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Technology Paper

Voracity for Capacity: New Opportunities in Storage-Hungry Enterprise Applications

Introduction

Storage managers have long known that staying ahead of capacity demands is an uphill battle; recently it's become even more challenging as capacity-intensive applications continue to proliferate. Companies of all sizes urgently need storage solutions that can store, manage and protect ever more massive amounts of data.

A recent Enterprise Strategy Group study estimates that in 2006 reference information will comprise the majority of enterprise data. While mission-critical, transactional (non-reference) data is brilliantly handled by high-performance enterprise disc drives, they lack the enormous capacity and low cost-per-gigabyte necessitated by the explosive growth of reference data.

Savvy system builders have been quick to recognize the significant business opportunities that such growth presents. With so many enterprises hungering for additional capacity, the demand for innovative, cost-effective storage systems has never been greater. A new generation of high-capacity enterprise drives is the key to meeting that demand.

Capacity Is Now a Business Enabler

Storage-hungry, 24x7 business applications are driving a fundamental change in storage solutions. Requiring a unique combination of high capacity, enhanced reliability and multidrive performance and availability, these business-critical applications play key roles throughout the enterprise:

- Network Attached Storage (NAS)
- Storage Area Networks (SAN)
- Maximum-Capacity Servers
- Rich Media Content Storage—Audio, Video, Image
- Reference and Compliance Data Storage
- Enterprise Backup and Restore—D2D, Virtual Tape
- Collaboration—Email, Messaging
- Infrastructure—Web, Print, File
- Video Surveillance

Business-Critical Applications: Storage Profile	
Application	Storage Profile
Network Attached Storage (NAS)	Popular way to add network storage without expense, complication of SAN; typically entails multiple drives in a single enclosure, demands high capacity and greater immunity to rotational vibration (RV).
Storage Area Networks (SAN)	Premier network storage solution, enables ready access to massive quantities of data by multitude of users; high-density storage arrays require drives with robust temperature and vibration tolerance.
Maximum-Capacity Servers	Enterprise's emphasis on higher efficiency underpins need for greater capacity-per-drive in servers; can eliminate need for external storage array, reduces power consumption/GB.
Rich Media Content Storage— Audio, Video, Image	Rich media content has become common element of enterprise data; huge file sizes demand copious storage capacity, ability to seamlessly stream content.
Reference and Compliance Data Storage	Regulatory compliance (Sarbanes-Oxley, HIPAA) stipulates rapid retrieval of enormous quantities of financial and medical data.
Enterprise Backup and Restore— D2D, Virtual Tape	Enterprise moving towards continuous, real-time backup to minimize business impact of system failure; disc-to-disc backups impose significant disc space requirements.
Collaboration—Email, Messaging	Legal requirements dictate lengthy retention of email and messaging data; requires high-capacity archival solutions that can quickly access data when needed.
Infrastructure—Web, Print, File	Traditional foundation of enterprise data is growing exponentially; increased capacity must be accompanied by superior reliability to ensure business continuity.
Video Surveillance	Migration from analog-based tape surveillance solutions to digital-based disc storage requires enormous capacity, ready availability of archival video footage.

Tasked with the mild desktop duties for which they were designed, desktop-class SATA can deliver stellar reliability. But when utilized in the far more rigorous environment of business-critical applications, desktop-class SATA drives simply cannot keep up. With far lower IOPS than high-performance SAS and FC drives, desktop SATA drives are forced to work longer to execute the same drive commands. This requires the drives to spend more sustained time at elevated temperatures.

Heat is the enemy of drive reliability, and business-critical workloads are a key contributor to prolonged periods of elevated drive temperatures and higher failure rates. Furthermore, business-critical environments present additional thermal challenges. Their dense servers, large storage farms and rack-based data centers impair airflow and chassis cooling, which sustains elevated drive temperatures even longer.

These high-density storage environments also entail challenges with rotational vibration (RV) tolerance. Desktop-class SATA drives are not engineered for multidrive deployments, and rotational vibration from nearby drives in the enclosure can cause desktop-class SATA drives to repeatedly perform recalibrations, greatly slowing net throughput.

Despite their undeniable merits, desktop-class SATA disc drives are simply not built to meet the demands of rigorous enterprise environments. If system builders are to take advantage of the market opportunities presented by business-critical applications, they must utilize drives that leverage the extraordinary capacity and low cost-per-gigabyte of desktop SATA, while adding key enhancements to ensure reliability and performance in heat- and vibration-intensive deployments.

Seagate Barracuda ES: The First 750 GB Drive for the Enterprise

The Seagate® Barracuda ES is a new family of high-capacity enterprise drives, delivering 50 percent more storage capacity than competing drives in the same 3.5-inch form factor. Leveraging unparalleled Seagate enterprise technology, Barracuda ES drives boast the highest reliability of any 7200-RPM drive in the industry and are optimized for 24x7 business-critical applications.

Purpose-built for demanding enterprise duty, Barracuda ES drives maximize system availability and performance in high drive-count storage systems with multidrive firmware features and class-leading RV tolerance. These enhancements are critical when implementing dense storage solutions, where a multitude of drives is often deployed.

HIGHEST AVAILABLE CAPACITY OF ANY ENTERPRISE DRIVE

- 750, 500, 400, 250 GB
- Up to 50 percent more capacity than competitors' drives

HIGHEST-RELIABILITY 7200-RPM DRIVE IN THE INDUSTRY

- 0.73 percent AFR
- Built for 24x7 operation

OPTIMIZED FOR MULTIDRIVE PERFORMANCE AND AVAILABILITY

- Best-in-class RV tolerance sustains performance in tightly packed, high-vibration drive configurations (RAID, JBOD, and so forth).
- Advanced power management reduces power consumption, heat levels.
- Workload Management (WLM) tracks drive temperature/activity to prevent overheating when workload spikes, boosting drive reliability and lifespan.
- Error Recovery Control (ERC) streamlines error recovery, increases system availability.

Seagate Barracuda ES Specifications	
Interface	SATA 3Gb/s
Capacity (GB)*	750, 500, 400, 250
Spindle Speed (RPM)	7200
Cache, Multisegmented (Mbytes)	8, 16
Seek Time, Read/Write (average, msec)	8.5/9.5
Reliability Rating at Full 24x7 Operation (AFR)	0.73%
Transfer Rate, Sustained (Mbytes/sec)	72 or 78 (750 GB only)
Power Consumption (watts, idle)	9.3
Rotational Vibration (rad/sec ²)	12.5
Limited Warranty (years)	5

*500 GB, 400 GB FC versions available through OEMs only

Conclusion

While desktop-class SATA disc drives offer economical capacity, they lack the enterprise features demanded by business-critical applications. Barracuda ES drives are designed to be the workhorse infrastructure solution for server and storage environments. Enormous capacity and low cost-per-gigabyte are key selling points, but enhanced reliability, and multidrive performance and availability in business-critical applications are the foundation of their value proposition.

The most successful system builders stay ahead of the storage curve, proactively anticipating and addressing their customers' needs. With the growing importance of capacity-intensive, business-critical enterprise applications, system builders have a significant opportunity to add unprecedented value to their storage systems with Barracuda ES—and take the lead over competitors who settle for desktop-class SATA drives in their enterprise storage solutions.