24Y4C a0:b4:39:77:64:40  
Monitor Only



ADDRESS  
170 W Tasman Dr, San Jose, CA 95134

LAN IP  
10.16.93.44 (statically assigned)

PUBLIC IP  
173.36.197.78

GATEWAY  
10.16.93.42

DNS  
10.16.1.10

LAN IPV6  
Not configured

TERMINAL  
Launch Terminal

SERIAL NUMBER  
CAT2345L1R7 (Catalyst)  
Q2ZZ-STB6-WH3A (Meraki)

Summary Ports Event log Location Tools Config

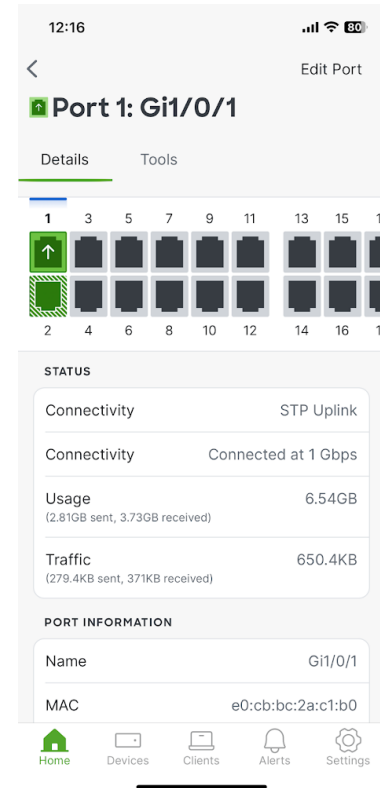
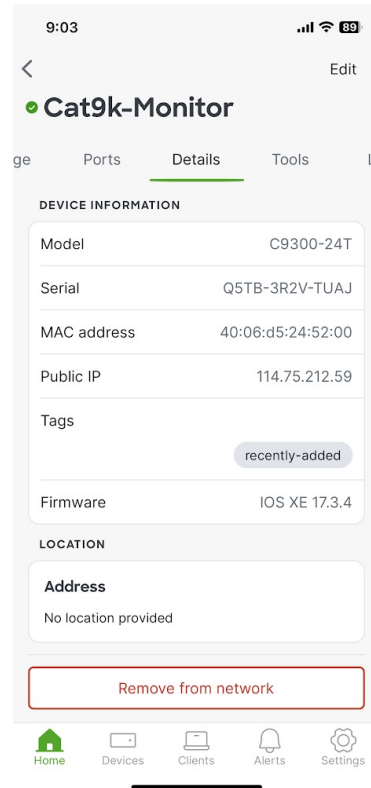
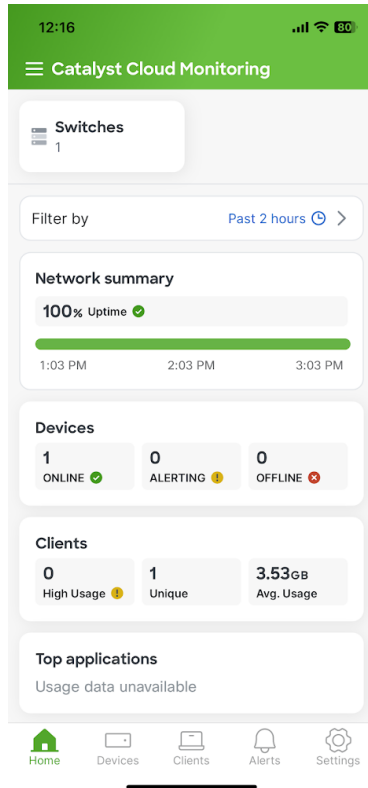
**Ping**  Ping

**Terminal** Opens a troubleshooting console to this device, similar to an IOS-XE CLI window.  
Launch Terminal Detach

**Cycle port** Warning: PoE powered devices will be temporarily powered down.  
Ports   
Cycle ports

**MAC forwarding table** Run

# Mobile Application



# API Access

- Organisation Summary
- Network Information
- Client Data
- Interface Statistics

```
GET {{baseUrl}}/devices/serial/switch/ports/statuses

Params • Authorization Headers (7) Body Pre-request Script Tests Settings •

Body Cookies Headers (16) Test Results

Pretty Raw Preview Visualize • JSON ▾

1
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33
34
35
{
  "portId": "1",
  "enabled": true,
  "status": "Connected",
  "isUplink": true,
  "errors": [],
  "warnings": [],
  "speed": "1 Gbps",
  "duplex": "full",
  "usageInKb": {
    "total": 9722780,
    "sent": 3906546,
    "recv": 5816234
  },
  "lldp": {
    "systemName": "Meraki MX64 - Lab_Branch - appliance",
    "systemDescription": "Meraki MX64 Cloud Managed Router",
    "portId": "1",
    "chassisId": "e0:cb:bc:2a:c1:b0",
    "portDescription": "lan port 1"
  },
  "clientCount": 0,
  "trafficInKbps": {
    "total": 921.9,
    "sent": 370.4,
    "recv": 551.5
  },
  "securePort": {
    "enabled": false,
    "active": false,
    "authenticationStatus": "Disabled",
    "configOverrides": {}
  }
},
}
```

# Simplify Catalyst Network Operations

## Simplify IOS-XE Switchport Packet Captures

### IOS-XE CLI

```
C9300-SW(config)# ip access-list extended pcap1-filter  
C9300-SW(config)# permit ip host 172.16.24.1 host 172.16.24.1
```

```
C9300-SW# monitor capture pcap1 access-list pcap1-filter
```

```
C9300-SW# monitor capture pcap1 limit duration 60
```

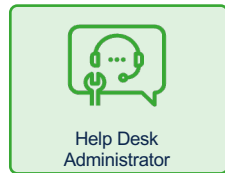
```
C9300-SW# monitor capture pcap1 interface te1/0/47 both
```

```
C9300-SW# monitor capture pcap1 buffer circular size 10
```

```
C9300-SW# monitor capture pcap1 start
```

```
C9300-SW# monitor capture pcap1 export tftp://10.1.22.55/ pcap-  
ts-1.pcap
```

```
% TFTP 10.1.22.55 get pcap-ts-1.pcap
```

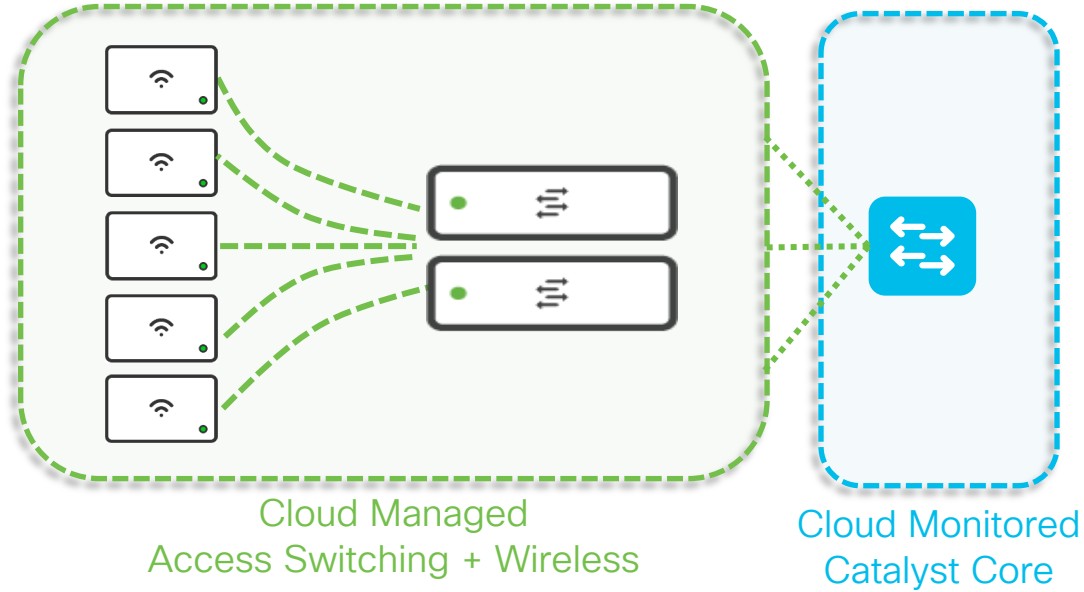


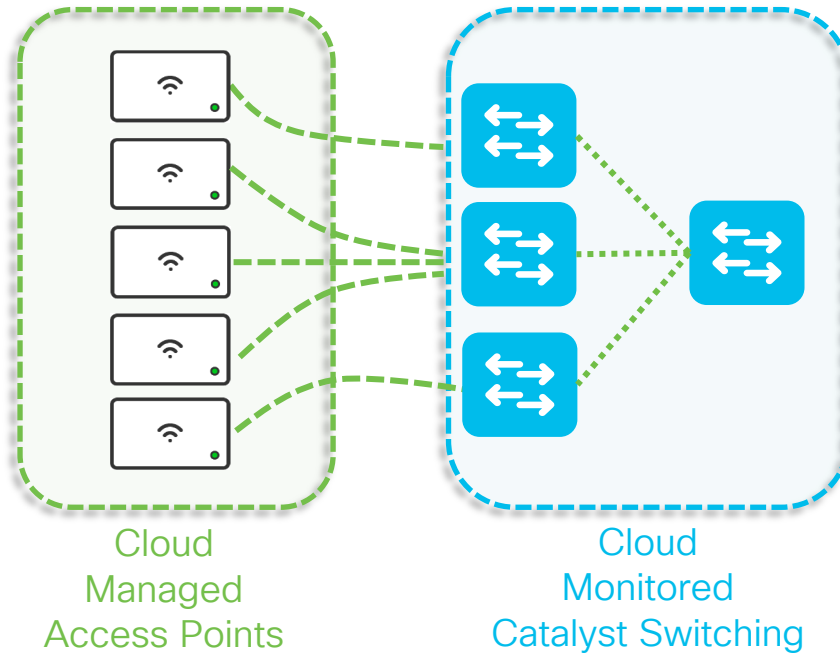
### Dashboard

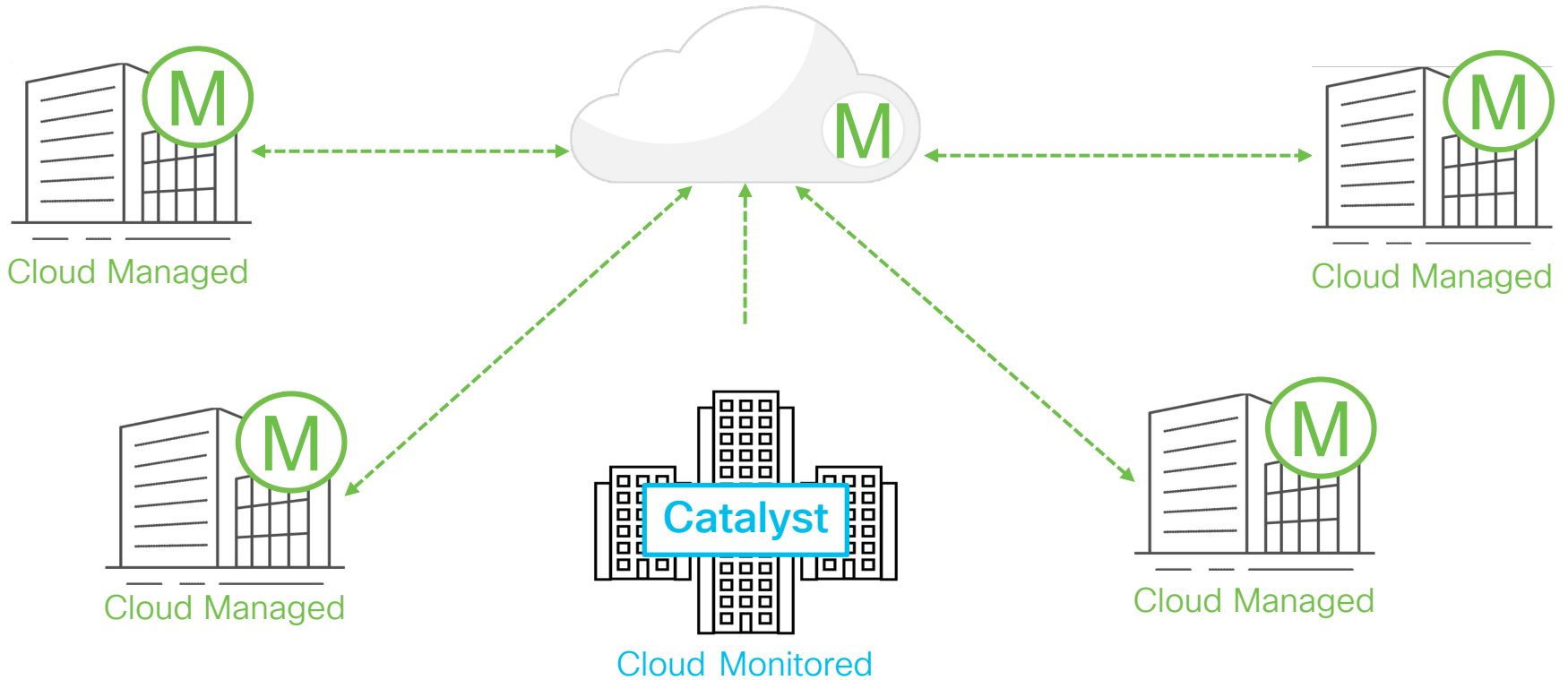
The dashboard shows a 'Troubleshooting' section with a link 'Run a packet capture on this port'. Below it is a 'Packet capture' form for switches. The form includes a dropdown for 'Switch' (Sw5-C9300L-48), a dropdown for 'Switch ports' (1), a dropdown for 'Output' (Download .pcap file (for Wireshark)), a 'Duration (secs)' field (60), a 'Filter expression' field (ipV4 172.16.24.1/24 host 172.16.24.1), and a 'File name' field (Test Meraki - switch\_MS-Sw5-C9300L-48\_IF-). A progress bar shows 'Uploading' at 50%, and a red 'Start Capture' button is visible. In the bottom right, there is a file manager window showing 'Test Meraki - swi....zip' with options to 'Open', 'Always Open Files of This Type', 'Show in Finder', and 'Cancel'.

Simplified Troubleshooting for Tier 1 Support and Help Desk – No IOS-XE CLI Training Required

# Design Scenarios

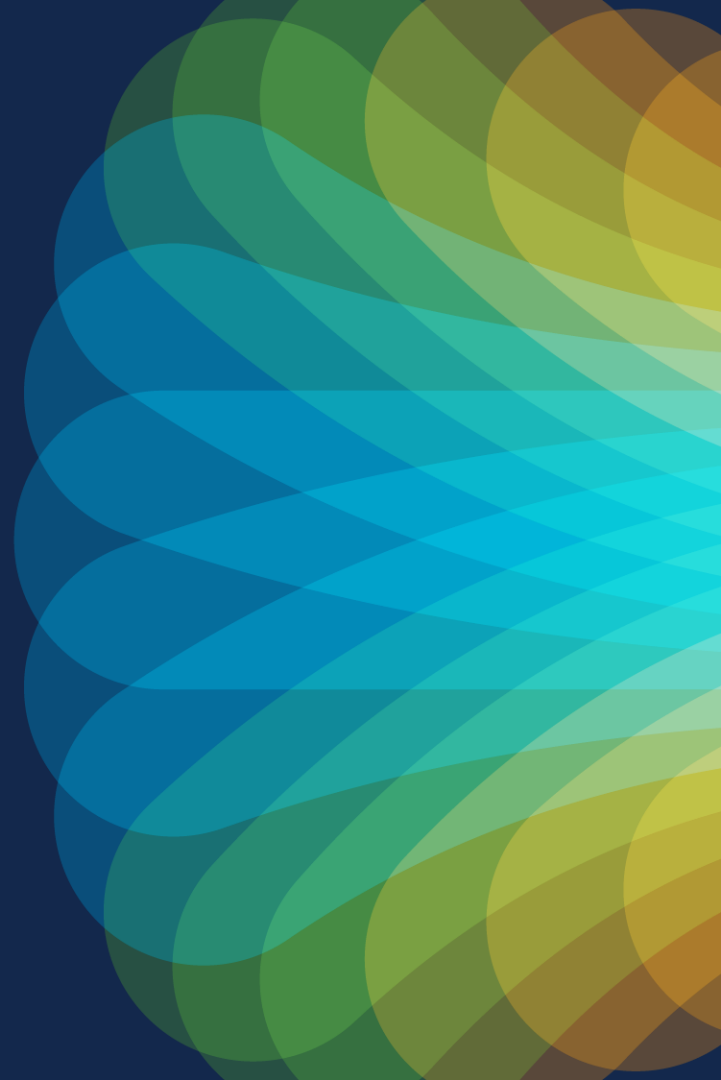








# Future



# IOS-XE Image Upgrades

## Firmware upgrades

Overview **Schedule upgrades** Scheduled changes

Cloud Managed **Cloud Monitored** New

Q Search All networks Any status All devices All firmware version All availability 1 devices

1 Item selected Clear all Cancel **Cancel Upgrade** **Schedule Upgrade**

Device	Network	Current firmware	Upgrade status
<input checked="" type="checkbox"/> C9500SV-CORE-RIO	Stack (2)	Tasman Campus CL - switch	IOS-XE 17.3.4



Cloud Managed **Cloud Monitored**

Q Search All networks Any status

2 Items selected Select all 25 items Cancel **Schedule upgrades**

Device	Network	Current firmware	Upgrade status
<input checked="" type="checkbox"/> C9200-1	San Jose - Building 23 - switch	IOS-XE	
<input checked="" type="checkbox"/> Stack123			
<input type="checkbox"/> test [2]			
<input type="checkbox"/> sw2018			
<input type="checkbox"/> xSW3-93			
<input type="checkbox"/> C9200-2			<span style="color: red;">●</span> Not eligible for upgrade
<input type="checkbox"/> Pub-Rout			
<input type="checkbox"/> Sw4-C93			
<input type="checkbox"/> Switch20			

### Schedule upgrade

Select Target Version

1 ————— 2

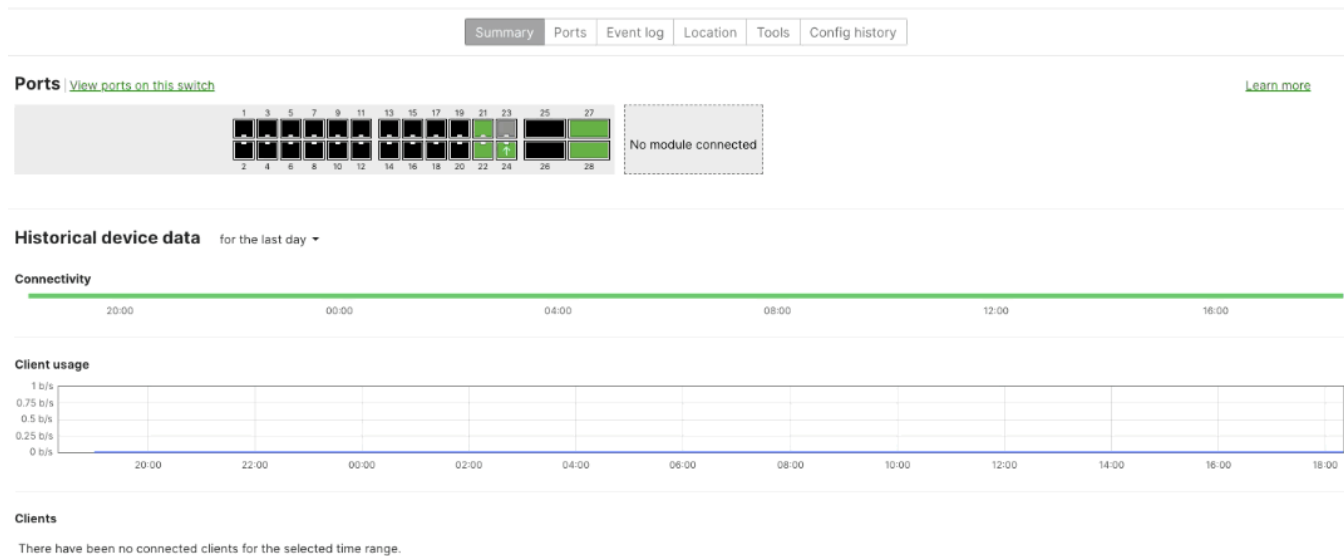
Perform the upgrade now

Schedule the upgrade

Cancel Back **Confirm**

# Configuration Archive

- Date-selectable two-column format
- Diff functionality with highlighting
- Download option for local backup and use for restoring/replacing
- Changes detected automatically and updated in Dashboard



# Cloud Monitoring for Catalyst Wireless

Coming H1CY24

IOS-XE Native Dashboard Communications

Native Dashboard Onboarding

9800-L, 9800-40 and 9800-80 Wireless Controller Support

9100, 4800, 3800 and 2800 Series Access Point Support

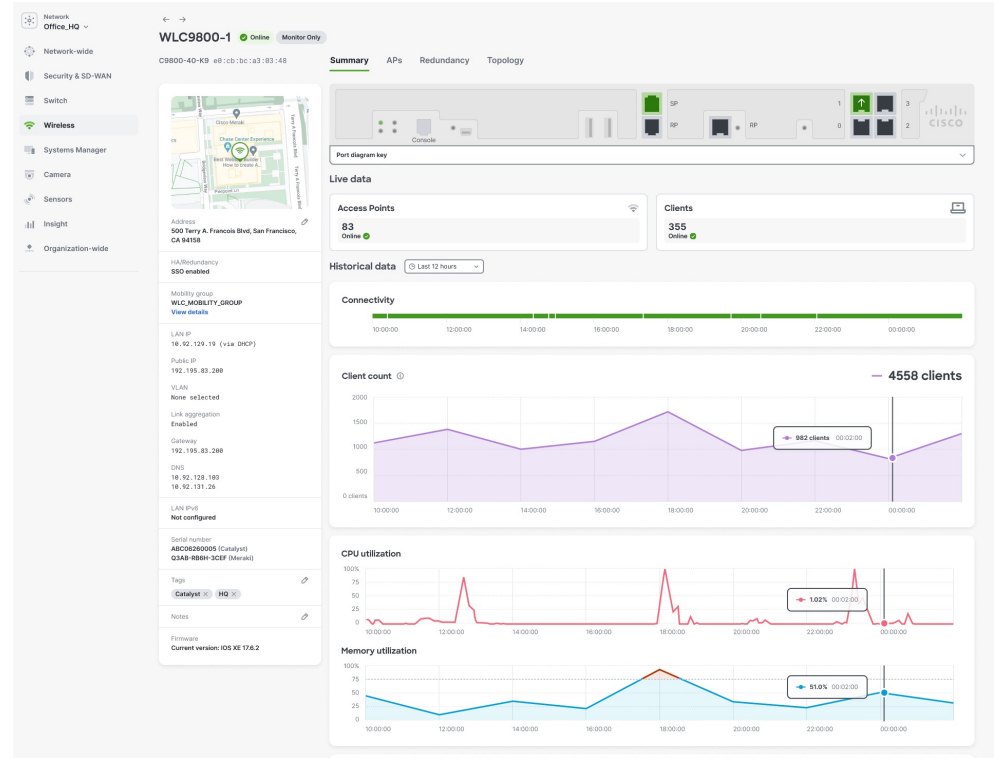
Future

Health and Troubleshooting Tools

IOS-XE image Upgrades

Configuration Backup

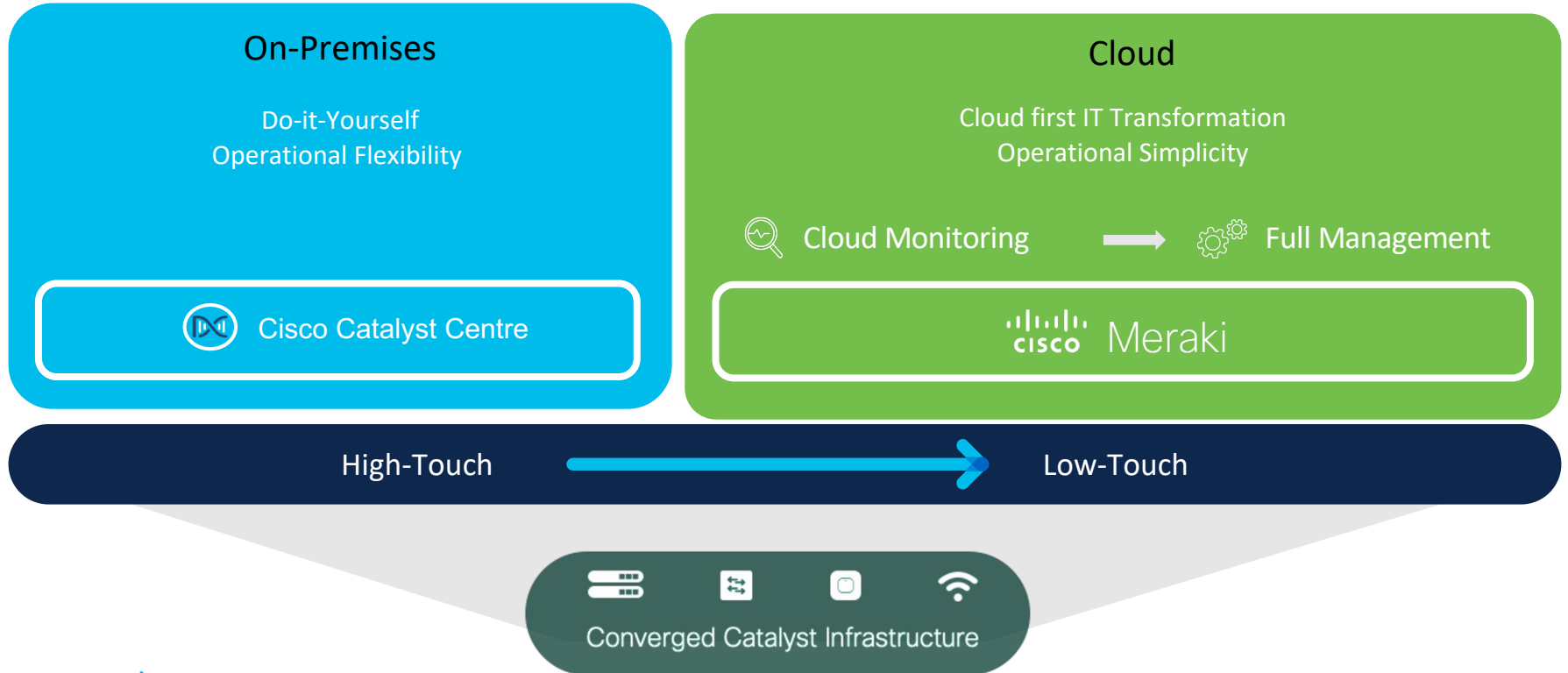
RF and RRM performance and troubleshooting



# What's coming to Cloud Monitoring?

- Catalyst 9400/9600 support
- Application-less on-boarding

# Your IT operation model, your way



# Cloud Monitoring for Catalyst



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<b>Tuesday</b>	<b>3:00pm – 7:00pm</b>
<b>Wednesday</b>	<b>11:15am – 7:00pm</b>
<b>Thursday</b>	<b>9:30am – 4:00pm</b>
<b>Friday</b>	<b>10:30am – 1:30pm</b>



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The bridge to possible

Thank you

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The Cisco Live! logo features the word "CISCO" in a bold, black, sans-serif font, followed by "Live!" in a black, cursive script font. The background of the entire slide is a vibrant, multi-colored abstract pattern of overlapping, wavy bands in shades of red, orange, yellow, green, and blue, creating a sense of motion and energy.

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