

Servers.com

EXECUTIVE SUMMARY

Challenge

Rethink the network architecture to achieve unlimited scale, stability, and agility for meeting next-generation cloud data center demands.

Solution

- Brocade VDX 6940 Switches as IP fabric spine switches.
- Brocade VDX 6740-T Switches as IP fabric leaf switches.
- Brocade ICX 6430 Switches for out-of-band management.

Results

- Enabled high-capacity connectivity with exceptional stability and performance.
- Optimized scalability to support up to hundreds of switches.
- Increased agility and reduced customer provisioning time from hours to minutes.
- Supported OpenStack development and SDN initiatives easily.

IP Fabric Delivers Unlimited Cloud Scale, Reliability, and Agility

With a Global Private Network that connects three continents, Servers.com is taking cloud hosting services to the next level. Based in The Netherlands, Servers.com delivers dedicated server hosting, colocation, and Content Delivery Network (CDN) services from the cloud. Its high-performance network provides numerous connections to international exchanges to ensure seamless, business-critical data interchange with five-nines, carrier-grade uptime. Servers.com is also one of the only providers to offer 40 GbE server connectivity for data-intensive applications such as Big Data.

Meeting the scale and agility demands of modern cloud services is challenging. For example, Servers.com has developed its own OpenStack and Software-Defined Networking (SDN) solutions to fully automate data centers, reducing the risk of error and simplifying ongoing maintenance. The network is protected on both physical and logical levels to ensure fast, safe data processing. However, Servers.com is growing quickly, adding multiple data centers per year, and its existing infrastructure could not scale as needed or enable the company to deliver flawless, on-demand services to customers.

"We had to completely re-think our infrastructure," said Konstantin Bezruchenko, Chief Technical Officer at Servers.com. "And although we needed powerful capabilities, the network itself had to remain simple to scale and manage."

Simple Yet Sophisticated

Above all, Servers.com wanted a simple, flat network architecture that is highly reliable and can scale quickly. Its fully automated data centers deliver advanced features while reducing ongoing maintenance, costs, and the risk of human error associated with manual configuration. Servers.com's SDN orchestration software is developed in-house and the network had to seamlessly support other OpenStack solutions designed for the cloud.

The new network had to be fast, with no oversubscription. For example, typically, networks provide 1 Gbps connectivity at the access layer to connect servers, but Servers.com aggregates 40 Gbps of traffic to each server over multiple 10 Gbps

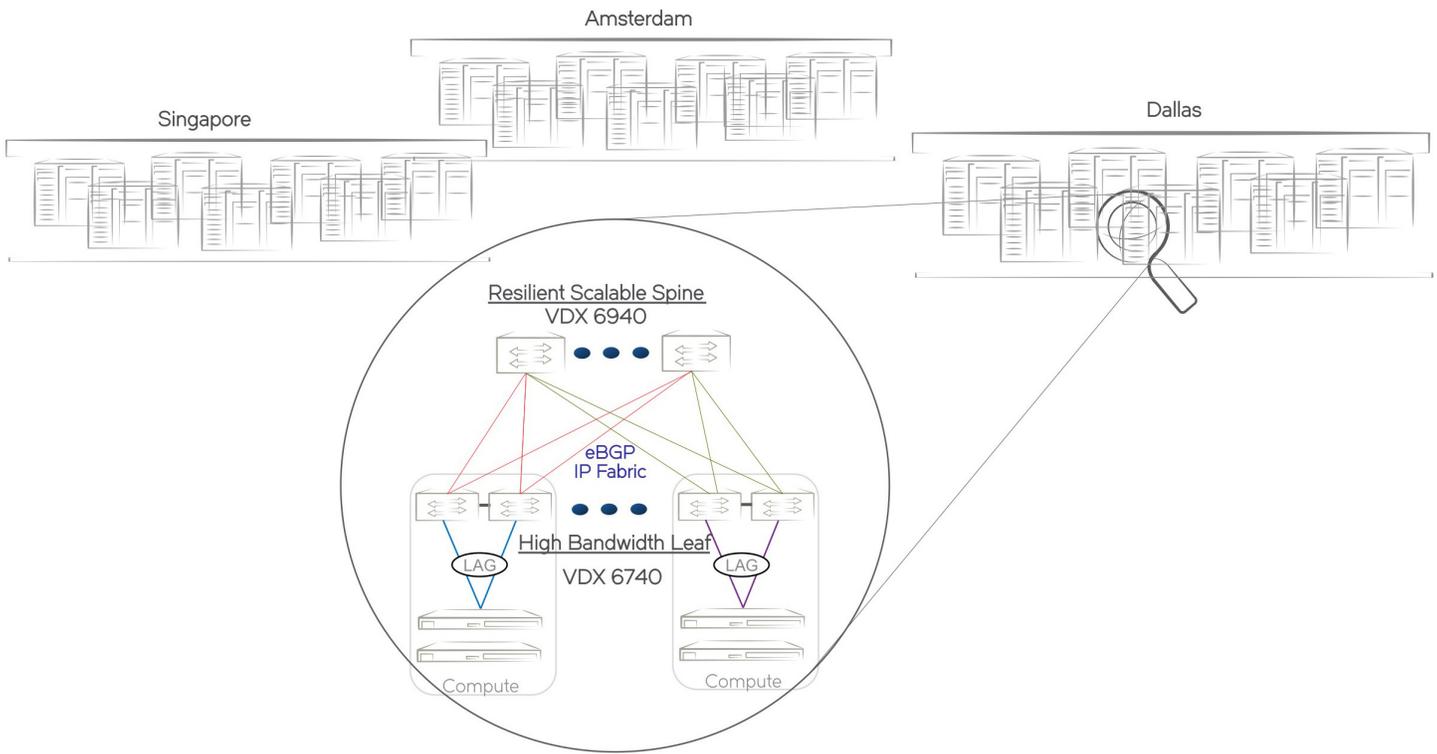


Figure 1: Servers.com Resilient, High-Performance Spine and Leaf Architecture.

links. This architecture enables completely redundant public and private networking, and it demands a significant number of 10 Gbps ports in each data center.

“Finally, one of the most important qualities that we wanted in a new network was a superb, trusted relationship with the vendor,” said Bezruchenko. “When you can’t easily predict how cloud services might evolve, and with our high rate of growth, we need to be able to count on our vendor as a partner to help use incorporate new SDN features down the road without significant changes to the infrastructure.”

Bezruchenko and his team reviewed all of the major networking vendors in their quest for a new network. After a comprehensive evaluation, they chose Brocade® VDX® Switches and an IP Fabric network topology.

Building a Powerful IP Fabric Network

Servers.com’s new network is built on Brocade VDX 6940 and Brocade VDX 6740 Switches and deployed in an IP fabric spine-and-leaf network topology for simplicity and scale, as shown in Figure 1.

Brocade VDX 6940 Switches form the network spine, packing massive capabilities into a small footprint. The Brocade VDX 6940 Switches have extremely high 10 GbE and 40 GbE port density with full line rate throughput across all ports. A scale-out architecture means that Servers.com can horizontally scale spine switches as leaf switches increase. It also creates a resilient IP fabric that eliminates a single point of failure. Servers.com only buys what it needs and can easily plug new switches in without missing a beat. Ideal for designing non-oversubscribed networks and providing

optimized buffer and latency, the Brocade VDX 6940 Switch is ideal for cloud applications.

Brocade VDX 6740 Switches are used for leaf switches. They offer 10 GbE and 40 GbE ports, and the 40 GbE ports can be broken into four independent 10 GbE ports. Both models of Brocade VDX Switches provide OpenStack support and programmable REST APIs to enable integration with in-house network automation and cloud management tools. Leaf switches are connected to servers using multiple 10 GbE links, and they are connected to spine switches over 40 GbE links.

To provide security for tenant traffic, tenants are isolated in two ways. First, there are separate leaf and spine switches for private Virtual Routing and Forwarding (VRF) and public VRF, which keep the two networks isolated from the access layer

to the network core. As a second layer of separation, Servers.com deploys each customer's servers with an Access Control List (ACL) on specific ports and constantly monitors ACLs to ensure security.

End-to-End Consistency

The Brocade IP Fabric creates a solid base for fast, dynamic innovation. Servers.com deployed a consistent Layer 3 IP Fabric from the access layer to the core for unmatched stability and resiliency.

Internet-proven IP Layer 3 Equal Cost Multipath Routing (ECMP) capabilities provide standards-based protocol support for deployments with hundreds of switches—perfect for unpredictable cloud services growth.

"Brocade delivers a robust set of Layer 3 features on the Brocade VDX Switches," said Bezruchenko. "We were able to have consistent Layer 3 IP features such as ACLs, Border Gateway Protocol (BGP) routing, and dynamic routing delivered all the way to the top-of-rack access layer. This capability helps keep everything simple, which was important to us."

Optimizing Scalability

The Brocade IP Fabric also enables Servers.com to scale ports and bandwidth as much as needed on demand.

"One really interesting thing for us was the ability for Brocade VDX Switches to deliver 10 GbE port licenses on demand," said Bezruchenko. "That's a great cost-saving opportunity, because if we don't need all of the 10 GbE ports from day one, we can save the initial cost and use 1 GbE with the option to upgrade later to 10 GbE."

Automation Enables Agility

"Brocade has really great seamless support for OpenStack orchestration," said Bezruchenko. "This allows us to offer anything from bare-metal dedicated networking to cloud

networking. It's integrated over the same network, with the same vendor, and delivers the same quality."

With SDN readiness built in and REST APIs, the Brocade VDX Switches also enable Servers.com to automate provisioning for new customers. In the past, provisioning a customer required at least two hours. Today, customers can order their server from a self-service portal get exactly what they need within 20 or 30 minutes.

The Brocade IP fabric also allows a new level of flexibility for Servers.com and its customers. Customers often need servers in different networks, which used to require different physical connections and having to be in the same location. Now, the Brocade IP Fabric enables virtual connections anywhere—freeing switches from having to physically connect to specific servers and enabling customers to quickly and dynamically scale their private networks.

"Brocade VDX Switches include the REST API, which is important for our DevOps tools and SDN plans," said Bezruchenko. "It's very extensive and offers even more features than we need."

Preserving Addressing Space

In the past, when a customer ordered redundant servers, Servers.com had to allocate one IP address for each server, two IP addresses for each top-of-rack switch, and one virtual IP address. With the Brocade VDX Switch IP Fabric Virtual Gateway IP address and /31 network masks for point-to-point links, the company can save valuable IPv4 public addresses. And customers can move data between redundant servers across the Servers.com global network while maintaining the same IP address.

WHY BROCADE

"Brocade has really great seamless support for OpenStack orchestration. This allows us to offer anything from bare-metal dedicated networking to cloud networking. It's integrated over the same network, with the same vendor, and delivers the same great quality."

— Konstantin Bezruchenko, Chief Technical Officer at Servers.com

Support for Whatever Comes Next

Servers.com plans to add Brocade VDX Switch VxLAN network virtualization capabilities, which will enable the team to extend customer subnets across multiple server racks to simplify Virtual Machine (VM) moves, server moves, and growth. The team expects to achieve line-rate routing through VxLAN tunnels with no performance impact.

"Brocade has outstanding technical support," said Bezruchenko. "They delivered as promised on their VxLAN capability and are always there when we need them. "As we become more software-driven and move towards the future, we know that Brocade will help us reach our goal, without having to re-engineer our network."

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