Overview

This 5 day course is designed to provide network engineers and technicians with the knowledge and skills required to implement and support a service provider network. Cisco routers, typically found in the service provider network, are used for this course. 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.

Hands on labs are used to gain practical skills on deploying Cisco IOS, IOS XE, and IOS XR Software features to operate and support the service provider network.

Pre-Requirements

Attendees should meet the following prerequisites:

- Valid CCNA SP - SPNGN1 and SPNGN2 Recommended.
- Attendance of SPROUTE Recommended.

Content

Service Provider Connectivity with BGP

- Defining Customer-to-Provider Connectivity Requirements
- Connecting a Customer to a Service Provider

Scale Service Provider Networks

- Scaling BGP in Service Provider Networks
- Introducing BGP Route Reflectors and Confederations

Secure and Optimize BGP

- Implementing Advanced BGP Operations
- Improving BGP Convergence
- Improving BGP Configuration Scalability

Multicast Overview
- Introducing IP Multicast
- Defining Multicast Distribution Trees and Forwarding
- Multicast on the LAN
- Populating the Mroute Table

**Intradomain and Interdomain Multicast Routing**

- Introducing the PIM-SM Protocol
- Implementing PIM-SM Enhancements
- Implementing Interdomain IP Multicast
- Identifying Rendezvous Point Distribution Solutions

**Service Provider IPv6 Transition Implementations**

- Introducing IPv6 Services
- Defining IPv6 Transition Mechanisms
- Deploying IPv6 in the Service Provider Network

**Labs**

- Lab 2-1: Implement BGP Route Reflectors
- Lab 3-1: Implement BGP Security Options
- Lab 3-2: Improve BGP Scalability
- Lab 4-1: Implement Layer 2 and Layer 3 Multicast
- Lab 5-1: Enable and Optimize PIM-SM
- Lab 5-2: Implement PIM-SM Enhancements
- Lab 5-3: Implement Rendezvous Point Distribution
- Lab 6-1: Implement a DHCPv6 Server with Prefix Delegation
- Lab 6-2: Implement IPv6 Multicasting
- Lab 6-3: Implement Tunnels for IPv6

**Objectives**

**After you complete 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
**Target Audience**

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.

**Certification**

**Recommended preparation for exam(s):**

- **642-885** - Deploying Cisco Service Provider Network Advanced Routing (SPADVROUTE)

This exam is required for those delegates wishing to achieve the Cisco Certified Network Professional Service Provider Certification.

**Follow on Courses**

**The following courses are recommended for further study:**

- **SPCORE** - Implementing Cisco Service Provider Next Generation Core Network Services
- **SPEDGE** - Implementing Cisco Service Provider Next Generation EDGE Network Services

**Further Information**

**Recertification**

Cisco professional level certifications (CCNP, CCNP Service Provider Operations, CCNP Wireless, CCDP, CCNP Security CCNP Voice, and CCNP Service Provider) are valid for three years. To recertify, pass ONE of the following exams before the certification expiration date:

- Pass any current 642-XXX professional level exam, or
- Pass any current CCIE Written Exam,
- Pass the current CCDE Written Exam OR current CCDE Practical Exam, or
- Pass the Cisco Certified Architect (CCAr) interview AND the CCAr board review to extend lower certifications