



End User Computing with VMware View™ and Brocade VCS™ Technology

Scalable virtual desktops with Brocade VDX™ products for simplified, cloud-optimized networking

Introduction

Today, personal computing is transforming to serve a user-centric world. This new world order requires information to be available ubiquitously, to be accessed from anywhere at anytime. An Information Technology (IT) infrastructure that can support user-centric computing requires speed, reliability, security, and native support for an array of popular mobile devices. A common look and feel across all these devices is vital for user productivity. VMware View software is designed to present that unique desktop to all devices so the same user experience can be delivered.

This paper highlights a VMware View 4.6 solution built on Brocade breakthrough Ethernet fabric networking, using fast and affordable servers and storage.

Business Benefits of VDI

Organizations of all sizes can derive many benefits from deploying a virtual desktop infrastructure (VDI). Included among the benefits are:

- **Increased user productivity** with easy and uniform access to all applications and data using different devices from office, home, and mobile locations
- **Desktop client security** to prevent the outflow of sensitive information via data leakage or the loss of a laptop or tablet
- **Higher IT operational efficiency** from the lockdown of software and desktop configurations and the ability to manage all virtual desktops remotely from a central site
- **Lower total cost of ownership** from savings in space and power consumption and from lower network, server, and storage CapEx and OpEx costs
- **Increased IT agility** as virtual end user computing empowers business to deliver IT functions faster and with shorter refresh cycles.

Challenges

In order to deliver on the benefits of virtual desktops, IT needs to address a unique set of challenges. These include:

- **Maintaining desktop performance** to meet user expectations that virtual desktop response times will be equivalent to their personal desktops or laptops
- **Securing client access** and preventing data loss and leakage while giving the user the freedom to access applications and data – at any time, from anywhere, using any device
- **Ensuring business continuity** while building out the end-to-end high performance network required for a wide-scale VDI deployment – “rip and replace” and proprietary solutions can have a negative impact on customer services
- **Boosting business productivity** and finding ways to cut costs on existing IT expenditures so that resources are available to invest in new functions to drive further productivity.

The Brocade-VMware Solution

The Brocade-VMware solution deploys VMware’s innovative virtual end user computing on the Brocade® VDX™ family of data center switches and Ethernet fabric, with converged network adapters (CNA) on the servers. VMware View enhances the reliability, availability, and security of the virtual desktops being deployed. The security server includes a PCoIP secure gateway to enhance desktop security. The high-performance Ethernet fabric is critical to delivering the required response times when virtual desktops are started in the ESX servers and when the applications process and save data onto the storage arrays. Brocade VDX switches use VCS technology to provide a flat, high-performance network that can scale horizontally and seamlessly on demand. Deployment of VMware View on this network brings best-in-class performance. The Brocade VDX switches include distributed intelligence to simplify network configuration and reduce management time as the virtualized environment grows.

Solution Architecture

The following diagram provides an overview of the Brocade-VMware reference virtual end user computing solution.

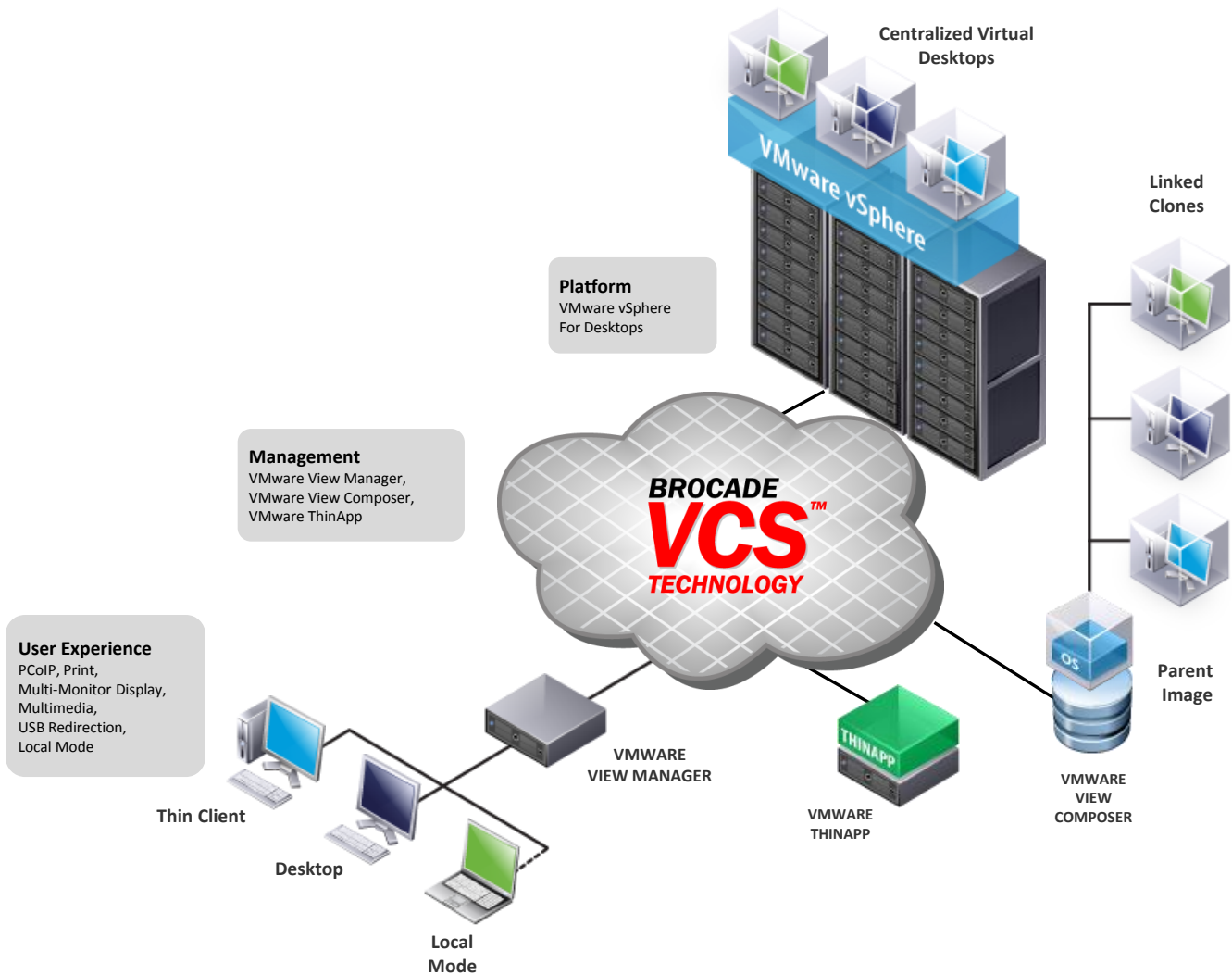


Figure 1: VMware View solution architecture with Brocade VCS Technology

Advantages of the Brocade-VMware Virtual End User Solution

The Brocade-VMware solution is uniquely architected to turn VDI challenges into business advantages. By utilizing the Brocade-VMware solution, organizations are able to:

- **Enable performance and scalability** as Brocade and VMware provide the price/performance, end-to-end VDI and network products to allow users to build high-performance wide-scale VDI solutions. VMware View optimizes the provisioning and deployment of desktops using features like Integrated Application Assignment, Tiered Storage, and Single Sign ON (SSO). Unlike

classical, hierarchical Ethernet architectures, Brocade Ethernet fabrics provide higher levels of performance, utilization, availability, and simplicity with 600ns port-to-port latency. Brocade CNAs are fully featured 10 GbE NICs that provide stateless networking offloads such as TCP checksum and segmentation offloads for improved performance and more efficient CPU usage. Brocade CNAs support Virtual Machine Optimized Ports (VMOPs) to offload the hypervisor of essential virtual switching tasks, such as incoming packet classification and sorting tasks, helping to reduce latency and improve throughput while freeing CPU cycles. Brocade CNAs drive throughput of 500K IOPs per port. Other advanced features in the CNA and Brocade VDX switches, such as stateless networking

offloads and active-active connection, provide even higher performance and throughput.

- **Provide security** with powerful, validated functions from best-of-breed vendors enabled via VMware View PCoIP security gateway, which allows secure connections to the desktops with stronger authentication without VPN connections. The solution protects the virtual desktops from malware and viruses. Brocade ServerIron® ADX Security Shields can be added to deliver wire-speed multi-gigabit-rate protection from Denial of Service (DoS) and Distributed DoS (DDoS).
- **Ease migration** as Brocade and VMware products are built on open standards and validated for interoperability with leading server, storage, and network vendors. This allows customers to leverage their existing infrastructure for VDI without resorting to a “rip and replace” and

proprietary solution. In addition, Brocade support for multiple protocols (such as TRILL, DCB, iSCSI, NAS and FCoE) and “pay as you grow” modular upgrades allow organizations to expand and use new technology and products at their own pace and budget. VMware View is fully compatible with vSphere, and View is tested and certified for all the major host operating systems.

- **Drive lower TCO** as the solution utilizes best-of-breed products built on the strengths of two companies that are market innovators. The solution utilizes a virtualization platform with VMware vSphere and View in conjunction with the Brocade VDX 6720 family of data center switches and the best options from leading compute and storage vendors. Organizations can choose the best options to realize the best ROI at the lowest TCO.

Scalability and Flexibility of the Brocade-VMware Virtual End User Solution

The solution is built on a highly scalable pod architecture enabled by Brocade VCS technology. A single pod is pre-tested to host up to 1,000 virtual desktops. Multiple pods can be connected together using up to 80 Gigabits per second (Gbps) Inter-Switch Links (ISLs) between switches to quickly scale out the solution as necessary.

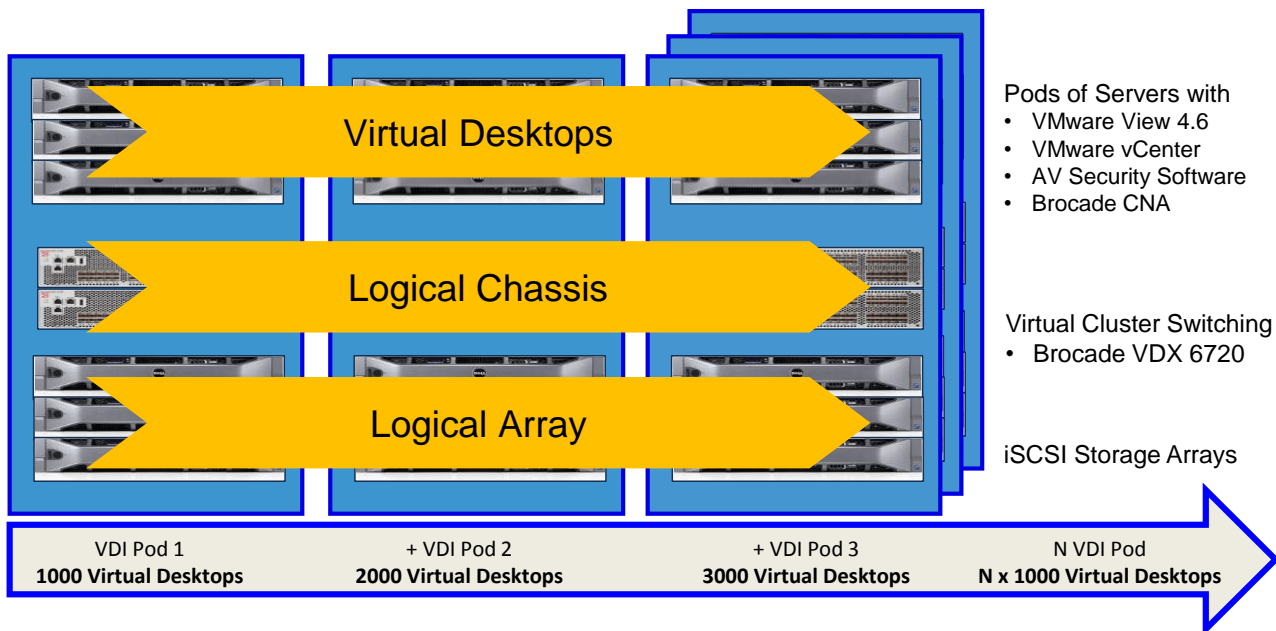


Figure 2: Scalable virtual desktops with Brocade VDX products for simplified, cloud-optimized networking

Key Solution Products

The following are key products in the Brocade VMware End User Computing Solution:

- VMware View 4.6
<http://www.vmware.com/company/news/releases/view-ga-4-6.html>
- VMware vSphere 4
<http://www.vmware.com/products/vsphere/overview.html>
- Brocade VDX 6720 Data Center Switches
<http://www.brocade.com/launch/products/vdx/index.html?gclid=CL2h15S06KcCFcfsKgod91RMaw>
- Brocade CNAs
<http://www.brocade.com/products/all/adapters/product-details/1010-1020-cna/index.page>

About VMware

VMware, the global leader in virtualization and cloud infrastructure, delivers customer-proven solutions that significantly reduce IT complexity and enable more flexible, agile service delivery. Leveraging VMware vSphere™, the most widely deployed foundation for cloud computing, VMware accelerates the transition to a cloud computing approach while preserving existing investments and improving security and control. With VMware vCloud™ solutions and services, VMware enables private, public and hybrid cloud deployment models that ensure application mobility and portability.

With more than 190,000 customers and 25,000 partners, VMware helps organizations of all sizes lower costs, preserve freedom of choice and energize business through IT while saving energy—financial, human and the Earth's.

For information visit www.vmware.com.

About Brocade

Brocade networking solutions help the world's leading organizations transition smoothly to a virtualized world where applications and information reside anywhere. This approach is based on the Brocade One™ unified network strategy, which enables a wide range of consolidation, convergence, virtualization, and cloud computing initiatives.

Offering an industry-leading family of Ethernet, storage, and converged networking solutions, Brocade helps organizations achieve their most critical business objectives through unmatched simplicity, non-stop networking, application optimization, and investment protection. To ensure a complete solution, Brocade partners with world-class IT companies and provides a full range of education, support, and professional services offerings.

For more information about Brocade products, services, and solutions, visit **www.brocade.com**.

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Protected by one or more U.S. Patent Nos. 6,397,242, 6,496,847, 6,704,925, 6,711,672, 6,725,289, 6,735,601, 6,785,886, 6,789,156, 6,795,966, 6,880,022, 6,944,699, 6,961,806, 6,961,941, 7,069,413, 7,082,598, 7,089,377, 7,111,086, 7,111,145, 7,117,481, 7,149, 843, 7,155,558, 7,222,221, 7,260,815, 7,260,820, 7,269,683, 7,275,136, 7,277,998, 7,277,999, 7,278,030, 7,281,102, 7,290,253, 7,356,679 and patents pending.

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