

CISCO *Live!*

GO BEYOND

#CiscoLiveAPJC



Scalable Meraki Access Switching

Brennan Martin, Technical Leader – Meraki Switching
Nico Darrow – Sr Technical Marketing Engineer
BRKARC-1415

Cisco Webex App

Questions?

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

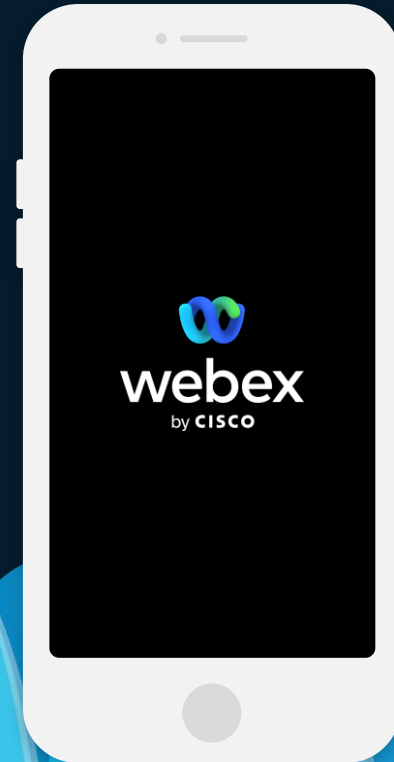
How

- 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 November 15, 2024.



<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKARC-1415>

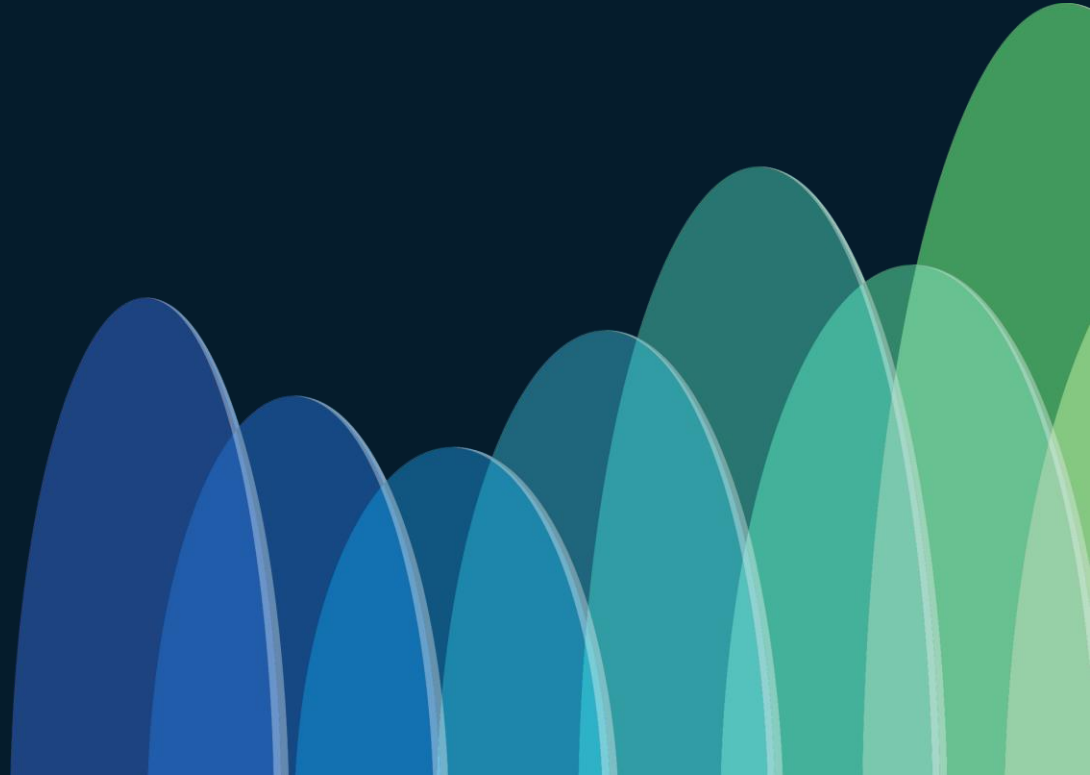




Agenda

- Introductions
- New Features
- Cloud-Native IOS-XE
- QnA
- Wrap up

Who is this
funny guy, eh?



I'm a Canadian that loves building networks

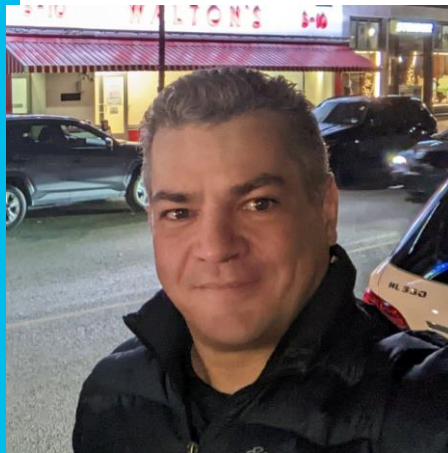
- Based in Saskatoon, Saskatchewan – Canada
- 16 years in the field deploying networks
- CCIE R/S #50782
- More time underground than in data centers
- Ask me about potash

CISCO *Live!*

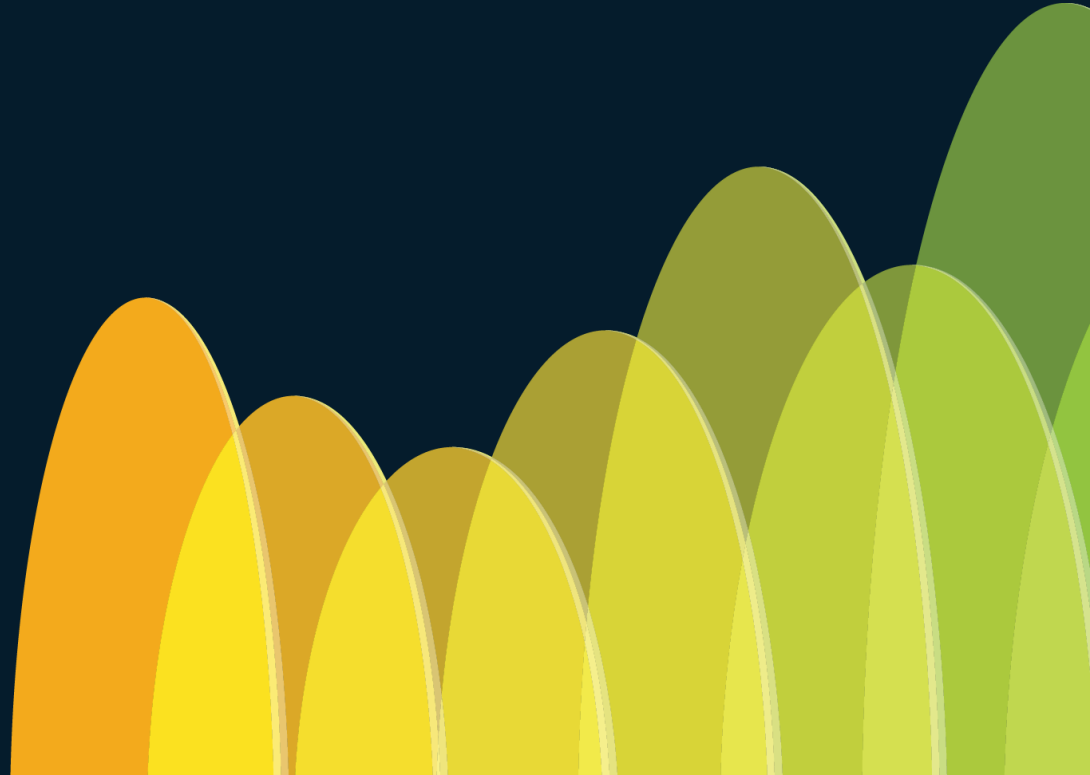


Nico Darrow

- Maker/Hacker/Geek
- Robotics Lover
- Maker and Chronic Tinkerer
- Python Geek
- 14 year Cisco veteran
- Enterprise/Premier Architect
- Life-long Meraki Believer
- Programmability became the new superpower



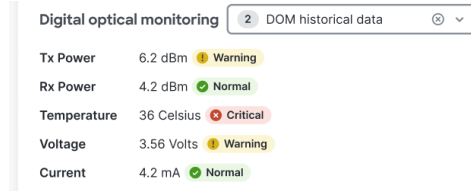
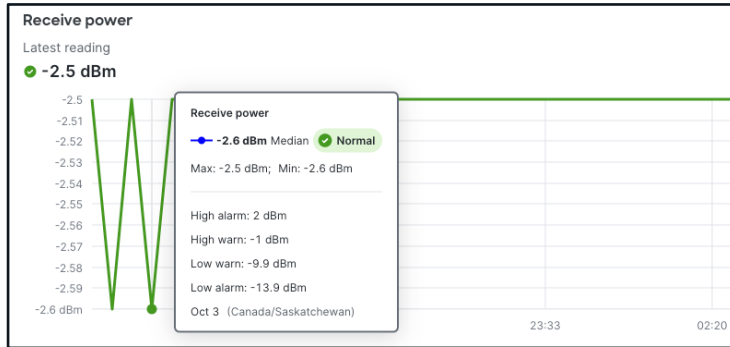
New Features



Digital optical monitoring

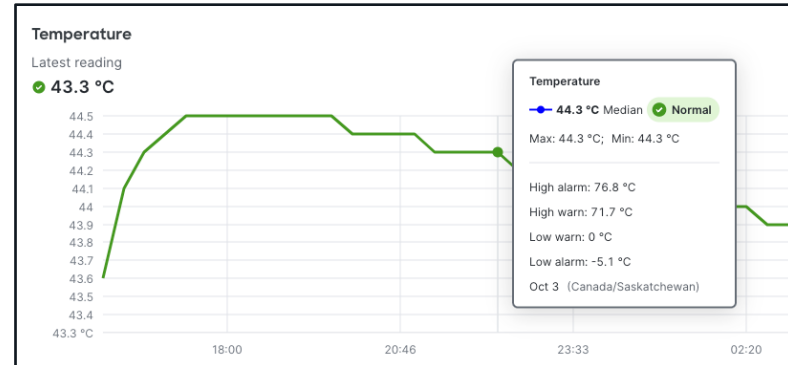
MS17

Soon to IOSXE



- Compare multiple metrics
- Real-time and historical values
- Thresholds for supported modules

Digital optical monitoring



Port management at scale with SmartPorts

Formerly known as Port Profiles

The screenshot displays the Cisco SmartPorts web interface. On the left, under the 'Profiles' tab, there is a table listing port profiles. Below the table, three network switch icons are shown, labeled 'Site 1', 'Site 2', and 'Site n'. A blue box highlights a specific port on Site 1, with lines connecting it to the 'Edit switch port' configuration window on the right. This configuration window shows settings for switch 'SFO22-M51-FLOOR1 / 1', port 'AP1', and 'No port profile' selected in the Profile dropdown. Various port settings like status, type, VLAN, and security features are visible.

Profile Name	Created	Count
My_switch_port_profile_B	January 12, 12:34 AM	5
Switch port profile name 3	January 12, 12:34 AM	0
Switch port profile name 4	January 12, 12:34 AM	12
Switch port profile name 5	January 12, 12:34 AM	33
Switch port profile name 6	January 12, 12:34 AM	0

Edit switch port

Switch / port: SFO22-M51-FLOOR1 / 1

Name: AP1

Profile: No port profile

Port status: ☒ Enabled

Type: Access

Access policy: Open

VLAN: 1

Voice VLANs: All

Link negotiation: Auto negotiate

RSTP: ☒ Enabled

STP guard: Disabled

Port schedule: Unscheduled

Adaptive policy group: 11: toT

Port isolation: ☐ Enabled

Trusted DAI: ☐ Enabled

Peer SGT capable: ☒ Enabled

UDLD: Alert only

Tags: Two X Three X

PoE: ☒ Enabled

Buttons: Cancel Save

Available Now

Building-blocks containing configuration settings for a switchport that can be applied to one or thousands of ports.

SmartPorts

MS17

Soon to IOSXE

Automations for configuring ports based on connected device recognition

← Automations

Edge port automation

Automate port configuration for Cisco Phones, Workstations, and Printers.

Triggers & actions

#	Match type ①	Match criteria	Profile to apply ①
1	LLDP system description	"Meraki MR*" OR "Meraki Wireless" OR "cisco-al...	Wireless port profile
	MAC Address OUI	"00:18:0a*"; "00:18:0b*"; "00:18:0c*"	
2	LLDP system description	"Meraki MX450 Cloud Managed Security Applian..."	Firewall port config
3	LLDP system description	"Cisco IP Phone **"	Phones profile
4	LLDP system description	"Cisco ASR1000 Series **"	HSRP Primary uplink
	MAC Address OUI	"00:18:0a:12:7c:41"	
5	LLDP system description	"Cisco ASR1000 Series **"	HSRP Secondary uplink
	MAC Address OUI	"00:18:0a:fa:3c:a3"	

+ Add trigger

Default action

Settings to apply if no triggers match

Use existing port configuration ▾

Target port range

2 networks, 5 switches, 30 ports ✎ 📄

Automation sequence

Match type ①

LLDP system description

Match criteria

"Meraki MR*" OR "Meraki Wireless" OR "cisco-al..."

Match type ①

MAC Address OUI

Match criteria

"00:18:0a*";
"00:18:0b*";
"00:18:0c*"

Match type ①

Match criteria

+ Add conditions

Profile to apply

Wireless port profile ▾

Cancel

Add

CDP/LLDP

MAC OUI

RADIUS*

*Coming soon

Demo: SmartPorts

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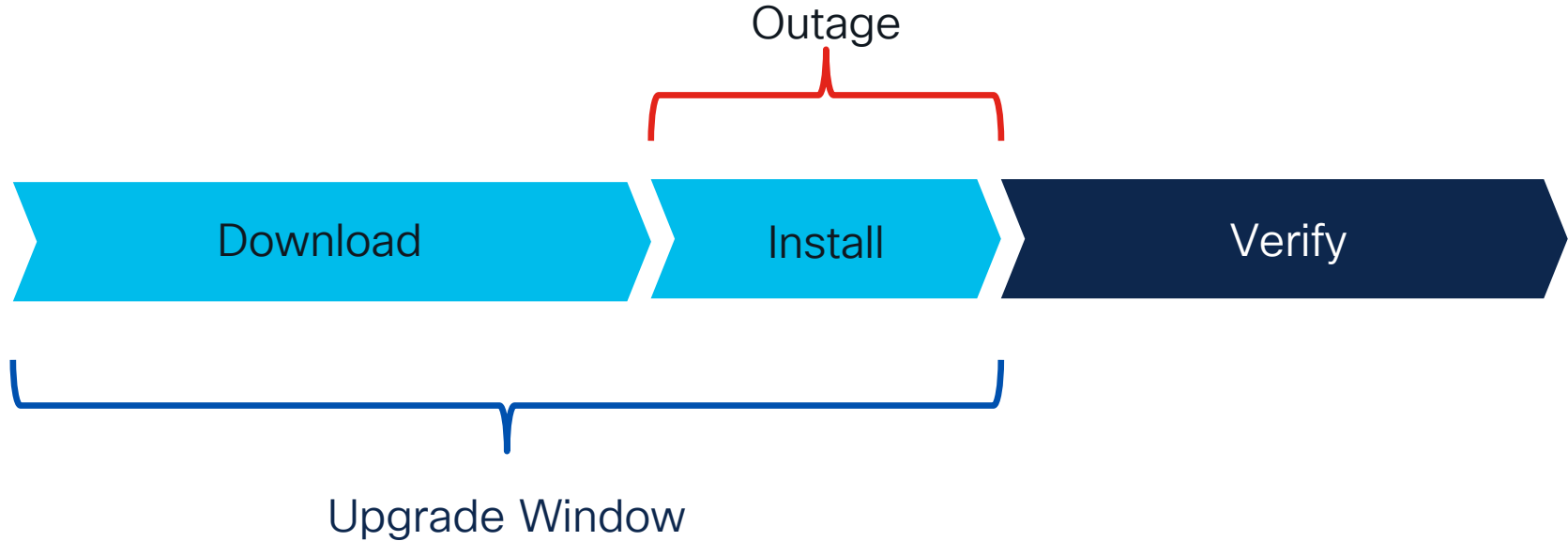


How about shorter upgrade windows?

Firmware Predownload

IOSXE Beta

Coming soon to MS

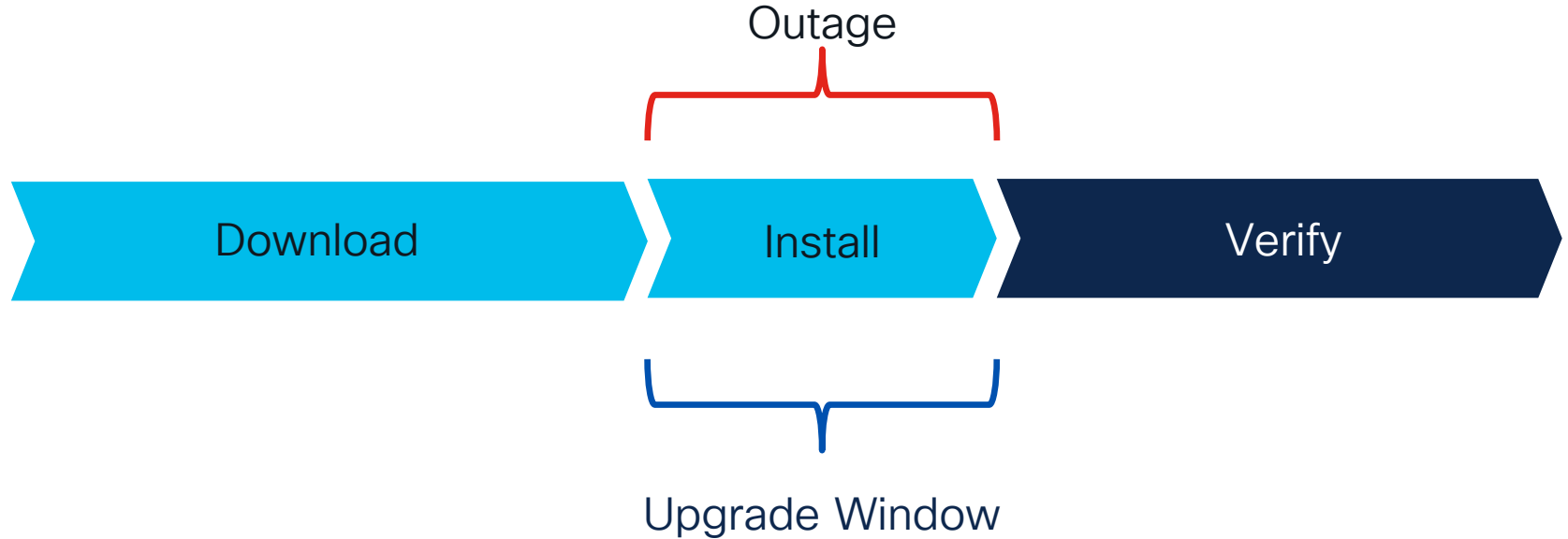


How about shorter upgrade windows?

Firmware Predownload

IOSXE Beta

Coming soon to MS

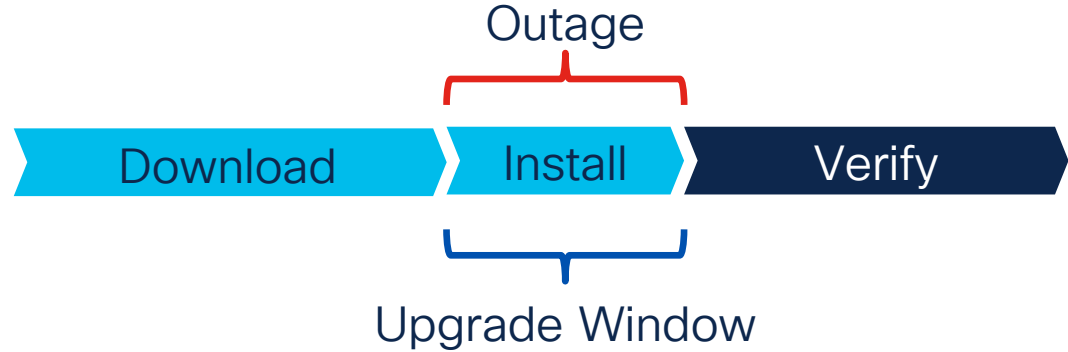


How about shorter upgrade windows?

Firmware Predownload

IOSXE Beta

Coming soon to MS



Napkin math

100 switches with 100Mbps goodput:

- MS 30 min > 5 min
- CS/Catalyst 2h44 min > 10 min



MS Device Health

Visibility into switch health metrics

Coming Soon

End of 2024

MS120-8FP  Online

MS120-8FP 2c:3f:0b:

Summary Ports **Device Health** Event log Location Tools



Santuario Histórico de Machu Picchu
Iconic, sprawling Inca city ruins

Google El Templo del Sol
Map data ©2024

Address
Machu Picchu

Serial number
Q2CX-I

Device uptime
19d 2h 21m

Last device boot Sep 15 14:10:51 (CST)

Last boot reason [View in Event log](#)

System resources

CPU  Poor

150 dropped packets

 1 last 5 mins

Number of CPU packets dropped has increased by 1 over 5 mins.

9680 total packets

 2542 last 5 mins

The total traffic to CPU increased by 2542 packets over 5 mins.

Last updated at: Oct 4 2024 16:35

Protocols	Status	Dropped	Total 	Dropped/Total
LACP	 Good	0	38	0 %
STP	 Poor	150	299	50.2 %
ARP	 Good	0	28	0 %
OSPF	 Good	0	0	0 %
Management	 Good	0	1105	0 %
All Protocols 	 Fair	150	9680	1.5 %

[Historical Data](#)

CPU

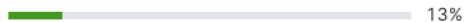
Memory

Real-time metrics

Memory  Good

 Software (RAM) 

69 MB out of 513 MB



13%

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BRKARC-1415

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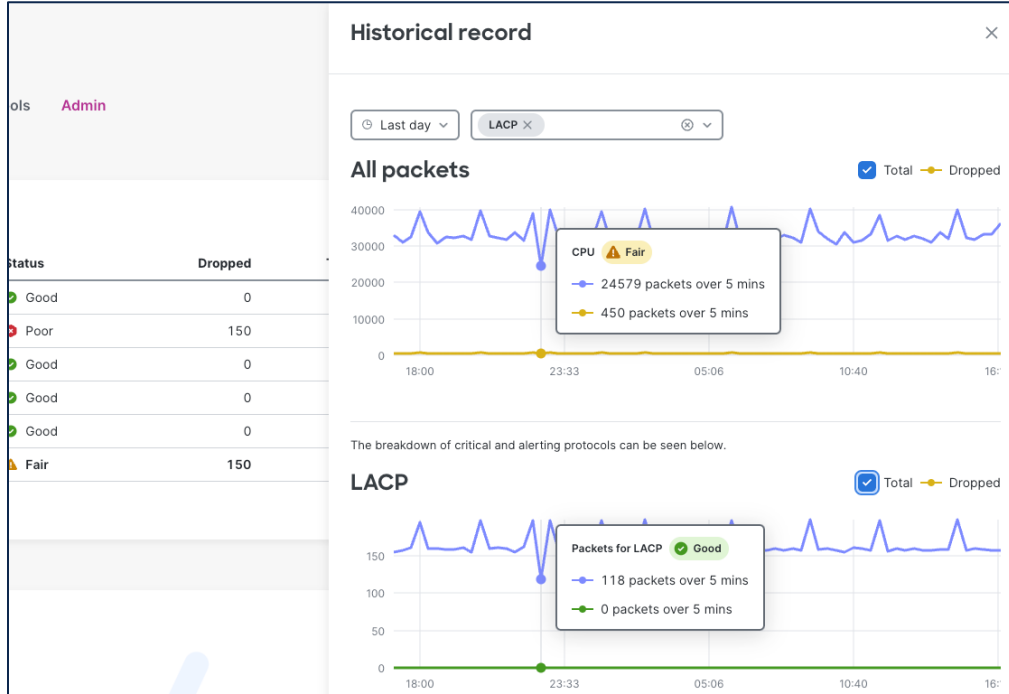
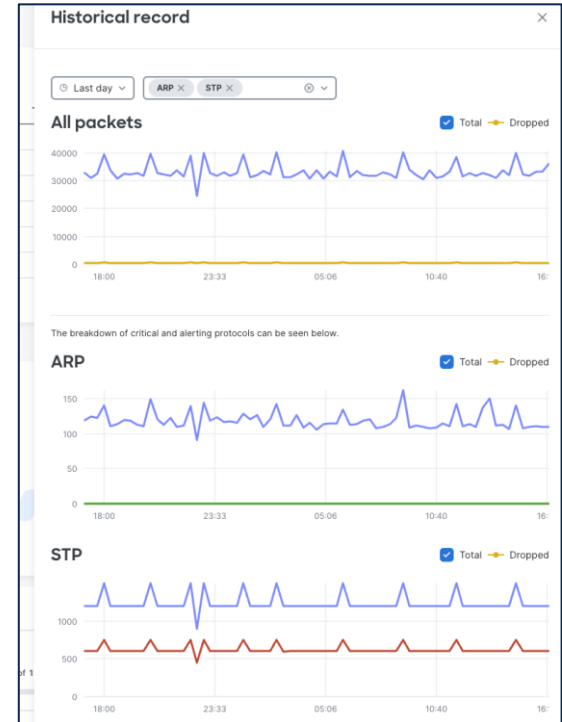
17

MS Device Health

Coming Soon

End of 2024

Historical Benchmarking



MT sensor integration

Available Now

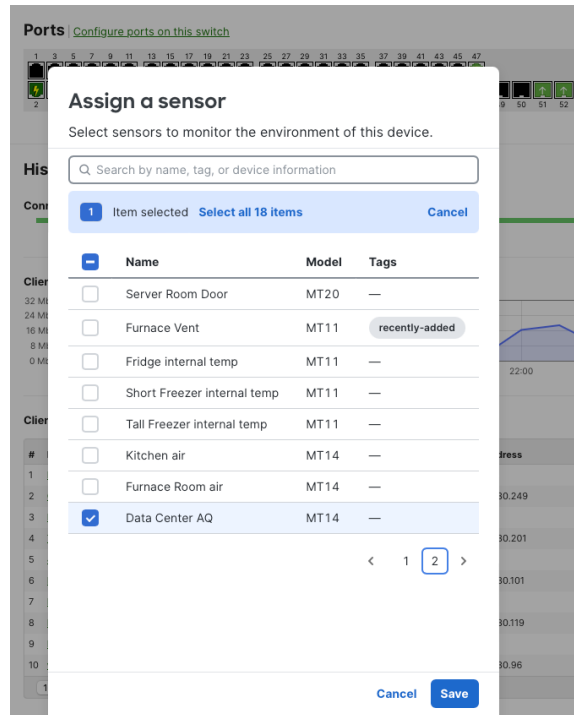
Assign relevant sensors to any switch

Name	Model	Latest reading	
Rack 3	MT40	Apparent power	59.5 VA
		Current	0.49 A
		Frequency	60 Hz
		Power factor	99%
		Real power	✖ 59.1 W
		Voltage	121.4 V
Data Center AQ	MT14	Humidity	30% RH
		Indoor air quality	75
		Ambient noise	✖ 59 dBA
		PM2.5	0 µg/m³
		Temperature	✖ 30.94°C
		TVOC	50 µg/m³
Data Center water sensor	MT12	Water leak	✖ Present

See environment readings on the switch details page

Is it too hot in the network closet?

How loud is the data center?



Intelligent Capture

Streamlined packet captures with a cloud-hosted option

MS17

Early Access

IOSXE 17.15.1

Packet Captures

Switches ▾

New capture

Schedules

Stored captures

Switch

Closet 2.2.4 ▾

Ports

2-8

Output

Save to cloud ▾

Duration (secs) ⓘ

60

Capture filters

View example filters

File name

<default file name here>

Comments

We recommend including a description of the reason for your capture, this will help us improve the analysis capabilities of our capture tool.

Start capture

Schedule capture

Packet Captures

Switches ▾

New capture Schedules Stored captures

Q Search 6 schedules

☐	Schedule name	Username	Start time (UTC-8)	Frequency	End time (UTC-8)
☐	Schedule 1	tonyc@cisco.com	Oct 20, 2023 08:20	Occurs every Tuesday	Jan 20, 2024 08:20
☐	Schedule 2	tonyc@cisco.com	Oct 12, 2023 08:20	Occurs on day 1 of every month	Nov 24, 2023 08:20
☐	Schedule 3	davidz432@gmail.com	Oct 12, 2023 08:20	Once	—
☐	Schedule 4	lly@gmail.com	Oct 12, 2023 08:20	Occurs on day 1 of every month	Nov 24, 2023 08:20
☐	Schedule 5	davidz432@gmail.com	Oct 12, 2023 08:20	Once	—
☐	Schedule 6	tonyc@cisco.com	Oct 12, 2023 08:20	Occurs on day 1 of every month	Nov 24, 2023 08:20

Scheduled Captures
Coming soon

Packet Captures

Switches ▾

New capture Schedules Stored captures

Q Search Filter 124 captures

☐	Time (UTC-8)	Name	Switch / Ports	Username	Status	Output type	Sources	Packet size	Packet count
☐	Aug 20, 09:00	Capture name	Closet 1.2 / 1	jl342@cisco.com	✔ Saved to cloud	Streaming tcpdump	Auto capture by Meraki cloud	3.2 MB	1,163
☐	Aug 20, 08:25	Meraki-appliance	Closet 2.2 / 3	Meraki tech support	✔ Saved to cloud	raw pcap	davidz432@gmail.com	4.5 MB	2,312
☐	Aug 20, 08:20	Packets 2	Closet 1.2 / 1	tonyc@cisco.com	❌ Failed	Streaming tcpdump	Auto capture by Meraki cloud	3.2 MB	1,163
☐	Aug 20, 08:19	Packets 1	Closet 2.2 / 3	lizlev@cisco.com	✔ Saved to cloud	raw pcap	davidz432@gmail.com	4.5 MB	2,312

Stored Captures

Intelligent Capture

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Early Access

IOSXE 17.15.1

Global Overview

Packet capture For switches

New capture Stored captures

← New capture

Lab - switch-MS130-12X-UL-IF-1

Filter Expression...

Apply Clear

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52310/22220, ttl=200 (reply in 2)
2	0.048701	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52310/22220, ttl=248 (request in 1)
3	0.943119	CiscoMeraki_a2:e2:57	Broadcast	LLC	80	U: func=UL SNAP, OUI 0=000000C (Cisco Systems, Inc), PID 0=013C
4	0.943479	CiscoMeraki_a2:e2:57	CiscoMeraki_4f:00:02	ARP	80	Who has 10.20.20.24? Tell 10.20.20.24
5	0.944279	CiscoMeraki_4f:00:02	CiscoMeraki_a2:e2:57	ARP	64	10.20.20.24 is at 00:18:0a:4f:00:02
6	1.000088	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52311/22476, ttl=200 (reply in 7)
7	1.048868	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52311/22476, ttl=248 (request in 6)
8	1.139958	CiscoMeraki_a2:e2:57	Broadcast	LLC	76	U: func=UL SNAP, OUI 0=000000C (Cisco Systems, Inc), PID 0=013C
9	1.684781	CiscoMeraki_4f:00:02	Spanning-tree-BP-bridge0_00	STP	64	BST: Root = 4096/0/0/0/18:0a:4f:00:01:Coat = 22000 Port = 0=8016
10	1.702158	CiscoMeraki_4e:01:8c	Broadcast	LLC	64	U: func=UL SNAP, OUI 0=000000C (Cisco Systems, Inc), PID 0=013C
11	2.000331	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52312/22732, ttl=200 (reply in 12)
12	2.043322	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52312/22732, ttl=248 (request in 11)
13	3.000267	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52313/22988, ttl=200 (reply in 14)
14	3.043553	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52313/22988, ttl=248 (request in 13)
15	3.289894	CiscoMeraki_5d:dc:62	Broadcast	LLC	64	U: func=UL SNAP, OUI 0=000000C (Cisco Systems, Inc), PID 0=013C
16	3.491927	CiscoMeraki_4e:01:8c	Broadcast	LLC	80	U: func=UL SNAP, OUI 0=000000C (Cisco Systems, Inc), PID 0=013C
17	3.574742	CiscoMeraki_4f:00:02	Spanning-tree-BP-bridge0_00	STP	64	BST: Root = 4096/0/0/0/18:0a:4f:00:01:Coat = 22000 Port = 0=8016
18	4.000464	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52314/23244, ttl=200 (reply in 19)
19	4.048162	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52314/23244, ttl=248 (request in 18)
20	5.000530	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52315/23500, ttl=200 (reply in 21)
21	5.049599	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52315/23500, ttl=248 (request in 20)
22	5.594857	CiscoMeraki_4f:00:02	Spanning-tree-BP-bridge0_00	STP	64	BST: Root = 4096/0/0/0/18:0a:4f:00:01:Coat = 22000 Port = 0=8016
23	6.000752	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52316/23756, ttl=200 (reply in 24)
24	6.000070	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52316/23756, ttl=248 (request in 23)
25	6.075161	CiscoMeraki_a2:e2:57	CDPVTPDTTPAggVUdL	UdLd	114	Device ID: 8C28000C2E257 Port ID: 1
26	6.376576	CiscoMeraki_4f:00:02	CDPVTPDTTPAggVUdL	UdLd	98	Device ID: F8E28770DF Port ID: 22
27	7.000787	10.20.20.24	8.8.8.8	ICMP	102	Echo (ping) request id=0x4ae4, seq=52317/24012, ttl=200 (reply in 28)
28	7.048101	8.8.8.8	10.20.20.24	ICMP	102	Echo (ping) reply id=0x4ae4, seq=52317/24012, ttl=248 (request in 27)

Frame 12: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on 0
Ethernet II, Src: CiscoMeraki_4f:00:02 (00:18:0a:4f:00:02), Dst: CiscoMeraki_a2:e2:57 (bc:de:09:e2:e2:57)
Destination: CiscoMeraki_a2:e2:57 (bc:de:09:e2:e2:57)
Source: CiscoMeraki_4f:00:02 (00:18:0a:4f:00:02)
Type: 802.1Q Virtual LAN (0x4000)
802.1Q Virtual LAN, Prio: 0, DEI: 0, ID: 20
000...0000 = Priority: Best Effort (default) (0)
..0...0000 = DEI: Ineligible
...0000 0000 = ID: 20
Type: IPv4 (0x0800)
Internet Protocol Version 4, Src: 8.8.8.8, Dst: 10.20.20.24
0100... = Version: 4
0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 84
Identification: 0x0000 (0)
000... = Flags: 0x0
..0 0000 0000 = Fragment Offset: 0
Time to Live: 248
Protocol: ICMP (1)
Header Checksum: 0x946a (validation disabled)
[Header checksum status: Unverified]
Source Address: 8.8.8.8
Destination Address: 10.20.20.24
[Source GeoIP: US, AS: 15169, GOOGLE]
Internet Control Message Protocol
Echo (ping) request id=0x4ae4, seq=52317/24012, ttl=200 (reply in 28)

Packets: 120 Displayed: 120 (100.0%) File Size: 12.7 KB Duration: 29.004s

Embedded Packet Viewer

Coloring Profiles

Intelligent Capture

MS17

Early Access

IOSXE 17.15.1

Packet Capture Analysis

The packet capture analytics tool currently reports on DHCP, ARP, ICMP and DNS issues. This is not a complete list of possible issues within your packet capture.

Packet Capture Analysis Summary

Tests summary

Protocols

- 2 protocols with issues

DHCP

- No issues

ARP

- 3 issues

ICMP

- No issues

DNS

- 1 issue

MAC address summary

These MAC addresses appeared in at least one of the failed tests.

e8:ea:6a:24:e3:32 cc:9c:3e:ec:31:10
00:c0:17:c5:01:61 00:18:0a:4f:00:02

Device summary

These devices appeared in at least one of the failed tests.

-

Q Search Issue Type MAC address Device 4 results

DHCP No issues

- DHCP Transactions completed No issues
- Multiple DHCP servers seen No issues

ARP 3 issues

ICMP No issues

- Missing ICMP responses
- Constant ICMP client failure

DNS 1 issue

- Client constantly failing to resolve URL No issues
- Multiple responses for URL No issues
- Multiple clients failing to resolve URL Issues 1

Multiple clients failing to resolve URL

1 total issue

Multiple clients failing to resolve URL: BRENNMAR-M-6V3V_companion-link_tcp.local

Frame No. 104, 105

Details Multiple clients (10.20.30.17) failing to resolve URL: BRENNMAR-M-6V3V_companion-link_tcp.local.

ARP Requests have responses

3 total issues

No response for IP address 10.20.30.26

Frame No. 11, 17, 22

Details ARP request from 00:c0:17:c5:01:61 to 10.20.30.26 has no response

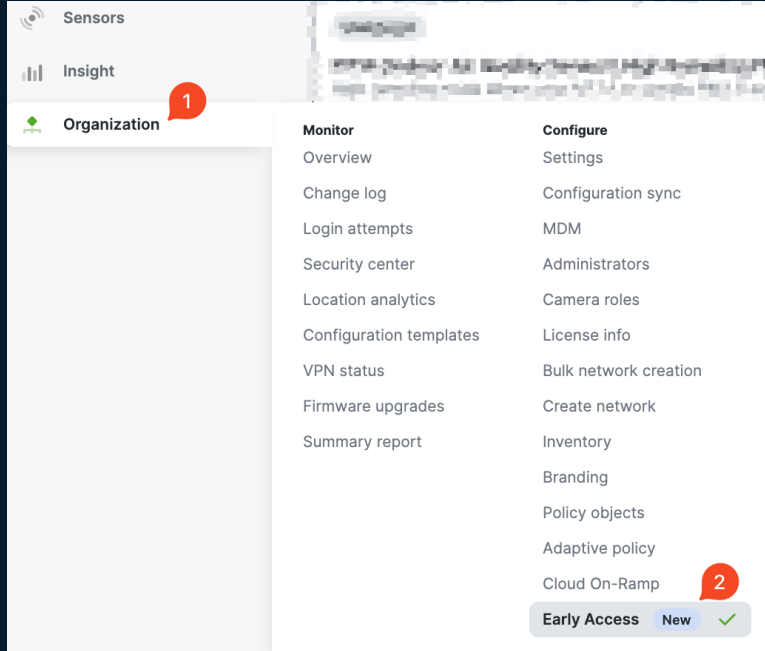
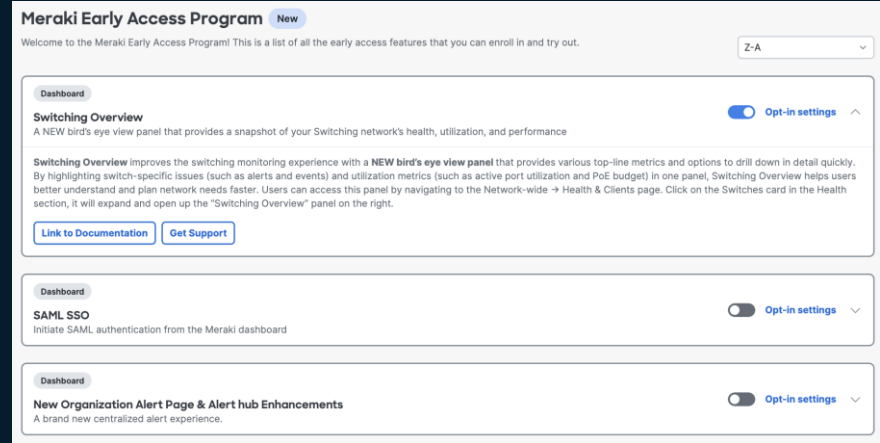
AI driven analyzer

Demo: Intelligent Capture



Meraki Early Access Program

Available Now



Easily test-drive new features

VLAN database Coming soon

VLAN profiles

Uses VLAN profiles

Edit profile

Profile name
Twenty VLANs

Name
TwentyVLANs

Active VLANs
1,10,20

See Active VLANs

☒ Trunk ☐ Access

Native VLAN
default - 1

Allowed VLANs
all

Allow all on trunks

Allowed VLANs
all

Active VLANs
1,10,20

Maximum Active VLANs
Catalyst 9300 = 1000
Catalyst 9200 = 500

Dashboard
intelligently handles
active VLAN limits

Lower broadcast
and multicast
overhead

Simpler trunk
configs

Easier out-of-box
deployment

MAC allow list / Sticky MAC Allow list

Early Access

For Catalyst based switches

Switch / Port: Shaun-Stack01 / 45

Name:

Port status: **Enabled** Disabled

Link negotiation: Auto negotiate

Port schedule: Unscheduled

Tags: +

Type: Trunk **Access**

Access policy ⓘ: Sticky MAC allow list

Allow list size limit: 5

Allow listed MACs: 00:0c:29:13:23:74

Cancel Update

Adaptive policy on MS130X/R

Early Access

MS17

Leverage Cisco TrustSec across the entire wired network, from the core to any type of edge



Adaptive policy enhancements Early Access

VLAN name + Add Named VLAN

#	VLAN name	VLAN ID	Adaptive policy group	Actions
1	default	1	<input type="text"/>	
2	ise-client	21	<input type="text"/>	
3	Cisco-Server	39	<input type="text"/>	
4	User1	10	<input type="text"/>	
5	Server	2	<input type="text"/>	
6	Cat-wifi	3	<input type="text"/>	
7	Cat-wifi-user	4	7 : Production_Users	
8	Routing	9	<input type="text"/>	
9	Meraki-wifi	18	<input type="text"/>	
10	user	11	<input type="text"/>	

#	Policy	Protocol	Source port	Destination port	Log	TCP Established	Act
1	<input type="text" value="Deny"/>	<input type="text" value="TCP"/>	<input type="text" value="any"/>	<input type="text" value="any"/>	☒	☒	<input type="button" value="Cancel"/> <input type="button" value="Done"/>
2	<input type="text" value="Deny"/>	UDP	any	any	☒	☐	...
3	<input type="text" value="Deny"/>	ICMP	any	any	☒	☐	...
4	<input type="text" value="Deny"/>	Any	any	any	☒	☐	...

Hit Counter Live Tool

SGACL Logging

TCP Established

VLAN to SGT mapping

Adaptive Policy Counters Run

AdP Hit Counters 🔄

Filter by:

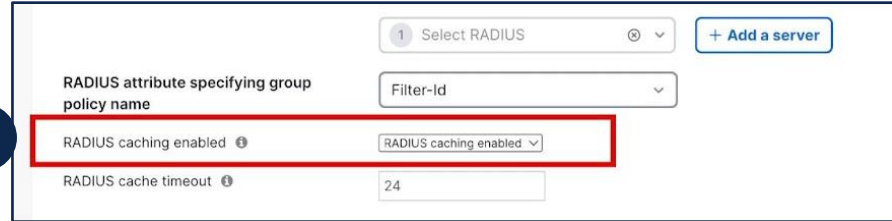
Source SGT	Destination SGT	IPv4 Allow	IPv4 Deny
7	7	0	0
7	14	0	0
7	18	0	0
7	29	0	25

Group policy enhancements

MS390 & Cloud Managed Catalyst

Early Access

RADIUS Caching



1 Select RADIUS ⓘ

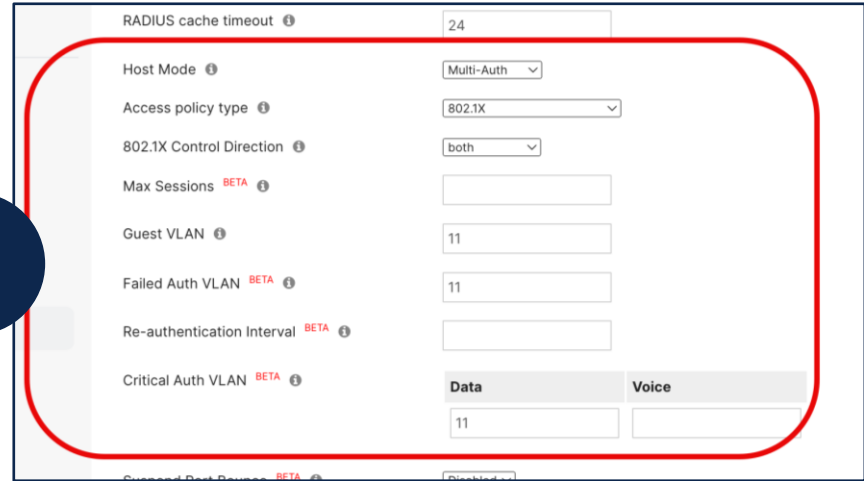
+ Add a server

RADIUS attribute specifying group policy name Filter-Id

RADIUS caching enabled ⓘ RADIUS caching enabled

RADIUS cache timeout ⓘ 24

Critical Auth & Guest VLAN with Multi-Auth



RADIUS cache timeout ⓘ 24

Host Mode ⓘ Multi-Auth

Access policy type ⓘ 802.1X

802.1X Control Direction ⓘ both

Max Sessions BETA ⓘ

Guest VLAN ⓘ 11

Failed Auth VLAN BETA ⓘ 11

Re-authentication Interval BETA ⓘ

Critical Auth VLAN BETA ⓘ

Data	Voice
11	

Cloud-native Catalyst

Architecture Advancements



Cloud Born Hardware



A family of 24 Catalyst 9300/X/L-M options!

Gigabit

Up to 1 GbE



C9300L 24/48T-4X

- 24/48x 1G/100M copper
- Data only
- 4x SFP+ 1/10G fixed fiber uplink



C9300L 24/48P-4X

- 24/48x 1G/100M copper
- 30W PoE
- 4x SFP+ 1/10G fixed fiber uplink



C9300L 48PF-4X

- 48x 1G/100M copper
- 30W PoE
- 4x SFP+ 1/10G fixed fiber uplink



C9300 24/48T

- 24/48x 1G copper
- Data only
- Modular uplink options



C9300 24/48P

- 24/48x 1G copper
- 30W PoE+
- Modular uplink options



C9300 24/48U

- 24/48x 1G copper
- 60W UPOE
- Modular uplink options

MultiGig

Up to 10 GbE (mGig)



C9300L 24/48UXG-4X

- 24/48x 10G mGig
- 60W PoE
- 4x SFP+ 1/10G fixed fiber uplink



C9300X 48TX

- 48x 10G mGig
- Data only
- Modular uplink options



C9300X 24/48HX

- 24/48x 10G mGig
- 90W UPOE+
- Modular uplink options



C9300X 48HXN

- 40x 5G and 8x 10G mGig
- 90W UPOE+
- Modular uplink options



C9300 24UX

- 24x 10G mGig
- 60W UPOE
- Modular uplink options



C9300 48UXM

- 36x 2.5G mGig and 12x 10G mGig
- 60W UPOE
- Modular uplink options



C9300 48UN

- 48x 5G mGig
- 60W UPOE
- Modular uplink options

Fiber aggregation

10/1 GbE SFP+ fiber



C9300 24S/48S

- 24/48 port 1G SFP
- 40G/10G/1G fiber modular uplink options



C9300X 12/24Y

- 25G/10G/1G (SFP28)
- 40G/10G/1G fiber modular uplink options

Catalyst 9300X modular uplinks*



2x QSFP28 40/100G



8x SFP28 1/10/25G

Note: 9300X modules are not compatible with 9300

StackWise® and StackPower cables



Stack Adapters 50CM-1M-3M 50 cm-1 m-3 m 30 cm-150 cm

Platinum-rated power supplies



350W AC 715W AC/DC 1100W AC 1900W AC

Catalyst 9300 modular uplinks*



4x 10G/1G SFP



8x 10G/1G SFP/SFP+



2x 40G QSFP



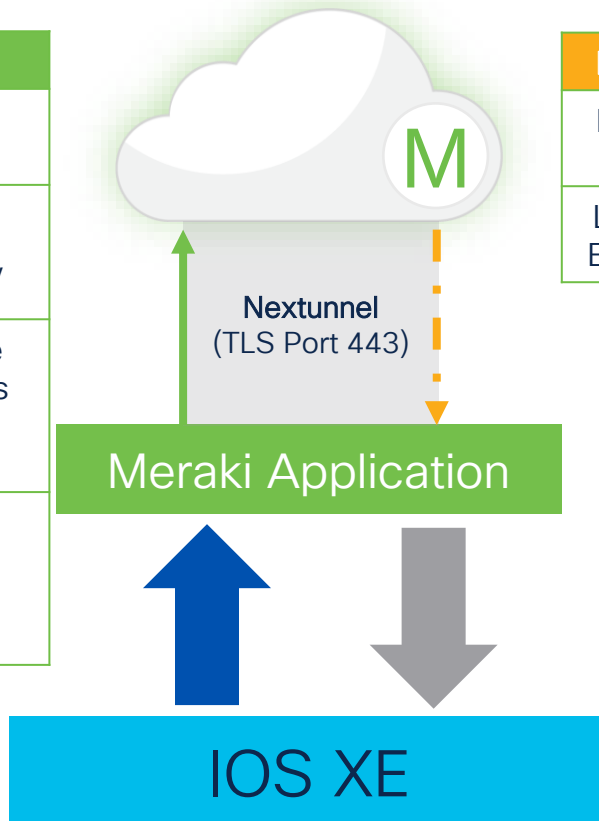
2x 25G/10G/1G SFP/SFP+

The Origin Story



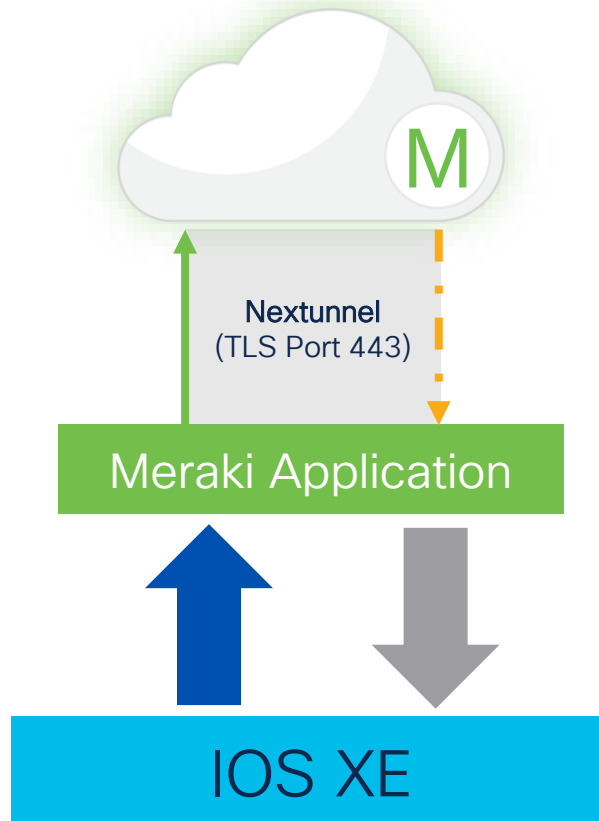
1st Gen software architecture – app to cloud

Function	Use
Heartbeat	Checks in to dashboard and evaluates state flags
Packet Capture Stream	Stream packet capture to dashboard browser proxy
Config File Download	Pulls the configuration file and translates config lines to XML yang modeled configuration
Firmware Proxy	Downloads firmware and stages for either an app update or IOS XE + app update



Function	Use
Protobuf Grabber	Captures telemetry and stores in dashboard
Live Tool Execution	Proxy live tool command to Meraki App

1st Gen software architecture – app to XE



Function	Use
NetConf Oper Subscriptions	Telemetry capture and store as protobuf
Packet Capture	Stream packet capture to dashboard browser proxy
IPFIX Stream	Client and application visibility and tracking

Function	Use
NetConf Write Operations	Configuration Deploy & update
Live Tool Execution	Run Tools executed by admin in dashboard
Firmware Management	Deploys firmware installation to IOS XE

Challenges and learnings



Platform dependent
development



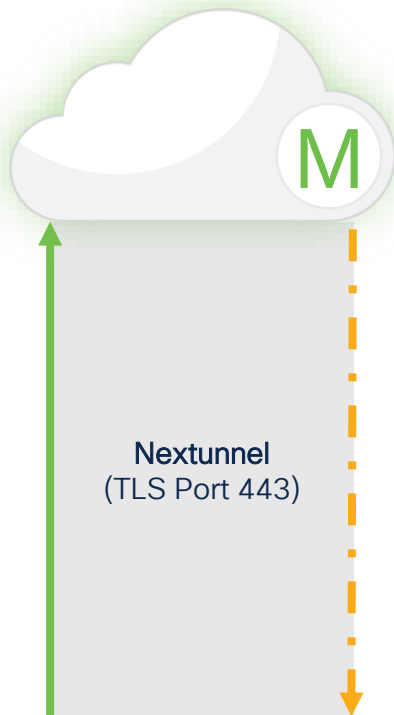
Limited agility in
software architecture



Multiple abstraction layers
and software stacks

How did we improve the architecture?

Function	Use
Uplink Auto Configuration (UAC)	Dynamic interface creation using discovery mechanisms maintaining connectivity to dashboard
Connect Service	Checks in to dashboard and evaluates state flags
Packet Capture	Stream packet capture to dashboard browser proxy
Config File DL/UL and deployment	Uploads current configuration and pulls XML formatted configuration to deploy locally against NetConf Service
Local Status Page	Hosted in IOS XE instead of in app, providing local configuration tools
Telemetry Cache	Stores telemetry on box for Dashboard grabbers to retrieve



Function	Use
Telemetry Grabbers	Pulls telemetry directly from IOS XE for presentation in Dashboard
Live Tool RPC	Executes Live Tools via NetConf RPC
Packet Capture Trigger	Executes packet capture process using NetConf RPC



Resilient connectivity to the cloud

IOS-XE 17.15 (Beta)



Uplink Auto Config (UAC)

- Automated discovery for dashboard connectivity
- Automated failover / path discovery
- Tunable for primary interface
- Creates stack-ranked interface list

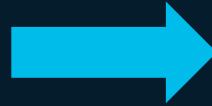


Safe Config Rollback

- Recovery mechanism for configuration error
- Marks configuration safe if dashboard connectivity is maintained after change
- Will roll-back to safe config if dashboard access is lost after configuration change

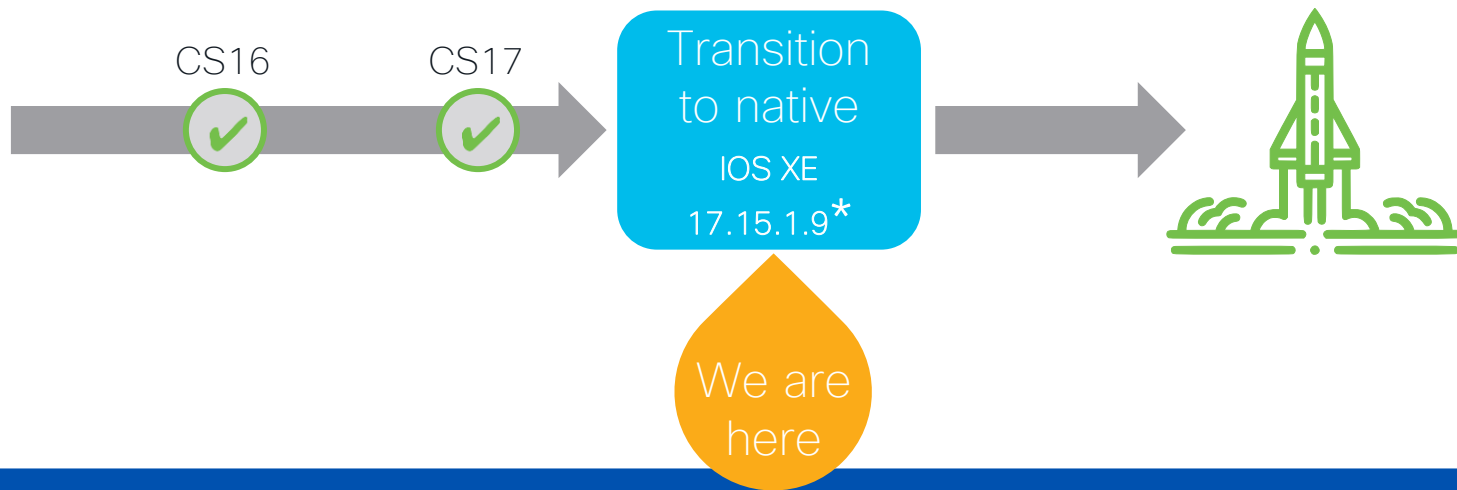
Optimization

Container



Native IOS XE

Seamless upgrade path, from CS to XE



All current/future installs (MS390/C9300) will have an in-path upgrade to native IOS XE management

Runtime improvements with architecture changes

Configuration Updates		
Type	Version 1.0	Version 2.0
Small config update	30s	15s
Full configuration deployment	120s	60s

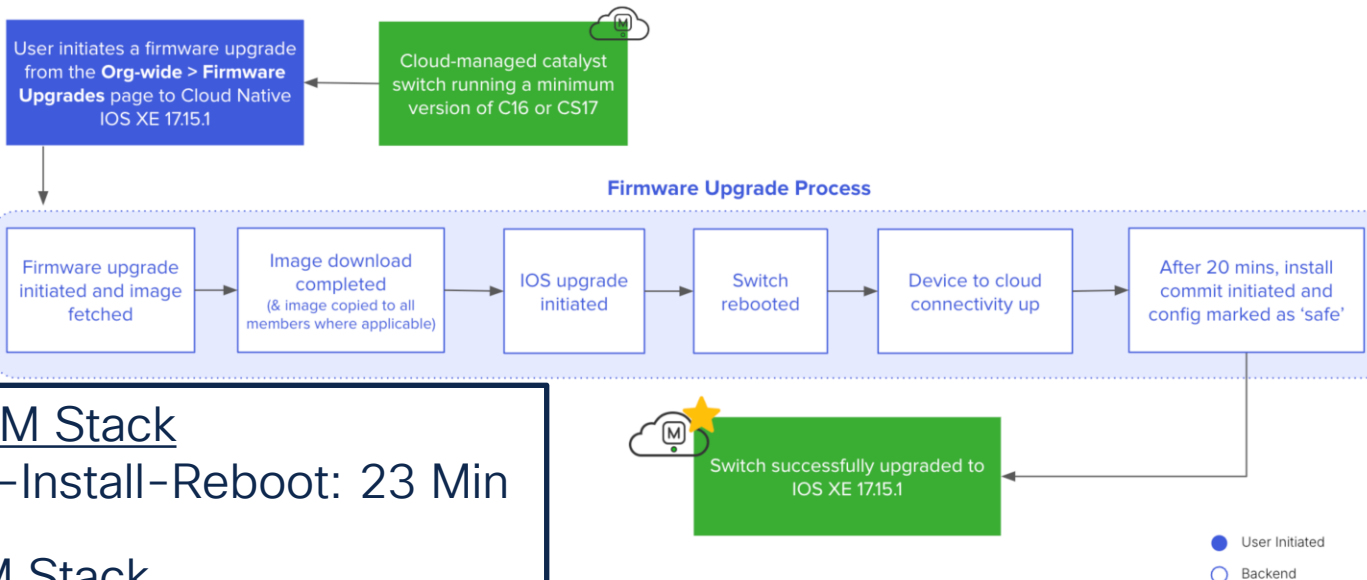
50% Improvement
on standalone switches

Boot Times		
Stack Size	Version 1.0	Version 2.0
Single switch	6 min	4 min
8M stack	11 min	4 min

More than 50%
Improvement on stacks

What does it really look like?

CS to Cloud Native IOS-XE | Upgrade Process



C9300X 2M Stack

Download-Install-Reboot: 23 Min

C9300 3M Stack

Download-Install-Reboot 27 Min

Easy cloud onboarding

```
WW_CORE_9300(config)# service meraki connect

Switch 1 has been successfully registered
Meraki MAC: AABBCDDDEEFF
Cloud ID: QXXX-XXXX-YYYY

*May 7 00:16:03.519: %MERAHI-5-SWITCH_REGISTER_SUCCESS: Switch 1 has been succesfully registered.
*May 7 00:16:03.519: %MERAHI-5-MAC_ADDR: Meraki MAC: AABBCDDDEEFF
*May 7 00:16:03.519: %MERAHI-5-CLOUD_ID: Cloud ID: QXXX-XXXX-YYYY

Device Registration Status:
-----
Switch          Serial
Num   PID      Number      Cloud ID      Mac Address      Migration
-----
1     C9300-24UX  XXYYQCCXXC  QXXX-XXXX-YYYY aabb.ccdd.eeff   Registered      C9K-C [Monitoring]
```

Cloud Management App-less Onboarding

- Automated Registration and Nextunnel creation
(`service meraki connect`)
- Simply claim the Cloud ID and add to a network

```
Service meraki connect: enable

Meraki Tunnel Config
-----
Fetch State:
Fetch Fail:
Last Fetch(UTC):
Next Fetch(UTC):
Config Server:
Primary:                usw.nt.meraki.com
Secondary:              use.nt.meraki.com
Client IPv6 Addr:      FD0A:9B09:1F7:1:9A18:8BFF:FE00:CC00
Network Name:          .Corrin - switch

Meraki Tunnel State
-----
Primary:                Up
Secondary:              Up
Primary Last Change(UTC): 2024-05-29 23:34:02
Secondary Last Change(UTC): 2024-05-29 23:34:02
Client Last Restart(UTC): 2024-05-29 23:33:56

Meraki Tunnel Interface
-----
Status:                Enable
Rx Packets:             795767
Tx Packets:             600246
Rx Errors:              0
Tx Errors:              0
Rx Drop Packets:        0
Tx Drop Packets:        0

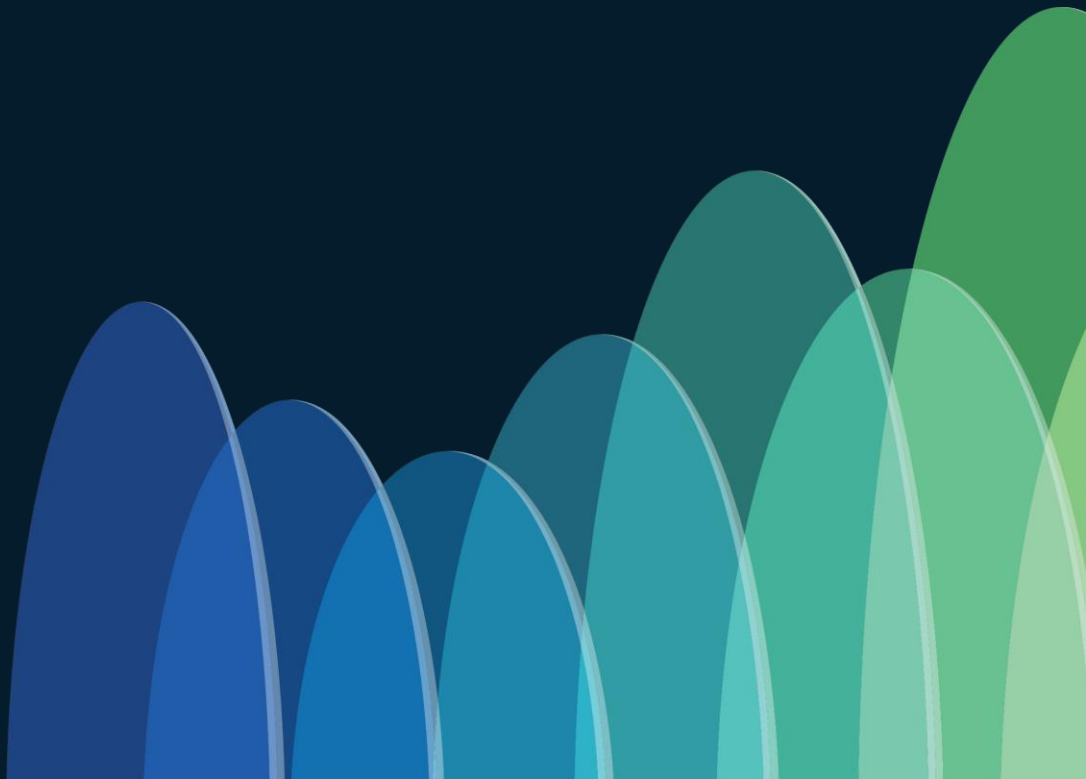
Meraki Device Registration
-----
url:                   https://catalyst.meraki.com/nodes/register
```

Connection State (`show meraki connect`)

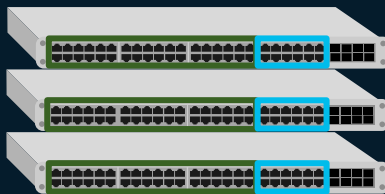
Demo: Cloud CLI Terminal



Q&A



Get Intelligent help
analyzing packet captures



Check out the CLI in Dashboard

```
Bullwinkle# show meraki connect

Service meraki connect: enable

Meraki Tunnel Config
-----
Fetch State:           Config fetch succeeded
Fetch Fail:
Last Fetch(UTC):       2024-10-05 16:45:40
Next Fetch(UTC):       2024-10-05 18:10:56
Config Server:         cs46-2037.meraki.com
Primary:               usw.nt.meraki.com
Secondary:             use.nt.meraki.com
Client IPv6 Addr:      FD0A:9B09:1F7:1:3A84:79FF:FE6E:5700
Network Name:          Eh2 - switch

Meraki Tunnel State
-----
Primary:               Up
Secondary:             Up
```

Get ready for Cloud-Native



Keynote Deep Dives

Wednesday
10:30am – 11:30am



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How AI Can Fuel Better Employee and Customer Experiences

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