

Junos Layer 3 VPNs

Durée: 3 Jours **Réf de cours: JL3V** **Version: 19.x** **Méthodes d'apprentissage: Virtual Learning**

Résumé:

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.

[Formation délivrée en anglais par Juniper]

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Public visé:

Individuals responsible for configuring and monitoring devices running Junos OS

Objectifs pédagogiques:

- Describe the purpose and functions of MPLS VPNs.
- Describe the differences between Layer 2 VPNs (L2VPNs) and Layer 3 VPNs (L3VPNs).
- Describe the roles of a customer edge (CE) device, provider edge (PE) router, and provider (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 autonomous system (AS).
- List the BGP design constraints to enable L3VPNs within a provider network.
- Explain the operation of the L3VPN 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 BGP extended communities, and use BGP extended communities.
- List the steps necessary for the proper operation of a PE-CE dynamic routing protocol.
- List the troubleshooting and monitoring techniques for routing instances.
- Describe ways to support communication between sites attached to a common PE router.
- Provision and troubleshoot hub-and-spoke L3VPNs.
- Describe the flow of control traffic and data traffic in a hub-and-spoke L3VPN.
- Describe the quality of service (QoS) mechanisms available in L3VPNs.
- Describe seamless MPLS fundamentals.
- Describe the carrier-of-carriers model.
- Configure the carrier-of-carriers and "Option C" configuration.
- Describe the flow of control traffic and data traffic in BGP MVPN.
- Describe the configuration steps for establishing a BGP MVPN.
- Monitor and verify the operations of BGP MVPNs.
- Describe the flow of control traffic and data traffic when using BGP MVPNs for Internet multicast.
- Describe the configuration steps for enabling Internet multicast using BGP MVPNs.
- Monitor and verify the operation of BGP MVPN Internet multicast

- • 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.
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Pré-requis:

- - Experience configuring MPLS label-switched paths using Junos
 - Completion of the Introduction to the Junos Operating System, Junos Intermediate Routing, and the Junos MPLS Fundamentals courses
 - JL2V - Junos Layer 2 VPNs
 - JMF - Junos MPLS Fundamentals
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Après cette formation, nous vous conseillons le(s) module(s) suivant(s):

- AJSPR - Advanced Junos Service Provider Routing
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Contenu:

1ER JOUR

Course Introduction

Refresher—VPNs and MPLS

- Contrast the differences between IPsec VPNs and MPLS VPNs
- Contrast the differences between L3VPNs and L2VPNs

Layer 3 VPNs—Overview

- Explain L3VPN terminology
- Define the VPN-IPv4 address structure

Layer 3 VPNs—Operational Characteristics

- Explain how the L3VPN control plane advertises VPN-IPv4 prefixes across a service provider network
- Explain how the L3VPN data plane transports traffic between sites, across a service provider's core

Layer 3 VPN—Configuration

- Describe the preliminary steps needed for configuring an L3VPN
- Describe the L3VPN PE configuration
- Lab 1: Layer 3 VPNs with Static and BGP Routing

Layer 3 VPN—Verification

- Describe how to verify L3VPN operations
- Lab 2: Route Redistribution

OSPF as the PE-to-CE Protocol

- Configure and verify a basic L3VPN deployment, with OSPF to the CE router
- Explain the purpose of the BGP route type community and the domain ID

OSPF—Optimal Routing

- Explain and verify the use of the DN bit and the VPN route tag, which prevent control plane loops
- Configure and verify sham links to control routing decisions in networks with backdoor links

Route Leaking

Hub-and-Spoke Topologies

2EME JOUR

Layer 3 VPN CoS : Describe how to configure and use CoS with L3VPNs

Layer 3 VPN Protection Mechanisms

- Explain how BGP PIC edge works
- Define how provider edge link protection functions

Layer 3 VPN Scaling

- Describe different ways to improve L3VPN scaling
- Define L3VPN scaling guidelines

BGP Route Target Filtering

Lab 3: Additional L3VPN Scalability Techniques

Layer 3 VPNs and Internet Access

- Explain the differences between the methods of providing Internet access within an L3VPN environment
- Demonstrate how to configure VRF Internet access with a single connection through a use case

Inter-AS Layer 3 VPNs

- Describe the functionality of Interprovider Options A, B, and C
- Configure and verify the Interprovider Option C method

Carrier-of-Carriers VPNs

Lab 4: Carrier-of-Carriers VPNs

3EME JOUR

Troubleshooting Layer 3 VPN—Overview

- Explain basic L3VPN troubleshooting steps
- Define PE-to-CE verification methods

Additional Layer 3 VPN Troubleshooting

- Explain how to troubleshoot MPLS-related problems in an L3VPN
- Explain how to troubleshoot BGP-related problems in an L3VPN
- Demonstrate how to troubleshoot forwarding plane related problems in an L3VPN
- Describe troubleshooting an L3VPN with a use case

Lab 5: Troubleshooting L3VPNs

Multicast Overview

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

Introduction to IGMP

- Explain the role of IGMP
- Describe the different versions of IGMP

Multicast Routing Protocols

- Discuss multicast routing
- Describe the different PIM messages

BGP MVPN Overview

- Describe the overall functionality of BGP MVPNs
- Explain how BGP MVPNs operate

Configuring BGP MVPNs

- Explain the configuration steps of BGP MVPNs
- Describe how to verify that a BGP MVPN is correctly working

Lab 6: MVPNs

Autres moyens pédagogiques et de suivi:

- Compétence du formateur : Les experts qui animent la formation sont des spécialistes des matières abordées et ont au minimum cinq ans d'expérience d'animation. Nos équipes ont validé à la fois leurs connaissances techniques (certifications le cas échéant) ainsi que leur compétence pédagogique.
- Suivi d'exécution : Une feuille d'émargement par demi-journée de présence est signée par tous les participants et le formateur.
- Modalités d'évaluation : le participant est invité à s'auto-évaluer par rapport aux objectifs énoncés.
- Chaque participant, à l'issue de la formation, répond à un questionnaire de satisfaction qui est ensuite étudié par nos équipes pédagogiques en vue de maintenir et d'améliorer la qualité de nos prestations.

Délais d'inscription :

- Vous pouvez vous inscrire sur l'une de nos sessions planifiées en inter-entreprises jusqu'à 5 jours ouvrés avant le début de la formation sous réserve de disponibilité de places et de labs le cas échéant.
- Votre place sera confirmée à la réception d'un devis ou ""booking form"" signé. Vous recevrez ensuite la convocation et les modalités d'accès en présentiel ou distanciel.
- Attention, si vous utilisez votre Compte Personnel de Formation pour financer votre inscription, vous devrez respecter un délai minimum et non négociable fixé à 11 jours ouvrés.