Implementing Cisco Enterprise Advanced Routing and Services

Duration: 180 Days Course Code: ENARSI Version: 1.1 Delivery Method: Elearning (Self-paced)

Overview:

The Implementing Cisco Enterprise Advanced Routing and Services (ENARSI) course provides you with the knowledge you need to install, configure, operate, and troubleshoot a dual stack enterprise network. This course covers advanced routing and infrastructure technologies, expanding on the topics covered in the Implementing and Operating Cisco Enterprise Network Core Technologies (ENCOR) course.
This course helps to prepare you for theImplementing Cisco Enterprise Advanced Routing and Services (300-410 ENARSI) exam, which leads to the CCNP® Enterprise and Cisco Certified Specialist – Enterprise Advanced Infrastructure Implementation certifications.

This course is worth 40 Continuing Education (CE) Credits

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:

Network professionals who need to install, configure, operate and troubleshoot an enterprise network using advanced routing and infrastructure technologies.

Objectives:

- **After completing this course you should be able to:**
- Configure, optimize, and troubleshoot enhanced interior gateway routing protocol (EIGRP)
- Configure, optimize, and troubleshoot open shortest path first (OSPF)v2 and OSPFv3
- Implement and troubleshoot route redistribution using filtering mechanisms
- Implement path control using policy-based routing (PBR) and IP service level agreement (SLA)
- Configure, optimize, and troubleshoot border gateway protocol (BGP)
- Implement multiprotocol BGP (MP-BGP)
- Describe the features of multiprotocol label switching (MPLS)
- Describe the major architectural components of an MPLS virtual private network (VPN)
- Identify the routing and packet forwarding functionalities for MPLS VPNs
- Explain how packets are forwarded in an MPLS VPN environment
- Implement Cisco internetwork operating system (IOS®) dynamic multipoint VPNs (DMVPNs)
- Implement and troubleshoot dynamic host configuration protocol (DHCP)
- Describe the tools available to secure the IPV6 first hop
- Troubleshoot Cisco router security features
- Troubleshoot infrastructure security and services
- Troubleshoot network issues with Cisco DNA Center Assurance

Prerequisites:

Attendees should meet the following prerequisites:

- General understanding of network fundamentals
- Basic knowledge of how to implement LANs

Testing and Certification

Recommended as preparartion for the following exams:

- **300-410 ENARSI** - Implementing Cisco Enterprise Advanced Routing and Services

- General understanding of how to manage network devices
- General understanding of how to secure network devices
- Basic knowledge of network automation
- CCNA - Implementing and Administering Cisco Solutions
- ENCOR - Implementing and Operating Cisco Enterprise Network Core Technologies

Content:

Implementing EIGRP

- EIGRP Features
- EIGRP Reliable Transport
- Explore EIGRP Operation
- Compare EIGRP Classic and Named Mode
- Exchange of Routing Knowledge in EIGRP
- EIGRP Metrics
- EIGRP Classic Mode Metric Calculation
- Example of EIGRP Classic Mode Metric Calculation
- EIGRP Feasibility Condition
- Example of EIGRP Path Calculation

Optimizing EIGRP

- EIGRP Queries
- EIGRP Stub Routers
- EIGRP Stuck in Active
- EIGRP Summary Routes
- EIGRP Load Balancing
- EIGRP Authentication

Troubleshooting EIGRP (Self-Study)

- Troubleshoot EIGRP
- Troubleshoot EIGRP Neighbor Issues
- Troubleshoot EIGRP Routing Table Issues
- Troubleshoot EIGRP Stub
- Troubleshoot EIGRP Summarization
- Troubleshoot EIGRP for IPv6
- Troubleshoot EIGRP Authentication

Implementing OSPF

- OSPF Features
- OSPF Operations
- Hierarchical Structure of OSPF
- Design Limitations of OSPF
- OSPF Message Types
- Compare OSPFv2 and OSPFv3
- OSPFv2 and OSPFv3 LSA Types
- Periodic OSPF Database Changes
- Exchange and Synchronize LSDBs
- Synchronize LSDB on Multi-Access Networks
- Execution of the SPF Algorithm

Optimizing OSPF

- OSPF Route Summarization
- Default Routing in OSPF
- OSPF Special Areas
- Default Route Cost in OSPF Special Areas
- OSPF Authentication
- OSPF Virtual Link

Troubleshooting OSPF (Self-Study)

- Components of Troubleshooting OSPF
- Troubleshoot OSPF Adjacency
- Troubleshoot OSPF Routing Issues
- Troubleshoot OSPF Path Selection

Implementing Path Control

- Need for Path Control
- PBR Features and Benefits
- Explain How to Configure PBR
- Bidirectional Forwarding Detection
- BFD Operational Modes

Implementing IBGP

- BGP Fundamentals
- BGP Neighbor Relationships
- BGP Path Attributes
- BGP Path Selection
- BGP Transit AS Functionality
- IBGRP Path Processing
- IBGRP Split Horizon
- IBGRP Full Mesh

Optimizing BGP

- Configure the Weight Attribute
- Configure the MED Attribute
- Configure BGP Route Filtering
- Implement BGP Peer Groups
- IBGP Scalability Issues in a Transit AS
- Route Reflector Split-Horizon Rules
- Redundant Route Reflectors
- BGP Authentication

Implementing MP-BGP

- MP-BGP Support for IPv6
- IPv6 BGP Filtering Mechanisms

Troubleshooting BGP (Self-Study)

- Monitor BGP
- Troubleshoot BGP Neighbor Relationships
- Understand BGP Monitoring
- Troubleshooting IBGP
- Troubleshoot MP-BGP

Exploring MPLS (Self-Study)

- Describe Traditional IP Routing
- Describe MPLS Features and Benefits
- Explain MPLS Terminology
- Describe MPLS Architecture Components
- Describe the Architecture of Ingress Edge LSRs
- Describe the Architecture of Intermediate LSRs
- Describe the Architecture of Egress Edge LSRs

Introducing MPLS L3 VPN Architecture (Self-Study)

- Describe MPLS L3 VPN Architecture
- Describe PE Router Architecture

Configuring VRF-Lite

- PE Router Routing Contexts
- VPN-Aware Routing Protocols
- VRF Table
- VRF-Lite Functionality
- Implement VRF-Lite
- Migration from Old to New Style VRF CLI
- Routing with VRF-Lite

Implementing DMVPN

- Overview of Cisco IOS DMVPN
- DMVPN Solution Components
- Understanding GRE
- NHRP
- DMVPN Operations
- DMVPN Authentication
- DMVPN Hub Configuration
- DMVPN Spoke configuration
- DMVPN Routing Configuration
- Verify DMVPN

Implementing DHCP

- DHCP Overview
- DHCP Relay
- DHCP Manual Address Binding
- Describe DHCP Options
- IPv6 Stateless Address Autoconfiguration Overview
- DHCPv6 Overview
- DHCPv6 Operation
- Stateless DHCPv6 Overview
- DHCPv6 Relay Agent
- Troubleshoot DHCP
- Troubleshoot IPv6 Address Assignment on Clients

Introducing IPv6 First Hop Security (Self-Study)

- Describe IPv6 Snooping
- Describe IPv6 ND Inspection
- Describe IPv6 RA Guard
- Describe DHCPv6 Guard
- Describe IPv6 Source Guard
- Describe IPv6 Destination Guard

Securing Cisco Routers

- Interpret an IPv4 ACL
- Implement an IPv4 ACL for Filtering
- Implement a Time-Based IPv4 ACL
- Interpret an IPv6 ACL
- Implement an IPv6 ACL for Filtering
- Troubleshoot Access Links
- Describe Control Plane Security
- Describe Control Plane Policing
- CoPP Implementation Steps
- Describe uRPF
- uRPF Configuration Example

- Troubleshoot OSPF Special Areas
- Troubleshoot OSPF Summarization

Configuring Redistribution

- Route Redistribution
- Redistribution of Route Information
- Determine Default Metrics for Redistributed Routes
- Calculation of Costs for OSPF E1 and E2 Routes
- Types of Redistribution
- Mutual Redistribution
- Need for Redistribution
- Need for Redistribution Manipulation
- Filtering Tools: Distribute Lists
- Filtering Tools: Prefix Lists
- Filtering Tools: Route Maps
- Identity Caveats of Redistribution

Troubleshooting Redistribution (Self-Study)

- Troubleshooting Redistribution
- Troubleshoot Issues with Redistribution Route Feedback

- Describe VRF
- Describe Methods of Propagating Routing Information Across the P-Network
- Describe Route Distinguishers
- Describe RD Operation in MPLS VPN
- Describe Route Targets
- Describe RT and RD Process Flow

Introducing MPLS L3 VPN Routing (Self-Study)

- Describe MPLS L3 VPN Routing Requirements
- Describe Support for Internet Routing
- Describe Routing Tables on PE Routers
- Describe the End-toEnd Flow of Routing Updates
- Describe End-toEnd VPN Packet Forwarding Mechanisims
- Describe VPN Penultimate Hop Popping
- Describe the Propagation of VPN Labels Between PE Routers

Troubleshooting Infrastructure Security and Services (Self-Study)

- AAA Overview
- AAA Configuration Using Local Database
- AAA Configuration Using a AAA Server
- Troubleshoot AAA
- SNMP
- Troubleshoot SNMP
- Syslog
- Network Management Protocols
- NetFlow
- Cisco Flexible NetFlow

Troubleshooting with DNA Center Assurance (Self-Study)

- Need for DNA Assurance
- Cisco AI Network Analytics
- DNA Assurance Health Scores
- Using Path Trace for Troubleshooting
- Troubleshooting using DNA Assurance-Use Cases

Labs

- Discovery Lab 1: Configure EIGRP Using Classic Mode and Named Mode for IPv4 and IPv6
- Discovery Lab 2: Verify the EIGRP Topology Table
- Discovery Lab 3: Configure EIGRP Stub Routing, Summarization, and Default Routing
- Discovery Lab 4: Configure EIGRP Load Balancing and Authentication
- Discovery Lab 5: Troubleshoot EIGRP Issues
- Discovery Lab 6 : Configure OSPFv3 for IPv4 and IPv6
- Discovery Lab 7: Verify the Link-State Database
- Discovery Lab 8: Configure OSPF Stub Areas and Summarization
- Discovery Lab 9: Configure OSPF Authentication
- Discovery Lab 10: Troubleshoot OSPF Issues
- Discovery Lab 11: Implement Routing Protocol Redistribution
- Discovery Lab 12: Manipulate Redistribution
- Discovery Lab 13: Manipulate Redistribution Using Route Maps
- Discovery Lab 14: Troubleshoot Redistribution Issues
- Discovery Lab 15: Implement PBR
- Discovery Lab 16: Configure IBGP and EBGP
- Discovery Lab 17: Implement BGP Path Selection
- Discovery Lab 18: Configure BGP Advanced Features
- Discovery Lab 19: Configure BGP Route Reflectors

- Discovery Lab 20: Configure MP-BGP for IPv4 and IPv6
- Discovery Lab 21: Troubleshoot BGP Issues
- Discovery Lab 22: Configure Routing with VRF-Lite
- Discovery Lab 23: Implement Cisco IOS DMVPN
- Discovery Lab 24: Obtain IPv6 Addresses Dynamically
- Discovery Lab 25: Troubleshoot DHCPv4 and DHCPv6 Issues
- Discovery Lab 26: Troubleshoot IPv4 and IPv6 ACL Issues
- Discovery Lab 27: Configure and Verify uRPF
- Discovery Lab 28: Troubleshoot Network Management Protocol Issues: Lab 1
- Discovery Lab 29: Troubleshoot Network Management Protocol Issues: Lab 2

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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