

# Virtual Chassis User Guide for Switches

Published  
2021-04-09

Juniper Networks, Inc.  
1133 Innovation Way  
Sunnyvale, California 94089  
USA  
408-745-2000  
[www.juniper.net](http://www.juniper.net)

Juniper Networks, the Juniper Networks logo, Juniper, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

*Virtual Chassis User Guide for Switches*

Copyright © 2021 Juniper Networks, Inc. All rights reserved.

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

## YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

## END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at <https://support.juniper.net/support/eula/>. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

# Table of Contents

About This Guide | viii

1

## Virtual Chassis Overview

Virtual Chassis Overview for Switches | 2

Unresolved topicref | 9

Understanding QFX Series Virtual Chassis | 9

Unresolved topicref | 17

Unresolved topicref | 18

Unresolved topicref | 18

Unresolved topicref | 18

Unresolved topicref | 19

Unresolved topicref | 19

Unresolved topicref | 19

Unresolved topicref | 20

Unresolved topicref | 20

2

## Virtual Chassis Configuration

Configuring an EX2300, EX3400, or EX4300 Virtual Chassis | 22

Configuring an EX2300, EX3400, or EX4300 Virtual Chassis with a Nonprovisioned Configuration File | 25

Configuring an EX2300, EX3400, or EX4300 Virtual Chassis with a Preprovisioned Configuration File | 29

Configuring EX4600 Switches in a Mixed or Non-Mixed Virtual Chassis | 33

Configuring an EX4600 Virtual Chassis with a Nonprovisioned Configuration File | 34

Configuring an EX4600 Virtual Chassis with a Preprovisioned Configuration File | 37

Configuring an EX4650 or a QFX Series Virtual Chassis | 40

Understanding the Licensing Requirements for a Virtual Chassis | 41

Configuring an EX4650 or QFX Series Virtual Chassis with a Preprovisioned Configuration | 42

Configuring an EX4650 or a QFX Series Virtual Chassis with a Nonprovisioned Configuration | 46

**Adding a New Switch to an Existing EX2300, EX3400, or EX4300 Virtual Chassis | 48**

**Adding an EX4600 Switch to a Mixed or Non-mixed Virtual Chassis | 53**

**Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis | 56**

Add a New Switch to an EX4650 or QFX Series Virtual Chassis | 56

Add or Replace a QFX5100-24Q Switch with Two Expansion Modules in a QFX5100 Virtual Chassis | 60

Unresolved topicref | 61

Unresolved topicref | 61

Unresolved topicref | 62

Unresolved topicref | 62

Unresolved topicref | 63

Unresolved topicref | 63

Unresolved topicref | 63

Unresolved topicref | 64

3

## **Virtual Chassis Routine Monitoring and Troubleshooting**

Unresolved topicref | 66

Unresolved topicref | 66

Unresolved topicref | 66

Unresolved topicref | 67

Unresolved topicref | 67

4

## **Upgrading Software on a Virtual Chassis**

Understanding Software Upgrades in a Virtual Chassis | 69

## Upgrading a QFX5100 Switch with a USB Device to Join a QFX5110 Virtual Chassis or Virtual Chassis Fabric | 71

Identifying Compatible Software for QFX5100 Switches to Run in a QFX5110 Virtual Chassis or VCF | 72

Creating a USB Boot Device for a QFX5100 Switch | 73

Upgrading a QFX5100 Switch from Junos OS “QFX 5 Series” to “QFX 5e Series” Software Using a USB Boot Device | 75

## Understanding Nonstop Software Upgrade on a Virtual Chassis and Mixed Virtual Chassis | 77

Unresolved topicref | 83

## Upgrading Software on a Virtual Chassis and Mixed Virtual Chassis Using Nonstop Software Upgrade | 83

Preparing the Switch for Software Installation | 84

Upgrading the Software Using NSSU | 85

## 5

## Configuration Statements

aliases (Virtual Chassis) | 91

Unresolved topicref | 93

Unresolved topicref | 94

Unresolved topicref | 94

Unresolved topicref | 94

Unresolved topicref | 95

Unresolved topicref | 95

Unresolved topicref | 95

Unresolved topicref | 96

no-auto-conversion | 96

Unresolved topicref | 98

Unresolved topicref | 98

Unresolved topicref | 99

Unresolved topicref | 99

rcp-count | 100

Unresolved topicref | 102

Unresolved topicref | 102

Unresolved topicref | 103

Unresolved topicref | 103

Unresolved topicref | 103

Unresolved topicref | 104

Unresolved topicref | 104

6

## Operational Commands

Unresolved topicref | 107

Unresolved topicref | 107

Unresolved topicref | 107

Unresolved topicref | 108

Unresolved topicref | 108

Unresolved topicref | 108

Unresolved topicref | 109

request virtual-chassis vc-port diagnostics optics | 109

Unresolved topicref | 111

Unresolved topicref | 111

Unresolved topicref | 111

Unresolved topicref | 112

Unresolved topicref | 112

Unresolved topicref | 112

Unresolved topicref | 113

Unresolved topicref | 113

Unresolved topicref | 113

Unresolved topicref | 114

Unresolved topicref | 114

Unresolved topicref | 114

Unresolved topicref | 115

show virtual-chassis vc-port diagnostics optics | 115

Unresolved topicref | 137

# About This Guide

Use this guide to set up and configure an EX2300, EX3400, EX4300, EX4600, EX4650, or QFX Series Virtual Chassis. A Virtual Chassis is composed of a supported combination of multiple switches that operate and are managed as a single switch or network entity. Refer also to the hardware documentation for the types of switches comprising the Virtual Chassis for more details on how to physically interconnect them.



# 1

CHAPTER

## Virtual Chassis Overview

---

[Virtual Chassis Overview for Switches](#) | 2

[Unresolved topicref](#) | 9

[Understanding QFX Series Virtual Chassis](#) | 9

[Unresolved topicref](#) | 17

[Unresolved topicref](#) | 18

[Unresolved topicref](#) | 18

[Unresolved topicref](#) | 18

[Unresolved topicref](#) | 19

[Unresolved topicref](#) | 19

[Unresolved topicref](#) | 19

[Unresolved topicref](#) | 20

[Unresolved topicref](#) | 20

---

# Virtual Chassis Overview for Switches

## IN THIS SECTION

- [Benefits of Virtual Chassis on Switches | 3](#)
- [Virtual Chassis Basics on Switches | 3](#)
- [Global Management of Member Switches in a Virtual Chassis | 6](#)
- [High Availability Using Redundancy | 6](#)
- [Adaptability as an Access Switch or Distribution Switch | 7](#)
- [Virtual Chassis Provisioning From the Factory-Default State Using the Phone-Home Client | 7](#)

Many Juniper Networks EX Series and QFX Series switches support *Virtual Chassis*, a flexible and scalable technology with which you can connect individual switches together to form one unit, and configure and manage the unit as a single chassis. Virtual Chassis ports (VCPs) connect member switches together to form a Virtual Chassis, and are responsible for passing all data and control traffic between member switches.

Use the following links to find the right Virtual Chassis User Guide for different EX Series and QFX Series switches if this guide doesn't cover the switches you're interested in:

- [Virtual Chassis User Guide for EX2200, EX3300, EX4200, EX4500 and EX4550 Switches](#) covers configuring and maintaining EX2200, EX3300, EX4200, EX4500, and EX4550 Virtual Chassis.
- [Virtual Chassis User Guide for EX8200 Switches](#) describes configuring and maintaining EX8200 Virtual Chassis.
- For deployments with EX9200 switches, you should plan or move to MC-LAG or Junos Fusion Enterprise architectures rather than using a Virtual Chassis. We do not recommend using EX9200 switches in a Virtual Chassis. If needed to aid in migration away from EX9200 Virtual Chassis, see [Virtual Chassis User Guide for EX9200 Switches](#).
- *Virtual Chassis User Guide for Switches* describes configuring and maintaining *all other* EX Series and QFX Series Virtual Chassis.

**NOTE:** Virtual Chassis Fabric (VCF) is an evolution of Virtual Chassis technology. VCF configurations share some elements of Virtual Chassis technology, including configuration

statements and administrative commands, but use a spine-and-leaf topology with supported QFX Series switches as spine devices and supported EX Series and QFX Series switches as leaf devices. For details on configuring and maintaining a VCF, see the [Virtual Chassis Fabric User Guide](#).

## Benefits of Virtual Chassis on Switches

- Simplifies configuration and maintenance: Multiple devices can be managed as a single device with the same or similar capabilities as the standalone device.
- Increases fault tolerance and high availability (HA): A Virtual Chassis can remain active and network traffic can be redirected to other member switches when a single member switch fails.
- Flattens your network and reduces networking overhead by allowing network devices to synchronize to one resilient logical device rather than to multiple physical devices.
- Enables a simplified Layer 2 network topology that minimizes or eliminates the need for loop prevention protocols such as Spanning Tree Protocol (STP).
- Provides a flexible model for expanding your network: You can easily add Virtual Chassis member switches to increase the number of access ports on your network to support more servers, computers, phones, or other devices with minimal complications to the existing network topology and switch configuration.

## Virtual Chassis Basics on Switches

Virtual Chassis is a feature on Juniper Networks routing or switching devices that provides network resiliency in the form of redundant Routing Engines and network expansion flexibility with minimal impact to a configuration.

Virtual Chassis technology on switches enables you to interconnect supported combinations of EX Series and QFX Series switches into one logical device that you can configure and manage as a single unit. Switches interconnected into a Virtual Chassis are called Virtual Chassis member switches, identified by a member ID within the Virtual Chassis.

Virtual Chassis member switches are interconnected and communicate with each other using Virtual Chassis ports (VCPs).

## Connecting Member Switches with Virtual Chassis Ports

A switch is not recognized by the Virtual Chassis as a member switch until it is interconnected with the primary or interconnected with an existing member of the Virtual Chassis using VCPs. EX Series and QFX Series switches that can be in a Virtual Chassis might support one or more of the following VCP options:

- Network or uplink ports that support the option to be configured as VCPs. Most switches support this VCP option.
- Ports that are configured as VCPs in the default factory settings. These ports can also be converted into and used as network ports instead of as VCPs, and converted back into VCPs again if needed.
- Dedicated VCPs, which are ports that can only function as VCPs. Only a few switches have dedicated VCPs.

Available VCP options vary among the different switch models. See *Virtual Chassis Port Options* for a summary of the ports that are supported as VCPs on different switches.

When a port is set as a VCP, it cannot be used for any other purpose. If you want to use the port for another purpose, you must delete the VCP setting using the **request virtual-chassis vc-port** command. You can run this command directly on the member whose uplink VCP setting you want to delete or through the primary member of the Virtual Chassis configuration.



**CAUTION:** Deleting a VCP in a Virtual Chassis configuration can cause the Virtual Chassis configuration to split. For more information, see *Understanding Split and Merge in a Virtual Chassis*.

If redundant VCP links of the same speed are connected between the same two member switches of a Virtual Chassis, the ports automatically form a VCP Link Aggregation Group (LAG) or bundle that distributes the inter-member VCP traffic load among them. See *Understanding Virtual Chassis Port Link Aggregation* for details.

## Virtual Chassis Configuration

You configure and manage nearly all aspects of an EX Series or QFX Series Virtual Chassis through the primary switch of the Virtual Chassis. However, you can also configure Virtual Chassis parameters when a switch is a standalone switch not interconnected with other members yet, because any switch that supports being in a Virtual Chassis is by default a single-member Virtual Chassis with member ID 0. Upon connecting the switch with others in a Virtual Chassis, any Virtual Chassis configuration statements and uplink Virtual Chassis port (VCP) settings previously configured on the standalone switch remain part of its configuration.

You can set up an EX Series or QFX Series Virtual Chassis using a nonprovisioned or preprovisioned configuration. If you want to deterministically control the roles and member IDs assigned to the member switches when creating and managing a Virtual Chassis, use a preprovisioned configuration, which distinguishes member switches by associating their serial numbers with the member ID.

When adding new member switches to a preprovisioned Virtual Chassis, you might be able to simplify the procedure by using the autoprovisioning feature, which automatically converts the interconnecting links into VCPs when cabling the new switch into the Virtual Chassis under certain conditions and configuration settings. See *Automatic Virtual Chassis Port (VCP) Conversion* for details.

## Configuring Interfaces for a Virtual Chassis

The member ID of an EX Series or QFX Series Virtual Chassis member switch functions as an FPC slot number. When you are configuring interfaces for a Virtual Chassis configuration, you specify the appropriate member ID as the *slot* element of the interface name.

The default factory settings for a Virtual Chassis configuration include FPC 0 as a member of the default VLAN because FPC 0 is configured as part of the **ethernet-switching** family. To include the FPC in the default VLAN, add the **ethernet-switching** family to the configurations for those interfaces.

## Mixed and Non-mixed EX Series and QFX Series Virtual Chassis

A Virtual Chassis might consist of all the same type of switches or different types of switches in supported combinations.

Some combinations of switches in a Virtual Chassis comprise a *mixed Virtual Chassis*, which contains member switches that have operational differences requiring the Virtual Chassis to be configured with a mixed mode setting that enables all of the member switches to inter-operate successfully.

Some combinations of different types or models of switches can inter-operate in a Virtual Chassis without requiring the Virtual Chassis to be configured in mixed mode, such as different switches that can run the same Junos OS software image.

See *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details on the different combinations of switches supported in a Virtual Chassis.

## Virtual Chassis Member Switch Roles

Member switches in an EX Series or QFX Series Virtual Chassis operate in either a *primary* Routing Engine role, *backup* Routing Engine role, or *linecard* role. For some mixed Virtual Chassis, the member switches in the Routing Engine role are recommended (and in some cases required) to be particular types or models of switches. Any switch supported in a Virtual Chassis can operate in the linecard role.

A standalone switch that supports Virtual Chassis is by default a single-member Virtual Chassis that is assigned member ID 0 and operates in the primary Routing Engine role as the primary of itself. When

connected and configured into a Virtual Chassis with other member switches, the switch will be assigned a unique member ID and might take on a different role.

A nonprovisioned Virtual Chassis uses a primary-role election algorithm to select the member switches that assume the primary and backup roles if an existing member switch in the Routing Engine role fails or when new member switches are added. In a preprovisioned Virtual Chassis, you assign the roles to each member switch when forming the Virtual Chassis and adding or replacing member switches.

See the following for details on EX Series and QFX Series Virtual Chassis member switch roles:

- *Understanding Virtual Chassis Components*
- *Understanding How the Primary in a Virtual Chassis Is Elected*

## Global Management of Member Switches in a Virtual Chassis

The interconnected member switches in a Virtual Chassis operate and can be configured as a single network entity.

The serial console port and dedicated out-of-band management port on individual switches have global virtual counterparts when the switches are interconnected in a Virtual Chassis configuration. You can connect to the primary switch by connecting a terminal directly to the console port of any member switch. A *virtual management Ethernet (VME)* interface allows you to remotely manage the Virtual Chassis configuration by connecting to the out-of-band management port of any member switch through a single IP address. You can perform remote configuration and administration of all member switches of the Virtual Chassis configuration using the Junos CLI through the VME interface. See *Understanding Global Management of a Virtual Chassis* for details.

When setting up a Virtual Chassis on EX Series switches that support the EZSetup script, you can run EZSetup once to specify the identification parameters for the primary, and these parameters implicitly apply to all member switches of the Virtual Chassis.

On switches that support the J-Web user interface, you can view the Virtual Chassis as a single device in J-Web and apply various device management functions to all member switches of the Virtual Chassis.

## High Availability Using Redundancy

Interconnecting EX Series or QFX Series switches into a Virtual Chassis increases your network's high availability. A Virtual Chassis is more fault tolerant than a standalone switch because it can remain active, forward traffic and provide sub-second convergence in the case of a device or link failure.

Standalone switches that support only a single Routing Engine can operate with a primary and a backup Routing Engine when configured into a Virtual Chassis, and therefore support some high availability features that would otherwise not be available on the switch, such as Graceful Routing Engine Switchover (GRES) for hitless failover.

You can also increase fault tolerance within a Virtual Chassis by configuring other supported high availability features. For example, configuring Link Aggregation Group (LAG) bundles that include member links on different switches in the same Virtual Chassis enables traffic traversing the LAG to be redirected from a Virtual Chassis member switch that fails to links on another active Virtual Chassis member switch.

## Adaptability as an Access Switch or Distribution Switch

A Virtual Chassis configuration supports a variety of user environments because it can be composed of different types of switches. You can select different switch models to support various functions. For example, you might set up one Virtual Chassis access switch configuration composed of full Power over Ethernet (PoE) models to support users sitting in cubicles equipped with PCs and Voice over IP (VoIP) phones. You could set up another Virtual Chassis configuration with partial PoE models to support the company's internal servers, and another to support the company's external servers. You can alternatively use a Virtual Chassis in a topology as a distribution switch.

## Virtual Chassis Provisioning From the Factory-Default State Using the Phone-Home Client

Phone-home provisioning on a Virtual Chassis is a form of zero-touch provisioning (ZTP). With phone-home provisioning, when a device in the factory-default state boots up, a phone-home client (PHC) process automatically starts running on the device. The PHC gets bootstrapping information over the network from a central network management data source called the phone-home server (PHS), and installs the intended software image and configuration on the device without requiring any user interaction at the remote site.

The PHC also supports phone-home provisioning on some EX Series Virtual Chassis. Check [Feature Explorer](#) and search for **phone-home** to see the Virtual Chassis platforms that support phone-home provisioning. Phone-home provisioning on a Virtual Chassis is an extension of standalone device phone-home support.

See [Provision a Virtual Chassis Using the Phone-Home Client](#) for details about how the PHC works to provision a Virtual Chassis.

The PHS is usually part of a network management system (NMS) that supports phone-home provisioning. The network administrator enters the information that defines how the devices or Virtual Chassis at remote sites should be set up. An organization might have more than one PHS for redundancy.

## Requirements for Phone-Home Provisioning to Work for a Virtual Chassis

The PHC only supports Virtual Chassis that meet the following conditions:

- The Virtual Chassis member devices have dedicated or default-configured VCPs.

*Virtual Chassis Port Options* explains the different VCP types and what's supported on different platforms.

- The Virtual Chassis members are all the same type of device.

In other words, it isn't a mixed-mode Virtual Chassis. See *Understanding Mixed EX Series and QFX Series Virtual Chassis*.

- All member devices have the factory-default configuration.

The PHC process only runs when a device or Virtual Chassis is in the factory-default state.

- The Virtual Chassis member are interconnected in a ring topology using only dedicated or default-configured VCPs.

[How To Enable Phone-Home Provisioning on a Virtual Chassis](#) shows a sample EX4300 Virtual Chassis that is wired this way.

- At least one Virtual Chassis member has an active connection to the network and can access an available PHS that supports provisioning a Virtual Chassis.

The connection to the PHS can be through the Virtual Chassis VME interface or any network-facing port on any Virtual Chassis member. See *Understanding Global Management of a Virtual Chassis* for more about how the VME interface works.

## RELATED DOCUMENTATION

[Understanding QFX Series Virtual Chassis](#) | 9



# Unresolved topicref

## SUMMARY

Unresolved topicref placeholder.

This is a placeholder for unresolved topicref links.

## Understanding QFX Series Virtual Chassis

### IN THIS SECTION

- [Virtual Chassis Support on QFX Series Switches | 10](#)
- [Basic Configuration of QFX Series Virtual Chassis | 11](#)
- [QFX5200 Switches in a Virtual Chassis | 12](#)
- [QFX5120 or EX4650 Switches in a Virtual Chassis | 12](#)
- [QFX5110 Switches in a Virtual Chassis | 13](#)
- [QFX5100 Switches in a Virtual Chassis | 14](#)
- [QFX3500 and QFX3600 Switches in a Virtual Chassis | 15](#)
- [EX4300 Switches in a QFX Series Virtual Chassis | 16](#)

This topic introduces QFX Series Virtual Chassis. A QFX Series Virtual Chassis is a supported combination of interconnected QFX3500, QFX3600, QFX5100, QFX5110, QFX5120 or EX4650, QFX5200, and EX4300 switches operating as one logical device and managed as a single chassis. Switches in a Virtual Chassis are called *member switches* of the Virtual Chassis.

This topic does not discuss Virtual Chassis Fabric (VCF). For information on understanding VCF, see [Virtual Chassis Fabric Overview](#).

## Virtual Chassis Support on QFX Series Switches

A QFX Series Virtual Chassis is a flexible, scaling switch solution for supported combinations of QFX3500, QFX3600, QFX5100, QFX5110, QFX5120, and QFX5200 switches. EX4650-48Y switches operate the same as QFX5120-48Y switches in a Virtual Chassis, so QFX Series Virtual Chassis configuration, monitoring and maintenance steps also apply to EX4650 Virtual Chassis. EX4300 switches can be included in some configurations of a QFX Series Virtual Chassis.

In a QFX Series Virtual Chassis, you can interconnect standalone switches in the following combinations into one logical device, and manage the logical device as a single chassis:

- Up to three QFX5200 switches (a non-mixed Virtual Chassis)
- Two QFX5120 switches or up to four EX4650 switches (a non-mixed Virtual Chassis), as follows:
  - Starting in Junos OS Release 19.3R1, you can interconnect two QFX5120-48Y or EX4650-48Y switches into a Virtual Chassis.
  - Starting in Junos OS Release 20.1R1, you can interconnect up to four EX4650-48Y switches into a Virtual Chassis.
  - Starting in Junos OS Release 20.2R1, you can interconnect two QFX5120-48T switches into a Virtual Chassis.
  - Starting in Junos OS Release 20.3R1, you can interconnect two QFX5120-32C switches into a Virtual Chassis.
- Up to ten QFX5110 switches or a combination of QFX5110 and QFX5100 switches (a non-mixed Virtual Chassis)
- Up to ten QFX5100 switches (a non-mixed Virtual Chassis)
- Up to ten QFX5100 switches with any combination of QFX3500, QFX3600, or EX4300 switches (a mixed-mode Virtual Chassis)
- Up to ten QFX3500 switches or QFX3600 switches, or a combination of QFX3500 and QFX3600 switches (a non-mixed Virtual Chassis)
- Up to ten QFX3500 or QFX3600 switches with supported EX4300 switches, or a combination of all three types of switches (a mixed-mode Virtual Chassis)

**NOTE:** EX4300 multigigabit model (EX4300-48MP) switches are not supported in a mixed-mode Virtual Chassis with any QFX Series switches.

## Basic Configuration of QFX Series Virtual Chassis

Some QFX Series switches can only form a Virtual Chassis with the same type of switches, while others can be interconnected with other types of switches into a mixed-mode Virtual Chassis. See *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details on the different types of switches that can be mixed in a Virtual Chassis.

You set up a Virtual Chassis by configuring Virtual Chassis ports (VCPs) on the member switches, and interconnecting the switches using the VCPs. VCPs are responsible for passing all data and control traffic between member switches in the Virtual Chassis.

The following ports on QFX Series switches that support Virtual Chassis can be configured into VCPs to form a QFX Series Virtual Chassis:

- On QFX5200 switches: Any 40-Gigabit Ethernet QSFP+ ports

**NOTE:** Starting in Junos OS Release 17.3R2-S4, 100-Gigabit Ethernet QSFP28 ports are also supported as VCPs on QFX5200 switches.

- On QFX5120 or EX4650 switches:
  - QFX5120-48Y or EX4650-48Y: Only the eight 40-Gigabit Ethernet QSFP+ or 100-Gigabit Ethernet QSFP28 front panel uplink ports (ports 48 through 55)
  - QFX5120-48T: Only the six 40-Gigabit Ethernet QSFP+ or 100-Gigabit Ethernet QSFP28 front panel uplink ports (ports 48 through 53)
  - QFX5120-32C: Any network ports installed with either 40-Gigabit Ethernet QSFP+ or 100-Gbps QSFP28 transceivers
- On QFX5110 switches: Any 40-Gigabit Ethernet QSFP+ or 100-Gigabit Ethernet QSFP28 ports
- On QFX3500, QFX3600, or QFX5100 switches: Any non-channelized 40-Gigabit Ethernet QSFP+ ports
- Any fixed 10-Gigabit Ethernet SFP+ ports on any QFX Series switches that support these ports

EX4650 and QFX Series switches don't have any dedicated VCPs (ports that can only be used as VCPs) or default-configured VCPs (ports that are configured as VCPs in the default factory configuration). See *Virtual Chassis Port Options* for details on which ports on different QFX Series switches can be VCPs.

You can increase VCP bandwidth between member switches by connecting multiple VCP links between the switches. When multiple VCP links interconnect the same two member switches, the links automatically form a Link Aggregation Group (LAG) bundle if they have the same speeds. For example, if you have two 40-Gigabit Ethernet QSFP+ interfaces configured as VCPs between member switches, the

two links form a LAG with 80-Gbps of total bandwidth. However, 10-Gigabit Ethernet SFP+ and 40-Gigabit Ethernet QSFP+ interfaces configured as VCPs between two Virtual Chassis member switches will not become member links in the same VCP LAG.

You can set up a Virtual Chassis using either a nonprovisioned or a preprovisioned configuration. If you want to deterministically control the role and member ID assigned to each member switch, use a preprovisioned configuration. Virtual Chassis member switches can have one of three roles: primary Routing Engine, backup Routing Engine, or linecard role. In some combinations of switches in a Virtual Chassis, we recommend or require that you configure certain switches into the Routing Engine roles. See *Understanding Virtual Chassis Components* for more information about Virtual Chassis roles.

Adding switches to a preprovisioned configuration is simpler if you use the automatic VCP conversion feature (see *Automatic Virtual Chassis Port (VCP) Conversion*), which automatically converts uplink ports into VCPs on the member switches on both sides of the new VCP links as they are cabled. This method to expand a Virtual Chassis is also called *autoprovisioning*.

## QFX5200 Switches in a Virtual Chassis

Virtual Chassis is supported on QFX5200 switches starting in Junos OS Release 17.3R2 and 17.4R1 onward.

You can interconnect up to three QFX5200 switches into a QFX5200 Virtual Chassis. QFX5200 switches cannot be combined with other types of switches in a Virtual Chassis.

The following QFX5200 switches are supported in a QFX5200 Virtual Chassis:

- QFX5200-32C

## QFX5120 or EX4650 Switches in a Virtual Chassis

QFX5120 and EX4650 switches are similar and operate the same way in a Virtual Chassis. Each QFX5120 or EX4650 switch model can only be combined with the same model of switches into a Virtual Chassis.

- Starting in Junos OS Release 19.3R1, you can interconnect two QFX5120-48Y switches or two EX4650-48Y switches into a Virtual Chassis.

Starting in Junos OS Release 20.2R1, you can interconnect two QFX5120-48T switches into a Virtual Chassis.

Starting in Junos OS Release 20.3R1, you can interconnect two QFX5120-32C switches into a Virtual Chassis.

The two member switches must be in the primary and backup Routing Engine roles.

- Starting in Junos OS Release 20.1R1, you can interconnect up to four EX4650-48Y switches into a Virtual Chassis.

We recommend that you configure two member switches in the primary and backup Routing Engine roles for Routing Engine redundancy, and the remaining switches in linecard role.

See *Understanding Virtual Chassis Components* for more information about Virtual Chassis member roles.

QFX5120 and EX4650 switches do not have dedicated or default-configured VCPs, but you can set any of the following ports as VCPs:

- On QFX5120-48Y, QFX5120-48T, or EX4650-48Y switches: Any of the 40-Gigabit Ethernet QSFP+ or 100-Gigabit Ethernet QSFP28 uplink ports on the front panel (non-channelized). These are ports 48 through 55 on EX4650-48Y or QFX5120-48Y switches, and ports 48 through 53 on QFX5120-48T switches.

**NOTE:** You can't use any of the other ports (network ports 0 through 47) as VCPs. Running the **request virtual-chassis vc-port set** command on the network ports doesn't fail, but they will not function properly as VCPs.

- On QFX5120-32C switches: Any of the 32 network ports installed with either 40-Gigabit Ethernet QSFP+ or 100-Gigabit Ethernet QSFP28 transceivers

You configure, monitor, and maintain a QFX5120 Virtual Chassis or an EX4650 Virtual Chassis in the same way as other QFX Series Virtual Chassis. See the following for more details:

- ["Configuring an EX4650 or a QFX Series Virtual Chassis" on page 40](#)
- ["Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis" on page 56](#)
- *Removing or Replacing a Member Switch of a Virtual Chassis Configuration*

## QFX5110 Switches in a Virtual Chassis

Starting in Junos OS Release 17.3R1, QFX5110 switches support Virtual Chassis.

You can interconnect up to ten QFX5110 switches or a combination of QFX5110 and QFX5100 switches into a QFX5110 Virtual Chassis. All switches can run the same software image, and you do not need to configure mixed mode.

The following QFX5110 and QFX5100 switches are supported in a QFX5110 Virtual Chassis:

- QFX5110-32Q
- QFX5110-48S
- QFX5100-24Q
- QFX5100-48S
- QFX5100-48T

Starting in Junos OS Release 17.3R2, you can include QFX5100-48T switches in a QFX5110 Virtual Chassis.

- QFX5100-96S

## QFX5100 Switches in a Virtual Chassis

Starting in Junos OS Release 13.2X51-D20, QFX5100 switches support Virtual Chassis. You can interconnect up to ten switches into a QFX5100 Virtual Chassis that can include any combination of QFX5100, QFX3500, QFX3600, and EX4300 switches.

**NOTE:** In Junos OS release 13.2X51-D20, you can interconnect only up to four QFX5100-96S switches in a non-mixed QFX5100 Virtual Chassis. Starting in Junos OS release 13.2X51-D25, you can configure up to ten QFX5100-96S switches into a mixed or non-mixed QFX Series Virtual Chassis.

The following QFX5100 switches are supported in a non-mixed QFX5100 Virtual Chassis or a mixed QFX5100 Virtual Chassis (QFX5100 switches with QFX3500, QFX3600, or EX4300 switches):

- QFX5100-24Q
- QFX5100-48S
- QFX5100-48T
- QFX5100-96S

**NOTE:** You should configure QFX5100-24Q switches as the Routing Engine role member switches in a mixed QFX5100 Virtual Chassis.

QFX5100 switches can also be part of a QFX5110 Virtual Chassis, which can be a combination of up to ten QFX5110 and QFX5100 switches. For a QFX5100 switch to participate in a QFX5110 Virtual Chassis, the switch must have the same software version and image installed as the software running on the QFX5110 switches in the Virtual Chassis. You don't need to configure mixed mode. In a QFX5110 Virtual Chassis, we recommend to use QFX5110 switches in the primary and backup Routing Engine roles, and QFX5100 switches only in the line-card role.

The following QFX5100 switches are supported in a QFX5110 Virtual Chassis:

- QFX5100-24Q
- QFX5100-48S
- QFX5100-48T

Starting in Junos OS Release 17.3R2, you can include QFX5100-48T switches in a QFX5110 Virtual Chassis.

- QFX5100-96S



**CAUTION:** You *must* first upgrade a QFX5100 switch running a Junos OS software image with “-qfx-5-” in the package filename to a Junos OS software image with “-qfx-5e-” in the package filename before it can be added to a QFX5110 Virtual Chassis or VCF. See ["Upgrading a QFX5100 Switch with a USB Device to Join a QFX5110 Virtual Chassis or Virtual Chassis Fabric" on page 71.](#)

## QFX3500 and QFX3600 Switches in a Virtual Chassis

QFX3500 and QFX3600 switches support Virtual Chassis. To be included in a Virtual Chassis, you must configure QFX3500 and QFX3600 switches as standalone switches and not as QFX node devices in a QFabric system.

QFX3500 and QFX3600 switches can be in a Virtual Chassis with up to ten member switches in a non-mixed Virtual Chassis as follows:

- All QFX3500 switches
- All QFX3600 switches
- A combination of QFX3500 and QFX3600 switches

QFX3500 or QFX3600 switches can also be in a mixed QFX5100 Virtual Chassis with any combination of QFX3500, QFX3600, QFX5100, and EX4300 switches.

**NOTE:** EX4300 multigigabit model (EX4300-48MP) switches are not supported in a mixed Virtual Chassis with QFX Series switches.

## EX4300 Switches in a QFX Series Virtual Chassis

Starting in Junos OS Release 13.2X51-D20, EX4300 switches except multigigabit models (EX4300-48MP) can be interconnected into a mixed-mode QFX Series Virtual Chassis with up to ten member switches that can be any combination of EX4300, QFX3500 switches, QFX3600 switches, and QFX5100 switches.

**Release History Table**

Release	Description
20.2R1	Starting in Junos OS Release 20.2R1, you can interconnect two QFX5120-48T switches into a Virtual Chassis.
20.1R1	Starting in Junos OS Release 20.1R1, you can interconnect up to four EX4650-48Y switches into a Virtual Chassis.
19.4R1	Starting in Junos OS Release 20.3R1, you can interconnect two QFX5120-32C switches into a Virtual Chassis.
19.3R1	Starting in Junos OS Release 19.3R1, you can interconnect two QFX5120-48Y or EX4650-48Y switches into a Virtual Chassis.
17.3R2-S4	Starting in Junos OS Release 17.3R2-S4, 100-Gigabit Ethernet QSFP28 ports are also supported as VCPs on QFX5200 switches.
17.3R2	Virtual Chassis is supported on QFX5200 switches starting in Junos OS Release 17.3R2 and 17.4R1 onward.
17.3R2	Starting in Junos OS Release 17.3R2, you can include QFX5100-48T switches in a QFX5110 Virtual Chassis.
17.3R1	Starting in Junos OS Release 17.3R1, QFX5110 switches support Virtual Chassis.



13.2X53-D25	Starting in Junos OS release 13.2X51-D25, you can configure up to ten QFX5100-96S switches into a mixed or non-mixed QFX Series Virtual Chassis.
13.2X51-D20	Starting in Junos OS Release 13.2X51-D20, QFX5100 switches support Virtual Chassis.
13.2X51-D20	In Junos OS release 13.2X51-D20, you can interconnect only up to four QFX5100-96S switches in a non-mixed QFX5100 Virtual Chassis.
13.2X51-D20	Starting in Junos OS Release 13.2X51-D20, EX4300 switches except multigigabit models (EX4300-48MP) can be interconnected into a mixed-mode QFX Series Virtual Chassis with up to ten member switches that can be any combination of EX4300, QFX3500 switches, QFX3600 switches, and QFX5100 switches.

RELATED DOCUMENTATION

<a href="#">Virtual Chassis Overview for Switches   2</a>
<a href="#">Configuring an EX4650 or a QFX Series Virtual Chassis   40</a>

# Unresolved topicref

SUMMARY

Unresolved topicref placeholder.

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# 2

CHAPTER

## Virtual Chassis Configuration

---

[Configuring an EX2300, EX3400, or EX4300 Virtual Chassis | 22](#)

[Configuring EX4600 Switches in a Mixed or Non-Mixed Virtual Chassis | 33](#)

[Configuring an EX4650 or a QFX Series Virtual Chassis | 40](#)

[Adding a New Switch to an Existing EX2300, EX3400, or EX4300 Virtual Chassis | 48](#)

[Adding an EX4600 Switch to a Mixed or Non-mixed Virtual Chassis | 53](#)

[Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis | 56](#)

[Unresolved topicref | 61](#)

[Unresolved topicref | 61](#)

[Unresolved topicref | 62](#)

[Unresolved topicref | 62](#)

[Unresolved topicref | 63](#)

[Unresolved topicref | 63](#)

[Unresolved topicref | 63](#)

[Unresolved topicref | 64](#)

---

# Configuring an EX2300, EX3400, or EX4300 Virtual Chassis

## IN THIS SECTION

- [Configuring an EX2300, EX3400, or EX4300 Virtual Chassis with a Nonprovisioned Configuration File | 25](#)
- [Configuring an EX2300, EX3400, or EX4300 Virtual Chassis with a Preprovisioned Configuration File | 29](#)

You can use the procedures in this topic to configure:

- A non-mixed Virtual Chassis composed of EX2300, EX3400, or EX4300 switches
- A mixed EX4300 Virtual Chassis with EX4300 multigigabit model (EX4300-48MP) switches interconnected with other EX4300 model switches

You can mix non-multigigabit model EX4300 switches with other switches in a Virtual Chassis or Virtual Chassis Fabric (VCF) in the following supported combinations. In these cases, use the following configuration procedures instead of the procedures in this topic:

- A mixed EX4600 Virtual Chassis that includes EX4600 and EX4300 member switches: ["Configuring EX4600 Switches in a Mixed or Non-Mixed Virtual Chassis" on page 33.](#)
- A mixed QFX Series Virtual Chassis that includes supported QFX Series and EX4300 switches: ["Configuring an EX4650 or a QFX Series Virtual Chassis" on page 40.](#)
- A mixed VCF with EX4300 switches as leaf nodes: [Preprovisioning a Virtual Chassis Fabric](#) or [Autoprovisioning a Virtual Chassis Fabric.](#)

Use the following requirements and guidelines to plan the devices to include in your Virtual Chassis:

- EX2300 switches:

In Junos OS releases prior to 18.4R1, you can interconnect EX2300 and EX2300-C switches into a Virtual Chassis, or you can interconnect EX2300 multigigabit model switches (EX2300-24MP and EX2300-48MP) into a Virtual Chassis. You can't combine EX2300 or EX2300-C switches with EX2300 multigigabit model switches in a Virtual Chassis.

Starting in Junos OS Release 18.4R1, you can combine EX2300, EX2300-C, and EX2300 multigigabit switches in the same non-mixed Virtual Chassis, and use any of these switches in any role (primary Routing Engine role, backup Routing Engine role, or linecard role).

- EX3400 switches:

You can interconnect EX3400 switches only with other EX3400 switches in a Virtual Chassis (no mixed mode).

- EX4300 switches:

You can interconnect EX4300 switches excluding multigigabit models into a *non-mixed* EX4300 Virtual Chassis.

You can also connect EX4300 multigigabit model switches (EX4300-48MP) together into a *non-mixed* EX4300 Virtual Chassis.

You can combine EX4300 multigigabit model switches with other EX4300 model switches as a *mixed* EX4300 Virtual Chassis with the following configuration:

- You must configure the Virtual Chassis into mixed mode.
- You must also include a special port mode option (**ieee-clause-82**) when you configure mixed mode on the EX4300 switches that are not multigigabit models. This port mode enables the Virtual Chassis ports (VCPs) on EX4300 non-multigigabit model switches to communicate with VCPs on multigigabit model members.

**NOTE:** If you remove a non-multigigabit model EX4300 switch from a mixed EX4300 Virtual Chassis with multigigabit model members, remember to disable **ieee-clause-82** port mode on the removed switch if you want to reconfigure it as a standalone switch or use it in any other type of mixed Virtual Chassis or non-mixed Virtual Chassis. Otherwise, the VCPs will not connect with other members in the new Virtual Chassis. (See *Removing or Replacing a Member Switch of a Virtual Chassis Configuration*.)

- The members in the Routing Engine role must be multigigabit model (EX4300-48MP) switches.

Use these guidelines to plan the VCP connections:

- In a non-mixed EX4300 Virtual Chassis with only EX4300 multigigabit model (EX4300-48MP) switches, interconnect the member switches using the dedicated VCPs—the 40-Gbps QSFP+ ports on the rear panel. These are the only ports that can be used as VCPs on EX4300-48MP switches.
- In a mixed EX4300 Virtual Chassis with a combination of EX4300 multigigabit model switches and other EX4300 model switches, you must use 40-Gbps QSFP+ ports on the other EX4300 model switches as VCPs and interconnect those ports with the dedicated VCPs on the multigigabit model switch members.

**NOTE:** All QSFP+ ports on EX4300 non-multigigabit switches are configured as VCPs in the default factory configuration.

- In non-mixed EX2300, EX3400, and non-multigigabit model EX4300 Virtual Chassis, use uplink ports that you configure as VCPs or that are VCPs by default to interconnect the member switches. Keep the following in mind about VCPs on these switches:
  - EX2300 switches do not have any ports that are configured by default as VCPs. You must explicitly configure the ports you want to use as VCPs.
  - The QSFP+ uplink ports on EX3400 and EX4300 switches support 40-Gbps speeds and can connect switches that are up to 492 feet (150 m) apart. These are set as VCPs by default, so you don't need to explicitly configure them.
  - You can configure the SFP+ uplink ports on any of these switches as VCPs. These ports support 10-Gbps speeds and can connect switches that are up to 6.2 miles (10 km) apart.

**NOTE:** The only exceptions are the four *built-in* 10-Gbps SFP+ ports on 32-port EX4300 switches. You can't use the built-in ports as VCPs.

- You can't use uplink ports installed with SFP transceivers as VCPs on any of these switches.
- The simplest way to interconnect EX3400 or EX4300 switches into a non-mixed EX3400 or EX4300 Virtual Chassis is to install the switches within 492 feet of one another and interconnect them into a Virtual Chassis by using the QSFP+ ports.

For an EX3400 or EX4300 Virtual Chassis, if you must install member switches in locations that are more than 492 feet apart (such as at a different site or at a distant location within the same site), or if you are using the QSFP+ ports for another purpose, or for any EX2300 Virtual Chassis, you must configure SFP+ uplink module ports into VCPs.

- If you need additional VCP bandwidth between two member switches, you can configure additional ports as VCPs and create redundant links between the member switches.

Redundant VCP links are not required to be the same speed, but the links with identical speeds automatically form a VCP link aggregation group (LAG) to provide resiliency to the Virtual Chassis. For example, if you have two 40-Gbps QSFP+ ports and two 10-Gbps SFP+ ports configured as VCPs connecting the same two member switches to each other, the member switches form two LAGs—one LAG with two 40-Gbps QSFP+ port links and another with two 10-Gbps SFP+ port links.



**NOTE:** A Virtual Chassis configuration has two Routing Engines—the primary switch and the backup switch. We recommend that you always use **commit synchronize** rather than simply **commit** to save configuration changes made for a Virtual Chassis. This ensures that you save the configuration changes on both Routing Engines at the same time.

An EX2300, EX3400, or EX4300 Virtual Chassis can be configured with either of the following options:

- A nonprovisioned configuration—The primary sequentially assigns a member ID to other member switches. The role is determined by the primary-role priority value and other factors in the primary-role election algorithm.
- A preprovisioned configuration—You can deterministically control the member ID and role assigned to a member switch by tying the member switch to its serial number.

All member switches must be running the same version of Junos OS to form a Virtual Chassis.

**NOTE:** You must configure a VLAN on all interfaces in the Virtual Chassis, except on member switch 0, before the interfaces can send or receive traffic. This is because the interfaces on member switch 0 are initially placed into the default VLAN, but the interfaces on all other member switches are not placed into any VLAN. See [Configuring VLANs for EX Series Switches with ELS Support \(CLI Procedure\)](#).

**NOTE:** On an EX4300 Virtual Chassis, STP is disabled on all interfaces except the interfaces on member switch 0 until some type of spanning-tree protocol is enabled. See [Configuring RSTP on EX Series Switches \(CLI Procedure\)](#) (RSTP is the default spanning-tree protocol), [Configuring MSTP on Switches](#), or [Configuring VSTP Protocol](#) to enable a spanning-tree protocol on the interfaces in your EX4300 Virtual Chassis.

## Configuring an EX2300, EX3400, or EX4300 Virtual Chassis with a Nonprovisioned Configuration File

You can use a nonprovisioned configuration to configure an EX2300, EX3400, or EX4300 Virtual Chassis.

This procedure shows example configuration steps for a Virtual Chassis with two to ten members. You can have up to 4 members in an EX2300 Virtual Chassis, and up to 10 members in an EX3400 or EX4300 Virtual Chassis.

**NOTE:** We recommend that you physically cable the interconnecting ports as the final step of this procedure.

You can, however, configure the Virtual Chassis while the cables are physically connected.

1. Power on only the switch that you will use as the primary switch.

**NOTE:** For a mixed EX4300 Virtual Chassis with EX4300 multigigabit model (EX4300-48MP) switches and other EX4300 model switches, the members in the primary and backup Routing Engine roles must be EX4300 multigigabit model switches.

2. (Required for a mixed EX4300 Virtual Chassis only) Set the primary switch into mixed mode, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode mixed reboot
```

3. If you are configuring a mixed Virtual Chassis, wait for the reboot to complete before performing this step. Run the EZSetup program on the primary switch, specifying the identification parameters. See *Connecting and Configuring an EX Series Switch (CLI Procedure)* for details.

**NOTE:** The properties that you specify for the primary switch apply to the entire Virtual Chassis configuration.

4. (Optional) Configure the primary switch with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis (see *Understanding Global Management of a Virtual Chassis*):

```
[edit]user@switch# set interfaces
vme unit 0 family inet address /ip-address/mask/
```

5. (Optional) Configure primary-role priority for the other member switches. For example, for a ten-member Virtual Chassis:

```
[edit virtual-chassis]user@switch# set member 0 mastership-priority
255user@switch# set member 1 mastership-priority 255user@switch# set member
```

```

2 mastership-priority
10user@switch# set member
3 mastership-priority 9user@switch# set member 4 mastership-priority
8user@switch# set member 5 mastership-priority 7user@switch# set member 6
mastership-priority 6user@switch# set member 7 mastership-priority
5user@switch# set member 8 mastership-priority 4user@switch# set member 9
mastership-priority 3

```

The primary-role priority value determines the roles in a non-provisioned Virtual Chassis configuration. The switches with the highest primary-role priority values assume the primary and backup roles. All other switches assume the linecard role.

If you do not configure the primary-role priority for any switch in your Virtual Chassis, including when you do not configure the Virtual Chassis, all switches assume the default primary-role priority of 128. The primary-role election algorithm selects the roles for the member switches. In most cases, the switches that have been powered on the longest assume the primary and backup roles when all Virtual Chassis member switches are configured with the same primary-role priority. See *Understanding How the Primary in a Virtual Chassis Is Elected* for additional information on the primary-role election algorithm.

A switch with a primary-role priority of 0 never assumes the primary or backup role.

**NOTE:** We recommend that you specify the same primary-role priority value for the intended primary and backup members.

6. (Optional: Recommended for a two-member Virtual Chassis) On the primary switch, disable the split and merge feature:

```
[edit virtual-chassis]user@switch# set no-split-detection
```

7. Commit the configured items.
8. Power on the other member switches.
9. (Required for a mixed EX4300 Virtual Chassis only) Set each additional individual EX4300 multigigabit model (EX4300-48MP) switch into mixed mode and reboot the switch for the change to take effect:

```

user@device> request virtual-chassis mode mixed
reboot

```

Set each of the other EX4300 switches that are not multigigabit model switches into mixed mode with the **ieee-clause-82** option, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode ieee-clause-82
mixed reboot
```

10. If needed, on each individual member switch, configure SFP+ uplink ports that will be used as VCPs to interconnect the member switches.

**NOTE:** This step is not needed for EX4300 multigigabit model (EX4300-48MP) switches, which have dedicated VCPs on the rear panel of the switch. Dedicated VCPs do not require configuration, and you must use the dedicated ports on these switches because no other ports on these switches are supported as VCPs.

**NOTE:** On EX3400 switches and on EX4300 member switches that are not multigigabit model switches, because QSFP+ ports are configured into VCPs by default, you do not usually have to perform this step when you are using a QSFP+ port as a VCP. You only need to configure a QSFP+ port as a VCP if you previously configured the QSFP+ port into a network port. If you previously configured the QSFP+ port into a network port, perform this step to configure the QSFP+ port back into a VCP.

Use the *request virtual-chassis vc-port* command to configure SFP+ or QSFP+ ports into VCPs. For example, for a four-member Virtual Chassis:

```
user@switch-0> request
virtual-chassis vc-port set pic-slot 1 port 0
user@switch-0> request
virtual-chassis vc-port set pic-slot 1 port 1
```

```
user@switch-1> request
virtual-chassis vc-port set pic-slot 1 port 0
user@switch-1> request
virtual-chassis vc-port set pic-slot 1 port 1
```

```
user@switch-2> request
virtual-chassis vc-port set pic-slot 1 port 0
```

```
user@switch-2> request
virtual-chassis vc-port set pic-slot 1 port 1
```

```
user@switch-3> request
virtual-chassis vc-port set pic-slot 1 port 0
user@switch-3> request
virtual-chassis vc-port set pic-slot 1 port 1
```

11. Cable the ports interconnecting the members if they were not connected earlier.

**NOTE:** If you want to change the member ID that the primary has assigned to a member switch, use the `request virtual-chassis renumber` command.

## Configuring an EX2300, EX3400, or EX4300 Virtual Chassis with a Preprovisioned Configuration File

Preprovisioning a Virtual Chassis configuration allows you to assign the member ID and role for each switch in the Virtual Chassis.

This procedure shows example configuration steps applicable to a Virtual Chassis with two to ten members; up to 4 members are supported in an EX2300 Virtual Chassis, and up to 10 members are supported in an EX3400 and EX4300 Virtual Chassis.

To configure a Virtual Chassis using a preprovisioned configuration:

**NOTE:** We recommend that you physically cable the optical ports as the final step of this procedure.  
You can, however, configure the Virtual Chassis while the cables are physically connected.

1. Make a list of the serial numbers of all the switches to be connected in a Virtual Chassis configuration.

**NOTE:** Serial number values are case-sensitive.

2. Note the intended role (**routing-engine** or **line-card**) of each switch. If you configure the member with a **routing-engine** role, it is eligible to function in the primary or backup role. If you configure the member with a **line-card** role, it is not eligible to function in the primary or backup role.

**NOTE:** For a mixed EX4300 Virtual Chassis with EX4300 multigigabit model (EX4300-48MP) switches and other EX4300 model switches, the members in the primary and backup Routing Engine roles must be EX4300 multigigabit model switches.

3. Power on only the switch that you plan to use as the primary switch.
4. (Required for a mixed EX4300 Virtual Chassis only) Set the primary switch into mixed mode, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode mixed reboot
```

5. If you are configuring a mixed Virtual Chassis, wait for the reboot to complete before performing this step. Run the EZSetup program on the primary switch, specifying the identification parameters. See *Connecting and Configuring an EX Series Switch (CLI Procedure)* for details.

**NOTE:** The properties that you specify for the primary switch apply to the entire Virtual Chassis configuration.

6. (Optional) Configure the primary switch with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis (see *Understanding Global Management of a Virtual Chassis*):

```
[edit]user@switch# set interfaces
vme unit 0 family inet address /ip-address/mask/
```

7. Specify the preprovisioned configuration mode:

```
[edit virtual-chassis]user@switch# set preprovisioned
```

8. Specify all the members that you want included in the Virtual Chassis, listing each switch's serial number with the desired member ID and role. For example, for a ten-member Virtual Chassis:

**NOTE:** You can retrieve the switch's serial number using the **show chassis hardware** command output or by viewing the serial number ID label on the switch. See *Locating the*

*Serial Number on an EX2300 Switch or Component, [Locating the Serial Number on an EX3400 Switch or Component](#), or [Locating the Serial Number on an EX4300 Switch or Component](#). Serial number values are case-sensitive.*

```
[edit virtual-chassis]user@switch# set member 0 serial-number abc123 role
routing-engineuser@switch# set member 1 serial-number
def456 role routing-engineuser@switch# set member 2 serial-number ghi789
role line-carduser@switch# set member 3 serial-number jkl012 role
line-carduser@switch# set
member 4 serial-number mno013 role line-carduser@switch# set member 5 serial-
number pqr014 role
line-carduser@switch# set
member 6 serial-number stu015 role line-carduser@switch# set member 7 serial-
number vwx016 role
line-carduser@switch# set
member 8 serial-number yzz017 role line-carduser@switch# set member 9 serial-
number aaa018 role
line-card
```

9. (Optional: Recommended for a two-member Virtual Chassis) Disable the split and merge feature:

```
[edit virtual-chassis]user@switch# set no-split-detection
```

10. Commit the configured items.
11. Power on the other member switches. The member IDs and roles have been determined by the configuration, so you can power on the member switches in any order.
12. (Required for a mixed EX4300 Virtual Chassis only) Set each additional individual EX4300 multigigabit model (EX4300-48MP) switch into mixed mode and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode mixed
reboot
```

Set each of the other EX4300 switches that are not multigigabit model switches into mixed mode with the **ieee-clause-82** option, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode ieee-clause-82
mixed reboot
```

13. If needed, on each individual member switch, configure the SFP+ uplink ports that will be used as VCPs to interconnect the member switches.

**NOTE:** This step is not needed for EX4300 multigigabit model (EX4300-48MP) switches, which have dedicated VCPs on the rear panel of the switch. Dedicated VCPs do not require configuration, and you must use the dedicated ports on these switches because no other ports on these switches are supported as VCPs.

**NOTE:** On EX3400 switches and on EX4300 member switches that are not multigigabit model switches, because QSFP+ ports are configured into VCPs by default, you do not usually have to perform this step when you are using a QSFP+ port as a VCP. You only need to configure a QSFP+ port as a VCP if you previously configured the QSFP+ port into a network port. If you previously configured the QSFP+ port into a network port, perform this step to configure the QSFP+ port back into a VCP.

Use the *request virtual-chassis vc-port* command to configure SFP+ or QSFP+ ports into VCPs. For example, for a four-member Virtual Chassis:

```
user@switch-0> request
virtual-chassis vc-port set pic-slot 1 port 0
user@switch-0> request
virtual-chassis vc-port set pic-slot 1 port 1
```

```
user@switch-1> request
virtual-chassis vc-port set pic-slot 1 port 0
user@switch-1> request
virtual-chassis vc-port set pic-slot 1 port 1
```

```
user@switch-2> request
virtual-chassis vc-port set pic-slot 1 port 0
user@switch-2> request
virtual-chassis vc-port set pic-slot 1 port 1
```

```
user@switch-3> request
virtual-chassis vc-port set pic-slot 1 port 0
```



```
user@switch-3> request
virtual-chassis vc-port set pic-slot 1 port 1
```

14. Cable the ports interconnecting the members if they were not connected earlier.

**NOTE:** You cannot modify the primary-role priority when you are using a preprovisioned configuration. The primary-role priority values are generated automatically and controlled by the role that is assigned to the member switch in the configuration file. The two Routing Engines are assigned the same primary-role priority value. However, the member that was powered on first has higher prioritization according to the primary-role election algorithm. See *Understanding How the Primary in a Virtual Chassis Is Elected*.

## RELATED DOCUMENTATION

| *Monitoring the Virtual Chassis Status and Statistics on EX Series Virtual Chassis*

# Configuring EX4600 Switches in a Mixed or Non-Mixed Virtual Chassis

## IN THIS SECTION

- [Configuring an EX4600 Virtual Chassis with a Nonprovisioned Configuration File | 34](#)
- [Configuring an EX4600 Virtual Chassis with a Preprovisioned Configuration File | 37](#)

This topic provides information about configuring a non-mixed EX4600 Virtual Chassis or a mixed EX4600 Virtual Chassis that includes EX4600 switches and EX4300 switches. It does not cover EX4650 Virtual Chassis, which is more like a QFX5120 Virtual Chassis than an QFX4600 Virtual Chassis; instead, see ["Configuring an EX4650 or a QFX Series Virtual Chassis" on page 40](#).

**NOTE:** A mixed EX4600 Virtual Chassis can include any models of EX4300 switches except multigigabit EX4300 models (EX4300-48MP).

You configure 40-Gbps QSFP+ and 10-Gbps SFP+ uplink ports as Virtual Chassis ports (VCPs) to interconnect members in an EX4600 Virtual Chassis. Uplink ports can connect switches that are several miles apart in different buildings into the same Virtual Chassis.

You must configure QSFP+ or SFP+ uplink module ports into VCPs to create a non-mixed or mixed EX4600 Virtual Chassis. If you need additional VCP bandwidth between two member switches, you can configure additional ports as VCPs between the member switches. The ports that have identical speeds become links in a link aggregation group (LAG) to provide resiliency to the Virtual Chassis; for instance, if you had two QSFP+ ports and two SFP+ ports configured as VCPs connecting to the same switch, you would have two LAGs—one LAG with two 40Gbps QSFP+ port member links and another with two 10Gbps SFP+ port member links—between the member switches.

**NOTE:** A Virtual Chassis configuration has two Routing Engines—the primary switch and the backup switch. We recommend that you always commit Virtual Chassis changes by using the **commit synchronize** command rather than **commit**. This ensures that the configuration changes are saved on both Routing Engines at the same time.

You can set up a EX4600 Virtual Chassis with either:

- A nonprovisioned configuration—The primary sequentially assigns a member ID to other member switches, and determines the role from the primary-role priority value and other factors in the primary-role election algorithm.
- A preprovisioned configuration—You deterministically control the member ID and role assigned to a member switch by tying the member switch to its serial number.

## Configuring an EX4600 Virtual Chassis with a Nonprovisioned Configuration File

You can use nonprovisioned configuration to configure an EX4600 Virtual Chassis.

To configure the Virtual Chassis using a nonprovisioned configuration:

**NOTE:** You can configure a EX4600 Virtual Chassis while the cables are or are not physically connected.

1. Power on only the switch that you plan to use as the primary switch.

If you are configuring a mixed EX4300 and EX4600 Virtual Chassis, you must use an EX4600 switch. We don't support a mixed EX4300 and EX4600 Virtual Chassis with an EX4300 in the primary routing engine role.

2. (Required for a mixed Virtual Chassis only) Set the primary switch into mixed mode, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode mixed
reboot
```

3. If you are configuring a mixed Virtual Chassis, wait for the reboot to complete before performing this step. Specify the identification parameters for the switch by completing the initial configuration. See [Configuring Junos OS on the EX4600](#).

**NOTE:** The properties that you specify for the primary switch apply to the entire Virtual Chassis configuration.

4. (Optional) Configure the primary switch with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis:

```
user@switch# set interfaces vme unit 0 family
inet address /ip-address/mask/
```

5. (Required for mixed EX4300 and EX4600 Virtual Chassis, optional for other Virtual Chassis) Configure primary-role priority for the member switches:

**NOTE:** If you are configuring a mixed EX4300 and EX4600 Virtual Chassis, configure the EX4600 switches with the highest primary role priorities to ensure EX4300 switches do not

assume the primary role. We don't support a mixed EX4300 and EX4600 switch operating with an EX4300 switch in the primary role.

```
[edit virtual-chassis]user@switch# set member 0 mastership-priority
255user@switch# set member 1 mastership-priority 255
```

6. (Optional. Recommended for a two-member Virtual Chassis) On the primary switch, disable the split and merge feature:

```
[edit virtual-chassis]user@switch# set no-split-detection
```

7. Power on the other member switches.
8. (Required for a mixed Virtual Chassis only) Set each individual switch into mixed mode, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode mixed
reboot
```

9. On each individual member switch, use the following command to configure the ports that will be used to interconnect the member switches into VCPs:

```
user@switch> request virtual-chassis vc-port set pic-slot pic-slot-number
port port-number local
```

where *pic-slot-number* is the PIC slot number.

For instance, if you wanted to set port 0 on the QSFP+ interface on PIC slot 2 as a VCP:

```
user@switch> request virtual-chassis vc-port set pic-slot
2 port 0 local
```

The VCPs automatically bundle into a Link Aggregation Group when two or more interfaces of the same speed are configured into VCPs between the same two member switches. See *Understanding Virtual Chassis Port Link Aggregation*.

**NOTE:** By default, a Virtual Chassis forms with a nonprovisioned configuration if you don't set the member roles and primary role priorities. In a non-provisioned configuration, the primary-role priority value for each member switch is **128**, and the primary role is selected by default. You can modify the primary-role priority to change the role a member takes on. See *Configuring Primary Role of a Virtual Chassis*.

We recommend that you specify the same primary-role priority value for the primary and backup members. In this example, the highest possible primary-role priority has been assigned to two members. However, the member that was powered on first is given priority according to the primary-role election algorithm. See *Understanding How the Primary in a Virtual Chassis Is Elected*. The other members use the default primary-role priority in this example, and they take on the linecard role.

**NOTE:** Use the `request virtual-chassis renumber` command if you want to change the member ID that the primary assigns to a member switch.

## Configuring an EX4600 Virtual Chassis with a Preprovisioned Configuration File

When you preprovision a Virtual Chassis configuration, you assign the member ID and role for each switch in the Virtual Chassis.

To set up a Virtual Chassis using a preprovisioned configuration:

**NOTE:** You can configure a EX4600 Virtual Chassis while the cables are or are not physically connected.

1. Make a list of the serial numbers of all the switches to be connected in a Virtual Chassis configuration.
2. Note the desired role (**routing-engine** or **line-card**) of each switch. If you configure the member with a **routing-engine** role, it is eligible to function in the primary or backup role. If you configure the member with a **line-card** role, it is not eligible to function in the primary or backup role.  
If you are configuring a mixed EX4300 and EX4600 Virtual Chassis, EX4300 switches must be configured into the **line-card** role only. A mixed EX4300 and EX4600 Virtual Chassis
3. Power on only the switch that you plan to use as the primary switch.

4. (Required for a mixed Virtual Chassis only) Set the primary switch into mixed mode, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode mixed
reboot
```

5. If you are configuring a mixed Virtual Chassis, wait for the reboot to complete before performing this step. Specify the identification parameters for the switch by completing the initial configuration. See [Configuring Junos OS on the EX4600](#).

**NOTE:** The properties that you specify for the primary switch apply to the entire Virtual Chassis configuration.

6. (Optional) Configure the primary switch with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis:

```
user@switch# set interfaces vme unit 0 family
inet address /ip-address/mask/
```

7. Specify the preprovisioned configuration mode:

```
[edit virtual-chassis]user@switch# set preprovisioned
```

8. Specify all the members that you want included in the Virtual Chassis, listing each switch's serial number with the desired member ID and role:

```
[edit virtual-chassis]user@switch# set member 0 serial-number abc123 role
routing-engineuser@switch# set member 1 serial-number
def456 role routing-engineuser@switch# set member 2 serial-number ghi789
role line-carduser@switch# set member 3 serial-number jkl012 role
line-card
```

9. (Optional. Recommended for a two-member Virtual Chassis) Disable the split and merge feature:

```
[edit virtual-chassis]user@switch# set no-split-detection
```

See *Disabling Split and Merge in a Virtual Chassis* for more details.

10. Power on the other member switches. The member IDs and roles have been determined by the configuration, so you can power on the member switches in any order.

11. (Required if you are configuring a mixed Virtual Chassis) Set each individual switch into mixed mode, and reboot the switch for the change to take effect:

```
user@device> request virtual-chassis mode mixed
reboot
```

12. On each individual member switch, configure the ports you will use to interconnect the member switches into VCPs using the following command:

```
user@switch> request virtual-chassis vc-port set pic-slot pic-slot-number
port port-number local
```

where *pic-slot-number* is the PIC slot number.

For instance, if you wanted to set port 0 on the QSFP+ interface on PIC slot 2 as a VCP:

```
user@switch> request virtual-chassis vc-port set pic-slot
2 port 0 local
```

The VCPs automatically bundle into a Link Aggregation Group when two or more interfaces of the same speed are configured into VCPs between the same two member switches. See *Understanding Virtual Chassis Port Link Aggregation*.

**NOTE:** You cannot modify the primary-role priority when you use a preprovisioned configuration. The primary-role priority values are generated automatically and controlled by the role that is assigned to the member switch in the configuration file. The two Routing Engines are assigned the same primary-role priority value. However, the member that was powered on first has higher prioritization according to the primary-role election algorithm. See *Understanding How the Primary in a Virtual Chassis Is Elected*.

## RELATED DOCUMENTATION

| *Monitoring the Virtual Chassis Status and Statistics on EX Series Virtual Chassis*

# Configuring an EX4650 or a QFX Series Virtual Chassis

## IN THIS SECTION

- [Understanding the Licensing Requirements for a Virtual Chassis | 41](#)
- [Configuring an EX4650 or QFX Series Virtual Chassis with a Preprovisioned Configuration | 42](#)
- [Configuring an EX4650 or a QFX Series Virtual Chassis with a Nonprovisioned Configuration | 46](#)

This topic discusses configuring an EX4650 or a QFX Series Virtual Chassis. For information on configuring a Virtual Chassis Fabric (VCF), see [Understanding Virtual Chassis Fabric Configuration](#).

You configure a Virtual Chassis by configuring Virtual Chassis ports (VCPs) on the member switches and interconnecting the switches using the VCPs. The VCPs pass all data and control traffic between member switches in the Virtual Chassis. See "[Understanding QFX Series Virtual Chassis](#)" on page 9 and *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details on the switches that can be interconnected into a Virtual Chassis, and the ports on those switches that can be used as VCPs.

When you set up a Virtual Chassis, ideally all the proposed member switches should have the default factory configuration and operating in standalone mode.

- All the switches interconnected into a Virtual Chassis must be running the same version of Junos OS. See *Installing Software Packages on QFX Series Devices*.
- For QFX3500 or QFX3600 switches in a Virtual Chassis, you must download the Junos OS image that supports Virtual Chassis—an image that includes "jinstall-qfx-3-" in the filename when the Junos OS image is downloaded from the Software Center. QFX3500 and QFX3600 switches that are node devices in a QFabric system cannot be part of a Virtual Chassis.
- For QFX5100 and EX4300 switches in a QFX5100 Virtual Chassis, you must download the software image for the standalone switch. EX Series and QFX switches that are in a Junos Fusion cannot be part of a Virtual Chassis.
- For a QFX5110 Virtual Chassis with both QFX5110 and QFX5100 switches, all the switches must be running the same Junos OS image that includes "-qfx-5e-" in the Junos OS software package filename.





**CAUTION:** You *must* upgrade QFX5100 switches running a Junos OS image with “-qfx-5-” in the software package filename to a “-qfx-5e-” image filename before adding them to a QFX5110 Virtual Chassis, or the Virtual Chassis will not form. See ["Upgrading a QFX5100 Switch with a USB Device to Join a QFX5110 Virtual Chassis or Virtual Chassis Fabric" on page 71.](#)

You can set up the Virtual Chassis with either:

- A preprovisioned configuration—With preprovisioning, you deterministically control the member ID and role assigned to a member switch by tying it to its serial number.
- A nonprovisioned configuration—Without provisioning, the primary sequentially assigns a member ID to other member switches, and determines the role of each member switch using the primary-role priority value and other factors in the primary-role election algorithm.

A Virtual Chassis configuration has two switches acting in the Routing Engine role—the primary switch and the backup switch. With any Virtual Chassis configuration, we recommend that you always use **commit synchronize** rather than simply **commit** to save configuration changes. This make sure the configuration changes are saved to both switches acting as Routing Engines.

Be sure that all switches that are interconnected into a Virtual Chassis are running the same version of Junos OS. See *Installing Software Packages on QFX Series Devices*.

## Understanding the Licensing Requirements for a Virtual Chassis

Feature licenses are required to configure advanced features on a Virtual Chassis.

For a Virtual Chassis deployment, two license keys are recommended for redundancy—one for the device in the primary Routing Engine role and the other for the device in the backup Routing Engine role.

For information on the feature licensing requirements for a Virtual Chassis, see [Licenses for EX Series](#) or [Software Features That Require Licenses on the QFX Series](#).

You can install the feature licenses after configuring the Virtual Chassis.

## Configuring an EX4650 or QFX Series Virtual Chassis with a Preprovisioned Configuration

Preprovisioning a Virtual Chassis configuration allows you to assign the member ID and role for each switch in the Virtual Chassis.

Before you begin, note that you can configure a Virtual Chassis while the cables are or are not physically connected. However, when committing a preprovisioned configuration on the member switches, under certain conditions the switches will *autoprovision* the ports cabling the member switches together, which means that those ports are automatically converted into Virtual Chassis ports (VCPs) when the Virtual Chassis members detect the link. Conditions for autoprovisioning include having LLDP enabled on the interfaces being used for the VCP links, and neither side of the link already has the port set as a VCP.

Automatic conversion of VCP links can cause links to come up unexpectedly, so if you want to control when the VCP links become active during Virtual Chassis configuration on the member switches, before you start the configuration, you can disable the VCP auto-conversion feature or any of the conditions required for the feature. See *Automatic Virtual Chassis Port (VCP) Conversion* for details. If the conditions for autoprovisioning the links are not present, you must manually set the ports connecting the member switches as VCPs as described in this procedure.

To set up a Virtual Chassis using a preprovisioned configuration:

1. Make a list of the serial numbers of all the switches to be connected in a Virtual Chassis configuration.

**NOTE:** Serial number values are case-sensitive.

2. Note the desired role (**routing-engine** or **line-card**) of each switch. If you configure the member with a **routing-engine** role, it is eligible to function as the primary or backup Routing Engine. If you configure the member with a **line-card** role, it is not eligible to function as the primary or backup. See *Understanding Virtual Chassis Components* and *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details on which switches are recommended or required to be configured into each role depending on the types of switches in the Virtual Chassis.
3. Power on only the switch that you plan to use as the primary switch.
4. Specify the identification parameters for the switch by completing the initial configuration. See [Configuring Junos OS on the EX4650](#), [Configuring a QFX3500 Device as a Standalone Switch](#) or [Configuring a QFX3600 Device as a Standalone Switch](#), [Configure a QFX5100 Device](#), [Configuring a QFX5110](#), [Configure Junos OS on the QFX5120](#), or [Performing the Initial Software Configuration for QFX5200 Switches](#).

**NOTE:** The properties that you specify for the primary switch apply to the entire Virtual Chassis configuration.

5. (Optional) Configure the primary switch with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis:

```
user@switch# set interfaces vme unit 0 family
inet address /ip-address/mask/
```

6. (Required for a mixed Virtual Chassis only) Set the primary switch into mixed mode and reboot the switch to complete the configuration:

**NOTE:** You must complete this step if your Virtual Chassis includes a combination of different types of switches, except when you are configuring a Virtual Chassis that includes only QFX3500 and QFX3600 switches or only QFX5110 and QFX5100 switches (which are considered to be non-mixed Virtual Chassis). See *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details.

```
user@device> request virtual-chassis mode mixed
reboot
```

7. After the reboot is complete, specify the preprovisioned configuration mode:

```
[edit virtual-chassis]user@switch# set preprovisioned
```

8. Specify all the members that you want included in the Virtual Chassis, listing each switch's serial number with the desired member ID and role:

```
[edit virtual-chassis]user@switch# set member 0 serial-number abc123 role
routing-engineuser@switch# set member 1 serial-number
def456 role routing-engineuser@switch# set member 2 serial-number ghi789
role line-carduser@switch# set member 3 serial-number jkl012 role
line-card
```

9. (Optional. Recommended for a two-member Virtual Chassis) Disable the split and merge feature:

```
[edit virtual-chassis]user@switch# set no-split-detection
```

10. Commit the configured items.
11. Power on the other member switches. The member IDs and roles have been determined by the configuration, so you can power on the member switches in any order.
12. (Required if you are configuring a mixed Virtual Chassis) Set each individual switch into mixed mode and reboot the switch to complete the configuration:

**NOTE:** You must complete this step if your Virtual Chassis includes a combination of different types of switches, except when you are configuring a Virtual Chassis that includes only QFX3500 and QFX3600 switches or only QFX5110 and QFX5100 switches (which are considered to be non-mixed Virtual Chassis). See *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details.

```
user@device> request virtual-chassis mode mixed
reboot
```

13. (Optional, if the VCP links will not be autoprovisioned) On each individual member switch, configure the ports that you will use to interconnect the member switches into VCPs:

**NOTE:** SFP+, QSFP+, and 10-Gbps copper links between two member switches will be automatically set as VCPs (auto-provisioned) in a preprovisioned configuration under certain conditions. The required conditions on both sides of the link include having automatic VCP conversion enabled on the switches, LLDP enabled on the interfaces being used as VCPs, and those ports are not already set as VCPs. (See *Automatic Virtual Chassis Port (VCP) Conversion*.)

This step is optional and should only be used when a VCP link is not automatically created.

```
user@switch> request virtual-chassis vc-port set pic-slot pic-slot-number
port port-number
```

where *pic-slot-number* is the PIC slot number.

For example, if you wanted to set port 0 on the QSFP+ interface on PIC slot 2 as a VCP:

```
user@switch> request virtual-chassis vc-port set pic-slot
2 port 0
```

**NOTE:** You can include the **local** option if you want to make sure the command applies only to that port locally on the switch where you're running the command.

The VCPs automatically bundle into a Link Aggregation Group when two or more interfaces of the same speed are configured into VCPs between the same two member switches. See *Understanding Virtual Chassis Port Link Aggregation*.

**NOTE:** You cannot modify the primary-role priority when you are using a preprovisioned configuration. The primary-role priority values are generated automatically and controlled by the role that is assigned to the member switch in the configuration file. The two Routing Engines are assigned the same primary-role priority value. However, the member that was powered on first has higher priority according to the primary-role election algorithm. See *Understanding How the Primary in a Virtual Chassis Is Elected*.

**NOTE:** If you want to change the member ID of a preprovisioned member switch later, you must re-configure the member information for that member switch using the **member** configuration statement. For example, to re-configure member 3 (which has serial number "jkl012") to have 6 as its new member ID, you associate member ID 6 with the serial number of member 3, and then delete the configuration item for member ID 3, as follows:

```
[edit virtual-chassis]user@switch# set member 6 serial-number
jkl012user@switch# delete member 3
```

The `request virtual-chassis renumber` command can only be used to change a Virtual Chassis member ID in a nonprovisioned Virtual Chassis.

## Configuring an EX4650 or a QFX Series Virtual Chassis with a Nonprovisioned Configuration

You can use a nonprovisioned configuration to set up an EX4650 or a QFX Series Virtual Chassis.

To configure the Virtual Chassis using a nonprovisioned configuration:

**NOTE:** You can configure the Virtual Chassis while the cables are or are not physically connected.

1. Power on only the switch that you plan to use as the primary switch.
2. (Required for a mixed Virtual Chassis only) Set the primary switch into mixed mode and reboot the switch to complete the configuration:

**NOTE:** You must complete this step if your Virtual Chassis includes a combination of different types of switches, except when you are configuring a Virtual Chassis that includes only QFX3500 and QFX3600 switches or only QFX5110 and QFX5100 switches (which are considered to be non-mixed Virtual Chassis). See *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details.

```
user@device> request virtual-chassis mode mixed
reboot
```

3. After the primary switch reboots, specify the identification parameters for the switch by completing the initial configuration. See [Configuring Junos OS on the EX4650](#), [Configuring a QFX3500 Device as a Standalone Switch](#), [Configuring a QFX3600 Device as a Standalone Switch](#), [Configure a QFX5100 Device](#), [Configuring a QFX5110](#), [Configure Junos OS on the QFX5120](#), or [Performing the Initial Software Configuration for QFX5200 Switches](#) for details.

**NOTE:** The properties that you specify for the primary switch apply to the entire Virtual Chassis configuration.

4. (Optional) Configure the primary switch with the virtual management Ethernet (VME) interface for out-of-band management of the Virtual Chassis:

```
user@switch# set interfaces vme unit 0 family
inet address /ip-address/mask/
```

5. (Optional) Configure primary-role priority for the member switches:

```
[edit virtual-chassis]user@switch# set member 0 mastership-priority
255user@switch# set member 1 mastership-priority 255
```

6. (Optional. Recommended for a two-member Virtual Chassis) On the primary switch, disable the split and merge feature:

```
[edit virtual-chassis]user@switch# set no-split-detection
```

7. Commit the configured items.
8. Power on the other member switches.
9. (Required for a mixed Virtual Chassis only) Set each individual switch into mixed mode and reboot the switch to complete the configuration:

**NOTE:** You must complete this step if your Virtual Chassis includes a combination of different types of switches, except when you are configuring a Virtual Chassis that includes only QFX3500 and QFX3600 switches or only QFX5110 and QFX5100 switches (which are considered to be non-mixed Virtual Chassis). See *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details.

```
user@device> request virtual-chassis mode mixed
reboot
```

10. On each individual member switch, configure the ports that will be used to interconnect the member switches into VCPs using the following command:

```
user@switch> request virtual-chassis vc-port set pic-slot pic-slot-number
port port-number
```

where *pic-slot-number* is the PIC slot number.

For example, if you wanted to set port 0 on the QSFP+ interface on PIC slot 2 as a VCP:

```
user@switch> request virtual-chassis vc-port set pic-slot
2 port 0
```

**NOTE:** You can include the **local** option if you want to make sure the command applies only to that port locally on the switch where you're running the command.

The VCPs automatically bundle into a Link Aggregation Group when two or more interfaces of the same speed are configured into VCPs between the same two member switches. See *Understanding Virtual Chassis Port Link Aggregation*.

**NOTE:** If you don't set primary role priorities on any member switches, the default primary-role priority value is **128**. If the primary role priorities are the same on all members, the primary-role election algorithm determines the member switches in the primary and backup Routing Engine roles based on the other factors in the algorithm. You control the role settings by configuring the primary-role priority to a higher number on the switches you want to be the primary and backup members. (see *Configuring Primary Role of a Virtual Chassis*). We recommend that you specify the same primary-role priority value for the members you want to be the primary and backup members. This example assigns the highest possible primary-role priority to two members. However, the member that was powered on first has higher priority according to the primary-role election algorithm. See *Understanding How the Primary in a Virtual Chassis Is Elected* for details on all the factors considered when electing the primary. The other members have the default primary-role priority in this example, and they become linecard role members.

**NOTE:** If you want to change the member ID that the primary automatically assigned to a member switch, use the `request virtual-chassis renumber` command.

## RELATED DOCUMENTATION

[Understanding QFX Series Virtual Chassis | 9](#)

*Monitoring the Virtual Chassis Status and Statistics on EX Series Virtual Chassis*

# Adding a New Switch to an Existing EX2300, EX3400, or EX4300 Virtual Chassis

You can use this procedure to:



- Add an EX2300 switch to an existing EX2300 Virtual Chassis.

**NOTE:** Starting with Junos OS Release 18.4R1, you can combine any models of EX2300 switches, including EX2300 multigigabit models, into the same EX2300 Virtual Chassis using this procedure. In releases prior to Junos OS Release 18.4R1, EX2300 multigigabit switches cannot be combined with any other models of EX2300 switches in the same Virtual Chassis.

- Add an EX3400 switch to an existing EX3400 Virtual Chassis.
- Add an EX4300 switch to an existing non-mixed EX4300 Virtual Chassis. For example:
  - Add an EX4300 multigigabit model (EX4300-48MP) switch to a Virtual Chassis consisting of all EX4300 multigigabit model switches.
  - Add any other type of EX4300 switch to a Virtual Chassis that contains only EX4300 switches and no EX4300 multigigabit model switches.
- Add an EX4300 switch to a mixed EX4300 Virtual Chassis that consists of a supported combination of EX4300 multigigabit model switches and any other EX4300 switches.

**NOTE:** You cannot use this procedure to add an EX4300 multigigabit model (EX4300-48MP) switch to an existing EX4300 Virtual Chassis that consists only of other non-multigigabit EX4300 model switches. EX4300 multigigabit model switches must be in the primary and backup Routing Engine roles in an EX4300 Virtual Chassis that contains both types of switches. As a result, in that case, you should first create a new multigigabit EX4300 Virtual Chassis with multigigabit EX4300 switches in the primary and backup roles, and then merge the other non-multigigabit EX4300 model switches from the original non-mixed Virtual Chassis into a new mixed-mode EX4300 Virtual Chassis.

To add an EX4300 switch to any other type of Virtual Chassis, see the following other references for adding member switches to a mixed Virtual Chassis with EX4600 or QFX Series switches, or adding an EX4300 switch (excluding multigigabit models) as a leaf node to a Virtual Chassis Fabric (VCF):

- Adding an EX4300 switch to a mixed Virtual Chassis with EX4600 switches: ["Adding an EX4600 Switch to a Mixed or Non-mixed Virtual Chassis" on page 53.](#)
- Adding an EX4300 switch to a mixed Virtual Chassis with QFX Series switches: ["Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis" on page 56](#)
- Adding an EX4300 switch to a mixed VCF: [Adding a Device to a Virtual Chassis Fabric.](#)

**NOTE:** To join an existing Virtual Chassis, new member switches must be running the same version of Junos OS that is running on the Virtual Chassis primary. If you have configured the automatic software update feature in an existing Virtual Chassis, the primary switch updates newly added members with the correct software version automatically, if necessary. Otherwise, you must manually install the correct software version. See *Understanding Automatic Software Update on Virtual Chassis Member Switches*.

Before you begin, be sure you have:

- Confirmed that the new switch is supported as a member of the Virtual Chassis and in the role in which you want to add it. See *Understanding EX Series Virtual Chassis* and *Understanding Virtual Chassis Components* for details on the different EX Series switches, switch combinations, and switch roles that are supported or recommended in a Virtual Chassis.
- Mounted the new switch in a rack.
- Determined which ports you will use as Virtual Chassis ports on the new switch, and the member ports in the existing Virtual Chassis to which you will interconnect the new switch.

See *Virtual Chassis Port Options* for the ports that can be used as VCPs on switches that support Virtual Chassis.

- If you are expanding a preprovisioned configuration:
  - Made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.

**NOTE:** Serial number values are case-sensitive.

- Edited the existing Virtual Chassis configuration to include the serial number of the new member switch. The parameters specified in the primary Virtual Chassis configuration file are applied to the new switch after it has been interconnected to an existing member switch.
- (If you are using the autoprovisioning feature to add a member switch to an existing preprovisioned Virtual Chassis) Confirmed that the member ports in the Virtual Chassis to which you will interconnect the new switch are not already configured as VCPs. One condition for automatic VCP conversion is that the ports on both sides of the new link must not already be configured as VCPs. See *Automatic Virtual Chassis Port (VCP) Conversion* for details on the requirements and conditions under which this feature will be invoked.

- (Optional) Configured Ethernet interfaces on different member switches into the same LAG. For example, see *Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*.

An active member switch might temporarily go down before coming back up as part of this procedure. Having traffic load-balanced across member switches using a LAG helps alleviate traffic loss during this procedure.

- (Optional) Considered deleting the `no-split-detection` configuration item if you are expanding a two-member Virtual Chassis with this option configured. The split detection and merge feature is recommended for Virtual Chassis configurations with more than two members, and is enabled by default when a Virtual Chassis is initially set up.

To add a new member switch to an existing Virtual Chassis configuration:

1. If the new member switch has been previously configured, revert that switch's configuration to the factory defaults before interconnecting it into the Virtual Chassis. See *Reverting to the Default Factory Configuration for the EX Series Switch*.
2. (Required for a mixed EX4300 Virtual Chassis only) A mixed EX4300 Virtual Chassis contains a combination of EX4300 multigigabit model (EX4300-48MP) switches and other EX4300 switches. If you are adding a new switch in this case, set the new switch into mixed mode, and reboot the switch for the mode change to take effect as follows:

- If the new switch is an EX4300 multigigabit model (EX4300-48MP) switch:

```
user@device> request virtual-chassis mode mixed reboot
```

- If the new switch is any other EX4300 model switch, you must also configure the switch with a special port mode by including the **ieee-clause-82** option when you set mixed mode. This port mode enables VCPs on the EX4300 switch to communicate with VCPs on multigigabit model member switches:

```
user@device> request virtual-chassis mode ieee-clause-82
mixed reboot
```

If adding this switch to the Virtual Chassis converts a non-mixed EX4300 Virtual Chassis into a mixed EX4300 Virtual Chassis, log into the Virtual Chassis and set all the existing member switches into mixed mode as well, and reboot the Virtual Chassis to complete the configuration:

```
user@vc-master> request virtual-chassis mode
mixed reboot all-members
```

For example, if you have an EX4300 Virtual Chassis consisting of all EX4300 multigigabit model member switches, that is a non-mixed EX4300 Virtual Chassis. If you add an EX4300 switch that isn't a multigigabit model to that Virtual Chassis, you must change the mode to **mixed** on all existing members when you add the new switch.

Wait for the reboot operation to complete on any affected switches in this step before moving to the next step.

3. Power off the new switch, and interconnect the unpowered new switch to one member of the existing Virtual Chassis configuration using a supported VCP.

Connect only one VCP on the unpowered new switch to a VCP on a member switch in the existing Virtual Chassis at this point in the procedure.

4. Power on the new switch.
5. Set the interconnecting interface as a Virtual Chassis Port (VCP), if needed:

```
user@switch> request virtual-chassis vc-port set pic-slot
1 port port-number
```

You do not need to perform this step in the following cases:

- You are using dedicated VCPs, which do not need to be configured. EX4300 multigigabit model (EX4300-48MP) switches have dedicated VCPs on the rear panel, which are the only VCP port options on those switches.
  - You do not typically need to perform this step with QSFP+ ports on EX3400 and EX4300 switches that are not multigigabit models. All QSFP+ ports on these switches are configured as VCPs by default. However, you might use the **request virtual-chassis vc-port** command to set a QSFP+ port back into a VCP if the QSFP+ port had previously been reconfigured as a network port.
  - If you have the right conditions to use the autoprovisioning feature, after the new switch is provisioned and cabled into the Virtual Chassis, the interconnecting links automatically convert into VCP links. You do not need to manually set the ports on either side of the links as VCPs.
6. Confirm that the new member switch is now included within the Virtual Chassis configuration by entering the **show virtual-chassis** command. The new member switch should be listed in the output and the **Status** is **Prsnt**.
  7. Cable the next port into the Virtual Chassis, configuring the ports into VCPs if needed.



**CAUTION:** If you immediately cable both VCPs on the new switch into the existing Virtual Chassis at the same time, a member switch that was already part of the Virtual

Chassis might become nonoperational for several seconds. Network traffic to this switch is dropped during the downtime.

The member switch will return to the normal operational state with no user intervention, and normal operation of the Virtual Chassis will resume after this downtime.

## RELATED DOCUMENTATION

| [Configuring an EX2300, EX3400, or EX4300 Virtual Chassis](#) | 22

# Adding an EX4600 Switch to a Mixed or Non-mixed Virtual Chassis

You can use this procedure to add an EX4600 switch to a mixed or non-mixed Virtual Chassis or to add an EX4300 switch to an existing mixed EX4300 and EX4600 Virtual Chassis. For EX4650 Virtual Chassis, which is more like a QFX5120 Virtual Chassis than an QFX4600 Virtual Chassis, see ["Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis" on page 56](#).

**NOTE:** EX4300 multigigabit model (EX4300-48MP) switches are not supported in a mixed Virtual Chassis with EX4600 switches.

Before you begin, be sure you have:

- Mounted the new switch in a rack.
- Determined which ports you will use as Virtual Chassis ports on the new switch, and the member ports in the existing Virtual Chassis to which you will interconnect the new switch.
- If you are expanding a preprovisioned configuration:
  - Made a note of the serial number (the number is on the back of the switch). You will need to edit the Virtual Chassis configuration to include the serial number of the new member switch.

**NOTE:** Serial number values are case-sensitive.

- Edited the existing Virtual Chassis configuration to include the serial number of the new member switch. The parameters specified in the primary Virtual Chassis configuration file are applied to the new switch after it has been interconnected to an existing member switch.
- (If you are using the autoprovisioning feature to add a member switch to an existing preprovisioned Virtual Chassis) Confirmed that the member ports in the Virtual Chassis to which you will interconnect the new switch are not already configured as VCPs. One condition for automatic VCP conversion is that the ports on both sides of the new link must not already be configured as VCPs. See *Automatic Virtual Chassis Port (VCP) Conversion* for details.
- (Optional) Configured Ethernet interfaces on different member switches into the same LAG. See *Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*.

An active member switch might temporarily go down before coming back up as part of this procedure. Having traffic load-balanced across member switches using a LAG helps alleviate traffic loss during this procedure.

To add a new member switch to an existing Virtual Chassis configuration:

1. If the new member switch has been previously configured, revert that switch's configuration to the factory defaults before interconnecting it into the Virtual Chassis. See *Reverting to the Default Factory Configuration for the EX Series Switch*.
2. (Required for a mixed Virtual Chassis) Set the new switch into mixed mode, and reboot the switch to complete the configuration:

```
user@device> request virtual-chassis mode mixed
reboot
```

If adding this switch to the Virtual Chassis converts a non-mixed Virtual Chassis into a mixed Virtual Chassis, log into the Virtual Chassis and set the switches into mixed mode. Reboot the Virtual Chassis to complete the configuration:

```
user@device> request virtual-chassis mode mixed
reboot all-members
```

3. If you are rebooting the switch or the Virtual Chassis to complete a mixed mode setting change, wait for the reboot to complete before performing this step. Power off the new switch, and interconnect the unpowered new switch to one member of the existing Virtual Chassis configuration using a port that is supported as a VCP.

Connect only one VCP on the unpowered new switch to a VCP on a member switch in the existing Virtual Chassis at this point of the procedure.

4. Set the interconnecting QSFP+ or SFP+ ports as Virtual Chassis ports (VCPs) on the new member switch and the existing Virtual Chassis member switch where you connected the new switch, if needed:

```
user@switch> request virtual-chassis vc-port set pic-slot pic-slot port port-number
```

**NOTE:** Include the **local** option in this command if you want to make sure the command applies only to that port locally on the switch where you're running the command.

You do not need to perform this step in a preprovisioned Virtual Chassis if you set up the right conditions to use the autoprovisioning feature (see *Automatic Virtual Chassis Port (VCP) Conversion*). After the new switch is provisioned and cabled into the Virtual Chassis, the interconnecting links automatically convert into VCP links. You do not need to manually set the ports on either side of the links as VCPs.

5. Confirm that the new member switch is now included within the Virtual Chassis configuration by entering the **show virtual-chassis** command. The new member switch should be listed in the output and the **Status** is **Prsnt**.
6. Cable the next port into the Virtual Chassis, using Steps ["2" on page 54](#) through ["5" on page 55](#).



**CAUTION:** If you immediately cable both VCPs on the new switch into the existing Virtual Chassis at the same time, a member switch that was already part of the Virtual Chassis might become nonoperational for several seconds. Network traffic to this switch is dropped during the downtime.

The member switch will return to the normal operational state with no user intervention, and normal operation of the Virtual Chassis will resume after this downtime.

## RELATED DOCUMENTATION

| [Configuring EX4600 Switches in a Mixed or Non-Mixed Virtual Chassis](#) | 33

# Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis

## IN THIS SECTION

- [Add a New Switch to an EX4650 or QFX Series Virtual Chassis | 56](#)
- [Add or Replace a QFX5100-24Q Switch with Two Expansion Modules in a QFX5100 Virtual Chassis | 60](#)

Use this procedure to add a new switch to an EX4650 or a QFX Series Virtual Chassis.

To add a switch to a Virtual Chassis Fabric (VCF), see [Adding a Device to a Virtual Chassis Fabric](#).

## Add a New Switch to an EX4650 or QFX Series Virtual Chassis

You can use this procedure to add a switch in a supported combination to an existing EX4650 or QFX Series Virtual Chassis. A Virtual Chassis is a supported combination of switches interconnected using Virtual Chassis ports (VCPs). EX4650, QFX5120 and QFX5200 switches can be members of a non-mixed Virtual Chassis only (all members must be the same type of switch). QFX series switches that can be members of a mixed or non-mixed Virtual Chassis include QFX3500, QFX3600, QFX5100, and QFX5110 switches. EX4300 switches can also be members of a mixed QFX Series Virtual Chassis with QFX3500, QFX3600, and QFX5100 switches. See *Understanding Mixed EX Series and QFX Series Virtual Chassis* for details on the types and combinations of switches that can make up a mixed QFX Series Virtual Chassis.

**NOTE:** EX4300 multigigabit model (EX4300-48MP) switches are not supported in a mixed Virtual Chassis with QFX Series switches.

Before you begin, make sure you have:

- Mounted the new switch in a rack.
- Enabled automatic software updates on the Virtual Chassis. See *Configuring Automatic Software Update on Virtual Chassis Member Switches*.





**CAUTION:** When adding a QFX5100 switch installed with a “-qfx-5-” Junos OS image to a QFX5110 Virtual Chassis, you must first upgrade the QFX5100 switch to run a “-qfx-5e-” Junos OS image before this step in the procedure. The automatic software update feature cannot automatically update a QFX5100 switch running a “-qfx-5-” Junos OS image to a “-qfx-5e-” image. See ["Upgrading a QFX5100 Switch with a USB Device to Join a QFX5110 Virtual Chassis or Virtual Chassis Fabric" on page 71](#)

- Determined which ports you will use as Virtual Chassis ports on the new switch, and the member ports in the existing Virtual Chassis to which you will interconnect the new switch.
- If you are expanding a preprovisioned configuration:
  - Made a note of the serial number (the number is on the back of the switch). You'll need to edit the Virtual Chassis configuration to include the serial number of the new member switch.

**NOTE:** Serial number values are case-sensitive.

- Edited the existing Virtual Chassis configuration to include the serial number of the new member switch. The Virtual Chassis applies the parameters in the primary's configuration file to the new switch after it has been interconnected with an existing member switch.
- (If you are using the autoprovisioning feature to add a member switch to an existing preprovisioned Virtual Chassis) Confirmed that the member ports in the Virtual Chassis to which you will interconnect the new switch are not already configured as VCPs. One condition for automatic VCP conversion is that the ports on both sides of the new link must not already be configured as VCPs. See *Automatic Virtual Chassis Port (VCP) Conversion* for details.
- (Optional) Configured Ethernet interfaces on different member switches into the same LAG. See [Configuring Link Aggregation](#).

An active member switch might temporarily go down before coming back up as part of this procedure. If you configure the Virtual Chassis members so that traffic is load-balanced across member switches using a LAG, you can alleviate traffic loss during this procedure.

To add a new member switch to an existing EX4650 or QFX Series Virtual Chassis configuration:

1. If you previously configured the new member switch, we recommend you revert that switch's configuration to the factory defaults before interconnecting it into the Virtual Chassis. See *Reverting to the Default Factory Configuration*.
2. (Recommended for a QFX5100 Virtual Chassis under certain conditions) When you add or replace a QFX5100-24Q switch that is configured in the Routing Engine role in a QFX5100 Virtual Chassis, if the new switch has two EX4600-EM-8F expansion modules, we recommend that you set the primary

role priorities on the routing engine members and the new switch to prevent a primary-role switchover to the new switch until after the new switch is completely initialized in the Virtual Chassis.

Before interconnecting the new switch into the Virtual Chassis in this case, see ["Add or Replace a QFX5100-24Q Switch with Two Expansion Modules in a QFX5100 Virtual Chassis"](#) on page 60 for details on why, when, and how you should do this step.

**NOTE:** You might need to do this even if the new switch has the default factory configuration.

3. (Required for a mixed Virtual Chassis only) Set the new switch into mixed mode and reboot the switch to complete the configuration:

**NOTE:** You do not need to configure your Virtual Chassis into mixed mode if the Virtual Chassis is composed of only QFX3500 and QFX3600 switches or only QFX5110 and QFX5100 switches (which are considered non-mixed Virtual Chassis).

```
user@device> request virtual-chassis mode mixed
reboot
```

If you are adding a switch that converts a non-mixed Virtual Chassis into a mixed Virtual Chassis, you must also log onto the Virtual Chassis and enter the **request virtual-chassis mode mixed all-members reboot** command either before or after interconnecting the new switch into your Virtual Chassis. This step makes sure all switches in the Virtual Chassis can communicate with the new mixed-mode member switch.

4. Interconnect the new switch to one member of the existing Virtual Chassis using an interface that can be configured into a VCP. See *Virtual Chassis Port Options* for details on ports you can use as VCPs on different switches.  
Connect only one interface on the new switch to a VCP on a member switch in the existing Virtual Chassis at this point of the procedure.
5. Set the interconnecting ports for the new member switch as Virtual Chassis Ports (VCPs) on the new member switch and the existing Virtual Chassis member switch where you connected the new switch, if needed:

```
user@switch> request virtual-chassis vc-port set pic-slot slot-number port
port-number
```

**NOTE:** Include the **local** option in this command if you want to make sure the command applies only to that port locally on the switch where you're running the command.

You do not need to perform this step in a preprovisioned Virtual Chassis if you set up the right conditions to use the autoprovisioning feature (see *Automatic Virtual Chassis Port (VCP) Conversion*). After the new switch is provisioned and cabled into the Virtual Chassis, the interconnecting links automatically convert into VCP links. You do not need to manually set the ports on either side of the links as VCPs.

6. Confirm that the new member switch is now included within the Virtual Chassis configuration by entering the **show virtual-chassis** command on a Virtual Chassis console or management port. You should see the new member switch listed in the output with **Status** displayed as **Prsnt**.
7. Cable the next port into the Virtual Chassis. Refer to Steps "4" on page 58 through "6" on page 59 in this procedure.



**CAUTION:** If you immediately cable both VCPs on the new switch into the existing Virtual Chassis at the same time, a member switch that was already part of the Virtual Chassis might become non-operational for several seconds. The Virtual Chassis drops network traffic to this switch during the downtime.

The member switch returns to the normal operational state with no user intervention, and normal operation of the Virtual Chassis resumes after this downtime.

8. (Optional) Split detection is enabled in a Virtual Chassis by default. We recommend configuring the **no-split-detection** option to disable it in a Virtual Chassis that has only two members. We recommend keeping it enabled in a Virtual Chassis that has more than two members. See *Understanding Split and Merge in a Virtual Chassis* for details.

If your Virtual Chassis had only two members with **no-split-detection** configured, now that you've added another member switch in this procedure, you should enable split detection again (in other words, remove the **no-split-detection** setting):

```
[edit]user@switch# delete virtual-chassis no-split-detection
```

9. If you need to customize your Virtual Chassis configuration further, see ["Configuring an EX4650 or a QFX Series Virtual Chassis" on page 40](#) or *Removing or Replacing a Member Switch of a Virtual Chassis Configuration*.

## SEE ALSO

[Configuring an EX4650 or a QFX Series Virtual Chassis](#) | 40

## Add or Replace a QFX5100-24Q Switch with Two Expansion Modules in a QFX5100 Virtual Chassis

A QFX5100-24Q switch installed with two EX4600-EM-8F expansion modules needs more time to check and initialize all its interfaces than a switch with one or no expansion modules. If you add a new switch or replace a member switch in an QFX5100 Virtual Chassis, when you connect and power on the new switch, the Virtual Chassis detects the new switch and reconfigures the Virtual Chassis to include it.

During that time, the Virtual Chassis might reassign primary role to the new switch before it is fully initialized and ready to take the primary Routing Engine role. This might happen if the new switch

- is a QFX5100 switch with two expansion modules,
- is configured in the Routing Engine role,
- has a system MAC address lower than the other member switches in the Routing Engine role, and
- has the same primary-role priority as the other member switches in the Routing Engine role.

See *Understanding How the Primary in a Virtual Chassis Is Elected* for more information on primary-role election.

The Virtual Chassis takes significantly longer to re-stabilize across a primary-role switchover during Virtual Chassis reconfiguration, which causes traffic loss. To avoid a primary-role switchover in this case, before cabling the new switch into the Virtual Chassis, you can reassign the new switch's primary-role priority to be lower than the other Virtual Chassis member switches configured in the Routing Engine role.

For example, you have a QFX5100 Virtual Chassis with member 0 as the primary routing engine and member 1 as the backup routing engine. Both members have primary-role priority 255 in the current Virtual Chassis configuration, and you want to replace member 0 with a QFX5100-24Q switch that has two expansion modules.

1. Remove member 0 according to the procedure in *Remove a Member Switch and Make Its Member ID Available for Reassignment to a Different Switch*.

Member 1 assumes primary role of the Virtual Chassis.

2. Reconfigure the primary-role priority of member 0 on the Virtual Chassis to a lower number than member 1 to make sure member 1 retains primary role while you replace member 0:

```
[edit]user@switch# set virtual-chassis
member 0 mastership-priority 128
user@switch# set virtual-chassis member 1 mastership-priority
```

255

```
user@switch# commit synchronize
```

3. Add the new member 0 into the Virtual Chassis using the procedure in ["Add a New Switch to an EX4650 or QFX Series Virtual Chassis" on page 56](#), or continue with the steps in *Remove a Member Switch, Replace It with a Different Switch, and Reapply the Old Configuration* after removing the member you are replacing.
4. After the new member switch is fully initialized and established as a member of the Virtual Chassis, you can restore the primary role priorities on member 0 so the Virtual Chassis switches primary role back to the new member 0:

[edit]

```
user@switch# set virtual-chassis member 0 mastership-priority
```

255

```
user@switch# commit synchronize
```

See *Configuring Primary Role of a Virtual Chassis* for more details on changing primary role priorities.

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.



# 3

CHAPTER

## Virtual Chassis Routine Monitoring and Troubleshooting

---

[Unresolved topicref](#) | 66

[Unresolved topicref](#) | 66

[Unresolved topicref](#) | 66

[Unresolved topicref](#) | 67

[Unresolved topicref](#) | 67

---

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# 4

CHAPTER

## Upgrading Software on a Virtual Chassis

---

[Understanding Software Upgrades in a Virtual Chassis | 69](#)

[Upgrading a QFX5100 Switch with a USB Device to Join a QFX5110 Virtual Chassis or Virtual Chassis Fabric | 71](#)

[Understanding Nonstop Software Upgrade on a Virtual Chassis and Mixed Virtual Chassis | 77](#)

[Unresolved topicref | 83](#)

[Upgrading Software on a Virtual Chassis and Mixed Virtual Chassis Using Nonstop Software Upgrade | 83](#)

---

# Understanding Software Upgrades in a Virtual Chassis

## IN THIS SECTION

- [Automatic Software Updates | 70](#)
- [Nonstop Software Upgrade | 70](#)

This topic discusses software upgrades on EX Series and QFX Series *Virtual Chassis*, except EX8200 Virtual Chassis. For information on software upgrades on an EX8200 Virtual Chassis, see [Understanding Software Upgrades in an EX8200 Virtual Chassis](#). For information on software upgrades on a Virtual Chassis Fabric (VCF), see [Understanding Software Upgrades in a Virtual Chassis Fabric](#).

In a Virtual Chassis, each member switch must be running the same version of Juniper Networks Junos operating system (Junos OS) that supports Virtual Chassis. You can install a new Junos OS release on the entire Virtual Chassis or on individual members in the Virtual Chassis by using the same CLI command that you use to install Junos OS on standalone switches—the `request system software add` command.

In a mixed Virtual Chassis, the member switches must also be running the same version of Junos OS, but you might need to specify multiple Junos OS images when manually or automatically upgrading a mixed Virtual Chassis. For example, for the same Junos OS release, an EX4200 switch runs a different Junos OS image than an EX4500 or EX4550 switch, or an EX4300 switch runs a different Junos OS image than a QFX5100 switch in a QFX5100 Virtual Chassis. You can upgrade all member switches simultaneously by specifying a path to multiple Junos OS images in the same **request system software add** command.

**NOTE:** Some different switch platforms can run the same Junos OS image. For example, you do not need to use multiple Junos OS images when updating a Virtual Chassis with a combination of EX4500 and EX4550 switches, or a Virtual Chassis with a combination of QFX3500 and QFX3600 switches.

You can also use the following features to upgrade software on members of a Virtual Chassis:

## Automatic Software Updates

You can use the automatic software update feature on a non-mixed or mixed Virtual Chassis to automatically update the Junos OS version on member switches as you add them to the Virtual Chassis. See *Understanding Automatic Software Update on Virtual Chassis Member Switches* for more information.

If you are not configuring the automatic software update feature, we recommend that you update the new member switch to the version of Junos OS running on the Virtual Chassis before adding the member switch to the Virtual Chassis.

## Nonstop Software Upgrade

You can also use nonstop software upgrade (NSSU) to upgrade Junos OS on all members of a Virtual Chassis for EX Series and QFX Series Virtual Chassis that support NSSU. NSSU provides an orderly upgrade of each member of the Virtual Chassis and takes advantage of *graceful Routing Engine switchover*, *nonstop active routing*, and link aggregation to minimize traffic disruption during the upgrade.

For more information about NSSU, see:

- ["Understanding Nonstop Software Upgrade on a Virtual Chassis and Mixed Virtual Chassis" on page 77](#)
- ["Upgrading Software on a Virtual Chassis and Mixed Virtual Chassis Using Nonstop Software Upgrade" on page 83](#)
- (For legacy EX Series switches in a Virtual Chassis) *Upgrading Software Using Nonstop Software Upgrade on EX Series Virtual Chassis and Mixed Virtual Chassis (CLI Procedure)*

If NSSU is not supported to upgrade a Virtual Chassis from the currently-installed release to the release you need, refer to procedures like these for some guidance:

- [Two-Member QFX Series Virtual Chassis Upgrade Procedure](#), a network configuration example on how to manually upgrade a two-member QFX Series Virtual Chassis when NSSU isn't available.

### RELATED DOCUMENTATION

*Installing Software on an EX Series Switch with a Virtual Chassis or Single Routing Engine (CLI Procedure)*

*Installing Software on a Mixed Virtual Chassis with EX4200, EX4500, and EX4550 Switches (CLI Procedure)*

# Upgrading a QFX5100 Switch with a USB Device to Join a QFX5110 Virtual Chassis or Virtual Chassis Fabric

## IN THIS SECTION

- Identifying Compatible Software for QFX5100 Switches to Run in a QFX5110 Virtual Chassis or VCF | 72
- Creating a USB Boot Device for a QFX5100 Switch | 73
- Upgrading a QFX5100 Switch from Junos OS “QFX 5 Series” to “QFX 5e Series” Software Using a USB Boot Device | 75

Use this procedure to upgrade a standalone QFX5100 switch running “QFX 5 Series” Junos OS software to a “QFX 5e Series” software image so the QFX5100 switch can join a QFX5110 Virtual Chassis or Virtual Chassis Fabric (VCF).

A QFX5110 Virtual Chassis or VCF can have a combination of QFX5110 and QFX5100 switches all running compatible Junos OS “QFX 5e Series” software. This procedure explains how you identify the compatible “QFX 5e Series” install package for QFX5100 switches, create a USB boot device as the installation media, and use the boot device to upgrade the software on a QFX5100 switch to the “QFX 5e Series” image. After installing the new software image, when you reboot the QFX5100, the switch is running a compatible software image and you can successfully add it into a QFX5110 Virtual Chassis or VCF.

**NOTE:** With releases prior to Junos OS Release 17.3R2 or 17.4R1, you must use this USB install method due to the differences in the boot structure and host OS software of the two types of devices.

Starting in Junos OS Releases 17.3R2 and 17.4R1, you are not required to use the USB install method to upgrade a QFX5100 switch from a “QFX 5 Series” to a “QFX 5e Series” image. Instead, you can install the “QFX 5e Series” package directly using the CLI command *request system software add*. See *Installing a Standard Software Package on QFX5000 and EX4600 Switches* for details on using the CLI install method.

If a QFX5100 switch is already running a “QFX 5e Series” image (software package filename contains the string “-qfx-5e-”), a QFX5110 Virtual Chassis or VCF can automatically update it to the right release

when you add it to the Virtual Chassis or VCF. See ["Understanding Software Upgrades in a Virtual Chassis" on page 69](#) and [Understanding Software Upgrades in a Virtual Chassis Fabric](#).

## Identifying Compatible Software for QFX5100 Switches to Run in a QFX5110 Virtual Chassis or VCF

Standalone QFX5100 switches traditionally run Junos OS “QFX 5 Series” software, and the corresponding install media and installation software package file names include the string “-qfx-5-”. For example:

```
install-media-qfx-5-17.2R1.13.tgz install-host-qfx-5-17.2R1.13-signed.tgz
```

QFX5110 switches run Junos OS “QFX 5e Series” software and use a secure-boot method at startup, so the install media and software package filenames for QFX5110 switches include “-qfx-5e-” and “secure”. For example:

```
install-media-host-usb-qfx-5e-x86-64-17.2R1.13-secure.tgz install-host-qfx-5e-x86-64-17.2R1.13-secure-signed.tgz
```

QFX5100 switches can also run “5e Series” software, but in releases prior to Junos OS Release 17.3R2 or 17.4R1 they do not use the same secure boot method as QFX5110 switches, so the “QFX 5e Series” install media and software package filenames for QFX5100 switches include “-qfx-5e-” without the “secure” keyword. For example:

```
install-media-host-usb-qfx-5e-x86-64-17.3R1.6-signed.tgz
```

To add a QFX5100 switch to a QFX5110 Virtual Chassis or VCF, the QFX5100 must be running the same “QFX 5e Series” software version as the other switches in the Virtual Chassis or VCF. If the QFX5100 switch has a “QFX 5 Series” image, you must first upgrade it manually to a “QFX 5e Series” image using a USB boot device that does not employ the secure-boot method.

To create the USB boot device (see ["Creating a USB Boot Device for a QFX5100 Switch" on page 73](#)), use the same install media filename *without* the “secure” keyword that matches what’s running on the other QFX5110 Virtual Chassis or VCF members. For example:



If the Virtual Chassis or VCF is running the software from this install media package for QFX5110 switches (with the secure-boot method):

```
install-media-host-usb-qfx-5e-x86-64-17.3R1.6-secure-signed.tgz
```

Then the matching install media package for QFX5100 switches (without the secure-boot method) is:

```
install-media-host-usb-qfx-5e-x86-64-17.3R1.6-signed.tgz
```

After any QFX5100 switches are running a “QFX 5e Series” image, you can just use the same “install-host-qfx-5e-” package file *with* the “secure” keyword to update the “QFX 5e Series” software running on all members of the Virtual Chassis or VCF, because when it starts up, the secure-boot install software determines whether or not to use the secure-boot method based on the type of switch on which it’s running. The Virtual Chassis or VCF can also successfully update any “QFX 5e Series” member switches as needed in the same way with the automatic software update feature for adding or replacing members, or even during initial Virtual Chassis or VCF configuration.

**NOTE:** If you remove a QFX5100 switch from a QFX5110 Virtual Chassis or VCF and want to revert the QFX5100 switch to a “QFX 5 Series” software image to run as a standalone switch, you need to reinstall the image on the switch using a USB boot device with a “qfx-5-” install media file that does not use the secure-boot method.

## Creating a USB Boot Device for a QFX5100 Switch

Use the following procedure to create a USB boot device with a Junos OS “QFX 5e Series” install media package (contains “-qfx-5e-” in the package filename) for a QFX5100 switch. You can then use the USB boot device to upgrade a QFX5100 switch to run that image.

**NOTE:** You can create the USB boot device on the switch you want to upgrade, on another Juniper Networks switch or router, or on any PC or laptop that supports Linux. The following steps describe creating the boot device from a Junos OS device, and might differ based on the device you use to create the boot device.

Before you begin, download the installation media file from <https://www.juniper.net/customers/support/> to the device where you are creating the boot device. The install media filename should include the string “-qfx-5e-” for the same Junos OS release as the QFX5110 Virtual Chassis or VCF, but without

a “secure” keyword in the filename, because you must initially upgrade QFX5100 switches without using the same secure-boot method employed by QFX5110 switches. (See ["Identifying Compatible Software for QFX5100 Switches to Run in a QFX5110 Virtual Chassis or VCF" on page 72](#) for details.)

**NOTE:** The Junos OS software running on the QFX5110 members must be the “QFX 5e Series” image that uses the secure-boot method, so the install media and package filenames used on QFX5110 switches include the “secure” keyword. After initial USB installation of a “QFX 5e Series” software image on a QFX5100 switch, the same software image that supports secure boot runs on either switch model, and determines the appropriate boot method to use based on the switch on which it is running. As a result, for future updates, you can directly install the same image with the “secure” keyword on both QFX5110 and QFX5100 switches in your Virtual Chassis or VCF.

On a Junos OS device where you are creating the USB boot device:

1. Use FTP to copy the installation media file into the `/var/tmp` directory.
2. Insert the USB storage device into the USB port.
3. From the Junos OS command-line interface (CLI), start the shell:

```
user@device> start shell
%
```

4. Switch to the root account using the `su` command:

```
% su
Password: password
```

**NOTE:** The password is the root password for the device on which you are creating the boot media. If you logged in to the device as root, you do not need to perform this step.

5. (Optional) Before copying the installation media file to the USB device, erase the boot sector of the USB device. In some cases, depending on how the USB device was formatted previously, this step can help avoid unexpected behavior during the USB boot process. For example, enter the following command:

```
root@device% dd if=/dev/zero of=/dev/dal count=20
20+0 records in
```

```
20+0 records out
10240 bytes (10 kB) copied, 0.008281 seconds, 1.2 MB/s
```

6. Enter the following command to copy the installation media file (see ["Identifying Compatible Software for QFX5100 Switches to Run in a QFX5110 Virtual Chassis or VCF" on page 72](#)) to the USB device:

```
root@device% dd if=/var/tmp/filename of=/dev/da1 bs=1m
```

The device writes the installation media image to the USB device. For example:

```
root@device% dd if=install-media-host-qfx-5e-17.3R1.5-domestic.img of=/dev/
da0 bs=1m
1399+0 records in
1399+0 records out
1466957824 bytes transferred in 394.081902 secs (3722469 bytes/sec)
```

7. Log out of the shell:

```
root@device% exit
% exit
user@device>
```

8. Remove the USB storage device from the USB port.

You can now use the USB storage device to install the “QFX 5e Series” Junos OS software image on a QFX5100 switch.

## Upgrading a QFX5100 Switch from Junos OS “QFX 5 Series” to “QFX 5e Series” Software Using a USB Boot Device

You must upgrade a standalone QFX5100 switch running “QFX 5 Series” software to “QFX 5e Series” software before the switch can join a QFX5110 Virtual Chassis or VCF. For this upgrade, you need to boot and install the software using a USB boot device.

Before you begin, have a USB boot device ready with the required Junos OS software install package as described in ["Creating a USB Boot Device for a QFX5100 Switch" on page 73](#). The upgrade process overwrites the contents of the internal flash storage on the QFX5100 switch, so if desired, before

proceeding with the upgrade, save existing configuration, backup configurations, and other stored files to a remote system, server, or other storage device. Then:

1. Insert the USB boot device into a USB port on the QFX5100 switch you need to upgrade, and power-cycle the QFX5100 switch.
2. The switch comes up, booting from the USB device and running the **Juniper Linux Installer**.

**NOTE:** If the switch doesn't automatically boot from the USB device, press the ESC key while the switch reboots to bring up the BIOS boot manager so you can manually select to boot from the USB device.

The installer menu prompts you to with the following options:

```
Juniper Linux Installer - (c) Juniper Networks 2014RebootInstall Juniper
Linux PlatformBoot to host shell [debug]
```

Tab through the options to select **Install Juniper Linux Platform**, and press Enter.

3. The installer displays status messages during the install process, creates and formats the local storage partitions, and installs the host OS and Junos OS software on the switch.

After completing installation, the installer displays a list of boot options and after a few seconds automatically selects the default option to boot **Juniper Linux**. The switch boots the host OS and automatically selects and brings up Junos OS. Upon completion of the install and reboot process, the switch displays the Junos OS login prompt.

4. Log in to Junos OS on the switch, enter operational mode, and verify that the new version of software has been properly installed by running the show version command.

```
user@switch> show version
```

After the QFX5100 switch is running the “QFX 5e Series” software image, you can continue with any other configuration and setup to add the QFX5100 to a QFX5110 Virtual Chassis or VCF, such as configuring the Virtual Chassis ports (VCPs).

#### Release History Table

Release	Description
17.4R1	Starting in Junos OS Releases 17.3R2 and 17.4R1, you are not required to use the USB install method to upgrade a QFX5100 switch from a “QFX 5 Series” to a “QFX 5e Series” image. Instead, you can install the “QFX 5e Series” package directly using the CLI command request system software add

## RELATED DOCUMENTATION

[Understanding Mixed Virtual Chassis Fabric](#)

[Configuring an EX4650 or a QFX Series Virtual Chassis | 40](#)

[Understanding Virtual Chassis Fabric Configuration](#)

# Understanding Nonstop Software Upgrade on a Virtual Chassis and Mixed Virtual Chassis

## IN THIS SECTION

- [Benefits of NSSU | 78](#)
- [Requirements for Performing an NSSU | 78](#)
- [How an NSSU Works on a Virtual Chassis and Mixed Virtual Chassis | 80](#)
- [NSSU Limitations | 81](#)
- [NSSU and Junos OS Release Support | 81](#)
- [Overview of NSSU Configuration and Operation | 82](#)

Nonstop software upgrade (NSSU) enables you to upgrade the software running on all member switches in a *Virtual Chassis* with minimal network traffic disruption during the upgrade. This topic describes NSSU on EX Series and QFX Series Virtual Chassis that support this feature.

See these other references for information on using NSSU on the following specific platforms:

- EX8200 Virtual Chassis—For information on using NSSU with an EX8200 Virtual Chassis, see *Upgrading Software on an EX8200 Virtual Chassis Using Nonstop Software Upgrade (CLI Procedure)*.
- Virtual Chassis Fabric (VCF)—For information on using NSSU with a VCF, see [Understanding Nonstop Software Upgrade on a Virtual Chassis Fabric](#).

**NOTE:** Because NSSU upgrades the software on each Virtual Chassis member one at a time, upgrading using NSSU can take longer than an upgrade using the **request system software add** command.

You can reduce the amount of time an upgrade takes by configuring line-card upgrade groups on larger Virtual Chassis that support this feature. The Virtual Chassis upgrades the member switches in an upgrade group simultaneously, reducing the amount of time it takes to complete an upgrade. See *Configuring Line-Card Upgrade Groups for Nonstop Software Upgrade*.

## Benefits of NSSU

- No disruption to the control plane—NSSU uses *graceful Routing Engine switchover* (GRES) (and *nonstop active routing* (NSR) on applicable platforms) to ensure no disruption occurs to the control plane. During the upgrade process, the Virtual Chassis preserves interface, kernel, and routing protocol information.
- Minimal disruption to network traffic—NSSU minimizes network traffic disruption by upgrading member switches one at a time, enabling the primary and backup members to maintain their primary and backup roles (although primary role will change) without disrupting traffic, and permitting traffic to continue to flow through members in the linecard role that are not being upgraded.

## Requirements for Performing an NSSU

Requirements for performing NSSU for a Virtual Chassis include:

- All Virtual Chassis members and all Routing Engines must be running the same Junos OS release.
- You must enable Graceful Routing Engine switchover (GRES).
- You must enable nonstop active routing (NSR) for applicable platforms.

Although nonstop bridging (NSB) is not required to perform an NSSU, we also recommend enabling NSB before performing an NSSU on applicable platforms. NSB ensures that all NSB-supported Layer 2 protocols operate seamlessly when the Routing Engine switches over during NSSU. See *Configuring Nonstop Bridging on Switches (CLI Procedure)*.

- To minimize traffic disruption, you must configure link aggregation groups (LAGs) such that the member links of each LAG reside on different Virtual Chassis members, and configure Link Aggregation Control Protocol (LACP) to monitor LAG member link states. When one member link of a LAG is down, the remaining links are up, and traffic continues to flow through the LAG. For more information on configuring LAGs and LACP, see [Configuring Link Aggregation](#) and [Configuring Aggregated Ethernet LACP \(CLI Procedure\)](#).

**NOTE:** When you upgrade an EX Series switch in a mixed Virtual Chassis to Junos OS Release 15.1 or later from a release earlier than Release 15.1, there might be a drop in traffic for up to 60 seconds.

**NOTE:** During an NSSU operation, if you try to view LAG interface status on the primary Routing Engine member using the **show interfaces ae-*ae-interface-number*** CLI command, you might see incorrect or zero traffic counts. To work around this problem, run the command on the backup Routing Engine member instead if that member is already loaded and running.

Requirements for the Virtual Chassis or mixed Virtual Chassis members being upgraded using NSSU:

- The member switches must be connected in a ring topology so that no member is isolated as a result of another member being rebooted. This topology prevents the Virtual Chassis from splitting during an NSSU.
- The primary and backup member switches must be adjacent to each other in the ring topology. Adjacent placement ensures the primary and backup are always in sync while the member switches in linecard roles are rebooting.
- The Virtual Chassis is preprovisioned and you have explicitly assigned the linecard role to the member switches acting in a linecard role. The Virtual Chassis primary and backup member switches change primary role while one or the other is being upgraded during NSSU, but they must maintain their primary and backup routing engine roles, and the remaining switches must maintain their linecard roles.
- A two-member Virtual Chassis must have **no-split-detection** configured so that the Virtual Chassis doesn't split when an NSSU upgrades a member. See *Understanding Split and Merge in a Virtual Chassis*.

**NOTE:** In an EX4300 Virtual Chassis running a Junos OS 13.2X50 release, you should enable the *vcp-no-hold-time* statement at the **[edit virtual-chassis]** hierarchy level before performing a software upgrade using NSSU. Without this option configured, the Virtual Chassis might split during the upgrade. A split Virtual Chassis can cause disruptions to your network, and you might have to manually reconfigure your Virtual Chassis after the NSSU if the split and merge feature was disabled. For more information about a split Virtual Chassis, see *Understanding Split and Merge in a Virtual Chassis*. This statement only affects EX4300 Virtual Chassis or mixed Virtual Chassis that contain EX4300 switches.

## How an NSSU Works on a Virtual Chassis and Mixed Virtual Chassis

When you request an NSSU on a Virtual Chassis or mixed Virtual Chassis:

1. The Virtual Chassis primary verifies that:

- The backup is online and running the same software version.
- You enabled Graceful Routing Engine switchover (GRES), and, if applicable, nonstop active routing (NSR).
- You used a preprovisioned configuration to set up the Virtual Chassis.

2. The primary copies the new software image to the backup and remaining linecard role members in sequence using **rcp**.

(For QFX5100 Virtual Chassis only) Starting with Junos OS Release 14.1X53-D40, to optimize the time needed to complete an NSSU operation for a Virtual Chassis, the primary uses parallel **rcp** sessions to copy the new software to multiple members at a time (rather than waiting for the copy operation to complete to each member before starting to copy the software image to the next member). The primary uses a default algorithm to determine the number of parallel copy operations based on the number of members in the Virtual Chassis, or you can configure a specific number using the **rcp-count** configuration statement. See ["rcp-count" on page 100](#) for details.

**NOTE:** If copying the new software to any member fails, NSSU terminates the upgrade process for the entire Virtual Chassis without rebooting any members, and logs the error condition. Starting with Junos OS Release 14.1X53-D40, if an NSSU copy operation to a member fails, the primary performs an additional error recovery measure to remove the new software from the members to which it was already transferred.

3. The primary restarts the backup member switch with the new software, and the backup resynchronizes with the primary.
4. The primary loads and reboots member switches that are in the linecard role, one at a time. The primary waits for each member to become online and active running the new software before rebooting the next member.
  - If you configured upgrade groups, the Virtual Chassis members in the first upgrade group load the new image and restart. When the members in that upgrade group are online again, the members in the next upgrade group load the new image and restart. (NSSU upgrades the groups in the order that they appear in the configuration.)
  - Traffic continues to flow through the other members during this process.



5. Rebooting continues until all active members have restarted with the new software.

**NOTE:** If any linecard role member fails to reboot successfully, NSSU terminates the upgrade process and logs the error condition. In this case, to avoid Virtual Chassis instability, you should either back out the partial upgrade by restoring the old software and rebooting the members that were already rebooted with the new software, or try to manually reboot all members with the new software that was copied to them, so all members come online again running the same version of the software.

Starting with Junos OS Release 14.1X53-D40, NSSU automatically invokes recovery measures if the reboot fails on any linecard role member, stopping the sequential reboot process and bringing down and rebooting the entire Virtual Chassis. The Virtual Chassis then cleanly brings up all members at the same time running the new software, which recovers Virtual Chassis stability more quickly than having an unstable Virtual Chassis running different versions of the software trying to converge.

6. After the primary has upgraded all members in the linecard role, it performs a graceful Routing Engine switchover and the upgraded backup member switch becomes the new primary.
7. The new primary upgrades the software on the original primary and automatically reboots it. After the original primary has rejoined the Virtual Chassis, you can optionally revert primary role to that switch by explicitly requesting another graceful Routing Engine switchover.

## NSSU Limitations

You can't use NSSU to downgrade the software—that is, to install an earlier version of the software than is currently running on the switch. To install an earlier software version, use the **request system software add** command.

You can't roll back to the previous software version after you perform an upgrade using NSSU. If you need to roll back to the previous software version, you can reboot from the alternate root partition if you have not already copied the new software version into the alternate root partition.

## NSSU and Junos OS Release Support

NSSU works only on some Virtual Chassis with particular *from* and *to* Junos OS Releases. Contact Juniper Networks Technical Assistance Center (JTAC) to confirm supported *from* and *to* releases if you are considering upgrading your Virtual Chassis using NSSU.

If your Virtual Chassis is running a software version that does not support NSSU or does not support the combination of *from* and *to* releases with NSSU, use the **request system software add** command to upgrade the member switches in the Virtual Chassis individually.

You can also refer to this network configuration example on how to manually upgrade a two-member QFX Series Virtual Chassis with minimal impact to traffic flow when NSSU is not supported:

- [Two-Member QFX Series Virtual Chassis Upgrade Procedure](#)

## Overview of NSSU Configuration and Operation

For NSSU to succeed, the Virtual Chassis and member switches must meet the requirements in ["Requirements for Performing an NSSU" on page 78](#). NSSU requires only those configuration steps.

If your Virtual Chassis meets the NSSU requirements, simply enter the `request system software nonstop-upgrade` command to start NSSU. See ["Upgrading Software on a Virtual Chassis and Mixed Virtual Chassis Using Nonstop Software Upgrade" on page 83](#) for details.

Release History Table

Release	Description
14.1X53-D40	(For QFX5100 Virtual Chassis only) Starting with Junos OS Release 14.1X53-D40, to optimize the time needed to complete an NSSU operation for a Virtual Chassis, the primary uses parallel rcp sessions to copy the new software to multiple members at a time (rather than waiting for the copy operation to complete to each member before starting to copy the software image to the next member).
14.1X53-D40	Starting with Junos OS Release 14.1X53-D40, if an NSSU copy operation to a member fails, the primary performs an additional error recovery measure to remove the new software from the members to which it was already transferred.
14.1X53-D40	Starting with Junos OS Release 14.1X53-D40, NSSU automatically invokes recovery measures if the reboot fails on any linecard role member, stopping the sequential reboot process and bringing down and rebooting the entire Virtual Chassis.

### RELATED DOCUMENTATION

[Upgrading Software on a Virtual Chassis and Mixed Virtual Chassis Using Nonstop Software Upgrade | 83](#)

[Understanding Aggregated Ethernet Interfaces and LACP for Switches](#)

# Unresolved topicref

## SUMMARY

Unresolved topicref placeholder.

This is a placeholder for unresolved topicref links.

## Upgrading Software on a Virtual Chassis and Mixed Virtual Chassis Using Nonstop Software Upgrade

### IN THIS SECTION

- [Preparing the Switch for Software Installation | 84](#)
- [Upgrading the Software Using NSSU | 85](#)

Nonstop software upgrade (NSSU) enables you to upgrade the software running on all member switches of supported Virtual Chassis with minimal traffic disruption during the upgrade.

**NOTE:** NSSU works only on some Virtual Chassis with certain *from* and *to* Junos OS Releases. Use the **request system software add** command to upgrade the member switches in the Virtual Chassis individually if the Virtual Chassis is running a software version that does not support NSSU or does not support the combination of *from* and *to* releases.

You can also refer to [Two-Member QFX Series Virtual Chassis Upgrade Procedure](#), a network configuration example on how to manually upgrade a two-member QFX Series Virtual Chassis with minimal impact to traffic flow when NSSU is not supported.

## Preparing the Switch for Software Installation

Before you begin installing the new software using NSSU:

- Ensure that the Virtual Chassis is connected and configured correctly to support the NSSU process. See ["Requirements for Performing an NSSU" on page 78](#).
- Verify that the members are running the same version of the software:

```
user@switch> show version
```

If the Virtual Chassis or mixed Virtual Chassis members are not running the same version of the software, use the `request system software add` command to upgrade the software on the inconsistent members.

- Ensure that graceful Routing Engine switchover (GRES) is enabled, or for applicable platforms, make sure nonstop active routing (NSR) is enabled, which also enables graceful Routing Engine switchover. See *Configuring Nonstop Active Routing on Switches* for more information.

To check the nonstop active routing state to verify both NSR and GRES are enabled:

```
user@switch> show task replication
```

- (Optional for applicable platforms) Enable nonstop bridging (NSB), which ensures that all NSB-supported Layer 2 protocols operate seamlessly during the Routing Engine switchover that is part of the NSSU. See *Configuring Nonstop Bridging on Switches (CLI Procedure)* for details.
- For a two-member Virtual Chassis, make sure you configured `no-split-detection` so the Virtual Chassis does not split when NSSU upgrades one of the members. See *Disabling Split and Merge in a Virtual Chassis*.
- In an EX4300 Virtual Chassis running a Junos OS 13.2X50 release, you should set the **vcp-no-hold-time** option at the `[edit virtual-chassis]` hierarchy level before performing a software upgrade using NSSU, otherwise the Virtual Chassis might split during the upgrade. A split Virtual Chassis can disrupt your network, and you might need to manually reconfigure your Virtual Chassis after the NSSU if the split-and-merge feature was disabled. For more information about a Virtual Chassis split, see *Understanding Split and Merge in a Virtual Chassis*. This statement only affects EX4300 Virtual Chassis or mixed Virtual Chassis that contain EX4300 switches.

To configure this option:

```
user@switch# set virtual-chassis vcp-no-hold-time
```

- On a QFX5100 Virtual Chassis with line-card upgrade groups configured, you should enable the **lc-reboot-delay** option to configure a delay for when adjacent members in a line card group reboot. Without this option, when the next member reboots, approximately two minutes after the previous member reboots and joins the Virtual Chassis, the previous rebooted member might not be ready to carry traffic. This delay helps prevent dropping traffic when there are two adjacent line card members with interfaces that are part of a common link aggregation group (LAG).

We recommend setting a 200-second delay (the allowable range is 0 to 600 seconds). To configure this delay:

```
[edit chassis]
user@switch# set chassis nssu lc-reboot-delay 200
```

- (Optional) Back up the system software (Junos OS, the active configuration, and log files) on each member to an external storage device as desired using the `request system snapshot` command.

## Upgrading the Software Using NSSU

This procedure describes how to upgrade the software running on all Virtual Chassis or mixed Virtual Chassis members using NSSU. When the upgrade completes, all members are running the new version of the software. The upgrade includes a graceful Routing Engine switchover, so the original Virtual Chassis backup member switch becomes the new primary.

During NSSU, the primary copies the new software image to all the members in the Virtual Chassis and reboots them in turn. If copying the new software to a member fails or rebooting a member fails, NSSU terminates the upgrade process and logs the error. In this case, you must manually perform recovery measures for members left in an incompatible state to restore all members to running the same version of the software. Starting in Junos OS Release 14.1X53-D40, NSSU automatically invokes recovery measures after either of these failures, as follows:

- if NSSU terminates due to a copy error, the primary removes the new image from any members to which it was already copied.
- If any member fails to reboot, NSSU automatically initiates a clean Virtual Chassis restart by bringing down and rebooting the entire Virtual Chassis. All members come up running the new software at

the same time. This action cleanly recovers correct Virtual Chassis operation more quickly than having an unstable Virtual Chassis running different versions of the software trying to converge.

**NOTE:** Junos OS software images with enhanced automation are only supported on a non-mixed Virtual Chassis with QFX5100 switches. Also, you can't perform an NSSU from a standard Junos OS software image to a Junos OS software image with enhanced automation, or from a Junos OS software image with enhanced automation to a standard Junos OS software image.

To upgrade all members in a Virtual Chassis using NSSU:

1. Download the software package as described in *Installing Software Packages on QFX Series Devices*. If you are upgrading a mixed Virtual Chassis, download the software packages for the different switch types.
2. Copy the software package or packages to the Virtual Chassis. We recommend that you copy the file or files to the `/var/tmp` directory on the primary.
3. Use the console connection or the virtual management Ethernet (VME) interface to log in to the Virtual Chassis or mixed Virtual Chassis. You can monitor the progress of the primary switch reboot if you use a console connection.
4. Start the NSSU:
  - On a Virtual Chassis where all members use the same software image, enter:

```
user@switch> request system software nonstop-upgrade force-host /var/tmp/package-name.tgz
```

where ***package-name.tgz*** is the software package name, for example, ***jinstall-qfx-3-13.2X50-D15.3-domestic-signed.tgz***.

- On a mixed Virtual Chassis where members might use different software images, enter the **request system software nonstop-upgrade** command with the **set** option to specify more than one software package name:

```
user@switch> request system software nonstop-upgrade set [/var/tmp/package-name1.tgz /var/tmp/package-name2.tgz]
```

For example, `/var/tmp/package-name1.tgz` and `/var/tmp/package-name2.tgz` might specify software packages for EX4200 and EX4500 switches in a mixed EX Series Virtual Chassis with EX4200 and EX4500 switches.

The switch displays status messages similar to the following messages as the upgrade executes:

```
Chassis ISSU Check Done
NSSU: Validating Image
NSSU: Preparing Backup RE
Installing image on other FPC's along with the backup

Checking pending install on fpc1
Pushing bundle to fpc1
WARNING: A reboot is required to install the software
WARNING:      Use the 'request system reboot' command immediately
Completed install on fpc1

Checking pending install on fpc2
Pushing bundle to fpc2
WARNING: A reboot is required to install the software
WARNING:      Use the 'request system reboot' command immediately
Completed install on fpc2

Rebooting fpc1
NSSU: Backup RE Prepare Done
Waiting for Backup RE reboot
GRES operational
Initiating Chassis In-Service-Upgrade
Chassis NSSU Started
NSSU: Preparing Daemons
NSSU: Daemons Ready for NSSU
NSSU: Starting Upgrade for FRUs
NSSU: Preparing for Switchover
NSSU: Ready for Switchover
Checking In-Service-Upgrade status
  Item           Status           Reason
  FPC 0          Online
  FPC 1          Online
  FPC 2          Online (ISSU)
Going to install image on master
WARNING: A reboot is required to install the software
WARNING:      Use the 'request system reboot' command immediately
relinquish mastership
NSSU: IDLE
```

```
*** FINAL System shutdown message from user@switch ***  
  
System going down IMMEDIATELY  
  
Shutdown NOW!  
[pid 9336]
```

5. Log in after the original primary switch reboot completes. To verify that the software is upgraded on all Routing Engines in the Virtual Chassis, enter the following command:

```
user@switch> show version
```

6. To ensure the resilient dual-root partitions feature operates correctly, copy the new Junos OS image into the alternate root partitions of all members:

```
user@switch> request system snapshot slice alternate all-members
```

With resilient dual-root partitions, the switch can boot transparently from the alternate root partition if the system fails to boot from the primary root partition.

## RELATED DOCUMENTATION

[Understanding Nonstop Software Upgrade on a Virtual Chassis and Mixed Virtual Chassis](#) | 77

*Configuring Dual-Root Partitions*



# 5

CHAPTER

## Configuration Statements

---

[aliases \(Virtual Chassis\) | 91](#)

[Unresolved topicref | 93](#)

[Unresolved topicref | 94](#)

[Unresolved topicref | 94](#)

[Unresolved topicref | 94](#)

[Unresolved topicref | 95](#)

[Unresolved topicref | 95](#)

[Unresolved topicref | 95](#)

[Unresolved topicref | 96](#)

[no-auto-conversion | 96](#)

[Unresolved topicref | 98](#)

[Unresolved topicref | 98](#)

[Unresolved topicref | 99](#)

[Unresolved topicref | 99](#)

[rcp-count | 100](#)

[Unresolved topicref | 102](#)

[Unresolved topicref | 102](#)

[Unresolved topicref | 103](#)

[Unresolved topicref | 103](#)

[Unresolved topicref | 103](#)



# aliases (Virtual Chassis)

## IN THIS SECTION

- [Syntax | 91](#)
- [Hierarchy Level | 91](#)
- [Release Information | 91](#)
- [Description | 92](#)
- [Options | 92](#)
- [Required Privilege Level | 93](#)

## Syntax

```
aliases {  
    serial-number serial-number {  
        alias-name alias-name;  
    }  
}
```

## Hierarchy Level

```
[edit virtual-chassis]
```

## Release Information

Statement introduced in Junos OS Release 14.1X53-D10.

## Description

Optionally create an alias for a member switch in a Virtual Chassis or Virtual Chassis Fabric (VCF). You can more clearly identify the member switches in your Virtual Chassis or VCF by assigning text labels (alias names) to them, associating the alias name with member switch serial numbers. Aliases are for administrative purposes only and have no effect on member switch operations.

The **show virtual-chassis** command displays assigned alias names in the **Alias-Name** output field.

## Options

***serial-number*** The permanent serial number for the member switch in the Virtual Chassis or VCF that you want to label with an alias name. Serial number values are case-sensitive.

The **show virtual-chassis** command displays the serial number for all members in the Virtual Chassis or VCF in the **Serial No** output field.

***alias-name*** The text label you want to assign to the member switch.

For example, if you configure alias name **dc-floor-1** in a VCF for member switch 0 with serial number AB012345678 as follows:

```
[edit virtual-chassis aliases]user@switch# set serial-number AB0123456789 alias-name dc-floor-1
```

then you'll see the alias **dc-floor-1** in the Alias-Name column in the output from the **show virtual-chassis** command:

**show virtual-chassis**

```
user@switch> show virtual-chassis
Preprovisioned Virtual Chassis Fabric
Fabric ID: 9d5d.5556.919a
Fabric Mode: Enabled

Mstr
Member ID  Status  Serial No  Alias-Name  Model  prio  Role
0 (FPC 0)  Prsnt   AB0123456789  dc-floor-1  qfx5100-48s-6q  129
Master
.
```

- .
- .

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

### RELATED DOCUMENTATION

- [Autoprovisioning a Virtual Chassis Fabric](#)
- [Preprovisioning a Virtual Chassis Fabric](#)
- [Configuring an EX4650 or a QFX Series Virtual Chassis | 40](#)
- [Understanding Virtual Chassis Fabric Components](#)

# Unresolved topicref

### SUMMARY

Unresolved topicref placeholder.

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

## SUMMARY

Unresolved topicref placeholder.

This is a placeholder for unresolved topicref links.

## no-auto-conversion

### IN THIS SECTION

- [Syntax | 96](#)
- [Hierarchy Level | 97](#)
- [Release Information | 97](#)
- [Description | 97](#)
- [Required Privilege Level | 98](#)

## Syntax

```
no-auto-conversion;
```



## Hierarchy Level

[edit ]

## Release Information

Statement introduced in Junos OS Releases 14.1X53-D47, 17.4R2, 18.1R3, 18.2R2, and 18.3R1.

## Description

Disable automatic Virtual Chassis port (VCP) conversion in a Virtual Chassis.

**NOTE:** This statement is available as of Junos OS Releases 14.1X53-D47, 17.4R2, 18.1R3, 18.2R2, and 18.3R1 only on EX Series and QFX Series switches in a Virtual Chassis that have automatic VCP conversion enabled by default, which include all EX4300, EX4600, EX4650, and QFX Series switches that support Virtual Chassis. See for details.

Configuring this statement disables the feature for the entire Virtual Chassis, and subsequently removing this statement returns the Virtual Chassis to the default behavior with automatic VCP conversion enabled.

VCP links connect members in a Virtual Chassis using supported VCP ports on the member switches. Ports that are supported as VCPs and are not dedicated VCPs or configured as VCPs by default must be converted into VCPs to use them to interconnect Virtual Chassis members. You can manually convert a supported port into a VCP port using the command, or when automatic VCP conversion is enabled, a port will be automatically converted into a VCP under the following conditions:

- LLDP is enabled on the interfaces for the members on both sides of the link. The two interfaces exchange LLDP packets to accomplish the port conversion.
- The Virtual Chassis must be preprovisioned with the switches on both sides of the link already configured in the members list of the Virtual Chassis using the **set virtual-chassis** command.
- The ports on both ends of the link are supported as VCPs and are *not* already configured as VCPs.

If you want to deterministically control VCP port conversion during a preprovisioned Virtual Chassis configuration or expansion, you might want to disable this feature and set up all VCPs manually.

Otherwise, you can use the default automatic VCP conversion behavior in a “plug and play” approach to simplify adding a new switch to an existing Virtual Chassis or adding a redundant VCP link between two existing members of a Virtual Chassis.

## Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

### RELATED DOCUMENTATION

[Adding a New Switch to an Existing EX2300, EX3400, or EX4300 Virtual Chassis | 48](#)

[Adding an EX4600 Switch to a Mixed or Non-mixed Virtual Chassis | 53](#)

[Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis | 56](#)

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# rcp-count

## IN THIS SECTION

- [Syntax | 100](#)
- [Hierarchy Level | 100](#)
- [Release Information | 100](#)
- [Description | 101](#)
- [Options | 101](#)
- [Required Privilege Level | 102](#)

## Syntax

```
rcp-count number;
```

## Hierarchy Level

```
[edit chassis nssu]
```

## Release Information

Statement introduced in Junos OS Release 14.1X53-D40.

## Description

(QFX5100 Virtual Chassis or Virtual Chassis Fabric [VCF] only) Optionally override the default algorithm that defines the number of parallel **rcp** sessions used for copying the new software image to member switches in a Virtual Chassis or VCF for nonstop software upgrade (NSSU).

You can upgrade the software running on all members of a Virtual Chassis or VCF using NSSU. At the beginning of the upgrade process, NSSU uses **rcp** to copy the new software from the primary switch to each of the member switches. Starting in Junos OS Release 14.1X53-D40, to minimize the time to copy the files to all members, NSSU uses parallel **rcp** sessions to copy the software to multiple members at the same time, rather than copying sequentially to each member in turn.

By default, the number of parallel **rcp** sessions that NSSU launches at a time follows an algorithm that optimizes the transfer time based on the total number of members in the Virtual Chassis or VCF, so that the new software is transferred to about half the members in parallel up to a maximum of 8 members at one time. After the first set of parallel copy operations are complete, NSSU launches the next set of parallel copy operations, and so on as needed until all members are updated.

Although the default value is usually optimal, you can configure the **rcp-count** statement to set a specific value for the number of parallel copy sessions instead. For example, you might want to use a lower number of parallel sessions to avoid potential impact on Virtual Chassis or VCF forwarding activity during NSSU.

After copying the new software to all members using as many parallel **rcp** sessions as needed, the NSSU process continues by rebooting each member with the new software in sequence, starting with the member in the backup Routing Engine role.

**NOTE:** If copying the new software to any member fails, NSSU terminates the upgrade process for the entire Virtual Chassis or VCF, logs the error condition, and initiates an error recovery measure to remove the new software from the members to which it was already transferred.

## Options

**number** Number of parallel **rcp** sessions for NSSU to launch at a time, which overrides the default algorithm.

Allowable values are 0 through 8. Specifying a value of 0 suppresses parallel copy sessions; the new software is copied to each member sequentially.

## Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

### RELATED DOCUMENTATION

[Understanding Nonstop Software Upgrade on a Virtual Chassis and Mixed Virtual Chassis](#) | 77

[Understanding Nonstop Software Upgrade on a Virtual Chassis Fabric](#)

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

## Unresolved topicref

---

### SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.





# Operational Commands

---

Unresolved topicref	107
Unresolved topicref	107
Unresolved topicref	107
Unresolved topicref	108
Unresolved topicref	108
Unresolved topicref	108
Unresolved topicref	109
request virtual-chassis vc-port diagnostics optics	109
Unresolved topicref	111
Unresolved topicref	111
Unresolved topicref	111
Unresolved topicref	112
Unresolved topicref	112
Unresolved topicref	112
Unresolved topicref	113
Unresolved topicref	113
Unresolved topicref	113
Unresolved topicref	114
Unresolved topicref	114
Unresolved topicref	114

[Unresolved topicref | 115](#)

[show virtual-chassis vc-port diagnostics optics | 115](#)

[Unresolved topicref | 137](#)

---

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

## SUMMARY

Unresolved topicref placeholder.

This is a placeholder for unresolved topicref links.

## request virtual-chassis vc-port diagnostics optics

### IN THIS SECTION

- [Syntax | 109](#)
- [Release Information | 109](#)
- [Description | 110](#)
- [Required Privilege Level | 110](#)
- [Sample Output | 110](#)

## Syntax

```
request virtual-chassis vc-port diagnostics optics
```

## Release Information

Command introduced in Junos OS Release 13.2X50-D10.

## Description

Run a digital optical monitoring (DOM) scan on the optical ports configured as Virtual Chassis ports (VCPs).

Enter the **show virtual-chassis vc-port diagnostics optics** command to view the results of the diagnostic scan.

On certain EX Series switches, you must enter the **request virtual-chassis vc-port diagnostics optics** command to run a diagnostic scan before you can gather the **show virtual-chassis vc-port diagnostics optics** output.

## Required Privilege Level

system-control

## Sample Output

**request virtual-chassis vc-port diagnostics optics**

```
user@switch> request virtual-chassis vc-port diagnostics
optics
fpc0:
-----
vc-port Diagnostics Optics Done
```

## RELATED DOCUMENTATION

[show virtual-chassis vc-port diagnostics optics](#) | 115

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.



# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# Unresolved topicref

## SUMMARY

Unresolved topicref placeholder.

This is a placeholder for unresolved topicref links.

## show virtual-chassis vc-port diagnostics optics

### IN THIS SECTION

- [Syntax | 115](#)
- [Release Information | 116](#)
- [Description | 116](#)
- [Options | 116](#)
- [Required Privilege Level | 117](#)
- [Output Fields | 117](#)
- [Sample Output | 121](#)

## Syntax

```
show virtual-chassis vc-port diagnostics optics  
<all-members | local | member member-id>  
<interface-name>
```

## Release Information

Command introduced in Junos OS Release 12.2.

## Description

Display diagnostics data and alarms for Ethernet optical transceivers installed in ports configured as Virtual Chassis Ports (VCPs) in an EX Series switches. The information provided by this command is known as digital optical monitoring (DOM) information.

Thresholds that trigger a high alarm, low alarm, high warning, or low warning are set by the transponder vendors. Generally, a high alarm or low alarm indicates that a transceiver is not operating properly. DOM information can be used to diagnose why a transceiver is not working.

On some EX Series switches, the **request virtual-chassis vc-port diagnostics optics** command must be entered to run a diagnostic scan before you can gather the **show virtual-chassis vc-port diagnostics optics** output.

## Options

<b>none</b>	Display diagnostics information for transceivers installed in VCPs of all members of a Virtual Chassis or VCF.
<b>all-members</b>	(Optional) Display diagnostics information for transceivers installed in VCPs of all members of a Virtual Chassis or VCF.
<b><i>interface-name</i></b>	(Optional) Display diagnostics information for the transceiver installed in a specified VCP.
<b>local</b>	(Optional) Display diagnostics information for transceivers installed in VCPs on the switch or external Routing Engine where you enter this command.
<b>member</b> <b><i>member-id</i></b>	(Optional) Display diagnostics information for transceivers installed in VCPs on a specified member of a Virtual Chassis or VCF.

## Required Privilege Level

view

## Output Fields

[Table 1 on page 117](#) lists the output fields for the **show virtual-chassis vc-port diagnostics optics** command. Output fields are listed in the approximate order in which they appear.

**Table 1: show virtual-chassis vc-port diagnostics optics Output Fields**

Field Name	Field Description
FPC	Displays the FPC slot number.
Virtual chassis port	Displays the name of the VCP.
Laser bias current	Displays the magnitude of the laser bias power setting current, in milliamperes (mA). The laser bias provides direct modulation of laser diodes and modulates currents.
Laser output power	Displays the laser output power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).
Module temperature	Displays the temperature, in Celsius and Fahrenheit.
Module voltage	Displays the voltage, in Volts.
Receiver signal average optical power	Displays the receiver signal average optical power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).
Laser bias current high alarm	Displays whether the laser bias power setting high alarm is <i>On</i> or <i>Off</i> .

Table 1: show virtual-chassis vc-port diagnostics optics Output Fields (Continued)

Field Name	Field Description
Laser bias current low alarm	Displays whether the laser bias power setting low alarm is <i>On</i> or <i>Off</i> .
Laser bias current high warning	Displays whether the laser bias power setting high warning is <i>On</i> or <i>Off</i> .
Laser bias current low warning	Displays whether the laser bias power setting low warning is <i>On</i> or <i>Off</i> .
Laser output power high alarm	Displays whether the laser output power high alarm is <i>On</i> or <i>Off</i> .
Laser output power low alarm	Displays whether the laser output power low alarm is <i>On</i> or <i>Off</i> .
Laser output power high warning	Displays whether the laser output power high warning is <i>On</i> or <i>Off</i> .
Laser output power low warning	Displays whether the laser output power low warning is <i>On</i> or <i>Off</i> .
Module temperature high alarm	Displays whether the module temperature high alarm is <i>On</i> or <i>Off</i> .
Module temperature low alarm	Displays whether the module temperature low alarm is <i>On</i> or <i>Off</i> .
Module temperature high warning	Displays whether the module temperature high warning is <i>On</i> or <i>Off</i> .
Module temperature low warning	Displays whether the module temperature low warning is <i>On</i> or <i>Off</i> .

Table 1: show virtual-chassis vc-port diagnostics optics Output Fields (Continued)

Field Name	Field Description
Module voltage high alarm	Displays whether the module voltage high alarm is <i>On</i> or <i>Off</i> .
Module voltage low alarm	Displays whether the module voltage low alarm is <i>On</i> or <i>Off</i> .
Module voltage high warning	Displays whether the module voltage high warning is <i>On</i> or <i>Off</i> .
Module voltage low warning	Displays whether the module voltage low warning is <i>On</i> or <i>Off</i> .
Laser rx power high alarm	Displays whether the receive laser power high alarm is <i>On</i> or <i>Off</i> .
Laser rx power low alarm	Displays whether the receive laser power low alarm is <i>On</i> or <i>Off</i> .
Laser rx power high warning	Displays whether the receive laser power high warning is <i>On</i> or <i>Off</i> .
Laser rx power low warning	Displays whether the receive laser power low warning is <i>On</i> or <i>Off</i> .
Laser bias current high alarm threshold	Displays the vendor-specified threshold for the laser bias current high alarm.
Laser bias current low alarm threshold	Displays the vendor-specified threshold for the laser bias current low alarm.
Laser bias current high warning threshold	Displays the vendor-specified threshold for the laser bias current high warning.
Laser bias current low warning threshold	Displays the vendor-specified threshold for the laser bias current low warning.

**Table 1: show virtual-chassis vc-port diagnostics optics Output Fields (Continued)**

Field Name	Field Description
Laser output power high alarm threshold	Displays the vendor-specified threshold for the laser output power high alarm.
Laser output power low alarm threshold	Displays the vendor-specified threshold for the laser output power low alarm.
Laser output power high warning threshold	Displays the vendor-specified threshold for the laser output power high warning.
Laser output power low warning threshold	Displays the vendor-specified threshold for the laser output power low warning.
Module temperature high alarm threshold	Displays the vendor-specified threshold for the module temperature high alarm.
Module temperature low alarm threshold	Displays the vendor-specified threshold for the module temperature low alarm.
Module temperature high warning threshold	Displays the vendor-specified threshold for the module temperature high warning.
Module temperature low warning threshold	Displays the vendor-specified threshold for the module temperature low warning.
Module voltage high alarm threshold	Displays the vendor-specified threshold for the module voltage high alarm.
Module voltage low alarm threshold	Displays the vendor-specified threshold for the module voltage low alarm.



**Table 1: show virtual-chassis vc-port diagnostics optics Output Fields (Continued)**

Field Name	Field Description
Module voltage high warning threshold	Displays the vendor-specified threshold for the module voltage high warning.
Module voltage low warning threshold	Displays the vendor-specified threshold for the module voltage low warning.
Laser rx power high alarm threshold	Displays the vendor-specified threshold for the laser rx power high alarm.
Laser rx power low alarm threshold	Displays the vendor-specified threshold for the laser rx power low alarm.
Laser rx power high warning threshold	Displays the vendor-specified threshold for the laser rx power high warning.
Laser rx power low warning threshold	Displays the vendor-specified threshold for the laser rx power low warning.

## Sample Output

### show virtual-chassis vc-port diagnostics optics

```

user@switch> show virtual-chassis vc-port diagnostics
optics
fpc0:
-----
Virtual chassis port: vcp-0
    Optical diagnostics                : N/A
Virtual chassis port: vcp-1
    Optical diagnostics                : N/A

```

fpc1:

-----  
Virtual chassis port: vcp-0

Optical diagnostics : N/A

Virtual chassis port: vcp-1

Optical diagnostics : N/A

fpc2:

-----  
Virtual chassis port: vcp-2/0

Optical diagnostics : N/A

Virtual chassis port: vcp-2/1

Optical diagnostics : N/A

Virtual chassis port: vcp-255/0/14

Optical diagnostics : N/A

Virtual chassis port: vcp-255/0/15

Optical diagnostics : N/A

Virtual chassis port: vcp-255/0/24

Laser bias current : 4.130 mA

Laser output power : 0.2450 mW / -6.11 dBm

Module temperature : 32 degrees C / 90 degrees F

Module voltage : 3.3530 V

Receiver signal average optical power : 0.0971 mW / -10.13 dBm

Laser bias current high alarm : Off

Laser bias current low alarm : Off

Laser bias current high warning : Off

Laser bias current low warning : Off

Laser output power high alarm : Off

Laser output power low alarm : Off

Laser output power high warning : Off

Laser output power low warning : Off

Module temperature high alarm : Off

Module temperature low alarm : Off

Module temperature high warning : Off

Module temperature low warning : Off

Module voltage high alarm : Off

Module voltage low alarm : Off

Module voltage high warning : Off

Module voltage low warning : Off

Laser rx power high alarm : Off

Laser rx power low alarm : Off

Laser rx power high warning : Off

Laser rx power low warning : Off

```

Laser bias current high alarm threshold : 14.998 mA
Laser bias current low alarm threshold  : 0.998 mA
Laser bias current high warning threshold : 14.000 mA
Laser bias current low warning threshold : 1.198 mA
Laser output power high alarm threshold : 0.7940 mW / -1.00 dBm
Laser output power low alarm threshold  : 0.0790 mW / -11.02 dBm
Laser output power high warning threshold : 0.6300 mW / -2.01 dBm
Laser output power low warning threshold : 0.0990 mW / -10.04 dBm
Module temperature high alarm threshold : 85 degrees C / 185 degrees F
Module temperature low alarm threshold  : -10 degrees C / 14 degrees F
Module temperature high warning threshold : 80 degrees C / 176 degrees F
Module temperature low warning threshold : -5 degrees C / 23 degrees F
Module voltage high alarm threshold      : 3.600 V
Module voltage low alarm threshold       : 3.000 V
Module voltage high warning threshold    : 3.499 V
Module voltage low warning threshold     : 3.099 V
Laser rx power high alarm threshold      : 1.5848 mW / 2.00 dBm
Laser rx power low alarm threshold       : 0.0100 mW / -20.00 dBm
Laser rx power high warning threshold    : 1.2589 mW / 1.00 dBm
Laser rx power low warning threshold     : 0.0125 mW / -19.03 dBm
Virtual chassis port: vcp-255/0/3
Laser bias current                      : 5.428 mA
Laser output power                      : 0.4760 mW / -3.22 dBm
Module temperature                      : 28 degrees C / 83 degrees F
Module voltage                          : 3.3440 V
Receiver signal average optical power   : 0.4002 mW / -3.98 dBm
Laser bias current high alarm           : Off
Laser bias current low alarm             : Off
Laser bias current high warning          : Off
Laser bias current low warning           : Off
Laser output power high alarm            : Off
Laser output power low alarm             : Off
Laser output power high warning          : Off
Laser output power low warning           : Off
Module temperature high alarm            : Off
Module temperature low alarm             : Off
Module temperature high warning          : Off
Module temperature low warning           : Off
Module voltage high alarm                : Off
Module voltage low alarm                 : Off
Module voltage high warning              : Off
Module voltage low warning               : Off
Laser rx power high alarm                : Off

```

```

Laser rx power low alarm           : Off
Laser rx power high warning        : Off
Laser rx power low warning         : Off
Laser bias current high alarm threshold : 10.500 mA
Laser bias current low alarm threshold : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold : 3.630 V
Module voltage low alarm threshold : 2.970 V
Module voltage high warning threshold : 3.465 V
Module voltage low warning threshold : 3.135 V
Laser rx power high alarm threshold : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold : 0.1023 mW / -9.90 dBm

```

fpc3:

-----  
Virtual chassis port: vcp-255/0/2

```

Laser bias current           : 7.876 mA
Laser output power          : 0.5330 mW / -2.73 dBm
Module temperature           : 26 degrees C / 78 degrees F
Module voltage               : 3.3060 V
Receiver signal average optical power : 0.4885 mW / -3.11 dBm
Laser bias current high alarm : Off
Laser bias current low alarm  : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm  : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm : Off
Module temperature low alarm  : Off
Module temperature high warning : Off

```

```

Module temperature low warning      : Off
Module voltage high alarm           : Off
Module voltage low alarm            : Off
Module voltage high warning         : Off
Module voltage low warning          : Off
Laser rx power high alarm           : Off
Laser rx power low alarm            : Off
Laser rx power high warning         : Off
Laser rx power low warning          : Off
Laser bias current high alarm threshold : 14.500 mA
Laser bias current low alarm threshold : 3.500 mA
Laser bias current high warning threshold : 14.500 mA
Laser bias current low warning threshold : 3.500 mA
Laser output power high alarm threshold : 1.8620 mW / 2.70 dBm
Laser output power low alarm threshold : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7410 mW / -1.30 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold : 3.630 V
Module voltage low alarm threshold : 2.970 V
Module voltage high warning threshold : 3.465 V
Module voltage low warning threshold : 3.135 V
Laser rx power high alarm threshold : 1.9952 mW / 3.00 dBm
Laser rx power low alarm threshold : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold : 0.1023 mW / -9.90 dBm
Virtual chassis port: vcp-255/0/3
Laser bias current                  : 5.052 mA
Laser output power                  : 0.5030 mW / -2.98 dBm
Module temperature                  : 24 degrees C / 75 degrees F
Module voltage                      : 3.2890 V
Receiver signal average optical power : 0.5028 mW / -2.99 dBm
Laser bias current high alarm       : Off
Laser bias current low alarm        : Off
Laser bias current high warning     : Off
Laser bias current low warning      : Off
Laser output power high alarm       : Off
Laser output power low alarm        : Off
Laser output power high warning     : Off
Laser output power low warning      : Off

```

```

Module temperature high alarm      : Off
Module temperature low alarm       : Off
Module temperature high warning    : Off
Module temperature low warning     : Off
Module voltage high alarm          : Off
Module voltage low alarm           : Off
Module voltage high warning        : Off
Module voltage low warning         : Off
Laser rx power high alarm          : Off
Laser rx power low alarm           : Off
Laser rx power high warning        : Off
Laser rx power low warning         : Off
Laser bias current high alarm threshold : 10.500 mA
Laser bias current low alarm threshold : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold : 3.630 V
Module voltage low alarm threshold : 2.970 V
Module voltage high warning threshold : 3.465 V
Module voltage low warning threshold : 3.135 V
Laser rx power high alarm threshold : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold : 0.1023 mW / -9.90 dBm
Virtual chassis port: vcp-255/0/4
Laser bias current                  : 7.978 mA
Laser output power                  : 0.5460 mW / -2.63 dBm
Module temperature                  : 24 degrees C / 76 degrees F
Module voltage                      : 3.3060 V
Receiver signal average optical power : 0.6305 mW / -2.00 dBm
Laser bias current high alarm       : Off
Laser bias current low alarm        : Off
Laser bias current high warning     : Off
Laser bias current low warning      : Off
Laser output power high alarm       : Off

```

```

Laser output power low alarm           : Off
Laser output power high warning        : Off
Laser output power low warning         : Off
Module temperature high alarm          : Off
Module temperature low alarm           : Off
Module temperature high warning        : Off
Module temperature low warning         : Off
Module voltage high alarm              : Off
Module voltage low alarm               : Off
Module voltage high warning            : Off
Module voltage low warning             : Off
Laser rx power high alarm              : Off
Laser rx power low alarm               : Off
Laser rx power high warning            : Off
Laser rx power low warning             : Off
Laser bias current high alarm threshold : 14.500 mA
Laser bias current low alarm threshold : 3.500 mA
Laser bias current high warning threshold : 14.500 mA
Laser bias current low warning threshold : 3.500 mA
Laser output power high alarm threshold : 1.8620 mW / 2.70 dBm
Laser output power low alarm threshold : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7410 mW / -1.30 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold     : 3.630 V
Module voltage low alarm threshold      : 2.970 V
Module voltage high warning threshold   : 3.465 V
Module voltage low warning threshold     : 3.135 V
Laser rx power high alarm threshold     : 1.9952 mW / 3.00 dBm
Laser rx power low alarm threshold      : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold   : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold     : 0.1023 mW / -9.90 dBm

```

fpc4:

```

-----
Virtual chassis port: vcp-0
    Optical diagnostics           : N/A
Virtual chassis port: vcp-1
    Optical diagnostics           : N/A
Virtual chassis port: vcp-255/0/4
    Laser bias current            : 7.860 mA

```

```

Laser output power           : 0.5370 mW / -2.70 dBm
Module temperature           : 24 degrees C / 75 degrees F
Module voltage                : 3.2920 V
Receiver signal average optical power : 0.6271 mW / -2.03 dBm
Laser bias current high alarm : Off
Laser bias current low alarm  : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm  : Off
Laser output power low alarm   : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm  : Off
Module temperature low alarm   : Off
Module temperature high warning : Off
Module temperature low warning : Off
Module voltage high alarm      : Off
Module voltage low alarm       : Off
Module voltage high warning    : Off
Module voltage low warning     : Off
Laser rx power high alarm      : Off
Laser rx power low alarm       : Off
Laser rx power high warning    : Off
Laser rx power low warning     : Off
Laser bias current high alarm threshold : 14.500 mA
Laser bias current low alarm threshold  : 3.500 mA
Laser bias current high warning threshold : 14.500 mA
Laser bias current low warning threshold  : 3.500 mA
Laser output power high alarm threshold : 1.8620 mW / 2.70 dBm
Laser output power low alarm threshold  : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7410 mW / -1.30 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold  : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold     : 3.630 V
Module voltage low alarm threshold      : 2.970 V
Module voltage high warning threshold   : 3.465 V
Module voltage low warning threshold    : 3.135 V
Laser rx power high alarm threshold     : 1.9952 mW / 3.00 dBm
Laser rx power low alarm threshold      : 0.0407 mW / -13.90 dBm

```



```

Laser rx power high warning threshold      : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold       : 0.1023 mW / -9.90 dBm

```

### show virtual-chassis vc-port diagnostics optics (interface-name)

```

user@external-routing-engine> show virtual-chassis
vc-port diagnostics optics vcp-255/0/3
fpc0:
-----

fpc1:
-----

fpc2:
-----
Virtual chassis port: vcp-255/0/3
Laser bias current           : 5.448 mA
Laser output power           : 0.4770 mW / -3.21 dBm
Module temperature           : 28 degrees C / 82 degrees F
Module voltage                : 3.3450 V
Receiver signal average optical power : 0.3973 mW / -4.01 dBm
Laser bias current high alarm : Off
Laser bias current low alarm  : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm  : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm : Off
Module temperature low alarm  : Off
Module temperature high warning : Off
Module temperature low warning : Off
Module voltage high alarm     : Off
Module voltage low alarm      : Off
Module voltage high warning   : Off
Module voltage low warning    : Off
Laser rx power high alarm     : Off
Laser rx power low alarm      : Off
Laser rx power high warning   : Off
Laser rx power low warning    : Off

```

```

Laser bias current high alarm threshold : 10.500 mA
Laser bias current low alarm threshold  : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold  : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold   : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold  : 75 degrees C / 167 degrees F
Module temperature low alarm threshold    : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold  : 0 degrees C / 32 degrees F
Module voltage high alarm threshold       : 3.630 V
Module voltage low alarm threshold        : 2.970 V
Module voltage high warning threshold     : 3.465 V
Module voltage low warning threshold      : 3.135 V
Laser rx power high alarm threshold       : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold        : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold     : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold      : 0.1023 mW / -9.90 dBm

```

fpc3:

-----  
Virtual chassis port: vcp-255/0/3

```

Laser bias current           : 5.040 mA
Laser output power           : 0.5020 mW / -2.99 dBm
Module temperature           : 24 degrees C / 74 degrees F
Module voltage                : 3.2870 V
Receiver signal average optical power : 0.5073 mW / -2.95 dBm
Laser bias current high alarm : Off
Laser bias current low alarm  : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm  : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm : Off
Module temperature low alarm  : Off
Module temperature high warning : Off
Module temperature low warning : Off
Module voltage high alarm     : Off
Module voltage low alarm      : Off

```

```

Module voltage high warning          : Off
Module voltage low warning           : Off
Laser rx power high alarm            : Off
Laser rx power low alarm             : Off
Laser rx power high warning          : Off
Laser rx power low warning           : Off
Laser bias current high alarm threshold : 10.500 mA
Laser bias current low alarm threshold : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold    : 3.630 V
Module voltage low alarm threshold     : 2.970 V
Module voltage high warning threshold  : 3.465 V
Module voltage low warning threshold   : 3.135 V
Laser rx power high alarm threshold    : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold     : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold  : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold   : 0.1023 mW / -9.90 dBm

fpc4:
-----

```

### show virtual-chassis vc-port diagnostics optics local

```

user@switch> show virtual-chassis vc-port diagnostics
optics local
Virtual chassis port: vcp-2/0
    Optical diagnostics          : N/A
Virtual chassis port: vcp-2/1
    Optical diagnostics          : N/A
Virtual chassis port: vcp-255/0/14
    Optical diagnostics          : N/A
Virtual chassis port: vcp-255/0/15

```

```

Optical diagnostics : N/A
Virtual chassis port: vcp-255/0/24
Laser bias current : 4.130 mA
Laser output power : 0.2450 mW / -6.11 dBm
Module temperature : 32 degrees C / 90 degrees F
Module voltage : 3.3530 V
Receiver signal average optical power : 0.0961 mW / -10.17 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm : Off
Module temperature low alarm : Off
Module temperature high warning : Off
Module temperature low warning : Off
Module voltage high alarm : Off
Module voltage low alarm : Off
Module voltage high warning : Off
Module voltage low warning : Off
Laser rx power high alarm : Off
Laser rx power low alarm : Off
Laser rx power high warning : Off
Laser rx power low warning : Off
Laser bias current high alarm threshold : 14.998 mA
Laser bias current low alarm threshold : 0.998 mA
Laser bias current high warning threshold : 14.000 mA
Laser bias current low warning threshold : 1.198 mA
Laser output power high alarm threshold : 0.7940 mW / -1.00 dBm
Laser output power low alarm threshold : 0.0790 mW / -11.02 dBm
Laser output power high warning threshold : 0.6300 mW / -2.01 dBm
Laser output power low warning threshold : 0.0990 mW / -10.04 dBm
Module temperature high alarm threshold : 85 degrees C / 185 degrees F
Module temperature low alarm threshold : -10 degrees C / 14 degrees F
Module temperature high warning threshold : 80 degrees C / 176 degrees F
Module temperature low warning threshold : -5 degrees C / 23 degrees F
Module voltage high alarm threshold : 3.600 V
Module voltage low alarm threshold : 3.000 V
Module voltage high warning threshold : 3.499 V
Module voltage low warning threshold : 3.099 V

```

```

Laser rx power high alarm threshold      : 1.5848 mW / 2.00 dBm
Laser rx power low alarm threshold       : 0.0100 mW / -20.00 dBm
Laser rx power high warning threshold    : 1.2589 mW / 1.00 dBm
Laser rx power low warning threshold     : 0.0125 mW / -19.03 dBm
Virtual chassis port: vcp-255/0/3
Laser bias current                       : 5.426 mA
Laser output power                       : 0.4760 mW / -3.22 dBm
Module temperature                       : 28 degrees C / 83 degrees F
Module voltage                           : 3.3450 V
Receiver signal average optical power    : 0.3955 mW / -4.03 dBm
Laser bias current high alarm            : Off
Laser bias current low alarm             : Off
Laser bias current high warning          : Off
Laser bias current low warning           : Off
Laser output power high alarm            : Off
Laser output power low alarm             : Off
Laser output power high warning          : Off
Laser output power low warning           : Off
Module temperature high alarm            : Off
Module temperature low alarm             : Off
Module temperature high warning          : Off
Module temperature low warning           : Off
Module voltage high alarm                : Off
Module voltage low alarm                 : Off
Module voltage high warning              : Off
Module voltage low warning               : Off
Laser rx power high alarm                : Off
Laser rx power low alarm                 : Off
Laser rx power high warning              : Off
Laser rx power low warning               : Off
Laser bias current high alarm threshold  : 10.500 mA
Laser bias current low alarm threshold   : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold  : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold   : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold  : 75 degrees C / 167 degrees F
Module temperature low alarm threshold   : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold       : 3.630 V

```

```

Module voltage low alarm threshold      : 2.970 V
Module voltage high warning threshold   : 3.465 V
Module voltage low warning threshold    : 3.135 V
Laser rx power high alarm threshold     : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold      : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold   : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold    : 0.1023 mW / -9.90 dBm

```

### show virtual-chassis vc-port diagnostics (member member-id)

```

user@switch> show virtual-chassis vc-port diagnostics
optics member 2
fpc2:
-----
Virtual chassis port: vcp-2/0
    Optical diagnostics                : N/A
Virtual chassis port: vcp-2/1
    Optical diagnostics                : N/A
Virtual chassis port: vcp-255/0/14
    Optical diagnostics                : N/A
Virtual chassis port: vcp-255/0/15
    Optical diagnostics                : N/A
Virtual chassis port: vcp-255/0/24
    Laser bias current                 : 4.130 mA
    Laser output power                 : 0.2450 mW / -6.11 dBm
    Module temperature                 : 31 degrees C / 88 degrees F
    Module voltage                     : 3.3530 V
    Receiver signal average optical power : 0.0961 mW / -10.17 dBm
    Laser bias current high alarm      : Off
    Laser bias current low alarm       : Off
    Laser bias current high warning    : Off
    Laser bias current low warning     : Off
    Laser output power high alarm      : Off
    Laser output power low alarm       : Off
    Laser output power high warning    : Off
    Laser output power low warning     : Off
    Module temperature high alarm      : Off
    Module temperature low alarm       : Off
    Module temperature high warning    : Off
    Module temperature low warning     : Off

```

```

Module voltage high alarm           : Off
Module voltage low alarm            : Off
Module voltage high warning         : Off
Module voltage low warning          : Off
Laser rx power high alarm           : Off
Laser rx power low alarm            : Off
Laser rx power high warning         : Off
Laser rx power low warning          : Off
Laser bias current high alarm threshold : 14.998 mA
Laser bias current low alarm threshold : 0.998 mA
Laser bias current high warning threshold : 14.000 mA
Laser bias current low warning threshold : 1.198 mA
Laser output power high alarm threshold : 0.7940 mW / -1.00 dBm
Laser output power low alarm threshold : 0.0790 mW / -11.02 dBm
Laser output power high warning threshold : 0.6300 mW / -2.01 dBm
Laser output power low warning threshold : 0.0990 mW / -10.04 dBm
Module temperature high alarm threshold : 85 degrees C / 185 degrees F
Module temperature low alarm threshold : -10 degrees C / 14 degrees F
Module temperature high warning threshold : 80 degrees C / 176 degrees F
Module temperature low warning threshold : -5 degrees C / 23 degrees F
Module voltage high alarm threshold : 3.600 V
Module voltage low alarm threshold : 3.000 V
Module voltage high warning threshold : 3.499 V
Module voltage low warning threshold : 3.099 V
Laser rx power high alarm threshold : 1.5848 mW / 2.00 dBm
Laser rx power low alarm threshold : 0.0100 mW / -20.00 dBm
Laser rx power high warning threshold : 1.2589 mW / 1.00 dBm
Laser rx power low warning threshold : 0.0125 mW / -19.03 dBm
Virtual chassis port: vcp-255/0/3
Laser bias current           : 5.418 mA
Laser output power           : 0.4770 mW / -3.21 dBm
Module temperature           : 28 degrees C / 83 degrees F
Module voltage               : 3.3450 V
Receiver signal average optical power : 0.3964 mW / -4.02 dBm
Laser bias current high alarm : Off
Laser bias current low alarm  : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm  : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm : Off

```

```

Module temperature low alarm           : Off
Module temperature high warning        : Off
Module temperature low warning         : Off
Module voltage high alarm              : Off
Module voltage low alarm               : Off
Module voltage high warning            : Off
Module voltage low warning             : Off
Laser rx power high alarm              : Off
Laser rx power low alarm               : Off
Laser rx power high warning            : Off
Laser rx power low warning             : Off
Laser bias current high alarm threshold : 10.500 mA
Laser bias current low alarm threshold : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Module voltage high alarm threshold     : 3.630 V
Module voltage low alarm threshold      : 2.970 V
Module voltage high warning threshold   : 3.465 V
Module voltage low warning threshold    : 3.135 V
Laser rx power high alarm threshold     : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold      : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold   : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold    : 0.1023 mW / -9.90 dBm

```

## RELATED DOCUMENTATION

*Install a Transceiver*

*Remove a Transceiver*

[Junos OS Ethernet Interfaces Configuration Guide](#)



# Unresolved topicref

---

## SUMMARY

Unresolved topicref placeholder.

---

This is a placeholder for unresolved topicref links.

# 7

CHAPTER

## Knowledge Base

---

---

