

## Build Your Own High Performance Shared SSD Flash Storage with ATTO XstreamCORE™

### SOFTWARE DEFINED STORAGE

Building your own storage solution involves server-side software that provides many of the features typically found in flash arrays. Software defined storage (SDS) eliminates paying for the same features multiple times and makes software upgrades less painful. Features may include:

- End-to-end checksum protection
- Self-healing
- Copy-on-write
- Automated storage tiering
- Block storage support
- Thin-provisioning
- Deduplication and compression
- IP-based replication
- RAID protection

### ALL-FLASH STORAGE ARRAYS VS. SSDS

All-flash arrays are typically all-in-one proprietary systems that package software, flash memory and hardware in a single box and leave little room for expansion outside of the vendor's proprietary ecosystem. But with prices for SSD drives dropping, high-performance storage controllers like ATTO XstreamCORE™ provides an alternative by allowing users to build their own, open storage solution using SSDs from leading manufacturers paired with off-the-shelf enclosures and software defined storage software.

### CHALLENGE

When building out a virtualized data center, the stress that virtual machines (VM) place on primary storage needs to be taken into account. Any increase in VM density can drag down application performance — a problem aggravated by the I/O blender effect, where multiple simultaneous I/O requests issued to a hypervisor by multiple VMs adds latency. Other challenges include the high cost of storage arrays designed specifically for virtualized environments, along with the proprietary data formats that such arrays use for storage management services.

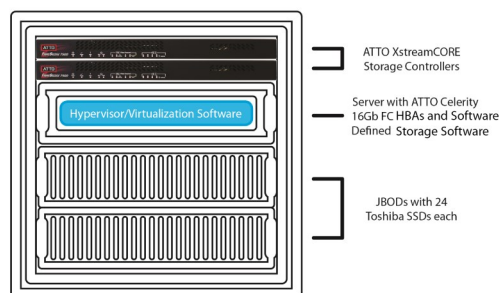
### SOLUTION

Even with their added cost and complexity, flash storage arrays are seeing increased use in virtualized environments. Compared with regular hard disk drives, flash is extremely efficient in responding to application requests. Flash arrays also minimize the I/O Blender effect through the use of high-performance SSDs to cache read/write data.

Fortunately, the advent of software-defined storage (SDS) has created new possibilities for assembling high performance, low cost per-gigabyte flash storage solutions that combine storage controllers with commodity solid-state drives (SSDs). ATTO Technology, Inc. storage controllers provide the flexibility to use off-the-shelf SAS JBOD or JBOF enclosures that aggregate up to 240 drives while adding enterprise Fibre Channel for network connectivity. And since SDS software manages features and services, ATTO storage controllers remain independent with no proprietary data format written to the attached storage arrays.

With consistent latency measured at under four microseconds, ATTO XstreamCORE™ storage controllers have the lowest latency of any advertised storage product on the market. It also provides the fastest way to create a shared pool of storage for a large number of servers, each with a direct connection for immediate access to data. ATTO storage controllers allow multiple servers to share SSD storage at very high rates of speed — up to 3.0 million IOPS. This eliminates the need for each server to have its own high-priced, dedicated, non-sharable SSD or flash storage.

ATTO storage controllers are VMware Ready certified and support the vStorage API for Array Integration (VAAI) framework from VMware. This allows tasks such as ATS, Clone Blocks, XCOPY, Full Copy, Block Zero, Write Same and Native Snapshot Support to be offloaded from the VMware server virtualization hardware to the storage controller hardware.



## Build Your Own High Performance Shared SSD Flash Storage with ATTO XstreamCORE™

### SOLUTION BENEFITS

- Provides a modular platform to build high-performance computing, clustered and virtualized infrastructure
- Ability to build your own shared SSD storage using industry standard JBOD enclosures for a low total cost of ownership (lowest \$/GB and \$/IOPs)
- Connect up to 240 drives by building out racks of high-capacity storage
- Use software defined storage for control software and storage features
- World's fastest storage solution (3M IOPs and 12GB/s throughput per controller pair)
- Allows for data mobility and redundancy via multisite cluster installations up to hundreds of kilometers apart
- Low-latency, high-performance Fibre Channel connected storage a superior solution to Ethernet
- Add shelves of HDD drives to create tiered high-speed storage

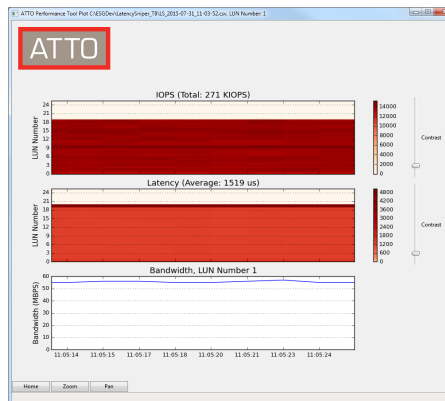
### ABOUT ATTO TECHNOLOGY

ATTO Technology, Inc. is a global leader of storage connectivity and infrastructure solutions for data-intensive computing environments. ATTO provides solutions that help customers store, manage and deliver data more efficiently.



### REAL-TIME PERFORMANCE AND LATENCY ANALYTICS

Many IT administrators face challenges in determining infrastructure performance needs and identifying bottlenecks. ATTO real-time storage performance analytics tool is a stand-alone application that communicates directly with ATTO XstreamCORE™ via an API to measure average latency, IOPs and throughput for all connected LUNs. By measuring in real-time at one second intervals from storage to host, storage to controller, or controller to host, it can pinpoint and identify performance issues in an entire storage system or with individual disks. Performance data and latency is displayed either as a heatmap or in up to three separate graphs. This allows IT administrators to view the latency distribution for any single LUN in different I/O ranges, and to take corrective action by replacing equipment that is not meeting performance expectations. All performance data is saved by ATTO analytics tool in real-time to a comma-separated value (CSV) file, and graphs from previously stored CSV data can also be viewed and compared.



*ATTO real-time storage performance analytics tool measures average latency, IOPS and throughput for all connected LUNs.*

<b>Storage Controller</b>	ATTO XstreamCORE™
<b>Performance Capability</b>	3M 4K IOPs and 12Gb per controller pair
<b>Controller Latency</b>	Less than four microseconds
<b>SSDs</b>	Toshiba PX035N 12Gb/s SAS SSD
<b>Storage Enclosure</b>	AIC J2024-01 12Gb SAS JBOD Enclosures
<b>Server</b>	Dell™ PowerEdge R730
<b>Host Bus Adapters</b>	ATTO Celerity™ 16Gb Fibre Channel, dual port
<b>Storage Protocols</b>	16Gb Fibre Channel 12Gb SAS
<b>Supported Configurations</b>	Single Controller Redundant pairs managed via software
<b>Control Software</b>	Software Defined Storage (SDS)
<b>Performance Benchmark</b>	ATTO Latency Scout™