Implementing and Administering Cisco Solutions

OUR LEARNING EXCLUSIVE

- Custom exam prep software and materials
- Exam delivery in the classroom, with a **98% success rate**
- Course-specific thinQtank® Learning publications to make the learning fun and engaging
- Extended hours of training, including immersive hands-on exercises
- **We do not teach the test.** We always deliver valuable hands-on experience
- All reading material and study guides sent to you when you register
- Every course taught by CCIE expert instructors

TRAINING CAMP FORMAT

thinQtank® Learning delivers this course as an intensive, **extended-hours instructor-led boot camp**, with the exam sat in the classroom as part of the camp. The extended days are **entirely instructor-led** and cover the self-study content as well as the standard delivery — you are not sent away to work through it alone. That self-study material also arrives as part of the digital courseware on day one and should form part of your exam preparation. Camps are scheduled by cohort rather than to a fixed calendar, and the balance of lecture and practical lab work is set to suit the group and the delivery method. Contact us for the schedule covering your dates.

PREREQUISITES

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

COURSE OBJECTIVES

On completing this course you will be able to:

- Identify the components of a computer network and explain their basic characteristics
- Describe the features and functions of Cisco IOS Software
- Explain IPv4 and IPv6 addressing schemes, and subnet an IPv4 network
- Implement basic configurations on a Cisco switch and a Cisco router
- Configure VLANs, trunks and inter-VLAN routing
- Configure static routing and single-area OSPF
- Build redundant switched topologies with STP and EtherChannel
- Configure IPv4 access control lists, NAT and PAT
- Identify and resolve common switching and routing issues
- Describe network and device architectures, and explain virtualization
- Describe smart network management solutions — Cisco Catalyst Center, SD-Access and Cisco Catalyst SD-WAN
- Explain the role of AI and machine learning in network operations
- Outline threat defense technologies, and harden Cisco devices against common attacks
- Describe wireless fundamentals and configure a WLAN on a wireless LAN controller

COURSE OVERVIEW

thinQtank® Learning offers an industry-unique training camp in which students earn the **Cisco Certified Network Associate** certification. As with all our Cisco training experiences, the exam is delivered in the classroom.

Implementing and Administering Cisco Solutions teaches you how to install, operate, configure and verify basic IPv4 and IPv6 networks — configuring network components including switches, routers and wireless LAN controllers, managing network devices, and identifying basic security threats.

The course provides a broad range of fundamental knowledge for all IT careers. Network programmability, automation and software-defined networking are covered at a foundational level, alongside an introduction to the role of **AI and machine learning** in network operations.

CCNA is the industry's most widely recognized associate-level networking certification, and the single exam — **200-301** — is the foundation the entire Cisco professional-level track is built on.

EXAM

200-301 CCNA — Implementing and Administering Cisco Solutions

This outline follows course version 2.2.

One exam earns the **Cisco Certified Network Associate** certification — the associate-level foundation for the whole Cisco professional track.

TARGET AUDIENCE

- Anyone looking to earn their **CCNA** certification
- Support technicians who install, operate and verify Cisco network solutions
- Anyone preparing to go on to a **CCNP** certification
- Entry-level network engineers and network administrators
- Network support technicians and help desk technicians

DELIVERY METHODS

- Instructor-led training
- Immersive live-online training
- On-site and custom delivery

EXCLUSIVE LEARNING PACKAGE

- Comprehensive video training package
- Hundreds of pre-built labs for continued practice and learning
- Custom Linux builds for LAN penetration testing
- After-course instructor coaching benefits
- Exam voucher included, and the exam delivered in the classroom

Implementing and Administering Cisco Solutions

COURSE OUTLINE

01 Exploring the Functions of Networking
- What is a Computer Network?
- Common Usage of a Computer Network
- Components of a Network
- Characteristics of a Network
- Physical vs. Logical Topologies
- Interpreting a Network Diagram
- Impact of User Applications on the Network

02 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
- TCP/IP Stack vs OSI Reference Model

03 Operating Cisco IOS Software
- Cisco IOS Software Features and Functions
- Cisco IOS Software CLI Functions
- Cisco IOS Software Modes

04 Introducing LANs
- Local Area Networks
- LAN Components
- Need for Switches
- Characteristics and Features of Switches

05 Exploring the TCP/IP Link Layer
- Ethernet LAN Connection Media
- Ethernet Frame Structure
- LAN Communication Types
- MAC Addresses
- Frame Switching
- Duplex Communication

06 Starting a Switch
- Switch Installation
- Connecting to a Console Port
- Switch Components
- Switch LED Indicators
- Basic show Commands and Information
- Implement the Initial Switch Configuration

07 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 the IPv4 Address of a Host

08 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

09 Exploring the Functions of Routing
- Role of a Router
- Router Components
- Router Functions
- Routing Table
- Path Determination
- Cisco Router Models
- Routing Hierarchy on the Internet

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

11 Exploring the Packet Delivery Process
- Layer 2 Addressing
- Layer 3 Addressing
- Default Gateways
- Address Resolution Protocol
- Host-to-Host Packet Delivery

12 Troubleshooting a Simple Network
- Troubleshooting Methods
- Troubleshooting Tools
- Troubleshooting Common Switch Media Issues
- Troubleshooting Common Switch Port Issues
- Troubleshooting Common Problems Associated with IPv4 Addressing

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

COURSE OUTLINE CONTINUED

14 Configuring Static Routing
- Routing Operation
- Static and Dynamic Routing Comparison
- When to Use Static Routing
- IPv4 Static Route Configuration
- Default Routes
- Verifying Static and Default Route Configuration
- IPv6 Static Route Configuration
- Implement IPv4 Static Routing
- Implement IPv6 Static Routing

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 Considerations
- Troubleshoot VLANs and Trunks

16 Routing Between VLANs
- Purpose of Inter-VLAN Routing
- Options for Inter-VLAN Routing
- Implement Multiple VLANs and Basic Routing Between the VLANs

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

18 Building Redundant Switched Topologies
- Physical Redundancy in a LAN
- Issues in Redundant Topologies
- Spanning Tree Operation
- Types of Spanning Tree Protocols
- PortFast, BPDU Guard and BPDU Filter
- Rapid Spanning Tree Protocol
- STP Loop Guard
- STP Root Guard

19 Improving Redundant Switched Topologies with EtherChannel
- EtherChannel Overview
- EtherChannel Configuration Options
- Configuring and Verifying EtherChannel
- Improve Redundant Switched Topologies with EtherChannel

20 Explaining the Basics of ACLs
- 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

21 Enabling Internet Connectivity
- 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

22 Introducing AI and ML in Network Operations
- Basics of AI and ML
- Advanced AI Concepts
- Retrieval-Augmented Generation
- Role of AI and ML in Network Operations

23 Managing Cisco Devices
- Cisco IOS Integrated File System and Devices
- Stages of the Router Power-On Boot Sequence
- Loading and Managing System Image Files
- Loading Cisco IOS Configuration Files
- Validating Cisco IOS Images Using MD5/SHA512
- Managing Cisco IOS Images and Device Configuration Files
- Cisco IOS WebUI

24 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

25 Implementing Device Hardening
- Securing Unused Ports
- Infrastructure ACL
- Disabling Unused Services
- Port Security
- Mitigating VLAN Attacks
- Dynamic ARP Inspection
- Mitigating STP Attacks
- Implement Device Hardening

26 Exploring Layer 3 Redundancy
- Need for Default Gateway Redundancy
- Understanding FHRP
- Understanding HSRP

COURSE OUTLINE CONTINUED

27 Introducing WAN Technologies
- Introduction to WAN Technologies
- WAN Devices and Demarcation Point
- WAN Topology Options
- WAN Connectivity Options
- Virtual Private Networks
- Enterprise-Managed VPNs

28 Introducing QoS
- Converged Networks
- QoS Defined
- QoS Policy
- QoS Mechanisms
- QoS Models
- Deploying End-to-End QoS

29 Explaining Wireless Fundamentals
- Wireless Technologies
- Wireless Radio Communication
- WLAN Architectures
- Wi-Fi Channels
- AP and WLC Management

30 Introducing Architectures and Virtualization
- Introduction to Network Design
- Enterprise Three-Tier Hierarchical Network Design
- Spine-Leaf Network Design
- Cisco Enterprise Architecture Model
- Underlay and Overlay Network Concepts
- Cloud Computing Overview
- Network Device Architecture
- Virtualization Fundamentals

31 Explaining Software-Defined Networking
- Software-Defined Networking
- Traditional versus Software-Defined Networks
- Software-Defined Network Layers
- Introducing Cisco Catalyst Center
- Cisco Catalyst Center Dashboard and Tools
- Introducing Cisco SD-Access
- Introducing Cisco Catalyst SD-WAN

LABS OUTLINE

01 Get Started with Cisco CLI
02 Observe How a Switch Operates
03 Perform Basic Switch Configuration
04 Inspect TCP/IP Applications
05 Configure an Interface on a Cisco Router
06 Configure and Verify Layer 2 Discovery Protocols
07 Configure Default Gateway
08 Explore Packet Forwarding
09 Troubleshoot Switch Media and Port Issues
10 Troubleshoot Port Duplex Issues
11 Configure Basic IPv6 Connectivity
12 Configure and Verify IPv4 Static Routes
13 Configure IPv6 Static Routes
14 Configure VLAN and Trunk
15 Configure a Router on a Stick
16 Configure and Verify Single-Area OSPF
17 Configure and Verify EtherChannel
18 Configure and Verify IPv4 ACLs
19 Configure a Provider-Assigned IPv4 Address
20 Configure Static NAT
21 Configure Dynamic NAT and PAT
22 Log In to the WLC
23 Monitor the WLC
24 Configure a Dynamic (VLAN) Interface
25 Configure a DHCP Server
26 Configure a WLAN
27 Define a RADIUS Server
28 Explore Management Options
29 Explore Cisco Catalyst Center
30 Configure and Verify NTP
31 Create the Cisco IOS Image Backup
32 Upgrade Cisco IOS Image
33 Configure WLAN Using WPA2 PSK Using the GUI
34 Secure Console and Remote Access
35 Enable and Limit Remote Access Connectivity
36 Configure and Verify Port Security

TERMS

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