

## **Advanced Junos Enterprise Routing (AJER)**

### **Course Overview**

This three-day course is designed to provide students with the tools required for implementing, monitoring, and troubleshooting Layer 3 components in an enterprise network. Detailed coverage of OSPF, BGP, class of service (CoS), and multicast is strongly emphasized. Through demonstrations and hands-on labs, students will gain experience in configuring and monitoring the Junos operating system and in monitoring device and protocol operations.

This course uses Juniper Networks SRX Series Services Gateways for the hands-on component, but the lab environment does not preclude the course from being applicable to other Juniper hardware platforms running the Junos OS. This course is based on the Junos OS Release 12.1X46-D20.5.

### **Intended Audience**

This course benefits individuals responsible for configuring and monitoring devices running the Junos OS.

### **Course Level**

AJER is an advanced-level course.

### **Prerequisites**

Students should have basic networking knowledge and an understanding of the Open Systems Interconnection (OSI) model and the TCP/IP protocol suite. Students should also have working experience with basic routing principles.

Students should also attend the Introduction to the Junos Operating System (IJOS), Junos Routing Essentials (JRE), and Junos Intermediate Routing (JIR) courses prior to attending this class.

## Objectives

- Describe the various OSPF link-state advertisement (LSA) types.
- Explain the flooding of LSAs in an OSPF network.
- Describe the shortest-path-first (SPF) algorithm.
- Describe OSPF area types and operations.
- Configure various OSPF area types.
- Summarize and restrict routes.
- Identify scenarios that require routing policy or specific configuration options.
- Use routing policy and specific configuration options to implement solutions for various scenarios.
- Describe basic BGP operation and common BGP attributes.
- Explain the route selection process for BGP.
- Describe how to alter the route selection process.
- Configure some advanced options for BGP peers.
- Describe various BGP attributes in detail and explain the operation of those attributes.
- Manipulate BGP attributes using routing policy.
- Describe common routing policies used in the enterprise environment.
- Explain how attribute modifications affect routing decisions.
- Implement a routing policy for inbound and outbound traffic using BGP.
- Identify environments that might require a modified CoS implementation.
- Describe the various CoS components and their respective functions.
- Explain the CoS processing along with CoS defaults on SRX Series Services Gateways.
- Describe situations when some CoS features are used in the enterprise.
- Implement some CoS features in an enterprise environment.
- Describe IP multicast traffic flow.
- Identify the components of IP multicast.
- Explain how IP multicast addressing works.
- Describe the need for reverse path forwarding (RPF) in multicast.
- Explain the role of Internet Group Management Protocol (IGMP) and describe the available IGMP versions.
- Configure and monitor IGMP.
- Identify common multicast routing protocols.
- Describe rendezvous point (RP) discovery options.
- Configure and monitor Protocol Independent Multicast (PIM) sparse modes.
- Configure and monitor RP discovery mechanisms.

- Describe the basic requirements, benefits, and caveats of source-specific multicast (SSM).
- List the address ranges used for SSM.
- Illustrate the role of Internet Group Management Protocol version 3 (IGMPv3) and PIM sparse mode (PIM-SM) in an SSM implementation.
- Configure and monitor SSM.

## **Course Contents**

### **Day 1**

#### **Chapter 1: Course Introduction**

#### **Chapter 2: OSPF**

OSPFv2 Review

Link-State Advertisements

Protocol Operations

OSPF Authentication

OSPFv3

Lab 1: Configuring and Monitoring OSPF

#### **Chapter 3: OSPF Areas**

Review of OSPF Areas

Stub Area Operation

Stub Area Configuration

NSSA Operation

NSSA Configuration

Route Summarization

Lab 2: Configuring and Monitoring OSPF Areas and Route Summarization

## **Chapter 4: OSPF Case Studies and Solutions**

IGP Transition Overview

Transition Case Study

OSPF Multiarea Adjacencies

External Reachability

Virtual Links

Lab 3: Configuring and Monitoring Routing Policy and Advanced OSPF Policy

### **Day 2**

## **Chapter 5: BGP**

Review of BGP

BGP Operations

Load Balancing Options

Path Selection and Configuration Options

Lab 4: Implementing BGP

## **Chapter 6: BGP Attributes and Policy**

Policy and BGP

BGP Attributes

Details and Manipulation of Common BGP Path Attributes

Lab 5: BGP Attributes

## **Chapter 7: Enterprise Routing Policies**

Enterprise BGP Core Network Design

Enterprise External Network Deployment

Lab 6: Implementing Enterprise Routing Policies

## **Day 3**

### **Chapter 8: Introduction to Multicast**

Overview of Multicast

Multicast Addressing

RPF

IGMP

### **Chapter 9: Multicast Routing Protocols and SSM**

Overview of Multicast Routing Protocols

PIM-SM Using the ASM Model

Lab 7: Implementing PIM-SM

PIM-SM Using the SSM Model

Lab 8: Implementing SSM

### **Chapter 10: Class of Service**

CoS Components Review and Case Study

CoS Processing and CoS Defaults on the SRX Series Device

Policing

Virtual Channels

Monitoring with Resource Performance Monitoring

Lab 9: Implementing CoS Features in the Enterprise

### **Appendix A: BGP Route Reflection**

Route Reflection Operation

Configuration and Routing Knowledge

Lab 10: BGP Route Reflection (Optional)

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