



**SERVER
CONNECTIVITY**

Ten Ways to Optimize Your Microsoft Hyper-V Environment with Brocade

To maximize the benefits of network connectivity in a virtualized server environment, Brocade works seamlessly with Microsoft Hyper-V and Microsoft System Center Virtual Machine Manager (MSCVMM) to deliver high performance, high availability, security, energy efficiency, and streamlined management end to end.

Doing more with less is the new prime directive for today's data center managers. With the continued high cost of data center real estate, power costs, cooling overhead, and the need to streamline management, companies must find new solutions to dramatically reduce the amount of hardware required to support business applications, realize energy savings, and centralize management of IT processing resources—all while accommodating the flexibility required for today's fluid business environment. These are the main business drivers behind new data center strategies and designs.

INTRODUCTION

Microsoft Hyper-V server virtualization software is a key component for building the next-generation data center. Integrated into Windows Server 2008, Hyper-V enables customers to cost-effectively run multiple virtual machines on a single hardware platform and achieve much higher productivity in a smaller, more energy efficient footprint. Implementing a virtualized server environment, though, has both upstream (client) and downstream (storage) impact in the data center. Because Brocade now has a full spectrum of products spanning LAN, WAN and SAN, we can help insure that a Hyper-V deployment proactively addresses the new requirements of both client and storage access. The value of a Hyper-V virtualization solution is thus amplified when combined with Brocade's extraordinary network technology.

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The ten Brocade solutions described in this paper will enhance your Microsoft Hyper-V deployment and help eliminate potential bottlenecks. Also provided are pointers to relevant reference material on the Brocade corporate Web site and www.brocade.com/msvirt.

TEN WAYS TO OPTIMIZE YOUR HYPER-V ENVIRONMENT

1. Accelerating Client Access to Hyper-V Servers

Deploying a virtual server solution can impact client access to new virtual machines (VMs). Is your network ready to handle the sudden increase in client traffic volumes? Brocade now offers a full line of sophisticated LAN switches and routers for Ethernet and IP traffic from Layer 2- 3 to Layer 4 - 7 application switching. This product suite is the natural complement to Brocade's robust SAN products and enables customers to build full-featured and secure networks end to end. As with the Brocade DCX® and DCX-4S Backbone architecture for SANs, Brocade BigIron® RX and FastIron® SuperX switches incorporate best-in-class functionality and low power consumption to deliver high-performance core switching for data center LAN backbones. Brocade edge switches with Power over Ethernet (PoE) support enable customers to integrate a wide variety of IP business applications, including Voice over IP (VoIP). Brocade SecureIron® switches bring advanced security protection for client access into virtualized Hyper-V clusters, while Brocade ServerIron® ADX switches provide Layer 4- 7 application acceleration and load balancing. Brocade LAN solutions provide up to 10 Gigabits per second (Gbps) throughput per port to accommodate the higher traffic loads typical of virtual machine environments.

- www.brocade.com/products-solutions/products/ethernet-switches-routers

2. Is Your Hyper-V Deployment Secure?

Most companies are now subject to government regulations that mandate protection and security for customer data transactions. Therefore, planning a Hyper-V deployment must also account for basic security mechanisms for both client and storage access. Brocade offers a broad spectrum of security solutions, including LAN- and WAN-based technologies and storage-specific SAN security features. Brocade SecureIron products, for example, provide firewall traffic management and LAN security to safeguard access from clients to virtual hosts on the IP network. Brocade SAN security features include authentication via Access Control Lists (ACLs) and Role-Based Access Control (RBAC) as well as security mechanisms for authenticating connectivity of switch ports and devices to fabrics. In addition, the new Brocade Encryption Switch and Brocade FS8-18 Encryption Blade for the Brocade DCX platform provide high performance (96 Gbps) data encryption for data-at-rest. Brocade's security environment thus protects data-in-flight from client to virtual host as well as data written to disk across the SAN.

- "The Growing Need for Security in Storage Area Networks" on www.brocade.com/msvirt
- www.brocade.com/products-solutions/solutions/security
- www.brocade.com/products-solutions/products/switches/product-details/encryption-switch
- www.brocade.com/products-solutions/products/switches/product-details/FS8-18_encryption_blade

3. Ensure Hyper-V Storage Workloads Follow Migrating VMs

In a virtual server environment, individual virtual machine instances are unaware of physical ports since the underlying hardware has been abstracted by the hypervisor. This creates potential problems for identifying traffic flows from virtual machines through shared physical ports. N_Port ID Virtualization (NPIV) is an industry standard that enables multiple Fibre Channel addresses to share a single physical Fibre Channel port. In a Hyper-V environment, NPIV allows each virtual machine instance to have a unique World Wide Name (WWN) or virtual Host Bus Adapter (HBA) port. This in turn provides a level of granularity for identifying each VM attached to the fabric for end-to-end monitoring, accounting, and configuration. Because the WWN is now bound to an individual virtual machine, the WWN follows the VM when it is migrated to another platform. In addition, NPIV creates the linkage required for advanced services such as Quality of Service (QoS), security, and zoning as discussed below.

- www.brocade.com/products-solutions/products/server-connectivity
- www.brocade.com/products-solutions/products/switches/product-details/5100-switch

4. Multiple VMs per Server Requires More Powerful Storage Adapters

In a conventional server, a Host Bus Adapter provides storage access for a single operating system and its applications. In a virtual server configuration, the HBA may be supporting 10 to 20 OS instances, each running its own application. High performance is therefore key for enabling multiple virtual machines to share HBA ports without congestion. The Brocade 815 (single port) and 825 (dual port) Fibre Channel HBAs provide 8 Gbps bandwidth and 500K I/Os per second (IOPS) performance per port to ensure the maximum throughput for shared Hyper-V virtualized connectivity. Brocade N_Port trunking enables the Brocade 825 HBA to deliver an amazing 16 Gbps bandwidth (3,200 Megabytes per second (MBps)) and one million IOPS performance. This extraordinary performance helps ensure that Hyper-V configurations can scale over time to accommodate additional virtual machines without impacting the continuous operation of existing applications.

The Brocade 815 and 825 HBAs are further optimized for server virtualization connectivity with support for advanced intelligent services that enable end-to-end visibility and management. As discussed below, Brocade virtual machine SAN boot, NPIV, and integrated QoS provide powerful tools for simplifying Hyper-V deployments and providing proactive alerts directly to Microsoft System Center Virtual Machine Manager.

- www.brocade.com/products-solutions/products/server-connectivity/product-details/fc-815-825-hba

5. How to Simplify Boot Image Management

For both standalone physical servers and blade server environments, the ability to boot from the storage network greatly simplifies virtual machine deployment and migration of VM instances from one hardware platform to another. Brocade 815 and 825 HBAs provide the ability to automatically retrieve boot LUN parameters from a centralized fabric-based registry. This eliminates the manual host-based configuration scheme, which is often prone to error, required by other HBA vendors. Brocade's SAN boot and boot LUN discovery facilitates migration of virtual machines from host to host, removes the need for local storage, and improves reliability and performance.

- "Fabric-Based Boot LUN Discovery Automates Diskless Server Deployment" on www.brocade.com/msvirt

6. Make Sure Your Mission-Critical Applications Receive Priority

The combination of NPIV and zoning functionality on Brocade Fibre Channel HBAs and switches provides the foundation for higher-level fabric services including end-to-end QoS. Because the traffic flows from each Hyper-V virtual machine can be identified by virtual WWN and segregated via zoning, each can be assigned a bandwidth priority (low, medium or high) that is enforced fabric-wide from the host connection to the storage port. While some applications running on virtual machines are logical candidates for QoS prioritization (for example, Microsoft SQL Server), Brocade's "Top Talkers" management feature can help identify which VM applications may require priority treatment. Because Brocade end-to-end QoS is ultimately tied to the virtual machine's virtualized WWN address, the QoS assignment follows the VM if it is migrated from one hardware platform to another. This feature ensures that applications enjoy non-disruptive data access despite adds, moves, or changes to the Hyper-V environment and enables administrators to more easily fulfill client Service-Level Agreements (SLAs).

- "Adaptive Networking—Advanced Data Center Fabric Technology" on www.brocade.com/msvirt

7. How to Keep Hyper-V Blade Server Deployments Simple

Microsoft Hyper-V can be installed on conventional server platforms or blade server chassis. Blade server form factors offer the highest density for consolidating IT processing in the data center and leverage shared resources across the backplane. To optimize storage access from blade servers, Brocade partners with blade server providers to create high-performance, high-availability Access Gateway blades for Fibre Channel connectivity to the SAN. Brocade Access Gateway technology leverages NPIV to simplify virtual machine addressing and F_Port Trunking for high utilization and automatic link failover. By integrating SAN connectivity into a virtualized blade server chassis, Brocade helps to streamline deployment and simplify management while reducing overall costs.

- www.brocade.com/sites/dotcom/products-solutions/products/blade-server-SAN-IO-modules

8. Have You Consolidated Storage Assets As Well As Servers?

One of the central benefits of server virtualization is the ability to extract more compute power from less hardware. This dramatically reduces the data center footprint for IT processing, streamlines connectivity, and cuts power consumption and cooling overhead. Those benefits can be extended by implementing consolidation in the storage infrastructure as well. With 4x the performance and over 10x the energy efficiency of other SAN enterprise-class platforms, the Brocade DCX delivers the high performance required for Hyper-V server implementation and can accommodate growth in VM environments in a compact footprint. The Brocade DCX supports 384 ports of 8 Gbps for a total of 3 Tbps chassis bandwidth. Ultra-high speed inter-chassis links (ICLs) allow further expansion of the SAN core for scaling to meet the requirements of very large Hyper-V deployments. The Brocade DCX is also designed to non-disruptively integrate Fibre Channel over Ethernet (FCoE) and Converged Enhanced Ethernet (CEE) for future Hyper-V server connectivity. The Brocade DCX-4S is available in a 192-port configuration to support medium Hyper-V configurations while still providing high availability, performance, and advanced SAN services.

The Brocade Adaptive Networking services for QoS, Ingress Rate Limiting, and congestion detection and management ensure that traffic streams from Hyper-V virtual machines are proactively managed throughout the fabric and accommodates the varying requirements of upper-layer business applications. Adaptive Networking services provide greater agility in managing application workloads as they are moved between physical servers.

- www.brocade.com/products-solutions/products/dcx-backbone
- "Adaptive Networking—Advanced Data Center Fabric Technology" on www.brocade.com/msvirt

9 . Simplify Management of Complex VM Environments

Virtual server deployments dramatically increase the number of data flows and requisite bandwidth per physical server or blade server. Because Microsoft Hyper-V supports dynamic migration of application workloads between physical servers, complex traffic patterns are created and unexpected congestion can occur. This complicates server management and can impact performance and availability. The Brocade Management Pack for Microsoft System Center can proactively address these issues by enabling communication between Brocade intelligent fabric services with Microsoft System Center Virtual Machine Manager. As the fabric monitors potential congestion on a per-virtual machine basis, it can proactively alert MSCVMM that a workload should be migrated to a less-utilized physical link. Because this diagnostic functionality is fine-tuned to the workflows of each VM, changes can be restricted to only the Hyper-V instances impacted by congestion. The ability to send Performance and Resource Optimization (PRO) alerts to System Center enables customers to proactively perform manual or automatic migrations based on policies previously set up within MSCVMM.

Open management standards, such as the Storage Manage Initiative (SMI), are the appropriate tools for integrating virtualization management platforms with fabric management services. As one of the original contributors to the SMI-S specification, Brocade is uniquely positioned to provide a truly open systems solution end-to-end. In addition, configuration management, capacity planning, SLA policies, and virtual machine provisioning can be integrated with Brocade fabric services such as Adaptive Networking and encryption and security policies.

- "Brocade Data Center Fabric Manager: Unified Fabric Management in the Evolving Data Center" on www.brocade.com/msvirt
- www.brocade.com/products-solutions/products/fabric-management-software

10. You Might Need Help

Even large companies who want to take advantage of the cost savings, consolidation, and lower energy consumption characteristic of server virtualization technology may not have the staff or in-house expertise to plan and implement a Hyper-V project. Many organizations fail to consider the overall impact of virtualization on the data center and that in turn can lead to degraded application performance, inadequate data protection, and increased management complexity. Because Brocade technology is ubiquitous in the vast majority of data centers worldwide and has years of experience in the most mission-critical IT environments, it can provide a wealth of practical knowledge and insight into the key issues surrounding client-to-server and server-to-storage data access. Brocade Professional Services has helped hundreds of customers upgrade to virtualized server infrastructures and provides a spectrum of services from virtual server assessments, audits and planning to end-to-end deployment and operation. A well-conceived and executed virtualization strategy can ensure that your Hyper-V deployment achieves its budgetary goals and fulfills the prime directive to do far more with much less.

- www.brocade.com/dotcom/services-support/professional-services/data-virtualization

ABOUT BROCADE

Brocade connects the world's most important information—delivering proven networking solutions for today's most data-intensive organizations. From the data center to high-performance Ethernet networks, Brocade is extending its near-15-year heritage as a leading partner for advanced storage and networking solutions.

The innovative Brocade approach to networking facilitates strategic partnerships by providing:

- Standards-based solutions that streamline qualification and help ensure interoperability
- Leading-edge technology that enables comprehensive, best-in-class solutions
- The best alternative choice to Cisco in terms of overall business value

The world's largest enterprise networks, government entities, and global service providers rely on Brocade to maximize the business return on their data. It's no wonder 90 percent of the world's most critical business information flows through Brocade solutions. Quite simply, Brocade enables today's complex businesses to run. Where other vendors produce networking that's ordinary, Brocade is committed to delivering the extraordinary.

Corporate Headquarters

San Jose, CA USA
T: +1-408-333-8000
info@brocade.com

European Headquarters

Geneva, Switzerland
T: +41-22-799-56-40
emea-info@brocade.com

Asia Pacific Headquarters

Singapore
T: +65-6538-4700
apac-info@brocade.com

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