JUNIPER
NETWORKS

SET FOR GROWTH: BUILDING SECURE PRIVATE CLOUDS

Keep up with business growth while retaining control and ensuring security of sensitive data

Challenge

If you're building a private cloud to increase business agility and efficiency, you need a secure and adaptable network that can support the transition from your current traditional data centers to a private cloud model.

Solution

Based on innovative routing, switching, security and software technologies, together with orchestration, and management solutions, MetaFabric™ Architecture enables a simple, open, and smart data center network that accelerates the deployment and delivery of applications within and across multiple sites and clouds.

Benefits

- Gain competitive advantage with a network that supports responses to rapid changes in your business climate
- Achieve cost savings with a network that can scale to accommodate rapid growth in the business
- Become more agile by maintaining a simple and open networking environment
- Ensure security and continuity for both data and applications

By now you might have heard of the benefits of the cloud: that it provides elastic, on-demand, and flexible resources that can drive efficiency and increase business agility. For most companies, it's not a question of "cloud or no cloud?" but a question of how to best make use of cloud technologies. Do you use public cloud services? Do you build your own private cloud? Or do you deploy a mix of the two in a hybrid cloud strategy?

One reason for the popularity of private clouds is that companies value the control and security that they offer. For example, if protecting sensitive data is important to you or your customers, private clouds may provide a good option—or may even be a requirement for certain industries. In particular, if you belong to a highly regulated industry such as financial services or healthcare, you cannot entrust your data or proprietary applications and algorithms to clouds that are shared with other organizations due to regulatory or compliance constraints. A second, related reason is control. With a private cloud, you can build it to your own specifications, using preferred technology partners to maximize agility and minimize TCO. Building a best-in-class cloud infrastructure can also provide you with an advantage over competitors who use off-the-shelf cloud services. In either case, choosing the right networking components—and therefore vendor—is critical to your business outcomes.

The Challenge

If you're building a private cloud, you require agility and elasticity in your networking solutions so they can be seamlessly integrated with third-party vendor or homegrown tools. You also require those networking solutions to contain security elements that ensure regulatory compliance, with disaster protection built in to ensure continuous availability of sensitive data.

These are some of the things that distinguish a private cloud from the IT infrastructure in a traditional data center:

- **Fully automated**—Unlike a traditional data center, there are very few human touchpoints required in your private cloud. This allows your business to operate quickly and efficiently, and reduces the risk of human error that inevitably accompanies manual operations. As a result, you can typically reduce OpEx and respond faster to user requests.
- **Self-provisioning**—Rather than submitting change-ticket requests and waiting weeks or even months to get compute, storage, and networking resources provisioned, your users can spin up their own resource instances in minutes using a point-and-click interface.
- **Consumption tracking**—Since your IT organization can precisely track resources consumed on demand by various groups or business units, it can implement accurate charge-back systems that in turn help them monitor and control costs for lower TCO of the business overall.
- **Fully elastic**—You can easily scale up when you need more capacity, and, in the reverse scenario, release resources when demand is lower.

While the benefits of the cloud are clear, moving applications and processes to a private or public cloud can pose challenges. Some examples of the types of issues that should be considered when evaluating cloud solutions include:

Costs and return on investment—Implementing changes or new technology initiatives can involve disruption to either infrastructure or operations. By deploying networking devices that are intelligent, adaptable, and able to support new protocols and applications as they evolve, you don't have to rip and replace older technologies and can protect your network investments.

Interoperability—When you deploy closed systems or proprietary technologies, you can end up with islands of applications or infrastructure. Your networking solutions should interoperate with all of the different devices, applications, and management tools within the cloud. Lack of interoperability makes implementation and operations difficult for any type of IT organization, whether it consists of traditional loyalists, expert programmers and open source advocates, or is largely staffed with do-it-yourselfers who create their own tools and solutions from scratch.

Security—Security is paramount if you want to build a private cloud. Data exfiltration, website outages, and other serious data center threats can bring down private clouds and thus your business operations.

Intelligence and visibility—Lack of visibility into resource usage affects the experience of your end users. You also can run into compliance issues. Likewise, if you don't have mechanisms that associate resource tracking with consumption and roles, you create unpredictability and will have difficulty in forecasting demand. This ultimately leads to a higher TCO.

Agility and competitive advantage—Traditional data centers and legacy or proprietary networking technologies can make it difficult for you to respond to dynamic changes happening in the market.

The Juniper Networks Private Cloud Solution

Juniper Networks offers a complete portfolio of cloud networking solutions that can make the cloud more adaptable, intelligent, and scalable. The foundation of Juniper's cloud portfolio is Juniper Networks® MetaFabric™ Architecture, an overarching reference architecture framework that combines switching, routing, and security with technologies such as SDN, orchestration, and management solutions to help companies build the optimal cloud network. Juniper solutions are:

- **Adaptable**—They support evolutionary upgrades to new technologies that become available on the path to a private cloud. They are also SDN-ready, so it is never necessary to rip and replace old infrastructure.
- **Intelligent**—Context-aware and application-oriented with built-in analytics capabilities, they bring intelligence to the network.
- **Seamlessly scalable**—Juniper solutions offer scale-out IP fabrics, IT automation tools, network virtualization, and SDN solutions that allow for the massive scalability you require to build a private cloud.

Features and Benefits

- **Migration path to overlay networks**—Juniper solutions possess flexible L2/L3 fabric architectures that have a migration path to overlay networks without any need to rip and replace. Within the data center, the Virtual Extensible LAN (VXLAN) and Open vSwitch Database (OVSDB) management protocol support, coupled with the L2/L3 fabric architectures, mean that performance is consistent no matter where in the fabric an application resides. Innovative technologies and a comprehensive product portfolio integrated with L2/L3 VMware NSX gateway capabilities provide a reliable, flexible, and scalable underlay.
- **Integration with third-party orchestration software or self-service Web portals**—OpenStack delivered via Juniper Networks Contrail or directly from routing and switching platforms can integrate with third-party orchestration software or self-service Web portals. Enterprises can have a point-and-click interface with OpenStack and still have access to all attributes of Juniper solutions.
- **Automation**—Support for automation tools such as Puppet, Chef, Python, JSON, and zero touch provisioning (ZTP) reduce the need for human intervention by your network providers, making Juniper's top-of-rack (ToR) and modular switches very attractive.
- **Analytics**—Tying analytics to application delivery addresses any network performance and availability challenges.
- **Robust security**—As applications advance from bare metal to virtualized, Juniper Networks SRX Series Services Gateways for the high end and Juniper Networks Firefly Perimeter products remove the burden of complexity for your IT organizations with respect to "where" an app is getting protected.
- **Meeting SLAs**—Juniper's insight technology on its switches provides for a more granular visibility into networking operations. By extracting that data into a correlation engine, and feeding it into Junos® Space Network Director, you can get insight into different parts of the virtual network, and see where it is underutilized. This in turn can be used to optimize the application environment, ensuring consistency and performance and improving your users' experience.

Solution Components

Juniper Networks MetaFabric Architecture is a simple, open, and smart approach to network architecture. It leverages Juniper's comprehensive portfolio of switching, routing, security, orchestration, and management software; its open innovative technologies for network virtualization and SDN; and its analytics and automation tools to accelerate the deployment and delivery of applications within and across multiple data centers. MetaFabric Architecture also provides location-independent coordination and management of devices across multiple sites, maximizing data center resources and ROI.

Juniper also offers an end-to-end product portfolio consisting of a complete set of routing, switching, and security products along with management and orchestration software. This ensures a seamless evolution to private cloud environments.

Other solution components include:

- **Routing**—The Juniper Networks MX Series 3D Universal Edge Routers are a highly scalable routing platform that form the core of the data center network as well as the data center interconnect edge. These routers can connect multiple physical data centers across different geographies into a seamless private cloud environment, which makes them very attractive if you want to build a private cloud.

- **Switching**—Juniper Networks QFX Series and EX Series Ethernet Switches provide you with a choice of switch architectures and fabrics that reduce latency and ensure application consistency. These switching products deliver robustness, reliability, high performance, and scale within your data center.
- **Security**—Juniper Networks' next-generation security products offer you unparalleled protection against data exfiltration, website outages, and other serious data center threats that can bring down private cloud-based applications and systems. The high-end SRX Series Services Gateways can be used to secure physical infrastructure within your data center. Firefly Perimeter provides you with the same benefits of a high-performing firewall in a virtual form factor.
- **Network management**—As a single point of management for all networking hardware and software, Junos Space Network Director allows you to automate network maintenance and upgrades in your private cloud from a single management interface. Additionally, interoperable APIs allow Network Director to talk to other cloud orchestration tools such as OpenStack or VMware NSX.
- **SDN controller**—Contrail is an agile SDN controller that automates and orchestrates the creation of highly scalable virtual networks. Contrail increases your business agility by enabling the migration of applications and IT resources to more flexible private or hybrid cloud environments.
- **SDN and network virtualization**—Juniper's network virtualization solutions offer nondisruptive SDN migration to your private cloud and support the inclusion of open source or third-party SDN controllers, including the VMware NSX controller. Juniper is partnering with VMware to integrate both L2 and L3 NSX capabilities on some of the routing and switching products and to deliver management and orchestration. Juniper's routing, switching, and security products form a secure and reliable underlay that can abstract out the complexities of the network to simplify the provisioning and management of applications and can also be seamlessly integrated to the overlay. With Contrail, you can build virtual networks that interoperate with a wide range hypervisors, orchestration systems, and integrate seamlessly with existing physical networks.
- **Standards-based technologies**—Juniper solutions ensure seamless connectivity and interoperability within or across your data centers through technologies that are open and standards-based. Virtual network protocols like VXLAN and CloudStack can be integrated within the data center itself. OpenStack delivered via Contrail provides open orchestration, while MPLS, VPLS, and Ethernet VPN (EVPN) technologies offer interconnectivity between data centers.

- **Network analytics**—Juniper solutions offer open analytics that truly integrate application requirements with network performance for visibility into operations, capacity planning, telemetry, and precision measurements within and across data centers.
- **Fabrics**—Juniper solutions deliver support for a range of physical or virtual, L2 and L3 data center fabrics for coherent and efficient connectivity within your data center.
- **IT automation**—Juniper solutions integrate with tools such as Puppet, Chef, Python, JSON, and zero touch provisioning (ZTP) or workflow automation to mask your network complexity and simplify your operations. This allows you to achieve greater agility and eliminate human errors, resulting in increased reliability and reduced operating costs.

Summary—Juniper Scalable and Secure Private Cloud Solution That's Also Future-Proof

If you're interested in building a private cloud, you probably operate in a fast-moving industry with significant data storage and processing needs as well as strict SLA and data protection requirements. You need IT infrastructures that can support those needs through rapid changes in a business climate that is frequently volatile and often heavily regulated. You also require agility and elasticity in networking solutions that can be seamlessly integrated with third-party vendor or homegrown tools, and delivered at a TCO that matches your individual business model. Juniper Networks' portfolio of routers, switches, security products, and innovative technologies, including SDN, orchestration, and management solutions, ensures that you can achieve your transition from an in-house IT infrastructure or public cloud hosted apps to a private cloud consumption model—without disrupting your business.

Next Steps

For more information about Juniper's next-generation portfolio of networking solutions, please contact your Juniper Networks sales representative or 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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