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DataDirect Networks – An Early Leader In SAN Virtualization Appliances

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Management Summary

The world of enterprise storage is in the midst of a shift from direct-attach to networked storage architectures. **The growing deluge of data is driving enterprises to seek more efficient storage infrastructures, and networked storage is eminently more cost-effective.** It is easier to share, manage, and efficiently utilize storage assets when they are consolidated and universally accessible on a network.

Within the storage-networking trend, there is an emerging product category that promises the utmost in economies of scale: the storage area network (SAN) virtualization appliance. It is an intelligent platform that resides in the network (i.e., between servers and storage arrays) and presents multiple, heterogeneous disk arrays as a single entity to the servers, as if they were one giant disk. The idea is to *simplify administration* by allowing IT departments to manage, grow, and reallocate all storage as a common asset. This can mean tremendous savings since administrative costs are by far the largest part of storage total cost of ownership (TCO). It also improves capacity utilization through storage consolidation.

Much enthusiasm and promotion have surrounded this product category. **A number of storage vendors – both established and startup – now offer or will offer a virtualization appliance.** Enterprises have begun to deploy them, though the technology is still in the earlier phases of market adoption.

One company in particular has enjoyed early success – DataDirect Networks, Inc. Previously a manufacturer of RAID arrays, DataDirect refocused and now exclusively offers a family of high-performance virtualization appliances called *Silicon Storage Appliance*, or *S2A*. DataDirect claims to have been the virtualization appliance leader in 2001 with $25 M in revenue and an installed base of 600+ TB.

DataDirect has been successful because its offering is both targeted and unique. As expected, S2A delivers low storage TCO, but that's only half the value proposition. **Unlike other virtualization appliances, S2A also delivers very high bandwidth – up to 800 MB/s in a single appliance**. This makes it an especially attractive solution for rich media (i.e., graphics, video, audio) and scientific applications like broadcasting, digital media management, visual simulation, and modeling. DataDirect has targeted these segments and won customers like BBC, Time Warner Cable, NASA, and Sandia National Laboratories.

Enterprises that consider *cost-effectiveness* and *high bandwidth* to be high on their storage priority list should have a look at DataDirect's S2A. Read on for more details.

DataDirect S2A

The DataDirect Silicon Storage Appliance (S2A) is a SAN virtualization appliance that can connect as much as 180 TB of storage to as many as 512 servers. This enterprise solution presents all storage as a single asset that can be allocated and expanded as needed among the connected servers. Change is non-disruptive, and LUNs[1] are securely mapped to specific servers to protect information. As a result of this unified view of storage, S2A can deliver simplified management, especially as capacity scales.

The appliance comes in two versions – S2A 6000 for enterprise applications and S2A 3000 for workgroup or departmental applications (*see sidebar for specifications*). Prices for the S2A 3000 start at $39,000 with 500 GB and $49,995 with 1TB.

Conceptually, one can think of S2A as a Fibre Channel (FC) switch plus multiple, intelligent RAID[2] controllers integrated into a single, high-performance package. On the host server side, it connects to as many as 8 servers directly or 512 through a FC network. Supported operating systems include *Solaris, IRIX, AIX, Windows NT/2000, MacOS,* and *Linux*. S2A also has up to 20 FC ports for connecting to disk arrays. Since S2A performs RAID processing itself, the attached storage must be JBOD[3] and not RAID (DataDirect supplies disk arrays with their solutions, though customers can purchase them independently).

As mentioned, S2A is unique among virtualization appliances in providing very high bandwidth (MB/s). DataDirect claims a 3X improvement over competitive SAN solutions and 10X over network-attached storage (NAS). In fact, one S2A 6000 can deliver 96 concurrent streams of MPEG2@ML video for broadcast applications. It achieves this level of performance with several technologies, including simultaneous, parallel access to all storage resources, cache memory, automatic performance tuning, and unique RAID

algorithms and disk striping**. By incorporating these into a tightly-integrated hardware and software platform (a.k.a.,** *appliance***), DataDirect is able to meet high performance marks.**

For high availability, S2A supports RAID, hot spare drives, and redundant controllers, fans, power, and network paths (in conjunction with server-based multipathing). An optional software module called *directMIRROR* creates

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DataDirect S2A at a Glance

S2A 6000

Max capacity **...................................**	180 TB
Max host servers............................	512
Max cache.....................................	20 GB
FC host ports	8
FC disk ports..................................	20
Aggregate bandwidth......................	800 MB/s
Max LUNs.....................................	8,192

S2A 3000

Max capacity	7 TB
Max host servers............................	24
Max cache.....................................	3 GB
FC host ports	4
FC disk ports..................................	6
Aggregate bandwidth......................	400 MB/s
Max LUNs.....................................	4,096

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point-in-time copies, and there are plans to release a module for remote mirroring next quarter. S2A also integrates with a number of third-party tape backup and recovery solutions.

S2A offers other features, as well. A pay-as-you-grow function allows customers to turn on additional capacity and ports by purchasing a software license key. For file sharing, S2A supports a number of third-party, SAN-based solutions like IBM/Tivoli's *SANergy* and ADIC's *Centravision*. Another optional software module called *directMONITOR* enables remote, centralized management of multiple appliances.

Lower TCO and Higher Productivity

This feature set enables S2A to deliver several important benefits to the enterprise:

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[1] Logical Unit Number – a unit of storage capacity comprised of one or more blocks.
[2] Redundant Array of Independent Disks
[3] Just a Bunch Of Disks – implies a disk array *without* a dedicated RAID controller.

- **Lower administration costs through simplified management.** S2A's management and virtualization capabilities enable each administrator to effectively handle a much higher capacity of storage. This is a tremendous benefit because the cost of managing storage over its useful life can be several times its acquisition cost.

- **Lower acquisition costs by enabling inexpensive storage procurement and improved asset utilization.** The S2A unit itself is relatively inexpensive, especially when compared to products with similar performance and scalability characteristics. It scales by incorporating additional JBOD arrays, which are much less expensive on a per-megabyte basis than RAID arrays. Furthermore, S2A's single view of all storage allows enterprises to manage capacity more efficiently, thereby improving asset utilization and deferring capacity upgrades. When upgrades are needed, the pay-as-you-grow feature allows them to be purchased in a just-in-time manner. As a result, S2A is quite competitive on the basis of acquisition cost, especially for larger installations (i.e., > 500 GB).

- **Increased productivity by improving application performance.** Storage supports applications, which in turn drive business processes. Modern enterprises leverage information technology to such an extent that they are dependent on application performance and availability for ongoing operations. S2A's high availability and exceptional support for high-bandwidth applications can therefore positively impact productivity. For example, a newsroom that moves from a traditional, tape-based production system to a digital system based on S2A can air news stories more quickly and with fewer human resources. The business benefits, in this case, are a higher quality product and lower costs.

Target Applications

As a general-purpose SAN appliance, S2A can support most applications and environments. However, its ability to deliver exceptional bandwidth makes it particularly well suited for applications such as:

- Broadcasting

- Digital media management

- Modeling and visual simulation (e.g., scientific, financial)

- CAD/CAM[4]

- Animation and special effects

The common thread among these applications is the need to store and quickly access large, sequential blocks of data, which makes high bandwidth the dominant requirement. Furthermore, the burgeoning long-term trend to digitize and store assets such as graphics, video, and voice will open up additional industries and applications for high-bandwidth storage solutions in the future.

Conclusion

DataDirect has landed a beachhead in storage virtualization with its Silicon Storage Appliance. Its initial success in the broadcasting industry and with scientific organizations will provide credibility and momentum for moving into other sectors. **Expect DataDirect to be a significant player in the growing market for storage virtualization appliances.** If you are looking for a low-TCO storage solution, and especially if it is for a high-bandwidth application, DataDirect's S2A is one to evaluate.

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[4] Computer Aided Design/Computer Aided Manufacturing

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