WHITE PAPER

Matching Server Virtualization with Advanced Storage Virtualization

LeftHand Networks accelerates VMware® server virtualization with SAN/iQ® software-based storage systems

This white paper outlines the improved ease of use, reduced cost and complexity, increased availability, and complete compatibility that comes with using LeftHand Networks storage systems together with VMware Infrastructure 3.

LeftHand NETWORKS®

INTRODUCTION

In order to meet the challenges of running today's datacenters, an increasing number of IT organizations are turning to VMware® Infrastructure 3 software. The ability to virtualize the datacenter and deploy applications across a shared pool of server resources allows organizations to break free of the limitations they face with aging, silo-based applications. Virtualization enables consolidation, and running more than one operating system and application instance per server can help to increase utilization, reduce cost and help organizations work within the space, power, and cooling constraints of their datacenters.

The features that VMware offers on the server side can be enhanced by a storage system that recognizes and enables the added intelligence of a virtualized infrastructure. LeftHand Networks® SAN/iQ® technology delivers a clustered, open, iSCSI SAN solution with specific features to complement VMware Infrastructure 3. Customers can enjoy even better ease of use, reduced complexity, and unmatched availability when using the two products together. Examples of how these two products work better together are discussed in this brief, and they include the following:

- VMware makes it easy to create new virtual machines to meet the demands of unexpected workload fluctuations, or to create temporary application instances for development and testing. LeftHand Networks complements VMware with the ability to create new storage volumes from existing ones (volume cloning) virtually instantaneously, and with minimal additional use of storage.

- VMware's VMotion feature migrates applications from server to server with zero downtime to balance workloads or to allow servers to be taken offline without affecting service levels. LeftHand Networks products do the same in storage, allowing volumes to be moved from one storage cluster to another with zero downtime and without modifying the VMware environment.

- VMware HA assists in disaster recovery by re-starting failed virtual machines on alternate servers automatically. LeftHand Networks' SAN/iQ architecture allows organizations to distribute their storage networks so that access to the virtual machines' storage volumes can continue uninterrupted even through the loss of an entire datacenter.

SANs based on LeftHand Networks' SAN/iQ software are standards based, providing plug-and-play compatibility with the IP networks on which they are deployed. LeftHand is a member of VMware's Technology Alliance Partner Program, and its products are certified and included on VMware's Hardware Compatibility List. The use of open standards, partnership with VMware, and certified hardware means that compatibility with customer infrastructure is guaranteed.

ENHANCING VMWARE WITH A COMPATIBLE, VIRTUALIZED POOL OF STORAGE

Unlike traditional Fibre Channel-based SANs, iSCSI SANs use IP networks to deliver disk storage to servers. Every network engineer understands IP networks, and the ability to leverage common technology and skill sets helps to reduce both capital and labor costs. In contrast to expensive Fibre Channel interfaces and switches, iSCSI SANs use commodity Gigabit Ethernet hardware, with disk storage appearing to the operating system as SCSI devices.

Just as VMware Infrastructure 3 software provides a virtualized pool of servers, LeftHand Networks' SAN/iQ technology provides a scalable, reliable, high-performance, virtual pool of storage to those servers. LeftHand uses patented clustering techniques to create a storage system that distributes incoming requests across servers in the cluster. The intelligence in the cluster itself distributes and replicates storage blocks across the cluster according to customer-defined storage policies, including RAID levels and performance targets.

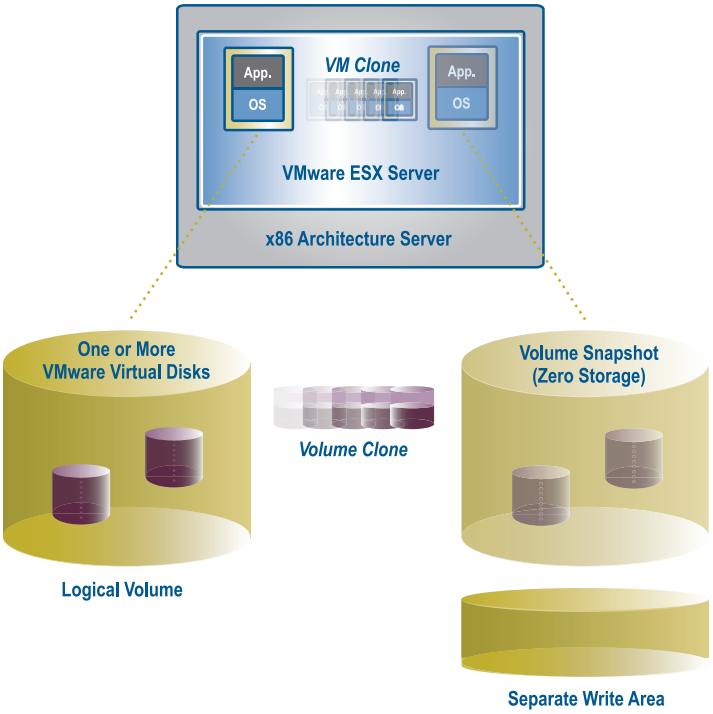

Figure 1: LeftHand's volume cloning capability allows VMware to use volume snapshots that can be written without affecting the original snapshot.

CREATING NEW VIRTUAL MACHINES WITH RAPID VOLUME CLONING

VMware's VirtualCenter makes it easy to create and provision new virtual machines based on existing ones, a process referred to as cloning, adding to an IT organization's flexibility, responsiveness, and efficiency. Organizations can benefit from cloning in a number of ways. For example, they can create a set of temporary Web servers to manage performance and capacity in the face of unexpected workload demands. Administrators can clone an existing, mission-critical application and use the copy to test new patches or configurations without the risk of disrupting a running service. IT organizations can create virtual desktop environments, maintaining a single 'golden master' PC image, and cloning a new virtual PC each time a user logs in, reducing the number of different PC configurations to test and maintain. Developers can deploy as many test environments as they need without consuming physical server resources.

LeftHand's Volume Cloning capability allows administrators to create snapshot copies of logical volumes virtually instantaneously because it doesn't require making an actual copy. This is ideal for short-lived virtual machines because it speeds the cloning process and consumes only minimal amounts of storage. As a result, IT organizations can be more responsive yet more frugal with their resources.

LeftHand accomplishes volume cloning by creating a snapshot of an existing volume, and attaching the snapshot to the new virtual machine. In contrast to other approaches, LeftHand SAN/iQ technology maintains modified blocks separately from the snapshot itself, preserving the original snapshot and enabling instant rollback to the original state (Figure 1).

MIGRATING DISK VOLUMES BETWEEN STORAGE CLUSTERS

VMware VMotion allows IT organizations to move running virtual machines between servers without taking the operating system or application offline. This makes it easy to dynamically balance workloads for optimum performance, and to repair or replace servers without affecting service availability.

LeftHand's SAN/iQ technology delivers similar flexibility and availability in storage. Administrators can move storage volumes (or LUNs) containing one or more VMware virtual disk images from one cluster to another with zero downtime, transparent to VMware itself. This empowers administrators to move volumes between clusters to balance workloads, optimize performance, upgrade or retire storage modules, or even move workloads from one datacenter to another on the same local network.

With most SAN technology, administrators would need to bring down the virtual machine, copy the volume from one system to another, reconfigure the virtual machine to access a new logical unit number, and reboot. With LeftHand Networks' Volume Migration, all administrators do is change the properties of the storage volume itself, and the volume migrates block-by-block to the new cluster without changing logical units or requiring the virtual machine to reboot (Figure 2). Because LeftHand's approach is transparent even to VMware itself, it can be used in conjunction with, or independently of VMware VMotion.

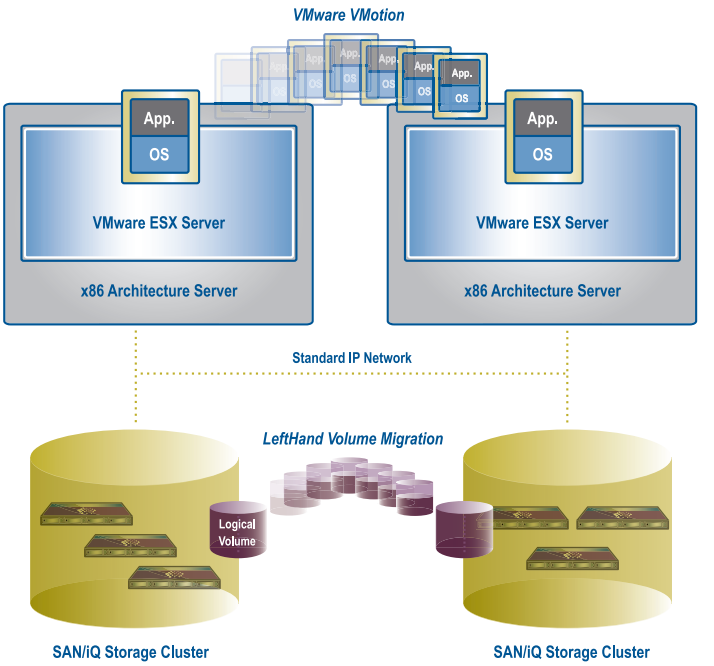

Figure 2: LeftHand's volume migration moves logical volumes immediately and transparently to VMware, without affecting availability.

HIGH AVAILABILITY AND DISASTER RECOVERY WITH LEFTHAND'S DISTRIBUTED STORAGE ARCHITECTURE

VMware HA provides cost-effective high availability for applications that do not have built-in HA mechanisms, providing organizations with a base level of disaster recovery capability regardless of application complexity. VMware HA continuously monitors virtual machine status and automatically re-starts failed VMs on secondary servers in the event of a failure. LeftHand SAN/iQ technology matches these server capabilities in storage, offering continuous availability that surpasses the capabilities of traditional SAN implementations.

While most SAN solutions use replicated components and configurations that allow them to operate despite the failure of a single component, they are typically centralized, rather than distributed, and cannot continue running in the face of an entire datacenter going offline. Traditional SANs offer remote replication to protect against datacenter-wide failures, but these solutions may not work seamlessly with VMware HA.

LeftHand's SAN/iQ technology overcomes these limitations through patented clustering techniques that automatically distribute incoming requests and storage blocks across a set of network storage modules according to the logical volume's storage policy. For example, Network RAID level 2 (mirroring) is accomplished by synchronously replicating each block to two network storage modules within a cluster.

Protecting against the failure of an entire datacenter is as easy as distributing the network storage modules in a cluster so that blocks and their replicas are always stored in two different locations (Figure 3). In the event of a datacenter failure, the storage cluster manages failover to the surviving components of the cluster, and VMware HA re-starts the failed virtual machines on secondary servers. No change in logical unit or even IP addressing is necessary because the storage system is continuously available throughout the failure.

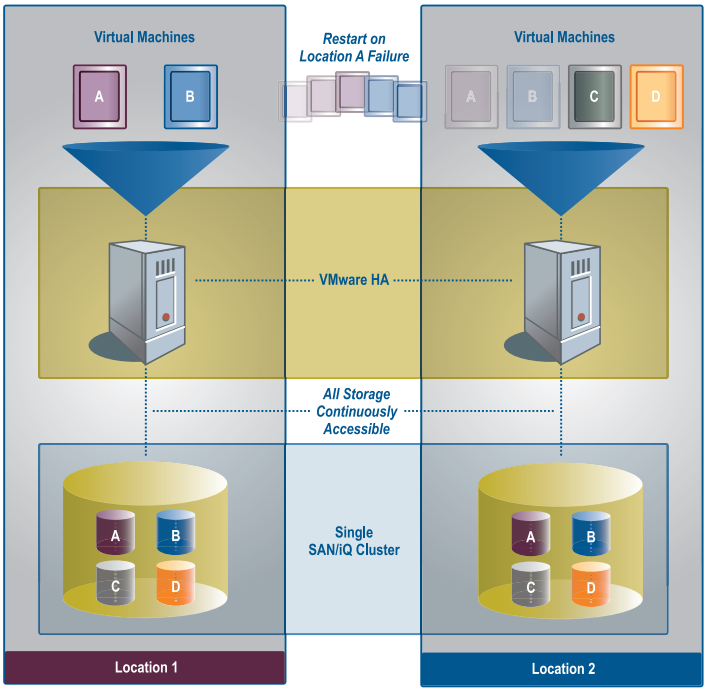

Figure 3: A SAN/iQ technology-powered storage cluster with as few as two network storage modules can provide continuous availability to VMware HA even across the loss of an entire location.

The beauty of this solution is that it provides a storage and server disaster-recovery strategy for organizations of all sizes, and for even the simplest of applications. Small businesses can distribute their storage clusters across multiple closets in the same building, while medium and large businesses can distribute their storage clusters across multiple datacenters on a campus.

LEFTHAND NETWORKS AND VMWARE: UNMATCHED SERVER AND STORAGE CAPABILITIES FOR THE VIRTUAL DATACENTER

SAN/iQ technology-powered storage systems from LeftHand Networks deliver an easy-to-use, flexible, scalable, highly available, and highly efficient storage solution for VMware Infrastructure 3 customers. Matching in storage what VMware provides for servers, SAN/iQ technology allows IT organizations the ability to move logical volumes between storage devices without taking the corresponding service down. It supports volume cloning for large numbers of temporary virtual machines without the delay and cost of actually consuming storage for each clone. And because it is distributed by design, creating a disaster-resilient storage infrastructure is as easy as choosing which storage modules to configure in each separate location.

With the value of VMware Infrastructure 3 software powering so many datacenters today, why settle for a storage solution that doesn't match up? Contact LeftHand for more details on these, and other solutions for your storage requirements today.

ABOUT LEFTHAND NETWORKS

LeftHand Networks is the leader in Open iSCSI SANs. Founded in 1999, the company pioneered the IP SAN market in 2001 with the introduction of SAN/iQ-powered solutions. Today, thousands of SAN/iQ systems are running worldwide in production environments.

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