Advanced Junos Enterprise Routing

COURSE OVERVIEW

This five-day course is designed to provide students with the tools and methods required for implementing, monitoring, and troubleshooting Layer 3 components in an enterprise network. This course covers OSPF, BGP, multicast, enterprise architecture, and Ethernet VPN-Virtual Extensible LAN (EVPN-VXLAN) is covered in depth. The course also exposes students to common troubleshooting commands and tools used to diagnose various intermediate to advanced issues.

Through demonstrations and hands-on labs, students will gain experience with features of each of these devices, vSRX virtual firewalls and vQFX virtual switches. This course is based on Junos OS Release 22.1R1.10.

COURSE LEVEL

Advanced

AUDIENCE

Individuals responsible for configuring and monitoring devices running the Junos OS

PREREQUISITES

- Familiarity with the Junos Operating System (OS)
- Basic understanding of the Open Systems Interconnection model
- Knowledge of basic routing and switching principles
- Experience configuring and monitoring the TCP/IP protocol suite
- Basic understanding of firewall filters

RECOMMENDED NEXT COURSE

JNCIE-ENT Self-Study Bundle

RELATED CERTIFICATION

JNCIP-ENT

RELEVANT JUNIPER PRODUCT

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

OBJECTIVES

- Describe OSPFv2 concepts.
- Describe OSPF operations.
- Describe and configure OSPF area types and operations.
- Configure OSPF areas through summarization and restrictions.
- Utilize commands to troubleshoot and verify OSPF operations.
- Analyze different OSPF issues.
- Describe BGP operations.
- Describe and configure the BGP route selection process.
- Explain the use of routing policies in BGP.
- Describe BGP attributes and their usages.
- Describe and configure BGP communities.
- Describe BGP troubleshooting.
- Explain how routing policies are used in an enterprise network.
- Reduce problems related to routing policy structure and configuration.
- Identify commands for troubleshooting routing policy.
- Explain the fundamentals of multicast routing.
- Describe and configure Internet Group Management Protocol (IGMP).
- Describe Protocol Independent Multicast (PIM).
- Configure PIM.
- Describe and configure route reflection.
- Explain enterprise networking.
- Describe the key concepts of Evolved core and Layer 3 based campus designs.
- Explain the benefits of VXLAN.
- Explain why you would use EVPN-VXLAN in a campus network.
- Describe and configure an Evolved Campus Core (ECC) network.
- Describe and configure a distribution and access network.
- Describe Ethernet Virtual Private Network (EVPN) route types.
- Describe EVPN troubleshooting.

CONTACT YOUR REGIONAL EDUCATION SERVICES TEAM:

- Americas: training-amer@juniper.net
- Europe, Middle East, Africa: training-emea@juniper.net
- Asia-Pacific: training-apac@juniper.net

COURSE CONTENTS

DAY 1

1 Course Introduction

2 OSPF–Part 1

- Describe OSPFv2 operations
- Differentiate link-state advertisements

3 OSPF–Part 2

- Distinguish protocol operations
- Explain OSPF authentication
- Apply OSPFv3
- Lab: Configuring and monitoring OSPF

Lab: Configuring and Monitoring OSPF

4 OSPF Areas–Part 1

- Identify OSPF areas
- Describe stub area operations
- Add a stub area configuration

5 OSPF Areas–Part 2

- Explain NSSA operation
- Add an NSSA configuration
- Explain route summarization

Lab: OSPF Route Summarization

6 Advanced OSPF Options

- Explain NSSA operation
- Generate a NSSA configuration
- Explain route summarization

7 Advanced OSPF Case Studies

- Interpret external reachability case studies

Lab: Configuring Advanced OSPF Options

DAY 2

8 Troubleshooting OSPF

- Perform troubleshooting and verification of OSPF adjacencies
- Perform troubleshooting and verification of OSPF consistencies

9 Troubleshooting OSPF Routing Issues

- Conduct troubleshooting and verification of OSPF routing

Lab: Troubleshooting OSPF

10 BGP–Part 1

- Explain BGP concepts
- Describe BGP configuration options

11 BGP–Part 2

- Explain BGP route options
- Describe BGP path selection

Lab: Implementing BGP

12 BGP Attributes and Policy

- Explain BGP route processing
- Describe BGP Attributes

13 Common BGP Attributes

- Describe and configure common BGP attributes

14 BGP Communities

- Configure BGP communities
- Explain how to use regular expressions with BGP communities
- Examine a BGP community use case

Lab: BGP Attributes

15 Troubleshooting BGP

- Examine IBGP and EBGP troubleshooting

16 BGP Troubleshooting Case Study

- Examine troubleshooting BGP neighbor issues

Lab: Troubleshooting BGP

COURSE CONTENTS (contd.)

DAY 3

17 Enterprise Routing Policies–Part 1

- Review an enterprise routing policy use case

18 Enterprise Routing Policies–Part 2

- Examine enterprise external network deployment

Lab: Implementing Enterprise Routing Policies

19 Troubleshooting Policies–Part 1

- Examine routing policy structure
- Describe regular expression matching with routing policies
- Examine routing policy troubleshooting methods

20 Troubleshooting Policies–Part 2

- Examine the routing policy troubleshooting command usage
- Review a routing policy use case

Lab: Troubleshooting Routing Policy

21 Introduction to Multicast–Part 1

- Describe IP multicast traffic flow and multicast components
- Describe multicast addressing
- Describe the need for RPF check in multicast networks
- Describe multicast routing tables

22 Introduction to Multicast–Part 2

- Explain the role of IGMP
- Describe the different versions of IGMP
- Configure and monitor IGMP

DAY 4

23 Multicast Operations–Part 1

- Describe PIM sparse mode operation

Lab: Implementing PIM-SM

24 Multicast Operations–Part 2

- Configure and monitor PIM sparse mode
- Configure and monitor RP discovery mechanisms

Lab: Implementing SSM

25 BGP Route Reflection

- Describe the operation of BGP route reflection
- Configure a route reflector

Lab: BGP Route Reflection

DAY 4 (contd.)

26 Enterprise Architectures–Part 1

- Describe traditional enterprise networks
- Examine new enterprise networking methods

27 Enterprise Architectures–Part 2

- Examine EVPN-VXLAN enterprise networks
- Examine new enterprise networking methods

28 VXLAN Overview

- Describe Layer 2 tunneling
- Explain VXLAN functionality
- Describe VXLAN gateways

DAY 5

29 EVPN-VXLAN Architecture

- Describe EVPN features
- Describe EVPN operations
- Describe EVPN with VXLAN for data plane encapsulation

30 Configuring EVPN-VXLAN Networks–Part 1

- Examine a case study
- Configure an underlay network
- Configure an overlay network
- Verify an ECC network

31 Configuring EVPN-VXLAN Networks–Part 2

- Add leaf nodes to an ECC network
- Build a full fabric EVPN-VXLAN network

Lab: Configuring an EVPN-VXLAN Network

32 Verifying and Troubleshooting EVPN-VXLAN Architecture–Part 1

- Explain EVPN route identification

33 Verifying and Troubleshooting EVPN-VXLAN Architecture–Part 2

- Explain EVPN troubleshooting commands

AJER09112022

Advanced Junos Enterprise Switching

COURSE OVERVIEW

This two-day course is designed to provide detailed coverage of VLAN operations, Multiple Spanning Tree Protocol (MSTP) and VLAN Spanning Tree Protocol (VSTP), authentication and access control for Layer 2 networks, IP telephony features, class of service (CoS) and monitoring and troubleshooting tools and features supported on the EX Series Ethernet Switches. Through demonstrations and hands-on labs, students will gain experience in configuring and monitoring the Junos operating system (OS) and in monitoring device and protocol operations. This course uses Juniper Networks EX 4300 Series Ethernet switches 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 Junos OS Release 21.4R1.12.

COURSE LEVEL

Advanced

AUDIENCE

- Individuals responsible for configuring and monitoring EX Series switches using Junos Enhanced Layer 2 Software (ELS)

PREREQUISITES

- Basic networking knowledge and an understanding of the OSI reference model and the TCP/IP protocol suite
- Completion of the *Introduction to the Junos Operating System* (IJOS) course, or equivalent knowledge
- Completion of *Junos Enterprise Switching* (JEX) course, or equivalent knowledge

RELEVANT JUNIPER PRODUCT

- EX Series
- QFX Series

OBJECTIVES

- Restrict traffic flow within a VLAN.
- Manage dynamic VLAN registration.
- Tunnel Layer 2 traffic through Ethernet networks.
- Review the purpose and operations of a spanning tree.
- Implement multiple spanning-tree instances in a network.
- Implement one or more spanning-tree instances for a VLAN.
- List the benefits of implementing end-user authentication.
- Explain the operations of various access control features.
- Configure and monitor various access control features.
- Describe processing considerations when multiple authentication and access control features are enabled.
- Describe some common IP telephony deployment scenarios.
- Describe features that facilitate IP telephony deployments.
- Configure and monitor features used in IP telephony deployments.
- Explain the purpose and basic operations of CoS.
- Describe CoS features used in Layer 2 networks.
- Configure and monitor CoS in a Layer 2 network.
- Describe a basic troubleshooting method.
- List common issues that disrupt network operations.
- Identify tools used in network troubleshooting.
- Use available tools to resolve network issues.

COURSE CONTENTS

DAY 1

1 **Course Introduction**

2 **VLAN Traffic Management**

- Assign user traffic to VLANs
- Explain how to restrict traffic flows within a VLAN

3 **Advanced Ethernet Switching**

- Configure dynamic VLAN registration using MVRP
- Implement Layer 2 tunnel traffic through Ethernet networks

Lab 1: Advanced Ethernet Switching

CONTACT YOUR REGIONAL EDUCATION SERVICES TEAM:

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- Asia-Pacific: training-apac@juniper.net

COURSE CONTENTS (contd.)

DAY 1 (contd.)

4 MSTP

- Describe a spanning tree's purpose and operations
- Implement multiple spanning tree instances in a network
- Overview of Authentication Processing

5 VSTP

- Describe spanning tree instances for a VLAN
- Implement spanning tree instances for a VLAN

Lab 2: Advanced Spanning Tree

6 Authentication and Access Control

- List the benefits of implementing end-user authentication
- Describe the operations of 802.1X access control features

7 Access Control Features—MAC RADIUS and Captive Portal

- Configure and monitor MAC radius access control features
- Configure and monitor captive portal access control features
- Describe processing considerations when multiple authentication and access control features are enabled

Lab 3: Authentication and Access Control

DAY 2

8 IP Telephony Features—Power over Ethernet, Neighbor Discovery using LLDP

- Describe some common IP telephony deployment scenarios
- Explain power over Ethernet feature of IP telephony
- Describe neighbor discovery feature of IP telephony

9 IP Telephony Features—Voice LAN

- Describe voice VLAN feature of IP telephony
- Implement the IP telephony features

Lab 4: Deploying IP Telephony Features

DAY 2 (contd.)

10 Class of Service Overview

- Configure and monitor class of service in a Layer 2 network
- Perform class of service troubleshooting

11 Implement Class of Service

- Configure and monitor class of service in a Layer 2 network
- Perform class of service troubleshooting

Lab 5: Class of Service

12 Introduction to Monitoring and Troubleshooting Layer 2 Enterprise Networks

- Explain basic troubleshooting flow
- Evaluate troubleshooting steps

13 Implement Monitoring and Troubleshooting Layer 2 Enterprise Networks

- List common issues that disrupt network operations
- Identify tools used in network troubleshooting
- Use available tools to resolve network issues

Lab 6: Monitoring and Troubleshooting

A Appendix: Junos Space Network Director

- Describe Junos Space Network Director
- Configure Junos Space Network Director

B Appendix: Introduction to Mist AI Integration

- List the wired assurance options and the supported Juniper switching devices
- Describe provisioning and deployment process

C Appendix: Mist Wired Assurance

- Describe the deployment options
- Explain wired assurance SLE and their classifiers
- Describe the role of Mist within campus and branch architecture

D Appendix: ELS and Non-ELS Configuration Examples

- Configure switch options
- Describe IRB and VLAN Interfaces
- Describe Q-in-Q Tagging

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