Junos Layer 3 VPNs (JL3V)

Duration: 3 Days   Course Code: JUN_JL3V

Overview:

This three-day course is designed to provide students with MPLS-based Layer 3 virtual private network (VPN) knowledge and configuration examples.
The course includes an overview of MPLS Layer 3 VPN concepts, scaling Layer 3 VPNs, Internet access, Interprovider Layer 3 VPNs, and Multicast for Layer 3 VPNs.
This course also covers Junos operating system-specific implementations of Layer 3 VPNs.
These concepts are put into practice with a series of in-depth hands-on labs, which will allow participants to gain experience in configuring and monitoring Layer 3 VPNs on Junos OS devices.
These hands-on labs utilize Juniper Networks vMX Series devices using the Junos OS Release 19.4R1.10, and are also applicable to other MX Series devices.
The Junos Layer 3 VPNs (JL3V) course is an advanced-level course.
Relevant Juniper Product
• Routing • Junos OS • M Series • T Series • MX Series • PTX Series • Service Provider Routing and Switching Track

Target Audience:

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

Objectives:

- • Describe the value of MPLS VPNs.

- • Describe the differences between provider-provisioned VPNs and customerprovisioned VPNs.

- • Describe the differences between Layer 2 VPNs and Layer 3 VPNs.

- • List the provider-provisioned MPLS VPN features supported by the Junos OS software.

- • Describe the roles of a CE device, PE router, and P router in a BGP Layer 3 VPN.

- • Describe the format of the BGP routing information, including VPN-IPv4 addresses and route distinguishers.

- • Describe the propagation of VPN routing information within an AS.

- • List the BGP design constraints to enable Layer 3 VPNs within a provider network.

- • Explain the operation of the Layer 3 VPN data plane within a provider network.

- • Create a routing instance, assign interfaces to a routing instance, create routes in a routing instance, and import/export routes from a routing instance using route distinguishers/route targets.

- • Describe the purpose of BGP extended communities, configure extended BGP extended communities, and use BGP extended communities.

- • Provision and troubleshoot hub-and-spoke Layer 3 VPNs,

- • Describe the flow of control traffic and data traffic in a hub-and-spoke Layer 3 VPN.

- • Describe QoS mechanisms available in L3VPNs.

- • Configure L3VPN over GRE tunnels.

- • Describe the RFC 4364 VPN options.

- • Describe the carrier-of-carriers model.

- • Configure the carrier-of-carriers and "Option C" configuration.

- • Describe the flow of control and data traffic in a draft-rosen multicast VPN.

- • Describe the configuration steps for establishing a draft-rosen multicast VPN.

- • Monitor and verify the operation of draft-rosen multicast VPNs.

- • Describe the flow of control traffic and data traffic in a next-generation multicast VPN.

- • Describe the configuration steps for establishing a next-generation multicast VPN.

- • Monitor and verify the operation of next-generation multicast VPNs.

- • Describe the flow of control traffic and data traffic when using MPVNs for Internet multicast.

- • Describe the configuration steps for enabling internet multicast

- • List the steps necessary for proper operation of a PE-CE dynamic routing protocol.

- • List the troubleshooting and monitoring techniques for routing instances.

- • Explain the difference between the bgp.l3vpn table and the inet.0 table of a routing instance.

- • Monitor the operation of a CE-PE dynamic routing protocol.

- • Explain the operation of a PE multi-access interface in a Layer 3 VPN and list commands to modify that behavior.

- • Describe ways to support communication between sites attached to a common PE router.

using MVPNs.

- • Monitor and verify the operation of MVPN internet multicast.

Prerequisites:

• Intermediate-level networking knowledge and an understanding of OSPF, ISIS, BGP, and Junos policy

• Experience configuring MPLS label-switched paths using Junos

• Attend the Introduction to the Junos Operating System (IJOS), Junos Intermediate Routing (JIR), and Junos MPLS Fundamentals (JMF) courses prior to attending this class

Testing and Certification

Associated Certification:
JNCIP-SP
Exams can be purchased and scheduled at an additional cost – please ask for details.

Follow-on-Courses:

Advanced Junos Service Provider Routing (AJSPR)

Junos Layer 2 VPNs (JL2V)

Junos Multicast Routing (JMR)

JNCIE-SP Bootcamp

Content:

Day 1

Course Introduction

MPLS VPNs

• MPLS VPNs

• Provider-Provisioned VPNs

Layer 3 VPNs

• Layer 3 VPN Terminology

• VPN-IPv4 Address Structure

• Operational Characteristics

Basic Layer 3 VPN Configuration

• Preliminary Steps

• PE Router Configuration

LAB: Layer 3 VPN with Static and BGP Routing

Layer 3 VPN Scaling and Internet Access

• Scaling Layer 3 VPNs

• Public Internet Access Options

LAB: LDP over RSVP Tunnels and Public Internet Access

Day 2

Layer 3 VPNs – Advanced Topics

• Exchanging Routes between Routing Instances

• Hub-and-Spoke Topologies

• Layer 3 VPN CoS Options

• Layer 3 VPN and GRE Tunneling Integration

• Layer 3 VPN and IPsec Integration

• Layer 3 VPN Egress Protection

• BGP Prefix-Independent Convergence (PIC)

• Edge for MPLS VPNs

• VRF Localization

• Provider Edge Link Protection

• Support for Configuring More Than 3 Million L3VPN Labels

LAB: GRE Tunneling and Route Redistribution

Interprovider Backbones for Layer 3 VPNs

• Hierarchical VPN Models

• Carrier-of-Carriers Model

• Option C Configuration

LAB: Carrier-of-Carriers VPNs

Troubleshooting Layer 3 VPNs

• Working with Multiple Layers

• Troubleshooting Commands on a PE Device

• Multi-Access Interfaces in Layer 3 VPNs

• PE and CE-Based Traceroutes

• Layer 3 VPN Monitoring Commands

LAB: Troubleshooting Layer 3 VPNs

Day 3

Draft Rosen Multicast VPNs

• Multicast Overview

• Draft Rosen MVPN Overview

• Draft Rosen MVPN Operation

• Configuration

• Monitoring

Next-Generation Multicast VPNs

• Multicast VPN Overview

• Next-Generation MVPN Operation

• Configuration

• Monitoring

• Internet Multicast

• Ingress Replication

• Internet Multicast Signaling and Data Plane

• Configuring MVPN Internet Multicast

• Monitoring MVPN Internet Multicast

LAB: MVPNs

Additional Information:

Delegates will receive e-kit courseware.

Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

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