

CCNP ENTERPRISE - ENCOR 350-401

Implementing and Operating Cisco Enterprise Network Core Technologies v1.0

ENCOR - Implementing and Operating Cisco Enterprise Network Core Technologies v1.0 course gives you the knowledge and skills needed to configure, troubleshoot, and manage enterprise wired and wireless networks.

You'll also learn to implement security principles within an enterprise network and how to overlay network design by using solutions such as SD-Access and SD-WAN.

This exam tests a candidate's knowledge of implementing core enterprise network technologies including

- Dual stack (IPv4 and IPv6) architecture,
- Virtualization,
- Infrastructure (L2 and L3)
- Network assurance,
- Security
- Network Automation.

Who this course is for:

- Anyone who wants to prepare for the CCNP Enterprise certification exams
- Anyone who wants to learn routing at the professional level

COURSE CONTENT

CCNP Certifications - Overview

- About Cisco
- Cisco Certification Updates
- Cisco Re-Certification
- CCNP Certifications
- CCIE Certifications
- Cisco Certification Migration Options
- Required Exams for CCNP

ENCOR 350-401 Course Content

- CCNP ENCOR-350-401
- CCNP ENCOR-Contents

CCNP Labs- Setup - GNS3

- Cisco Lab Options
- About GNS3
- Installing GNS3 on Windows
- GNS3 - Adding IOS Images

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- Default Topology- IOS Routers -Initial Configurations
- IOS Default Topology
- Connecting GNS3 Topology to Host Computer
- GNS3- VMWARE Integration
- GNS3 - IOSv L2-L3 Configuration Steps
- GNS3 - ASA v Setup
- GNS3- IOU- L2-L3 Configuration Steps

Basic Switching

- Local Area Network
- Ethernet
- SOHO LANs
- Enterprise LAN
- Transmission Media - UTP cables
- Fiber Cables - Wireless
- Basic LAN Setup
- Address Resolution Protocol - ARP

Virtual LAN (VLAN)

- What is Broadcast Domain
- What is VLAN
- VLAN Types
- VLAN Ranges
- Creating VLANs
- VLANs- Assigning Ports
- VLAN-Design
- Voice VLAN
- 009 Management VLAN

Trunking VLANs

- VLANs- Multiple Switches
- Trunk Links
- Access- Trunk Links
- 802.3 Ethernet Frame Format
- Frame tagging - on Trunk Links
- Trunking Protocols - ISL-DOT1Q
- Trunk Link - Configuration

Inter-VLAN Routing

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- Forward Packets between VLANs
- VLAN Routing - Methods
- VLAN Routing- Physical Gateways
- VLAN Routing -Physical Gateway - Configuration
- VLAN Routing Physical Gateway- Limitations
- VLAN Routing - Sub interfaces
- VLAN Routing - Sub interfaces - Configuration - PART 1
- VLAN Routing- Sub interfaces -PART 2
- VLAN Routing Sub Interfaces - Advantages - Disadvantages
- VLAN Routing - SVI - L3 Switch
- SVI- Configurations
- SVI - Multiple Switches
- L3 Routed Ports

VLAN Trunking Protocol - VTP

- What is VTP
- VTP Modes
- VTP-configuration

Spanning Tree Protocol (STP)

- Bridging loops with Redundant links
- Bridging Loops - STP
- How STP Works
- Selecting Root Bridge
- Root Bridge - Verification
- Root Port Selection- PART 1
- Root Port Selection- PART 2
- STP till now - Review
- Selecting Designated Ports

STP Terminology

- Root Port -VS- Designated Ports
- STP - Hello BPDUs
- STP Convergence
- STP Timers
- STP Interfaces States

STP Tuning

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- Hierarchical Campus model
- Selecting Root Bridge -STP
- Tuning STP Cost-Priority - Timers
- EtherChannel - Port Channel
- 704 Spanning Tree Port Fast
- Rapid Spanning Tree Protocol - RSTP
- STP Convergence

Rapid STP /Multiple STP – RSTP & MSTP

- RSTP Port Roles
- RSTP BPDU
- Per VLAN STP (PVST) - Multiple STP (MSTP)
- Per VLAN STP - PVST
- MSTP Lab Verification
- Tuning MSTP Port Priority - Cost

Switch Port Analyzer – SPAN-RSPAN_ERSPAN

- SPAN - Switch Port Analyzer
- SPAN - Configuration Example
- Remote Switch Port Analyzer - RSPAN
- RSPAN - Example
- Encapsulated Remote SPAN - ERSPAN
- SPAN Conditions and Restrictions

Static -Default Routing

- Routing- Introduction
- Static Routing
- Static Routing Lab
- Static Routing- 3 Routers
- Default Routing
- Verify Default Routing
- Routing Table Lookup
- Building Routing table
- Floating Static-Default Routing - PART 1
- Floating Static-Default Routing - PART 2

OSPF Basics

- Knowledge - Prerequisite
- OSPF - Overview

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- OSPF - How it Works
- OSPF - Becoming Neighbors
- Router-ID
- OSPF - LSDB- Database
- Exchanging the LSDB
- Synchronize LSDB- Best Route
- Maintaining Neighbors - LSDB
- OSPF -Tables

OSPF Configuration - Single Area

- OSPF Configuration Syntax
- OSPF - Wild Card Mask
- OSPF Single Area - Pre-Requisite
- OSPF Single Area-Configuration
- OSPF - Single Area- Verification
- OSPF - Advertisement Example

OSPF Metric - COST

- Calculate Best Routes - OSPF
- OSPF Metric - COST
- Changing Interface Bandwidth
- Default Reference BW- Limitations
- Manual Cost
- Auto-Cost Reference BW

OSPF Multiple Areas

- OSPF Single Area - Limitations
- Multiple Areas
- Multi Area -Design Rules
- Multi-Area - Configurations
- LAB - Multi -Area- Configuration
- OSPFv2 Interface Subcommands

OSPF Network Types

- OSPF Network Types
- OSPF Broadcast Networks- DR-BDR
- 004 OSPF DR-BDR - Lab
- DR-BDR - Elections

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- 005 OSPF Point to Point Links

Advertising Default Routes - OSPF

- Advertising Default Routes -IGP
- OSPF Default Routes Advertisements
- OSPF Default Route- LAB
- OSPF Default Routes - Options

EIGRP Routing Protocol

- EIGRP
- EIGRP - How it works
- Verify EIGRP Process
- EIGRP Tables
- EIGRP Convergence
- Metric Path Calculation - 1
- Metric Path Calculation - 2
- EIGRP Configuration
- Successor- Feasible Successor
- Feasible - Reporting Distance
- Feasibility Condition

IPv4 Summarization

- Summarization
- Summarization - Advantages
- Auto-Summary
- Auto-Summary-Verification
- Manual Summary
- Calculate Summary Address- EX-1
- Calculate Summary Address- EX-2
- Calculate Summary Address- EX-3
- Summarization Conditions
- EIGRP Summarization
- Summarization - NULL 0
- OSPF Summarization LAB

IPv6

- IPV6- Introduction
- IPv6 Addressing
- IPV6 Address types

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- IPv6 Static Addressing
- IPv6 Static-Default Routing
- OSPFv3
- EIGRP-IPv6
- OSFv3 Summarization
- EIGRP6 Summarization

Border Gateway Protocol - BGP

- BGP Introduction
- When BGP is more Appropriate
- BGP Options Connecting to Internet

BGP Neighbors - IBGP

- Understanding BGP neighbors
- IBGP neighbors -LAB
- BGP Split Horizon Rule
- IBGP neighbors using loopbacks -LAB - PART 1
- IBGP neighbors using loopbacks -LAB - PART 2

External BGP - EBGP

- Basic EBGP configuration
- Using Next-hop-self

BGP Attributes

- Understanding BGP attributes
- BGP AS path-Origin-Next hop Attributes
- BGP Weight & Local preference Attributes

Weight & Local Preference Attributes

- BGP Path Manipulation using Weight -PART 1
- BGP Path Manipulation using Weight -PART 2
- Weight Attribute - using Route-Maps

Understanding IN OUT

- BGP Local Preference Attribute
- Local Preference - with Route-maps
- BGP Path Selection Process
- Clear IP BGP SESSIONS

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Threat Defense Technologies

- What is Firewall
- Next Generation Firewalls
- AAA- Network Security
- Cisco Traffic Telemetry methods
- Virtual Private Networks
- Web Access-Possible Threats
- Web Traffic-Security
- Cisco Web Security - WSA - CWS
- Email Based Threats
- Cisco Email Security - ESA - CES
- Intrusion Prevention System - IPS

Network Infrastructure Protection

- Network Infrastructure Protection
- Identify Network Planes
- Data Plane
- Control Plane
- Management Plane

Remote Management - TELNET -SSH

- Inband vs OutBand
- Remote Access - Telnet
- Remote Access - SSH

AAA - Authentication-Authorization-Accounting

- AAA- Network Security
- AAA - Components
- AAA - Protocols -TACACS- RADIUS

AAA - Cisco Authentication Servers

- AAA - Authentication
- AAA Authentication - Device Access
- Authentication - Local Database
- AAA - External Servers
- LAB- Authentication - TACACS

AAA Authorization

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- Authorization - Device Access
- IOS Privilege Levels
- LAB -Local Authorization- Privilege Levels
- IOS Privilege Levels - Limitations
- Role based CLI Access - RBAC
- RBAC - Views Types
- LAB1- RBAC Views
- LAB2 - Modify RBAC Views
- LAB3 - RBAC Views
- LAB4 - RBAC Super Views

Cisco Telemetry Services

- Cisco Traffic Telemetry methods
- Device-Network Events Logging
- Syslog - Terminal Logging
- Network Time Protocol
- NTP -Stratum Value
- LAB - NTP - Configuration

Access Control Lists- ACL

- Access Control Lists
- ACL Types
- Standard - Extended ACL
- ACL Logic- How Match Rules

Standard ACL

- Standard ACL lab - Prerequisite
- Standard ACL Lab
- ACL - Wild Card Mask
- ACL Statements- Things to Know
- Standard ACL - Configuration
- Apply ACL - Select Right Interface
- Standard ACL- IN- OUT
- Standard ACL - Verification
- Standard ACL- Wrong Direction
- Standard ACL - Practice Examples
- Standard ACL- Find IP-Ranges

Extended ACL

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- Extended ACL
- Extended ACL- Lab Pre-Requisite
- Extended ACL - Config Example
- Similarities- Extended - Standard ACL
- Extended ACL- Things to Know
- Extended ACL- Syntax
- Extended ACL- Configuration
- Extended ACL-Apply - Verify
- Extended ACL - Examples

Named ACL

- Named ACLs
- Named ACL- Syntax
- Named Standard ACL - Configuration
- Named Extended ACL - Configuration
- Editing Named ACLs

Control Plane Security

- Control Plane - Possible Threats
- Routing Protocol Authentication
- Control Plane Policing -CoPP
- Classmap -Policymap -Hierarchy
- CoPP_ Configuration Example

Zone Based Firewall - ZBF

- IOS - Zone based Firewall
- ZBF- Configuration overview
- ZBF- Security Zones
- ZBF - Default Traffic flow
- Class Map -Policy Map -Hierarchy
- ZBF - Classify Traffic using Class-maps
- ZBF- Class-map Configuration
- ZBF- Policy map- Zone Pairs

Virtual Private Networks - VPN

- VPN-Introduction
- VPN Types
- VPN Logical Typologies
- VPN Default Lab Setup- Routers

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GRE - Generic Routing Encapsulation

- VPN over Internet
- Generic Routing encapsulation
- Default Lab setup
- LAB- GRE point to point Configuration
- LAB- GRE point to point Configuration Advance
- Drawbacks of GRE

Dynamic Multipoint VPN - DMVPN

- DMVPN - Introduction
- DMVPN-Protocols
- DMVPN - mGre Tunnels
- DMVPN-NHRP Protocol - Messages
- VPN Default Lab Setup- Routers
- DMVPN-Basic Tunnel Configuration Example
- EIGRP Routing over DMVPN

What is IPSEC ?

- What is IPSEC
- IPsec Security Services
- IPsec Modes - Tunnel vs Transport

IPSEC Site to Site VPN

- How IPsec VPN works
- Step-1 Interesting Traffic Configuration
- Step-2 IKE Phase-1
- Step-3- IKE - Phase 2
- IKE Phase -2 Configuration- Verification

Network Address Translation -NAT

- NAT- What we Cover
- Why do we need NAT
- What is NAT
- NAT Types
- NAT - Lab Setup
- Static NAT - LAB
- Dynamic NAT- LAB
- PAT- LAB
- PAT with Exit Interface

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First Hop Redundancy Protocols (FHRP)

- First Hop Redundancy Protocols - Overview
- FHRP Protocols - HSRP - VRRP - GLBP
- HSRP lab - Basic Configuration
- HSRP lab - Advance Configuration
- HSRP Load sharing using Multiple Groups
- VRRP Configuration LAB
- GLBP Configuration LAB
- GLBP - Tracking and Load Balancing

IP Service Level Agreement - IP SLA

- IP SLA Configuration Example
- IP Service Level Agreement

IP Multicasting

- Multicasting - Overview
- Multicast-Benefits
- How Multicast works
- Multicast IP Ranges

IGMP - PIM Protocols

- IGMP Protocol and Versions
- Protocol independent Multicast
- PIM Modes -Trees
- Dense mode - Configuration
- RPF check _ loop prevention

PIM Sparse Mode - Rendezvous Point

- PIM sparse-mode Operation
- Sparse-Mode Configuration
- Static RP
- Auto-RP
- Auto-RP Configuration
- Auto-RP Redundancy
- Auto-RP Load Sharing
- PIM-Bootstrap Router

Quality of Service (QoS)

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- Quality of Service (QoS) - Overview
- QoS - MQC configuration
- Quality of Service (QoS) Mechanisms
- QoS Models

Classification & Marking

- Classification and Marking
- Layer 2 & Layer 3 Marking
- Classification & Marking - Configuration Example

Congestion Management - Queueing

- Queueing - Overview
- Legacy Queueing Mechanisms
- 603 Weighted fair Queueing
- Class Based Weighted Fair Queueing
- Low Latency Queueing

QoS - Congestion Avoidance

- Congestion Avoidance- Introduction
- WRED-CBWRED
- CBWRED-configuration
- Traffic Policing - Shaping
- Traffic Policing and Shaping

What is Network Management ?

- What is Network Management
- Past-Present Methods of Network Management - PART 1
- Past-Present Methods of Network Management - PART 2
- SNMP - Simple Network Management Protocol

What is Network Automation ?

- Challenges - Traditional Management
- Network Automation- Goals
- Types of Network Automation
- What can be Automated- PART 1
- What can be Automated - PART 2
- Impact of Network Automation

Software Defined Networking - SDN & SDN Controllers

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- Automation Origination Points
- SDN- Software Defined Networking
- SDN Controllers
- Networks Managed by SDN Controllers

SDN-Control - Management - Data Planes

- Identify Network Device Planes
- Identify Network Device Planes
- Data Plane
- Control Plane
- Management Plane
- Control Plane- Data Plane
- SDN- management Plane

SDN Models - Architecture

- SDN - Imperative Model
- SDN - Declarative Model
- SDN-Network Design Requirements
- Underlay Networks
- Overlay Networks
- SDN Fabric

Application Programming Interface - API

- API - Application Programming Interface
- API - Types
- API - with SDN Networks
- NorthBound API
- SouthBound API

Cisco DEVNET- SANDBOX

- Cisco DEVNET
- DevNET Certifications
- DevNET SandBox
- Sandbox LABS
- Sandbox Lab Access-Reservations

Cisco DNA Center

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- Cisco DNA Center
- DNA Center Appliance
- DNA Center- What can do - PART 1
- DNA Center- What can do - PART 2

Application Programming Interface - API

- Web Service API
- Web Service API - Commonly Used
- REST API

Network Automation Tools

- Config MGMT Tools
- Config MGMT Tools - Capabilities
- Config-MGMT tools - Similarities
- Master - Agent
- Agent based- Agentless
- Push-Pull Model
- Configuration Files

PUPPET Config Management Tool

- PUPPET-Tool
- Puppet Master-Agent-Database
- Puppet-Manifest
- Puppet-Module-Forge
- Puppet Agent-Agentless
- Puppet- PULL Model Steps

CHEF Config Management Tool

- CHEF-Terminology
- CHEF- Config MGMT Tool

ANSIBLE Config MGMT Tool

- ANSIBLE-Tool
- ANSIBLE-Control Station
- ANSIBLE -PLayBook-Inventory
- ANISBLE - Templates-Variables

JSON DATA Encoding

- API Data Formats

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- JSON Overview
- JSON Data Types
- JSON Syntax Rules
- JSON Data Interpretation

Wireless LAN Foundations -WLAN

- Wired vs Wireless Networks
- Types of Wireless Networks
- WLAN Devices - AP-WLC
- Ad-HOC vs Infrastructure Mode

Service Sets - SSID-BSS-ESS

- SSID-Service Set Identifier
- Service Sets - Types
- Independent Basic Service Set - IBSS
- Basic Service Set -BSS
- Extended Service Set- ESS
- Distribution System

RF - WLAN Standards

- Wireless Signal Basics
- Frequency - Ranges
- IEEE- 802 Standards
- 802.11 - Wireless LAN Standards
- 802.11 - a - b - g
- 802.11 n
- 802.11 ac
- 802.11 ax

Wireless Architecture - WLC Deployments

- Wireless Architectures
- Autonomous AP - Architecture
- Autonomous AP - Challenges
- Split-MAC Architecture- Lightweight AP
- LAP-WLC Binding
- CAPWAP Tunnels

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- CAPWAP Messages
- WLC Deployments Methods



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