

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.

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COURSE CONTENTS

DAY 1

1	Course Introduction
2	OSPF-Part 1 <ul style="list-style-type: none"> Describe OSPFv2 operations Differentiate link-state advertisements
3	OSPF-Part 2 <ul style="list-style-type: none"> Distinguish protocol operations Explain OSPF authentication Apply OSPFv3 Lab: Configuring and monitoring OSPF Lab: Configuring and Monitoring OSPF
4	OSPF Areas-Part 1 <ul style="list-style-type: none"> Identify OSPF areas Describe stub area operations Add a stub area configuration
5	OSPF Areas-Part 2 <ul style="list-style-type: none"> Explain NSSA operation Add an NSSA configuration Explain route summarization Lab: OSPF Route Summarization
6	Advanced OSPF Options <ul style="list-style-type: none"> Explain NSSA operation Generate a NSSA configuration Explain route summarization
7	Advanced OSPF Case Studies <ul style="list-style-type: none"> Interpret external reachability case studies Lab: Configuring Advanced OSPF Options

DAY 2

8	Troubleshooting OSPF <ul style="list-style-type: none"> Perform troubleshooting and verification of OSPF adjacencies Perform troubleshooting and verification of OSPF consistencies
9	Troubleshooting OSPF Routing Issues <ul style="list-style-type: none"> Conduct troubleshooting and verification of OSPF routing Lab: Troubleshooting OSPF
10	BGP-Part 1 <ul style="list-style-type: none"> Explain BGP concepts Describe BGP configuration options
11	BGP-Part 2 <ul style="list-style-type: none"> Explain BGP route options Describe BGP path selection Lab: Implementing BGP
12	BGP Attributes and Policy <ul style="list-style-type: none"> Explain BGP route processing Describe BGP Attributes
13	Common BGP Attributes <ul style="list-style-type: none"> Describe and configure common BGP attributes
14	BGP Communities <ul style="list-style-type: none"> Configure BGP communities Explain how to use regular expressions with BGP communities Examine a BGP community use case Lab: BGP Attributes
15	Troubleshooting BGP <ul style="list-style-type: none"> Examine IBGP and EBGP troubleshooting
16	BGP Troubleshooting Case Study <ul style="list-style-type: none"> Examine troubleshooting BGP neighbor issues Lab: Troubleshooting BGP

COURSE CONTENTS (contd.)

DAY 3

17	Enterprise Routing Policies–Part 1 <ul style="list-style-type: none"> Review an enterprise routing policy use case
18	Enterprise Routing Policies–Part 2 <ul style="list-style-type: none"> Examine enterprise external network deployment Lab: Implementing Enterprise Routing Policies
19	Troubleshooting Policies–Part 1 <ul style="list-style-type: none"> Examine routing policy structure Describe regular expression matching with routing policies Examine routing policy troubleshooting methods
20	Troubleshooting Policies–Part 2 <ul style="list-style-type: none"> Examine the routing policy troubleshooting command usage Review a routing policy use case Lab: Troubleshooting Routing Policy
21	Introduction to Multicast–Part 1 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Explain the role of IGMP Describe the different versions of IGMP Configure and monitor IGMP

DAY 4

23	Multicast Operations–Part 1 <ul style="list-style-type: none"> Describe PIM sparse mode operation Lab: Implementing PIM-SM
24	Multicast Operations–Part 2 <ul style="list-style-type: none"> Configure and monitor PIM sparse mode Configure and monitor RP discovery mechanisms Lab: Implementing SSM
25	BGP Route Reflection <ul style="list-style-type: none"> Describe the operation of BGP route reflection Configure a route reflector Lab: BGP Route Reflection

DAY 4 (contd.)

26	Enterprise Architectures–Part 1 <ul style="list-style-type: none"> Describe traditional enterprise networks Examine new enterprise networking methods
27	Enterprise Architectures–Part 2 <ul style="list-style-type: none"> Examine EVPN-VXLAN enterprise networks Examine new enterprise networking methods
28	VXLAN Overview <ul style="list-style-type: none"> Describe Layer 2 tunneling Explain VXLAN functionality Describe VXLAN gateways

DAY 5

29	EVPN-VXLAN Architecture <ul style="list-style-type: none"> Describe EVPN features Describe EVPN operations Describe EVPN with VXLAN for data plane encapsulation
30	Configuring EVPN-VXLAN Networks–Part 1 <ul style="list-style-type: none"> Examine a case study Configure an underlay network Configure an overlay network Verify an ECC network
31	Configuring EVPN-VXLAN Networks–Part 2 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Explain EVPN route identification
33	Verifying and Troubleshooting EVPN-VXLAN Architecture–Part 2 <ul style="list-style-type: none"> 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

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COURSE CONTENTS (contd.)

DAY 1 (contd.)

4	<p>MSTP</p> <ul style="list-style-type: none"> Describe a spanning tree's purpose and operations Implement multiple spanning tree instances in a network Overview of Authentication Processing
5	<p>VSTP</p> <ul style="list-style-type: none"> Describe spanning tree instances for a VLAN Implement spanning tree instances for a VLAN <p>Lab 2: Advanced Spanning Tree</p>
6	<p>Authentication and Access Control</p> <ul style="list-style-type: none"> List the benefits of implementing end-user authentication Describe the operations of 802.1X access control features
7	<p>Access Control Features—MAC RADIUS and Captive Portal</p> <ul style="list-style-type: none"> 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 <p>Lab 3: Authentication and Access Control</p>

DAY 2

8	<p>IP Telephony Features—Power over Ethernet, Neighbor Discovery using LLDP</p> <ul style="list-style-type: none"> Describe some common IP telephony deployment scenarios Explain power over Ethernet feature of IP telephony Describe neighbor discovery feature of IP telephony
9	<p>IP Telephony Features—Voice LAN</p> <ul style="list-style-type: none"> Describe voice VLAN feature of IP telephony Implement the IP telephony features <p>Lab 4: Deploying IP Telephony Features</p>

DAY 2 (contd.)

10	<p>Class of Service Overview</p> <ul style="list-style-type: none"> Configure and monitor class of service in a Layer 2 network Perform class of service troubleshooting
11	<p>Implement Class of Service</p> <ul style="list-style-type: none"> Configure and monitor class of service in a Layer 2 network Perform class of service troubleshooting <p>Lab 5: Class of Service</p>
12	<p>Introduction to Monitoring and Troubleshooting Layer 2 Enterprise Networks</p> <ul style="list-style-type: none"> Explain basic troubleshooting flow Evaluate troubleshooting steps
13	<p>Implement Monitoring and Troubleshooting Layer 2 Enterprise Networks</p> <ul style="list-style-type: none"> List common issues that disrupt network operations Identify tools used in network troubleshooting Use available tools to resolve network issues <p>Lab 6: Monitoring and Troubleshooting</p>
A	<p>Appendix: Junos Space Network Director</p> <ul style="list-style-type: none"> Describe Junos Space Network Director Configure Junos Space Network Director
B	<p>Appendix: Introduction to Mist AI Integration</p> <ul style="list-style-type: none"> List the wired assurance options and the supported Juniper switching devices Describe provisioning and deployment process
C	<p>Appendix: Mist Wired Assurance</p> <ul style="list-style-type: none"> Describe the deployment options Explain wired assurance SLE and their classifiers Describe the role of Mist within campus and branch architecture
D	<p>Appendix: ELS and Non-ELS Configuration Examples</p> <ul style="list-style-type: none"> Configure switch options Describe IRB and VLAN Interfaces Describe Q-in-Q Tagging

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