

Cisco CCNP Implementing Cisco IP Routing

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IIC, and EC-Council. He has designed and customized courses for private and public

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in corporate Cyber security and Information Assurance training since 2001.

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Course description: The Implementing Cisco IP Routing is a qualifying exam for the Cisco Certified Network Professional CCNP®, Cisco Certified Internetwork Professional CCIP®, and Cisco Certified Design Professional CCDP® certifications. The ROUTE exam will certify that the successful candidate has the knowledge and skills necessary to use advanced IP addressing and routing in implementing scalable and secure Cisco ISR routers connected to LANs and WANs. The exam also covers configuration of secure routing solutions to support branch offices and mobile workers.

Course outline:

Enterprise Network

Frameworks and Architecture

- Introduction
- Traffic Conditions in a Converged Network
- IIN: Cisco Intelligent Information Network
- 3 Phases of the Intelligent Information Network
- Cisco SONA Framework
- SONA Layers
- Updated SONA Framework
- Cisco Enterprise Architecture
- Architecture Types
- Cisco Hierarchical Network Model
- The Enterprise Composite Network Model
- Summary

Implementation Plan

- Introduction
- Creating an Implementation Plan
- Implementation Plan Approaches
- Methodologies and Models
- Cisco Lifecycle Services (PPDIOO) Model
- Implementation Plan Documentation
- Sample Implementation Plan
- Examples of Project Documents
- Summary

IP Routing

- Introduction

- IP Routing
- Third Option: OnDemand Routing
- Link-State vs. Distance Vector Protocols
- Classless vs. Classful Routing
- Discontinugous Subnets
- IP Classless Command
- Automatic Route Summarization
- Routing Table Criteria
- Administrative Distance
- Floating Static Route
- Demo: RIP Next Generation Setup
- Demo: RIP Next Generation Setup Continued
- Demo: Set up a Static Address
- Demo: Configure RIP Next Generation
- Demo: Configure RIP Next Generation Continued
- Demo: Troubleshooting
- Summary

EIGRP Terminology

- Introduction
- EIGRP Attributes and Capabilities
- Terminology of the EIGRP Protocol
- Tables Used with the EIGRP Protocol
- FD vs. AD
- Feasible Successor and Active vs. Passive Routes

- Major EIGRP Technologies
- Reliable Transport Protocols
- Neighbor Discovery and PDMs
- DUAL Finite-State Machine
- Packet Types Used by EIGRP
- EIGRP Administrative Distance
- EIGRP Metric Calculation and Bandwidth
- Summary

Planning EIGRP Routing Implementation

- Introduction
- EIGRP Deployment Prerequisites and Implementation
- EIGRP Verification and Documentation
- Summary

EIGRP Routing

- Introduction
- Enable EIGRP Routing
- Demo: Enable EIGRP
- Automatic Summarization
- Demo: Automatic Summarization
- EIGRP Commands
- Demo: Automatic Summarization
- Passive-Interface and Default Route Propagation
- Demo: Passive-Interface
- IP Default Network Command and Route Summarization
- Demo: IP Default Network

- Demo: Next Hop
- Interface Summarization
- Demo: Next Hop Continued
- Creating a Summary Route
- Demo: Summarization
- Summary

EIGRP Enterprise WAN

- Introduction
- WAN and Enterprise Considerations
- Demo: Frame Relay Using Dynamic Mapping
- Load Balancing with EIGRP
- Demo: EIGRP over Layer 3 MPLS VPN
- Demo: EIGRP over Layer 2 MPLS VPN
- Unequal EIGRP Cost Load Balancing
- EIGRP Bandwidth to Use on WAN Links
- Summary

EIGRP Authentication

- Introduction
- Authentication in Routers
- Comparing MD5 to Simple Password
- Preparing to Configure EIGRP Configuration
- Demo: EIGRP Authentication
- The Configuration of EIGRP Authentication
- Demo: Configure the Keychain
- Summary

Optimize EIGRP

- Introduction

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- Demo: Enable Authentication with the Keychain
- EIGRP Scalability
- Query Process and Stuck-in-Active
- Summarization: SIA Solution
- Stub Networks
- Demo: Add IPv4 Addresses
- Demo: Add IPv4 Addresses Continued
- Demo: Configure EIGRP
- Demo: Configure EIGRP Continued
- Summary

OSPF Terminology

- Introduction
- OSPF: Open Shortest Path First
- Features of OSPF
- Characteristics of Link-State Protocol
- Advantages
- Terminology
- Router Types
- Internal and Backbone Routers
- Area Border Router
- Autonomous System Boundary Router
- BDR and DR Routers
- Summary

OSPF Packets

- Introduction
- What Are OSPF Packets Used For
- OSPF Hello Packet: Type 1
- OSPF DBD Packet: Type 2
- OSPF LSR and LSU Packets: Type 3 and 4
- OSPF LSack Packet: Type 5
- Adjacent Neighbors
- Link-State Data Structures
- Summary

OSPF Routing

- Introduction
- Planning OSPF Deployment
- OSPF Implementation
- OSPF Verification
- OSPF Documentation
- Summary

OSPF Verification and Configuration

- Introduction
- Enable OSPF Routing and Network Identification
- Wildcard Mask
- Interface Bandwidth Definition and OSPF Router ID
- Demo: Configure Single-Area OSPF
- Router ID Definition
- Demo: Configure Multi-Area OSPF

- OSPF Verification: First Method

- Demo: Verify OSPF

- OSPF Verification: Second

- Through Fifth Methods

- Clearing the OSPF Routing

- Broadcast
- DR and BDR
- Election Manipulation and Router Priority
- Demo: Assign Router Priority
- Influencing the Election Process
- Demo: Configure Simple Authentication Key
- OSPF over MPLS
- Demo: Verify Simple Password Authentication
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- Demo: IP Addresses
- Demo: Configure OSPF
- Demo: Routes
- Demo: Branch Routers
- Summary

Routing Performance Issues

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- Usual Routing Performance Issues
- Running Different Protocols at the Same Time
- Performance Solutions for Routing Protocols
- Route Filtering
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Multiple Routing Protocols

- Introduction
- Simple Protocols and Complex Networks
- Multiple Protocols Running on One Network
- Complex Networks
- Redistribution
- Demo: Redistribution
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- How to Select the Best Route
- Edge and Core Routing Protocols
- Loop Prevention and Redistribution Guidelines
- Summary

Route Redistribution

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- Redistribution Command
- Demo: Redistributing into RIP
- Important Route Redistribution Information
- Demo: Redistributing into OSPF
- Default Metric for BGP, OSPF, and RIP
- Demo: Default Metrics
- Default Metric for EIGRP
- Demo: Apply Metrics for EIGRP
- Modifying the Administrative Distance
- Demo: Modify Administrative Distance
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- Demo: EIGRP Routes
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- Passive Interfaces
- Static Routes and Route Maps
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- Various Route-map Commands for PBR
- Using Distribute Lists
- Demo: Distribute Lists
- Define a Filter for Incoming Routing Updates
- Demo: Incoming Filter
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- Demo: Outgoing Filter
- Demo: Prevent Feedback Loops
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- Demo: Avoid Route Feedback
- Prefix List Configuration
- Demo: Prefix List
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Path Control

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- Path Control Network Performance Assessment
- Considerations for Network Redundancy
- Path Control Integrated Strategy
- Prefix Lists and ACLs
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Path Control Using Offset Lists

- Introduction
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- Demo: IP SLA Applications
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- Demo: Operations, Responders, and Sources
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- Demo: Operations
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- Demo: Define an SLA IP Operation
- icmp-echo Sub-Commands
- Scheduling an IP SLA Operation
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- Tracking Delay Configuration
- Demo: Configure Tracking Delay
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- PBR Configuration
- Demo: Configure PBR
- PBR route-map Commands
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- Demo: Match Statement
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- Demo: match ip-address
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- Demo: Set Statements
- set interface Command
- Demo: Set Conditions
- set ip default next-hop Command
- Demo: Set Commands Using PBR
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- Demo: AS Numbers Summary
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- Demo: BGP Summary
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- BGP and Enterprise Networks
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- Demo: BGP Operational Overview
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- Branch Office Design Considerations
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- IPv6 Address Specifics
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