



STK Consolidates Open Systems Storage for the Mid-Sized Enterprise

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Management Summary

When it came to making a standard product, no one could beat Henry Ford. Ford revolutionized manufacturing. By 1914, his Highland Park, Michigan, plant could turn out a complete auto every 93 minutes using innovative production techniques. This was a great improvement over the earlier production time of 728 minutes. Using a constantly moving assembly line, subdivision of labor, and careful coordination of operations, Ford realized huge gains in productivity. Ford's mass-production techniques would eventually allow for the manufacture of a *Model T* every 24 seconds. Moreover, every one of them was standard black.

Today, however, the consumer, while still looking for a standard product, looks for a bit of variation in order to create his own identity or fit his own job requirements. This might mean a bigger engine, heavy-duty battery, or, maybe even a trailer hitch. The automobile industry has grown in terms of capability — today you can choose your own options, even color.

The Information Technology (IT) world has also matured. It no longer looks at IT components with a one size fits all mentality. IT suppliers have extended their range of vision beyond the scope of the mainframe. They recognize that there are enterprise requirements for distributed processing, which also must adhere to industry standard interfaces. They have also extended their aim beyond the limits of the Fortune 500. There are literally 1000's of mid-sized businesses (MSEs) that have similar processing requirements, but not necessarily on the largest scale. They also have storage requirements that mirror the major enterprises in terms of backup and restore, disaster recovery, and compliance with industry standards and some of the same legislative edicts. The amount of data required by even the MSEs is growing dramatically as executives look to improve performance and protect themselves from judicial inquiry

In order to satisfy their growing appetite for storage across a wide-range of capacity requirements, MSEs are looking to acquire scalable storage solutions that will protect the investments being made in disk arrays in their rapidly expanding environments. StorageTek (STK) has responded to these needs with the restructuring of their open systems disk products into a consolidated family of open systems storage arrays, capable of interfacing with all of the standard operating systems, from *Windows* to *Linux*. To see if their *FlexLine* family of online storage systems can meet your needs, please read on.

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The MSE Storage Requirement

No matter how the IT industry measures them, i.e., via number of employees, revenue dollar value, number of servers, etc., mid-sized enterprises (MSEs)¹ number in tens of thousands around the world. The growth in storage for an MSE is due, in part, to not only normal business growth, additional customers, and new products, but also a significant portion is due to the requirement to preserve all financial records for the enterprise in order to protect the executives from potential legal action. In MSEs, this has led to the implementation of storage area networks (SANs) to help manage the growth. Many MSEs will even try to take advantage of legislated initiatives to achieve better business performance. This includes growing revenues, increasing margins, and maximizing return on assets.

Another aspect is the desire to improve operational efficiencies. With a continual reduction in the cost of disk arrays, many MSEs are looking to disk as the media of choice for short-term backup and restart, keeping mirror images and snapshots of data changes online, via additional disk volumes, as opposed to near-line via magnetic tape within an auto-changer or library. Disaster recovery copies still may be kept on tape for off-site preservation of mission-critical information. Moreover, tape is still the media of choice for the long term archiving of historical data, such as annual business trends that might be retrieved for use in a data warehouse environment.

The demands for storage applications are widespread, with uses spanning the enterprise from mission-critical production environments, application development, through archiving. A more complete list can be found in *Exhibit 1*. Some of these applications require high-speed online transaction processing and require *access-centric*, or high-throughput, storage systems. Typically, these are the modular arrays manufactured for high IOPS and transaction intensive operations. Other applications, such as programs implemented to manipulate fixed content or for data protection, are designed to specific *capacity-centric*, or high-volume, goals.

¹ See *The Clipper Group Captain's Log* dated December 14, 2004, entitled *Why "SMB" is a Meaningless Acronym - Trying to Define the "Middle"* and available at <http://www.clipper.com/research/TCG2004096.pdf>.

Exhibit 1 - Storage Applications

- Storage consolidation
- Offline data processing
- Disaster recovery
- Application development
- Centralized storage management
- Online transaction processing
- Mirroring and data replication
- Disk-to-disk backup and recovery
- Archiving
- Fixed content storage and distribution
- General purpose secondary disk

While most access-centric arrays use Fibre Channel as the primary communications protocol, capacity-centric systems increasingly are based on the more cost-effective Serial ATA technology. SATA is optimized for fast write-throughput, with high reliability, and a simple policy-based web interface. STK also maintains a third category for FlexLine, a *Shared Virtual Array* (SVA), in support of the older applications, proprietary protocols, and data integral to the enterprise's mission-critical legacy application set which enables a more efficient use of existing resources. These cover the resources used for the most storage-intensive applications, requiring unique replication and enterprise management features.

The three most important criteria established for the selection of scalable disk storage are price, ease of use, and features and functions, with simplification close behind. That said, there is also a strong desire within MSE operations to implement a strategy that allows clear, flexible options, to protect the investment in storage already made, and to provide a clean upgrade path for the future.

StorageTek FlexLine Family

StorageTek has recently introduced a new family of open systems disk storage components, *FlexLine*, consisting of some new elements and the restructuring of two older families, the *B Series* and the *D Series*, into a unified product set called the FlexLine 200/300 Series, running with the same management software throughout, SANtricity Storage Manager. In this bulletin, we will concentrate on the

newest additions to the portfolio, including the newest FlexLine 600 Series of capacity-centric disk that will have availability in early 2005 and the access-centric models, recently renamed into the *FlexLine 200 Series* and *300 Series*. This bulletin will also show how STK has positioned the FlexLine V Series so that the reader has a clear understanding of how the various models fit into the storage environment of the mid-sized enterprise.

The FlexLine Family consists of three major divisions: the FlexLine V-Series, the FlexLine 200 and 300 Series, and the newest member, the FlexLine 600 Series.

The FlexLine 200/300 Series

Within the FlexLine 200/300 Series that contains both access-centric Fibre Channel drives and capacity-centric ATA drives there are three different controllers – the FLC210, FLX240, and the FLX280. Under the 200 family naming, StorageTek offers the FLA200 *access-centric* and the FLC200 *capacity-centric* models. In addition, STK also offers an FLC250 capacity-centric model that is based upon STK's Blade-based arrays, with up to 10 blades in a drawer and up to five SATA devices in a drawer. The access-centric models all use Fibre Channel drives with a capacity ranging from 36 to 146GB per drive, while the capacity-centric models use the 250GB SATA drives. The newest array in the portfolio is the FLA300, an access-centric drawer that uses an embedded switch to help eliminate the risk of a single drive disrupting the loop.

All basic models are rack-mounted and

occupy 3U of vertical space, except for the FLC-250 whose vertical blades require a 6U configuration, and supports up to ten blades with 12.5TB of disk storage. The access-centric models support 14 Fibre Channel drives and up to 2TBs of capacity, while the FLC200 capacity-centric model can support 3.5TB of disk using the 250GB SATA drives with 2Gb/s bandwidth.

To support all of the array choices, STK offers three levels of controllers that allow customers to match performance and capacity requirements with their business needs. The FLX210, the FLX240, and the FLX280 are all connected to the host or the SAN through an integrated 2 Gb/s Fibre Channel interface. The FLX210 is compatible with the FLC200 and supports up to 112 SATA drives, or 28 TB of disk capacity. The FLX240 and the FLX280 also can support integrated arrays containing either Fibre Channel or SATA drives or a 3U drawer for blade configurations. Additional FlexLine configurability information is shown in *Exhibit 2*, below.

The FLA access-centric models are particularly cost effective for database and OLTP applications, while the FLC capacity-centric models provide an economical solution in disk-to-disk backup and data replication and consolidation applications.

The FlexLine 600 Series

The FlexLine 600 Series storage system is a rack-mount unit designed for a 4U configuration and positioned specifically to provide excellence in data protection cost-effective on-line storage for fixed content information. This SATA array

Exhibit 2 - FlexLine Controller Configurability

	FLX280	FLX240	FLX210
Max. # of Drives	224/120 Blades	112/60 Blades	112
Max. Capacity FC	32.7TB	16.4TB	28TB
Max. Capacity ATA	150TB	28TB	28TB
Host Connections	8	4	4
Max. # of Arrays	16/12 Blade	7/6 Blade	7
Max. Burst Rate (IO/s)	148K/s	77.5K/s	76K/s
Max. sustained I/Os (FC)	53.2K/s	25K/s	-
Max. sustained I/Os (SATA)	6,000	3,000	3,000
Max. sustained I/Os (Blade)	12,800 I/Os	6,500 I/Os	-
Max. sustained Throughput	795MB/s	395MB/s	485MB/s
Array Compatibility Matrix	FLA200/300, FLC200/250	FLA200/300, FLC200/250	FLC200
Pricing	<\$50K	<\$30K	<\$20K

is an extension of STK's *BladeStore* family and will be available for shipment in 1H2005.

The FlexLine V Series

The FlexLine V2X2/V2Xf Shared Virtual Array transitions the legacy STK V-Series into the FlexLine family. In addition to support of open systems such as *Windows*, *Solaris*, *HP-UX*, and *AIX*, among others, the V-series also supports *OS/390*, *z/OS*, *MVS/ESA*, *VM/ESA*, and *z/VM*, with ESCON (V2X2) and FICON (V2Xf) interfaces, in addition to Fibre Channel. In fact, the V-series can support 8192 logical ESCON paths or 2048 logical FICON paths, with a capacity up to 11.624 TB of legacy data. Because the V-series can utilize 100% of available capacity with both proprietary and commodity interfaces, it becomes a useful tool in on-line transaction processing and storage consolidation.

StorageTek SANtricity Software

The glue that enables consolidated storage management, centralized control of resources, and faster execution of backups for the FlexLine 200 and 300 families is SANtricity, a software suite developed through partnership between STK and Engenio Information Technologies.

SANtricity consists of a base module with a single consistent Storage Manager software view – and a set of optional features that allow you to enhance the storage management with enterprise-class functionality for *Partitioning*, *Snapshot Copy*, *Internal Volume Copy*, and *Remote Volume Copy*, as the data center's needs evolve. (See *Exhibit 3* above, next column.)

The base application provides the flexibility to mix drive types from high-performance Fibre Channel, to cost-effective SATA, to high-density blades within a single disk subsystem. The tools provided enable the data center staff with the capability to:

- Configure new drives;
- Enable dynamic volume expansion;
- Enable dynamic capacity expansion;
- Update controller firmware; and
- Hot swap failed components.

Conclusion

The key to providing the broadest possible

Exhibit 3 – SANtricity Optional Software

- ***SANshare Storage Partitioning*** – enables a range of hosts to effectively share a single disk system to improve storage utilization and reduce TCO;
- ***Snapshot Copy*** – provides an instantaneous image of a volume using only a fraction of the disk space enabling the testing of new versions before deployment;
- ***Internal Volume Copy*** – creates a clone of a volume for applications requiring a full point-in-time volume copy;
- ***Remote Volume Copy*** – enables primary volumes on an STK open systems disk system to be mirrored over the SAN to volumes on another open disk system, both synchronously and asynchronously.

storage platform to the widest possible audience is to identify and meet the most basic requirements that these enterprises have. In terms of meeting the needs of the MSE, we have identified three major categories: cost, ease of use, and functionality. By restructuring their disparate products into a single, scalable product family, StorageTek has removed one hurdle from their path. With the capability to mix both access-centric and capacity-centric volumes within a single array subsystem, MSEs have the consolidation effort simplified for any sized enterprise, removing another potential hurdle. With the availability of a single software management interface across all of their open products, an MSE can further simplify their consolidation needs.

The roadmap that StorageTek has laid out for the future, with the FlexLine 600 family, indicates that they have recognized the basic requirements that MSEs have across the board, for low-cost and scalable systems. Henry Ford taught us a lesson 100 years ago: If you provide the consumer with what they need, they will buy it. Only time will tell if mid-sized enterprises find the shortest path to storage simplification is a *FlexLine*.



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