Implementing and Operating Cisco Enterprise Network Core Technologies Training

Duration: **5 Day**

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The **Implementing and Operating Cisco Enterprise Network Core Technologies (ENCOR) v1.0** course provides the knowledge and practical skills required to configure, operate, manage, and troubleshoot enterprise wired and wireless networks.

Participants explore enterprise network architecture, switching, routing, wireless technologies, security, network services, automation, and programmability. The course also examines how overlay network designs can be implemented using technologies such as Cisco SD-Access and Cisco SD-WAN.

The programme develops practical understanding of enterprise network security principles, advanced routing and switching technologies, infrastructure services, network troubleshooting, and automation.

The course content also includes **three days of self-study material**.

This training supports preparation for the**350-401 Implementing Cisco Enterprise Network Core Technologies (ENCOR)** exam. The examination is associated with the following certification paths:

- CCNP Enterprise
- CCIE Enterprise Infrastructure
- CCIE Enterprise Wireless
- Cisco Certified Specialist – Enterprise Core

Prerequisites

Participants should have:

- Experience implementing Enterprise LAN networks
- A basic understanding of enterprise routing and wireless connectivity
- A basic understanding of Python scripting

Who Should Attend

This course is suitable for:

- Mid-level Network Engineers
- Network Administrators
- Network Support Technicians
- Help Desk Technicians

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What You Will Learn

By completing the course, participants will be able to:

- Explain the hierarchical network design model using access, distribution, and core layers
- Compare hardware and software switching mechanisms
- Describe TCAM, CAM, process switching, fast switching, and Cisco Express Forwarding
- Troubleshoot Layer 2 connectivity using VLANs and trunking
- Build redundant switched networks using Spanning Tree Protocol
- Troubleshoot link aggregation using EtherChannel
- Describe EIGRP features, metrics, and path selection
- Implement and optimise OSPFv2 and OSPFv3 for IPv4 and IPv6
- Work with OSPF adjacencies, packet types, areas, summarisation, and route filtering
- Implement EBGP interdomain routing, path selection, and single-homed and dual-homed designs
- Implement network redundancy using HSRP and VRRP
- Configure enterprise internet connectivity using static and dynamic NAT
- Describe server, switch, and network device virtualisation technologies
- Implement overlay technologies including VRF, GRE, VPN, and LISP
- Explain wireless networking concepts including RF, antenna characteristics, and wireless standards
- Compare autonomous AP and cloud-based wireless deployment models within Cisco WLC architectures
- Describe wireless roaming and location services
- Explain how APs communicate with WLCs for software, configuration, and centralised management
- Configure and verify EAP, WebAuth, and PSK wireless client authentication on a WLC
- Troubleshoot wireless client connectivity
- Troubleshoot enterprise networks using NTP, SNMP, Cisco IOS IP SLA, NetFlow, and Cisco IOS Embedded Event Manager
- Use show and debug commands and apply troubleshooting best practices
- Configure secure administrative access to Cisco IOS devices using CLI access, RBAC, ACLs, and SSH
- Apply device hardening concepts to reduce reliance on less secure services such as Telnet and HTTP
- Implement scalable administration using AAA and local databases
- Explain enterprise network security architecture, including VPNs, content security, logging, endpoint security, and personal firewalls
- Describe Cisco DNA Center Assurance and its role in Intent-Based Networking
- Explain the components of Cisco SD-Access, including nodes, the fabric control plane, data plane, and VXLAN gateways
- Describe the orchestration, management, control, and data planes of Cisco SD-WAN
- Explain multicast concepts including IGMP v2/v3, PIM dense mode, PIM sparse mode, and rendezvous points
- Describe Quality of Service concepts and their importance within enterprise networks
- Use basic Python components and conditional logic when writing and analysing scripts
- Explain network programmability protocols including NETCONF and RESTCONF
- Describe APIs available in Cisco DNA Center and vManage

Training Outline

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1. Examining Cisco Enterprise Network Architecture

- Enterprise network architecture
- Access, distribution, and core layers
- Hierarchical network design

2. Understanding Cisco Switching Paths

- Hardware and software switching
- TCAM and CAM
- Process switching
- Fast switching
- Cisco Express Forwarding

3. Implementing Campus LAN Connectivity

- VLANs
- Trunking
- Layer 2 connectivity
- Campus LAN troubleshooting

4. Building Redundant Switched Topologies

- Spanning Tree Protocol
- Redundant switched network design
- RSTP and MSTP concepts

5. Implementing Layer 2 Port Aggregation

- EtherChannel
- Link aggregation
- EtherChannel troubleshooting

6. Understanding EIGRP

- EIGRP features
- Metrics
- Path selection

7. Implementing OSPF

- OSPFv2
- OSPFv3
- Adjacencies
- Packet types
- Areas

8. Optimising OSPF

- Route summarisation
- Route filtering
- OSPF tuning

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- IPv4 and IPv6 optimisation

9. Exploring EBGP

- External Border Gateway Protocol
- Interdomain routing
- Path selection
- Single-homed networking
- Dual-homed networking

10. Implementing Network Redundancy

- HSRP
- VRRP
- Gateway redundancy

11. Implementing NAT

- Static NAT
- Dynamic NAT
- Enterprise internet connectivity

12. Introducing Virtualisation Protocols and Techniques

- Server virtualisation
- Switch virtualisation
- Network device virtualisation

13. Understanding Virtual Private Networks and Interfaces

- VRF
- GRE
- VPN
- LISP
- Overlay technologies

14. Understanding Wireless Principles

- Radio Frequency
- Antenna characteristics
- Wireless standards
- Wireless network components

15. Examining Wireless Deployment Options

- Autonomous Access Point deployments
- Cloud-based wireless designs
- Cisco Wireless LAN Controller architecture

16. Understanding Wireless Roaming and Location Services

- Wireless roaming
- Location services

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- Mobility concepts

17. Examining Wireless AP Operation

- Communication between APs and WLCs
- Software distribution
- Configuration management
- Centralised administration

18. Understanding Wireless Client Authentication

- EAP
- WebAuth
- PSK
- WLC authentication configuration

19. Troubleshooting Wireless Client Connectivity

- Wireless connectivity troubleshooting
- Troubleshooting tools
- Client connectivity verification

20. Introducing Multicast Protocols

- IGMP v2/v3
- PIM dense mode
- PIM sparse mode
- Rendezvous points

21. Introducing Quality of Service

- QoS concepts
- The role of QoS within enterprise networks

22. Implementing Network Services

- NTP
- SNMP
- Cisco IOS IP SLA
- NetFlow
- Cisco IOS Embedded Event Manager

23. Using Network Analysis Tools

- Show commands
- Debug commands
- Network troubleshooting best practices

24. Implementing Infrastructure Security

- Secure CLI access
- RBAC
- ACLs

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- SSH
- Device hardening
- Limiting less secure services such as Telnet and HTTP

25. Implementing Secure Access Control

- Authentication, Authorization, and Accounting
- Local databases
- Server-based AAA
- Scalable administration

26. Understanding Enterprise Network Security Architecture

- VPNs
- Content security
- Logging
- Endpoint security
- Personal firewalls
- Enterprise security components

27. Exploring Automation and Assurance Using Cisco DNA Center

- Cisco DNA Center Assurance
- Intent-Based Networking
- Network visibility
- Proactive monitoring
- Application experience

28. Examining the Cisco SD-Access Solution

- Cisco SD-Access components
- Nodes
- Fabric control plane
- Data plane
- VXLAN gateways

29. Understanding Cisco SD-WAN

- Orchestration plane
- Management plane
- Control plane
- Data plane
- Cisco SD-WAN solution architecture

30. Understanding the Basics of Python Programming

- Basic Python components
- Conditional statements
- Script writing
- Script analysis

31. Introducing Network Programmability Protocols

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- NETCONF
- RESTCONF
- Network automation concepts

32. Introducing APIs in Cisco DNA Center and vManage

- Cisco DNA Center APIs
- vManage APIs
- API-based network management

Lab Outline

- Investigate CAM
- Analyse Cisco Express Forwarding
- Troubleshoot VLAN and trunking issues
- Tune Spanning Tree Protocol and configure RSTP
- Configure Multiple Spanning Tree Protocol
- Troubleshoot EtherChannel
- Implement Multi-area OSPF
- Perform OSPF tuning
- Apply OSPF optimisation
- Implement OSPFv3
- Configure and verify Single-Homed EBGP
- Implement HSRP
- Configure VRRP
- Implement NAT
- Configure and verify VRF
- Configure and verify a GRE tunnel
- Configure Static VTI Point-to-Point tunnels
- Configure wireless client authentication in a centralised deployment
- Troubleshoot wireless client connectivity
- Configure Syslog
- Configure and verify Flexible NetFlow
- Configure Cisco IOS Embedded Event Manager
- Troubleshoot connectivity and analyse traffic using Ping, Traceroute, and Debug
- Configure and verify Cisco IP SLAs
- Configure Standard and Extended ACLs
- Configure Control Plane Policing
- Implement Local and Server-Based AAA
- Write and troubleshoot Python scripts
- Explore JSON objects and scripts using Python
- Use NETCONF over SSH
- Use RESTCONF with Cisco IOS XE Software

Exam Preparation

This course is designed to support preparation for the **350-401 Implementing Cisco Enterprise Network Core Technologies (ENCOR)** examination.

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