Sun StorEdge™ N8400 Filer

Just the Facts

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Figure 1. Sun StorEdge™ N8400 filer

Introduction

The Sun StorEdge™ N8400 filer is the mid-range product in the Sun StorEdge N8000 filer series family of network-attached storage (NAS) appliances. The Sun StorEdge N8000 filer products are factory-integrated bundles of proven hardware and software that provide a complete file server solution and allow customers to quickly add storage to their network.

Ideal for rapidly changing storage environments that require high performance, easy management, and scalability, the Sun StorEdge N8400 filer's low price and simple installation make it easy and cost-effective for service providers and enterprises to implement.

The Sun StorEdge N8400 filer is based on proven Sun technology with a history of uptime and reliability. The flexible system scales either vertically or horizontally in a "pay-as-you-grow" architecture. A customer can add more filers to a network or add more storage to a filer.

Product Family Placement

The Sun StorEdge N8400 filer is the mid-range offering in the Sun StorEdge N8000 filer family. Scaling from 1 to 4 TB, it is geared toward enterprises with significant capacity requirements which demand high performance. The Sun StorEdge N8400 filer's built-in redundancy and availability features make it ideal for a datacenter environment.

The Sun StorEdge N8200 filer is the entry-level product in the Sun StorEdge N8000 filer family. The Sun StorEdge N8600 filer is currently the high-end product in Sun's filer family.

Key Messages

- As the pioneer of the network file system (NFS), Sun was one of the first providers of NAS solutions. Previously, customers had to build their own Sun server/storage-based NAS solutions or look to other vendors for NAS. The Sun StorEdge N8000 filer series provides Sun customers with one of the first turnkey NAS solutions based on proven Sun hardware and software. With this growing product line, Sun is positioned to be a key provider of NAS appliances.

- The Sun StorEdge N8000 products provide outstanding performance density (NFS ops/RU), performance/price (NFS ops/$), and capacity density (GB/RU).

- Sun's products are the only NAS appliances backed by Sun's world-class service and support organization. That, in addition to the account attention provided by Sun's dedicated storage sales team, provide the customer with a single source for end-to-end solutions.

Product Availability

- First order date   February 6, 2001
- Revenue Release   February 9, 2001
- General Availability   February 9, 2001

Target Users

Customer	Key Features to Highlight
CEOs seeking to maximize employee productivity and bring products to market faster	• Companies are able to bring products/services to market faster when groups are able to quickly share information using the Sun StorEdge N8400 filer.
CIOs concerned with reducing total cost of operations (TCO) and maintaining high availability	• The Sun StorEdge N8400 filer provides a high-performance, highly reliable solution to a company's file serving needs. • The flexible architecture of the Sun StorEdge N8400 filer means that customers can add more storage to a filer or more filers to a network without bringing down the system. • Easy scalability reduces network administration costs and protects the existing storage investment.
IT managers and department managers who require ease of installation and ease of management to help reduce administration costs	• The Sun StorEdge N8400 filer is pre-configured to provide easy installation. • In addition to the streamlined CLI, the flexibility of the browser-based management interface helps enable IT managers to reduce administrative costs. • The filer centralizes network storage, making it easier to set backup policies and administer backup procedures.

Target Markets

The target market is existing Sun customers who require NAS. These customers may currently use Network Appliance products, but, more likely, have been building their own dedicated file servers using Sun servers (and possibly non-Sun storage). While their IT staffs are very knowledgeable about Solaris™ Operating Environment and they are fully capable of building a high-performance filer using Sun products, they seek an appliance-like solution that they can deploy within minutes. They may already utilize products from other NAS vendors (NetApp, EMC, Auspex), but would readily employ a NAS solution from Sun.

Market Value Proposition

The Sun StorEdge™ N8000 filer series provides Sun customers with one of the first turnkey NAS solutions based on proven Sun hardware and software, from the company that pioneered the NFS protocol. Previously, customers have had to build their own Sun™ server/storage-based NAS solutions or look to other vendors for NAS.

The Sun StorEdge N8400 filer is an economically priced, easy-to-implement solution for rapidly changing storage requirements that require high performance, easy management, and scalability. It integrates easily into a customer's network using a standard network connection. The pre-configured system can be installed in minutes without impacting data availability. The Sun StorEdge N8400 filer's low price and simple installation make it easy for service providers and enterprises to implement. In addition, the system offers the NAS market excellent performance, providing users with rapid access to data. In fitting with Sun's network storage approach, the Sun StorEdge N8400 filer scales in a modular fashion, either vertically or horizontally.

The system's low entry cost helps enable customers to get started with a minimal initial investment. The "pay-as-you-grow" architecture and simple expandability make it easy and cost effective to increase capacity over time. The system's scalability helps enable customers to scale an existing system to accommodate high-end storage requirements, thereby extending the life of their original investment. In addition, the easy administration of the Sun StorEdge N8400 filer means that less time is spent managing the storage.

Enabling Technology

Technology Overview

The Sun StorEdge™ N8400 filer is based on the Sun Enterprise™ 420R server and Sun StorEdge T3 Enterprise arrays. A brief overview of the technology of these products is provided below. For more detailed information, refer to the Just The Facts documents for each product (Sun Enterprise 420R server = #111556; Sun StorEdge T3 array = #112864).

UltraSPARC-II Processor

The Sun Enterprise 420R server is a shared-memory, multitasking system built around the UltraSPARC™-II multiprocessor. The UltraSPARC-II is Sun's second generation of Sun's 64-bit UltraSPARC chips. The Sun Enterprise 420R server used in the Sun StorEdge N8400 filer uses the 450-MHz UltraSPARC-II processor.

PCI Technology

System I/O for the Sun Enterprise 420R server is provided by two industry-standard peripheral component interconnect (PCI) data buses. All PCI buses in the Sun Enterprise 420R server comply with the 2.1 revision of the PCI specification, released in March 1995.

Switched-Loop Architecture

Sun's switched-loop architecture is at the heart of the Sun StorEdge T3 array's ability to scale performance linearly as capacity grows. Traditional SCSI and Fibre Channel arrays typically consist of one or more controllers connected to one or more disk trays by dual Fibre Channel loops. In a bandwidth-intensive application, for example, a traditional array's two internal disk loops could be completely saturated with just two disk trays delivering data concurrently. Additional capacity would not increase performance.

The Sun StorEdge T3 array employs a radically different architecture to connect its disks to the controller functions. Sun has overlaid the concept of a Fibre Channel switched fabric on the loop architecture used to connect the disks to the controllers. This allows for the ability to segment the disk interconnect loops on a tray-by-tray basis into smaller dedicated sub-loops that can all operate independently and concurrently without interference. This function is under control of the Sun StorEdge T3 array controllers and is managed dynamically in order to help optimize performance and deliver complete failover data access.

The Sun StorEdge T3 enterprise array used in the Sun StorEdge N8400 filer consists of two controller units which segment one set of redundant loops into two dedicated data loops—one per controller—so that each controller's data accesses can proceed without interference from the other controller. The second loop is not segmented and is used to transfer mirrored cache writes between the controllers, again without interfering with either controller's disk accesses.

Lightning-Fast RAID 5

The Sun StorEdge T3 array is designed for outstanding Fibre Channel RAID 5 performance. The system employs a revolutionary hardware-pipelined, XOR engine (pXOR) that operates, and can calculate parity data, at the full internal data bus speed of the array. This helps reduce the requirement for cache memory accesses, which serves as a bottleneck in most RAID 5 arrays.

The Sun StorEdge™ N8400 filer is an integrated suite of proven Sun™ products and technologies.

Sun Enterprise™ 420R Server

The Sun Enterprise™ 420R server is a high-performance, multiprocessing system built around the UltraSPARC-II microprocessor.

The Sun Enterprise 420R server processors, memory, and I/O subsystems are interconnected by the high-speed Ultra™ port architecture (UPA) crossbar datapath. This is an enhanced implementation of the same UPA design used in the Ultra 60 workstations.

The Sun Enterprise 420R server used in the Sun StorEdge N8400 filer configuration supports 4 GB of 60-ns, 5-volt, dynamic RAM memory.

System I/O for the Sun Enterprise 420R server is provided by two industry-standard peripheral component interconnect (PCI) data buses. Both PCI buses in the Sun Enterprise 420R server comply with the 2.1 revision of the PCI specification, released in March 1995.
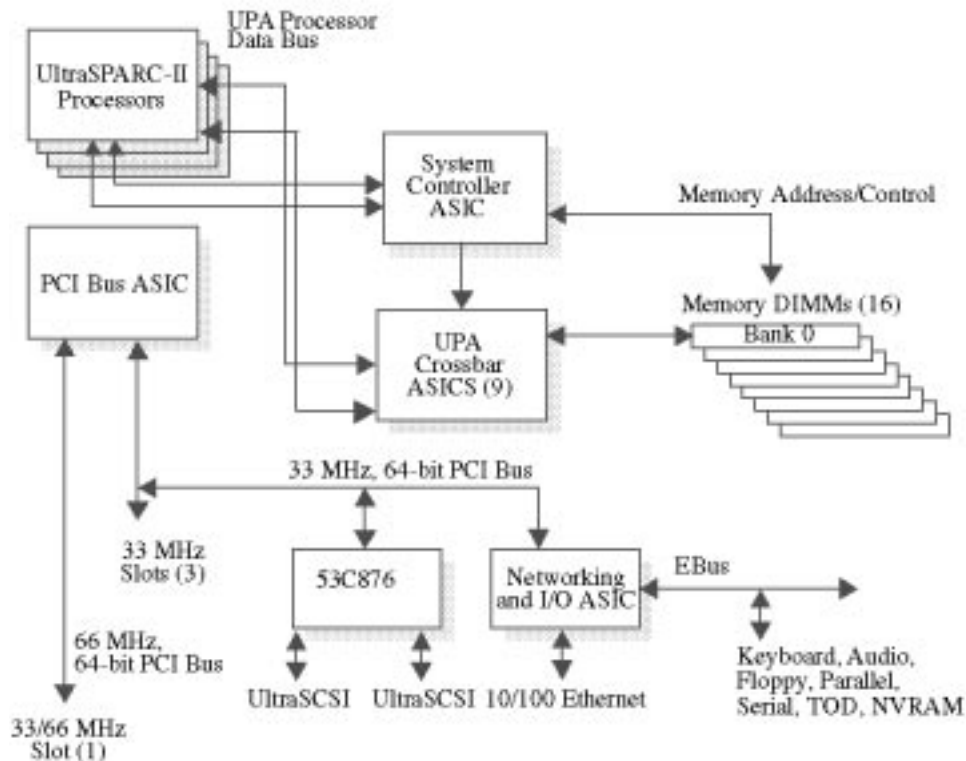
Figure 2. Architecture of the Sun Enterprise 420R server

Key Facts—Sun Enterprise 420R Server

- One of Sun's fastest performance multiprocessor systems; uses the 450-MHz UltraSPARC-II processor.
- Balanced system design
  - High-performance UPA at 112.5 MHz or 1.8 GB/second throughput
  - Matching performance enhancement in I/O, networking, and memory access

Technical Facts Summary—Sun Enterprise 420R Server

- High-performance memory subsystem
  - 4 GB in the Sun StorEdge N8400 filer configuration using 16 x 256-MB DIMMs
- Two internal hot-swap disks with 18-GB capacity each
- High-performance I/O
  - Two channels at 100/second Fibre channel
  - Innovative high-performance PCI I/O bus offering dual independent PCI buses, plus 66MHz PCI support
    - PCI slot 1 operates at 33 or 66 MHz and supports either a 32-bit or 64-bit, 3.3-volt or universal PCI card
    - PCI slots 2 and 3 operate at 33 MHz and provide for 32- or 64-bit, 5-volt or universal PCI cards
    - PCI slot 4 operates at 33 MHz and provides for 32-bit 5-volt PCI cards
- Expansion to advanced networking
  - Fast Ethernet, 100BASE-T, autosensing, and autoswitching to 10BASE-T for backward compatibility
  - PCI networking options include Gigabit Ethernet and QuadFast Ethernet
- Power supply
  - Second power supply allows for complete redundancy
  - Power supplies are hot-swappable
  - Each power supply has its own power cord
- System enclosure
  - Rack-optimized 4RU system fits in standard 19-inch enclosure
  - Front-accessible disk drives and power supplies
- Front to back cooling
- Does not support automatic system recovery

Overview—Sun StorEdge T3 Array

The Sun StorEdge T3 array's architecture begins with a basic *controller unit*. The architecture integrates disks, data cache, hardware RAID, power, cooling, uninterrupted power supply (UPS), diagnostic capabilities, and administration into a versatile, standalone component. The controller unit includes external connections to a data host (or hub or switch), and to a management network.

In the Sun StorEdge N8400 filer configuration, two controller units are paired in a *partner group* to create a configuration with redundant controllers and redundant data and management paths, allowing for cache mirroring, controller failover, and path failover capability. This array configuration uses two unit interconnect cables for connecting controller units and expansion units together. The unit interconnect cables use a proprietary connector. The unit interconnect cables may be replaced without taking the partner group offline. One cable MUST be in place at all times for the partner group to remain functional.
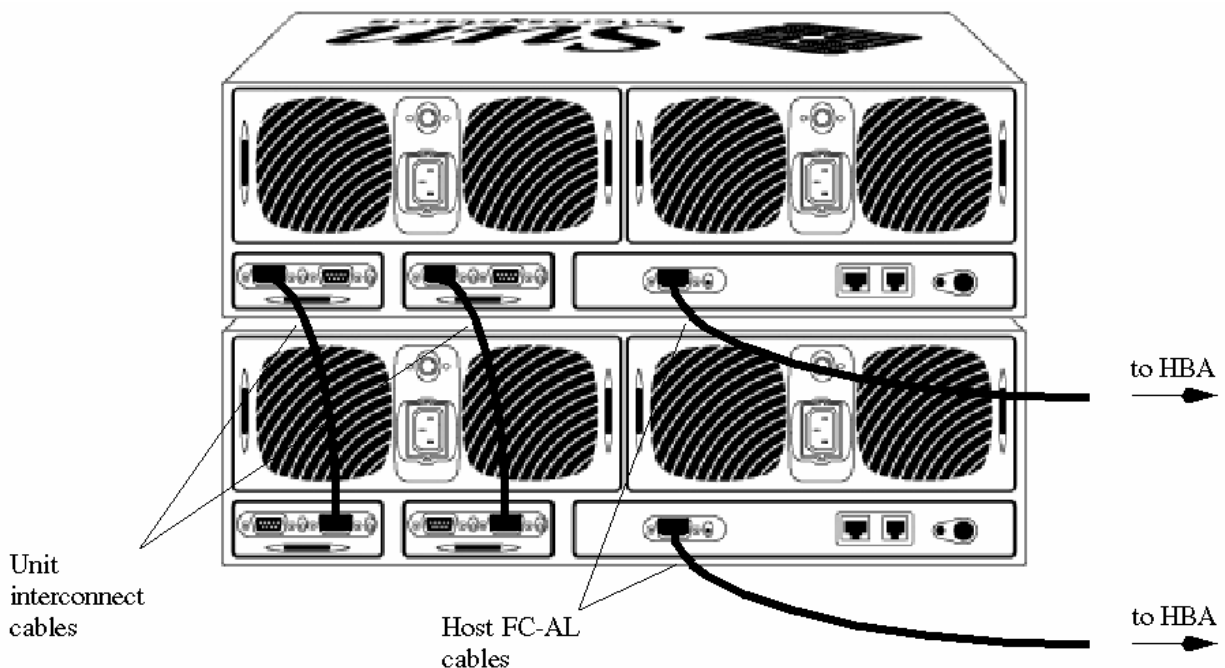

Figure 3. Sun StorEdge T3 array interconnect

Technical Facts Summary—Sun StorEdge T3 Array

- Hardware RAID controller for RAID 5
- 256-MB read/write cache
- Dedicated hardware RAID 5 XOR parity engine
- Reliable single RAID controller design
- Redundant power and cooling modules
- Hot-spare disk drive

Reliability and Serviceability via FRUs

In the Sun StorEdge T3 array, all active components are designed to be N+1 redundant, including disks, power supply, fans, and UPS. On the back end, loops, loop switching, diagnostics, and administration channels are also redundant. In the partner groups utilized in the Sun StorEdge N8400 filer configuration, even controllers, host channels, and external administration channels are redundant.

Disk Drives

Every Sun StorEdge T3 unit used in the Sun StorEdge N8400 filer is configured with nine dual-ported Fibre Channel disks of 73-GB capacity. The disk drives are concealed by a removable front bezel that provides electromagnetic interference (EMI) shielding. Individual disk drives are not visible to the application host; rather they are configured into one RAID 5 logical volume. The ninth disk is configured as a standby drive (also known as a hot-spare drive).

Power Cooling Unit (PCU)

Each Sun StorEdge T3 array's tray includes two redundant power and cooling units (PCUs). Each has an external power connection, allowing for connection to two independent power grids. There is one internal 325-watt auto-switching power supply per PCU. In case of external power failure or PCU failure, one power supply is sufficient to power the Sun StorEdge T3 array indefinitely.

RAID Controller Card

The RAID controller card provides cache, RAID management, administration, diagnostics, and external interfaces. Controller units include one controller FRU. In the Sun StorEdge N8400 filer configuration, two controller units are paired in a partner group for cache mirroring and controller redundancy.

Data Cache

Each Sun StorEdge T3 array controller includes 256-MB SDRAM data cache. The primary purpose of the data cache in the Sun StorEdge T3 array is to provide a low-latency buffer for write data, allowing writes to be quickly acknowledged to the application host. The cache is especially crucial to RAID 5 write performance, because it can coalesce several partial-stripe writes into a single read/modify/write operation. A secondary benefit of the cache is to buffer read data, allowing for low latency on repeated reads of the same data. Adaptive cache is a key feature of the Sun StorEdge T3 array. The algorithms used for allocating, coalescing, and flushing data are automatically and dynamically adjusted based on I/O patterns. This limits the amount of cache configuration needed to be performed by the user, thus greatly simplifying administration, improving ease of use, and enabling optimal cache behavior for current I/O patterns.

Reliability, Availability, and Serviceability (RAS)

The Sun StorEdge™ N8400 filer was designed to be easy-to-install, easy-to-manage, high-performance, highly available, network-attached storage.

Reliability

Reliability features include the following:

- Mirrored boot drive
- Industry-standard Solaris™ Operating Environment
- Error checking and correction on array disk drives
- Skip sectors and spare cylinders on array disk drives
- Automatic sector reallocation on RAID controller
- Link redundancy chip and 8- to 10-bit encoding on FC-AL loops
- Parity on data cache
- Passive midplane (except ID signature) and temperature sensor

Availability

- Boot disk mirroring transparently maintains a mirror copy of the Sun StorEdge N8400 filer software on a second disk, and automatically uses the surviving copy of the event of a disk failure.
- Online system recovery is supplemented by the use of a hot-spare utility that automatically replaces failed RAID 5 components. This facility migrates new partitions to replace failing ones. Users continue to access the surviving copy of the data—while a new mirror is automatically generated—with no interruption of operation.
- When coming back online after a reboot, UNIX® software typically checks file systems for integrity. Although a time-consuming process—especially on large systems—it is necessary to avoid data corruption. With the UFS logging feature, the need for this process has been eliminated. Reboots are much shorter, and a system recovery is much faster.
- Redundant power supplies with integrated UPS and dual power cords on Sun StorEdge T3 arrays and Sun Enterprise™ 420R server
- Electrically isolated N+1 fans
- Redundant unit interconnect cards and interconnect cables
- Redundant drives (RAID), standby drives, and drive loops
- Redundant RAID controllers for automatic failover and cache mirroring (in dual-unit system)
- Redundant host interfaces (in dual-unit system)

Serviceability

The system administrator may selectively replace unit components as needed. Serviceability features include the following:

- Low FRU count (three excluding drives and cables)
- All FRUs can be hot-swapped with no tools required (except for chassis)
- Status/failure LED on every FRU
- All FRUs electronically identifiable
- Fibre Channel world-wide name support
- Detection and reporting for incorrect drive position
- Automatic drive-ID selection
- SNMP messaging

The Sun StorEdge™ N8400 filer is currently offered only in a rackmounted configuration.

Sun Enterprise™ 420R Server

Hardware Dimensions

	U.S.	Metric
Height	7.0 in.	17.78 cm
Width	17.25 in.	44.90 cm
Depth	27.25 in.	69.56 cm
Weight	65 lb.	29.5 kg

Environmental Specifications—Operating

Feature	Specifications
Temperature	5 to 35ºC (41º F to 95º F)—IEC 68-2-1, 68-2-2
Humidity	20% to 80% TH, noncondensing; 27º C max. wet bulb—IEC 68-2-2, 68-2-3
Altitude	0 to 3000 meters (0 to 10,000 feet)—IEC 68-2-40, 68-2-41
Vibration	0.2 gravity (g) peak, 5-500 Hz (swept sine); 0.0002 g^2/Hz, 5-500 Hz (random)
Shock	4g peak, 11 milliseconds half-sine pulse—IEC 68-2-27
Threshold Impact	1 m/s—SUN 900-1813

Sun StorEdge™ T3 Array

Dimensions

Dimensions listed are per tray. Note that the Sun StorEdge N8000 filer array (SG-FLRN8000-1027) consists of two trays.

	U.S.	Metric
Height	5.5 in.	13.97 cm
Width	17.5 in.	44.45 cm
Depth	18.5 in.	46.99 cm
Weight—max. with half-height drives	67 lb.	30.15 kg

Environmental Specifications

Feature	Specifications
Environmental (operating)	
Temperature	5 to 35°C, maximum gradient 20 C per hour
Relative Humidity	20 to 80% noncondensing, maximum gradient 10% per hour
Effective Altitude	-1,000 to +10,000 feet (-305 to +3,048 meters)
Vibration	0.2 gravity (g) peak, 5-500 Hz (swept sine); 0.0002 g^2/Hz, 5-500 Hz (random)
Shock (from any axis X, Y, Z)	4.0 g for maximum duration of 11 ms (half sinewave)
Vibration (from any axis X, Y, Z)	5 to 500 Hz at 0.25 g
Environmental (nonoperating)	
Temperature	-20 to 60°C, maximum gradient 20 C per hour
Relative Humidity	5 to 93% noncondensing, maximum gradient 10% per hour
Effective Altitude	-1,000 to +40,000 feet (-305 to 12,192 meters)
Shock (from any axis X, Y, Z)	10.0 g for maximum duration of 11 ms (half sinewave)
Vibration (from any axis X, Y, Z)	5 to 500 Hz at 1.0 g

System Administration

The Sun StorEdge™ N8400 filer is a hardware/software integrated solution that is pre-configured for fast deployment. The system includes Sun StorEdge N8400 filer software, which is a combination of standard Sun™ software, enhancements to help increase performance and restrict functionality to a level expected of an appliance solution, and a unique filer management interface (GUI and CLI) to ease administrative tasks. The Sun StorEdge N8400 filer management interface provides customers with a simple and accessible method of managing a Sun StorEdge N8400 filer that is consistent with other appliance-like solutions in the marketplace.

Protocols

The Sun StorEdge N8400 filer includes support for these protocols:

- NFS v2/v3 UDP and TCP
- CIFS
- Network time protocol (NTP) 3.4y
- SMTP
- Telnet
- SNMP traps
- NDMP

Software

- **Performance:** To enhance performance, Sun fine-tuned file system parameters and adjusted kernel parameters in the `/etc/system` file.
- **Restricted functionality:** Sun modified the Solaris™ Operating Environment to restrict functionality to be more consistent with an appliance solution. The result is a system that provides minimal opportunity for user intervention and, more importantly, user error. These modifications include the following:
  - Disabling of start-up scripts found in `/etc/rc2.d`
  - Disabling of unneeded network services in `/etc/inetd.conf` and `/etc/services`
- **Enhanced functionality:** Sun added additional value by installing and configuring several pieces of standard software products including the following:
  - VERITAS Volume Manager v3.1 software mirrors the internal system disks of the Sun Enterprise™ 420R server, with built-in ability to provide administrator notification in the event of a problem with the mirrored system disks.
  - Solaris PC NetLink software version 1.2 provides CIFS support for Microsoft Windows NT and Microsoft Windows 2000 clients. The Sun StorEdge N8400 filer functions as a member server only, it does not provide authentication services in a Microsoft Windows NT environment.
  - The Solstice Backup™ v6.0 client is pre-installed on the Sun StorEdge N8400 filer.

- **Easy administration:** A browser-based administration tool simplifies the administration of the system. This tool itself does not introduce any new functionality to the system, but provides automation of various administrative processes, such as adding, changing, or deleting users, groups, hosts, and shares. In order to make this tool accessible, the Apache 1.3.9 Web server, bundled as part of Solaris 8 Operating Environment, is utilized. The administration tool is password protected and allows super-user access only. A streamlined command line interface was developed to simplify management of the system from the command line. The Solaris Operating Environment restricted shell was used to develop this interface.

Supported Software

Solstice Backup Software

The Solstice Backup software products provide a tightly integrated backup and storage management solution for distributed enterprise environments. It provides scalable, high-performance, lights-out data protection and management services for environments ranging from a stand-alone server to networks with hundreds of multiplatform systems and multi-gigabytes of data. This solution delivers among the best heterogeneous data protection available today and provides consistent, reliable data protection as well as comprehensive, automated storage management. These products reduce administrative overhead, improve data accessibility to users and applications, and reduce the cost of ownership.

The Solstice Backup client is provided on the Sun StorEdge N8400 filer for use in a Solstice Backup environment. The Sun StorEdge N8400 filer is not designed for use as a backup server.

VERITAS NetBackup Software

VERITAS NetBackup software provides high-performance, industrial-strength backup, archive, recovery, and space management services for UNIX® and PC clients in the large enterprise. With high-speed backup of large databases, centralized management capabilities, mainframe-class media management, and support for high-end tape drives and robotics, VERTIAS NetBackup software is specially geared for the large datacenter customer.

The VERITAS NetBackup client may be installed from the backup server onto the Sun StorEdge N8400 filer for use in a VERITAS NetBackup environment. The Sun StorEdge N8400 filer is not designed for use as a backup server.

Sun StorEdge Instant Image Software

Sun StorEdge Instant Image software is a point-in-time copy facility which runs on a Solaris Operating Environment application or storage server. Sun StorEdge Instant Image software helps enhance the ability of businesses to achieve non-stop business processing by capturing frequent snapshots of live data for independent read and write purposes. Sun StorEdge Instant Image software helps enable point-in-time copies, or shadow volumes, to be created on a Sun StorEdge system. A shadow volume is a replicated view of data which has been frozen at a specific point in time and is used to enable a secondary application to non-disruptively access a primary application's data.

Product applications include the following:

- Backups—Enable on-line processing to continue while backup processes backup a point-in-time snapshot image of on-line data
- Data warehouse loading—Populate a data warehouse from a snapshot image of on-line data

- Application development and testing—Make a snapshot image of production data available as test data for new applications
- Data migration—Use Sun StorEdge Instant Image software to help migrate from one storage platform to another

Sun StorEdge Network Data Replicator (SNDR) Software

Sun StorEdge Network Data Replicator (SNDR) software is a live data replication utility that runs on Solaris Operating Environment servers. It allows businesses to replicate and protect the most important component of their investment, information, by replicating data from one site to another. The replica site can be located anywhere in the world. Using SNDR software, data is written to both primary and secondary sites simultaneously. SNDR allows data to be replicated in both synchronous and asynchronous modes over IP. Virtually any medium can be used to replicate data including ATM, ISDN, Ethernet, gigabit Ethernet, T1, and T3 lines.

Key messages include the following:

- Disaster protection, business continuance, and resilience—In case of a site disaster, data can quickly be made accessible from the remote site by following disaster recovery procedures.
- Fast recovery from unplanned disruptions—Provides businesses the capability for fast recovery from unplanned disruptions.
- Media independent, IP-based software—Provides businesses the flexibility necessary to architect sophisticated data centers for outstanding productivity. Media independent, SNDR works over ATM, ISDN, Ethernet, Gigabit Ethernet, T1, T3, and so on.
- Ease of information management and administration—SNDR can be utilized in conjunction with Sun StorEdge Instant Image software to perform management and administrative tasks such as remote backups and data migration.
- Information sharing—SNDR an be utilized in conjunction with Sun StorEdge Instant Image software to make information available for read/write purposes on the secondary site.

Assemble-to-order Configurations

To provide the customer with maximum flexibility, the Sun StorEdge™ N8400 filer is available as an assemble-to-order (ATO) system. All system components and options appearing on a sales order on the same line item with a Sun StorEdge N8400 filer base part will be installed in that system at the factory for no additional charge.

Note: *Sun StorEdge N8400 filer configurations are presently available rackmounted only.*

Follow the configuration steps listed in the Sun StorEdge N8400 Filer Ordering Matrix, below, to prepare a complete and valid sales order.

Sun StorEdge N8400 Filer Ordering Matrix

STEP 1:	Enter Product Family. Specify N8400-FAMILY	

STEP 2: Order Sun StorEdge N8400 Filer Base Package

MANDATORY COMPONENTS	DESCRIPTION	FIXED QUANTITIES
SG-ARY030A	Sun StorEdge 72-inch expansion cabinet	1
A33-SI-ULD4-4GGB1	Sun Enterprise 420R server	1

STEP 3: Order Options

	DESCRIPTION	FIXED QUANTITIES			
973A	2-meter FC-AL cable	2			
6799A	Fibre Channel HBA boards	2			
6732AR5	FC-AL hub	2			
6735AR5	Dual-hub rackmount kit	1			
9818A	Rack door assembly	1			
9819AR5	Rack fan assembly	1			
3858A or 3859A	US or international power cord for Sun StorEdge rack; customer books either/or depending on GEO	2			
MANDATORY COMPONENTS	**DESCRIPTION**	**VARIABLE QUANTITIES**			
SG-FLRN8000-1027R5	Sun StorEdge N8000 FC arrays. Each array uses 73GB disks and holds 1TB.	1	2	3	4
Match up GBIC quantities as detailed:		⇓	⇓	⇓	⇓
6731A	GBICs - installed into FC Hub (include 2 per rack + 2 per FC array)	4	6	8	10

STEP 4: Order Software Options

MANDATORY COMPONENTS	DESCRIPTION	FIXED QUANTITIES
SG-FLRN8400	Sun StorEdge N8400 Filer software suite	1

STEP 5: Optional Components

Note there is only one available slot, so please select only one of the part numbers listed below:

OPTIONAL COMPONENTS	DESCRIPTION	FIXED QUANTITIES
1141A	Gigabit Ethernet card	1
1034A	Quadfast Ethernet card	1

Note: *Sun StorEdge N8400 filer configurations are available rackmounted only.*

Sun microsystems

Options

Below is a list of options available for the Sun StorEdge N8400 filer. The options will not be installed as part of a Sun StorEdge N8400 filer configuration. Refer to Sun Price Book for complete options listings, configuration notes, and ordering information.

Order Number	Option Description	Maximum Number Supported	Comments
TRKIS-121-99N9	Sun Trunking 1.l software	1	For use when QFE is ordered as part of Sun StorEdge N8400 filer
INI9S-200-W999	Sun StorEdge Instant Image software	1	
BCB9S-200-W999	Sun StorEdge Network Data Replicator (SNDR) with StorEdge Instant Image software	1	

If the customer does not order the Sun StorEdge N8400 filer in its maximum capacity initially, Sun StorEdge T3 for the enterprise arrays (p/n XT3ES-RR-22-1321) can be added at a later date to achieve the maximum capacity of 4 TB (usable).

Upgrades

Sun™ Upgrade Allowance Program (Sun UAP)

Since August 29, 2000, Sun has offered customers a simple, flexible, and easy-to-understand way of ordering desktop workstation upgrades. The Sun™ UAP program has a new percentage-based upgrades model. This new model simplifies the upgrades process by providing a trade-in value as a percentage allowance. This percentage allowance can then be applied to the list price of a regular Sun system configuration.

Under the Sun UAP program, allowance codes or part numbers have been created and the percentage allowance is built into this part number (see below). These allowance codes replace the previous UG/CU marketing codes used for all desktop upgrades.

Allowance codes can be found in the Sun Price Book. Please note that allowance codes apply to configured systems and **cannot be applied to X-options other than monitors**.

Allowance Code Numbering Scheme

Below is an example allowance code, along with a breakdown of the components.

Allowance code = ALW-15-T-D-A21-P2

- **ALW** = Upgrade Identifier (All allowance codes start with ALW.)
- **15** = Allowance Percentage—Percentage is applied to the list price of a standard marketing part number . "15" means 15% off of list price , "08" means 8% off of list price, and so on.

   (Note: Any other discounts such as volume discounts should also be taken off the list price and not the net of the above.)
- **T** = Desktop Upgrade, "S" for Server upgrades, and "D" for Storage Upgrades.
- **D** = Indicates the residue group—a way of grouping system in the Sun installed base. The letters "A" through "X" are reserved for Sun systems. The letter, "Z" is used for competitive systems.
- **A21** = Identifies the product family that the customer is purchasing (the example is the Ultra™ 5 workstation).
- **P2** = Promotion code—Used for tracking corporate sponsored and other types of promotions.

Upgrade Codes for Sun StorEdge N8400 Filer

Upgrade From	Allowance Code
Sun StorEdge™ A3500 Array	ALW-15-D-A3-N84
Sun StorEdge N8400 Filer	ALW-15-D-N82-N84
Network Appliance < 1997	ALW-20-D-Z1-N84-NA
Network Appliance 1997 and newer	ALW-25-D-Z2-N84-NA
Other competitive < 1997	ALW-20-D-Z1-N84
Other competitive 1997 and newer	ALW-25-D-Z2-N84

Service and Support

The SunSpectrum℠ program is an innovative and flexible service offering that allows customers to choose the level of service best suited to their needs, ranging from mission-critical support for maximum solution availability to backup assistance for self-support customers. The SunSpectrum program provides a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the Solaris™ Operating Environment software, and telephone support for Sun™ software packages. The majority of Sun's customers today take advantage of the SunSpectrum program, underscoring the value that it represents. Customers should check with their local Sun Enterprise Services representatives for program and feature availability in their areas.

Support Contracts

SunSpectrum program support contracts are available both during and after the warranty program. Customers may choose to uplift the service and support agreement to meet their business needs by purchasing a SunSpectrum contract. For more information on the SunSpectrum program offerings refer to the following URL:
`http://service.central/TS/ESP/SunSpectrum/Feature_Matrix/index.html`.

The four levels of SunSpectrum support contracts are outlined below.

SunSpectrum Program Support

Program	Description
Mission-Critical SunSpectrum Platinum℠ Support	Designed to support client-server, mission critical solutions by focusing on failure prevention, rapid recovery and year round technical services planning. Support is provided 24 x 7.
Business-Critical SunSpectrum Gold℠ Support	Includes a complete package of proactive and responsive services for customers who require maximum uptime for their strategic business critical systems. Support is provided 24 x 7.
System Coverage SunSpectrum Silver℠ Support	Combines the service expertise, responsive on-site support and technical support by telephone and SunSolve™ CD/on-line services. Support is provided 8 a.m. to 8 p.m. Mon. through Fri.
Self-Directed SunSpectrum Bronze℠ Support	Provided for customers who rely primarily upon their own in-house service capabilities. Enables customers to deliver high quality service by giving them access to UNIX® expertise, Sun certified replacement parts, software releases and technical tools. Support is provided 8 a.m. to 5 p.m. Mon. through Fri.

Warranty

The server and storage components of the Sun StorEdge™ N8400 filer is backed by individual standard warranties. The Sun Enterprise™ 420R server standard warranty is three years with second business day onsite; the Sun StorEdge N8000 filer array standard warranty is two years with second business day onsite in the first year. SunSpectrum enterprise-level support programs are available to upgrade or extend the standard warranties.

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microsystems

If a Sun StorEdge N8400 filer is expanded after initial configuration with the addition of a Sun StorEdge T3 enterprise array, this array will be covered by its own standard warranty of two years with same day on-site service and 24 x 7 phone support.

Glossary

100BASE-T	See Fast Ethernet.
CIFS	Common Internet File System. Enhanced version of the SMB file sharing protocol for the Internet that allows Web applications to share data over the Internet and intranets; similar to WebNFS™ software.
Disk array	A subsystem that contains multiple disk drives, designed to provide performance, high availability, serviceability, or other benefits.
Fast Ethernet	IEEE standard for 100 Mb Ethernet. This technology supports a data transfer rate of 100 megabits per second over special grade of twisted-pair wiring.
FC-AL	Fibre Channel arbitrated loop, a loop topology used with Fibre Channel.
Filer/filer server	A filer is a NAS device which has been designed solely to serve up files to the network. It consolidates storage, simplifies the management of network data, and provides consistent improved performance and increased data availability while reducing administrative complexity and operating costs. Filers are attached directly to a network to provide file-level access to data.
	A file server has a single focus, to serve up data to the network. An application server's focus is to run user applications.
FRU	Field replaceable unit.
GBIC	Gigabit interface converter.
GUI	Graphical user interface. The GUI provides the user with a method of interacting with the computer and its special applications, usually via a mouse or other selection device. The GUI usually includes such things as windows, an intuitive method of manipulating directories and files, and icons.
Hot-plug	A hot-plug component means that it is electrically safe to remove or add that component while the machine is still running. Typically, the system must be rebooted before the hot-plug component is configured into the system.
Hot spare	A drive in an array that is held in reserve to replace any other drive that fails. Hot spares are continuously powered up and spinning. This allows the array processor to have immediate access to a functioning drive for possible reconstruction of lost data.
Hot-swap	A hot-swap component can be installed or removed by simply pulling the component out and putting the new one in. The system will either automatically recognize the component change and configure itself as necessary or will require user interaction to configure the system; however, in neither case is a reboot required. All hot-swappable components are hot pluggable, but not all hot-pluggable components are hot-swappable.

Hub	A device for connecting fiber cables.
Latency	Latency is an expression of how much time it takes for a packet of data to get from one designated point to another on a network.
Network-attached storage (NAS)	Network-attached storage is a concept of shared storage on a network. A NAS device is typically a dedicated, high-performance, high-speed communicating, single-purpose server or device.
NFS	Network file system. This is a client/server application that allows a computer user view and optionally store and update files on a remote computer as though they were on the user's own computer. NFS was developed by Sun Microsystems and has been designated a file server standard. Most UNIX® clients use NFS for remote file access.
Parity	In an array environment, data that is generated from user data and is used to regenerate user data lost due to a drive failure. Used in RAID 5.
PCI	Peripheral component interconnect. An industry-standard for connecting peripherals such as disk drives, tape drives, and other devices used in the PCs.
RAID 5	RAID level 5, or striping with distributed parity. Both data and parity are distributed across disks. No single disk can compromise the integrity of the data. RAID 5 optimizes performance, reliability and cost.
SNMP	Simple network management protocol. A simple protocol designed to allow networked entities (for example, hosts, routers) to exchange monitoring information.
Striping	Spreading or interleaving logical contiguous blocks of data across multiple independent disk spindles. Striping allows multiple disk controllers to simultaneously access data, improving performance.
Volume	A volume is a virtual disk into which a file system, DBMS, or other application can place data. A volume can physically be a single disk partition or multiple disk partitions on one or more physical disk drives. 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.

Materials Abstract

All materials will be available on SunWIN except where noted otherwise.

Collateral	Description	Purpose	Distribution	Token # or COMAC Order #
Product Literature				
– *Sun StorEdge™ N8400 Filer Just The Facts*	Reference Guide (this document)	Training Sales Tool	SunWIN, Reseller Web	129796
– *Sun StorEdge N8000 Filer Series Data Sheet*	Data Sheet	Sales Tool	SunWIN, Reseller Web, COMAC	129667 DE1416-0
– *Sun StorEdge N8000 Filer Series Customer Presentation*	Customer Presentation with Speaker Notes	Training Sales Tool	SunWIN, Reseller Web	120157
– *Network-Attached Storage White Paper*	White Paper	Training	SunWIN, Reseller Web	119836
References				
– *Sun StorEdge N8200 Filer, Just the Facts*	Reference Guide	Training Sales Tool	SunWIN, Reseller Web	120359
– *Sun StorEdge T3 Array, Just the Facts*	Reference Guide	Training Sales Tool	SunWIN, Reseller Web	112864
– *Sun Enterprise 420R Server, Just the Facts*	Reference Guide	Training Sales Tool	SunWIN, Reseller Web	111556
External Web Site				
– *Sun StorEdge N8400 Filer Web Site*	http://www.sun.com/storage/nas/N8400			
Internal Web Site				
– *Sun StorEdge N8000 Filer Internal Web Site*	http://webhome.ebay/networkstorage/products/N8000			