

# LSI® Nytro™ XD Application Acceleration Storage Solution



## Key Features

- Data hot spots are automatically and continuously detected and placed in LSI PCIe®-attached flash storage without any user intervention
- SAN or direct attached storage (DAS) can benefit from Nytro XD software – just identify the LUNs you want to accelerate
- High Availability support with Microsoft Cluster Services
- See if you can benefit from this product by using the Nytro Predictor™ software tool. This free software analyzes your application for hot spots and identifies if it will benefit from caching

A solution designed to dramatically improve application performance in SAN and DAS storage environments by intelligently caching the most frequently accessed data on PCIe-attached flash storage.

Virtually every industry is facing competitive pressures for increasing customer responsiveness. For example, studies have shown that with online shopping even several seconds of delay can mean a lost sale. In today’s environments, application performance is often limited by accesses to storage. Due to their mechanical operation, hard drives (HDDs) provide relatively slow access to data. Many companies have found that Solid State Drives (SSDs) can accelerate applications, but moving all data from HDDs to SSDs is expensive.

## Cache Data on Flash Storage Instead of Replacing HDDs

For many applications, performance can increase significantly by simply reducing the latency to the frequently accessed data. The LSI® Nytro™ XD solution includes host-based software designed to detect hot spots of frequently accessed data and store them in a LSI Nytro WarpDrive™ application acceleration card for faster responses to applications – allowing an economical mix of both flash storage and SAN-based or DAS storage that predominately uses HDDs.

The Nytro XD solution’s host-based software is designed to intelligently and dynamically accelerate the applications, without the need to reconfigure the application or the OS to make the best use of flash storage.

## Caching on PCIe-Attached Flash

Storage latency, the delay in retrieving stored data, is one of the most important metrics limiting the performance of databases and applications using block access. Array controllers and storage networks, like iSCSI and FC throttle the performance from SSDs installed in the storage arrays. Installing the Nytro WarpDrive card in a server provides low latency access to flash storage through a PCIe port. The Nytro XD solution includes host-based caching software and a single PCIe Nytro WarpDrive card with onboard flash storage. Additional Nytro WarpDrive cards can be added within a single server to support applications requiring larger cache size. Application data is always written to the back-end attached storage. If the data is determined by the Nytro XD algorithms to be within a hot spot, the contents of the Nytro WarpDrive card will also be updated.

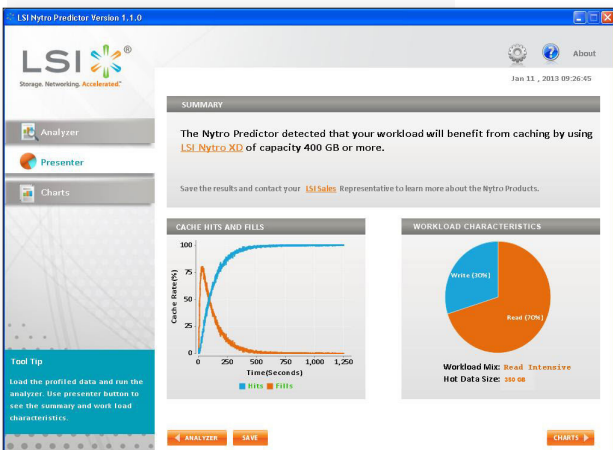


Figure 1, Nytro Predictor Software Tool

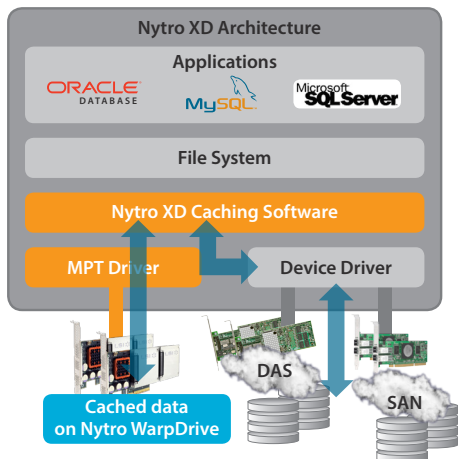


Figure 2

In the event of a Nytro WarpDrive Card failure, your data is always available on the attached storage and application processing can continue.

### High Availability Support

Ensuring continuous availability of applications and services is essential in today’s business world. If users can’t use the applications they need, the productivity of your business will be affected. And if customers can’t access the services your organization provides, you’ll lose their business. The Nytro XD implements these high availability features.

- Support for Multipath: when multiple paths are available to the SAN storage, they are used for redundancy in case of path failure. Windows MPIO, Linux DM-Multipath, and EMC’s PowerPath work transparently with Nytro XD..
- Windows Cluster Services is supported and in the event that the primary server fails with the Nytro XD solution installed, Windows will failover to a secondary server. The cache on the secondary will be empty and data from hot spots will begin to be cached. When fail back occurs to the primary node, Nytro XD will invalidate the previous cache contents and begin hot spot identification.

### Caching Application Hot Spots

The use of caching on servers for accelerating access has been around for decades. The Nytro XD solution’s host-based software employs “intelligent” detection of application hot spots. This software is located between the file system and the device driver (Figure 2) and it directs frequently accessed data from flash storage to deliver latencies and performance up to 100X faster than HDDs can achieve.

Because hot spot activity varies by application, a free assessment software tool called the Nytro Predictor (figure 1), helps IT managers to identify the potential benefits of using the Nytro XD solution. Using non-intrusive Windows® (xperf) or Linux® (blktrace) utilities, traces of the storage activity generated by the application are captured and analyzed for hot spot activity using the same algorithms that the Nytro XD solution uses. IT Administrators can determine if their application will benefit from caching. There is no need to install LSI hardware to run Nytro Predictor tool.

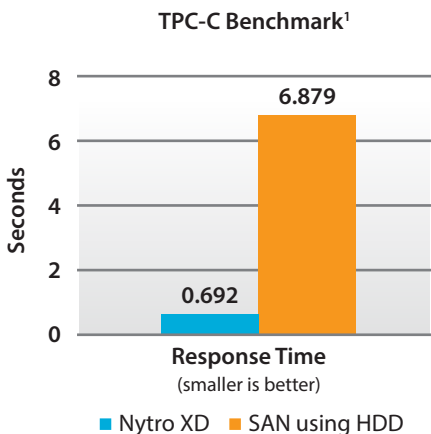


Figure 3

### Potential Database Performance Improvements

The Nytro XD storage solution has been tested using an OLTP database on a high performance RAID array using a benchmark similar to TPC-C. In testing, the Nytro XD solution provided a 10X reduction in latency which means that data will be delivered faster to your users (figure 3).

## Nytro XD Solution Specifications

Operating Systems	RHEL 5.4, 5.5, 5.6, 5.7, 5.8, 6.0, 6.1, 6.2, 6.3 SLES 11 SP0, SP1, SP2 Cent OS 5.7, 5.8, 6.1, 6.2, 6.3 Ubuntu 10.04, 11.10 & 12.04 OEL 5.6, 6.0, 6.1, 6.2 Debian 6.0.5 Windows Server 2008 SP2, 2008 R2 SP1, 2012
LUN Support	SAN: Fibre Channel, iSCSI, SAS DAS: LSI SAS HBAs and MegaRAID controller cards
Path failover and Multipath Support	Windows MPIO, Linux DM-Multipath, EMC PowerPath (both on Windows and Linux)
Cluster Support	Windows 2008 R2 SP1, Windows 2012
Caching Implementation	Write Through
Maximum number of HDD LUNs that can be cached	64
Maximum number of WarpDrives used for Caching	8
Maximum cache size	6.4 TB

## Nytro XD Ordering Information

Name	Memory Type	Capacity	Part Number
LSI Nytro XD BLP4-400	eMLC	400GB	LSI00325
LSI Nytro XD BLP4-800	eMLC	800GB	LSI00352

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<sup>1</sup> Testing used an OLTP database being benchmarked with a workload similar to TPC-C. The database was located on a NetApp E2600 storage array. Actual performance gains are not guaranteed and are highly dependent on the customer environment and hot spots occurring in the customer's application.

For more information and sales office locations, please visit the LSI websites at: [www.lsi.com/channel](http://www.lsi.com/channel)



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