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Deploying Cisco Service Provider Advanced Network Routing

Learn via: **Classroom/AFA**

Duration: **5 Day**

Overview

The Deploying Cisco Service Provider Advanced Network Routing (SPADVROUTE) v1.0 is a course that provides network engineers and technicians with the knowledge and skills that are necessary to implement and support a service provider network.

The course focuses on using Cisco routers that are typically found in the service provider network and on various technologies that are used to offer different services to customers. Upon completing this course, learners will be able to configure, verify, and troubleshoot advanced Border Gateway Protocol (BGP) configuration, IP multicasting, and IPv6 transition mechanisms.

The course also includes classroom activities with remote labs that are useful to gain practical skills on deploying Cisco IOS, IOS XE, and IOS XR Software features to operate and support the service provider network.

Target Audience:

The primary audience for this course is:

- This course is intended primarily for network administrators, network engineers, network managers and systems engineers who would like to implement IP routing in service provider environments.

The secondary audience for this course is:

- This course is intended for network designers and project managers. The course is also recommended to all individuals that are preparing for CCNP service provider certification.

The tertiary audience for this course is as follows:

- This course is intended for program managers.

Certifications:

- Cisco Certified Network Professional Service Provider (CCNP SERVICE PROVIDER)

Prerequisites

- Skills and knowledge that are equivalent to those learned in Interconnecting Cisco Network Devices Part 1 Version 1.1 (CICND1)
- Basic knowledge of Cisco IOS, IOS XE, and IOS XR Software configuration
- Skills and knowledge that are equivalent to those learned in Building Cisco Service Provider Next-Generation Networks, Part 1 (SPNGN1)
- Skills and knowledge that are equivalent to those learned in Building Cisco Service Provider Next Generation Networks, Part 2 (SPNGN2)
- Skills and knowledge that are equivalent to those learned in Deploying Cisco Service Provider Network Routing (CSPROUTE)

What You Will Learn

At the end of this course you will be able to:

- Configure the provider network to support multiple BGP connections with customers and other autonomous systems
- Describe common routing and addressing scalability issues in the provider network
- Describe available BGP tools and features to secure and optimize the BGP routing protocol in a service provider environment
- Introduce IP multicast services and the technologies that are present in IP multicasting
- Introduce PIM-SM as the most current scalable IP multicast routing protocol
- Describe service provider IPv6 transition implementations

Training Outline

1: Service Provider Connectivity with BGP

Learn about the different connectivity types and routing options between a service provider and a customer.

Defining Customer-to-Provider Connectivity Requirements

- Connectivity Types
- Routing Schemes
- Addressing and AS Number Allocation

Connecting a Customer to a Service Provider

- Implementing Customer Connectivity Using Static Routing
- Connecting a Dual-Attached Customer to a Single Service Provider
- Connecting a Multihomed Customer to Multiple Service Providers

2: Scale Service Provider Networks

Get hands on training on routing and addressing issues that may arise in a typical service provider network.

Scaling BGP in Service Provider Networks

- Route Propagation
- Scaling BGP Routing and Addressing

Introducing BGP Route Reflectors and Confederations

- BGP Route Reflector
- Design with BGP Route Reflectors
- Implementing BGP Route Reflectors
- BGP Confederations

LAB: Implement BGP Route Reflectors

3: Secure and Optimize BGP

Use BGP tools and features that are available to secure and optimize the BGP routing protocol in a service provider environment.

Implementing Advanced BGP Operations

- BGP Security Options
- BGP Optimization Options

LAB: Implement BGP Security Options

Improving BGP Convergence

- BGP Route Dampening
- BGP Convergence
- BGP Timers and Intervals

Improving BGP Configuration Scalability

- BGP Peer Groups
- BGP Configuration Templates

LAB: Improve BGP Scalability

4: Multicast Overview

Learn about IP multicast services and the technologies that are present in IP multicasting.

Introducing IP Multicast

- IP Multicast Benefits and Caveats
- Multicast Sessions
- IP Multicast Model

Defining Multicast Distribution Trees and Forwarding

- Multicast Distribution Trees
- Multicast Protocols Overview

Multicast on the LAN

- Mapping Multicast IP Addresses to a MAC Addresses
- Implementing IGMP
- IGMP Snooping

LAB: Implement Layer 2 and Layer 3 Multicast

Populating the Mroute Table

- Introducing the Mroute Table
- Multiprotocol BGP

5: Intradomain and Interdomain Multicast Routing

Learn how to Implement intradomain and interdomain multicast routing in the service provider environment.

Introducing the PIM-SM Protocol

- PIM-SM Principles and Operation
- PIM-SM Protocol Mechanics
- Implement PIM-SM

Implementing PIM-SM Enhancements

- Source Specific Multicast
- Bidirectional PIM

LAB: Implement PIM-SM Enhancements

Implementing Interdomain IP Multicast

- Dynamic Interdomain IP Multicast
- Multicast Source Discovery Protocol

Identifying Rendezvous Point Distribution Solutions

- RP Distribution Solutions
- Auto-RP
- PIMv2 Bootstrap Router
- Anycast RP

6: Service Provider IPv6 Transition Implementations

Review and practice IPv6 transition implementations in a typical service provider network.

Introducing IPv6 Services

- IPv6 Multicast Services
- IPv6 Multicast Listener Discovery
- DNS and DHCPv6 in the IPv6 Networks
- QoS Support in the IPv6 Network
- Cisco IOS, IOS XE, and IOS XR Software IPv6 Tools

LAB: Implement a DHCPv6 Server with Prefix Delegation

LAB: Implement IPv6 Multicasting

Defining IPv6 Transition Mechanisms

- Dual Stack
- IPv6 Tunneling Mechanisms

LAB: Implement Tunnels for IPv6

Deploying IPv6 in the Service Provider Network

- IPv6 Service Provider Deployment
- IPv6 Broadband Access Services