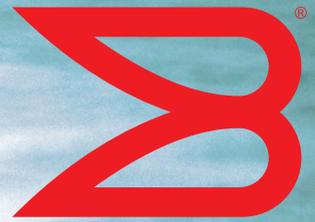


VIRTUALIZED DATA CENTER SOLUTIONS



STORAGE AREA NETWORK

Brocade Virtualization Solutions for a Microsoft Environment

HIGHLIGHTS

- With Microsoft System Center, you can manage both physical and virtual assets for clients and servers, all on the same platform.
- The Brocade® Management Pack for Microsoft System Center supports the Performance and Resource Optimization (PRO) feature in System Center Virtual Machine Manager (VMM) 2008.
- The Brocade Data Center Fabric (DCF) and HBA management capabilities are now extended into System Center VMM to provide server administrators visibility beyond the confines of the server into the shared storage network.
- Brocade DCF architecture provides a strategic foundation for transforming today's IT infrastructures into next-generation, virtualization-enabled data centers with centralized and unified management, and greater investment protection, performance, and cost efficiencies.
- Bridging the "virtualization management gap" will help server administrators make informed decisions on where to place, migrate, or reconfigure applications, hardware, or virtual machines.

Virtualization puts even more demand on your data center fabric and IT infrastructure—as your organization now has physical and virtualized access points and connections that need to be effectively managed. In fact, industry analysts have used the term "virtualization management gap" to describe the deficiency in managing virtualized environments compared with the maturity of tools to manage physical server environments. Microsoft is addressing this gap with the release of Hyper-V, enabling more and more customers to readily evaluate and adopt Windows as its server virtualization technology of choice.

WHAT IS DYNAMIC IT?

The term Microsoft uses to describe an information infrastructure that demonstrates these characteristics is "Dynamic IT." Dynamic IT requires a virtualization strategy that mobilizes and manages the resources of the entire infrastructure to respond to dynamic business demands. The extent to which IT deploys the right virtualization strategy is the extent to which it can free up resources to address larger business goals and ultimately achieve competitive advantage through business agility.

"We are pleased to align with Brocade in their delivery of new capabilities which integrate with the end-to-end virtualization management solutions provided by System Center to simplify infrastructure management and provide powerful new capabilities to the dynamic, virtualized data center," said Zane Adam, senior director of integrated virtualization at Microsoft."

Brocade, the world leader in Data Center Fabric technology, is working with Microsoft to ensure support and integration of the Microsoft Windows virtualization and System Center technologies. When an enterprise application, such as SQL Server or BizTalk or an Oracle database application, is running in a Windows virtual server environment, Brocade can help ensure reliable, secure access to the application's data by deploying the Brocade DCF architecture. Companies can leverage these solutions to build a truly dynamic IT environment that features adaptive networking, non-disruptive services, enterprise-class data protection, and unmatched scalability.

Microsoft®
GOLD CERTIFIED

Partner

BROCADE

CHALLENGES IN THE ENTERPRISE VIRTUALIZED DATA CENTER

IT departments, always compelled to “do more with less,” now have the products and technology to realize the promise of virtualization to meet dynamic business demands. Some of these competing demands include: agility and ease of use, security and compliance, performance and scalability, Business Continuity (BC), and Disaster Recovery (DR). And all this with ever-decreasing operating and capital expense budgets.

SERVER CONSOLIDATION

When an Operating System (OS) and application are packaged together and operate independently of the OS on the physical server, they form a Virtual Machine (VM), which is hosted on the physical server.

By consolidating multiple workloads (VMs) onto a single physical server, you can actually reverse the proliferation of physical servers resulting in less hardware and more flexibility. According to Microsoft research, the net gain of server consolidation is to increase server utilization from a typical rate of 15 percent to an average rate of 60 percent. Other benefits of server consolidation include reduced power and cooling costs and freeing up floor space in the data center by reducing equipment footprint.

MANAGEMENT CHALLENGES

But because resources are virtualized, you may not know how many you really have and where your assets reside. Simply stated, the more you virtualize, the more essential management becomes. Moreover, the increased IT overhead required to manage VMs may offset the cost savings realized by physical consolidation. New capabilities need to be described and engineered, such as “virtualization mobility” and “personality profile.”

To enable VMs to be mobile, you need to create individual profiles that move with VMs when they are migrated across servers. The personality profile keeps track of VM associations with a virtual port, QoS priority, rule-based SLA assignment, encryption requirements, and so on. Without strong management capabilities, the benefits you

gain from virtualization technologies will be greatly diminished. Effective management brings everything together: it pinpoints where virtualization products reside and it lets you easily allocate the right resources in real-time.

Management solutions must enable you to control both physical and virtual worlds in a unified, easy manner. Using a common tool set for virtual and physical servers can provide the flexibility to migrate workloads across physical and virtual server resources. Data centers can also benefit from a consolidated technology platform that centralizes and unifies Storage Area Network (SAN) management, as characterized in the Brocade DCF architecture.

MEETING PERFORMANCE REQUIREMENTS

Virtual storage applications automatically move data from one storage tier to another, actions dictated by access patterns and data retention policies. This dynamic movement of application workloads and data can create unexpected bottlenecks,

which in turn cause unpredictable congestion in the networks hosting server-to-storage traffic, server-to-server clusters, and storage-to-storage replication. Provisioning, configuration management, capacity planning, security, and fault isolation are all more complex in a virtual environment.

Brocade Adaptive Networking services, part of the advanced Brocade DCF architecture, simplify provisioning, configuration management, capacity planning, security management, and fault isolation in the virtualized data center. It uses deep network intelligence to anticipate congestion and to dynamically make adjustments in the fabric so that application traffic continues to flow. Adaptive Networking introduces several networking services: Quality of Service (QoS), Congestion Management, and Fabric Dynamic Profiling. Advanced fabric intelligence can simplify management and improve fabric utilization, while delivering massive performance, constant availability, and non-disruptive scalability—the essential qualities required in virtual server and virtual storage environments.

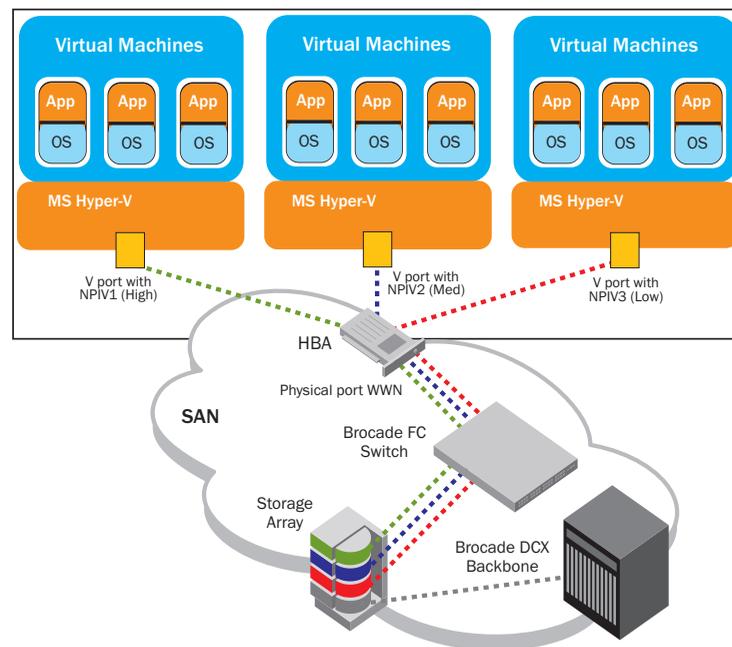


Figure 1. QoS extended from server to storage.

ADAPTIVE NETWORKING

Adaptive Networking services with the following capabilities were introduced in Brocade fabrics with the release of Fabric OS® (FOS) 6.0.0:

- Special QoS zones have assigned priorities (Low, Medium, and High), as shown in Figure 1.
- “Top Talkers” feature identifies the top “n” bandwidth-consuming flows for ingress and/or egress traffic on a given switch port.
- Congestion Management, the other key technology associated with Adaptive Networking, functions in the switch itself and involves no user interaction.

Brocade Fibre Channel HBAs extends Adaptive Networking services from the SAN to the server. In the case of server virtualization and Microsoft Hyper-V, more than one operating system image can be running on the server. Each image functions independently of the other and has its own flow dynamics with its target, yet they can all coexist and connect to the same storage pool, thanks to Brocade technology and management tools.

BROCADE MANAGEMENT PACK FOR MICROSOFT SYSTEM CENTER

In fall of 2008, Brocade will release a workload-aware resource optimization product that is extensible through the Microsoft System Center Operation Manager 2007 (OM). The Brocade Management Pack for Microsoft System Center monitors the health and performance of data center SAN infrastructure and provides intelligent recommendations that enable the IT administrators to dynamically optimize the performance of their virtualized workloads. It allows creation of specific policies that Microsoft System Center Virtual Machine Manager 2008 (VMM) can act upon automatically or that you can act upon manually. System Center VMM vNext Performance and Resource Optimization (PRO) Pack leverages the OM Framework to create specific policies that VMM is called to act upon—allowing partners to deliver enhanced capabilities to our mutual customers.

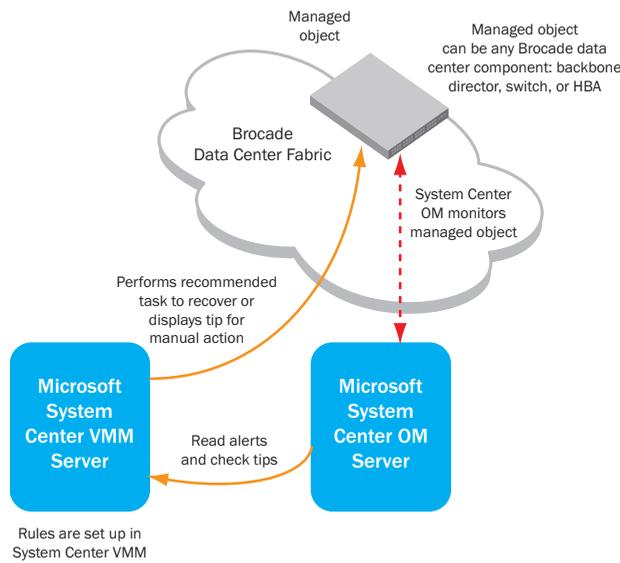


Figure 2. How Brocade Management Pack for Microsoft System Center provides a PRO Tip.

In real time, the Brocade Management Pack for Microsoft System Center works with Microsoft VMM as follows:

- During synchronization, System Center VMM receives all alerts sent from Brocade Management Pack events and creates PRO Tips.
- The PRO Tip includes a recommended action and can be of Critical or Warning severity.
- PRO Tips can be implemented either manually or automatically.

In short, the Brocade Management Pack for Microsoft System Center considers both HBA and switch parameters to maximize the performance of virtualized environment.

MONITORING THE HEALTH OF A FIBRE CHANNEL LINK IN THE SAN

To help you understand how the Brocade Management Pack works, this example follows the health of a Fibre Channel link from an HBA in a physical server to switches in the SAN. Some of the events that can be monitored and are relevant in this example include Cyclic Redundancy Check (CRC), synchronization errors, link initializations, and link resets. When the Brocade Management Pack sees deterioration in the FC link that will impact performance, it acts to create a PRO Tip and implements the recommended action.

The recommended action is to migrate all VMs residing on the host with the affected link to the next cluster node (based on System Center VMM intelligent placement). Since automatic execution of the PRO Tip has previously been configured, the Brocade automatically executes the recommended action.

If manual resolution had been specified, System Center VMM would have displayed an onscreen PRO Tip that would allow the IT Administrator to evaluate the recommended action and then implement or ignore it.

KEY MICROSOFT VIRTUALIZATION TECHNOLOGIES

These components of the Microsoft System Center suite of server management products are perfectly positioned to participate in the Brocade DCF.

Microsoft System Center Virtual Machine Manager 2008 (VMM) manages both Hyper-V and VMware virtual infrastructure. Additional functionality, new to this version of VMM, includes Performance and Resource Optimization (PRO), which dynamically tunes virtual infrastructure, simplified virtual host cluster support, and other improvements and enhancements:

- Manages host configuration, VM creation, library management, Intelligent VM placement, monitoring, rapid recovery, self-provisioning, and automation

SOLUTIONS BRIEF

- Seamlessly manages virtual server environment with existing familiar physical server management tools
- Provides complete scripted control of portable, connected VMs and enables easy automation of deployment, ongoing change and configuration

Microsoft System Center Operation Manager 2007 (OM):

- Provides comprehensive monitoring and reporting of host OS and guest VMs, including discovery, state view, diagram view, alerts, tasks, and performance
- Identifies good candidates for conversion to VMs based on specified memory and CPU requirements

For more information about these technologies, visit:
www.microsoft.com/virtualization.

BROCADE END-TO-END ADVANTAGE

Brocade's product offerings include hardware and software:

- 4 Gbit/sec and 8 Gbit/sec SAN platforms (Brocade DCX[®] Backbone, directors, switches, and embedded switches)
- Brocade 415/425 and 815/825 Fibre Channel Host Bus Adapters

- Brocade Data Center Fabric Manager[™] (DCFM), a comprehensive network management application that enables end-to-end management of data center fabrics

• Brocade Host Connectivity Manager (HCM) for Brocade FC Host Bus Adapters
Brocade technologies that enable and support the virtualized data center include:

- Monitoring and diagnostics in Brocade Fabric OS[®] (FOS)
- Performance and scalability in Brocade proprietary ASICs
- Security and in-flight data encryption capability at the server using on-chip AES-GCM encryption technology (an authenticated encryption algorithm designed to provide both authentication and privacy), which saves CPU cycles and power, while ensuring data protection across the fabric
- Adaptive Networking enabled by FOS and Brocade centralized fabric management applications
- Virtualization mobility via individual profiles that move with VMs when they are migrated across servers, the "personality profile," including associations with a virtual port, rule-based SLA assignment, encryption requirements, and so on

For more information, contact a Brocade sales partner or visit www.brocade.com. For more information on the Brocade Virtualization Solutions with Microsoft, visit www.brocade.com/msvirt.

CONCLUSION

The Brocade Data Center Fabric architecture, deployed with Microsoft System Center VMM and OM and Brocade Management Pack for Microsoft System Center, integrates support for Brocade products with emerging technologies to unify the overall management of the physical and virtualized data center. Brocade and Microsoft together offer companies a data-centric, end-to-end solution that helps them harness, manage, and deploy a virtualized data center.

Corporate Headquarters

San Jose, CA USA
T: (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

© 2008 Brocade Communications Systems, Inc. All Rights Reserved. 10/08 GA-SB-1225-01

Brocade, the B-wing symbol, DCX, Fabric OS, File Lifecycle Manager, MyView, and StorageX are registered trademarks, and DCFM and SAN Health are trademarks of Brocade Communications Systems, Inc., in the United States and/or in other countries. All other brands, products, or service names are or may be trademarks or service marks of, and are used to identify, products or services of their respective owners.

Notice: This document is for informational purposes only and does not set forth any warranty, expressed or implied, concerning any equipment, equipment feature, or service offered or to be offered by Brocade. Brocade reserves the right to make changes to this document at any time, without notice, and assumes no responsibility for its use. This informational document describes features that may not be currently available. Contact a Brocade sales office for information on feature and product availability. Export of technical data contained in this document may require an export license from the United States government.



BROCADE