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Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Summary

Description

The Implementing Cisco Wireless Network Fundamentals (WIFUND) is an ILT course, designed to help students prepare for the CCNA-Wireless certification, an associate level certification specializing in the wireless field. The WIFUND course and CCNA-Wireless certification is a prerequisite to the CCNP-Wireless (Cisco Certified Wireless Professional) curriculum.

WIFUND curriculum will prepare wireless network associate for the use, positioning, planning, implementation and operation of Cisco WLAN networks. The goal of WIFUND is to provide students with information and practice activities to prepare them to help design, install, configure, monitor and conduct basic troubleshooting tasks of a Cisco WLAN in SMB and Enterprise installations. As an associate level, the course aims at providing entry level information, and will not specialize in any of the advanced features of the Cisco WLAN networks solutions.

Objectives
By the end of this course, participants will be able to:

- Understand the basic RF principles and characteristics.
- Understand WLAN security methods and access with differing client devices.
- Define the Cisco WLAN architecture and the underlining infrastructure used to support it.
- Implement a Centralized wireless access network using AireOS or IOSXE wireless LAN controllers
- Implement small and remote access wireless network using FlexConnect, Autonomous or cloud architectures.
- Perform basic WLAN maintenance for a WLAN design.
- Describe the requirements for a WLAN design

Topics

- Explain Wireless Fundamentals
- Describe RF Principles
- Understand RF Mathematics
- Describe Antenna Characteristics
- Describe the Basics of Spread Spectrum
- Describe Wireless Media Access
- Describe Wireless Governance
- Describe Wireless Security Components
- Explain 802.11 Security
- Explain 802.1X/EAP Framework
- Describe EAP Authentication
- Describe WPA and WPA2 Security
- Provide Guest Access
- Native Operating Systems for WLAN Connectivity
- Configure Smart Handheld Clients
- Define Cisco Wireless Network Deployment Options
- Define One Management
- Define One Policy
- Define the Cisco One Network
- Mobility Architecture Concepts
- Optimize RF Conditions and Performance for Clients
- Describe Layer 2 Infrastructure Support
- Describe Protocols Used in Wired Infrastructure to Support Wireless
- Initialize a Centralized WLC
- Describe AP Initialization
- Explore Additional WLC Features
- Implement IPv6 in a Cisco Wireless Environment
- Configure Client Access

Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Summary (cont'd)

- Implement Roaming in the Centralized Architecture
- Initialize a Converged WCM
- Describe AP Connectivity
- Explore Additional Wireless Features
- Configure Client Access
- Implement Roaming in the Converged Architecture
- Overview of the FlexConnect Architecture
- Overview of the Autonomous Architecture
- Overview of the Cloud Architecture
- Describe Wireless Maintenance
- Explain Troubleshooting Tools
- Describe Troubleshooting Methodology
- Predictive WLAN Design Process
- WLAN Site Survey Process
- Labs

Audience

This course is designed for individuals who are involved in the technical management of Cisco wireless platforms and solutions, which involves installing, configuring, operating and troubleshooting.
This audience includes: Network engineers, Network administrators, Network managers, System engineers.

Prerequisites

To fully benefit from this course, students should have the following prerequisite skills and knowledge:
Interconnecting Cisco Networking Devices Parts 1 & 2 or Cisco CCENT certification

Duration

Five days

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Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Outline

I. Explain Wireless Fundamentals
- A. Wireless Topologies
- B. Ad Hoc Networks
- C. Wi-Fi Direct
- D. Piconets
- E. Bluetooth
- F. iBeacon
- G. Near Field Communication
- H. ZigBee
- I. Infrastructure Mode
- J. Service Set Identifiers
- K. Workgroup Bridges
- L. Repeaters
- M. Outdoor Wireless Bridges
- N. Outdoor Mesh Networks
- O. Cordless Phones
- P. Other Non-802.11 Radio Interferers
- Q. Summary

II. Describe RF Principles
- A. RF Spectrum
- B. Frequency
- C. Wavelength
- D. Amplitude
- E. Free Path Loss
- F. Absorption
- G. Reflection
- H. Multipath
- I. Scattering and Diffusion
- J. Refraction
- K. Line of Sight
- L. Fresnel Zone
- M. RSSI and SNR and SNIR
- N. Summary

III. Understand RF Mathematics
- A. Watts, Milliwatts, and Decibels
- B. Decibel Referenced to 1 Milliwatt
- C. Calculations Using the Rules of 3 and 10
- D. Decibel Referenced to Isotropic Antenna
- E. Effective Isotropic Radiated Power
- F. Answer Key: Practice RF Math
- G. Summary

IV. Describe Antenna Characteristics
- A. RF Antenna Principles
- B. Common Antenna Types
- C. Omnidirectional Antennas
- D. Directional Antennas
- E. Antenna Connectors
- F. Attenuators and Amplifiers
- G. Lightning Arrestors
- H. Splitters
- I. Antennas and EIRP
- J. Summary

V. Describe the Basics of Spread Spectrum
- A. Spread Spectrum Transmission Technologies
- B. Frequency Spectrums
- C. Channel Width and Overlap
- D. Summary

VI. Describe Wireless Media Access
- A. Wireless Frame Transmission
- B. Management Frames: Discovering the Network
- C. Control Frames: Improving the Network
- D. Data Frames – Using the Connection
- E. Summary

VII. Describe Wireless Governance
- A. IEEE Wireless Standards
- B. WiFi Alliance
- C. Regulatory Bodies
- D. European Telecommunication Standards Institute
- E. 802.11 Standards for Channels and Data Rates
- F. 802.11a Protocol
- G. 802.11n Protocol
- H. 802.11ac Protocol

Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Outline (cont'd)

I. Common WiFi Benefits of 802.11n/ac
J. 802.11b/g/n/ac Coexistence
K. Summary

VIII. Module Summary

IX. Module Self-Check

X. Describe Wireless Security Components
A. WiFi Security Issues
B. Authentication and Encryption
C. Key Management
D. Summary

XI. Explain 802.11 Security
A. Authentication
B. Encryption
C. Additional Security Measures
D. Summary

XII. Explain 802.1X/EAP Framework
A. IEEE 802.1x and Its Components
B. Summary

XIII. Describe EAP Authentication
A. Certificates and Digital Signatures
B. PKI Terminology and Components
C. PKI in the WLAN
D. EAP-Transport Layer Security
E. Protected Extensible Authentication Protocol
F. EAP-FAST
G. Summary

XIV. Describe WPA and WPA2 Security
A. WPA Authentication Modes
B. Discovery 5: Review Centralized Authentication
C. Answer Key: Review Centralized Authentication
D. Summary

XV. Provide Guest Access
A. Authentication Methods
B. Local Web Authentication—LWA

XVI. Native Operating Systems for WLAN Connectivity
A. Windows 7 Configuration
B. WLAN AutoConfig Service Scan Logic
C. Windows 8.1 Configuration
D. Mac OS X Configuration
E. Summary

XVII. Configure Smart Handheld Clients
A. Configure Apple iOS Handheld Devices
B. Configure Google Android 4.4 Clients
C. Summary

XVIII. Module Summary

XIX. Module Self-Check

XX. Define Cisco Wireless Network Deployment Options
A. Cisco Unified Access Architecture
B. Summary

Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Outline (cont'd)

XXI. Define One Management
- A. Cisco Enterprise and Cloud Managed Unified Access
- B. Cisco Prime Infrastructure
- C. Meraki Cloud Based Management
- D. Summary

XXII. Define One Policy
- A. Cisco ISE Personas
- B. ISE Licensing Model
- C. Summary

XXIII. Define the Cisco One Network
- A. Wireless Controllers as a Function
- B. Appliance Based Wireless Controllers Products
- C. AireOS Controllers
- D. Meraki Cloud Managed Indoor Access Points
- E. Cisco Aironet Access Points
- F. Summary

XXIV. Mobility Architecture Concepts
- A. Understanding the Cisco WLAN Architecture
- B. Summary

XXV. Optimize RF Conditions and Performance for Clients
- A. Radio Resource Management and RF Groups
- B. Cisco CleanAir
- C. Band Select
- D. Cisco ClientLink
- E. Summary

XXVI. Describe Layer 2 Infrastructure Support
- A. Mapping SSIDs to VLANs
- B. Describe Link Aggregation for AireOS and IOS-XE WLCs
- C. Summary

XXVII. Describe Protocols Used in Wired Infrastructure to Support Wireless
- A. Function of Dynamic Host Configuration Protocol
- B. Function of Domain Name Services
- C. Function of Network Time Protocol
- D. Function of Authentication Authorization and Accounting
- E. Function of Management Protocols
- F. Control and Provisioning of Access Points

XXVIII. Module Summary

XXIX. Module Self-Check

XXX. Initialize a Centralized WLC
- A. Centralized WLC Deployment and Configuration—Centralized with AireOS WLC
- B. WLC Command Line Interface
- C. WLC AireOS CLI Setup Wizard
- D. WLC AireOS GUI Setup Wizard
- E. WLAN Express Setup (WES)
- F. WLC Advanced Menu Tabs
- G. Controller Ports, Interfaces, and Mapping
- H. Interfaces
- I. Prime Infrastructure 2.2 and the WLC
- J. Summary

XXXI. Describe AP Initialization
- A. Explain the AP Discovery Process
- B. Explain Universal AP Priming
- C. AP Failover Process
- D. AP Failover Priority
- E. Explain High Availability
- F. AP Modes of Operation
- G. Summary

Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Outline (cont'd)

XXXII. Explore Additional WLC Features
- A. Explain and Configure Client Link
- B. Summary

XXXIII. Implement IPv6 in a Cisco Wireless Environment
- A. IPv6 Addressing Overview
- B. IPv6 Bridge Mode
- C. IPv6 Client Mode
- D. IPv6 in Infrastructure Mode
- E. Other IPv6 Services on the WLC
- F. Summary

XXXIV. Configure Client Access
- A. WLAN Open Authentication
- B. WLAN PSK Authentication
- C. WLAN EAP and RADIUS Authentication
- D. WLAN WebAuth Authentication
- E. Summary

XXXV. Implement Roaming in the Centralized Architecture
- A. Intra-Controller or Inter-Controller Roaming
- B. Mobility Groups
- C. Layer 2 Dynamic Roaming in a Centralized AireOS Deployment
- D. Layer 3 Dynamic Roaming in a Centralized AireOS Deployment
- E. Roaming with Mobility Anchors
- F. Summary

XXXVI. Module Summary

XXXVII. Module Self-Check

XXXVIII. Initialize a Converged WCM
- A. WLC/WCM CLI Initialization
- B. Catalyst 3850/3650 Switches GUI Setup and Configuration
- C. Web GUI Setup for Wired Network
- D. Wireless Web GUI
- E. Switch Ports, Interfaces, and Mapping
- F. Cisco Prime Infrastructure Management of WLCs/WCMs
- G. Summary

XXXIX. Describe AP Connectivity
- A. Access Point Connectivity
- B. Unsupported Features of Converged WCMs
- C. License Requirements of Converged WCMs
- D. Summary

XL. Explore Additional Wireless Features
- A. Review and Configure Client Link
- B. Review and Configure Band Select
- C. Local Profiling and Local Policies
- D. Summary

XLI. Configure Client Access
- A. WLAN Open Authentication
- B. WLAN PSK Authentication
- C. Local-EAP Authentication
- D. WLAN Local-EAP Authentication
- E. Configuration of RADIUS Authentication
- F. WebAuth Authentication
- G. Summary

XLII. Implement Roaming in the Converged Architecture
- A. Converged Mobility—Overview
- B. Describe L2/L3 Roaming
- C. WebAuth Deployments
- D. Design and Scaling Best Practices
- E. Mobility Deployment Models—Centralized with AireOS WLC or IOS-XE WLC
- F. Summary

Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Outline (cont'd)

XLIII. Module Summary

XLIV. Module Self-Check

XLV. Overview of the FlexConnect Architecture
- A. Overview of FlexConnect
- B. FlexConnect Groups
- C. FlexConnect Requirements
- D. Configure Client Access
- E. Summary

XLVI. Overview of the Autonomous Architecture
- A. Autonomous AP Management Options
- B. Autonomous AP Initialization
- C. Autonomous AP Configuration
- D. Explore Additional Autonomous AP Features
- E. Summary

XLVII. Overview of the Cloud Architecture
- A. Overview of the Cloud Products
- B. Infrastructure Requirements for Cloud APs
- C. Cloud AP Initialization
- D. Cloud AP Management
- E. RF/802.11 Access
- F. Client Access
- G. Summary

XLVIII. Module Summary

XLIX. Module Self-Check

L. Describe Wireless Maintenance
- A. Licensing Options
- B. Image Updates Methods
- C. Backup and Restore Process
- D. Summary

LI. Explain Troubleshooting Tools
- A. Overview of Third-Party Tools
- B. Cisco Troubleshooting Tools
- C. Summary

LII. Describe Troubleshooting Methodology
- A. Overview of Troubleshooting Techniques
- B. Overview of Best Practices
- C. Common Wireless Issues
- D. Summary

LIII. Module Summary

LIV. Module Self-Check

LV. Predictive WLAN Design Process
- A. Predictive WLAN Design Process Overview
- B. Summary

LVI. WLAN Site Survey Process
- A. Off-Premise Predictive Site Surveys
- B. Initial Walk Through
- C. Pre Deployment Site Survey: Active Site Survey
- D. Post-Deployment Survey
- E. Summary

LVII. Module Summary

LVIII. Module Self-Check

LIX. Labs
- A. Discovery 1: Practice RF Math
- B. Discovery 2: Calculate EIRP and Choose the Correct Antenna
- C. Discovery 3: Explore the RF Spectrum
- D. Discovery 4: Analyze Wireless Frames
- E. Discovery 5: Review Centralized Authentication

Implementing Cisco Wireless Network Fundamentals (WIFUND)

Course Outline (cont'd)

F. Discovery 6: Initialize a Centralized WLAN Deployment
G. Hardware Lab 1: Configure Windows 7 Client Access
H. Hardware Lab 2: Configuring the Wired Infrastructure
I. Hardware Lab 3: Configuring the Centralized WLAN Deployment
J. Hardware Lab 4: Configuring IPv6 Operation in a Centralized WLAN Deployment
K. Hardware Lab 5: Configuring Security in a Centralized WLAN Deployment
L. Hardware Lab 6: Configuring Guest Access Using the Anchor WLC
M. Hardware Lab 7: Deploying a Converged Access WLAN
N. Hardware Lab 8: Configuring Security on a Converged WLAN Deployment
O. Hardware Lab 9: Implement a FlexConnect WLAN Deployment
P. Hardware Lab 10: Initialize an Autonomous WLAN Deployment
Q. Hardware Lab 11: Configure Security on an Autonomous AP WLAN Deployment
R. Hardware Lab 12: Configure Security on a Cloud WLAN Deployment
S. Hardware Lab 13: Perform Centralized Controller Maintenance
T. Hardware Lab 14: Perform WiFi Scanning
U. Hardware Lab 15: Challenge—Various Trouble Tickets
V. Hardware Lab 16: Perform a Predictive WLAN Design
W. Hardware Lab 17: Perform Passive Site Survey Analysis