

# Engineering Cisco Meraki Solutions



# Path to Certification

How to become Meraki certified



## ECMS1

Build your Cisco Meraki technical knowledge and skills with this full-day, virtual, instructor-led training



## ECMS2

Elevate your Cisco Meraki technical knowledge and skills with this three-day, instructor-led training



## Meraki Certification

This Cisco technical specialist certification will recognize IT professionals' expertise in Meraki solutions

# About This Training

The five Ws and one H

## WHY

- Increase Dashboard proficiency
- Learn operational best practices

## WHEN

- 7-hour course
- Self-paced lab activities

## WHO

- Operators, administrators
- Networking fundamentals

## WHERE

- Virtual format (WebEx)
- Dashboard (web browser)

## WHAT

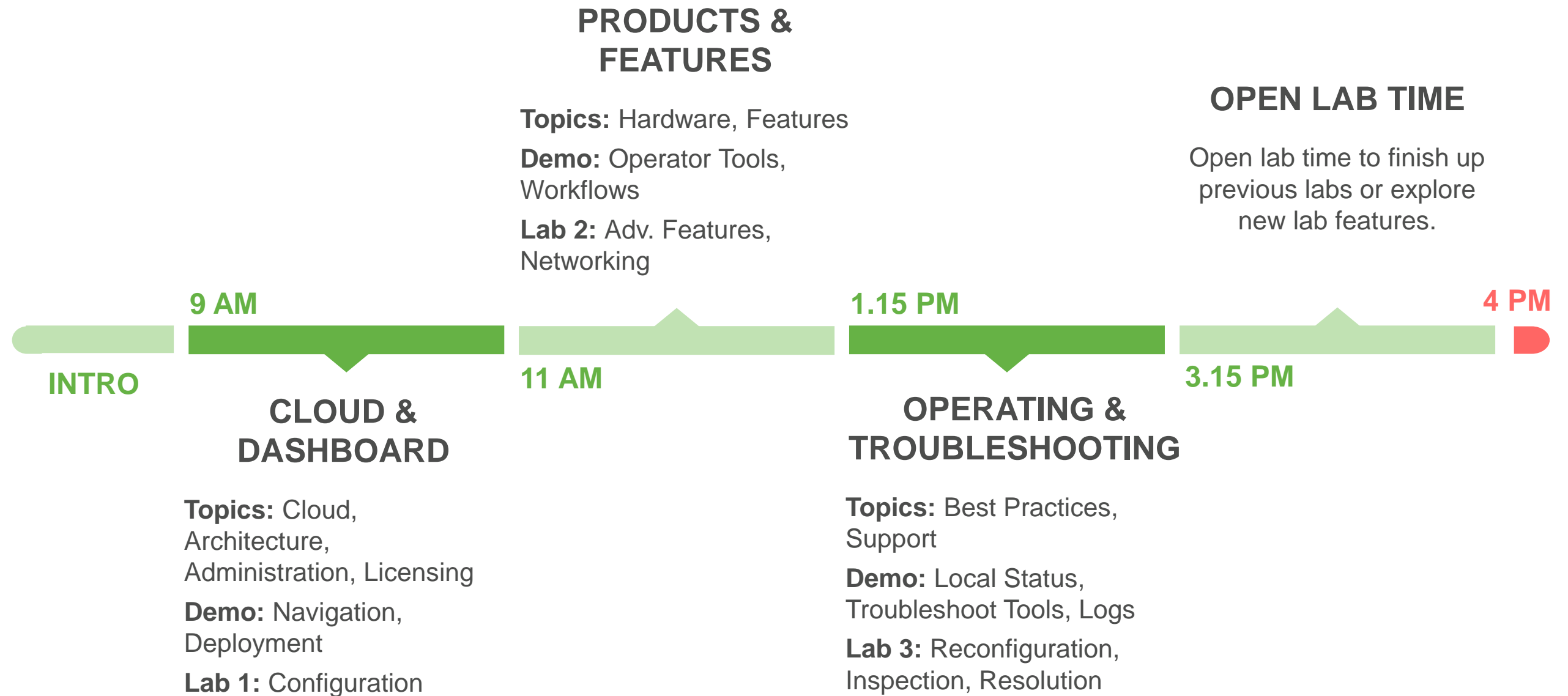
- Presentations / demos
- Labs / review

## HOW

- Configuring real devices
- Knowledge checks

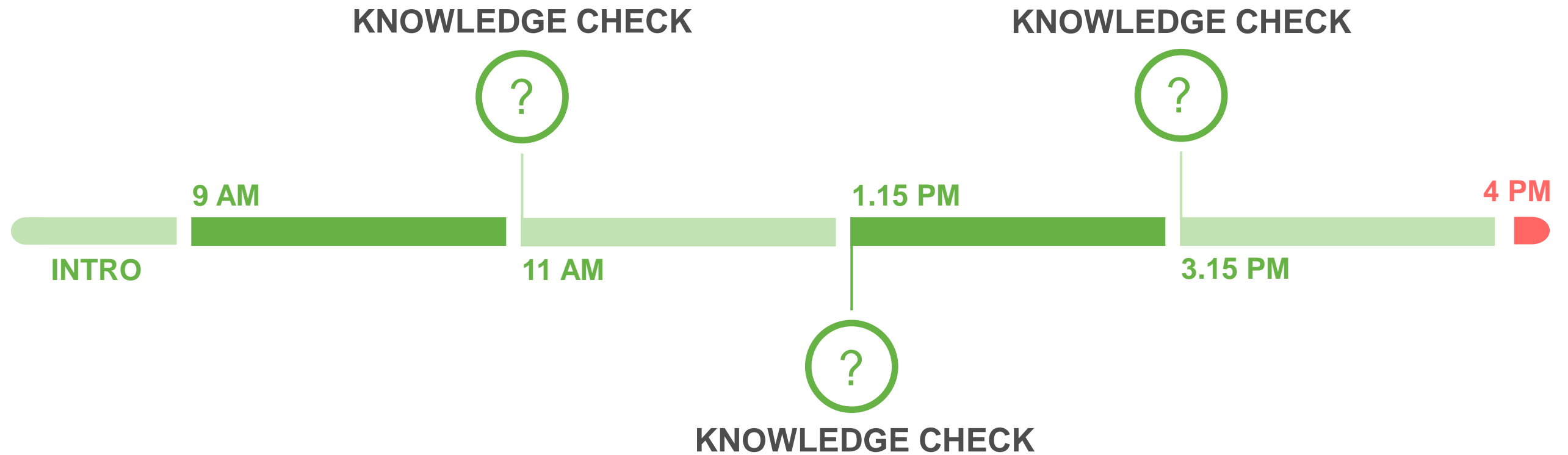
# Agenda

## Sections breakdown



# Agenda

Knowledge checks

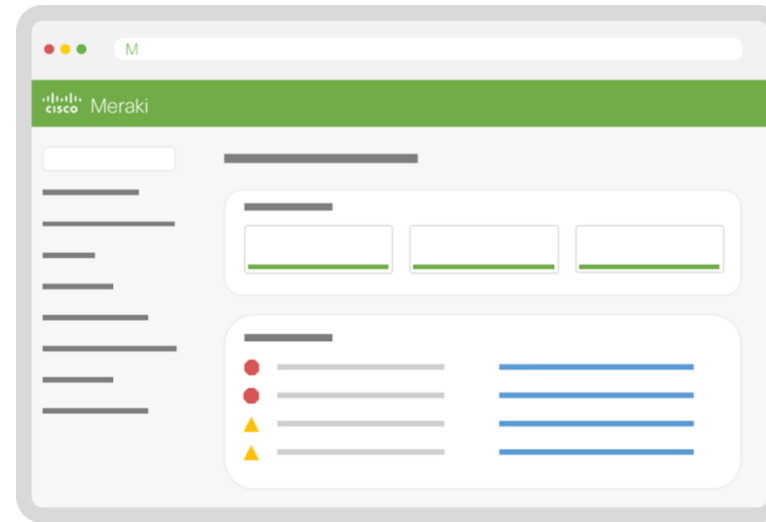


# SECTION 1

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## Cloud & Dashboard

# Single Pane of Glass Management



**MR**  
Wireless



**MX**  
Security Appliances



**MS**  
Switches



**SM EM**  
Systems Manager



**MV**  
Smart Cameras



**MI**  
Insight



**MG**  
Cellular Gateway



**MT**  
Sensors

# The Power of the Stack



## **Scalability**

Deploy and grow networks at branch locations or large campuses easily and rapidly.



## **Management**

Manage and monitor those networks with robust analytics from a single pane of glass.



## **Licensing**

Reduce administrative overhead with simple all-inclusive licensing models and tools.



# Cisco Meraki Devices & the Cloud

A highly effective out of band control plane

## Step 1: Deploy

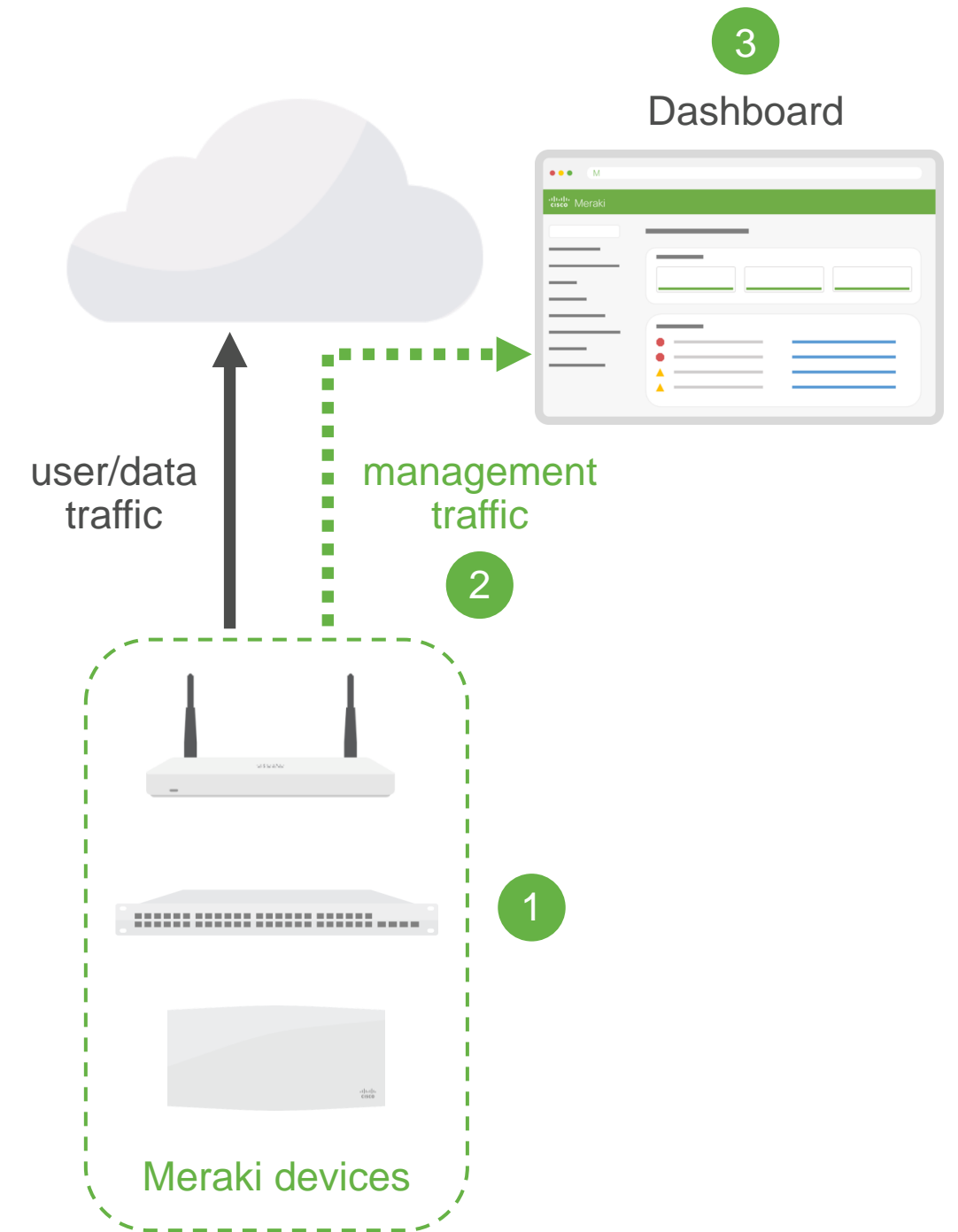
Cisco Meraki appliances and devices are deployed in your campus or remote branches.

## Step 2: Connect

Devices automatically connect via SSL to the Meraki cloud, registers to the proper network, and download their configurations.

## Step 3: Manage

Centralized Dashboard provides visibility, diagnostic tools, and management of the entire network.



# Benefits of a Cloud-Based Solution

Common questions about the architecture

## **Security**

Does my network traffic flow through the Cisco Meraki cloud infrastructure?

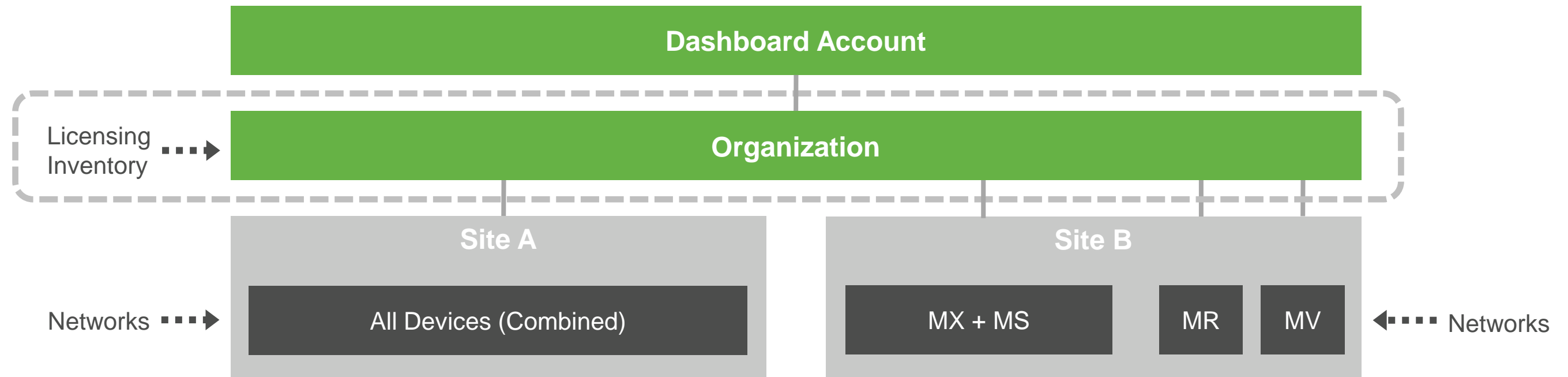
## **Reliability**

What happens if the devices can't access the Cisco Meraki cloud?

## **Future Proof**

How do firmware upgrades work? How often do I get new features?

# Dashboard Organizational Structure

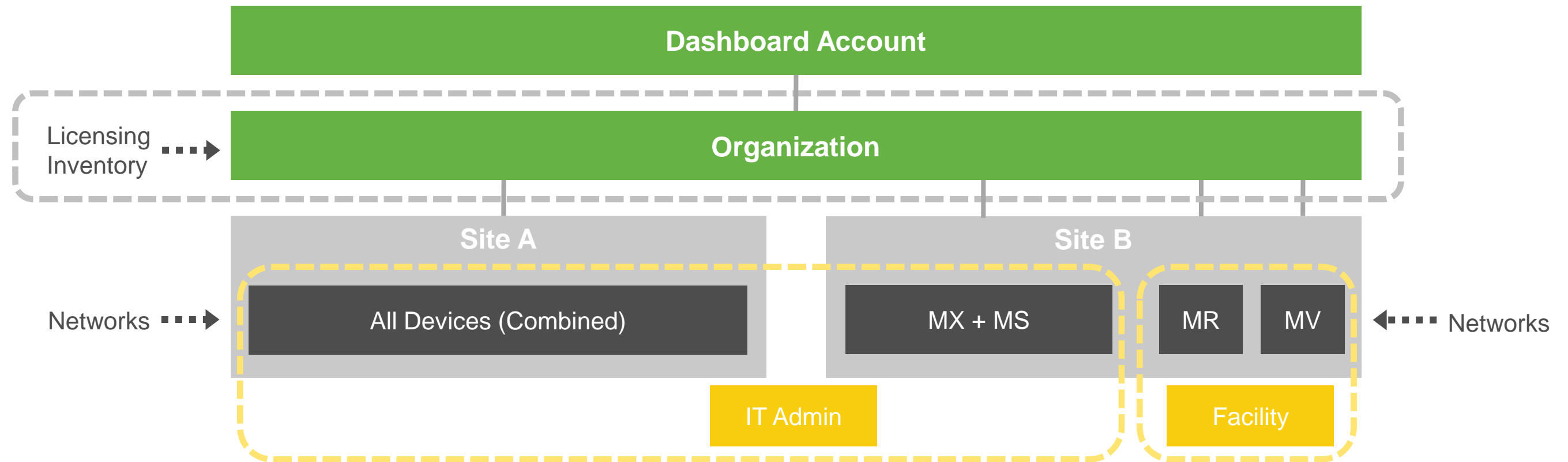


Dashboard Account: associated with an e-mail address, used to log in to Dashboard

Organization: contain licenses and inventory of a single organizational entity (i.e. a company)

Networks: contain devices, their configurations, statistics, and any client-device info

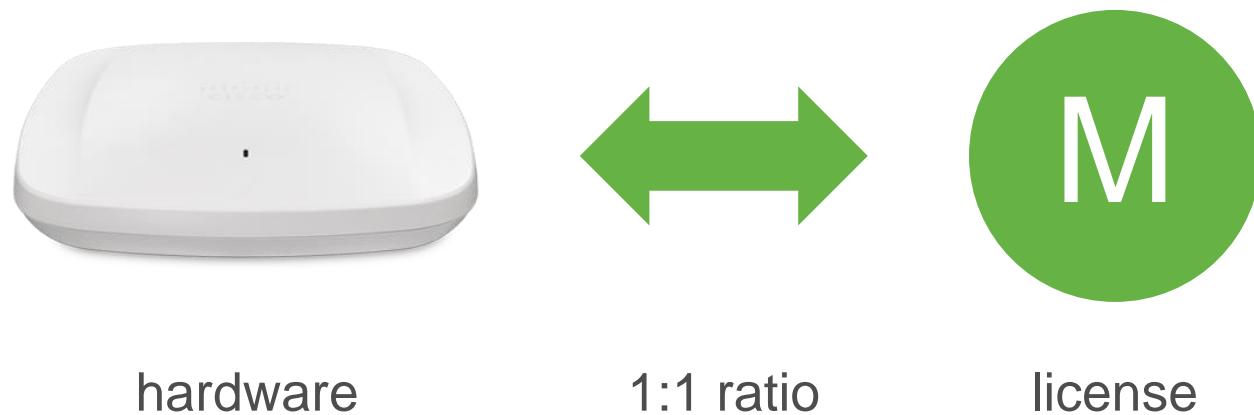
# Dashboard Organizational Structure



Tags: Used to organize and for management purposes (partitioning, grouping), assigning role-base access, and may be combined to be used to generate custom Summary Reports

# Licensing

Licensing is required for all Meraki solution deployments

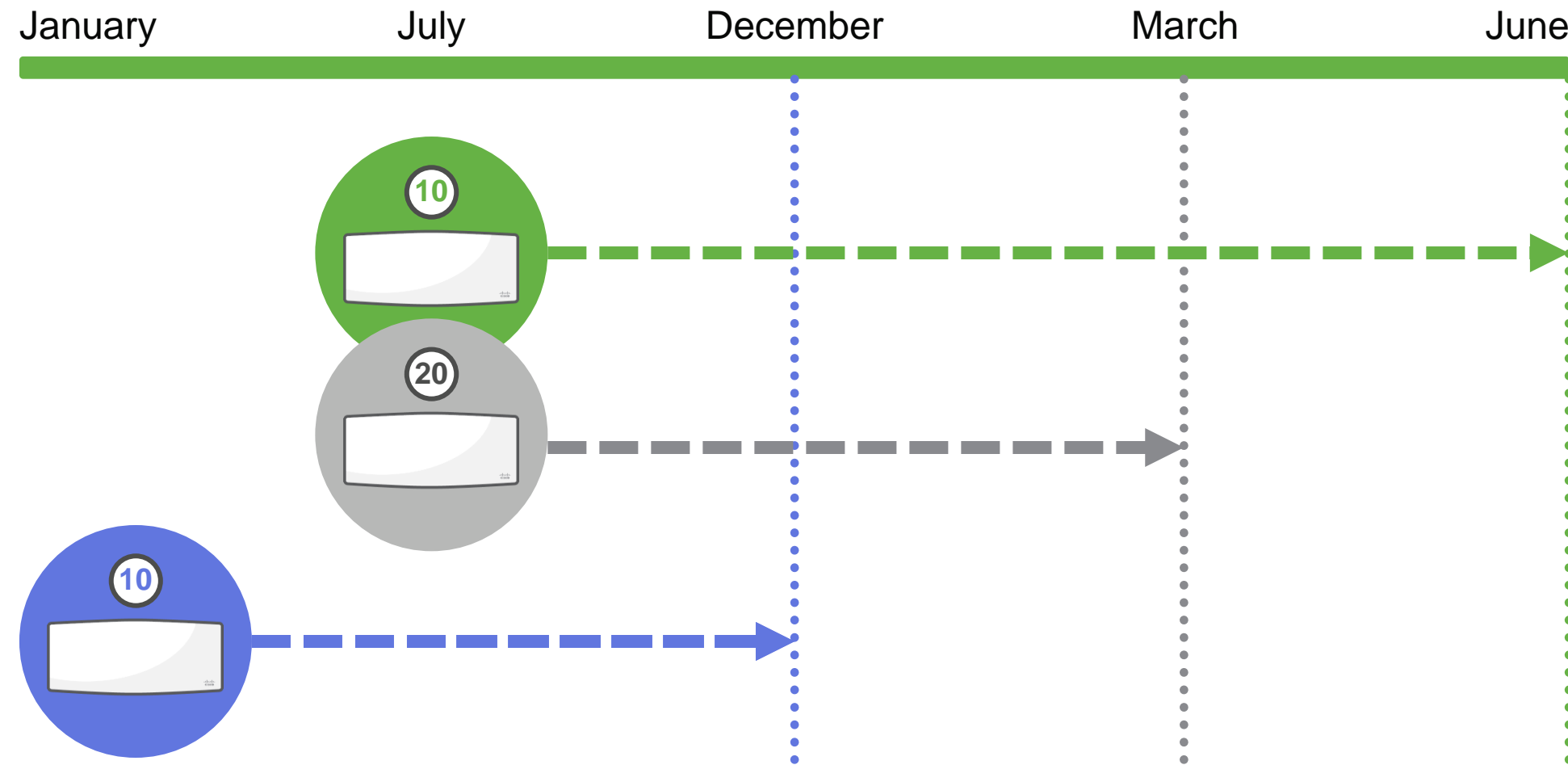


Licensing represents the total cost of ownership:

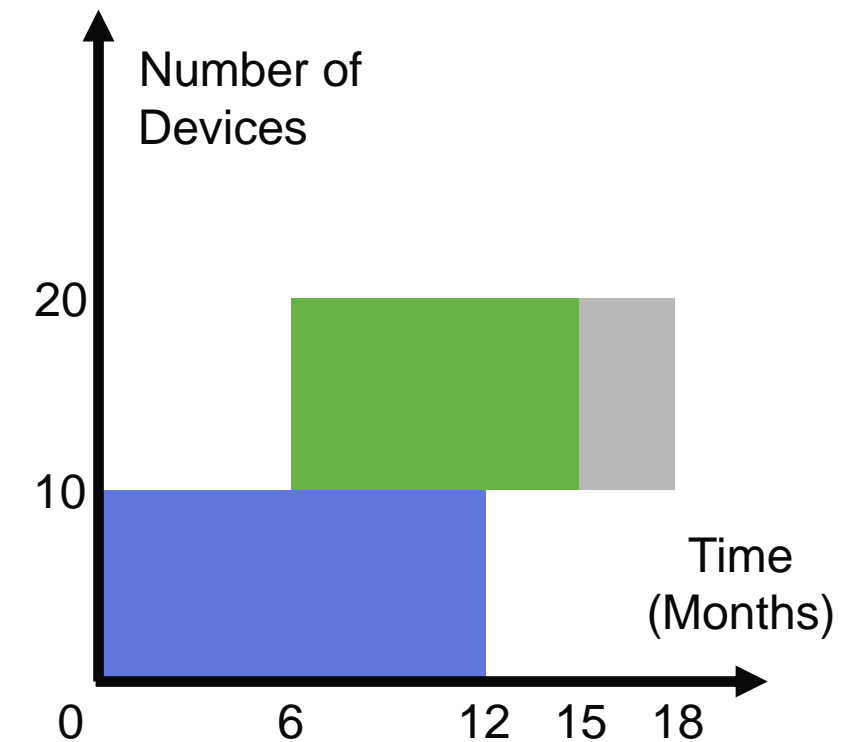
- Centralized management and network-wide visibility and control
- Seamless firmware and security updates
- 24/7 Enterprise Support and lifetime warranty

Meraki supports two types of licensing models:  
**co-termination licensing** (co-term) and **per-device licensing** (PDL)

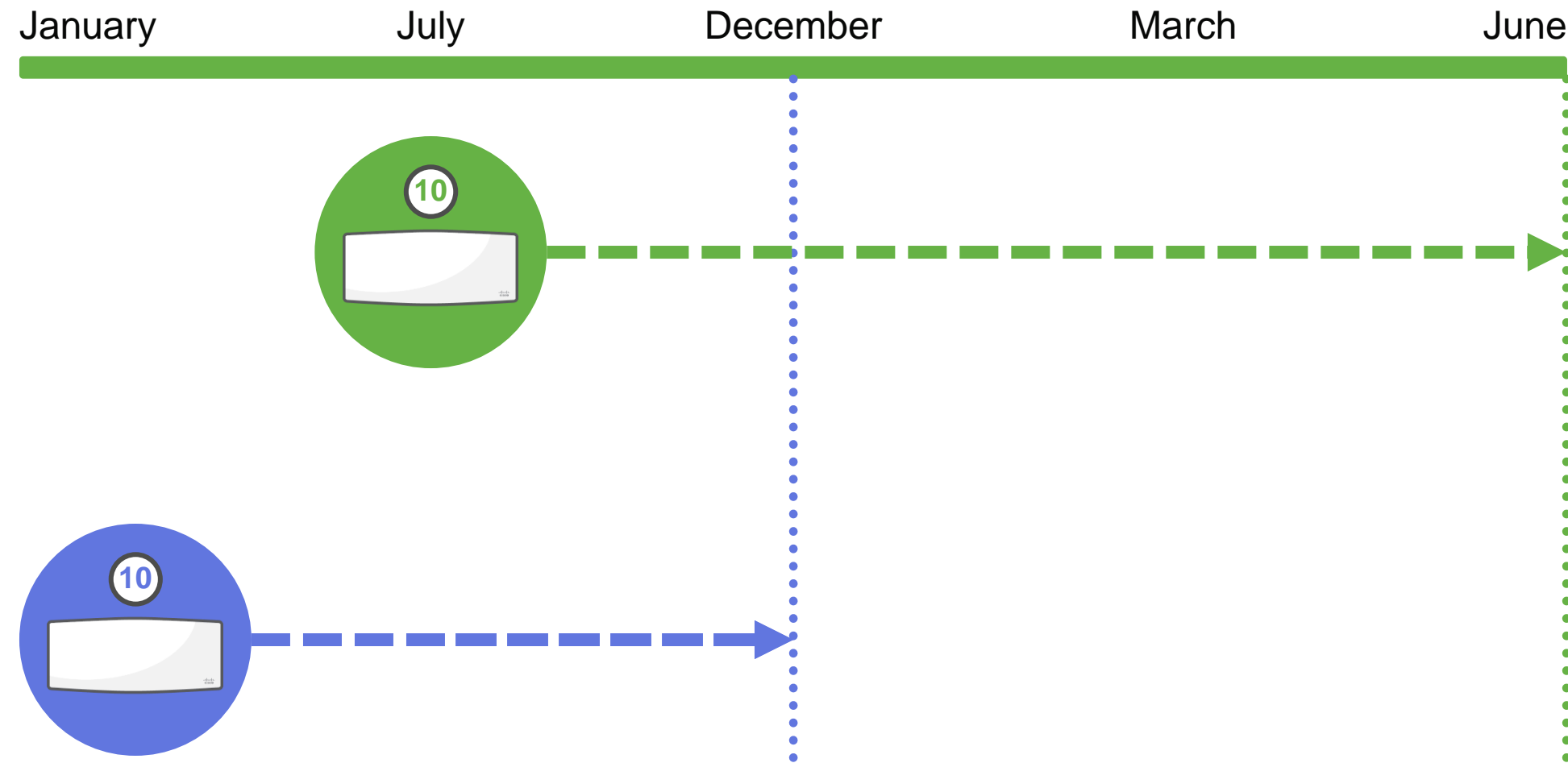
# Co-termination Case Study



Number of Devices: **10** + **10** = **20**  
License Term: **12 months**    **12 months**  
Time Remaining: ~~6 months~~    ~~12 months~~    **9 months**



# Per-Device Case Study



Number of Devices: 10 + 10  
License Term: 12 months 12 months  
Time Remaining: 62 months 12 months

# License Violation

The screenshot shows the 'License information' page in the Cisco Meraki dashboard. A red banner at the top says 'License Required'. Below it, the 'License expiration' is listed as 'Oct 16, 2028 (2400 days from now)'. At the bottom, a table shows the 'License limit' as 0 and the 'Current device count' as 4. A red dashed box highlights the table, indicating a violation because the current device count exceeds the license limit.

License limit	Current device count
0	4

## OVER DEVICE LIMIT

Number of physical devices exceeds the number of licensed devices

The screenshot shows the 'License information' page in the Cisco Meraki dashboard. A red banner at the top says 'License Required'. Below it, the 'License expiration' is listed as 'Oct 16, 2028'. A red dashed box highlights the expiration date, indicating a violation because the license has expired.

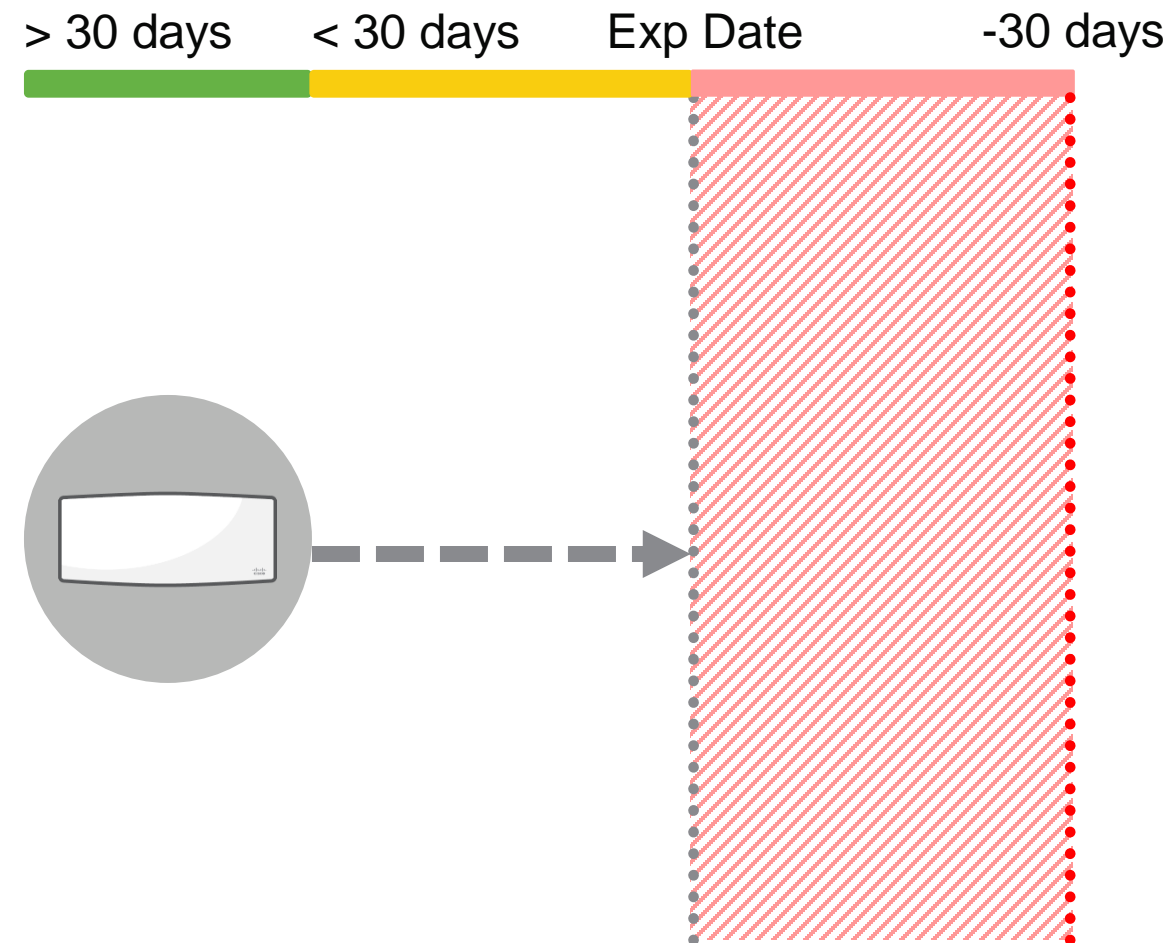
License limit	Current device count
4	4

## LICENSE EXPIRED

When the expiration date has passed without proper license renewal



# Grace Period



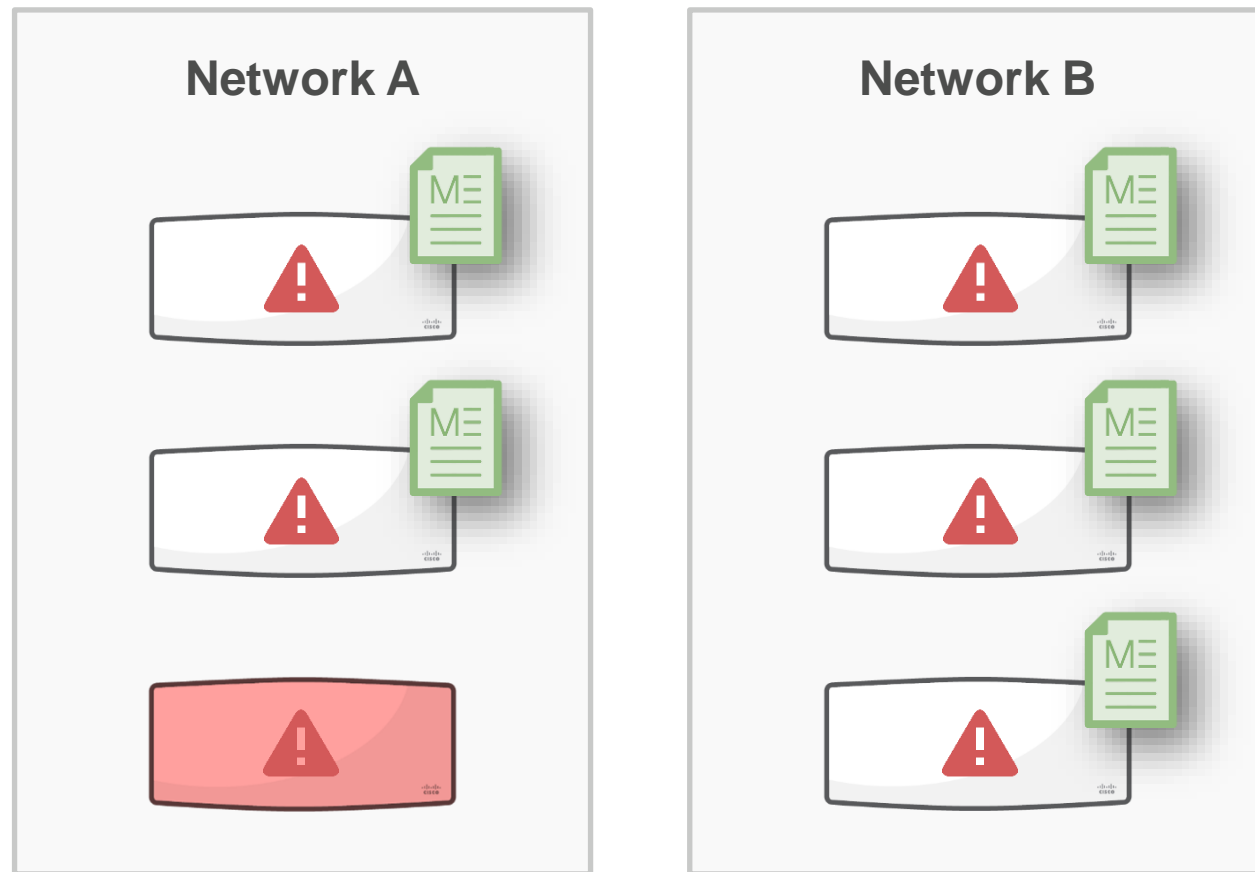
This network has been disabled for non-payment. Please contact Meraki Sales for assistance.

## License information

License status	<b>License Required</b>
License model	Co-termination ⓘ
	<a href="#">Convert to per-device licensing.</a> ⓘ
License expiration ⓘ	Oct 16, 2028 (2400 days from now)
MX Product Edition	Advanced Security
Systems Manager	Enabled (paid)

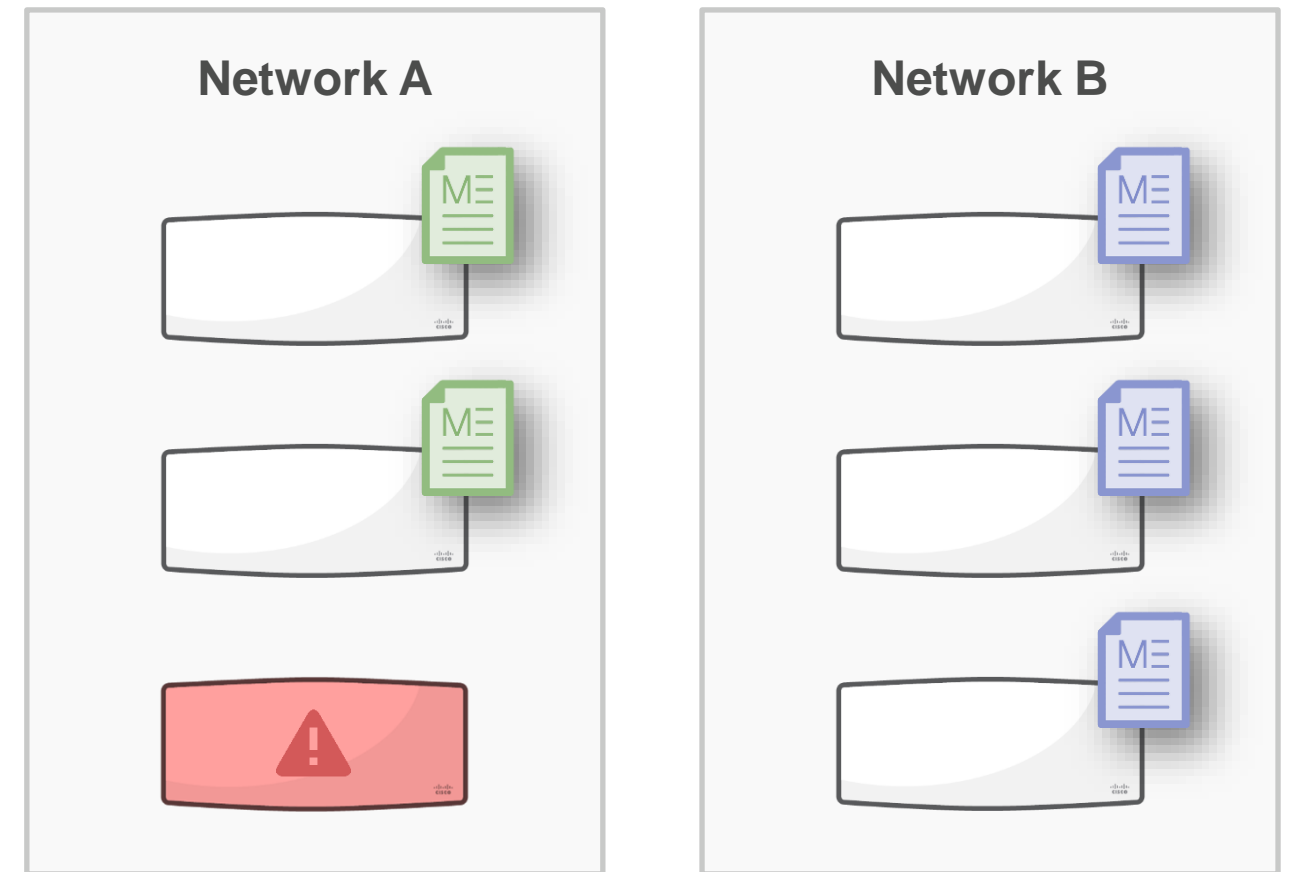
# Device Shutdown

## Co-termination



Exp Date: Jan 01, 2025

## Per-Device

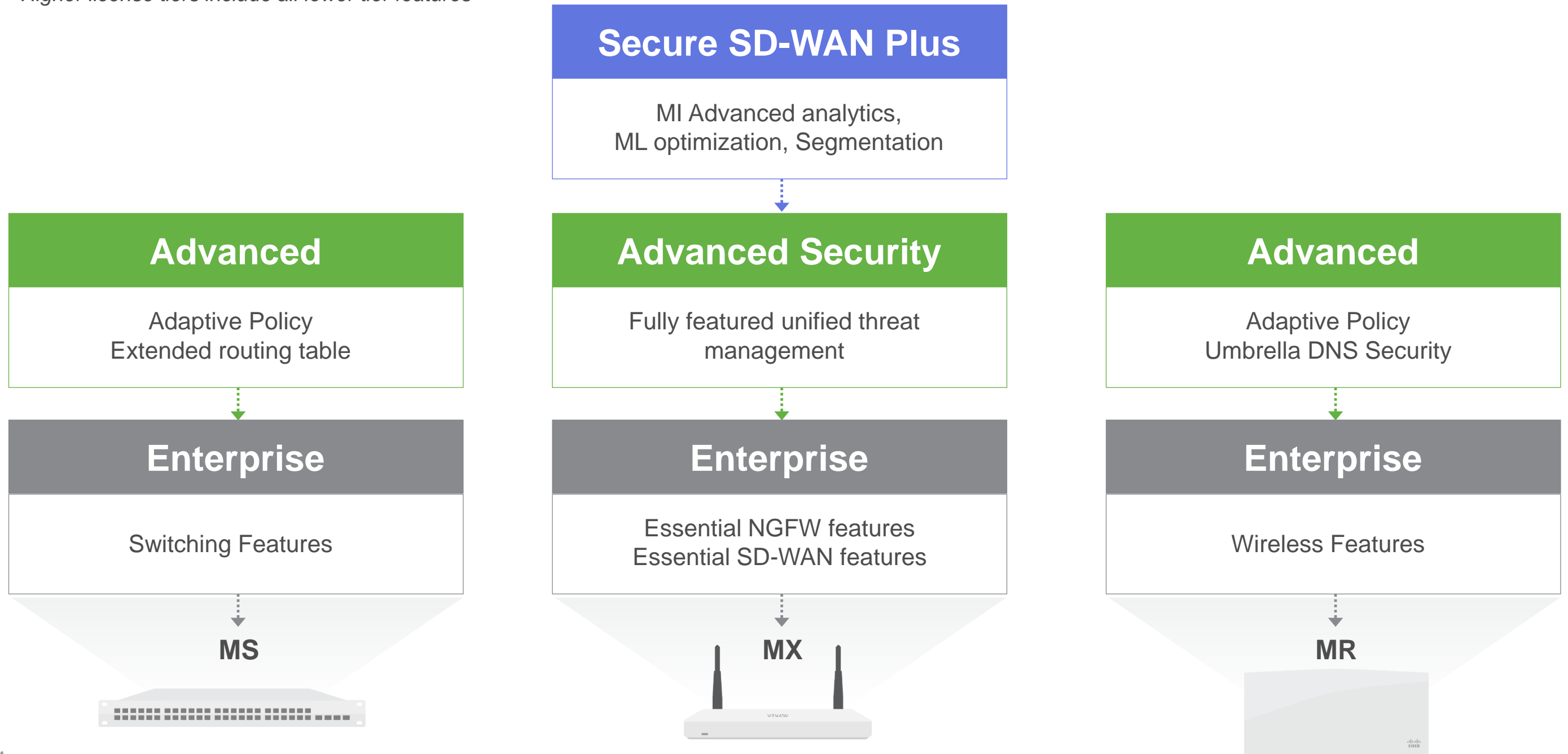


Exp Date: Jan 01, 2025

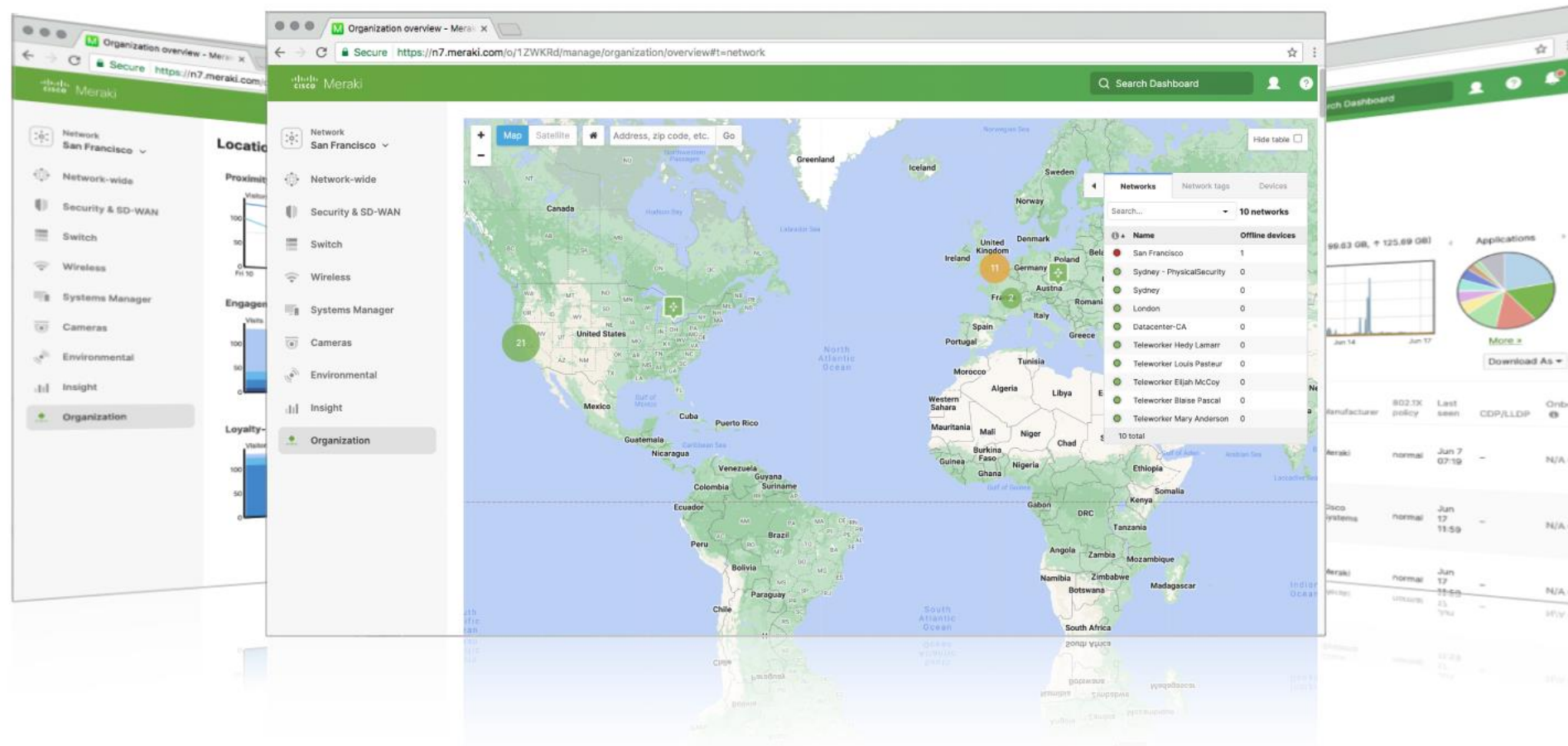
Exp Date: Jul 01, 2025

# Tier Licenses

Higher license tiers include all lower tier features



# Dashboard Demo #1



## Dashboard

- How to access
- How to navigate
- How to operate
- How to get help

## Key Takeaways

- ✓ Administration & permissions
- ✓ Navigation tabs & menus
- ✓ Dashboard interface tips
- ✓ Built-in tools & self-help

## A Common Workflow

1. Creating a network
2. Claiming devices
3. Applying licenses
4. Building configurations

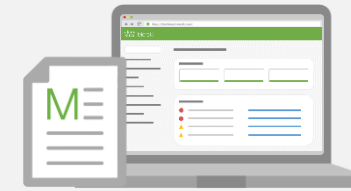
# Section 1 Review



## Training Objectives

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- Meraki cloud architecture (out-of-band control plane)
- Dashboard structure (organizations, networks)
- Co-termination and per-device licensing
- Deployment workflow



## Lab Learnings

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- Basic initial device setup
- Typical network needs (DHCP, VLANs, and switch port settings)
- Multiple WLAN SSIDs
- Dashboard tools for operators

# Knowledge Check!

# Knowledge Check #1

**Which statement correctly defines how Cisco Meraki devices behave should they not be able to contact the Meraki Cloud?**

- A. Meraki devices continue to operate, but remote/full management and configuration functions are interrupted
- B. Meraki devices stop passing traffic across all of their interfaces
- C. Meraki devices will attempt to establish a connection to a locally hosted server
- D. Meraki devices may be re-initiated into a backup mode if an administrator manually intervenes using a direct, local connection

## Knowledge Check #2

Which of the following is an **INCORRECT** statement about Meraki's licensing Grace Period?

- A. The Grace Period is activated when an organization has passed its co-termination expiration date
- B. The Grace Period lasts 30 days and allows for full Dashboard and device functionality during that time
- C. The Grace Period is activated when an organization has exceeded the total number of devices that have been licensed
- D. The Grace Period limits administrators to only apply additional license keys but no other Dashboard actions are allowed



# SECTION 2

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## Products & Administration

# MX Security and SD-WAN



## FEATURE HIGHLIGHTS

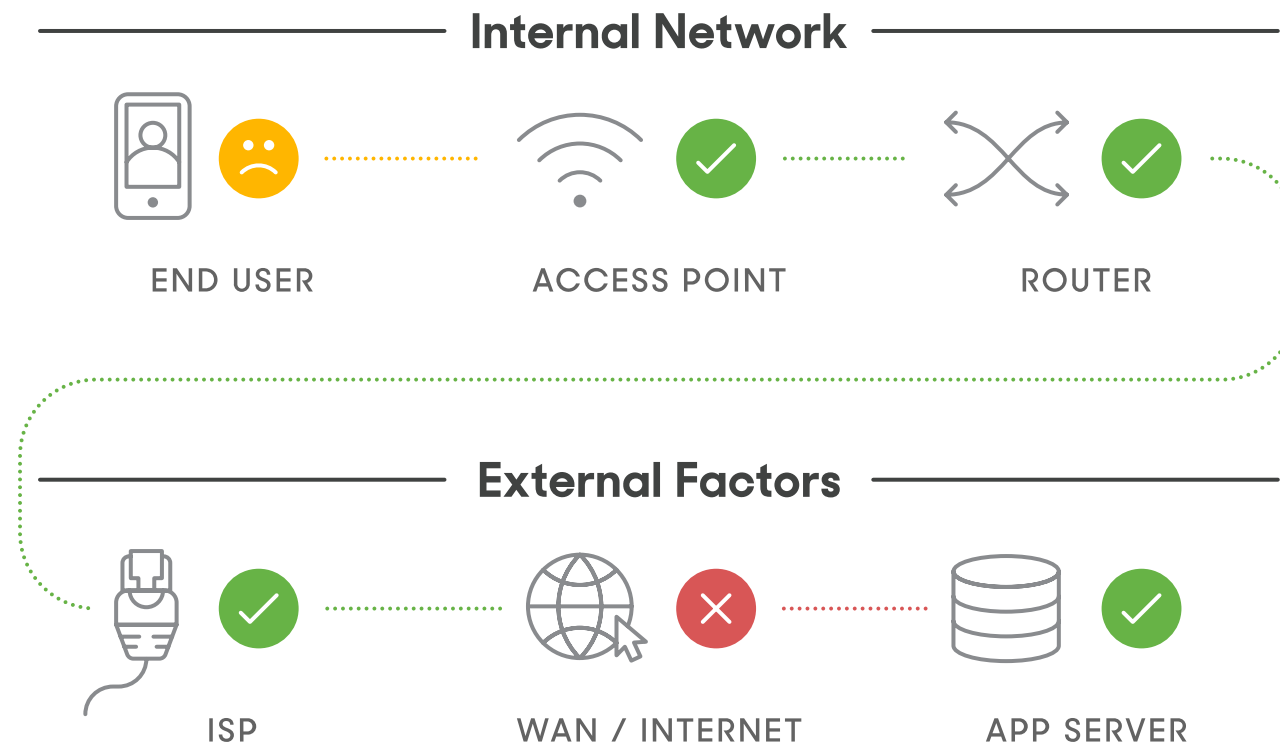
Secure SD-WAN Plus License

- Identity-based firewall
- High-availability and failover
- SD-WAN and Auto VPN
- Content filtering and geo-location rules
- Intrusion detection/prevention
- Advanced malware protection
- VPN segmentation / exclusion
- End-user experience monitoring (MI)

NGFW, unified threat management and SD-WAN solution with advanced user experience analytics

Various models scaling from teleworker and small branch to campus and datacenter.

# MI End-User Experience Monitoring



## FEATURE HIGHLIGHTS

### Web App Health

End-to-end visibility into SaaS applications

### Root Cause Analysis

Informs of the cause of an application problem

### WAN Health

Holistic view of WAN link performance

### VOIP Health

End-to-end visibility into VoIP services

Offers data for external and internal factors including LAN, WAN, ISPs, cloud applications and VoIP services.

Leverage existing MX appliances as collectors (with either MX Secure SD-WAN Plus license or a separate Meraki Insight license)

# MG Cellular Gateway



## FEATURE HIGHLIGHTS

Up to 1.2Gbps CAT18 LTE

2 separate gateway connections

Compact form factor

Dual physical SIM

High performance antennas

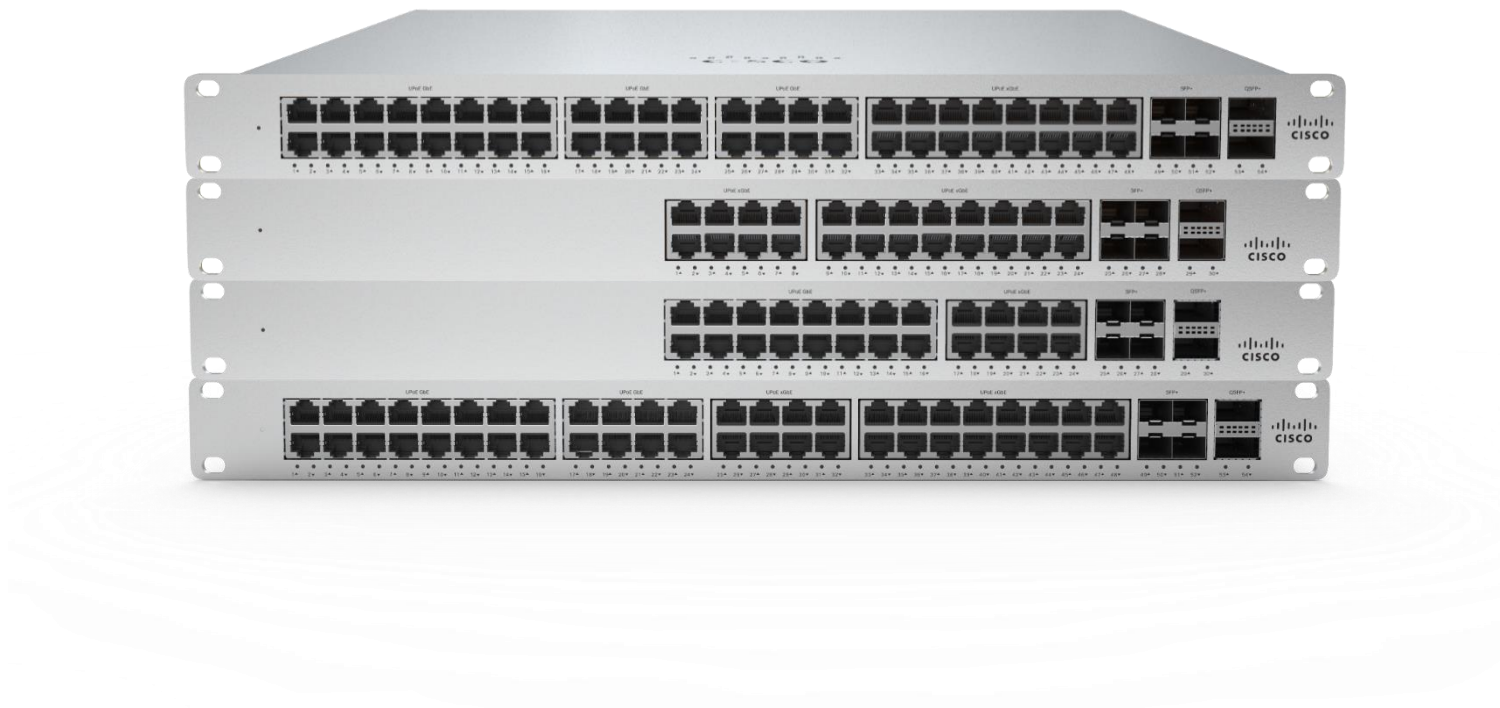
PoE or DC powered

IP67 rating

Unlock wireless WAN connectivity via cellular as a primary or backup uplink

Pair with any router and obtain optimal cellular signal strength with various antennas and mounting options

# MS Switches



Various models scaling from access to campus aggregation deployments

Wide range of power options (UPoE, StackPower)



## FEATURE HIGHLIGHTS

### Enterprise License

Voice and video QoS

Layer 7 app visibility

Virtual and physical stacking

Multigigabit performance

Dynamic routing

Enterprise security

Remote packet capture, cable testing

Adaptive Policy

# MR Wireless Access Points



## FEATURE HIGHLIGHTS

### Enterprise License

BYOD and guest access policies

Application traffic shaping

Enterprise security

WIDS / WIPS

Location analytics

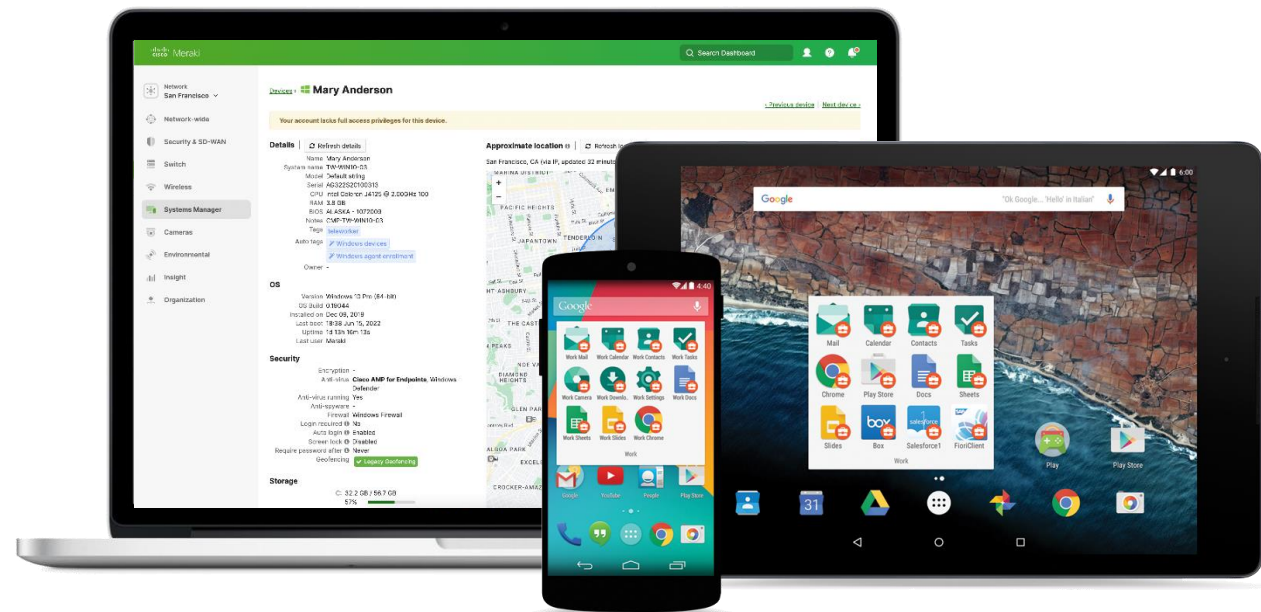
Wireless Health

Umbrella DNS security

Adaptive Policy

Variety of models that cater to indoor / outdoor, hospitality, high performance, and value-priced 802.11ac and WiFi 6E models, multigigabit performance, with dedicated scanning and BLE radios

# Systems Manager Endpoint Management



## FEATURE HIGHLIGHTS

Device security and location

Network settings deployment

Mobile and desktop troubleshooting

Easy and rapid provisioning

Backpack file sharing

Software inventory and app deployment

MDM-less onboarding with Trusted Access

Multi-platform mobile and desktop support: macOS, iOS, Apple TV, Windows, Android, & Chrome OS

Cloud-based: no on-site appliances or software, works with any vendor's network

# MV Security Cameras



## FEATURE HIGHLIGHTS

Edge architecture with optimized retention

End-to-end encryption

Customizable video wall layouts

Retroactive motion event searching

Granular role-based access control

Audio recording

Cloud archive - optional

MV Sense - optional

Different indoor and outdoor models with narrow, wide, or fisheye field of vision

Integrated high-endurance SSD, 802.11ac WiFi, IR illumination, and industry-leading onboard processor



# MT Sensors



## FEATURE HIGHLIGHTS

Sensors for protecting the network closet

Sensor for refrigerated environments

Sensor for air quality and ambient noise

Smart button

Five years battery life

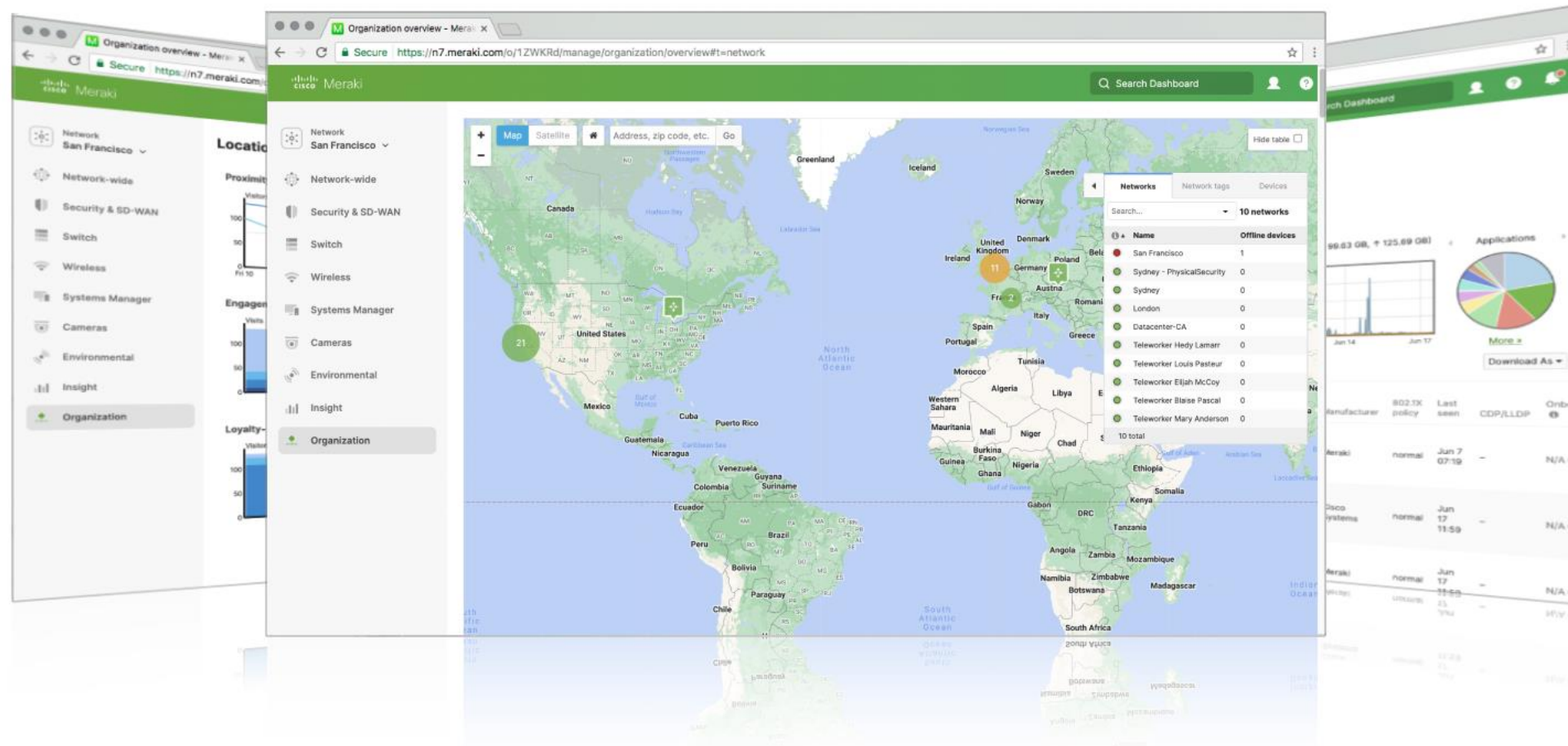
Bluetooth low energy for data transmission

Gateways: Wi-Fi 5 or 6 MR, or 2<sup>nd</sup> generation MV

Indoor sensor models for protecting your business-critical assets with real-time environmental visibility

Out-of-the-box provisioning and flexible management for real-time visibility

# Dashboard Demo #2



## Dashboard

- How to oversee
- How to upgrade
- How to scale/automate

## Key Takeaways

- ✓ Tools that grant visibility
- ✓ Firmware upgrades
- ✓ Templates

## A Common Workflow

1. Security
2. Switching
3. Wireless
4. Physical Security
5. Device Management
6. New/Beta Features

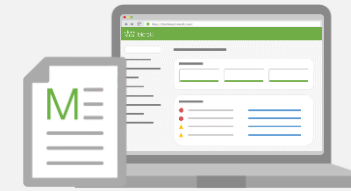
# Section 2 Review



## Training objectives

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- Meraki portfolio (key product features)
- Dashboard visibility tools and UI elements (Topology)
- Operating at scale and automation (Templates)
- Managing firmware



## Lab learnings

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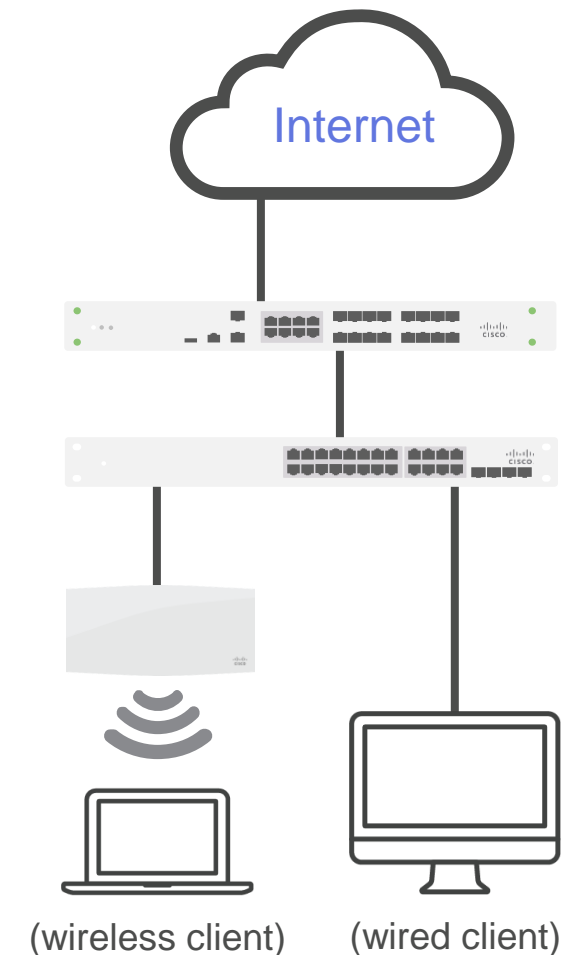
- Enabling network security (MX, MR)
- Securing guest Wi-Fi and limiting access
- Configuring routing (MS)
- Building VPN across sites (Auto VPN)

# Knowledge Check!

# Knowledge Check #3

**How/where can traffic shaping be implemented within a network consisting of Meraki Devices?  
(Choose TWO)**

- A. On layer 3 virtual interfaces, enforced by the MS
- B. On a per-radio level (2.4 or 5GHz), enforced by the MR access point
- C. On a global, per-client basis, enforced by the MX security appliance
- D. On the uplink interfaces between the MX security appliance and the MS switch
- E. On a per-SSID level, enforced by the MR access point



# Knowledge Check #4

**What are two of Cisco Meraki's SD-WAN suite of features? (Choose TWO)**

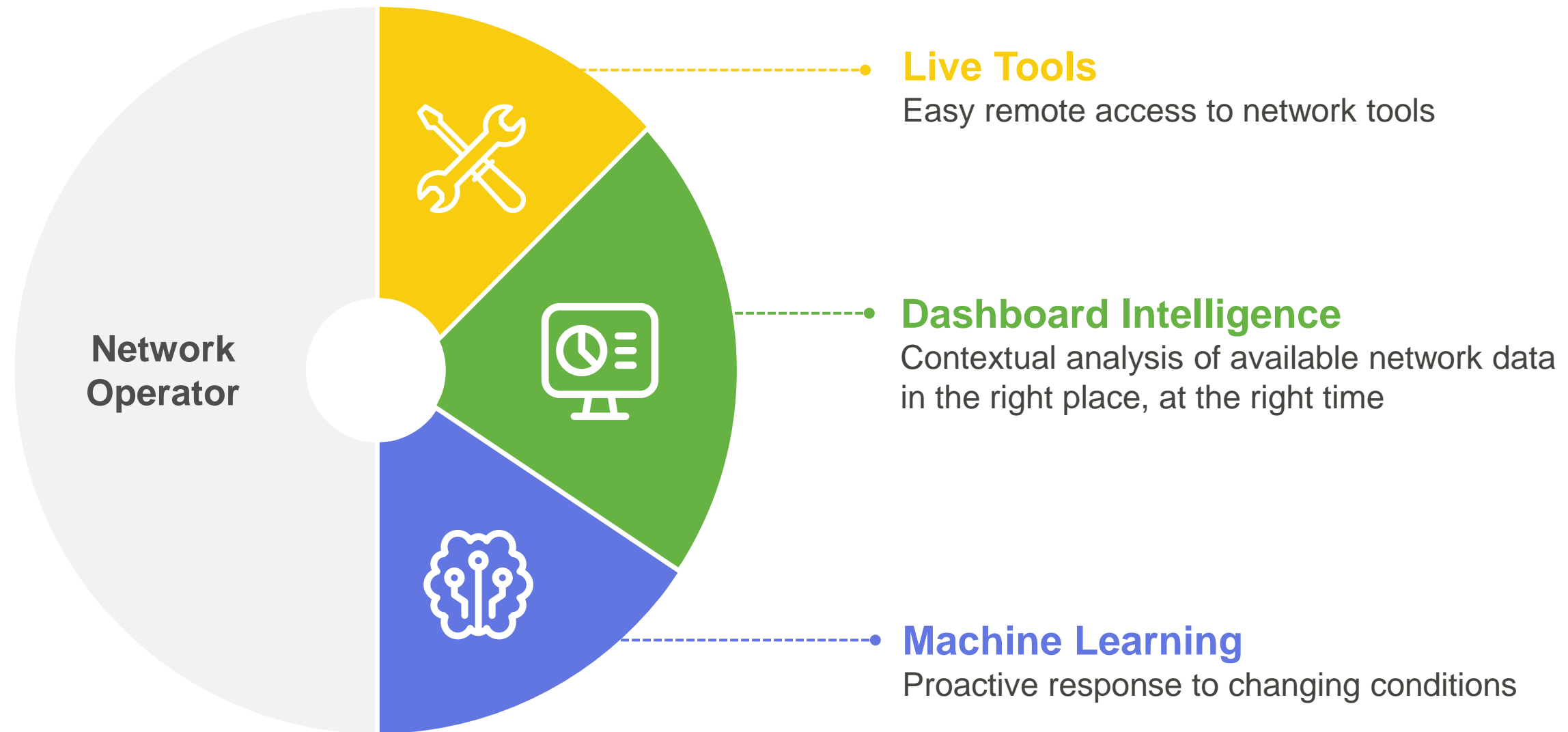
- A. Policy-based routing
- B. Physical and virtual stacking
- C. SSL VPN
- D. Dynamic path selection
- E. RSTP and MGig support

# SECTION 3

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## Operation & Troubleshooting

# Operation & Troubleshooting with Meraki

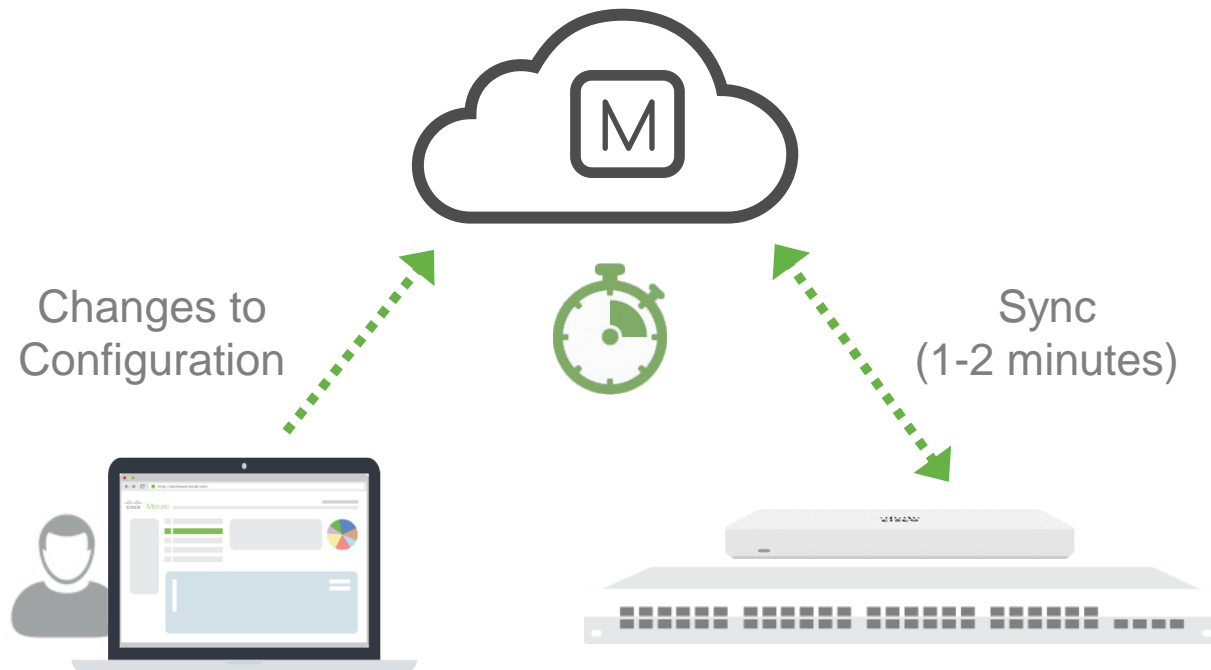




# Dashboard Sync and Real-Time Tools

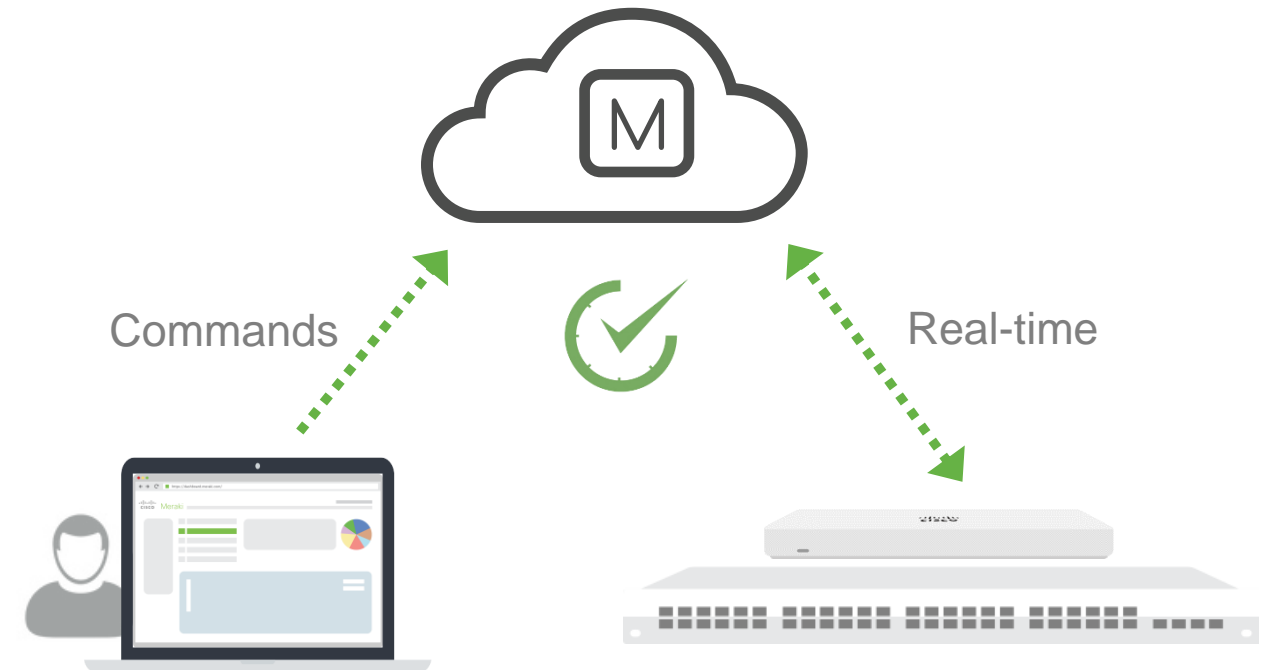
## Configuration updates

Saved immediately in Dashboard, but physical devices may take a few moments to download those changes



## Live tools

Commands in real-time: ping, traceroute, DNS test, port status, DHCP leases, cycle ports\*, and more



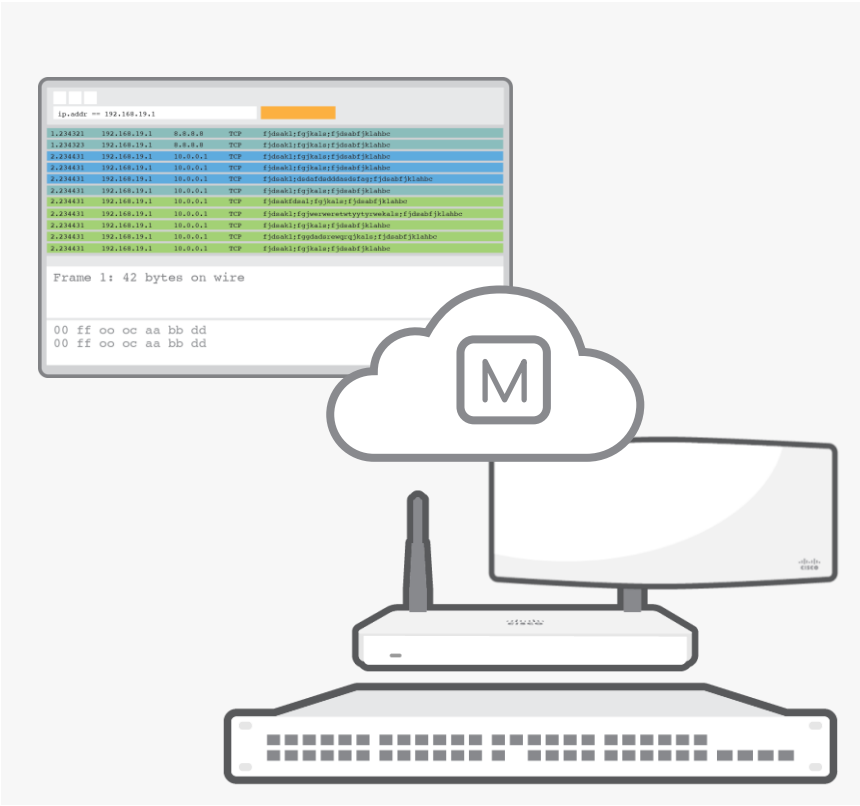
\*Be patient after you have cycled a port; the powered device needs time to reboot and reconnect to Dashboard (3-5 minutes)

# Monitoring and Troubleshooting Tools

## Alerting + Topology



## Packet Capture



## Event + Change Log

Time (GMT)

Jan 5 9:18:22

Jan 5 9:18:22

Jan 5 16:44:51

Jan 5 16:44:50

...

Event

Port STP change

Port status change

802.11 disassociation

AP channel change

...

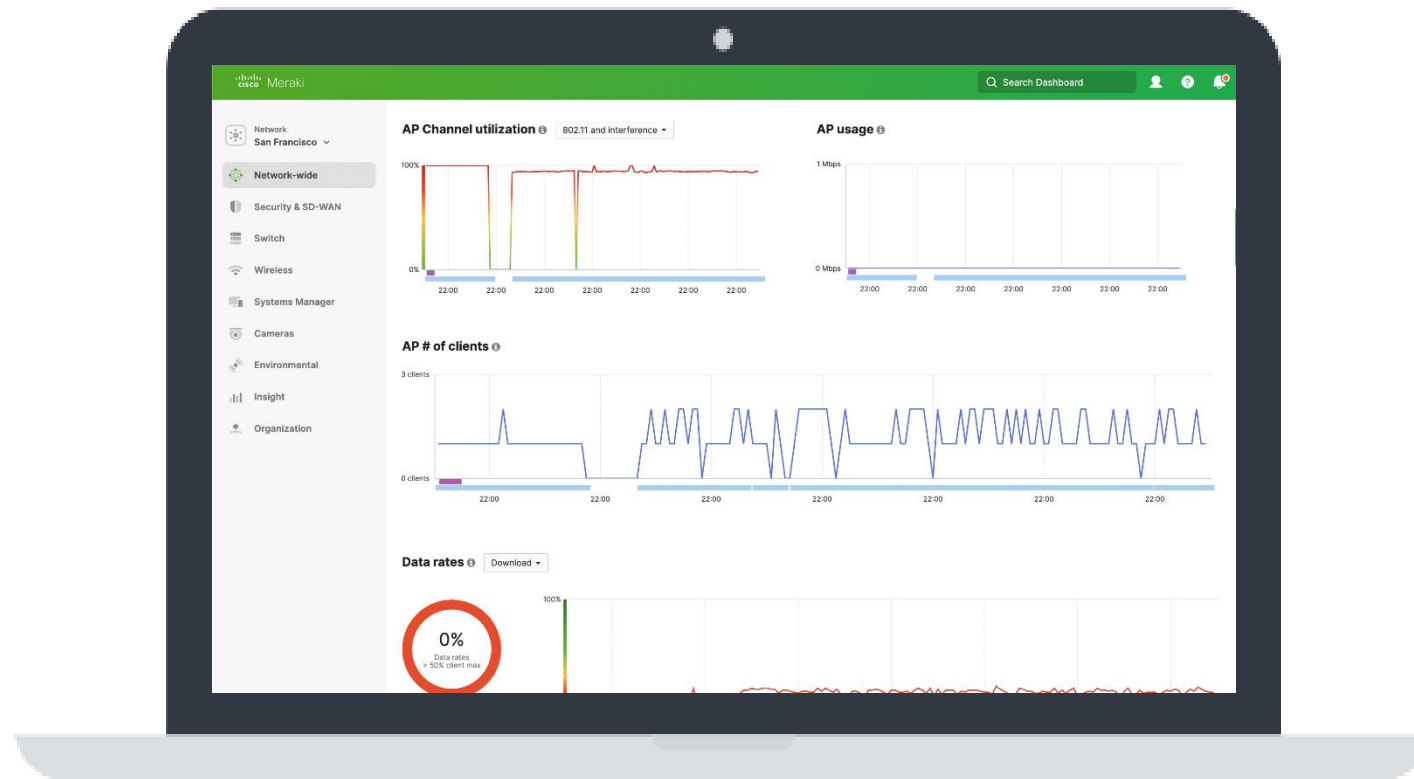
Company ABC change log

Search...

4996 changes dating back to Apr 18 [load more changes](#)

Time (UTC)	Admin	Network	Page	Label	Old value	New value
Apr 25 16:50	Meraki Admin	LAB1 - switch	Switch ports	Meraki Switch / 14	Type ◦ trunk Native VLAN: 1 Allowed VLANs ◦ all	Type ◦ access VLAN: 1 Access policy ◦ [none]
Apr 25 16:50	CMNO Lab User	LAB1 - switch	Switch ports	Meraki Switch / 13	Type ◦ trunk Native VLAN: 1 Allowed VLANs ◦ all	Type ◦ access VLAN: 1 Access policy ◦ [none]

# Meraki Health



## Client Performance

Gauge performance for each wireless client

## Client Health

Historic connectivity and health timelines

## Access Point Performance

Gauge performance of an individual AP

## Wireless Health

Historic holistic wireless deployment health

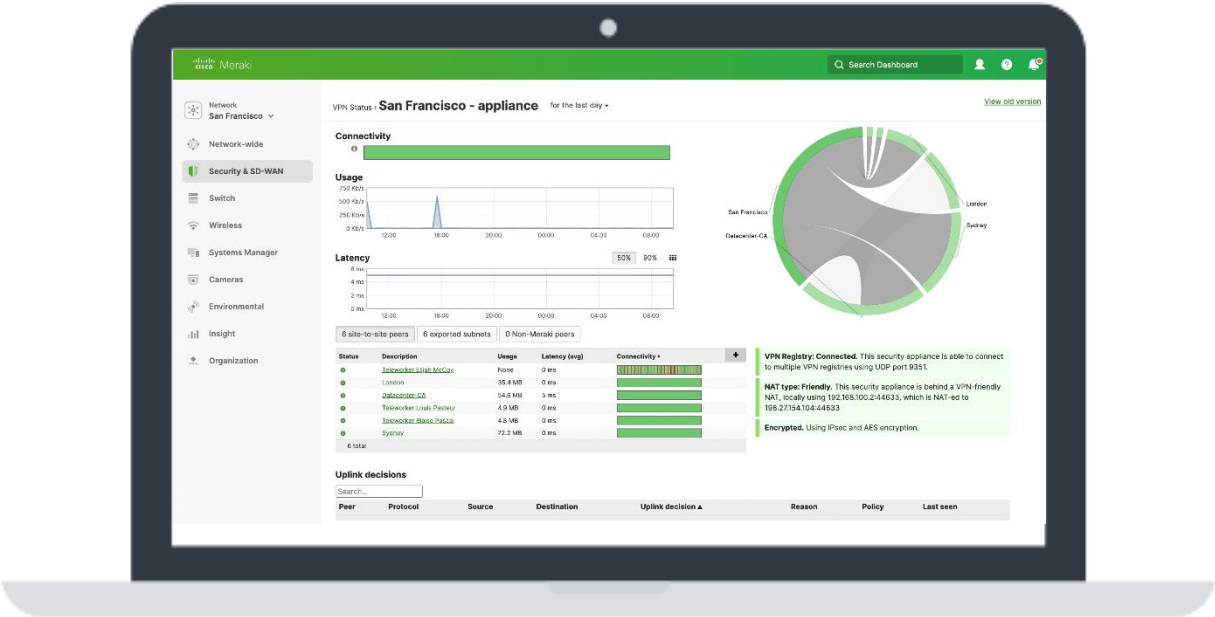
End-to-end network deployment, monitoring, troubleshooting and assurance for efficiency

Contextual visibility to proactively resolve issues, and reduce troubleshooting from hours to minutes

# WAN Performance

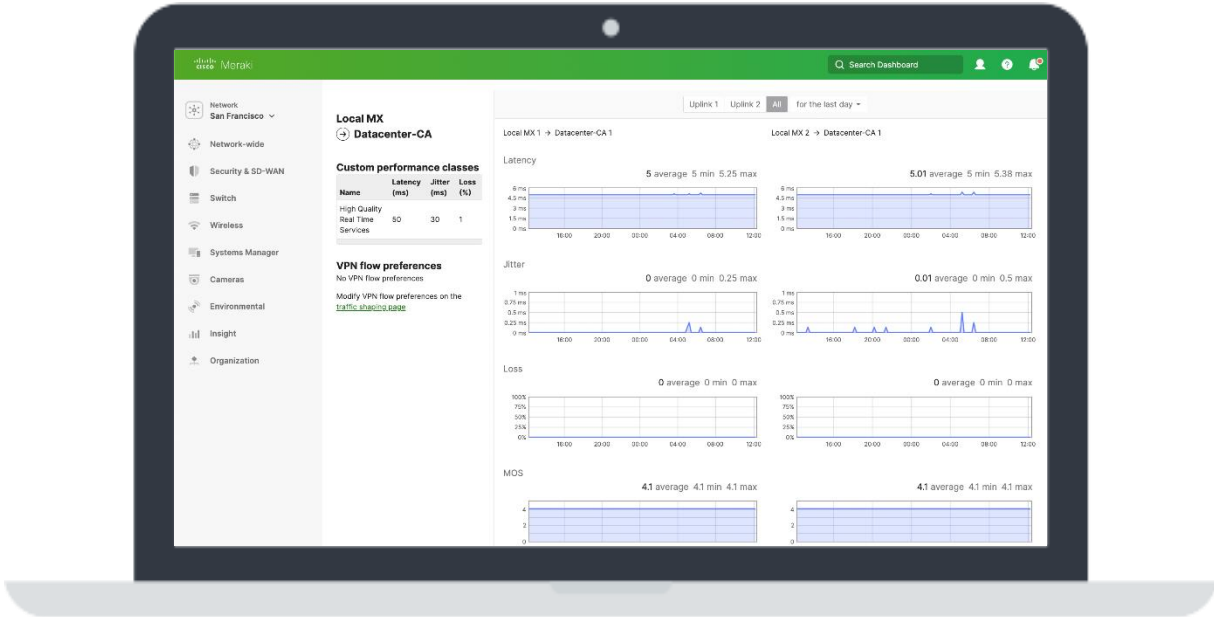
## VPN Status

Real-time status of AutoVPN tunnels  
SD-WAN decisions monitoring

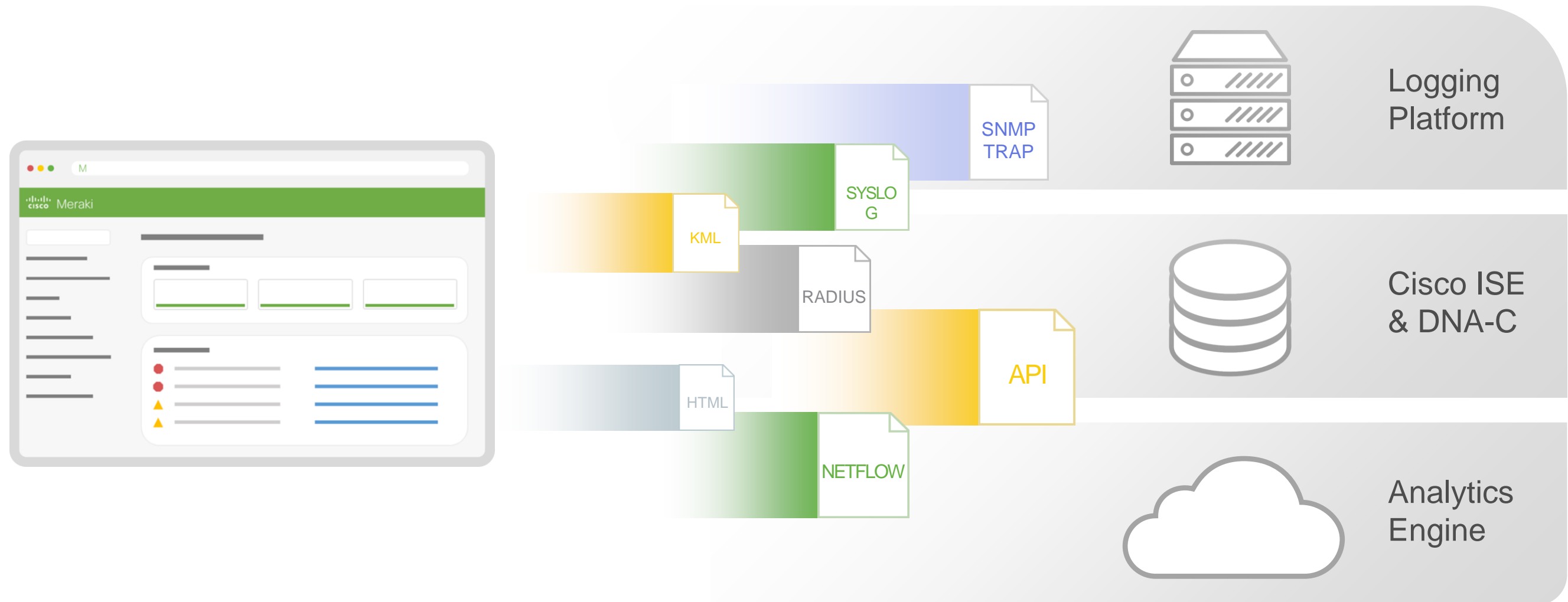


## Uplink performance

Real-time uplink monitoring:  
Latency, jitter, loss and MoS score

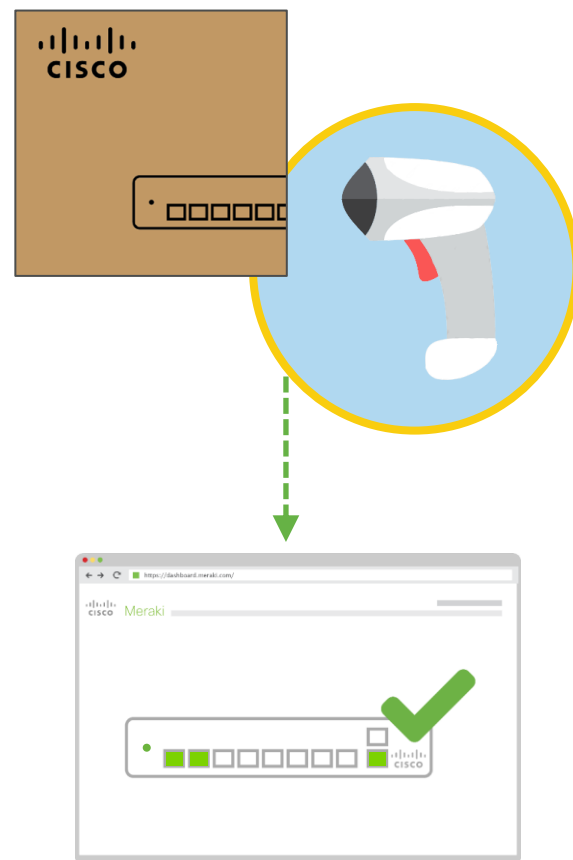


# Integration Into Existing Systems

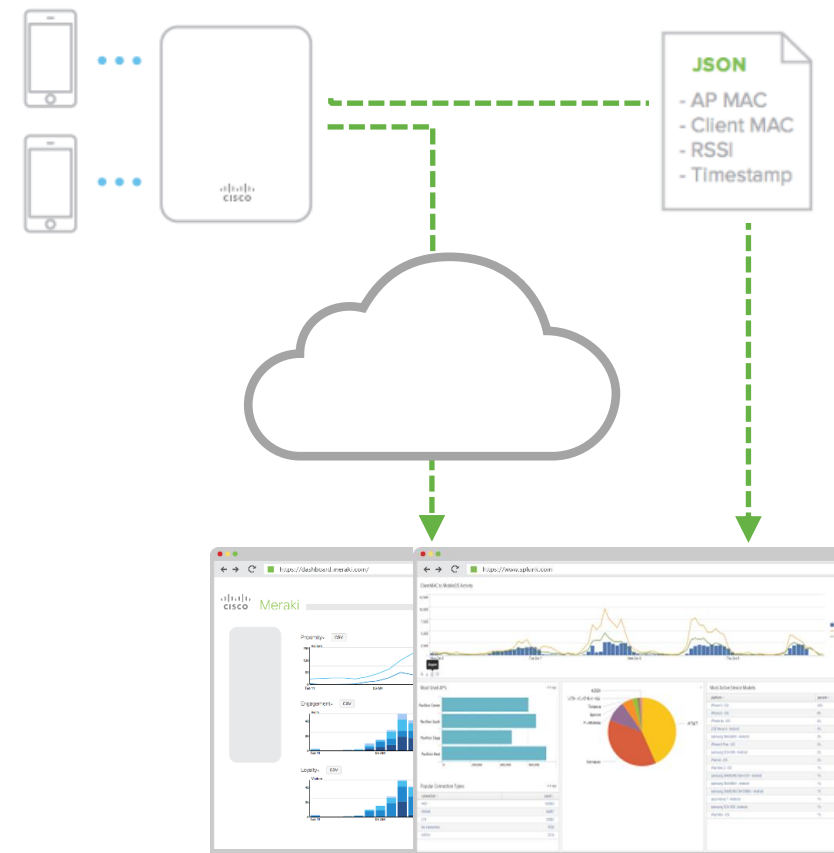


# Application Program Interfaces (APIs)

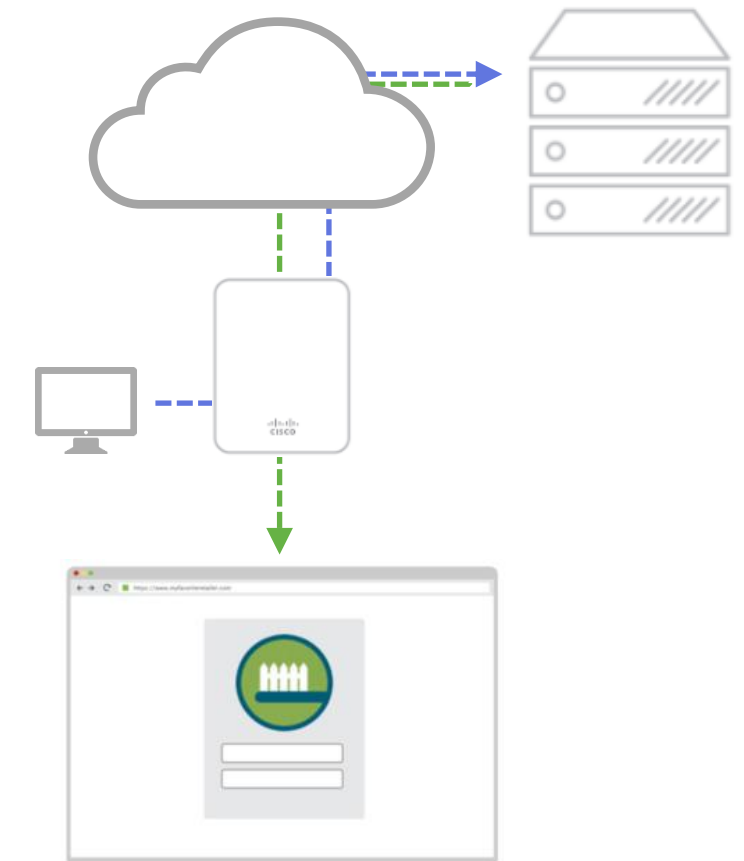
## Dashboard



## Location Scanning



## Captive Portal



 Deploy, Build, & Engage using the Meraki Platform: <https://developer.cisco.com/meraki>

# Working with Meraki support

**Phone support** at Meraki support centers are always staffed for timely, one-on-one case management

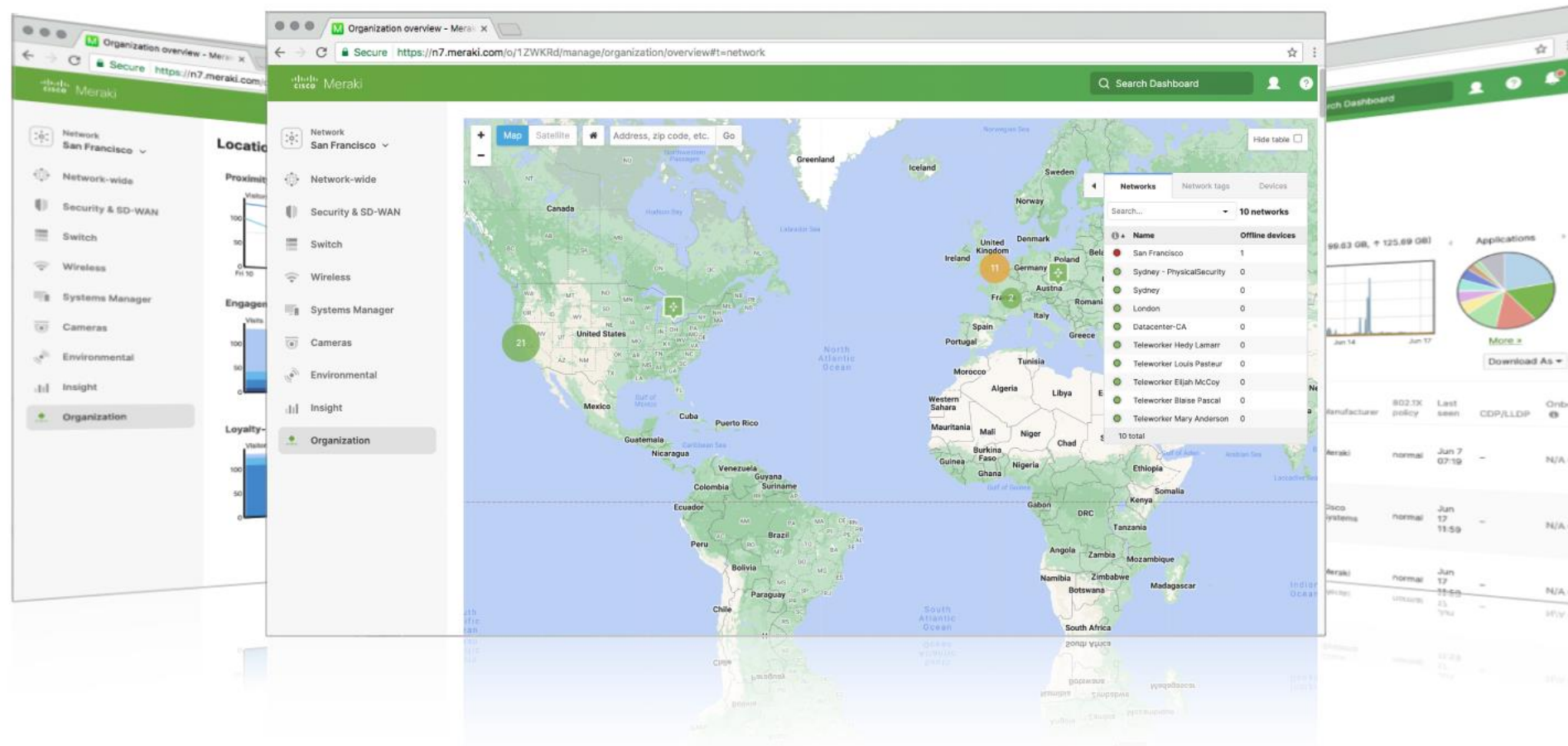
**Online support** cases opened via email or Dashboard allows Meraki support to quickly locate and solve issues

On-going cases can be managed, updated, or audited directly in the Dashboard (**Help > Cases**)

24 x 7 telephone & e-mail support  
technical assistance centers based in  
**San Francisco, Sydney, Shanghai, London, and Chicago**



# Dashboard Demo #3



## Dashboard

- Where to start
- What to look for
- What tools exist

## Key Takeaways

- ✓ Local Status Page
- ✓ Physical & UI elements that help and what they mean
- ✓ Tools, logs, and reports

## A Common Workflow

1. Waiting for sync
2. Rebooting as necessary
3. Proper troubleshooting progression



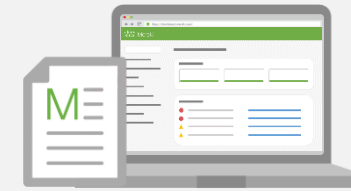
# Section 3 Review



## Training Objectives

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- Dashboard/cloud sync (configuration updates)
- Real-time diagnostic and local troubleshooting
- Where to look and what to look for (logs)
- Engaging Meraki Support (Help, Cases)



## Lab Learnings

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- Wireless reconfiguration and fine-tuning
- IP/VLAN reassignment
- Packet capture inspection
- Troubleshooting offline, unreachable, and restricted traffic flow of devices

# Knowledge Check!

# Knowledge Check #5

**Where can administrators and operators go to open, manage, or review cases with the Meraki support team?**

- A. The Meraki portal within Salesforce.com
- B. The Cisco TAC Service Request System
- C. Through the live Cisco Meraki help desk chat at Meraki.com
- D. The Help section within the Meraki Dashboard

# Knowledge Check #6

**Which of the following are live, remote troubleshooting tools available directly within the Meraki Dashboard (Choose THREE)**

- A. Packet capture
- B. Flexible Netflow
- C. Debug commands
- D. Remote device reboot
- E. Cable test tool
- F. Virtual breakout boxes

# Open Lab



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THANK YOU