

# Netra 440 Server

## *Just the Facts*

SunWIN token # 406565

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**Figure 1: Netra 440 Server, front view**

### Introduction

Deregulation and privatization has created intense competition in the worldwide telecommunications market over the past few years. The marketplace continues to evolve as voice and data solutions become more integrated and next-generation wireless, video and messaging technologies emerge. Growing demand for scalable and available services coupled with modern economic realities are re-shaping the design of the telecommunications infrastructure. Now more than ever, availability of key services can dictate success or failure, with stringent service-level agreements increasingly common. At the same time, today's challenging economic climate means that successful organizations must consider issues such as total cost of ownership (TCO) and investment protection to make sure their decisions make long-term business sense.

Many organizations have realized that filling racks with inexpensive servers is only part of the solution. The administrative costs of dealing with hundreds or thousands of systems - installing and replacing systems, managing software and enforcing security - can quickly drive TCO upward. In addition, maintaining 24x7 service availability can be challenging due to a variety of reasons ranging from hardware failure to security issues to a lack of individual system performance and scalability. Systems that aren't available are the most expensive of all, causing lost productivity, broken service-level agreements and revised customer loyalties.

Sun understands that telecom servers have the same needs in terms of performance, reliability, stability, security, scalability and manageability. As a result, Netra 440 servers, which are NEBS Level 3 certified (DC version only), are designed to be affordable, yet retain higher performance level functionality. Running the proven Solaris Operating System (OS) and compatible with the rest of Sun's high-performance family of UltraSPARC servers, these systems provide the performance, scalability and expandable capacity to help organizations anticipate rapidly changing situations. With up to four processors, the Netra 440 Server also addresses increasing requirements for network bandwidth, secure network transactions and manageability in a compact, rack-mount enclosure.

## Product Overview

The Netra 440 server is the next generation, high-performance, UltraSPARC IIIi processor-based, NEBS Level 3 certified (DC version only) and ETSI compliant server that continues to address the expanding market for open computing platforms and solutions for deployment within the network infrastructure. This next-generation Netra server brings multiprocessing power, Ultra320 SCSI disk drives, and the industry-standard Peripheral Component Interconnect (PCI) I/O bus to a rack optimized 5RU (rack unit) design. In addition, the Netra 440 server delivers outstanding performance that users expect from Sun servers, while at the same time preserving 100 percent SPARC/Solaris binary compatibility with application software.

Features of the Netra 440 server include:

- Up to four (4) 1.28 GHz UltraSPARC IIIi processors, the 64-bit SPARC® V9 architecture specifically crafted to support low cost and low power requirements
- Sun Solaris™ 8 (HW 07/03 ) or Solaris 9 (HW 12/03) or later Operating System designed for multiprocessing and 64-bit computing, where availability and stability are the key requirements
- Up to 16GB of DDR1 memory (16 x 1GB DIMM's)
- Up to four (4) 73GB 15Krpm Ultra320 SCSI hard drives
- Up to six (6) PCI slots (3 at 33MHz, 3 at 33/66Mhz)
- Two (2) Gigabit Ethernet ports
- Two (2) Serial ports (1 DB-9, 1 RJ-45)
- Four (4) USB 1.0 ports
- Ability to operate in potentially hostile environmental conditions
- Telcordia NEBS Level 3 certification (DC version only)
- Compact footprint
- Optimized for rack environments and space constrained environments
- AC and DC power supply
- ALOM (Advanced Lights Out Manager)
- Alarms and high-availability options
- Attractive price/performance

Among the firsts for the Netra 440 server:

- The FIRST Netra platform four processor UltraSPARC IIIi-based, rack-optimized server with 64-bit computing performance at attractive pricing
- The FIRST 4P Netra server in a 5U height and less than 20-inch deep form factor
- The Price/Performance leader in the 4 way carrier grade server segment

## Product Family Placement

The Netra 440 server, targeted primarily at the telecommunication, defense/military, and Embedded OEM markets, is the latest member of the Netra server product family, which also includes the dual processor Netra 240 at the low end.

<i>Server</i>	<i>Target Users and Markets</i>
Netra 240 Server (2 processor UltraSPARC IIIi)	The Netra 240 server are entry level carrier-grade servers with high availability and expandability features. Featuring up to two 1.28 GHz UltraSPARC[r] IIIi processors, four built-in gigabit ethernet ports, pre-installed software, a system configuration card, advanced remote management, and an optional integrated SSL card, the Netra 240 servers provide exceptional compute density and performance at entry level prices.
Netra 440 Server (4 processor UltraSPARC IIIi)	The Netra 440 utilizes an integrated processor architecture optimized to reduce cost and maintain performance. The Netra 440 represents a significant improvement in price/performance relative to other competitive four-way systems. The Netra 440 utilizes the UltraSPARC IIIi processor which combines 1 MB of internal cache with a processor speed of 1.28GHz and up to 16GB of system memory in a compact 5RU package. Thus, the Netra 440 maximizes CPU processing/memory density per square foot of floor space.

## Netra 440 vs. Sun Fire V440 and Netra t1400/1405 feature comparison

<b>Features</b>	<b>Netra 440</b>	<b>Sun Fire™ V440</b>	<b>Netra t 1400/1405</b>
<b>Form factor</b>	5 RU rack optimized, 20" Depth (includes bezel)	4 RU rack optimized, 24" Depth (includes bezel)	6 RU rack optimized, 20" Depth (includes bezel)
<b>NEBS Level 3 certified</b>	YES	NO	YES
<b>Number of CPUs</b>	1 - 4	1 - 4	1 - 4
<b>CPU type</b>	64 bit UltraSPARCIIIi	64 bit UltraSPARCIIIi	64 bit UltraSPARCII
<b>CPU speed</b>	1.28 GHz	1.06 / 1.28 GHz	440 MHz
<b>Level 2 cache</b>	1MB	1MB	4MB
<b>Memory (Max.)</b>	16 GB (16 x 1GB)	16 GB (16 x 1GB)	4 GB
<b>O/S</b>	Solaris 8 HW 07/03 or Solaris 9 HW 12/03 or later	Solaris 8 HW 07/03 or later	Solaris 2.6 or later
<b>PCI slots: (Total)</b>	<b>6</b>	<b>6</b>	<b>4</b>
<b>@66 MHz</b>	3	3	1 (33/66)
<b>@33 MHz</b>	3	3	3
<b>Integrated Network</b>	Two 10/100/1000 Ethernet	Two 10/100/1000 Ethernet	One 10/100 Ethernet
<b>I/O connections</b>	Dual serial, Four USB, One SCSI	Dual serial, Four USB, One SCSI	Dual serial, One SCSI
<b>Internal Storage (disk drives)</b>	4x73 GB, 15Krpm	4x36/73 GB, 10Krpm	4x36 GB, 10Krpm
<b>Remote management</b>	ALOM (standard)	ALOM (standard)	LOM (standard)
<b>System configuration Card</b>	Standard	Standard	Standard
<b>Power supply</b>	2+2 Hot Swap AC/DC	1+1 Hot Swap AC	3 (N+1) AC/DC
<b>Minimum input power (typ)</b>	375 W 2x1.28Ghz, 4GB memory, 2x73GB HDD, 1 PCI card, 2 power supplies	360 W 2x1.06Ghz, 4GB memory, 4x36GB HDD, 1 PCI card	330W (Nominal)
<b>Maximum input power (typ)</b>	660 W 4x1.28Ghz, 16GB memory, 4x73GB HDD, 6 PCI cards, 2 power supplies	650 W 4x1.28Ghz, 16GB memory, 4x36GB HDD, 6 PCI cards	-
<b>RAS Features</b>	Hot pluggable disks, hot pluggable power supplies, ALOM, SCC, front and rear power and fault LED indicators, hot swappable fan trays	Hot pluggable disks, hot pluggable power supplies, ALOM, SCC, front and rear power and fault LED indicators	Hot pluggable power supplies, ALOM, SCC, front and rear power and fault LED indicators



<b>Features</b>	<b>Netra 440</b>	<b>Sun Fire™ V440</b>	<b>Netra t 1400/1405</b>
<b>Alarms</b>	YES	NO	YES
<b>Removable Media</b>	DVD-RW, DVD-ROM	DVD-ROM only	DVD-ROM
<b>Height / Width / Depth</b>	5U / 17.32" / 19.5"	4U / 17.52" / 24"	6U / 17" / 19.9"
<b>Maximum shipping weight</b>	37 Kg (81.6 lb.) fully configured	37 Kg (82 lb.) fully configured	23.16 kg (51 lb.)

### Netra 440 Features, Functions, and Benefits

<b>Feature</b>	<b>Function</b>	<b>Benefit</b>
<ul style="list-style-type: none"> <li>Powered by Sun's latest processor technology</li> </ul>	<ul style="list-style-type: none"> <li>The Netra 440 server is the first 4P Netra platform to deploy the latest, low-cost, high-performance 1.28 GHz UltraSPARC IIIi processor technology.</li> </ul>	<ul style="list-style-type: none"> <li>Provides better scalability and increased performance</li> </ul>
<ul style="list-style-type: none"> <li>Space efficient 4P, 5RU, 19.5-inch deep form factor</li> </ul>	<ul style="list-style-type: none"> <li>Offers high compute density, providing maximum value per rack unit while leaving ample room for cable management.</li> </ul>	<ul style="list-style-type: none"> <li>Lowers total cost of ownership and increases return on investment.</li> </ul>
<ul style="list-style-type: none"> <li>Six PCI slots (3 x 33 MHz and 3 x 33/66 MHz, all at 64-bits)</li> </ul>	<ul style="list-style-type: none"> <li>Allows users to configure systems according to their needs with additional network, storage, graphics adapters, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Eliminates contention among peripheral controllers, thereby maximizing processing capabilities.</li> </ul>
<ul style="list-style-type: none"> <li>Dual integrated Gigabit Ethernet ports</li> </ul>	<ul style="list-style-type: none"> <li>Provides increased throughput and redundancy</li> </ul>	<ul style="list-style-type: none"> <li>Excellent I/O performance and memory capacity.</li> </ul>
<ul style="list-style-type: none"> <li>Up to four hot-swappable front accessible 73GB 15Krpm Ultra320 SCSI hard disk drives</li> </ul>	<ul style="list-style-type: none"> <li>Up to 4x73GB internal disk storage. Online maintenance and repair enhances system availability</li> </ul>	<ul style="list-style-type: none"> <li>Customers can store data directly onto the server without external storage requirements. Hot-swap function helps to increase serviceability and ease maintenance</li> </ul>
<ul style="list-style-type: none"> <li>NEBS Level-3 certification (DC version only)</li> </ul>	<ul style="list-style-type: none"> <li>Enables continuous operation in earthquake Zone 4 environments; complies with regulatory regulations for deployment in central office environments</li> </ul>	<ul style="list-style-type: none"> <li>Maximizes availability and decreases downtime due to environmental conditions</li> </ul>
<ul style="list-style-type: none"> <li>Ruggedized enclosure</li> </ul>	<ul style="list-style-type: none"> <li>Provides the highest levels of protection from temperature fluctuations, humidity, vibration, pollutants, or other air contaminants such as dust; resist/retard fire or other electrical hazards</li> </ul>	<ul style="list-style-type: none"> <li>Increases reliability and availability. Minimizes downtime due to environmental conditions</li> </ul>

<b>Feature</b>	<b>Function</b>	<b>Benefit</b>
<ul style="list-style-type: none"> <li>• Dry Contact Alarms</li> </ul>	<ul style="list-style-type: none"> <li>• Four programmable alarms are available in the Netra 440 server, these include Critical, Major, Minor, and User. Critical, Major, and Minor alarms are to be used to denote corresponding system states while User alarm is user-definable</li> </ul>	<ul style="list-style-type: none"> <li>• Enables Telco operators to use a relay to signal fault conditions to a rack or control room panel as well as an alarm monitoring system</li> </ul>
<ul style="list-style-type: none"> <li>• Among the lowest priced 4 way carrier-grade server on the market</li> </ul>	<ul style="list-style-type: none"> <li>• Allows for a cost effective platform. Reduces cost of acquisition and overall cost of hardware platform as part of an OEM solution</li> </ul>	<ul style="list-style-type: none"> <li>• Enables customers to get SPARC/Solaris reliability, availability and security along with carrier-grade packaging all at affordable attractive entry-level price-points</li> </ul>
<ul style="list-style-type: none"> <li>• 64-bit architecture</li> </ul>	<ul style="list-style-type: none"> <li>• Allows computer to handle 64 bits of data simultaneously (versus 32 bits)</li> </ul>	<ul style="list-style-type: none"> <li>• Increased scalability of computer and applications. Ideal for applications that require large files, large numbers of files, or a large number of users.</li> </ul>
<ul style="list-style-type: none"> <li>• J-bus interconnect operating at 2.67 GB/s.</li> </ul>	<ul style="list-style-type: none"> <li>• High-bandwidth interconnect ensures scalability with minimal contention and latency between processing and I/O subsystems.</li> </ul>	<ul style="list-style-type: none"> <li>• Increases efficiency</li> </ul>
<ul style="list-style-type: none"> <li>• Binary and application compatibility through an end-to-end SPARC/Solaris architecture from 1 to 106 processors</li> </ul>	<ul style="list-style-type: none"> <li>• Increases operation efficiency while eliminating costs for application porting.</li> </ul>	<ul style="list-style-type: none"> <li>• Provides investment protection.</li> </ul>
<ul style="list-style-type: none"> <li>• Redundant DC power supplies with separate power cords</li> </ul>	<ul style="list-style-type: none"> <li>• System can carry up to 4 power supplies, however, a fully configured system can run on two power supplies</li> </ul>	<ul style="list-style-type: none"> <li>• Increase availability and helps ensure uptime of critical applications. DC power provides a much "cleaner" power supply that is less susceptible to power spikes than AC power. DC power also allows for battery backup of the power supply.</li> </ul>
<ul style="list-style-type: none"> <li>• Advanced Lights Out Manager (ALOM)</li> </ul>	<ul style="list-style-type: none"> <li>• Monitors and reports system and component status, meaning less need for on-site staff.</li> </ul>	<ul style="list-style-type: none"> <li>• Increases productivity and availability by allowing remote management via network or serial connections.</li> </ul>
<ul style="list-style-type: none"> <li>• Industry's only System Configuration Card (SCC) comes standard</li> </ul>	<ul style="list-style-type: none"> <li>• Contains the system's host ID,MAC and IP address, which is easily transferrable to a standby system</li> </ul>	<ul style="list-style-type: none"> <li>• Increases system availability and serviceability by allowing customers to quickly transfer configuration data from one system to another</li> </ul>
<ul style="list-style-type: none"> <li>• Automatic System Recovery (ASR)</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor the system memory and automatically configures around failed DIMMs or PCI cards.</li> </ul>	<ul style="list-style-type: none"> <li>• Enhances availability by restoring system to operation as quickly as possible. Minimizes the need for manual intervention.</li> </ul>
<ul style="list-style-type: none"> <li>• Front and back LEDs</li> </ul>	<ul style="list-style-type: none"> <li>• Provide easy and quick diagnosis of system state and faults</li> </ul>	<ul style="list-style-type: none"> <li>• Physical security preventing access to enclosed hardware and preventing initiation of applications from unauthorized users.</li> </ul>

<b>Feature</b>	<b>Function</b>	<b>Benefit</b>
<ul style="list-style-type: none"> <li>19-inch 2/4 post rackmount kit and flip down bezel are standard with every system. Other rackmount kits available: 23-inch 2 post, 600mmx600mm, and 19-inch 4 post slide rail.</li> </ul>	<ul style="list-style-type: none"> <li>Provides ease of serviceability and ability to rack system in a variety of industry racks</li> </ul>	<ul style="list-style-type: none"> <li>Reduces service time and gives customers the flexibility to rack mount the Netra 440 in a variety of different industry racks</li> </ul>
<ul style="list-style-type: none"> <li>Optional DVD-RW</li> </ul>	<ul style="list-style-type: none"> <li>Ability to read and write to a removable media access device</li> </ul>	<ul style="list-style-type: none"> <li>Enables customers to store data on a removable media access device without external storage or hard drive requirements</li> </ul>
<ul style="list-style-type: none"> <li>Optional factory integration with qualified custom options, racked, cabled and delivered to the customer's site as a "ready-to-deploy" system through Sun Customer Ready Systems (CRS) program</li> </ul>	<ul style="list-style-type: none"> <li>Hardware/software integration services now available as part of system ordering process</li> </ul>	<ul style="list-style-type: none"> <li>Pre-integrated systems reduce the time and resources required for deployment</li> <li>Factory integration reduces system handling thereby decreasing early life system failures</li> <li>Increased customer confidence knowing the integrated system is checked for readiness at the factory before shipment</li> <li>Cost effective</li> </ul>

## Availability of Product

General Availability for the Netra 440 DC Server is scheduled for Q3CY2004.

General Availability for the Netra 440 AC Server is scheduled for Q4CY2004.

## Target Users

Target users are found in the following market areas:

- Network equipment providers, including wireless and wireline telecommunications infrastructures
- Government and military installations
- Manufacturing / Utilities
- Service providers deploying data centers, POPs, or metropolitan area networks

## Target Markets

Industry/Customer	Key Features to Highlight
Network equipment providers and telecommunications companies	<ul style="list-style-type: none"> <li>• Meets mandatory requirements for deployment in central office-type environments: NEBS Level 3 certification (Dc version only), AC/DC power, shallow depth (19.5 inches)</li> <li>• Minimal footprint to maximize data center space usage</li> <li>• Flexible to fit in virtually any rack-type environment</li> <li>• Reliability, availability, and scalability provided by the UltraSPARC IIIi 64-bit microprocessor and Sun Solaris 8 and 9 Operating System</li> <li>• Integrated Dual Gigabit Ethernet for high speed connectivity</li> </ul>
Government, military, manufacturing, utilities, IT infrastructures	<ul style="list-style-type: none"> <li>• NEBS Level 3 certification (DC version only)</li> <li>• Minimal footprint to maximize data center space usage</li> <li>• High performance</li> <li>• Reliability and serviceability</li> <li>• Availability</li> </ul>

## Target Applications

The Netra 440 is targeted for Tier 2 and Tier 3 applications, such of which are listed below.

- Media Gateway Controller
- Wireless – HLR/VLR, 3G - UMTS/GGCN/SSGN
- VOIP – Softswitch, Signaling Gateway, Media Server, App Server
- Intelligent Network
- Unified Messaging
- Multimedia Messaging Services (MMS)
- Short Messaging Services (SMS)
- OA&M OSS/BSS application areas
- Web App services, LDAP, AAA, Mailstore
- Security
- Streaming Video Services
- Defense/Military /Intelligence applications include shipboard command and control, mobile weapons control and remote intelligence access servers
- Embedded OEM applications such as industrial process control, semiconductor test equipment and network imaging systems

# Key Messages

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With the introduction of the Netra 440, Sun continues to offer customers innovation, simplicity, durability, and compatibility.

- **INNOVATION**

- Latest Processor Technology: The Netra 440 server is the first 4P Netra platform to deploy the latest low-cost high-performance 1.28 GHz UltraSPARC IIIi processor technology designed for low cost systems.
- Memory capacity: The Netra 440 consists of 16 DIMM slots (4 per processor) for a total memory capacity (at GA) of 16 GB (16 x 1GB DIMMs), thereby allowing for the deployment of a wide range of applications.
- Large disk drive capacity: Netra 440 offers 4 x 73GB – 15,000Krpm Ultra320 SCSI drives to allow for enhanced data storage without the added cost and delay of accessing external drives.

- **SIMPLICITY**

- Ease of Serviceability: The Netra 440 was designed with features that include front and back system LEDs, front accessible hot-swappable drives, removable system configuration card and modular field replacement units (FRUs).
- Ease of Administration: Administration and recovery for the Netra 440 is provided through the Advanced Lights Out Manager (ALOM) and the system configuration card (SCC). The ALOM provides remote monitoring and diagnosis of the system and the SCC enables quick replacement of a faulty system by transferring the system identity to ensure rapid recovery.

- **DURABILITY**

- Ruggedization: Ruggedized packaging provides a high level of system reliability which helps ensure that the Netra 440 servers continue to operate under the extremes of environmental conditions.
- Reliability: The Netra 440 with the 64-bit UltraSPARC IIIi microprocessors and Solaris Operating Environment enables an architecture that is robust and reliable. In addition, the Netra 440 offers high availability for mission critical applications with redundant hot-swap components and redundancy through the dual Gigabit Ethernet ports.

- **COMPATABILITY**

- Investment protection: Customers get binary and application compatibility through an end-to-end SPARC/Solaris architecture that increases operation efficiency while eliminating cost for application porting.
- Continuity: Netra based servers are used around the globe in a variety of locations including telecommunications central offices and wireless base stations, Internet data centers, metropolitan area networks, POPs, and enterprise service provider infrastructures. The Netra 440 reaffirms Sun's commitment to customers who invested in the Netra product line by offering a product that delivers enhanced performance/throughput, consistent form, fit, and function.

# Selling Highlights

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## Market Value Proposition:

Based on the latest SPARC/Solaris technology , the Netra 440 Carrier-Grade server provides high performance in an ultra dense rack-optimized package.

- **Price/performance leader:** Netra 440 offers an industry-leading price-performance ratio for 4 way Carrier-Grade servers. Competitive systems (such as the HP rp5470) cost in excess of \$45,000 for 2 way (875 MHz) systems.
- **Continuity:** Netra based servers are used around the globe in a variety of locations including telecommunications central offices and wireless base stations, Internet data centers, metropolitan area networks, POPs, and enterprise service provider infrastructures. The Netra 440 reaffirms Sun's commitment to customers who invested in the Netra product line by offering a product that delivers enhanced performance/throughput, consistent form, fit, and function.
- **Availability:** There are few metrics more important than “system uptime” in a telco environment. Sun's success with customers lies in the ability to deliver systems and applications that are ready whenever a customer is online. The Netra 440 server includes the following RAS features to help customers achieve high availability:
  - Redundant, hot-swappable power supplies
  - Hot-swappable, front accessible disk drives, with software mirroring
  - Built-in dual Gigabit Ethernet ports for redundancy
  - Front LEDs for visual identification of faults
  - Serviceability to include System Configuration Card (removable host ID) , modular FRUs, hot-swap drives and front/back accessible components.
- **Reliability:** The Netra 440 with the 64-bit UltraSPARC IIIi microprocessors and Solaris Operating Environment enables an architecture that is robust and reliable, scales readily, provides binary compatibility with existing applications and maintains consistency across all tiers of the network.
- **Ruggedization:** Ruggedized packaging and NEBS level 3 certification (DC version only) provides a high level of system reliability which helps ensure that the Netra 440 server continues to operate under extreme environmental conditions.
- **Manageability:** Advanced Lights Out Manager (ALOM) provides remote management functionality lowering the requirement for onsite staff. Additional cradle-to-grave features reduce costs by providing features like provisioning and patch management.

# Enabling Technology

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## Technology Overview

The Netra 440 is the next generation carrier-grade 4 way server targeted primarily for telecom and service provider environments. Design characteristics are focused on high performance, scalability, serviceability, and reliability. The Netra 440 server is powered by one to four UltraSPARC IIIi CPUs and can be configured with up to 16 GB of memory to support any application to offer the widest flexibility in service delivery.

The Netra 440 server is targeted at Tier 2 and Tier 3 applications like signaling gateway, wireless applications, video streaming, security, and VOIP applications. The architecture and design of the server provides an extremely powerful and well balanced system to eliminate bottlenecks and maintain service availability.

Netra 440 servers have the following system architectural features:

- UltraSPARC IIIi processor(s) with integrated 1MB of on-chip (internal) L2 cache
- Superscalar SPARC V9 processor technology
- J-Bus system databus, running at 183MHz for the 1.28GHz configuration
- Integrated Networking
- ALOM
- Low power consumption

### UltraSPARC IIIi Processor

The UltraSPARC IIIi processor is a highly integrated processor that implements the 64-bit, SPARC V9 architecture and Sun's Visual Instruction Set (VIS). The UltraSPARC IIIi processor contains primary data and instruction caches and a unified 1MB L2-Cache. It also contains a DDR1 SDRAM memory controller, a JBus controller, and sophisticated power management capabilities.

A high performance integrated processor, the UltraSPARC IIIi processor is used with a wide range of applications. Its RISC architecture and VIS instruction set make it ideally suited for compute servers and embedded applications in tele-communications and imaging. Support for the Visual Instruction Set (VIS) is the means to accelerate multimedia, networking encryption and Java processing.

### System Storage

The Netra 440 server uses an intelligent, two-channel 320 MB/sec Ultra320 SCSI controller. Integrated into the motherboard, the controller resides on the PCI Bus 2B and supports a 64-bit, 66MHz PCI interface. The on-board Ultra320 SCSI controller provides hardware RAID mirroring (RAID 1) capability with higher performance than conventional software RAID mirroring. One pair of hard disk drives can be mirrored using the on-board Ultra320 SCSI controller.

Internal disk storage is provided by up to four 1-inch (2.54-cm) high, hot-pluggable, Small Computer System Interface (SCSI) disk drives. The basic system includes an Ultra320 SCSI disk backplane that accommodates four 73GB disks capable of data transfer rates of up to 320 MB/sec (MBps). The system also supports external mass-storage devices, with an external SCSI port located on the system's back panel. Internal and external SCSI devices are on independent buses, providing better performance for both buses.

External multidisk storage subsystems and redundant array of independent disks (RAID) storage arrays can be supported by installing single-port or dual-port peripheral component interconnect (PCI) host adapter cards along with

the appropriate system software. Software drivers supporting SCSI and other types of devices are included in the Solaris operating system. In addition, the system supports internal hardware mirroring (RAID 1) using the on-board Ultra320 SCSI controller.

## Memory Controller

The memory controller integrated to each CPU, controls the addressing and retrieving of memory data. Memory is divided as "local," which is accessible by the CPU itself, and "foreign," which has to be retrieved from the memory controlled by another CPU. There is a minimal overhead when retrieving foreign data transactions because addressing and data transfers are realized in completely separate buses.

The supported memory is DDR-1 SDRAM PC2100 DIMM installed in 16 DIMM slots, 4 per processor, and they are divided in two banks of 2 equal size DIMMS. The available capacity per DIMM slot will be 512MB and 1GB.

## System Bus

The system bus provides high throughput paths clocked at 183 MHz with the 1.28 GHz CPUs. The system bus is a memory-coherent interconnect joining the four CPU modules and the two System J-bus-to-PCI bus ASIC Bridges. J-Bus provides a memory-coherent 128-bit shared address/data path between each of the J-Bus resident devices.

## I/O Interface

The system provides two RJ-45 on-board 10/100/1000Base-T Gigabit/Fast Ethernet ports for high throughput.

The system also provides a standard serial communication port (ttyb) through a DB-9 connector located on the back panel.

For additional storage capabilities, four 12Mb/s USB 1.0 ports are available to attach USB Jazz and Zip drives and other supported products.

For additional networking connectivity or storage redundancy, six PCI slots (3x33 MHz and 3x33/66 MHz all at 64-bits) are available on the Netra 440 server.

## Sun Advanced Lights-Out-Manager (ALOM)

Sun Advanced Lights Out Manager (ALOM) system controller is a server management tool that comes preinstalled on the Netra 440 server. It lets you monitor and control your server over a serial line or over a network. The ALOM system controller provides remote system administration for geographically distributed or physically inaccessible systems. You can connect to the ALOM system controller card using a local alphanumeric terminal, a terminal server, or a modem connected to its serial management port, or over a network using its 10/BASE T network management port.

When you first power on the system, the ALOM system controller card provides a default connection to the system console through its serial management port. After initial setup, you can assign an IP address to the network management port and connect the network management port to an ethernet network. You can run diagnostic tests, view diagnostic and error messages, reboot your server, and display environmental status information using the ALOM system controller software, even if the operating system is down or the system is powered off. The ALOM system controller can also send email alerts on hardware failures, or other important events that can occur on the server.

The ALOM system controller provides the following features:

- Default system console connection through its serial management port to an alphanumeric terminal, terminal server, or modem
- Network management port for remote monitoring and control over a network, after initial setup
- Remote system monitoring and error reporting, including diagnostic output



- Remote reboot, power-on, power-off, and reset functions
- Ability to monitor system environmental conditions remotely
- Ability to run diagnostic tests using a remote connection
- Ability to remotely capture and store boot and run logs, which you can review or replay later
- Remote event notification for overtemperature conditions, power supply faults, system shutdown, or system resets
- Remote access to detailed event logs

## **ALOM Watchdog Timer**

ALOM features a watchdog mechanism to detect and respond to system hang, should one ever occur. The ALOM watchdog is a timer that is continually reset by a user application as long as the operating system and user application are running. In the event of a system hang, the user application is no longer able to reset the timer. The timer will then expire and will perform an action set by the user, eliminating the need for operator intervention.

A simple software driver (ntwtdt) provides interfaces to the application programs to implement these features.

## **Serial Management Port**

The serial management port (SERIAL MGT) provides access to ALOM system controller functions and is the default connection to the system console. All power-on self-test (POST) and ALOM system controller messages are directed to the serial management port by default.

## **Network Management Port**

The network management port (NET MGT) provides you with direct network access to the ALOM system controller card and its firmware, as well as access to the system console and ALOM system controller messages. You can use the network management port to perform remote administration, including externally initiated resets (XIR).

## **Environmental Monitoring and Control**

The Netra 440 server features an environmental monitoring subsystem designed to protect the server and its components against:

- Extreme temperatures
- Lack of adequate airflow through the system
- Operating with missing or misconfigured components
- Power supply failures
- Internal hardware faults

Monitoring and control capabilities are handled by the ALOM system controller firmware. This ensures that monitoring capabilities remain operational even if the system has halted or is unable to boot, and without requiring the system to dedicate CPU and memory resources to monitor itself. The operating system reports the failure of the ALOM system controller.

The environmental monitoring subsystem uses an industry-standard I2C bus. The I2C bus is a simple two-wire serial bus used throughout the system to allow the monitoring and control of temperature sensors, fans, power supplies, status LEDs, and the front panel system control keyswitch.

Temperature sensors are located throughout the system to monitor the operating temperature of the CPU junction temperature. The monitoring subsystem polls each sensor and uses the sampled temperatures to report and respond to any overtemperature or undertemperature conditions. Additional I2C sensors detect component presence and component faults.

The hardware and software together ensure that the temperatures within the enclosure do not exceed predetermined safe operation ranges. If the temperature observed by a sensor falls below a low-temperature warning threshold or rises above a high-temperature warning threshold, the monitoring subsystem software lights the system Service Required LEDs on the front and back panels. If the temperature condition persists and reaches a critical threshold, the system initiates a graceful system shutdown. In the event of a failure of the ALOM system controller, backup sensors are used to protect the system from serious damage, by initiating a forced hardware shutdown.

All error and warning messages are sent to the system console and logged in the `/var/adm/messages` file. Service Required LEDs remain lit after an automatic system shutdown to aid in problem diagnosis.

The monitoring subsystem is also designed to detect fan failures. The system features integral power supply fans, as well as two different fan assemblies. If any fan or blower fails, the monitoring subsystem detects the failure and generates an error message to the system console, logs the message in the `/var/adm/messages` file, and lights the Service Required LEDs.

The power subsystem is monitored in a similar fashion. Polling the power supply status periodically, the monitoring subsystem indicates the status of each supply's DC outputs, AC inputs, and presence.

If a power supply problem is detected, an error message is sent to the system console and logged in the `/var/adm/messages` file. Additionally, LEDs located on each power supply light to indicate failures. The system Service Required LED lights to indicate a system fault. The ALOM system controller console alerts record power supply failures.

## **Low Power Consumption**

The low power consumption of the Netra 440 server gives greater flexibility in high-density rackmounting environments. In today's deployment scenarios where costs are driven down by reducing the amount of external resources that servers need, the Netra 440 will be welcome because of its reduced power consumption and lower heat dissipation characteristics.

## **Memory Subsystems**

The Netra 440 uses industry-standard DDR1 Memory DIMMs. Each of the four CPU modules in a Netra 440 system can contain up to 4 DIMMs. By using stacked DIMM technology, the Netra 440 will support up to 1GB DIMMs, for a total system memory capacity of 16GB.

## **Automatic System Recovery (ASR)**

The system provides for automatic system recovery (ASR) from component failures in memory modules and PCI cards. The ASR features allow the system to resume operation after experiencing certain non-fatal hardware faults or failures. Automatic self-test features enable the system to detect failed hardware components and an auto-configuring

capability designed into the system's boot firmware allows the system to deconfigure failed components and restore system operation. As long as the system is capable of operating without the failed component, the ASR features will enable the system to reboot automatically, without operator intervention.

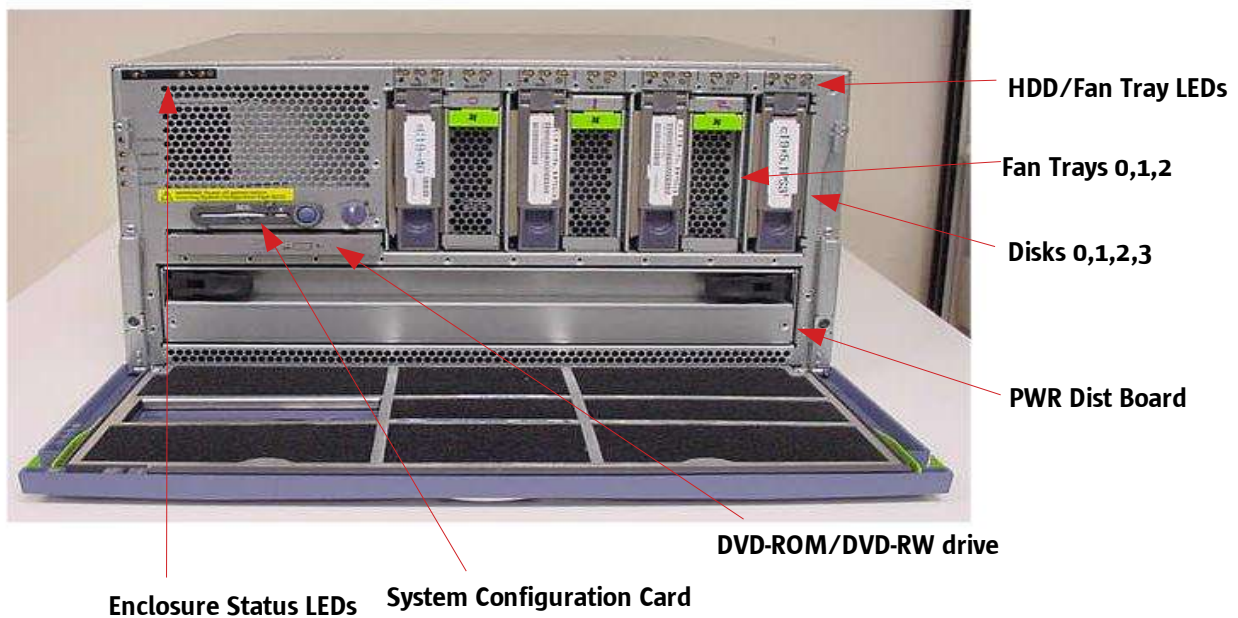
During the power-on sequence, if a faulty component is detected, the component is effectively disabled and, if the system remains capable of functioning, the boot sequence continues. In a running system, some types of failures (such as a memory module) can bring down the system. If this happens, the ASR functionality enables the system to reboot immediately if it is possible for the system to run without the failed component. This prevents a faulty hardware component from keeping the entire system down or causing the system to crash repeatedly.

---

NOTE: ASR functionality is not enabled until you activate it. Control over the system's ASR functionality is provided by a number of OpenBoot PROM commands and configuration variables.

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## Front Panel Features



## Power Button

The system Power button is recessed to prevent accidentally turning the system on or off. The ability of the Power button to turn the system on or off is controlled by the system control rotary switch. The ALOM system controller can also control the power-on and power-off functions if environmental conditions are out of specification or if the ALOM system controller detects that the system configuration card (SCC) is missing or invalid.

If the operating system is running, pressing and releasing the Power button initiates a graceful software system shutdown. Pressing and holding in the Power button for four seconds causes an immediate hardware shutdown.

---

CAUTION: When possible, use the graceful shutdown method. Forcing an immediate hardware shutdown can cause disk drive corruption and loss of data.

---

## Power Redundancy

The system features four hot-pluggable power supply units (PSU), with a minimum of 2 PSU's required for normal system operation. The PSU's can be configured to provide 2 + 2 redundancy. Each PSU can deliver a maximum of 400W.

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NOTE: Less than 2 working PSU's will keep the system in reset state except ALOM. A minimum of 1 working PSU is enough for ALOM to function.

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## System Configuration Card (SCC) Reader

The system configuration card (SCC) reader contains the system configuration card. This plastic card stores the system's host ID, Ethernet MAC addresses for all on-board Ethernet devices, OpenBoot™ configuration variables, and ALOM system controller user and system configuration data. The card performs the same functions that were performed by the NVRAM module in previous Sun systems, along with enhanced system controller support. Using the SCC, you can transfer this configuration data from one system to another.

---

CAUTION: The system configuration card must be installed and in place at all times while the system is running. If you remove the SCC while the system is running, the system will power off within 30 seconds. In addition, if the system is in standby mode and the SCC is missing, the ALOM system controller prevents the system from being powered on.

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## About Reliability, Availability, and Serviceability Features

Reliability, availability, and serviceability (RAS) are aspects of a system's design that affect its ability to operate continuously and to minimize the time necessary to service the system. Reliability refers to a system's ability to operate continuously without failures and to maintain data integrity. System availability refers to the ability of a system to recover to an operational state after a failure, with minimal impact. Serviceability relates to the time it takes to restore a system to service following a system failure. Together, reliability, availability, and serviceability features provide for near continuous system operation.

To deliver high levels of reliability, availability, and serviceability, the Netra 440 server offers the following features:

- Hot-pluggable disk drives
- Redundant, hot-pluggable power supplies
- Sun Advanced Lights-Out Manager (ALOM) system controller
- Environmental monitoring and fault protection
- Automatic system recovery (ASR) capabilities
- Multiplexed I/O
- Hardware watchdog mechanism and XIR
- Hardware RAID mirroring (RAID 1)
- Support for disk and network multipathing with automatic failover capability
- Error correction and parity checking for improved data integrity
- Easy access to all internal replaceable components
- Full in-rack serviceability for nearly all components

## Hot-Pluggable Components

The Netra 440 hardware is designed to support hot-plugging of internal disk drives, fan trays, and power supplies. By using the proper software support, you can install or remove these components while the system is running. Hot-plug technology significantly increases the system's serviceability and availability, by providing the ability to:

- Increase storage capacity dynamically to handle larger work loads and improve system performance
- Replace disk drives, fan trays 0, 1, and 2 (within 15 minute window), and power supplies without service disruption

## RAID Implementation

The Netra 440 server offers RAID 1 Hardware Mirroring of the 4 internal Ultra320 SCSI disk drives via the internal, dual channel LSI 1030 controller. Hardware RAID 1 is an attractive enhancement that can boost overall I/O throughput and performance as well as create a mirrored image of the internal drives for redundancy.

Software RAID may also be implemented on the internal storage array by either Solstice Disk Suite or Veritas Volume Manager with Dynamic Multipathing. The Netra 440 server requires a departmental, Tier 1 license for Veritas Volume Manager.

Solstice Disk Suite is licensed with Solaris and provides:

- RAID 0 - Striping
- RAID 1 - Mirroring
- RAID 1+0 - Mirroring plus Striping
- RAID 5 - Striping with Distributed Parity
- Dynamic File System Expansion
- UNIX File System Logging
- Hot Disk Sparing

Information is available under Solaris of which Solstice Disk Suite is a component.

Veritas Volume Manager with Dynamic Multipathing is licensed separately and provides:

- RAID 0 - Striping
- RAID 1 - Mirroring
- RAID 0+1 - Striping plus Mirroring
- RAID 1+0 - Mirroring plus Striping
- RAID 5 - Striping with Distributed Parity
- UNIX File System Logging provided separately by Veritas File System
- Hot Disk Sparing

# Netra 440 Block Diagram

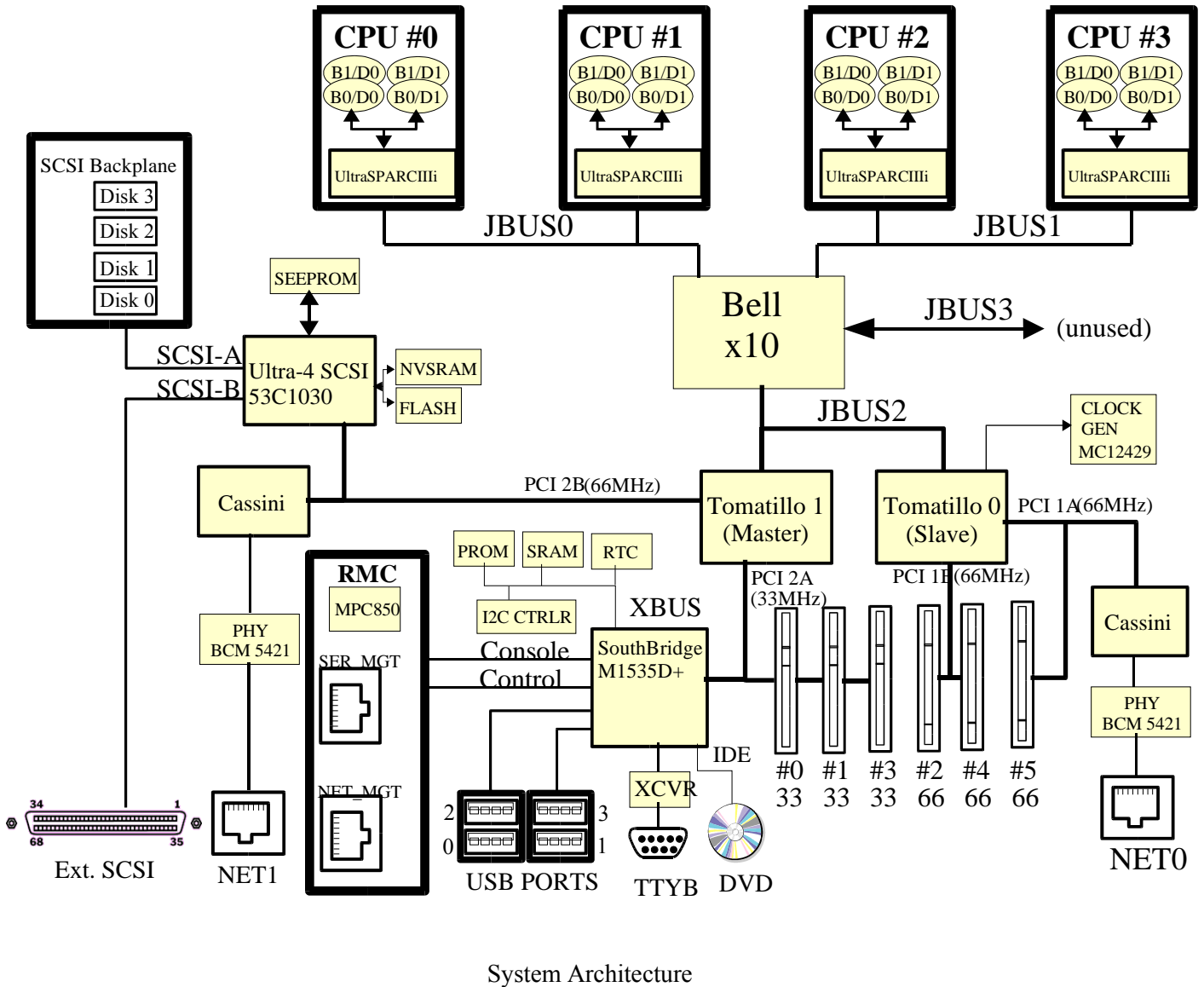


Figure 7: Netra 440 Server, Block Diagram

## Reliability, Availability, and Serviceability (RAS)

Reliability, availability and serviceability are three aspects of the design and quality of a system that contribute to continuous operation and consequently, minimize system downtime.

- Reliability

Reliability refers to a system's ability to operate continuously without failures and to maintain data integrity. Reliability influences MTBF.

- Availability

System availability measures the percentage of time that a system is accessible by users and is providing service.

- Serviceability

Serviceability measures the time to restore a system to operation once a failure has occurred. Serviceability influences MTTR.

Various metrics may be applied in calculating RAS, including:

- MTBF - mean time between failures. MTBF measures system reliability for duration until a system will fail. This measurement is influenced by quality, design, environmental considerations such as power and cooling and even operational errors, i.e. how well the hardware and software verifies the intention of staff.

### MTBF

Detailed information concerning MTBF and availability may be obtained using RAS tool at:

<http://ram-server.eng/>

The MTBF for the Netra 440 server, which will vary depending on the actual configuration, is predicted by calculations (for two standard base configurations) as follows -

#### DC system:

16,822 hours: 4x1.28GHZ/8GB/4x73GB/2 DC PSU configuration

13,562 hours: 4x1.28GHZ/16GB/4x73GB/2 DC PSU configuration

**For the AC system please refer to <http://ram-server.eng/>**

MTTR - mean time to restore. MTTR is a measure of system maintainability and usually includes diagnostic and repair times only. Dispatch and response time of service personnel are typically not included in this calculation as this factor is dependent upon service contracts (SLAs), geographical conditions, etc. which can radically influence the measurement. Nevertheless, these times will ultimately influence availability.

Simplistically stated,  $Availability = MTBF / (MTBF + MTTR)$

These documents will indicate that the system can provide extremely high levels of availability.

### MTTR

The vast majority of FRUs can be replaced in under 30 minutes by the average, trained service engineer. Those components requiring a longer time for replacement generally have a significantly higher MTBF.

The time for replacement does not include time for diagnosis.

# Installation Data

## Netra 440 Server Specifications

### Processor Options

Processor	Two or four 1.28 GHz UltraSPARC IIIi processor
Architecture	64-bit, 4-way Superscalar SPARC V9
Cache	64 KB data, 32 KB instructions and 1 MB integrated L2

### Main Memory

4 DIMM slots per processor, registered DDR-1 SDRAM (PC2100) 128 bit plus ECC databus.
System configurations from 4 GB to 16 GB

### Standard/Integrated Interfaces

Network	Two 10/100/1000Base-T Ethernet ports
Network management	One 10Base-T Ethernet port
Serial management	One TIA/EIA-232-F (RJ45) Port
Serial	One TIA/EIA-232-F asynchronous (DB9) Port
SCSI	One Ultra320SCSI multimode (SE/LVD)
USB	Four OHCI 1.0-compliant interfaces, supporting dual speeds of 12 and 1.5 Mbits/s each
Expansion bus	Six internal PCI 2.2 compliant expansion slots: Three full-length 64-bit 33/66 MHz 3.3V Three full-length 64-bit 33 MHz 5V
System Configuration Card and reader (removable)	Front accessible for transfer of system configuration information, including host ID, MAC address and NVRAM
Alarms	Four fail-safe, dry contact alarms (critical, major, minor and user)

### Software

Operating system	Solaris 8 HW 7/03 or Solaris 9 HW 12/03
Languages	C/C++, FORTRAN, Java programming language, all other standard Sun-supported languages
Networking	ONC™, NFS, TCP/IP, SunLink™, OSI, MHS, IPX™/SPX
Management	SunVTS™, SRS Net Connect, SRM, ALOM, Watchdog Timer
High availability	Sun™ Cluster 3.X

### Power Supplies

Minimum of two power supplies ( AC and DC) required. The below are based on two power supplies.	
Maximum Input Power (DC)	1040 W
Maximum Input Power (AC)	1000W
Maximum Output Power (AC and DC)	800 W



Maximum Power consumption (typ) - AC and DC	660 W
Input current (DC)	23 A max
Input current (AC)	11 A @90V AC
BTU (AC and DC)	2252BTU/hour @660W max.power consumption

## Environment

DC power	-40V to -75V DC (range) – up to 4 power supplies -48V or -60V DC (nominal)
AC power	90-264V AC (47-63Hz)
Operating temperature	5°C to 40°C (41°F to 104°F), 5% to 85% relative humidity, noncondensing , short term -5°C to 55°C ( 23°F to 131°F), 5% to 90% relative humidity, noncondensing, but not to exceed 0.024 kg water/kg dry air (0.053 lbs. water/2.205 lb. dry air)
Nonoperating temperature	-40°C to 70°C (-40°F to 158°F), up to 93% relative humidity, noncondensing, 38°C (100.4°F) max wet bulb
Altitude (operating)	Up to 3,000m
Altitude (nonoperating)	Up to 12,000m
Acoustic noise	Declared Noise emissions in accordance with ISO 9296: Operating: 7.0 B ( LWAd(1B=10dB)) Idling: 7.0 B (LWAd(1B=10dB))
ETSI	EN 300 019-2-1,2,3, Table 3.1 & 3.1 E – Except -5°C cold start – Except condensing humidity – Except rain
Seismic	GR-63-CORE requirements for earthquake zone 4

## Regulations

Meets or exceeds the following requirements:	
Safety	IEC60950, UL/CSA60950, EN60950
RFI/EMI	FCC Class A, Part 15 47 CFR, EN55022, CISPR 22, EN 300-386:2001 <a href="#">V1.3.1</a> , ICES-003
Immunity	EN55024
Certifications Safety EMC Telecommunication	cULus Mark, TUV GS Mark, CE Mark, CCC, GOST R CE Mark (93/68/EEC), FCC authorized Class A, VCCI, BSMI, C-Tick, MIC Telcordia GR-63 CORE, GR-1089-CORE, SR 3580 NEBS Level 3

## Dimensions and Weight

Chassis Height	222 mm (8.75 in.)
Width	440 mm (17.32 in.) INCLUDING bezel
Depth	476mm (18.75 in) front bezel tangent to rear IO Panel 495mm (19.5 in.) overall maximum depth
Weight	36 kg (79.4 lbs.) - Not including PCI cards & rack kit 37 kg (81.6 lbs) - Fully configured with PCI cards & rack kit

Enclosure	Fits into a standard 19-inch wide rack. Rack kit included - 19 inch 2 & 4 post. Additional rack kits available - 23-inch 2 post, 600mmx600mm, and 19-inch 4 post slide adjustable up to 800 mm
Sun Rack Support	Supports Sun Rack 900 and 1000. Must use X8100A rack kit.

# Requirements and Configuration

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## System Requirements

The Netra 440 Server requires Solaris™ 8 HW 07/03 plus recommended patches, or Solaris 9 HW 12/03, plus recommended patches.

## Licensing/Usage

### Operating System:

The Netra 440 Server comes pre-loaded with Solaris operating system. It qualifies under the *Free Solaris™ Binary License Program*. For only a nominal cost of media and shipping, the Solaris™ 8 operating environment may be used without paying a license fee on an unlimited number of computers with a capacity of eight or fewer CPUs.

Please refer to [www.sun.com/software/solaris/binaries](http://www.sun.com/software/solaris/binaries) for more details and to register under this program.

# Ordering Information

## Standard Configurations – Preconfigured Systems

Standard configurations are a means to offer popularly configured systems. These systems insure a functional base system via a single line item for the convenience of customers, sales, and operation/manufacturing.

Three Netra 440 server Standard Configurations are offered.

Marketing Part Number	Configuration Description
N42-XCB2-4GUBD	2 x 1.28 GHz, 4 GB (8 x 512 MB), 2 x 73 GB -15KRPM, 4 DC power supplies
N42-XCB4-8GUDD	4 x 1.28 GHz, 8 GB (16 x 512 MB), 4 x 73 GB -15KRPM, 4 DC power supplies
N42-XCB4-16GUDD	4 x 1.28 GHz, 16 GB (16 x 1 GB), 4 x 73 GB -15KRPM, 4 DC power supplies
N42-XCB2-4GUBA	2 x 1.28 GHz, 4 GB (8 x 512 MB), 2 x 73 GB -15KRPM, 4 AC power supplies
N42-XCB4-8GUDA	4 x 1.28 GHz, 8 GB (16 x 512 MB), 4 x 73 GB -15KRPM, 4 AC power supplies
N42-XCB4-16GUDA	4 x 1.28 GHz, 16 GB (16 x 1 GB), 4 x 73 GB -15KRPM, 4 AC power supplies

## Supported Options

**Note:** The prefix X indicates availability strictly as a field installable option.

X-option number	Option Description	Maximum Number Supported
<b>Processor/Memory Modules</b>		
X7426A/7426A	1.28 GHz UltraSPARC IIIi processor/memory module, processor with 1 MB internal (L2) cache, 2GB DDR1 (4 x 512MB) of memory included.	4
X7416A 7436A (for XATO and factory integration)	1.28 GHz UltraSPARC IIIi processor/memory module, processor with 1 MB internal (L2) cache, 4GB DDR1 (4 x 1 GB) of memory included.	4
<b>Memory</b>		
X7403A	1 GB (2 DIMMs of 512 MB each)	8 Sets (4 DIMMs per module available as 2 Pairs per module)
X7404A	2 GB (2 DIMMs of 1 GB each)	8 Sets (4 DIMMs per module available as 2 Pairs per module)
X7603A	1 GB (2 DIMMs of 512 MB each)	8 Sets (4 DIMMs per module available as 2 Pairs per module)
X7604A	2 GB (2 DIMMs of 1 GB each)	8 Sets (4 DIMMs per module available as 2 Pairs per module)
<b>Internal Storage Devices</b>		
XRA-SC1N2-73G15K	73-GB, 15K RPM, 1-inch SCSI hard drive	4
<b>DVD</b>		
X7423A/7423A	Internal slim DVDROM drive	1
X7424A/7424A	Internal slim DVD-RW drive	1
<b>Other</b>		
X8217A	Air filter pack containing 10 foam filters	1
X311L	Localized power cord kit (North America/Asia)	

X312L	Localized power cord kit (Continental Europe)	
X314L	Localized power cord kit (Switzerland)	
X317L	Localized power cord kit (U.K.)	
X383L	Localized power cord kit (Denmark)	
X384L	Localized power cord kit (Italy)	
X386L	Localized power cord kit (Australia)	
<b>Rackmount Kit</b>		
X7903A	23-inch 2 post rackmount kit	
X7905A	600mm x 600mm rackmount kit	
X8100A	19-inch 4 post slide mount kit	

## External Storage Interfaces

*NOTE: Netra 440 server has 6 full-size PCI expansion slots:*

- 3 slots@64bit/33Mhz
- 3 slots@64bit/66Mhz

Marketing Part #	Description	Number supported	NEBS Qualified	Normal card qualification
<b>PCI SCSI Adapters</b>				
X6541A	Dual channel Differential Ultra/Wide SCSI PCI Adapter	3	YES	YES
X6758A	Dual Channel LVD Ultra160 SCSI HBA	3	YES	YES
SG-XPCI2SCSCI-LM320	Dual Channel LVD Ultra320 SCSI HBA (x6758A follow-on)	3	Post GA	Post GA
<b>PCI Fibre Channel Adapters</b>				
X6768A (SG-XPCI2FC-QF2)	Sun Dual Loop PCI FC-AL 2GB host adapter	3	YES	YES
X6799A	Sun Single Loop PCI FC-AL Host Adapter	3	YES	YES
X6767A (SG-XPCI1FC-QF2)	Sun 2GB Single Fibre Channel Network Adapter	3	YES	YES
X6727A	Sun Dual Loop PCI FC-AL Host Adapter	3	YES	YES
SG-XPCI1FC-JF2	JNI 2Gb PCI Single FC HBA w SFK	2	YES	YES
SG-XPCI2FC-JF2	JNI 2Gb PCI Dual FC HBA w SFK	2	YES	YES
	<b>NOTE:</b> The (X)6729A - PCI to single FC-AL controller is not supported in UltraSPARC IIIi systems			
<b>Network Interfaces</b>				
	<b>PCI Serial Adapters</b>			
X1155A	Sun HSI/P high-speed serial interface, PCI	3	YES	YES
X1355A	X1155A Follow-On	3	Post GA	Post GA
X2156A	Sun SAI/P serial asynchronous interface, PCI	3	YES	YES
X3150A (was x1150A)	Sun Gigabit Ethernet-Cat5 (copper) PCI66 adapter	2	YES	YES
X3151A (was x1151A)	Sun Gigaswift Ethernet PCI adapter (Fiber)	2	YES	YES

X4444A	QGE	2	YES	YES
	<b>PCI to ATM Adapters</b>			
X1157A	Sun ATM-155/MMF 4.0/5.0 PC166 Bus Adapter	3	YES	YES
	<b>PCI Combination Cards</b>			
X4422A	Dual Gbe + Dual SCSI PCI Adapter	2	YES	YES
	<b>Note:</b> The (X)2069A Gigabit Ethernet plus FC-AL is not supported in UltraSPARC IIIi systems			
	<b>PCI Encryption</b>			
X4011A	Venus Encryption Card (Copper)	1	YES	YES
X4012A	Venus Encryption Card (Fibre)	1	YES	YES
<b>PCI Video and Graphics Adapters</b>				
X3780A	XVR-600 (IFB3 Lite) <b>Not supported in Solaris 8 HW 07/03 but drivers may be available for download separately.</b>	2	NO	YES
X3770A	XVR-100 Graphics Card	2	NO	YES

### Additional PCI Adapters:

Other PCI adapters, including those for ATM, FDDI and Token Ring are available from:

I/O Technologies Group, <http://www.sun.com/io/>

### External Options

The following external storage devices and arrays are supported. Please refer to Network Storage configuration guidelines for specific details and current updates.

### Disk Arrays

- Sun StorEdge 3310 SCSI
- Sun StorEdge 3310 NAS
- Sun StorEdge 3510
- Sun StorEdge 3120
- Sun StorEdge A1000/D1000
- Sun StorEdge D240
- Sun StorEdge T3 enterprise array
- Sun StorEdge T3 workgroup array
- Sun StorEdge D2
- Sun StorEdge S1
- Sun StorEdge A5200
- Sun StorEdge 6120/6320
- Sun StorEdge 3900
- Sun StorEdge 6900
- Sun StorEdge 9900

Workgroup Storage Configuration Matrix:

<http://sundoc.central/SunWINPublicView.jsp?token=130674>

## **Tape Drives and Tape Automation**

### **Current:**

- Sun StorEdge 4mm DDS-3 Unipack
- Sun StorEdge 4mm DDS-4 Unipack
- Sun StorEdge SDLT 320 Desktop Tape Drive
- Sun StorEdge LTO 2 Desktop Tape Drive (**Supported with firmware patch**)
- Sun StorEdge L8 Tape Autoloader ( **See Note 1 below**)
- Sun StorEdge L9 Tape Autoloader ( **See Note 1 below**)
- Sun StorEdge L25-LVD versions ( **See Note 1 below**)
- Sun StorEdge L100-LVD versions ( **See Note 1 below**)
- Sun StorEdge L180 ( **See Note 1 below**)

**\*NOTE 1: Requires HBA. Not supported via Netra 440 external SCSI connector. Please refer to Network Storage configuration guidelines for specific details and current updates.**

Tape Library Calculator

<http://rmqual.ebay/TLC/TLC.html>

Tape Automation Products At-A-Glance

[http://webhome.ebay/networkstorage/products/tape\\_automation/index.html](http://webhome.ebay/networkstorage/products/tape_automation/index.html)

## Field Replaceable Units (FRUs)

The following field replaceable units (FRUs) are available for Netra 440 servers.

FRU Part Number	Field Replaceable Units (FRUs)
<b>F595-7286-xx</b>	FRU, CABLE KIT NETRA 440
<b>F595-7287-xx</b>	FRU, CABLE ALARM KIT NETRA 440
<b>F540-6067-xx</b>	FRU, DVD-ROM ASSY, SLIM, W/NETRA BRKT
<b>F540-6068-xx</b>	FRU, DVD-RW ASSY, SLIM, W/NETRA BRKT
<b>F540-5853-xx</b>	FRU,ASSY, SCSI BD, NETRA440
<b>F540-5854-xx</b>	FRU,ASSY, PDB, NETRA440
<b>F540-5855-xx</b>	FRU,ASSY,BLOWER, NETRA440
<b>F540-5856-xx</b>	FRU,ASSY, SCCR/SWITCH, NETRA 440
<b>F540-5919-xx</b>	FRU,ASSY, MOTHERBOARD, NETRA 440
<b>F540-6069-xx</b>	FRU,FAN ASSY, PCI, NETRA 440
<b>F370-5155-xx</b>	FRU, SYSTEM CONFIGURATION CARD
<b>F300-1567-xx</b>	FRU, ASSY,PSU,EN-2U,400W,D158
<b>F300-1674-xx</b>	FRU, ASSY,PWR,SUPPLY,A192,400W AC
<b>F540-5924-xx</b>	FRU, 73GB15K1 "SCIS4,S&P,NEB,DRV
<b>F370-4939-xx</b>	FRU,ASSY,DDR1,DIMMX2, 512MB, SPD0.0
<b>F370-4940-xx</b>	FRU,ASSY,DDR1,DIMMX2, 1GB, SPD0.0
<b>F540-6229-xx</b>	FRU,ASSY,DDR1,DIMMX2, 512MB, SPD1.0
<b>F540-6230-xx</b>	FRU,ASSY,DDR1,DIMMX2, 1GB, SPD1.0
<b>F501-6346-xx</b>	FRU, SYSTEM CONTROLLER (ALOM) CARD
<b>F501-6370-xx</b>	FRU, ASSY,A42,1.280GHZ,0MB,CPU



# Upgrades

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## Sun Upgrade Advantage Program (UAP)

The Netra 440 server is the newest member of Sun's powerful generation of Volume servers for enterprise network computing based upon the UltraSPARC IIIi microprocessor technology.

From branch office or data center, Sun provides upgrade solutions customers can count on to maximize their investment. The Sun Upgrade Advantage program allows customers to receive a fair trade-in allowance towards the purchase of a 4-way Netra 440 server.

Sun UAP simplifies the upgrades process by providing a trade-in value as a percentage allowance. This percentage allowance is applied to the list price of a new 4 way Netra 440 system configuration.

Upgrades to the Netra 440 server are available as a full system swap. Customers can upgrade from an Ultra 5s, 10s, Enterprise 2, Enterprise 250, Enterprise 220R, Enterprise 450, Enterprise 420R, and Sun Fire 280R to the new Netra 440 server. However, components such as CPUs, memory and drives cannot migrate from UltraSPARC II or UltraSPARC III systems. Netra 440 uses UltraSPARC IIIi technology. Memory components such as the 512 MB and 1 GB memory options can migrate from UltraSPARC IIIi systems like the Sun Fire V210 and Sun Fire V240.

Systems being upgraded must be owned by, used by, and in the possession of the customer at least ninety (90) days prior to upgrading. To qualify for the upgrade allowance, customers must return within 90 days, a bootable working system.

## How To Order

An allowance code is used when upgrading to a Netra 440 server. Volume server Sun UAP product matrices containing standard upgrade allowance codes are included in the Sun Configuration guide. The Sun UAP matrices provide instructions for using codes.

## Upgrade Paths

Sun Upgrade Advantage Program (UAP)

	Upgrade From	Upgrade To	Allowance Code Part Number	Return
<b>Sun Servers</b>				
	Ultra 5s, 10s Enterprise 2, Enterprise 250, Enterprise 220R Enterprise 450, Enterprise 420R, Sun Fire 280R, Netra 240, Netra 20 or Netra 1400/1405	Netra 440 (4 way systems only)	See Worldwide Configuration Guide or Sun Win #108159 and Sun Win #96194 for standard trade -in allowances	A full functioning system
<b>CPU/Memory Modules</b>				
<b>Available up to 4 total</b>	1.062 GHz UltraSPARC IIIi processor/memory module, processor with 1 MB internal (L2) cache, 2GB ((X)7403A = 4 x 512MB) of memory included.	1.28 GHz UltraSPARC IIIi processor/memory module, processor with 1 MB internal (L2) cache, 4GB ((X)7404A = 4 x 1 GB) of memory included.	See Worldwide Configuration Guide or Sun Win #108142 for standard trade -in allowances	A full functioning, 1.062 GHz UltraSPARC IIIi processor/memory module.
<b>Memory</b>				
<b>Available for each CPU module up to 4 total groups of 4 DIMMs</b>	2GB 4*512MB DIMM (2*X7403A)	4GB configured as 4x1GB DIMM (2*X7404A)	See Worldwide Configuration Guide or Sun Win #108142 for standard trade -in allowances	Functional, 2GB configured as 4*512MB DIMM (2*X7403A)

### Memory Configurations:

Please refer to details under the Section entitled *Ordering Information*.

## Service and Support

The SunSpectrum<sup>SM</sup> 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<sup>TM</sup> Operating Environment software, and telephone support for Sun<sup>TM</sup> 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.

FEATURE	<b>SUNSPECTRUM PLATINUM<sup>SM</sup> Mission-critical Support</b>	<b>SUNSPECTRUM GOLD<sup>SM</sup> Business-critical Support</b>	<b>SUNSPECTRUM SILVER<sup>SM</sup> Systems Support</b>	<b>SUNSPECTRUM BRONZE<sup>SM</sup> Self Support</b>
<b>Systems Features</b>				
Systems approach coverage	Yes	Yes	Yes	Yes
System availability guarantee	Customized	No	No	No
<b>Account Support Features</b>				
Service account management team	Yes	No	No	No
Local customer support management	No	Yes	No	No
Personal technical account support	Yes	Yes	Option	No
ServerStart	No	No	No	No
Account support plan	Yes	Yes	No	No
Software release planning	Yes	No	No	No
On-site account reviews	Monthly	Semiannual	No	No
Skills assessment	Yes	No	No	No
Site activity log	Yes	Yes	No	No
<b>Coverage / Response Time</b>				
Standard telephone coverage hours	7 day/24 hour	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday
Standard on-site coverage hours	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday	N/A
7-day/24-hour telephone coverage	Yes	Yes	Option	Option
7-day/24-hour on-site coverage	Yes	Option	Option	N/A
7-day/12-hour on-site coverage	No	Option	No	No
5-day/24-hour on-site coverage	No	Option	No	No
<b>Coverage / Response Time (cont.)</b>				
Customer-defined priority setting	Yes	Yes	Yes	Option

FEATURE	SUNSPECTRUM PLATINUM <sup>SM</sup> Mission-critical Support	SUNSPECTRUM GOLD <sup>SM</sup> Business-critical Support	SUNSPECTRUM SILVER <sup>SM</sup> Systems Support	SUNSPECTRUM BRONZE <sup>SM</sup> Self Support
<b>Note:</b> Urgent (phone/on-site)	Live transfer/ 2 hour	Live transfer/ 4 hour	Live transfer/ 4 hour	4 hour / N/A
<b>Note:</b> Serious (phone/on-site)	Live transfer/ 4 hour	2 hour/next day	2 hour/next day	4 hour / N/A
<b>Note:</b> Not critical (phone/on-site)	Live transfer/ customer convenience	4 hour/ customer convenience	4 hour/ customer convenience	4 hour / N/A
2-hour on-site response	Yes	Option	Option	N/A
Additional contacts	Option	Option	Option	Option
<b>Premier Support Features</b>				
Mission-critical support team	Yes	For urgent problems	No	No
Sun Vendor Integration Program (SunVIP <sup>SM</sup> )	Yes	Yes	No	No
Software patch management assistance	Yes	No	No	No
Field change order (FCO) management assistance	Yes	No	No	No
<b>Hardware Support Delivery</b>				
Replacement hardware parts	On-site technician	On-site technician	On-site technician	Courier
Two day parts delivery	N/A	N/A	N/A	Yes
Overnight parts delivery	N/A	N/A	N/A	Option
Same-day parts delivery	Yes	Yes	Yes	Option
<b>Remote Systems Diagnostics</b>				
Remote dial-in analysis	Yes	Yes	Yes	Yes
Remote systems monitoring	Yes	Yes	No	No
Remote predictive failure reporting	Yes	Yes	No	No
<b>Software Enhancements and Maintenance Releases</b>				
Solaris Operating Environment enhancement releases	Yes	Yes	Yes	Yes
Patches and maintenance releases	Yes	Yes	Yes	Yes
Sun unbundled software enhancements	Option	Option	Option	Option
<b>Internet and CD-ROM Support Tools</b>				
SunSolve <sup>SM</sup> license	Yes	Yes	Yes	Yes
SunSolve EarlyNotifier <sup>SM</sup> Service	Yes	Yes	Yes	Yes

## Support Services:

As the Netra 440 assumes a bigger role in the data center, there is an opportunity to enhance the level of service. Customers may upgrade the warranty on the Netra 440 to SunSpectrum Platinum, Gold or Silver.

1. Workgroup server installation services are available under part number **WGSERVER-INSTALL**.
  
2. Workgroup server rack installation services are available under part number **SERVER-INSTALL**.
  
3. Sun StorEdge Array Hardware Installation
  - (Order both of the following part numbers for each Sun StorEdge hardware only installation event.)  
**ARRAY-HW-INS-BASE2**
  
  - Per tray charge (Order in quantities of total number of disk trays being installed.)  
**ARRAY-HW-PER-TRAY**
  
4. Sun StorEdge ArrayStart
  - (Order both of the following part numbers for each Sun StorEdge ArrayStart installation event.)  
**ARRAY-INS-BAS2**
  
  - Per tray charge (Order in quantities of total number of disk trays being installed.)  
**ARRAY-INS-PER-TRAY**

### Standalone SW support contracts:

Support for Solaris Operating Environment is included in the support contract for Sun systems. If the Sun system is not covered under a support contract, customers may put their systems under Sun Software Support service for phone support and entitlement to future updates and upgrades. More information can be found at:

[http://www.sun.com/service/support/sw\\_only/solaris/index.html](http://www.sun.com/service/support/sw_only/solaris/index.html)

There are opportunities for extended Sun Software Support Services providing the following:

- Unlimited technical support during coverage hours and live call transfer
- Expert assistance from Sun's experienced support engineers

- 24 x 7 access to SunSolve(SM), Sun's technical knowledge database
- Software patches and updates
- Remote diagnostics to speed problem resolution
- International service coverage

## Warranty

The standard warranty for the Netra 440 server is one year, parts exchange, return to Sun. Phone support is available Monday – Friday 8AM to 8PM. A 90 day (from system purchase date) Solaris media warranty is also available.

## Education

Contact the local Sun representative.

## Glossary

5U	A rack unit as defined by the Electronic Industries Alliances (EIA), under which 1U is equal to 1.75 inches. 5U equals to 8.75 inches.
AC	Alternating current.
ALOM	Advanced Lights Out Management. A service and availability feature that monitors the system board, fan power and rpm, and temperature via a dedicated ALOM serial port, combined console/ALOM serial port, or alarm software that can be tied into SNMP. The ALOM module also has a remote power on/off and cycle.
ASIC	Application Specific Integrated Circuit. A chip that is custom designed for a specific application rather than a general-purpose chip such as a microprocessor. The use of ASICs improve performance over general-purpose CPUs because ASICs are hardwired to do a specific job and do not incur the overhead of fetching and interpreting stored instructions.
ASR	Automatic Server Restart. A feature of the LOM module that reduces downtime from system lock-up. ASR enables administrators to configure the Netra 240 server to restart automatically in case of a software lock-up.
ATM	Asynchronous transfer mode. ATM is a network technology that supports realtime voice, video, and data. ATM is used as a backbone technology by major enterprises and ISPs.
Carrier grade	Ruggedized, rack-mountable systems with features including remote alarm capabilities, front-back cooling, front accessibility of media, rear cabling, and rugged NEBS-compliant packaging.
Density	Number of units in a given amount of space.
DES	Data Encryption Standard. A NIST-standard secret key cryptography method that uses a 56-bit key. DES decryption is very fast and widely used.
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.
Ethernet 10/100/1000Base-T	The most widely used LAN access method defined by the IEEE 802.3 standard; uses standard RJ-45 connectors and telephone wire. 100Base-T is also referred to as Fast Ethernet. And 1000Base-T is also referred to as Gigabit Ethernet.
Fault resilience	Capability of a system to mask many individual errors, but not all. This approach generally requires redundancy of some components and additional software. An example would be the dual path capability and automatic failover for storage and networks. Another term for 'high availability'.
Fault tolerance	Capability of a system to mask any individual point of failure. This type of system is typically implemented with redundancy of components and synchronization of clock signals to maintain each unit in 'lock step' with it's counterpart.
FC-AL	Fibre channel arbitrated loop. A topology for Fibre Channel in which all devices are linked together in a loop.
FRU	Field Replaceable Unit.

FRU ID	A solution for capturing, transmitting, and analyzing field replaceable unit (FRU)–specific configuration, diagnosis, and failure information associated with a particular FRU.
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 technology with transmission speeds up to 1 Gbps.
Horizontal scalability	Increasing throughput and reliability by running the same service on several machines at the same time. Any applications run in a horizontally scaled configuration must be stateless.
Host ID	The unique identifier assigned to the host computer.
Hot-pluggable	A feature that allows an administrator to add or remove a device such as a disk drive without affecting hardware system integrity.
Hot-swappable	A feature that allows an administrator to remove and/or replace a device without affecting software integrity. This means that, while the system does not need to be rebooted, the new component is not automatically recognized by the system.
Infrastructure services	Services that an SP runs to provide revenue services to clients. Examples include: firewalls, DNS, log processing, authentication, mail-relay, distributed SNMP, and low-end cache server.
I/O	Input/output. Transferring data between the CPU and any peripherals.
ISP	Internet service provider.
L2 cache	See Ecache.
LOM	Lights out management. A service and availability feature that monitors the system board, fan power and rpm, and temperature via a dedicated LOM serial port, combined console/LOM serial port, or alarm software that can be tied into SNMP. The LOM module also has a remote power on/off and cycle.
Mirroring	Maintaining a redundant, logical copy of a disk volume for higher availability. Also known as volume shadowing or RAID 1.
Multipathing	A higher availability option which provides two independent paths to storage and/or networks. An intermediate software layer is generally required to mask the failure of one path from the application. When both paths are functional, higher bandwidth and throughput is possible as a secondary benefit beyond higher availability.
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.
NEBS	Network Equipment Building Standard. A stringent standard for durability, grounding cables, and hardware interfaces specified by Telcordia Technologies (formerly Bellcore) for equipment used in Telco central offices.
NEPs	Network equipment providers.
NSPs	Network service providers.
POP	Point of presence. A local connection point, usually a telephone number provided by Internet service providers.



RAID	Redundant array of independent disks. A set of disk drives that appear to be a single logical disk drive to an application such as a database or file system. Different RAID levels provide different capacity, performance, high availability, data protection and cost per unit of storage.
RAM	Random access memory.
RAS	Reliability, availability, and serviceability, Three aspects of the design of a system contributing to continuous operation and minimizing system downtime for services. Together reliability, availability, and serviceability provide for near continuous system operation.
Revenue services	Services for which an SP can collect payment from clients. Examples include: low-end Web server, low-end hosting server, and application server.
RISC	Reduced Instruction Set Computer. A computer architecture that reduces chip complexity by using simpler instructions.
RSA	Rivest-Shamir-Adleman. A highly secure cryptography method developed by RSA Data Security, Inc. It uses a two-part key in which the private key is kept by the owner and the public key is published. RSA is very computation-intensive.
SCC(R)	System configuration card (reader). A device which allows a systems identity (Host ID/MAC address) to be stored on a replaceable card.
SCSI	Small computer systems interface. Pronounced "scuzzy." A hardware interface that allows the connection of up to 15 peripheral devices to a single bus.
SNMP MIBs	SNMP is a simple network management protocol used for managing complex networks. A MIB is a management information base used to map device-managed features to enable data to be returned to an SNMP requester.
SP	Service provider.
SPECfp	A benchmark for floating point performance.
SPECint	A benchmark for integer performance.
SPECWeb99	A benchmark for Web performance.
SSL	Secure Sockets Layer. The leading security protocol on the Internet. When an SSL session is started, the server sends its public key to the browser, which the browser uses to send a randomly generated secret key back to the server in order to have a secret key exchange for that session.
Sun Quad FastEthernet™	A Sun product that has four Fast Ethernet ports on the same I/O card.
TTY A	A serial port. Referred to as the console/LOM port.
TTY B	A serial port.
USB	Universal serial bus. An external bus standard supporting data rates up to 12 Mbps and up to 127 peripheral devices.
VIS	Visual Instruction Set. VIS is a set of RISC instructions which are extensions to the SPARC V9 open processor architecture and are designed to accelerate applications where multiple data entries require the same instruction, such as multimedia, image processing, and networking applications.
WAP	Wireless application protocol. Standard for providing handheld devices including cell phones and pagers with secure access to e-mail and text-based Web pages.

## Materials Abstract

All materials are available on SunWIN except where noted otherwise.

Collateral	Description	Purpose	Distribution	Token # or COMAC Order #
<b>Product Literature</b>				
<i>Netra 440 Server, Just The Facts</i>	Reference Guide (this document)	Training Sales Tool	SunWIN, Reseller Web	406565
<i>Netra 440 Server Customer/Sales Presentation</i>	Customer/Sales Presentation	Sales Tool	SunWIN, Reseller Web	406563
<i>Netra 440 Server Data Sheet</i>	Data Sheet	Sales Tool	SunWIN, Reseller Web	406564
<i>Netra 440 Server Pocket facts</i>	Pocket facts	Sales Tool	SunWIN, Reseller Web	406566
<i>Netra 440 Architecture White Paper</i>	White Paper	Sales Tool	SunWIN, Reseller Web	406567
<i>Netra 440 Configuration Guide</i>	Configuration Guide	Sales Tool	SunWIN, Reseller Web	
<b>References</b>				
<b>External Web Sites</b>				
<i>General Information on the Netra 440 Server</i>	<a href="http://www.sun.com/netra440/index.html">http://www.sun.com/netra440/index.html</a>			
<i>Features and Benefits of the Netra 440 Server</i>	<a href="http://www.sun.com/netra440/features.html">http://www.sun.com/netra440/features.html</a>			
<i>Specifications of the Netra 440 Server</i>	<a href="http://www.sun.com/netra440/spec.html">http://www.sun.com/netra440/spec.html</a>			
<b>Internal Web Sites</b>				
<i>Internal Web Site for the Netra 440 Server</i>	<a href="http://vsp.eng/products/netra440">http://vsp.eng/products/netra440</a>			

## Competitive Information

	<b>Netra 440</b>	<b>HP rp5470</b>	<b>IBM (BladeCenter HS40)</b>
Processor Specs.	UltraSPARC IIIi 4 @ 1.28 GHz	PA-RISC 4 @ 875 MHz	Xeon MP 4 @ 2.7GHz
Maximum Memory	16GB	16 GB	16 GB
PCI slots	6	10	0 (2 via optional daughter card)
GbE	Two Integrated	none	Four Integrated
Disks	4 x 73GB SCSI 15K hot swap	4 x 146GB SCSI 10K hot swap	0 standard; 2 x 73GB 15K in optional daughter blade
PSU	4 (2N redundant) DC hot swap	Redundant DC hot swap	2N redundant AC or DC
Dimensions	5RU X 19.5"	8RU x 30"	8RU x 20"
Other I/O	DVD-RW, 4XUSB, serial, external U320 SCSI port	CD-ROM, 3xserial, external SCSI port	FC, DVD drive
NEBS	Certified	Certified	Compliant
Other	SCC, ALOM, telco alarms	Telco Alarms	IBM Director
O/S	Solaris 8 and 9	HP-UX	Win 2K or 2003 Server, RedHat or SuSe Linux
Entry config (2p, 4GB, 2x73)	\$13,995	\$53,342	
Medium (4p, 8GB, 4x73)	\$23,995	\$89,631	\$43,019 (inc. chassis with 2x73GB)
Large (4p, 16GB, 4x73)	\$31,995	\$113,631	\$48,946 (inc. chassis with 2x73GB)

## Notes:

- Competitive pricing based upon information available in November, 2003.
- All systems configured with four disks per system.

## Strengths

- Price: very strongly placed vs HP; reasonably placed against IBM BladeCenter, especially when only one or two servers per location are required.
- TCOO: very strongly placed vs HP; reasonably placed against IBM BladeCenter, especially when only one or two servers per location are required.
- Connectivity: vs IBM's BladeCenter, the Netra 440 has 6 PCI slots against none standard and only two optional.
- NEBS: vs IBM's BladeCenter, the Netra 440 is NEBS certified vs compliant. For many Telcos and OEMs, this is a major differentiator.
- Disk storage: The Netra 440 supports 4 SCSI disks, vs just two in the IBM BladeCenter HS40, which in any case are optional and require an optional daughter blade. It is also likely that any 4p Itanium Telco server from HP will support just 2 disks.
- Family: The Netra 440 is part of a compatible family of servers, from one processor through to twelve processors.

## Weaknesses

- Performance: The processor performance of the IBM BladeCenter is likely to be significantly superior to the Netra 440. A 4p Itanium Telco server from HP might offer slightly better performance than a Netra 440.
- Rack space: when installed in multiples, the IBM BladeCenter will use fewer rack units than the Netra 440.
- IO: The IBM BladeCenter supports FC, as well as an integrated Ethernet switch.
- Storage: HP supports 146GB disks, vs 73GB in the Netra 440.

## Opportunities

- Replace the substantial inventory of Netra t 1400.