Troubleshooting Cisco Wireless Enterprise Networks - On Demand (WITSHOOT 1.1)

Modality: On Demand

Duration: 24 Hours

CLC: 8 Units

About the course:

Upgrade your comprehension of Cisco innovations and items with e-learning offerings from Cisco and Cisco's approved learning accomplices. Courses of E-learning aims around the assortment of Cisco innovations to set you up for Cisco confirmation tests and to pick up Cisco item information. The e-learning offerings are made to be engaging and interactive for students who favor self-study.

Some Self-paced courses of Cisco give access to hands-on virtual lab works out, allowing you the chance to rehearse troubleshooting and configuration on genuine Cisco stages.

Course Objective:

- Troubleshoot Methodology
- Troubleshoot issues of AP Joining
- Troubleshoot Issues for Client Connectivity
- Locate and identify RF Interferences
- Troubleshoot issues for Client Performance
- Troubleshoot Issues for AP and WLC High Availability

Targeted Audience:

- Customers
- Channel Partners
- Employees

Prerequisite:

Basic understanding of:

- Cisco Identity Services Engine
- Cisco Prime Infrastructure
- Metageek Channelizer Software
- Control LAN Switching
- Basic QoS
- Protocol of Voice Signaling
- Application Control and Visibility

Course Outline:

Module 1: Identify Common Troubleshooting Approaches

Objective: Identify common troubleshooting approaches

Lesson 1: Describing Network Troubleshooting Methodology

Objective: Describe the network troubleshooting methodology and approaches

This lesson includes these topics:

- Describing Network Troubleshooting Methodology
    - Objective: Describe the network troubleshooting methodology
- Systematic Approach
- Preparing for Network Failure
- Structured Troubleshooting Methodologies
- Bottom-Up Approach
- Use of the Bottom-Up Approach
- Bottom-Up Approach: Example
- Top-Down Approach
- Use of the Top-Down Approach
- Top-Down Approach: Example
- Divide-and-Conquer Approach
- Use of the Divide-and-Conquer Approach
- Divide-and-Conquer Approach: Example
- Follow-the-Path Approach
- Follow-the-Path Approach: Example
- Documentation
- Summary
    - Objective:

Lesson 2: Describing Network Troubleshooting Tools and Resources

Objective: Describe network troubleshooting tools and resources

This lesson includes these topics:

- Define Common Show and Debug Commands
    - Objective: Describe common show and debug commands
- Debug Commands for Intercontroller Mobility Issues
- Describe Packet Captures
- Objective: Describe packet captures
- Using Packet Captures
- Sniffer Mode Setup
- Wireshark Configuration
- Configure SPAN and RSPAN
- Configure Switch Capture

- Discovery 1: Setting Up and Analyzing Packet Captures
  - Topology
  - Required Resources
  - Job Aid
  - Task 1: Set Up Access Point in Sniffer Mode
  - Task 2: Set Up Wireshark and Capture Packets
  - Task 3: Analyze Packets from a Capture File
  - Task 4: Lab Cleanup
- Discovery 2: Analyzing Switch Packet Capture of AP Joining a WLC
  - Topology
  - Required Resources
  - Job Aid
  - Task 1: Set Up Converged Access Wireshark Packet Capture
  - Task 2: View the AP Discovery/Join Packets from Wireshark
- Describe RF Spectrum Analysis
  - Objective: Describe RF spectrum analysis
- Spectrum Analysis Functions
- Monitor the Air Quality of Radio Bands
- Cisco CleanAir Detail
- Interference Device Report
- Air Quality and Device Trap Control
- Interference Reporting
- Unclassified Interference
- Cisco Spectrum Expert GUI
- Use Cisco Prime Infrastructure as a Troubleshooting Tool
- Objective: Use Cisco Prime Infrastructure as a troubleshooting tool
- Cisco Prime Infrastructure Troubleshooting Capabilities
- Cisco Prime Infrastructure Security Dashboard
- Describe Third-Party Tools
- Objective: Describe third-party tools
- Ekahau Troubleshooting Capabilities
- MetaGeek Troubleshooting Capabilities
- Network Viewing Tools
- Describe the WLCCA Tool
  - Objective: Describe the WLCCA
- Describe Message Logging
- Objective: Describe message logging
- Management > Logs > Message Logs
- Management > SNMP > General / SNMPv3 Users
- Management > SNMP > Communities and Trap Receiver
- Management > SNMP > Trap Logs
- Management > SNMP > Trap Controls
- Management > Tech Support > Controller Crash
- Management > Tech Support > AP Crash Log
- Management > Tech Support > System Resource Information
- Discovery 3: Viewing CleanAir Reports from Cisco Prime Infrastructure
  - Topology
  - Required Resources

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- - Job Aid
    - Task 1: Set Up Access Point for CleanAir
    - Task 2: View CleanAir Reports on Cisco Prime
  - Summary
    - Objective:

Module 2: Identify Core Wireless Infrastructure Issues

Objective: Identify core wireless infrastructure issues

Lesson 1: Troubleshooting Wireless-Related Wired Infrastructure Issues

Objective: Describe how to troubleshoot wired infrastructure that is related to wireless network

This lesson includes these topics:

- Describe Wireless-Related Wired Infrastructure Issues
  - Objective: Describe wireless-related wired infrastructure issues
- Describe and Troubleshoot IP, DHCP, and DNS Issues
  - Objective: Describe and troubleshoot IP, DHCP, and DNS issues
- DHCP and DNS Troubleshooting Best Practices
- Troubleshoot DHCP and DNS Issues
- CLI Command: debug dhcp message
- CLI Command: debug dhcp packet
- Controller > Internal DHCP Server > New or Edit
- DHCP Relay Suboptions: Introduction
- Cisco AireOS show and debug Commands
- CLI Command: show arp switch
- Cisco IOS XE show and debug Commands
- Describe and Troubleshoot VLANs and Trunks
  - Objective: Describe and troubleshoot VLANs and trunks
- Cisco IOS XE show and debug Commands
- Troubleshooting VLAN Issues
- Cisco IOS XE show and debug Commands
- Describe and Troubleshoot PoE
  - Objective: Describe and troubleshoot PoE issues
- Troubleshoot PoE Issues
- PoE Standards
- Current Implementations
- Impact of Adopting Newer PoE Capabilities
- Power Draw of Cisco Aironet 3700 Series Access Points
- 802.11ac-Ready Cisco Switches
- Cisco Aironet 3700 Series Access Points: Access Layer Switches
- Cisco Aironet 2700 Series Access Points: Power Requirements
- PoE with Aironet 3700 Series AP Using 15.4 W (802.3af)
- PoE with Aironet 3700 Series AP Using PoE+ (802.3at)
- Troubleshoot PoE Issues
- Identify an AP

- - Objective: Identify an AP
- Troubleshoot Cisco Catalyst 3650 and 3850 Series Switch Stacking Issues
  - Objective: Troubleshoot Cisco Catalyst 3650 and 3850 Series Switch stacking issues
- Troubleshoot Switch Stacking Issues
- Challenge 1: Troubleshooting Client DHCP Issues
  - Topology
  - Job Aid
  - Task 1: Resolve the Issue of a Client Not Getting an IP Address (Centralized Access on AireOS)
  - Task 2: Resolve the Issue of a Client Not Getting an IP Address (Converged Access on IOS-XE)
- Summary
  - Objective:

Lesson 2: Troubleshooting AP-to-Controller Issues

Objective: Describe how to troubleshoot AP-to-controller issues

This lesson includes these topics:

- Describe and Troubleshoot the CAPWAP AP Join Process
  - Objective: Describe and troubleshoot the CAPWAP AP join process
- Troubleshooting AP Discover and Join
- CAPWAP State Machine
- Troubleshoot AP-to-Controller Issues
  - Objective: Troubleshoot AP-to-controller issues
- Additional AP-to-Controller Issues
- Controller Discovery Issues: DHCP Option 43
- Controller Discovery Issues: Discovery Via DNS
- Describe Cisco WLC Tools
  - Objective: Describe Cisco WLC tools
- GUI Summary
- Command: show system
- AP Name Change and Join Stats
- Ping from Dynamic Interfaces (Extended Ping)
- CLI Command: debug ?
- Debug Filtering
- CLI Command: debug capwap
- Describe Best Practice Approaches for Troubleshooting
  - Objective: Describe Cisco WLC Example Scenarios
- Cisco AireOS show and debug Commands
- Common Issues with AP Joins
- Common AireOS show and debug Commands
- Troubleshoot DTLS Session Establishment Issues
- Troubleshoot DTLS Session Establishment: Certificate Issues
- Troubleshoot DTLS Session Establishment: Time Issues
- Describe Converged Access Scenarios
  - Objective: Describe converged access scenarios

- Describe Common Cisco IOS-XE show and debug Commands
- Common Reasons for AP Join Failure
- Best Practices for Troubleshooting AP Failover
    - Objective: Troubleshoot AP Failover
    - Objective: Describe how to troubleshoot AP failover
- Challenge 2: Troubleshooting AP Discovery and Join Failures
    - Topology
    - Job Aid
    - Task 1: Troubleshoot APs AP failing to Discover or Join the Converged WCM
    - Task 2: Troubleshoot APs AP Failing to Discover or Join the Centralized WCM
- Summary
    - Objective:

Lesson 3: Troubleshooting Cisco FlexConnect

Objective: Troubleshoot Cisco FlexConnect

This lesson includes these topics:

- Troubleshoot Cisco FlexConnect
- Objective: Troubleshoot Cisco FlexConnect
- Cisco Wireless Hardware Installation
- Important Concepts
- Cisco FlexConnect in Standalone Mode
- Cisco FlexConnect Fault Tolerance
- Troubleshoot Central or Local Switching Mode Errors
- Common Cisco AireOS and Switch show and debug Commands
- Summary
- Objective:
- Self-Check

Module 3: Identify Wireless Infrastructure Issues

Objective: Identify and describe wireless infrastructure issues

Lesson 1: Troubleshooting Client Connectivity Issues

Objective: Describe client connectivity troubleshooting

This lesson includes these topics:

- Describe Troubleshooting of Client Connectivity Issues
    - Objective: Describe troubleshooting of client connectivity issues
- Current State of the 2.4-GHz Spectrum
- Current State of the 5-GHz Spectrum in the United States
- Common Client Connection Utilities
- Troubleshooting WLAN Configuration Errors
- Common Client Problems

- Describe Troubleshooting of Client Connections
  - Objective: Describe troubleshooting of client connections
- Monitor > Clients > Client MAC Address
- Describe Other Tools
  - Objective: Describe other troubleshooting tools
- Command: show client detail
- Common Issues
- Spectrum Analysis
- Common Interference Devices and RF Propagation Issues
- Causes of Interference and Propagation Issues
- Command: debug client
- Debug Client Shows the AP
- Describe Third-Party Tools
  - Objective: Describe third-party troubleshooting tools
- Using Ekahau to Troubleshoot RF Signal Issues
- Troubleshoot End-to-End Issues
- Discovery 4: Check Client Speed/Throughput
  - Topology
  - Required Resources
  - Job Aid
  - Task 1: Check the Client Speed Using the Windows Wireless Client Tool
  - Task 2: Check the Client Throughput Using the Tamosoft Throughput Tester
- Summary
- Objective:

Lesson 2: Troubleshooting Client Performance Issues

Objective: Describe client performance troubleshooting

This lesson includes these topics:

- Describe Issues Affecting Client Performance
  - Objective: Describe issues that can affect client performance
- Common Client Performance Problems
- Cisco Aironet 802.11n and 802.11ac AP Comparison
- AP and Client Power Levels
- Power Levels and Client Density
- Signal Power vs. Coverage
- Enterprise WLAN Coverage and Capacity
- Developing an SSID Design Plan
- 802.11ac Channel and Enhancements
- Airtime Fairness
- Rate-Shifting Boundaries
- Describe Client Performance Troubleshooting Tools
  - Objective: Describe client performance troubleshooting tools
- Using Ekahau to Troubleshoot Performance
- Troubleshoot Throughput and Data Rate Issues
- Describe Cisco Wireless LAN Controller CLI Tools

  - ○ Objective: Describe Cisco Wireless LAN Controller (Cisco WLC) CLI tools
- Summary
  - ○ Objective:

Module 4: Identify Wireless Security Issues

Objective: Identify wireless security issues

Lesson 1: Troubleshooting Client Authentication Issues

Objective: Describe how to troubleshoot client authentication issues

This lesson includes these topics:

- Best Practice Approaches for Troubleshooting
  - ○ Objective: Describe client authentication issues and explain how to troubleshoot them
- Troubleshoot Client Authentication Issues
  - ○ Objective: Describe client authentication issues and explain how to troubleshoot them
- Common Issues with Client Authentication
- CLI Command debug dot11
- CLI Command debug dot1x
- CLI Command debug aaa
- Mobility Troubleshooting CLI Commands
- Voice Troubleshooting CLI Commands
- Example Scenarios
  - ○ Objective: Present some examples of client authentication issues
- Challenge 3: Verifying Client Authentication Issues Using Prime Troubleshooting Tools
  - ○ Topology
  - ○ Job Aid
  - ○ Task 1: Use Prime to Verify the failure/success of a Client Using WPA2-PSK Authentication
  - ○ Task 2: Use Prime to Verify the failure/success of a Client Using 802.1X Authentication
- Discovery 5: Using Debug to Troubleshoot a Client with 802.1x Authentication
  - ○ Topology
  - ○ Required Resources
  - ○ Job Aid
  - ○ CLI Command List and Controller GUI Navigation Support
  - ○ Task 1: Setting Up the WLC and Client for 802.1x Authentication
  - ○ Task 2: Debugging the 802.1x Authentication
- Summary
  - ○ Objective:

Lesson 2: Troubleshooting Guest Access Issues

Objective: Describe guest access issues and troubleshooting approaches

This lesson includes these topics:

- Describe Guest Access
  - Objective: review guest access
- Auto-Anchor
- Web Authentication
- Troubleshoot Guest Access Issues
  - Objective: Describe guest access troubleshooting options
- Common Issues with Client Guest Access
- Troubleshoot Guest Access: WebAuth
- Common Issues with Guest Access Anchoring (Local and Central)
- Troubleshoot Guest Access: Mobility Groups
- Troubleshoot Guest Access: Mobility Anchor
- Troubleshoot Guest Access: mping, eping
- Challenge 4: Troubleshooting Guest Network Issues
  - Topology
  - Job Aid
  - Task 1: Resolve the Issue of Guests Not Being Able to Authenticate to the Network Using Web- Authentication (Centralized Access on AireOS)
  - Task 2: Resolve the Issue of Guests Not Being Prompted for Web Authentication. (Converged Access on IOS-XE)
- Summary
  - Objective:

Lesson 3: Troubleshooting Issues with RF-Related Security Threats

Objective: Describe issues with RF-related security threats and how to troubleshoot them

This lesson includes these topics:

- Common Issues with RF Security Threats
- Troubleshoot Issues with RF-Related Security Threats
  - Objective: Troubleshoot issues with RF-related security threats
- Common Issues with Rogue Devices
- Rogue Access Points and Clients
- Monitoring Rogue APs Using Cisco WLC GUI
- Monitoring and Managing Rogue Devices Using Cisco Prime Infrastructure
- Cisco Prime Infrastructure Security Dashboard
- Rogue Clients and APs
- Hacker APs
- Denial of Service
- Over-the-Air Attacks
- Interference
- Troubleshoot Issues with Non-802.11 Interferers
  - Objective: Troubleshoot issues with non-802.11 interferers
- Non-802.11 Interference: Bluetooth Example
- Non-802.11 Interference: Microwave Oven Example
- Non-802.11 Interference: Cordless 2.4-GHz Phone Example
- Non-802.11 Interference: Wireless Video Camera Example
- Troubleshoot Non-802.11 Interference Issues

- Challenge 5: Spectrum Analysis Using metageek Chanalyzer
  - Topology
  - Job Aid
  - Task 1: Setup Access Point for SE-Connect Mode
  - Task 2: Configure metageek Chanalyzer - Spectrum Analyzer software
  - Task 3: Analyze RF Captures Information into metageek Chanalyzer - spectrum analyzer software
- Discovery 6: Identifying Rogue APs and Clients Using WLCs and Prime Infrastructure
  - Topology
  - Required Resources
  - Job Aid
  - Task 1: Identify Rogue APs and Clients on a WLC
  - Task 2: Identify Rogue APs and Clients on Prime Infrastructure