

drobo



No Compromise, Cost Effective, VMware Storage for the SMB

Designing a highly available, highly affordable,
virtualized server environment for small business

A joint white paper between Drobo and Storage Switzerland



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Executive Summary

VMware can bring tremendous operational flexibility to organizations of all sizes. Often thought of as a large data center technology, the value of virtualization to the small to medium-sized business (SMB) should not be overlooked. These businesses typically have grown to a point at which they need for four to five servers running functions such as Exchange and SQL Server and applications such as financial packages and file serving. And often, they find that a single physical host running these applications in virtual machines can replace all their servers. The problem is that putting all these functions onto one physical host means that a single hardware failure could impact all of them.

VMware has the solution with vMotion, which is managed by VMware's centralized management console vCenter. vCenter provides a single pane of glass for all of the host servers and virtual machines in the data center. The challenge is that the cost of shared storage requirements and vMotion put this solution out reach for most SMBs. This has caused many IT managers at these businesses to look for a low-cost storage option that integrates seamlessly into VMware as a potential solution for this environment—making vMotion a reality for the SMB.

The Importance of Using Server Drives

One of the advantages of the Drobo product line is its ability to accept almost any type of hard drive. That said when using Drobo in a business environment, especially with an application like VMware, it's important to be more selective about which drives to use. Using the cheapest available disk drives is not recommended for this environment. Since Drobo is only as fast as its slowest component, when a high-capacity but low-performance drive is mixed with high-performance drives, Drobo can perform only as well as the low-performance drive. Also, the number of drives in the system affects overall performance, and a larger number of disk spindles enables better throughput. Considering the savings associated with Drobo in a VMware environment, spending the extra \$150 for a better-performing drive is a wise investment, and it can be affordable to use 6 to 8 drives even if all of the capacity is not initially required.

Drobo provides additional information on using Drobo for VMware @ <http://www.drobo.com/vmware/index.php>, including detailed best practices on using Drobo in VMware environments @ http://www.drobo.com/pdf/Drobo_VMware_Best_Practices.pdf.

The Need for Shared Storage

vMotion removes concerns around single point of failure associated with loading up one physical server with virtual machines (VMs), by allowing the movement of virtual servers from one physical host to another. In the case of a hardware failure or the need for maintenance, virtual machines can be transitioned in real time (live) to another physical system. The second physical system doesn't need to be sitting idle all day waiting for failure either. It can be used by some of the VMs in the environment, balancing the load to some extent.

Virtual machine migration does require that physical hosts be able to access each other's storage. The easiest way to accomplish this is to share storage between the two (or more) systems, typically with a network made up of either Ethernet or Fibre Channel switches that connect physical servers to a common storage pool. If a server fails or needs maintenance, the other host already has access to the latest copy of the server images it was hosting and merely needs to mount those images to be ready for production. With live migration, assuming that the primary host didn't 'hard fail', failover can be accomplished without users even noticing.

VMware High Availability (HA) leverages vMotion to provide the capability to move virtual machines from a failed server. This again requires shared storage so that in the case of a failed server host, the virtual machines are shifted to the remaining physical hosts and restarted. Without shared storage there would be no way to get to the virtual machine images on the locally attached storage.

VMware Data Recovery can be used to provide effective backups of the environment. This is an ideal backup solution for SMB, since it integrates directly into vCenter and provides a wizard-driven workflow to create, configure, and schedule backup jobs. It also automatically tracks virtual machines and their virtual images when they are moved via vMotion or Storage vMotion to make sure that those virtual machines are still protected. In addition VMware Data Recovery has built-in data deduplication, so that backups are space optimized during the backup to minimize the use of network and disk backup capacities.

What makes this compelling to SMB is that all of these capabilities are available in a very cost-effective package. VMware has a perfect bundle for the small business "VMware vSphere 4.1 Essentials Plus Kit for 3 hosts," which starts at \$4,229 with basic support and maintenance. Now the only SMB roadblock to effective use of all of these tools is the cost of acquiring the foundational shared storage to make it all work.

The Shared Storage Dilemma for the SMB

Creating the shared storage network can become a problem for SMB. Even the cost of less-expensive iSCSI shared storage systems can quickly get into the double-digit thousands and require a “buy it full” upfront capacity purchase with small capacity drives that don’t provide a cost-effective price point. This means that if the organization needs more capacity, they have to buy a second complete system. In reality, as they enter the world of server virtualization, most SMBs simply need the ability to share two or three hosts. They typically need less initial capacity than these entry-level shared storage systems require them to purchase, but they need the ability to add capacity as the environment grows.

While iSCSI, especially in the SMB environment, is relatively simple to set up and manage, iSCSI storage systems are not. Many have attractive user interfaces but they fall short and become a challenge for SMBs when it comes to the actual management of that storage. It takes too much effort just configuring the data protection (RAID) and dealing with storage provisioning and expansion. Finally, most of these entry-level systems are laden with features that add to their complexity, features most SMBs simply don’t need. The typical SMB wants to connect two or three physical servers to a shared storage pool and leverage the capabilities within VMware to manage that storage and they want the storage hardware to stay out of the way.

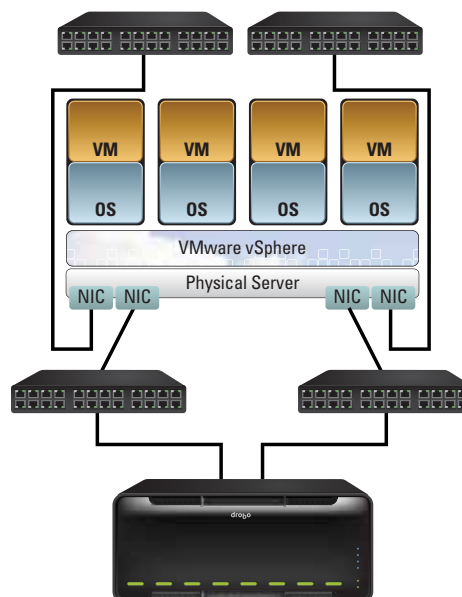
The SMB Answer: Drobo

As shown in our testing, Drobo® may be an ideal answer for SMBs looking for their first shared storage system to complement a VMware environment so that they can take full advantage of features such as vMotion, HA, and Data Recovery. First, the Drobo 8-Bay SAN Storage for Business leverages iSCSI, meaning that the shared storage connects via simple 1 Gigabit Ethernet (GbE). It’s very cost effective to build a redundant storage network using this topology. It’s true that an existing LAN can be leveraged, but many SMBs don’t have that level of redundant infrastructure investment at this point.

Simple Infrastructure

It’s very straightforward to set up two small 1 GbE switches and to connect one to each of the ports on Drobo. While almost any 1 GbE switch will do, it’s advisable to select a switch that can sustain the total bandwidth of the ports. For example a 24-port switch should have 48 Gigabits per second (Gbps) of total bandwidth. Also if the switch is going to share storage and standard network traffic, it may be ideal to use a managed switch so that port traffic can be isolated for a given function. After the switches are in place then install two 1 GbE NICs (assuming they’re not already there) in each of the physical servers, with each card connecting to a different switch. Within minutes a completely redundant storage network can be inexpensively put together.

Figure 1:
Simple infrastructure and one Drobo



Simple Capacity Planning

Drobo solves the capacity growth problem that other systems place on the business, mentioned earlier. Using Drobo BeyondRAID™ technology, disk drives of varying sizes can be installed in the system. Initially three or four 1 or 2 TB drives may be more than enough capacity for most small business. These are standard off-the-shelf drives, which can be purchased at any local computer store inexpensively. As a result of this economy, it's an easy decision to leverage the Drobo's dual-drive redundancy feature, meaning that even a two-drive failure won't result in data loss.

This drive flexibility not only keeps costs down, it also simplifies expansion by allowing storage to be bought as it's needed. BeyondRAID technology allows for the addition of more capacity by simply inserting additional drives into the Drobo chassis when needed and within seconds that capacity is fully protected and available for use. This is an ideal use case for SMBs. Since storage will feature higher capacity and be less expensive as drive sizes increase, purchasing less today means more value for what's acquired tomorrow. Traditional storage vendors have the opposite situation—drives remain the same size and can increase in price over time.

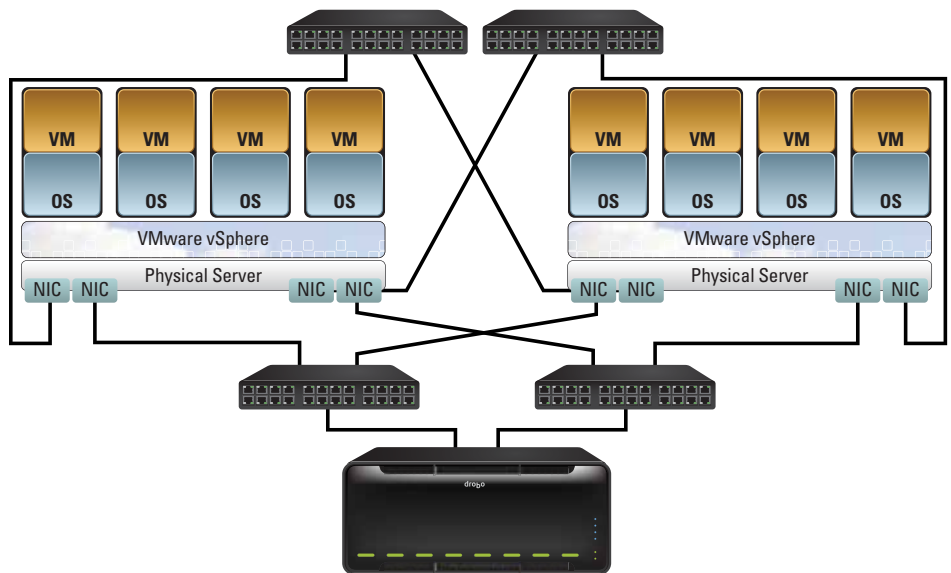
Drobo focuses investment in their BeyondRAID technology so that storage management tasks are simplified or eliminated; then they leverage the capabilities of VMware to round out the solution. In other words, storage can be managed from where the IT administrator spends most of the day—at the VMware vCenter console. From the vCenter console snapshots can be taken, backups triggered, and VMs copied to other storage pools.

Enhancing your VMware Environment

Utilizing features of VMware such as Storage vMotion can maximize your ability to use more affordable storage options such as Drobo. While vMotion moves virtual machines between physical server hardware, to move virtual machines between storage devices VMware has Storage vMotion. Storage vMotion allows a virtual machine, while it is active and still using the resources of the current physical host, to have its image migrated to a second storage device. This provides both an ideal data availability mechanism and I/O load balancing. It brings availability features to almost any storage system. As is the case with vMotion, shared storage is a must for Storage vMotion, as VMware vCenter console needs to be able to see both storage systems.

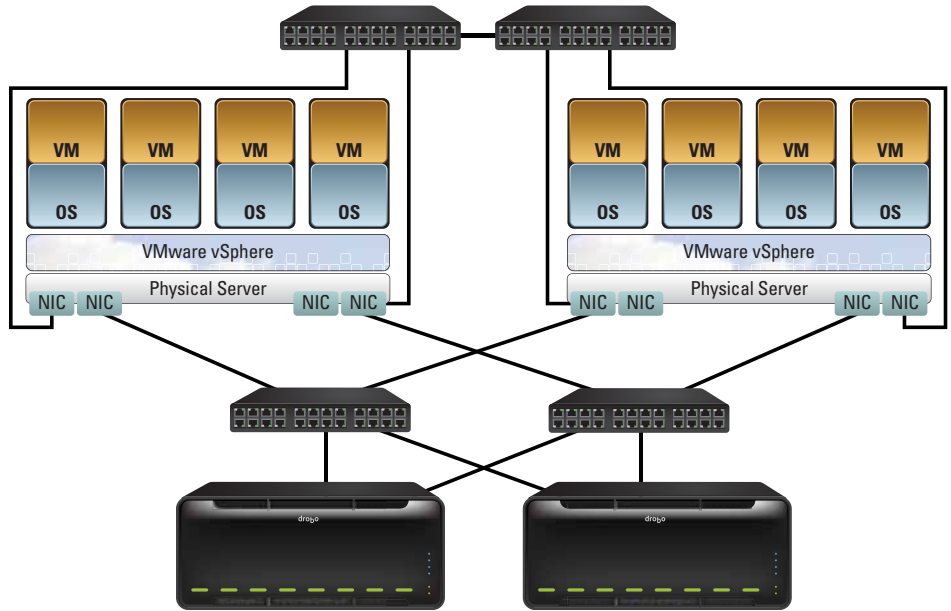
Configuring VMware servers to use a multipath I/O scheme with multiple switches and a combination of vMotion and Storage vMotion provides an almost bulletproof infrastructure that can overcome the perceived limitations of any component in the setup.

Figure 2:
Shared storage deployed with
VMware Storage vMotion



For complete redundancy, implement Storage vMotion and add a second Drobo, which can still be done for significantly less cost than for other shared storage systems, potentially providing the ultimate in resiliency from failure. Most storage system failures can be overcome by ensuring that VM images can migrate between storage systems. As stated earlier, Storage vMotion enables live migration of virtual machine disk files across storage arrays and lets you relocate virtual machine disk files between and across shared storage locations, while maintaining continuous service availability and complete transaction integrity.

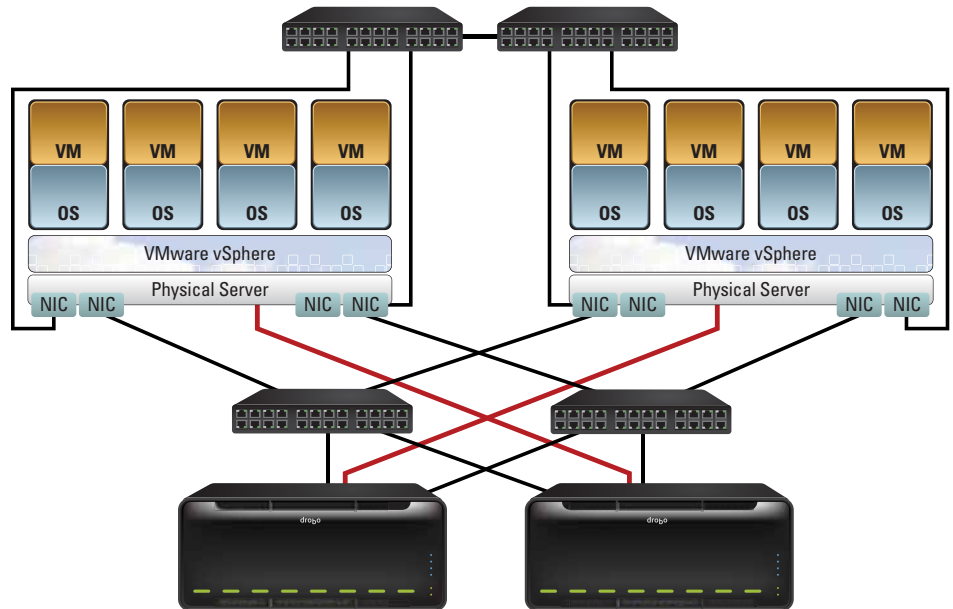
Figure 3:
Complete redundancy with VMware
Storage vMotion and a second Drobo



Another advantage of this configuration is that while the storage systems are 100% operational (the common state), the VM workload can be balanced across them for improved performance. VMware and its tools allow the second Drobo to be fully utilized and not sitting unused waiting for failure. SMBs cannot afford to have assets sitting on the sideline, and vSphere Essentials Plus enables them to achieve higher utilization. In the case of a storage system failure prior to a storage migration, use VMware Data Recovery features to ensure that backup copies of physical hosts are safely stored on secondary volumes.

Drobo allows its volumes to be seen by any system on the network, which allows Drobo to share its storage amongst many systems on the network. Every volume defined on the unit is available to all the servers until that volume is locked into and mounted by a particular host. Security for mounting the volumes is provided by an industry-standard security protocol, CHAP, which provides a password authentication process for volume access.

Figure 4:
Higher utilization with VMware
vSphere Essentials Plus



Drobo provides a simple-to-use, straightforward storage platform, which integrates seamlessly into a VMware environment. Features that other higher-priced storage systems include are already present in VMware, such as snapshots. Those that VMware does not include directly, such as clones and continuous data protection, can be addressed by cost-effective, third-party add-ons.

For protection from site failure, several third-party applications provide cost-effective, bandwidth-efficient replication, including Double-Take Availability, Neverfail, Veeam Backup & Replication, and CA ARCserve High Availability (formerly known as CA XOSoft). Some of these replication solutions even leverage cloud-hosting providers to address another SMB need, lack of a second site to hold the DR data. In these situations, the entire VM can be replicated to one of these providers and in the event of a building-wide failure, the entire application can be restarted in the provider's facility with the user accessing data remotely. This gives SMBs the same backup advantages as the "big guys."

Ideal for Virtualized SMB

Drobo may be the ideal solution for SMBs taking the first step toward server virtualization. These SMBs are large enough to justify virtualizing servers but not large enough to justify traditional underlying shared storage solutions to get the most out of the virtual investment. Drobo fills that gap by offering a cost-effective and simple alternative that allows SMBs to get back to work without having to become a storage expert.