



Supercharge your Storage

Lenovo[®] Storage S3200 & SANsymphony[™]-V

Two key storage components necessary to improve application response include powerful high performance disk sub-systems and intelligent caching software.

SOLUTION HIGHLIGHTS

- Extremely fast using inexpensive RAM caches
- Accelerates application response
- Budget-friendly bundles

LENOVO STORAGE S3200 HIGHLIGHTS

- DataCore Ready certified
- Up to 5200 MB/s sequential read, and 3000 MB/s sequential write
- Mix SSD and SAS drives within a configuration
- Up to 192 drives per system
- Cache mirroring technology
- Ideal for demanding HPC & Media & Entertainment applications

DataCore Ready Certified

Lenovo Storage S3200 storage arrays, certified under the rigorous DataCore Ready Program, offer RAID disk sub-systems delivering up to 5200 MB/s read and 3000 MB/s write performance with 100,000 IOPS sustained from disk. SAN response and throughput are further accelerated by combining these arrays with high-speed caching, auto-tiering and random-write acceleration technologies in DataCore's SANsymphony-V Software-defined Storage platform.

Delivering Supercharged Performance at a Compelling Price

The Lenovo Storage S3200 array delivers best-in-class price/performance with a modular architecture facilitating simple performance upgrades and maintenance. SANsymphony-V software, running between the hosts and the arrays, further accelerates applications by leveraging powerful processors and large memories of commodity x86-64 servers for read and write caching. Its auto-tiering software optimally utilizes the array's SSDs to speed up active workloads, while migrating less-frequently accessed data to lower cost, higher capacity SAS disks. DataCore also converts host random write patterns known to suffer high disk latencies, into sequential IOs far more favorable for disks.

The DataCore Ready Program Value Proposition

DataCore Ready identifies solutions trusted to strengthen SANsymphony-V- based infrastructures. While DataCore solutions interoperate with popular open and industry-standard products, the DataCore Ready designation ensures that these solutions have successfully executed a functional test plan and additional verification testing to meet a superior level of joint solution compatibility.

Customers who leverage DataCore Ready offerings benefit from quality assurance, reduced risk and lower integration costs. The DataCore Ready logo helps customers quickly identify products and solutions that are optimized for SANsymphony-V.

Smart high-speed caching

High-speed caching has long been a potent differentiator for DataCore's products. If you have been conditioned by other suppliers to believe that any form of virtualization brings a performance penalty, think again. In the process of virtualizing disks, DataCore software accelerates reads and writes by leveraging the powerful processors and large memories of the x86-64 servers on which it runs. Up to 1 TB of RAM may be used as read and write cache per DataCore node.

In the diagram you see how the software uses the CPUs on the DataCore nodes to rapidly poll for inputs and immediately service IO requests from SAN-wide caches. Polling replaces slower (higher latency) interrupt servicing techniques used in other products. The quicker the CPU, the faster the software can turn around IOs. The same polling method is used whether fielding requests from the host computers or responding to the back-end arrays. Write coalescing, along with random write acceleration, significantly speed up de-staging to disk by grouping inputs into more disk-friendly, sequential writes that markedly reduce latency.

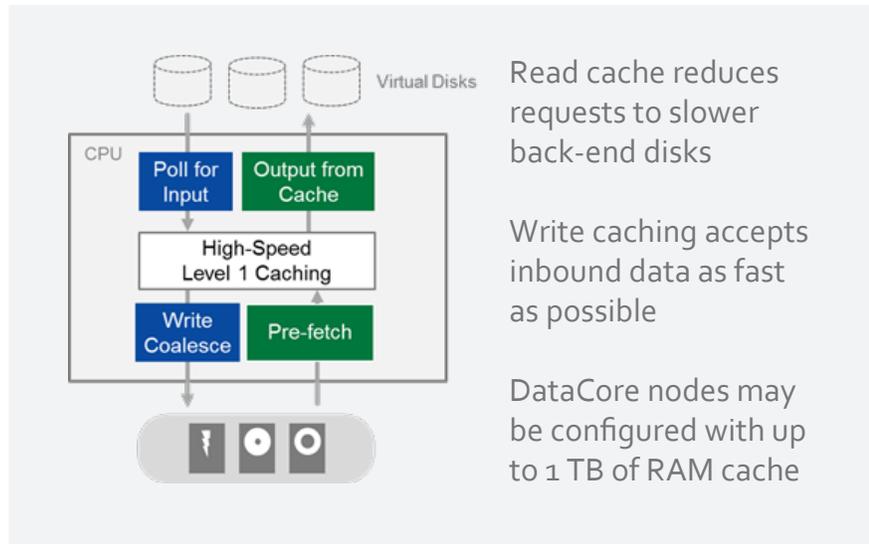
To speed up reads, DataCore pre-fetches data into cache. Essentially, it anticipates blocks likely to be read given earlier requests. The adaptive algorithms have been perfected over nearly two decades.

Avoid waiting on disks while extending SSD service life

The simplest way to understand caching on a DataCore node is to view it as a level 1 cache that can respond in less than 20 microseconds, whereas the caches on the disk array may be somewhere in the hundreds of microseconds.

Both caches aim to hide the much longer delay of the physical disk IO which is in the order of 4,000 to 6,000 microseconds (or 4 to 6 milliseconds). DataCore high-speed caching also plays an important role when using very fast SSD technology, extending its useful life by reducing media wear.

In addition to caching, and random write acceleration, DataCore auto-tiering software dynamically places hot active data on the array's fast solid state drives, and the cooler, less-frequently accessed data on the more cost-effective spinning disks.



Sequential performance with Lenovo cache mirroring technology

Application environments such as data acquisition or video post-production can generate a huge amount of sequential data from the host application. The processing overhead for writing high throughput sequential data streams to disk is therefore an important factor in overall system performance. This is especially important in dual controller RAID configurations where the incoming data must be written to two controllers

Lenovo Storage S3200 SAN storage arrays employ cache mirroring technology: a unique data caching architecture providing exceptionally high bandwidth write performance in RAID protected configurations.

Cache mirroring uses an extremely low latency internal bus to copy incoming data from the active to the standby controller without the noticeable drop in write performance experienced with traditional RAID cache designs.

About Lenovo Storage Systems

Lenovo Storage is in a very unique position among the competition to offer customers a comprehensive list of products which are feature-rich, flexible, and optimized for business. Lenovo Storage offers a wide range of SAN, NAS, DAS, and Archive products. With this broad portfolio of products, Lenovo Storage is perfectly aligned to offer the product which meets our customers' needs. For further information please visit www.lenovo.com/storage.

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