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NETRA™ st D130 STORAGE ARRAY

OVERVIEW

An Incrementally Scalable Rack-Optimized Storage Solution

The Netra st D130 storage array is a rack-optimized unit that houses three hot-swappable disks and is ideally suited for many applications, including:

- Small-to-medium sized databases
- Boot devices for rack mounted servers
- Disk arrays for high availability and data mirroring

The Netra st D130 storage array conforms to an extremely compact form factor—one rack unit (1.75 inches) in height, by 19 inches in depth. Despite its small size, the Netra st D130 storage array is a powerful storage solution that is capable of supporting 18 to 109 gigabyte capacities within a single unit. Up to two units can be daisy chained together for a total capacity of 218 gigabytes.

The Netra st D130 storage array helps users to maximize rack density and minimize the use of valuable vertical space in Internet Data Centers, Enterprise Data Centers, and Telco Central Offices. Service providers and Telcos, in particular, are beginning to measure the cost of each rack unit of space. Products that occupy less space are essentially less expensive to operate and maintain.

Potential applications for the Netra st D130 storage array include hot-swappable external disk storage solutions for rack mounted servers (e.g., small-to-medium sized databases), hot-swappable boot disks for larger servers, hot-swappable mirrors of the system and data disks for rack mounted servers, and incrementally scalable storage subsystems for applications that grow over time.

Reliability Features

The Netra™ st D130 storage array is designed to meet the high reliability requirements and provide the special features required by the service provider and Telco industries. The unit has been independently certified to meet the Telcordia NEBS Level 3 standard, a criteria that is required for equipment deployed within Telco central offices. The Netra st D130 storage array offers many high reliability features:

- Fire-proof and fire-resistant metal enclosure
- Withstands zone 4 earthquakes (8.0 magnitude)
- Operates within compliant levels of EMI and ESD
- Operates in environments with non-ambient temperature, high humidity, and airborne contaminants
- Provides a choice of AC power (90V to 240V) or DC power (-48V/-60V)
- Provides isolated ground chassis (DC version)
- Adheres to Telco industry rack mount standards including depth restrictions—The unit is shipped with a 19" rack mount kit, and optional rack mount kits can be purchased for 23", 24", and 600mm racks.
- Offers a fixed mount option for front, front/back, and center mounting
- Provides sliding rail mount option for easy servicing and replacement



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Serviceability Features

The Netra st D130 storage array offers the flexible storage options and the easy serviceability features required by the Service Provider, Enterprise and Telco industries. The unit supports:

- Up to three hot-swappable disks per enclosure—The drives can be removed and replaced while the unit is running.
- High performance 18 or 36 gigabyte 10,000 RPM disks
- Simplified field replaceable units (FRUs)
- Auto-termination for easy serviceability—Traditional SCSI devices rely on System Administrators to install a terminator on the device at the end of a SCSI bus. The auto-termination feature automatically detects whether the unit is the device at the end of the bus. If this is the case, it terminates the bus.
- Dual host support for clustering
- UltraSCSI single-ended host connection
- Dual SCSI connectors
- Status LEDs on the front and back of the unit
- Activity LEDs for each disk
- Labeling area for easy identification and serviceability

System Monitoring Software for Better Site Management and Up-Time

The Netra st D130 storage array is shipped with the Storage Subsystem Manager (SSM) software which runs on the host server and monitors the status of the storage enclosure as well as the individual disk drives. The SSM software—which is a standard feature provided at no extra charge—helps system administrators to assure that the Netra st D130 units are serviced as quickly as possible in the event of a failure. In addition, the SSM software monitors the temperature of the disk drives and generates a message if the temperature exceeds the customer-defined warning and critical thresholds.

By default, the software places these messages in the system log. It is also possible to view these messages on the host system or from any other system on the network by using the provided **ssmadmin** utility. The SSM software is flexible and configurable, and can be easily set up to meet the needs of diverse data center and central office environments.



Rack Mounting Options

As with all Netra server and storage products, the Netra st D130 storage array supports a wide range of rack mounting options. Each Netra st D130 unit is shipped with a rack mount kit that supports 19" slide mount, two-post, and four-post rack mounting, including mounting within the Sun StorEdge™ 72" Expansion Cabinet and the Sun Enterprise™ 68" system cabinet. Other rack mount kits are available for 23", 24", and 600mm racks.

Server Compatibility

The Netra st D130 storage array is supported by Sun Microsystems when attached to any of the following server platforms:

Netra T1 AC200/DC200
Netra t1 Model 100/105
Netra t 1120/1125
Netra t 1400/1405
Netra ct 400/800
Sun Enterprise 220R and 420R
Sun Enterprise 3500, 4500, 5500, 6500

Sample Application: Boot Device for Sun Enterprise Server

A Netra st D130 unit is frequently used to mirror the internal boot device of a Sun Enterprise 220R or 420R server. It is also often used as the boot device—or mirrored boot device—for the Sun Enterprise 3500 through 6500 servers (including the rack mounted Sun Enterprise 4500-R server) in order to conserve system slots within the server for other purposes. Customers often use mirrored boot devices for Sun Enterprise servers because these servers typically run mission-critical applications with stringent high availability requirements. A mirrored boot device removes a single point of failure.

This application brief spells out the requirements for this application and provides configuration tips.

Why Customers Choose the Netra st D130 Storage Array for this application

There are several reasons that customers choose the Netra st D130 storage array as a boot device for a Sun Enterprise server:

- The small form factor of the Netra st D130 storage array is important, since very little additional rack space is required for boot devices.
- The price point of the Netra st D130 storage array makes it an attractive and cost effective alternative for this application.
- The Netra st D130 storage array can be used as an external boot device, which some customers prefer. (A disk board is mounted in a system slot within a Sun Enterprise server.)
- The reliability and rugged construction of the Netra st D130 storage array is important because of the high availability requirements of most applications hosted on Sun Enterprise servers.

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Connecting to an Enterprise Server

It is possible to connect up to two Netra st D130 units to a Sun Enterprise 3500-6500 server. One unit can be used as the boot device and the second unit can be used as the mirrored boot device. The Netra st D130 storage array is supported as an external attach and boot device for these servers. However, up to four Netra st D130 units may be installed within a Sun Enterprise 5500 or 6500 cabinet, where those units are connected to two different servers. Up to six Netra st D130 units may be installed within a Sun Enterprise 4500-R cabinet, where those units are connected to three different servers.

The Netra st D130 storage array can be connected to a Sun Enterprise 3500-6500 servers via either the on-board SCSI host interface (a component that is built into an I/O board) or a SCSI host adapter card (an optional add-in card). The following SCSI host adapters cards are supported:

- SCSI port on SunSwift 100BaseT F/W SCSI SBus adapter (X1018A)
- SCSI port on 10/100BaseT F/W Ultra SCSI PCI adapter (X1032A)
- Either SCSI port on a Dual Channel Ultra SCSI PCI adapter (X6540A)

Mounting Units Within Sun Enterprise Server Cabinets

Up to six Netra st D130 units can be mounted within a Sun Enterprise 4500-R 72 inch cabinet. The first Netra st D130 unit is mounted immediately below the 2 inch air gap at the top of the cabinet. Each subsequent Netra st D130 unit is placed immediately below the previous unit installed in the cabinet.

Up to four Netra st D130 units can be mounted within a Sun Enterprise 5500 or 6500

68 inch cabinet. The first Netra st D130 unit is mounted in the first slot at the top of the cabinet. Each subsequent Netra st D130 unit is placed immediately below the previous unit installed in the cabinet.

Sample Application: Web Caching or Other Horizontally Scaled Applications

With thousands of e-commerce sites being launched daily, Internet users will not tolerate web sites that require more than a few seconds to load pages and complete transactions. To remain competitive, e-commerce companies are setting up caching servers—which combine servers and storage subsystems along with caching software—at strategic locations known as Internet Data Centers (iDC). This allows a web browser to transparently load static content from the caching servers that are closest to the user's location, rather than loading that content from the originating web servers. This, in turn, results in faster downloads and greater bandwidth since more requests can be handled from all over the world at any given time.

The Netra st D130 storage array is ideal for caching applications for several reasons. The small 1U form factor makes it possible to mount 32 units within a Sun StorEdge 72" rack, preserving floor space which is often a critical factor within Internet Data Centers. The reliability of the Netra st D130 storage array is important for caching applications which must sometimes be hosted in lights-out environments. Also, by striping data across all three disk drives within a Netra st D130 unit, data can be read and written very quickly, thereby increasing the response time of an e-commerce site.

An example caching package might consist of:

- One Netra T1 AC 200 (or other Netra server)
- One Netra st D130 storage array
- Inktomi traffic server software

The Netra st D130 storage array also works well for other types of horizontally scaled applications that require small-to-medium sized databases. In general, a horizontally scaled application uses multiple servers with direct attached storage subsystems to perform a single task—such as serving web pages—on each server. Horizontally scaled applications grow over time by adding new servers and storage units (as opposed to adding capacity to existing units). If the database in such an application must be duplicated for each server node, the Netra st D130 storage array is an excellent choice because of its small footprint, easy serviceability, and cost-effective price point. These features become increasingly important if the application grows to such a size that many densely populated racks of servers and storage units must be deployed, possibly in multiple locations.

SUN PART NUMBERS FOR THIS APPLICATION

The Sun part numbers for some of the popular Netra st D130 storage array configurations that can be used for these applications are:

NS-XDSKD130-36GAC—AC powered unit with two 18 gigabyte drives

NS-XDSKD130-54GAC—AC powered unit with three 18 gigabyte drives

NS-XDSKD130-54GDC—DC powered unit with three 18 gigabyte drives

NS-XDSKD130-72GAC—AC powered unit with two 36 gigabyte drives

NS-XDSKD130-72GDC—DC powered unit with two 36 gigabyte drives

X5239A—Additional 18 gigabyte NEBS compliant disk drive

X5244A—Additional 36 gigabyte NEBS compliant disk drive

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Connecting to a Netra Server

The Netra st D130 storage array facilitates horizontally scaled applications by supporting easy direct attach to the Netra T1 AC200/DC200, Netra t1 1120/1125, and Netra t 1400/1405 servers (as well as the other servers mentioned in Server Compatibility, above). Connecting a Netra st D130 unit to any of these servers is an extremely simple "plug-and-play" operation. It is also a cost effective option since the server's onboard SCSI adapter can be used; add-on hardware is not required.

The Netra st D130 storage array provides the same NEBS Level 3 reliability as the Netra servers mentioned above. In addition, the Netra st D130 storage array uses the same front-to-back cooling, rear cabling, and front-end servicing procedures. All of these features make it easy to build, maintain, and service horizontally scaled solutions using the Netra st D130 storage array in conjunction with Netra servers.

Modular Computing

The Netra st D130 storage array can be part of a rack-optimized modular computing solution that supports horizontally scaled applications by allowing users to cost-effectively build and evolve solutions over time, using the right mix of connectivity, CPU/memory, and storage capacity. A typical modular solution can be built using the following components:

- Netra T1 AC200/DC200, Netra t 1120/1125, or Netra t 1400/1405 servers
- Netra E1 PCI System Expander
- Netra st D130 storage array

With this family of components, a solution can start small and grow larger over time. For example, an application might be hosted initially on a single node, consisting of a Netra T1 AC200 server with 500-MHz UltraSPARC performance, two 18 gigabyte disk drives, and one PCI connector. As the requirements for the application grow over time, the node can be expanded by simply attaching a Netra st D130 unit and a Netra E1 PCI System Expander. This results in a storage capacity of up to five 18 or 36 gigabyte disk drives, and an I/O capacity (or connectivity capacity) of up to four PCI connections. In a horizontally scaled application, this node can then be duplicated as many times as necessary to handle increasing loads.

Netra st A1000 and D1000 Storage Arrays —When Larger Storage Solutions Are Required

The Netra st A1000 and D1000 are rack-optimized versions of the Sun StorEdge A1000 and D1000 storage subsystems. These powerful subsystems are able to scale from gigabytes up to terabytes as information storage demands increase. Service providers and Telcos are able to scale applications up and down quickly—using modular units of storage—in order to meet fast-changing requirements without overbuying storage capacity.

The rack-optimized Netra st A1000 and D1000 offer special reliability features, including:

- Fireproof metal chassis
- Expanded rack options including 19", 23", 24", and 600mm rack sizes
- Wide temperature and humidity operational ranges—These units are designed to operate for 96 consecutive hours at 122∞F (50∞C) with humidity as high as 90%. This translates into peace of mind in the event of air conditioning failures.
- The Netra st A1000 and D1000 storage arrays offer redundant power supplies and fan modules to increase the availability of the products. Hot swappable modules permit repair and upgrade while the storage array remains online. And, because these systems are NEBS Level 3 certified, they will perform reliably under the most demanding environmental conditions. These storage subsystems also support multiple RAID levels, mirrored cache, and automatic failover. In addition, they can be part of a cluster solution consisting of Netra servers with Sun Cluster software.

Conclusion

The Netra st D130, Netra st A1000, and Netra st D1000 storage arrays make up a full line of rack-optimized storage solutions. These storage subsystems can be used in a wide array of applications within large and small Internet Data Centers, Enterprise Data Centers, Points of Presence, and Telco Central Offices.

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