Advanced Junos Enterprise Routing (AJER)

JUNIPER NETWORKS
EDUCATION SERVICES

Engineering Simplicity

COURSE LEVEL

Advanced Junos Enterprise Routing (AJER) is an advanced-level course.

AUDIENCE

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

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) and *Junos Intermediate Routing* (JIR) courses prior to attending this class.

ASSOCIATED CERTIFICATION

JNCIP-ENT

RELEVANT JUNIPER PRODUCT

- Junos OS
- M Series
- MX Series
- SRX Series

RECOMMENDED NEXT COURSE

JNCIE-ENT Bootcamp

CONTACT INFORMATION

Contact Juniper Education Services

COURSE OVERVIEW

This five-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, multicast, class of service (CoS), and EVPN-VXLAN is covered in depth. The course also exposes students to common troubleshooting commands and tools used to troubleshoot various intermediate to advanced issues.

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 vSRX virtual firewall for the hands-on component, but the lab environment does not preclude the course from being applicable to other Juniper hardware platforms running Junos OS. This course is based on Junos OS Release 19.3R1.8.

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 link metrics.
- Describe the various OSPF authentication methods.
- Explain the differences between OSPFv2 and OSPFv3.
- Describe OSPF area types and operations.
- Configure various OSPF area types.
- Summarize and restrict routes.
- Configure OSPF multi-area adjacencies.
- Configure OSPF virtual links.
- Explain OSPF external reachability.
- List useful commands that are used to troubleshoot and verify OSPF.
- Isolate different OSPF issues.
- Describe BGP operations.
- Configure various BGP options.
- Explain the route selection process for BGP.
- Describe how to alter the route selection process.
- Explain the use of routing policies in BGP.
- Explain how BGP routes are processed.
- Describe the various BGP attributes and their use.
- Manipulate common BGP attributes.
- Review common BGP troubleshooting procedures.
- List common BGP troubleshooting commands.
- Identify issues with BGP peering.
- Explain reasons to use BGP in the Enterprise.
- Explain how ISP policies can influence external connectivity.
- Describe three common routing policies for external connectivity in the enterprise.
- Identify common commands for troubleshooting routing policy.
- Describe basic multicast terminology.
- Describe the multicast address space.
- Describe how RPF is used in a multicast network.
- Describe the basic functionality of IGMP.
- Describe the multicast service models and modes.
- Describe PIM-SM operation and configuration when using the ASM model.
- Describe PIM-SM operation and configuration when using the SSM model.
- Verify and troubleshoot multicast.
- Identify environments that may 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 devices.
- Describe situations in which some CoS features are used in the enterprise.
- Describe the use of the Real-Time Performance Monitoring tool.
- Verify and troubleshoot CoS.
- Describe a traditional Campus network design.
- Understand the need for a new architectural design.
- Describe the five key concepts of the Evolved Core.
- Describe the benefits of a Layer 3-based Campus Networks.
- Describe Layer 2 tunneling.

Continued on the next page.

OBJECTIVES (contd.)

- Explain VXLAN functionality.
- Describe VXLAN gateways.
- Describe EVPN features.
- Describe EVPN operations.
- Describe EVPN with VXLAN for data plane encapsulation.
- Configuring a Spine Only EVPN-VXLAN network.
- Add IP Fabric nodes to the Spine Only architecture.
- Configure a new IP Fabric EVPN-VXLAN network.
- Describe EVPN route information.
- List useful EVPN-VXLAN commands.

COURSE CONTENT

Day 1

1 COURSE INTRODUCTION

2 OSPF

- OSPFv2 Review
- Link-State Advertisements
- Protocol Operations
- OSPF Authentication
- OSPFv3

LAB 1: Configuring and Monitoring OSPF

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

4 Advanced OSPF Options

- OSPF Multi-Area Adjacencies
- Virtual Links
- External Reachability

LAB 3: Configuring and Monitoring Routing Policy and Advanced OSPF Options

Day 2

5 Troubleshooting OSPF

- Troubleshooting OSPF Adjacency Issues
- Troubleshooting LSDB Consistency Issues
- Case Study: Adjacency Issues

LAB: Troubleshooting OSPF

6 BGP

- Review of BGP
- BGP Configuration Options
- BGP Operations
- BGP Path Selection and Options

LAB: Implementing BGP

7 BGP Attributes and Policy

- Policy and BGP
- BGP Attributes
- Details and Manipulation of Common BGP Attributes

LAB: BGP Attributes

8 Troubleshooting BGP

- BGP Troubleshooting
- BGP Case Study

LAB: Troubleshooting BGP

COURSE CONTENT (contd.)

Day 3

9 Enterprise Routing Policies

- Enterprise BGP Core Network Design
- Enterprise External Network Deployment

LAB: Implementing Enterprise Routing Policies

10 Troubleshooting Policies

- Routing Policy Overview
- Routing Policy Structure
- Using RegEx
- Routing Policy Troubleshooting
- Case Study

LAB: Troubleshooting Routing Policies

11 Introduction to Multicast

- Overview of Multicast
- Multicast Addressing
- RPF
- IGMP

Day 4

12 Multicast Routing Protocols and SSM

- Overview of Multicast Routing Protocols
- PIM-SM Using the ASM Model
- PIM-SM Using the SSM Model

LAB: Implementing PIM-SM
LAB: Implementing SSM

13 Troubleshooting Multicast

- Multicast Troubleshooting
- Multicast Case Study

LAB: Troubleshooting Multicast

14 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

15 Troubleshooting Class of Service

- CoS Troubleshooting
- CoS Case Study

LAB: Troubleshooting Class of Service

COURSE CONTENT (contd.)

Day 5

16 Enterprise Architectures

- Traditional Enterprise Networks
- A New Architecture
- Key Concepts of the Evolved Core
- IP Fabric Campus Design

17 VXLAN

- Layer 2 Connectivity over a Layer 3 Network
- VXLAN Overview
- VXLAN Gateways

18 EVPN-VXLAN

- Overview of EVPN
- EVPN Operations
- EVPN and VXLAN

19 Configuring EVPN-VXLAN

- EVPN-VXLAN Spine Only Network
- IP Fabric Leaf Nodes in a Spine Only Design
- A New IP Fabric EVPN-VXLAN Network

20 Migrating to an IP Fabric

- EVPN Routes
- Useful EVPN Commands

A Appendix A: BGP Route Reflection

- Route Reflection Operation
- Configuration and Routing Knowledge

LAB: BGP Route Reflection (Optional)

B Appendix B: Troubleshooting IS-IS

- IS-IS Troubleshooting

LAB: Troubleshooting IS-IS and Mixed Environments (Optional)

C Appendix C: Additional Troubleshooting

- RIP Troubleshooting
- IGP Troubleshooting Case Studies

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