

Taking Business Continuity to the Next Level

Live Migration over Distance Using Hitachi Storage Cluster for Microsoft® Hyper-V™



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Plan Ahead to Achieve Zero Downtime

Hitachi Data Systems, Microsoft and Brocade understand the challenges of today's business climate and the crippling effect downtime, whether planned or otherwise, can have on organizations. Application downtime or data loss can have costly or even business-ending consequences. In partnership, these three companies are continuing to take business continuity to new heights. Live Migration over Distance using Hitachi Storage Cluster for Microsoft Hyper-V enables the proactive, orderly migration of data and applications across distance in minutes, with no fear of user interruption or data loss, and no additional user interaction required.

Many disasters or outages come without warning, in which case Hitachi Storage Cluster for Microsoft Hyper-V is the answer. But many other outages come with enough advanced warning to enable proactive measures to be taken to reduce or eliminate downtime altogether. For these occasions, Live Migration over Distance using Hitachi Storage Cluster for Microsoft Hyper-V can help by enabling organizations to proactively move applications, resources and associated data across distance to secondary sites within minutes, without fear of user interruption or data loss.

The Live Migration over Distance solution is optimal for many situations, including times when a data center is being decommissioned or renovated, when a new data center is being brought online as a result of growth or acquisition, or when a slow moving natural disaster is in the forecast.

In all these scenarios, the ability to move virtual machines and data quickly and transparently over a distance is critical from both a business and IT perspective. Failure to do so can have costly consequences.

With Live Migration over Distance support, Hitachi Storage Cluster provides an end-to-end business continuity solution for life's planned and unplanned activities.

Introduction: The Move to Virtualized Environments

The benefits of virtualization are well proven and documented. Capital and operational cost savings, improved utilization, reduced energy consumption and, of interest here, improved business continuity can all result from a server and storage environment that is virtualized. The benefits have led to the rapid adoption of server virtualization, which in turn has changed the data center infrastructure and design.

As server virtualization technology and supporting hardware have matured to

enterprise-level reliability, performance and functionality, organizations have begun virtualizing more tier one and tier two applications. With this move come new storage and IT requirements as well as opportunities to significantly improve overall application availability in planned or unplanned scenarios. Live Migration over Distance is an important means toward this end.

End-to-end Business Continuity

The Live Migration over Distance solution provides an end-to-end business continuity solution for Hyper-V virtualized server environments. It provides improved

flexibility and agility for today's computing environments.

Specifically, the solution enables organizations to move Hyper-V virtual machines and their associated data across distances of up to 200km (125 miles), without any downtime. This means administrators can do virtually any maintenance in and around the data center during normal working hours without impacting end users: they simply move the impacted virtual machine and associated data within the data center or to a remote site. This simplifies maintenance window planning, which effectively increases overall application availability.

As even the most robust disaster recovery solutions risk some level of user interruption or data loss, it is always to a company's advantage to proactively plan data moves whenever possible. However, Hitachi Storage Cluster for Microsoft Hyper-V also ensures business continuity for those times when advanced planning is not possible or if disaster strikes during the Live Migration over Distance process.

The Live Migration over Distance solution is useful in many situations. These situations include the decommissioning of a data center during a temporary lapse of service, such as during a major data center renovation or repair, or in advance of a slow-moving disaster, such as a hurricane.

The implementation of the solution has been jointly architected and tested by Microsoft, Hitachi Data Systems and Brocade to ensure customer success and satisfaction.

Combined Power of Three Partners

The Live Migration over Distance solution integrates proven technologies from Brocade, Hitachi Data Systems and Microsoft.

As seen in Figure 1, Microsoft provides the virtualized environment and functionality. Hitachi integrates with the native Microsoft Failover Clustering capabilities and provides the necessary storage replication technology and advanced recovery capabilities to make it possible to move the associated virtual machine data across distances. Brocade provides the advanced Fibre Channel SAN and network infrastructure components to support and optimize the environment. These components and their roles are summarized below.



KEY BENEFITS YOUR ORGANIZATION CANNOT LIVE WITHOUT

Using Live Migration over Distance with Hitachi Storage Cluster for Microsoft Hyper-V provides much greater flexibility and agility for a high availability computing environment.

Key solution benefits include:

- **End-to-end business continuity**, which increases overall availability by providing failover of critical applications to a geographically dispersed data center for widespread disasters. This helps IT avoid application downtime or data loss, which can have costly consequences or even result in the loss of the business.
- **Data center application workload balancing**, which provides the agility to dynamically and nondisruptively move workloads between data centers. This enables applications temporarily in need of extra capacity to borrow from applications running at lower capacity, regardless of their physical location. For example, this is useful during critical times, such as at the end of the quarter for reporting applications.
- **Zero downtime data center maintenance**, which provides the ability to move an application from one server to another without any perceived downtime to users. With Live Migration over Distance it is now possible to do virtually any maintenance in and around the data center during normal working hours without impacting end users by simply moving the impacted applications either locally within the data center or to a remote site. This eliminates the need for maintenance windows, effectively increasing application availability.

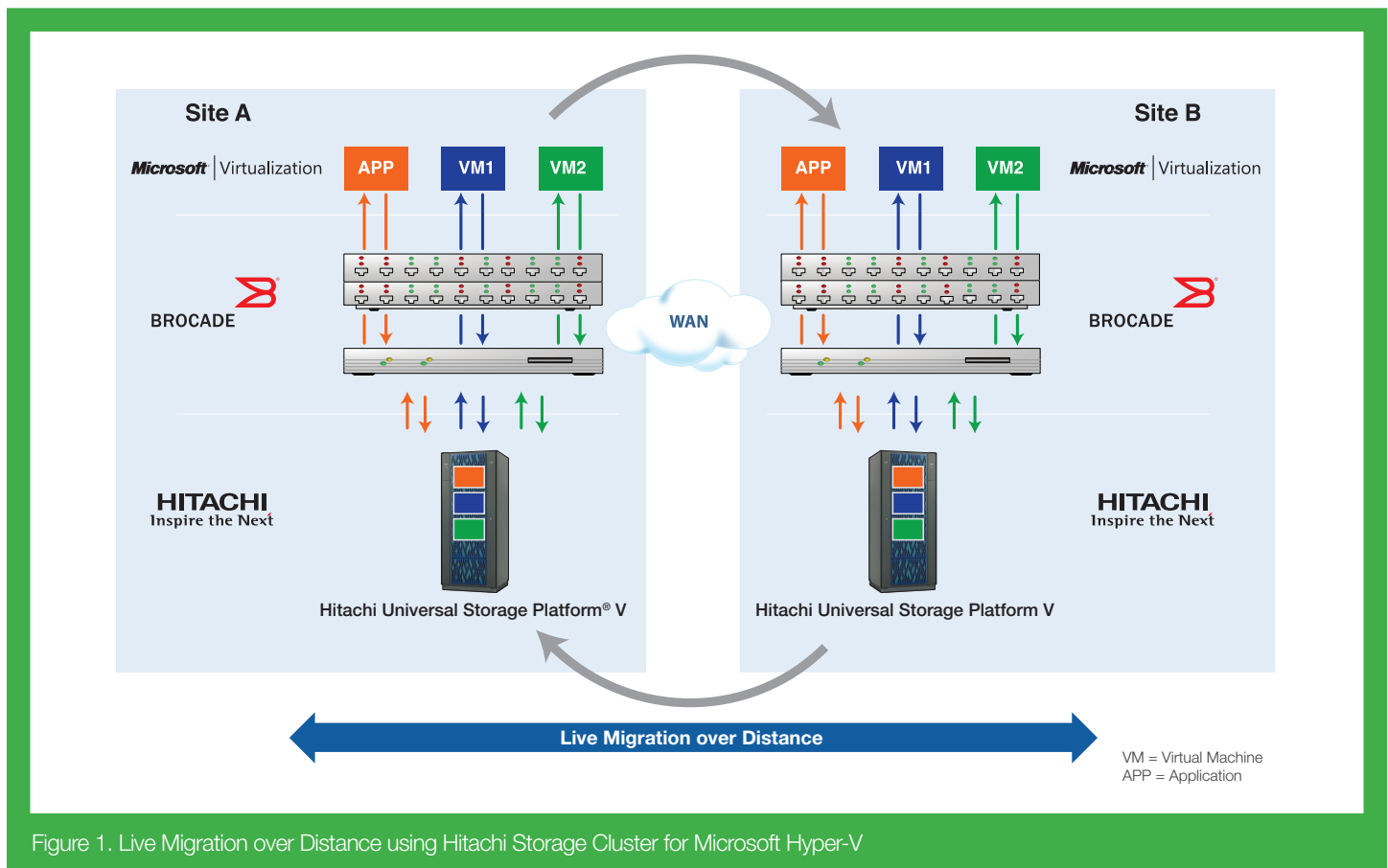


Figure 1. Live Migration over Distance using Hitachi Storage Cluster for Microsoft Hyper-V

The key to making Live Migration over Distance work at distance is for the network latency to be low enough that the final leg of the migration can be completed before a timeout occurs. In addition, when the virtual machine starts in the remote data center, the replicated data must be complete and immediately available for the application to continue without incident.

Microsoft Hyper-V Environment

■ Microsoft Windows Server® 2008 R2 and Live Migration

Live Migration is a powerful new feature of Windows Server 2008 R2. It enables virtual machines to be moved across physical hosts in the data center with no perceived application downtime to its users.

When used with Hitachi Storage Cluster for Microsoft Hyper-V and with a Brocade network infrastructure (the solution described in this paper), Live Migration can be used to move virtual machines across extended distances to physical hosts located in a geographically separate data center.

As a cornerstone of the Microsoft virtual machine migration, Windows Server Failover Clustering enables virtual machine migrations for business continuity failover scenarios. Windows Server Core 2008 R2 Installation is the recommended host platform for deploying production Hyper-V environments.

Microsoft System Center Virtual Machine Manager 2008 R2

System Center Virtual Machine Manager R2 (VMM) is the Microsoft management solution for the virtualized data center. It enables consolidation of multiple physical servers onto Hyper-V host servers running as guest virtual machines, provides for rapid provisioning of virtual machines and enables unified management of the virtual infrastructure through a single console.

The Live Migration over Distance solution uses System Center VMM 2008 R2 to manage Live Migration. It is the mechanism used to manage the virtual machines in the Windows Server Failover Cluster and also to initiate and track Live Migration times.

Hitachi Storage Solutions

Hitachi storage solutions provide the high performance, reliability and optimization organizations needed for virtualized environments. For the Live Migration over Distance solution, Hitachi provides the following components:

■ Hitachi Storage Cluster for Microsoft Hyper-V

Hitachi Storage Cluster for Microsoft Hyper-V is a business continuity solution for Microsoft Hyper-V virtualized environments. Hitachi Storage Cluster software enables the replication of virtual machines and their associated data either locally or across geographically dispersed sites as in the case of the Live Migration solution. Hitachi Storage Cluster enables the automated or manual failover of virtual machines and automated data resynchronization.

Data replication and control are handled by the Hitachi Storage Cluster software and the storage system controllers. This has little effect on the applications running in the virtual machine guest partitions

and is fully automated. Consistency groups and time stamped writes ensure database integrity. This solution enables remote LUN replication between the two geographically dispersed sites.

■ Hitachi Universal Storage Platform® V and Universal Storage Platform VM

Hitachi Universal Storage Platform V and VM storage systems provide a reliable, scalable and cost-effective storage foundation for the Live Migration over Distance solution. Additionally, they provide the performance and ease of management that is needed to support an increasing number of virtualized business critical applications. This platform is ideal for failover clustering and storage replication environments that demand high availability, scalability and ease of use.

■ Hitachi TrueCopy® Synchronous Replication Software

Hitachi TrueCopy Synchronous replication software enables administrators to create and maintain duplicate copies of all user data stored on Hitachi Universal Storage Platform V and VM systems.

Data is replicated from the primary Universal Storage Platform V or VM to a secondary Universal Storage Platform V or VM either in a local data center or across geographically dispersed data centers. With TrueCopy Synchronous replication software, the remote copy of the data is always identical to the local copy. This enables fast restart and data recovery at the remote site.

During normal TrueCopy operations, the primary volumes remain online to all hosts and continue to process both read and write operations. During planned or unplanned outages, the second copy of the data can be invoked to recover or migrate with complete data integrity.

Brocade Networking Infrastructure

■ Brocade LAN and SAN Network

Brocade's end-to-end network enables the virtual server environment and the virtual storage environment to work together seamlessly.

Brocade LAN: Brocade's IP network supports the crucial Live Migration over Distance bandwidth requirements of the virtual machines that will be migrated while maintaining high availability using a combination of highly resilient hardware and software design, and advanced failure detection and traffic protection or restoration schemes.

Brocade SAN: Between geographically dispersed sites, as is the case with the Live Migration solution, the combination of the Brocade Backbone with the Brocade network extension blade or switch with advanced compression, provides fast, reliable, secure connectivity. Brocade host bus adapters and Enterprise Data Center Fabric Manager (DCFM) complete the end-to-end network solution.

A Proactive Business Continuity Solution

Business continuity has long ranked high on organizations' IT priority lists and its importance is rising. Keeping systems up and operational with full transactional consistency in today's economic and business climate is paramount. Application downtime or data loss can have costly consequences or even result in the loss of the business.

Replication is a well-known enabler of business continuity. However, traditional offerings have brought about unacceptable costs and resource demands, requiring organizations to duplicate the primary server

environment at the remote site. By virtualizing the environment, organizations can reduce physical server expenses at both primary and remote sites while realizing many important benefits.

One of those benefits is Live Migration over Distance. Live Migration over Distance takes business continuity to the next level, creating a proactive center with no fear of user interruption or data loss.

Live Migration over Distance using Hitachi Storage Cluster for Microsoft Hyper-V enables proactive migration of virtual machines during any planned downtime without user interruption or data loss. No additional user interaction is required. By using this solution to perform a planned migration when time permits, an enterprise can increase its overall application availability.

For More Information

For more information about the solution, visit www.hds.com/go/HyperV or send an email to HyperV@hds.com. Additionally, you can contact your local Hitachi Data Systems Sales Office or Hitachi Data Systems Authorized Reseller at www.hds.com/contact-sales.html.

For the solution architecture technical white paper, go to: www.hds.com.

For more information about Microsoft virtualization, go to: <http://www.microsoft.com/virtualization/en/us/default.aspx>.

For more information about Brocade, go to: www.brocade.com.

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