



SEAGATE SAN TECHNOLOGIES

Introduction

Seagate SAN Technologies enables lightning fast performance, yielding the best \$/IOPS in its price band in the industry. Seagate firmware is a vehicle for continuous innovation and provides customers with leading, enterprise-grade features.



Virtual Pools



Security



Thin Provisioning



Auto Tiering



ADAPT



Snapshots



SSD Read Cache



Async Replication





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Virtual Pools

Streamline system management

Users can streamline system management by automatically creating storage pools. Storage pools are capacity aggregated from disparate physical storage resources in a shared storage environment. Physical disks are grouped into RAID and organized by disk group. Disk groups are inserted into pools, and volumes are written/read in 4MB blocks. Volumes are then carved from the pool.

Storage pools can be configured in varying sizes and provide a number of benefits, including improvements in:

- Performance
- Management
- Data protection

Value Proposition

Is the underlying technology enabling other features that include:

- Autonomic SSD tiering
- Thin provisioning with unmap and zero-block reclamation
- SSD read cache
- Faster rebuilds
- Larger volumes (spanning multiple disk groups)
- Performance snaps



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Thin Provisioning

Allocate storage needs on demand

Thin provisioning automatically allocates storage resources on an as-needed basis by the applications. Thin provisioning dramatically increases storage utilization by removing the equation between allocated and purchased capacity.

Application administrators traditionally purchase storage based on immediate and future growth capacity needs. This can result in over-provisioning and underutilized storage space. With thin provisioning, applications are provided with the needed capacity required to operate and grow, while operating on a smaller amount of physical storage. An overcommit setting allows for the provisioning of storage volumes that exceed physical storage while capacity alarms notify when service or storage capacity is required.

This provisioning facilitates a build-as-you-grow approach to data storage and when required, new storage is added to an array's storage pools.

Value Proposition

- Better control of CAPEX by efficiently using installed storage resources.
- Space reclamation of storage pools
- Efficient use of resources including a reduction in power and cooling requirements



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Advanced Distributed Erasure Protection Technology (ADAPT)

Improve storage management and much faster rebuild times

ADAPT is a dispersed RAID implementation which distributes data across every drive in the pool, rather than a subset of drives. The Seagate Advanced Distributed Autonomic Protection Technology (ADAPT) is based on intelligent parallel architecture that utilizes more drives to respond to potential or active failure. This unique approach virtually eliminates performance impacts, where time from failure to fault tolerance is measured in minutes, not days.

This innovation makes Seagate's systems "self-healing," giving the end user uninterrupted access to assets while drastically reducing administration and management. This is not limited to one drive or a type of drive—it applies even if multiple SSD or HDD are impacted. This creates an unprecedented layer of data protection and peace of mind for users.

Value Proposition

- Make data safer, more secure, and constantly available.
- Anticipate trouble and respond seamlessly when road blocks arise.
- Ease of management/self-healing
- The bigger the better—the bigger the array the more powerful it is
- Flexible—can be used in HDD, SSD, or AFA configurations and any Seagate enclosure
- Easy capacity expansion
- Efficient—no need to bring in spare devices for rebuild because spare disk space in active devices is used
- Business continuity—protects critical data
- Rapid access to data without time lapse as in the past
- Advanced data protection without sacrificing performance—all drives contribute to lighting fast IOPs, even during rebuild
- Can address two concurrent drive failures, increasing data integrity and access
- Self-healing, reduced management



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SSD Read Cache

Improve performance for read-intensive workloads

A read cache is a special-purpose disk group dedicated to holding volatile copies of data within one or more SSD. The read cache is active when the controller cache is saturated. The controller cache software gives “hints” to the system software about which pages it would like to keep, but can’t. The system then copies these pages into the read cache. Reads are served from the SSD, and writes are written to both SSD and HDD.

This results in performance improvements, particularly for read-intensive workloads, and provide other benefits including helping to minimize investment in additional SSD.

Value Proposition

- Improve performance for read intensive workloads where maximum IOPS is crucial
- Eliminate the need for multiple SSD for read/write protection
- Requires fewer SSD when compared with a dedicated SSD tier. A single SSD disk can be used as a read cache for a storage pool; whereas, an SSD tier requires multiple disk to provide fault tolerance.
- Takes advantage of algorithms that act like tiering, so that only active pages are copied into the read cache. Active pages can be from any volume within the pool.



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Security

Data-at-Rest encryption leveraging Seagate SED and FIPS

In a security-conscious world, every step to increase data security is critical. Increasingly sophisticated hacks have proven that cyber security needs to begin at the foundation of the data life cycle—where it is stored.

Seagate is committed to keeping data safe and secure from breaches that can disrupt business and impact lives. We build security into the foundation of our storage systems, creating peace of mind for the businesses that trust our technology. Seagate continually enhances system firmware so administrators have the tools to ensure industry standards and company objectives are met.

Array-based, data-at-rest encryption leveraging Seagate SED and FIPS capable devices enhanced data security with features including:

- Encryption including SED and FIPS. Encrypt logs and other functions for increased security
- User privileges. SFTP access controls allow administrators to limit who has access to critical information
- Connected device security
- SFTP
- Security scans

Value Proposition

- Robust security provides competitive advantage
- More safely transfer business critical data
- Reduce legal implications



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Auto Tiering

Continuous background optimization of data placement to ensure optimal data storage performance

Real-time tiering automatically tiers between SSD and hard drives—as opposed to a batch-migration process. Seagate’s tiering software recognizes incoming data patterns, and distributes data on the most appropriate tier to provide optimal performance (citation: hybrid white paper)

As data pages becomes “hot” it is moved to SSD, while cold data moves back to HDD. Other performance characteristics include:

- Continuous background monitoring of I/O workload
- Highly responsive to workload changes
- Automatically moves 4MB pages of data to best performing location, in real time
- Supports up to three tiers (HDD archive, HDD performance and SSD)
- SSD tier is usually (but does not have to be) lower capacity than the HDD tier
- SSD caching uses similar technology, but is optimized for read performance, and less SSD capacity

Value Proposition

- Blended deployment strategy—accelerate performance with SSD while leveraging cost and capacity benefits of HDD
- Right-size your SSD investment



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 **Snapshots**

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Snapshots

Improve test and development time

Snapshots are commonly used for development and testing and are a foundation for copy services including data replication. A snapshot is a new volume with pointers referencing the original volume's data. A volume is created for all new incoming write data and it includes page tables and information about data structures within the larger storage pool. The new volume duplicates the original volume and keeps track of all references between them.

A snapshot is therefore, a consistently high performing volume based on write-directed technology. Every volume maintains the same level of performance, whether the 1st snap of a volume created or the 100th.

Value Proposition

- All volumes are equivalent—all volumes being subject to snapshot use. There is no special “master” volume
- No loss of performance for snaps
- Improve Recovery Time Objective (RTO) and Recovery Point Objective (RPO)
- Test and development time savings – use snapshot to test and develop
- New use opportunities are available (e.g. data mining, daily backups)



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 **Async Replication**

Asynchronous Replication

Replicate between arrays for business continuity and disaster recovery

Data replication is making copies of all critical data to ensure it is not lost. Keeping data safe, secure, and available is an ongoing challenge businesses face. In response, data can now be replicated to a secondary site that is geographically removed from the first and is not limited by legacy transport infrastructure.

Seagate storage systems supports replication over fiber channel and Ethernet networks. Companies who have invested in either standard can replicate using either approach that best suits them.

Value Proposition

- Promotes the value of business continuity
- Data in regional offices can be replicated back to HQ for analytics and critical business operations such as audits, video surveillance, etc.
- Users have the ability to use secondary site for continued business operations until primary is back up and running
- Natural disaster proofing
- Solution is available regardless of existing transport infrastructure – no system upgrade required to enjoy replication benefits



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Feature	Description	License Required
 Virtual Pools	Streamline management by automatically creating storage pools	Included
 Thin Provisioning	Save on storage costs by dedicating storage only when needed	Included
 ADAPT	Improved storage management and much faster rebuild times	Included
 SSD Read Cache	Improved performance for Read intensive workloads while minimizing SSD cost	Included
 Encryption	Improved data security by with array-based data-at-rest encryption leveraging Seagate SED and FIPS capable devices	Included (requires SED/FIPs devices)
 Auto Tiering	Accelerate performance with SSDs while providing cost and capacity benefits of HDD	Optional Software Bundle
 Snapshots	Reduce RPO/RTO and mount snapshots for development and testing	Optional Software Bundle
 Async Replication	Replicate between arrays for business continuity/ disaster recovery	Optional Software Bundle