Brocade and VMware Help Organizations Accelerate the Transition to Cloud-Ready Data Centers

Industry Trend
Application users in organizations of all sizes have come to expect on-demand provisioning and availability of applications. This means the underlying compute, storage, and networking infrastructure has to deliver consistently high performance and anywhere, anytime access. With hyperscale public cloud service providers, that level of service has become readily available outside the traditional IT-managed data center. Public clouds are scalable, reliable, and secure. And they deliver reliable service levels despite the massively increasing data volumes driven by mobile computing, application-driven businesses, and social networking.

Today’s hardware-centric data centers, however, cannot support the pace of change. Provisioning takes time (especially if new hardware is required), is inefficient, and can be error-prone. These factors create a bottleneck that pressures IT administrators into a continuous reactionary mode. Frustrated by delays, employees (and even organizations that deliver applications quickly to keep pace with demand) are turning elsewhere for the services they need. Such rogue operations cause management nightmares for IT and put the security of the organization at risk.

SDDC and the Role of the Network
The Software-Defined Data Center (SDDC) is an evolutionary concept to build cloud-ready data centers in which all the infrastructure components are virtualized: compute, storage, network, and security. An orchestration layer abstracts the physical layer, giving the application layer more freedom and flexibility to support multiple use cases. IT can innovate further using this consistent, persistent, unified platform for all applications, while enabling a fully automated, zero-downtime infrastructure for any application and hardware.
Although an SDDC is managed and operated as a virtualized infrastructure, it needs to be built on a solid physical infrastructure that is programmable and can sustain the growth of new services and applications. The network is the crucial underlay connecting data centers and the cloud.

The SDDC requires virtualization, automation, and orchestration; an agile network fabric; and a supporting ecosystem to bring best-of-breed components and solutions together. The more integrated these elements are, the more efficient the data center cloud will be. And since cloud efficiencies drive operational efficiencies, product integration is an important goal for IT administrators building private or hybrid clouds.

Large-scale adoption of the SDDC has been hindered by a lack of standardization and interoperability across different networking vendor technologies. Based on an open ecosystem and software-driven, the New IP network provides a powerful foundation for an SDDC. It enables rapid network automation, integrates with varied cloud orchestration stacks, and delivers the necessary physical and virtual network functions and services to provide scale, intelligence, and performance.

Virtualization
The SDDC extends virtualization beyond compute to every data center resource. Networking, storage, security, and application load balancing run as virtualized instances. Comprehensive virtualization allows resources to be instantiated as needed throughout the data center to increase compute and network utilization, while optimizing application performance and security.

Automation and Orchestration
On-demand provisioning of resources and services depends on automation and orchestration capabilities. Today’s hyper-scale clouds (for example, Amazon Web Services) automatically provision resources based on application data and predefined policy frameworks. Orchestration tools include network resource visibility and automatic provisioning for optimal application performance. In policy-based automation, for example, a policy that defines the quality of video streaming is translated by orchestration tools into specific network requirements, such as bandwidth. By eliminating the need to provision resources manually, modern automation and orchestration tools better serve the dynamic needs of users while freeing IT to focus on business-critical initiatives.

Agile Network Fabric
Virtualized resources ultimately run on physical servers and a physical network. To complement software-driven cloud environments, physical networks must be agile, automated, easy to scale up or out, and adaptable. A fabric provides the best agility and automation for data center networks. Fabrics behave and are managed logically as one switch, with capacity that is easily expanded. This is ideal for meeting the performance, scalability, and resiliency needs of a virtualized environment, as well as reducing network management challenges.

Ecosystem-driven Solutions
Broad partner ecosystems enable organizations to move beyond single-vendor limitations. Single-vendor environments dictate specific visions, product sets, and sometimes ecosystems. Because that vision is controlled by the vendor, organizations are unable to take advantage of industry innovation and tap into best-of-breed solutions. Open solutions also allow enterprises to take advantage of cost savings and build a data center most suitable for their needs with relevant technology and infrastructure investments.

Brocade and VMware: Complementary Visions and Technologies
VMware and Brocade share the vision of a software-driven environment, and are building complementary products and services that can deliver hyper-scale cloud efficiencies to the enterprise: agility, operational cost efficiencies, and performance.

VMware’s SDDC architecture provides a virtualized and orchestrated data center that is agile, efficient, reliable, and secure for either on-premise or hybrid cloud architectures.

Brocade is leading the industry to deliver the promise of the New IP, with networking solutions designed for automation, orchestration, and centralized management. Brocade networking solutions for the New IP include Virtualized Network Functions (VNFs)—such as firewalls, ADCs, and routers—supported by an integrated, highly scalable, reliable, self-forming, self-healing fabric built on the principles of:

• **Distributed intelligence:** Every port is aware of every other port, allowing workloads to be moved with their associated characteristics without labor-intensive, error-prone manual network reconfiguration.

• **Native automation:** Native automation delivers near-perfect load balancing at Layer 1 throughout the mesh, automatic provisioning for VMs, and network self-configuration.
Absolute persistence: Optimized traffic flow lets the fabric react in real time and balance itself automatically if a port or a switch is lost.

Performance: The fabric eliminates the compromise between scale and latency, providing scalability with consistently high performance.

Implementing the Vision with Integrated Products
Tightly integrated products from Brocade and VMware allow organizations to deploy a VMware-based SDDC efficiently and effectively (see Figure 1).

End-to-End Visibility across Physical and Virtual Networks
Brocade Ethernet and Fibre Channel fabrics interoperate with VMware vRealize Operations Insight to provide end-to-end visibility of VMs across physical and virtual networks. This visibility helps organizations increase data center performance as well as application and data availability.

The product integration is enabled via vRealize plugins that access information from Brocade devices. This data supports network troubleshooting by illustrating how performance issues map to a physical device supporting the virtual environment.

The user interface is familiar to IT professionals: a vRealize dashboard with separate tabs for the Brocade IP Analytics Pack for vRealize Operations, the Brocade SAN Analytics Pack for vRealize Operations, and the Brocade Content Pack for vRealize Log Insight, which supports IP and SAN in one pack.

For example, the Brocade IP Content Pack for vRealize Log Insight monitors network traffic to determine normal patterns, enabling it to provide alerts in response to abnormal behavior. Administrators can also view operational data such as activity spikes and drill down to the specific port involved.

The VMware tools include intelligence that provides best-practice recommendations for solving a variety of problems. The ability to view the entire infrastructure from one familiar interface helps administrators without extensive networking expertise accelerate troubleshooting and minimize downtime.

Scalable, High-Performance Network Virtualization
Brocade VCS® Gateway for VMware NSX bridges virtual and physical networks, enabling manageability, scalability, and performance. This VCS Gateway solution connects VXLAN-based virtual infrastructure with the underlying VLAN-based physical devices, providing a unified network operations model for traditional, multitier, and emerging applications (see Figure 2). The result is a tightly integrated and readily manageable physical and virtual network environment that scales and delivers high performance. Any VM running on top of the VXLAN overlay network can access data and applications available on the physical network.

When a VM moves between servers, the Brocade VCS fabric automatically migrates VM profile information along with it. This capability eliminates the need for labor-intensive and time-delivering manual port profile updates, and maintains visibility as traffic moves from a VM, across a physical infrastructure, to a physical endpoint.

Seamless Application Delivery Performance across Hybrid Data Centers
Brocade Virtual Application Delivery Controller (vADC™) integrates with VMware vRealize Orchestrator to provide fast, reliable application delivery across virtual and cloud platforms at a massive scale. The suite of Brocade vADC products consists of:

- Brocade Virtual Traffic Manager (vTM): Allows administrators to inspect traffic in real time, control service levels, and automatically configure applications through the vRealize Orchestrator, enabling load balancing on demand.

- Brocade Services Director: Provides a lifecycle management tool that activates and deactivates Brocade vTM, and assists with resource allocation for application services.
Brocade Virtual Web Application Firewall (vWAF): Works with Brocade vTM to deliver the same levels of application acceleration, security, and resilience across the entire hybrid infrastructure—whether deployed on premise or in the cloud.

In addition to integration with VMware vRealize Orchestrator, Brocade vADC solutions optimize application performance in VMware vCloud Air, a public cloud platform that includes infrastructure, disaster recovery, and various application-as-a-service offerings. Its compatibility with on-premise, VMware-based data centers facilitates extending workloads to the cloud to create a hybrid environment.

In hybrid environments, using VNFs that provide the same features and performance on premise and in the cloud is a best practice for overall efficiency and manageability.

SDDC Architecture to Support Desktop Virtualization
IT departments are constantly challenged to increase the responsiveness of their Virtual Desktop Infrastructure (VDI) deployments. VMware and Brocade provide a reference architecture to address this challenge.

VMware Horizon View brings the agility of cloud computing to the desktop by transforming desktops into highly available end-user computing appliances with agile services delivered from the cloud. Horizon View delivers virtual sessions that follow end users across devices and locations. It enables fast, secure access to corporate data across a wide range of devices and operating systems, including Mac OS, Windows, and Linux machines as well as iOS and Android tablets. The Brocade VCS fabric, as the network infrastructure, provides high reliability, performance, and scalability.

Case Study: California Department of Water Resources
An SDDC deployment built on Brocade networking technology is a reality today for The State of California Department of Water Resources.

Customer Overview
The State of California Department of Water Resources (DWR) is responsible for managing and protecting California’s water. In fulfilling this role, the DWR works closely with more than 40 other California agencies, including California Natural Resources Agency (CNRA) departments such as the California Department of Forestry and Fire Protection (CAL FIRE) and the California Department of Parks and Recreation. That work includes providing IT services.
Challenge
As a de facto service provider for multiple state government agencies, the DWR utilizes leading-edge technology throughout its multitenant data center. That technology includes a significant investment in virtualization products from VMware.

In 2014, the DWR was operating a multitenant data center that provided full IT resources to its client agencies. Virtualized tools from VMware made provisioning storage and compute resources fast and easy. Network services were another story. Complexities in managing the data center security policies lengthened the application and network provisioning process, extending deployment times for line-of-business applications.

The DWR needed an updated data center infrastructure that would allow end users to self-provision network and firewall services without placing additional demands on its IT resources. As a public agency, the DWR also required that the new infrastructure be extremely cost-effective and secure.

Solution
The answer was to give end users the same efficiencies for provisioning network and firewall resources that they already enjoyed for compute and storage. The solution was an integrated approach, combining the VMware vCloud Suite (VMware vRealize Automation, VMware vSphere, and VMware NSX) and a network underlay from Brocade.

VMware NSX was the obvious choice to expand the existing data center virtualization beyond compute and storage to the network, creating an SDDC. For the network underlay, the DWR wanted a switch vendor that was already a VMware partner. The agency also wanted switches that would meet its automation, scalability, performance, and reliability needs—and that would support the hardware VXLAN Tunnel End Point (VTEP) capability in the upcoming release of VMware NSX.

With the help of systems integrator Enterprise Networking Solutions, the DWR selected Brocade for its network underlay. Enterprise Networking Solutions works extensively with VMware and Brocade in a shared ecosystem that was ideally suited to the DWR project.

Brocade supplied Brocade VDX® 6740 Switches, which include Brocade VCS Fabric technology. Only four switches were required due to the capacity and scalability of the Brocade VDX 6740. The DWR also implemented the Brocade Management Pack for vRealize Operations Insight, which provides a single point of management. The entire Brocade deployment was completed in an afternoon.

Business Success
The DWR has completely automated provisioning of cloud-based services within its organization, and is becoming a model for other California agencies. In the past, provisioning the DWR network took days; now it requires only a few hours. With VMware SDDC software and Brocade solutions for the New IP, the DWR is able to achieve greater business agility, operational cost efficiencies, and performance from its data center.

Software-Defined Networking for the Private Data Center
Organizations such as The State of California Department of Water Resources recognize that the SDDC is the way forward. By building integrated products that facilitate SDDC development, VMware and Brocade are helping organizations accelerate their transition to software-driven data centers that enable enhanced agility, cost efficiencies, and performance.

For more information about Brocade solutions, visit www.brocade.com.