ENSLD (DESIGNING CISCO ENTERPRISE NETWORKS) 1.0

Objetivo

Objectives After taking this course, you should be able to: â□¢ Design Enhanced Interior Gateway Routing Protocol (EIGRP) internal routing for the enterprise network; â□¢ Design Open Shortest Path First (OSPF) internal routing for the enterprise network; â□¢ Design Intermediate System to Intermediate System (IS-IS) internal routing for the enterprise network; â□¢ Design a network based on customer requirements; â□¢ Design Border Gateway Protocol (BGP) routing for the enterprise network; â□¢ Describe the different types and uses of Multiprotocol BGP (MP-BGP) address families; â□¢ Describe BGP load sharing; â□¢ Design a BGP network based on customer requirements; â□¢ Decide where the L2/L3 boundary will be in your Campus network and make design decisions; â□¢ Describe Layer 2 design considerations for Enterprise Campus networks; â□¢ Design a LAN network based on customer requirements; â□¢ Describe Layer 3 design considerations in an Enterprise Campus network; â□¢ Examine Cisco SD-Access fundamental concepts; â□¢ Describe Cisco SD-Access Fabric Design; â□¢ Design an Software-Defined Access (SD-Access) Campus Fabric based on customer requirements; â□¢ Design service provider-managed VPNs; â□¢ Design enterprise-managed VPNs; â□¢ Design a resilient WAN; â□¢ Design a resilient WAN network based on customer requirements; â□¢ Examine the Cisco SD-WAN architecture; â□¢ Describe Cisco SD-WAN deployment options; â□¢ Design Cisco SD-WAN redundancy; â□¢ Explain the basic principles of QoS; â□¢ Design Quality of Service (QoS) for the WAN; â□¢ Design QoS for enterprise network based on customer requirements; â□¢ Explain the basic principles of multicast; â□¢ Designing rendezvous point distribution solutions; â□¢ Describe high-level considerations when doing IP addressing design; â□¢ Create an IPv6 addressing plan; â□¢ Plan an IPv6 deployment in an existing enterprise IPv4 network; â□¢ Describe the challenges that you might encounter when transitioning to IPv6; â□¢ Design an IPv6 addressing plan based on customer requirements; â□¢ Describe Network APIs and protocols; â□¢ Describe Yet Another Next Generation (YANG), Network Configuration Protocol (NETCONF), and Representational State Transfer Configuration Protocol (RESTCONF).

PÃºblico Alvo

Professionals interested in designing Cisco Enterprise Networks Solution. This course also helps prepare student to take the Designing Cisco Enterprise Networks v1.0 (ENSLD 300-420) exam, which is part of the new CCNPÂ® Enterprise. Network design engineers Network engineers System administrators

PrÃ©-Requisitos

Before taking this course, you should be familiar with: â□¢ Basic network fundamentals and building simple LANs; â□¢ Basic IP addressing and subnets; â□¢ Routing and switching fundamentals; â□¢ Basic wireless networking concepts and terminology. For reference, here are Cisco Learning Offerings that contribute to recommended skills and knowledge: â□¢ CCNA Certification Course; â□¢ Implementing and Operating Cisco Enterprise Network Core (ENCOR).

Carga HorÃ¡ria

40 horas (5 dias).

ConteÃºdo ProgramÃitico

Course Introduction
Course Outline
Course Goals & Objectives

Designing EIGRP Routing
Design EIGRP internal routing for the enterprise network
Describe Scalable EIGRP Designs and Fast Convergence
Describe the issues to consider when designing the EIGRP topology
Examine EIGRP Autonomous Systems and Layered Designs
Explain the use of multiple EIGRP autonomous systems
Describe Scalable EIGRP Hub-and-Spoke and Stub Designs
Describe the EIGRP hub-and-spoke design
Describe EIGRP Convergence Features
Describe the EIGRP convergence features

Designing OSPF Routing
Design OSPF internal routing for the enterprise network
OSPF Neighbor Adjacencies and LSAs
Describe the impact of adjacent neighbors on OSPF scalability
OSPF Scalability Issues
Identify factors that influence OSPF scalability
Define Area and Domain Summarization
Design OSPF area
OSPF Full and Partial Mesh
Explain OSPF full-mesh design challenges
OSPF Convergence
Describe how OSPF convergence can be improved

Designing IS-IS Routing
Design IS-IS internal routing for the enterprise network
Describe the basics of IS-IS
Examine IS-IS Adjacencies and Authentication
Describe IS-IS and OSPF Similarities
Explain IS-IS routing logic in a case study
Describe IS-IS Operations
Examine Integrated IS-IS for IPv6
Describe IS-IS for IPv6

Lab 1 Designing Enterprise Connectivity
Design a network based on customer requirements
Determine the proper routing protocol based on the enterprise design
Define the proper backbone area design based on the enterprise design
Define the proper spoke area design based on the enterprise design
Investigate a special case of the spoke area design in the enterprise.
Implement OSPF summarization design in the enterprise
Define the migration steps for RIPv2-to-OSPF

Route Redistribution
Understand how to disable RIPv2 after a successful migration to OSPF
Understand how to disable RIPv2 after a successful migration to OSPF
Define the future growth and scalability in the enterprise.

Designing BGP Routing and Redundancy
Design BGP routing for the enterprise network
Identify IBGP Scalability Issues
BGP Route Reflector Terminology
Explain BGP route reflector definitions
Describe the BGP split-horizon rule
Describe route reflector loop prevention mechanisms
Compare BGP Load Sharing Designs
Describe the two ways of connecting networks to the Internet with BGP
Examine Dual and Multihomed BGP Designs
Describe load sharing when dual-homed to one ISP through a single local router

Understanding BGP Address Families and Attributes
Describe the different types and uses of MP-BGP address families
Describe the BGP address family model
Identify BGP route selection criteria
Describe BGP Communities
Design BGP communities
Examine a Case Study—Designing a Dual-Stack MP-BGP Environment
Describe BGP named community lists

Lab 2 Designing an Enterprise Network with BGP Internet Connectivity
Design a BGP network based on customer requirements
Determine the routing protocol needed within a specific scenario
Determine the autonomous system numbers needed within a specific scenario
Determine the BGP sessions within a specific scenario
Determine the BGP communities within a specific scenario
Define the routing policies as they would apply to the sites in North America
Define the routing policies as they would apply to the sites in Europe and Asia
Describe the internet segment and determine traffic exit points
Determine Main Headquarters Multihoming
Determine and prioritize prioritize different default routes from three sources in each location
Determine the final design for each location based on a specific scenario

Designing the Enterprise Campus LAN
Decide where L2/L3 boundary will be in your Campus network and make design decisions
Compare End-to-End and Local VLANs
Describe design considerations of end-to-end and local VLAN designs
Describe the Layer 3 Access Layer
Describe 3-tier network design with Layer 3 access
Examine a Case Study
Describe design considerations with layer 2 distribution interconnect

Designing Layer 2 Campus
Describe layer 2 design considerations for Enterprise Campus networks
Describe VLANs, Trunks, and VTP
Describe recommended design practices that are related to VLANs and trunks
Understanding the Spanning Tree Protocol
Describe why STP is needed in layer 2 environment
STP Root Bridge Placement
Alignment of STP with FHRP
Consistent STP Metrics
Cisco STP Toolkit
STP Stability Mechanism Recommendations
Problem with Unidirectional Links
Comparing Loop Guard with UDLD
UDLD Recommended Practices
MST Recommended Practices
Power over Ethernet for Endpoints and APs
Calculate PoE Requirements: Case Study
Bandwidth and Oversubscription
Wake on LAN and EnergyWise
Describe Port Aggregation Considerations
Describe EtherChannel design considerations
VSS Considerations
Cisco StackWise
Stacking Considerations
First-Hop Redundancy
Describe HSRP and VRRP design considerations
The Case for GLBP
Describe Network Requirements of Applications
Identify traffic types within an enterprise campus network.
Twisted-Pair Cabling

Lab 3 Designing an Enterprise Campus LAN
Design a LAN network based on customer requirements

Designing Layer 3 Campus
Describe layer 3 design considerations in an Enterprise Campus network
Explain why building triangles instead of squares is best for optimal convergence.
How to Build Redundant Links
Explain Routing Convergence
Describe case when routing information will need to converge after failure in equal-cost link Describe Campus network
Limit Peering Across the Access Layer
Describe Routing Protocols and Summarization
Explain why summarization should be performed at the distribution layer
Interior and Exterior Routing Protocols
Using Route Summarization
Summarize at Distribution Layer
Describe Default Routes, Redistribution, and Filtering

Describe use case for originating default routes
Route Redistribution Sources
Describe Avoid Transit Traffic
Using Defensive Filtering
Examine Passive Interface, Routing Convergence, and Routing IPv4 and IPv6
Use Cases for Passive Interface
Coexistence of IPv4 and IPv6 IGP Routing
Describe recommended best practices for network management
OOB Management Best Practices
OOB and IB Management Connections
Remote Management Best Practices

Discovering the Cisco SD-Access Architecture
Examine Cisco SD-Access fundamental concepts
Describe Cisco Software Defined Access Overview
Explain what is Cisco SD-Access
Describe the Cisco SD-Access Node Roles
Examine the Fabric Enabled Wireless LAN
Describe the Role of Cisco SD-Access in Cisco DNA

Exploring Cisco SD-Access Fabric Design
Describe Cisco SD-Access Fabric Design
Describe SD-Access Fabric Constructs
Explain the use of Virtual Networks in Cisco SD-Access
Describe Design Requirements of Underlay Network
Describe MTU and Layer 3 to the Access Design
Describe Loopback Propagation and IGP Process for fabric, Point to Point links
Describe DHCP and Security Solutions for the Fabric Domain
Describe the DHCP issues in Co-located Control Plane and Border node and Distributed Describe Control Plane and Border node
Describe Sizing and Single Platform Scalability

Discovering Service Provider-Managed VPNs
Design service provider-managed VPNs
Describe WAN Connection Decision Points
Describe WAN connection considerations
Describe Layer 3 MPLS VPN
Describe Use Routing Protocols at the PE-CE
Describe using EIGRP as the PE-CE routing protocol

Designing Enterprise-Managed VPNs
Design enterprise-managed VPNs
Describe enterprise-managed VPNs
Describe GRE, mGRE, and IPsec
Describe GRE basics
Describe Dynamic VTI, GET VPN, SSL VPN, and FlexVPN
Describe IPsec with DVTI
Describe DMVPN basics

Describe EIGRP DMVPN and DMVPN Scaling
Explain how EIGRP scales in a DMVPN

Designing WAN Resiliency
Design a resilient WAN
WAN Design Overview
Describe WAN remote site
Describe Common MPLS WAN Design Models
Describe Common Layer 2 WAN Design Models
Describe Common VPN WAN Design Models
Describe Cellular VPN Design Models
Identify 3G and 4G VPN design models + 5G
Connect remote site using the local Internet
Describe remote-site LAN
WAN Connectivity Case Study
Explain some redundancy and connectivity use cases
Describe Basic Traffic Engineering Techniques

Lab 4 Designing Resilient Enterprise WAN
Design a resilient WAN network based on customer requirements
Explain how to quiz the customer
Explain how to select WAN links
Determine the Need for an Overlay VPN
Create a High-Level Design

Examining Cisco SD-WAN Architectures
Examine the Cisco SD-WAN architecture
Describe SDN for the WAN
Describe how the WAN is evolving with SDN
Describe Cisco SD-WAN Components and Functions
Describe the Orchestration Plane
Describe the Management Plane
Describe the Control Plane
Describe the Data Plane
Describe the SD-WAN analytics platform
Describe the Overlay Management Protocol
Describe the Cisco SD-WAN OMP protocol
Define OMP Network Terminology
Describe OMP terminology
Describe Transport Locators
Describe TLOCs
Describe Fabric Operation
Describe how the SD-WAN fabric operates

Cisco SD-WAN Deployment Design Considerations
Describe Cisco SD-WAN deployment options
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
Describe how to use an enterprise CA in Cisco SD-WAN
Describe Controller Placement and Challenges
Describe SD-WAN cloud controller placement and issues
Describe Cloud Controller Connections
Describe On-Premises Controller Connections
Describe MPLS and Internet Interconnection
Describe Deployment Considerations
Describe cloud-hosted deployment
Describe On-Premises Deployment Considerations
Describe vBond On-Premises Deployment
Describe vBond and NAT traversal deployment options
Describe Working with NAT
Describe how NAT works with SD-WAN
Describe NAT Traversal Combinations
Describe Zero-Touch Provisioning
Describe the vEdge ZTP process
Describe Considerations for Hybrid Scenarios
Describe Deployment Options: Pure vs Hybrid
Describe the cEdge PnP process

Designing Cisco SD-WAN Routing and High Availability
Design Cisco SD-WAN redundancy
Describe Horizontal Solution Scale
Describe SD-WAN Redundancy
Describe vManage redundancy
Describe Site Design
Describe Path Redundancy
Describe bidirectional forwarding detection
Compare an Underlay vs Overlay Network
Comparing the SD-WAN underlay and overlay networks
Describe SD-WAN Branch Connectivity
Describe DIA
Describe SD-WAN Privacy and Integrity
Describe the SD-WAN security features
Describe SD-WAN Secure Segmentation
Describe SD-WAN Security Features
SD-WAN Security Use Cases
Explore Cisco SD-WAN security use cases

Understanding QoS
Explain the basic principles of QoS
Describe and compare the IntServ and DiffServ QoS models
Provide an overview of classification and marking tools
Describe and contrast the role and usage of policers and shapers
Describe Queuing Tools

Describe the concept of queuing
Explain RFC 4594 QoS Recommendations
Describe QoS Strategy Models
Four-Class QoS Strategy
Eight-Class QoS Strategy Example
Describe Twelve-Class QoS Strategy

Designing LAN and WAN QoS
Design QoS for the WAN
Identify the need for QoS in campus networks
VoIP vs. Video
Buffers and Bursts
Describe the Classification, Marking, and Policing QoS Model
Queuing and Dropping Recommendations
EtherChannel QoS Design
Campus QoS Design Example
Explain the need for WAN and branch QoS
Latency and Jitter Considerations
Example of WAN and Branch QoS
QoS in MPLS VPN
Layer 2 Private WAN QoS Administration
Fully Meshed MPLS VPN QoS Administration
MPLS DiffServ Tunneling Facts
MPLS VPN QoS Example
Describe the need for QoS in an IPsec VPN
VPN Use Cases and Their QoS Models
IPsec Refresher
Encryption and Classification in Cisco IOS
MTU Considerations
Describe DMVPN QoS Considerations
GET VPN QoS Considerations
Describe SD-WAN Forwarding
Describe SD-WAN QoS Operation
Describe vEdge Queuing

Lab 5 Designing QoS in an Enterprise Network
Design QoS for en enterprise network based on customer requirements
Describe Traffic Inspection
Describe the options for inspecting different traffic types in the network
Describe the QoS Model
Describe Trust Boundaries
Describe Queuing Mechanisms
Describe Scavenger Traffic
Describe MPLS DiffServ Tunneling
Describe a QoS Design for an Enterprise Network

Exploring Multicast with PIM-SM
Explain the basic principals of multicast

Explain How IP Multicast Works
Explain Multicast Groups
Describe the IP Multicast Service Model
Describe SD-WAN Multicast Application Support
Describe the multicast application support of Cisco SD-WAN
Describe the Functions of a Multicast Network
Describe Multicast Protocols
Describe Multicast Forwarding and RPF Check
Case Study: RPF Check Fails and Succeeds
Explain Multicast Protocol Basics
Provide an overview of multicast protocol basics
Describe Multicast Distribution Trees Identification
Describe PIM-SM
Describe Receiver Joins and Source Is Registered
Describe the step of a receiver joining the PIM-SM shared tree
Describe PIM-SM SPT Switchover
Describe Multicast Routing Table
Describe Basic SSM Concepts
Describe Bidirectional PIM
Describe PIM Modifications for Bidirectional Operation
Describe DF Election and Messages
Case Study: DF Election

Designing Rendezvous Point Distribution Solutions
Designing rendezvous point distribution solutions
Rendezvous Point Discovery
Case Study: Auto-RP Operation
Provide an example of Auto-RP operation
Auto-RP and BSR Flooding
Describe the Auto-RP scope issue
MSDP Protocol Overview
Provide an overview of MSDP

Designing an IPv4 Address Plan
Describe high-level considerations when doing IP addressing design
IPv4 Address Planning Considerations
Plan the IP Addressing Hierarchy
Describe why it is important to create an IP addressing plan that is hierarchical
Create an Addressing Plan
Describe how to determine the size of subnets and correct VLAN assignments
Case Study: Design an IPv4 Address Space
Describe how to perform subnetting using VLSM
Case Study: Resolve Overlapping Address Ranges
Describe what will be the future needs as related to IPv4 addressing
Allocating More IP Addresses
Describe how would you solve a situation where /24 subnet runs out of available address space

Exploring IPv6

Create an IPv6 addressing plan
IPv6 Address Planning Considerations
Describe the challenges and benefits that come with IPv6
Describe how an Enterprise gets allocated an IPv6 address
Describe how to create an IPv6 addressing plan by linking IPv4 addresses into IPv6 addresses
Describe how to create IPv6 addressing using per-type and per-location design
Describe how to create IPv6 addressing using VLAN IDs

Deploying IPv6
Plan an IPv6 deployment in an existing enterprise IPv4 network
Describe the phased approach to deploying IPv6
Identify the IPv6 services to be deployed
IPv4 and IPv6 Coexistence
Explain the transition from IPv4 to IPv6
Describe IPv6 transition mechanisms
Describe NAT64 and DNS64
Describe Manual Tunnels
Describe Tunnel Brokers
Describe 6rd tunneling and 6rd addresses
Describe DS-Lite
Describe LISP
Describe IPv6 application support
IPv6-Related Security
Describe the IPv6 transition-related security risks, threats, and challenges

Lab 6 Designing an Enterprise IPv6 Network
Design an IPv6 addressing plan based on customer requirements
Choose the IPv6 Address Space Type
Choose the appropriate IPv6 address space type
Connect Sites
Choose the appropriate deployment model
Determine Address Allocation
Analyze Address Provisioning
Analyze Communication Between Branches
Migrate Applications
Analyze Network Management
Analyze the Migration of Services
Describe an Enterprise IPv6 Network Design

Introducing Network APIs and Protocols
Describe Network APIs and protocols
Describing the Evolution of Device Management and Programmability
Describing Data Encoding Formats
Describing JSON
Describing XML
Describing Data Models
Describe Model Drive Programmability Stack
Describing REST

Describing NETCONF
Describing gRPC

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