

## ENWLSI

# Implementing Cisco Enterprise Wireless Networks

40 horas

Enterprise Network

Cisco

Cisco Continuing Education Credits

**40 CE Credits**

## INTRODUÇÃO

Implementing Cisco Enterprise Wireless Networks (ENWLSI) v2.0 is a 5 day training designed to prepare network professionals to implement network settings to provide a secure wireless network infrastructure and troubleshoot any related issues.

The goal is help prepare network professionals to secure the wireless infrastructure, implement the wireless infrastructure and use Cisco Identity Service Engine (ISE), Cisco Prime Infrastructure (PI), Cisco DNA Center, Cisco Spaces, and Cisco Connect Mobile Experience (CMX) to monitor and troubleshoot network issues.

This course helps students prepare for the CCNP Enterprise Wireless Implement (300-430) certification.

ENWLSI v2.0 is a major update of the content that was originally covered in the ENWLSI v1.1 course. The course now focuses on IOS XE wireless deployments using the Catalyst 9800 WLC.

The course now includes topics on Cisco DNA Center and Cisco Spaces. Two Cisco Prime Infrastructure labs have been replaced with a single simulated activity. In addition, four Cisco DNA Centre simulated activities have been added.

**IMPORTANTE:** para turmas fechadas, o treinamento poderá ser adaptado e customizado as necessidades do cliente.

## OBJETIVO DO CURSO

After taking this course, you should be able to:

- Implement network settings to provide a secure wireless network infrastructure;
- Troubleshoot security issues as they relate to the wireless network infrastructure;
- Implement a secure wireless client and troubleshoot wireless client connectivity issues;
- Implement and troubleshoot QoS in wireless networks;
- Implement and troubleshoot advanced capabilities in wireless network services.

## **PÚBLICO-ALVO**

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Professionals interested in knowing and implementing solutions using the Cisco Wireless portfolio.

This course also helps prepare student to take the Implementing Cisco Enterprise Wireless Networks (300-430 ENWLSI) exam, which is part of the new CCNP® Enterprise.

## **PRÉ-REQUISITOS**

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Before taking this course, you should have:

- General knowledge of networks;
- General knowledge of wireless networks;
- Routing and switching knowledge.

For reference only: the following Cisco courses can help you gain the knowledge you need to prepare for this course:

- Implementing and Operating Cisco Enterprise Network Core Technologies (ENCOR)
- Understanding Cisco Wireless Foundations (WLFNDU)

## Course Introduction

- Overview
- Course Goal and Objectives
- Course Flow
- Learner Introductions

## Secure the Wireless Network Infrastructure

- Explain how to secure the wireless network infrastructure
- Device Administration
- Security Best Practices for Administrative Access to Cisco WLC
- TACACS+ Overview
- Provide TACACS+ overview
- Cisco WLC Configuration for TACACS+
- Role-Based Access Control on Cisco ISE
- Explain role-based access control in Cisco ISE
- AP Configuration for Management
- Explain how to configure access to the access point

## 802.1X Authentication

- Explain the 802.1X authentication process
- AP Configuration for 802.1 X Authentication
- Explain how to configure Access Points for the 802.1X authentication
- Cisco ISE Configuration for AP 802.1X Authentication

## Monitor and Troubleshoot Wireless Networks

- Defining Network Troubleshooting Techniques
- Structured Troubleshooting Methodologies
- Troubleshooting Access Point Join Issues
- Troubleshooting CAPWAP Access Point Discovery Issues
- Troubleshooting CAPWAP Access Point DTLS Issues
- Describe CAPWAP access point DTLS issues troubleshooting
- Troubleshooting CAPWAP Access Point Join Issues
- Tools for Troubleshooting Access Point Issues

## Monitoring Wireless Network

- Describe how to monitor the network for rogue devices
- Monitoring and Managing RF Interferers on Cisco WLC
- Describe how to monitor and manage RF interferers on Cisco WLC
- Monitor Wireless Networks with Cisco Prime Infrastructure
- Explain how to monitor wireless networks with Cisco Prime Infrastructure
- Cisco WLC Configuration for Cisco Prime Infrastructure
- Describe how to implement Cisco Prime Infrastructure
- Add New Devices to Cisco Prime Infrastructure
- Credential Profiles
- Discover Devices with Discovery Settings
- Add and Synchronize a Device
- Add Access Points to Maps / Add Access Points to the Floor
- Monitor Wireless Clients
- Reports in Cisco Prime Infrastructure

- Create, Schedule, and Run a New Report
- Combine Reports in Cisco Prime Infrastructure
- Create Custom Reports
- Customize Report Results
- Schedule Reports in Cisco Prime Infrastructure
- Enhanced Client Information with Cisco ISE
- Add Cisco ISE to Cisco Prime Infrastructure
- Location Details with Cisco CMX
- Add Cisco CMX to Cisco Prime Infrastructure
- Monitor Wireless Networks for Rogue Devices with Cisco Prime Infrastructure
- Configure Rogue Rules on Cisco Prime Infrastructure
- Use Maps in Cisco Prime Infrastructure to Locate Rogue Access Points
- Monitor and Manage RF Interferers on Cisco Prime Infrastructure

### **Monitor Wireless Networks with Cisco Catalyst Center**

- Explain how to observe wireless network with Cisco DNA Center
- Adding Devices to Cisco Catalyst Center
- Adding Access Points to Maps
- Add Access Points to a Map
- Add Planned Access Points to a Map
- Assign Actual Access Points to Planned Access Points
- Position an Access Point on a Map
- Edit an Access Point
- Edit Multiple Access Points
- Removing Access Points and PAPs From a Map
- Monitoring Wireless Clients
- Enhanced Client Information with Cisco ISE
- Location Details with Cisco Spaces or Cisco CMX
- Explain location details with Cisco Spaces or Cisco CMX
- Troubleshooting Access Point and WLC Issues with Cisco DNA Center Assurance
- Enhanced Network Insights with Cisco AI Network Analytics
- Reports in Cisco DNA Center
- Monitoring the Wireless Network for Rogue Devices with Cisco DNA Center
- Monitor the Rogue Management and aWIPS Dashboard
- Obtain Rogue Access Point Details from the Threat 360° View
- Build and Deploy Rogue Management and aWIPS Workflow
- Rogue Access Point Containment on Wireless Network
- Monitoring Radio Frequency Interferers on Cisco DNA Center

### **Implement 802.1X Authentication**

- IEEE 802.1 X Overview
- Explain how to implement 802.1X authentication
- AAA-Based Wireless Security on Cisco WLC
- Explain how to implement AAA-based wireless security on Cisco WLC
- Configure a RADIUS Server on the Cisco WLC (Cisco IOS XE)
- Configure the RADIUS Server Group on the Cisco WLC (Cisco IOS XE)
- Configure the AAA Method List on the Cisco WLC (Cisco IOS XE)
- AAA-Based Wireless Security on Cisco ISE
- WLAN for 802.1X on Cisco WLC
- Configure WLAN for 802.1X on Cisco WLC

- Create a VLAN
- Configure a Policy Profile
- Wireless Client for 802.IX Authentication
- Configure Wireless Client for 802.IX Authentication
- AAA Override on Cisco WLC
- AAA Override on Cisco ISE
- Create a Policy Set on Cisco ISE
- Configure Authorization Policies

### **Configure Cisco FlexConnect**

- Cisco FlexConnect Overview
- Cisco FlexConnect Configuration on Cisco WLC
- Cisco FlexConnect Authentication Configuration
- Cisco FlexConnect Identity-Based Networking
- Split Tunneling Configuration for Cisco FlexConnect
- Cisco FlexConnect Access Points Upgrade
- OfficeExtend Configuration

### **Implement Guest Access**

- Guest Services in the Wireless Network
- Defining Guest Users
- Central Web Authentication
- Cisco WLC Configuration for Centralized Web Authentication
- Create WLANs
- Create Policy Profiles
- Apply the Tag to the Access Point
- Cisco IOS XE Redirect ACLs
- Cisco ISE Configuration for Centralized Web Authentication
- Create an Authorization Profile
- Create an Authentication Rule
- Create an Authorization Policy
- Access Control for Guest Traffic
- Configure Self-Registered Guest Flow
- Set Up Cisco ISE Sponsor Portal

### **BYOD Overview**

- Explain the basics of BYOD
- BYOD Device Onboarding
- Cisco ISE Configuration for BYOD
- BYOD Portal
- My Device Portal

### **Monitor and Troubleshoot Client Connectivity**

- Troubleshooting Client Connectivity
- Troubleshooting Client Authentication Issues
- Troubleshooting Client Connectivity on Cisco WLC
- Tools for Troubleshooting Client Connectivity on Cisco WLC
- Issues That Affect Client Performance
- Wireless Coverage and Capacity
- Enhancing Client Performance

- Troubleshooting Client Throughput and Data Rate Issues

### **Implement QoS in Wireless Networks**

- Describe how to implement QoS in wireless networks
- Describe QoS In wireless networks
- Traffic Classification and Marking
- Explain traffic classification and marking QoS
- Congestion in the Wireless World
- IEEE 802.11 QoS Fundamentals
- Cisco WLC Configuration to Support Voice Traffic
- Enable QoS
- Wireless Utilization Optimization with Cisco Air Time Fairness
- Configure Air Time Fairness
- Wireless Utilization Optimization with QoS Profiles
- Wireless Utilization Optimization with Cisco Fastlane

### **Implement Cisco AVC in Wireless Networks**

- Application Visibility and Control
- Describe Cisco AVC implementation in wireless networks
- Cisco AVC on Cisco WLC
- Cisco AVC Configuration on Cisco WLC

### **Implement Multicast Services**

- Multicast Services on Cisco WLC
- Multicast Forwarding on Cisco WLC
- Multicast Configuration on Cisco WLC
- Multicast DNS Service
- mDNS Configuration
- Cisco Catalyst Center Service for Bonjour
- Describe Cisco Catalyst Center Service for Bonjour
- Cisco Media Stream
- Cisco Media Stream Configuration

### **Troubleshoot QoS**

- Explain the QoS troubleshooting process
- QoS Issues in the Wireless Network
- QoS Verification and Troubleshooting on Cisco WLC
- Issue Identification with Cisco AVC
- Cisco AVC Data in Cisco Catalyst Center
- mDNS Verification and Troubleshooting on Cisco WLC
- Cisco Media Stream Verification and Troubleshooting on Cisco WLC

### **Deploy Cisco Spaces and Cisco CMX**

- Describe how to deploy Cisco Spaces and Cisco CMX
- Location Services Overview
- Location Services Design
- Cisco Spaces Deployment
- Cisco Spaces and Cisco Catalyst Center Integration
- Cisco CMX Deployment
- Cisco CMX Integration with Cisco PI

- Cisco CMX Integration with Cisco Catalyst Center
- Cisco Hyperlocation Overview
- Cisco Hyperlocation Deployment
- Cisco Hyperlocation Configuration

### **Implement Location Services**

- Explain how to implement location services
- Detect and Locate Services in Cisco Spaces
- Prepare Maps for Location Services in Cisco Catalyst Center
- Detect and Locate Services on Cisco CMX
- Analytics Services in Cisco Spaces
- Analytics on Cisco CMX
- Presence Services on Cisco CMX
- Guest Services Implementation in Cisco Spaces
- Guest Services Configuration with Cisco Spaces
- Guest Services Implementation with Facebook on Cisco CMX

### **Monitor Wireless Networks with Cisco Spaces and Cisco CMX**

- Monitoring and Detecting Wireless Clients with Cisco Spaces
- Monitoring and Detecting Wireless Clients with Cisco CMX
- Monitoring and Locating Rogue Devices and Interferers with Cisco Spaces
- Monitoring and Locating Rogue Devices and Interferers with Cisco CMX
- Running Analytics on Wireless Clients with Cisco Spaces
- Running Analytics on Wireless Clients with Cisco CMX
- Troubleshooting Location Accuracy

### **Labs**

#### **Discovery 1: Lab Familiarization (Base Learning Lab)**

- Access and navigate the remote lab
- Task 1: Verify the Network Configuration of Campus-C9800-CL
- Task 2: Create a WLAN on Campus-C9800-CL
- Task 3: Associate the Wireless PC 1 with Cisco Catalyst 9800 WLC PSK WLAN

#### **Discovery 2: Configure Secure Management Access for WLCs and Aps**

- Configure secure port access for the APs
- Task 1: Configure the Cisco WLC for TACACS+
- Task 2: Configure Cisco ISE for TACACS+
- Task 3: Verify TACACS+ Access
- Task 4: Configure SSH Access to Aps

#### **Discovery 3: Capture a Successful AP Authentication**

- Configure secure port access for the APs
- Task 1: Capture a Successful Join from Cisco WLC
- Task 2: Use Wireshark to Identify the Steps in a WLC-Join

#### **Discovery 4: Network Monitoring with Cisco Prime Infrastructure**

- Discover how to use Cisco Prime Infrastructure for network monitoring
- Task 1: Monitor Health and Performance Data with Dashboards and Alarms
- Task 2: Use the 360° View

- Task 3: Explore Scheduling and Managing Reports

#### **Discovery 5: Add Network Devices to Cisco DNA Center**

- Describe how to add network devices to Cisco DNA Center
- Task 1: Explore Network Devices Configuration
- Task 2: Add Network Devices to Cisco DNA Center
- Task 3: Place Access Points to a Floor Map

#### **Discovery 6: Integrate Cisco DNA Center with External Resources**

- Describe how to integrate Cisco DNA Center with external resources
- Task 1: Prepare Cisco ISE for Integration with Cisco DNA Center
- Task 2: Integrate Cisco ISE and Cisco DNA Center

#### **Discovery 7: Use Cisco DNA Center for Network Monitoring**

- Describe how to use Cisco DNA Center for network monitoring
- Task 1: Explore Overall Health of Network Devices and Clients
- Task 2: Explore Clients Health and 360 View
- Task 3: Explore Network Health and 360 View

#### **Discovery 8: Use Cisco DNA Center Reports**

- Explain how to use Cisco DNA Center reports
- Task 1: Explore Scheduling and Managing Reports

#### **Discovery 9: Configure AAA Services**

- Configure Cisco WLC for AAA services
- Task 1: Configure Campus-C9800-CL for 802.1X Access
- Task 2: Configure Cisco ISE for RADIUS Integration with the Cisco WLCs
- Task 3: Configure a Basic Access Policy for Employees
- Task 4: Verify Employees Can Log In and Reach the Correct VLAN

#### **Discovery 10: Configure AAA Services for Cisco FlexConnect**

- Configure AAA services for FlexConnect
- Task 1: Configure the Ethernet Port to Allow All VLANs
- Task 2: Configure WLAN for FlexConnect Local Switching with 802.1x Authentication
- Task 3: Configure a Flex Location and Modify Necessary Policies
- Task 4: Configure a Policy Set to Provide Access to the Configured VLAN on the WLAN
- Task 5: Verify the Configuration with Wireless PC

#### **Discovery 11: Configure Guest Services**

- Cisco WLC configuration for Guest Services
- Task 1: Configure AAA Authentication and Authorization Method List
- Task 2: Configure Hotspot Guest WLAN on Cisco WLC
- Task 3: Create a Redirect ACL for Guest Flow
- Task 4: Configure an Authorization Profile
- Task 5: Configure a Policy Set to Access the Configured VLAN

#### **Discovery 12: Configure BYOD in the Wireless Network**

- Describe how to configure BYOD in the wireless network
- Task 1: Configure the Ethernet Port and Add the VLANs
- Task 2: Configure AAA Authentication and Authorization Method List

- Task 3: Configure BYOD Guest and Cisco ISE WLANs on the Cisco WLC
- Task 4: Modify the Native Supplicant Profile
- Task 5: Edit the NSP\_Onboard Authorization Profile
- Task 6: Edit the Default Policy Set
- Task 7: Edit the Default Self-Registered Guest Portal
- Task 8: Update the Windows File to Activate BYOD on a Personal Device

#### **Discovery 13: Capture Successful Client Authentication Using Radioactive Trace**

- Show how to capture successful client authentication by using Radioactive Trace
- Task 1: Use the Radioactive Trace Feature to Capture a Client Authentication
- Task 2: Use Debugs to Observe a Successful Client Authentication

#### **Discovery 14: Capture Successful Client Authentication Using Cisco ISE**

- Show how to capture successful client authentication by using Cisco ISE
- Task 1: Use Cisco ISE to View a Successful Authentication

#### **Discovery 15: Configure QoS in the Wireless Network for Voice and Video Services**

- Show how to configure QoS in the wireless network for voice and video services
- Task 1: Configure WLAN for Voice Only
- Task 2: Configure the AAA Policy for Enterprise

#### **Discovery 16: Configure Cisco AVC in the Wireless Network**

- Configure Cisco AVC in the wireless network
- Task 1: Configure Application Visibility on the WLAN
- Task 2: Verify Cisco AVC Configuration with Client PC
- Task 3: Configure AVC Profile to Block Access to YouTube