SGI® InfiniteStorage™ 5600 Storage System

High Performance, Density, and Energy Efficiency

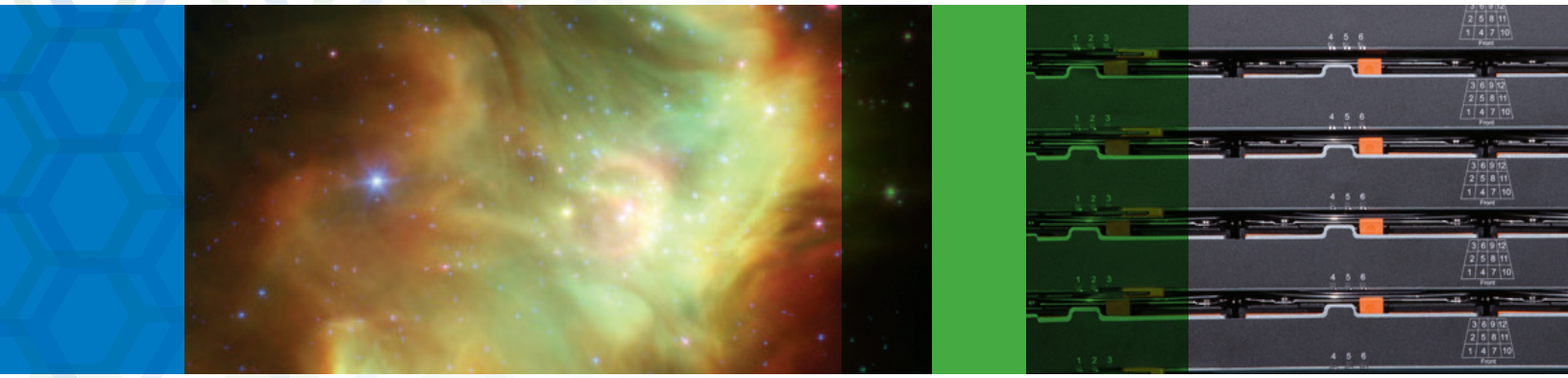
Key Features

Massive bandwidth performance

Extreme density

Modular flexibility

Growth without limits and non-disruptive operations



The Next Generation Storage System for Performance and Efficiency

The InfiniteStorage 5600 storage system meets both demanding performance and capacity requirements of science and technology, simulation modeling and decision support in the most efficient footprint with extreme simplicity, reliability, and scalability. This next-generation storage system is unsurpassed at supporting high-performance file systems and bandwidth-intensive applications in the most efficient footprint. In addition, its fully redundant I/O paths, advanced protection features, and proactive support monitoring and services provide the highest levels of availability (99.99%), integrity, and security.

Two Versions of the Platform

Two versions of the platform are available: the IS5600 SGI-tuned and the IS5600-standard. The IS5600 SGI-tuned comes with specially tuned firmware intended to enhance SGI high-performance compute environments.

In addition, the IS5600-standard version of the platform comes with generic firmware, and is ideal for customers integrating the platform into heterogeneous environments. The IS5600 line offers heterogeneous support with the flexibility to tightly integrate with SGI compute environments, operate as standalone storage, or integrate with other non-SGI compute environments.

Versatility and Flexibility

This versatility extends to the platform itself. The IS5600 comes with eight 6Gb/s SAS and eight 16Gb/s FC interface options, and three drive enclosure options supporting up to 384 high-performance and nearline SAS drives, self-encrypting drives (SEDs), and solid state disk (SSDs). All of the drive types and enclosures can be intermixed in a single system. The IS5600 supports multiple expansion enclosure types to support this growth, and to provide great flexibility in building a system. All drive enclosures can also be intermixed in a IS5600 system. In addition to the 12-bay 3.5” and 24-bay 2.5” enclosures, the IS5600 controllers can also be housed within the ultra-dense 4U 60-drive enclosures, which can be expanded to support up to 384† drives. This system is purpose-built for capacity-intensive environments requiring optimal space utilization and reduced power/cooling requirements. By combining dense storage capabilities and intelligent design, the 60-bay enclosure can provide up to 60TB per rack unit, reducing rack space up to 60%, while also lowering power and cooling requirements.

†For configurations greater than 240 slots premium feature key(s) will be required.

Accelerate Results

The IS5600 platform provides the I/O performance needed for complex analyses, research modeling, High Performance Computing and simulations. The IS5600 can ingest and process data at high speeds and reduce the time for large data processing, seismic processing analysis, research and design, financial modeling and other simulations. This performance can enhance the speed of business intelligence, hasten the validation of complex new product designs, and reduce the time to exciting new scientific breakthroughs.

The IS5600 storage system doubles the bandwidth performance of the previous generation of the IS5000 series, and fits perfectly into SGI's block storage portfolio for supporting high-performance file systems and data-intensive applications.

Reduced Footprint

Today's storage must keep up with continuous growth and meet exploding capacity requirements. The IS5600 is purpose-built for capacity-intensive environments requiring optimal space utilization and reduced power/cooling requirements. The ultra-dense 60-drive 4U enclosure provides dense storage capacity in a serviceable and high-performance system. In addition to reducing the footprint by up to 60% over leading competitors, high-efficiency power supplies and intelligent design lower power and cooling requirements, saving 40%+ on costs.

Reliability and Uptime

The IS5600 is based on a field-proven 7th generation architecture designed to provide continuous access to data with its redundant hot-swappable components, automated path failover, and online administration. Proactive drive monitoring, a highly serviceable design, and SGI's worldwide support with AutoSupport™ tracking options enhance serviceability and prevent downtime.

Dynamic Disk Pools

As drive capacities continue to grow, it takes longer and longer to perform a rebuild when drives fail. The IS5600 architecture minimizes the performance impact of a drive failure, increasing performances, efficiency and scalability and returns the system to optimal condition faster than traditional RAID. This unique combination enables a significant improvement in computational efficiency and allows the IS5600 to maintain a high level of performance even under drive failure conditions.

Data Management Security and More

SGI InfiniteStorage System Manager (ISSM) storage management software offers an appealing combination of robustness and ease of use. Storage administrators appreciate the extensive configuration flexibility, which allows optimal performance tuning and complete control over data placement. With its dynamic capabilities, ISSM software supports on-the-fly expansion, re-configurations, and maintenance without interrupting storage system I/O. As part of ISSM, a robust command line interface is also available.

When data is entrusted to your storage, protecting it is essential. With advanced ISSM protection technologies such as drive encryption, proactive monitoring, background repair, data assurance supporting T10PI standards for data integrity, and extensive diagnostic features, data is fully protected when it reaches the storage system.

An ISSM SSD Cache feature provides intelligent cache tiering to cache active data on SSD(s). Because this caching approach works in real-time and in a data-driven fashion, it remains always on. Users are not required to set up complicated policies to define the trigger for data movement between tiers—they simply define which volumes should take advantage of the SSD Cache and forget it. SSD Cache accelerates data access through the intelligent use of solid state disks located in the drive trays and is expandable up to 5TB per storage system. This takes full advantage of the dual port performance available from SSDs.

ISSM Features	Function and Benefits
Software XOR	Software XOR augments Cache Mirroring Disabled (CMD) and Cache Mirroring Enabled (CME) write performance giving competitive advantage for Intel-based storage controllers. Software XOR boosts performance of the IS5600 which leverages the latest Intel chipset and also the IS5500 without requiring a hardware upgrade.
AutoSupport	AutoSupport provides an easy option for collection and reporting of key operational statistics to central support location for enhanced customer support. Multiple statistics can be collected, including information about misbehaving drives, to enhance the customer support and improve business responsiveness and uptime with SGI's global support capabilities.
Drive Encryption	Drive Encryption secures data while maintaining performance and meets AES-256 security requirements. Storage array password enhancements are provided in ISSM to enhance security management and provide new security levels.
Performance Monitor	Provides administrators with graphical displays including quality of service displays at the drive and drive group level to fine-tune and optimize system performance. System performance information is aggregated and can provide both a historical or real-time view of performance.
Dynamic Disk Pools	Dynamic Disk Pools (DDP) greatly simplifies management for IT generalists through the elimination of RAID and hot spare management and is more efficient than traditional RAID by allowing capacity to be added in single drive increments lowering CapEX. Protection actually increases as drive count increases, and DDP recovers from failed drives in minutes while maintaining performance.
SSD Cache	SSD Cache acts as a memory extension to significantly reduce latency and speed execution of random I/O bound applications without physically moving data to the SSD drive. Set it and forget it. SSD Cache accelerates data access through the intelligent caching use of Solid State Disks located in the drive trays that are expandable up to 5TB per storage system. The Performance Modeling Tool projects performance with added SSD Cache to optimize a customer environment.

12-bay enclosure

24-bay enclosure

60-bay enclosure

SGI IS5600 System Specifications

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Performance (RAID 5)	• Maximum burst I/O rate from cache: 900,000 IOPs (estimated)* • Maximum sustained I/O rate from SSD drives: 400,000 IOPs (estimated)* • Maximum sustained I/O rate from SAS drives: 150,000 IOPs (estimated)* • Maximum sustained transfer rate from drives: 12,000 MB/s (estimated)*
Host Connection (Dual Controller)	• Eight 6Gb SAS • Eight 16Gb FC
Drive Connections (Dual Controller)	• Two 6Gb/s SAS drive connections
Drive Types Supported	• SAS, NL SAS, SED and SSDs
Maximum Number of Drives Supported	• 12bay/2U/3.5" - 192 drives • 24bay/2U/2.5" - 384† drives • 60bay/4U/2.5" or 3.5" - 360† drives • Enclosures and drive types can be intermixed in a system. All models are capable of reaching 384† disk drives when configured with intermixed drive shelves.
OS Version	• ISSM
Segment Size Value	• 8K, 16K, 32K, 64K, 128K, 256K, 512K
High-Availability Features	• Dual-active controller with automated I/O path failover • Dynamic Disk Pools Dynamic Rebalancing for drive addition, or loss • Supports Dynamic Disk Pools and RAID levels 0, 1, 3, 5, 6, and 10 • Redundant, hot-swappable storage controllers, disk drives, power supplies, and cooling fans • Automatic drive failover and detection and rebuild using global hot spare drives • Mirrored data cache with battery backup and destage to flash • SANtricity® Proactive Drive Health monitoring identifies problem drives before they create issues • SANtricity Persistent Monitor makes periodic copies of the storage system configuration • 99.999% Availability (with appropriate drive configurations and service plans)
Software Features **Standard Features**	• Dynamic Disk Pooling • Dynamic Volume Expansion • Dynamic Capacity Expansion • Dynamic RAID Level Migration • Dynamic Segment Size Migration • Persistent Monitor • Proactive Drive Heath Monitoring • Nondisruptive Firmware Upgrades • Media Scan with autoparity check and correction • AutoSupport • Drive Encryption (Except countries where prohibited) • Hyper Performance • SANShare 512 • SSD feature key
Optional Premium Features **Extended-Value Software**	• SSD Cache • Unlock between 241-300 slots • Unlock between 301-384 slots • Volume Copy • Snapshot Consistency Group • Thin Provisioning • Checkpoint Asynchronous Mirroring • Remote Volume Mirroring - 16

†For configurations greater than 240 slots premium feature key(s) will be required.
††Calculated upon typical drive type, may vary
*Numbers are based on a minimum of 100 disk drives.
**available on the SGI-tuned version of the platform

SGI IS5600 System Specifications (continued)

Product and Manufacturing Directive Compliance	• Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (RoHS, 2002/95/EC) • Waste Electrical and Electronic Equipment Directive (WEEE) • European Technical Standards Institute (ETSI)	
Power Supply Attributes	• Dual output up to 725 watts maximum wide-ranging AC input (12-Bay and 24-Bay) • Dual output up to 1,750 watts maximum wide-ranging AC input (60-Bay) • All drive trays must have dual power supplies	
TEMPERATURE	• Operating range: 10°C to 40°C (50°F to 104°F) — for 12 and 24 bay • Operating range: 10°C to 35°C (50°F to 95°F) — for 60 bay • Storage range: -10°C to 50°C (14°F to 122°F) • Transit range: -40°C to 60°C (-40°F to 140°F) without the battery	
Supported Operating Systems	• Red Hat® Enterprise Linux®, Novell® SUSE™ Linux Enterprise Server	
DIMENSIONS (CONTROLLER AND DRIVE MODULE)	**Height x Width (incl. mounting brackets) x Depth (incl. drive CRUs and endcaps)**	
IS5600-12: 12 3.5-in drive enclosure	• 3.4" x 19" x 21.75" 8.64cm x 48.26cm x 55.25cm	
IS5600-24: 24 2.5-in drive enclosure	• 3.47" x 19" x 19.6" 8.81 cm x 48.26 cm x 49.78 mm	
IS5600-60: 60 3.5-in/2.5-in drive enclosure	• 7.0" x 19.0" x 32.5" 17.78 cm x 48.26 cm x 825.5 mm	
WEIGHT	**Module Weight (max)**	
IS5600-12: 12-Bay enclosures with (12) 3.5-in drives	• 59.52 lbs (27 kg)	
IS5600-24: 24-Bay enclosures with (24) 2.5-in drives	• 57.32 lbs (26 kg)	
IS5600-60: 60-Bay enclosures with (60) 3.5-in drives	• 232.00 lbs (105.2 kg)	
Air Flow and Heat Dissipation††	**Controller Enclosure**	**Drive Enclosure**
IS5600-12: with (12) 3.5-in drives	505W (1724 BTU/hr)	223W (761 BTU/hr)
IS5600-24: with (24) 2.5-in drives	551W (1878 BTU/hr)	268W (916 BTU/hr)
IS5600-60: with (60) 3.5-in drives	1135W (3872 BTU/hr)	847W (2889 BTU/hr)
ISSM maximums		
Hosts/partitions	• 512	
Volumes	• 2,048	
Snapshot copies	• 2,048	
Mirrors	• 128	

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About SGI

SGI, the trusted leader in high performance computing (HPC), is focused on helping customers solve their most demanding business and technology challenges by delivering technical computing, Big Data analytics, cloud computing, and petascale storage solutions that accelerate time to discovery, innovation, and profitability.

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