



Cisco CCNA Wireless Certification Online – IT112 95 hours

CCNA

The Cisco Certified Network Associate (CCNA) certification is Cisco's entry-level Network Installation and Support certification. CCNAs exhibit basic networking skills, and should be able to install simple LAN and WAN networks. This program provides a comprehensive introduction to deploying Cisco routers in an inter-networked environment. Through extensive hands-on exercises, students gain the fundamental knowledge and skills needed to install, configure and troubleshoot Cisco routers. A single exam must be passed to attain this certification.

Basic Networking Concepts

Overview/Description

To identify the major components of a computer system, to define basic computer and networking terminology, and to describe the benefits and functions of the OSI reference model

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Basic Networking Concepts

- identify the major components of a computer system and their functionality, and list the resources required to install a NIC.
- identify the main purposes and functions of networking.
- distinguish between the OSI reference model and the TCP/IP stack.
- distinguish between basic computer and networking terms, and between the principles of the OSI reference model and the TCP/IP protocol stack.

Creating a Simple Ethernet Network

Overview/Description

To demonstrate how to build a simple Ethernet network



Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Creating a Simple Ethernet Network

- identify the standards, functions, and operation of important LAN technologies.
- differentiate between the different network media types.
- differentiate between the different network media types.
- determine the appropriate network media type to use in a given scenario.

Extending Ethernet Networks

Overview/Description

To describe the functions and operations of switched LANs and virtual LANs

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Extending Ethernet Networks

- distinguish between the features of different network topologies.
- identify the functions, features, and operation of network devices used at different layers of the OSI model.
- match network devices to their function and distinguish between different network topologies.
- recall methods used to extend Ethernet LANs and reduce the size of collision domains.
- determine how to resolve problems with bridging loops in a switched environment, for a given scenario.
- differentiate between the features and characteristics of shared and switched LANs.
- identify the components of a VLAN and the benefits and advantages provided by VLANs.
- relate the benefits and costs of establishing a VLAN for a given scenario.



Networks with Cisco Devices

Overview/Description

To identify the basic operations of routing and to describe the operations of routing protocols, and to identify the functions of specific network layer protocols

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Connecting Networks with Cisco Devices

- distinguish between different network layer protocols and their functions, and identify the fields of the IP datagram.
- differentiate between the functions of protocols used at the network layer.
- identify the basic operations involved in the routing process.
- distinguish between different routing protocol classes.
- describe the features and operations of interior and exterior routing protocols.
- distinguish between the functions and application of common interior and exterior routing protocols.**

Constructing IP Network Addresses

Overview/Description

To describe the major aspects of IP addressing and calculate valid IP subnet addresses and masks

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Constructing IP Network Addresses

- distinguish between the processes used to convert between decimal, binary, and hexadecimal numbering systems.
- interpret numerical systems.



- distinguish between the types of IP address classes and between the types of reserved IP addresses.
- recognize how the use of IPv4, IPv6, and CIDR affects IP address availability.
- convert a 32-bit binary number to its corresponding IP address.
- recognize how to calculate the number of usable subnets and host addresses.
- recognize how to calculate a subnet number.
- calculate a subnet assignment.

Ensuring Data Delivery in Networks

Overview/Description

To demonstrate how to ensure the reliability of data delivery through the transport layer

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Ensuring Data Delivery in Networks

- identify the functionality of common transport layer protocols and recognize the applications supported by TCP/IP.
- recognize the functionality of the TCP/IP transport layer.
- After completing this topic, you should be able to sequence the steps required to establish, maintain, and terminate a TCP connection in a TCP/IP network environment.

Remote Network Connectivity

Overview/Description

To describe the functions of major WAN technologies

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Remote Network Connectivity

- recognize the functions, operation, and primary components of a WAN.
- identify the features and functions of major WAN technologies.



- determine the WAN connection types and multiplexing used in a given scenario.
- recognize the structure and functionality of the Internet.
- identify the characteristics and functions of the PPP and HDLC protocols.
- identify the function and operation of ISDN, DSL, Frame Relay, ATM, and SONET connection technologies.
- identify the function and operation of analog modems and cable modems.
- determine the appropriate connection medium to use when connecting a WAN in a given scenario.
- distinguish between the functions, operations, and primary components of a MAN, SAN, CN, and VPN.
- match an appropriate WAN connection technology and modem to a corporate network, for a given scenario.

Operation and Configuration of Cisco IOS Switches

Overview/Description

To use the available configuration tools to establish connectivity to the appropriate network device in order to complete initial switch configurations and to verify the default configuration and status of switch devices

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Operation and Configuration of Cisco IOS Switches

- recognize the setup of console connections for Cisco devices.
- identify the requirements for configuring a Cisco network device from an external source.
- start a Cisco IOS EXEC session and change EXEC modes.
- recognize the LED sequence that verifies successful POST completion for a Catalyst switch.
- interpret initial boot-up output and use the CLI help facilities on a Catalyst switch.
- use the command line interface to configure basic switch details, and to examine the status and configuration of the switch.
- implement the initial configuration for a Catalyst 2950 switch.

Operation and Configuration of Cisco IOS Routers

Overview/Description

To use available configuration tools to establish connectivity to a router in order to



complete the initial router configuration and to verify the default configuration and status of a functioning access-layer router

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Operation and Configuration of Cisco IOS Routers

- recognize the router startup sequence and the initial router setup.
- recognize the keyboard help, enhanced editing key functions, and command history feature associated with the command line interface.
- use the router command line interface to locate and complete commands, correct command line errors, and observe and verify the status of a router.
- identify the router status commands used to verify initial startup of a router.
- verify the initial router startup sequence and configuration process.
- identify the different router configuration modes and their functions.
- configure basic router features and interfaces.
- implement a basic router configuration.
- modify the configuration files to configure a router in a given scenario.

Managing the Cisco Network Environment

Overview/Description

To discover and determine the status of connected devices on a network and enable connections to these devices

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Lesson Objectives

Managing the Cisco Network Environment

- use CDP to determine the host names and addresses of neighboring Cisco devices, and recognize how to create a network map of the environment.
- use CDP to determine the host names and addresses of neighboring Cisco devices and create a map of the network environment, given operational access-layer switches and routers.
- identify how to connect to a remote device using Telnet.
- use CDP and Telnet to collect information from network devices.
- use IOS commands to manage Telnet sessions.



Cisco Network Device Administration

Overview/Description

To manage devices on a network according to designated best practices

Target Audience

Individuals new to networking concepts and terminology; individuals preparing to take the Interconnecting Cisco Network Devices (ICND) learning path; anyone preparing for the Introduction to Cisco Networking Technologies (INTRO) exam, the Interconnecting Cisco Network Devices (ICND) exam, or the Cisco Certified Network Associate (CCNA) exam

Cisco Network Device Administration

- use Cisco IOS commands to manage device configuration files.
- manage Cisco IOS image files and device configuration files.
- implement the correct methods for managing device configurations.
- recognize how to execute adds, moves, and changes on a router, and troubleshoot operational Cisco devices.
- execute adds, moves, or changes on a router, and use the debug troubleshooting tool to minimize potentially adverse impacts on Cisco devices.

Configuring Cisco Catalyst Switch Operations

Overview/Description

To discuss and implement specific bridging and VLAN Catalyst switch configurations, which provide for scalability, security, and enhanced management of the local area switched network

Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

Lesson Objectives

Configuring Cisco Catalyst Switch Operations

- explain the fundamentals of layer 2 switching.
- describe redundant topologies in switched environments.
- describe how the spanning-tree algorithm is used to eliminate switching loops.
- describe how the Spanning-Tree and Rapid Spanning-Tree Protocols affect frame forwarding on bridges and switch ports.
- discuss Spanning-Tree Protocol operation.
- describe how to configure ports on a switch.



- configure port security, add, move, and change MAC addresses and manage device configuration files.
 - explain how to implement port and MAC security on a switch.
 - configure a Catalyst 2950 series switch.
 - describe the operation of VLANs.
 - explain how VTP is used to manage VLANs.
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- determine the appropriate commands used in VLAN configuration and trunking.
 - scale the size and number of VLANs and troubleshoot their operation.
 - verify VLAN configuration on a switch.

Routing in Cisco Networks

Overview/Description

To describe the different forms of routing and explain the concepts of distance vector and link state routing

Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

Lesson Objectives

Routing in Cisco Networks

- outline the basic principles of routing.
- distinguish the features and operation of dynamic routing protocols.
- discuss the operation and method used for routing between VLANs and choose the commands used to configure trunking modes.
- analyze the operation of distance vector routing protocols.
- explain the mechanisms used to eliminate routing loops.
- describe the features and operation of link state and balanced hybrid routing protocols.
- use IOS software commands to discover routing protocols supported and in use on a router.

Implementing Routing Protocols on Cisco Networks

Overview/Description

To describe the operation and configuration of popular modern routing protocols

Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services



Lesson Objectives

Implementing Routing Protocols on Cisco Networks

- enable RIP on a router.
- configure and verify RIP operation on Cisco routers.
- explain the operation of IGRP.
- describe how to enable IGRP on a router.
- configure IGRP on a router.
- distinguish the various features and functions of EIGRP.
- describe the commands used to configure EIGRP.
- verify EIGRP configuration on routers.
- identify the features of OSPF and how they compare to distance vector routing protocols.
- describe the commands used to configure OSPF in a single area.
 - configure and verify configuration of OSPF.
- explain the operation of variable-length subnet masks (VLSM) on Cisco routers.

Managing IP Traffic on Cisco Networks

Overview/Description

To describe and configure efficient network traffic restrictions and security using properly implemented access list management and address translation

Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

Lesson Objectives

Managing IP Traffic on Cisco Networks

- explain the requirement for access lists.
- describe access list operation and configuration.
- describe how access lists filter by protocols and packet details.
- explain how wildcards are used in access list configuration.
- explain the rules governing access list configuration.
- demonstrate how to control network access using access control lists.
- implement and manage standard access lists using IOS commands.
- describe extended access lists, and explain how to configure them and determine their effectiveness.
- implement and manage standard access control lists (ACL) using IOS commands.
- explain the ideal implementation of access lists.
- describe the features and operation of Network Address Translation (NAT) and Port Address Translation (PAT).



- describe the commands used to configure address translation and overloading.
- verify and troubleshoot NAT and PAT configurations.

Extending a Cisco Network to a WAN

Overview/Description

To describe the implementation and configuration of the different technologies used on Cisco devices to enable wide area connections

Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services

Lesson Objectives

Extending a Cisco Network to a WAN

- discuss the elements of a wide-area network.
- describe the protocols used for WAN connectivity and how devices are connected to the network.
- detail HDLC and PPP protocol operation.
- detail the authentication and encapsulation processes used by PPP.
- configure PPP on a Cisco device interface.
- describe the terminology of Frame Relay and how it operates.
- describe the purpose and command syntax for defining static Frame Relay map entries on a router.
- configure Frame Relay subinterfaces on a router.
- discuss the typical types of Frame Relay connections made to service providers.
- configure a subinterface on a Cisco router.
- configure a Frame Relay connection.

Completing ISDN Calls on Cisco Networks

Overview/Description

To detail the operation and configuration of ISDN and DDR

Target Audience

Network administrators responsible for implementing and managing small and medium-sized business networks; network technicians who install network devices in small business environments; Cisco channel resellers who are new to Cisco products and services



Lesson Objectives

Completing ISDN Calls on Cisco Networks

- describe the characteristics of ISDN.
- detail the functional elements of ISDN and describe the commands used to configure BRI and PRI interfaces.
- identify the different ISDN switch types and configure basic ISDN.
- configure ISDN PRI on a router.
- discuss the commands used to verify and troubleshoot ISDN connections.
- explain how DDR operates.
- detail the steps for configuring DDR.
- describe the configuration of dialer profiles on ISDN interfaces.
- configure and troubleshoot a given ISDN DDR connection.
- use context sensitive help and set up IP static routes.

TestPrep 640-801 Cisco Certified Network Associate (CCNA)

Overview/Description

Generally taken near the end of a program of certification-orientated study, the 640-801 Cisco Certified Network Associate (CCNA) TestPrep enables the learner to test their knowledge in a simulated certification testing environment. Learners can take TestPrep in two different modes: Study and Certification. Study mode is designed to maximize learning by providing feedback, while Certification mode is designed to mimic a certification exam.

Target Audience

Individuals seeking practice in a simulated testing environment, covering the skills and competencies being measured by the actual certification exam.

Lesson Objectives

TestPrep 640-801 Cisco Certified Network Associate (CCNA)

- Introduction to Networking
- Network Types
- Network Media
- Switching Fundamentals
- TCP/IP
- IP Addressing and Routing
- WAN Technologies
- Operating and Configuring Cisco IOS Devices
- Managing Your Network Environment
- Configuring Catalyst Switch Operations
- Extending Switched Networks with VLANs
- Determining IP Routes
- Managing IP Traffic with Access Lists



- Establishing Serial Point-to-Point Connections
- Establishing Frame Relay Connections
- Completing ISDN Calls

Cisco IUWNE 1.0: Wireless Fundamentals

Overview/Description

Wireless network deployment has exploded in recent years. The use of wireless devices went quickly from early adoption in sites where cabling was difficult or impossible, to widespread use in home networks. The change was rapid due to the ease of use of wireless routers and other equipment. With improvements in security and performance, wireless networks have moved into many mainstream business LANs. With new and better standards and equipment in development all the time, growth is virtually unlimited. This course introduces wireless networks, examining where they are used and what kinds of wireless networks can be built. The evolution of wireless technology, wireless topology categories, and wireless networks types, such as ad hoc and infrastructure are discussed, along with some basic wireless devices. This course also explores WLAN radio frequency (RF) principles and RF mathematics, to provide an explanation of how the radio waves used in wireless networks function.

This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing wireless topologies (IBSS, BSS, ESS, Point-to-Point, Point-to-Multipoint, basic Mesh, bridging); describing networking technologies used in wireless (SSID, WLAN_ID, Interface, VLAN, 802.1q trunking); and describing WLAN RF principles (refraction, reflection, etc.).

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 1.5 hours

Lesson Objectives

Wireless Types and Topologies

- Distinguish between WPAN, WLAN, WMAN, and WWAN network types
- Recognize the characteristics of ad hoc networks

Wireless Network Basics

- Recognize the characteristics of access point (APs), service set identifier (SSIDs), and workgroup bridge (WGB) topologies



- Recognize the characteristics of repeaters, outdoor wireless bridges, and outdoor mesh network topologies

WLAN RF Principles

- Recognize how frequency, wavelength, and amplitude define the radio frequency spectrum

Performance Influences

- Recognize how the principles of free path loss, absorption, and reflection affect the transmission of wireless signals
- Recognize the role of reflection and refraction in wireless signal loss

Factors that Impact Signal Quality

- Recognize how the Fresnel zone and measures of signal strength can be used to estimate signal quality

Understanding RF Mathematics

- Recognize the meaning and scale of common radio frequency units
- Recognize how the signal "power" of antennae can be compared using references

Using Radio Frequency Principles and Mathematics

Course ID: cc_iuwn_a01_it_enus

Cisco IUWNE 1.0: Wireless Antennae and Spread Spectrum Technologies

Overview/Description

The technology behind sending wireless signals includes antennae, which are needed to transmit RF signals, and spread spectrum technologies, which include the protocols involved in sending wireless frames. This course describes the different types of antennae used in wireless implementations. It outlines the principles behind antenna technology, and discusses how to choose the right antenna based on where and how you want the signal to be received. This course also explains spread spectrum technologies, including Direct Sequence Spread Spectrum (DSSS) and orthogonal frequency-division multiplexing (OFDM), as well as the various modulation types used with each. In addition, the issues linked to channel overlaps and channel reuse are explored. This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing the basics of spread spectrum technology including modulation, DSSS, OFDM, channels reuse and overlap, and describing WLAN RF principles including antenna types and RF gain and loss.

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers, or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credentials.

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part



2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 1.5 hours

Lesson Objectives

Antennae Principles

- Recognize key principles of wireless signal radiation

Omnidirectional and Directional Antennae

- Recognize the coverage patterns and placement considerations associated with four categories of omnidirectional antennae
- Recognize the coverage patterns and placement considerations associated with three categories of directional antennae

Antennae Accessories

- Recognize the impact of antenna accessories on signal patterns and strength

Choosing and Placing the Wireless Antenna

Resisting Interference Using FHSS and DSSS

- Recognize how spread spectrum technologies offer resistance to narrowband interference

Direct Sequence Spread Spectrum (DSSS) Modulations

- Recognize how DBPSK, DQPSK, and CCK are used to achieve higher signal speeds in Direct Sequence Spread Spectrum (DSSS) technology

Orthogonal Frequency-Division Multiplexing (OFDM)

- Recognize the capabilities and coding techniques for three OFDM modulations: BPSK, QPSK, and QAM

Channels and Overlapping Issues

- Recognize the implications of potential overlap between spread spectrum channels

Course ID: cc_iuwn_a02_it_enus

Cisco IUWNE 1.0: Wireless Regulation Bodies, Standards, and Certifications

Overview/Description

In order to send information wirelessly, devices must make use of the radio frequency (RF) spectrum. Rules regarding what transmit power is allowed in specific frequencies differ between regions. In order to allow for interoperability between regions, a common set of rules, or protocols, for sending information is needed for vendors to follow when designing their wireless devices. This course describes wireless regulation bodies, such as the IEEE and Wi-Fi Alliance, as well as code regulatory bodies such as the FCC and ETSI. The 802.11 family of protocols, which govern wireless operation, is also covered. This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing wireless regulatory bodies, standards and certifications such as FCC, ETSI, 802.11a/b/g/n, and Wi-Fi Alliance.



Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credentials.

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 1.5 hours

Lesson Objectives

The IEEE and the Wi-Fi Alliance

- Recognize the role of the IEEE and the Wi-Fi Alliance in defining wireless protocols and specifications

Regulatory Bodies for Wireless

- Recognize the role of wireless regulatory bodies such as the FCC and ETSI

The IEEE Family of Protocols

- Identify the scope of 802.11 standards that operate in the 2.4 GHz spectrum and in the 5 GHz spectrum
- Identify the place of the 802.11n and the 802.11 original protocol in the 802.11 family of protocols

The 802.11a, b, and g Protocols

- Identify the capabilities of the 802.11b and 802.11g protocols, and recognize issues related to their coexistence
- Recognize the spectrum, channels, speed, and data rates of the 802.11a protocol

The 802.11n Protocol

- Identify components of the 802.11n protocol
- Identify the improvements made possible by 802.11n and the elements that facilitate these improvements

Understanding the 802.11 Standards

Course ID: cc_iuwn_a03_it_enus

Cisco IUWNE 1.0: Wireless Frame Basics and Nonstandard Technologies

Overview/Description

While the 802.11x standard is most prevalent in today's wireless environments, it is also important to have a working knowledge of non-802.11 wireless technologies and their impact on WLANs. Understanding the principles behind wireless frame exchange, whether 802.11x or nonstandard frames, is key to installing and troubleshooting wireless networks efficiently, and knowing the tools used to support these activities is just as



important. This course provides the basics needed to understand which frames can be expected, what their role is, and what their speed will be in order to quickly detect when a portion of a dialog is failing. This course follows the end-to-end journey of the wireless frame, and also describes the impact of nonstandard wireless technologies on Wi-Fi networks.

This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing the spread spectrum technology CSMA/CA; describing the impact of various wireless technologies such as Bluetooth, WiMAX, ZigBee, and cordless telephones on WLANs; describing networking technologies used in wireless, such as trunking interfaces and 802.1q trunking; and describing the management, control, and data frame types.

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 2.0 hours

Lesson Objectives

Understanding Data Frame Basics

- Recognize how wireless devices prevent collisions as data frames travel through the system
- Recognize frame types, frame speed organization, and the structural elements of frame shape

Management Frames

- Recognize how beacons, probes, and management frames enable a wireless client to discover and connect to a network

Control Frames and Power Saving

- Recognize how control frames improve connection efficiency and how power save mode conserves battery power in stations

Nonstandard ISM Devices

- Recognize how Bluetooth, cordless phones, and ZigBee networks operate
- Identify the impact of various nonstandard devices on WLANs

WiMAX Technology

- Recognize how WiMAX can interact with Wi-Fi

The Journey of a Wireless Frame

- Recognize how network components function to send frames from a wireless client to the control network



VLANs and VLAN Trunking

- Recognize how VLANs and trunks function to separate SSIDs on the wired side of the network
- Recognize how to configure VLANs and trunks

Preparing VLANs for Wireless Operation

Course ID: cc_iuwn_a04_it_enus

Cisco IUWNE 1.0: Unified Wireless Network Basic Architecture

Overview/Description

Depending on the size of a wireless network, the number of deployed access points (APs) can run from a single AP to thousands on a single campus. As WLANs get bigger and the number of devices grows, management can go from cumbersome to nearly impossible. Cisco's Unified Wireless Network architecture provides a means to centralize configuration of APs. Service Set Identifier (SSID) configuration, power level, and channels can be automatically configured by a central control point. This course explains the basics of the Cisco Unified Wireless Network architecture, its operation, benefits, and components. In addition, it provides an overview of the primary Cisco APs and WLAN Controllers used in deployment. This course also describes Cisco's wireless LAN controller, its hardware and configuration. The course also covers how lightweight access points (APs) associate and communicate with wireless LAN (WLAN) controllers to obtain software, configurations, and to access centralized management. This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing the basics of the Cisco Unified Wireless Network architecture, including Split MAC, LWAPP, stand-alone AP versus controller-based AP, and specific hardware examples and describing controller-based AP discovery and association using OTAP, DHCP, DNS, Master-Controller, Primary-Secondary-Tertiary, and n+1 redundancy.

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 2.0 hours

Lesson Objectives



Unified Wireless Networks Basics

- Recognize how LWAPP works
- Identify the benefits of LWAPP

Hardware Components

- Recognize the different component families and the main Cisco APs
- Distinguish between main Cisco WLAN controllers

Basic WLAN Controller Configuration

- Recognize the controller boot sequence
- Recognize how to make an initial configuration from the CLI

Advanced WLAN Controller Configuration

- Recognize the controller options in the web interface
- Identify different controller files

Access Point Association

- Distinguish between the different LWAPP modes
- Recognize how a LWAPP AP joins a WLAN controller

Design Precautions

- Distinguish between different redundancy designs

Configuring a Cisco 2106 WLC

- Configure basic settings for the Cisco 2106 wireless LAN controller

Course ID: cc_iuwn_a05_it_enus

Cisco IUWNE 1.0: Access Point Management

Overview/Description

The primary function of an access point is to provide entry onto a network to wireless clients. However, access points can also be expected to monitor channels to detect rogues or interference, locate devices, or help troubleshoot network issues. As well, access points need to be able to dynamically service legitimate clients as they move from the range of one access point into the range of another. The ability to centrally manage the access points within a network can greatly reduce the load on administrative duties. This course describes the operational modes of access points and explains the concepts behind roaming users. The course also covers some of the common configuration parameters run on a controller as they relate to access points. This course also introduces the Cisco Mobility Express Architecture and explains some of the specific differences between it and the enterprise version of the Cisco Unified Wireless Network solution.

This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing the Cisco Mobility Express Wireless architecture (Smart Business Communication System – SBCS, Cisco Config Agent – CCA, 526WLC, 521AP – stand-alone and controller-based); describing the modes of controller-based AP deployment (local, monitor, HREAP, sniffer, rogue detector, bridge); describing roaming (Layer 2 and Layer 3, intra-controller and inter-controller, mobility groups); configuring the basics of a stand-alone access point (no lab) (Express setup, basic security); and describing RRM.



Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 2.5 hours

Lesson Objectives

Access Point Modes

- Distinguish between access point operational modes

Roaming

- Recognize how the roaming process works

Mobility Anchors

- Recognize the functions of mobility anchors

Basic AP Management and Monitoring

- Recognize how to monitor and manage APs

Managing and Monitoring Rogues

- Recognize how to manage and monitor rogues

Managing and Monitoring Wireless Clients

- Recognize how to monitor and manage clients
- Recognize how to create an internal DHCP scope

Standalone Access Point Setup and Management

- recognize how to set up and configure a standalone Access Point

Converting a Standalone Access Point

- Recognize how to convert a standalone AP to LWAPP using the Cisco IOS-to-LWAPP
- Recognize how to convert a standalone AP to LWAPP using the Cisco WCS

Understanding the Cisco Mobility Express Architecture

- Recognize the architecture of Cisco Mobility Express

Managing Networks and Standalone Access Points

Course ID: cc_iuwn_a06_it_enus

Cisco IUWNE 1.0: Wireless Clients

Overview/Description

A number of configuration tools exist to aid in the setup and administration of wireless clients on common operating systems, for example NetworkManager under Linux, the



Mac AirPort configuration utility, and Windows Wireless Zero Configuration (WZC). Cisco also provides their own client configuration tools that can be installed on an administrator's computer. This course describes the default configuration tools found on common operating systems that allow a user to detect wireless LANs and create basic profiles. It also explains the Cisco software used for client configuration, including Aironet Desktop Utility (ADU), the Aironet Site Survey Utility (ASTU), and the Cisco Aironet Client Administration Utility, as well as the Cisco Secure Services Client that provides IEEE 802.1X user and device authentication. In addition, the course introduces the Cisco Compatible Extensions (CCX) Program, which is a widely supported Cisco program that allows wireless clients to benefit from Cisco innovations. This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing client OS WLAN configuration (Windows, Apple, and Linux.) and basic CSSC; installing Cisco ADU; and describing the Cisco Compatible Extension program.

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 2.5 hours

Lesson Objectives

Linux NetworkManager and Mac AirPort

- Recognize how to use the Network Manager to configure wireless networks for Linux
- Recognize how to use Mac AirPort to configure wireless networks for Mac

Windows Wireless Zero Configuration

- Recognize how to use the Wireless Zero Configuration (WZC) utility to configure wireless networks in Windows

Cisco ADU and ASTU Basics

- Recognize how to manage Cisco wireless cards with the Cisco ADU tool

Additional ADU Functions

- Recognize how to use additional ADU functions for diagnostics, troubleshooting, administration, and profile management

Cisco Secure Services Client

- Recognize how to use Cisco Secure Services Client (SSC) for advanced administration and network profile management

Introduction to CCX

- Identify the features of the Cisco Compatible Extensions (CCX) program



Cisco Compatible Extensions Features and Versions

- Recognize the features of different Cisco Compatible Extensions (CCX) versions

Installing and Using the Cisco ADU

Course ID: cc_iuwn_a07_it_enus

Cisco IUWNE 1.0: WLAN Security Basics

Overview/Description

Early security for wireless communication was weak, as the IEEE 802.11 standard was designed for ease of deployment in residential homes instead of in enterprise environments. With the widespread adoption of wireless networks by businesses, better protection of data and the ability to authenticate users was required. Thanks to improvements in security protocols, today's wireless networks are as secure, if not more secure, than wired networks. This course provides an overview of WLAN security and shows the steps required to ensure privacy in wireless networks as well as some of the advanced features that Cisco networks have to increase wireless network security. This course also explains the configuration of basic WLAN security and describes centralized WLAN authentication.

This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing 802.11 authentication and encryption methods including Open, Shared, 802.1X, EAP, TKIP, AES, LEAP, PEAP, AES, WPA/WPA2, TKIP, PSK, EAP-local or -external, and RADIUS.

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers, or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 1.5 hours

Lesson Objectives

Authentication and Encryption

- Identify the features of authentication
- Identify the features of encryption

Advanced Wireless Security

- Match wireless threats with detection and prevention methods
- Identify the role of Management Frame Protection (MFP) in advanced wireless security



Establishing IEEE 802.11 Security

- Recognize how open authentication and WEP are used to establish security
- Recognize how to configure a MAC filter on a WLAN

Introducing 802.1X

- Identify the features of IEEE 802.1X
- Recognize how EAP resolves authentication issues

RADIUS and AAA Servers

- Recognize how to use a RADIUS server as an authentication source on the controller

Configuring EAP

- Recognize how to configure the controller for local EAP

Configuring Cisco WCS

- Create a wireless security profile

Course ID: cc_iuwn_a08_it_enus

Cisco IUWNE 1.0: WLAN Authentication and Encryption

Overview/Description

Extensible Authentication Protocol (EAP) and Wi-Fi Protected Access (WPA) authentication and encryption mechanisms are vast improvements over early implementations of wireless security. Given the variety of ways EAP and WPA can be used in a wireless environment, it is important to understand their strengths and weaknesses, in order to decide which will work best in a given network situation. This course describes the different flavors of EAP as well as the two generations of Wi-Fi Protected Access – WPA and WPA2. The course also provides the information necessary to be able to configure wireless security on Cisco controllers and clients. This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing and configuring authentication methods (Guest, PSK, 802.1X, WPA/WPA2 with EAP-TLS, EAP-FAST, PEAP, LEAP); describing and configuring encryption methods (WPA/WPA2 with TKIP, AES); and describing and configuring the various sources of authentication (PSK, EAP-local or -external, Radius).

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 2.5 hours



Lesson Objectives

Certificates and PKI

- Recognize how asymmetric keys function in wireless networks
- Recognize how certificates and public key infrastructure (PKI) allow authentication and encryption

EAP-TLS and EAP-FAST

- Recognize how EAP-TLS functions as an authentication scheme
- Recognize how EAP-FAST functions as an authentication scheme

PEAP, LEAP, and Other EAPs

- Recognize how PEAP and LEAP provide security on wireless networks

First Generation WPA

- Recognize what is involved in the WPA authentication process
- Recognize how WPA enhances the encryption process

WPA2 and 802.11i

- Identify the features of the WPA2 certification

Security Configuration Options

- Recognize how to configure security options on the controller

Client Configuration

- Recognize how to configure the specific EAP authentication profile on the client side

Web Authentication

- Recognize how to configure web authentication

Preparing for WLAN Security

- Recommend and identify key features of wireless network security solutions, in a given scenario

Course ID: cc_iuwn_a09_it_enus

Cisco IUWNE 1.0: Introducing, Installing, and Administering WCS

Overview/Description

The Cisco Wireless Control System (WCS) is an optional network component that works in conjunction with lightweight access points (APs), controllers, and the Cisco Wireless Location Appliance. With Cisco WCS, network administrators have a single interface for managing the wireless network. This course introduces the Cisco WCS and the Cisco WCS Navigator and explains the installation and administration of WCS. It also covers the hardware requirements for WCS and describes related licensing procedures. This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing the key features of WCS and Navigator (versions and licensing); and installing/upgrading WCS and configuring basic administration parameters (ports, O/S version, strong passwords, service vs. application).



Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 1.5 hours

Lesson Objectives

Introduction to Cisco WCS

- Recognize the features of Cisco WCS Location
- Recognize how the Cisco WCS licensing system works

Features of Cisco WCS and WCS Navigator

- Recognize the features of Cisco WCS
- Recognize the features of Cisco WCS Navigator

Installing Cisco WCS

- Recognize the requirements for Cisco WCS installation
- Recognize how to install Cisco WCS

Meeting Cisco WCS Requirements

- Choose a license and determine whether systems meet the requirements for Cisco WCS

Introduction to WCS Administration

- Recognize the functions you can perform in the Cisco WCS Administration Background Tasks window

Advanced WCS Configuration

- Recognize how to configure authentication and authorization for Cisco WCS
- Recognize how to edit Cisco WCS logging options

Creating Credentials on the Cisco WCS

Course ID: cc_iuwn_a10_it_enus

Cisco IUWNE 1.0: Cisco WCS Administration

Overview/Description

The Cisco Wireless Control System (WCS) is a tool that helps to centralize, and therefore simplify, the administration of wireless networks. The WCS can manage multiple access points and controllers as well as offer enhanced monitoring and security. WCS also includes tools for wireless LAN (WLAN) planning and design, RF management, location tracking, Cisco Intrusion Prevention System (IPS), and WLAN systems configuration, monitoring, and management. This course describes the process



of adding controllers to the Cisco WCS and managing and configuring network devices with WCS. The course also explains how to understand and use maps to provide a graphical representation of the wireless network either for planning or documentation purposes. Also covered are techniques for using WCS for monitoring various network components, and personalizing the Cisco WCS home page.

This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE), exam objectives for describing the configuration of controllers and APs (using the Configuration tab, not templates); the configuration and use of maps in the WCS (add campus, building, floor, maps, position AP); and using the WCS Monitor tab and alarm summary to verify the WLAN operations.

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers, or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 1.5 hours

Lesson Objectives

Working with Controllers from Cisco WCS

- Recognize how to configure controllers and network devices from Cisco WCS

Working with Maps

- Recognize how maps provide a graphical representation of network layout
- Recognize how to use and edit Cisco WCS maps

The Home and Monitor Pages

- Recognize how the WCS Home page can be customized
- Recognize how the WCS Monitor page enables you to verify and monitor devices

Monitoring Clients, Security, Alarms, and Events

- Identify the client and security information provided by the WCS
- Identify information and actions available from the Alarms window and Events page

Device Location

- Identify techniques used by Cisco WCS to locate wireless devices
- Recognize how to identify the position of devices

Monitor the Network Using Cisco WCS

- Advise on how to monitor events with the Cisco WCS

Course ID: cc_iuwn_a11_it_enus



Cisco IUWNE 1.0: WLAN Maintenance and Troubleshooting

Overview/Description

Troubleshooting wireless networks presents a unique set of challenges. Unlike wired LAN users, wireless clients are mobile and their relative position within a building is often the most likely culprit in connectivity issues. However, positioning isn't the only factor that can keep clients from connecting to access points. In an ever-changing RF environment, the connection quality from a fixed location may change over time. Proper maintenance of the wireless infrastructure can help prevent many issues, and good troubleshooting practices can make the detection process much more efficient when problems do arise. This course explains the procedure and reasoning behind controller backup and code upgrade. Design and site survey considerations are also covered, along with descriptions of many of the common and useful troubleshooting tools and techniques.

This course maps to the 640-721, Implementing Cisco Unified Wireless Networking Essentials (IUWNE) exam objectives for identifying basic WLAN troubleshooting methods for controllers, access points, and client methodologies; and understanding RF deployment and troubleshooting issues. As well, the course covers the objectives for using the WLC and WCS troubleshooting tools.

Target Audience

Network associates, WLAN designers, planners, implementers, optimizers, trainers, or support personnel; candidates for the Implementing Cisco Unified Wireless Networking Essentials v1.0 640-721 examination, seeking to attain Cisco's CCNA-WIRELESS credential

Prerequisites

Certification in Interconnecting Cisco Networking Devices Part 1 (ICND1/CCENT); knowledge and skills commensurate with Interconnecting Cisco Networking Devices Part 2 (ICND2); a working knowledge of the Windows operating system and Cisco IOS networking and concepts

Expected Duration - 1.5 hours

Lesson Objectives

Maintaining the System

- Recognize how to upgrade or downgrade controller code
- Identify WCS database backup procedures

Understanding Interference

- Recognize the sources and nature of interference

Coverage Considerations

- Recognize considerations for conducting a predeployment site survey

Client, Controller, and AP Issues

- Recognize how to use visual elements to isolate a problem
- Recognize how to detect common client, controller, and AP issues

Layer 2 and Layer 3 Troubleshooting

- Recognize how to test Layer 2 and Layer 3 connectivity



Logs and Troubleshooting Tools

- Recognize how logs and messages can be used for troubleshooting
- Recognize Cisco and third-party troubleshooting tools

Configuring Troubleshooting Options

- Configure logs and SNMP traps to monitor the wireless network

Course ID: cc_iuwn_a12_it_enus

Mentoring 640-721 Implementing Cisco Unified Wireless Networking Essentials (IUWNE)

Overview/Description

SkillSoft Mentors are available to help students with their studies for exam 640-721 Implementing Cisco Unified Wireless Networking Essentials (IUWNE). You can reach them by entering a Mentored Chat Room or by using the E-mail My Mentor service.

Target Audience

Individuals who are studying the associated SkillSoft content in preparation for, or to become familiar with, the skills and competencies being measured by the actual certification exam.

Objectives

Mentoring 640-721 Implementing Cisco Unified Wireless Networking Essentials (IUWNE)

- Describe WLAN fundamentals
- Install a basic Cisco wireless LAN
- Install Wireless Clients
- Implement basic WLAN Security
- Operate basic WCS
- Conduct basic WLAN Maintenance and Troubleshooting

Course ID: mnt640721

TestPrep 640-721 Implementing Cisco Unified Wireless Networking Essentials (IUWNE)

Overview/Description

To test your knowledge on the skills and competencies being measured by the vendor certification exam. TestPrep can be taken in either Study or Certification mode. Study mode is designed to maximize learning by not only testing your knowledge of the material, but also by providing additional information on the topics presented. Certification mode is designed to test your knowledge of the material within a structured testing environment, providing valuable feedback at the end of the test.



Target Audience

Individuals seeking practice in a structured testing environment, covering the skills and competencies being measured by the vendor certification exam.

Expected Duration - 1.5 hours

Lesson Objectives

Describe WLAN fundamentals

Install a basic Cisco wireless LAN

Install Wireless Clients

Implement basic WLAN Security

Operate basic WCS

Conduct basic WLAN Maintenance and Troubleshooting

Course ID: cc_iuwn_a01_tp_enus