Designing Cisco Enterprise Networks

Duration: 180 Days **Course Code: ENSLD** **Version: 2.0** **Delivery Method: Elearning (Self-paced)**

Overview:

The Designing Cisco Enterprise Networks (ENSLD) course provides the skills, technologies and best practices needed to design an enterprise network, deepening your understanding of enterprise design including advanced addressing and routing solutions, advanced enterprise campus networks, WAN, security services, network services, and software-defined access SDA./P>
This course expands on the topics covered in the Implementing and Operating Cisco® Enterprise Network Core Technologies (ENCOR) course.

This course is worth 40 Continuing Education (CE) credits towards recertification

e-Learning

Interactive self-paced content that provides flexibility in terms of pace, place and time to suit individuals and organisations. These resources also consist of online books, educational podcasts and vodcasts, and video-based learning.

Target Audience:

Presales and postsales network engineers that are involved in network design, planning, and implementation, Network administrators and designers that are responsible for designing and implementing the enterprise network.

Objectives:

- **After completing this course, you should be able to:**
- Design EIGRP internal routing for the enterprise network
- Design OSPF internal routing for the enterprise network
- Design IS-IS internal routing for the enterprise network
- Design a network based on customer requirements
- Design BGP routing for the enterprise network
- Describe the different types and uses of MP-BGP address families
- Describe BGP load sharing
- Design a BGP network based on customer requirements
- Decide where L2/L3 boundary will be in your Campus network and make design decisions
- Describe layer 2 design considerations for Enterprise Campus networks
- Design a LAN network based on customer requirements
- Describe layer 3 design considerations in an Enterprise Campus network
- Examine Cisco SD-Access fundamental concepts
- Describe Cisco SD-Access Fabric Design
- Design a resilient WAN network based on customer requirements
- Examine the Cisco SD-WAN architecture
- Describe Cisco SD-WAN deployment options
- Examine Cisco SD-WAN—NAT and hybrid design considerations
- Design Cisco SD-WAN redundancy
- Explain the basic principles of QoS
- Design QoS for the WAN
- Design QoS for enterprise network based on customer requirements
- Explain the basic principles of multicast
- Exploring Multicast with PIM-SM
- Designing rendezvous point distribution solutions
- Describe high-level considerations when doing IP addressing design
- Create an IPv6 addressing plan
- Plan an IPv6 deployment in an existing enterprise IPv4 network
- Describe the challenges that you might encounter when transitioning to IPv6
- Design an IPv6 addressing plan based on customer requirements
- Describe Network APIs and protocols

- Design an SD-Access Campus Fabric based on customer requirements
- Design service provider-managed VPNs
- Design enterprise-managed VPNs
- Design a resilient WAN
- Describe YANG, NETCONF and RESTCONF

Prerequisites:

Attendees should meet the following prerequisites:

- Understand network fundamentals
- Implement LANs
- Implement Internet connectivity
- CCNA - Implementing and Administering Cisco Solutions
- ENCOR - Implementing and Operating Cisco Enterprise Network Core Technologies

Testing and Certification

Recommended as preparation for the following exams:

- **300-420 ENSLD** - Designing Cisco Enterprise Networks

Follow-on-Courses:

- ENWLSD - Designing Cisco Enterprise Wireless Networks

Content:

Designing EIGRP Routing

- Describe Scalabale EIGRP Designs and Fast Convergence
- Examine EIGRP Autonomous Systems and Layered Designs
- Describe Scalable EIGRP Hub-and-Spoke and Stub Designs
- Describe EIGRP Convergence Features

Designing OSPF Routing

- OSPF Neigbour Adjacencies and LSAs
- OSPF Scalability Issues
- Define Area and Domain Summarization
- OSPF Full and Partial Mesh
- OSPF Convergence
- Design Case Study Activity: Designing an Enterprise Connectivity

Designing IS-IS Routing

- Describe IS-IS Routing Protocol
- Examine IS-IS Adjacencies and Authentication
- Describe IS-IS and OSPF Similarities
- Explore IS-IS Routing Logic
- Describe IS-IS Operations
- Examine Integrated IS-IS for IPv6

Designing BGP Routing and Redundancy

- Identify IBGP Scalability Issues
- BGP Route Reflector Terminology
- Describe BGP-Split-Horizon
- Route Reflector Loop Prevention Mechanisms
- BGP Confederation Loop Prevention Mechanisms
- Compare BGP Load Sharing Designs
- Examine Dual and Mulithomed BGP Designs

Explorig BGP Address Families and Attributes

- BGP Address Families and Attributes
- BGP Route Selection Preferences
- Describe BGP Communities
- Examine a Case Study - Designing a Dual-Stack MP-BGP Environment
- Design Case Study Activity: Designing an Enterprise Network with BGP Internet Connectivity

Designing an Enterprise Campus LAN

- Compare End-to-End and Local VLANs
- Describe the Layer 3 Access Layer
- Examine a Case Study
- Describe Cloud Deployment Models

Designing Layer 2 Campus

Exploring Cisco SD-Access Site Design Strategy and Considerations

- Cisco SD-Access Site Reference Models
- Cisco SD-Access Distributed Campus Considerations
- Migration to Cisco SD-Access
- Design Case Study Activity: Designing Cisco SD-Access in the Enterprise

Discovering Service Provider-Managed VPNs

- WAN Connection Decision Points
- Describe Layer 3 MPLS VPN
- Use Routing Protocols at the PE-CE

Designing Enterprise-Managed VPNs

- Enterprise-Managed VPNs Overview
- Describe GRE, mGRE and IPsec
- Describe Dynamic VTI, GET VPN, SSL VPN and Flex VPN
- Describe DMVPN
- Describe EIGRP DMVPN and DMVPN Scaling

Designing WAN Resiliency

- WAN Design Overview
- Describe Common MPLS WNA Design Models
- Describe Common Layer 2 WNA Design Models
- Describe Cmmon VPN WAN Design Models
- Describe Cellular VPN Design Models
- Remote Site Local Internet Connectivity
- Remote-Site LAN Design
- WAN Connectivity Case Study
- Describe Basic Traffic Engineering Techniques
- Describe Cloud Connectivity Options
- Design Case Study Activity: Designing Resilient Enterprise WAN

Examining Cisco SD-WAN Architectures

- Describe SDN for the WAN
- Describe Cisco SD-WAN Components and Functions
- Describe the Orchestration Plane
- Describe the Management Plane
- Describe the Control Plane
- Describe the Data Plane
- Describe SD-WAN Analytics
- Describe the Overlay Management Protocol
- Define OMP Network Terminology
- Describe Transport Locators
- Describe Fabric Operation

Examining Cisco SD-WAN Deployment Design Considerations

Introducing Multicast

- Explain How IP Multicast Works
- Explain Multicast Groups
- Describe SD-WNA Multicast Application Support
- Describe the Functions of a Multicast Network
- Describe Multicast Protocols
- Describe Multicast Forwarding and RPF Check
- Explain Multicast Protocol Basics

Exploring Multicast with PIM-SM

- Describe Multicast Distribution Trees Identification
- Describe Reciver Joins and Registering the Source
- Describe PIM-SM SPT Switchover
- Describe Multicast Routing Table
- Describe Basic SSM Concepts
- Describe Bidirectional PIM
- Describe DF Election and Messages
- Case Study: DF Election

Designing Rendezvous Point Distribution Solutions

- Rendezvous Point Discovery
- Case Study: Auto-RP Operation
- Auto-RP and BSR Flooding
- MSDP Protocol Overview

Designing an IPv4 Address Plan

- IPv4 Adress Planning Considerations
- Plan the IP Addressing Hierarchy
- Create an Addressing Plan
- Case Study: Design an IPv4 Address Space
- Case Study: Resolve Overlapping Address Ranges
- Allocating More IP Addresses

Exploring IPv6 (Self-Study)

- IPv6 Address Planning Considerations
- IPv6 for an Enterprise
- Describe IPv6 Address Allocation: Linked IPv4 Into IPv6
- Describe IPv6 Address Allocation: Per Location/Type
- Describe IPv6 Address Allocation: Per VLAN

Deploying IPv6 (Self-Study)

- Describe the IPv6 Phased Approach
- Identify IPv6 Services to Deploy
- IPv4 and IPv6 Coexistence
- Transition Mechanisms
- Describe NAT64 and DNS64

- Describe VLANs, Trunks and VTP
- Understanding the Spanning Tree Protocol
- Understanding Layer 2 Security Techniques
- Understand MST, POE, and EnergyWise
- Describe Port Aggregation Considerations
- First-Hop Redundancy
- Describe Network Requirements of Applications
- Design Case Study Activity: Designing an Enterprise Campus LAN

Designing a Layer 3 Campus

- The Benefits of Building Triangles
- Routing Convergence
- Describe Routing Protocols and Summarization
- Describe Default Routes, Redistribution and Filtering
- Examine Passive Interface, Routing Convergence and Routing IPv4 and IPv6
- Describe Network Management Best Practices

Discovering the Cisco SD-Access Architecture

- Cisco Software Defined Access Overview
- Cisco Software-Defined Access Architecture
- Cisco SD-Access Node Roles
- Cisco Software-Defined Access Definition and Benefits
- Examine the Fabric Enabled Wireless LAN
- Role of Cisco SD-Access in Cisco DNA

Exploring Cisco SD-Access Fabric Design

- Describe SD-Access Fabric Constructs
- Describe Design Requirements of Underlay Network
- Describe DHCP and Security Solutions for the Fabric Domain
- Describe Cisco SD-Access Wireless Fabric Constructs

- Describe Controller Deployment Options
- Describe Controller Deployment Models
- Describe Cisco SD-WAN Cloud Deployment
- Describe Cisco SD-WAN Managed Service Provider Deployment
- Describe Cisco SD-WAN On-Premises Deployment
- Use Enterprise CA
- Describe Controller Placement and Challenges
- Describe Cloud Controller Connections
- Describe On-Premise Controller Connections
- Describe MPLS and Internet Interconnection
- Describe Deployment Considerations
- Describe On-Premises Deployment Considerations
- Describe vBond On-Premises Deployment

Examining Cisco SD-WAN-NAT and Hybrid Design Considerations

- Describe Working with NAT
- Describe NAT Traversal Combinations
- Describe Zero-Touch Provisioning
- Describe Considerations for Hybrid Scenarios
- Describe Deployment Options: Pure Vs Hybrid

Designing Cisco SD-WAN Routing and High Availability

- Describe Horizontal Solution Scale
- Describe SD-WAN Redundancy
- Describe Site Design
- Describe Path Redundancy
- Compare an Underlay Vs Overlay Network
- Describe SD-WAN Branch Connectivity
- Describe SD-WAN Privacy and Integrity
- Describe SD-WAN Secure Segmentation
- Describe SD-WNA Security Features
- Cisco SD-WAN Security Use Cases
- Design Case Study Activity: Designing Resilient Enterprise Cisco SD-WAN

Exploring QoS

- IntServ vs DiffServ
- Explain Classification and Marking Tools
- Policers and Shapers
- Describe Queuing Tools
- Explain RFC 4594 QoS Recommendations

Designing LAN and WAN QoS

- Need for Campus QoS
- Describe the Classification, Marking and Policing QoS Model

- Describe Manual Tunnels
- Describe Tunnel Brokers
- Describe 6rd
- Describe DS-Lite
- Describe LISP
- IPv6 Application Support
- IPv6 Related Security
- Design Case Study Activity: Designing an Enterprise IPv6 Network

Introducing Network APIs and Protocols (Self-Study)

- Describing Network APIs and Protocols
- Describing the Evolution of Device Management and Programmability
- Describing Data Encoding Formats
- Describing JSON
- Decrisbing XML
- Describing Data Models
- Describing the Model-Driven Programmability Stack
- Describing REST
- Describing NETCONF
- Describing RESTCONF
- Describing gRPC

Exploring YANG, NETCONF, RESTCONF, and Model-Driven Telemetry (Self-Study)

- Define YANG, NETCONF and RESTCONF
- Describe YANG Concepts
- Describe NETCONF Concepts
- Describe RESTCONF Concepts
- Compare NETCONF and RESTCONF
- Describe gRPC and gNMi
- Define Model-Driven Telemetry
- Describe Stream Telemetry Data
- Explain Subscription
- Describe Dial-In and Dial-Out Model-Driven Telemetry

- Need for QoS in WAN and Branch
- Need for QoS in IPsec VPN
- Describe DMVPN QoS Considerations
- Describe SD-WAN Forwarding
- Describe SD-WAN QoS Operation
- Descrive vEdge Queuing
- Design Case Study Activity: Designing QoS in an Enterprise Network

Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

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