

Network Configuration Example

MetaFabric™ Architecture 1.1: Configuring Virtual Chassis Fabric and Network Director 1.6



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Network Configuration Example MetaFabric Architecture 1.1: Configuring Virtual Chassis Fabric and Network Director 1.6

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About This Network Configuration Example

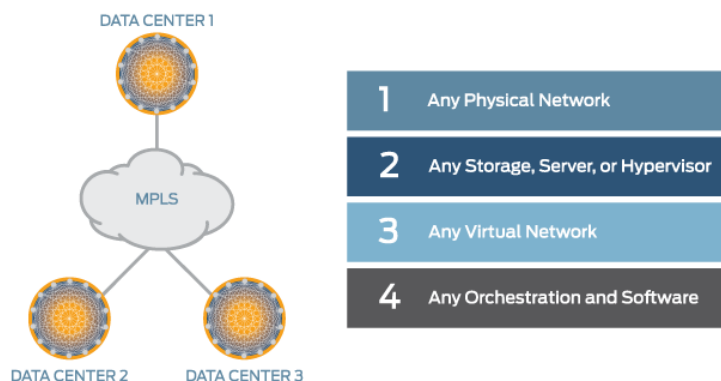
This network configuration example provides an overview of MetaFabric Architecture 1.1, offers configurations for Virtual Chassis Fabric (VCF) and Network Director 1.6, and illustrates a sample use case showing how these technologies support virtual machines, VM movement, and applications in a data center network.

Understanding MetaFabric 1.1 Architecture Benefits

The growing popularity and adoption of switching fabrics, new protocols, automation, orchestration, security technologies, and software-defined networks (SDNs) are strong indicators of the need for a more agile network in the data center. Juniper Networks has applied its networking expertise to the problems of today's data centers to develop and deliver the Juniper Networks® MetaFabric™ architecture—a combination of switching, routing, security, software, orchestration, and SDN—all working in conjunction with an open technology ecosystem to accelerate the deployment and delivery of applications for enterprises and service providers.

The goal of the MetaFabric architecture is to allow you to connect any physical network, with any combination of storage, servers, or hypervisors, to any virtual network, and with any orchestration software ([Figure 1 on page 1](#)). Such an open ecosystem ensures that you can add new equipment, features, and technologies over time to take advantage of the latest trends as they emerge.

Figure 1: MetaFabric – Putting It All Together



The MetaFabric Architecture 1.1 virtualized IT data center solution described in this network configuration example is a variation of the original solution described in the [MetaFabric™ Architecture Virtualized Data Center Design and Implementation Guide](#). Most of the architecture remains the same for the compute, storage, business-critical applications, high availability, class of service, security, and network management components. The main changes in the MetaFabric Architecture 1.1 include:

- **Virtual Chassis Fabric (VCF)**—The VCF replaces the QFabric™ systems and EX9200 core switches found in the original MetaFabric Architecture 1.0 solution and provides a smaller scale network option for medium-sized data centers.

- **Network Director 1.6**—This version of the popular network management tool enables you to autoprovision a VCF and perform orchestration services that allow seamless VM movement and sustained application performance.

When used in conjunction with the original [MetaFabric™ Architecture Virtualized Data Center Design and Implementation Guide](#), the examples that follow offer another way for you to implement the MetaFabric architecture by empowering you to design and build a resilient, secure, and scalable virtualized IT data center.

**Related
Documentation**

- [Example: Configuring a Virtual Chassis Fabric for MetaFabric Architecture 1.1 on page 2](#)
- [Example: Configuring Network Director 1.6 for MetaFabric Architecture 1.1 on page 50](#)

Example: Configuring a Virtual Chassis Fabric for MetaFabric Architecture 1.1

This example shows how to configure a mixed-mode Virtual Chassis Fabric (VCF) for MetaFabric Architecture 1.1. For more details on the MetaFabric architecture, see the [MetaFabric™ Architecture Virtualized Data Center Design and Implementation Guide](#).

- [Requirements on page 2](#)
- [Overview and Topology on page 2](#)
- [Configuring a Virtual Chassis Fabric for MetaFabric Architecture 1.1 on page 3](#)
- [Verification on page 35](#)

Requirements

This example uses the following hardware and software components:

- Four QFX5100-24Q switches used as the spine layer in the mixed-mode VCF
- Two QFX5100-24Q switches used in the leaf layer in the mixed-mode VCF
- Four QFX5100-48S switches used in the leaf layer in the mixed-mode VCF
- Two EX4300 switches used in the leaf layer in the mixed-mode VCF
- Junos OS Release 13.2X51-D25 or later for all EX Series and QFX Series switches in the mixed-mode VCF
- Network Director 1.6 for VCF orchestration

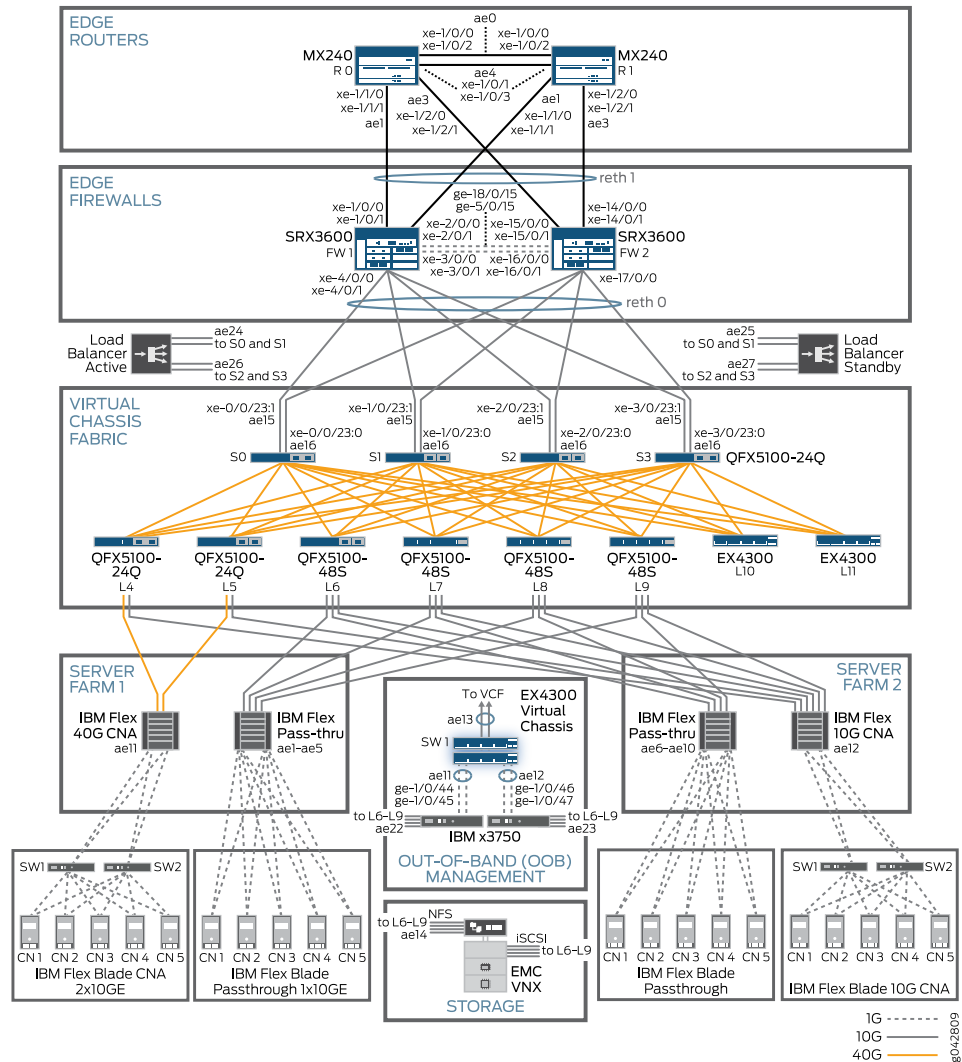
Overview and Topology

MetaFabric Architecture 1.1 continues to provide the proper foundation for a virtualized environment that supports virtual machine movement (VMware), robust application hosting (IBM), load balancing (F5), storage (EMC), and security (Firefly Host and SRX3600 devices). However, this evolved architecture now introduces a Virtual Chassis Fabric (VCF) as a next-generation fabric technology and Network Director 1.6 for orchestration and dynamic configuration.

In this example, a mixed-mode VCF replaces the EX9200 core switches and QFabric systems seen in the original MetaFabric Architecture 1.0 solution. As a result, the VCF

connects directly to servers, storage, and load balancers on the access side (also known as the *leaf layer* in a VCF), and SRX security devices on the core network side (also known as the *spine layer* in a VCF). [Figure 2 on page 3](#) shows the topology used in this example.

Figure 2: MetaFabric Architecture 1.1 - Topology Diagram

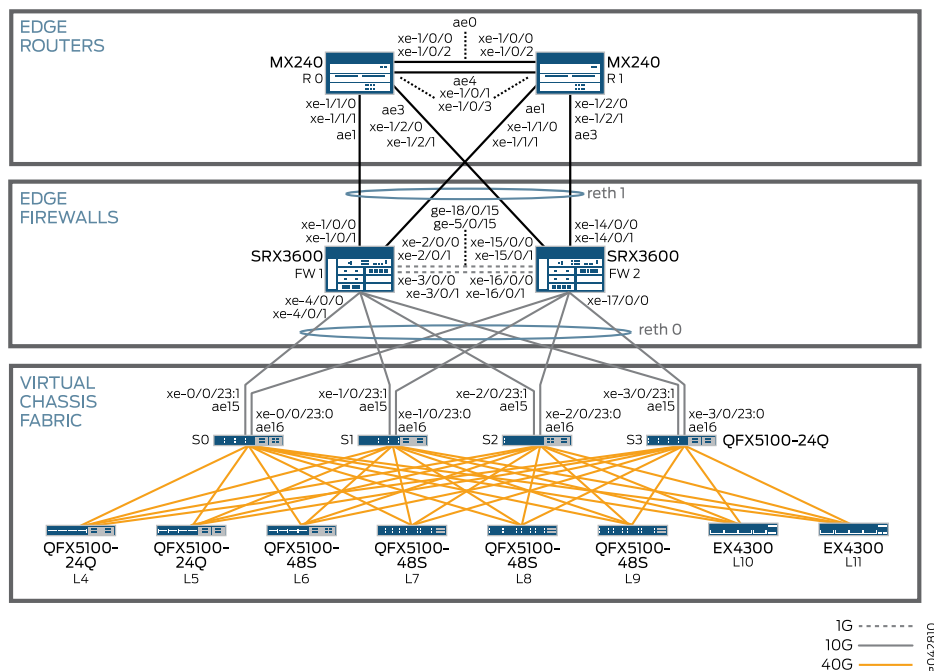


The VCF used in this example is a mixed-mode fabric that implements four QFX5100-24Q switches in the spine layer. The leaf layer uses two QFX5100-24Q switches, four QFX5100-48S switches, and two EX4300 switches for a total of eight leaf layer devices. All server and storage destinations are a maximum of two hops from each other to keep latency to a minimum and application performance to a maximum.

Configuring a Virtual Chassis Fabric for MetaFabric Architecture 1.1

In [Figure 3 on page 4](#), you can see that the focus of this configuration example is the VCF, and how it connects to the SRX Series edge firewall cluster which in turn connects to the MX Series edge routers.

Figure 3: MetaFabric Architecture 1.1 - VCF, SRX Series Cluster, and MX Series Edge Routers



This example explains how to configure a preprovisioned VCF to support the MetaFabric Architecture 1.1 solution. It includes the following sections:

- [Gathering Information for All Devices in the Virtual Chassis Fabric on page 5](#)
- [Converting Each Device to Participate in the Virtual Chassis Fabric on page 6](#)
- [Configuring Preprovisioning for the Virtual Chassis Fabric on page 8](#)
- [Configuring a Virtual Management Ethernet \(VME\) Interface on page 10](#)
- [Connecting the VCF Devices Together on page 10](#)
- [Installing VCF Software Licenses on page 13](#)
- [Configuring Gigabit Ethernet and 10-Gigabit Ethernet Interfaces for the VCF on page 14](#)
- [Configuring Aggregated Ethernet Interfaces for the VCF on page 16](#)
- [Configuring Integrated Routing and Bridging \(IRB\) Interfaces for the VCF on page 26](#)
- [Configuring VLANs for the VCF on page 29](#)
- [Configuring OSPF and LLDP for the VCF on page 32](#)

Gathering Information for All Devices in the Virtual Chassis Fabric

Step-by-Step Procedure Before configuring the VCF, make a list of all devices that you plan to include in the fabric, write down the serial number for each device, and determine what role each device will play in the VCF (either *Routing Engine* [spine] or *linecard* [leaf]). You will use this information when you configure a preprovisioned VCF.

1. To discover the serial number for each device, issue the **show chassis hardware** command on each device:

Look for the **Chassis** listing in the **Item** column and scan the row for the corresponding **Serial number** output. In this example, the serial number for the VCF master spine member 0 is **TB3714010375**.

```
user@device> show chassis hardware
Hardware inventory:
Item              Version  Part number  Serial number  Description
Chassis           TB3714010375
Routing Engine 0   BUILTIN    BUILTIN       QFX Routing Engine
Routing Engine 3   BUILTIN    BUILTIN       QFX Routing Engine
FPC 0             REV 11     650-049942    TB3714010375   QFX5100-24Q-2P
  CPU             BUILTIN    BUILTIN       FPC CPU
  PIC 0           BUILTIN    BUILTIN       24x 40G-QSFP
    Xcvr 0         REV 01     740-032986    QD420838       QSFP+-40G-SR4
    Xcvr 1         REV 01     740-032986    QD410187       QSFP+-40G-SR4
    Xcvr 2         REV 01     740-032986    QC260513       QSFP+-40G-SR4
    Xcvr 3         REV 01     740-032986    QD410493       QSFP+-40G-SR4
    Xcvr 4         REV 01     740-032986    QD410137       QSFP+-40G-SR4
    Xcvr 5         REV 01     740-032986    QA360120       QSFP+-40G-SR4
    Xcvr 6         REV 01     740-032986    QD420199       QSFP+-40G-SR4
    Xcvr 7         REV 01     740-032986    QD410181       QSFP+-40G-SR4
    Xcvr 10        REV 01     740-032986    QA360129       QSFP+-40G-SR4
    Xcvr 11        REV 01     740-032986    QB300944       QSFP+-40G-SR4
    Xcvr 18        REV 01     740-032986    QB160658       QSFP+-40G-SR4
    Xcvr 22        REV 01     740-032986    QC480862       QSFP+-40G-SR4
    Xcvr 23        REV 01     740-032986    QD410161       QSFP+-40G-SR4
  PIC 1           REV 03     611-049555    RR3713490066   QFX-EM-4Q
  PIC 2           REV 03     611-049555    RR3713490152   QFX-EM-4Q
  Power Supply 0   REV 03     740-041741    1GA23480401    JPSU-650W-AC-AFO
  Power Supply 1   REV 03     740-041741    1GA23480400    JPSU-650W-AC-AFO
Fan Tray 0       QFX5100 Fan Tray
0, Front to Back Airflow - AFO
Fan Tray 1       QFX5100 Fan Tray
1, Front to Back Airflow - AFO
Fan Tray 2       QFX5100 Fan Tray
2, Front to Back Airflow - AFO
Fan Tray 3       QFX5100 Fan Tray
3, Front to Back Airflow - AFO
Fan Tray 4       QFX5100 Fan Tray
4, Front to Back Airflow - AFO
```

2. To prepare to configure the VCF, create a device-to-serial-number table for your VCF devices:

The device-to-serial-number mapping table used in this example is shown in [Table 1 on page 6](#).

Table 1: VCF Devices for the MetaFabric Architecture 1.1 NCE

Device Name and Type	Serial Number	Role
S0 - QFX5100-24Q	TB3714010375	Routing Engine
S1 - QFX5100-24Q	TB3714010058	Routing Engine
S2 - QFX5100-24Q	TB3714010044	Routing Engine
S3 - QFX5100-24Q	TB3714010450	Routing Engine
L4 - QFX5100-24Q	TB3714010595	Linecard
L5 - QFX5100-24Q	TB3714010270	Linecard
L6 - QFX5100-48S	TA3714030625	Linecard
L7 - QFX5100-48S	TA3714030225	Linecard
L8 - QFX5100-48S	TA3714030519	Linecard
L9 - QFX5100-48S	TA3714030562	Linecard
L10 - EX4300	PG3714080066	Linecard
L11 - EX4300	PG3714080086	Linecard

Converting Each Device to Participate in the Virtual Chassis Fabric

Step-by-Step Procedure

To convert each device:

1. Power on your VCF devices in the following order to help establish the device roles:
 - a. Spine device you want to act in the master role
 - b. Spine device you want to act in the backup role
 - c. All remaining spine devices
 - d. All devices acting in the linecard role



NOTE: The spine device that has been powered on the longest assumes the master Routing Engine role; the spine device that has been powered on the second longest assumes the backup Routing Engine role. The remaining spine devices assume the linecard role.

2. Connect your laptop or management station to the console port of a device that you want to add to the VCF.

Use the same order as shown in Step 1 when configuring the devices.

3. On EX4300 switches only (L10 and L11), issue the **request virtual-chassis vc-port delete** command to disable the default VCP configuration on all built-in QSFP+ ports (ports et-0/1/0, et-0/1/1, et-0/1/2, and et-0/1/3).

This step enables the switch to join the VCF automatically when connected to other VCF members.

```
user@device> request virtual-chassis vc-port delete pic-slot 1 port 0
vc-port successfully deleted
```

```
user@device> request virtual-chassis vc-port delete pic-slot 1 port 1
vc-port successfully deleted
```

```
user@device> request virtual-chassis vc-port delete pic-slot 1 port 2
vc-port successfully deleted
```

```
user@device> request virtual-chassis vc-port delete pic-slot 1 port 3
vc-port successfully deleted
```

4. To verify the current mode of your device, issue the **show virtual-chassis mode** command. If the mode displays **Virtual Chassis with similar devices**, the device can participate in a legacy Virtual Chassis with other devices of the same type (such as an all-QFX5100 Virtual Chassis).

```
user@device> show virtual-chassis mode
fpc0:
```

```
-----
Current mode : Virtual Chassis with similar devices
Future mode after reboot : Virtual Chassis with similar devices
```

However, to enable the device to participate in the mixed-mode VCF shown in this example, you must convert the device in the next step.

5. Issue the **request virtual-chassis mode** command and include the **fabric** option (so the device can participate in a VCF), the **mixed** option (so the VCF can permit multiple device types, such as QFX5100, QFX3600, QFX3500, and EX4300 switches), and the **local** option (so the conversion can happen on the connected device).

You can also choose to reboot the device with the **reboot** option if you want to skip Step 6.

```
user@device> request virtual-chassis mode fabric mixed local
Mode set to 'Fabric with mixed devices'. (Reboot required)
```

6. Reboot the device.

```
user@device> request system reboot
Reboot the system ? [yes,no] (no) yes
```

```
Shutdown at Mon Jul 21 19:03:48 2014.
[pid 22478]
```

```
{master:0}
```

```
user@device>
*** System shutdown message from user@device ***
```

```
System going down in 1 minute
```

7. While the device reboots, repeat Steps 2 through 6 on all other devices you want to include in your VCF.
8. To verify that your device is ready to participate in the mixed-mode VCF, issue the **show virtual-chassis mode** command.

When the Current Mode displays **Fabric with mixed devices**, the device is ready.

```
user@device> show virtual-chassis mode
fpc0:
```

```
-----
Current mode : Fabric with mixed devices
Future mode after reboot : Fabric with mixed devices
```

Configuring Preprovisioning for the Virtual Chassis Fabric

CLI Quick Configuration

To quickly configure preprovisioning for the VCF, enter the following configuration statements on one of the spine members (preferably the master):

```
[edit]
set virtual-chassis preprovisioned
set virtual-chassis member 0 role routing-engine
set virtual-chassis member 0 serial-number TB3714010375
set virtual-chassis member 1 role routing-engine
set virtual-chassis member 1 serial-number TB3714010058
set virtual-chassis member 2 role routing-engine
set virtual-chassis member 2 serial-number TB3714010044
set virtual-chassis member 3 role routing-engine
set virtual-chassis member 3 serial-number TB3714010450
set virtual-chassis member 4 role line-card
set virtual-chassis member 4 serial-number TB3714010595
set virtual-chassis member 5 role line-card
set virtual-chassis member 5 serial-number TB3714010270
set virtual-chassis member 6 role line-card
set virtual-chassis member 6 serial-number TA3714030625
set virtual-chassis member 7 role line-card
set virtual-chassis member 7 serial-number TA3714030225
set virtual-chassis member 8 role line-card
set virtual-chassis member 8 serial-number TA3714030519
set virtual-chassis member 9 role line-card
set virtual-chassis member 9 serial-number TA3714030562
set virtual-chassis member 10 role line-card
set virtual-chassis member 10 serial-number PG3714080066
set virtual-chassis member 11 role line-card
set virtual-chassis member 11 serial-number PG3714080086
```

Step-by-Step Procedure

To configure the VCF:

1. Connect your laptop or management station to the console port of one of the devices that is part of the spine layer, preferably the device you want to act in the master role.
2. Configure the VCF to use the preprovisioning method:

```
[edit virtual-chassis]
user@device# set preprovisioned
```
3. Configure member 0 to participate as a Routing Engine in the spine layer:

```
[edit virtual-chassis]
user@device# set member 0 role routing-engine
user@device# set member 0 serial-number TB3714010375
```

4. Configure member 1 to participate as a Routing Engine in the spine layer:

```
[edit virtual-chassis]
user@device# set member 1 role routing-engine
user@device# set member 1 serial-number TB3714010058
```

5. Configure member 2 to participate as a Routing Engine in the spine layer:

```
[edit virtual-chassis]
user@device# set member 2 role routing-engine
user@device# set member 2 serial-number TB3714010044
```

6. Configure member 3 to participate as a Routing Engine in the spine layer:

```
[edit virtual-chassis]
user@device# set member 3 role routing-engine
user@device# set member 3 serial-number TB3714010450
```

7. Configure member 4 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 4 role line-card
user@device# set member 4 serial-number TB3714010595
```

8. Configure member 5 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 5 role line-card
user@device# set member 5 serial-number TB3714010270
```

9. Configure member 6 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 6 role line-card
user@device# set member 6 serial-number TA3714030625
```

10. Configure member 7 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 7 role line-card
user@device# set member 7 serial-number TA3714030225
```

11. Configure member 8 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 8 role line-card
user@device# set member 8 serial-number TA3714030519
```

12. Configure member 9 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 9 role line-card
user@device# set member 9 serial-number TA3714030562
```

13. Configure member 10 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 10 role line-card
user@device# set member 10 serial-number PG3714080066
```

14. Configure member 11 to participate as a linecard in the leaf layer:

```
[edit virtual-chassis]
user@device# set member 11 role line-card
user@device# set member 11 serial-number PG3714080086
```

15. Commit the configuration:

```
[edit]
user@device# commit
```

Configuring a Virtual Management Ethernet (VME) Interface

Step-by-Step Procedure

Establishing a VME interface enables you to log in to any of the VCF devices and be redirected to the device acting in the master role.

To configure a VME interface:

1. Set the IP address for your management interface:

```
[edit]
user@vcf# set interfaces vme unit 0 family inet address 10.94.47.165/28
```

2. Commit the configuration:

```
[edit]
user@vcf# commit
```

Connecting the VCF Devices Together

Step-by-Step Procedure

To connect the VCF devices together:

1. Connect fiber optic cables between the 40-Gigabit Ethernet ports in the devices shown in [Table 2 on page 11](#):



NOTE: When you interconnect the *et-fpc/pic/port* interfaces between devices configured to participate in a VCF, the ports automatically convert to Virtual Chassis ports (VCP). [Table 2 on page 11](#) includes both the pre- and post-conversion port numbers.

Table 2: 40-Gigabit Ethernet (et-) to Virtual Chassis Port (vcp-) Mappings

Local Member	Local Port	Local VCP	Remote Member	Remote Port	Remote VCP
S0	et-0/0/0	vcp-255/0/0	L4	et-4/0/0	vcp-255/0/0
	et-0/0/1	vcp-255/0/1	L5	et-5/0/0	vcp-255/0/0
	et-0/0/7	vcp-255/0/7	L6	et-6/0/48	vcp-255/0/48
	et-0/0/6	vcp-255/0/6	L7	et-7/0/48	vcp-255/0/48
	et-0/0/4	vcp-255/0/4	L8	et-8/0/48	vcp-255/0/48
	et-0/0/3	vcp-255/0/3	L9	et-9/0/48	vcp-255/0/48
	et-0/0/10	vcp-255/0/10	L10	et-10/1/0	vcp-255/1/0
	et-0/0/11	vcp-255/0/11	L11	et-11/1/0	vcp-255/1/0
	et-1/0/0	vcp-255/0/0	L4	et-4/0/1	vcp-255/0/1
	et-1/0/1	vcp-255/0/1	L5	et-5/0/1	vcp-255/0/1
S1	et-1/0/7	vcp-255/0/7	L6	et-6/0/49	vcp-255/0/49
	et-1/0/6	vcp-255/0/6	L7	et-7/0/49	vcp-255/0/49
	et-1/0/4	vcp-255/0/4	L8	et-8/0/49	vcp-255/0/49
	et-1/0/3	vcp-255/0/3	L9	et-9/0/49	vcp-255/0/49
	et-1/0/2	vcp-255/0/2	L10	et-10/1/3	vcp-255/1/3
	et-1/0/5	vcp-255/0/5	L11	et-11/1/3	vcp-255/1/3
	et-2/0/0	vcp-255/0/0	L4	et-4/0/2	vcp-255/0/2
	et-2/0/1	vcp-255/0/1	L5	et-5/0/2	vcp-255/0/2
	et-2/0/7	vcp-255/0/7	L6	et-6/0/50	vcp-255/0/50
	et-2/0/6	vcp-255/0/6	L7	et-7/0/50	vcp-255/0/50
S2	et-2/0/4	vcp-255/0/4	L8	et-8/0/50	vcp-255/0/50
	et-2/0/3	vcp-255/0/3	L9	et-9/0/50	vcp-255/0/50
	et-2/0/2	vcp-255/0/2	L10	et-10/1/2	vcp-255/1/2
	et-2/0/5	vcp-255/0/5	L11	et-11/1/2	vcp-255/1/2

Table 2: 40-Gigabit Ethernet (et-) to Virtual Chassis Port (vcp-) Mappings (*continued*)

Local Member	Local Port	Local VCP	Remote Member	Remote Port	Remote VCP
S3	et-3/0/0	vcp-255/0/0	L4	et-4/0/3	vcp-255/0/3
	et-3/0/1	vcp-255/0/1	L5	et-5/0/3	vcp-255/0/3
	et-3/0/7	vcp-255/0/7	L6	et-6/0/51	vcp-255/0/51
	et-3/0/6	vcp-255/0/6	L7	et-7/0/51	vcp-255/0/51
	et-03/0/4	vcp-255/0/4	L8	et-8/0/51	vcp-255/0/51
	et-3/0/3	vcp-255/0/3	L9	et-9/0/51	vcp-255/0/51
	et-3/0/10	vcp-255/0/10	L10	et-10/1/1	vcp-255/1/1
	et-3/0/11	vcp-255/0/11	L11	et-11/1/1	vcp-255/1/1
	et-4/0/0	vcp-255/0/0	S0	et-0/0/0	vcp-255/0/0
	et-4/0/1	vcp-255/0/1	S1	et-1/0/0	vcp-255/0/0
L4	et-4/0/2	vcp-255/0/2	S2	et-2/0/0	vcp-255/0/0
	et-4/0/3	vcp-255/0/3	S3	et-3/0/0	vcp-255/0/0
L5	et-5/0/0	vcp-255/0/0	S0	et-0/0/1	vcp-255/0/1
	et-5/0/1	vcp-255/0/1	S1	et-1/0/1	vcp-255/0/1
	et-5/0/2	vcp-255/0/2	S2	et-2/0/1	vcp-255/0/1
	et-5/0/3	vcp-255/0/3	S3	et-3/0/1	vcp-255/0/1
L6	et-6/0/48	vcp-255/0/48	S0	et-0/0/7	vcp-255/0/7
	et-6/0/49	vcp-255/0/49	S1	et-1/0/7	vcp-255/0/7
	et-6/0/50	vcp-255/0/50	S2	et-2/0/7	vcp-255/0/7
	et-6/0/51	vcp-255/0/51	S3	et-3/0/7	vcp-255/0/7
L7	et-7/0/48	vcp-255/0/48	S0	et-0/0/6	vcp-255/0/6
	et-7/0/49	vcp-255/0/49	S1	et-1/0/6	vcp-255/0/6
	et-7/0/50	vcp-255/0/50	S2	et-2/0/6	vcp-255/0/6
	et-7/0/51	vcp-255/0/51	S3	et-3/0/6	vcp-255/0/6

Table 2: 40-Gigabit Ethernet (et-) to Virtual Chassis Port (vcp-) Mappings (*continued*)

Local Member	Local Port	Local VCP	Remote Member	Remote Port	Remote VCP
L8	et-8/0/48	vcp-255/0/48	S0	et-0/0/4	vcp-255/0/4
	et-8/0/49	vcp-255/0/49	S1	et-1/0/4	vcp-255/0/4
	et-8/0/50	vcp-255/0/50	S2	et-2/0/4	vcp-255/0/4
	et-8/0/51	vcp-255/0/51	S3	et-3/0/4	vcp-255/0/4
L9	et-9/0/48	vcp-255/0/48	S0	et-0/0/3	vcp-255/0/3
	et-9/0/49	vcp-255/0/49	S1	et-1/0/3	vcp-255/0/3
	et-9/0/50	vcp-255/0/50	S2	et-2/0/3	vcp-255/0/3
	et-9/0/51	vcp-255/0/51	S3	et-3/0/3	vcp-255/0/3
L10	et-10/1/0	vcp-255/1/0	S0	et-0/0/10	vcp-255/0/10
	et-10/1/1	vcp-255/1/1	S3	et-1/0/10	vcp-255/0/10
	et-10/1/2	vcp-255/1/2	S2	et-2/0/2	vcp-255/0/2
	et-10/1/3	vcp-255/1/3	S1	et-3/0/2	vcp-255/0/2
L11	et-11/1/0	vcp-255/1/0	S0	et-0/0/11	vcp-255/0/11
	et-11/1/1	vcp-255/1/1	S3	et-1/0/11	vcp-255/0/11
	et-11/1/2	vcp-255/1/2	S2	et-2/0/5	vcp-255/0/5
	et-11/1/3	vcp-255/1/3	S1	et-3/0/5	vcp-255/0/5

- If any of the ports do not automatically become VCP ports, issue the **request virtual-chassis vc-port set** command on both sides of the connection to set the VCP ports manually:

```
user@device> request virtual-chassis vc-port set pic-slot 0 port 0
Port conversion initiated, use show virtual-chassis vc-port to verify
```

Installing VCF Software Licenses

Step-by-Step Procedure

To install a VCF software license:

- Purchase two VCF software license keys (QFX-VCF-LIC) from your [Juniper Networks sales representative](#).

The sales representative will provide you with the feature license files and license keys. You will be asked to supply the chassis serial number of your switch; you can obtain the serial number by issuing the **show virtual-chassis** command.

2. Install the first software license on one device in the VCF (for example, the device acting in the master role):

```
user@device> request system license add (filename | url)
```

3. Install the second software license on a second device in the VCF (for example, the device acting in the backup role):

```
user@device> request system license add (filename | url)
```

For more information about installing licenses, see [Generating License Keys, Software Features That Require Licenses on the QFX Series](#), and [Adding New Licenses \(CLI Procedure\)](#).

Configuring Gigabit Ethernet and 10-Gigabit Ethernet Interfaces for the VCF

CLI Quick Configuration

To quickly configure Gigabit Ethernet and 10-Gigabit Ethernet interfaces for the VCF, enter the following configuration statements on the device acting in the master role:



NOTE: The details about the applications that each interface participates in are provided in the aggregated Ethernet section of this example.

[edit]

```
set interfaces xe-0/0/18:0 ether-options 802.3ad ae33
set interfaces xe-0/0/22:3 ether-options 802.3ad ae17
set interfaces xe-0/0/23:0 ether-options 802.3ad ae16
set interfaces xe-0/0/23:1 ether-options 802.3ad ae15
set interfaces xe-0/0/23:2 ether-options 802.3ad ae24
set interfaces xe-0/0/23:3 ether-options 802.3ad ae25
set interfaces xe-1/0/22:0 ether-options 802.3ad ae28
set interfaces xe-1/0/23:0 ether-options 802.3ad ae16
set interfaces xe-1/0/23:1 ether-options 802.3ad ae15
set interfaces xe-1/0/23:2 ether-options 802.3ad ae24
set interfaces xe-1/0/23:3 ether-options 802.3ad ae25
set interfaces xe-2/0/22:0 ether-options 802.3ad ae28
set interfaces xe-2/0/23:0 ether-options 802.3ad ae16
set interfaces xe-2/0/23:1 ether-options 802.3ad ae15
set interfaces xe-2/0/23:2 ether-options 802.3ad ae26
set interfaces xe-2/0/23:3 ether-options 802.3ad ae27
set interfaces xe-3/0/18:0 ether-options 802.3ad ae33
set interfaces xe-3/0/22:1 ether-options 802.3ad ae31
set interfaces xe-3/0/23:0 ether-options 802.3ad ae16
set interfaces xe-3/0/23:1 ether-options 802.3ad ae15
set interfaces xe-3/0/23:2 ether-options 802.3ad ae26
set interfaces xe-3/0/23:3 ether-options 802.3ad ae27
set interfaces et-4/0/10 ether-options 802.3ad ae11
set interfaces et-4/0/11 ether-options 802.3ad ae11
set interfaces xe-4/0/16:0 ether-options 802.3ad ae12
set interfaces xe-4/0/22:2 ether-options 802.3ad ae30
```

```
set interfaces xe-4/0/22:3 ether-options 802.3ad ae17
set interfaces et-5/0/10 ether-options 802.3ad ae11
set interfaces et-5/0/11 ether-options 802.3ad ae11
set interfaces xe-5/0/16:0 ether-options 802.3ad ae12
set interfaces xe-5/0/22:0 ether-options 802.3ad ae18
set interfaces xe-6/0/0 ether-options 802.3ad ae1
set interfaces xe-6/0/1 ether-options 802.3ad ae2
set interfaces xe-6/0/2 ether-options 802.3ad ae3
set interfaces xe-6/0/3 ether-options 802.3ad ae4
set interfaces xe-6/0/5 ether-options 802.3ad ae22
set interfaces xe-6/0/12 description iSCSI-Interface-to-Server-Farm1
set interfaces xe-6/0/12 mtu 9192
set interfaces xe-6/0/12 unit 0 family ethernet-switching vlan members Server-Farm1
set interfaces xe-6/0/22 ether-options 802.3ad ae19
set interfaces xe-6/0/24 ether-options 802.3ad ae6
set interfaces xe-6/0/25 ether-options 802.3ad ae7
set interfaces xe-6/0/26 ether-options 802.3ad ae8
set interfaces xe-6/0/27 ether-options 802.3ad ae9
set interfaces xe-6/0/29 ether-options 802.3ad ae12
set interfaces xe-6/0/30 ether-options 802.3ad ae23
set interfaces xe-6/0/34 ether-options 802.3ad ae14
set interfaces xe-6/0/47 ether-options 802.3ad ae13
set interfaces xe-7/0/0 ether-options 802.3ad ae1
set interfaces xe-7/0/1 ether-options 802.3ad ae2
set interfaces xe-7/0/2 ether-options 802.3ad ae3
set interfaces xe-7/0/3 ether-options 802.3ad ae4
set interfaces xe-7/0/5 ether-options 802.3ad ae22
set interfaces xe-7/0/12 ether-options 802.3ad ae29
set interfaces xe-7/0/16 ether-options 802.3ad ae30
set interfaces xe-7/0/22 ether-options 802.3ad ae19
set interfaces xe-7/0/24 ether-options 802.3ad ae6
set interfaces xe-7/0/25 ether-options 802.3ad ae7
set interfaces xe-7/0/26 ether-options 802.3ad ae8
set interfaces xe-7/0/27 ether-options 802.3ad ae9
set interfaces xe-7/0/29 ether-options 802.3ad ae12
set interfaces xe-7/0/30 ether-options 802.3ad ae23
set interfaces xe-7/0/34 ether-options 802.3ad ae14
set interfaces xe-7/0/36 description iSCSI-Interface-to-Storage-Server-Farm2
set interfaces xe-7/0/36 mtu 9192
set interfaces xe-7/0/36 unit 0 family ethernet-switching vlan members Server-Farm2
set interfaces xe-7/0/47 ether-options 802.3ad ae13
set interfaces xe-8/0/0 ether-options 802.3ad ae1
set interfaces xe-8/0/1 ether-options 802.3ad ae2
set interfaces xe-8/0/2 ether-options 802.3ad ae3
set interfaces xe-8/0/3 ether-options 802.3ad ae4
set interfaces xe-8/0/4 ether-options 802.3ad ae5
set interfaces xe-8/0/5 ether-options 802.3ad ae22
set interfaces xe-8/0/12 description iSCSI-Interface-to-Storage-Server-Farm1
set interfaces xe-8/0/12 mtu 9192
set interfaces xe-8/0/12 unit 0 family ethernet-switching vlan members Server-Farm1
set interfaces xe-8/0/18 ether-options 802.3ad ae32
set interfaces xe-8/0/22 ether-options 802.3ad ae20
set interfaces xe-8/0/23 ether-options 802.3ad ae18
set interfaces xe-8/0/24 ether-options 802.3ad ae6
set interfaces xe-8/0/25 ether-options 802.3ad ae7
set interfaces xe-8/0/26 ether-options 802.3ad ae8
set interfaces xe-8/0/27 ether-options 802.3ad ae9
set interfaces xe-8/0/28 ether-options 802.3ad ae10
set interfaces xe-8/0/29 ether-options 802.3ad ae12
```

```
set interfaces xe-8/0/30 ether-options 802.3ad ae23
set interfaces xe-8/0/34 ether-options 802.3ad ae14
set interfaces xe-8/0/47 ether-options 802.3ad ae13
set interfaces xe-9/0/0 ether-options 802.3ad ae1
set interfaces xe-9/0/1 ether-options 802.3ad ae2
set interfaces xe-9/0/2 ether-options 802.3ad ae3
set interfaces xe-9/0/3 ether-options 802.3ad ae4
set interfaces xe-9/0/4 ether-options 802.3ad ae5
set interfaces xe-9/0/5 ether-options 802.3ad ae22
set interfaces xe-9/0/12 ether-options 802.3ad ae29
set interfaces xe-9/0/16 ether-options 802.3ad ae31
set interfaces xe-9/0/18 ether-options 802.3ad ae32
set interfaces xe-9/0/22 ether-options 802.3ad ae20
set interfaces xe-9/0/24 ether-options 802.3ad ae6
set interfaces xe-9/0/25 ether-options 802.3ad ae7
set interfaces xe-9/0/26 ether-options 802.3ad ae8
set interfaces xe-9/0/27 ether-options 802.3ad ae9
set interfaces xe-9/0/28 ether-options 802.3ad ae10
set interfaces xe-9/0/29 ether-options 802.3ad ae12
set interfaces xe-9/0/30 ether-options 802.3ad ae23
set interfaces xe-9/0/34 ether-options 802.3ad ae14
set interfaces xe-9/0/36 description iSCSI-Interface-to-Storage-Server-Farm2
set interfaces xe-9/0/36 mtu 9192
set interfaces xe-9/0/36 unit 0 family ethernet-switching vlan members Server-Farm2
set interfaces xe-9/0/47 ether-options 802.3ad ae13
set interfaces ge-10/0/0 ether-options 802.3ad ae21
set interfaces ge-11/0/0 ether-options 802.3ad ae21
```

Configuring Aggregated Ethernet Interfaces for the VCF

CLI Quick Configuration

To quickly configure aggregated Ethernet interfaces for the VCF, enter the following configuration statements on the device acting in the master role:

```
[edit]
set interfaces ae1 description "Towards Server-Farm1 Passthrough CN1"
set interfaces ae1 mtu 9192
set interfaces ae1 aggregated-ether-options lacp active
set interfaces ae1 aggregated-ether-options lacp periodic fast
set interfaces ae1 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae1 unit 0 family ethernet-switching vlan members Infra
set interfaces ae1 unit 0 family ethernet-switching vlan members VM-FT
set interfaces ae1 unit 0 family ethernet-switching vlan members Vmotion
set interfaces ae1 unit 0 family ethernet-switching vlan members OOB-Transport
set interfaces ae1 unit 0 family ethernet-switching vlan members Compute-MGMT
set interfaces ae1 unit 0 family ethernet-switching vlan members Server-Farm1
set interfaces ae1 unit 0 family ethernet-switching vlan members Server-Farm2
set interfaces ae2 description "Towards Server-Farm1 Passthrough CN2"
set interfaces ae2 mtu 9192
set interfaces ae2 aggregated-ether-options lacp active
set interfaces ae2 aggregated-ether-options lacp periodic fast
set interfaces ae2 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae2 unit 0 family ethernet-switching vlan members all
set interfaces ae3 description "Towards Server-Farm1 Passthrough CN3"
set interfaces ae3 mtu 9192
set interfaces ae3 aggregated-ether-options lacp active
set interfaces ae3 aggregated-ether-options lacp periodic fast
set interfaces ae3 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae3 unit 0 family ethernet-switching vlan members all
set interfaces ae4 description "Towards Server-Farm1 Passthrough CN4"
set interfaces ae4 mtu 9192
```

```
set interfaces ae4 aggregated-ether-options larp active
set interfaces ae4 aggregated-ether-options larp periodic fast
set interfaces ae4 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae4 unit 0 family ethernet-switching vlan members all
set interfaces ae5 description "Towards Server-Farm1 Passthrough CN5"
set interfaces ae5 mtu 9192
set interfaces ae5 aggregated-ether-options larp active
set interfaces ae5 aggregated-ether-options larp periodic fast
set interfaces ae5 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae5 unit 0 family ethernet-switching vlan members all
set interfaces ae6 description "Towards Server-Farm2 Passthrough CN1"
set interfaces ae6 mtu 9192
set interfaces ae6 aggregated-ether-options larp active
set interfaces ae6 aggregated-ether-options larp periodic fast
set interfaces ae6 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae6 unit 0 family ethernet-switching vlan members all
set interfaces ae7 description "Towards Server-Farm2 Passthrough CN2"
set interfaces ae7 mtu 9192
set interfaces ae7 aggregated-ether-options larp active
set interfaces ae7 aggregated-ether-options larp periodic fast
set interfaces ae7 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae7 unit 0 family ethernet-switching vlan members all
set interfaces ae8 description "Towards Server-Farm2 Passthrough CN3"
set interfaces ae8 mtu 9192
set interfaces ae8 aggregated-ether-options larp active
set interfaces ae8 aggregated-ether-options larp periodic fast
set interfaces ae8 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae8 unit 0 family ethernet-switching vlan members all
set interfaces ae9 description "Towards Server-Farm2 Passthrough CN4"
set interfaces ae9 mtu 9192
set interfaces ae9 aggregated-ether-options larp active
set interfaces ae9 aggregated-ether-options larp periodic fast
set interfaces ae9 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae9 unit 0 family ethernet-switching vlan members all
set interfaces ae10 description "Towards Server-Farm2 Passthrough CN5"
set interfaces ae10 mtu 9192
set interfaces ae10 aggregated-ether-options larp active
set interfaces ae10 aggregated-ether-options larp periodic fast
set interfaces ae10 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae10 unit 0 family ethernet-switching vlan members all
set interfaces ae11 description "Towards Server-Farm1 CNA"
set interfaces ae11 mtu 9192
set interfaces ae11 aggregated-ether-options larp active
set interfaces ae11 aggregated-ether-options larp periodic fast
set interfaces ae11 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae11 unit 0 family ethernet-switching vlan members all
set interfaces ae12 description "Towards Server-Farm2 CNA"
set interfaces ae12 mtu 9192
set interfaces ae12 aggregated-ether-options larp active
set interfaces ae12 aggregated-ether-options larp periodic fast
set interfaces ae12 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae12 unit 0 family ethernet-switching vlan members all
set interfaces ae13 description "Towards OOB MGMT"
set interfaces ae13 mtu 9192
set interfaces ae13 aggregated-ether-options larp active
set interfaces ae13 aggregated-ether-options larp periodic fast
set interfaces ae13 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae13 unit 0 family ethernet-switching vlan members all
set interfaces ae14 description "EMC NFS Storage"
```

```
set interfaces ae14 mtu 9192
set interfaces ae14 aggregated-ether-options lacp active
set interfaces ae14 aggregated-ether-options lacp periodic fast
set interfaces ae14 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae14 unit 0 family ethernet-switching vlan members all
set interfaces ae15 description "Towards Firewall"
set interfaces ae15 mtu 9192
set interfaces ae15 aggregated-ether-options minimum-links 1
set interfaces ae15 aggregated-ether-options lacp active
set interfaces ae15 aggregated-ether-options lacp periodic fast
set interfaces ae15 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae15 unit 0 family ethernet-switching vlan members vcf-srx
set interfaces ae16 description "Towards Firewall"
set interfaces ae16 mtu 9192
set interfaces ae16 aggregated-ether-options minimum-links 1
set interfaces ae16 aggregated-ether-options lacp active
set interfaces ae16 aggregated-ether-options lacp periodic fast
set interfaces ae16 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae16 unit 0 family ethernet-switching vlan members vcf-srx
set interfaces ae17 description "LAG to TrafficGenerator VLAN501"
set interfaces ae17 mtu 9192
set interfaces ae17 aggregated-ether-options minimum-links 1
set interfaces ae17 aggregated-ether-options lacp active
set interfaces ae17 aggregated-ether-options lacp periodic fast
set interfaces ae17 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae17 unit 0 family ethernet-switching vlan members TrafficGenerator-501
set interfaces ae18 description "LAG to TrafficGenerator VLAN502"
set interfaces ae18 mtu 9192
set interfaces ae18 aggregated-ether-options minimum-links 1
set interfaces ae18 aggregated-ether-options lacp active
set interfaces ae18 aggregated-ether-options lacp periodic fast
set interfaces ae18 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae18 unit 0 family ethernet-switching vlan members TrafficGenerator-502
set interfaces ae19 description "LAG to TrafficGenerator VLAN503"
set interfaces ae19 mtu 9192
set interfaces ae19 aggregated-ether-options minimum-links 1
set interfaces ae19 aggregated-ether-options lacp active
set interfaces ae19 aggregated-ether-options lacp periodic fast
set interfaces ae19 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae19 unit 0 family ethernet-switching vlan members TrafficGenerator-503
set interfaces ae20 description "LAG to TrafficGenerator VLAN504"
set interfaces ae20 mtu 9192
set interfaces ae20 aggregated-ether-options minimum-links 1
set interfaces ae20 aggregated-ether-options lacp active
set interfaces ae20 aggregated-ether-options lacp periodic fast
set interfaces ae20 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae20 unit 0 family ethernet-switching vlan members TrafficGenerator-504
set interfaces ae21 description "LAG to TrafficGenerator VLAN505"
set interfaces ae21 mtu 9192
set interfaces ae21 aggregated-ether-options minimum-links 1
set interfaces ae21 aggregated-ether-options lacp active
set interfaces ae21 aggregated-ether-options lacp periodic fast
set interfaces ae21 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae21 unit 0 family ethernet-switching vlan members TrafficGenerator-505
set interfaces ae22 description "Towards Server-Farm1 Standalone Server"
set interfaces ae22 mtu 9192
set interfaces ae22 aggregated-ether-options lacp active
set interfaces ae22 aggregated-ether-options lacp periodic fast
set interfaces ae22 unit 0 family ethernet-switching interface-mode trunk
```

```
set interfaces ae22 unit 0 family ethernet-switching vlan members all
set interfaces ae23 description "Towards Server-Farm2 Standalone Server"
set interfaces ae23 mtu 9192
set interfaces ae23 aggregated-ether-options lacp active
set interfaces ae23 aggregated-ether-options lacp periodic fast
set interfaces ae23 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae23 unit 0 family ethernet-switching vlan members all
set interfaces ae24 description "Towards active Load balancer L2 internal"
set interfaces ae24 aggregated-ether-options minimum-links 1
set interfaces ae24 aggregated-ether-options lacp active
set interfaces ae24 aggregated-ether-options lacp periodic fast
set interfaces ae24 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae24 unit 0 family ethernet-switching vlan members Sharepoint
set interfaces ae24 unit 0 family ethernet-switching vlan members Exchange
set interfaces ae24 unit 0 family ethernet-switching vlan members Wikimedia
set interfaces ae25 description "Towards standby Load balancer L2 internal"
set interfaces ae25 aggregated-ether-options minimum-links 1
set interfaces ae25 aggregated-ether-options lacp active
set interfaces ae25 aggregated-ether-options lacp periodic fast
set interfaces ae25 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae25 unit 0 family ethernet-switching vlan members Sharepoint
set interfaces ae25 unit 0 family ethernet-switching vlan members Exchange
set interfaces ae25 unit 0 family ethernet-switching vlan members Wikimedia
set interfaces ae25 unit 0 family ethernet-switching vlan members Exchange-Cluster
set interfaces ae26 description "Towards active Load balancer L3 external"
set interfaces ae26 aggregated-ether-options lacp active
set interfaces ae26 aggregated-ether-options lacp periodic fast
set interfaces ae26 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae26 unit 0 family ethernet-switching vlan members Load-balancer-Ext
set interfaces ae26 unit 0 family ethernet-switching vlan members Load-balancer-Ext-Tera-VM
set interfaces ae27 description "Towards standby Load balancer L3 external"
set interfaces ae27 aggregated-ether-options lacp active
set interfaces ae27 aggregated-ether-options lacp periodic fast
set interfaces ae27 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae27 unit 0 family ethernet-switching vlan members Load-balancer-Ext
set interfaces ae27 unit 0 family ethernet-switching vlan members Load-balancer-Ext-Tera-VM
set interfaces ae28 description "vlan27"
set interfaces ae28 mtu 9192
set interfaces ae28 aggregated-ether-options minimum-links 1
set interfaces ae28 aggregated-ether-options lacp active
set interfaces ae28 aggregated-ether-options lacp periodic fast
set interfaces ae28 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae28 unit 0 family ethernet-switching vlan members vcf-srx
set interfaces ae29 description Layer2-Tera-VM-Controller-Link
set interfaces ae29 aggregated-ether-options minimum-links 1
set interfaces ae29 aggregated-ether-options lacp active
set interfaces ae29 aggregated-ether-options lacp periodic fast
set interfaces ae29 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae29 unit 0 family ethernet-switching vlan members Tera-VM
set interfaces ae30 description "Towards TrafficGenerator-v502"
set interfaces ae30 mtu 9192
set interfaces ae30 aggregated-ether-options minimum-links 1
set interfaces ae30 aggregated-ether-options lacp active
set interfaces ae30 aggregated-ether-options lacp periodic fast
set interfaces ae30 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae30 unit 0 family ethernet-switching vlan members TrafficGenerator-502
set interfaces ae31 description "Towards TrafficGenerator-v501"
set interfaces ae31 mtu 9192
set interfaces ae31 aggregated-ether-options minimum-links 1
```

```
set interfaces ae31 aggregated-ether-options lacp active
set interfaces ae31 aggregated-ether-options lacp periodic fast
set interfaces ae31 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae31 unit 0 family ethernet-switching vlan members TrafficGenerator-501
set interfaces ae32 description "Towards TrafficGenerator-v27"
set interfaces ae32 mtu 9192
set interfaces ae32 aggregated-ether-options minimum-links 1
set interfaces ae32 aggregated-ether-options lacp active
set interfaces ae32 aggregated-ether-options lacp periodic fast
set interfaces ae32 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae32 unit 0 family ethernet-switching vlan members vcf-srx
set interfaces ae33 description "Towards TrafficGenerator-v503"
set interfaces ae33 mtu 9192
set interfaces ae33 aggregated-ether-options minimum-links 1
set interfaces ae33 aggregated-ether-options lacp active
set interfaces ae33 aggregated-ether-options lacp periodic fast
set interfaces ae33 unit 0 family ethernet-switching interface-mode trunk
set interfaces ae33 unit 0 family ethernet-switching vlan members TrafficGenerator-503
```

Step-by-Step Procedure

To configure aggregated Ethernet interfaces:

1. Configure interface ae1 to provide application connectivity to CN1 at Server Farm 1. Assign the Infrastructure, VM Fault Tolerance, VMotion, OOB Transport, Compute Management, Server Farm 1, and Server Farm 2 VLANs to this interface.

```
[edit interfaces ae1]
user@device# set description "Towards Server-Farm1 Passthrough CN1"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members Infra
user@device# set unit 0 family ethernet-switching vlan members VM-FT
user@device# set unit 0 family ethernet-switching vlan members VMotion
user@device# set unit 0 family ethernet-switching vlan members OOB-Transport
user@device# set unit 0 family ethernet-switching vlan members Compute-MGMT
user@device# set unit 0 family ethernet-switching vlan members Server-Farm1
user@device# set unit 0 family ethernet-switching vlan members Server-Farm2
```

2. Configure interface ae2 to provide connectivity to CN2 at Server Farm 1.

```
[edit interfaces ae2]
user@device# set description "Towards Server-Farm1 Passthrough CN2"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

3. Configure interface ae3 to provide connectivity to CN3 at Server Farm 1.

```
[edit interfaces ae3]
user@device# set description "Towards Server-Farm1 Passthrough CN3"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```


-
4. Configure interface ae4 to provide connectivity to CN4 at Server Farm 1.

```
[edit interfaces ae4]
user@device# set description "Towards Server-Farm1 Passthrough CN4"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

5. Configure interface ae5 to provide connectivity to CN5 at Server Farm 1.

```
[edit interfaces ae5]
user@device# set description "Towards Server-Farm1 Passthrough CN5"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

6. Configure interface ae6 to provide connectivity to CN1 at Server Farm 2.

```
[edit interfaces ae6]
user@device# set description "Towards Server-Farm2 Passthrough CN1"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

7. Configure interface ae7 to provide connectivity to CN2 at Server Farm 2.

```
[edit interfaces ae7]
user@device# set description "Towards Server-Farm2 Passthrough CN2"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

8. Configure interface ae8 to provide connectivity to CN3 at Server Farm 2.

```
[edit interfaces ae8]
user@device# set description "Towards Server-Farm2 Passthrough CN3"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

9. Configure interface ae9 to provide connectivity to CN4 at Server Farm 2.

```
[edit interfaces ae9]
user@device# set description "Towards Server-Farm2 Passthrough CN4"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
```

```
user@device# set unit 0 family ethernet-switching vlan members all
```

10. Configure interface ae10 to provide connectivity to CN5 at Server Farm 2.

```
[edit interfaces ae10]
user@device# set description "Towards Server-Farm2 Passthrough CN5"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

11. Configure interface ae11 to provide connectivity to the converged network adapter (CNA) at Server Farm 1.

```
[edit interfaces ae11]
user@device# set description "Towards Server-Farm1 CNA"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

12. Configure interface ae12 to provide connectivity to the converged network adapter (CNA) at Server Farm 2.

```
[edit interfaces ae12]
user@device# set description "Towards Server-Farm2 CNA"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

13. Configure interface ae13 to provide connectivity to the out-of-band management network.

```
[edit interfaces ae13]
user@device# set description "Towards OOB MGMT"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

14. Configure interface ae14 to provide connectivity for NFS storage on the EMC VNX device.

```
[edit interfaces ae14]
user@device# set description "EMC NFS Storage"
user@device# set mtu 9192
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members all
```

-
15. Configure interfaces ae15 and ae16 to provide connectivity to the SRX Series security devices. In this case, limit the VLAN membership for both interfaces to the vcf-srx VLAN group.

```
[edit interfaces]
user@device# set ae15 description "Towards Firewall"
user@device# set ae15 mtu 9192
user@device# set ae15 aggregated-ether-options minimum-links 1
user@device# set ae15 aggregated-ether-options lacp active
user@device# set ae15 aggregated-ether-options lacp periodic fast
user@device# set ae15 unit 0 family ethernet-switching interface-mode trunk
user@device# set ae15 unit 0 family ethernet-switching vlan members vcf-srx
user@device# set ae16 description "Towards Firewall"
user@device# set ae16 mtu 9192
user@device# set ae16 aggregated-ether-options minimum-links 1
user@device# set ae16 aggregated-ether-options lacp active
user@device# set ae16 aggregated-ether-options lacp periodic fast
user@device# set ae16 unit 0 family ethernet-switching interface-mode trunk
user@device# set ae16 unit 0 family ethernet-switching vlan members vcf-srx
```

16. Configure interfaces ae17 through ae21 to provide connectivity for production traffic.

For verification lab testing, this portion of the Juniper Networks MetaFabric Architecture 1.1 solution topology was connected to a series of traffic generators.

```
[edit interfaces]
user@device# set ae17 description "Towards LAG to TrafficGenerator VLAN501"
user@device# set ae17 mtu 9192
user@device# set ae17 aggregated-ether-options minimum-links 1
user@device# set ae17 aggregated-ether-options lacp active
user@device# set ae17 aggregated-ether-options lacp periodic fast
user@device# set ae17 unit 0 family ethernet-switching interface-mode trunk
user@device# set ae17 unit 0 family ethernet-switching vlan members TrafficGenerator-501
user@device# set ae18 description "Towards LAG to TrafficGenerator VLAN502"
user@device# set ae18 mtu 9192
user@device# set ae18 aggregated-ether-options minimum-links 1
user@device# set ae18 aggregated-ether-options lacp active
user@device# set ae18 aggregated-ether-options lacp periodic fast
user@device# set ae18 unit 0 family ethernet-switching interface-mode trunk
user@device# set ae18 unit 0 family ethernet-switching vlan members TrafficGenerator-502
user@device# set ae19 description "Towards LAG to TrafficGenerator VLAN503"
user@device# set ae19 mtu 9192
user@device# set ae19 aggregated-ether-options minimum-links 1
user@device# set ae19 aggregated-ether-options lacp active
user@device# set ae19 aggregated-ether-options lacp periodic fast
user@device# set ae19 unit 0 family ethernet-switching interface-mode trunk
user@device# set ae19 unit 0 family ethernet-switching vlan members TrafficGenerator-503
user@device# set ae20 description "Towards LAG to TrafficGenerator VLAN504"
user@device# set ae20 mtu 9192
user@device# set ae20 aggregated-ether-options minimum-links 1
user@device# set ae20 aggregated-ether-options lacp active
user@device# set ae20 aggregated-ether-options lacp periodic fast
user@device# set ae20 unit 0 family ethernet-switching interface-mode trunk
user@device# set ae20 unit 0 family ethernet-switching vlan members
TrafficGenerator-504
user@device# set ae21 description "Towards LAG to TrafficGenerator VLAN505"
user@device# set ae21 mtu 9192
user@device# set ae21 aggregated-ether-options minimum-links 1
user@device# set ae21 aggregated-ether-options lacp active
```

```
user@device# set ae21 aggregated-ether-options lACP periodic fast
user@device# set ae21 unit 0 family ethernet-switching interface-mode trunk
user@device# set ae21 unit 0 family ethernet-switching vLAN members TrafficGenerator-505
```

17. Configure interface ae22 to provide connectivity to the standalone IBM server in Server Farm 1.

```
[edit interfaces ae22]
user@device# set description "Towards Server-Farm1 Standalone Server"
user@device# set mtu 9192
user@device# set aggregated-ether-options lACP active
user@device# set aggregated-ether-options lACP periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vLAN members all
```

18. Configure interface ae23 to provide connectivity to the standalone IBM server in Server Farm 2.

```
[edit interfaces ae23]
user@device# set description "Towards Server-Farm2 Standalone Server"
user@device# set mtu 9192
user@device# set aggregated-ether-options lACP active
user@device# set aggregated-ether-options lACP periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vLAN members all
```

19. Configure interface ae24 to provide connectivity between the active load balancer and the SharePoint, Exchange, and Wikimedia applications running on the VM hosts.

```
[edit interfaces ae24]
user@device# set description "Towards active Load balancer L2 internal"
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options lACP active
user@device# set aggregated-ether-options lACP periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vLAN members Sharepoint
user@device# set unit 0 family ethernet-switching vLAN members Exchange
user@device# set unit 0 family ethernet-switching vLAN members Wikimedia
```

20. Configure interface ae25 to provide connectivity between the standby load balancer and the SharePoint, Exchange, and Wikimedia applications running on the VM hosts.

```
[edit interfaces ae25]
user@device# set description "Towards standby Load balancer L2 internal"
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options lACP active
user@device# set aggregated-ether-options lACP periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vLAN members Sharepoint
user@device# set unit 0 family ethernet-switching vLAN members Exchange
user@device# set unit 0 family ethernet-switching vLAN members Wikimedia
user@device# set unit 0 family ethernet-switching vLAN members Exchange-Cluster
```

21. Configure interface ae26 to provide connectivity between the active load balancer and the Layer 3 production traffic.

```
[edit interfaces ae26]
```

```
user@device# set description "Towards active Load balancer L3 external"
user@device# set aggregated-ether-options larp active
user@device# set aggregated-ether-options larp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members Load-balancer-Ext
user@device# set unit 0 family ethernet-switching vlan members
Load-balancer-Ext-Tera-VM
```

22. Configure interface ae27 to provide connectivity between the standby load balancer and the Layer 3 production traffic.

```
[edit interfaces ae27]
user@device# set description "Towards standby Load balancer L3 external"
user@device# set aggregated-ether-options larp active
user@device# set aggregated-ether-options larp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members Load-balancer-Ext
user@device# set unit 0 family ethernet-switching vlan members
Load-balancer-Ext-Tera-VM
```

23. Configure interface ae28 to provide connectivity to VLAN 27, which interconnects the VCF and the SRX Series security cluster.

```
[edit interfaces ae28]
user@device# set description "vlan27"
user@device# set mtu 9192
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options larp active
user@device# set aggregated-ether-options larp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members vcf-srx
```

24. Configure interface ae29 to provide management traffic connectivity to the Tera-VM controller.

Although a traffic generator was used in the verification lab, you can assign this interface to your production traffic.

```
[edit interfaces ae29]
user@device# set description "Layer2-Tera-VM-Controller-Link"
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options larp active
user@device# set aggregated-ether-options larp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members Tera-VM
```

25. Configure interface ae30 to provide connectivity to the traffic generator on VLAN 502.

In your data center network, you can assign this interface to your production traffic.

```
[edit interfaces ae30]
user@device# set description "Towards TrafficGenerator-v502"
user@device# set mtu 9192
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options larp active
user@device# set aggregated-ether-options larp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
```

```
user@device# set unit 0 family ethernet-switching vlan members TrafficGenerator-502
```

26. Configure interface ae31 to provide connectivity to the traffic generator on VLAN 501.

In your data center network, you can assign this interface to your production traffic.

```
[edit interfaces ae31]
user@device# set description "Towards TrafficGenerator-v501"
user@device# set mtu 9192
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members TrafficGenerator-501
```

27. Configure interface ae32 to provide connectivity to the traffic generator on VLAN 27 for the connection between the VCF and the SRX Series security cluster.

```
[edit interfaces ae32]
user@device# set description "Towards TrafficGenerator-v27"
user@device# set mtu 9192
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members vcf-srx
```

28. Configure interface ae33 to provide connectivity to the traffic generator on VLAN 503.

In your data center network, you can assign this interface to your production traffic.

```
[edit interfaces ae33]
user@device# set description "Towards TrafficGenerator-v503"
user@device# set mtu 9192
user@device# set aggregated-ether-options minimum-links 1
user@device# set aggregated-ether-options lacp active
user@device# set aggregated-ether-options lacp periodic fast
user@device# set unit 0 family ethernet-switching interface-mode trunk
user@device# set unit 0 family ethernet-switching vlan members TrafficGenerator-503
```

Configuring Integrated Routing and Bridging (IRB) Interfaces for the VCF

CLI Quick Configuration

To quickly configure IRB interfaces for the VCF, enter the following configuration statements on the device acting in the master role:

```
[edit]
set interfaces irb mtu 9192
set interfaces irb unit 15 description Load-balancer-External
set interfaces irb unit 15 family inet address 192.168.15.254/24
set interfaces irb unit 16 description Load-balancer-Tera-VM-External
set interfaces irb unit 16 family inet address 192.168.16.254/24
set interfaces irb unit 20 description "OOB link towards vdc-mgmt-ae8"
set interfaces irb unit 20 family inet address 192.168.20.254/24
set interfaces irb unit 27 description "Link between VCF and SRX"
```

```
set interfaces irb unit 27 family inet mtu 9170
set interfaces irb unit 27 family inet address 192.168.255.254/16
set interfaces irb unit 101 description VDC-Domain-Infra-Access
set interfaces irb unit 101 family inet address 172.16.1.254/24
set interfaces irb unit 102 description Sharepoint
set interfaces irb unit 102 family inet address 172.16.2.254/24
set interfaces irb unit 103 description Wikimedia
set interfaces irb unit 103 family inet address 172.16.3.254/24
set interfaces irb unit 104 description Exchange
set interfaces irb unit 104 family inet address 172.16.4.254/24
set interfaces irb unit 105 description Sharepoint-SQL
set interfaces irb unit 105 family inet address 172.16.5.254/24
set interfaces irb unit 106 description V-motion
set interfaces irb unit 106 family inet address 172.16.6.254/24
set interfaces irb unit 107 description Vmware-Fault-Tolerance
set interfaces irb unit 107 family inet address 172.16.7.254/24
set interfaces irb unit 108 description Server-Farm1
set interfaces irb unit 108 family inet address 172.16.8.254/24
set interfaces irb unit 109 description Exchange-Cluster
set interfaces irb unit 109 family inet address 172.16.9.254/24
set interfaces irb unit 208 description Server-Farm2
set interfaces irb unit 208 family inet address 172.20.8.254/24
set interfaces irb unit 501 family inet address 10.10.255.254/16
set interfaces irb unit 502 family inet address 10.20.255.254/16
set interfaces irb unit 503 family inet address 10.30.255.254/16
set interfaces irb unit 504 family inet address 10.40.255.254/16
set interfaces irb unit 505 family inet address 10.50.255.254/16
```

Step-by-Step Procedure

To configure IRB interfaces for the VCF:

1. Configure a default MTU value of 9192 bytes for the IRB interfaces:

```
[edit interfaces irb]
user@device# set mtu 9192
```
2. Configure IRB interfaces 15 and 16 to provide Layer 3 services for the load balancers:

```
[edit interfaces irb]
user@device# set unit 15 description Load-balancer-External
user@device# set unit 15 family inet address 192.168.15.254/24
user@device# set unit 16 description Load-balancer-Tera-VM-External
user@device# set unit 16 family inet address 192.168.16.254/24
```
3. Configure IRB interface 20 to provide Layer 3 services for the EX4300 out-of-band management network:

```
[edit interfaces irb]
user@device# set unit 20 description "OOB link towards vdc-mgmt-ae8"
user@device# set unit 20 family inet address 192.168.20.254/24
```
4. Configure IRB interface 27 to provide Layer 3 services between the VCF and the SRX cluster:

```
[edit interfaces irb]
user@device# set unit 27 description "Link between VCF and SRX"
user@device# set unit 27 family inet mtu 9170
user@device# set unit 27 family inet address 192.168.255.254/16
```

5. Configure IRB interface 101 to provide Layer 3 services for the data center domain:

```
[edit interfaces irb]
user@device# set unit 101 description VDC-Domain-Infra-Access
user@device# set unit 101 family inet address 172.16.1.254/24
```

6. Configure IRB interfaces 102 and 105 to provide Layer 3 services for the SharePoint application and SQL database:

```
[edit interfaces irb]
user@device# set unit 102 description Sharepoint
user@device# set unit 102 family inet address 172.16.2.254/24
user@device# set unit 105 description Sharepoint-SQL
user@device# set unit 105 family inet address 172.16.5.254/24
```

7. Configure IRB interface 103 to provide Layer 3 services for the Wikimedia application:

```
[edit interfaces irb]
user@device# set unit 103 description Wikimedia
user@device# set unit 103 family inet address 172.16.3.254/24
```

8. Configure IRB interfaces 104 and 109 to provide Layer 3 services for the Exchange application:

```
[edit interfaces irb]
user@device# set unit 104 description Exchange
user@device# set unit 104 family inet address 172.16.4.254/24
user@device# set unit 109 description Exchange-Cluster
user@device# set unit 109 family inet address 172.16.9.254/24
```

9. Configure IRB interfaces 106 and 107 to provide Layer 3 services for VMware virtual machine fault tolerance and VMotion:

```
[edit interfaces irb]
user@device# set unit 106 description V-motion
user@device# set unit 106 family inet address 172.16.6.254/24
user@device# set unit 107 description Vmware-Fault-Tolerance
user@device# set unit 107 family inet address 172.16.7.254/24
```

10. Configure IRB interfaces 108 and 208 to provide Layer 3 services for the two server farms:

```
[edit interfaces irb]
user@device# set unit 108 description Server-Farm1
user@device# set unit 108 family inet address 172.16.8.254/24
user@device# set unit 208 description Server-Farm2
user@device# set unit 208 family inet address 172.20.8.254/24
```

11. Configure IRB interfaces 501 through 505 to provide Layer 3 services for production traffic.

```
[edit interfaces irb]
user@device# set unit 501 family inet address 10.10.255.254/16
user@device# set unit 502 family inet address 10.20.255.254/16
user@device# set unit 503 family inet address 10.30.255.254/16
```

```
user@device# set unit 504 family inet address 10.40.255.254/16
user@device# set unit 505 family inet address 10.50.255.254/16
```

Configuring VLANs for the VCF

CLI Quick Configuration To quickly configure VLANs for the VCF, enter the following configuration statements on the device acting in the master role:

```
[edit]
set vlans Compute-MGMT vlan-id 800
set vlans Exchange vlan-id 104
set vlans Exchange l3-interface irb.104
set vlans Exchange-Cluster vlan-id 109
set vlans Exchange-Cluster l3-interface irb.109
set vlans Infra vlan-id 101
set vlans Infra l3-interface irb.101
set vlans Load-balancer-Ext vlan-id 15
set vlans Load-balancer-Ext l3-interface irb.15
set vlans Load-balancer-Ext-Tera-VM vlan-id 16
set vlans Load-balancer-Ext-Tera-VM l3-interface irb.16
set vlans OOB-Transport vlan-id 20
set vlans OOB-Transport l3-interface irb.20
set vlans Remote-Access vlan-id 810
set vlans SQL vlan-id 105
set vlans SQL l3-interface irb.105
set vlans Security-Mgmt vlan-id 801
set vlans Server-Farm1 vlan-id 108
set vlans Server-Farm1 l3-interface irb.108
set vlans Server-Farm2 vlan-id 208
set vlans Server-Farm2 l3-interface irb.208
set vlans Sharepoint vlan-id 102
set vlans Sharepoint l3-interface irb.102
set vlans TrafficGenerator-501 vlan-id 501
set vlans TrafficGenerator-501 l3-interface irb.501
set vlans TrafficGenerator-502 vlan-id 502
set vlans TrafficGenerator-502 l3-interface irb.502
set vlans TrafficGenerator-503 vlan-id 503
set vlans TrafficGenerator-503 l3-interface irb.503
set vlans TrafficGenerator-504 vlan-id 504
set vlans TrafficGenerator-504 l3-interface irb.504
set vlans TrafficGenerator-505 vlan-id 505
set vlans TrafficGenerator-505 l3-interface irb.505
set vlans Tera-VM vlan-id 900
set vlans VM-FT vlan-id 107
set vlans VM-FT l3-interface irb.107
set vlans Vmotion vlan-id 106
set vlans Vmotion l3-interface irb.106
set vlans Wikimedia vlan-id 103
set vlans Wikimedia l3-interface irb.103
set vlans default vlan-id 1
set vlans default l3-interface irb.0
set vlans vcf-srx vlan-id 27
set vlans vcf-srx l3-interface irb.27
```

- Step-by-Step Procedure** Create the following VLANs to enable connectivity for applications, security, load balancing, and infrastructure support:
1. Create VLAN 800 for compute management:

```
[edit vlans]
user@device# set Compute-MGMT vlan-id 800
```
 2. Create VLANs 104 and 109 to support the Microsoft Exchange application:

```
[edit vlans]
user@device# set Exchange vlan-id 104
user@device# set Exchange l3-interface irb.104
user@device# set Exchange-Cluster vlan-id 109
user@device# set Exchange-Cluster l3-interface irb.109
```
 3. Create VLAN 101 to provide domain access for the data center:

```
[edit vlans]
user@device# set Infra vlan-id 101
user@device# set Infra l3-interface irb.101
```
 4. Create VLANs 15 and 16 to provide support for the load balancers:

```
[edit vlans]
user@device# set Load-balancer-Ext vlan-id 15
user@device# set Load-balancer-Ext l3-interface irb.15
user@device# set Load-balancer-Ext-Tera-VM vlan-id 16
user@device# set Load-balancer-Ext-Tera-VM l3-interface irb.16
```
 5. Create VLAN 20 to support the out-of-band management network:

```
[edit vlans]
user@device# set OOB-Transport vlan-id 20
user@device# set OOB-Transport l3-interface irb.20
```
 6. Create VLAN 810 to support remote access:

```
[edit vlans]
user@device# set Remote-Access vlan-id 810
```
 7. Create VLAN 105 to support the SQL application:

```
[edit vlans]
user@device# set SQL vlan-id 105
user@device# set SQL l3-interface irb.105
```
 8. Create VLAN 801 to support security management:

```
[edit vlans]
user@device# set Security-Mgmt vlan-id 801
```
 9. Create VLANs 108 and 208 to support Server Farm 1 and Server Farm 2, respectively:

```
[edit vlans]
user@device# set Server-Farm1 vlan-id 108
user@device# set Server-Farm1 l3-interface irb.108
```

```
user@device# set Server-Farm2 vlan-id 208
user@device# set Server-Farm2 l3-interface irb.208
```

10. Create VLAN 102 to support the SharePoint application:

```
[edit vlans]
user@device# set Sharepoint vlan-id 102
user@device# set Sharepoint l3-interface irb.102
```

11. Create VLANs 501 through 505.

In the lab, these VLANs supported traffic generators, but you can assign these VLANs to your production traffic.

```
[edit vlans]
user@device# set TrafficGenerator-501 vlan-id 501
user@device# set TrafficGenerator-501 l3-interface irb.501
user@device# set TrafficGenerator-502 vlan-id 502
user@device# set TrafficGenerator-502 l3-interface irb.502
user@device# set TrafficGenerator-503 vlan-id 503
user@device# set TrafficGenerator-503 l3-interface irb.503
user@device# set TrafficGenerator-504 vlan-id 504
user@device# set TrafficGenerator-504 l3-interface irb.504
user@device# set TrafficGenerator-505 vlan-id 505
user@device# set TrafficGenerator-505 l3-interface irb.505
```

12. Create VLAN 900.

In the lab, this VLAN supported management traffic for the Tera-VM application, but you can assign this VLAN to your production traffic.

```
[edit vlans]
user@device# set Tera-VM vlan-id 900
```

13. Create VLANs 106 and 107 to support the infrastructure for virtual machine fault tolerance and movement:

```
[edit vlans]
user@device# set VM-FT vlan-id 107
user@device# set VM-FT l3-interface irb.107
user@device# set Vmotion vlan-id 106
user@device# set Vmotion l3-interface irb.106
```

14. Create VLAN 103 to support the Wikimedia application:

```
[edit vlans]
user@device# set Wikimedia vlan-id 103
user@device# set Wikimedia l3-interface irb.103
```

15. Create VLAN 1 to act as the default VLAN in the data center:

```
[edit vlans]
user@device# set default vlan-id 1
user@device# set default l3-interface irb.0
```

16. Create VLAN 27 to support the connection between the VCF and the SRX Series security cluster:

```
[edit vlans]
user@device# set vcf-srx vlan-id 27
user@device# set vcf-srx l3-interface irb.27
```

Configuring OSPF and LLDP for the VCF

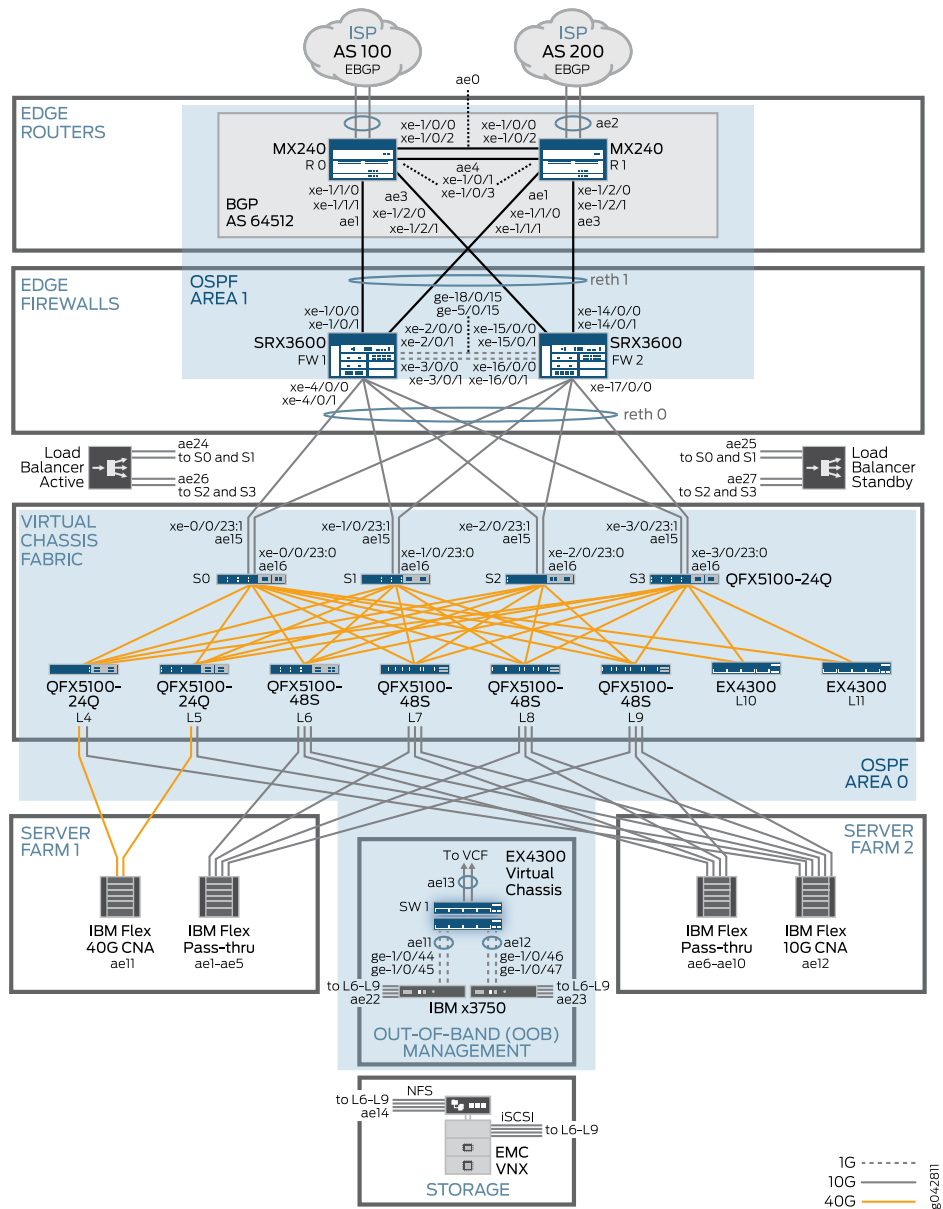
CLI Quick Configuration

To quickly configure OSPF and LLDP for the VCF, enter the following configuration statements on the device acting in the master role:

```
[edit]
set protocols ospf export export-ospf
set protocols ospf area 0.0.0.0 interface irb.27 node-link-protection
set protocols ospf area 0.0.0.0 interface irb.27 bfd-liveness-detection minimum-interval 335
set protocols ospf area 0.0.0.0 interface irb.503
set protocols ospf area 0.0.0.0 interface irb.501
set protocols ospf area 0.0.0.0 interface irb.502
set protocols ospf area 0.0.0.0 interface irb.504
set protocols ospf area 0.0.0.0 interface irb.505
set protocols ospf area 0.0.0.0 interface irb.106 passive
set protocols ospf area 0.0.0.0 interface irb.107 passive
set protocols ospf area 0.0.0.0 interface irb.20
set protocols ospf area 0.0.0.0 interface irb.101 passive
set protocols ospf area 0.0.0.0 interface irb.15
set protocols lldp interface all
set policy-options policy-statement export-ospf term export-vip from protocol static
set policy-options policy-statement export-ospf term export-vip from route-filter 10.94.127.128/26
exact accept
```

[Figure 4 on page 33](#) shows where you configure routing protocols in MetaFabric Architecture 1.1. OSPF Area 0 belongs to the VCF and the out-of-band management network, while OSPF Area 1 covers the SRX Series firewalls and the MX Series edge routers. OSPF connects with BGP on the MX240 routers, and data center traffic is sent to the Internet service providers by way of two EBGP peers. This example focuses on the OSPF configuration for the VCF.

Figure 4: MetaFabric Architecture 1.1 - Routing Protocols



For additional routing protocol configurations for the other components shown in this solution, see the [MetaFabric™ Architecture Virtualized Data Center Design and Implementation Guide](#).

**Step-by-Step
Procedure**

1. Configure OSPF Area 0 on IRB interfaces 15 (External load balancer), 20 (Out-of-band management), 27 (SRX to VCF), 101 (data center domain), 106 and 107 (VM related), and 501 through 505 (production traffic):

```
[edit protocols ospf]
user@device# set area 0.0.0.0 interface irb.503
user@device# set area 0.0.0.0 interface irb.501
user@device# set area 0.0.0.0 interface irb.502
user@device# set area 0.0.0.0 interface irb.504
user@device# set area 0.0.0.0 interface irb.505
user@device# set area 0.0.0.0 interface irb.106 passive
user@device# set area 0.0.0.0 interface irb.107 passive
user@device# set area 0.0.0.0 interface irb.20
user@device# set area 0.0.0.0 interface irb.101 passive
user@device# set area 0.0.0.0 interface irb.15
```

2. Configure node link protection and BFD detection settings for OSPF:

```
[edit protocols ospf]
user@device# set area 0.0.0.0 interface irb.27 node-link-protection
user@device# set area 0.0.0.0 interface irb.27 bfd-liveness-detection minimum-interval 335
```

3. Configure an export policy for the application virtual IP address and apply it to OSPF:

```
[edit]
user@device# set policy-options policy-statement export-ospf term export-vip from protocol static
user@device# set policy-options policy-statement export-ospf term export-vip from route-filter 10.94.127.128/26 exact accept
user@device# set protocols ospf export export-ospf
```

4. Configure LLDP on all interfaces to enable Network Director 1.6 to perform orchestration services:

```
[edit]
user@device# set protocols lldp interface all
```



NOTE: When you enable LLDP on VCF members, it is possible for interfaces to become VCP ports automatically when you connect members together. As a result, we normally recommend that you disable LLDP on all network ports.

However, because Network Director requires you to enable LLDP on network ports so it can perform orchestration services, you must be careful not to connect other Juniper Networks devices to the preprovisioned VCF after the initial setup.

Verification

Confirm that the VCF configuration is working properly.

- [Verifying the Status of Your VCF on page 35](#)
- [Verifying VCP Port Mappings for the VCF on page 36](#)
- [Verifying VCF Member Adjacencies on page 39](#)
- [Verifying IRB Interfaces on page 41](#)
- [Verifying Aggregated Ethernet Interfaces on page 41](#)
- [Verifying OSPF Adjacencies with the SRX Cluster and EX4300 OOB Virtual Chassis on page 42](#)
- [Verifying That LACP Is Working in the VCF on page 43](#)

Verifying the Status of Your VCF

Purpose The output of the **show virtual-chassis status** command informs you of several facts about your VCF. The first three lines of output indicate what kind of VCF has been established (in this case, **Preprovisioned Virtual Chassis Fabric** and **Fabric Mode: Mixed**). You can also see the member numbers, the status and serial number of each member, the device model numbers, the VCF roles, the IDs of connected members, and the remote VCP port interface names.

Action To verify the status of the VCF, issue the **show virtual-chassis status** command:

```
user@device> show virtual-chassis status
```

```
Preprovisioned Virtual Chassis Fabric
Fabric ID: 2bf3.84be.3e5d
Fabric Mode: Mixed
```

Member ID	Status	Serial No	Model	Mstr prio	Role	Mixed Mode	Route Mode	Neighbor List ID Interface
0 (FPC 0)	Prsnt	TB3714010375	qfx5100-24q-2p	129	Master*	Y	F	4 vcp-255/0/0 5 vcp-255/0/1 10 vcp-255/0/10 11 vcp-255/0/11 9 vcp-255/0/3 8 vcp-255/0/4 7 vcp-255/0/6 6 vcp-255/0/7
1 (FPC 1)	Prsnt	TB3714010058	qfx5100-24q-2p	129	Linecard	Y	F	4 vcp-255/0/0 5 vcp-255/0/1 9 vcp-255/0/3 8 vcp-255/0/4 7 vcp-255/0/6 6 vcp-255/0/7
2 (FPC 2)	Prsnt	TB3714010044	qfx5100-24q-2p	129	Linecard	Y	F	4 vcp-255/0/0 5 vcp-255/0/1 10 vcp-255/0/2 9 vcp-255/0/3 8 vcp-255/0/4 11 vcp-255/0/5 7 vcp-255/0/6 6 vcp-255/0/7

3 (FPC 3)	Prsnt	TB3714010450	qfx5100-24q-2p	129	Backup	Y	F	4 vcp-255/0/0 5 vcp-255/0/1 10 vcp-255/0/10 11 vcp-255/0/11 9 vcp-255/0/3 8 vcp-255/0/4 7 vcp-255/0/6 6 vcp-255/0/7
4 (FPC 4)	Prsnt	TB3714010595	qfx5100-24q-2p	0	Linecard	Y	F	0 vcp-255/0/0 1 vcp-255/0/1 2 vcp-255/0/2 3 vcp-255/0/3
5 (FPC 5)	Prsnt	TB3714010270	qfx5100-24q-2p	0	Linecard	Y	F	0 vcp-255/0/0 1 vcp-255/0/1 2 vcp-255/0/2 3 vcp-255/0/3
6 (FPC 6)	Prsnt	TA3714030625	qfx5100-48s-6q	0	Linecard	Y	F	0 vcp-255/0/48 1 vcp-255/0/49 2 vcp-255/0/50 3 vcp-255/0/51
7 (FPC 7)	Prsnt	TA3714030225	qfx5100-48s-6q	0	Linecard	Y	F	0 vcp-255/0/48 1 vcp-255/0/49 2 vcp-255/0/50 3 vcp-255/0/51
8 (FPC 8)	Prsnt	TA3714030519	qfx5100-48s-6q	0	Linecard	Y	F	0 vcp-255/0/48 1 vcp-255/0/49 2 vcp-255/0/50 3 vcp-255/0/51
9 (FPC 9)	Prsnt	TA3714030562	qfx5100-48s-6q	0	Linecard	Y	F	0 vcp-255/0/48 1 vcp-255/0/49 2 vcp-255/0/50 3 vcp-255/0/51
10 (FPC 10)	Prsnt	PG3714080066	ex4300-24t	0	Linecard	Y	F	0 vcp-255/1/0 3 vcp-255/1/1 2 vcp-255/1/2
11 (FPC 11)	Prsnt	PG3714080086	ex4300-24t	0	Linecard	Y	F	0 vcp-255/1/0 3 vcp-255/1/1 2 vcp-255/1/2

Verifying VCP Port Mappings for the VCF

Purpose The output of the **show virtual-chassis vc-port all-members | no-more** command displays information that helps you determine if your members connect to each other properly. For each member, the output provides details about the local VCP interfaces (**PIC / Port** field), which remote member connects through each local VCP interface (**Neighbor ID** field), and the remote VCP interface name (**Neighbor Interface** field).

Action To verify the port mappings for the VCF, issue the **show virtual-chassis vc-port all-members | no-more** command:

```
user@device> show virtual-chassis vc-port all-members | no-more
fpc0:
```

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Neighbor Interface
0/0	Configured	-1	Up	40000	4	vcp-255/0/0
0/1	Configured	-1	Up	40000	5	vcp-255/0/0
0/10	Configured	-1	Up	40000	10	vcp-255/1/0

0/11	Configured	-1	Up	40000	11	vcp-255/1/0
0/3	Configured	-1	Up	40000	9	vcp-255/0/48
0/4	Configured	-1	Up	40000	8	vcp-255/0/48
0/5	Configured	-1	Down	40000		
0/6	Configured	-1	Up	40000	7	vcp-255/0/48
0/7	Configured	-1	Up	40000	6	vcp-255/0/48

fpc1:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/0	Configured	-1	Up	40000	4	vcp-255/0/1
0/1	Configured	-1	Up	40000	5	vcp-255/0/1
0/2	Configured	-1	Up	40000	10	vcp-255/1/3
0/3	Configured	-1	Up	40000	9	vcp-255/0/49
0/4	Configured	-1	Up	40000	8	vcp-255/0/49
0/5	Configured	-1	Up	40000	11	vcp-255/1/3
0/6	Configured	-1	Up	40000	7	vcp-255/0/49
0/7	Configured	-1	Up	40000	6	vcp-255/0/49

fpc2:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/0	Configured	-1	Up	40000	4	vcp-255/0/2
0/1	Configured	-1	Up	40000	5	vcp-255/0/2
0/2	Configured	-1	Up	40000	10	vcp-255/1/2
0/3	Configured	-1	Up	40000	9	vcp-255/0/50
0/4	Configured	-1	Up	40000	8	vcp-255/0/50
0/5	Configured	-1	Up	40000	11	vcp-255/1/2
0/6	Configured	-1	Up	40000	7	vcp-255/0/50
0/7	Configured	-1	Up	40000	6	vcp-255/0/50

fpc3:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/0	Configured	-1	Up	40000	4	vcp-255/0/3
0/1	Configured	-1	Up	40000	5	vcp-255/0/3
0/10	Configured	-1	Up	40000	10	vcp-255/1/1
0/11	Configured	-1	Up	40000	11	vcp-255/1/1
0/3	Configured	-1	Up	40000	9	vcp-255/0/51
0/4	Configured	-1	Up	40000	8	vcp-255/0/51
0/6	Configured	-1	Up	40000	7	vcp-255/0/51
0/7	Configured	-1	Up	40000	6	vcp-255/0/51
0/5	Configured		Absent			

fpc4:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/0	Configured	-1	Up	40000	0	vcp-255/0/0
0/1	Configured	-1	Up	40000	1	vcp-255/0/0
0/2	Configured	-1	Up	40000	2	vcp-255/0/0
0/3	Configured	-1	Up	40000	3	vcp-255/0/0

fpc5:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/0	Configured	-1	Up	40000	0	vcp-255/0/1
0/1	Configured	-1	Up	40000	1	vcp-255/0/1
0/2	Configured	-1	Up	40000	2	vcp-255/0/1
0/3	Configured	-1	Up	40000	3	vcp-255/0/1

fpc6:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/48	Configured	-1	Up	40000	0	vcp-255/0/7
0/49	Configured	-1	Up	40000	1	vcp-255/0/7
0/50	Configured	-1	Up	40000	2	vcp-255/0/7
0/51	Configured	-1	Up	40000	3	vcp-255/0/7

fpc7:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/48	Configured	-1	Up	40000	0	vcp-255/0/6
0/49	Configured	-1	Up	40000	1	vcp-255/0/6
0/50	Configured	-1	Up	40000	2	vcp-255/0/6
0/51	Configured	-1	Up	40000	3	vcp-255/0/6

fpc8:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/48	Configured	-1	Up	40000	0	vcp-255/0/4
0/49	Configured	-1	Up	40000	1	vcp-255/0/4
0/50	Configured	-1	Up	40000	2	vcp-255/0/4
0/51	Configured	-1	Up	40000	3	vcp-255/0/4

fpc9:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
0/48	Configured	-1	Up	40000	0	vcp-255/0/3
0/49	Configured	-1	Up	40000	1	vcp-255/0/3
0/50	Configured	-1	Up	40000	2	vcp-255/0/3
0/51	Configured	-1	Up	40000	3	vcp-255/0/3

fpc10:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
1/0	Configured	-1	Up	40000	0	vcp-255/0/10
1/1	Configured	-1	Up	40000	3	vcp-255/0/10
1/2	Configured	-1	Up	40000	2	vcp-255/0/2
1/3	Configured	-1	Up	40000	1	vcp-255/0/2

fpc11:

Interface or PIC / Port	Type	Trunk ID	Status	Speed (mbps)	Neighbor ID	Interface
1/0	Configured	-1	Up	40000	0	vcp-255/0/11
1/1	Configured	-1	Up	40000	3	vcp-255/0/11
1/2	Configured	-1	Up	40000	2	vcp-255/0/5
1/3	Configured	-1	Up	40000	1	vcp-255/0/5

Verifying VCF Member Adjacencies

Purpose The output of the **show virtual-chassis protocol adjacency** command displays information about VCF member adjacencies. For each local member, the output shows all remote member VCP interface names, system IDs, states of the remote members, and the hold time.

Action To verify the status of member adjacencies in the VCF, issue the **show virtual-chassis protocol adjacency** command:

```
user@device> show virtual-chassis protocol adjacency
fpc0:
```

```
-----
Interface      System      State      Hold (secs)
vcp-255/0/0.32768 100e.7eb8.2140 Up          57
vcp-255/0/1.32768 100e.7eb8.8540 Up          57
vcp-255/0/10.32768 f4b5.2f41.7fa0 Up          57
vcp-255/0/11.32768 f4b5.2f41.7a00 Up          58
vcp-255/0/3.32768 100e.7eb9.4e80 Up          59
vcp-255/0/4.32768 100e.7eb9.3bc0 Up          58
vcp-255/0/6.32768 100e.7eab.b3c0 Up          59
vcp-255/0/7.32768 100e.7ebc.e180 Up          59
```

```
fpc1:
```

```
-----
Interface      System      State      Hold (secs)
vcp-255/0/0.32768 100e.7eb8.2140 Up          57
vcp-255/0/1.32768 100e.7eb8.8540 Up          59
vcp-255/0/3.32768 100e.7eb9.4e80 Up          57
vcp-255/0/4.32768 100e.7eb9.3bc0 Up          58
vcp-255/0/6.32768 100e.7eab.b3c0 Up          57
vcp-255/0/7.32768 100e.7ebc.e180 Up          59
```

```
fpc2:
```

```
-----
Interface      System      State      Hold (secs)
vcp-255/0/0.32768 100e.7eb8.2140 Up          59
vcp-255/0/1.32768 100e.7eb8.8540 Up          59
vcp-255/0/2.32768 f4b5.2f41.7fa0 Up          59
vcp-255/0/3.32768 100e.7eb9.4e80 Up          57
vcp-255/0/4.32768 100e.7eb9.3bc0 Up          58
vcp-255/0/5.32768 f4b5.2f41.7a00 Up          58
vcp-255/0/6.32768 100e.7eab.b3c0 Up          57
vcp-255/0/7.32768 100e.7ebc.e180 Up          59
```

```
fpc3:
```

```
-----
Interface      System      State      Hold (secs)
vcp-255/0/0.32768 100e.7eb8.2140 Up          58
vcp-255/0/1.32768 100e.7eb8.8540 Up          59
vcp-255/0/10.32768 f4b5.2f41.7fa0 Up          58
```

```

vcp-255/0/11.32768    f4b5.2f41.7a00 Up           58
vcp-255/0/3.32768    100e.7eb9.4e80 Up           59
vcp-255/0/4.32768    100e.7eb9.3bc0 Up           57
vcp-255/0/6.32768    100e.7eab.b3c0 Up           59
vcp-255/0/7.32768    100e.7ebc.e180 Up           58

```

fpc4:

```

-----
Interface      System      State      Hold (secs)
vcp-255/0/0.32768 100e.7eb7.c100 Up          57
vcp-255/0/1.32768 100e.7eb7.ddc0 Up          58
vcp-255/0/2.32768 100e.7eb8.1b00 Up          58
vcp-255/0/3.32768 100e.7eb8.87c0 Up          59

```

fpc5:

```

-----
Interface      System      State      Hold (secs)
vcp-255/0/0.32768 100e.7eb7.c100 Up          58
vcp-255/0/1.32768 100e.7eb7.ddc0 Up          59
vcp-255/0/2.32768 100e.7eb8.1b00 Up          59
vcp-255/0/3.32768 100e.7eb8.87c0 Up          59

```

fpc6:

```

-----
Interface      System      State      Hold (secs)
vcp-255/0/48.32768 100e.7eb7.c100 Up          59
vcp-255/0/49.32768 100e.7eb7.ddc0 Up          59
vcp-255/0/50.32768 100e.7eb8.1b00 Up          58
vcp-255/0/51.32768 100e.7eb8.87c0 Up          59

```

fpc7:

```

-----
Interface      System      State      Hold (secs)
vcp-255/0/48.32768 100e.7eb7.c100 Up          57
vcp-255/0/49.32768 100e.7eb7.ddc0 Up          57
vcp-255/0/50.32768 100e.7eb8.1b00 Up          59
vcp-255/0/51.32768 100e.7eb8.87c0 Up          59

```

fpc8:

```

-----
Interface      System      State      Hold (secs)
vcp-255/0/48.32768 100e.7eb7.c100 Up          57
vcp-255/0/49.32768 100e.7eb7.ddc0 Up          57
vcp-255/0/50.32768 100e.7eb8.1b00 Up          59
vcp-255/0/51.32768 100e.7eb8.87c0 Up          59

```

fpc9:

```

-----
Interface      System      State      Hold (secs)
vcp-255/0/48.32768 100e.7eb7.c100 Up          58
vcp-255/0/49.32768 100e.7eb7.ddc0 Up          59
vcp-255/0/50.32768 100e.7eb8.1b00 Up          58
vcp-255/0/51.32768 100e.7eb8.87c0 Up          57

```

fpc10:

```

-----
Interface      System      State      Hold (secs)
vcp-255/1/0.32768 100e.7eb7.c100 Up          59
vcp-255/1/1.32768 100e.7eb8.87c0 Up          57
vcp-255/1/2.32768 100e.7eb8.1b00 Up          58
vcp-255/1/3.32768 100e.7eb7.ddc0 up          59

```

fpc11:

Interface	System	State	Hold (secs)
vcp-255/1/0.32768	100e.7eb7.c100	Up	58
vcp-255/1/1.32768	100e.7eb8.87c0	Up	59
vcp-255/1/2.32768	100e.7eb8.1b00	Up	59
vcp-255/1/3.32768	100e.7eb7.ddc0	up	59

Verifying IRB Interfaces

Purpose The output of the **show interfaces terse | match irb** command displays information about the Layer 3 IRB interfaces in the VCF. The output shows the IRB interface name, administrative and link status, protocol, and the local IP address for each interface.

Action To verify the status of the VCF, issue the **show interfaces terse | match irb** command:

```
user@device> show interfaces terse | match irb
```

Interface	Admin	Link	Proto	Local	Remote
irb	up	up			
irb.0	up	up	inet		
irb.15	up	up	inet	192.168.15.254/24	
irb.16	up	up	inet	192.168.16.254/24	
irb.20	up	up	inet	192.168.20.254/24	
irb.27	up	up	inet	192.168.255.254/16	
irb.101	up	up	inet	172.16.1.254/24	
irb.102	up	up	inet	172.16.2.254/24	
irb.103	up	up	inet	172.16.3.254/24	
irb.104	up	up	inet	172.16.4.254/24	
irb.105	up	up	inet	172.16.5.254/24	
irb.106	up	up	inet	172.16.6.254/24	
irb.107	up	up	inet	172.16.7.254/24	
irb.108	up	up	inet	172.16.8.254/24	
irb.109	up	up	inet	172.16.9.254/24	
irb.208	up	up	inet	172.20.8.254/24	
irb.501	up	up	inet	10.30.255.254/16	
irb.502	up	up	inet	20.30.255.254/16	
irb.503	up	up	inet	30.30.255.254/16	
irb.504	up	up	inet	40.30.255.254/16	
irb.505	up	up	inet	50.30.255.254/16	

Verifying Aggregated Ethernet Interfaces

Purpose The output of the **show interfaces terse | match ae** command displays information about the aggregated Ethernet interfaces in the VCF. The output shows the LAG interface name, administrative and link status, and switching protocol for each interface.

Action To verify the status of LAG interfaces in the VCF, issue the **show interfaces terse | match ae** command:

```
user@device> show interfaces terse | match ae
```

Interface	Admin	Link	Proto	Local	Remote
ae1	up	up			
ae1.0	up	up	eth-switch		
ae2	up	up			
ae2.0	up	up	eth-switch		
ae3	up	up			
ae3.0	up	up	eth-switch		

ae4	up	up	
ae4.0	up	up	eth-switch
ae5	up	up	
ae5.0	up	up	eth-switch
ae6	up	up	
ae6.0	up	up	eth-switch
ae7	up	up	
ae7.0	up	up	eth-switch
ae8	up	up	
ae8.0	up	up	eth-switch
ae9	up	up	
ae9.0	up	up	eth-switch
ae10	up	up	
ae10.0	up	up	eth-switch
ae11	up	up	
ae11.0	up	up	eth-switch
ae12	up	up	
ae12.0	up	up	eth-switch
ae13	up	up	
ae13.0	up	up	eth-switch
ae14	up	up	
ae14.0	up	up	eth-switch
ae15	up	up	
ae15.0	up	up	eth-switch
ae16	up	up	
ae16.0	up	up	eth-switch
ae17	up	up	
ae17.0	up	up	eth-switch
ae18	up	up	
ae18.0	up	up	eth-switch
ae19	up	up	
ae19.0	up	up	eth-switch
ae20	up	up	
ae20.0	up	up	eth-switch
ae21	up	up	
ae21.0	up	up	eth-switch
ae22	up	up	
ae22.0	up	up	eth-switch
ae23	up	up	
ae23.0	up	up	eth-switch
ae24	up	up	
ae24.0	up	up	eth-switch
ae25	up	up	
ae25.0	up	up	eth-switch
ae29	up	up	
ae29.0	up	up	eth-switch
ae30	up	up	
ae30.0	up	up	eth-switch
ae31	up	up	
ae31.0	up	up	eth-switch
ae32	up	up	
ae32.0	up	up	eth-switch
ae33	up	up	
ae33.0	up	up	eth-switch

Verifying OSPF Adjacencies with the SRX Cluster and EX4300 OOB Virtual Chassis

Purpose The output of the **show ospf neighbor** command displays the current OSPF adjacencies. It shows the IP address of each OSPF neighbor, adjacency state, neighbor ID, and other adjacency details.

Action To verify the status of OSPF adjacencies in the VCF, issue the **show ospf neighbor** command:

```
user@device> show ospf neighbor
Address          Interface      State   ID                Pri  Dead
192.168.20.3     irb.20        Full   192.168.168.20   128  39
192.168.255.253 irb.27        Full   192.168.168.3    128  35
```

Meaning In this case, interface irb.20 connects to the EX4300 out-of-band management Virtual Chassis, and irb.27 connects to the SRX cluster. Because both neighbor adjacencies are in the **Full** state, OSPF is working correctly.

Verifying That LACP Is Working in the VCF

Purpose The output of the **show lacp interfaces** command displays the status of LACP in your VCF. It shows which ports participate in each LAG, what role each link in the bundle plays, the state of each port, timeout settings, activity, and other helpful details.

Action To verify the status of LACP in the VCF, issue the **show lacp interfaces** command:

```
user@device> show lacp interfaces | no-more
Aggregated interface: ae1
LACP state:      Role  Exp  Def  Dist  Col  Syn  Aggr  Timeout  Activity
xe-9/0/0        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-9/0/0        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
xe-7/0/0        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-7/0/0        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
xe-8/0/0        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-8/0/0        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
xe-6/0/0        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-6/0/0        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
LACP protocol:   Receive State  Transmit State  Mux State
xe-9/0/0         Current  Slow periodic  Collecting distributing
xe-7/0/0         Current  Slow periodic  Collecting distributing
xe-8/0/0         Current  Slow periodic  Collecting distributing
xe-6/0/0         Current  Slow periodic  Collecting distributing

Aggregated interface: ae2
LACP state:      Role  Exp  Def  Dist  Col  Syn  Aggr  Timeout  Activity
xe-8/0/1        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-8/0/1        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
xe-9/0/1        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-9/0/1        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
xe-6/0/1        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-6/0/1        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
xe-7/0/1        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-7/0/1        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
LACP protocol:   Receive State  Transmit State  Mux State
xe-8/0/1         Current  Slow periodic  Collecting distributing
xe-9/0/1         Current  Slow periodic  Collecting distributing
xe-6/0/1         Current  Slow periodic  Collecting distributing
xe-7/0/1         Current  Slow periodic  Collecting distributing

Aggregated interface: ae3
LACP state:      Role  Exp  Def  Dist  Col  Syn  Aggr  Timeout  Activity
xe-9/0/2        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
xe-9/0/2        Partner No   No   Yes  Yes  Yes  Yes   Slow   Active
xe-6/0/2        Actor No   No   Yes  Yes  Yes  Yes   Fast   Active
```

xe-6/0/2	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/2	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-7/0/2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/2	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:	Receive State			Transmit State			Mux State		
xe-9/0/2	Current			Slow periodic			Collecting distributing		
xe-6/0/2	Current			Slow periodic			Collecting distributing		
xe-8/0/2	Current			Slow periodic			Collecting distributing		
xe-7/0/2	Current			Slow periodic			Collecting distributing		

Aggregated interface: ae4

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-6/0/3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-7/0/3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-9/0/3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:	Receive State			Transmit State			Mux State		
xe-6/0/3	Current			Slow periodic			Collecting distributing		
xe-7/0/3	Current			Slow periodic			Collecting distributing		
xe-9/0/3	Current			Slow periodic			Collecting distributing		
xe-8/0/3	Current			Slow periodic			Collecting distributing		

Aggregated interface: ae5

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-8/0/4	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/4	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-9/0/4	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/4	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:	Receive State			Transmit State			Mux State		
xe-8/0/4	Current			Slow periodic			Collecting distributing		
xe-9/0/4	Current			Slow periodic			Collecting distributing		

Aggregated interface: ae6

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/24	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/24	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-7/0/24	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/24	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-6/0/24	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/24	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/24	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/24	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:	Receive State			Transmit State			Mux State		
xe-9/0/24	Current			Slow periodic			Collecting distributing		
xe-7/0/24	Current			Slow periodic			Collecting distributing		
xe-6/0/24	Current			Slow periodic			Collecting distributing		
xe-8/0/24	Current			Slow periodic			Collecting distributing		

Aggregated interface: ae7

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-7/0/25	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/25	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-6/0/25	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/25	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-9/0/25	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/25	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active

xe-8/0/25	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/25	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive	State	Transmit	State			Mux	State
xe-7/0/25		Current		Slow periodic		Collecting		distributing	
xe-6/0/25		Current		Slow periodic		Collecting		distributing	
xe-9/0/25		Current		Slow periodic		Collecting		distributing	
xe-8/0/25		Current		Slow periodic		Collecting		distributing	

Aggregated interface: ae8

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-6/0/26	Actor	No	Yes	No	No	No	Yes	Fast	Active
xe-6/0/26	Partner	No	Yes	No	No	No	Yes	Fast	Passive
xe-7/0/26	Actor	No	Yes	No	No	No	Yes	Fast	Active
xe-7/0/26	Partner	No	Yes	No	No	No	Yes	Fast	Passive
xe-8/0/26	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/26	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-9/0/26	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/26	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive	State	Transmit	State			Mux	State
xe-6/0/26		Defaulted		Fast periodic				Detached	
xe-7/0/26		Defaulted		Fast periodic				Detached	
xe-8/0/26		Current		Slow periodic		Collecting		distributing	
xe-9/0/26		Current		Slow periodic		Collecting		distributing	

Aggregated interface: ae9

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/27	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/27	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-6/0/27	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/27	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-7/0/27	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/27	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/27	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/27	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive	State	Transmit	State			Mux	State
xe-9/0/27		Current		Slow periodic		Collecting		distributing	
xe-6/0/27		Current		Slow periodic		Collecting		distributing	
xe-7/0/27		Current		Slow periodic		Collecting		distributing	
xe-8/0/27		Current		Slow periodic		Collecting		distributing	

Aggregated interface: ae10

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/28	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/28	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/28	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/28	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive	State	Transmit	State			Mux	State
xe-9/0/28		Current		Slow periodic		Collecting		distributing	
xe-8/0/28		Current		Slow periodic		Collecting		distributing	

Aggregated interface: ae11

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
et-5/0/10	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
et-5/0/10	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
et-5/0/11	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
et-5/0/11	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
et-4/0/10	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
et-4/0/10	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
et-4/0/11	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
et-4/0/11	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive	State	Transmit	State			Mux	State

et-5/0/10	Current	Slow periodic	Collecting	distributing
et-5/0/11	Current	Slow periodic	Collecting	distributing
et-4/0/10	Current	Slow periodic	Collecting	distributing
et-4/0/11	Current	Slow periodic	Collecting	distributing

Aggregated interface: ae12

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/29	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/29	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-7/0/29	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/29	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-6/0/29	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/29	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/29	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/29	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-4/0/16:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-4/0/16:0	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-5/0/16:0	Actor	Yes	No	No	No	Yes	Yes	Fast	Active
xe-5/0/16:0	Partner	No	Yes	No	No	No	Yes	Fast	Active

LACP protocol:	Receive State	Transmit State	Mux State
xe-9/0/29	Current	Slow periodic	Collecting distributing
xe-7/0/29	Current	Slow periodic	Collecting distributing
xe-6/0/29	Current	Slow periodic	Collecting distributing
xe-8/0/29	Current	Slow periodic	Collecting distributing
xe-4/0/16:0	Current	Slow periodic	Collecting distributing
xe-5/0/16:0	Expired	Fast periodic	Attached

Aggregated interface: ae13

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/47	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/47	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/47	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/47	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/47	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/47	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/47	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/47	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active

LACP protocol:	Receive State	Transmit State	Mux State
xe-9/0/47	Current	Fast periodic	Collecting distributing
xe-6/0/47	Current	Fast periodic	Collecting distributing
xe-7/0/47	Current	Fast periodic	Collecting distributing
xe-8/0/47	Current	Fast periodic	Collecting distributing

Aggregated interface: ae14

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/34	Actor	No	Yes	No	No	No	Yes	Fast	Active
xe-9/0/34	Partner	No	Yes	No	No	No	Yes	Fast	Passive
xe-6/0/34	Actor	No	Yes	No	No	No	Yes	Fast	Active
xe-6/0/34	Partner	No	Yes	No	No	No	Yes	Fast	Passive
xe-7/0/34	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/34	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/34	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/34	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active

LACP protocol:	Receive State	Transmit State	Mux State
xe-9/0/34	Defaulted	Fast periodic	Detached
xe-6/0/34	Defaulted	Fast periodic	Detached
xe-7/0/34	Current	Fast periodic	Collecting distributing
xe-8/0/34	Current	Fast periodic	Collecting distributing

Aggregated interface: ae15

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
-------------	------	-----	-----	------	-----	-----	------	---------	----------

xe-2/0/23:1	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-2/0/23:1	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
xe-3/0/23:1	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/23:1	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
xe-0/0/23:1	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-0/0/23:1	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
xe-1/0/23:1	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-1/0/23:1	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
LACP protocol:		Receive State		Transmit State				Mux State	
xe-2/0/23:1		Current		Fast periodic			Collecting distributing		
xe-3/0/23:1		Current		Fast periodic			Collecting distributing		
xe-0/0/23:1		Current		Fast periodic			Collecting distributing		
xe-1/0/23:1		Current		Fast periodic			Collecting distributing		

Aggregated interface: ae16

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-2/0/23:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-2/0/23:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
xe-3/0/23:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/23:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
xe-0/0/23:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-0/0/23:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
xe-1/0/23:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-1/0/23:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Passive
LACP protocol:		Receive State		Transmit State				Mux State	
xe-2/0/23:0		Current		Fast periodic			Collecting distributing		
xe-3/0/23:0		Current		Fast periodic			Collecting distributing		
xe-0/0/23:0		Current		Fast periodic			Collecting distributing		
xe-1/0/23:0		Current		Fast periodic			Collecting distributing		

Aggregated interface: ae17

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-0/0/22:3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-0/0/22:3	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-4/0/22:3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-4/0/22:3	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-0/0/22:3		Current		Fast periodic			Collecting distributing		
xe-4/0/22:3		Current		Fast periodic			Collecting distributing		

Aggregated interface: ae18

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-8/0/23	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/23	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-5/0/22:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-5/0/22:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-8/0/23		Current		Fast periodic			Collecting distributing		
xe-5/0/22:0		Current		Fast periodic			Collecting distributing		

Aggregated interface: ae19

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-6/0/22	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/22	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/22	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/22	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-6/0/22		Current		Fast periodic			Collecting distributing		
xe-7/0/22		Current		Fast periodic			Collecting distributing		

Aggregated interface: ae20

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/22	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/22	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/22	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/22	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-9/0/22		Current		Fast periodic			Collecting	distributing	
xe-8/0/22		Current		Fast periodic			Collecting	distributing	
Aggregated interface: ae21									
LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
ge-11/0/0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
ge-11/0/0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
ge-10/0/0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
ge-10/0/0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
ge-11/0/0		Current		Fast periodic			Collecting	distributing	
ge-10/0/0		Current		Fast periodic			Collecting	distributing	
Aggregated interface: ae22									
LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/5	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/5	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/5	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/5	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-6/0/5	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/5	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-7/0/5	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/5	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-9/0/5		Current		Slow periodic			Collecting	distributing	
xe-8/0/5		Current		Slow periodic			Collecting	distributing	
xe-6/0/5		Current		Slow periodic			Collecting	distributing	
xe-7/0/5		Current		Slow periodic			Collecting	distributing	
Aggregated interface: ae23									
LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-7/0/30	Actor	No	Yes	No	No	No	Yes	Fast	Active
xe-7/0/30	Partner	No	Yes	No	No	No	Yes	Fast	Passive
xe-9/0/30	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/30	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-6/0/30	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-6/0/30	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-8/0/30	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/30	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-7/0/30		Defaulted		Fast periodic				Detached	
xe-9/0/30		Current		Slow periodic			Collecting	distributing	
xe-6/0/30		Current		Slow periodic			Collecting	distributing	
xe-8/0/30		Current		Slow periodic			Collecting	distributing	
Aggregated interface: ae24									
LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-0/0/23:2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-0/0/23:2	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-1/0/23:2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-1/0/23:2	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-0/0/23:2		Current		Slow periodic			Collecting	distributing	
xe-1/0/23:2		Current		Slow periodic			Collecting	distributing	

Aggregated interface: ae25

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-0/0/23:3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-0/0/23:3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-1/0/23:3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-1/0/23:3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-0/0/23:3		Current		Slow periodic		Collecting		distributing	
xe-1/0/23:3		Current		Slow periodic		Collecting		distributing	

Aggregated interface: ae26

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-2/0/23:2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-2/0/23:2	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-3/0/23:2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/23:2	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-2/0/23:2		Current		Slow periodic		Collecting		distributing	
xe-3/0/23:2		Current		Slow periodic		Collecting		distributing	

Aggregated interface: ae27

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-2/0/23:3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-2/0/23:3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
xe-3/0/23:3	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/23:3	Partner	No	No	Yes	Yes	Yes	Yes	Slow	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-2/0/23:3		Current		Slow periodic		Collecting		distributing	
xe-3/0/23:3		Current		Slow periodic		Collecting		distributing	

Aggregated interface: ae28

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-2/0/22:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-2/0/22:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-1/0/22:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-1/0/22:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-2/0/22:0		Current		Fast periodic		Collecting		distributing	
xe-1/0/22:0		Current		Fast periodic		Collecting		distributing	

Aggregated interface: ae29

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/12	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/12	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/12	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/12	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-9/0/12		Current		Fast periodic		Collecting		distributing	
xe-7/0/12		Current		Fast periodic		Collecting		distributing	

Aggregated interface: ae30

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-7/0/16	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-7/0/16	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-4/0/22:2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-4/0/22:2	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:		Receive State		Transmit State				Mux State	
xe-7/0/16		Current		Fast periodic		Collecting		distributing	
xe-4/0/22:2		Current		Fast periodic		Collecting		distributing	

Aggregated interface: ae31

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/16	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/16	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/22:1	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/22:1	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:	Receive State		Transmit State		Mux State				
xe-9/0/16	Current		Fast periodic		Collecting distributing				
xe-3/0/22:1	Current		Fast periodic		Collecting distributing				

Aggregated interface: ae32

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-9/0/18	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-9/0/18	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/18	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-8/0/18	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:	Receive State		Transmit State		Mux State				
xe-9/0/18	Current		Fast periodic		Collecting distributing				
xe-8/0/18	Current		Fast periodic		Collecting distributing				

Aggregated interface: ae33

LACP state:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-0/0/18:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-0/0/18:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/18:0	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-3/0/18:0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP protocol:	Receive State		Transmit State		Mux State				
xe-0/0/18:0	Current		Fast periodic		Collecting distributing				
xe-3/0/18:0	Current		Fast periodic		Collecting distributing				

- Related Documentation**
- [Setting Up Virtual Chassis Fabrics](#)
 - [Analyzing Virtual Chassis Fabrics](#)
 - [Managing Virtual Chassis Fabrics](#)
 - [Network Director Dashboard User Guide](#)
 - [Network Director Administration Guide](#)

Example: Configuring Network Director 1.6 for MetaFabric Architecture 1.1

This example shows how to configure Network Director 1.6 for MetaFabric Architecture 1.1. For more details on the MetaFabric architecture, see the [MetaFabric™ Architecture Virtualized Data Center Design and Implementation Guide](#).

- [Requirements on page 50](#)
- [Overview and Topology on page 51](#)
- [Configuring Network Director 1.6 for MetaFabric Architecture 1.1 on page 52](#)
- [Verification on page 66](#)

Requirements

This example uses the following hardware and software components:

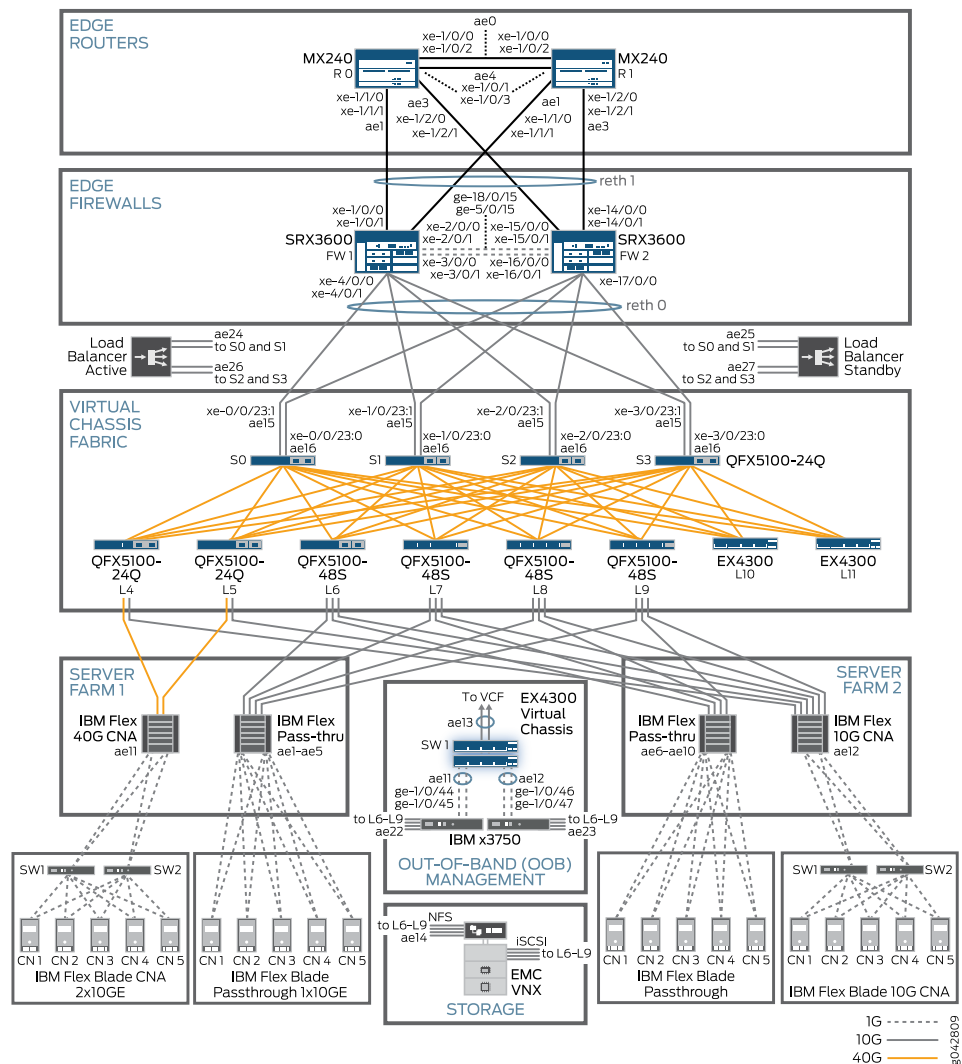
-
- Four QFX5100-24Q switches used as the spine layer in the mixed-mode VCF
 - Two QFX5100-24Q switches used in the leaf layer in the mixed-mode VCF
 - Four QFX5100-48S switches used in the leaf layer in the mixed-mode VCF
 - Two EX4300 switches used in the leaf layer in the mixed-mode VCF
 - Junos OS Release 13.2X51-D25 or later for all EX Series and QFX Series switches in the mixed-mode VCF
 - Network Director 1.6 for VCF orchestration

Overview and Topology

MetaFabric Architecture 1.1 continues to provide the proper foundation for a virtualized environment that supports virtual machine movement (VMware), robust application hosting (IBM), load balancing (F5), storage (EMC), and security (Firefly Host and SRX3600 devices). However, this evolved architecture now introduces Virtual Chassis Fabric as a next-generation fabric technology and Network Director 1.6 for orchestration and dynamic configuration.

In this example, Network Director 1.6 is used to provide orchestration services for a Virtual Chassis Fabric (VCF). The VCF replaces the core switches and QFabric systems seen in the original MetaFabric Architecture 1.0 solution. As a result, the VCF connects directly to servers, storage, and load balancers on the access side (also known as the *leaf layer* in a VCF), and SRX security devices on the core network side (also known as the *spine layer* in a VCF). [Figure 2 on page 3](#) shows the topology used in this example.

Figure 5: MetaFabric Architecture 1.1



Network Director 1.6 can provision the Virtual Chassis Fabric, and use orchestration services to update the VCF configuration dynamically as virtual machines move between servers. The VCF used in this example is a mixed-mode fabric that implements four QFX5100-24Q switches in the spine layer. The leaf layer uses two QFX5100-24Q switches, four QFX5100-48S switches, and two EX4300 switches for a total of eight leaf layer devices. All server and storage destinations are a maximum of two hops from each other to keep latency to a minimum and application performance to a maximum.

Configuring Network Director 1.6 for MetaFabric Architecture 1.1

This section explains how to provision devices in a Virtual Chassis Fabric and enable orchestration services.

It includes the following sections:

- Using Network Director 1.6 to Provision Devices into a Virtual Chassis Fabric on page 53
- Using Network Director 1.6 and Junos Space to Verify Virtual Chassis Fabric Operations on page 55
- Using Network Director 1.6 to Configure Orchestration for a Virtual Chassis Fabric on page 57

Using Network Director 1.6 to Provision Devices into a Virtual Chassis Fabric

GUI Step-by-Step Procedure



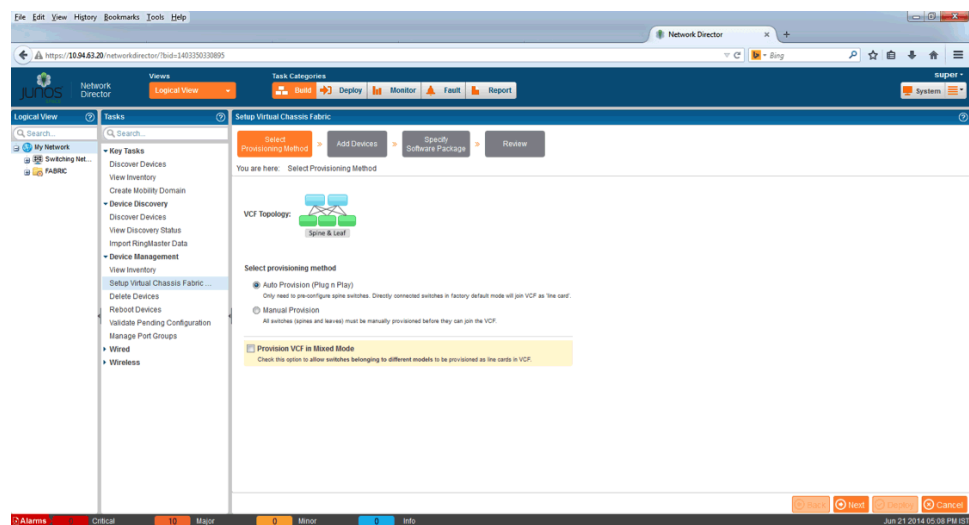
NOTE: Do not use this procedure if you have already provisioned your Virtual Chassis Fabric with the preprovisioning method shown in “[Example: Configuring a Virtual Chassis Fabric for MetaFabric Architecture 1.1](#)” on page 2.

Network Director 1.6 enables you to autoprovision a Virtual Chassis Fabric. If you configure the serial number and role for each spine layer device, you can connect factory-default leaf devices to the spine devices and have these leaf devices automatically join the VCF. Using autoprovisioning enables you to get your VCF up and running quickly so you can offer new services to your customers more rapidly.

To use Network Director 1.6 to autoprovision the Virtual Chassis Fabric:

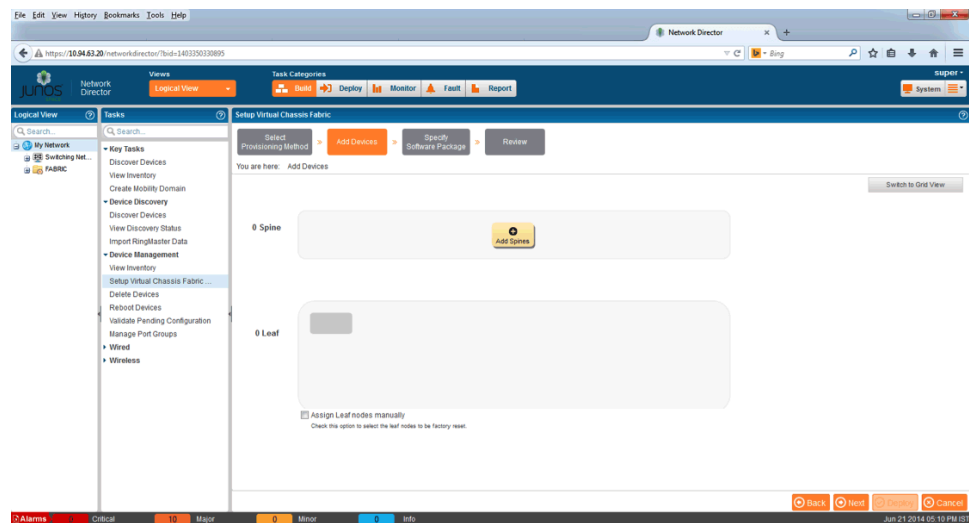
1. In Network Director, navigate to **Views > Logical View > Device Management > Setup Virtual Chassis Fabric** as shown in [Figure 6 on page 53](#). For the **Select Provisioning Method** step, click the **Auto Provision** radio button, check the **Provision VCF in Mixed Mode** box when using more than one device model in your VCF, and click the **Next** button:

Figure 6: Network Director 1.6 — VCF Autoprovisioning



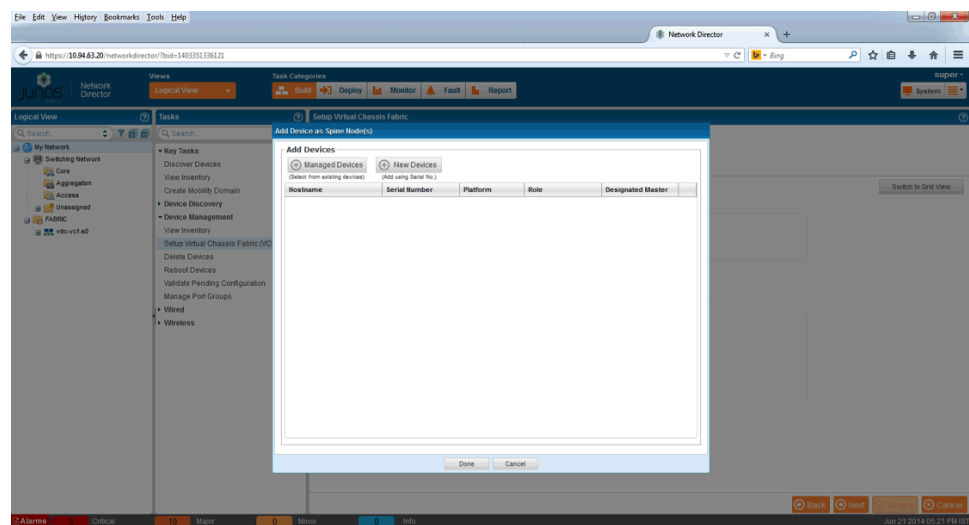
2. For the **Add Devices** step, click the **Add Spines** button, as shown in [Figure 7 on page 54](#):

Figure 7: Network Director 1.6 — Add Spine Devices to the VCF



- As shown in Figure 8 on page 54, click the **New Devices** button in the **Add Device as Spine Node(s)** box, and add the serial numbers and Routing Engine role for the four QFX5100 switches that you want to act as the spine layer:

Figure 8: Network Director 1.6 — Specify the Serial Number and Role for VCF Spine Devices



- Connect the factory-default leaf devices to the 40-Gigabit Ethernet VCF ports of the four spine members by using fiber optic cables. The leaf devices will automatically sense their addition to the VCF, receive a configuration from the master VCF member, reboot, and join the VCF.

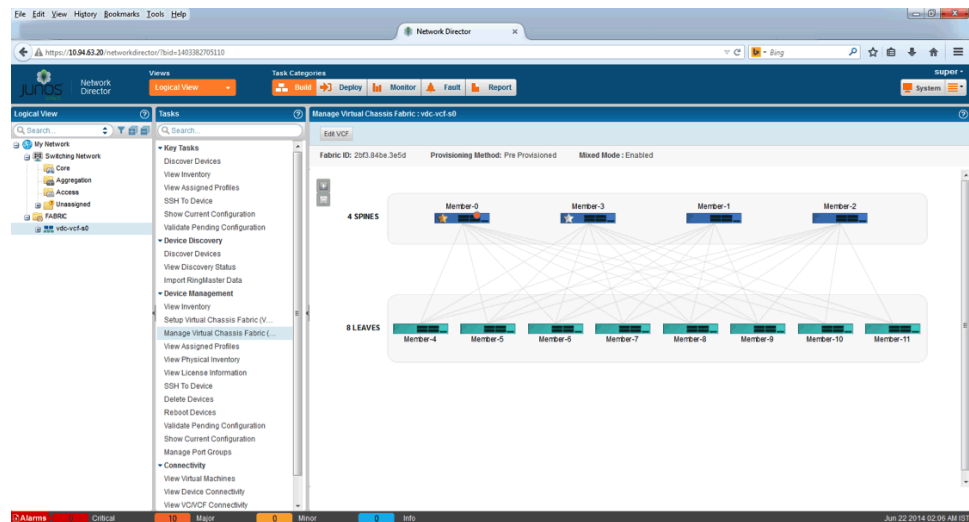
Using Network Director 1.6 and Junos Space to Verify Virtual Chassis Fabric Operations

Verifying VCF Operations with Network Director 1.6 and Junos Space

Purpose Use the verification tools in Network Director 1.6 and Junos Space to ensure that your VCF is working correctly.

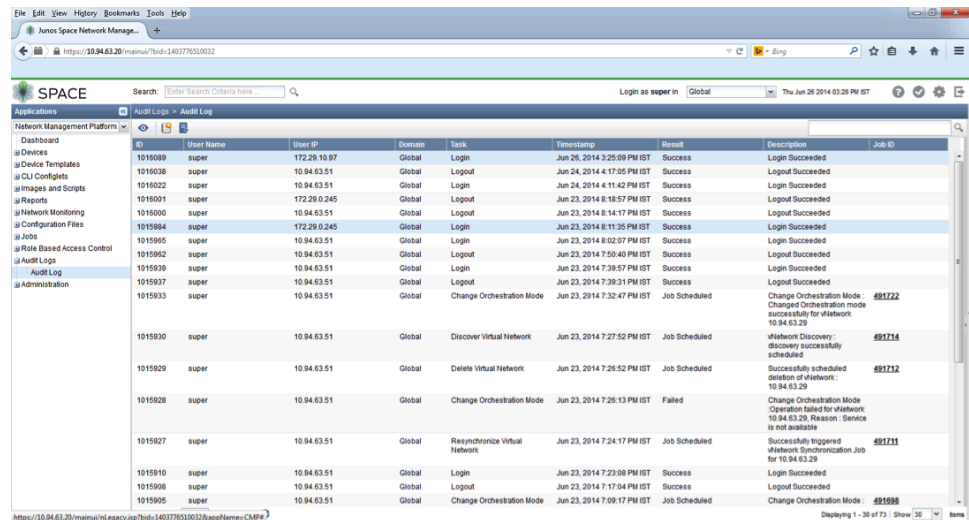
- Action**
1. In Network Director, navigate to **Views > Logical View > Device Management > Manage Virtual Chassis Fabric** to verify VCF members, as shown in [Figure 9 on page 55](#):

Figure 9: Network Director 1.6 — Verifying VCF Membership



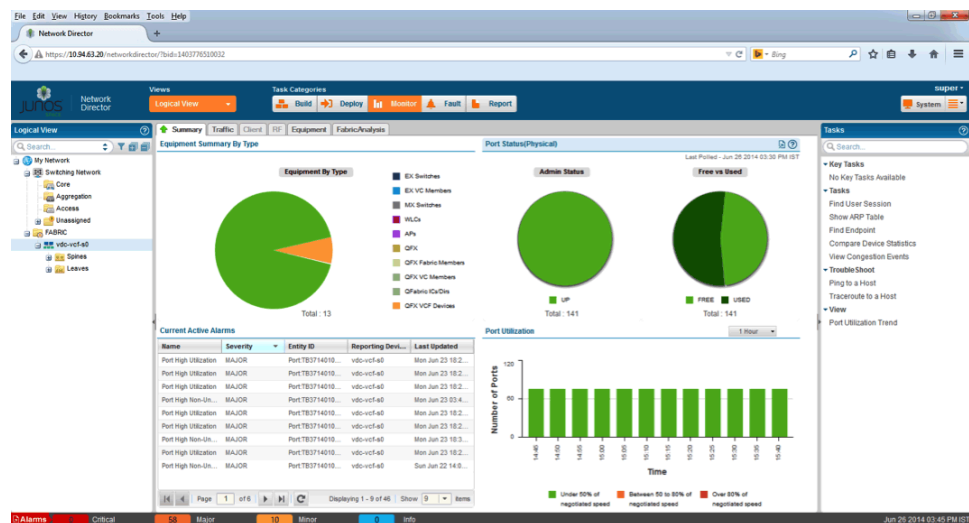
2. In Junos Space, navigate to **Applications > Network Management Platform > Audit Logs > Audit Log** to verify all login events and configuration changes in the audit trail, as shown in [Figure 10 on page 56](#):

Figure 10: Junos Space — Verifying Login Events and Configuration Changes



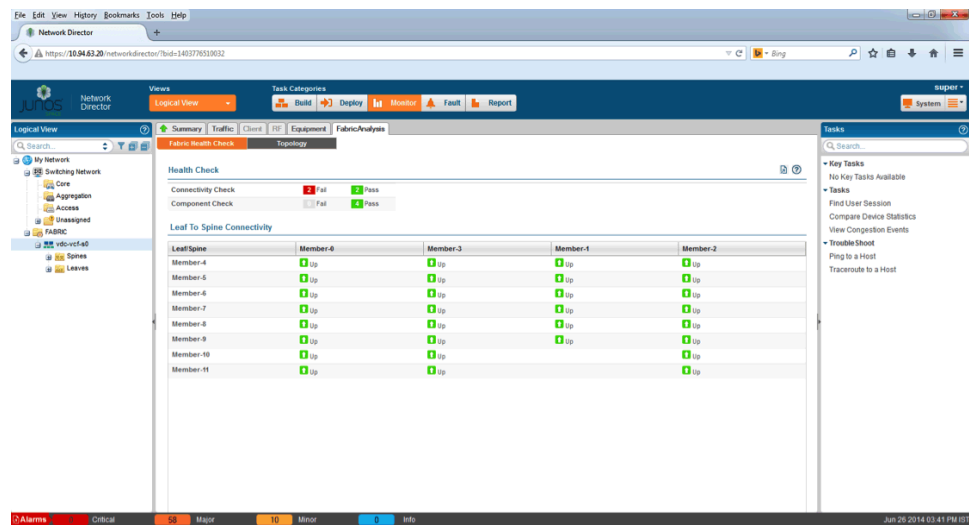
- In Network Director, navigate to **Views > Logical View** and **Task Categories > Monitor > Summary** to view alarms for VCF members, as shown in Figure 11 on page 56:

Figure 11: Network Director 1.6 — Verifying VCF Alarms



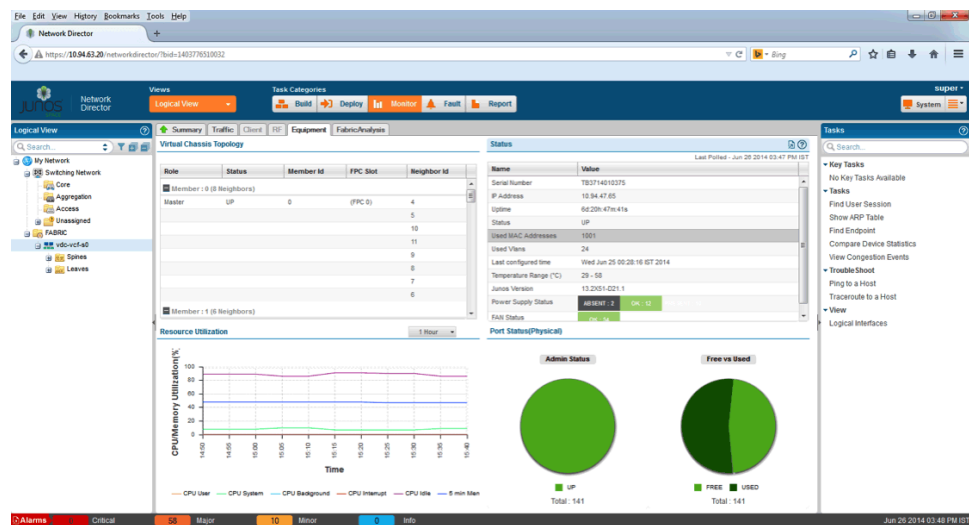
- In Network Director, navigate to **Views > Logical View** and **Task Categories > Monitor > Fabric Analysis** to view a fabric health check for connections between members in the VCF, as shown in Figure 12 on page 57:

Figure 12: Network Director 1.6 — Verifying Fabric Health



- In Network Director, navigate to **Views > Logical View** and **Task Categories > Monitor > Equipment** to verify CPU memory utilization and status of the VCF, as shown in [Figure 13 on page 57](#):

Figure 13: Network Director 1.6 — Verifying VCF Status and CPU Memory Utilization



Using Network Director 1.6 to Configure Orchestration for a Virtual Chassis Fabric

GUI Step-by-Step Procedure

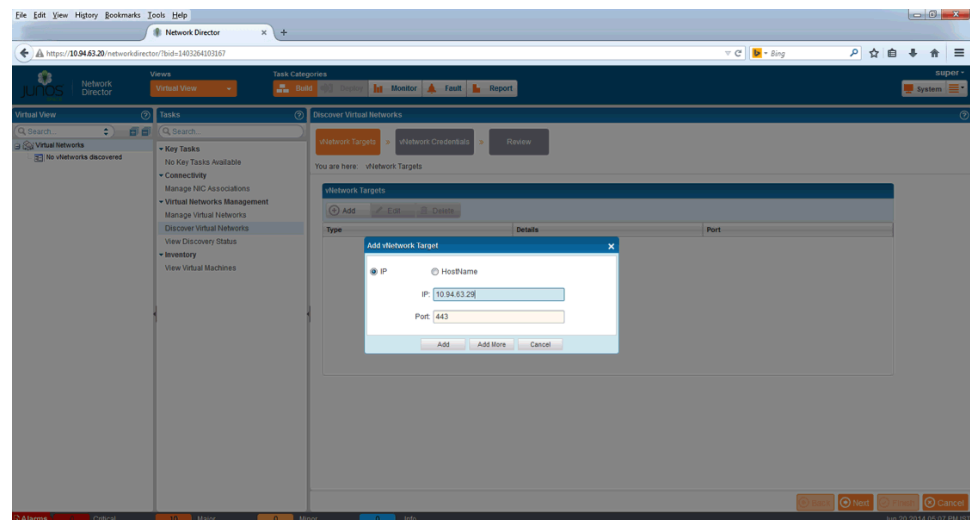
A data center network that contains a significant number of virtual machines (VMs) can be challenging to maintain. Either the administrator needs to change the configuration for access devices manually (which requires additional monitoring and configuration revisions) or enter a generic configuration that allows all VLANs on all ports (which decreases security for the network).

To alleviate this situation, Network Director 1.6 enables you to dynamically change the configuration of a Virtual Chassis Fabric as VMs migrate to new servers. Orchestration tracks VM movement automatically and updates the configuration to reflect the new location of the VM. The result is real-time configuration management that adapts VCF devices to network conditions and configures the correct VLANs on the applicable ports so that VM and application traffic can continue flowing to end users without administrator intervention.

To use Network Director 1.6 to perform orchestration services on the Virtual Chassis Fabric:

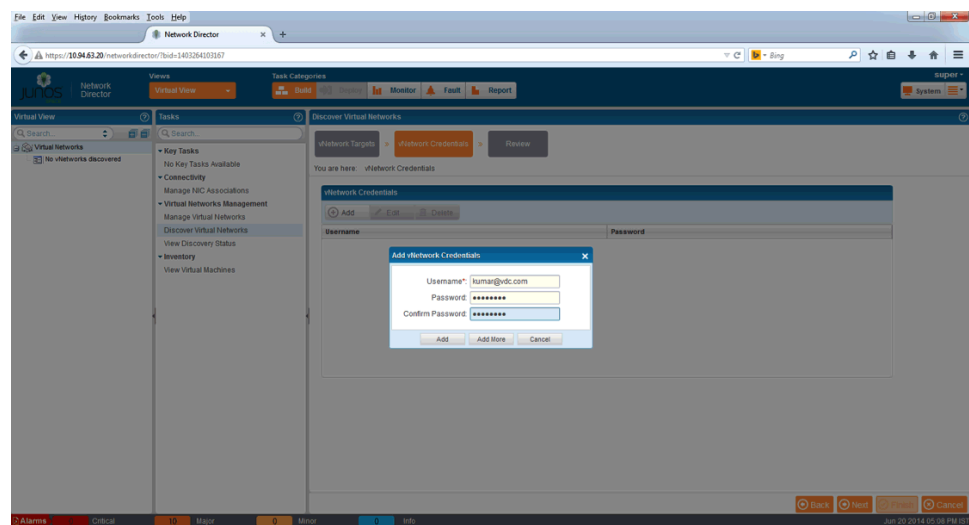
1. Discover the vCenter network through Virtual View in Network Director. Navigate to **Views > Virtual View > Virtual Networks Management > Discover Virtual Networks** and enter the vCenter IP address and hostname as shown in [Figure 14 on page 58](#):

Figure 14: Network Director 1.6 — Entering the vCenter IP Address and Hostname



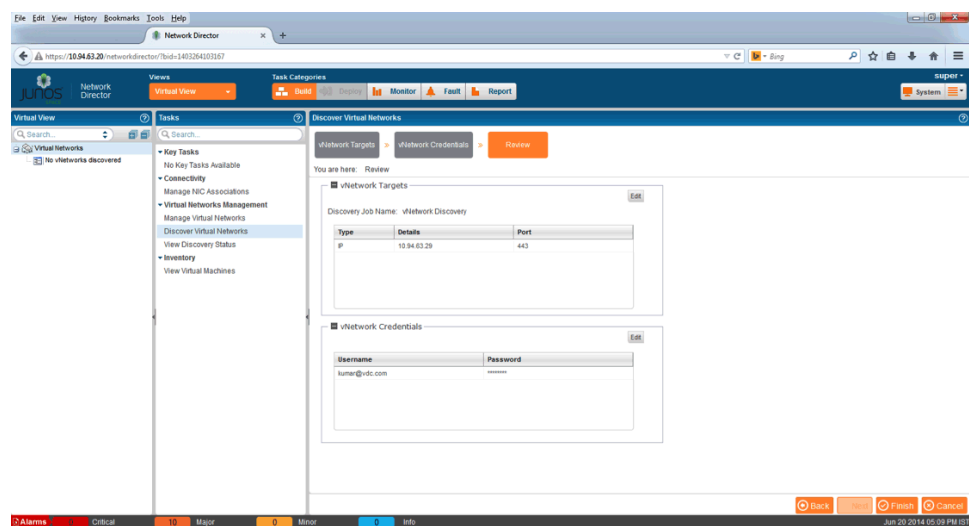
2. Enter your username and password as shown in [Figure 15 on page 59](#):

Figure 15: Network Director 1.6 — Logging In to vCenter



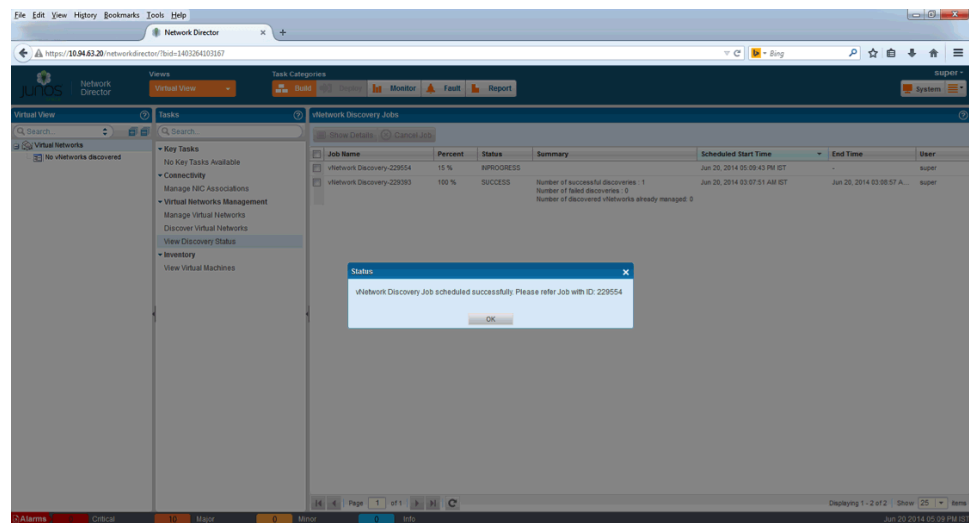
3. Discover the virtual network by completing the steps in the wizard, as shown in [Figure 16 on page 59](#):

Figure 16: Network Director 1.6 — Discovering the Virtual Network



4. Navigate to **Views > Virtual View > Virtual Networks Management > View Discovery Status** to verify the discovery of the virtual network, as shown in [Figure 17 on page 60](#):

Figure 17: Network Director 1.6 — Verifying Network Discovery

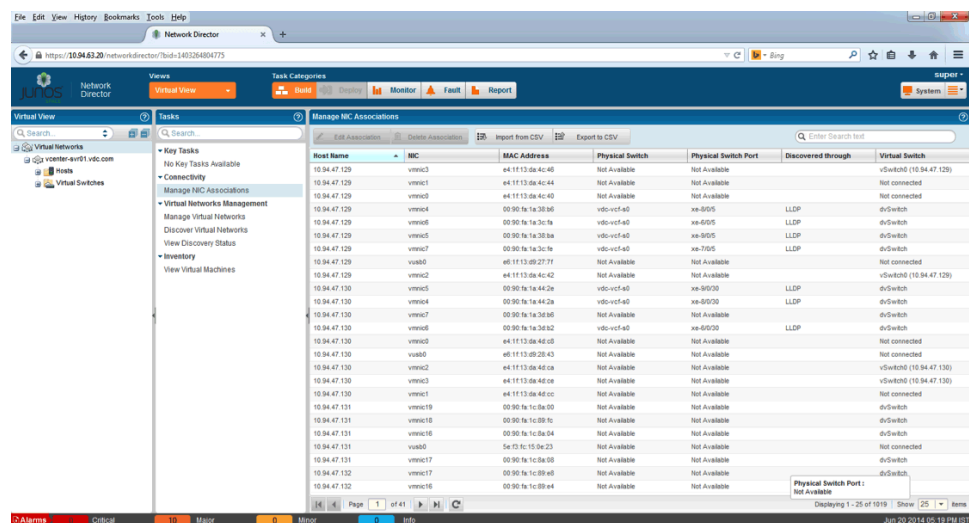


5. Navigate to **Views > Virtual View > Connectivity > Manage NIC Associations** to verify that LLDP is configured on the VMware dvSwitches, as shown in Figure 18 on page 60:



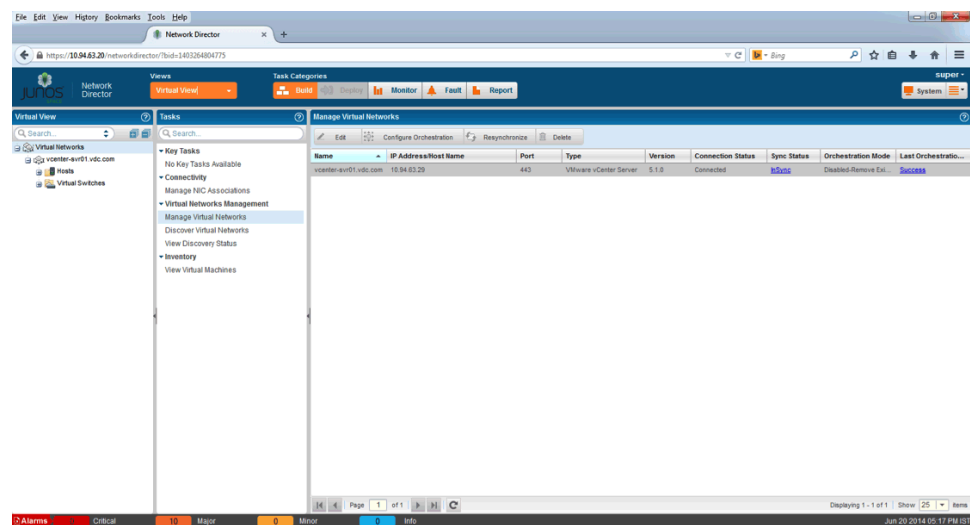
NOTE: If LLDP is not running, use vCenter WebGUI 5.1 to configure LLDP. For more information about vCenter WebGUI 5.1, see the [MetaFabric™ Architecture Virtualized Data Center Design and Implementation Guide](#).

Figure 18: Network Director 1.6 — Verifying LLDP on the dvSwitches



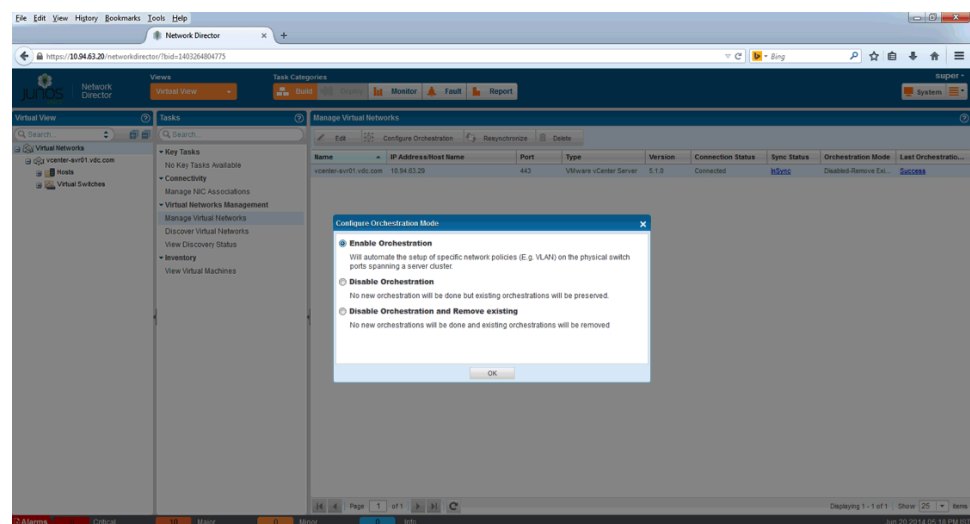
6. Navigate to **Views > Virtual View > Virtual Networks Management > Manage Virtual Networks**, click the network you want to orchestrate, and click **Configure Orchestration** to start orchestration services, as shown in Figure 19 on page 61:

Figure 19: Network Director 1.6 — Configuring Orchestration



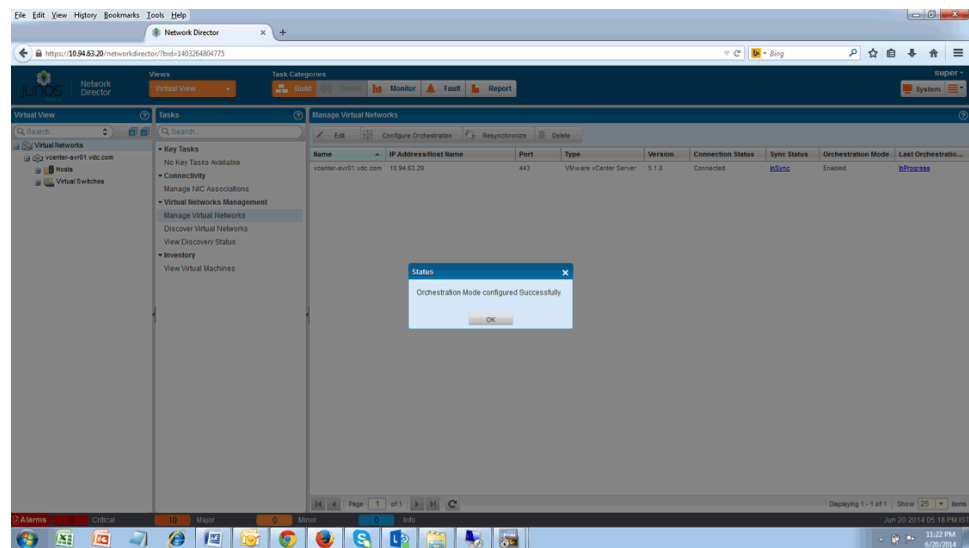
7. Select the **Enable Orchestration** radio button in the popup window and click the **OK** button, as shown in Figure 20 on page 61:

Figure 20: Network Director 1.6 — Enabling Orchestration



8. When you see the successful status box appear (as shown in Figure 21 on page 62), click the **OK** button. The orchestration services are now operating:

Figure 21: Network Director 1.6 — Orchestration Enabled Successfully



9. After orchestration services are operational, Network Director scans the virtual network. Based on the current network topology, Network Director creates a Junos[®] operating system group configuration for the VCF that maps the ports and VLANs of the VCF to the corresponding VMs and servers that access the VCF. After creating the configuration, Network Director sends the configuration to the VCF and performs a commit operation.

From this point forward, Network Director monitors VMotion. If a VM moves to a different server that accesses the VCF on a different port than the one contained in the configuration, Network Director changes the group configuration, sends it to the VCF, and performs another commit operation to update the port and VLAN mappings as needed. The following is an example of a group configuration created by Network Director orchestration services:



NOTE: The process to create the group configuration and push it to the VCF takes awhile, and the completion time varies depending on how many servers and VMs exist in the network.

```
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 description
10.94.47.148:vmnic1
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching vlan members Sharepoint
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching vlan members Storage-POD2
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching vlan members Compute-MGMT
```

```
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1248332 interfaces ae8 unit 0 family
ethernet-switching vlan members Tera-VM
set groups ND-ORCHESTRATION-GROUP-1248423 interfaces ae9 description
10.94.47.149:vmnic1
set groups ND-ORCHESTRATION-GROUP-1248423 interfaces ae9 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1248423 interfaces ae9 unit 0 family
ethernet-switching vlan members Sharepoint
set groups ND-ORCHESTRATION-GROUP-1248423 interfaces ae9 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1248423 interfaces ae9 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1248423 interfaces ae9 unit 0 family
ethernet-switching vlan members Storage-POD2
set groups ND-ORCHESTRATION-GROUP-1248423 interfaces ae9 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 description
10.94.47.147:vmnic0
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 unit 0 family
ethernet-switching vlan members Sharepoint
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 unit 0 family
ethernet-switching vlan members Storage-POD2
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1248452 interfaces ae7 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 description
10.94.47.136:vmnic25
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 unit 0 family
ethernet-switching vlan members Storage-POD1
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1248486 interfaces ae1 unit 0 family
ethernet-switching vlan members Exchange
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 description
10.94.47.137:vmnic0
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching vlan members Exchange
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching vlan members VM-FT
```

```
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching vlan members Storage-POD1
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching vlan members Exchange-Cluster
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1248527 interfaces ae2 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 description
10.94.47.138:vmnic1
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 unit 0 family
ethernet-switching vlan members Infra
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 unit 0 family
ethernet-switching vlan members Storage-POD1
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1249039 interfaces ae3 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1249142 interfaces ae5 description
10.94.47.140:vmnic25
set groups ND-ORCHESTRATION-GROUP-1249142 interfaces ae5 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1249142 interfaces ae5 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1249142 interfaces ae5 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1249142 interfaces ae5 unit 0 family
ethernet-switching vlan members Storage-POD1
set groups ND-ORCHESTRATION-GROUP-1249142 interfaces ae5 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1249142 interfaces ae5 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1249168 interfaces ae10 description
10.94.47.150:vmnic25
set groups ND-ORCHESTRATION-GROUP-1249168 interfaces ae10 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1249168 interfaces ae10 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1249168 interfaces ae10 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1249168 interfaces ae10 unit 0 family
ethernet-switching vlan members Storage-POD2
set groups ND-ORCHESTRATION-GROUP-1249168 interfaces ae10 unit 0 family
ethernet-switching vlan members Compute-MGMTset groups
ND-ORCHESTRATION-GROUP-1249168 interfaces ae10 unit 0 family ethernet-switching vlan
members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 description
10.94.47.130:vmnic5
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 unit 0 family
ethernet-switching vlan members Infra
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 unit 0 family
ethernet-switching vlan members Vmotion
```

```
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1249192 interfaces ae23 unit 0 family
ethernet-switching vlan members Tera-VM
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 description
10.94.47.129:vmnic4
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching vlan members Infra
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching vlan members Storage-POD1
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1248939 interfaces ae22 unit 0 family
ethernet-switching vlan members Remote-Access
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 description
10.94.47.146:vmnic0
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching vlan members Sharepoint
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching vlan members Storage-POD2
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching vlan members Security-Mgmt
set groups ND-ORCHESTRATION-GROUP-1248378 interfaces ae6 unit 0 family
ethernet-switching vlan members Tera-VM
set groups ND-ORCHESTRATION-GROUP-1249073 interfaces ae4 description
10.94.47.139:vmnic1
set groups ND-ORCHESTRATION-GROUP-1249073 interfaces ae4 unit 0 family
ethernet-switching interface-mode trunk
set groups ND-ORCHESTRATION-GROUP-1249073 interfaces ae4 unit 0 family
ethernet-switching vlan members Vmotion
set groups ND-ORCHESTRATION-GROUP-1249073 interfaces ae4 unit 0 family
ethernet-switching vlan members VM-FT
set groups ND-ORCHESTRATION-GROUP-1249073 interfaces ae4 unit 0 family
ethernet-switching vlan members Storage-POD1
set groups ND-ORCHESTRATION-GROUP-1249073 interfaces ae4 unit 0 family
ethernet-switching vlan members Compute-MGMT
set groups ND-ORCHESTRATION-GROUP-1249073 interfaces ae4 unit 0 family
ethernet-switching vlan members Security-Mgmt
```

Verification

Confirm that the configuration is working properly.

Verifying the Insertion of the Generated Group Configuration into the VCF, VM Movement, and Successful Orchestration

Purpose To verify that the VCF has received the group configuration generated by Network Director, and that orchestration occurs when a VM moves to another server.

Action 1. Issue the **show interfaces | display inheritance** command to confirm that the group configuration has been applied correctly for the original host interface for the Exchange application:

```
user@vcf> show interfaces ae4 | display inheritance
description "Towards Server-Farm1 Passthrough CN4";
mtu 9192;
aggregated-ether-options {
    lacp {
        active;
        periodic fast;
    }
}
unit 0 {
    family ethernet-switching {
        interface-mode trunk;
        vlan {
            ##
            ## 'Exchange' was inherited from group
            'ND-ORCHESTRATION-GROUP-1249073'
            ## 'Vmotion' was inherited from group
            'ND-ORCHESTRATION-GROUP-1249073'
            ## 'VM-FT' was inherited from group 'ND-ORCHESTRATION-GROUP-1249073'

            ## 'Storage-POD1' was inherited from group
            'ND-ORCHESTRATION-GROUP-1249073'
            ## 'Compute-MGMT' was inherited from group
            'ND-ORCHESTRATION-GROUP-1249073'
            ## 'Security-Mgmt' was inherited from group
            'ND-ORCHESTRATION-GROUP-1249073'
            ##
            members [ all Exchange Vmotion VM-FT Storage-POD1 Compute-MGMT
Security-Mgmt ];
        }
    }
}
```

2. Issue the **show interfaces | display inheritance** command to verify that the group configuration has not been applied to a host interface that is not currently running the Exchange application:

```
user@vcf> show interfaces ae1 | display inheritance
description "Towards Server-Farm1 Passthrough CN1";
mtu 9192;
aggregated-ether-options {
    lacp {
        active;
        periodic fast;
    }
}
```

```

}
unit 0 {
    family ethernet-switching {
        interface-mode trunk;
        vlan {
            ##
            ## 'Security-Mgmt' was inherited from group
            'ND-ORCHESTRATION-GROUP-1248486'
            ## 'Exchange' has not been inherited
            ##
            members [ Storage-POD1 Storage-POD2 Infra VM-FT Vmotion
00B-Transport Compute-MGMT Security-Mgmt ];
        }
    }
}

```

3. Use VMware vCenter to migrate the Exchange VM from CN4 to CN1.
4. Issue the **show interfaces | display inheritance** command to verify that the group configuration has now been applied to the new host interface running the Exchange application:

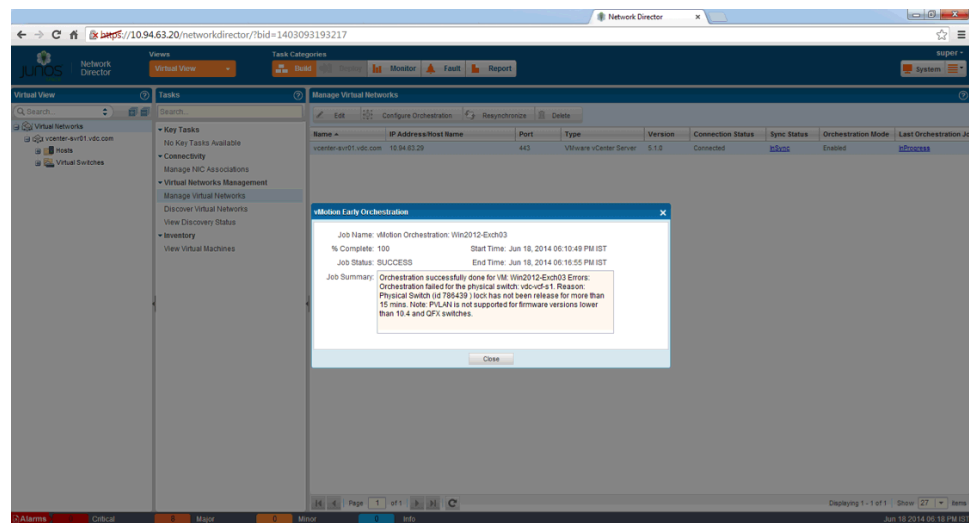
```

user@vcf> show interfaces ae1 | display inheritance
description "Towards Server-Farm1 Passthrough CN1";
mtu 9192;
aggregated-ether-options {
    lacp {
        active;
        periodic fast;
    }
}
unit 0 {
    family ethernet-switching {
        interface-mode trunk;
        vlan {
            ##
            ## 'Security-Mgmt' was inherited from group
            'ND-ORCHESTRATION-GROUP-1248486'
            ## 'Exchange' was inherited from group
            'ND-ORCHESTRATION-GROUP-1248486' <-----
            ##### Exchange VLAN added by ND in the groups
            configuration #####
            members [ Storage-POD1 Storage-POD2 Infra VM-FT Vmotion
00B-Transport Compute-MGMT Security-Mgmt Exchange ];
        }
    }
}

```

5. In Network Director, navigate to **Views > Virtual View > Virtual Networks Management > Manage Virtual Networks**, and click the network that was orchestrated. As shown in [Figure 22 on page 68](#), the Exchange application migrated correctly to the new server and Network Director performed the orchestration successfully:

Figure 22: Network Director 1.6 — Orchestration Performed Successfully



Meaning The initial orchestration performed by Network Director placed the Exchange application on server CN4 and connected the server to the VCF on interface ae4. As expected, the group configuration for the Exchange application was applied to interface ae4 but not to interface ae1.

After the VM move of the Exchange application to server CN1, Network Director modified the group configuration, and pushed it to the VCF. As a result, the Exchange application moved to interface ae1 and Network Director reported the successful orchestration of this VM move.

- Related Documentation**
- *Setting Up Virtual Chassis Fabrics*
 - *Analyzing Virtual Chassis Fabrics*
 - *Managing Virtual Chassis Fabrics*
 - *Network Director Dashboard User Guide*
 - *Network Director Administration Guide*