

Nytro SATA SSDs: Applications and Use Cases

Technology Paper

Features / Benefits

- Maximum computing for the dollar, minimal cost to deploy
- Blazing speed for read-intensive environments
- Low power consumption to lower total cost of ownership
- SATA 6Gb/s interface for easy deployment in existing enterprise storage systems
- Ideal for environments where speed of random reads is a priority

Evolve Your Data Center Without Replacing the Infrastructure

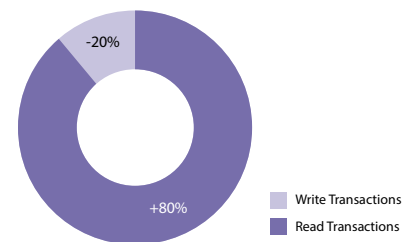
Companies seeking to improve the performance and reliability of their existing storage system without moving to an entirely new infrastructure should look no further than the new Seagate® Nytro® SATA solid state drives (SSDs). Engineered as an affordable, power-efficient storage option for cloud servers and all-flash array systems, the Nytro line of SATA SSDs is ideally suited for enterprises wanting both to eliminate performance bottlenecks and reduce expenses.

When comparing traditional storage media to SSDs, hard disk drives (HDDs) may have the edge in the categories of overall capacity and cost-per-gigabyte, but SSDs make up for it in speed and performance. SSDs access data almost instantaneously wherever it resides on its chips, resulting in incredible response times and blazingly fast random-access read performance compared to even the best HDDs on the market. SSDs also typically require a lot less power than traditional drives, because SSDs do not need electricity to keep platters spinning.

Upgrading to SSDs to eliminate bottlenecks and gain this performance, however, doesn't have to be cost-prohibitive. It doesn't need to break the bank.

Seagate designed the Nytro SATA SSDs with a standard 2.5-inch form factor, allowing them to be incorporated into any existing server or storage chassis with a SATA 6Gb/s interface. Enterprise storage administrators, therefore, can effortlessly upgrade their existing server storage to the speed, performance and reliability of SSDs, while realizing decreases in power consumption during active workloads. All this translates into more computing for the dollar at a minimal cost to deploy.

Nytro SATA SSDs are designed for cloud computing and read-intensive environments. They perform well in a wide variety of deployments, especially where the speed of random reads is a priority. They are particularly suited for environments with light write workloads and heavy read workloads. In general, ideal uses are those where a write-once-read-many-times paradigm applies. More specifically, these deployments have workloads with read transactions that account for at least



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80 percent of all IO operations and write transactions that account for less than 20 percent.

This paper describes a few of those environments. It starts with a summary of the major types of deployments for which NyTRO SATA SSDs are ideally suited (see the figure below), then goes on to describe each of these applications in more detail. It also includes a description of one type of deployment, which, although it doesn't fit the above-mentioned scenario perfectly, can still benefit greatly from using the NyTRO SATA SSD.



Customer-Facing Web Servers

Companies looking to accelerate the performance of their customer-facing web servers should consider the NyTRO SATA SSD. Data stored on these kinds of servers is typically written occasionally, but is then read again repeatedly—transaction loads break down to roughly 80 percent reads and 20 percent writes. These servers often must be able to field simultaneous queries from millions of users worldwide. In such situations, the quicker the reads can be made, the longer the customers stay happy. So, compared with traditional media, the gains made from the fast response times and high random-read access performance of NyTRO SATA SSDs can be nothing short of dramatic.

Typical customers and applications include the following:

search-engine and travel-booking sites, Web-hosting companies, public clouds like online stores and ride-sharing applications, and large companies with extensive intranets.

Read-Intensive Databases

Read-intensive databases chalk up read transactions that account for more than 90 percent of all their IO activity. These databases typically have data written to them once (or at least infrequently), and that information is read many times over. The reads are normally random in nature, and they also involve responses to table scanning and queries from multiple sources.

Typical customers and applications include the following: retail stores, which have point-of-sales terminals that constantly query databases for price lookups, product descriptions, and customer information; photo-sharing sites such as SmugMug and Flickr; interactive kiosks; supply chain systems; SAP and Oracle CRMs.

Data Analysis and Reporting

Organizations engaged in heavy data analysis and reporting also would do well to take a look at the NyTRO SATA SSD. Like groups that use read-intensive databases, these organizations tend to write massive amounts of data to their storage media either once or infrequently, which is then accessed often in the form of database queries from multiple sources and scanning tables. These applications, however, would benefit even more greatly from the NyTRO SATA SSD, as the enterprise SSD's performance can keep pace with the speed and power demands required to drive

Customer-Facing Web Servers		Read-Intensive Databases		Data Analysis and Reporting		Virtual Desktop Infrastructures	
Description	Transaction load of roughly 80% reads and 20% writes. Potentially millions of users accessing data simultaneously.	Description	Transaction load of more than 90% reads and less than 10% writes. Reads typically random and involve table scanning and queries from multiple sources.	Description	Similar to Read-Intensive Databases, but more dependent on speed.	Description	Hosting entire desktop operating systems (OS) in virtual machines (VMs). Thousands of users simultaneously might need to access data.
Value	Read-optimized storage allows customers quicker access to data.	Value	SSD technology excels at random read performance.	Value	Speedy performance allows data access needs to keep up with intensive compute needs involved with heavy analysis.	Value	Quicker read access times allows faster boot-ups for VMs, helps solve boot-storm problem.
Examples	Web-hosting companies, organizations with private servers, public clouds.	Examples	Point-of-sales terminals, photo-sharing sites interactive kiosks; supply chain systems; SAP and Oracle CRMs.	Examples	University research and financial institutions, inventory and sales analysis.	Examples	Call centers, grocery stores check-out terminals, retail bank tellers.

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their much heavier and more intense analytical computations. Typical customers include the following: university research institutions, groups engaged in inventory and sales analysis, investment banking firms and business analysis groups.

Cloud Server Boot Drives

Nytro SATA SSDs are ideally suited to replace HDDs as boot drives, especially in hyperscale and dense data centers. Booting is the process of loading the drivers, applications, registry files and other stored data that a computer system needs at power-up. Almost all activity in a boot process comprises small read transactions, and because Nytro SATA SSDs handle reads much more quickly than traditional spinning media, a single Nytro SATA SSD drive can replace a number of HDD boot drives in a cloud server system, thereby cutting down on space and power consumption.

Typical applications include: Infrastructure as a Service (IaaS) platforms, commodity and clustering servers, and other cloud servers.

Virtual Desktop Infrastructures

Also called server-based computing, virtual desktop infrastructures (VDIs) involve hosting entire desktop operating systems within virtual machines (VMs) running on a centralized server. Virtualized desktops can load VMs for all employees in a company. Hundreds, even thousands, of users on VDI terminals often must be able to access the shared resources and applications of compute and storage (primary reads) simultaneously.

Call centers, grocery stores (check-out terminals), and bank tellers are all typical users of VDI.

Nytro SATA SSDs can also help to solve a particularly nasty problem associated with the VDI model called the boot storm. A VDI boot storm describes a scenario in which a VDI network becomes overwhelmed with data requests when a large number of end-users start their terminals simultaneously or within a very narrow period of time. Boot storms are highly problematic, as end-users can become completely disillusioned with the entire VDI system if performance is degraded only at boot time, even if it is otherwise good for the remainder of the computing session.

Other Deployments

Not all applications that have more writes than reads are write-intensive. A typical computer system in a small business environment or home setting, for example, might have a read/write ratio closer to 50/50, but compared with jobs in enterprise environments, their workloads aren't intensive at all. These applications see relatively sporadic activity in both read and write operations. In such cases, the end-user would benefit greatly from both the Nytro SATA SSD's affordability and enterprise-level performance.

Nytro SATA SSDs can also be deployed as reliable crash-dump drives, which are dedicated to saving data quickly in cases of fatal error.

Summary

The Nytro SATA SSD is an ideal solution for myriad cloud-computing and read-intensive storage applications. It is worth a look for any enterprise considering upgrading their storage capabilities with a reliable, affordable and power-efficient storage option without having to replace their entire infrastructure. For more information, visit www.seagate.com/enterprise-storage/nytro-drives/nytro-sata-ssd/.

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