

## Junos Multicast Routing (JMR)

Duration: 2 Days    Course Code: JUN\_JMR

### Overview:

This two-day course is designed to provide students with detailed coverage of multicast protocols including Internet Group Management Protocol (IGMP), Protocol Independent Multicast-Dense Mode (PIM-DM), Protocol Independent Multicast-Sparse Mode (PIMSM), Bidirectional PIM, and Multicast Source Discovery Protocol (MSDP).

Through demonstrations and hands-on labs, students will gain experience in configuring and monitoring the Junos OS and monitoring device and protocol operations.

This course utilizes Juniper Networks vMX Series devices 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.

The Juniper Networks vMX Series devices run Junos OS Release 16.2R1.6.

The Junos Multicast Routing (JMR) course is an advanced-level course.

#### Relevant Juniper Product

• Routing • Switching • Junos OS • M Series • MX Series • PTX Series • T Series • Service Provider Routing and Switching Track

### Target Audience:

This course benefits individuals responsible for implementing, monitoring, and troubleshooting multicast components in a service provider's network.

### Objectives:

- Describe IP multicast traffic flow.
- Identify the components of IP multicast.
- Explain how IP multicast addressing works.
- Describe the need for reverse path forwarding (RPF) in multicast.
- Explain the role of IGMP and describe the available IGMP versions.
- Configure and monitor IGMP.
- Identify common multicast routing protocols.
- Explain the differences between dense-mode and sparse-mode protocols.
- Describe rendezvous point (RP) discovery options.
- Describe bidirectional PIM.
- Configure and monitor rendezvous point discovery mechanisms.
- Configure bidirectional PIM sparse mode.
- Explain the purpose and operation of MSDP.
- Describe the usage of MSDP within a single PIM domain with anycast-RP.
- Describe the usage of MSDP across multiple PIM domains.
- Compare the any-source multicast (ASM) and source-specific multicast (SSM) service models.
- Describe the basic requirements, benefits, and caveats of SSM.
- List the address ranges used for SSM.
- Illustrate the role of IGMPv3 and PIM-SM in an SSM implementation.
- Configure and monitor SSM.
- Describe the default PIM sparse mode information distribution.
- Explain how routing policies control IGMP joins.
- Explain how routing policies alter PIM protocol message flow.
- Identify the role of a policy in controlling MSDP message advertisement.
- Explain how you can use a policy to scope multicast groups.
- Configure and monitor PIM dense mode and PIM sparse mode.
- Describe IPv6 multicast addresses.
- Describe IPv6 multicast scoping.
- Compare IPv6 Multicast Listener Discovery (MLD) versions with IPv4's IGMP protocol versions.
- Describe IPv6 SSM.

- • Configure and monitor MSDP.

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## 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 knowledge of security policies.

Students should also attend the Introduction to the Junos Operating System (IJOS) and Junos Intermediate Routing (JIR) 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.

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## Follow-on-Courses:

Advanced Junos Service Provider Routing (AJSPR)

Junos Layer 2 VPNs (JL2V)

Junos Layer 3 VPNs (JL3V)

Junos Class of Service (JCOS)

JNCIE-SP Bootcamp

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## Content:

Day 1	<ul style="list-style-type: none"><li>• Monitoring Sparse Mode</li></ul>	<ul style="list-style-type: none"><li>• Controlling PIM Join and Register Messages</li></ul>
Course Introduction	LAB 2: PIM Sparse Mode and RP Discovery	<ul style="list-style-type: none"><li>• Controlling BSR Messages</li></ul>
Introduction to Multicast	Day 2	<ul style="list-style-type: none"><li>• Controlling MSDP SA Messages</li></ul>
<ul style="list-style-type: none"><li>• Overview of Multicast</li></ul>	MSDP	<ul style="list-style-type: none"><li>• Implementing Multicast Scoping</li></ul>
<ul style="list-style-type: none"><li>• Multicast Addresses</li></ul>	<ul style="list-style-type: none"><li>• MSDP</li></ul>	LAB 5: Multicast and Policy
<ul style="list-style-type: none"><li>• Reverse Path Forwarding</li></ul>	<ul style="list-style-type: none"><li>• Anycast-RP</li></ul>	The following Appendices can be covered, if time permits, and are requested by the delegate/s prior to booking:
<ul style="list-style-type: none"><li>• Internet Group Management Protocol</li></ul>	LAB 3: Implementing MSDP and Anycast-RP	Appendix A: PIM Dense Mode
LAB 1: Implementing a Baseline Network	Source-Specific Multicast	<ul style="list-style-type: none"><li>• Dense Mode Operation</li></ul>
Multicast Routing Protocols	<ul style="list-style-type: none"><li>• Overview of SSM Operation</li></ul>	<ul style="list-style-type: none"><li>• Configuring Dense Mode</li></ul>
<ul style="list-style-type: none"><li>• Overview of Multicast Routing Protocols</li></ul>	<ul style="list-style-type: none"><li>• SSM Addresses</li></ul>	<ul style="list-style-type: none"><li>• Monitoring Dense Mode</li></ul>
<ul style="list-style-type: none"><li>• PIM Message Types</li></ul>	<ul style="list-style-type: none"><li>• IGMPv3 and SSM</li></ul>	LAB 6: PIM Dense Mode (Optional)
PIM Sparse Mode	<ul style="list-style-type: none"><li>• PIM-SM and SSM</li></ul>	Appendix B: IPv6 Multicast
<ul style="list-style-type: none"><li>• PIM Sparse Mode Operation</li></ul>	<ul style="list-style-type: none"><li>• SSM Case Study</li></ul>	<ul style="list-style-type: none"><li>• IPv6 Multicast Addresses</li></ul>
<ul style="list-style-type: none"><li>• Bidirectional PIM Operation</li></ul>	LAB 4: Source-Specific Multicast	<ul style="list-style-type: none"><li>• IPv6 MLD</li></ul>
<ul style="list-style-type: none"><li>• Configuring Sparse Mode</li></ul>	Multicast and Policy	<ul style="list-style-type: none"><li>• IPv6 ASM Options</li></ul>
<ul style="list-style-type: none"><li>• Configuring Bidirectional PIM</li></ul>	<ul style="list-style-type: none"><li>• Multicast and Policy Overview</li></ul>	<ul style="list-style-type: none"><li>• IPv6 SSM Addresses</li></ul>

## 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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