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Implementing and Administering Cisco Solutions (CCNA) v1.0 is a 5-day class that teaches learners how to install, operate, configure, and verify a basic IPv4 and IPv6 network, including configuring a network components, such as switch, router, and Wireless LAN Controller; managing network devices, and identifying basic security threats. Today's job roles are ever changing. The new CCNA will now cover wireless, overview of SD-WAN, DNA Center and Security threats.

 The goal of the course is to provide learners with the knowledge and skills that are necessary to install, configure, and operate a small to medium-sized network.

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Pre-requisitos

Attendees should meet the following prerequisites:

- Basic computer literacy
- Basic PC operating system navigation skills
- Basic internet usage skills
- Basic IP address knowledge

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Contenido

Section 1: Exploring the Functions of Networking

• Identify the components of a computer network and describe their basic characteristics

• Define a network and describe examples of networks 12 Implementing and Administering Cisco Solutions (CCNA)

• Components of a Network

• Characteristics of a Network

• Physical vs. Logical Topologies

• Compare and contrast logical and physical topologies

• Interpreting a Network Diagram

• Impact of User Applications on the Network

Section 2: Introducing the Host-To-Host Communications Model

• Host-To-Host Communications Overview

• ISO OSI Reference Model

• TCP/IP Protocol Suite

• Peer-To-Peer Communications

• Encapsulation and De-Encapsulation

• Describe the process of encapsulation and de-encapsulation

• TCP/IP Stack vs OSI Reference Model

Section 3: Operating Cisco IOS Software

• Cisco IOS Software Features and Functions

• Cisco IOS Software CLI Functions

• Cisco IOS Software Modes

Section 4: Introducing LANs

• Local Area Networks

• LAN Components

• Need for Switches

• Characteristics and Features of Switches

Section 5: Exploring the TCP/IP Link Layer

• Ethernet LAN Connection Media

• Ethernet Frame Structure

• Describe the fields of an Ethernet frame

• LAN Communication Types

• MAC Addresses

• Frame Switching

• Duplex Communication

Section 6: Starting a Switch

• Switch Installation

• Connecting to a Console Port

• Switch LED Indicators

• Basic show Commands and Information

Section 7: Introducing the TCP/IP Internet Layer, IPv4 Addressing, and Subnets

• Internet Protocol

• Decimal and Binary Number Systems

• Binary-to-Decimal Conversion

• Decimal-to-Binary Conversion

• IPv4 Address Representation

• IPv4 Header Fields

• IPv4 Address Classes

• Subnet Masks

• Subnets

• Implementing Subnetting: Borrowing Bits

• Implementing Subnetting: Determining the Addressing Scheme

• Benefits of VLSM and Implementing VLSM

• Private vs. Public IPv4 Addresses

• Reserved IPv4 Addresses

• Verifying IPv4 Address of a Host

Section 8: Explaining the TCP/IP Transport Layer and Application Layer

• TCP/IP Transport Layer Functions

• Reliable vs. Best-Effort Transport

• TCP Characteristics

• UDP Characteristics

• TCP/IP Application Layer

• Introducing HTTP

• Domain Name System

• Explaining DHCP for IPv4

Section 9: Exploring the Functions of Routing

• Role of a Router

• Router Components

• Router Functions

• Routing Table

• Path Determination

Section 10: Configuring a Cisco Router

• Initial Router Setup

• Configuring Router Interfaces

• Configuring IPv4 Addresses on Router Interfaces

• Checking Interface Configuration and Status

• Exploring Connected Devices

• Using Cisco Discovery Protocol

• Configure and Verify LLDP

• Implement an Initial Router Configuration

Section 11: Exploring the Packet Delivery Process

• Layer 2 Addressing

• Layer 3 Addressing

• Default Gateways

• Address Resolution Protocol

• Host-To-Host Packet Delivery

Section 12: Troubleshooting a Simple Network

• Troubleshooting Methods

• Troubleshooting Tools

• Troubleshooting Common Switch Media Issues

• Troubleshooting Common Switch Port Issues

• Identify common access port issues

• Troubleshooting Common Problems Associated with IPv4 Addressing

Section 13: Introducing Basic IPv6

• IPv4 Address Exhaustion Workarounds

• IPv6 Features

• IPv6 Addresses and Address Types

• Comparison of IPv4 and IPv6 Headers

• Internet Control Message Protocol Version 6

• Neighbor Discovery

• IPv6 Address Allocation

• Verification of End-To-End IPv6 Connectivity

Section 14: Configuring Static Routing

• Routing Operation

• When to Use Static Routing

• IPv4 Static Route Configuration

• Default Routes

• Verifying Static and Default Route Configuration

• Configuring IPv6 Static Routes

• Implement IPv4 Static Routing • Implement IPv6 Static Routing

Section 15: Implementing VLANs and Trunks

• VLAN Introduction

• Creating a VLAN

• Assigning a Port to a VLAN

• Trunking with 802.1Q

• Configuring an 802.1Q Trunk

• VLAN Design Consideration

• Troubleshoot VLANs and Trunk

Section 16: Routing Between VLANs

• Purpose of Inter-VLAN Routing

• Options for Inter-VLAN Routing

• Implement Multiple VLANs and Basic Routing Between the VLANs

Section 17: Introducing OSPF

• Dynamic Routing Protocols

• Path Selection

• Link-State Routing Protocol Overview

• Link-State Routing Protocol Data Structures

• Introducing OSPF

• Establishing OSPF Neighbor Adjacencies

• OSPF Neighbor States

• SPF Algorithm

• Building a Link-State Database

• Routing for IPv6

Section 18: Building Redundant Switched Topologies

• Physical Redundancy in a LAN

• Issues in Redundant Topologies

• Spanning Tree Operation

• Types of Spanning Tree Protocols

• Rapid Spanning Tree Protocol

• PortFast and BPDU Guard

Section 19: Improving Redundant Switched Topologies with EtherChannel

• EtherChannel Overview

• EtherChannel Configuration Options

• Configuring and Verifying EtherChannel

• Improve Redundant Switched Topologies with EtherChannel

Section 20: Exploring Layer 3 Redundancy

• Need for Default Gateway Redundancy

• Understanding FHRP

• Understanding HSRP

Section 21: Introducing WAN Technologies

• Introduction to WAN Technologies

• WAN Devices and Demarcation Point

• WAN Topology Options

• WAN Connectivity Options

• Virtual Private Networks

• Enterprise-Managed VPNs

• Provider-Managed VPNs

Section 22: Explaining Basics of ACL

• ACL Overview

• ACL Operation

• ACL Wildcard Masking

• Wildcard Mask Abbreviations

• Types of Basic ACLs

• Configuring Standard IPv4 ACLs

• Configuring Extended IPv4 ACLs

• Verifying and Modifying IPv4 ACLs

• Applying IPv4 ACLs to Filter Network Traffic

• Implement Numbered and Named IPv4 ACLs

Section 23: Enabling Internet Connectivity

• Configure internet access using DHCP clients and explain and configure NAT on Cisco routers

• Introducing Network Address Translation

• NAT Terminology and Translation Mechanisms

• Benefits and Drawbacks of NAT

• Static NAT and Port Forwarding

• Dynamic NAT

• Port Address Translation

• Configuring and Verifying Inside IPv4 NAT

• Implement PAT

Section 24: Introducing QoS

• Converged Networks

• Quality of Service Defined

• QoS Policy

• QoS Mechanisms

• QoS Models

• Deploying End-to-End QoS

Section 25: Explaining Wireless Fundamentals

• Wireless Technologies

• WLAN Architectures

• WLAN Components

• WiFi Channels

• AP and WLC Management

Section 26: Introducing Architectures and Virtualization

• Introduction to Network Design

• Enterprise Three-Tier Hierarchical Network Design

• Spine-Leaf Network Design

• Cisco Enterprise Architecture Model

• Cloud Computing Overview

• Device Architecture

• Virtualization Fundamentals

Section 27: Explaining the Evolution of Intelligent Networks

• Overview of Network Programmability in Enterprise Networks

• Software-Defined Networking

• Common Programmability Protocols and Methods

• Configuration Management Tools

• Introducing Cisco DNA Center

• Cisco SD-Access

• Introducing Cisco SD-WAN

Section 28: Introducing System Monitoring

• Introducing Syslog

• Syslog Message Format

• SNMP Overview

• Enabling Network Time Protocol

• Configure System Message Logging

Section 29: Managing Cisco Devices

• Cisco IOS Integrated File System and Devices

• Stages of the Router Power-On Boot Sequence

• Loading and Managing System Images Files

• Loading Cisco IOS Configuration Files

• Validating Cisco IOS Images Using MD5

• Managing Cisco IOS Images and Device Configuration Files

Section 30: Examining the Security Threat Landscape

• Security Threat Landscape Overview

• Malware

• Hacking Tools

• Denial of Service and Distributed Denial of Service

• Spoofing

• Reflection and Amplification Attacks

• Social Engineering

• Evolution of Phishing

• Password Attacks

• Reconnaissance Attacks

• Buffer Overflow Attacks

• Man-in-the-Middle Attacks

• Vectors of Data Loss and Exfiltration

• Other Considerations

Section 31: Implementing Threat Defense Technologies

• Information Security Overview

• Firewalls

• Intrusion Prevention Systems

• Introduction to Cryptographic Technologies

• IPsec Security Services

• Secure Sockets Layer and Transport Layer Security

• Wireless Security Protocols

• Configure WPA2 PSK

Section 32: Securing Administrative Access

• Network Device Security Overview

• Securing Access to Privileged EXEC Mode

• Securing Console Access

• Securing Remote Access

• Configuring the Login Banner

• Limiting Remote Access with ACLs

• External Authentication Options

• Secure Device Administrative Access

Section 33: Implementing Device Hardening

• Securing Unused Ports

• Infrastructure ACL

• Disabling Unused Services

• Port Security Overview

• Mitigating VLAN Attacks

• DHCP Snooping

• Dynamic ARP Inspection

• Implement Device Hardening

LAB OUTLINE

• Discovery 1: Get Started with Cisco CLI

• Discovery 2: Observe How a Switch Operates

• Discovery 3: Perform Basic Switch Configuration

• FASTLab 1: Implement the Initial Switch Configuration

• Discovery 4: Inspect TCP/IP Applications

• Discovery 5: Configure an Interface on a Cisco Router

• Discovery 6: Configure and Verify Layer 2 Discovery Protocols

• FASTLab 2: Implement an Initial Router Configuration

• Discovery 7: Configure Default Gateway

• Discovery 8: Explore Packet Forwarding

• Discovery 9: Troubleshoot Switch Media and Port Issues

• Discovery 10: Troubleshoot Port Duplex Issues

• Discovery 11: Configure Basic IPv6 Connectivity

• Discovery 12: Configure and Verify IPv4 Static Routes

• Discovery 13: Configure IPv6 Static Routes

• FASTLab 3: Implement IPv4 Static Routing

• FASTLab 4: Implement IPv6 Static Routing

• Discovery 14: Configure VLAN and Trunk

• FASTLab 5: Troubleshoot VLANs and Trunk

• Discovery 15: Configure a Router on a Stick

• FASTLab 6: Implement Multiple VLANs and Basic Routing Between the VLANs

• Discovery 16: Configure and Verify Single-Area OSPF

• Discovery 17: Configure and Verify EtherChannel

• FASTLab 7: Improve Redundant Switched Topologies with EtherChannel

• Discovery 18: Configure and Verify IPv4 ACLs

• FASTLab 8: Implement Numbered and Named IPv4 ACLs

• Discovery 19: Configure a Provider-Assigned IPv4 Address

• Discovery 20: Configure Static NAT

• Discovery 21: Configure Dynamic NAT and PAT

• FASTLab 9: Implement PAT

• Discovery 22: Log into the WLC

• Discovery 23: Monitor the WLC

• Discovery 24: Configure a Dynamic (VLAN) Interface

• Discovery 25: Configure a DHCP Scope

• Discovery 26: Configure a WLAN

• Discovery 27: Define a RADIUS Server

• Discovery 28: Explore Management Options

• Discovery 29: Explore the Cisco DNA Center

• Discovery 30: Configure and Verify NTP

• FASTLab 10: Configure System Message Logging

• Discovery 31: Create the Cisco IOS Image Backup

• Discovery 32: Upgrade Cisco IOS Image

• Discovery 33: Configure WLAN Using WPA2 PSK Using the GUI

• Discovery 34: Secure Console and Remote Access

• Discovery 35: Enable and Limit Remote Access Connectivity

• FASTLab 11: Secure Device Administrative Access

• Discovery 36: Configure and Verify Port Security

• FASTLab 12: Implement Device Hardening

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Objetivos del Curso

Upon completing this course, the learner will be able to meet these overall objectives:

• Identify the components of a computer network and describe their basic characteristics

• Understand the model of host-to-host communication

• Describe the features and functions of the Cisco Internetwork Operating System (IOS®) software

• Describe LANs and the role of switches within LANs

• Describe Ethernet as the network access layer of TCP/IP and describe the operation of switches

• Install a switch and perform the initial configuration

• Describe the TCP/IP Internet layer, IPv4, its addressing scheme, and subnetting

• Describe the TCP/IP Transport layer and Application layer

• Explore functions of routing

• Implement basic configuration on a Cisco router

• Explain host-to-host communications across switches and routers Identify and resolve common switched network issues and common problems associated with IPv4 addressing

• Describe IPv6 main features and addresses, and configure and verify basic IPv6 connectivity

• Describe the operation, benefits, and limitations of static routing

• Describe, implement, and verify Virtual Local Area Networks (VLANs) and trunks

• Describe the application and configuration of inter-VLAN routing

• Explain the basics of dynamic routing protocols and describe components and terms of Open Shortest Path First (OSPF)

• Explain how Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP) work

• Configure link aggregation using EtherChannel

• Describe the purpose of Layer 3 redundancy protocols

• Describe basic WAN and VPN concepts

• Describe the operation of Access Control Lists (ACLs) and their applications in the network

• Configure Internet access using Dynamic Host Configuration Protocol (DHCP) clients and explain and configure Network Address Translation (NAT) on Cisco routers

• Describe basic Quality of Service (QoS) concepts

• Describe the concepts of wireless networks, which types of wireless networks can be built, and how to use Wireless LAN Controllers (WLCs)

• Describe network and device architectures and introduce virtualization

• Introduce the concept of network programmability and Software-Defined Networking (SDN) and describe smart network management solutions such as Cisco DNA Center™, Software-Defined Access (SD-Access), and Software-Defined Wide Area Network (SD-WAN)

• Configure basic IOS system monitoring tools

• Describe the management of Cisco devices

• Describe the current security threat landscape

• Describe threat defense technologies

• Implement a basic security configuration of the device management plane

• Implement basic steps to harden network devices

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The primary audience for this course is as follows:

• Individuals seeking the Cisco CCNA certification

• Entry-level network engineer

• Network administrator

• Network support technician

• Help desk technician

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