Sun Storage 7000
Unified Storage System

Just the Facts

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Sun Storage 7000 Unified Storage System

Positioning

S7110
Entry-level Appliance

S7210
High Density Appliance

S7310
Entry-level Cluster

S7410
Highly Scalable Cluster

Introduction

The Sun Storage 7000 Systems is a family of unified storage systems that deliver enterprise-class data services, file and block level support, scale, and performance, and a set of new storage innovations, at significant cost savings. All Sun Storage 7000 products feature a common, built-in, easy-to-use management interface that requires no additional training. These systems have the industry's most comprehensive analytics environment including innovative new tools to help isolate and resolve issues to minimize impact to your business. These systems are the only storage systems with Hybrid Storage Pools that automatically optimize performance while lowering your power and cooling requirements. The Sun Storage 7000 family delivers breakthrough performance while radically simplifying the way you manage your storage with breakthrough cost savings, speed and scale.

The Sun Storage 7xxx Unified Storage System family consists of three main platforms:

- Sun Storage 7110 Unified Storage System
- Sun Storage 7210 Unified Storage System
- Sun Storage 7310 Unified Storage System
- Sun Storage 7410 Unified Storage System

Sun Storage 7110 Unified Storage Solution

The Sun Storage 7110 is an entry level unified storage appliance that offers simplified installation, administration and problem solving with the standard Analytics tool. It is ideal for companies who simply want enterprise features at entry level pricing, with no need for high availability clustering, and who require simple ways to manage their storage. The Storage 7110 is offered in 2TB or 4TB capacity. This model does not support expansion units for additional capacity, currently the maximum capacity of 4TB.

Sun Storage 7210 Unified Storage Solution

The Sun Storage 7210 system is ideal for companies with high-density and space saving requirements who require dramatically easier ways to manage and scale their storage. The Storage 7210 scales up to 46TB in 4U rack space, and with the addition of up to 2 J4500 Arrays, the total maximum capacity increases to 142TB. The Storage 7210 is offered with the option of write-optimized SSD, making ideal for organizations that require high performance for write operations.

Sun Storage 7310 Unified Storage Solution

The Sun Storage 7310 redefines mission-critical entry storage for the Enterprise, with simplified management, performance, efficiency and seamless expansion to meet your growing needs. It provides a high-availability cluster option with scalability up to 96TB raw capacity, and supports the hybrid storage pool that can be configured with up to 600GB of read-cache and optional write-optimized cache for enhanced application performance.

Sun Storage 7410 Unified Storage Solution

The Sun Storage 7410 is an enterprise-class unified storage system that radically simplifies storage management, from simple installation and administration to capacity scaling and problem solving capabilities with the integrated Analytics tool. It is ideal for enterprises requiring mission-critical and high performance storage, with dramatically easier and faster way to manage and scale their storage. The Storage 7310 scales up to 288TB raw capacity, and supports a hybrid storage architecture, combining Read and Write optimized Flash Accelerators (SSDs) with high-capacity 7200 RPM drives to deliver superior performance and capacity at lower cost and energy consumption.

Software

All the different models of the Sun Storage 7000 family of products use the same operating system, providing simplified storage management, comprehensive analytics environment, and data services that are common across all the member of the family, simplifying an administrator's job of managing different appliances. The Storage 7000 software consists of a storage-optimized distribution of OpenSolaris, and a web UI management application with specialized data services such as replication and clustering (based on Fishworks technology), that are only available for these unified storage systems. With the exception of some features (such as clustering which is only available for the 7310 and 7410 models), all other features are available in all the models of the Sun Storage 7000 family of products.

The Sun Storage 7000 Series Software offers innovative and market differentiation features. Following are the main features of the software and release history:

Initial software release: 2008.Q4 (November 2008)

- DTrace Analytics
- Flash Hybrid Storage Pool
- Block and File protocols: iSCSI, NFS, CIFS, HTTP, WebDAV, FTP

- ZFS Data Integrity (19 "nines" of end-to-end data checksums)
- Thin-Provisioned LUNs and Filesystems
- Striped, Mirrored, Single or Double-parity RAID-Z, no single point of failure (NSPF)
- Unlimited Snapshots and Clones
- Data Compression
- NIS, AD, LDAP, Identity Mapping
- Remote Replication
- NDMP Backup
- Active-Active Clustering (for HA models)
- Virus Scanning
- Predictive Self-Healing for CPU, DRAM, PCIe, HDDs, and Flash
- Link aggregation, VLANs, IP-Multipathing, IPv4 and IPv6
- I/O Multipathing
- Remote Support and Phone Home
- AJAX-based Browser Interface and Scriptable CLI
- Role-Based Access Control

Software Update: 2009.Q2 (May 2009)

- NFSv2 support
- HTTPS, WebDAV over SSL
- FTPS
- SFTP
- FTP Analytics
- CIFS Oplocks
- Microsoft VSS Shadow Copy for shared folders
- CIFS share-level ACLs
- Active Directory cross-forest authentication
- Workflow automation
- SMTP relay configuration
- NTP authentication

Software Update: 2009.Q3 (September 2009)

- Triple-parity RAID-Z and Triple-mirroring storage profiles
- Enhanced iSCSI support, with LUN provisioning control
- Infiniband support for files (IPoIB)
- Shadow Data Migration from existing NFS servers
- Support for nested share mountpoints
- User and group quotas
- Analytics for CPU utilization, disk utilization, L2ARC efficacy
- Per-share log device disposition
- IP Multipathing Active Standby
- Microsoft Computer Manager MMC Integration
- Configuration backup/restore, import/export
- Analytics worksheets uploadable as support bundles

Product Family Placement

The Sun Storage 7000 Unified Storage System NAS replaces the Sun Storagetek 5320 NAS family of products. The Sun Storage 7000 System uses Sun IP (Solaris technology, Fishworks appliance toolkit, and Sun Servers and Storage), and provides unique differentiation vs competitive solutions in the marketplace. It is positioned in the Systems Storage division, enhancing an already strong storage portfolio. The Sun Storage 7000 will enable our organization to provide a unified solution that will address not only file level needs for customers, but also iSCSI block support in the same unit, and eventually Fibre Channel and Infiniband support.

Sun Storage 7000 Product Availability

The following are the dates associated with the release of the Sun Storage7000 product family.

Product Release	Release Date
Initial Release (7110, 7210, 7410) Software: 2008.Q4	11/11/08
Storage 7210 two new configurations (no logzilla)	03/30/09
Storage 7110 4TB configuration	04/28/09
Software: 2009.Q2	04/29/09
Storage 7310	05/26/09
J4500 expansion array support for Storage 7210	05/26/09
EOL: Storage 7210 11.5TB configuration, 7410 16GB RAM configuration	08/18/09
Storage 7410 refresh (six-core Istanbul CPU, 256GB RAM)	09/01/09
Software: 2009.Q3	09/16/09
Storage 7110, 7310 refresh (six-core Istanbul CPU)	10/27/09
EOL: Storage 7210 500GB-drive configurations	01/18/10

Key Messages

The Sun Storage 7000 Unified Storage System delivers the following key benefits:

- **Easy to deploy, analyze, and optimize**
  Provisioning and management is dramatically simplified in Sun Storage 7000 series systems through the easy-to-use management interface, that requires no additional training and takes the guess work out of system installation, configuration, and tuning. DTrace Analytics is the industry's only and intuitive analytics environment that provides storage administrators with the tools to optimize the configuration of their storage system and maximize performance to address their application requirements.

- **Rapidly diagnose, troubleshoot and resolve issues**
  DTrace Analytics provides real-time analysis of the Storage 7000 System and of the enterprise network, from the storage system to the clients accessing the data. This unprecedented tool permits administrators to quickly find and troubleshoot issues affecting the system performance, minimizing impact to business productivity. The data can be saved for further analysis to better understand the network, application and system behavior.

- **Breakthrough Economics**
  The Sun Storage 700 family are the only storage systems with a Hybrid Storage Pool that combines DRAM, write-optimized SSD, read-optimized SSD with high-capacity and low cost enterprise class SATA drives. This new storage design uses the low latency of SSDs to increase performance for both write and read oriented applications, rendering the use of 15K rpm drives unnecessary, while using the high capacity of the SATA drives to deliver not only superior performance but also high capacity at lower cost and lower energy consumption. In addition, all software features are included with the price of the product, which combined with the benefits that the Hybrid Storage Pool provides, enables the Sun Storage 7410 achieve a price advantage of up to 75% less than equivalent competitive solutions.

- **Most comprehensive self-healing storage system**
  The Sun Storage 7000 systems include FMA (Failure Management Architecture) which provides the capability to detect and take faulty hardware components offline in order to prevent system disruption. In addition, to avoid accidental data corruption, the ZFS file system provides memory-based end-to-end data and metadata checksumming with self-healing capabilities to fix potential issues. FMA combined with ZFS data integrity facilities, make the sun Storage 7000 the most comprehensive self-healing unified storage system.

The Sun Storage 7000 Unified Storage System also delivers value with the following:

- **Open Storage Community**
  Driving innovation and cost-effective storage solutions to foster technology adoption and economic value for your business with the Open Storage community, the fastest growing open source community in the world with over 4000 members. Sun Storage 7000 Unified Storage Systems leverage much of the development cost and technology innovation from OpenSolaris and the community.

- **Open Storage Partner Specialty Program**
  The Sun Storage 7000 Unified Storage System will help Sun partners appeal to large, new storage opportunities, allowing them to grow their businesses and secure a foothold in new, emerging markets. Supported by the Sun Partner Advantage Program, Sun partners are offered a simple, highly aligned program integrated across systems, software and services giving partners the flexibility to resell server, storage, software products, and services within a single channel program. As part of the Sun Partner Advantage Program, Sun is announcing an Open Storage Specialty, which will enable participating partners to expand revenue by gaining the skills, tools and access to Open Storage solutions that radically simplify storage management with breakthrough speed, scale, and cost savings.

▪ **Services**
Sun makes it easy to deploy the Sun Storage 7000 Unified Storage Systems with new services that can help mitigate the risk of downtime, data loss, and costly delays.

- *Implementation and Assessment Services for the Sun Storage 7000 Unified Storage System Family:* Go beyond standard setup and basic diagnostics of standard installation to provide select configuration and validation. Providing the expertise to help ensure that your systems are running at an optimal level right from the start.
- *Sun Unified Storage Data Migration:* Minimize disruption and gain full feature functionality of new technology investments. Securely migrate your data, utilizing MD5 hashing for file and security validation. Speed ROI with Sun's deep technical expertise and proven implementation and migration tools.
- *Sun's Storage 7000 Unified Storage Systems* will be covered under a single service contract which provides the features of Sun's software and StorageTek™ service plans. SunSpectrum™ Service Plan: Simplify and reduce the cost of managing an IT infrastructure while delivering proven Return on Investment (ROI).
- *LEARNING SERVICES: Sun Storage 7000 Unified Storage System Administration and Sun Storage 7000 Unified Storage Data Migration:* Courses that help administrators gain a deep knowledge of Sun Storage 7000 Unified Storage Systems through knowledge transfer that will help enable staff to be more productive.
- With all Sun innovation, Sun also offers the expertise to help you architect implement, manage and support your entire network infrastructure.

▪ **Investment protection**
The Sun Storage 7000 Product Family incorporates state-of-the-art components that allow a seamless integration into any existing network infrastructure. It enables organizations to consolidate storage, reducing unused pools of expensive storage, and to scale as capacity requirements grow. Combined with simplified management, maximized system availability, and no additional user license fees required, the Sun Storage 7000 Product Family provides an effective investment protection for current and future growth requirements.

▪ **Sun's "One-Stop Shop"**
Buy your Sun Storage 7000 System, service, consulting and training from Sun's "One-Stop Shop." Sun makes it easy – we understand secure enterprise network storage computing. Sun has what you need and Sun is here to help you.

Sun's Value Proposition

Faced with a challenging economic climate and rapid data growth, now is the time for storage operators and administrators to demand alternative ways to keep pace.

Sun Storage 7000 Unified Storage systems have the industry's most comprehensive analytics environment including innovative new tools to help isolate and resolve issues before they impact your business. These systems are the only storage systems with Hybrid Storage Pools that automatically optimize performance while lowering your power and cooling requirements. The Sun Storage 7000 family delivers breakthrough performance while radically simplifying the way you manage your storage with breakthrough cost savings, speed and scale. Sun Storage systems are based on industry- standard architectures and an open platform, and therefore allow customers to gain these economic benefits in an enterprise-class storage product.

Target Markets

The Sun Storage 7000 Unified Storage Systems redefines storage for the enterprise,with simplified management, performance, efficiency and seamless expansion to meet customer growing needs. The different models range from 2TB to 288TB, to address data storage requirements from small and medium to large enterprises.

The biggest sales opportunity for Sun Storage 7000 Unified Storage Systems is in new, fast-growing, innovative storage projects where customers are concerned with better economics. The Sun Storage 7000 Systems provide not only new features that simplify management, troubleshooting, performance tuning, lower energy consumption, but also provide an extremely economical alternative to leading solutions in the unified storage market.

The main target applications are listed below, and resources will be focused on these areas to develop solutions and documentation to support sales efforts. But keep in mind that there are many other applications in which NFS or CIFS storage is ideal, and where the advantages that the Sun Storage 7000 System provides will abundantly satisfy customer requirements. This is a product that has broad marketability — cost-effective storage that is simple to manage and provides advanced yet simple-to-use tools to diagnose or optimize the system for specific application needs. Customers with file storage requirement will greatly benefit with what the Storage 7000 family of products have to offer.

Sun Storage 7110 Unified Storage System

The Sun Storage 7110 is ideal for companies who simply want enterprise features at entry level pricing, with no need for high availability clustering, and who require simple ways to manage their storage, with capacity no larger than 4TB in a space savings 2U package.

Target:
- Low-cost unified storage (CIFS/NFS, iSCSI)
- General purpose file storage/sharing
- Web Storage
- Imaging (medical, financial, GIS)
- Home Directories
- Application engineering

Sun Storage 7210 Unified Storage System

The Sun Storage 7210 system is ideal for companies with high-density and space saving requirements who require dramatically easier ways to manage and scale their storage. It is also offered with the option of write-optimized SSD, making ideal for organizations that require high performance for write operations. And with the support for additional J4500 Arrays, customers can now scale the 7210 system up to 142TB in a 12U rack space.

Target:
- Bulk unified storage (CIFS/NFS, iSCSI)
- High-Performance Computing
- Web 2.0
- Server virtualization
- Database/BIDW
- Backup

Sun Storage 7310 Unified Storage System

The Sun Storage 7310 redefines mission-critical entry storage for the Enterprise, with simplified management, performance, efficiency and seamless expansion to meet your growing needs. It provides a high-availability cluster option with scalability up to 96TB raw capacity, and supports the hybrid storage pool that can be configured with up to 600GB of read-cache and optional write-optimized cache for enhanced application performance.

Target:
- Windows file services/infrastructure
- Windows consolidation/virtualization
- Business processing
- Disaster recovery
- Rich media

Sun Storage 7410 Unified Storage System

The Sun Storage 7410 is an enterprise-class unified storage system that radically simplifies storage management, from simple installation and administration to capacity scaling and problem solving capabilities with the integrated Analytics tool. It is ideal for enterprises requiring mission-critical and high performance storage, with dramatically easier and faster way to manage and scale their storage up to 288TB raw capacity. With the hybrid storage architecture, combining Read and Write optimized Flash Accelerators (SSDs) with high-capacity 7200 RPM drives, the Storage 7410 delivers superior performance and capacity at lower cost and energy consumption.

Target:
- Windows file services/infrastructure
- Windows consolidation/virtualization
- Business processing
- High Performance Computing
- Web Infrastructure
- Database
- Backup
- Bulk unified storage (CIFS/NFS, iSCSI)

Features, Function and Benefits

Feature	Function	Benefit
DTrace Analytics	A management framework for analyzing and optimizing performance real-time with rapid diagnostics & troubleshooting with ease to use graphical tools	- Minimizes business downtime through quick discovery/fix of issues - Improved productivity with performance optimization
Browser Interface	User interfacefor appliance administration, with intuitive design for administration tasks, visualizing concepts, and analyzing performance data	Simplified administration reduces management costs
ZFS Hybrid Storage Pool	Composed of optional Flash-memory devices for acceleration of reads and writes, low-power, high-capacity disks, and DRAM memory, all managed transparently as a single data hierarchy	Superior performance and capacity at lower cost and energy consumption
Auto Service Request/ ASR (Phone home)	Auto Service Request uses fault telemetry to automatically initiate a service request and begin the problem resolution process as soon as a problem occurs	Increased service availability, faster time to resolution, reduced administration time, reduced phone time, maintenance of storage system performance, and ability to manage data center more efficiently
Data Compression	4 levels supported, compress data before being written to disk	Greater investment protection with more efficient storage utilization
Solaris as the Microcode	Enterprise class and industry proven operating system, provides the resilience required for a robust Unified Storage System	Customer assurance that their data is being protected and managed by an industry proven OS
Triple Parity RAID	Industry-leading data protection from up to three drive failures	Reduces risk of data loss
Triple Mirroring	Maintain three full online copies of data	Optimized for data reliability
RAID-Z (5 and 6), Mirrored and Striping	Allows drive grouping to achieve greater levels of performance, reliability, and/or larger data volume sizes	Flexibility to choose RAID architecture to match application requirements
Snapshots	Read-only copies of a file system at a given point in time	Enables rapid recovery of accidentally deleted files or objects, and facilitates backup to tape
Clones	A writable copy of a LUN or file system snapshot	Allows testing and development of true data with no additional storage requirements
Snapshot Restore	Restores single files, file systems, LUNs	Increased productivity; allows immediate restore of files, file systems, LUNs
Remote Replication	Data replication between Sun Storage 7000 systems	Enables disaster recovery architecture and distribution of data to one or multiple locations
Shadow Data Migration	Easily migrate data and shares from legacy storage devices to Sun 7000 Systems	Minimize impact to IT environment while saving time and money

Feature	Function	Benefit
Active-Active Clustering	Transparent failover when one node fails	Increased data availability
Thin Provisioning	Allocates physical space to share as needed	Greater investment protection with more efficient storage utilization
System Self-Healing	Predictive self-healing and diagnosis of all system FRUs: CPUs, DRAM, I/O cards, disks, fans, power supplies	Increased data availability
Configuration Backup/ Restore	Backup system configuration settings for quick recovery	Reduces downtime resulting from administrator error
Configuration Import/Export	Import configuration settings from an existing 7000 system	Can improve setup time and efficiency by leveraging existing 7000 configuration settings
ZFS Data Integrity	ZFS end-to-end data checksums of all data and metadata, protecting data throughout the stack	Increased data availability
Role-Based Access Control	Restricts system access to authorized users	Increased productivity and data protection
Migration Service - Sizing Tool	Sizes raw data migration, time to migrate, and cost of migration	Allows you to plan the migration around your business needs
Migration Service Feature	Migration of data, files, iSCSI volumes, and control information from existing NAS system to Sun Storage 7000 series	Provides a quick, complete and non-disruptive migration resulting in faster time to market and accelerated return on investment
Migration Service Feature Environment recreation	Recreation of NAS operational environment	Maximizes the full feature/functionality of the new unified storage environment
Migration Service Feature CIFS/NFS Migrators	MD5 hashing built in for validation 3-phase shadow migration approach -Remove files on target not appearing on source - Copy files from source to target - Verify files with MD5 signature Multi-threaded and criteria-based migration Schedulable; runs as a service	Highly secure Efficient Non-disruptive; able to throttle network usage and manage sync after cutover
LACP	Link Aggregation Control Protocol, to bundle multiple network devices to behave as one.	Higher performance
IP MultiPathing (IPMP)	provide IP network address fail-over in the event of a device failure (such a physical wire disconnection or a failure of the connection between a device and its switch) or in the event of a path failure between the system and its network gateway	Higher data availability with protection for network failure
I/O Multipathing	Provides redundant paths to the storage subsystem, eliminating single point of failure	High data availability
Browser Interface	User interface for appliance administration, with intuitive design for administration tasks, visualizing concepts, and analyzing performance data	Reduced administration overhead
Heterogenous access	Supports access through CIFS, NFS, FTP, HTTP, WebDAV, IPoIB (Infiniband), iSCSI	Flexibility to access system in different ways

Feature	Function	Benefit
Autohome share	Temporary SMB/CIFS shares that are automatically created when a user logs on to the system and removed when the user logs off	IT Administrator's do not have to create and manage shares manually for potentially thousands of users
Backup	Local, Remote or 3-Way backup utilizing NDMP with supported third party NDMP-enabled backup products.	Increased data protection
Replication	Provides for business continuance, even in the face of catastrophic loss of the primary (source) system	Increased data protection

Enabling Technology

Technology Overview

The Sun Storage 7000 Unified Storage products provide efficient file and block data services to clients over a network, and a rich set of data services that can be applied to the data stored on the system. The Storage 7000 include support for a variety of industry-standard client protocols, including: CIFS, NFS, HTTP/HTTPS, WebDAV, FTP/FTPS/SFTP, IP over Infiniband, and iSCSI.

The Sun Storage 7000 Family of products is based on Standard Server and Storage products from Sun Microsystems. The software is common among all the Storage 7000 platforms, which will be reviewed in this section. The platform sections, including specifications, will be reviewed in subsequent sections.

The Software for the Storage 7000 family consists of two major components, a management interface that is based on the Fishworks appliance toolkit, and on a storage-optimized distribution of OpenSolaris that is streamlined to the needs of the Storage 7000 appliance needs. This distribution is specific for this storage family of products.

Software/Operating System

The Storage 7000 System includes new technologies, data services and features to deliver the best storage price/performance and unprecedented observability of the storage system and the enterprise network. The following are the main features, for which additional information is provided in the following pages.

Refer to page 4 for a Software release history and features that were added in each release.

- DTrace Analytics
- The ZFS Hybrid Storage Pool
- Industry-leading Data Protection with Triple-parity RAID and Triple Mirroring
- Remote Replication of data for Disaster Recovery
- Unlimited Read-only and Read-write Snapshots, with Snapshot Schedules
- Built-in Data Compression
- Active-Active Clustering (in the Sun Storage 7410) for High Availability
- Enhanced iSCSI Support
- Shadow Data Migration
- Virus Scanning and Quarantine
- NDMP Backup and Restore
- Phone-Home of Telemetry for all Software and Hardware Issues
- Predictive Self-Healing and Diagnosis of all System FRUs
- ZFS End-to-End Data Checksums of all Data and Metadata

The software section will be enhanced frequently, please refer to sunwin document number for latest information. You may also refer to the Sun Storage 7000 System online help documentation for additional information at:

http://fgw.sfbay.sun.com/wiki/index.php/Main_Page, or
http://docs.sun.com/app/docs/prod/uni.stor?l=en#hic

DTrace Analytics

The Sun Storage 7000 Systems are equipped with Dtrace Analytics, an advanced DTrace-based facility for server analytics. DTrace Analytics provides real-time analysis of the Storage 7000 System and of the enterprise network, from the storage system to the clients accessing the data. It is an advanced facility to graph a variety of statistics in real-time and record this data for later viewing. It has been designed for both long term monitoring and short term analysis. When needed, it makes use of DTrace to dynamically create custom statistics, which allows different layers of the operating system stack to be analyzed in detail.

Analytics has been designed around an effective performance analysis technique called drill-down analysis. This involves checking high level statistics first, and to focus on finer details based on findings so far. This quickly narrows the focus to the most likely areas.

For example, a performance issue may be experienced and the following high level statistics are checked first:

- Network bytes/sec
- NFSv3 operations/sec
- Disk operations/sec
- CPU utilization

Network bytes/sec is found to be at normal levels, and the same for disk operations and CPU utilization. NFSv3 operations/sec is somewhat high, and the type of NFS operation is then checked and found to be of type "read". So far we have drilled down to a statistic which could be named "NFS operations/sec of type read", which we know is higher than usual.

Some systems may have exhausted available statistics at this point, however Analytics can drill down much further. "NFSv3 operations/sec of type read" can then be viewed by client - which means, rather than examining a single graph - we can now see separate graphs for each NFS client. (These separate graphs sum to the original statistic that we had.)

Let's say we find that the host "kiowa" is responsible for a majority of the NFS reads. We can use Analytics to drill down further, to see what files this client is reading. Our statistic becomes "NFSv3 operations/sec of type read for client kiowa broken down by filename". From this, we can see that kiowa is reading through every file on the NFS server. Armed with this information, we can ask the owner of kiowa to explain.

The above example is possible in Analytics, which can keep drilling down further if needed. To summarize, the statistics we examined were:

- "NFSv3 operations/sec"
- "NFSv3 operations/sec by type"
- "NFSv3 operations/sec of type read by client"
- "NFSv3 operations/sec of type read for client kiowa broken down by filename"

These match the statistic names as created and viewed in Analytics.

Analytics statistics provide incredible appliance observability, showing how the appliance is behaving and

how clients on the network are using it. They can be archived, meaning they will be a dataset that is continually read and saved to the system disks in one second summaries. This allows statistics to be viewed month by month, day by day, right down to second by second. Data is not discarded - if an appliance has been running for two years, you can zoom down to by-second views for any time in the previous two years for your archived datasets. Depending on the type of statistic, this could present an issue with system disk usage.

The term dataset refers to the in-memory cached and on-disk saved data for a statistic, and is presented as an entity in Analytics with administration controls. Datasets are automatically created when statistics are viewed in Open Worksheets, but are not saved to disk for future viewing unless they are archived.

You can monitor the growing sizes of the datasets in the Datasets view, and destroy datasets that are growing too large. The system disks have compression enabled, so the sizes visible in the datasets view will be larger than the space consumed on disk after compression. In addition, statistics can be exported as CSV format to be archived on a different server, either to free up disk space on the appliance or for other purposes.

Enabling statistics will incur some CPU cost for data collection and aggregation. In many situations, this overhead will not make a noticable difference on system performance. However for systems under maximum load, including benchmark loads, the small overhead of statistic collection can begin to be noticable.

Here are some tips for handling execution overheads:

- For dynamic statistics, only archive those that are important to record 24x7.
- Statistics can be suspended, eliminating data collection and the collection overhead. This may be useful if gathering a short interval of a statistic is sufficient for your needs (such as troubleshooting performance). Enable the statistic, wait some minutes, then click the power icon in the Datasets view to suspend it. Suspended datasets keep their data for later viewing.
- Keep an eye on overall performance via the static statistics when enabling and disabling dynamic statistics.
- Be aware that drilldowns will incur overhead for all events. For example, you may trace "NFSv3 operations per second for client deimos", when there is currently no NFSv3 activity from deimos. *This doesn't mean that there is no execution overhead for this statistic*. The appliance must still trace every NFSv3 event, then compare the host with "deimos" to see if the data should be recorded in this dataset - however we have already paid most of the execution cost at this point.

Flash Hybrid Storage Pool

The Sun Storage 7000 system uses a Flash Hybrid Storage Pool design, which is composed of optional Flash-memory devices for acceleration of reads and writes, low-power and high-capacity enterprise-class SATA disks, and DRAM memory. All these components are managed transparently as a single data hierarchy, with automated data placement by the file system. In the Storage 7310 and 7410 models, both Write Flash Accelerator (write-optmized SSD) and Read Flash Accelerator (read-optimized SSD) are used to deliver superior performance and capacity at lower cost and energy consumption than competitive solutions. The Storage 7210 currently implements only write-optimized SSD, and the Storage 7110 does not currently implement this design.

ZFS provides two dimensions for adding flash memory to the file system stack, and improve overall system performance: the L2ARC (Level 2 ARC) for random reads, and the ZIL (ZFS Intent Log) for writes ZFS. The L2ARC (ARC is the ZFS main memory cache in DRAM) sits in between memory cache and disk drives and extends the main memory cache to improve read performance. The ZFS Intent Log (the ZIL) uses Write-Flash SSD disks as log devices to improve write performance.
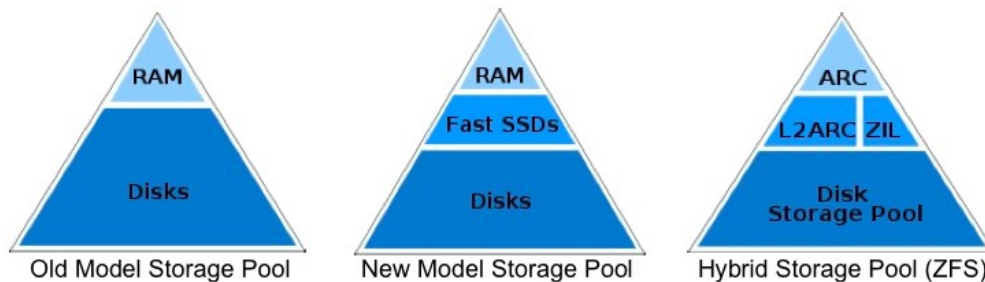
Using Hybrid Storage Pools can provide maximum performance while slashing capital and operating expenses. The ZFS file system transparently manages data placement, directing frequently used data to fast SSDs and less-frequently used data to slower, less expensive mechanical disks. The application data set can now be completely isolated from slower mechanical disk drives, unlocking new levels of performance and higher ROI.

The benefits that the Flash Hybrid Storage Pool delivers are:

- Increased performance for write-oriented or read-oriented workloads
- Significant latency reduction which enables the use of high capacity, low cost enterprise-class SATA drives
- Lower energy consumption due to the use of lower RPM drives
- Superior performance and capacity compared to 15K-rpm solutions, at lower cost
- Best $/GB, $/IOPS, Watt/GB

The illustration to the right, shows a diagram of the location of the Flash Hybrid Storage Pool components in the Storage 7310/7410. The Read-optimized Flash drives are located in the Storage controller, and the Write-optimized flash drives are located in the expansion units. DRAM and SATA disks (in the expansion arrays) complement the Hybrid Storage Pool.
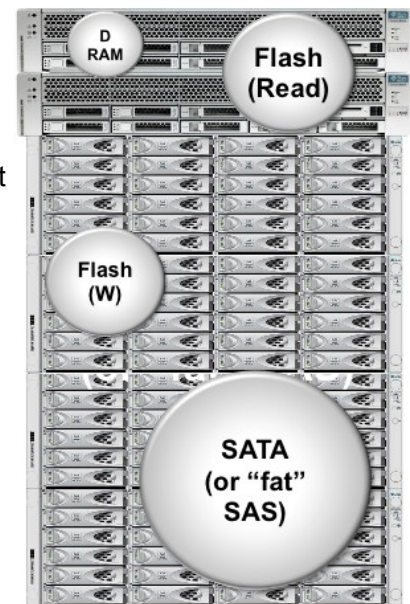
Industry-leading Data Protection: Triple-parity RAID and Triple Mirroring

Triple-parity RAID

A new feature of the 2009.Q3 software release, triple-parity RAID (RAID-Z3) offers parity protection from up to three disk drive failures. The necessity of triple-parity RAID arises from the observation that while hard drive capacity has roughly doubled annually, hard drive throughput has improved far more modestly. Accordingly, the time to populate a replacement drive in a RAID stripe is increasing rapidly. Today, a 1TB SAS drive takes about 4 hours to fill at its theoretical peak throughput; in a real-world environment that number can easily double, and 2TB and 3TB drives expected in 2009-10 won't move data much faster. Those long periods spent in a degraded state increase the exposure to the bit errors and other drive failures that would in turn lead to data loss. The industry moved to double-parity RAID because one parity disk was insufficient; longer resilver times mean that more and more time is spent back at single-parity. From that it was obvious that double-parity will soon become insufficient, and the need for additional protection will be necessary.

Functionally, triple-parity RAID is configured where each stripe has three disks for parity, and for which wide stripes are configured to maximize for capacity. Wide stripes can exacerbate the performance effects of double parity RAID: while bandwidth will be acceptable, the number of I/O operations that the entire system can perform will be greatly diminished. Resilvering data after one or more drive failures can take significantly longer due to the wide stripes and low random I/O performance. As with other RAID configurations, the presence of cache can mitigate the effects on read performance.

Triple Mirroring

Also added in the 2009.Q3 software release is triple mirroring. With triple mirroring, data is triply mirrored, reducing capacity by one third, but yielding a very highly reliable and high-performing system. This configuration is intended for situations in which maximum performance, and availability are required while capacity is much less important (for example, database storage). Compared with a two-way mirror, a three-way mirror adds additional protection against disk failures and latent disk failures in particular during reconstruction for a previous failure.

Data compression

Data compression is the process of encoding information using fewer bits (or other information-bearing units) than an unencoded representation would use through use of specific encoding schemes. Compression is useful because it helps reduce the consumption of expensive resources, such as hard disk space or transmission bandwidth. The Sun Storage 7000 System software supports 4 levels of data compression, LZJB and 3 levels of GZIP.

Shares can optionally compress data before writing to the storage pool. This allows for much greater storage utilization at the expense of increased CPU utilization. In the Sun Storage 7000 family, by default, no compression is done. If the compression does not yield a minimum space savings, it is not committed to disk to avoid unnecessary decompression when reading back the data. Before choosing a compression algorithm, it is recommended that you perform any necessary performance tests and measure the achieved compression ratio.

BUI VALUE	CLI VALUE	DESCRIPTION
Off	off	No compression is done
LZJB (Fastest)	lzjb	A simple run-length encoding that only works for sufficiently simple inputs, but doesn't consume much CPU.
GZIP-2 (Fast)	gzip-2	A lightweight version of the gzip compression algorithm.
GZIP (Default)	gzip	The standard gzip compression algorithm.
GZIP-9 (Best Compression)	gzip-9	Highest achievable compression using gzip. This consumes a significant amount of CPU and can often yield only marginal gains.

Remote Replication

The Sun Storage 7000 Remote Replication can be used to create a copy of a project (group of filesystems, LUNs) from any Storage 7000 System (source) to another 7000 system (target) at a remote location through an interconnecting TCP/IP network that is responsible for propagating the data between them. The target Sun Storage 7000 system can be located virtually any distance from the source, either in the same campus as the source, or on the other side of the world, as long as the interconnecting network has sufficient bandwidth to carry the data across.

Replication transfers the data and metadata in a project and its component shares either at discrete, point in time snapshots or continuously. Discrete replication can be initiated manually or occur on a schedule of your own creation. With continuous replication, data is streamed asynchronously to the remote appliance as it's modified locally at the granularity of storage transactions to ensure data consistency. In both cases, data transmitted between appliances is encrypted using SSL. A project replicated on another appliance is an exact copy of that local project. Every share, share property, snapshot, and configuration setting is replicated.

To set up replication from one target to another, you must first choose a replication target or add a new target. A target is simply another Sun Storage appliance; you will need appropriate privileges on that appliance in order to use it as a target. Replication to that target will transfer the local project and thus consume a portion of the total capacity on that remote appliance. After a target has been selected, you can then configure a replication schedule, enable continuous replication, or neither which still permits explicit manual replication updates. These settings can be altered at any time. Even if replication is set to scheduled, you can initiate manual replication.

On the receiving side, you can view the sources of replication and the projects replicated to that appliance. For each project, you can perform several administrative actions. You can failover a project which causes that replication project to appear as a local project. This can be done in a way that either preserves the relationship with the sending appliance (a more appropriate for testing a disaster condition for example) or in a way that severs that relationship to denote that ownership of that project has been transferred. Further, you can failover a project and reverse the direction of replication such that the original source of the replication becomes the target. Finally, you can destroy a project that had been replicated to an appliance.

Replication options:

- **One-to-One Mirroring:** This is the most straightforward and popular approach to mirroring. There are one Master system and one Target system in this configuration and is described above.

- **Many-to-One Mirroring:**
  In Many-to-One mirroring, several Master systems are mirrored to a single Mirror target. Many-to-One mirroring is frequently used by customers for Disaster Recovery purposes, to collect exact duplicates of multiple systems at multiple remote locations at a single, central site, where recovery scenarios can be centrally managed.

- **Bi-directional Mirroring:**
  Bi-directional Mirroring refers to the ability for systems at sister locations to mirror to each other. For instance, a system in Los Angeles may be configured to mirror its volumes to a sister system in Houston, which in turn and simultaneously mirrors its volumes to the Los Angeles system. In the event either site experiences a problem, the data is readily available at the sister site.

- **One-to-Many Mirroring**
  In One-to-Many mirroring, a single Master system is mirrored to multiple targets. This is frequently used to distribute data to multiple sites (i.e. remote offices of large corporations), or to setup several recovery points for disaster situations.

Applications

Remote replication can be used to help address many data management challenges facing IT professionals today:

Disaster Recovery:

Without a reliance on slow tape media, Replication eliminates the need for lengthy tape restores. It enhances recovery time in case of a complete loss of data, as businesses can now access mission-critical data from an online backup on a mirror System. With Replication properly configured, the target, or mirror, is assured to be an accurate representation of the offline source System. The target file volume can be brought online quickly to ensure uninterrupted operations.

Backup:

A target volume may be dedicated for backing up source volumes. Without affecting production operations, replicated data can be backed up on the target. Replication enhances operations by moving backup I/O to the remote volume. This shadow processing capability reduces CPU load on the production System, streamlining operations.

Clustering

The Sun Storage 7310/7410 Cluster architecture maintains data availability through hardware failures, providing true redundancy throughout the entire data I/O path. Clustering allows two heads connected to shared storage to take over that storage and provide service against it in the event that one of the heads fails. Clustering does not allow the use of more than two heads, nor does it provide a shared filesystem namespace. It is typically employed in applications for which the additional costs, risks, and complexity of clustering are outweighed by the availability advantages gained by reducing service interruptions when a head encounters a fatal software error or suffers a catastrophic hardware failure. In many applications, redundancies built into the appliance hardware, multiple paths to storage, and disk redundancy via RAID provide more than adequate availability. In other applications, a second head may prove advantageous.

The only Sun Storage 7xxx series systems that currently supports clustering (by design) are the *Sun Storage 7310 and 7410*. You will be unable to configure clustering on other appliance models, or if the two heads are not of the same model.

The clustering software is designed to be extremely simple and fast. The clustering software executes a heartbeat over redundant dedicated heartbeat links, and triggers fail-over either on-demand or when heartbeat failure is detected. The heartbeat transports consist of two serial interfaces and one Ethernet interface. For serial interfaces, the clustering software will be able to execute from high-level interrupt context inside a kernel device driver, thereby providing extremely accurate detection of system failure even when one appliance is under heavy networking load.

A cluster configuration can be setup as either active-passive or active-active. In the active-passive configuration, the system achieves the highest possible RAS (the second head node is a hot spare), while the active-active configuration there are two underlying storage pools, on which each head owns one pool and at the same time has passive ownership to the other pool to take over in case of failover. In the active/active configuration customers gain more utilization than in active/passive, but must be sure that each head node is provisioned at no more than 50% utilization to ensure that if fail-over occurs, clients do not experience a visible performance degradation once a single head-node is providing data from both pools.

The clustering facility is based upon a set of redundant heartbeat connections consisting of serial and Ethernet interfaces, provided through a PCIe x4 cluster card. The cluster card features a unique pin mapping so that standard Ethernet cables can be used for any interface, and inappropriate cable configurations are detected by software. The cluster card include LEDs for each interface that software will use to guide cabling and indicate successful or failed connections.

Other features of appliance kit clustering include:
- The ability for customers to configure clustered head-nodes through guided cabling. To create a cluster, customers need only cable a single heartbeat link and power to the second head-node, and then issue an administrative command from the web interface to the first head node to add the second node. The heartbeat link itself is used to transmit relevant configuration data to the second node, while the web interface provides a guided experience.
- The ability to synchronize administrative configuration of the two appliances: when changes occur on one side of the cluster, these are replicated to the other side of the cluster. If a cluster head-node reboots or is down for some extended period of time, it will resynchronize its configuration automatically on reboot.
- The ability to fail over network resources. Specifically, shared network interfaces are pre-configured on both sides of the cluster, with only the active node's interfaces marked IFF_UP. When fail-over occurs, the clustering software automatically brings up the new active node's interfaces and issues gratuitous ARPs to claim these addresses and update other entities on the network with the new MAC addresses.
- The ability to fail over storage resources. To support the storage configurations described earlier, an appliance cluster will support knowledge of up to two managed storage pools in addition to the system pool, where a passive node will preload the configuration of a managed pool and then automatically import it on fail-over.

States

Clustered head nodes are in one of a small set of states at any given time:

STATE	DESCRIPTION
UNCONFIGURED	Clustering is not yet configured for this node. A system that has no clustering at all is in this state. The system is either being set up, or no cluster setup task has been performed.
OWNER	Clustering is configured, and this node owns all shared resources in the system. A system is OWNER immediately after cluster setup is completed from its user interface, or if the other node has failed (i.e. after a take-over).
STRIPPED	Clustering is configured, and this node owns no shared resources. A system is STRIPPED immediately after cluster setup is completed from the user interface of the other node, or following a reboot, power disconnect, or other failure. A node remains stripped until an administrator manually executes a fail-back operation.
CLUSTERED	Clustering is configured, and both nodes own shared resources, according to their default owners. If each node owns a ZFS pool and is in the CLUSTERED state, then the two nodes form what is commonly called an active-active cluster.

So when you set up a cluster, you start with the node that initiated the setup as OWNER, and the other node as STRIPPED. Then you perform an initial fail-back operation to hand the STRIPPED node its portion of the shared resources. When that is done, both nodes are CLUSTERED. If at some point in the future, one node fails, the other node does a take-over and becomes the OWNER, and the failed node reboots and becomes STRIPPED. Only the administrator can make a STRIPPED node recover its resources, by manually executing a fail-back operation. If both cluster nodes fail or are powered off, then upon simultaneous startup they will arbitrate and one of them will become the OWNER and the other STRIPPED.

Node Cabling

Clustered head nodes must be connected together using the cluster interconnect controller. In a Sun Storage 7410 system, this device is located in slot PCIe5 (the upper right corner as viewed from the rear of the system).

In a Sun Storage 7310 system, this device is located in slot PCIe 0 (the slot on the left, as viewed from the rear of the system).

The controller provides three redundant links that enable the heads to communicate: two serial links (the outer two connectors) and an Ethernet link (the middle connector). In a Sun Storage 7310/7410 system, the controller is in a horizontal orientation, so we will refer to the links as S0 (the left-hand side, inner serial link), S1 (the middle, Ethernet link), and S2 (the right-hand side, outer serial link).

Using ordinary straight-through EIA/TIA-568B (8-wire, Gigabit Ethernet) cables:

1. Connect S0 on the first head node to S2 on the other head node,
2. Connect S2 on the first head node to S0 on the other head node, and
3. Connect S1 to S1.

The cluster cabling can be performed either prior to powering on either head node, or can be performed live while executing the cluster setup guided task. The user interface will show the status of each link, as shown later in this page. You must have established all three links before cluster configuration will proceed.

Enhanced iSCSI Support

The Sun Storage 7000 family of products act as a iSCSI target for Solaris 10 as well as the Microsoft iSCSI Software Initiator. When you configure a LUN on the appliance you can specify that it is an Internet Small Computer System Interface (iSCSI) target. The iSCSI service allows iSCSI initiators to access targets using the iSCSI protocol.

The service supports discovery, management, and configuration using the iSNS protocol. The iSCSI service supports both unidirectional (target authenticates initiator) and bidirectional (target and initiator authenticate each other) authentication using CHAP. Additionally, the service supports CHAP authentication data management in a RADIUS database.

The system performs authentication first, and authorization second, in two independent steps.

Properties.

PROPERTY	DESCRIPTION
Use iSNS	Whether iSNS discovery is enabled
iSNS Server	An iSNS server
Use RADIUS	Whether RADIUS is enabled
RADIUS Server	A RADIUS server
RADIUS Server Secret	The RADIUS server's secret

Changing services properties is documented in the BUI and CLI sections of services. The CLI property names are shorter versions of those listed above.

Authentication

If the local initiator has a CHAP name and a CHAP secret, the system performs authentication. If the local initiator does not have the CHAP properties, the system does not perform any authentication and therefore all initiators are eligible for authorization. This is true for all methods of discovery, whether or not the initiator has an ACL.

Authorization

The iSCSI service allows you to specify a global list of initiators that you can use within initiator groups.

An initiator has four properties:

PROPERTY	DESCRIPTION
Alias	A shortened, human-readable name for this initiator
IQN	The IQN (iSCSI qualified name) of the initiator
CHAP Name	The CHAP name for the initiator
CHAP Secret	The CHAP secret for the initiator

You cannot modify initiators after you create them. Instead you must delete the initiator and recreate it with new properties. If you delete an initiator from the list, the system removes it from any target ACL to which it belongs. If this results in an empty ACL, the associated target is accessible to all initiators.

New iSCSI Framework

Support for a new iSCSI framework was included in the 2009.Q3 software release. The new iSCSI support is based on the Common Multi-protocol SCSI Target (COMSTAR) framework, that enables users to turn any OpenSolaris host into a SCSI target that can be accessed over the network by initiator hosts. COMSTAR breaks down the huge task of handling a SCSI target subsystem into independent functional

modules. These modules are then glued together by the SCSI Target Mode Framework (STMF).

Among the benefits of the new COMSTAR framework is that iSCSI management has been enhanced for fine-grained control over target groups and to support multiple LUNs per target. In previous releases, each iSCSI LUN was assigned its own target, and all targets were exported over all network interfaces. With COMSTAR, no targets are created by default. Administrators must define targets and target groups and then assign LUNs to those groups. These operations are described in the appliance documentation.

An iSCSI Target Network Portal is an IP address and TCP port that can be used by an initiator node to connect to an iSCSI target. A collection of such portals represents a Target Portal Group (TPG). TPGs can be used to limit access to an iSCSI target through certain network interface cards. This new feature allows storage administrators to set up a separate Management network for normal BUI/CLI management network access and also have a dedicated Storage Data Network for iSCSI traffic.

This feature is configured when creating a new iSCSI target.

1. Log into the Sun Storage 7000 BUI

2. Configuration → SAN → Target

3. Click "+" to add a new Target

4. The Target Portal Group is configured by selecting the network interface that the initiator(s) should use for iSCSI traffic.

Multiple LUNS per Target allows the administrator to configure larger LUN counts to a specific application server. Multiple iSCSI LUNs can be configured under a single target: the current 2009.Q3 software can have a maximum of 32 Targets per system. Each Target can have up to 16,384 LUNS per Target. The LUN numbering is auto-assigned when you create an iSCSI LUN and assign it to a Target Group.

Shadow Data Migration

Shadow migration is a feature for moving data from other NAS systems with little downtime by setting up "shadow" shares which migrate data in the background while synchronously retrieving data when requested by clients.

Traditional Data Migration

Traditional file migration typically works in one of two ways: repeated synchronization or external interposition.

Migration via synchronization

This method works by taking an active host X and migrating data to the new host Y while X remains active. Clients still read and write to the original host while this migration is underway. Once the data is initially migrated, incremental changes are repeatedly sent until the delta is small enough to be sent within a single downtime window. At this point the original share is made read-only, the final delta is sent to the new host, and all clients are updated to point to the new location. The most common way of accomplishing this is through the rsync tool, though other integrated tools exist. This mechanism has several drawbacks:

The anticipated downtime, while small, is not easily quantified. If a user commits a large amount of change immediately before the scheduled downtime, this can increase the downtime window.

During migration, the new server is idle. Since new servers typically come with new features or performance improvements, this represents a waste of resources during a potentially long migration period.

Coordinating across multiple filesystems is burdensome. When migrating dozens or hundreds of filesystems, each migration will take a different amount of time, and downtime will have to be scheduled across the union of all filesystems.

Migration via external interposition

This method works by taking an active host X and inserting a new appliance M that migrates data to a new host Y. All clients are updated at once to point to M, and data is automatically migrated in the background. This provides more flexibility in migration options (for example, being able to migrate to a new server in the future without downtime), and leverages the new server for already migrated data, but also has significant drawbacks:

The migration appliance represents a new physical machine, with associated costs (initial investment, support costs, power and cooling) and additional management overhead.

The migration appliance represents a new point of failure within the system.

The migration appliance interposes on already migrated data, incurring extra latency, often permanently. These appliances are typically left in place, though it would be possible to schedule another downtime window and decommission the migration appliance.

Shadow Migration

Shadow migration uses interposition, but is integrated into the appliance and doesn't require a separate physical machine. When shares are created, they can optionally "shadow" an existing directory, either locally (see below) or over NFS. In this scenario, downtime is scheduled once where the source appliance X is placed into read-only mode, a share is created with the shadow property set, and clients are updated to point to the new share on the Sun Storage 7000 appliance. Clients can then access the appliance in read-write mode.

/export/ens

SOURCE

read-only NFS

/export/home/ens

7000

read-write

CLIENTS

□ new □ migrated □ unmigrated
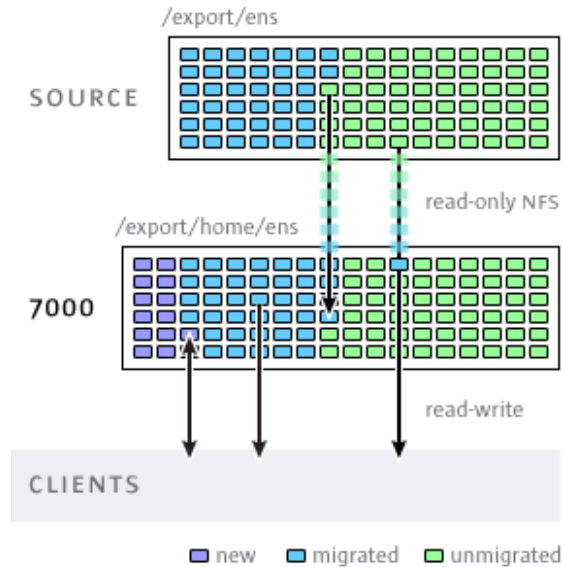
Once the shadow property is set, data is transparently migrated in the background from the source appliance locally. If a request comes from a client for a file that has not yet been migrated, the appliance will automatically migrate this file to the local server before responding to the request. This may incur some initial latency for some client requests, but once a file has been migrated all accesses are local to the appliance and have native performance. It is often the case that the current working set for a filesystem is much smaller than the total size, so once this working set has been migrated, regardless of the total native size on the source, there will be no perceived impact on performance.

The downside to shadow migration is that it requires a commitment before the data has finished migrating, though this is the case with any interposition method. During the migration, portions of the data exists in two locations, which means that backups are more complicated, and snapshots may be incomplete and/or exist only on one host. Because of this, it is extremely important that any migration between two hosts first be tested thoroughly to make sure that identity management and access controls are setup correctly. This need not test the entire data migration, but it should be verified that files or directories that are not world readable are migrated correctly, ACLs (if any) are preserved, and identities are properly represented on the new system.

Shadow migration implemented using on-disk data within the filesystem, so there is no external database and no data stored locally outside the storage pool. If a pool is failed over in a cluster, or both system disks fail and a new head node is required, all data necessary to continue shadow migration without interruption will be kept with the storage pool.

Virus Scan

This feature allows the Storage 7000 family to be configured as a client of an antivirus scan engine. The Virus Scan service will scan for viruses at the filesystem level. When a file is accessed from any protocol, the Virus Scan service will first scan the file, and both deny access and quarantine the file if a virus is found. Once a file has been scanned with the latest virus definitions, it is not rescanned until it is next modified. Files accessed by NFS clients that have cached file data or been delegated read privileges by the NFSv4 server may not be immediately quarantined.

Properties

PROPERTY	DESCRIPTION
Maximum file size to scan	Files larger than this size will not be scanned, to avoid significant performance penalties. These large files are unlikely to be executable themselves (such as database files), and so are less likely to pose a risk to vulnerable clients. The default value is 1GB.
Allow access to files that exceed maximum file size	Enabled by default, this allows access to files larger than the maximum scan size (which are therefore unscanned prior to being returned to clients). Administrators at a site with more stringent security requirements may elect to disable this option and increase the maximum file size, so that all accessible files are known to be scanned for viruses.

Changing services properties is documented in the user guide, refer to it for more details.

File Extensions

The File Extensions section allows control over which files are or are not scanned, based on filename pattern matching. The default value, "*", will cause all files to be scanned (impacting performance on all file access). It may suit your environment to scan only a subset of files deemed to pose the greatest risk.

For example, to scan all high-risk filename patterns, including zip files, but not files whose names match the pattern "data-archive*.zip", one might configure this setting as follows:

ACTION	PATTERN
Scan	exe
Scan	com
Scan	bat
Scan	doc
Don't Scan	data-archive*.zip
Don't Scan	*
Scan	zip

Note that "Don't Scan *" is required to prevent scanning of all other file types not explicitly included in the scan list.

Scanning Engines

A scanning engine is an external third-party virus scanning server which the appliance contacts using ICAP (Internet Content Adaptation Protocol, RFC 3507) to have files scanned. Supported scanning engines are (others will be added in the near future):

- Symantec AV 5.x
- CA ITM v8.1
- McAfee SIG v4.5

Snapshots

A snapshot is a read-only copy of a file system or volume. Snapshots can be created almost instantly, and initially consume no additional disk space within the pool. However, as data within the active dataset changes, the snapshot consumes disk space by continuing to reference the old data and so prevents the space from being freed. ZFS snapshots include the following features:

- Persist across system reboots.
- The theoretical maximum number of snapshots is 2^{64}.
- Use no separate backing store. Snapshots consume disk space directly from the same storage pool as the file system from which they were created.
- Recursive snapshots are created quickly as one atomic operation. The snapshots are created together (all at once) or not created at all. The benefit of atomic snapshots operations is that the snapshot data is always taken at one consistent time, even across descendent file systems.

Snapshots of volumes cannot be accessed directly, but they can be cloned and rolled back to.

While the functionality of using Snapshots is diverse and vast, the process of implementing and managing them is simple. When a snapshot is requested by an authorized user or is automatically "taken", the time required and performance overhead are negligible to both the network infrastructure and the live, active filesystem.

Applications

- **Rapid File Recovery:** When files are modified, deleted, snapshots can be used to quickly access a recent image of the file.

- **Online backup of files:** With its snapshot feature, Sun System allows the flexibility to backup large file systems without worrying about data being changed during the backup process. This exclusive feature ensures that such file systems will always be backed up in a consistent state.

- **Database backups:** By snapshoting database files on a Sun System, it is not necessary to take a database offline during the time it takes to back it up. Instead, the database can be paused momentarily, then a snapshot taken. The snapshot will contain an image of the database files at a given point in time, which in turn can be backed up at the user's convenience.

Benefits

- **Reduced Recovery Time:** point in time images dramatically reduce the time it takes to recover lost or damaged files and filesystems. Recovering files from tape is no longer the only option. Point-in-time images of the active filesystem (volume) are accessed in a read-only state and accessed via CIFS share or NFS mount point assuming proper access rights.

- **User Satisfaction:** In the event of lost, corrupted, or damaged files, system administrators are no longer faced with the complex task and lengthy process of recovering to a "clean" version of the file in question. In a Windows environment, accessed through CIFS share, the file can be "dragged" and dropped" from the snapshot folder into the proper volume. From a NFS mount point, the file in question can be copied from the snapshot directory to the proper location.

- **Reduced Cost (TCO):** Lower TCO is achieved, in the event of recovering lost files, in time savings of the administrators doing the recovery. The time usually spent in searching archived files on tape, the "normal" wear-and-tear of tapes and tape devices, and having to do multiple recoveries in the event the wrong file being recovered allows for time better spent doing more meaningful tasks.

Tape Backup and Restore

One of the primary goals of enterprise storage management is to back up and restore information in a timely, secure, and cost effective manner over enterprise wide operating systems. Companies need high-performance backup and the ability to back up data to local media devices. While the data itself may be distributed throughout the enterprise, its cataloging and control must be centralized. The emergence of network-attached storage and dedicated file servers makes storage management more challenging.

Network Data Management Protocol (NDMP) recognizes that these issues must be addressed. NDMP is an opportunity to provide truly enterprise-wide heterogeneous storage management solutions - permitting platforms to be driven at a departmental level and backup at the enterprise level.

The Sun Storage 7000 Systems support NDMP v3 and v4, with the following topologies:

a) Direct connect
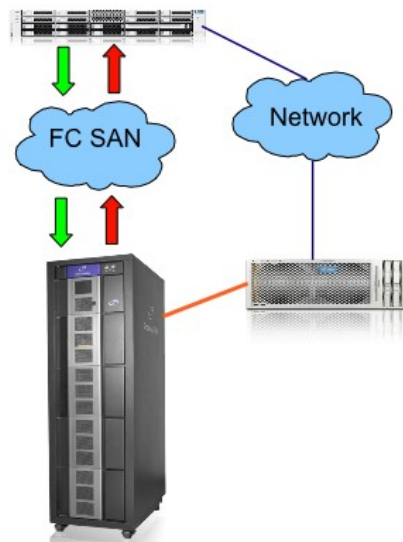
- Directly Connected Tape Drives
  - Backup application server controls the tape library and mounts tapes for the appliance.
  - NDMP commands and reporting go to and from the backup application server over the network.
  - Backups and restores go over FC connections to the tape drives in the tape library.

b) Remote (Tape connected to backup server)
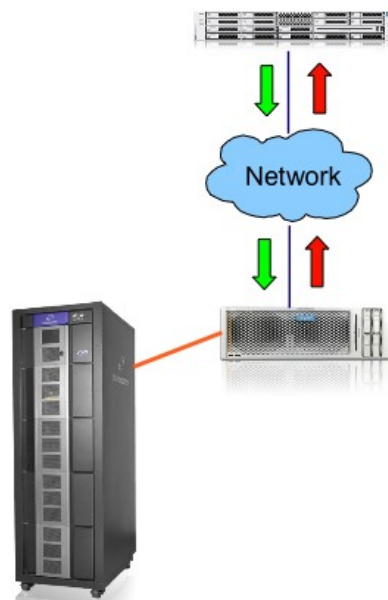
- Backup Server Connected Tape Drives
  - Tape drives and library are connected to the backup application server.
  - NDMP commands and reporting go to and from the backup application server over the network.
  - Backups and restores also go over the Network.
  - Ethernet Ports on the appliance can be dedicated to NDMP.

c) 3-way (through another unified storage appliance)
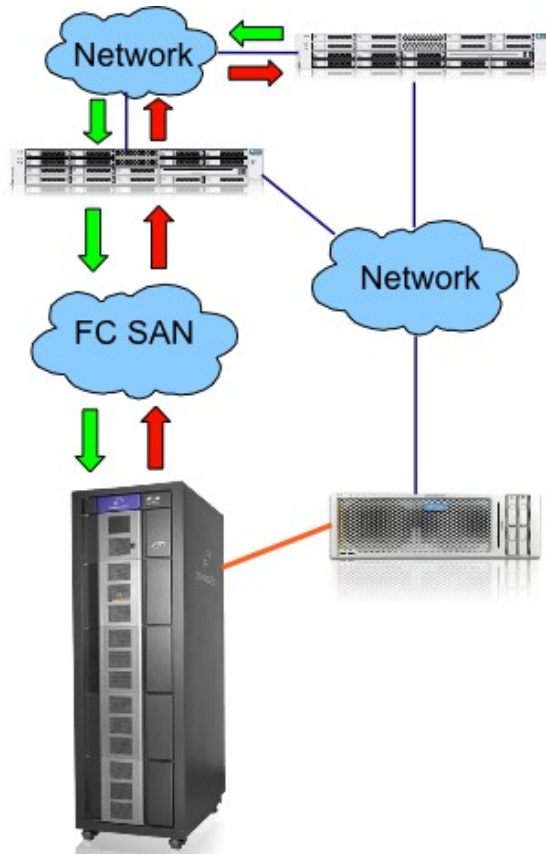
- Remote Directly Connected Tape Drives
  - The local backup application server controls the tape library and mounts tapes for the remote appliance.
  - NDMP commands and reporting go to and from the backup application server over the network.
  - Backups and restores go over FC connections to the tape drives in the remote tape library and then over the network between the local and remote appliances.

System Architecture

Overview

The Sun Storage 7000 Unified Storage Systems family consists of 4 models:
– Sun Storage 7110 System (Based on the Sun Fire x4240)
– Sun Storage 7210 System (Based on the Sun Fire x4540)
– Sun Storage 7310 System (Based on the Sun Fire x4140 and J4400 Expansion Array)
– Sun Storage 7410 System (Based on the Sun Fire x4440 and J4400 Expansion Array)

The following sections on each Sun Storage 7000 System, provides a high-level overview of the architecture. For details, please refer to the respective Just The Facts documents for the Sun Server and Storage Array listed below:

Sun Storage 7110 System
#509869   ---   Sun Fire x4140/x4240 (platform: AMD Barcelona 2347 1.9GHz CPU)
                    (Nov 2008 to Oct 2009: platform: AMD Barcelona 2347 Quad-Core 1.9GHz CPU)
                    (Sept 2009 to present: platform: AMD Istanbul 2427 Six-Core 2.2GHz CPU)

Sun Storage 7210 System
537836   ---   Sun Fire x4540 (platform: AMD Barcelona 2356 2.3GHz CPU)

Sun Storage 7310 System
#509869   ---   Sun Fire x4140/x4240
                    (Nov 2008 to Oct 2009: platform: AMD Barcelona 2347 Quad-Core 1.9GHz CPU)
                    (Sept 2009 to present: platform: AMD Istanbul 2427 Six-Core 2.2GHz CPU)
530139   ---   Sun Storage J4400

Sun Storage 7410 System
509885   ---   Sun Fire x4440
                    (Nov 2008 to Sept 2009: platform: AMD Barcelona 2356, 8356 Quad-core 2.3GHz CPU)
                    (Sept 2009 to present: platform: AMD Istanbul 2435, 8435 Six-Core 2.6GHz CPU)
530139   ---   Sun Storage J4400

Sun Storage 7110 System Architecture

Overview

The Sun Storage 7110 System is based on the Sun Fire x4240 Server, a symmetric, multiprocessor, x64-based, rack-optimized 2U height that can be mounted in industry-standard 19-inch racks. A rack mounting kit is included with the system.

Two configurations, a 2TB and a 4.2TB, are available for the Sun Storage 7110 System.

- 2.0TB config: 16 x 146GB 2.5" 10K-rpm SAS drives (2 mirrored drives used for the OS)
- 4.2TB config: 16 x 300GB 2.5" 10K-rpm SAS drives (2 mirrored drives used for the OS)

They both have the same CPU/RAM configuration:

- 1x Six-Core 2.2GHz CPU
- 8GB RAM
- Four 10/100/1000 Base-T Ethernet ports

This is an entry level appliance, and it can be upgraded as customer application needs change. Should the customer need more CPU or Memory capacity, they can use the qualified components for the x4240 server to upgrade their Storage 7110 System, all based on original platform component availability. This guide does not provide a listing of the part numbers required to upgrade the system, please refer to the x4240 Just The Facts for the necessary components.

The Storage 7110 System maximum capacity is 4.2TB (14x300GB drives). The remaining two drives are used as a mirrored set to host the operating system. Four integrated 1Gb-E ports are available for network connectivity. The System provides a total of 6 PCIe slots for network, or tape connectivity expandability. There are multiple options in NIC and HBA for tape backup, refer to the configuration flowchart for a listing of all the options. The table below summarizes the overall configuration, and where it is indicated "1Gb", this can be either the dual port 1Gb UTP, or MMF, or the quad-port 1Gb NIC. For tape options, a dual port SCSI and dual port Fibre Channel HBAs are provides.

With 2009.Q3 Software, Infiniband support was added. The supported HCA (host channel adapter) is the Sun P/N X4237A (4237A for the ATO-option). This card uses the QSFP connector, but the other end of the cable depends on what switch is being connected to. Refer to the JTF Sunwin: 564484 "Sun Datacenter Infiniband Switches" for cable information for each of our switches.

Note: 10Gb cannot be combined with 1Gb or IB HCA cards.

Configuration table for the Sun Storage 7110 Unified Storage System

Slot ==>	0	1	2	3	4	5	
HT Link	0	0	1	0	1	1	
PCIe Width	x8	x8	x16	x8	x8	x4	
10Gb Config	Internal SAS HBA	---	10Gb	---	10Gb	Tape HBA	
1Gb or IB Config	Internal SAS HBA	1Gb or IB	1Gb or IB	1Gb or IB	---	Tape HBA	
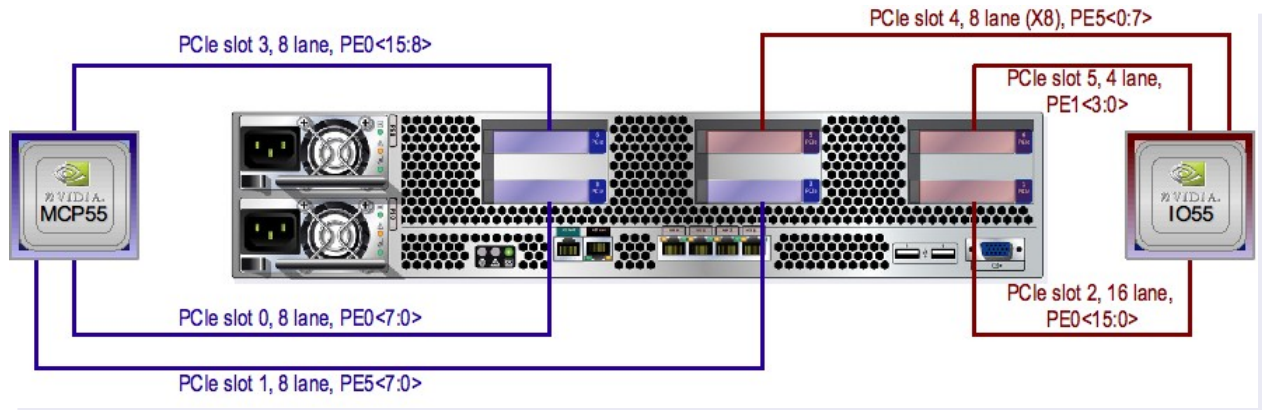
Reliability

- Striping, mirroring, single-parity RAID, double-parity RAID, wide stripes
- ECC memory with ChipKill supported.
- System monitoring and diagnostic of the Sun Storage System
- Mirrored disk drive set for the operating system
- Error checking and correction on disk drives
- Cable-less chassis design
- Direct-attach SATA drives

Availability

- FMA provides hardware "self-healing" capabilities, offlining faulty components
- ZFS memory-based end-to-end data and metadata checksumming
- RAID Z DP (RAID 6) with dual parity for increased data availability
- LACP aggregates multiple network ports and can survive the failure of n-1 ports
- Redundant hot-swappable power supplies and fan modules allow for system service without downtime.
- Built-in quad Gigabit Ethernet ports provide redundancy.
- Filesystem guarantees filesystem integrity across unforeseen events such as power outages
- Snapshots provide static images of the filesystem enabling rapid recovery of mistakenly deleted files or objects, and facilitating backup to tape.
- Replication provides for business continuance (data availability) in the event of a catastrophic loss of the primary (source) system.

Serviceability

- Front-accessible, hot-swappable disk drives
- Phone-home provides automated case opening when failures are detected in the system
- Identical Indicator LEDs on the front and back of the chassis allow problems to be detected and isolated easily.
- Diagnostic LEDs are integrated onto the motherboard.
- Front power switch (toggles between standby and power-on) provides easy access.
- Single-step power supply removal: Tool-less removal/replacement of hot-swap power supplies.
- Simple software upgrade maintains older copies of the operating system and can revert to them should newer versions present a problem
- Power-supplies can be serviced without sliding the servers out of the rack.
- Top-accessible, hot-swap direct connect SATA disk drives.
- Fan modules can be replaced without power down or complete removal of system from rack.
- Fault indicator LED(s) stays on following a fault even if the system has been powered off (but still connected to the power source).
- Rackmount slide rails for easy installation and removal of a unit are included in the system box

Sun Storage 7110 Specifications

Architecture	
Processor	Six-Core AMD Opteron 2.2GHz
Main Memory	8 GB, DDR2-667
Standard and Optional Interfaces	
Integrated Network	Four 10/100/1000 Base-T Ethernet ports
Expansion bus	Six internal PCIe slots
Optional Network Connectivity	Dual GigE UTP Dual GigE MMF Quad Gigabit Ethernet UTP Dual 10 GigE Fiber XFP (requires fiber transceiver) QDR Infiniband HCA
Optional Tape backup HBA	Dual Channel 4Gb FC HBA Dual Channel Ultra320 SCSI HBA
Mass Storage	
Raw capacity	2 TB or 4.2 TB
Disk Drives	2TB (14 x 146GB SAS 10K RPM Drives) 4.2TB (14 x 300GB SAS 10K RPM Drives)
Power Supplies	
	Dual redundant, hot -swappable power supply
UL Maximum (AC Input)	12 A RMS at 100 V AC
Power Supply Rating (DC output)	1,050 W
Environment	
AC power	100-120 V/200-240 V (50/60 Hz)
Operating temperature/humidity (single, non-rack system)	5 ºC to 35 ºC (41 ºF to 95 ºF), 10% to 90% relative humidity, non-condensing
Nonoperating temperature/humidity (single, non-rack system)	-40 ºC to 65 ºC (-40 ºF to 149 ºF), up to 93% relative humidity, non-condensing
Altitude (operating) (single, non-rack system)	Up to 3,000 m, maximum ambient temperature is derated by 1° C per 300m above 900 m
Altitude (nonoperating) (single, non-rack system)	Up to 12,000 m
Acoustic Noise Emissions	
	Declared noise emissions in accordance with ISO 9296, A-weighted, operating and idling:
LwAd (1B = 10dB) at max ambient	6.8 B
LpAm bystander at max ambient	53 dB
Regulations	
	Meets or exceeds the following requirements:
Safety	IEC 60950, UL/CSA 60950, EN60950, CB Scheme with all country differences
RFI/EMI	FCC CFR 47 Part 15 Class A, EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 300-386
Immunity	EN55024,EN300-386
Certifications	
Safety	UL/cUL, UL DEMKO, CE, BSMI, CCC, GOST-R, S-Mark
EMC	CE, FCC, VCCI, ICES, C-Tick, MIC, CCC, GOST-R, BSMI Class A
Other	Complies with WEEE Directive (2002/96/EC) and RoHS Directive (2002/95/EC)
Dimensions and Weight	
Height	88 mm (3.49 in.)
Width	426 mm (16.75 in.)
Depth	714 mm (28.125 in.)
Weight	25.75 kg (56.77 lbs.)

Sun Storage 7210 System Architecture

Overview

The Sun Storage 7210 System is based on the Sun Fire x4540 Server, which features two AMD Opteron quad-core processors, interconnected by a dedicated 8.0 GB/sec HyperTransport link, with a 64GB maximum amount of RAM. It is a 4U height server that can be mounted in industry-standard 19-inch racks. A rack mounting kit is included with the system.

There are four configurations available of the Sun Storage 7210 System, which are summarized in the table below. These are fixed options, customers can only add specific NICs or HBA for tape backup, or a SAS HBA to allow for capacity expansion, through the connection of specific J4500 arrays. The Storage 7210 System offers an option of write-optimized SSD (Write Flash Accelerator, aka Logzilla) to improve performance for write intensive applications. Configuration 2 and 3 in the table below include one and two Logzilla's, these are pre-configured options and cannot be changed at the time or ordering. The maximum capacity is 46TB with configuration 5. Two mirrored drives are used for the operating system.

Note: The 11.5TB configuration (48x250GB) was EOL in August 2009.

	Config 1	Config 2	Config 3	Config 4
Raw capacity (TB)	22.5	44	23	46
RAM	64GB	64GB	64GB	64GB
Processor	2 Quad-Core AMD Opteron - Model 2356			
Drives	47 x 500GB SATA	46 x 1TB SATA	48 x 500GB SATA	48 x 1TB SATA
Write Flash Accelerator (Logzilla), 18GB	1 x 18GB	2 x 18GB	none	none
Integrated NIC ports	Four 10/100/1000 Base-T Ethernet ports			
PCIe expansion slots (Total/Available)	3 / 3			
Optional NICs	Dual GigE UTP or MMF, Quad Gigabit Ethernet UTP Dual 10 GigE Fiber XFP (requires fiber transceiver)			
Optional HBA for tape backup	Dual Channel Ultra320 SCSI HBA Enterprise 4Gb FC HBA, Dual channel			
RU size	4 RU			
Mounting rail kit	Included			
Capacity Expansion	Use J4500 Array. Only two models supported and HBA/cables are required (see section below)			
Warranty	2 yr			

The Sun Storage 7210 comes with four integrated 1Gb-E ports for network connectivity. The System provides a total of 3 PCIe slots for network, or tape connectivity expandability. There are multiple options in NIC and HBA for tape backup, refer to the configuration flowchart for a listing of all the options. The table below summarizes the overall configuration, and where it is indicated "1Gb", this can be either the dual port 1Gb UTP, or MMF, or the quad-port 1Gb NIC. For tape options, a dual port SCSI and dual port Fibre Channel HBAs are provides.

With 2009.Q3 Software, Infiniband (IB) support was added. The supported HCA (host channel adapter) is the Sun P/N X4237A (4237A for the ATO-option). This card uses the QSFP connector, but the other end of the cable depends on what switch is being connected to. Refer to the JTF Sunwin: 564484 "Sun Datacenter Infiniband Switches" for cable information for each of our switches.

Note: 10Gb and 1Gb NICs cannot be combined in the same system.

A SAS HBA can be installed, to connect to optional J4500 arrays to expand capacity. Installation by a Sun or Sun partner professional is required. Refer below to the supported part numbers.

Note: on May 26 2009, Sun announced support for up to two J4500 expansion arrays with the Storage 7210. With this announcement, the table below was changed, to accommodate the SAS HBA to support additional capacity.

Configuration options for Sun Storage 7210 Unified Storage System

Slot ==>	0	1	2	Notes
HT Link	1	1	1	
PCIe Width	x8	x8	x8	
10Gb Config	10Gb	Tape HBA or 2nd 10Gb	SAS HBA or 2nd 10Gb	Maximum 2 of 10Gb NIC. Cannot mix 10Gb with 1Gb
1Gb or IB Config	1Gb or IB	Tape HBA or 1Gb or IB	SAS HBA or 1Gb or IB	Up to 3 1Gb NICs or IB

0, 1, 2
Slot

Capacity expansion for Sun Storage 7210 System

The Sun Storage J4500 Array can be used to expand the capacity of the Storage 7210 System. Only two models of the J4500 are supported, the 500GB and 1TB drive configurations, same drives that are supported with the Storage 7210 system.

The supported J4500 part numbers are:
- XTA4500R00A1A24TB [24TB, 48 x 500GB 7.2Krpm SATA]
- XTA4500R00A1N48TB [48TB, 48 x 1TB 7.2Krpm SATA]

In order to support the J4500 Arrays, a SAS HBA needs to be purchased separately and installed as specified in the previous configuration section. In addition, two SAS cables are required. The part numbers for the SAS HBA and cables are:
- SG-XPCIE8SAS-E-Z (8-port external SAS PCIe HBA).
- Qty:2, XTA-2.0M-SAS (2.0m, mini, shielded, SAS cable)

Professional installation is required when the existing 7210 system contains add-on Network cards or Tape HBAs. Relocation and reconfiguration of the existing NICs/HBA is required, and a Sun trained professional must perform the installation. The following are the service installation part numbers to use (effective June 9, 2009. In the meantime, a custom quote will be used). In addition, the J4500 array service installation must be purchased.

EIS-7210PLUS-E (during business hours)
EIS-7210PLUS-E-AH (after hours)

When there are no NICs or HBAs installed, it is still recommended that a Sun or Sun Partner professional perform the installation to ensure proper system configuration.

The illustration below depicts the proper cabling to support additional J4500 expansion arrays.
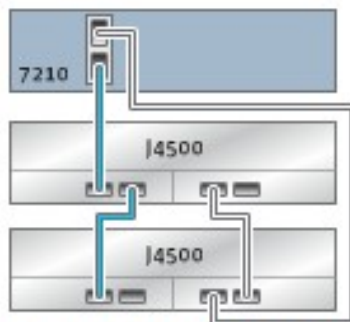
Sun Unified Storage 7210 system with two J4500 expansion units

Reliability

- Striping, mirroring, single-parity RAID, double-parity RAID, wide stripes
- ECC memory with ChipKill supported.
- System monitoring and diagnostic of the Sun Storage System
- Mirrored disk drive set for the operating system
- Error checking and correction on disk and SSD devices
- Cable-less chassis design
- Direct-attach SATA drives

Availability

- FMA provides hardware "self-healing" capabilities, offlining faulty components
- ZFS memry-based end-to-end data and metadata checksumming
- RAID Z DP (RAID 6) with dual parity for increased data availability
- LACP aggregates multiple network ports and can survive the failure of n-1 ports
- Redundant hot-swappable power supplies and fan modules allow for system service without downtime.
- Built-in quad Gigabit Ethernet ports provide redundancy.
- Filesystem guarantees filesystem integrity across unforeseen events such as power outages
- Snapshots provide static images of the filesystem enabling rapid recovery of mistakenly deleted files or objects, and facilitating backup to tape.
- Replication provides for business continuance (data availability) in the event of a catastrophic loss of the primary (source) system.

Serviceability

- Phone-home provides automated case opening when failures are detected in the system
- Identical Indicator LEDs on the front and back of the chassis allow problems to be detected and isolated easily.
- Diagnostic LEDs are integrated onto the motherboard.
- Front power switch (toggles between standby and power-on) provides easy access.
- Single-step power supply removal: Tool-less removal/replacement of hot-swap power supplies.
- Simple software upgrade maintains older copies of the operating system and can revert to them should newer versions present a problem
- Power-supplies can be serviced without sliding the servers out of the rack.
- Top-accessible, hot-swap direct connect SATA disk drives.
- Fan modules can be replaced without power down or complete removal of system from rack.
- Fault indicator LED(s) stays on following a fault even if the system has been powered off (but still connected to the power source).
- Rackmount slide rails for easy installation and removal of a unit are included in the system box free of charge to customers.

Sun Storage 7210 Specifications

Architecture	
Processor	Two Quad-core AMD Opteron Processors, (Model 2356, 2.3 GHz)
Main Memory	32 or 64 GB DDR-2 (depends on model number)
Standard and Optional Interfaces	
Integrated Network	Four 10/100/1000 Base-T Ethernet ports
Expansion bus	Three internal MD2 Low Profile 64-bit PCI-express slots
Optional Network Connectivity	Dual GigE UTP Dual GigE MMF Quad Gigabit Ethernet UTP Dual 10 GigE Fiber XFP (requires fiber transceiver) QDR Infiniband HCA
Optional Tape backup HBA	Dual Channel 4Gb FC HBA Dual Channel Ultra320 SCSI HBA
Optional HBA for capacity expansion	SG-XPCIE8SAS-E-Z (8-port external SAS PCIe HBA). Two cables required: XTA-2.0M-SAS (2.0m, mini, shielded, SAS cable)
Mass Storage	
Raw capacity (model dependent)	Up to 48 hot-swappable, 3.5" SATA II Disk supported. 2 mirrored disks dedicated for Software
	11.5 TB (46x250 GB) 7200 rpm SATA Disks
	22.5 TB (45x500 GB) 7200 rpm SATA Disks and 1x18GB Write Flash Accelerator
	44 TB (44x1 TBGB) 7200 rpm SATA Disks and 2x18GB Write Flash Accelerator
	23 TB (46x500 GB) 7200 rpm SATA Disks
	46 TB (46x1TB) 7200 rpm SATA Disks
Write Flash Accelerator	18 GB Write Flash Accelerator (SSD), available in certain models
J4500 Expansion Array	Up to Two J4500 Expansion Arrays are supported with the Storage 7210 System. The SG-XPCIE8SAS-E-Z HBA must be purchased separately, along with cables. Only the following two J4500 models are supported: XTA4500R00A1A24TB [24TB, 48 x 500GB 7.2Krpm SATA] XTA4500R00A1N48TB [48 x 1TB 7.2Krpm SATA] Note: Refer to the J4500 product page for specifications details
Power Supplies	
	Dual redundant, hot-swappable power supply for 220V power supply
UL Maximum(AC Input)	1800W
Power Supply Rating (DC output)	1500W
Typical Power Consumption	1200W, with 200CFM, max measured is 1200W
Environment Limit	
AC power Source Rating	200-220VAC @ 10 Amps, 100V-110V with three PSUs
Operating Temperature/Humidity	5 °C to 32 °C (37 °F to 91 °F), 10% to 90% relative humidity, non-condensing, 27 °C max wet bulb
Nonoperating Temperature/Humidity	-40 °C to 65 °C (-40 °F to 149 °F), up to 93% relative humidity, non-condensing, 38 °C max wet bulb
Altitude (operating)	Up to 4000 m, maximum ambient temperature is derated by 1 degree C per 300 m above 900 m
Altitude (nonoperating)	Up to 12000 m
Acoustic Noise Emissions	
	Declared noise emissions in accordance with ISO 9296, A-weighted,operating and idling:
Measure & Environment	
LwAd (1B = 10dB)	7.5 B (per spec., actual is TBD) 8.5 B (per spec., actual is TBD)
LpAm bystander	65dB (per spec., actual is TBD) 75dB (per spec., actual is TBD)
Regulations	
	Meets or exceeds the following requirements:
Safety	IEC60950, UL/CSA60950-1, EN60950, CB Scheme with all country differences
RFI/EMI	FCC Class A, Part 15 47 CFR, EN55022, CISPR 22, EN300-386:v1.3.2, ICES-003
Immunity	EN55024,EN300-386:v1.3.2
Certifications: Safety EMC	cULus Mark, UL/Demko GS Mark, CE Mark, CCC, GOST R, S-Mark CE Mark (93/68/EEC), Emissions and Immunity Class A Emissions Levels: FCC, VCCI, C-Tick, MIC, *CCC, *GOST R, *BSMI * = Applicable at GA
Other	Labeled per WEEE (Waste Electrical and Electronic Equipment) Directive
Dimensions and Weight	
Chassis	
Height	175 mm (6.75 in.) (4RU)
Width	445 mm (17 in.) 19" rack mountable
Depth	736 mm (29 in.)
Weight	88 kg (170lb.) maximum with rack kits

Sun Storage 7310 System Architecture

Overview

The Sun Storage 7310 System is based on the Sun Fire x4140 Server and the Sun Storage J4400 SAS Array. The x4440 server is powered by the AMD x64 Six-Core Opteron processor. It is 1U height designed to maximize rack space. The storage expansion units used for the Storage 7310 are based on the 4U J4400 SAS expansion array, with support for up to 24 x 3.5" 3Gb/sec 1TB SATA drive. Specific J4400 part numbers and configurations were created for the Sun Storage 7310 and 7410 Systems.

The Sun Storage 7310 implements a true ZFS Hybrid Storage Pool with support for Flash-memory devices for acceleration of Reads (100GB Read Flash Accelerator, aka Readzilla) and Writes (18GB Write Flash Accelerator, Logzilla).

The Storage 7310 and 7410 use the same SAS expansion arrays. The 7310 supports only 4 (maximum 96TB), while the 7410 supports up to 12 arrays, for a 288TB capacity. With the exception of the maximum number of expansion arrays supported, the same rules apply for both the 7310 and 7410 systems.

The Logzilla option is provided in the SAS expansion arrays, and there are preconfigured configurations to match customer requirements. The options are:
- 23 x 1TB drives with 1 x 18GB Logzilla
- 22 x 1TB drives with 2 x 18GB Logzilla
- 20 x 1TB drives with 4 x 18GB Logzilla

There are also half-populated configurations to provide a lower capacity entry point to those customers who need mainly performance but not capacity:
- 11 x 1TB drives with 1 x 18GB Logzilla
- 10 x 1TB drives with 2 x 18GB Logzilla

Important notes when selecting expansion arrays:
- Active-Active Cluster configurations require 2 storage pools, and a full Storage array is required. Storage arrays that are half populated, are only supported in Active-Passive mode.

- Maximum number of Logzillas supported in a 7310/7410 Single controller is 8, and 16 in a Cluster configuration. These restrictions are listed in the configuration flowcharts below.

- Half populated storage arrays are only supported when they are the first array in the system. 1.5 (full+ half), 2.5 (2x full + half), etc., are not supported configurations and WebDesk does not allow configurations of this type. This is done to optimize configurations.

- When configuring a 7310/7410 system in WebDesk, and two or more storage array with Logzillas will be selected, only the same type of array (i.e. 23x1TB drives with 1xLogzilla) is allowed in the same system configuration. This is done to balance the system and optimize performance.

- Restrictions listed above may change in the near future. These restrictions were put in place to minimize support issues.

- When upgrading a half-populated JBOD, the following drive part numbers must be used. This will

ensure that only the approved drive for Storage 7310/7410 configurations is used. In addition, the Write Flash Accelerator (Logzilla) is listed to allow upgrading a half-JBOD to one of the supported configurations (23 drives + 1Logzilla, or 22 + 2Logzillas, or 20 + 4 Logzillas).

XTA6ST1NJ-1T7K	6 * Internal 1TB 7.2Krpm SATA HDD, 3.5" x 1" drives with brackets for Sun(TM) Storage J4400 and J4200; RoHS-6
XTA-ST1NJ-1T7K	1 * Internal 1TB 7.2Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun(TM) Storage J4400 and J4200; RoHS-6
XTA7410-LOGZ18GB	Sun Storage 7410 Logzilla Flash Accelerator 18GB, 3.5 FF, RoHS 5. (This item to be installed in the J4400 SAS Array in the S7410 system).

The following tables provide details on the Sun Storage 7310 configurations.

	7310 Single	7310 Cluster (2 controllers)
RAM (default)	16GB	16GB per controller
RAM, maximum capacity supported	64GB	64GB per controller
READ Flash Accelerator (Readzilla)	Up to 6 (std config has none)	Up to 6 per controller (std config has none)
CPU Qty (std configuration)	1	1 per controller
CPU Maximum qty	2	2 per controller
CPU type	Six-Core AMD Opteron - Model 2427 2.2GHz	
PCIe Slots (Total/Available)	3 (2 available)	3 (1 available), per controller
Optional NICs	Dual GigE UTP or MMF, Quad Gigabit Ethernet UTP Dual 10 GigE Fiber XFP (requires fiber transceiver)	
Optional HBA for tape backup	Dual Channel Ultra320 SCSI HBA Dual Channel 4Gb FC HBA	
RU size	1U	2U (1U per controller)
Mounting rail kit	Included	
Warranty	3 yr	
Maximum capacity support	96 TB (96 x 1TB SATA drives)	
Expansion Array support	Special configuration J4400 for Sun Storage 7310/7410	
Maximum number of Expansion Array	4 arrays (24 drives each)	
Installed SAS HBA	1	2 (1 per controller)

J4400 for Sun Storage 7310 (same part numbers as for 7410)	
Write Flash Accelerator (Logzilla)	Options with 1, 2 or 4 Write Flash Accelerators (Logzilla)
Maximum number of drives per array	4
Drive type supported	1TB, SATA 7200rpm SATA II disk drive
RU size	4 RU
Mounting rail kit	Must purchase separately
Warranty	3 yr

The Sun 7310 comes with four integrated 1Gb-E ports, readily available for network connectivity. The

System provides a total of 3 PCIe slots (2 available in a single configuration, and only 1 in a cluster) for network, or tape connectivity expandability. There are multiple options of Network Interface Cards and HBA for tape backup, refer to the configuration flowchart for a listing of all the options. The table below summarizes the overall configuration, and where it is indicated "1Gb", this can be either the dual port 1Gb UTP, or MMF, or the quad-port 1Gb NIC. For tape options, a dual port SCSI and dual port Fibre Channel HBAs are provided.

With 2009.Q3 Software, Infiniband (IB) support was added. The supported HCA (host channel adapter) is the Sun P/N X4237A (4237A for the ATO-option). This card uses the QSFP connector, but the other end of the cable depends on what switch is being connected to. Refer to the JTF Sunwin: 564484 "Sun Datacenter Infiniband Switches" for cable information for each of our switches.

Note: Only one additional Network card is supported in the 7310 single configuration. There are two slots available, one is allocated for an additional NIC and the other one for a Tape HBA.

Configuration options for Sun Storage 7310 Unified Storage System

Slot ==>	0	1	2	Notes
HT Link	1	1	1	
PCIe Width	x8	x8	x16	
Single	Tape HBA	SAS HBA	1Gb or 10Gb or IB	In the Single 7310 ONLY one more NIC or IB can be installed
Cluster	Cluster	SAS HBA	Tape HBA or 1Gb or 10Gb or IB	7310 Cluster has only one slot for expansion. Install either NIC, IB or Tape HBA.

PCIe slot 0, 8 lane, PE0<7:0>

PCIe slot 1, 8 lane, PE5<7:0>

PCIe slot 2, 16 lane, PE0<15:0>
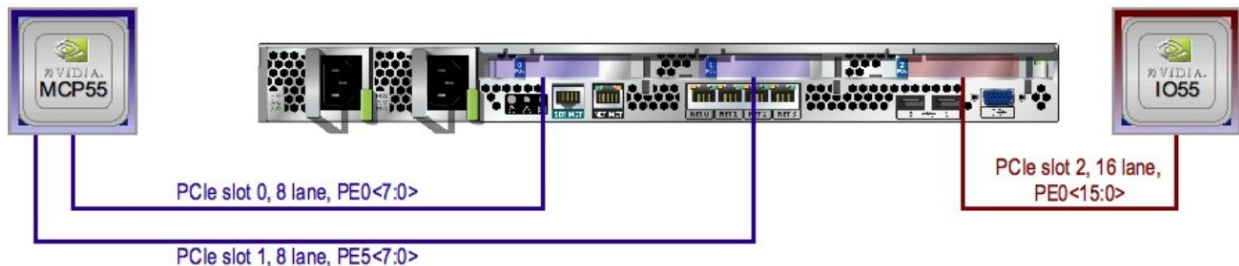
Sun Storage 7310 (single and cluster) Cabling
There is only one SAS HBA in the Storage 7310 Storage controller, and a maximum of 4 expansion arrays can be connected. The illustrations below show the proper cable configuration for a single node and cluster node.

Sun Unified Storage 7310 with one J4400 expansion unit
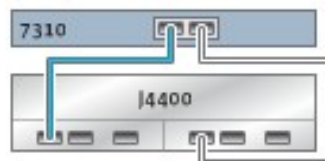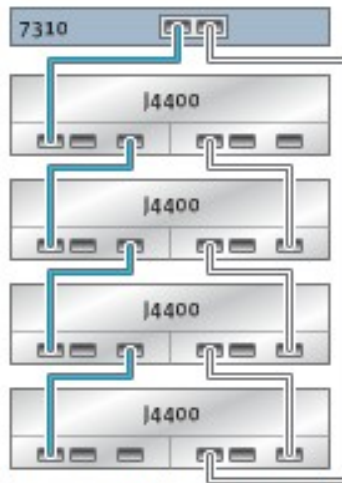
Sun Unified Storage 7310 with four J4400 expansion units
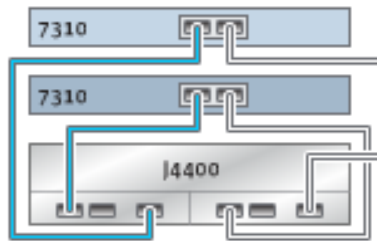
Sun Unified Storage 7310 cluster with one J4400 expansion unit
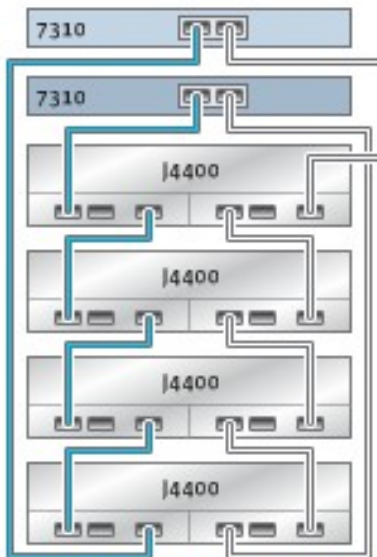
Sun Unified Storage 7310 cluster with four J4400 expansion units

Reliability

- Striping, mirroring, single-parity RAID, double-parity RAID, wide stripes

- ECC memory with ChipKill supported.

- System monitoring and diagnostic of the Sun Storage System

- Mirrored disk drive set for the operating system

- Error checking and correction on disk and SSD devices

Availability

- FMA provides hardware "self-healing" capabilities, offlining faulty components

- ZFS memory-based end-to-end data and metadata checksumming

- RAID Z DP (RAID 6) with dual parity for increased data availability

- JBOD mirroring to survive the failure of an entire JBOD

- Clustering option for node failover, delivering no single point of failure

- LACP aggregates multiple network ports and can survive the failure of n-1 ports

- Redundant hot-swappable power supplies and fan modules allow for system service without downtime.

- Built-in quad Gigabit Ethernet ports provide redundancy.

- Filesystem guarantees filesystem integrity across unforeseen events such as power outages

- Snapshots provide static images of the filesystem enabling rapid recovery of mistakenly deleted files or objects, and facilitating backup to tape.

- Replication provides for business continuance (data availability) in the event of a catastrophic loss of the primary (source) system.

Serviceability

- Phone-home provides automated case opening when failures are detected in the system

- Front-accessible, hot-swappable disk drives.

- Identical Indicator LEDs on the front and back of the chassis allow problems to be detected and isolated easily.

- Front power switch (toggles between standby and power-on) provides easy access.

- Single-step power supply removal: Power-supplies can be serviced without sliding the servers out of the rack.

- Simple software upgrade maintains older copies of the operating system and can revert to them should newer versions present a problem

Sun Storage 7310 Specifications

(for expansion unit specs, refer to 7410 section)

Architecture	
Configuration	Single Controller or Dual Controller (High Availability Cluster)
Processor	Up to Two Six-Core AMD Opteron
Main Memory	Up to 64 GB
Read Flash Accelerator (cache, SSD)	Up to 600GB (6x100GB Read Flash Accelerator), per controller
Standard and Optional Interfaces	
Integrated Network	Four 10/100/1000 Base-T Ethernet ports
Expansion bus	Three internal Low Profile PCIe slots: - Two available for expansion in the 7310 Single - One available for expansion in the 7310 Cluster, per controller
Optional Network Connectivity	Dual GigE UTP Dual GigE MMF Quad Gigabit Ethernet UTP Dual 10 GigE Fiber XFP (requires fiber transceiver) QDR Infiniband HCA
Optional Tape backup HBA	Dual Channel 4Gb FC HBA Dual Channel Ultra320 SCSI HBA
Mass Storage	
Maximum Raw Capacity	96 TB
Disk Drives	1 TB 7200 rpm SATA Disks
Write Flash Accelerator (SSD)	Optional 18GB Write Flash Accelerators for write-oriented applications
Expansion Arrays	Up to Four 24-drive expansion array, with 1TB high-capacity drives
7310 Storage Controller	
Power Supplies	
	Dual redundant, hot -swappable power supply
UL Maximum (AC Input)	8.2 Amps RMS at 100 VAC
Power Supply Rating (DC output)	650 W
Environment	
AC power	100-120 V/200-240 V AC (50/60 Hz)
Operating temperature/humidity (single, non-rack system)	5 ºC to 35 ºC (41 ºF to 95 ºF), 10% to 90% relative humidity, non-condensing
Nonoperating temperature/humidity (single, non-rack system)	-40 ºC to 70 ºC (-40 ºF to 149 ºF), up to 93% relative humidity, non-condensing
Altitude (operating) (single, non-rack system)	Up to 3000 m, maximum ambient temperature is derated by 1 degree C per 300 m above 900 m
Altitude (nonoperating) (single, non-rack system)	Up to 12,000m
Acoustic Noise Emissions	
	Declared noise emissions in accordance with ISO 9296, A-weighted, operating and idling:
LwAd (1B = 10dB) at max ambient	6.6 B
LpAm bystander at max ambient	51 dB
Regulations	
	Meets or exceeds the following requirements:
Safety	IEC 60950, UL/CSA 60950, EN60950, CB Scheme with all country differences
RFI/EMI	FCC CFR 47 Part 15 Class A, EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 300-386
Immunity	EN55024,EN300-386
Certifications	
Safety	UL/cUL, UL DEMKO, CE, BSMI, CCC, GOST-R, S-Mark
EMC	CE, FCC, VCCI, ICES, C-Tick, MIC, CCC, GOST-R, BSMI Class A
Other	Complies with WEEE Directive (2002/96/EC) and RoHS Directive (2002/95/EC)
Dimensions and Weight	
Height	44mm (1.746 in.)
Width	426mm (16.75 in.)
Depth	714mm (28.125 in.)
Weight	8.55 kg (40.90 lbs.)

Sun Storage 7410 System Architecture
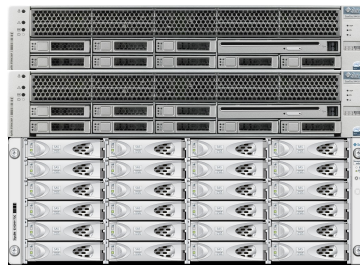
Overview

The Sun Storage 7410 System is based on the Sun Fire x4440 Server and the Sun Storage J4400 SAS Array. The x4440 server is powered by the AMD x64 Six-Core Opteron processor. It is 2U height designed to maximize rack space. The storage expansion units used for the Storage 7410 are based on the 4U J4400 SAS expansion array, with support for up to 24 x 3.5" 3Gb/sec 1TB SATA drive. Specific Expansion Array part numbers and configurations were created for the Sun Storage 7410 System.

Note: Prior to September 1, 2009 announcement, the Storage 7410 shipped with AMD x64 Four-Core Opteron processors and support up to 128GB RAM. Refer to Appendix A for information on those models.

The Sun Storage 7410 implements a true ZFS Hybrid Storage Pool with support for Flash-memory devices for acceleration of Reads (100GB Read Flash Accelerator, aka Readzilla) and Writes (18GB Write Flash Accelerator, Logzilla). Multiple configurations are provided on both the node configuration and the expansion array to accommodate the most demanding customer application performance requirements.

The 7410 System supports two configurations, a single node and a 2-node cluster for high availability. Each configuration has three levels, an Entry, Mid and High level, where the main differences are in computer power. The table below provides the main differences between the three different levels. The entry level does not provide any Readzilla drives, while the second and third provide 1 and 2 respectively (double for cluster).

The Logzilla option is provided in the SAS expansion arrays, and there are preconfigured configurations to match customer requirements. The options are:
  • 23 x 1TB drives with 1 x 18GB Logzilla
  • 22 x 1TB drives with 2 x 18GB Logzilla
  • 20 x 1TB drives with 4 x 18GB Logzilla

There are also half-populated configurations to provide a lower capacity entry point:
  • 11 x 1TB drives with 1 x 18GB Logzilla
  • 10 x 1TB drives with 2 x 18GB Logzilla

Important related to expansion arrays:
  • Active-Active Cluster configurations require 2 storage pools, and a full Storage array is required. Storage arrays that are half populated, are only supported in Active-Passive mode.

  • Maximum number of Logzillas supported in a 7410 Single controller is 8, and 16 in a Cluster

configuration. These restrictions are listed in the configuration flowcharts below.

- Half populated storage arrays are only supported when they are the first array in the system. 1.5 (full+ half), 2.5 (Two full + half), etc., are not supported configurations and WebDesk does not allow configurations of this type.

- When configuring a 7410 system in WebDesk, and two or more storage array with Logzillas will be selected, only the same type of array (i.e. 23x1TB drives with 1xLogzilla) is allowed in the same system configuration. This is done to balance the system and optimize performance.

- Restrictions listed above may change in the near future. For the first release of the Storage 7410 systems, these restrictions were put in place to minimize support issues.

- When upgrading a half-populated JBOD, the following drive part numbers must be used. This will ensure that only the approved drive for Storage 7310/7410 configurations is used. In addition, the Write Flash Accelerator (Logzilla) is listed to allow upgrading a half-JBOD to one of the supported configurations (23 drives + 1Logzilla, or 22 + 2Logzillas, or 20 + 4 Logzillas).

XTA6ST1NJ-1T7K	6 * Internal 1TB 7.2Krpm SATA HDD, 3.5" x 1" drives with brackets for Sun(TM) Storage J4400 and J4200; RoHS-6
XTA-ST1NJ-1T7K	1 * Internal 1TB 7.2Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun(TM) Storage J4400 and J4200; RoHS-6
XTA7410-LOGZ18GB	Sun Storage 7410 Logzilla Flash Accelerator 18GB, 3.5 FF, RoHS 5. (This item to be installed in the J4400 SAS Array in the S7410 system).

The following tables provide details on the Sun Storage 7410 available configurations. Effective Sept 1, 2009, the Storage 7410 (codename: Toro+) was refreshed with AMD Six-core CPUs (codename: Istanbul) and double the memory footprint with support up to 256GB per node. Note that the Readzillas were removed from the new configurations, to allow customers to select the right number for their requirements. Refer to Appendix A for old 7410 configuration information based on the 7410 Four-Core CPU.

7410 (Six-Core CPU-based)	Entry	Mid	High
Configuration available	Single or Cluster		
RAM (Single/Cluster)	64GB / 128GB	128GB / 256GB	256GB / 512GB
READ Flash Accelerator (Readzilla)	None (optional, up to 6)		
CPU Qty (Single/Cluster)	2 / 4 CPUs	4 / 8 CPUs	
CPU type	Six-Core AMD Opteron - Model 2435	Six-Core AMD Opteron - Model 8435	
Single: PCIe Slots (Total/Available)	6 / 4 2 SAS HBA standard (3 required to support full capacity)		
Cluster: PCIe Slots (Total/Available)	12 / 6 4 SAS HBA standard (6 required to support full capacity)		
Optional NICs	Dual GigE UTP or MMF, Quad Gigabit Ethernet UTP Dual 10 GigE Fiber XFP (requires fiber transceiver)		
Optional HBA for tape backup	Dual Channel Ultra320 SCSI HBA Dual Channel 4Gb FC HBA		
RU size (single / cluster)	2 / 4		
Mounting rail kit	Included		

Warranty	3 yr
Maximum capacity support	288 TB (288 x 1TB SATA drives)
Expansion Array support	Special configuration J4400 for Sun Storage 7410
Maximum number of Expansion Array	12 arrays (24 drives each)
Installed SAS HBA (single/cluster)	2 / 4

J4400 for Sun Storage 7410	
Write Flash Accelerator (Logzilla)	Options with 1, 2 or 4 Write Flash Accelerators (Logzilla)
Maximum number of drives per array	24
Drive type supported	1TB, SATA 7200rpm SATA II disk drive
RU size	4 RU
Mounting rail kit	Must purchase separately
Warranty	3 yr

The Sun 7410 comes with four integrated 1Gb-E ports, and are available for network connectivity. The System provides a total of 6 PCIe slots for network, or tape connectivity expandability. There are multiple options of Network Interface Cards and HBA for tape backup, refer to the configuration flowchart for a listing of all the options. The table below summarizes the overall configuration, and where it is indicated "1Gb", this can be either the dual port 1Gb UTP, or MMF, or the quad-port 1Gb NIC. For tape options, a dual port SCSI and dual port Fibre Channel HBAs are provides.

With 2009.Q3 Software, Infiniband (IB) support was added. The supported HCA (host channel adapter) is the Sun P/N X4237A (4237A for the ATO-option). This card uses the QSFP connector, but the other end of the cable depends on what switch is being connected to. Refer to the JTF Sunwin: 564484 "Sun Datacenter Infiniband Switches" for cable information for each of our switches.

Note: 10Gb and 1Gb NICs cannot be combined in the same system.

Configuration table for the Sun Storage 7410 (Single)

Slot ==>	0	1	2	3	4	5	
HT Link	0	0	1	0	1	1	
PCIe Width	x8	x8	x16	x8	x8	x4	
10Gb Config	SAS HBA	SAS HBA	10Gb	10Gb	SAS HBA	Tape HBA	
1Gb or IB Config	SAS HBA	SAS HBA	1Gb or IB	1Gb or IB	3rd SAS HBA or 1Gb or IB	Tape HBA	

Configuration table for the Sun Storage 7410 (Cluster)

Slot ==>	0	1	2	3	4	5	
HT Link	0	0	1	0	1	1	
PCIe Width	x8	x8	x16	x8	x8	x4	
10Gb Config	SAS HBA	SAS HBA	10Gb	10Gb or 3rd SAS HBA*	3rd SAS HBA or Tape HBA	Cluster card	
1Gb Config	SAS HBA	SAS HBA	1Gb or IB	1Gb or IB or 3rd SAS HBA*	1Gb or IB or Tape or 3rd SAS HBA	Cluster card	
* 3rd SAS HBA in slot 3 only if Tape HBA present in slot 4							
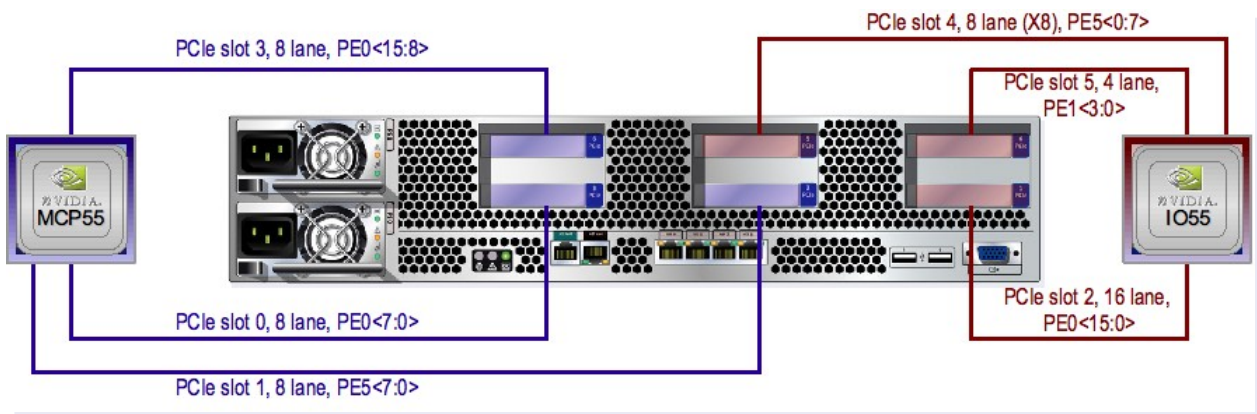
Sun Storage 7410 (single and cluster) Cabling

The expansion array options for the Sun Storage 7410 vary from fully populated and half-populated expansion units with write-optimized SSDs (Logzilla) to expansion arrays with only SATA drives. Refer to the configuration guide for the multiple options available. The following illustrations use an expansion array with 4 Logzilla's as the primary for the SAS HBA link. For maximum performance a customer may install an array with SSDs in each SAS HBA Link. For simplification, only one or two SAS HBA links are shown in the following illustrations. The maximum number of expansion arrays that is supported per SAS HBA link is 4,f or a total of 12 expansion arrays.

It is recommended that expansion units with Logzilla are positioned first in the SAS HBA link, and one per link (there are up to three SAS HBA links in each 7410 single or cluster).

Note: Refer to the online help documentation for complete single and cluster cabling illustrations from minimum to maximum number of expansion arrays.

Sun Storage 7410 with single array or multiple array (maximum 4 expansion arrays supported per SAS HBA).
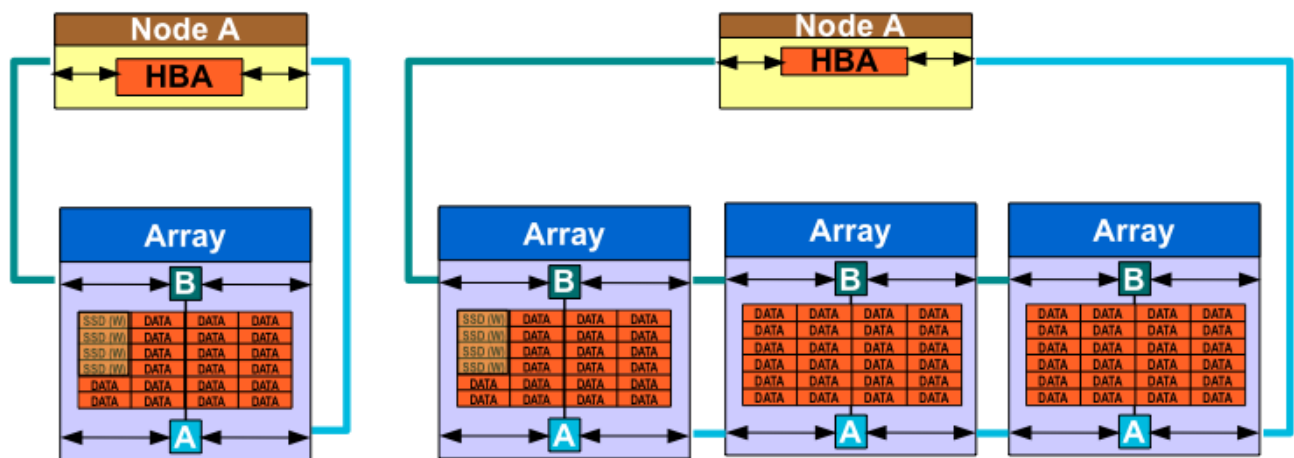
Sun Storage 7410 with multiple array daisy-chains, resilient to SAS HBA failure (maximum 4 expansion arrays supported per SAS HBA).
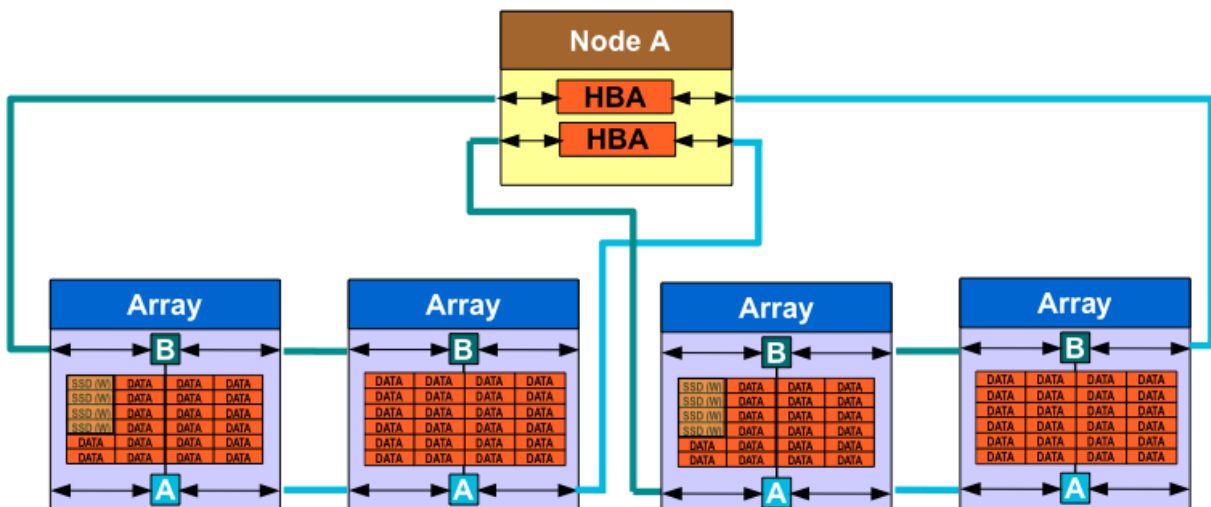
Sun Storage 7410 Cluster with single array or single array daisy-chain. When adding more expansion units to the second or third SAS HBA link, the connection is the same as for the single SAS HBA example shown below. Up to three SAS HBA links available for either the Single or Cluster configuration.

Reliability

- Striping, mirroring, single-parity RAID, double-parity RAID, wide stripes

- ECC memory with ChipKill supported.

- System monitoring and diagnostic of the Sun Storage System

- Mirrored disk drive set for the operating system

- Error checking and correction on disk and SSD devices

Availability

- FMA provides hardware "self-healing" capabilities, offlining faulty components

- ZFS memory-based end-to-end data and metadata checksumming

- RAID Z DP (RAID 6) with dual parity for increased data availability

- JBOD mirroring to survive the failure of an entire JBOD

- Clustering option for node failover, delivering no single point of failure

- LACP aggregates multiple network ports and can survive the failure of n-1 ports

- Redundant hot-swappable power supplies and fan modules allow for system service without downtime.

- Built-in quad Gigabit Ethernet ports provide redundancy.

- Filesystem guarantees filesystem integrity across unforeseen events such as power outages

- Snapshots provide static images of the filesystem enabling rapid recovery of mistakenly deleted files or objects, and facilitating backup to tape.

- Replication provides for business continuance (data availability) in the event of a catastrophic loss of the primary (source) system.

Serviceability

- Phone-home provides automated case opening when failures are detected in the system

- Front-accessible, hot-swappable disk drives.

- Identical Indicator LEDs on the front and back of the chassis allow problems to be detected and isolated easily.

- Front power switch (toggles between standby and power-on) provides easy access.

- Single-step power supply removal: Power-supplies can be serviced without sliding the servers out of the rack.

- Simple software upgrade maintains older copies of the operating system and can revert to them should newer versions present a problem

Sun Storage 7410 Specifications

Architecture

Configuration	Single Controller or Dual Controller (High Availability Cluster)
Processor	Up to Four Six-Core AMD Opteron
Main Memory	Up to 256 GB
Read Flash Accelerator (cache, SSD)	Up to 600GB (6x100GB Read Flash Accelerator), Optional

Standard and Optional Interfaces

Integrated Network	Four 10/100/1000 Base-T Ethernet ports
Expansion bus	Six internal MD2 Low Profile PCIe slots
Optional Network Connectivity	Dual GigE UTP Dual GigE MMF Quad Gigabit Ethernet UTP Dual 10 GigE Fiber XFP (requires fiber transceiver) QDR Infiniband HCA
Optional Tape backup HBA	Dual Channel 4Gb FC HBA Dual Channel Ultra320 SCSI HBA

Mass Storage

Maximum Raw Capacity	Up to 288 TB
Disk Drives	1 TB 7200 rpm SATA Disks
Write Flash Accelerator (SSD)	Optional 18GB Write Flash Accelerators for write-oriented applications
Expansion Arrays	Up to 12, 24-drive expansion array, with 1TB high-capacity drives

Storage Controller

Power Supplies

	Dual redundant, hot -swappable power supply
UL Maximum (AC Input)	12 Amps RMS at 100 VAC
Power Supply Rating (DC output)	1050 W

Environment

AC power	100-120 V/200-240V (50/60 Hz)
Operating temperature/humidity (single, non-rack system)	5 °C to 35 °C (41 °F to 95 °F), 10% to 90% relative humidity, non-condensing
Nonoperating temperature/humidity (single, non-rack system)	-40 °C to 70 °C (-40 °F to 158 °F), up to 93% relative humidity, non-condensing
Altitude (operating) (single, non-rack system)	Up to 3048 m, maximum ambient temperature is derated by 1 degree C per 300 m above 900 m
Altitude (nonoperating) (single, non-rack system)	15kPa

Acoustic Noise Emissions

	Declared noise emissions in accordance with ISO 9296, A-weighted, operating and idling:
LwAd (1B = 10dB) at max ambient	7.7 B
LpAm bystander at max ambient	65.8 dB

Regulations

	Meets or exceeds the following requirements:
Safety	IEC 60950, UL/CSA 60950, EN60950, CB Scheme with all country differences
RFI/EMI	FCC CFR 47 Part 15 Class A, EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 300-386
Immunity	EN55024,EN300-386

Certifications

Safety	UL/cUL, UL DEMKO, CE, BSMI, CCC, GOST-R, S-Mark
EMC	CE, FCC, VCCI, ICES, C-Tick, MIC, CCC, GOST-R, BSMI Class A
Other	Complies with WEEE Directive (2002/96/EC) and RoHS Directive (2002/95/EC)

Dimensions and Weight

Height	87.85mm (3.46in)
Width	425.5mm (16.75 in.)
Depth	711.2mm (28 in.)
Weight	28.6kg (63lbs)

Expansion Array

Reliability, Availability and Serviceability

RAS features	Hot-swappable components
	Non-disruptive hot-swappable I/O modules
	Non-disruptive hot-swappable disk drives
	Dual hot-swappable, load-sharing power supplies/cooling modules

Dimensions

Height x width x depth	6.88 in. x 17.52 in. x 24.02 in. (174.8 mm x 445.0 mm x 610.2 mm) including SAS connector; including thumb screws, depth is 23.24 in. (590.3 mm)
Weight (maximum)	110.23 lb. (50 kg)

Power

Input voltage	88 - 264 VAC
Input frequency	47 – 63 Hz
Output power	760 W
Power consumption	110.62 VA
	100 W

Operating Environment

Heat output	662 W (2123 BTU/hour)
Temperature	35°F to 95°F (0°C to 35°C)
Humidity (non-condensing)	20% to 80% maximum
Altitude	0 to 9843 feet (3000 meters)
Shock	31G +/-5%, with pulse duration of 2.6 ms or less half-sine, bottom side tested only
Vibration	0.25 G (peak), 3 to 200 Hz sweep @ ½ octave per minute, bottom side tested only

Regulations

Electromagnetic emissions standards	FCC - Class A
	CE - Specific requirements in effect from July 1, 2001
	VCCI - for Japan
	CCC - for China
	BSMI - for Taiwan/CNS/3438
	C-TICK - for Australia and New Zealand
Safety standards	UL/CUL: for U.S. with Canada/UL60950-1
	TUV: for Germany/EN60950-1
	CB (by TUV): IEC60950-1
	BSMI: Taiwan/CNS14336
	CCC: for China

Ordering Notes

There are two ordering models supported at Sun, PTO (pick to order) and ATO (assemble to order, customized factory configured). Whenever NICs/HBAs/Readzillas are ordered, ATO ensures that those additional options will be properly installed, configured, and tested prior to shipping to customers. All Storage 7000 will eventually be moved to ATO model to ensure maximum customer satisfaction.

The ATO process followed for Sun Storage 7000:

- Is designed to provide the best customer experience when NICs/HBAs are ordered
- These options will be pre-assembled at the factory and tested (our expert assembly and testing personnel will properly install/test the options)
- When unit arrives at the customer, they do not need to open the system to install components
- Removes the risk of misconfiguration by the customer

Follow the order-flow diagrams in the following section to properly configure the Sun Storage 7000.

- Ordering models offered.
  - 7410, 7310: ATO only.
    The expansion units for the Sun Storage 7310/7410 do not require any further assembly, they ship fully assembled and tested and are only offered in the PTO model.
  - 7210, 7110: PTO and ATO
- Power cords need to be ordered separate, depending on country where unit will be installed
- 7110, 7210 ship with mounting kits
- 7310 and 7410 ship with mounting kit, but the expansion array options does not. Rail mounting kits need to be ordered for the expansion arrays (see configuration flowchart below).
- All Software features are included with the Storage 7000 family, there is no need to order any additional license for the software to function.
- The Storage 7310 and 7410 systems are available in single or cluster mode.
- When upgrading a half-populated JBOD, the following drive part numbers must be used. This will ensure that only the approved drive for Storage 7310/7410 configurations is used. In addition, the Write Flash Accelerator (Logzilla) is listed to allow upgrading a half-JBOD to one of the supported configurations (23 drives + 1Logzilla, or 22 + 2Logzillas, or 20 + 4 Logzillas).

XTA6ST1NJ-1T7K	6 * Internal 1TB 7.2Krpm SATA HDD, 3.5" x 1" drives with brackets for Sun(TM) Storage J4400 and J4200; RoHS-6
XTA-ST1NJ-1T7K	1 * Internal 1TB 7.2Krpm SATA HDD, 3.5" x 1" drive with bracket for Sun(TM) Storage J4400 and J4200; RoHS-6
XTA7410-LOGZ18GB	Sun Storage 7410 Logzilla Flash Accelerator 18GB, 3.5 FF, RoHS 5. (This item to be installed in the J4400 SAS Array in the S7410 system).

Important:

The ATO process requires that the Storage 7310/7410 cluster controller be ordered in quantities of 2 (rather than 1). This change was required to be compatible with Sun's contract manufacturer processes. Pricing has been adjusted on the XATO part number accordingly, and the WebDesk Configurator has been changed to automatically include qty:2 of the ATO 7410 and 7310 Cluster storage controller part number.

Following are the ATO ordering flowcharts for all models. PTO shown for 7110 and 7210.

Sun Storage 7410 – XATO Configuration

Sun Storage 7410 – Ordering Flow Chart
Each step represents a line item on a Sales Order

Step 1. Required

Base Storage Appliance	⇨

Note: Rail mounting kit included with this SKU

Order qty: 2 (<== important, qty must be 2)
TB7410-26AR064 - S7410,64GB,2x2.6G,
TB7410-46AR128 - S7410,128GB,4x2.6G,
TB7410-46AR256 - S7410,256GB,4x2.6G,

Order qty: 2 (<== important, Cluster XATO qty must be 2)
Cluster configurations (per node)
TB7410-26AR064HA - S7410,64GB,2x2.6G,clustr-card
TB7410-46AR128HA - S7410,128GB,2x2.6G,clustr-card
TB7410-46AR256HA - S7410,256GB,2x2.6G,clustr-card

Step 2. Required

Storage	⇨

A maximum of 12 Arrays (with Write Flash or without) are supported.
- *Systems ship with 2 SAS HBA. Select 3rd HBA + cables when selecting 3 arrays with Flash or a total of 9 of more arrays*
- *Cannot select half-full array (10, 11, 12TB) after a full array. (x.5 config not supported)*

Array with Flash Accelerator (Logzilla)
Single Configuration – choose up to 3 (for Single), 4 (for Cluster)
XTA4400A2N23S18 - J4400 array, 23TB,LOG-18G
XTA4400A2N22S36 - J4400 array, 22TB,LOG-36G
XTA4400A2N20S72 - J4400 array, 20TB,LOG-72G
XTA4400A2N11S18 - J4400 array, 11TB,LOG-18G
XTA4400A2N10S36 - J4400 array, 10TB,LOG-36G

Expansion Array – Choose qty: 0 to 12 (max combined with above is 12)

XTA4400R00A2N24 - J4400 array, 24TB
XTA4400R00A2N12 - J4400 array,12TB

3rd SAS HBA (Qty 1 + 2 cables for single, double amount for Cluster)
Required when selecting 3 arrays with Flash or a total of 9 of more arrays

SG-PCIE8SAS-E-Z - 8-Port external SAS PCIe HBA
XTA-2.0M-SAS - 2.0m, mini, shielded, SAS cable

Storage Arrays do not ship with rail kit, order qty:1 for each 4400 array
Note: 7410 Storage controller ship with rail kit, only order for 4400 Arrays.

XTA-4400-4URK-19U - Sun(TM) Storage J4400 4U universal rack rail kit

Step 3. Optional

Read Flash Accelerator	⇨

Up to 6 (single) or 12 (cluster), including base items
TA7410-READZ100G - Sun Storage 7410 Read Flash Accelerator 100GB

Step 4. Required

Power cords	⇨

Order cable type for country of purchase (shown US type):
X311L - NORTH AMERICAN/ASIA PWR CRD KT
X320A – North. Amer./Asia 220V Pwr Cord Kit

Step 5. Optional

Network connectivity	⇨

Single configurations have 4 slots available. Cluster have 3 slots available.
Maximum 2x10Gb-E NICs or 3x1Gb-E/IB (2x when 3rd SAS HBA selected). Cannot combine 10Gb with 1Gb NICs or IB.
Order:
7280A-2 - Sun PCI-E Dual GigE UTP LP
7281A-2 - Sun PCI-E Dual GigE MMF LP
4446A-Z - Sun x4 PCI-E Quad GigE UTP
4237A – Sun QDR Infiniband HCA
1027A-Z – Sun PCI-E Dual 10 GigE Fiber

[If 10GbE NIC, select up to 2 transceivers]
5560A-Z - 10 GE LR XFP Transceiver
5558A-Z - 10 GE SR XFP Trnscvr

Step 6. Optional

Tape connectivity	⇨

Maximum one Tape HBA
SG-PCIE2SCSIU320Z - PCIex4 Dual Port U320 SCSI HBA (tape backup)
SG-PCIE2FC-QF4 - 4Gb FC Dual Port HBA (tape backup)

Step 7. Optional

Service Option	⇨

Order:
Select Silver, Gold, Gold 7x24, Platinum

Step 8. Optional

Installation Services	⇨

Order:
Select Installation during business hours or after business hours

Sun Storage 7310 – ATO Configuration

Sun Storage 7310 – Ordering Flow Chart
Each step represents a line item on a Sales Order

Step 1. Required

| Base Storage Appliance | ⇨ | **Order qty: 1**
TB7310-16AS00 - Storage 7310, 16GB, 2.2G Six-Core CPU

Order qty: 2 (<== important, Cluster XATO qty must be 2)
TB7310-16AS00HA - Storage 7310 (need qty:2), 16GB, 2.2G Six-Core CPU, cluster enabled

Note: Rail mounting kit is included with the product |

Step 2. Required

| Storage | ⇨ | **Array with Logzilla Flash Accelerator**
 - Maximum of Four arrays are supported (either with Logzilla or Expansion arrays)
 - Maximum Logzillas per Single is 8, per Cluster is 16.
- Cannot select half-full array (10, 11, 12TB) after a full array. (x.5 config not supported)

XTA4400A2N23S18 - J4400 array,23TB,LOG-18G
XTA4400A2N22S36 - J4400 array, 22TB,LOG-36G
XTA4400A2N20S72 - J4400 array, 20TB,LOG-72G
XTA4400A2N11S18 - J4400 array, 11TB,LOG-18G
XTA4400A2N10S36 - J4400 array, 10TB,LOG-36G
Expansion Array
XTA4400R00A2N24 - J4400 array,24TB
XTA4400R00A2N12 - J4400 array,12TB

Storage Arrays do not ship with rail kit, order qty:1 for each expansion array
Note: 7310 Storage controller ship with rail kit, only order for 4400 Arrays.
XTA-4400-4URK-19U – Sun Storage J4400 4U universal rack rail kit |

Step 3. Optional

| Read Flash (Readzilla) | ⇨ | *Up to 6 Readzillas (12 for Cluster)*
Order
TA7410-READZ100G – Read Flash Accelerator, 100GB |

Step 4. Required

| Power cords | ⇨ | **Order:**
X311L - NORTH AMERICAN/ASIA PWR CRD KT
X320A – North. Amer./Asia 220V Pwr Cord Kit

...other/depending on GEO |

Step 5. Optional

| Network Interface Cards | ⇨ | *Single configurations have 2 slots available. Cluster have 1 slot available.*
One NIC maximum is supported for either Single or Cluster. In single, the second card must be a Tape HBA if necessary.
Order:
7280A-2 - Sun PCI-E Dual GigE UTP LP
7281A-2 - Sun PCI-E Dual GigE MMF LP
4446A-Z - Sun x4 PCI-E Quad GigE UTP
4237A – Sun QDR Infiniband HCA
1027A-Z – Sun PCI-E Dual 10 GigE Fiber

[If 10GbE NIC, select up to 2 transceivers]
5560A-Z - 10 GE LR XFP Transceiver
5558A-Z - 10 GE SR XFP Trnscvr |

Step 6. Optional

| Tape HBA | ⇨ | *Maximum one Tape HBA (in Cluster, cannot add NIC when tape HBA selected)*
- SCSI dual port no longer supported with Storage 7310 (effective Sept 2009)
Order qty: 1
SG-PCIE2FC-QF4 - 4Gb FC Dual Port HBA (tape backup) |

Step 7. Optional

| Service Option | ⇨ | **Order:**
Select Silver, Gold, Gold 7x24, Platinum |

Step 8. Optional

| Installation Services | ⇨ | **Order:**
Select Installation during business hours or after business hours |

Sun Storage 7210 – PTO Configuration

Sun Storage 7210 – Ordering Flow Chart
Each step represents a line item on a Sales Order

Step 1. Required

Base Storage Appliance	⇨	Order qty: 1 XTA7210-24AS18N22 - S7210, 22.5TB, 64GB, LOG-18G XTA7210-24AS36N44 - S7210, 44TB, 64GB, LOG-36G XTA7210-24AS00N23 - S7210, 23TB, 64GB XTA7210-24AS00N46 - S7210, 46TB, 64GB *Note: Rail mounting kit is included with the product*

Step 2. Required

Power cords	⇨	**Order cable type for country of purchase (shown US type):** *note: only 220V is supported with the Storage 7210 System* X320A – North. Amer./Asia 220V Pwr Cord Kit

Step 3. Optional

Network Interface Cards	⇨	*3 slots available for NICs. Maximum three 1Gb-E or two 10Gb-E.* **Order:** X7280A-2 - Sun PCI-E Dual GigE UTP LP X7281A-2 - Sun PCI-E Dual GigE MMF LP X4446A-Z - Sun x4 PCI-E Quad GigE UTP X4237A – Sun QDR Infiniband HCA X1027A-Z – Sun PCI-E Dual 10 GigE Fiber *[If 10GbE NIC, select up to 2 transceivers]* X5560A-Z - 10 GE LR XFP Transceiver X5558A - 10 GE SR XFP Trnscvr

Step 4. Optional

Tape HBA	⇨	*Maximum one HBA* **Order qty: 1** SG-XPCIE2SCSIU320Z - PCIex4 Dual Port U320 SCSI HBA (tape backup) SG-XPCIE2FC-QF4 - 4Gb FC Dual Port HBA (tape backup)

Step 5. Optional

Service Option	⇨	**Order:** Select Silver, Gold, Gold 7x24, Platinum

Step 6. Optional

Installation Services	⇨	**Order:** Select Installation during business hours or after business hours

Sun Storage 7110 – ATO Configuration

Sun Storage 7110 – Ordering Flow Chart

Each step represents a line item on a Sales Order

Step 1. Required

| Base Storage Appliance | ⇨ | **Order qty: 1**
TB7110-16ASA20 - Sun Storage 7110, 2.0TB
TB7110-16ASA42 - Sun Storage 7110, 4.2TB
Note: Rail mounting kit is included with the product |

Step 2. Required

| Power cords | ⇨ | **Order:**
X311L - NORTH AMERICAN/ASIA PWR CRD KT
X320A – North. Amer./Asia 220V Pwr Cord Kit

...US type shown, select appropriate for country of purchase |

Step 3. Optional

| Network Interface Cards | ⇨ | *4 slots available for NICs. Maximum three 1Gb-E or two 10Gb-E.*
Order:
7280A-2 - Sun PCI-E Dual GigE UTP LP
7281A-2 - Sun PCI-E Dual GigE MMF LP
4446A-Z - Sun x4 PCI-E Quad GigE UTP
4237A – Sun QDR Infiniband HCA
1027A-Z – Sun PCI-E Dual 10 GigE Fiber

[If 10GbE NIC, select up to 2 transceivers]
5560A-Z - 10 GE LR XFP Transceiver
5558A-Z - 10 GE SR XFP Trnscvr |

Step 4. Optional

| Tape HBA | ⇨ | *Maximum one HBA*
Order qty: 1
SG-PCIE2SCSIU320Z - PCIex4 Dual Port U320 SCSI HBA (tape backup)
SG-PCIE2FC-QF4 - 4Gb FC Dual Port HBA (tape backup) |

Step 5. Optional

| Service Option | ⇨ | **Order:**
Select Silver, Gold, Gold 7x24, Platinum |

Step 6. Optional

| Installation Services | ⇨ | **Order:**
Select Installation during business hours or after business hours |

Part Number and Pricing for main Sun Storage 7000

As they are presented in the previous configuration tables. For common component pricing (i.e. NIC, HBA, etc.), refer to the standard List Price for information.

Part Number	Description	Disc. Cat	List Price USD
Sun Storage 7110			
TB7110-16ASA20	Sun Storage 7110 Unified Storage System: 2TB raw, 16x146GB 2.5" SAS HDD, 8GB RAM (2x4GB), 1x CPU Istanbul 2427 (2.2GHz), 4x 10/100/1000 Ethernet ports. Two power supplies, Rail kit included. No Power Cord, order Geo-specific X-option. RoHS 5. (For Factory Integration only)	F	$10,995
TB7110-16ASA42	Sun Storage 7110 Unified Storage System: 4TB raw, 16x300GB 2.5" SAS HDD, 8GB RAM (2x4GB), 1x CPU Istanbul 2427 (2.2GHz), 4x 10/100/1000 Ethernet ports. Two power supplies, Rail kit included. No Power Cord, order Geo-specific X-option. RoHS 5. (For Factory Integration only)	F	$15,995
Sun Storage 7210			
XTA7210-24AS18N22	Sun Storage 7210 Unified Storage System: 22.5TB raw, 47x500GB 3.5" SATA HDD, 64GB RAM, 1x18GB Logzilla Flash Accelerator, 2x2.3GHz Quad-Core processor, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit and Cable Management Arm. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$53,995
XTA7210-24AS36N44	Sun Storage 7210 Unified Storage System: 44TB raw, 46x1TB 3.5" SATA HDD, 64GB RAM, 2x18GB Logzilla Flash Accelerator, 2x2.3GHz Quad-Core processor, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit and Cable Management Arm. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$85,995
XTA7210-24AS00N23	Sun Storage 7210 Unified Storage System: 23TB raw, 48x500GB 3.5" SATA HDD, 64GB RAM, 2x2.3GHz Quad-Core processor, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit and Cable Management Arm. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$48,995
XTA7210-24AS00N46	Sun Storage 7210 Unified Storage System: 46TB raw, 48x1TB 3.5" SATA HDD, 64GB RAM, 2x2.3GHz Quad-Core processor, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit and Cable Management Arm. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$75,995
Sun Storage 7310			
TB7310-16AS00	Sun Storage 7310 Storage controller: 16GB RAM, 1x Istanbul 2427 (2.2GHz) , 1x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$22,995
TB7310-16AS00HA	(Must purchase qty: 2). Sun Storage 7310 Storage controller for Cluster configuration: 16GB RAM, 1x Istanbul 2427 (2.2GHz), 1x SAS HBA, 4x 10/100/1000 Ethernet ports, Cluster card. Two power supplies, Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$22,995
Sun Storage 7410 (Single)			
TB7410-26AR064	Sun Storage 7410 Storage controller: 64GB RAM, 2x six-core 2.6GHz processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$55,995
TB7410-46AR128	Sun Storage 7410 Storage controller: 128GB RAM, 4x six-core 2.6GHz processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$78,995
TB7410-46AR256	Sun Storage 7410 Storage controller: 256GB RAM (32x8GB), 4x six-core 2.6GHz processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$124,995
Sun Storage 7410 (Cluster: Must order qty 2)			
TB7410-26AR064HA	(Must purchase qty: 2). Sun Storage 7410 Storage controller for Cluster configuration: 64GB RAM, 2x six-core 2.6GHz processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports, Cluster card. Two power supplies, Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$52,995
TB7410-46AR128HA	(Must purchase qty: 2). Sun Storage 7410 Storage controller for Cluster configuration: 128GB RAM, 4x six-core 2.6GHz processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports, Cluster card. Two power supplies, Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$75,995
TB7410-46AR256HA	(Must purchase qty: 2). Sun Storage 7410 Storage controller for Cluster configuration: 256GB RAM, 4x six-core 2.6GHz processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports, Cluster card. Two power supplies, Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (FOR FACTORY INTEGRATION ONLY)	M	$121,995

Storage expansion arrays are PTO only, predefined configurations. These part numbers can be used for either Sun Storage 7410 or 7310.

Part Number	Description	Disc. Cat	List Price USD
Storage Options for Sun Storage 7410			
XTA4400A2N23S18	Sun Storage J4400 SAS Array for Sun Storage 7410 , Rack-Ready, 23x1TB 7200rpm SATA HDD, 1x18GB Logzilla Flash Accelerator, Includes 2* 0.5m SAS cables; RoHS-5.	M	$35,995
XTA4400A2N22S36	Sun Storage J4400 SAS Array for Sun Storage 7410 , Rack-Ready, 22x1TB 7200rpm SATA HDD, 2x18GB Logzilla Flash Accelerator, Includes 2* 0.5m SAS cables; RoHS-5.	M	$43,795
XTA4400A2N20S72	Sun Storage J4400 SAS Array for Sun Storage 7410 , Rack-Ready, 20x1TB 7200rpm SATA HDD, 4x18GB Logzilla Flash Accelerator, Includes 2* 0.5m SAS cables; RoHS-5.	M	$59,295
XTA4400A2N11S18	Sun Storage J4400 SAS Array for Sun Storage 7410 , Rack-Ready, 11x1TB 7200rpm SATA HDD, 1x18GB Logzilla Flash Accelerator, Includes 2* 0.5m SAS cables; RoHS-5.	M	$24,795
XTA4400A2N10S36	Sun Storage J4400 SAS Array for Sun Storage 7410 , Rack-Ready, 10x1TB 7200rpm SATA HDD, 2x18GB Logzilla Flash Accelerator, Includes 2* 0.5m SAS cables; RoHS-5.	M	$32,495
XTA4400R00A2N24	Sun Storage J4400 SAS Array for Sun Storage 7410 , Rack-Ready, 24x1TB 7200rpm SATA HDD, Includes 2* 0.5m SAS cables; RoHS-5.	M	$28,295
XTA4400R00A2N12	Sun Storage J4400 SAS Array for Sun Storage 7410 , Rack-Ready, 12x1TB 7200rpm SATA HDD, Includes 2* 0.5m SAS cables; RoHS-5.	M	$16,995
XTA7410-READZ100G	Sun Storage 7410 Readzilla Flash Accelerator 100GB, 2.5" FF, RoHS-6	M	$5,395
TA7410-READZ100G	Sun Storage 7410 Readzilla Flash Accelerator 100GB, 2.5" FF, RoHS 6 (Factory integration only).	M	$5,395

Warranty, Service and Support

SERVICE OFFERINGS

Sun offers a suite of award-winning services, including installation, support, professional services, and training to help customers optimize their Sun Storage 7000 implementations.

Warranty: The warranty varies by product, below is the warranty information for each product model:

	7110	7210	7310	7410
Basic Hardware Warranty term	1yr	2yr	3yr	3yr
Phone coverage/call back response	Business Hours/8 hrs			
On-site coverage hrs/response time	Next Business Day (business hours, FRUs only)			
Delivery Method	On-Site (FRU only) or Customer Replaceable Unit			
Customer installable hardware product	Yes			

* Full System support means the services provided are as designated in the legal Service Listing and includes software support. Refer to link for more details: http://www.sun.com/service/storageplans/resources.jsp

In-Warranty Upgrade (IWU) Offerings

SunSpectrum Service Plans are available both during and after the warranty period. Customers may choose to uplift the service and support agreement to meet their business needs by purchasing a SunSpectrum Service Plan.

Note: SunSpectrum Support applies to the base storage appliance and to the Storage Array options.

Enterprise Installation Service

Installation and configuration of the Sun Storage 7000 including installation planning, site audit, acceptance testing and system turnover. The scope of the installation is expected to get the Storage7000 System to a basic level of functionality including:

- Planning the Installation
- Installing the Storage 7000, and (for 7410, 7310) the Storage Expansion Unit
- Powering on the System Locally
- Connecting the Grounding Cable
- Connecting the Power Cables
- Establishing a Serial Connection
- Establishing Initial Configuration for one LUN
- Setting and Verifying Default Configuration

Knowledge Services

EA-111   Sun Spectrum Education Account.

Help your customers stay ahead of constantly changing technologies by investing in their enterprise's most important asset – people. Thousands of students each year are trained by Sun and its authorized centers through Web-based courses and at training sites located in more than 60 countries. Sun Education's historical business manages a portfolio of IT curriculum focused on Sun technology sold and delivered to Sun external audiences in classroom, CD-ROM, and web formats.

Professional Services

Storage Migration Service - This service can help customers safely transfer data from one storage system to another storage system, without pulling their internal resources from other critical business tasks. Sun Services can offer multiple levels of consulting services to ensure a smooth data migration from the existing storage to the Storage 7000. Sun Services offers a wide range of data management and migration services to accommodate most customer environments and circumstances. Contact local Sun Services for further details and quotation for the specific customer environment.

The following matrices provide Installation Pricing and SunSpectrum Pricing.

Type of Install	EIS PN	Short Description	CAT	Price(US LIST)
Business Hour Install	EIS-ST7110-E	Install SST 7110 SYSTEM	E	$960.00
After-Hour Install	EIS-ST7110-E-AH	Install SST 7110 SYSTEM AH	E	$1,920.00
Deinstall	EIS-DEINST7110-E	DeInstall SST 7110 SYSTEM	E	$480.00
Business Hour Install	EIS-ST7210-E	Install SST 7210 SYSTEM	E	$1,620.00
After-Hour Install	EIS-ST7210-E-AH	Install SST 7210 SYSTEM AH	E	$3,240.00
Deinstall	EIS-DEINST7210-E	DeInstall SST 7210 SYSTEM	E	$816.00
Business Hour Install	EIS-ST7310-E	Install SST 7310 Single	E	$960.00
After-Hour Install	EIS-ST7310-E-AH	Install SST 7310 Single AH	E	$1,920.00
Deinstall	EIS-DEINST7310-E	DeInstall SST 7310 Single	E	$480.00
Business Hour Install	EIS-ST7310CATO-E	Install SST 7310 Cluster ATO (qty:2 required)	E	$732.00
After-Hour Install	EIS-ST731CATO-E-AH	Install SST 7310 Cluster ATO AH (qty:2 required)	E	$1,464.00
Deinstall	EIS-DEIN731CATO-E	DeInstall SST 7310 Cluster ATO (qty:2 required)	E	$372.00
Business Hour Install	EIS-ST7410CNT-E	Install SST 7410 CONTROLLER	E	$960.00
After-Hour Install	EIS-ST7410CNT-E-AH	Install SST 7410 CONTROLLER AH	E	$1,920.00
Deinstall	EIS-DEIN7410CNT-E	DeInstall SST 7410 CONTROLLER	E	$480.00
Business Hour Install	EIS-ST7410CATO-E	Install SST 7410 CLUSTER ATO CONT (qty:2 required)	E	$732.00
After-Hour Install	EIS-ST741CATO-E-AH	Install SST 7410 CLUSTER ATO CONT AH (qty:2 required)	E	$1,464.00
Deinstall	EIS-DEIN7410CATO-E	DeInstall SST 7410 CLUSTER ATO CONT (qty:2 required)	E	$372.00
Business Hour Install	EIS-ST7410EXP-E	Install SST 7410 EXP.ARRAY	E	$168.00
After-Hour Install	EIS-ST7410EXP-E-AH	Install SST 7410 EXP. ARRAY AH	E	$336.00
Deinstall	EIS-DEIN7410EXP-E	DeInstall SST 7410 EXP.ARRAY	E	$84.00
Business Hour Install	EIS-7X00SSD-E	Install SST 7X00 SSDs(up to 8)	E	$660.00
After-Hour Install	EIS-7X00SSD-E-AH	Install SST 7X00 SDDs(up to 8) AH	E	$1,320.00
Deinstall	EIS-DEIN7X00SSD-E	DeInstall SST 7X00 SSDs	E	$336.00

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
TB7110-16AS20 TB7110-16AS42 Also for older: XTA7110-14ASA20 TA7110-14ASA20	IWU-ST7110-1P	ST7110 1YR PLAT STK SVC	$1,148.40
	IWU-ST7110-2P	ST7110 2YR PLAT STK SVC	$3,106.94
	IWU-ST7110-3P	ST7110 3YR PLAT STK SVC	$4,898.45
	IWU-ST7110-24-1G	ST7110 1YR GLD7X24 STK SVC	$861.30
	IWU-ST7110-24-2G	ST7110 2YR GLD7X24 STK SVC	$2,480.54
	IWU-ST7110-24-3G	ST7110 3YR GLD7X24 STK SVC	$3,961.98
	IWU-ST7110-1G	ST7110 1YR GOLD STK SVC	$645.98
	IWU-ST7110-2G	ST7110 2YR GOLD STK SVC	$1,998.22
	IWU-ST7110-3G	ST7110 3YR GOLD STK SVC	$3,235.62
	IWU-ST7110-1S	ST7110 1YR SILVER STK SVC	$417.60
	IWU-ST7110-2S	ST7110 2YR SILVER STK SVC	$1,403.14
	IWU-ST7110-3S	ST7110 3YR SILVER STK SVC	$2,305.15

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
XTA7210-24AS00N11 TA7210-24AS00N11	IWU-ST721011-1P	ST721011TB 1YR PLAT STK SVC	$3,207.60
	IWU-ST721011-2P	ST721011TB 2YR PLAT STK SVC	$6,158.59
	IWU-ST721011-3P	ST721011TB 3YR PLAT STK SVC	$11,267.42
	IWU-ST721011-24-1G	ST721011TB 1YR GLD7X24 STK SVC	$2,405.70
	IWU-ST721011-24-2G	ST721011TB 2YR GLD7X24 STK SVC	$4,618.94
	IWU-ST721011-24-3G	ST721011TB 3YR GLD7X24 STK SVC	$8,852.98
	IWU-ST721011-1G	ST721011TB 1YR GOLD STK SVC	$1,804.28
	IWU-ST721011-2G	ST721011TB 2YR GOLD STK SVC	$3,464.21
	IWU-ST721011-3G	ST721011TB 3YR GOLD STK SVC	$7,008.61
	IWU-ST721011-1S	ST721011TB 1YR SILVER STK SVC	$1,166.40
	IWU-ST721011-2S	ST721011TB 2YR SILVER STK SVC	$2,239.49
	IWU-ST721011-3S	ST721011TB 3YR SILVER STK SVC	$4,828.90
XTA7210-24AS18N22 TA7210-24AS18N22	IWU-ST721022-1P	ST721022TB 1YR PLAT STK SVC	$5,148.00
	IWU-ST721022-2P	ST721022TB 2YR PLAT STK SVC	$9,884.16
	IWU-ST721022-3P	ST721022TB 3YR PLAT STK SVC	$18,083.52
	IWU-ST721022-24-1G	ST721022TB 1YR GLD7X24 STK SVC	$3,861.00
	IWU-ST721022-24-2G	ST721022TB 2YR GLD7X24 STK SVC	$7,413.12
	IWU-ST721022-24-3G	ST721022TB 3YR GLD7X24 STK SVC	$14,208.48
	IWU-ST721022-1G	ST721022TB 1YR GOLD STK SVC	$2,895.75
	IWU-ST721022-2G	ST721022TB 2YR GOLD STK SVC	$5,559.84
	IWU-ST721022-3G	ST721022TB 3YR GOLD STK SVC	$11,248.38
	IWU-ST721022-1S	ST721022TB 1YR SILVER STK SVC	$1,872.00
	IWU-ST721022-2S	ST721022TB 2YR SILVER STK SVC	$3,594.24
	IWU-ST721022-3S	ST721022TB 3YR SILVER STK SVC	$7,750.08
XTA7210-24AS36N44 TA7210-24AS36N44	IWU-ST721044-1P	ST721044TB 1YR PLAT STK SVC	$7,590.00
	IWU-ST721044-2P	ST721044TB 2YR PLAT STK SVC	$14,572.80
	IWU-ST721044-3P	ST721044TB 3YR PLAT STK SVC	$26,661.60
	IWU-ST721044-24-1G	ST721044TB 1YR GLD7X24 STK SVC	$5,692.50
	IWU-ST721044-24-2G	ST721044TB 2YR GLD7X24 STK SVC	$10,929.60
	IWU-ST721044-24-3G	ST721044TB 3YR GLD7X24 STK SVC	$20,948.40
	IWU-ST721044-1G	ST721044TB 1YR GOLD STK SVC	$4,269.38
	IWU-ST721044-2G	ST721044TB 2YR GOLD STK SVC	$8,197.20
	IWU-ST721044-3G	ST721044TB 3YR GOLD STK SVC	$16,584.15
	IWU-ST721044-1S	ST721044TB 1YR SILVER STK SVC	$2,760.00
	IWU-ST721044-2S	ST721044TB 2YR SILVER STK SVC	$5,299.20
	IWU-ST721044-3S	ST721044TB 3YR SILVER STK SVC	$11,426.40

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
TB7410-26AR064 TB7410-26AR064HA (HA requires Qty:2)	IWU-741064GB-1P	ST7410CONT 1 Year Platinum Storage Service.	$4,290.00
	IWU-741064GB-2P	ST7410CONT 2 Years Platinum Storage Service.	$8,236.80
	IWU-741064GB-3P	ST7410CONT 3 Years Platinum Storage Service.	$11,840.40
	IWU-741064GB-24-1G	ST7410CONT 1 Year Gold 7X24 Storage Service	$3,293.66
	IWU-741064GB-24-2G	ST7410CONT 2 Years Gold 7X24 Storage Service	$6,324.13
	IWU-741064GB-24-3G	ST7410CONT 3 Years Gold 7X24 Storage Service	$9,086.27
	IWU-741064GB-1G	ST7410CONT 1 Year Gold Storage Service.	$2,413.08
	IWU-741064GB-2G	ST7410CONT 2 Years Gold Storage Service.	$4,633.11
	IWU-741064GB-3G	ST7410CONT 3 Years Gold Storage Service.	$6,660.10
	IWU-741064GB-1S		$1,539.65
	IWU-741064GB-2S		$2,953.24
	IWU-741064GB-3S		$4,245.90
TB7410-46AR128 TB7410-46AR128HA (HA requires Qty:2)	IWU-7410128G-1P	ST7410CONT 1 Year Platinum Storage Service.	$5,478.00
	IWU-7410128G-2P	ST7410CONT 2 Years Platinum Storage Service.	$10,517.76
	IWU-7410128G-3P	ST7410CONT 3 Years Platinum Storage Service.	$15,119.28
	IWU-7410128G-24-1G	ST7410CONT 1 Year Gold 7X24 Storage Service	$4,205.60
	IWU-7410128G-24-2G	ST7410CONT 2 Years Gold 7X24 Storage Service	$8,074.76
	IWU-7410128G-24-3G	ST7410CONT 3 Years Gold 7X24 Storage Service	$11,603.86
	IWU-7410128G-1G	ST7410CONT 1 Year Gold Storage Service.	$3,081.36
	IWU-7410128G-2G	ST7410CONT 2 Years Gold Storage Service.	$5,916.21
	IWU-7410128G-3G	ST7410CONT 3 Years Gold Storage Service.	$8,504.55
	IWU-7410128G-1S	ST7410CONT 1 Year Silver Storage Service.	$1,992.00
	IWU-7410128G-2S		$3,846.28
	IWU-7410128G-3S		$5,493.25
TB7410-46AR256 TB7410-46AR256HA (HA requires Qty:2)	IWU-7410256G-1P	ST7410CONT 1 Year Platinum Storage Service.	$7,590.00
	IWU-7410256G-2P	ST7410CONT 2 Years Platinum Storage Service.	$14,572.80
	IWU-7410256G-3P	ST7410CONT 3 Years Platinum Storage Service.	$20,948.40
	IWU-7410256G-24-1G	ST7410CONT 1 Year Gold 7X24 Storage Service	$5,692.93
	IWU-7410256G-24-2G	ST7410CONT 2 Years Gold 7X24 Storage Service	$11,099.58
	IWU-7410256G-24-3G	ST7410CONT 3 Years Gold 7X24 Storage Service	$15,752.40
	IWU-7410256G-1G	ST7410CONT 1 Year Gold Storage Service.	$4,269.36
	IWU-7410256G-2G	ST7410CONT 2 Years Gold Storage Service.	$8,197.17
	IWU-7410256G-3G	ST7410CONT 3 Years Gold Storage Service.	$11,783.43
	IWU-7410256G-1S	ST7410CONT 1 Year Silver Storage Service.	$2,760.00
	IWU-7410256G-2S		$5,298.46
	IWU-7410256G-3S		$7,637.47

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
XTA4400A2N22S36	IWU-22TB2LOG-1P	S74EXP22TB 1YR PLAT STK SVC	$1,927.20
	IWU-22TB2LOG-2P	S74EXP22TB 2YR PLAT STK SVC	$3,700.22
	IWU-22TB2LOG-3P	S74EXP22TB 3YR PLAT STK SVC	$5,273.60
	IWU-22TB2LOG-24-1G	S74EXP22TB 1YR GLD7X24 STK SVC	$1,445.40
	IWU-22TB2LOG-24-2G	S74EXP22TB 2YR GLD7X24 STK SVC	$2,775.17
	IWU-22TB2LOG-24-3G	S74EXP22TB 3YR GLD7X24 STK SVC	$3,989.30
	IWU-22TB2LOG-1G	S74EXP22TB 1YR GOLD STK SVC	$2,613.60
	IWU-22TB2LOG-2G	S74EXP22TB 2YR GOLD STK SVC	$5,018.11
	IWU-22TB2LOG-3G	S74EXP22TB 3YR GOLD STK SVC	$7,213.54
	IWU-22TB2LOG-1S	S74EXP22TB 1YR SILVER STK SVC	$1,798.20
	IWU-22TB2LOG-2S	S74EXP22TB 2YR SILVER STK SVC	$3,461.58
	IWU-22TB2LOG-3S	S74EXP22TB 3YR SILVER STK SVC	$4,934.21
XTA4400A2N23S18	IWU-23TB1LOG-1P	S74EXP23TB 1YR PLAT STK SVC	$1,581.00
	IWU-23TB1LOG-2P	S74EXP23TB 2YR PLAT STK SVC	$3,038.95
	IWU-23TB1LOG-3P	S74EXP23TB 3YR PLAT STK SVC	$4,687.61
	IWU-23TB1LOG-24-1G	S74EXP23TB 1YR GLD7X24 STK SVC	$2,280.96
	IWU-23TB1LOG-24-2G	S74EXP23TB 2YR GLD7X24 STK SVC	$3,278.88
	IWU-23TB1LOG-24-3G	S74EXP23TB 3YR GLD7X24 STK SVC	$1,824.77
	IWU-23TB1LOG-1G	S74EXP23TB 1YR GOLD STK SVC	$1,894.80
	IWU-23TB1LOG-2G	S74EXP23TB 2YR GOLD STK SVC	$2,762.70
	IWU-23TB1LOG-3G	S74EXP23TB 3YR GOLD STK SVC	$2,459.16
	IWU-23TB1LOG-1S	S74EXP23TB 1YR SILVER STK SVC	$576.00
	IWU-23TB1LOG-2S	S74EXP23TB 2YR SILVER STK SVC	$1,589.76
	IWU-23TB1LOG-3S	S74EXP23TB 3YR SILVER STK SVC	$1,240.80
XTA4400R00A2N24	IWU-24TB0LOG-1P	S74XOPTSSD 1YR PLAT STK SVC	$2,392.53
	IWU-24TB0LOG-2P	S74XOPTSSD 2YR PLAT STK SVC	$3,287.10
	IWU-24TB0LOG-3P	S74XOPTSSD 3YR PLAT STK SVC	$591.23
	IWU-24TB0LOG-24-1G	S74XOPTSSD 1YR GLD7X24 STK SVC	$792.50
	IWU-24TB0LOG-24-2G	S74XOPTSSD 2YR GLD7X24 STK SVC	$2,568.46
	IWU-24TB0LOG-24-3G	S74XOPTSSD 3YR GLD7X24 STK SVC	$697.95
	IWU-24TB0LOG-1G	S74XOPTSSD 1YR GOLD STK SVC	$413.42
	IWU-24TB0LOG-2G	S74XOPTSSD 2YR GOLD STK SVC	$504.30
	IWU-24TB0LOG-3G	S74XOPTSSD 3YR GOLD STK SVC	$139.20
	IWU-24TB0LOG-1S	S74XOPTSSD 1YR SILVER STK SVC	$226.72
	IWU-24TB0LOG-2S	S74XOPTSSD 2YR SILVER STK SVC	$1,245.31
	IWU-24TB0LOG-3S	S74XOPTSSD 3YR SILVER STK SVC	$384.19

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
TB7310-16AS00 Also for older: XTA7310-14AS00 TA7310-14AS00	IWU-ST7310-1P	ST7310SNGL 1YR PLAT STK SVC	$1,927
	IWU-ST7310-2P	ST7310SNGL 2YR PLAT STK SVC	$3,700
	IWU-ST7310-3P	ST7310SNGL 3YR PLAT STK SVC	$5,319
	IWU-ST7310-24-1G	ST7310SNGL 1YR GLD7X24 STK SVC	$1,445
	IWU-ST7310-24-2G	ST7310SNGL 2YR GLD7X24 STK SVC	$2,775
	IWU-ST7310-24-3G	ST7310SNGL 3YR GLD7X24 STK SVC	$3,989
	IWU-ST7310-1G	ST7310SNGL 1YR GOLD STK SVC	$1,084
	IWU-ST7310-2G	ST7310SNGL 2YR GOLD STK SVC	$2,081
	IWU-ST7310-3G	ST7310SNGL 3YR GOLD STK SVC	$2,992
	IWU-ST7310-1S	ST7310SNGL 1YR SILVER STK SVC	$701
	IWU-ST7310-2S	ST7310SNGL 2YR SILVER STK SVC	$1,346
	IWU-ST7310-3S	ST7310SNGL 3YR SILVER STK SVC	$1,934

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
TB7310-16AS00HA Also for older: TA7310-14AS00HA	IWU-7310CATO-1P	ST7310CATO 1YR PLAT STK SVC	$1,927
	IWU-7310CATO-2P	ST7310CATO 2YR PLAT STK SVC	$3,700
	IWU-7310CATO-3P	ST7310CATO 3YR PLAT STK SVC	$5,319
	IWU-7310CATO-24-1G	ST7310CATO 1YR GLD7X24 STK SVC	$1,445
	IWU-7310CATO-24-2G	ST7310CATO 2YR GLD7X24 STK SVC	$2,775
	IWU-7310CATO-24-3G	ST7310CATO 3YR GLD7X24 STK SVC	$3,989
	IWU-7310CATO-1G	ST7310CATO 1YR GOLD STK SVC	$1,084
	IWU-7310CATO-2G	ST7310CATO 2YR GOLD STK SVC	$2,081
	IWU-7310CATO-3G	ST7310CATO 3YR GOLD STK SVC	$2,992
	IWU-7310CATO-1S	ST7310CATO 1YR SILVER STK SVC	$701
	IWU-7310CATO-2S	ST7310CATO 2YR SILVER STK SVC	$1,346
	IWU-7310CATO-3S	ST7310CATO 3YR SILVER STK SVC	$1,934

Materials Abstract

Collateral	Description	Purpose	Distribution	SunWin Token #
References				
Sun Storage 7000, Just The Facts	Reference Guide (this document)	Training Sales Tool	SunWIN, Reseller Web	548655
Product Literature				
Sun Storage 7000 Data Sheet	Data Sheet	Sales Tool	SunWIN, Reseller Web	543485
Sun Storage 7000 Customer Presentation	Customer Presentation	Sales Tool	SunWIN, Reseller Web	547618
Sun Storage 7000 Business Value white paper	Business Value White Paper	Sales Tool	SunWIN, Reseller Web	547616
Sun Storage 7000 Technical Presentation	Technical presentation	Training Sales Tool	SunWIN, Reseller Web	549515
Sun Storage 7000 Architectural White Paper	Architectural White Paper	Sales Tool	SunWIN, Reseller Web	549516
Sun Storage 7000 RAS White Paper	RAS White Paper	Sales Tool	SunWIN, Reseller Web	549517
WWWW – Storage 7000	Reference Guide	Training Sales Tool	SunWIN, Reseller Web	555895
Sun Storage 7000 Sales Guide	Reference Guide	Training Sales Tool	SunWIN, Reseller Web	547617
Sun Storage 7000 IDC White Paper	Business Value White Paper	Sales Tool	SunWIN, Reseller Web	547619
External Web Site				
Product information	Www.sun.com/unifiedstorage			

Competitive Information

The Sun Storage 7000 United Storage System has Network Appliance and EMC as its main competition. Second-tier competition comes from BlueArc, IBM (OEMs NetApp), Hitachi (OEMs BlueArc), Isilon, etc.

This competitive section will continue to be improved, please check back on this sunwin number for updates. Also: refer to the "Sun Unified Storage 7000 Competitive Overview Presentation", Sunwin #: 562845 for more competitive details.

It is important to always convey to customers the advantages that our unified storage systems provide.

- Simplified management through a intuitive and easy-to-use Web UI. Feedback from online/magazine reviewers and existing customers is that our UI is much easier to use than existing solutions.

- DTrace Analytics, a new way of observing and understanding what the unified storage system and enterprise network clients are doing and how they are behaving, using real-time graphical analysis. IT administrators can use it to diagnose issues and optimize their application/storage environment. No one does it better than we do with our Storage 7000 system, be proud to emphasize this.

- A new storage architecture, with our Hybrid Storage Pool. A high-performance architecture that integrates read-optimized and write-optimized flash- based SSDs as a caching tier with DRAM and enterprise-class, 7200rpm high capacity drives. This architecture is highly tunable for performance, to accommodate a wide range of application workloads, while enabling significant costs savings and lower energy costs.

- Overall economics. The fact that customers can have a high performance system without the use of 15K RPM drives, saves a huge amount of money not only in acquisition costs, but also in operational costs since a lot less energy will be required to run the system. In addition, the Storage 7310/7410 use high capacity drives, delivering higher density than competitive offerings, helping IT departments save in precious IT real estate. Maintenance service fees are also lower, but more specific information will be added to this section.

- No license fees, all SW included with the price of the system.
  Many customers love the fact that they get all the features with the price of the system. Unlike leading vendors who charge for most features, the Storage 7000 system provides all protocols and data services, and this is a major point that needs to be highlighted, to let customers know that they will need not to worry about future hidden charges.

These are the main points that need to be mentioned. And we know that we do not yet have everything customers need, there are some weaknesses (i.e. User quota, deduplication, etc.), that are already roadmap items to be addressed in the near future.

However, take it from a few happy customers who put it this way:

- "I get a system that performs higher than the Netapp system" (note: we heard this from customers using Netapp's top of the line FAS6080 and also FAS3170). "The hybrid storage pool design using SSD as cache does deliver the performance required in our environment."

- "I get all the SW with the price of the system, while I needed to pay for almost everything with our other vendor"

- "The Storage 7410 offers the main features I need (protocols, replication, snapshots, clones), while we know that we will get more in the future (i.e. deduplication), and are willing to wait for that in order to get a overall better system platform today"

Simplify customers lives, by delivering a unified platform that provides innovative features, with most of what customers need today, and an attractive roadmap to deliver additional features in the near future.

The following matrix shows a competitive comparison of the Storage 7310 vs NetApp FAS2xxx and EMC NX and NS-120.

| CLUSTER Config (24TB All, 20TB for FAS2xxx)	Storage 7310 Cluster	EMC NX4-2C Typical Config Config A	NetApp FAS2020A Typical Config Config A	NetApp FAS2050A Config A	EMC NS-120 (2-node) Config A		NetApp FAS2050A Config B	EMC NS-120 (2-node) Config B
Dtrace Analytics	Included	Not Available	Not Available	Not Available	Not Available		Not Available	Not Available
Hybrid Storage Pool	Yes	Not Available	Not Available	Not Available	Not Available		Not Available	Not Available
Data Services	Included	License Fee	License Fee	License Fee	License Fee		License Fee	License Fee
Application Integration (VMWare, Exchange, Oracle, etc.)	Roadmap	Yes, License Fee	Yes, License Fee	Yes, License Fee	Yes, License Fee		Yes, License Fee	Yes, License Fee
Dedup, Compliance, N-way mgmnt, FC target, etc.	Roadmap	Yes, Most by License Fee	Yes, Most by License Fee	Yes, Most by License Fee	Yes, Most by License Fee		Yes, Most by License Fee	Yes, Most by License Fee
Serviceability	Advanced (Dtrace, FMA)	Basic	Basic	Basic	Basic		Basic	Basic
Max Raw Capacity	96TB	60TB	68TB	104TB	120TB		104TB	120TB
Drive Type:	SATA+SSD	SAS, SATA, FC	FC, SATA, EFD	SAS, SATA, FC	FC, SATA, EFD		SAS, SATA, FC	FC, SATA, EFD
Rack space	6U	5U	2U	4U	8U		4U	8U
List Price (estimate)	$74,985	$55,900	$64,000	$73,200	$97,000		$81,800	$106,000
Avg discount (est)	50%	50%	50%	60%	60%		50%	50%
$/GB (ASP)	$1.6	$1.2	$1.6	$1.5	$1.6		$2.0	$2.2
Warranty	3yr, 8x5, NBD	3yr NBD, 9x5	3yr, 7x24 (parts, NBD)	3yr, 7x24 (parts, NBD)	3yr, 24x7, NBD		3yr, 7x24 (parts, NBD)	3yr, 24x7, NBD

Notes:
- 7310 Cluster: 1 Socket CPU (4 cores), 16GB RAM, 0xLogzilla, 0xReadzilla per node.
- Main target is FAS2050. Priced to value vs FAS2020 and NX4, lower end platforms.
- Netapp/EMC Config A: Minimal s/w configuration, CIFS only (typical of Netapp 2000 series deployments)
- Netapp/EMC Config B: Richer s/w configuration, CIFS+SnapRestore for FAS2050, CIFS+Replication for NS120.
- Competitive vs FAS2050 at their best capacity point (20TB vs our 24TB). Additional capacity increases their price substantially vs Sun.
- As s/w features and Capacity are added, provides greater advantage for Sun.
- Assumed conservative discounting, up to 60% for FAS2050/NS120, and 50% for lower end models

- The Storage 7310 is positioned against the FAS2050 model. But get ready to encounter situations where customers will be offered the FAS2020 to play the price card. Use the advantages mentioned above against these systems. The 7310 provides a superior platform that delivers higher performance. The 7310 uses 16GB RAM and 1x QuadCore 2.3GHz CPU, vs FAS2050's 4GB RAM and a 2.2 GHZ Celeron processor! In addition, the 7310 can be scaled to 2 CPUs and 64GB RAM for additional performance gains.

- EMC provides the NS-120 at the low end of the NS family. They will use this model, which scales to 120TB, vs our 7410 system, at potentially lower prices. Counterattack with a Storage 7310, even though it scales to 96TB our usable capacity ratio is higher (details to be added), and our platform delivers outstanding performance for that class of product. We do not have comparable numbers from EMC, only comments from customers. The EMC NS-120 uses old Pentium IV CPUs and slow 266MHz-type RAM, limiting system performance.

- The NX-4 system is priced lower than our 7310, but is no match to our platform which is more scalable and provides higher performance. NX-4 is not a target for 7310, hence our higher price, but you may encounter it since it is a lower end system that EMC provides and they will offer it to customers whose performance and capacity needs may not be high enough. Sell our value add in this category.

- Keep in mind that "Config A" is a minimal configuration, with only one protocol. Sell the value of all the SW that we provide, and give peace of mind to the customer that they will not need to pay additional fees for other SW features as they would with the competition. 7310 vs Config B (2 right-most columns) offer even a greater advantage, which gets even greater as additional SW features are added.

- The competitive matrix shows some red areas, showing weaknesses in some SW features. Be aware of those but know that they are roadmap items and they will be delivered with future software updates.

- The estimated discount is just an estimate, based on partner feedback. We know that Netapp and EMC can provide higher discounts, keep that in mind.

The following is a performance comparison vs leading competitive systems. The information is not officially published, it is a high-confidence number but we cannot mention the vendor because it is not published officially, hence the "competitive offering" label.

The performance in IOPS/$ is outstanding, more than 4x.
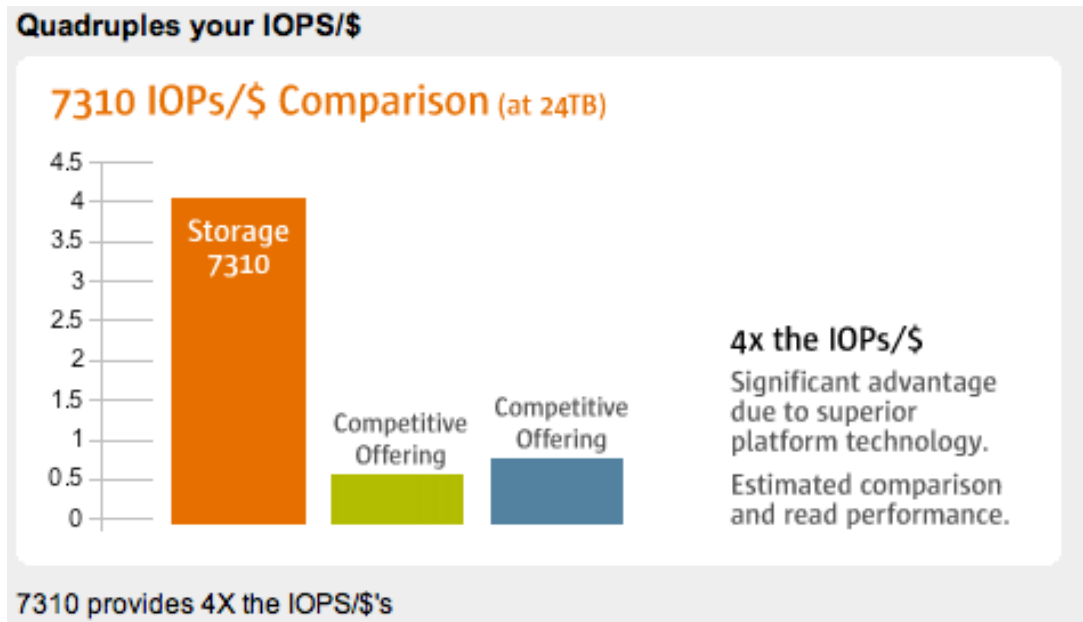
The following 2 sections (Netapp and EMC), contain comparison tables that will be updated to reflect additional values and updated information. Also to emphasize technological advantages before pricing. They are valid, but will be updated to provide even more information. They are provided for general information. In the case of the Storage 7410, they are true direct comparisons because the competitive models offer similar capabilities to what we offer (with the exception of our differentiated DTrace Analytics, Hybrid Storage Pools), but the units serve the same purpose. In the case of the 7110 and 7210, they are standalone products and they are being compared to products from EMC and Netapp that support clustering, to provide an idea where we can compete versus their single controller installation.

NetApp

NetApp, Inc. provides storage and data management solutions for storing, managing, protecting, and archiving business data. Its products include Data ONTAP operating system software to build a storage infrastructure and an enterprise-wide data for fabric business applications; and Data ONTAP GX, an operating system to support integrated and multi-node storage systems. The company offers storage management and application integration software, which includes storage, server, database, and application suite of products; fabric-attached storage (FAS) family of networked storage systems to provide access to enterprise data; V-series family to consolidate storage arrays, enabling SAN and NAS access to data stored in heterogeneous storage arrays; and StoreVault, an ONTAP technology for small to medium-sized businesses. The company, formerly known as Network Appliance, Inc., was founded in 1992 and is headquartered in Sunnyvale, California.

The NetApp FAS product line represents a large portion of the NAS and Unified Storage market.

- The FAS2000 series is focused at dispersed departments or remote branch offices, but also used for small to medium sized enterprises since this is their low end system (after EOL'ing FAS2xx and S series).

- The most recent release, the FAS3100 family, has increased performance and capacities and is a strong midrange product. The FAS3100 series consists of three models, the FAS3170, FAS3160 and the FAS3140, which are midrange systems that support Fibre Channel (FC) SAN, IP SAN, file services and multiple network configurations.

- At the top of the range, the FAS6000 series is designed for the largest enterprise applications and most demanding technical workloads, with a full range of high-availability and disaster-recovery options.

- All NetApp storage products are available with deduplication as a software option. NetApp was the first vendor to offer integrated dedupe on primary storage devices.

NetApp Strengths	NetApp Weaknesses
• Early NAS vendor with strong market presence	• Expensive hardware, software, maintenance costs
• Simple storage message – unified architecture	• Difficult to troubleshoot and optimize
• Strong channel and vertical presence	• Low ratio of raw/usable capacity
• Broad system and software portfolio	• Limited scalable performance
• Supports Deduplication, standard feature	• Fragmentable file system causes performance degradation above 75% volume full
• Licensee of the Microsoft CIFS code	• Slow delete times

Product Comparisons

Storage 7210, 23TB Comparison

	S7210	FAS270	FAS2020	FAS2050
List Price	$71,995	$147,000	$93,195	$116,055
Capacity	22.5	21.7	22.5	20
$/GB (List)	$3.2	$6.8	$4.1	$5.8
Clustering	No		Yes	
Packaging	4U	9U	5U	4U
Max Raw Capacity	44TB	48TB	68TB	104TB
Drive Types	SATA	FC	SAS,FC,SATA	
RAID	SW, 0,1,-Z, -ZP		SW, 4,6	
Serviceability	Call home +Adv feat: Dtrace, FMA		Call home + basic features	
Power consumption	1180/4026	1780/6075	1780/6075	747/2547

Storage 7410, 23TB Comparison (All SATA configurations)

	7410 Cluster MID (2xCPU, 64GB, 1Rz)	7410 Cluster HIGH (2xCPU, 128GB, 2Rz)	FAS3140	FAS3170
List Price	$142,000	$192,000	$338,000	$500,000
$/GB (List)	$6.2	$8.7	$14.1	$20.8
Form Factor	8U	8U	12U	
Max Raw Capacity	576TB		420TB	840TB
Drive Types	Hybrid: SATA + SSD		FC, SATA	
RAID	SW, 0,1,-Z, -ZP		SW, 4,6	
Serviceability	Call home +Adv feat: Dtrace, FMA		Call home + basic features	
Operating System	Enterprise-class OpenSolaris		Proprietary ONTAP	
Power Consumption	1262/4305	1862/6353	2776/9479	3009/10275

Storage 7410, 22TB Comparison (SATA vs 15K rpm FC configuration)

	7410 Cluster MID (2xCPU, 64GB, 1Rz)	7410 Cluster HIGH (2xCPU, 128GB, 2Rz)	FAS3140	FAS3170
List Price	$142,000	$192,000	$457,000	$620,000
$/GB (List)	$6.2	$8.7	$21.8	$29.5
Form Factor	8U	8U	21U	
Max Raw Capacity	576TB		420TB	840TB
Drive Types	Hybrid: SATA + SSD		FC, SATA	
RAID	SW, 0,1,-Z, -ZP		SW, 4,6	
Serviceability	Call home +Adv feat: Dtrace, FMA		Call home + basic features	
Operating System	Enterprise-class OpenSolaris		Proprietary ONTAP	
Power Consumption	1262/4305	1862/6353	4000/13661	4233/14457

EMC

EMC Corporation develops, delivers, and supports information infrastructure technologies and solutions. Its Information Storage segment offers networked information storage systems, networked attached storage, content addressed storage, or direct attached storage environment. The company also sells a wide array of software designed to manage, protect, and share data. The company sells its products and services through agreements with distributors, system integrators, resellers, and original equipment manufacturers. Its biggest resale partner, Dell, sells co-branded EMC systems. EMC Corporation was founded in 1979 and is headquartered in Hopkinton, Massachusetts.

EMC's Network Attached Storage (NAS) family of products also referred to as Unified Storage platforms. The Celerra NS products are dedicated network servers optimized for file and block access with integrated IP, iSCSI, and Fibre Channel connectivity and feature a NAS engine, storage processors and mix and match FC/SAS and SATA drives. EMC Celerra unified storage systems offer simple, web-based management and can improve storage utilization and simplify provisioning with automated volume management and virtual provisioning.

- The entry level NX4 is suited for small to medium business as well as remote branch office environments
- The NS20/40/80 were replaced by NS-120, 480, and 960 systems.
- The NS-120 is the entry point to the EMC Celerra NS series products for installations
- The NS-480 is a mid-tier stand-alone solution that can consolidate multiple file servers
- The NS-960 is an Enterprise-class, high-performance, advanced clustering unified storage system

The NS series is built using CLARiiON storage arrays behind the Celerra X-blade controllers. The X-blades control data movement from the disks to the network using the DART operating system. The Celerra Manager interface provides features including virtual provisioning, automated volume management for profile-based provisioning and snapshots.

EMC Strengths	EMC Weaknesses
• Strong storage brand • Early NAS vendor with significant market presence mainly at the high end but improving at low end • Broad system and software portfolio NS20 Installation wizards simplified installation for entry level users • Large SAN installed base	• Expensive hardware, software, maintenance costs • Difficult to troubleshoot and optimize • Complicated systems that require professional services for installation • Limited scalable performance • Proprietary and closed operating systems makes it hard to keep with advances in compute power • Clariion use as external storage requires multiple interfaces to manage the system

Product Comparisons

Table 1 – Storage 7110 Comparison

	IWASHI	NX4
List Price	$10,995	$18,170
$/GB (List)	$5.5	$9.1
Clustering	No	Yes
Processor	1x1.9GHz QC	2x 2.8/QC
RAM	8GB	4GB
Form Factor	2U	5U
Max Raw Capacity	2TB	60TB
Drive Types	SAS	SAS, SATA
RAID	SW, 0,1,-Z, -ZP	HW 0,1,5,7
Serviceability	Call home +Adv feat: Dtrace, FMA	Call home + basic features

Table 2 – 7210 Comparison

	FUGU	EMC NS40	EMC NS20
List Price	$71,995	$123,000	$101,000
Capacity	22.5	23	23
$/GB (List)	$3.2	$5.3	$4.4
Clustering	No	Yes	Yes
Form Factor	4U	13U	13U
Max Raw Capacity	44TB	240TB	60TB
Drive Types	SATA	FC, SATA	
RAID	SW, 0,1,-Z, -ZP	HW 1,3,5,6	
Serviceability	Call home +Adv feat: Dtrace, FMA	Call home + basic features	
Power Consumption	1180/4026	1168/3236	510/1740

Table 3 – Storage 7410 Comparison

	7410 Cluster MID (2xCPU, 64GB, 1Rz)	7410 Cluster HIGH (2xCPU, 128GB, 2Rz)	NS80 (23TB SATA)	NS80 (21TB FC 15K)
List Price	$142,000	$192,000	$325,000	$457,000
$/GB (List)	$6.2	$8.7	$14.1	$21.8
Packaging	8U	8U	11U	22U
Max Raw Capacity	575TB	575TB	480TB	480TB
Drive Types	SATA	SATA	FC, SATA	FC, SATA
RAID	SW, 0,1,-Z, -ZP	SW, 0,1,-Z, -ZP	HW 1,3,5,6	HW 1,3,5,6
Serviceability	Call home +Adv feat: Dtrace, FMA		Call home + basic features	Call home + basic features
Operating System	Enterprise-class OpenSolaris		Proprietary DART	Proprietary DART
Power Consumption	1262/4305	1862/6353	3096/10393	4389/14983

Q & A

For Q&A information, please refer to the following link:
https://sunspace.sfbay.sun.com/display/CEPEDIA/Sun+Storage+7000+Unified+Storage+Systems+FAQ

Q	**Why are the configurations in the Sun Store (www.sun.com/store or "Get It" tab in product pages) different than the real configurations that we support with WebDesk configurator?**
A	The Sun Store used a less sophisticated configurator than WebDesk Configurator. More complex rules can be setup in the WebDesk Configurator. As an example, SunStore cannot support rules of Max=2 for 10GbE and Max=3 for 1GbE, hence we lower the total Max=2 for both. In the near future, the Sun Store will be changing to use a better configurator.
Q	**Where can I find information on ISV certifications and interoperability with the SS7000?**
A	Refer to the WWWW guide, SunWin 555895. The Interop Tool is currently being updated to include software and hardware interoperability information, once updated, the Interop Tool can be found here: http://interop.central.sun.com/interop/interop For ISV test and certification status, please see this internal link:`http://wikihome.sfbay.sun.com/SSPG/Wiki.jsp?page=AmberRoadISVWork`
Q	**Does the SS7000 series support NFSv2 for legacy customer migrations?**
A	Yes, with 2009.Q2 software. I addition, the Storage 7000 supports NFSv3 and NFSv4.
Q	**Does the SS7000 support synchronous replication?**
A	Not at this time. It is under consideration.
Q	**Is SS7000 supported in a Windows Active Directory environment?**
A	SS7000 is tested with Windows 2008 Active Directory Domain Controllers albeit with a necessary change: You need to install a Microsoft Hot Fix for the following issue:Hotfix available! SRX080604601637: [MS-SMB] : SmbSessionSetup fails withNT_STATUS_INVALID_PARAM w/o ESS or work around that problem by setting the Window authentication used byyourSS7000 server to NTMLv1 (default is NTLMv2).
Q	Are there data migration services and tools available to assist customers in moving to the SS7000
A	platform? Yes, please see the link for more information on Unified Storage data migration: `http://icexchange.central.sun.com/index.jsp?wg=67428` In addition, the 2009.Q3 Software supports Shadow Data Migration, refer to the proper section in this document for more information.
Q	Are there any sales or technical training courses available on the SS7000 series?
A	Yes, there are courses available on learning.sun.com, and are available for Sun field and partners: WZCB-SAQS-T7000　　Quick Start for Open Storage - Technical WZC-ST7000-301　　　Sun Storage 7000 Unified Systems Sales Essentials WZC-ST7000-3U2　　　Sun Storage 7000 Unified Storage Systems Sales Presentation WZC-ST7000-302　　　Sun Storage 7000 Unified Storage Systems Technical Essentials
Q	Are there any customer training courses available?
A	Here are the customer courses on learning.sun.com: NWS-6425 Sun Storage 7000 Unified Storage System Administration

Glossary

1U	One rack unit as defined by the Electronic Industries Alliances (EIA). A vertical measurement equal to 1.75 inches.
2U	Two rack units; a vertical measurement equal to 3.5 inches.
AC	Alternating Current.
Access Control	Limits user access to resources on a computer network, most commonly by requiring a user name and password. Usually a single logon is sufficient to authenticate, or verify, a user.
Access Rights	Permissions granted to user accounts to allow access to such system resources as filesystems, applications, and directories. For example, read-only access allows a user to open or list a file without being able to make changes to the file. Users who are granted access rights to a directory usually have the same access rights to all subdirectories.
Active Directory	Microsoft Active Directory server
Alias IP Address	Multiple IP addresses assigned to a single port, in addition to the primary IP address. All IP aliases for a port must be on the same physical network and share the same netmask and broadcast address as the first or primary IP address.
Authentication	The process of validating that the user attempting to logon is truly the owner of the account.
Autohome Shares	Temporary SMB/CIFS shares that are created when a user logs on to the system and removed when the user logs off.
Block or Block Size	Also known as stripe unit size, block size is often used to describe the amount of data sent or received by the host per I/O operation. Also used to describe the size of an atomic read/write operation to/from a disk as well as the size of the data unit being "striped" across disks.
Boot Up	The process of starting a computer. Booting up involves checking all hardware components, initializing system components, and loading the operating system.
Browser	Software used for access to information on the World Wide Web. Microsoft Internet Explorer and Netscape Navigator are examples of browsers. See also Web Browser.
Cache	Cache is the DRAM based staging area used to provide higher performance to applications for reads and writes. During reads, the RAID controller tries to keep the latest and most often accessed data in the cache and also tries to pre-stage the cache with future data during sequential accesses. For writes, cache is used to provide delayed writes to the drives. This delays the parity calculations and drive writes during RAID 5 operations. More optimization and advanced staging algorithms thus provide better performance.
snapshot	A point-in-time image of a Storage NAS filesystem taken at the volume level. While the active file volume can be modified with read/write operations, a virtual volume produced at the time of snapshot creation remains available in a static, read-only state.
CIFS	Stands for Common Internet File System. An enhanced version of the SMB file-sharing protocol that allows groups of users to work together and share documents over the Internet in the same way as in local area networks.
Density	Number of units in a given amount of space.
DHCP	Stands for Dynamic Host Configuration Protocol. DHCP provides a mechanism by which a computer can acquire an IP address automatically when it connects to the network. DHCP allows more flexible and efficient use of network resources than static IP addresses.
DNS	Short for Domain Name System. A network service that translates domain names into IP addresses. If you have multiple DNS servers on your network, and one DNS server can't resolve host names, it asks another one, and so on, until the IP address is found. See also Domain Name System.
Domain	A group of computers and devices on a network that are administered as a unit with common rules and procedures.
Domain Name	A name that identifies a domain. See also Domain. The domain name can be the company name, division name, facility name, department name, or other descriptive name.

Domain Name System	The network server that maintains the list of all host names in a domain. Storage NAS OS uses the name server to translate domain names to the corresponding IP address. See also DNS.
DTQ	Stands for Directory Tree Quota. A directory tree quota is a quota, or limit, to the space or the number of files that a directory tree (a directory and its subdirectories) can occupy.
Ecache	External cache. Memory cache external to the CPU chip, also referred to as L2 cache.
ECC	Error Correcting Code. A type of memory that corrects errors on the fly.
Error Correction Code	Extra bits added to Words, or Double Words, that correct all single-bit errors, and detect all double-bit errors. A superior technology to parity, which detects, but does not correct, single-bit errors, and cannot detect double-bit errors.
Ethernet	A network communication system developed and standardized by DEC, Intel, and Xerox using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model and extends the physical layer and media with repeaters and implementations that operate on fiber optics, broadband, and unshielded twisted pair.
Ethernet 10/100/1000BaseT	The most widely used LAN access method defined by the IEEE 802.3 standard; uses standard RJ-45 connectors and telephone wire. 100BaseT is also referred to as Fast Ethernet. 1000BaseT is also referred to as Gigabit Ethernet.
Field Replaceable Unit	A component which can be removed and replaced during service in the field.
File Sharing	A feature that allows users of networked computers to make files available to other users.
File Volume	Filesystems created from partitions that have available space. If the file volume does not use up all the available space in a partition, the remaining space is automatically allocated into the next partition. See also Partition.
File Volume Extension	See Segment.
Filer	A Network Attached Storage device focused solely on file service and file storage
FRU	Field Replaceable Unit.
FTP	File Transfer Protocol. A client-server protocol which allows a user on one computer to transfer files to and from another computer over a TCP/IP network. Also the client program the user executes to transfer files. It is defined in STD 9, RFC 959.
General-purpose Server	A server designed to perform any type(s) of function(s). General-purpose servers typically require skilled IT professionals and system administrators to maintain them.
Gigabit Ethernet	An Ethernet standard that enables data transfer rates of up to 1 Gbps running over copper or optical fiber cable.
GUI	Stands for Graphical User Interface. A GUI uses graphical elements to present information to a computer user rather than the traditional text-only command line interface still found in telnet and similar implementations.
HBA	Host bus adapter.
Host ID	The unique identifier assigned to the host computer.
Hot-spare	A drive used by the RAID controller to replace a failed drive. Hot-spares are continuously powered up and spinning, but are not actually part of the array because they contain no data. This allows the array processor to have immediate access to a functioning drive for possible reconstruction of lost data when a disk fails.
Hot-swappable	A hot-swappable component can be installed or removed by simply pulling the component out and putting the new one in. The system automatically recognizes the component change and configures itself as necessary.
HTTP	Stands for Hyper-text Transmission Protocol. A protocol for exchanging HTML pages and forms.
I/O	Input/output. Transferring data between the CPU and any peripherals.
IP Address	A unique 32-bit value that identifies network hosts using TCP/IP. An IP address, or a block of addresses, is assigned upon application to organizations responsible for that function. No two network hosts can be assigned the same IP address. Each address consists of a network number, optional subnetwork number, and host number, written as four numbers separated by periods. Each number can be 0 to 255. See also *Address* and *URL*.
ISV	Independent software vendor.

Java	Java is a programming language developed by Sun Microsystems to be portable to any type of computing device. In practice, java allows web browsers to do much more than display information. Java scripts allow much more flexibility and functionality in web access and they run on virtually any type of computer.
Kerberos Realm	A kerberos realm is a secured network requiring access through a key. (See also *KDC*.) Each system or user with a key can access any services or systems that the key opens. The user does not have to enter a user name and password each time he requests a controlled service.
L2 cache	See Ecache.
LAN	Stands for Local Area Network. A communications network that provides high-speed (over 1 Mbps) data transmission and is limited to a specific physical area (up to about six miles). The basic components of a LAN are: adapter boards installed in each computer to provide a cable connector, cabling, server hardware, and network management software.
LCD	Stands for Liquid Crystal Display. On the Storage NAS, the LCD is a two line display that shows basic information about system functions and, in conjunction with the control panel, allows you to perform certain system functions, like setting the IP address, directly on the unit, without access through the internet or intranet.
LED	Light emitting diode.
Login	Logging in is a security process designed to prevent access to system settings or other resources by those who should not have access. A login process usually requires a user name and password to verify, or authenticate, a user.
Master Domain Model	One of several types of domain models. In the Master Domain Model, an account domain is trusted by a resource domain.
Mirroring	Mirroring allows you to duplicate any or all of the file volumes of an active server onto a mirror server. In the event that the active server fails, the mirrored file volumes on the mirror server can be made available to network users within minutes.
MTBF	Mean Time Between Failures. The average time a component works without failure.
MTTR	Mean Time To Repair. The average time it takes to repair a component.
NetBIOS	NetBIOS is a protocol used for networking. NetBIOS was designed to support communications between symbolically named stations and the transfer of arbitrary data. NetBIOS manages the use of node names and transport layer connections for higher layer protocols such as SMB.
Network	A series of nodes such as terminals, computer systems, or other peripheral devices connected by a communications channel. See also LAN.
NIC	Stands for Network Interface Card. A NIC is an expansion card that provides access to a network.
NIS	Short for Network Information Service. Along with NFS, NIS provides a distributed database system to centralize (i.e., store one copy, on a single computer) common configuration files, such as the password file (/ etc/passwd) and the hosts file (/etc/hosts).
NIS+	Short for Network Information Service Plus (NIS+). NIS+ was designed to replace NIS. NIS+ can provide limited support to NIS clients, but was mainly designed to address problems that NIS cannot address.
NTP	Stands for Network Time Protocol. NTP provides a mechanism for synchronizing the time among a number of computers connected to a network.
Packet	A piece of a message transmitted over a network. Contains the destination address in addition to the data. Once all packets arrive at the destination, they are recompiled into the original message.
Partition	Sections on a LUN. Each partition can either have some space allocated to it, or can be empty. When a LUN is first created, all of the available space is located in the first partition, while the other partitions are empty. Each partition can have only one volume.
Port Bonding	Otherwise known as "channel bonding." Port bonding allows you to scale network I/O by joining ports. This forms a single network channel of high bandwidth from two or more channels of lower bandwidth.

Protocol	A set of standards or rules that enable computers to connect to one another and exchange data. Using a protocol helps reduce the possibility of errors during data transmission.
Quota	A restriction on disk space or the number of files written to file volumes in the Storage NAS. This limit can be determined for a user or group (user or group quota) or for a directory (directory tree quota).
RAID	Redundant array of independent disks. A set of disk drives which appears as a single logical disk drive to the filesystem. Different RAID levels provide different capacity, performance, availability, and cost characteristics.
RAID 0	RAID level 0, or striping without parity or mirroring protection. Data is distributed evenly at the block level among disks for performance. No redundancy is provided, and the loss of a single disk causes the loss of data on all disks. Use this level for high-speed streaming of large file reads (for example, video) of non-critical data which is easily available elsewhere within the organization.
RAID 5	RAID level 5, or striping with distributed parity. Both data and parity are distributed evenly across all the disks in the array at the block level. No single disk can compromise the integrity of the data. RAID 5 balances the optimization of performance, reliability and cost. Use this level for most applications which do not require the special characteristics of the above RAID levels.
RAM	Random Access Memory.
RDATE	RDATE is a time synchronization method that simply asks another computer on the network what the correct time is and resets itself accordingly. RDATE is not particularly accurate, but is adequate for most networks.
Read-ahead	Sequential data read from disk into cache without having actually been requested by the application host, in anticipation that it will be requested by the host. When the request occurs, it can be serviced as a low latency cache hit, thus improving host application performance.
SCSI	Small Computer Systems Interface. Pronounced "scuzzy." An ANSI standard for controlling peripheral devices by one or more host computers.
Segment	Segments are available space that can be "attached" to a volume when the volume reaches its assigned capacity. This increases the volume's total capacity. The segment, after being attached, becomes part of the volume and cannot be removed. Otherwise known as volume extensions.
Server	A network host that makes network resources, such as software applications and databases on hard disk or CD-ROM, available to network users. The server provides the centralized, multi-user functionality of the network application, such as data management, information sharing, network administration, or security.
Server Name	Identifies a network server. Server names are used in addition to IP addresses. This allows a server to be advertised on a network with a recognizable name. For example, the first Storage NAS server on a network could be identified as cdts0, the second as cdts1, and the third as cdts2 or they could be identified as Fred, Barney, and Wilma.
Shutdown	The multi-user operating system resident on the Storage NAS server must be shut down in an orderly sequence prior to turning the power off. The shutdown sequence closes files and terminates running programs to prevent loss or corruption of data.
SMB	Stands for Server Message Block. A Microsoft-compatible network protocol for exchanging files. SMB is typically used by Windows for Workgroups, OS/2 Warp Connect, and DEC Pathworks. See also CIFS.
SMTP	SMTP (Simple Mail Transfer Protocol) is a TCP/IP protocol used in sending and receiving e-mail.
SNMP	Stands for Simple Network Management Protocol. SNMP is primarily used for network monitoring and notification of network errors and other events. In the Storage NAS, SNMP also provides notification services through e-mail messages.
TCP/IP	Stands for Transmission Control Protocol/Internet Protocol. A commonly used networking protocol that allows interconnection of different network operating systems.
Telnet	A terminal emulation program for TCP/IP networks. The Telnet program runs on your computer and connects your PC to the Storage NAS server on the network. You can then enter commands through the Telnet program and they run as if you were entering them directly on the server console.

Transfer Rate	The rate at which data is transferred, usually measured in megabytes per second (MB/sec.).

Ultra320 SCSI	A standard for SCSI data transfers. It allows a transfer rate of up to 320 Mbytes/sec over a 16-bit SCSI bus.
Unicode	Unicode is a standard for representing letters that allows the language of computer messages and commands to be displayed in a variety of languages without rewriting the underlying programs.
URL	Stands for Uniform Resource Locator. An address system used by servers and clients to request documents. See also IP Address.
User Credentials	The information containing the user, account data, and the user's group membership.
Volume	A volume is a virtual disk into which a filesystem, a DBMS, or an application can place data. A volume can be a single physical disk or a virtual disk mapped from one or more underlying extents. Applications that use volumes do not need to be aware of their underlying physical structure. Software handles the mapping of virtual partition addresses to physical addresses.
Web Browser	A web browser is a software application designed to search for and retrieve information from the Internet and the world-wide web.
WINS	Stands for Windows Internet Naming Service. A WINS server resolves NetBIOS names to IP addresses, allowing computers on a network to locate other NetBIOS devices more quickly and efficiently. WINS performs a similar function for Windows environments as DNS does for Unix environments.

Appendix

Storage 7410 (Barcelona-based) reference information

The following information is provided as reference for the now older Storage 7410 configuration.

Announce EOL: Sept 1, 2009. 16GB configuration announced on August 18, 2009.

Old (Barcelona CPU-based)	Entry	Mid	High
Configuration available	Single or Cluster		
RAM (Single/Cluster)	16GB / 32GB	64GB / 128GB	128GB / 256GB
READ Flash Accelerator (Readzilla)	0 / 0	1 / 2	2 / 4
CPU Qty (Single/Cluster)	2 / 4		4 / 8
CPU type	Quad-Core AMD Opteron - Model 2356		Quad-Core AMD Opteron - Model 8356

Part Number	Description	Disc. Cat	List Price USD
Sun Storage 7410 (Single) – PTO Configuration			
XTA7410-24AS000	Sun Storage 7410 Storage controller: 16GB RAM, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$40,495
XTA7410-24AS100	Sun Storage 7410 Storage controller: 64GB RAM, 1x100GB Readzilla flash accelerator, Read cache, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$53,495
XTA7410-44AS200	Sun Storage 7410 Storage controller: 128GB RAM, 2x100GB Readzilla flash accelerator, 4x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$78,495
Sun Storage 7410 (Cluster) – PTO Configuration			
XTA7410C24AS000	Sun Storage 7410 Cluster Storage controller: Each storage controller with 16GB RAM, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$72,495
XTA7410C24AS100	Sun Storage 7410 Cluster Storage controller: Each storage controller with 64GB RAM, 1x100GB Readzilla flash accelerator, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$97,995
XTA7410C44AS200	Sun Storage 7410 Cluster Storage controller: Each storage controller with 128GB RAM, 2x100GB Readzilla flash accelerator, 4x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5.	M	$148,495
Sun Storage 7410 (Single) – ATO Configuration			
TA7410-24AS000	Sun Storage 7410 Storage controller: 16GB RAM, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (Factory Integration only)	M	$40,495
TA7410-24AS100	Sun Storage 7410 Storage controller: 64GB RAM, 1x100GB Readzilla flash accelerator, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (Factory Integration only)	M	$53,495
TA7410-44AS200	Sun Storage 7410 Storage controller: 128GB RAM, 2x100GB Readzilla flash accelerator, 4x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (Factory Integration only)	M	$78,495
Sun Storage 7410 (Cluster) – ATO Configuration			
TA7410C24AS000	Sun Storage 7410 Storage controller for Cluster configuration (requires purchase of Qty:2): 16GB RAM, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (Factory Integration only)	M	$36,248
TA7410C24AS100	Sun Storage 7410 Storage controller for Cluster configuration (requires purchase of Qty:2): 64GB RAM, 1x100GB Readzilla flash accelerator, 2x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (Factory Integration only)	M	$48,998
TA7410C44AS200	Sun Storage 7410 Storage controller for Cluster configuration (requires purchase of Qty:2): 128GB RAM, 2x100GB Readzilla flash accelerator, 4x2.3GHz Quad-Core processor, 2x SAS HBA, 4x 10/100/1000 Ethernet ports. Includes Slide Rail Kit. No Power Cord, order Geo-specific X-option. RoHS 5. (Factory Integration only)	M	$74,248

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
TA7410C24AS000	IWU-7410CAT0-1P	ST7410CATO 1YR PLAT STK SVC	$3,148.20
	IWU-7410CAT0-2P	ST7410CATO 2YR PLAT STK SVC	$6,044.54
	IWU-7410CAT0-3P	ST7410CATO 3YR PLAT STK SVC	$8,689.03
	IWU-7410CAT0-24-1G	ST7410CATO 1YR GLD7X24 STK SVC	$2,361.15
	IWU-7410CAT0-24-2G	ST7410CATO 2YR GLD7X24 STK SVC	$4,533.41
	IWU-7410CAT0-24-3G	ST7410CATO 3YR GLD7X24 STK SVC	$6,516.77
	IWU-7410CAT0-1G	ST7410CATO 1YR GOLD STK SVC	$1,770.86
	IWU-7410CAT0-2G	ST7410CATO 2YR GOLD STK SVC	$3,400.06
	IWU-7410CAT0-3G	ST7410CATO 3YR GOLD STK SVC	$4,887.58
	IWU-7410CAT0-1S	ST7410CATO 1YR SILVER STK SVC	$1,144.80
	IWU-7410CAT0-2S	ST7410CATO 2YR SILVER STK SVC	$2,198.02
	IWU-7410CAT0-3S	ST7410CATO 3YR SILVER STK SVC	$3,159.65
TA7410C24AS100	IWU-7410CAT1-1P	ST7410CAT1 1YR PLAT STK SVC	$3,715.80
	IWU-7410CAT1-2P	ST7410CAT1 2YR PLAT STK SVC	$7,134.34
	IWU-7410CAT1-3P	ST7410CAT1 3YR PLAT STK SVC	$10,255.61
	IWU-7410CAT1-24-1G	ST7410CAT1 1YR GLD7X24 STK SVC	$2,786.85
	IWU-7410CAT1-24-2G	ST7410CAT1 2YR GLD7X24 STK SVC	$5,350.75
	IWU-7410CAT1-24-3G	ST7410CAT1 3YR GLD7X24 STK SVC	$7,691.71
	IWU-7410CAT1-1G	ST7410CAT1 1YR GOLD STK SVC	$2,090.14
	IWU-7410CAT1-2G	ST7410CAT1 2YR GOLD STK SVC	$4,013.06
	IWU-7410CAT1-3G	ST7410CAT1 3YR GOLD STK SVC	$5,768.78
	IWU-7410CAT1-1S	ST7410CAT1 1YR SILVER STK SVC	$1,351.20
	IWU-7410CAT1-2S	ST7410CAT1 2YR SILVER STK SVC	$2,594.30
	IWU-7410CAT1-3S	ST7410CAT1 3YR SILVER STK SVC	$3,729.31
TA7410C44AS200	IWU-7410CAT2-1P	ST7410CAT2 1YR PLAT STK SVC	$5,517.60
	IWU-7410CAT2-2P	ST7410CAT2 2YR PLAT STK SVC	$10,593.79
	IWU-7410CAT2-3P	ST7410CAT2 3YR PLAT STK SVC	$15,228.58
	IWU-7410CAT2-24-1G	ST7410CAT2 1YR GLD7X24 STK SVC	$4,138.20
	IWU-7410CAT2-24-2G	ST7410CAT2 2YR GLD7X24 STK SVC	$7,945.34
	IWU-7410CAT2-24-3G	ST7410CAT2 3YR GLD7X24 STK SVC	$11,421.43
	IWU-7410CAT2-1G	ST7410CAT2 1YR GOLD STK SVC	$3,103.65
	IWU-7410CAT2-2G	ST7410CAT2 2YR GOLD STK SVC	$5,959.01
	IWU-7410CAT2-3G	ST7410CAT2 3YR GOLD STK SVC	$8,566.07
	IWU-7410CAT2-1S	ST7410CAT2 1YR SILVER STK SVC	$2,006.40
	IWU-7410CAT2-2S	ST7410CAT2 2YR SILVER STK SVC	$3,852.29
	IWU-7410CAT2-3S	ST7410CAT2 3YR SILVER STK SVC	$5,537.66

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
XTA7410-24AS000 TA7410-24AS000	IWU-7410000-1P	ST7410CONT 1YR PLAT STK SVC	$3,828.00
	IWU-7410000-2P	ST7410CONT 2YR PLAT STK SVC	$7,349.76
	IWU-7410000-3P	ST7410CONT 3YR PLAT STK SVC	$10,565.28
	IWU-7410000-24-1G	ST7410CONT 1YR GLD7X24 STK SVC	$2,871.00
	IWU-7410000-24-2G	ST7410CONT 2YR GLD7X24 STK SVC	$5,512.32
	IWU-7410000-24-3G	ST7410CONT 3YR GLD7X24 STK SVC	$7,923.96
	IWU-7410000-1G	ST7410CONT 1YR GOLD STK SVC	$2,153.25
	IWU-7410000-2G	ST7410CONT 2YR GOLD STK SVC	$4,134.24
	IWU-7410000-3G	ST7410CONT 3YR GOLD STK SVC	$5,942.97
	IWU-7410000-1S	ST7410CONT 1YR SILVER STK SVC	$1,392.00
	IWU-7410000-2S	ST7410CONT 2YR SILVER STK SVC	$2,672.64
	IWU-7410000-3S	ST7410CONT 3YR SILVER STK SVC	$3,841.92
XTA7410-24AS100 TA7410-24AS100	IWU-7410100-1P	ST7410CONT 1YR PLAT STK SVC	$4,382.40
	IWU-7410100-2P	ST7410CONT 2YR PLAT STK SVC	$8,414.21
	IWU-7410100-3P	ST7410CONT 3YR PLAT STK SVC	$12,095.42
	IWU-7410100-24-1G	ST7410CONT 1YR GLD7X24 STK SVC	$3,286.80
	IWU-7410100-24-2G	ST7410CONT 2YR GLD7X24 STK SVC	$6,310.66
	IWU-7410100-24-3G	ST7410CONT 3YR GLD7X24 STK SVC	$9,071.57
	IWU-7410100-1G	ST7410CONT 1YR GOLD STK SVC	$2,465.10
	IWU-7410100-2G	ST7410CONT 2YR GOLD STK SVC	$4,732.99
	IWU-7410100-3G	ST7410CONT 3YR GOLD STK SVC	$6,803.68
	IWU-7410100-1S	ST7410CONT 1YR SILVER STK SVC	$1,593.60
	IWU-7410100-2S	ST7410CONT 2YR SILVER STK SVC	$3,059.71
	IWU-7410100-3S	ST7410CONT 3YR SILVER STK SVC	$4,398.34
XTA7410-44AS200 TA7410-44AS200	IWU-7410200-1P	ST7410CONT 1YR PLAT STK SVC	$6,877.20
	IWU-7410200-2P	ST7410CONT 2YR PLAT STK SVC	$13,204.22
	IWU-7410200-3P	ST7410CONT 3YR PLAT STK SVC	$18,981.07
	IWU-7410200-24-1G	ST7410CONT 1YR GLD7X24 STK SVC	$5,157.90
	IWU-7410200-24-2G	ST7410CONT 2YR GLD7X24 STK SVC	$9,903.17
	IWU-7410200-24-3G	ST7410CONT 3YR GLD7X24 STK SVC	$14,235.80
	IWU-7410200-1G	ST7410CONT 1YR GOLD STK SVC	$3,868.43
	IWU-7410200-2G	ST7410CONT 2YR GOLD STK SVC	$7,427.38
	IWU-7410200-3G	ST7410CONT 3YR GOLD STK SVC	$10,676.85
	IWU-7410200-1S	ST7410CONT 1YR SILVER STK SVC	$2,500.80
	IWU-7410200-2S	ST7410CONT 2YR SILVER STK SVC	$4,801.54
	IWU-7410200-3S	ST7410CONT 3YR SILVER STK SVC	$6,902.21

HW Mktg Parts	Part Number	Item Description	LIST (US) Cat K
XTA7410C24AS000	IWU-7410C000-1P	ST7410CLST 1YR PLAT STK SVC	$6,296.40
	IWU-7410C000-2P	ST7410CLST 2YR PLAT STK SVC	$12,089.09
	IWU-7410C000-3P	ST7410CLST 3YR PLAT STK SVC	$17,378.06
	IWU-7410C000-24-1G	ST7410CLST 1YR GLD7X24 STK SVC	$4,722.30
	IWU-7410C000-24-2G	ST7410CLST 2YR GLD7X24 STK SVC	$9,066.82
	IWU-7410C000-24-3G	ST7410CLST 3YR GLD7X24 STK SVC	$13,033.55
	IWU-7410C000-1G	ST7410CLST 1YR GOLD STK SVC	$3,541.73
	IWU-7410C000-2G	ST7410CLST 2YR GOLD STK SVC	$6,800.11
	IWU-7410C000-3G	ST7410CLST 3YR GOLD STK SVC	$9,775.16
	IWU-7410C000-1S	ST7410CLST 1YR SILVER STK SVC	$2,289.60
	IWU-7410C000-2S	ST7410CLST 2YR SILVER STK SVC	$4,396.03
	IWU-7410C000-3S	ST7410CLST 3YR SILVER STK SVC	$6,319.30
XTA7410C24AS100	IWU-7410C100-1P	ST7410CLST 1YR PLAT STK SVC	$7,431.60
	IWU-7410C100-2P	ST7410CLST 2YR PLAT STK SVC	$14,268.67
	IWU-7410C100-3P	ST7410CLST 3YR PLAT STK SVC	$20,511.22
	IWU-7410C100-24-1G	ST7410CLST 1YR GLD7X24 STK SVC	$5,573.70
	IWU-7410C100-24-2G	ST7410CLST 2YR GLD7X24 STK SVC	$10,701.50
	IWU-7410C100-24-3G	ST7410CLST 3YR GLD7X24 STK SVC	$15,383.41
	IWU-7410C100-1G	ST7410CLST 1YR GOLD STK SVC	$4,180.28
	IWU-7410C100-2G	ST7410CLST 2YR GOLD STK SVC	$8,026.13
	IWU-7410C100-3G	ST7410CLST 3YR GOLD STK SVC	$11,537.56
	IWU-7410C100-1S	ST7410CLST 1YR SILVER STK SVC	$2,702.40
	IWU-7410C100-2S	ST7410CLST 2YR SILVER STK SVC	$5,188.61
	IWU-7410C100-3S	ST7410CLST 3YR SILVER STK SVC	$7,458.62
XTA7410C44AS200	IWU-7410C200-1P	ST7410CLST 1YR PLAT STK SVC	$11,035.20
	IWU-7410C200-2P	ST7410CLST 2YR PLAT STK SVC	$21,187.58
	IWU-7410C200-3P	ST7410CLST 3YR PLAT STK SVC	$30,457.15
	IWU-7410C200-24-1G	ST7410CLST 1YR GLD7X24 STK SVC	$8,276.40
	IWU-7410C200-24-2G	ST7410CLST 2YR GLD7X24 STK SVC	$15,890.69
	IWU-7410C200-24-3G	ST7410CLST 3YR GLD7X24 STK SVC	$22,842.86
	IWU-7410C200-1G	ST7410CLST 1YR GOLD STK SVC	$6,207.30
	IWU-7410C200-2G	ST7410CLST 2YR GOLD STK SVC	$11,918.02
	IWU-7410C200-3G	ST7410CLST 3YR GOLD STK SVC	$17,132.15
	IWU-7410C200-1S	ST7410CLST 1YR SILVER STK SVC	$4,012.80
	IWU-7410C200-2S	ST7410CLST 2YR SILVER STK SVC	$7,704.58
	IWU-7410C200-3S	ST7410CLST 3YR SILVER STK SVC	$11,075.33

Sun Storage 7410 – XATO Configuration

Sun Storage 7410 – Ordering Flow Chart
Each step represents a line item on a Sales Order

Step 1. Required

Base Storage Appliance	⇨	**Order qty: 2 (<== important, qty must be 2)**

Note: Rail mounting kit
included with this SKU

TA7410-24AS000 – S7410, 16GB, 2x2.3G-QC
TA7410-24AS100 – S7410,64GB,2x2.3G,READ-100G
TA7410-44AS200 – S7410,128GB,4x2.3G,READ-200G

Order qty: 2 (<== important, Cluster XATO qty must be 2)
Cluster configurations (per node)
TA7410C24AS000 - S7410C,16GB,2x2.3G-QC
TA7410C24AS100 - S7410C,64GB,2x2.3G,READ-100G
TA7410C44AS200 - S7410C,128GB,4x2.3G,READ-200G

Step 2. Required

Storage	⇨	**A maximum of 12 Arrays (with Write Flash or without) are supported.**

Systems ship with 2 SAS HBA. Select 3rd HBA + cables when selecting
3 arrays with Flash or a total of 9 of more arrays

Array with Flash Accelerator (Logzilla)
Single Configuration – choose up to 3 (for Single), 4 (for Cluster)
XTA4400A2N23S18 - J4400 array, 23TB,LOG-18G
XTA4400A2N22S36 - J4400 array, 22TB,LOG-36G
XTA4400A2N20S72 - J4400 array, 20TB,LOG-72G
XTA4400A2N11S18 - J4400 array, 11TB,LOG-18G
XTA4400A2N10S36 - J4400 array, 10TB,LOG-36G

Expansion Array – Choose qty: 0 to 12 (max combined with above is 12)
XTA4400R00A2N24 - J4400 array, 24TB
XTA4400R00A2N12 - J4400 array,12TB

3rd SAS HBA (Qty 1 + 2 cables for single, double amount for Cluster)
Required when selecting 3 arrays with Flash or a total of 9 of more arrays
SG-PCIE8SAS-E-Z - 8-Port external SAS PCIe HBA
XTA-2.0M-SAS - 2.0m, mini, shielded, SAS cable

Storage Arrays do not ship with rail kit, order qty:1 for each 4400 array
Note: 7410 Storage controller ship with rail kit, only order for 4400 Arrays.
XTA-4400-4URK-19U - Sun(TM) Storage J4400 4U universal rack rail kit

Step 3. Optional

Read Flash Accelerator	⇨	**Up to 6 (single) or 12 (cluster), including base items**

TA7410-READZ100G - Sun Storage 7410 Read Flash Accelerator 100GB

Step 4. Required

Power cords	⇨	**Order cable type for country of purchase (shown US type):**

X311L - NORTH AMERICAN/ASIA PWR CRD KT
X320A – North. Amer./Asia 220V Pwr Cord Kit

Step 5. Optional

Network connectivity	⇨	**Single configurations have 4 slots available. Cluster have 3 slots available.**

Maximum 2 x 10Gb-E NICs or 3 x 1Gb-E. Cannot combine 10Gb with 1Gb NICs.
Order:
7280A-2 - Sun PCI-E Dual GigE UTP LP
7281A-2 - Sun PCI-E Dual GigE MMF LP
4446A-Z - Sun x4 PCI-E Quad GigE UTP
1027A-Z – Sun PCI-E Dual 10 GigE Fiber

[If 10GbE NIC, select up to 2 transceivers]
5560A-Z - 10 GE LR XFP Transceiver
5558A-Z - 10 GE SR XFP Trnscvr

Step 6. Optional

Tape connectivity	⇨	**Maximum one Tape HBA**

SG-PCIE2SCSIU320Z - PCIex4 Dual Port U320 SCSI HBA (tape backup)
SG-PCIE2FC-QF4 - 4Gb FC Dual Port HBA (tape backup)

Step 7. Optional

Service Option	⇨	**Order:**

Select Silver, Gold, Gold 7x24, Platinum

Step 8. Optional

Installation Services	⇨	**Order:**

Select Installation during business hours or after business hours

Storage 7310, 7110 (Barcelona-based) reference information

The following information is provided as reference for the now older Storage 7110, 7310 configuration.

Announce EOL: Oct 7, 2009.

Sun Storage 7110 – PTO Configuration

Sun Storage 7110 – Ordering Flow Chart
Each step represents a line item on a Sales Order

Step 1. Required

Base Storage Appliance	⇨

Order qty: 1
XTA7110-14ASA20 - Base: 8GB, 2.0TB (14x146GB SAS), 1x2.3GHz-QC
XTA7110-14ASA42 - Base: 8GB, 4.2TB (14x300GB SAS), 1x2.3GHz-QC
Note: Rail mounting kit is included with the product

Step 2. Required

Power cords	⇨

Order:
X311L - NORTH AMERICAN/ASIA PWR CRD KT
X320A – North. Amer./Asia 220V Pwr Cord Kit

...US type shown, select appropriate for country of purchase

Step 3. Optional

Network Interface Cards	⇨

4 slots available for NICs. Maximum three 1Gb-E or two 10Gb-E.
Order:
X7280A-2 - Sun PCI-E Dual GigE UTP LP
X7281A-2 - Sun PCI-E Dual GigE MMF LP
X4446A-Z - Sun x4 PCI-E Quad GigE UTP
X4237A – Sun QDR Infiniband HCA
X1027A-Z – Sun PCI-E Dual 10 GigE Fiber

[If 10GbE NIC, select up to 2 transceivers]
X5560A-Z - 10 GE LR XFP Transceiver
X5558A - 10 GE SR XFP Trnscvr

Step 4. Optional

Tape HBA	⇨

Maximum one HBA
Order qty: 1
SG-XPCIE2SCSIU320Z - PCIex4 Dual Port U320 SCSI HBA (tape backup)
SG-XPCIE2FC-QF4 - 4Gb FC Dual Port HBA (tape backup)

Step 5. Optional

Service Option	⇨

Order:
Select Silver, Gold, Gold 7x24, Platinum

Step 6. Optional

Installation Services	⇨

Order:
Select Installation during business hours or after business hours

Sun Storage 7310 – ATO Configuration

Sun Storage 7310 – Ordering Flow Chart
Each step represents a line item on a Sales Order

Step 1. Required

| Base Storage Appliance | ⇨ | **Order qty: 1**
TA7310-14AS00 - Storage 7310, 16GB, 2.3G-QC

Order qty: 2 (<== important, Cluster XATO qty must be 2)
TA7310-14AS00HA - Storage 7310 (need qty:2), 16GB, 2.3G-QC, cluster enabled

Note: Rail mounting kit is included with the product |

Step 2. Required

| Storage | ⇨ | **Array with Logzilla Flash Accelerator**
 - Maximum of Four arrays are supported (either with Logzilla or Expansion arrays)
 - Maximum Logzillas per Single is 8, per Cluster is 16.
 - Cannot select half-full array (10, 11, 12TB) after a full array. (x.5 config not supported)

XTA4400A2N23S18 - J4400 array,23TB,LOG-18G
XTA4400A2N22S36 - J4400 array, 22TB,LOG-36G
XTA4400A2N20S72 - J4400 array, 20TB,LOG-72G
XTA4400A2N11S18 - J4400 array, 11TB,LOG-18G
XTA4400A2N10S36 - J4400 array, 10TB,LOG-36G
Expansion Array
XTA4400R00A2N24 - J4400 array,24TB
XTA4400R00A2N12 - J4400 array,12TB

Storage Arrays do not ship with rail kit, order qty:1 for each expansion array
Note: 7310 Storage controller ship with rail kit, only order for 4400 Arrays.
XTA-4400-4URK-19U – Sun Storage J4400 4U universal rack rail kit |

Step 3. Optional

| Read Flash (Readzilla) | ⇨ | *Up to 6 Readzillas (12 for Cluster)*
Order
TA7410-READZ100G – Read Flash Accelerator, 100GB |

Step 4. Required

| Power cords | ⇨ | **Order:**
X311L - NORTH AMERICAN/ASIA PWR CRD KT
X320A – North. Amer./Asia 220V Pwr Cord Kit

...other/depending on GEO |

Step 5. Optional

| Network Interface Cards | ⇨ | *Single configurations have 2 slots available. Cluster have 1 slot available.*
One NIC maximum is supported for either Single or Cluster. In single, the second card must be a Tape HBA if necessary.
Order:
7280A-2 - Sun PCI-E Dual GigE UTP LP
7281A-2 - Sun PCI-E Dual GigE MMF LP
4446A-Z - Sun x4 PCI-E Quad GigE UTP
X4237A – Sun QDR Infiniband HCA (x-option only, ships separately)
1027A-Z – Sun PCI-E Dual 10 GigE Fiber

[If 10GbE NIC, select up to 2 transceivers]
5560A-Z - 10 GE LR XFP Transceiver
5558A-Z - 10 GE SR XFP Trnscvr |

Step 6. Optional

| Tape HBA | ⇨ | *Maximum one Tape HBA (in Cluster, cannot add NIC when tape HBA selected)*
- SCSI dual port no longer supported with Storage 7310 (effective Sept 2009)
Order qty: 1
SG-PCIE2FC-QF4 - 4Gb FC Dual Port HBA (tape backup) |

Step 7. Optional

| Service Option | ⇨ | **Order:**
Select Silver, Gold, Gold 7x24, Platinum |

Step 8. Optional

| Installation Services | ⇨ | **Order:**
Select Installation during business hours or after business hours |

Revision History

20081111	• Initial release
20090127	• updated tape HBA location in 7410 Cluster configuration, should be in slot 4, rather than 3. • added reference to WWWW. • several changes: additional information on Storage Array configurations, link to Q&A on Sunspace, update 7410 Cluster XATO information, updated configuration flowcharts, pricing charts. • corrected flowchart for XATO 7410 Cluster configuration. Qty must be 2 when ordering XATO cluster (PTO Cluster qty is 1).
20090526	• Added Storage 7310 information • Added Storage 7210 capability to support additional J4500 Arrays • Added 2 models for 7210 (no logzilla) • Added 4TB 7110 configuration • Updated 7210 and 7410 PCIe slot NICs/HBAs mapping • Updated positioning, Updated competitive section
20090901	• 7410 updates to support new configurations (Six-core Istanbul based configurations), ATO only. • Added appendix to preserve old 7410 configuration for reference • Removed references to 576TB with future SW update. Changed to indicate with upcoming 2TB drive • Other minor fixes
20090922	• Added Software 2009.Q3 features • Removed all references to Storage 7210 with 110V support. ONLY 220V supported. • Removed SCSI Tape HBA for 7310 (will not be supported due to compatibility issue and low usage) • Updated ordering information to include Inifiniband HCA support (note that ATO option is orderable on Oct 13, 2009. X-option need to be ordered before then) • Other minor changes
20100125	• 7110/7310 updates to reflect Six-core CPU (specifications, pricing and svce tables, general text) • Removed all references to 576TB with 7410 and left as maximum of 288TB • Removed 7210 11.5TB configuration (EOL'd) • Updated product availability table on p.6 with latest developments • Other minor corrections