



**Blue River  
Experts**

Member of the Art of Innovation Network

## IMPLEMENTING AND CONFIGURING CISCO MERAKI SOLUTIONS WORKSHOP

Version 2.4

## 1 Course Overview

This 5-day bootcamp provides students with the skills to configure, optimize, and troubleshoot all important Cisco Meraki products like the security appliance platform (MX), the switching platform (MS), the wireless platform (MR), Meraki Cameras (MV), Meraki Sensors, and Meraki Insight Network Visibility & Traffic Analytics. Students will also gain detailed knowledge of the Meraki dashboard and will learn how to automate Meraki networks.

**Please note, this workshop is based on real-world use cases and deployment experiences that also will be discussed with the students. We will point out real-life deployments whenever discussing topics or performing practical exercises. This will enable students to conduct POV / POC events for verifying business cases after attending this workshop.**

## 2 Who Should Attend

IT staff, network and systems engineers interested in comprehensive knowledge of all Meraki products and solutions.

## 3 Prerequisites

Before taking this course, you should have earned CCNA certification or be familiar with:

- Network Fundamentals
- IP Addressing and Subnets
- Routing and Switching Technology
- Wireless Networking Concepts and Terminology

## 4 Why Attend a Blue River Experts Course

Our courses are not delivered by instructors but by consulting system engineers who have a vast experience regarding real life design, deployment, and troubleshooting of actual customer installations. Besides delivering courses, our engineers are usually designing and deploying large enterprise solutions or performing real world POVs (proof of value) and POCs (proof of concept) for large customers. We are often requested and contracted by product vendors to help customers making buying decisions based on their particular use case. This allows us to discuss real world use cases, designs, and operational situations with our students.

If you would like to get educated by experts who will explain to you the whole life cycle from day 0 to day 2 as they have comprehensive knowledge from having written numerous business requirements documents, customer requirements documents, high level design and detailed design documents and having deployed and troubleshooted many customer installations then you should choose to attend one of our courses.

## 5 Course Objectives

After completing this course, students will be able to:

- Understand various use cases and design the best solution for a given enterprise customer
- Conduct a related POV / POC to allow the customer to verify their particular business case
- Design, deploy, and monitor Cisco Meraki switches and wireless products
- Integrate with other Cisco solutions like Identity Service Engine (ISE), Cisco Umbrella, etc.
- Diagnose and resolve most user and network issues in enterprise scale deployments

## 6 Course Details

### 6.1 Introduction to Meraki

#### 6.1.1 Why Cisco Meraki

- The Meraki Mission
- Cloud Managed Networking Architecture
- Benefits of a Cloud Based Solution
- The Meraki Full Stack: New and Unique Value Proposition
- Meraki Deployment
- Use Cases: Why Customers choose Meraki

#### 6.1.2 Meraki Product Overview

- Meraki MS Switches
- Meraki MR Wireless Access Points
- Meraki MX Security and SD-WAN Appliances
- Meraki MV Vision Security Cameras
- Meraki System Manager (SM)
- Meraki MT Sensors Access Points
- Cisco Meraki Insight

#### 6.1.3 Meraki API Overview

#### 6.1.4 Meraki Licensing and Support

- Meraki Licensing
- Enterprise Support and Warranties
- Cisco Meraki Documentation

### 6.2 Cloud Management with the Meraki Dashboard

#### 6.2.1 Overview of the Meraki Dashboard

- The Cisco Meraki Dashboard
- Dashboard: Organizational Structure
- Out-of-Band Cloud Management
- Loss of Connectivity to the Cisco Meraki Cloud
- Meraki Dashboard Logins
- Create Dashboard Accounts and Organization
- MSP Logins – Manage Multiple Organizations
- Modify an Organization
- View Organizations Health
- Meraki Dashboard Best Practices
- Dashboard Search
- Meraki Help

#### 6.2.2 Organization-Wide Settings

- Configuring Organizational Wide Settings
- Using Configuration Sync to View and Copy Settings
- Administrators
- Configuring and Monitoring Licensing
- Creating Bulk Networks
- Creating and Managing Networks (Sites)
- Managing the Meraki Inventory

### 6.2.3 Monitoring

- Overview
- Change Log, Login Attempts
- Monitoring the Security Center
- Using Location Analytics
- Monitoring VPN Status
- Scheduling and Managing Firmware
- Using the Summary Report

### 6.2.4 Creating and Managing Configuration Templates

- Understand Configuration Templates
- VLAN Templates

### 6.2.5 Configuring Network-Wide Settings

- Traffic Analysis
- Location and Scanning
- Configuring CloudShark for Capturing Traffic
- Manage the Local Status Page
- Manage Syslog, SNMP, Location, and NetFlow Services
- Managing Network Admins and Guest Ambassadors
- Managing Network Users
- Managing Port Management Privileges
- Configuring Group Policies
- Adding Devices to the Network

### 6.2.6 Monitoring Networks

- Clients, Traffic Analytics
- Displaying and exploring the Meraki Topology
- Performing Packet Captures
- Using the Event Log to Perform Troubleshooting

## 6.3 Module 3: Meraki MX Security

### 6.3.1 Meraki MX Overview

- One Unified Platform
- Complete Connectivity and Threat Management Solutions
- Security Integrations / Interoperability
  - Advanced Malware Protection for Meraki MX
  - Umbrella Integration
  - DNS / Web Layer Security Solutions Overview
  - Cisco Talos Threat Intelligence
- SD-WAN Solutions
  - Reliable and Cost-Effective Connectivity with SD-WAN
  - Automated Site-to-Site VPN (Auto VPN)
  - VPN Options
  - High Availability and Path Redundancy
  - SD-WAN Functionality for the Branch
  - VPN Health, Bandwidth, and Performance Monitoring
- MX Appliance Licensing
- MX Sizing Guide

### 6.3.2 Basic Settings

- Configuring the Local Status Page
- Adding the Appliance to the Network
- Device Configuration
- Device Tags and Notes
- Configuring Addressing and VLANs
  - Pass-Through or VPN Concentrator Mode vs NAT Mode
  - Creating VLANs
- DHCP Server Configuration and Options

### 6.3.3 Meraki Firewall Configuration

- Firewall Basics
- Layer 3 vs Layer 7 Firewall
- Firewall Outbound Rules
- Security Appliance Services
- Layer 7 Firewall Rules
- Content Filtering
  - Adult Content Filtering
  - Gaming Content Filtering
  - Social Site Content Filtering
- Geo-IP Based Firewalling
- Nat Configuration

### 6.3.4 Meraki Site-to-Site VPN

- What is a VPN
- Site-to-Site Hub Configuration
  - Hub Configuration
    - Hub Configuration with an Exit Hub
  - Spoke Configuration
    - Split Tunnel vs Full Tunnel
- VPN Firewall Rules
- Monitor VPN Status

### 6.3.5 One-Arm VPN Concentrator Configuration

- OSPF Configuration

### 6.3.6 SD-WAN and Traffic Shaping

- Uplink Selection
- Policy Based Routing
- Performance Based Routing
- Traffic Shaping Rules

### 6.3.7 Meraki Client VPN

- Enable Client VPN
- Configure Client VPN
- Client VPN Authentication Methods
- VPN Clients
- Enable the AnyConnect Client VPN
- AnyConnect Client VPN Authentication Methods

#### 6.3.8 Meraki Active Directory Integration

- Active Directory Authentication
- Active Directory integration with Group Policy

#### 6.3.9 Meraki Threat Protection

- Threat Protection - AMP
- Threat Protection – IDS/IPS
- Threat Protection – Umbrella Protection

### 6.4 Meraki MS Switching

#### 6.4.1 Overview and Features

- Avoiding Downtime, Client Disruption
- Cloud Managed from Access through Aggregation
- Ongoing Feature Updates Delivered from the Cloud
- MS Feature: Multigigabit Ethernet
- Integrated Event Logs, Alerts, and Anomaly Detection
- Advanced Network-Wide Security

#### 6.4.2 Meraki Switching Platforms

- Layer 2 Access Switches
- Layer 3 Access Switches
- Distribution Switches
- Prepare for 802.11AX with Meraki MS355 Switches

#### 6.4.3 Switch Configuration

- Using Tags to Search, Monitor and Configure Meraki Switches
- Add a Switch to the Network
- Meraki Switch Settings
- VLAN Configuration
- Configuring Layer 2 and Layer 3
- Configuring Static Routing
- Configuring Access Control Lists (ACL)
- Configuring Access Policies (802.1X)
- Integrating Radius and ISE with Access Policies

#### 6.4.4 Switch Stacks

- Stacking Mechanisms and Availability
- Meraki Stacking: Virtual and Physical
- Cloud-Managed Physical Stacking
- Flexible Stacking
- Provisioning Switch Stacks
- Create the Switch Stack
- Delete the Switch Stack
- View the Stack
- Configuring Ports on a Stack Switch Ports
- Blink the Switch
- Add and Remove Members to the Stack
- Clone and Replace a Member of the Stack

#### 6.4.5 Port Configuration

- Configuring Ports on a Switch
- Configuring Ports using Ranges and Search Criteria
- Configure Link Aggregation on a Switch
- Configuring Port Schedules
- Configuring Access Policies
- Configure Port Mirroring

#### 6.4.6 Meraki Multicast Configuration

- How Does IP Multicast Work?
- Internet Group Management Protocol
- Enable Multicast Routing
- IGMP Snooping Querier
- Multicast Routing

#### 6.4.7 Open Shortest Path First (OSPF)

- OSPF Areas
- OSPF LSA Types
- Normal Area
- Stub Area
- Not-So-Stubby Areas (NSSA)
- Open Shortest Path First (OSPF) Routing
- Create OSPF Areas
- Configure Interfaces into OSPF Areas
- OSPF for Static Routes
- OSPF Timers
- OSPF Authentication
- View OSPF Routes and OSPF Neighbors

#### 6.4.8 Switch Monitoring

- Monitoring Switch Status
- Monitoring Switch Port Status
- Monitoring Real-time and Historical Data
- Monitoring DHCP on the Switch
- Monitoring Power
- Monitoring DHCP
- Monitoring Event Logs

#### 6.4.9 Firmware Upgrades

## 6.5 Meraki MR Wireless

### 6.5.1 Overview and Features

- MR Wireless Access Points
- Meraki Built-In Location Analytics
- Granular Control Over Bandwidth, Apps, and Client Devices
- MR Feature: Multigigabit Ethernet
- MR Feature: Mesh Routing
- MR Dedicated Scanning Radio
- Secure Guest Wireless
- Built-In Bluetooth Beacons
- Bluetooth Beacons
- Built-In Meraki Location Heatmap
- High Density Support
- ISE Integration
- Guest Self-Registration
- Cisco Umbrella and Cisco Meraki
- DNS/Web-Layer Security
- Zero Touch Provisioning
- Meraki Application Program Interfaces (APIs)
- Licensing and Support

### 6.5.2 Meraki Product Portfolio

- Meraki MR Wireless Access Point Models Indoor
- Meraki MR Wireless Access Point Models Outdoor
- Directional Antennas
- AP Adapter Options
- Multi-Color LED Access Points

### 6.5.3 Designing a Meraki Wireless Architecture

- Wireless Standards
- Meraki RF WLAN Design
- Site Survey / Site Survey Tools
- Mounting APs Best Practices
- Meraki Design Principles
- Meraki Roaming Design
- Switch Design for Meraki Wireless Networks
- Designing Meraki Network Services
- Organization and Network Design
- Migrating Cisco DNA APs to Meraki Dashboard

### 6.5.4 Wireless Configuration

- Connecting Access Points to the Network
- Configuring Basic information including Tags
- Configuring Wireless RF Radio Settings
  - Auto RF
  - Transmit Power Control
  - Channel Selection
  - Band Steering
  - Client Balancing



- Configuring Floor Plans
- Placing Access Points on the Floor Plans
- Configuring RF Channel and Power Settings

#### 6.5.5 SSID Configuration

- Provisioning SSIDs
- Open with Splash Pages
  - Click-Through
  - Systems Manager Sign-in
  - Facebook Sign-in
  - Google Sign-in
  - SMS Authenticated
  - Billing Configuration for SSIDs
- Using Pre-Shared Keys with WPA2
- Using WPA2-Enterprise SSIDs with 802.1X
  - RADIUS
  - Cisco ISE
- Configuring Layer 3 Roaming
- Configuring ISE Integration with Access Policies
- Configuring Access Policies for Wireless
- MAC-Based Access Control Filtered SSIDs
- Firewall & Traffic Shaping Configuration
  - Block Local Network for Guests
  - Layer 3 Firewall Rules
  - Block Applications
- Traffic Shaping Rules per SSID

#### 6.5.6 Bluetooth Settings

- Bluetooth Low Energy (BLE)
- Bluetooth Scanning
- Bluetooth Clients
- Bluetooth Beaconing
- Asset Tracking

#### 6.5.7 Wireless Radio Settings

- Radio Settings
- Channel Planning
- Auto RF - Channel Changes
- RF Profile
- Client Balancing

#### 6.5.8 Monitoring

- Monitoring AP Status
- Using Meraki Wireless Health
- Monitoring Clients
- Monitoring RF Metrics
- Monitoring the RF Spectrum
- Monitoring SSID Availability

#### 6.5.9 Troubleshooting

- Using Heatmaps to Troubleshoot RF Issues
- Identify Problematic Areas
- Signal Attenuation
- Ping and Traceroute
- Reboot Device
- Blink LEDs
- Throughput
- Checking PCI Compliance
- Using the Event Log for Troubleshooting

### 6.6 Meraki MV Camera

#### 6.6.1 Meraki MV Security Cameras Product Family

- Use Cases
- Video Surveillance Solutions
- Meraki Mobile App
- Licensing
- Architecture
- Camera Video Display
- Object Detection
- Meraki Sense
- Camera Intelligence Training
- Cloud Archive
- Secure Encrypted Video

#### 6.6.2 Meraki MV Camera Models

- MV Camera Models
- Indoor Models
- Outdoor Models
- Meraki MV2 Flexible Camera

#### 6.6.3 Meraki MV Camera Accessory

#### 6.6.4 Network Wide Settings for NV Cameras

- Camera Lights and Frequency
- Camera Alerts
- Event Log
- Camera Map and Floor Plans

#### 6.6.5 Security Role Configuration for MV Cameras

- Role-Based Access
- Organizational Camera Administrators
- Network Camera Administrators
- Verify Access to Camera Network

#### 6.6.6 Switch Configuration for MV Cameras

- Port Information
- Camera Port Status

#### 6.6.7 Monitoring MV Cameras

- View Camera Status
- Camera Recording Schedule

#### 6.6.8 Wireless Role Configuration for MV Cameras

- Integrated Wireless for MV Cameras
- Wireless Details
- Wireless Profile
- Select and Apply Wireless Profiles for Camera

#### 6.6.9 Viewing Video

- Retroactive Video Search
- Video Viewing
- Motion Search
- Export / Screen Shot
- Video Analytics – People Count
- Video Analytics – Motion Heatmaps

#### 6.6.10 MV Camera Intelligence Training

##### 6.6.11 MV Camera Initial Configuration

- Camera Name
- Analytics
- Physical Address
- Network Settings
- Location Map
- Video Settings
- Quality and Retention
- Low Light Mode
- Motion Alerts
- Wireless Profiles

##### 6.6.12 MV Video Access

##### 6.6.13 Meraki Export

##### 6.6.14 MV Video Wall

##### 6.6.15 Meraki Vision

- Improvements over Dashboard
- Search for cameras, select cameras
- Site View, Camera View
- Video Wall

##### 6.6.16 MV Cameras APIs

- Use Cases
- MV Sense
- MV Sense Data Types
- REST vs MQTT (MQ Telemetry Transport) APIs
- Zones
- Optimized Video Retention
- Full Frame Snapshots via API

#### 6.6.17 Meraki Magic

- Smart Codec
- Network Bandwidth Savings

### 6.7 Meraki Sensors

#### 6.7.1 What is - Meraki Sensors?

- Meraki Sensors family
- Physical Spaces
- Use Cases - Consuming Telemetry at Scale
- Connectivity
- Device Security
- Room Usage
- Sensor Sight
- Volatile Organic Compounds (VOC)
- Particulate Matter (PM2.5)
- Smart Automation Button

### 6.8 Meraki Insight Network Visibility & Traffic Analytics

#### 6.8.1 Meraki Insight Introduction

- Meraki Insight Collector
- Meraki Insight Infrastructure
- Meraki Insight Scenario

#### 6.8.2 Meraki Insight Licensing

- Licensing Menu
- Add Meraki Insight to your Organization
- Meraki Insight licensing for MX Networks
- Meraki Insight Menu

#### 6.8.3 Meraki Insight Web App Health

- Configure Web Application
- Web Application Performance
- WAN Health
- VoIP Health

#### 6.8.4 Meraki Insight Alerting

### 6.9 Automating Meraki Networks

- Introducing Meraki Automation
- Dashboard APIs
- Setting up Postman for Meraki

## 7 Lab Exercises

### 7.1 Generic Configuration Tasks

- Creating a Dashboard Account
- Configure Organizational Settings
- Add Devices to your Organization
- Create Networks
- Manage Network-Wide Settings
- Create Group Policies
- Manage Firmware Upgrades
- Create Templates
- Manage VLAN Templates
- Bind Templates to Networks

### 7.2 Configuring MX Appliances

#### 7.2.1 Basic Configuration Tasks

- Viewing / Verifying License Information
- Bootstrapping the Local Status Page
- Creating a Network
- Claiming / Adding Devices
- General Settings
- Ensuring WAN Connectivity using PING
- Rebooting the Meraki Security Appliance and other useful Tools

#### 7.2.2 Configuring the MX Appliance

- Configuring VLANs and Layer 3 Interfaces
- Configuring Layer 3 Firewall Rules
- Configuring Layer 7 Firewall Rules
- Configuring Content Filtering
- Configuring Traffic Shaping
- Configuring SD-WAN Policies for Traffic Preference
- Configuring Client VPN against Meraki Cloud Directory
- Configuring Client VPN against Active Directory
- Configuring Site-to-Site VPN
- Integrating Meraki MX Appliance with Active Directory
- Identity Based Group Policies
- Create / Configure Splash Pages

#### 7.2.3 Content Filtering and Threat Protection

- Adult Content Filtering
- Gaming Content Filtering
- Social Site Content Filtering
- Threat Protection – AMP
- Threat Protection – IDS/IPS

#### 7.2.4 MX Verification and Troubleshooting

- Appliance Status
- Site-to-Site VPN
- Firewall Settings
- Routing Table
- Using Packet Capture

### 7.3 Configuring MS Switches

#### 7.3.1 Switch Configuration

- Basic Switch Settings
- Spanning Tree
- DHCP Servers and ARP
- Routing and DHCP Servers
- OSPF Routing
- Access Control List (ACL)
- Access Policies
- Packet Captures
- Port Policies

#### 7.3.2 Configure Switches Using a Network Template

#### 7.3.3 Configuring Ports

- Trunk Ports, Access Ports
- Link Aggregation
- Port Schedules
- Port Mirroring

#### 7.3.4 Switch Monitoring

- Switch Status, Port Status
- Real-Time and Historical Data
- DHCP and Routing
- Event Logs

#### 7.3.5 Troubleshooting Tools

- Packet Captures, Cable Tests, Port Reset
- Throughput
- ARP and Route Tables
- Ping and Traceroute

#### 7.3.6 Managing Firmware Upgrades

## 7.4 Configuring MR Wireless Devices

### 7.4.1 Configuring Meraki Access Points

- Claiming your Devices and adding Devices to your Organization
- MR Access Point Management
- Accessing Meraki MR Devices – Local Status Page
- Troubleshooting the Local Status Page
- Checking Status of Meraki MR Devices Health and Connectivity
- Configuring Templates and Deploying / Managing Meraki MR Devices through Templates
- Unbinding Networks from a Template
- Deleting a Configuration Template
- Configuring Access Point Tags
- Organizing a Wireless Network with Multiple Access Points
- VLAN Tagging on Specific Access Points

### 7.4.2 Configuring SSIDs

- Provisioning SSIDs
- Open with Splash Pages
  - Click-Through
  - Systems Manager Sign-in
  - Facebook Sign-in
  - Google Sign-in
  - SMS Authenticated
  - Billing Configuration for SSIDs
- Using Pre-Shared Keys with WPA2
- Using WPA2-Enterprise SSIDs with 802.1X
  - Cisco ISE
- MAC-based Access Control Filtered SSIDs

### 7.4.3 Firewall & Traffic Shaping Configuration for Wireless

- Blocking the Local Network for Guests
- Layer 3 Firewall Rules
- Blocking Applications
- Traffic Shaping Rules per SSID
- Configuring Layer 3 Roaming
- Configuring ISE Integration with Access Policies
- Configuring Access Policies for Wireless
- Configuring Wireless RF Radio Settings
- Configuring Bluetooth for Analytics
- Guest Self-Registration
- Configuring Splash Pages
- Configuring Floor Plans
- Placing APs on the Floor Plans
- Configuring RF Channel and Power Settings
- Configure Air Marshal to Isolate Rogue APs and Clients

#### 7.4.4 Monitoring Meraki Access Points

- Monitoring AP Status
- Using Meraki Wireless Health
- Monitoring Clients
- Monitoring RF Metrics
- Monitoring the RF Spectrum
- Monitoring SSID Availability

#### 7.4.5 Troubleshooting

- Using Heatmaps to Troubleshoot RF Issues
- Identify Problematic Areas
- Signal Attenuation
- Ping and Traceroute
- Throughput
- Checking PCI Compliance
- Using the Event Log for Troubleshooting

### 7.5 Automation using Meraki APIs

This part of the lab is delivered as an instructor demo. Granting students access to APIs would be very risky as mistakes could mess up the complete lab setup.

- Meraki Dashboard API with Postman
- Meraki Organization and Networks Import into Postman
- Meraki Devices into the appropriate Networks using APIs
- Troubleshooting Meraki using APIs
  - Dashboard
  - Device Dashboard

### 7.6 Meraki MV Cameras

- Adding Cameras to a dedicated Network
- Configuring Users and Admins
- Camera Settings
- View Camera Events
- Searching Videos for Events
- Creating / Configuring Video Wall Boards
- Troubleshooting Camera Connectivity

### 7.7 Meraki Insight

- Configuring Web Application Health
- Configuring Alert Management for WAN Packet Loss
- Configuring Alert Management for WAN Utilization
- Configuring Alert Management for Uplink Latency
- Monitor WAN Health