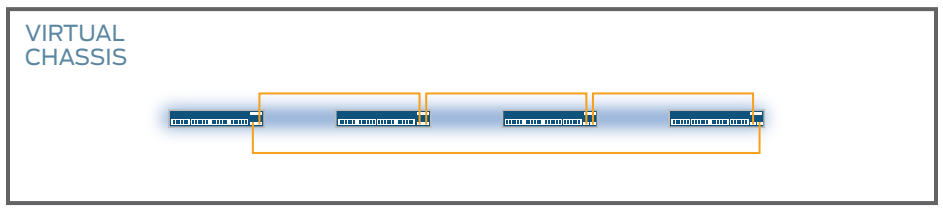
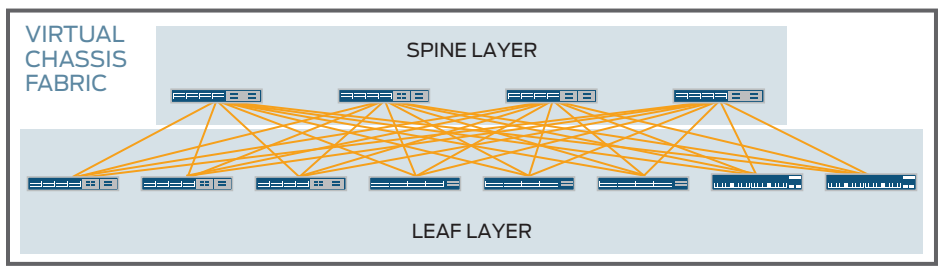
# What are Virtual Chassis and Virtual Chassis Fabric?

## *How do these technologies work?*

**Virtual Chassis** provides a simple way of interconnecting multiple switches into a ring topology and managing those interconnected switches as a single device. You can, for example, connect four switches, each with 48 ports, into one Virtual Chassis with 192 ports. (A Virtual Chassis scales to ten devices.) The devices can be on a single rack or in different locations that can be connected with long-distance optical cabling.




**Virtual Chassis Fabric** (VCF) evolves Virtual Chassis by allowing customers to interconnect multiple switches into a spine-and-leaf fabric architecture and manage the interconnected switches as a single device. VCF provides many of the benefits of a Virtual Chassis while supporting up to 20 devices. VCF works well for small data centers in which the Point of Delivery (POD) size could be as large as 16 racks, and can still be managed from a single device for the entire fabric.




## *Benefits of Virtual Chassis and Virtual Chassis Fabric*

**Virtual Chassis** is managed from a single IP address, eliminating the need to have an IP address for each device. Traffic can easily be redirected within a Virtual Chassis when a member device fails, increasing fault tolerance. And, Virtual Chassis simplifies network topology by minimizing or eliminating the need for loop prevention protocols like Spanning Tree Protocol (STP).

**Virtual Chassis Fabric** uses many of the same principles of Virtual Chassis, but it is purpose-built for data center traffic that requires predictable and consistent performance for virtualized and non-virtualized workloads.

VCF has the following attributes:

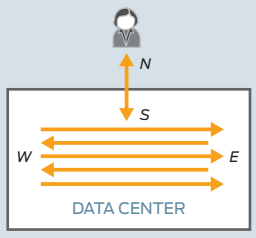
- It has a deterministic latency between any two end points within the fabric.
- It supports workload mobility – any workload, anywhere in the fabric – without impacting performance.
- All host nodes within the fabric are equal distance, equal hops, from each other.
- VCF has a single point of management.
- Once VCF has been deployed, you can automate a variety of day-to-day management tasks using many tools, such as Puppet, Chef, Ansible, Python, and Junos® Space.
- VCF allows customers that have maximized the port capacity of a Virtual Chassis to expand it without having to remove the existing, previously-purchased devices of that Virtual Chassis.
- It supports data centers that contain a mix of 1-Gbps, 10-Gbps, and 40-Gbps Ethernet interfaces.

## *What problems do they solve?*

**Virtual Chassis** solves a problem of complex management. It is optimized for traffic that is directionally North-South traffic, for example, between a user and an application. It is optimized for deployment in campus or enterprise networks.

**Virtual Chassis Fabric** also tackles complex management by providing connectivity for applications within data centers. This machine-to-machine, or application-to-application traffic, also referred to as East-West traffic, is in addition to the North-South traffic between data center and user. East-West traffic often lives on virtual machines (VMs) and as these VMs move, overall performance still needs to be predictable and deterministic. In order to optimize bandwidth for the growing amount of East-West traffic and support workload mobility, VCF uses a three-stage Clos spine-leaf topology optimized for data centers.

### East-West / North-South Traffic




In a data center network, traffic between clients and servers is referred to as North-South traffic, while traffic between switches within the data center is referred to as East-West traffic. When a user enters a search query to a cloud networking service about the local weather, for example, the search query request into the data center and the returning results from the data center are North-South traffic, while the activity between the servers to process the request in the data center is East-West traffic. As services become more dynamic and interdependent, the amount of East-West traffic will far exceed the amount of North-South traffic.

## *What Juniper switches can I use?**

**Virtual Chassis:** Most EX Series Ethernet switches, as well as QFX Series switches, support Virtual Chassis.

**Virtual Chassis Fabric:** QFX5100 switches are used as spine devices. QFX5100 and EX4300 switches can be used as leaf devices.

### QFX Series: Low-Latency, High-Performance Ethernet Switches

QFX Series data center switches are high-performance, low-latency platforms for top-of-rack or end-of-row installations. They can also be deployed as 10GbE or 40GbE devices in Virtual Chassis, Virtual Chassis Fabric, and Junos Fusion fabric architectures.

### EX Series: Highly-available, Powerful Ethernet Switches

These carrier-class switching solutions are for converged enterprise branch offices, campuses, and cost-optimized data centers, as well as for service provider deployments. They address escalating demands for high availability, unified communications, mobility, and virtualization within enterprise networks.

*Always check product literature and data sheets for specific Virtual Chassis or VCF compatibility.

For additional technical resources, please visit: www.juniper.net/documentation/

For field instructions on configuring and deploying Virtual Chassis in EX Series Ethernet switches, see Chapter 2 of *Day One: Configuring EX Series Ethernet Switches, 3rd Edition.*
http://www.juniper.net/us/en/training/jnbooks/day-one/fabric-switching-tech-series/config-ex-series/

For an in-depth review of Virtual Chassis Fabric and how to deploy it, see *Juniper QFX5100 Series*, by Douglas Hanks, and published by O'Reilly Media.
http://www.juniper.net/us/en/training/jnbooks/oreilly-juniper-library/

For an excellent overview of Virtual Chassis, begin on this page in the Juniper TechLibrary.
http://www.juniper.net/documentation/en_US/junos14.1/topics/concept/virtual-chassis-ex4200-overview.html

The Juniper TechLibrary has documents and support for VCF. Begin here.
http://www.juniper.net/documentation/en_US/junos14.1/information-products/pathway-pages/qfx-series/virtual-chassis-fabric.html



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