

# ROUTE (IMPLEMENTING CISCO IP ROUTING) 2.0

## Objetivo

O treinamento ROUTE (Implementing Cisco IP Routing) v2.0 apresenta teoria focada e intensivo uso de laboratório, os participantes aprenderão a planejar, configurar e implementar soluções de roteamento avançado, utilizando adequadamente os protocolos de roteamento para gerar maior escalabilidade em redes LAN e WAN. O curso também aborda a configuração de soluções para suporte à filiais e usuários móveis, além de fornecer as habilidades para diagnosticar possíveis problemas de roteamento existentes nas redes. Após concluir este treinamento, o aluno será capaz de:

- Planejar e documentar a configuração dos protocolos de roteamento e suas otimizações em redes corporativas
- Implementar e configurar EIGRP
- Implementar e configurar OSPF Multiarea
- Implementar e configurar BGP em conexões internas e externas
- Implementar soluções de redistribuição, listas de distribuição, distância administrativa, route maps e roteamento baseado em políticas em uma rede multi-protocolo que utiliza os recursos do Cisco IOS para o controle e seleção de rotas
- Avaliar problemas de performance e identificar as ferramentas necessárias para corrigi-los
- Utilizar o BGP para conectar uma rede corporativa à de um prestador de serviços

## Público Alvo

Este treinamento é recomendado aos profissionais de rede que atuam na implementação de soluções de roteamento avançado, bem como aos parceiros e revendas Cisco. É recomendado também aos candidatos as certificações CCNP Routing & Switching e CCDP. Esse treinamento específico proporciona a preparação para a realização da prova 300-101 (ROUTE).

## Pré-Requisitos

Para maior aproveitamento é recomendado que o aluno possua a certificação Cisco CCNA ou conhecimentos e experiências equivalentes. Estes conhecimentos podem ser adquiridos com os treinamentos ICND (Interconnecting Cisco Network Devices) partes 1 e 2.

## Carga Horária

40 horas (5 dias).

## Conteúdo Programático

- Course Introduction
  - Overview
  - Course Goal and Objectives
  - Course Flow
  - Additional References

- Your Training Curriculum

## Differentiating Routing Protocols

- Enterprise Network Infrastructure
- Role of Dynamic Routing Protocols
- Choosing the Optimal Routing Protocol
- IGP vs. EGP
- Types of Routing Protocols
- Convergence
- Route Summarization
- Routing Protocol Scalability

## Understanding Network Technologies

- Traffic Types
- IPv6 Address Types
- Network Types
- Nonbroadcast Multiple-Access Networks
- Routing over the Internet

## Connecting Remote Locations with the Headquarters

- Connectivity Overview
- Routing Across MPLS VPNs
- Routing over a GRE Tunnel
- Dynamic Multipoint Virtual Private Network
- Multipoint GRE
- Next Hop Resolution Protocol
- IPsec

## Implementing RIPng

- RIP Overview
- Configuring RIPng
- Investigating the RIPng Database

## Establishing EIGRP Neighbor Relationships

- EIGRP Features
- EIGRP Reliable Transport
- EIGRP Operation Overview
- Configuring and Investigating Basic EIGRP
- Manipulating EIGRP Timers
- EIGRP Neighborship over Frame Relay
- Establishing EIGRP over Layer 3 MPLS VPN
- EIGRP Neighborship over Layer 2 MPLS VPN

## Building the EIGRP Topology Table

- Building the EIGRP Topology Table
- Exchange of Routing Knowledge in EIGRP
- EIGRP Metric
- EIGRP Metric Calculation
- EIGRP Metric Calculation Example
- The Feasibility Condition
- EIGRP Path Calculation Example

## Optimizing EIGRP Behavior

- EIGRP Queries
- EIGRP Stub Routers
- EIGRP Stub Routing
- Stuck in Active
- Reducing Query Scope by Using Summary Routes
- EIGRP Summarization
- Load Balancing with EIGRP
- Configure EIGRP

## Configuring EIGRP for IPv6

- EIGRP for IPv6 Overview
- EIGRP for IPv6 Configuration
- Verifying EIGRP for IPv6 Configuration
- Configure and Optimize EIGRP for IPv6
- Introduction to Named EIGRP Configuration
- Named EIGRP Configuration Modes
- Classic vs. Named EIGRP Configuration

- Implement EIGRP for IPv4 and IPv6 Through Named Configuration

## Establishing OSPF Neighbor Relationships

- OSPF Features
- OSPF Operation Overview
- Hierarchical Structure of OSPF
- Design Limitations of OSPF
- OSPF Message Types
- Basic OSPF Configuration Introduction
- OSPF Neighborhood over Point-to-Point Links
- OSPF Neighborhood on Layer 3 MPLS VPN
- OSPF Neighborhood over Layer 2 MPLS VPN
- OSPF Neighbor States
- OSPF Network Types
- Configuring Passive Interfaces

## Building the Link-State Database

- OSPF LSA Types
- Building the Link-State Database
- Periodic OSPF Database Changes
- Exchanging and Synchronizing LSDBs
- Synchronizing LSDB on Multiaccess Networks
- Running the SPF Algorithm
- OSPF Path Selection
- Calculating the Cost of Intra-Area Routes
- Calculating the Cost of Interarea Routes
- Selecting Intra-Area and Interarea Routes
- Configure OSPF

## Optimizing OSPF Behavior

- OSPF Route Summarization
- Benefits of Route Summarization
- Discovery 12: OSPF Route Summarization
- Summarization on ABRs
- Summarization on ASBRs
- Two Ways of Directing Traffic to the Internet
- OSPF Stub Areas

- Cost of the Default Route in a Stub Area
- The default-information originate Command
- Other Stubby Area Types
- Optimize OSPF

## Configuring OSPFv3

- Implementing OSPFv3
- Configuring Advanced OSPFv3
- OSPFv3 Caveats

## Implementing Basic Routing Protocol Redistribution

- The Need for Redistribution
- Defining Route Redistribution
- Redistributing Route Information
- Default Metrics for Redistributed Routes
- Discovery 15: Basic Redistribution
- Calculating Costs for OSPF E1 and E2 Routes
- Types of Redistribution
- Mutual Redistribution

## Manipulating Redistribution Using Route Filtering

- The Need for Redistribution Manipulation
- Distribute Lists
- Distribute Lists Usage
- Prefix Lists
- Prefix List Example
- Discovery 16: Manipulate Redistribution
- Introducing Route Maps
- Route Map Applications
- Route Map Operation
- Configuring Route Maps
- Route Maps Example
- Manipulate Redistribution Using Route Maps
- Changing Administrative Distance
- Manipulating Redistribution Using Route Tagging
- Caveats of Redistribution

## Using Cisco Express Forwarding Switching

- Control Plane and Data Plane
- Cisco Switching Mechanisms
- Process Switching and Fast Switching
- Cisco Express Forwarding
- Analyzing Cisco Express Forwarding

## Implementing Path Control

- Need for Path Control
- PBR Features
- PBR Benefits
- Configuring PBR
- Implementing PBR
- Need for Dynamic Path Control
- Cisco IOS IP SLA
- Configuring IP SLA
- Using IP SLA for Path Control
- Implement Path Control

## Planning Enterprise Internet Connectivity

- Enterprise Internet Connectivity Needs
- Types of ISP Connectivity
- Public IP Address Assignments
- Provider-Independent IP Addressing
- AS Numbers

## Establishing Single-Homed IPv4 Internet Connectivity

- Configuring a Provider-Assigned IPv4 Address
- Obtaining a Provider-Assigned IPv4 Address with DHCP
- Need for NAT
- NAT Overview
- Configuring Static NAT
- Configuring Dynamic NAT
- Configuring PAT
- Limitations of NAT
- NAT Virtual Interface

- Configuring NAT Virtual Interface

#### Establishing Single-Homed IPv6 Internet Connectivity

- Obtaining Provider-Assigned IPv6 Addresses
- Basic IPv6 Internet Connectivity
- Securing IPv6 Internet Connectivity

#### Improving Resilience of Internet Connectivity

- Drawbacks of a Single-Homed Internet Connectivity
- Dual-Homed Internet Connectivity
- Configuring Best Path for Dual-Homed Internet Connectivity
- Multihomed Internet Connectivity
- Multihoming Options

#### Considering Advantages of Using BGP

- Routing Between Autonomous Systems
- Path Vector Functionality
- BGP Routing Policies
- Characteristics of BGP
- BGP Data Structures
- BGP Message Types
- When to Use BGP

#### Implementing Basic BGP Operations

- BGP Neighbor Relationships
- EBGP Neighbor Relationships
- IBGP Neighbor Relationships
- Basic BGP Configuration Requirements
- Configuring BGP Neighbors
- Basic BGP Configuration

## Using BGP Attributes and the Path Selection Process

- BGP Path Selection
- BGP Route Selection Process
- Weight Attribute
- Configuring the Default Weight for a Neighbor
- Configuring Weight with Route Maps
- Discovery 23: Influencing BGP Path Selection
- MED Attribute
- Setting MED with a Route Map

## Controlling BGP Routing Updates

- Filtering of BGP Routing Updates
- Using Prefix Lists to Filter BGP Updates
- Implementing AS Path Access Lists
- Using Route Maps to Manipulate BGP Updates
- Route Map Use Case Example
- Filtering Order
- Clearing the BGP Session
- BGP Peer Groups
- Peer Group Configuration Scenario
- Peer Group Configuration Example
- Configure BGP

## Implementing BGP for IPv6 Internet Connectivity

- MP-BGP Support for IPv6
- Exchanging IPv6 Routes over an IPv4 Session
- Exchanging IPv6 Routes over an IPv6 Session
- BGP for IPv6
- Comparing Single and Dual BGP Transport
- IPv6 BGP Filtering Mechanisms
- IPv6 Prefix List Filtering
- IPv6 Path Selection with BGP Local Preference

## Securing Cisco Routers

- Securing Cisco IOS Routers Checklist
- Router Security Policy
- Encrypted Passwords
- Use SSH Instead of Telnet
- Securing Access to the Infrastructure Using Router ACLs
- Secure SNMP
- Configuration Backups



- Implement Logging
- Disable Unused Services

## Describing Routing Protocol Authentication Options

- The Purpose of Routing Protocol Authentication
- Authentication Types
- Plaintext Authentication Process Hashing
- Authentication Process
- Time-Based Key Chains
- Authentication Options with Different Routing Protocols

## Configuring EIGRP Authentication

- EIGRP Authentication Configuration Checklist
- Configuring EIGRP Authentication
- EIGRP for IPv6 Authentication Configuration
- EIGRP for IPv6 Authentication Verification
- Configuring Authentication in Named EIGRP
- Configure Authentication for EIGRP Routes

## Configuring OSPF Authentication

- OSPF Authentication Configuration Checklist
- OSPF Authentication Configuration

## Configuring BGP Authentication

- BGP Authentication Configuration Checklist
- BGP Authentication Configuration
- BGP Authentication Verification
- BGP for IPv6 Authentication Configuration
- BGP for IPv6 Authentication Verification
- Configure BGP Authentication

## Labs

- Discovery 1: Configuring RIPng

- Discovery 2: Configuring and Investigating Basic EIGRP
- Discovery 3: Building the EIGRP Topology Table
- Discovery 4: EIGRP Stub Routing
- Discovery 5: EIGRP Summarization
- Discovery 6: EIGRP Load Balancing
- Discovery 7: EIGRP for IPv6 Configuration
- Discovery 8: Discovering the Named EIGRP Configuration
- Discovery 9: Basic OSPF Configuration Introduction
- Discovery 10: Building the Link-State Database
- Discovery 11: OSPF Path Selection
- Discovery 12: OSPF Route Summarization
- Discovery 13: OSPF Stub Areas
- Discovery 14: Implementing OSPFv3
- Discovery 15: Basic Redistribution
- Discovery 16: Manipulate Redistribution
- Discovery 17: Manipulate Redistribution Using Route Maps
- Discovery 18: Analyzing Cisco Express Forwarding
- Discovery 19: Implementing PBR
- Discovery 20: Configuring NAT Virtual Interface
- Discovery 21: Basic IPv6 Internet Connectivity
- Discovery 22: Basic BGP Configuration
- Discovery 23: Influencing BGP Path Selection
- Discovery 24: BGP for IPv6
- Discovery 25: Configuring EIGRP Authentication
- Discovery 26: OSPF Authentication Configuration
- Challenge 1: Configure RIPng
- Challenge 2: Configure EIGRP
- Challenge 3: Configure and Optimize EIGRP for IPv6
- Challenge 4: Implement EIGRP for IPv4 and IPv6 Through Named Configuration
- Challenge 5: Configure OSPF
- Challenge 6: Optimize OSPF
- Challenge 7: Configure OSPFv3
- Challenge 8: Implement Redistribution Using Route Filtering
- Challenge 9: Implement Path Control
- Challenge 10: Configure BGP
- Challenge 11: Configure Authentication for EIGRP Routes
- Challenge 12: Configure BGP Authentication