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Virtual Route Reflector

vRR Getting Started Guide for VMware

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Virtual Route Reflector vRR Getting Started Guide for VMware

The information in this document is current as of the date on the title page.

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About This Guide

Use this guide to install the virtual Route Reflector in the VMware environment. This guide also includes basic vRR configuration and management procedures.

After completing the installation and basic configuration procedures covered in this guide, refer to the Junos OS documentation for information about further software configuration.

RELATED DOCUMENTATION

- Using Route Reflectors for BGP Networks

CHAPTER 1

Virtual Route Reflector Overview

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Understanding Virtual Route Reflector

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The virtual Route Reflector (vRR) feature allows you to implement route reflector capability using a general purpose virtual machine that can be run on a 64-bit Intel-based blade server or appliance. Because a route reflector works in the control plane, it can run in a virtualized environment. A virtual route reflector on an Intel-based blade server or appliance works the same as a route reflector on a router, providing a scalable alternative to full mesh internal BGP peering. The vRR feature has the following benefits:

- Scalability: By implementing the vRR feature, you gain scalability improvements, depending on the server core hardware on which the feature runs. Also, you can implement virtual route reflectors at multiple locations in the network, which helps scale the BGP network with lower cost.
- Faster and more flexible deployment: You install the vRR feature on an Intel server, using open source tools, which reduces your router maintenance.
- Space savings: Hardware-based route reflectors require central office space. You can deploy the vRR feature on any server that is available in the server infrastructure or in the data centers, which saves space.

Virtual Route Reflector Package Contents

The vRR software packages are available as these types of packages:

- Application package—This package is for launching vRR software in a virtualized environment for the first time.
- Install package—This package is for upgrading vRR software that is already running to the next Junos OS release.

  Starting with Junos OS Release 15.1, the install package for vRR (**jinstall64-vrr-*.***) is no longer available. Use the install package of Junos OS for MX Series platforms: **junos-install-mx-x86-64-*.tgz** (e.g. use 64 Bit-MX High-End Series for MX240: Downloads for MX240) to upgrade vRR.

The vRR software images are available in these flavors:

- KVM and OpenStack—TGZ package
- VMware ESXi—OVA package
- Unified—64-bit Junos OS (upgraded FreeBSD kernel)
- Legacy—64-bit Junos OS

  Starting with Junos OS Release 15.1, the legacy package (**jinstall64-vrr-*.***) is no longer available.

Virtual Route Reflector Restrictions

The following features are not supported with the vRR feature:

- Graceful Routing Engine Switchover (GRES)
- Nonstop Active Routing (NSR)
- Unified in-service software upgrade (unified ISSU)

vRR is qualified primarily as a route reflector with minimal data plane support. For packet forwarding, MPLS VPN, and CoS feature support, you might consider vMX.

Release History Table

Release	Description
16.1	Starting with Junos OS Release 16.1, use the KVM archive (**vrr-bundle-kvm-*.tgz**) for vRR deployments on Linux hosts.
15.1	Starting with Junos OS Release 15.1, the install or the legacy package for vRR (**jinstall64-vrr-*.***) is no longer available. For Junos Releases 15.1 >= Junos Os Releases < 16.1, use the unified package (junos-x86-64-*.vmdk).

Virtual Route Reflector Hardware and Software Requirements

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Virtual Route Reflector Hardware Requirements

Table 1 on page 4 lists the hardware requirements.

Table 1: Hardware Requirements

Description	Value
CPU	Intel Xeon Nehalem or newer generation processor
Memory	8 GB for vRR to run with default settings 32 GB for vRR to achieve higher scale
Storage	Local or NAS Each vRR instance requires 25G of disk storage
Other requirements	Hyperthreading (recommended) Any ESXi HCL supported NIC

Virtual Route Reflector Software Requirements

For software requirements, we recommend ESXi 6.0 for VMware.

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CHAPTER

Installing and Configuring Virtual Route Reflector on VMware

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Installing the Virtual Route Reflector Image on VMware

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On VMware, connectivity to the vRR VM is accomplished by two interfaces:

- Management interface (em0)—Performs the same function as the fxp0 interface on other platforms and is connected to the out-of-band management network.
- Data interface (em1)—Terminates all routing traffic and is connected to the data network.

NOTE: The em0 interface can only function as a management interface. You cannot use the em0 interface for routing configurations.

The vRR instance installs with these two interfaces. They can be connected to either a single vSwitch or two vSwitches depending on the network configuration for the host.

The OVA file installs vRR with these default settings:

vCPUs	1
Memory	8 GB
Storage	vRR image—25 GB Metadata image—1 MB

Network adapters	Two adapters—em0, em1
Hardware version	Version 8 Version 10 (starting with Junos OS Release 16.1)

To install vRR with the VMware vSphere Client:

1. Download the vRR software package for VMware from the Virtual Route Reflector page to a location accessible to the server.
2. Launch the vSphere Client for your ESXi server and log in to the server with your credentials.

To install vRR with vSphere Client, perform these tasks:

Configuring the Network

You must assign port groups (networks) to the vRR interfaces to have proper connectivity. You configure the VLAN ID based on how you want to handle VLAN tagged traffic for the vRR interface assigned to the port group.

To configure the port group:

1. In the left navigation pane, select the ESXi server and click the **Configuration** tab. Select **Networking** under Hardware.
2. If you are using an existing vSwitch, skip to the next step.

   In the top right corner, click **Add networking** to create a vSwitch.

   a. For Connection Type, select the **Create vSphere standard switch** option button, select the physical NIC check box to which you want to direct traffic (for example, vmnic3), and click **Next**.

   b. For Connection Settings, name the network.
3. Select **Networking** and click **Properties** next to the Standard Switch.
4. In the vSwitch Properties dialog box, select the virtual machine port group in the Ports tab and click **Edit** at the bottom.
5. In the Port Group Properties section, name the port group and select the appropriate VLAN ID.
   - **None (0)**—Used when the vRR configuration that is not set up for VLAN tagged traffic and the traffic destined for the vRR interfaces assigned to this port group will not have a VLAN tag.
   - **All (4095)**—Used for the vRR configuration where vRR interfaces assigned to this port group are configured with VLAN tags.

- VLAN ID—Used for the vRR configuration where the traffic destined for the vRR interfaces assigned to this port group are tagged and the interface is configured only with the IPv4 or IPv6 address family. If you specify the VLAN ID, the traffic is untagged and delivered to the vRR interface as native IP frames.

Click **OK**.

Deploying the vRR VM

To deploy the VRR VM using **.ova** files:

1. In the left navigation pane, select the ESXi server and select **Deploy OVF Template** from the **File** menu.
2. In the Source pane, click **Browse**, select the **.ova** file for the VM, and click **Next**.
3. In the OVF Template Details pane, click **Next**. This pane displays a summary of the OVA file contents.
4. In the Name and Location pane, specify the name of the VM and click **Next**.
5. In the Storage pane, select the appropriate datastore for the destination storage of the VM and click **Next**.
6. In the Disk Format pane, select the **Thick Provision Lazy Zeroed** option button and click **Next**.
7. In the Network Mapping pane, map the destination to the port group for the interface. If you have not created the port groups when configuring the network, you can edit the VM later. The first interface (em0) is for the management network and the second interface (em1) is for the data network.

   Make your selections and click **Next**.
8. In the Ready to Complete pane, verify your configuration and click **Finish**.
9. To launch vRR, select the VM in the left navigation pane and right-click **Power > Power On**.

Adding Interfaces to the vRR Instance

After deploying vRR, you can add more virtual NIC interfaces.

> **NOTE**: vRR does not support hot-plugging of interfaces. You must power down the VM before adding more interfaces.

To add an interface to the VM:

1. In the left navigation pane, select the VM and and right-click **Edit Settings** to display the Virtual Machine Properties window.
2. To add an interface, click **Add** in the Hardware tab of the Virtual Machine Properties window. The Add Hardware wizard is displayed.
   a. For Device Type, select **Ethernet Adapter** and click **Next**.
   b. For Network connection, select E1000 for the adapter type, select the port group for the network connection, and click **Next**.
   c. Verify your configuration and click **Finish**.

   Click **OK** in the Virtual Machine Properties window.
3. To launch vRR, select the VM in the left navigation pane and right-click **Power > Power On**.

Setting Up the Serial Port

You can connect to the serial console on vRR by setting up a serial port.

> **NOTE**: vRR does not support hot-plugging of the serial port. You must power down the VM before setting or changing the serial port.

To set up the serial port for the VM:

1. In the left navigation pane, select the VM and and right-click **Edit Settings** to display the Virtual Machine Properties window.
2. To add the serial port, click **Add** in the Hardware tab of the Virtual Machine Properties window. The Add Hardware wizard is displayed.
   a. For Device Type, select **Serial Port** and click **Next**.
   b. For Select Port Type, select the **Connect via Network** button and click **Next**.
   c. For Select Network Backing, select the **Server** button and specify the port number in the Port URI text box in the format `telnet://:`*`port-number`* (for example, `telnet://:8601`). Click **Next**.
   d. Click **Finish**.

   Click **OK** in the Virtual Machine Properties window.
3. To launch vRR, select the VM in the left navigation pane and right-click **Power > Power On**.

After you have configured the serial port connection, you can access the serial console port for the VM using the `telnet` *`esxi-server-ip-address port-number`* command.

RELATED DOCUMENTATION

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Configuring Interfaces, Protocols, and Routes of the Virtual Route Reflector Using Junos CLI

1. Using the Junos CLI in the virtual machine console, configure the interfaces that were connected to the OVS virtual switch-br (for KVM or OpenStack) or the vSwitch (for VMware). Specify the IP addresses that were assigned to the VNICs while configuring OVS (KVM) or vSwitch (VMware).

```
[edit]
user@host# set interfaces interface-name family inet address address
user@host# set interfaces interface-name family inet6 address address
```

2. Configure the loopback interface with the IP address for the vRR.

```
[edit]
user@host# set interfaces lo0 unit 0 family inet address address
user@host# set interfaces lo0 unit 0 family inet6 address address
```

3. Add a static default route to the gateway address of the management IP address:

```
[edit]
user@host# set routing-options static route 0.0.0.0/0 next-hop address
```

4. Configure the hostname for the vRR.

```
[edit system]
user@host# set host-name hostname
```

5. Configure the root password.

```
[edit system]
user@host# set root-authentication plain-text-password
```

6. Add a user.

```
[edit system login]
user@host# set user user-name
```

7. Set the user identification (UID).

```
[edit system login user user-name]
user@host# set uid uid-value
```

8. Assign the user to a login class.

```
[edit system login user user-name]
user@host# set class class-name
```

9. Set the user password.

```
[edit system login user user-name]
user@host# set authentication plain-text-password
```

10. Enable Telnet and FTP access.

```
[edit system services]
user@host# set ftp
user@host# set telnet
```

11. Configure the types of system log messages to send to files and to user terminals.

```
[edit system syslog]
user@host# set user * any emergency
user@host# set file messages any notice
user@host# set file messages authorization info
user@host# set file interactive-commands interactive-commands any
```

12. Configure the vRR to always use 64-bit processing.

```
[edit system processes]
user@host# set routing force-64-bit
```

13. Configure the router ID and the autonomous system (AS) number.

```
[edit routing-options]
user@host# set router-id address
user@host# set autonomous-system autonomous-system
```

14. Configure BGP, including the cluster identifier and the neighbor relationships with all IBGP-enabled devices in the autonomous system (AS).

```
[edit protocols bgp group group-name]
user@host# set type internal
user@host# set local-address address
user@host# set cluster cluster-name
user@host# set neighbor address
```

15. (External peers only) Specify that the BGP next-hop value not be changed.

```
[edit protocols bgp group group-name multihop]
user@host# set no-nexthop-change
```

16. Configure a forwarding-table export policy to prevent the installation of BGP routes in the forwarding table. A vRR is not expected to be in the forwarding path for BGP service prefixes.

```
[edit policy-options]
user@host# set policy-statement policy-name term term-name from protocol bgp
user@host# set policy-statement policy-name term term-name then reject
```

17. Apply the BGP policy to the forwarding table.

```
[edit routing-options]
user@host# set forwarding-table export policy-name
```

18. Configure other desired protocols for the interfaces.