



# Storage Overview

Eric Eastman  
[eeastman@sgi.com](mailto:eeastman@sgi.com)



# Who We Are

## Industry Leading Innovation

- More than 1500 employees
- 800+ Customer-facing employees
- 300+ Engineers to continue innovation
- More than \$500m in annual revenues
- 6000+ Customers in over 50 countries around the world



## Core technology leadership in

- 650+ current patents
- 175+ patents pending
- Advancement of Linux into HPC market
- Scalable system architecture
- Global shared memory
- File systems and shared storage
- Consulting and services

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# What We Do

20+ Years of expertise in solving the most demanding compute and data-intensive problems

- Unified server, cluster and storage architecture
- Wide use of Open Standards, including Linux
- Largest and fastest storage systems
  - Global memory address to over 100TB
  - File systems over 100TB and 45GB/s disk-to-SAN
- Renown for deep vertical expertise of employees
  - More than 200 employees with security clearances
- World class customer service organization



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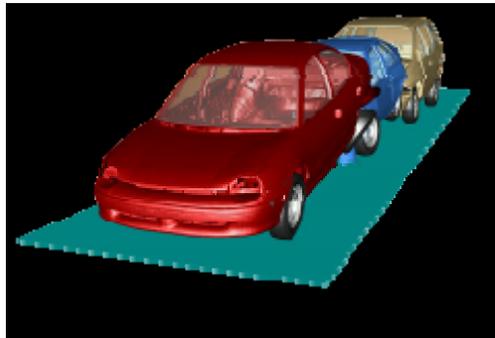
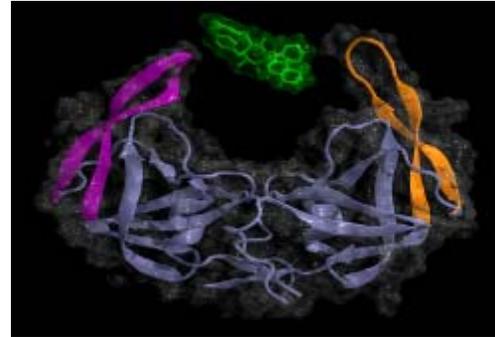
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# Market Focus and Opportunity

Defense &



Sciences



Engineering  
Analysis

Enterprise Data  
Management

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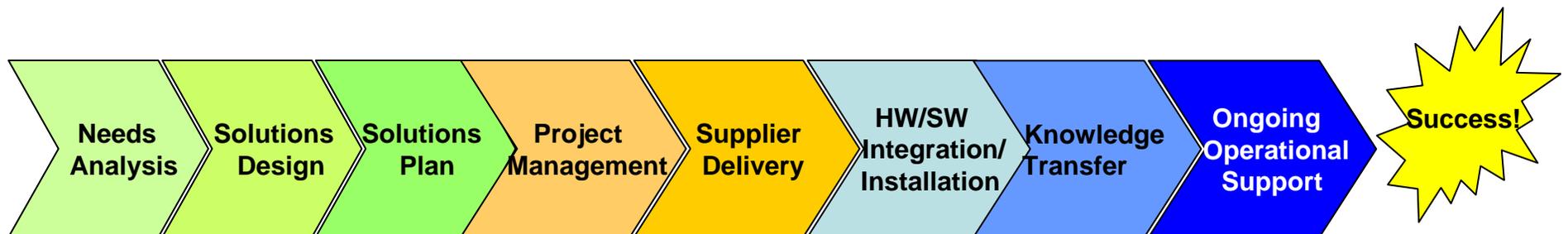
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# Professional Services

SGI PS is the architecture, integration, delivery and project management arm for SGI solutions.

- Architect/Test/Integrate “Best of Breed” applications, middleware, consulting and additional HW to complement SGI core products



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# The *New* SGI - Innovation for Results

- Delivering a Complete Range of High-Performance Storage Solutions with Industry-Leading Professional Services and Support
- Leveraging a legacy of Innovation
  - Focus on a market-driven, customer-centric approach to business
- Differentiated
  - Automating Workflows
  - Seamless Tiering of Data for Cost Reduction & Compliance
  - Cost effective management of unstructured data



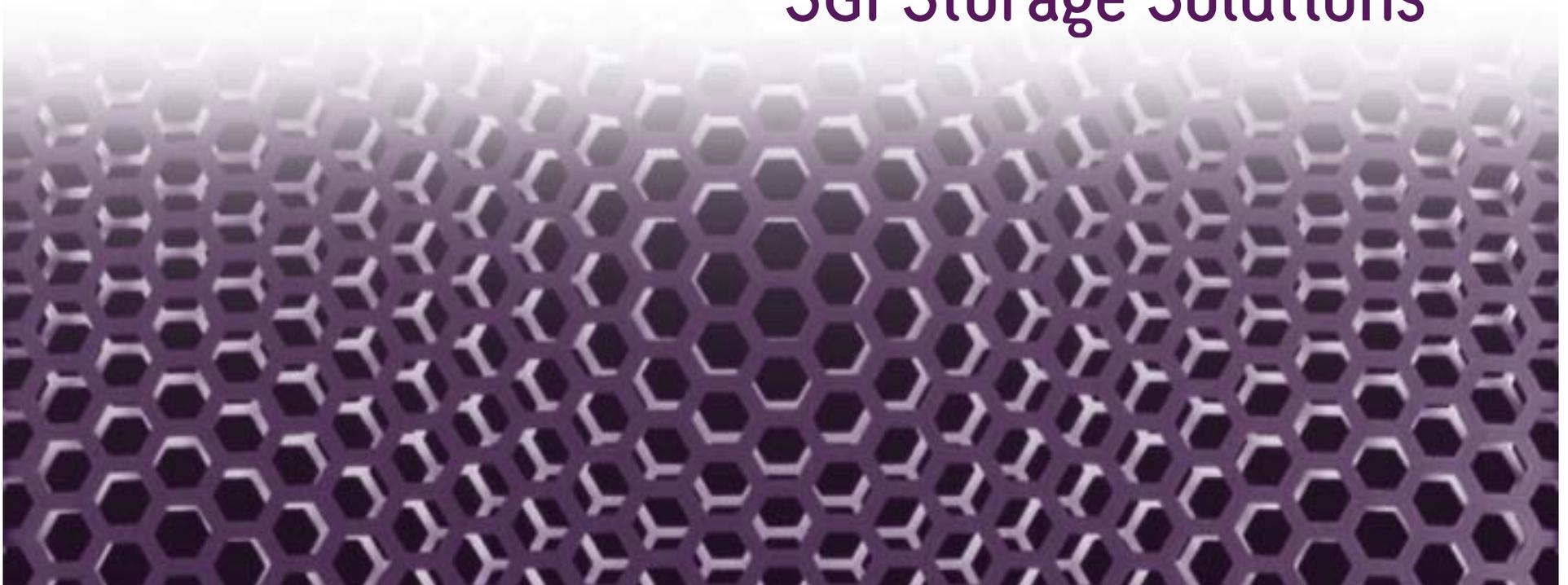
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# SGI Storage Solutions



# InfiniteStorage Overview

## Simplifying Data Management – Maximizing Storage Performance

-  SGI knows how to fit storage hardware and software to customer needs
-  SGI InfiniteStorage Solutions enable the non-disruptive linear scaling of performance and capacity
-  SGI InfiniteStorage Solutions allow customers to use data more efficiently and more effectively
-  SGI InfiniteStorage “open system” coupled with true data lifecycle management helps customers maximize and protect their investment.

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# Storage Firsts

- 1997 World Record Backup / Restore - 1TB / Hour
- 1998 First system vendor to demonstrate and ship 1Gb SAN
- 1999 First system vendor to ship SAN Shared File System (CXFSTM)
- 2000 First system vendor to ship Heterogeneous SAN Shared Filesystem
- 2001 First system vendor to open source Filesystem (XFS®)
- 2001 First system vendor to demonstrate and ship 2Gb SAN
- 2002 First system vendor to demonstrate and ship WAN Shared Filesystem
- 2003 First system vendor to demonstrate 1GB NFS NAS
- 2003 World Record by 3x Backup and Restore – 10TB / Hour
- 2004 First system vendor to provide guaranteed rate IO for Shared Filesystem
- 2004 First vendor to ship 10Gb NAS
- 2004 First vendor to provide application-level integration for ILM
- 2004 First vendor to demonstrate 4Gb SAN
- 2005 First Vendor to ship 4Gb Storage Array & InfiniBand Storage Array

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# SGI InfiniteStorage - Key Areas of Differentiation

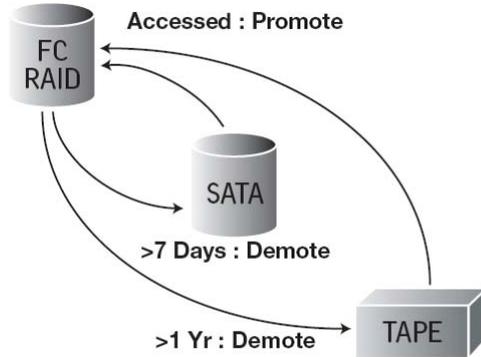
-  Reduces initial and ongoing costs (ROI)
-  Reduces burden of management (TCO)
-  Simplifies upgrade paths (TCO)
-  Enhances workflow (ROI)



# Differentiation via Solving Customer Problems

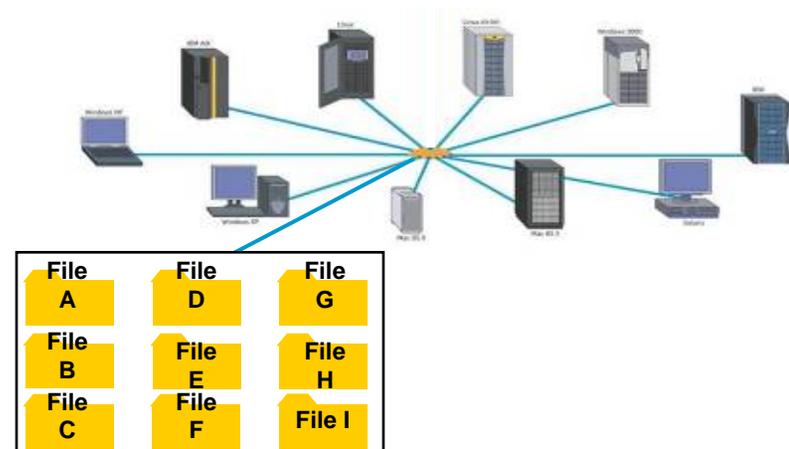
## InfiniteStorage Software Solutions

### InfiniteStorage Virtual Data Manager



Access =      Sub Second      Sub Second      Seconds to Minutes

### InfiniteStorage Shared File System



### InfiniteStorage Appliance Manager

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# SGI InfiniteStorage – A Complete Portfolio

## Infrastructure and Tape

### Host Bust Adapters



### Tape Libraries



### Directors and Switches



## RAID Systems, SAN and NAS Solutions

### InfiniteStorage RAID



### InfiniteStorage NAS



### InfiniteStorage SAN



## Software

### Appliance Manager

- Easy to deploy
- Insightful Monitoring
- Super-scalable

### CXFS

- No-compromise data sharing
- Improve productivity
- Projects completed in less time, at lower cost

### DMF

- Transparent file migration
- Reduced cost of capacity
- Optimize data management

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# Virtual Data Management



# InfiniteStorage Virtual Data Manager Tiering & Compliance



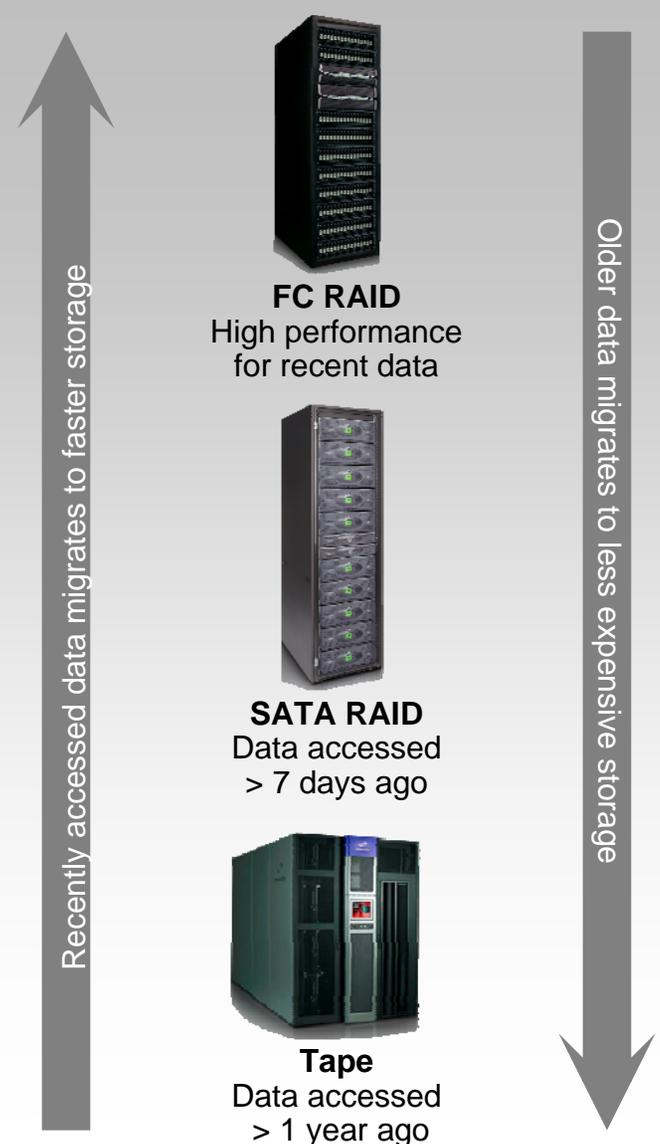
## Features

- Lower TCO with Reduced Cost of Capacity and Administration
- Increase ROI with Higher Data Access and Productivity
- Optimize Data Management and Control
- Reduce Risk to Data Retention and Accountability
- Protect Investment with Infinite Scalability



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# Virtual Data Manager Attributes

- Ensures highest availability & data integrity at all times
- High performance algorithms designed to move big data efficiently
- Virtually unlimited capacity and scalability
- Reduced Total Cost of Ownership and investment protection
- Management automation for efficient system operation
- Full integration with your environment

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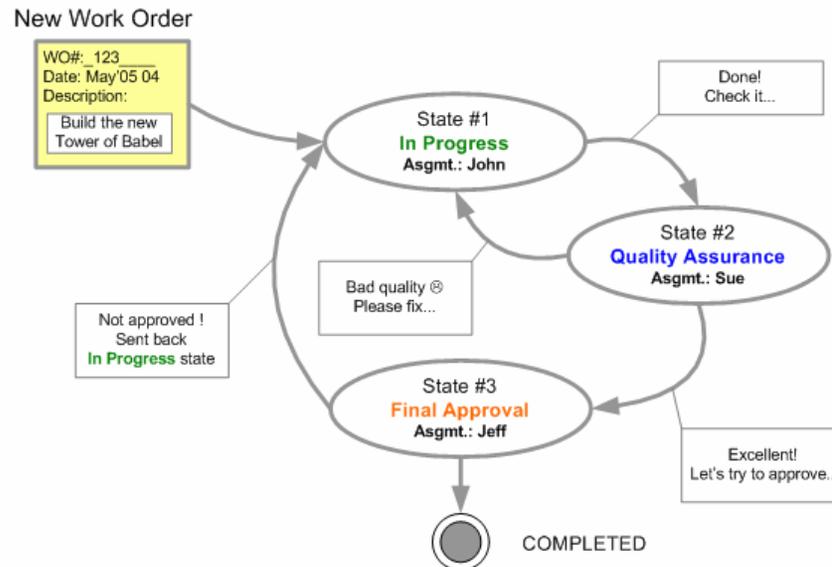
# Automate Data and Workflow Management



# InfiniteStorage Automated Data and Workflow Management

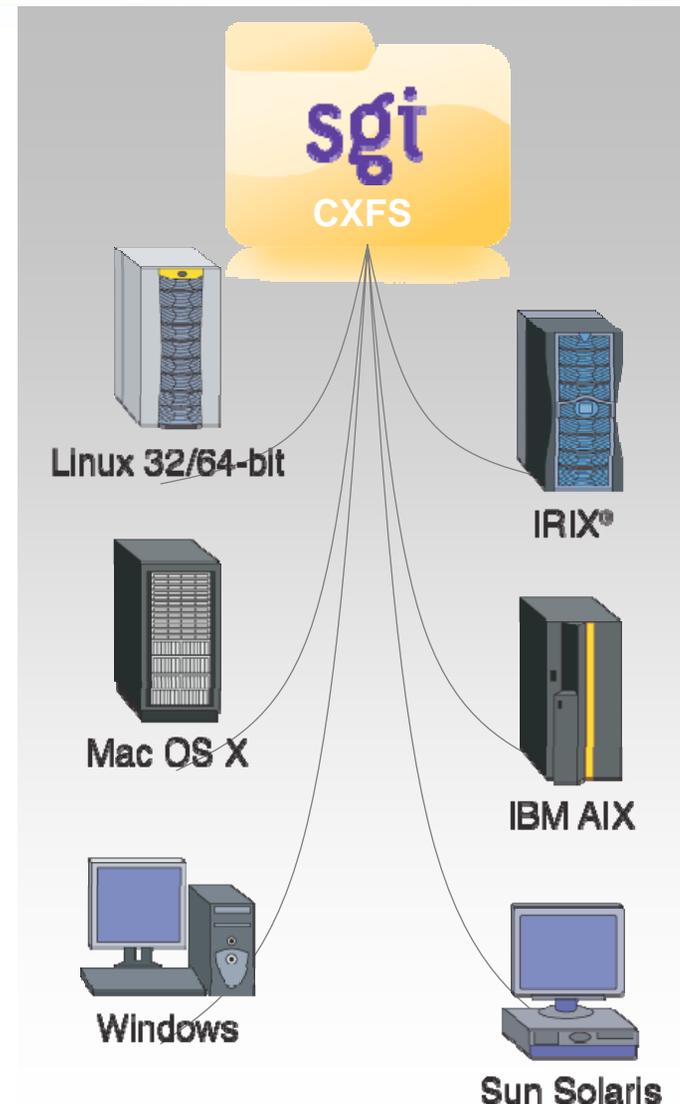
## Features

- Time-tested, proven solution
- DAS like performance, industry leading reliability
- Architected to scale up to 18 million terabytes
- High availability with data access failover
- True LAN-Free backup and restore
- Instant multi-OS, multi-platform no copy data sharing



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# Attributes

- Supports up to 64 Nodes
- Multiple metadata servers can exist in a cluster
  - MDS node can server from 1 to many file systems within the cluster
- Leverages SGI's XFS technology
  - Reliability and fast (sub second) recovery of a log-based filesystem.
  - 64-bit scalability to 9 million terabytes (9 Exabyte's) per file.
  - Speed: high *bandwidth* (megabytes per second), high *transaction rates* (I/O per second), and fast metadata operations.
  - Dynamically allocated metadata space.
  - Quotas.
  - Restriction of access to files using file permissions and access control lists (ACL's).
  - Real-time volumes. CXFS can write to real-time files in real-time volumes
  - XVM Volume Management
  - Self-identifying volumes
  - Multiple storage types (stripes, mirroring, concatenation)
  - Path Failover
  - Online reconfiguration

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# Concepts

- Metadata server node (a.k.a. CXFS server)
  - One machine in the cluster that is responsible for controlling the metadata of files.
  - Plays “traffic cop” to control access to the file.
  - Backup metadata servers designated for fail-over
  - No single point of failure
- Metadata client node (a.k.a. CXFS client)
  - Any machine in the cluster that is not the metadata server
  - Must obtain permission from metadata server before accessing a file.
- Data passes directly from disks to requesting system

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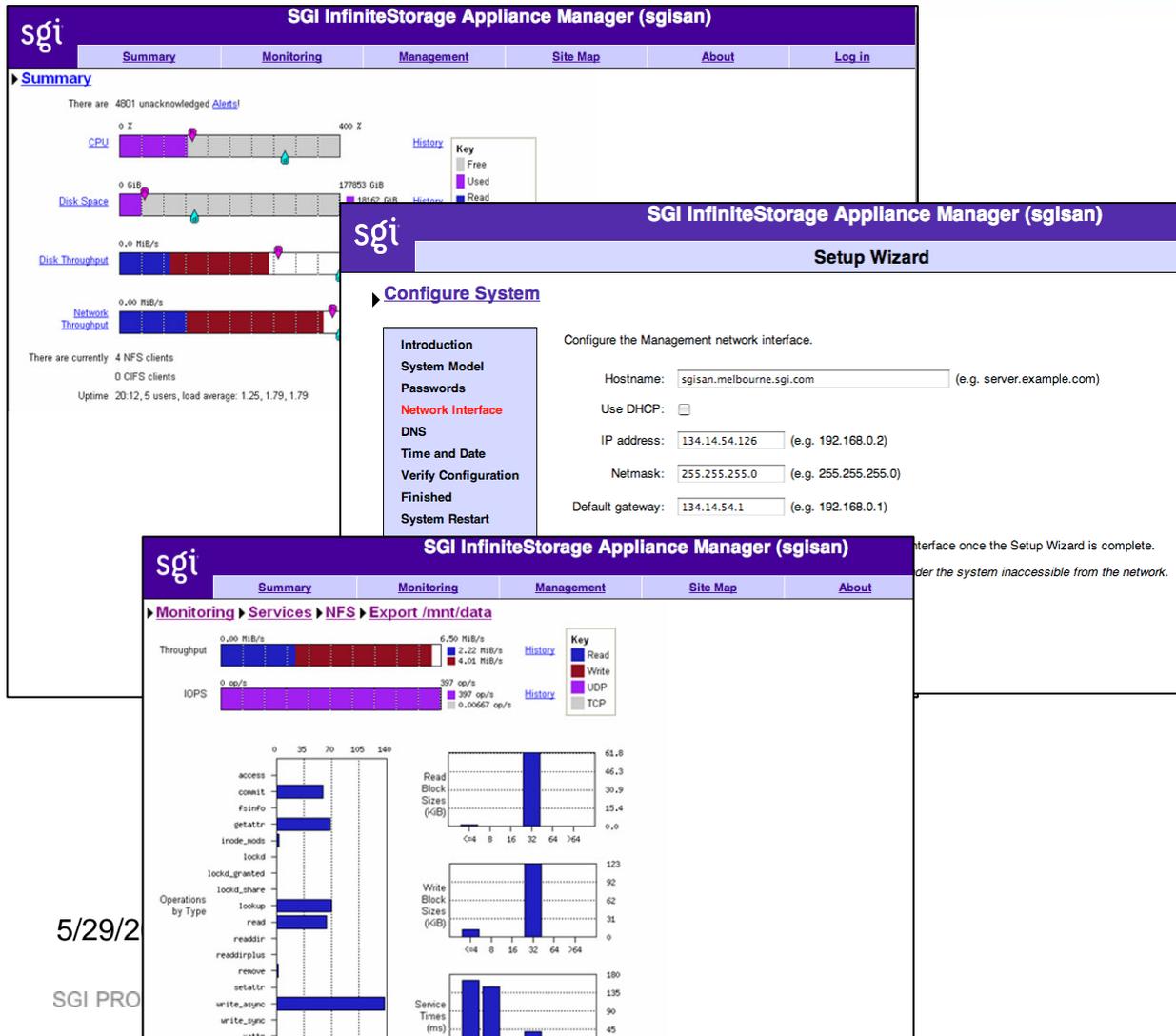




# Unstructured Data Management



# InfiniteStorage Appliance Manager



- Easy to read all-in-one graphical GUI
- Real time status on performance, resource utilization and system alert
- Standard features include trending analysis for proactive management

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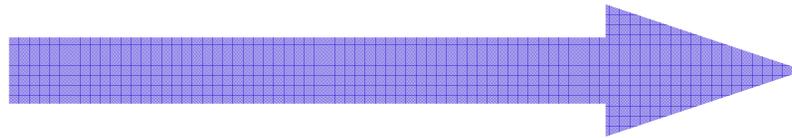


# NAS - SAN Seamless Upgrade

Scalable NAS

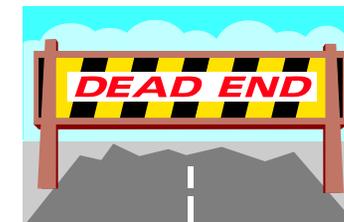
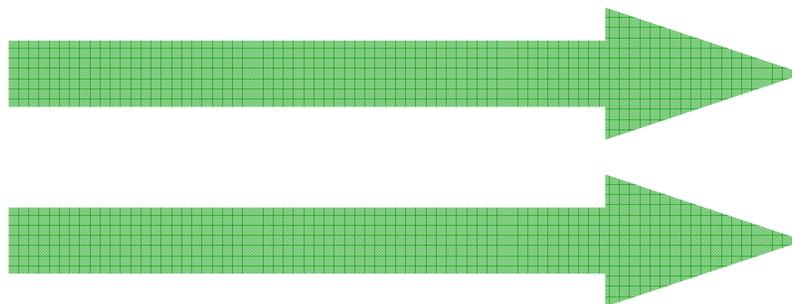
Scalable NAS/SAN

SGI NAS



No data conversion, No trade in, Zero down time, true NAS/SAN data sharing  
= **increased productivity**

Other NAS



Partitioned SAN

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# InfiniteStorage NAS Family



**NAS 4050**



**NAS 1050 Gateway**



**NAS 4550**

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## Storage Hardware



# InfiniteStorage RAID Family

## Multi-purpose RAID Systems

### 4500

- Max performance
- 4Gb FC or IB
- Enterprise S/W
- FC RAID / SATA



### 4000

- 4Gb Fibre Channel
- Ultimate Price/Performance
- FC RAID / SATA



## Streaming Real-time RAID

### 6700

- Multiple high resolution streaming
- Isochronous



## SAN NAS

- Completely integrated
- Easy to deploy
- Grows with customers' business



## Low-cost SATA RAID

### 350

- 4 Gb connectivity
- 500GB SATA drives



## Ultra-dense RAID

### 10000

- Ultra-high density
- Tape complement or replacement
- One rack – 240 TB



## JBOD

### 120

- Easy to deploy modular scalability



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# InfiniteStorage SAN Solution Platforms

- Turnkey SAN Solution delivers state-of-the-art infrastructure
- The performance of SAN with the connectivity of NAS
- Advanced storage resource management adds to consolidation TCO benefits
- Instant data sharing increases productivity for real ROI
- Industry-leading scalability and open storage provide sustainable investment protection
- Optional HA clustering, backup and data lifecycle management



# InfiniteStorage NAS 1050 Gateway

## NAS 1050 Gateway

- Based on SGI Server Technology
- SPECsfs 34500
- 8 GigE ports
- 4 FC Port
- Up to 32MB Memory
- Mirrored Root Drive
- Redundant CPU
- Redundant power



*Includes Appliance Manager 3.2!*

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# InfiniteStorage NAS 4550

- Fully Integrated High Performance NAS Solution
  - Purpose-built NAS manager to deliver outstanding customer experience
  - Factory integrated for fast deployment
  - Single, tunable file system for optimal scalability & throughput
  - Redundancy throughout Designed for the most demanding HPC and enterprise environments
- Two Models
  - Ultra Model: Optimized for high transaction performance and mixed workloads
  - Streaming Model: Optimized for high throughput workloads



# InfiniteStorage NAS 4050

- High Capacity Storage Appliance
  - Purpose-built NAS manager delivers outstanding customer experience
  - Cost effective high capacity
  - Single, scalable file system
  - Lowest cost per terabyte to manage
  - Redundancy throughout
- Two Models
  - Maximum Capacity Model: 80 TB in a rack will expand to 224 TB
  - SATA Server: Base Unit 8TB will expand to 56TB



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# Thank You

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