

VIRTUAL SERVER INFRASTRUCTURE SOLUTIONS

Juniper Delivers Scalable, High Performance, Secure, and Operationally Simple Virtual Server Network Infrastructure

Challenge

Operational efficiency, resource optimization, and information security are challenging the adoption of server virtualization and its full realization in enterprise data centers. Many organizations are hesitant to commit more data center infrastructure to server virtualization technologies due to these challenges.

Solution

Juniper's solution uniquely addresses the challenges related to server virtualization in the data center. It simplifies network design, creates a secure and faster network infrastructure, and ultimately enables the full potential of virtualization, simplifying operations and improving network economics.

Benefits

- Simple – streamlined operations for integration of virtual servers into the data center infrastructure
- High performance – network supporting virtualization domains of any size, offering mobility and flexibility in virtual workload management
- Safe – data center infrastructure with consistent physical and virtual security policy enforcement
- Improved economics that span both CapEx and OpEx savings

Juniper's solutions for networking virtual servers in the data center combine Juniper Networks routing, switching, security, and software to deliver a scalable, high performance, and operationally simple virtual server network infrastructure. Juniper's offerings enable IT organizations to enjoy the benefits of server virtualization more quickly and with superior future proofing. Some of the critical challenges in adopting server virtualization at scale are operational readiness and investment protection. Juniper's solution offers the flexibility to interoperate with a variety of hypervisor vendors in the same data center or across multiple data centers within an organization. It also preserves the separation of duties between network and server administration teams for more streamlined operations. Juniper's solution enables administrators to easily deploy new servers without worrying about server location, and it relieves server teams from the need to redesign network access as each virtual server is deployed. The result is a data center in which administrators can allocate resources and manage capacity elastically, in a highly flexible manner, drastically improving efficiency and business agility.

The Challenge

Operations Efficiency

Today's data center networks do not adequately address the unique requirements presented by virtual server infrastructures. This is a fundamental problem, since server virtualization technology holds great promise to significantly improve resource utilization and compute efficiency. Improvements in the network architecture are key to unlocking the potential offered by server virtualization. Since modern applications are constantly communicating among themselves, and virtual workloads must often be migrated between physical servers, how those servers are interconnected is crucial to achieving performance and efficiency. Typically, configuration, load balancing, and recovery in virtual server clusters are performed by automated systems, and network operations require additional overhead to implement corresponding changes manually. Effectively, the overhead of performing network configurations on a separate cycle from virtual server changes limits the efficiencies gained from server virtualization.

Resource Optimization

Beyond efficiency, a common challenge in data center operations is underutilization of compute resources. The reasons for this inefficiency vary. Over the past two decades, it has been common practice to couple an application with a single type or cluster of physical servers. When the application is idle, the resources that have been allocated to it are unused. In data centers where servers have been segmented into separate silos, the ability to recognize true economies of scale has been gated. This inefficiency becomes even more noticeable when organizations try to implement workload mobility within the data center or across multiple data centers in a fully virtualized environment.

Security

An additional concern with server virtualization is the challenge it presents to maintaining security of operations. The granularity of controls available in legacy security tools is insufficient to address the need for visibility and control in the virtualized environment. As application designs evolve, additional concerns about remaining compliant with industry regulations and the ability to enforce security policy consistently across virtual and physical infrastructures become ever more challenging. Typically, these challenges are related to the ability of the security infrastructure to insert itself into the virtual environment to enforce required security policies, and to the level of visibility the infrastructure provides to the security operations center. Ultimately, existing security technologies do not provide the same functionality in virtual environments as they do in physical ones.

The Juniper Virtual Server Network Infrastructure

Juniper's solution for networking virtual servers offers scalability, high performance, security, and operational simplicity. The solution leverages Juniper Networks® Junos® Platform, including the Junos operating system and Junos Space Virtual Control for automated administration of virtual servers and the network, the leading-edge Juniper Networks vGW Virtual Gateway and SRX Series Services Gateways. Superior agility and scale in the solution is provided by Juniper Networks EX Series Ethernet Switches, Juniper Networks QFabric™ family of products, and Juniper

Networks MX Series 3D Universal Edge Routers, delivering high performance and simplification of designs in a fully virtualized infrastructure. Juniper's solution offers organizations the ability to build, operate, maintain, and optimize network infrastructure and security as required—to achieve significant benefits from server virtualization technologies.

Network Operations and Management

As a foundation for network operations, the Junos Space platform has been designed for streamlined operations and efficient virtual and physical network administration and provisioning. Targeted towards virtualized server environments, Junos Space Virtual Control provides unique capabilities that dramatically reduce the operational overhead of managing virtual and physical data center networks. Junos Space Ethernet Design offers profile- and template-based Ethernet configuration and port characteristic provisioning. Junos Space Virtual Control extends the capabilities of managing the physical network to manage virtual networks in a similar manner. And Junos Space Security Design enables intuitive, business process aligned, security and services policy configuration and lifecycle management.

Beyond the advanced applications offered in the Junos Space suite, the Junos operating system itself offers industry-leading Instrumentation and scripting extensions to streamline even the most challenging operational tasks through automation.

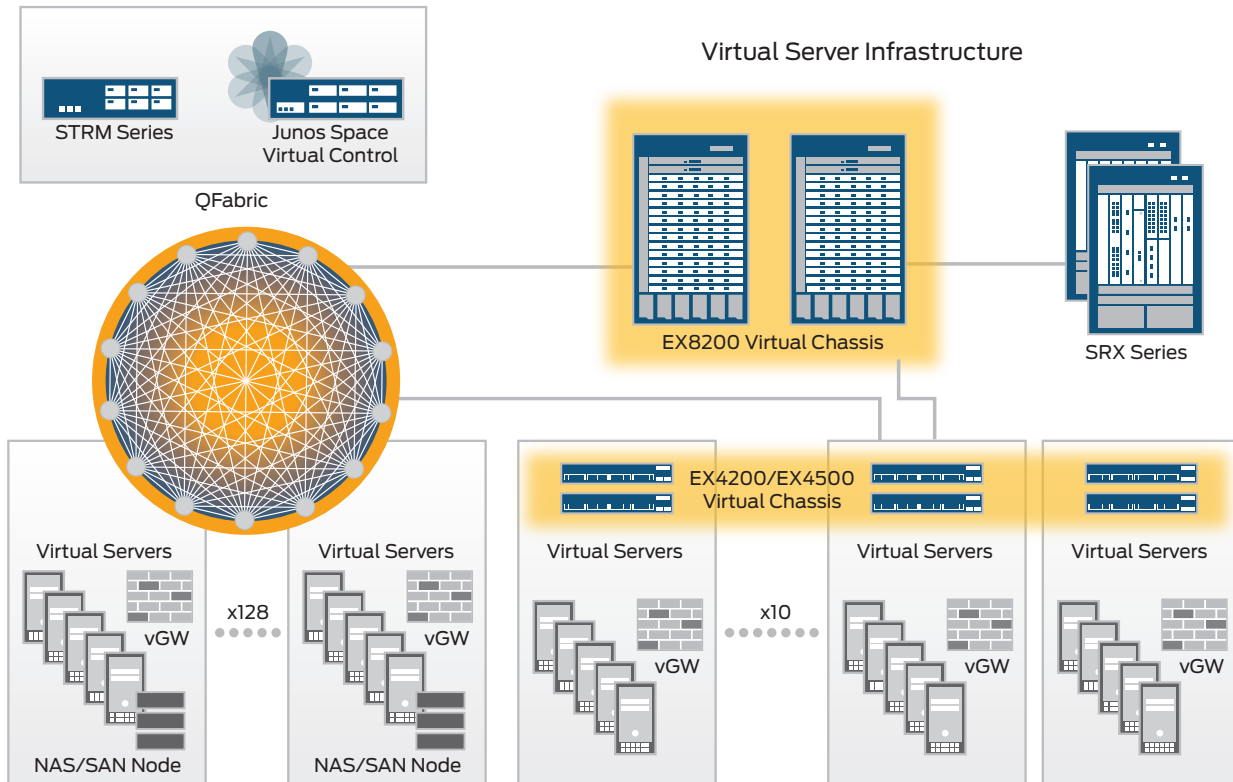


Figure 1: Juniper's virtual server network infrastructure elements

Network Connectivity Infrastructure

Beyond software, Juniper's network infrastructure platforms also make significant contributions to its simple and high performance designs. In our drive to unleash the flexibility and performance of modern business applications, Juniper's overriding design goal for the network has been to enable the data center to function as a single pool of elastic and flexible resources. Juniper has been first in the market to introduce Virtual Chassis technology, which allows for nearly 500 1GbE ports, potentially distributed across 10 separate physical server racks to operate as a single logical switch. More recently, Juniper's ground-breaking QFabric technology enhances the ability to pool network resources into a single logical switching fabric, with up to 6,000 10GbE ports operating as a single logical switch. QFabric technology allows organizations to build a single switching platform that connects the entire set of virtualized data center servers. Virtual Chassis technology is available on the EX Series of L2/L3 switches and also in the multiservice routing family of MX Series 3D Universal Edge Routers. QFabric technology is available on the ground-breaking Juniper Networks QFX Series platforms.

Network and Security Services

The dynamic manner in which virtual server workloads are created and moved creates challenges in allocating security resources that appropriately protect workloads, as well as in maintaining visibility to the operation of those workloads. SRX Series Services Gateways allow for rapid resource allocation, high capacity and performance, and seamless scaling of loads regardless of the physical location of the virtual machine. In

addition to the capabilities of the SRX Series within the physical network infrastructure, Juniper also offers the vGW software that runs inside the virtual server environment, and enforces the same security policies at the virtual machine level as the SRX Series offers at the physical network level. vGW executes inside the virtual server environment and retains its association with virtual servers across live migration events and through intra-server communications for enhanced visibility. Most importantly, the security policy at the network level remains intact through the physical and virtual network infrastructures.

Features and Benefits

Juniper's virtual server network infrastructure solutions enable organizations to truly achieve the benefits of virtual server technologies - while offering a streamlined operational experience for the IT department and ultimately for the business. Juniper's virtual server networking solutions allow customers to:

- Deploy virtual servers dynamically without concern for their physical network connectivity and location
- Trust the virtual server environment, even in the most demanding regulatory and multi-tenant environments
- Achieve economies of scale from their virtual server investment
- Achieve tangible economic results in both CapEx and OpEx based on unique and innovative system and software designs

Solution Components

CATEGORY	PRODUCT	VIRTUALIZATION BENEFITS
Connectivity	• QFabric technology with QFX Series product line – over 6,000 10GbE server connections to single fabric • Virtual Chassis with EX4200, EX4500, and EX8200 lines of Ethernet switches – up-to 480 1GbE server connections to single virtual switch and simplified core connectivity design	• Enable seamless mobility of workloads throughout the datacenter with full any-to-any connectivity and simple management. • Ability to design virtual workload clusters without network limitations and physical location affinity. • QFabric enabled I/O convergence at the virtual server NIC
Security	• High-performance SRX Series Services Gateways • vGW Series Virtual Gateway	• Support follow me policies for workloads mobilized around the datacenter in conjunction with vGW • Integrated security enforcement – at the virtual machine and virtual server levels • Deep insight into hypervisor internal communications between VM's
Administration	Junos Space Virtual Control	Streamlined operation of virtual and physical networks while maintaining traditional roles and responsibilities

Summary—Faster, Simpler, More Secure Data Center Networks

Juniper's solution for networking virtual servers offers scalability, high-performance, security, and operational simplicity. It delivers a simple architecture for physical and virtual data centers, comprehensive security for protecting virtualized data centers, and flexible automation feature set available for streamlining data center operations. With the Juniper solution organizations can find a short path to realizing the benefits of the server virtualization technology such as dynamism of workload capacity in the data center, secure and reliable compute foundation w/o blind spots and operations that follow existing organizational structure and business operation.

Get started today on realizing the true benefits of server virtualization in your data center with Juniper Networks solutions.

Next Steps

To learn more about how your virtualized servers and data center can benefit from Juniper's virtual server infrastructure solutions, please contact your Juniper Networks representative and visit www.juniper.net.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

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