

## About ATTO

For over 30 years, ATTO Technology, has been a global leader across the IT and media & entertainment markets, specializing in network and storage connectivity and infrastructure solutions for the most data-intensive computing environments. ATTO works with partners to deliver end-to-end solutions to better store, manage and deliver data.

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## About VMware®

VMware® is the leader in virtualization and cloud infrastructure solutions that enable businesses to thrive in the cloud era. Customers rely on VMware to help them transform the way they build, deliver and consume Information Technology resources in a manner that is evolutionary and based on their specific needs. The company is headquartered in Silicon Valley with offices throughout the world and can be found online at [www.vmware.com](http://www.vmware.com).

## ATTO Accelerates Virtual Storage Management Increasing Efficiency in the Data Center

Businesses are increasingly turning to server virtualization to make efficient use of hardware resources, reduce operating costs and provide flexibility for maintenance and disaster recovery. According to The Gartner Group, over 50% of server workloads have been virtualized using solutions such as VMware® VSphere. One challenge IT administrators working within virtualized environments face is migrating a virtual machine (VM) transparently and without interruption to the users. These migrations occur frequently when adjusting workloads, planning for system maintenance, or recovering from an unexpected network issue. Administrators need to get VMs running with as little impact on overall network capacity as possible.

Migration of VMs is one challenge that VMware Storage vMotion, a feature in VSphere 5.5 and later, effectively addresses. With Storage vMotion, VMs can be transferred live with continuous service availability and full data retention. A less certain factor when migrating virtual machines is the network connection between the physical server and storage. The heavy I/O operations and large queue depths demanded by VM migrations present significant challenges to an adapter as well as the storage, which must rapidly transfer data from one host to another to ensure an uninterrupted workflow.

### ExpressSAS® and Storage vMotion

Achieving the most efficient VM migration requires responsive infrastructure. High-performance storage, including low-latency disk storage, is critical. Additionally, the data pipe provided by the host bus adapter (HBA) needs to efficiently handle both large and small block transfers, including very deep queues. ATTO ExpressSAS® 12Gb HBAs complement Storage vMotion by enabling VM migrations to be accomplished more seamlessly than the leading competitor.

In a comparative test, ATTO HBA was able to transfer VMs from a data store consisting of high-performance Toshiba HDDs (MG035SCA400) to a second, identical data store with up to 37% higher sustained throughput (MB/s) and IOPs than a leading competitor. Perhaps more significantly, ATTO achieved higher performance while utilizing fewer CPU resources, meaning that those resources would be available for the business needs of end users. The significant throughput advantages delivered by ExpressSAS 12Gb HBAs provide the assurance that VMs, with the right hardware infrastructure choices, can be migrated with zero downtime and disruptions.



The performance advantages of ATTO 12Gb HBAs in a virtualized environment can have a real impact on businesses. VM migration creates risk by limiting resource availability and also the ability of a system to respond to sudden surges in demand. By enabling VMs to be transported and rapidly brought back online, ATTO reduces the risk of downtime or data loss during migrations.

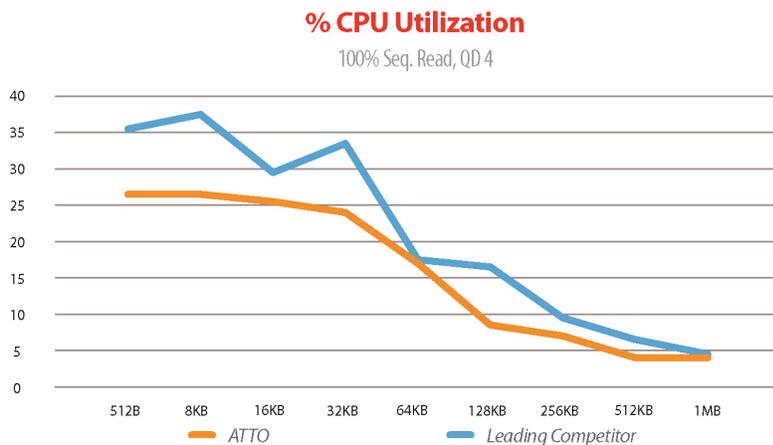
## Test Method

Both the ATTO ExpressSAS® H1280 12Gb HBA and the competitor's HBA were tested under the following conditions: vCenter server running Vmotion; SuperMicro X9 storage server; twelve Toshiba MG035SCA400 SAS HDDs. The Toshiba drives were used to create twelve independent VMware data stores, with two virtual machines assigned to two of the twelve data stores. One VM was used to hold a variety of file types on data store.

- Storage vMotion was then used to migrate that data to data store.
- During the migration, the performance of the second VM was monitored as it simultaneously ran I/O to all twelve data stores. This method was designed to mimic movement of a data store while continuing to provide users with access to key applications.

## Conclusion

When it comes to carrying out VM migration using Storage vMotion, faster time to data means reduced downtime and network congestion. ATTO ExpressSAS 12Gb HBAs deliver the necessary low latency and high bandwidth to execute tasks such as live VM migration with full data integrity and zero downtime. In doing so, ATTO enables businesses to take advantage of the cost-saving benefits of virtualization while maintaining consistent peak data center performance.



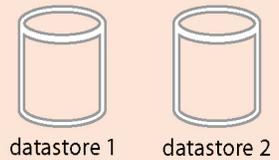
**vCenter Server Windows 2012**  
Used to control Storage vMotion

**ESXi 5.5 Hypervisor Server**

**VM**  
Windows  
2012

**VM**  
RHEL 6.5

**SAS RAID Storage Array**



Storage vMotion from  
datastore 1 to datastore 2

**vmware**  
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