

# Engenio 3994 Storage System

LSI LOGIC®

Mid-range customers have many of the same requirements as enterprise customers — reliability, availability, performance — but they often don't have the same budget. They can't afford to pay a big upfront cost for scalability or functionality they may or may not need down the road. Mid-range customers need an affordable solution, that's easy to administer, stays up and running, scales as needed, and gives them great performance value. The LSI Engenio 3994 storage system is what they've been looking for.



The 3994 storage system is the newest member of the Engenio SANtricity family of modular storage products for the mid-range market. The 3994

adds the most advanced end-to-end 4Gb/s Fibre Channel (FC) technology to our time-proven designs for enterprise-class RAID storage to create a fully-featured storage system engineered to maximize performance, scalability and availability.

The product is designed for speed, flexibility and growth. Dual-active 3994 controllers and up to 16 disk drives are integrated within a new RoHS-compliant, 3U, rack-mountable controller enclosure. It has eight 4Gb/s FC host ports for direct host or fabric SAN attachment, four 4Gb/s FC drive ports for capacity expansion, and supports 4GB of battery-backed, mirrored cache. Up to 6 additional expansion drive modules are easily FC attached to the controller for a total capacity of 112 drives, or up to 56 TB.

## Start Small, Grow Big — With Complete Investment Protection

You shouldn't have to pay for what you can't use. The 3994 storage system modular design avoids over-configuration — creating an affordable entry-point — without sacrificing future scalability. And when requirements change, the "pay-as-you-grow" scalability of the 3994 keeps expansion costs down through optimal "just-in-time" purchasing. If even more performance or scalability is needed, the 3994 can be upgraded to the much more powerful 4Gb/s 6998 storage

system. Additionally, if you've outgrown your current Engenio storage system, the most recent 2Gb/s FC drive enclosures are directly attachable behind the 3994 controller module. And in both instances, the data on all drives transferred in this manner are immediately useable without having to transfer or rebuild any of the configuration or data files. This feature advantage is known as "Data Intact."

## Robust storage management software provides complete control

SANtricity® Storage Manager software configures and administers the 3994 storage system. With SANtricity software, storage administrators are able to achieve maximum utilization of the purchased capacity through extensive configuration flexibility and custom performance tuning. SANtricity software allows continuous access to user data during administrative tasks, including configuration, reconfiguration, expansion and maintenance of the system. SANtricity software also lowers storage management costs through centralized management of all Engenio storage systems, run-anywhere flexibility, a common interface across all operating systems and fully integrated premium features.

## Protect your data investment during reconfigurations and upgrades

SANtricity software's unique DACstore technology provides the 3994 storage system and all Engenio storage with unequalled functionality. With DACstore, configuration data is stored on every configured drive.

## FEATURES:

- Designed for continuous availability with fully redundant data paths including the ability to perform online microcode upgrades
- Robust integrated, hardware-based RAID technology reinforce the performance/availability solution with support for RAID levels 0, 1, 0+1, 3 and 5, with the ability to reconfigure any LUN on the fly from one level to any other
- Online expansion of physical capacity and logical volumes, and reconfiguration of existing logical volumes (LUNs), including RAID level migration and segment size modification
- Optional features, such as Snapshot, Internal Volume Copy and Remote Volume Mirroring are controller-based and operate without any host system intervention, overhead or degradation
- Support for 4 or 2Gb/s high-performance Fibre Channel drives and/or high capacity SATA drives within the same drive module, addressing the needs of tiered storage and ILM solutions
- Auto-negotiation feature enables 4, 2, or 1Gb/s Fibre Channel connectivity for direct attachment to individual hosts or fabric switch to storage area networks, and protecting your infrastructure investment

This unique design creates data-intact drive portability — supporting drive-level reconfigurations and controller-level upgrades as system requirements change. Drives can be relocated within the storage system to improve channel utilization/protection, or even migrated as a complete volume group into another Engenio storage system.

#### **Entry-Level Controller Option**

An entry-level model of the 3994, the model 3992 storage system, is available for those who can't see the immediate need for all of the capabilities and performance of the 3994, but still would like the option available. The 3992 has the same functional capability of the 3994, but has only 2GB of controller cache (instead of four), four host channels (instead of eight) and somewhat lower overall controller performance. As described above, the 3992 user could replace the controllers with the 3994 version, upgrading while leaving the data on the drives intact.

#### **Value without Compromise**

The 3994 storage system brings unmatched value to the mid-range.

- the latest 4Gb/s FC technology
  - storage access and throughput will never be the gating factor to your application's productivity
- highest possible storage densities and capacities
  - saves power, cooling and space while extending the range and productive life of your storage solution
  - allows you to use newest and most cost-effective, reliable drives available, while protecting your investment in legacy disk drives and enclosures
- comprehensive solutions for data protection and security; such as snapshot-enabled continuous backup; and remote volume mirroring for data recovery and business continuance across the campus or across the continent
  - increases your immunity to natural, accidental or malicious disasters and negligence
  - solution packages save money, time and the pains associated with implementing new applications, as well as accelerating the values they bring so much sooner
- the most powerful interconnect design that allows you to protect yesterday's investment into the future
  - adherence to the most stringent interconnect standards provides the user greatest value at the 'front-end' with broad host interoperability, and at the 'back-end' for investment protection and redeployment of legacy storage, as well as supporting hierarchical storage architectures
- inventive packaging designed to meet the most stringent international standards for safety, availability, resilience and ecology
  - engineered for all the right reasons, the 3994 solution is adaptable to the broadest range of applications and requirements, including those explicitly specified by industry trade or regulatory organizations



## Technical specifications

| Performance                                                   |                                                                                                          |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Maximum burst I/O rate from cache                             | 120,000 I/Os per second                                                                                  |
| Maximum sustained I/O rate from disk                          | 44,000 I/Os per second                                                                                   |
| Maximum sustained I/O rate to disk                            | 9,000 I/Os per second                                                                                    |
| Maximum sustained transfer rate from disk                     | 990 MB per second                                                                                        |
| Maximum sustained transfer rate to disk                       | 850 MB per second                                                                                        |
| Capacity                                                      |                                                                                                          |
| Maximum capacity with 73 GB 15K rpm FC drives                 | 8 TB                                                                                                     |
| Maximum capacity with 146 GB 15K rpm FC drives                | 16 TB                                                                                                    |
| Maximum capacity with 300 GB 10K rpm FC drives                | 34 TB                                                                                                    |
| Maximum capacity with 500 GB SATA drives                      | 56 TB                                                                                                    |
| Maximum drives per enclosure                                  | 16 drives                                                                                                |
| Maximum enclosures per subsystem, including controller module | 7                                                                                                        |
| Maximum number of drives supported                            | 112 drives                                                                                               |
| Host / drive connections                                      |                                                                                                          |
|                                                               | Eight 4Gb/s FC-AL host or FC-SW SAN connections                                                          |
|                                                               | Four 4 Gb/s FC-AL drive expansion connections                                                            |
| Availability                                                  |                                                                                                          |
|                                                               | Automated I/O path failover and online administration                                                    |
|                                                               | Supports RAID levels 0, 1, 3, 5 and 1+0                                                                  |
|                                                               | Redundant, hot-swappable storage controllers, disk drives, power supplies, cooling fans, cache batteries |
|                                                               | Automatic drive failure detection and rebuild using global hot spare drives                              |
|                                                               | Mirrored cache with battery backup                                                                       |
|                                                               | Configuration metadata stored on every configured drive                                                  |
| Configuration / monitoring                                    |                                                                                                          |
|                                                               | SANtricity Storage Manager software                                                                      |
| OS support                                                    |                                                                                                          |
|                                                               | Windows® 2000                                                                                            |
|                                                               | Window® Server 2003                                                                                      |
|                                                               | Linux®                                                                                                   |
|                                                               | NetWare®                                                                                                 |
|                                                               | Solaris™                                                                                                 |
|                                                               | AIX® *                                                                                                   |
|                                                               | HP-UX                                                                                                    |
|                                                               | IRIX® *                                                                                                  |
|                                                               | *Failover support provided by server vendor or third-party provider                                      |
| Physical characteristics                                      |                                                                                                          |
| Rack mount:                                                   | Height    Width    Depth    Weight    Power Cooling                                                      |

|                                                  |                                                                    |          |         |       |           |             |
|--------------------------------------------------|--------------------------------------------------------------------|----------|---------|-------|-----------|-------------|
| <b>Controller module</b>                         | 5.13 in                                                            | 17.60 in | 22.2 in | 87 lb | 446 watts | 1521 btu/hr |
| <b>Drive module</b>                              | 5.13 in                                                            | 17.60 in | 22.2 in | 85 lb | 428 watts | 1461 btu/hr |
| <b>Operating temperature</b>                     |                                                                    |          |         |       |           |             |
| <b>Cabinet:</b>                                  | 50° – 95° F (10° – 35° C)                                          |          |         |       |           |             |
| <b>Controller module with battery option:</b>    | 50° – 104° F (10° – 40° C)                                         |          |         |       |           |             |
| <b>Controller module without battery option:</b> | 50° – 95° F (10° – 35° C)                                          |          |         |       |           |             |
| <b>Drive module:</b>                             | 50° – 104° F (10° – 40° C)                                         |          |         |       |           |             |
| <b>Regulatory / compliance</b>                   |                                                                    |          |         |       |           |             |
|                                                  | FCC Class A, VDE, CISPR, VCCI                                      |          |         |       |           |             |
|                                                  | WEEE and RoHS compliant                                            |          |         |       |           |             |
|                                                  | Safety: UL, CSA, IEC, EN60950, NEMKO                               |          |         |       |           |             |
|                                                  | NEBS Level 3 compliant with optional air filter in the front bezel |          |         |       |           |             |

**For more information and sales office locations, please visit the LSI Logic web sites at:**  
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