Sun Fire^{TM} X2270

Next Generation 1-RU 2-Socket (8-core) x64 Rackmount Server

Industry Best Performance & Power Envelope

Just the Facts

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03.30.09: Announce Sun Fire X2270 with Intel Xeon processor 5500 series

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Introduction

The Sun Fire™ X2270 is Sun's newest addition to its x64 server family powered by the Intel Xeon processor. The Sun Fire X2270 is an 1-RU follow-on version of the Sun Fire X2250, which is the best 1-RU 2-socket entry class x64 server in terms of performance, expandability and power efficiency that runs Solaris, Linux, Windows and VMware. This is another example of Sun's innovative engineering delivering the most compelling x64 (32-bit and 64-bit) solution in the market, the Quad-Core Intel Xeon processor ready Sun Fire X2270 server delivering world-class 32-bit and 64-bit performance in rack-mountable 1-RU form factor with Sun's rock-solid, entry class capabilities and quality.

Professionals prefer to use the highest-quality, highest-performing tools. Such tools best enable the fullest talents of a geophysicist, an aerospace engineer, or a scientific researcher, allowing them to express themselves, their vision, and their skills to the greatest effect. Organizations employing these tools get products to market more quickly, and with higher quality than organizations that employ lesser tools.

Sun Fire X2270 demonstrates Sun's commitment in delivering one of the most compelling entry-level HPC 1-RU rack-mount server in the industry. Designed to benefit companies with massively parallel technical computing workloads, Sun Fire X2270 offers a powerful I/O and compute node at a starting price under $1,500 USD. Sun Fire X2270 is an entry-level (no redundant PSU & fans) 2-socket server from Sun based on Intel's "Thurley" platform. Within a 1-RU form-factor, Sun Fire X2270 supports leading operating systems and applications, solid state storage, the fastest processor speed grades available, and the fastest memory available. Above all, the Sun Fire X2270 meets or exceeds the buying criteria of the discerning server buyer, at a price-performance ratio not previously available from Sun. "Entry-level" only from a pricing perspective, Sun Fire X2270 is inherently a server worthy to be placed in the critical path of mission-critical projects.

Sun listens actively on how users employ their systems, i.e. "workload". These workloads directly influences the technology that Sun uses as the basis for the product. Technologies such as Sun Flash Modules (Internal Solid State Disk in form of DIMM like modules), SSD (3.5-inch Solid State Disks), high-performance QuickPath Interconnect (QPI), three-channel Integrated Memory Controller supporting 1333 MHz Registered DDR3 DIMMs, Turbo Boost Mode, HyperThreading (HT), PCI-Express 2.0, quad-core Intel Xeon processor 5500 series with integrated memory controller, Intel 5500 chipset and ICH10-R South Bridge, were selected to benefit customers deploying technical compute (HPC) servers. Technologies such as 60W Intel Xeon processors were selected to benefit customers deploying mainstream (Web) servers. Another aspect of Sun Fire X2270 is not what appears on screen, but what goes on behind the scenes, such as certification testing and driver optimization. Sun has earned a solid reputation in all of these areas.

Running Solaris(TM), Linux, Windows and VMware Operating systems, the Sun Fire X2270 server allow customers to run existing 32-bit applications on the same hardware as they migrate to their choice of next

generation 64-bit applications. The Sun Fire X2270 server can help minimize required staff training and support as well as help reduce data center real estate and cooling needs.

The Sun Fire X2270 are high-performance compute and web services server designed for deployment in a wide range of architectures:

• Scale-out architectures: With large memory capacity, internal storage, dual Gigabit Ethernet ports and high speed PCI-Express 2.0 expansion slot that enable high speed system interconnects such as fibre channel and InfiniBand, these servers are able to solve complex computing problems that require intense compute resources.

• Scale-up architectures: With up to 8 cores available, these servers are well-suited for web, hpc and infrastructure services.

• Scale-within: With their ability to run Solaris 10 Containers and VMware, Sun Fire X2270 server is ideal platforms for consolidating multiple applications on a single platform.

In addition, these servers help customers scale their computing resources without additional complexity. The Integrated Lights Out Manager (ILOM) is optional on all systems, enabling the system to be managed and monitored locally or remotely.

The Sun Fire X2270 server, when combined with Sun's rich portfolio of software, storage, service offerings, help reduce cost and complexity while accelerating time-to-revenue for data centers that run a broad range of applications including web, app, database and grid applications.

For more information see: http://www.sun.com/X2270.

Features, Functions, and Benefits

Sun Fire X2270 Server Key Features, Functions, and Benefits

Feature	Function	Benefit
Performance		
Highest Performance in class with Intel Microarchitecture (Nehalem), DDR3 Memory, Intel QuickPath (QPI) and PCIe 2.0	• Sufficient power-envelope to support today's and tomorrow's fastest Intel Xeon processors • Delivers both 32- and 64-bit enterprise-class computing • In the case of several applications, the new servers offer performance that is equal to or better than systems with 4 Processors (4S). • Support more users or transactions with less • Same number of services can be provided with lesser number of servers	• Provides fastest performance in this class of servers • Increases performance while providing investment protection for existing 32-bit applications • Save on Capital Expenditures, Operational Expenditures • Fit into existing power, cooling and space limitations of the datacenter • Head room for incremental growth • Ability to adapt to changing business conditions
Intelligent Performance with Intel Microarchitecture (Nehalem), Turbo Boost and HyperThreading	• Adapt core frequency automatically to changing workloads • Take advantage of application threading for better system throughput • Turn of power to cores when not in use to conserver power	• Quality of service does not degrade at peak load. This can be an important customer satisfaction measure. • Better response time in case of transactional services can be a important competitive advantage for our customers • Conserving power, when not in use means lesser energy costs and more eco-friendliness.

Feature	Function	Benefit
DDR3 Memory with 96 GB Max (With 8 GB DIMMs, 6 DIMM Slots per Socket, 1333 MHz Speed	• Higher Speeds, Lower Power, Higher Performance • Maximum Memory Capacity • Maximum Memory Density, Scalability, Choice and Flexibility • Highest Speed Commodity Memory	• Get more memory performance, and less power usage • Application Performance • Future proofing, Investment protection, Pay as you grow, Need based deployment
Industry Leading Reliability and Expandability		
High Performance Hard Disks	• Increases performance of system for IO sensitive applications	• Application Performance, I/O throughput, reduces number of disks, reduces costs and cost of operation due to energy savings
Hot-pluggable HDDs	• Performance for I/O-bound applications and redundancy for mission-critical data	• Increases the system/application uptime and Disk replacement becomes a scheduled maintenance activity
Up to 96 GB of memory with Extended ECC	• Support memory-intensive applications • ECC provides automatic single-bit error correction • Extended ECC allows a single DRAM chip to fail and the system will continue to run	• Improve application performance • ECC helps to ensure data integrity • improving availability • Extended ECC improves system availability
Integrated Dual Gigabit Ethernet	• Outstanding network I/O performance • Increased network availability when installed in failover configurations • Intel Zoar offers best of breed performance via IO Acceleration Technology from Intel • Increasing Network Throughput via Ethernet link aggregation (trunking)	• Increases network efficiency, flexibility, and availability • Increases System Performance and Throughput, Reduces Costs, and saves energy • Increases system utilization and throughput.
64-bit PCI-Express 2.0 Slots	• Allows connectivity to additional network or storage while supporting full CPU path bandwidth • Doubles bandwidth over previous generation and allows connectivity to additional network or storage while supporting full CPU path bandwidth • High Bandwidth (5 GT/s bi-directional per lane; that is 0.5 GB/s per lane = 8GB/s for a x16 card)	• Enables flexibility to meet evolving business and application requirements • Guarantees that IT infrastructure based on the new servers can take advantage of emerging trends in IO technology. • Floating Point Acceleration on a off-CPU card (eg. Telsa from nVidia)
5 USB 2.0 Ports, 2 in front and 2 in back and one internal	• Flash Memory as a IDE/SATA drive for storage and boot	• Security. Allows for OS/boot image to be stored on a read-only Flash device directly attached to Server that can not be compromised. Usability. Allows for storage of useful tools such as System Install Assistant (SIA)
Energy Efficiency		
Intel Xeon Processors with Intel Intelligent	• Supports the latest Quad-Core Intel Xeon processors, placing up to 8 CPU	• Nearly doubles computing resources with minimal power and cooling

Feature	Function	Benefit
Power Technology with Sun's energy efficient system design	cores in a compact form factor • Supports the 60W Quad-Core Intel Xeon processor for energy conscious customers • Lowers energy costs by automatically putting processor and memory into the lowest available power state to meet the current workload while minimizing impact on performance. • Compact form factor and high memory and IO density allows datacenter to replace number of populated rack units.	increases • Big Savings in energy costs • Fit into existing power, cooling and space limitations of the datacenter
Operating System and Management Environment		
Optional Sun Integrated Lights Out Manager (ILOM) card for Remote Management	Integrated Lights Out Manager (ILOM): • Remote management with full Keyboard, Mouse, Video, Storage (KVMS) • Remote media capability (floppy, CD etc.) • Full DMTF CLI • Browser UI for control of the system through a graphical interface. • IPMI 2.0 compliant for management and control • SNMP v1, V2c, V3 for system monitoring • Monitor and report system and component status on all FRUs	• All management which does not require physically touching the system can be performed remotely • Easily integrates into customer's existing management environment by supporting industry standards • ILOM is a core part of system, there is no additional charge for this functionality as with some of the competition
Runs applications on: • Solaris 10 • Linux (RHEL and SLES) • Microsoft Windows • VMware	• Run applications on industry standard platform running OS of choice	• Maximize application performance with best OS • Ease transition to 64-bit computing • Maximize IT investment by standardizing hardware to reduce required training and spares
• Integration with Third Party System Management ISV tools • Sun Installation Assistant (SIA)	• 3rd part integration allows for easy integration of new systems into customers' existing management environments. • SIA helps you install supported Linux and Microsoft Windows OS easily. • Required and optional drivers, tools, and licenses are all put together in one package.	• Sun servers easily fit in and are deployable in brown field environments thus significantly reducing switching costs for customers. • SIA enhances IT persons out of box experience thus significantly increasing Recommendation Index.

Product Family Placement

The Sun Fire X2270 server is the newest member in Sun's x64 server based on the next generation Intel Xeon processor. The Sun Fire X2250 server still remains in the product lineup for customers who prefer 1-RU 2-socket servers based on the previous generation Intel Xeon processor.

x64 Server Family Comparison

The following table compares some features of the Sun Fire X2270 and Sun Fire X2250 servers.

Features	Sun Fire X2270 Server	Sun Fire X2250 Server
Form Factor	1-RU	1-RU
Processor Architecture	Intel Xeon 5500 Platform	Intel Xeon 5400 Platform
Processor Type	Intel Xeon 5500 processor series	Intel Xeon processor 5400 series Intel Xeon processor 5200 series
Processor Speed	2.0 GHz to 2.93 GHz	2.0 GHz to 3.4 GHz
Level 2 Cache	256KB L2 per Core	12 MB L2
Level 3 Cache	4 MB or 8 MB L3 Cache	N/A
CPU Interconnect	QuickPath up to 6.4 GT/s	1600 MHz FSB & 1333 MHz FSB
Memory Controller	Embedded in CPU	Embedded in MCH
Memory Type	DDR3 - 1066 or 1333 MHz	FB-DIMM DDR2 - 667 or 800 MHz
DIMM Slots	12	8
DIMMs per CPU	6	4
Max Memory	96 GB	32 GB
Internal Disk	4x 3.5" SATA HDD or SSD	2x 3.5" SATA
Internal Flash Module	2	N/A
Onboard RAID	SW RAID 0, 1, 5, 10	SW RAID 0, 1
Removable Media	None	DVD±RW
Network connections	Integrated 2x Gigabit Ethernet	Integrated 2x Gigabit Ethernet
Expansion Slots	1x PCIe 2.0 x16	1x PCIe 1.0 x16
Service Processor	Optional ILOM Module	Integrated LOM
Redundant, Hot-Swap PSU	No	No
In-band management	IPMI v2.0 via KCS driver SNMP OS-resident agent	IPMI v2.0 via KCS driver SNMP OS-resident agent
Out-of-band management	IPMI v2.0;DMTF CLI; SNMP- v1, v2, v3; Web GUI	IPMI v2.0;DMTF CLI; SNMP- v1, v2, v3; Web GUI
Side-band management	IPMI v2.0;DMTF CLI; SNMP- v1, v2, v3; Web GUI	N/A
Remote management features Remote Keyboard, Video, Mouse (KVM), and remote media capability Video redirection, Remote power control, remote access to BIOS, remote FRU status	Remote Keyboard, Video, Mouse (KVM), and remote media capability Video redirection, Remote power control, remote access to BIOS, remote FRU status	Remote Keyboard, Video, Mouse (KVM), and remote media capability Video redirection, Remote power control, remote access to BIOS, remote FRU status
System management paths	In-band, out-of-band and side-band	A single dedicated management port,

Features	Sun Fire X2270 Server	Sun Fire X2250 Server
	remote management	system serial port and two system Ethernet ports
Redundant, Hot-Swap Fans	No	No
Form Factor (H x W x D)	1.7 x 17.2 x 25.6 inches 43 x 436 x 650 mm	1.70 x 16.8 x 25.4 inches 44 x 425.5 x 633.7mm
Power supply	600 W (Non-redundant >80% Efficiency)	500 W (Non-redundant 80% efficiency)
O/S	See http://www.sun.com for latest operating system support for each product	
I/O	See http://www.sun.com for latest I/O support for each product	

Key Messages

- **Performance...do more with less**
  - Design and deliver the industry's most innovative, high performance, energy-efficient systems in the market
  - Run a broad range of applications more efficiently and quickly
- **Flexibility.... headroom to grow your business**
  - Up to two Sun Flash Modules (SFM) available
  - Up to twice the storage of similar systems in its class
- **Energy-efficient.....save power and cooling costs**
  - Customers can save on energy consumption, cooling cost and the environment
- **Manage and Monitor the System.....locally or remotely**
  - Delivering benefits of common manageability, serviceability and maximum performance
  - Optional Sun Integrated Lights Out Manager (ILOM) allows full remote KVMS functionality with video and media redirection
- **Multi-platform......less complexity**
  - Runs Solaris, Linux, Windows and VMware operating systems
  - Standardize on one hardware platform for all major operating systems in the data center
  - Integrate the very best features in system design, virtualization and systems management

Target Customers

The Sun Fire X2270 server is targeted at customers that want entry class x64 server that is fast, expandable and energy efficient.

Target Markets

- Web 2.0 Services
- Life Sciences
- Manufacturing (EDA, Oil &Gas)
- Financial Services
- Education
- Government
- Telco, SP, Media & Broadband

Target Applications

- HPC/Grid Computing
- EDA
- MCAE
- Financial Modeling
- Web Server (Low End)
- IT Infrastructure (Security, DNS, Proxy, Caching, Firewall, Gateway)
- Messaging/Collaboration
- File/Print

Market Value Proposition

Sun Fire X2270 server is fast, expandable and energy-efficient entry class x64 servers that run Solaris™, Linux, Windows and VMware operating systems.
- Do More With Less: High performing server helps to maximize Return On Investment.
- More Headroom to Grow: More expandable in memory and storage connectivity.
- Cut IT operating expenses: More power efficient that results in power consumption and cooling cost.

Visualize Larger Models (Industries: Oil & Gas, Health & Life Sciences)

Sun Fire X2270 has a large, fast, and reliable memory footprint. Based on 1333 MHz Registered DDR3 DIMMs, Sun Fire X2270 delivers a maximum memory bandwidth of 64GB per second. Sun Fire X2270 uses exclusively ECC memory to protect mission-critical data sets. ECC (Error Correcting Code), a method of checking integrity of data in DRAM, detects both single-bit and multiple-bit errors in a 64-bit data word, and it corrects single-bit errors. The large 96 GB memory capacity of Sun Fire X2270 allows geophysicists to analyze deeper oceanic seismic maps and biologists to model larger molecular structures, than ever before. Assessing how much crude oil sits below the earth's surface and are massively parallel mathematical computing problems suited for the high-performance 1333 MHz DDR3 Registered DIMMs. Analyzing genetic sequence are computational-demanding jobs suited for Intel Xeon processor 5500 series with 6.4GT/s QuickPath interconnects. Additionally, rigorous testing with SuSE Linux Enteprise Server 10 ("SLES 10") and Red Hat Enterprise Server 4 &5 ("RHEL 4 & 5") ensures Sun Fire X2270 is suited for Linux, the preferred OS for Oil & Gas professionals. Recognizing IT organization place the highest premium on absolutely compatibility, Sun works closely with ISVs such as Landmark, Paradigm, and Schlumberger for certification.

Accelerate Design Cycles (Industries: EDA & MCAE)

The Intel Xeon processor 5500 series with 6.4 GT/s QuickPath interconnects allow electrical engineers to synthesize, simulate, and verify sections of processor/ASIC designs and automotive engineers to simulate more realistic, higher resolution crash tests, quicker than ever before. The ultimate benefit is that Sun Fire X2270 help reduce their dependence on physical prototypes. The Intel Xeon processor 5500 series with 6.4 GT/s QuickPath interconnects provide the connection between each processor and the Intel 5500 Chipset. Another feature found on Sun Fire X2270 is the integrated memory controller found on Intel Xeon processor 5500 series. Besides reducing latency, the integrated memory controller delivers a memory bandwidth of 100 GBps over three channels of memory. Also, the Intel Xeon 5500 series processor has Intel Hyper-Threading (HT) resulting up to 16 thread capability. Lastly, Sun Fire X2270 has one PCI Express 2.0 x16-lane expansion slot for connecting to 10GBe, Infiniband, Fiber Channel HBAs, or third-party external graphics processors such as NVIDIA QuadroPlex, to help customers visualize more data sets simultaneously and make quicker decisions during design.

Maximize Financial Returns (Industries: Financial Services & E-commerce companies)

The SSDs and FMoDs (Flash modules) found inside Sun Fire X2270 help financial institutions respond to traders who buys and sell constantly and E-commerce companies to respond to potential buyers who compares and contrasts merchandise, quicker than ever before. These companies holds big collections of information and they need fast access to data because their customers are constantly buying, selling, or comparing. Traditional storage optimizations (i.e. Old tricks of the trade) is to invest in lots of DRAM to store the working set in DRAM to avoid latency. This optimization using DRAM is expensive. Another traditional optimization is to buy more hard disks to increase IOPS. Customers have grown tired of buying more HDDs just to get more IOPS. They waste the disks, pay for more energy and space. SSD's higher IOPS rate can reduce the amount of wasted gigabytes, reduce the energy they must pay, reduce the space they must allocated, because storage space is often wasted.

Sun Fire X2270 SSD was created for customers who value high $ per IOPS, rather than cheapest storage possible or largest storage possible. HDD cost $2.43 per IOPS. SSD costs $0.88 per IOPS.   A 146GB 15Krpm SAS HDD gets about 180 read IOPS and 320 write IOPS. A 32GB SSD gets 5000 read IOPS and 30000 read IOPS. Imagine this; a quartet of Intel Xeon processor 5500 series in two Sun Fire X2270 servers put out about one million IOPS. The local SATA HDDs hundreds of IOPS, a gross disparity leading to CPUs waiting for disk I/O. By placing four SSDs or two FMoDs in front of the SATA disks, the SSD-front ended storage run at about one million IOPS, a fantastic speed boost. Every time a disk drive is accessed, it has to power up, spin to the data, access it and send it along. "With SSD, there's no waiting. The data is right there.

Deploy With Confidence (Market Segment: IT Managers)

Sun Fire X2270 has been designed to help IT organizations support their environment. Sun Fire X2270 is compatible with many operating systems, factory lead-time is one week or less, pricing is competitive, certified by many ISVs, and service is backed by the Global Sun Services organization.

When an IT manager buys Sun Fire X2270, it can be deployed in more environments because it has been certified to be compatible with more operating systems than any server in its class. Sun Fire X2270 supports Solaris 10, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, and Microsoft Windows 2008 or Windows 2003 Server operating system. Customers can purchase Solaris, Linux, or Windows operating systems from Sun and obtain complete system support from Sun.

Servers are placed at the critical paths of the most important projects. Hence, time-to-delivery is important and Sun treats it very seriously. Factory lead time for standard configurations (pre-built in factory - PTO) of Sun Fire X2270 is two days or less. Factory lead time for Assemble to Order (ATO) and X-Options of Sun Fire X2270 is two days or less. Factory lead time of Field Replacement Units (FRUs) is 13 days or less. For more details on factory lead-time, please see the chapter on Availability and Ordering.

With a starting list price (U.S.) under $1,500, Sun Fire X2270 competes head-to-head with any 2-socket entry-level servers based on the Thurley platform. With price points similar to 2U rack-mount servers based on the

Intel Xeon processor 5400 series or 5200 series, Sun Fire X2270 effectively replaces any competing servers. Every Sun Fire X2270 is supported by the power of Sun Global Services organization. This organization provides a wide range of services to help customers migrate from legacy environments, reduce cost and complexity, accelerate network deployment and deliver mobility with security - all from a single source. A one-year, next business day warranty is standard with every Sun Fire X2270.

Lastly, Sun Fire X2270 is economical to operate. Featuring the 60W version of the"Intel Xeon 5500 processor. That is only 15W per core and 25% lower than standard 80 W parts (or 50% lower than 120W parts). These capabilities add up to higher performance, lower power consumption, and better energy efficiency, making Sun Fire X2270 ideal for highly dense, power-sensitive environments.

Target Workloads

Customer requirements for 2-socket entry-level servers vary by market segments. In market segments such as Oil & Gas, geophysicists care about large model size and hence, place a premium on the memory performance and memory capacity on the on the server. In the EDA segment, ASIC or processor designers run processor-intensive applications and usually evaluate a server based on its published SPECCPU2006 benchmark results. In the MCAE segment, automotive engineers want to reduce their dependence on physical prototypes and hence, place a premium on fast and accurate

simulations and hence require not only high processor performance but also memory integrity. In the financial segment, banks & brokerages have an insatiable need for processor performance and more importantly, precision, to performance daily task such as risk portfolio analysis, simulations, and financial modeling and have very similar requirements as MCAE customers. Web companies, whose constantly must respond to customer requests, values the responsiveness of servers in meeting the need of people constantly asking for data. Lastly, IT managers supporting web infrastructure companies the highest compute density at the least possible power, in addition to economical features such as SATA, single power supply, and the amount of networking ports. Examples for each market segment are explained in the next five paragraphs and also summarized later in Figure 1.

Mechanical Computer Aided Engineering (MCAE)

Today's automobile makers are running more and more crash simulations and are building more realistic, higher resolution simulations that help reduce their dependence on physical prototypes. Engineers simulating automobile crashes and assessing aerodynamic modeling of composite airframes, or evaluating the properties of reactive armor in military equipment, demand very high-performance processors, large amounts of memory and low-latency I/O bandwidth since the servers used are often grouped in clusters. The trends in Computer-Aided Engineering (CAE) toward increasingly powerful, less expensive hardware and more sophisticated, easier-to-use software combine to make engineering analysis feasible today. This has enabled analytical engineering and process manufacturing organizations to vastly improve productivity, bringing products to market faster and more cost-effective. For example, complex optimization studies, using computational fluid and solid mechanics techniques, enables product design integrity to be improved before costly investments are made in downstream operations High-end MCAE customers run applications such as Abaqus and Nastran to design products ranging from fan assemblies to complete automobiles.

Financial Services

Financial institutions must respond to traders who buys and sell constantly. These institutions holds big collections of information on disks and they need fast access to data because their customers are constantly buying, selling, or comparing. These customers look for a partner with a rich heritage in the financial services industry that spans multiple decades and is reflected in a significant presence in all the top banks, brokerages, stock and commodity exchanges and insurance carriers. The servers they provide must not follow traditional storage optimizations that generates heat, takes up space, just to satisfy their need for faster access. They

value high $ per IOPS, rather than cheapest storage possible or largest storage possible. Another aspect is precision and integrity, at the processor, memory, and disk level. These customers demand precision calculations from the processors and use ECC memory and reliable disks exclusively to protect mission-critical data sets.

Health and Life Sciences

Whether analyzing genetic sequence or visualizing molecular structures to find drug target sites, health researchers have an endless need for processor performance. Higher processor performance allow researchers to construct three-dimensional models of molecules, polymers, crystals, catalysts and other materials to analyze their structure and predict properties. The ability to run multiple simulations and analyses across a pool of servers allow quicker runs of materials modeling. Sun has the one of the fastest and easiest path to deploy HPC cluster solutions. From the compute nodes to the storage to the software to the deployment and installation, Sun integrates standard x64 systems before they are shipped. Sun offers customers a choice of the industry's best HPC products and components, including choice of operating systems, processor architectures, third party applications, networking, interconnect fabrics and more. Sun has a wide choice of certified high-performance systems, including Sun Fire servers, as well as high-performance Ultra workstations to visualize the most complex models.

Oil & Gas

Exponential increases in computing performance at the same budget have allowed geophysicists to analyze much larger and deeper oceanic seismic maps. Assessing how much crude oil sits in a pocket 6 miles below the earth's surface are massively parallel mathematical computing problems suited for servers. Availability of inexpensive memory have expanded their scope of the amount of data that can be processed. Faced with fluctuating margins, challenging political environments, regulatory constraints and capacity pressures, Oil & Gas companies need solutions that can help them meet the world's ever increasing demands for energy. To meet these goals, they value a partnership that is global in scope, trustworthy, and proven by years of experience. This partnership would support their IT organizations and save them money and allow exploration and production organizations to concentrate on what they do best—finding oil and profitably bringing it to market—instead of worrying about computing resources. These IT organization place the highest premium on performance, memory footprint, and absolute compatibility. Features such as servers with the fastest Xeon processors, 1333MHz memory, as well as absolute compatibility with Linux and SW applications from ISVs such as Landmark, Paradigm, and Schlumberger.

Electronic Design Automation (EDA)

The most complex IC projects, including the Sun UltraSPARC T1 processor with 32 simultaneous processing threads, were completed on a Sun server. Sun servers run applications from companies such as Mentor Graphics, Cadence Designs, and Synopsys, which are used to design, verify, and test complex IC products for the consumer and commercial market. Many companies have also developed in-house applications that run on Solaris and Linux. The complexity of IC devices is increasing dramatically and it is not uncommon to find devices with hundreds of millions of gates. Since the simulation run time of a device with 500M gates is much longer than a device with 50M gates, customers place a premium on high processor performance as it allows them to run more simulations in less time. EDA customers in general are extremely performance sensitive and require high-performance processors (measured by SPEC processor2000 benchmark results), memory (determined by capacity, reliability, memory-processor bandwidth and latency), and hard disks (determined by bandwidth, latency, and capacity). EDA customers also value large memory capacity that are affordable, to synthesize and simulate larger sections of their designsy. EDA customers generally do not need 3D graphics support but still require fast 2D graphics performance on the workstation side for layout and packaging design applications.

E-Commerce Companies

E-commerce companies must respond to potential buyers ande sellers who compares and shops for merchandise, quicker than ever before. These online marketplaces hold vast catalogs of information on disks and they need fast access to data because their customers are constantly buying, selling, or comparing. These customers look for a partner with a rich heritage in the e-commerce industry that spans multiple decades and is reflected in a significant presence in all the top online companies. The servers they provide must not follow traditional storage optimizations that generates heat, takes up space, just to satisfy their need for faster access. They value high $ per IOPS, rather than cheapest storage possible or largest storage possible. Another aspect is data integrity. These customers demand precision calculations from the processors and use ECC memory and reliable disks exclusively to perform financial transactions.

Target Markets	Target Customers	Customer Needs
Mechanical Computer Aid Engineering (MCAE)	Automotive engineers simulating crash tests, performing aerodynamic modeling, or assessing reactive amour in military equipment	**Very high IOPS** Very fast compute nodes Large & fast pool of memory High-bandwidth & low-latency interconnect Compatibility with Linux Hardware certified by MCAE ISVs Vendor with experience & complete porfolio
Financial Services	Wall Street banks and Financial analysts performing risk portfolio analysis, simulations, and financial modeling	High raito of $ per IOPS Fast Access to Data Precision Vendor with strong heritage in financial services industry
Health and Life Sciences	Scientists and researchers analyzing genetic sequence & biologists visualizing molecular structures to find drug target sites	Processor performance Large amount of memory to handle data sets of 4GB per processor core
Oil & Gas	Geophysicists analyzing seismic properties and performing reservoir simulation	Processor performance Large memory capacity Interoperability with visualization-class workstations Compatibility with Linux ISV certification with Oil & Gas SW applications
Electronic Design Automation (EDA)	Electrical engineers performing synthesis, simulation, and verification of ASICs and processors	Processor Performance Memory bandwidth Large affordable memory to simulate larger sections of their design Compatibility with Linux
E-commerce companies	Social networking online flea market auctions	High ratio of $ per IOPS Fast access to data Low power, high performance server
Mainstream servers not needing redundant power supplies & fans	IT managers implementing HPC/grid data centers, authentication servers, Web servers, proxy servers, application servers fire walls, domain servers, log processing	Fast Access to Data Price-sensitive Low power, high performance servers Real-time encryption and decryption to secure e-commerce & protect private or classified data. Quick access to data from hard disk drives

Figure 1. Target Markets and Customers

Availability

Sun Fire X2270 Standard configurations worldwide will RR on March 30, 2009 and GA on April 30, 2009.

Sun Fire X2270 XATO configurations worldwide will RR on March 30, 2009 and GA on April 30, 2009.

Technology Overview

The Sun Fire X2270 Server is dual-processor, x64-based, rack-optimized server which has the following system architectural features:

- Intel Xeon processor 5500 series with Integrated DDR3 memory controller and QuickPath interconnect
- Solid State Drives (SSDs)
- Sun Flash Modules
- PCI Express Generation 2 I/ONon-volatile boot media
- Optional Integrated Lights Out Management (ILOM) Service Processor

Intel Xeon 5500 Processor

Intel® Xeon® 5500 Platform, an entire new design

- New Processor Architecture
- New Platform Architecture
- New Memory subsystem
- New I/O subsystem

Key Features

- New Intel Core Micro-architecture (aka Nehalem)
- 45 nm manufacturing technology
- 4 cores
- Integrated DDR3 3-channel Memory controller
- Individual 64 KB L1 and 256 KB L2 cache for each core
- Up to 8 MB on-chip shared L3 cache
- 4x QuickPath interconnects, up to 6.4 GT/s each
- 2-way Hyper-Threading Technology
- Turbo Boost Technology
- New LGA 1366 socket
- Power 95W, 80W or 60W
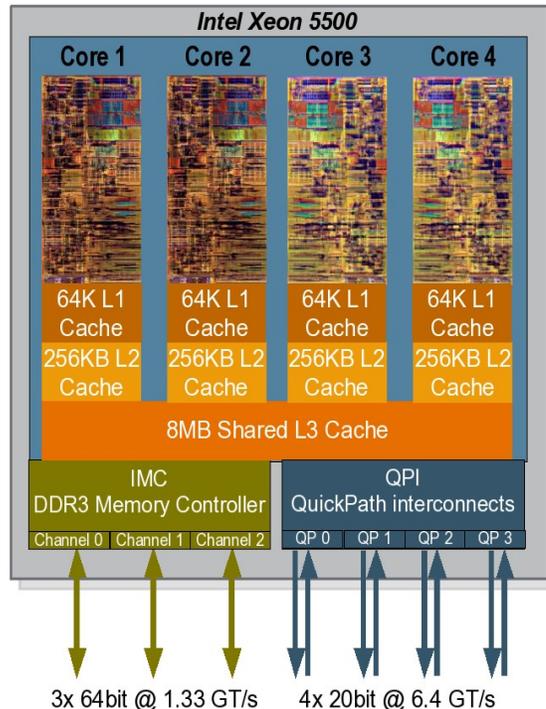
Figure 1. Intel Xeon 5500 Architecture

Key Innovations

Intel® QuickPath Technology

Starting with the Intel Xeon processor 5500 series, Intel is incorporating a scalable shared memory (also known as non-uniform shared access or NUMA). Intel's new system architecture and platform technology is called Intel® QuickPath Technology. It features new system architecture that integrates a memory controller into each microprocessor, and connects processors and other components with a new high-speed interconnect.

Intel QuickPath Architecture is a platform architecture that provides high-speed connections between microprocessors and external memory, and between microprocessors and the I/O hub. Each processor has its own dedicated memory that it accesses directly through an Integrated Memory Controller (IMC). In cases where a processor needs to access the dedicated memory of another processor, it can do so through a high-speed QuickPath Interconnect that links all the processors. A big advantage of the QuickPath Interconnect is that it is point-to-point. There is no single bus that all the processors must use and contend with each other to reach memory and I/O. It also improves scalability, eliminating the competition between processors for bus bandwidth. Coupled with Intel's great cache memory, this technological achievement will enable the performance of servers and workstations to take another leap forward.

Intel QuickPath Architecture Performance

- QuickPath Interconnect uses up to 6.4 Gigatransfers/second links, delivering up to 25 Gigabytes/second (GB/s) of total bandwidth.

- QuickPath Interconnect's architecture reduces the amount of communication required in the interface of multi-processor systems to deliver faster payloads.

- QuickPath Interconnect's tightly integrated reliability, availability and serviceability (RAS) features ensure high reliability. These features include:

    - Implicit Cyclic Redundancy Check (CRC) with link-level retry to ensure data quality and

performance by providing CRC without the performance penalty of additional cycles.

- Self-healing links that avoid persistent errors by re-configuring themselves to use the good parts of the link.
- Clock fail-over to automatically re-route clock function to a data lane in the event of clock-pin failure.
- Hot plug capability to support hot plugging of nodes, such as processor cards.

Integrated Memory Controller

The Integrated Memory Controller (IMC) is specially designed for servers and high-end clients to take full advantage of the Intel QuickPath Architecture with its scalable shared memory architecture. The independent high-bandwidth, low-latency memory controllers are paired with the high-bandwidth, low-latency QuickPath Interconnects enabling fast, efficient access to remote memory controllers. The Integrated Memory Controller has the significant advantage of being coupled with large high-performance caches. This relieves pressure on the memory subsystem and lowers overall latency. The Integrated Memory Controller also continues Intel's legacy of best-in-class scalability and RAS features, plus of course takes advantage of next generation Intel® microarchitecture (Nehalem) and Hi-k 45nm process technology.
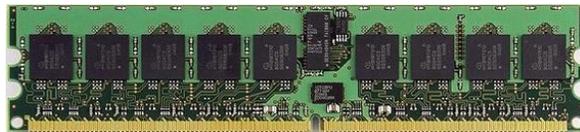
Figure 2. DDR3 DIMM

45nm Quad-Core Intel® Xeon® processors

Next generation Intel microarchitecture (Nehalem) has been designed to capitalize on the advantages of Intel's 45-nanometer (nm) Hi-k metal gate silicon technology. This new process technology uses a new material combination of Hi-k gate dielectrics and conductors to offer high performance while reducing the electrical leakage from transistors that can hamper chip and PC design, size, power consumption, and costs.

Intel's 45nm Hi-k silicon process technology increases transistor switching speeds to enable higher core and bus clock frequencies and thus more performance in the same power and thermal envelope.

Intel® Hyper-Threading Technology (Higher Performance for Threaded Workloads)

For next generation Intel microarchitecture (Nehalem), Intel introduces an enhanced version of Intel® Hyper-Threading Technology (HT), a technique used previously on some Intel Pentium and Intel Xeon processors that enabled a single execution core to run two threads at the same time. In a multi-core processor, Hyper-Threading doubles the potential number of overall threads that can be run simultaneously by each of the processors. Nehalem with its larger cache and larger bandwidth provides more opportunities to take advantage of HT. Hyper-Threading can deliver substantial performance increase depending on the application for only a slight amount of power.

Intel® Turbo Boost Technology (Higher Performance on Demand)

Intel® Core™ Microarchitecture (Nehalem) based processors incorporate a new feature: Intel® Turbo Boost technology. Under some configurations and workloads, Turbo Boost technology enables higher performance through the availability of increased core frequency. Turbo Boost technology automatically allows processor cores to run faster than the base operating frequency if the processor is operating below rated power, temperature, and current specification limits. Turbo Boost technology can be engaged with any number of cores or logical processors enabled and active. This results in increased performance of both multi-threaded and single-threaded workloads.

The BIOS contains a set-up option to enable or disable Turbo Boost technology and it operates under operating system (OS) control by engaging when the OS requests the highest performance state (P0). The maximum

frequency is dependent on the number of active cores and varies based on the specific configuration on a per processor number basis. The amount of time the processor spends in the Turbo Boost technology state will depend on workload and operating environment.

Turbo Boost Overview

Intel Turbo Boost technology is available only on supported processor versions. With Turbo Boost technology, the processor is capable of maximizing core frequency while ensuring that it does not exceed its electrical and thermal specifications. This means workloads that are naturally lower in power or lightly threaded may take advantage of headroom in the form of increased core frequency. Continual measurements of temperature, current draw, and power consumption are used to dynamically assess headroom.

Dependencies / Algorithm

Intel Turbo Boost technology core frequency upside availability is ultimately constrained by power delivery limits, but within those constraints, it is limited by the following factors:

- The estimated current consumption of the processor
- The estimated power consumption of the processor
- The temperature of the processor

The number of active cores at any given instant dictates the upper limit of Turbo Boost technology. For this discussion, a core is considered 'active' if it is in the "C0" or "C1" state; cores in the "C3" or "C6" state are considered 'inactive'. The upper limits will vary on a per processor number basis. For example, one particular processor may allow up to two frequency steps (266.66 MHz) when just one core is active and one frequency step (133.33 MHz) when two or more cores are active. Therefore, higher deep C-state residency ("C3" or "C6") on some cores will generally result in increased core frequency on the active cores. The upper limits are further constrained by temperature, power, and current. These constraints are managed as a simple closed-loop control system. If measured temperature, power and current are all below factory-configured limits and the OS is requesting P0, the processor automatically steps up core frequency (+133.33 MHz) until it reaches the upper limit dictated by the number of active cores. When temperature, power or current exceed factory configured limits and you are above the base operating frequency, the processor automatically steps down core frequency (-133.33 MHz) in order to reduce temperature, power and current. The processor then monitors temperature, power, and current and continuously re-evaluates.
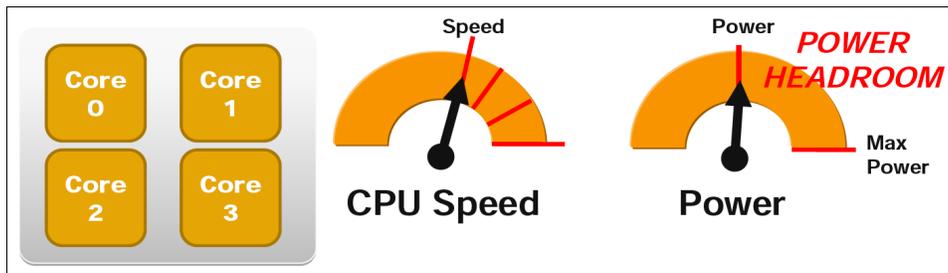

Figure 3. CPU without Turbo Boost mode – CPU is at base frequency, power headroom may be available
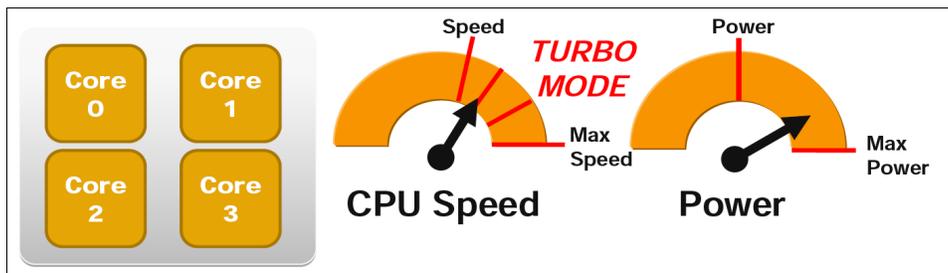
Figure 4. CPU with Turbo Boost mode – Turbo Boost speeds CPU cores up to utilize power headroom
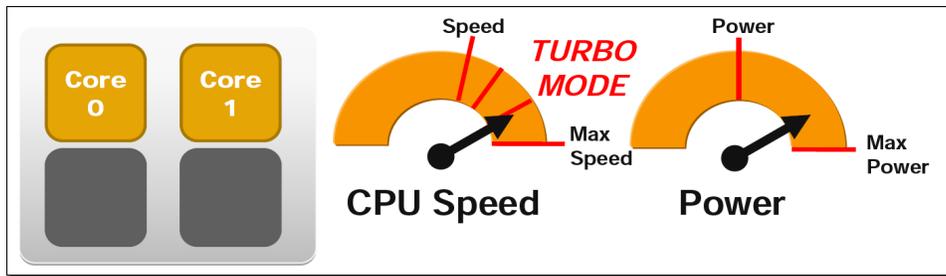
Figure 5. CPU with Turbo Boost mode – With less active cores, Turbo Boost can increase CPU speed more

Note: When Turbo Boost technology is requested by the OS, the processor will commonly operate between the max Turbo Boost technology frequency and the base operating frequency.

All active cores in the processor will operate at the same frequency. Even at frequencies above the base operating frequency, all active cores will run at the same frequency and voltage. Due to the way the BIOS and OS communicate Turbo Boost technology, software may never detect core clock frequencies above the base operating frequency. This is not reflective of actual core frequency.

Intel® Intelligent Power Technology

Intel® Intelligent Power Technologies improve performance per Watt while lowering idle power consumption. Integrated Power Gates enable idle cores to go to near zero power independently and reduce latency during power state transitions.

Intel® Smart Cache Enhancements

Next generation Intel microarchitecture (Nehalem) enhances the Intel Smart Cache by adding an inclusive shared L3 (last-level) cache that can be up to 8 MB in size. In addition to this cache being shared across all cores, the inclusive shared L3 cache can increase performance while reducing traffic to the processor cores. An exclusive L3 cache contains data not stored in other caches. Thus, if a data request misses on the L3 cache, each processor core must still be searched, or snooped, in case their individual caches might contain the requested data. This can increase latency and snoop traffic between cores. With Nehalem, a miss of its inclusive shared L3 cache guarantees the data is outside the processor and thus is designed to eliminate unnecessary core snoops to reduce latency and improve performance.

New Application Targeted Accelerators and Intel SSE4

Next generation Intel microarchitecture (Nehalem) includes all the additional Intel SSE4 instructions Intel included in the 45nm next generation Intel Core microarchitecture (Penryn) for faster computation/manipulation of media (graphics, video encoding and processing, 3-D imaging, and gaming). In addition, Nehalem adds seven new Application Targeted Accelerators for more efficient accelerated string and text processing of applications like Extensible Markup Language (XML).

Improved Virtualization Performance

Virtualization enables computers, particularly servers, to better leverage multi-core processing power and increase efficiency. Nehalem adds new features that enable software to further improve their performance in virtualized environments. For example, Nehalem includes an Extended Page Table (EPT) for reconciling memory type specification in a guest operating system with memory type specification in the host operating system in virtualization systems that support memory type specification.

Sun Integrated Lights Out Management (ILOM) - Optional

Sun ILOM Service Processor provides for full remote KVMS (Keyboard, Video, Mouse, Storage) redirection over IP. Lights-out management (LOM) is achieved using a new on-board, independently powered AST2100 service

processor with its own robust, security hardened OS. ILOM provides remote administration via an intuitive browser-based GUI over SSL, DTMF CLI over SSH, remote console, SNMP V1, v2c, v3 and IPMI v2.0 protocols using either Out-of band, Side-band or in-band management. Out-of-band management is provided over a dedicated 10/100 Ethernet port and Side-band management over one of the host's gigabit Ethernet interfaces. Using Out-of-band management or Side-band management, the system administrator can remotely control power of the system, monitor system FRU status, check the event logs,or upgrade new system firmware. With in-band management, the system administrator can monitor system status and control system power down.

The Service Processor (SP) provides the following functions:

- Capability to remotely manage the server through remote keyboard, video, mouse, and storage redirection over IP

- Extensive control and reporting over environmental, power, hardware and BIOS/OS features

- Remote flash upgrades of system BIOS and service processor software

- Remote diagnosis of failed components allows for rapid correction

- User configurable serial console accessible via a physical port or re-directed through the management network

Sun Fire X2270 Service Processor – Sun ILOM Service Processor Module

Sun Fire X2270 offers an optional Sun ILOM Service Processor module, a hardware-based SP named Aspeed AST2100. This SP consolidates system management functions with remote power control and monitoring capabilities. The SP is IPMI 2.0 compliant and enables specific capabilities including system configuration information retrieval, key hardware component monitoring, remote power control, full local and remote keyboard, video, mouse (KVM) access, remote media attachment, SNMP V1, V2c, and V3 support, and event notification and logging. In addition to manageability, it also provides a 16-bit graphics controller with 8 MB of dedicated video memory and key interfaces such as USB ports (for virtual devices), RJ45 RS-232 serial interface (for console redirection), two10/100 Ethernet interfaces (for out-of-band or side-band manageability), and a HD-15 SVGA video port (for video reproduction).

Within the chassis of Sun Fire X2270 and on the Intel Xeon processors, there are two temperature sensors and fourteen voltage sensors. The SP continuously monitors and detects errors on these sensors, including:

- Memory Voltage

- processor Core Voltage

- System Voltage (3.3V, 5V, 12V)

- processor Fan

- System Fans

- Processor Temperature

- Chassis Temperature

Through ILOM, Sun Fire X2270 provides SNMP, GUI, and CLI-based server management via a dedicated 10/100 Ethernet interface. The GUI, called Java Web Start, provides the necessity such as remote power control, server health inspection, management of configuration settings, and remote control capabilities. Administrators can track status from these sensors and intervene before a minor issue turns to major issue. Secure access to the SP and ILOM are available in several ways:

- Via a Secure Shell (SSH) command line interface (CLI).

- Using an IPMI v2.0 command interface

- Via Simple Network Management Protocol (SNMP) v3 interfaces

• Using the Web-based graphical interface

• Redirecting the managed server's console to the Remote Console application

Key Features

- **No KVM Switches:** Remote control (requires Java 5.0) allows administrators to gain remote KVM control of the server via an encrypted session to the SP over IP, without needing any KVM switches. This 16-bit graphical remote control provides video reproduction and mouse control

- **ILOM Firmware:** A Web server and Java™ Web Start remote console application are downloadable through a secure web connection.

- **Security**: For better security, the service processor includes multi-level role based access to features. The service processor supports RADIUS, LDAP and MS Active Directory Service lookup of authentication data. All functions can be provided out-of-band through a designated serial or network interface, eliminating the performance impact to workload processing or using Side-band management over one of the host's gigabit Ethernet interfaces.

- **Virtual storage**: The service processor can emulates local storage devices to enable store and retrieval operations on remote storage as if the devices are physically attached to X2270. The service processor incorporates a USB 2.0 device controller that connects to the USB host controller on the ICH10R of the Intel 5500 Chipset. By using the Java Webstart remote console application to launch the virtual storage function at an administrative workstation, the X2270 detects USB storage device attachment. This feature applies to a variety of remote storage devices such as DVD, CD-ROM, and floppy drives, as well as USB flash disk drives and ISO image files.

Sun xVM Ops Center

Management of One to Thousands of Sun Systems

Sun xVM Ops Center software, the industry's only complete solution for virtualizing and managing your data center infrastructure for rapid and simplified discovery, OS provisioning and updates and management of multi-vendor Solaris and Linux OS-based x86 and SPARC systems . This optional software combines the benefits of N1System manager with the administration of virtualized datacenter assets by merging with Sun Connection. Sun xVM Ops Center reduces cost pressure of (server name) and improves manageability by centralizing control of heterogenous architectures across the entire IT infrastructure.

Sun xVM Ops Center software provides full Life Cycle management for physical, and soon virtual, data center infrastructure. Highly scalable building on the proven N1SM and Sun Connection, xVM Ops Center provides End-to-End Systems Management:

- Discover & Inventory

- Check & Provision Firmware

- Bare Metal Provision OS

- Manage Hypervisors

- Provision applications

- Automate software lifecycle/update

- Monitor HW and SW

- Compliance reporting

System Architecture

Overview

Sun Fire X2270 Server is based on Intel's Tylersburg-EN platform, targeted toward HPC customers and mainstream server customers. Featuring the Intel Xeon 5500 series processor, Sun Fire X2270 Server is based on a similar, highly integrated, system architecture as the Sun Fire X2250 Server, while improving key features such as performance, memory, I/O, and power density. Compared to the Sun Fire X2250 Server, has higher overall performance (via the New Intel Core Architecture (Nehalem), QuickPath interconnect, integrated memory controller, Turbo Boost mode and Hyper-Threading), memory bandwidth (via 3 channels DDR3 1333 MHz per socket).

Below figure shows the block diagram of Sun Fire X2270 Server. The Intel Xeon processor 5500 series ("Nehalem-EP") are connected to each other and to the Intel 5500 Chipset ("Tylersburg-24D" IOH) using QuickPath interconnects (QPI). The Intel Xeon processor 5500 series each have one integrated memory controller with 3 DDR3 channels and up to 2 DIMMs per channel. The Intel 5500 chipset provides 24 PCI-Express generation 2 lanes, 16 of which are used for the single PCIe expansion slot (x16 electrical and mechanical). 4 PCIe Gen 2 lanes connect the Intel 5500 chipset to the Intel® 82575EB Gigabit Ethernet Controller (Zoar). The Intel® 82801JR I/O Controller Hub (ICH10R) provides PCI, SATA, and USB connectivity.

Out of the six SATA devices supported by the ICH10R, four go to the front of the chassis for internal SATA disk drives or solid state drives. The two remaining SATA ports go to two Sun Flash Module slots located in the back of the motherboard, next to the PCIe expansion slot.
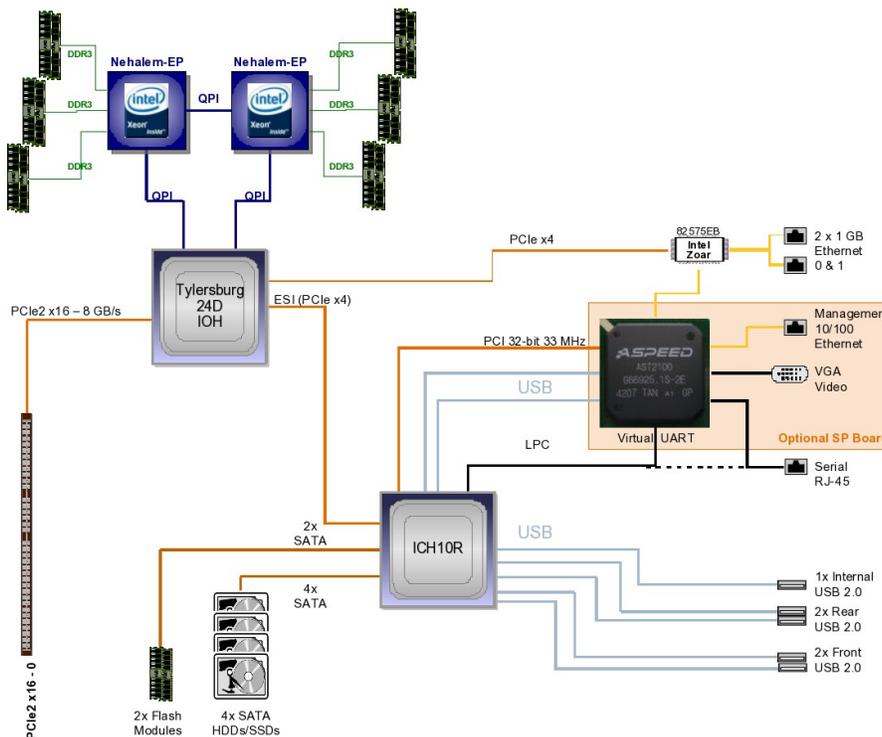
Figure 6. Sun Fire X2270 Server Block Diagram

Internal Storage (HDDs, SSDs and Sun Flash Modules)

Hard Disk Drives (HDDs)

Sun Fire X2270 Server can reach up to a maximum of 4 TB using its four internal drive bays. Sun Fire X2270 Server supports two HDD sizes: 500GB, and 1TB, all 3.5-inch SATA format operating at 7,200 rpm. All drive bays are hot-swappable.

SATA (Serial ATA) is the only method of internal storage for Sun Fire X2270 Server. Sun Fire X2270 Server can accommodate up to four 3.5-inch SATA drives . These four SATA drives can be configure for RAID 0 , 1, 5 or 10, via the RAID controller embedded inside the Intel 82801JR I/O Controller Hub (ICH10R). The RAID controller embedded inside the ICH10R supports RAID under windows server 2003/2008 only and requires installing the Intel Matrix Storage Technology (can be downloaded from Intel at: http://www.intel.com/design/chipsets/matrixstorage_sb.htm).

Sun Fire X2270 Server will not qualify any RAID adapters or any internal SAS drives.

Sun Fire X2270 Server supports Serial Attached SCSI (SAS), as well as SCSI, Fiber Channel (FC), but only as an external option. Sun Fire X2270 Server interfaces to a wide variety of StorageTek SAS JBODs, SCSI Array, FC Array, through different Host Bus Adapters.

Solid State Drives (SSDs)

The Sun Fire X2270 supports up to four SSDs. The SSDs have a capacity of 32 GB each and are seen by the BIOS and Operating System as standard but extremely fast SATA drives.

Sun Flash Modules

The Sun Fire X2270 support up to 2 Sun Flash Modules. The Flash Modules have a capacity of 24 GB each and are seen by the BIOS and Operating System as standard but extremely fast SATA drives.

Reliability, Availability, and Serviceability (RAS)

Reliability

- Software RAID 0, 1, 5 and 10 with SATA on-board controller using Intel Matrix Storage Technology (Windows OS only).
- Memory with Extended ECCsupported.

Availability

- High CPU density available with quad core combined with the small form factor of the Sun Fire X2270 server allow redundant deployment in a compact space to increase overall service availability.
- Built-in dual Gigabit Ethernet ports provide redundancy.

Serviceability

- Front-accessible, hot-pluggable disk drives or Solid State drives.
- Identical Indicator LEDs on the front and back of the chassis allow problems to be detected and isolated easily.
- A fault indicator LED stays on following a fault even if the system has been powered off (but still connected to the power source).
- Diagnostic LEDs are included on the motherboard.
- Front power switch (toggles between standby and power-on) provides easy access.
- Tool-less Rack mounting slide rails for easy installation and removal of a unit are available as x-options.

Operating System

Sun Fire X2270 Server Operating Systems

A world-class performance platform, the 64-bit Sun Fire X2270 server allow customers to run the operating system that best fits their needs. With a multitude of operating systems fully supported and/or certified, the Sun Fire X2270 server provide customers with more choices, within the same hardware architecture, than competing servers in its class.

Operating Systems		Support	Factory Installed	Sold by Sun	Supported by Sun
Solaris 10 10/08 Update 6	64-bit	Yes	Yes	Yes	Yes
OpenSolaris 2008.11	64-bit	Yes	Yes	Yes	Yes
VMware ESX 3.5 U4	64-bit	Yes	No	Yes	Yes
VMware ESXi 3.5 U4	64-bit	Yes	No	Yes	Yes
Windows Server 2003, SP2	32-bit/ 64-bit	Yes	No	No[2]	Yes[3]
Windows Server 2008	32-bit/ 64-bit	Yes	No	No[2]	Yes[3]
Red Hat Enterprise Linux 4, Update 7	32-bit/ 64-bit	Yes	No[1]	Yes	Yes
Red Hat Enterprise Linux 5, Update 3	32-bit/ 64-bit	Yes	No[1]	Yes	Yes
SUSE Linux Enterprise Server 10, SP2	64-bit	Yes	No[1]	Yes	Yes

1. Red Hat Enterprise Linux 4 & 5, SUSE Linux Enterprise Server 10, and Solaris 10 can be ordered from Sun. Support contracts are also available.

2. "Designed for Windows" designation as a certified platform.

3. Sun System Service Plans for Windows Server 2003 & 2008 are available from Sun.

Latest OS Information

For more information on the latest OS support for the Sun Fire X2270 Server, see
http://www.sun.com/servers/entry/X2270/os.html

Solaris 10 OS – The most advanced operating system on the planet

Key Messaging

In a class by itself, the Solaris Operating System is a significant leap forward form the Solaris 9 OS, establishing it in a class by itself when compared to competing operating systems. It offers many innovative technologies that fundamentally change the equation for organizations needing to reduce costs, reduce complexity, and minimize risk. The new features in the Solaris 10 OS bring mainframe-quality software to even the smallest single-processor servers and provide a stepping stone into tomorrow's data center.

For CIOs and Line of Business Managers who are dissatisfied with high infrastructure costs and security vulnerabilities in their workgroup server environments, the Solaris 10 OS on x64 brings a proven, enterprise-class OS at 1/11th the cost of Microsoft and 20-60% off the cost of Red Hat over three years. The Solaris 10 OS is designed to help organizations optimize system utilization levels, deliver extreme performance and provide virtually unparalleled security – all with relentless, around-the-clock availability.

- **Optimal Utilization** of computing systems is a priority for IT managers where server consolidation is a common approach and is improved in the Solaris environment by:

    - **Solaris Containers** enable as much a 4x increase in system utilization by helping to efficiently and securely support thousands of applications per system. Highly configurable, Solaris Containers can dynamically adjust system resources to business goals within and across Containers with the added benefit of isolating applications from each other and from system faults, so a problem in one application cannot affect the system or other applications.

    - **Solaris ZFS File System** (zetabyte file system) integrates devices, storage, and file systems structures into a single structure, simplifying file system management and providing a reliable and flexible solution that can help reduce cost, complexity, and risk.

- **Extreme Performance** is delivered with optimization for the latest UltraSPARC(R), AMD Opteron and Intel Xeon processors as well as:

    - **Dynamic Tracing (DTrace),** designed for use live use in production situations, is a powerful tool for analyzing and diagnosing elusive problems and increasing system performance. It is non-invasive and has no system overhead when not in use, but with its pervasive coverage, root cause for intermittent system problems can be found quickly and performance gains in real-world applications have been optimized to run as much as 30 times faster.

    - **A Unified TCP/IP Stack** where the TCP and IP layers are partially merged, delivers a 30- to 50-percent improvement in network throughput with a 10- to 15-percent lower CPU load than previous Solaris OS versions.

- **Unparalleled Security** continues to be a focus as Solaris 10 OS adds significant features that can help defend against attacks by preventing unauthorized access to data and applications with:

    - **Process Rights Management** replaces the traditional UNIX(R) platform's "all or nothing" root mechanism with a fine-grained set of privileges for control over the resources and objects that processes can manipulate.

    - **Solaris Cryptographic Framework** library secures data flows by providing a set of programming interfaces for application-level and kernel-level cryptographic operations, allowing developers to utilize highly optimized cryptographic algorithms and providing transparent access to the same hardware encryption acceleration devices used by the operating system kernel.

- **Relentless Availability –** Expected in a Solaris OS environment, predictive self-healing technologies

provide new levels of application availability with:

- **Solaris Fault Manager** proactively handles system problems by removing components before failure. CPU, memory and I/O problems are diagnosed and corrected – before they can cause downtime.
- **Solaris Service Manager** manages application software running on the system, monitoring applications and restarting entire application trees if necessary.

Compatibility

- **Same OS—Low-End to High-End Systems.** The Solaris OS is built from a single source base and optimized to run on multiple platforms, providing customers with the same best of breed OS on SPARC, Intel Xeon 64-bit, and x86 32-bit processor-platforms.
- **Solaris Application Guarantee Program.** This program guarantees binary compatibility between versions of Solaris OS on each platform and has been extended to include source code compatibility as well.
- **Linux Compatibility.** With unwavering support for interoperability and open standards, and a commitment to delivering customer choice, Sun has made Linux interoperability a high priority.
  - **Six Key Linux Libraries included in Solaris OS are:** Glib, Gtk+, JPEG, PNG, TIFF, and XML2
  - **Hundreds of Linux applications and libraries** are provided with the Solaris OS including the GNOME desktop.
  - **Linux Compatibility Assurance Toolkit (LinCat)** helps to simplify the process of porting Linux applications to run natively on the Solaris OS.

Pricing/Support

Solaris 10 OS is free to end-users upon registration and is available via free download. Media kits are available for purchase. Support is available at an additional charge.

Linux - Complementing Sun's Solaris OS Strategy

Key Messaging

Sun, the #1 systems provider, brings a Comprehensive Systems Approach to Linux--providing customers with a full Linux solution of hardware, OS choice with Sun's value added Sun Java(TM) Enterprise System, Sun Java Desktop System, tools, and services. Sun enhances standard Linux distributions with an integrated systems offering that includes fully supported OS, x64 rack-mount servers, and the Sun Java Enterprise System that simplifies platform support for customers and partners. Sun brings added value to the system offering with faster, low-cost hardware which is the primary concern for most Linux customers seeking cost-sensitive server alternatives.

- **Choice and Platform Neutrality – "The right tool for the right job"**

  Customers can choose the OS platform to best meet their server to desktop computing needs.

  - With the Sun Java Enterprise System for Linux, customers can standardize on a set of Java technology-based network services across their heterogeneous infrastructure of volume x86 systems based on the Solaris OS or standard Linux to large SMP systems from Sun on x64 or SPARC processor based systems.
  - A growing line of Sun and third-party Intel Xeon and AMD Opteron processor-based servers allows Linux customers to scale to 64-bit computing

- **Systems Approach - Simplified Operations - One-Stop Linux Support**

  Sun brings a complete systems approach to Linux: a value-added web services stack for the entire system, hardware, OS, tools, and applications backed by Sun's global support infrastructure.

  - Delivering Linux--from leading vendors (Red Hat and SUSE Linux)--with front-line support and training worldwide from Sun on x64 (Xeon and Opteron processors) hardware platforms from Sun and third parties.
  - Selling the simplest and most comprehensive middleware & web services offering with Sun Java Enterprise System.

- **Optimized Java Technology – Java Everywhere – Broaden the reach of Java technology investments**

  - Sun is focused on maximizing Java technology performance benefits and stretching customers' application investments by creating a common application engine.
  - Linux and Java platform integration - Alliances with Red Hat and SUSE Linux to distribute Sun's latest Java Virtual Machine (JVM(TM) machine) included as part of the OS distributions. (The JVM software technology allows the Java 2 Software to host applications on any computer or operating system without rewrite or recompile).

Pricing/Support

Sun resells subscriptions for Red Hat Enterprise Linux (RHEL) & SUSE Linux Enterprise Server/Desktop (SLES/D). Support includes access to either Red Hat Network or Novell Customer Center. During the support period, if any new versions of SLES/D or RHEL for Intel Xeon are made available, users with current support entitlements have access to those new versions from the maintenance sites of Red Hat and SUSE. Please see the "Services" section for more details.

Windows OS

The Sun Fire X2270 Server is certified to run the Microsoft Windows Server 2008 and Microsoft Windows Server 2003 Enterprise and Standard Edition operating systems. Sun System Service Plans will be available from Sun Microsystems at an additional charge. Please see the "Services" section for more details.

VMware OS

The Sun Fire X2270 Server is certified to run VMware ESX 3.5 U4 operating system. Sun System Service Plans will be available from Sun Microsystems at an additional charge. Please see the "Services" section for more details.

The Sun Fire X2270 server is ideal for running the latest virtualization technologies including Solaris Containers, VMware ESX, & Microsoft Virtual Server. The combination of Sun Fire X2270 server & VMware virtualization software enable:

- Server consolidation for greater energy & space efficiencies
- Advanced business continuity for critical applications
- Streamlined multi-OS software development on high-performance Sun Fire servers
- Standardized enterprise desktop environments
- Migration of legacy OSs & applications to new hardware for increased reliability

Installation Data

Sun Fire X2270 Server Specification

Processor Options	
Processor	One or two Intel Xeon Processors: • Intel Xeon L5520 (2.26GHz, 8MB cache, 5.86 GT/s QPI, DDR3-1066, Turbo On, HT On, 60W) • Intel Xeon E5504 (2.00GHz, 4MB cache, 4.8 GT/s QPI, DDR3-800, Turbo Off, HT Off, 80W) • Intel Xeon E5540 (2.53GHz, 8MB cache, 5.86 GT/s QPI, DDR3-1066, Turbo On, HT On, 80W) • Intel Xeon X5550 (2.66GHz, 8MB cache, 6.4 GT/s QPI, DDR3-1333, Turbo On, HT On, 95W) • Intel Xeon X5570 (2.93GHz, 8MB cache, 6.4 GT/s QPI, DDR3-1333, Turbo On, HT On, 95W)

Main Memory
12 DIMM slots total for PC3-8500 1066 MHz ECC DDR3 DIMMs or PC3-10600 1333 MHz ECC DDR3 DIMMs
System configurations from 2 GB (1x 2 GB) to 96 GB (12x 8 GB) of memory

Standard/Integrated Interfaces	
Network	Two 10/100/1000Base-T Ethernet ports
SATA	Four channel SATA interface, internal access only.
USB	Two USB 2.0 ports (Front), Two USB 2.0 ports (Rear), One USB 2.0 port (Internal)
Expansion bus	One internal MD2 Low Profile PCI-Express 2.0 slot (1x 16-lane)

Optional Integrated Lights Out Manager	
Network management	One dedicated 10/100Base-T Ethernet port
Serial	One TIA/EIA-232-F asynchronous RJ45 Port
Video	One VGA 8MB – 1024 x 768 @ 60Hz

Mass Storage and Media	
Hot-pluggable, 3.5" Internal disk	Up to four SATA disk drives
External disk	See http://www.sun.com/servers/entry/X2270/storage.html

Software

Operating environment	Solaris 10 Update 6 OpenSolaris 2008.11 Red Hat Enterprise Linux 4 Update 7, 32-bit/64-bit Red Hat Enterprise Linux 5 Update 3, 64-bit SUSE Linux 10 Professional SP2, 64-bit Windows Server 2003, Enterprise Edition, 32-bit/64-bit Windows Server 2003, Standard Edition, 32-bit/64-bit Windows Server 2008 VMware ESX 3.5 U4 VMware ESXi 3.5 U4 See http://www.sun.com/servers/entry/X2270/OS.html
Languages	C/C++, FORTRAN, Java programming language, all other standard Sun-supported languages
Networking Software	ONC™, ONC+(TM), NFS(TM), WebNFS(TM), TCP/IP, SunLink™, OSI, MHS, IPX™/SPX, SMB technologies, and XML
Management	CLI (in-band and out-of-band), IPMI 2.0 (in-band and out-of-band), SNMP (out-of-band only)

Power Supply

One power supply		
UL Maximum (AC Input)	600 W	8.6Amax @ 100Vac, 4.3Amax @ 200Vac, full load
Power Supply Rating (DC output)	600 W	600 W
Earth Leakage	600 W	1mA maximum 240Vac 60Hz
Inrush Current	600 W	<60A peak for 1mS

Environment

AC power	100-200 V/200-240 V AC (47/63 Hz)
Operating temperature/humidity (single, non-rack system)	5 ºC to 35 ºC (41 ºF to 95 ºF), 10% to 90% relative humidity, 38 ºC max wet bulb non-condensing
Non-operating temperature/humidity (single, non-rack system)	-40 ºC to 68 ºC (-40 ºF to 154 ºF), up to 93% relative humidity, non-condensing
Altitude (operating) (single, non-rack system)	Up to 3,000 m, maximum ambient temperature is derated by 1 ºC per 300 m above 900 m
Altitude (non-operating) (single, non-rack system)	Up to 10,000 m

Acoustic Noise Emissions

Declared noise emissions in accordance with ISO 9296, A-weighted, operating and idling:	
LwAd (1B = 10dB) at max ambient	7.5 B
LpAm bystander at max ambient	51 dB

Regulations

Meets or exceeds the following requirements:

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

Certifications:
    Safety
    EMC
	
	UL/cUL, UL DEMKO, CE, BSMI, CCC, GOST-R, S-Mark
	CE, FCC, VCCI, ICES, C-Tick, MIC, CCC, GOST-R, BSMI Class A

Other	Complies with WEEE Directive (2002/96/EC) and RoHS Directive (2002/95/EC)

Dimensions and Weight

Chassis
    Height
    Width
    Depth
    Minimum Weight
    Maximum Weight
	
	43 mm (1.7 in.)
	436 mm (17.2 in.)
	650 mm (25.6 in.)
	9.8 kg (21.7 lb.) minimum without rack mounting slide rail kit
	13.9 kg (30.6 lb.) maximum assuming PCIe card weighs 0.12 kg (0.25 lb) each and without rack mounting slide rail kit

System Requirements, Configuration and Management

System Requirements

The Sun Fire X2270 server run the Solaris 10, standard Linux distributions, Microsoft Windows Server 2003 and 2008, as well as VMware operating systems. For a list of supported OS versions, please refer to section "Sun Fire X2270 Server Operating Systems Support ".

System Configuration

The Sun Fire X2270 server have the following standard components:

- One or two Quad-Core Intel Xeon processors
- Twelve memory slots supporting PC3-8500 1066 MHz or PC3-10600 133 MHz ECC DDR3 DIMMs - Up to 96 GB of main memory with 8 GB DIMMs
- Four 3.5-inch SATA disk drives
- Two 10/100/1000Base-T Ethernet ports
- Serial port - One RJ-45 port
- Five USB 2.0 ports: two front, two rear, one internal
- One MD2 Low Profile PCIe 2.0 slot (1x 16-lane)
- Three fan blowers
- One 600 Watt AC power supply
- Integrated Lights Out Manager (ILOM) (optional)
  - VGA port - 8MB – 1024 x 768 @ 60Hz
  - Management port - 10/100Base-T Ethernet port
- 19-inch rack-mount kit (optional)
- Cable management arm (optional)

Licensing/Usage

The Sun Fire X2270 server can be ordered with the Solaris 10 pre-installed. Solaris 10 RTU is given when the system is registered with Sun.

MTBF Information

The MTBF (Mean Time Between Failure) for the Sun Fire X2270 server vary depending upon configuration. For more specific information, please refer to MTBF Tool at http://ram-server.eng

BTU Information

BTUs/hr for the Sun Fire X2270 server will vary depending upon configuration.

Min BTU:

461 BTUs/hr (135 W) at idle for Sun Fire X2270 with one Quad-Core Intel Xeon L5520 processor (2.26GHz, 60W), 1x 2GB DDR3-1066 MHz ECC DIMM, No HDDs, one PSU.

Max BTU:

1181 BTUs/hr (346 W) at max stress for Sun Fire X2270 with two Quad-Core Intel Xeon X5570 processors (2.93GHz, 95W), 12x 4GB DDR3-1333 MHz ECC DIMM, four 1 TB 7200 RPM 3.5" SATA drive, ILOM card, oone PSU.

Power Consumption Information

Please refer to Power Calculator at http://www.sun.com/servers/x64/X2270/calc/index.jsp

Rack Mounting

The Sun Fire X2270 server is 1.7 inches (43 mm) high, 17.2 inches (436 mm) wide and 25.6 inches (650 mm) deep. The air-flow direction is from front to back. I/O ports are located on the front and rear panels. Informational LEDs are located on the front and rear panels. Access to the power connection is at the rear of the chassis.

Every current Sun Rack is supported for in-field installation and for shipment pre-installed by Sun(SM) Customer Ready Program. Field installation in the Sun Fire Hardware Expansion Cabinet, the Sun StorEdge(TM) Array Cabinet as well as 3rd party ANSI/EIA 310-D-1992 or IEC 60927 compliant cabinets is supported with the optional Express Rack Mounting Slide Rail Kit (Tool-less - X8347A/8347A) or Rack Mounting Slide Rail Kit (X8348A/8348A) and optional Cable Management Arm (X8346A).

Bolt-On Slide Rail Kit:

The optional rack mounting slide rail kit (X8348A/8348A) is a 4-point mounted slide rail kit and is designed to enable Sun Fire X2270 server to be racked in the Sun Rack 938, Sun Rack 1038, Sun Rack 1042, Sun Rack II 1042, Sun Rack II 1242 and 3rd party ANSI/EIA 310-D-1992 or IEC 60927 compliant racks. No other kits will be available to allow 2 point, front-mount, nor mid-mount configuration. The slide kit will include hardware that enables mounting to any of the following types of rack rails:

- 6 mm threaded holes
- 5 mm threaded holes
- #10-32 threaded holes
- #1/4-20 threaded holes
- .281 (7.2 mm) clearance holes
- square unthreaded holes per EIA and IEC standards listed above utilizing the supplied M6 cage nuts

Express Slide Rail Kit:

The optional rack Express Rail slide rail kit (X8347A/8347A) is a 4-point mounted slide rail kit that mounts without the use of tools and is designed to enable Sun Fire X2270 server to be racked in the Sun Rack 938, Sun Rack 1038, Sun Rack 1042, Sun Rack II 1042, Sun Rack II 1242 and certain 3rd party ANSI/EIA 310-D-1992 or IEC 60927 compliant racks that utilize the supported mounting holes and have mounting rail thickness between .080 and .125 [2 - 3.2 mm].

- 6 mm threaded holes
- #1/4-20 threaded holes
- square unthreaded holes per EIA and IEC standards listed above

Rack Requirements:

- rack horizontal opening and unit vertical pitch conforming to ANSI/EIA 310-D-1992 and/or IEC 60927
- four-post structure (i.e. mounting at both front and rear)
- distance between front and rear mounting planes between 610mm and 915mm (24 to 36 inches)
- clearance depth (to front cabinet door) in front of front rack mounting plane at least 25.4mm (1 inch)
- clearance depth (to rear cabinet door) behind front rack mounting plane at least 800mm (31.5inches), or 700mm (27.5inches) without cable management arm
- clearance width (between structural supports, cable troughs, etc.) between front and rear mounting planes at least 456mm (18 inches)

Please note that not all 3rd party racks meet these parameters and are not compatible with these slide rail kits. Also,some third-party rack vendors do not support a completely filled rack with this type of server, due to the amount of power required.

The Express Rack Mounting Rail Kit (Tool-less) cannot be used to mount servers prior to shipment.

Rack Density

Sun Fire X2270 server rack density will vary widely based on systems installed, power distribution installation (in-cabinet, external) and power source (single-phase, three-phase).

Up to 38 Sun Fire X2270 can be mounted in the Sun Rack 938 or the Sun Rack 1038 or Sun Rack II 1038.

Up to 42 Sun Fire X2270 can be mounted in the Sun Rack 1042 or Sun Rack II 1042 using a 60A 3 phase MPS.

Sun Cluster Support

The support of Sun Fire X2270 server by Sun Cluster will be announced at a later date.

For the latest information, please go to: http://suncluster.sfbay.sun.com

Origin Statement

The Sun Fire X2270 server has components from various countries of origin. The motherboard and various board assemblies are manufactured in Shunde, China. The power supply is from China. The chassis is manufactured in Shunde, China. The commodity parts such as disk drivers, memory, and CPU come from a variety of countries. Final system assembly is performed in Schiphol, Netherlands or Fremont, California, USA.

Hardware Global compliance

Hardware Global compliance for this product complies with the guidelines as specified for hardware at: http://global.eng/compliance/i18nl10nbigrules.html

The localized documents will be located at: http://www.sun.com/products-n-solutions/hardware/docs/Servers/

Ordering Information

Sun Fire X2270 Server XATO Chassis Options

Part Number	Description	Availability
X2270-H1-AA	Sun Fire X2270 Server, XATO base chassis package including motherboard, 1 x PSU, No HDD, No Service Processor, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09

Power Cords

Due to regulatory requirements of other countries, Sun Fire X2270 server Standard Configurations and XATO Chassis options are required to bundle their power cord separately. These are shippable anywhere in the world.

Each Geography must select their specific Country Power cord kit as listed in table to be included with each system or chassis.

Part Number	Description
X311L	(US/Asia (except China) Localized power cord kit
X312E	(China) Localized power cord kit
X312L	(Continental Europe) Localized power cord kit
X314L	(Switzerland) Localized power cord kit
X317L	(U.K.) Localized power cord kit
X332A	(Taiwan) Localized power cord kit
X383L	(Danish) Localized power cord kit
X384L	(Italian) Localized power cord kit
X386L	(Australian) Localized power cord kit
X312F	(Argentina) Localized power cord kit
X312G	(Korean) Localized power cord kit

Sun Fire X2270 Server Compliant Options

The Sun(SM) Customer Ready Program part numbers are "Customer Ready Systems", and can be combined with other Sun and 3rd party products into customer-specific systems by the Sun(SM) Customer Ready Program.

These servers are identical to their Standard Configuration counterparts, but require Sun(SM) Customer Ready Program specific part numbers for factory integration.

The following part numbers are available as X- , XATO and Sun(SM) Customer Ready Program options as noted for the Sun Fire X2270 server.

X-Option	XATO	Customer Ready Program	Description	Notes
X8330A	8330A	8330A	2.26 GHz Quad-Core Intel Xeon L5520 with 8 MB Cache, 5.86 GT/s QPI, DDR3-1066, Turbo On, HT On, 60W, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8331A	8331A	8331A	2.00 GHz Quad-Core Intel Xeon E5504 with 4 MB Cache, 4.8 GT/s QPI, DDR3-800, Turbo Off, HT Off, 80W, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8332A	8332A	8332A	2.53 GHz Quad-Core Intel Xeon E5540 with 8 MB Cache, 5.86 GT/s QPI, DDR3-1066, Turbo On, HT On, 80W, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8333A	8333A	8333A	2.66 GHz Quad-Core Intel Xeon X5550 with 8 MB Cache, 6.4 GT/s QPI, DDR3-1333, Turbo On, HT On, 95W, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8334A	8334A	8334A	2.93 GHz Quad-Core Intel Xeon X5570 with 8 MB Cache, 6.4 GT/s QPI, DDR3-1333, Turbo On, HT On, 95W, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8335A	8335A	8335A	2 GB (1 x 2 GB DIMMs) DDR3-1066 Registered ECC Memory, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8336A	8336A	8336A	8 GB (1 x 8 GB DIMMs) DDR3-1066 Registered ECC Memory, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce TBD RR TBD GA TBD
X8337A	8337A	8337A	2 GB (1 x 2 GB DIMMs) DDR3-1333 Registered ECC Memory, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8338A	8338A	8338A	4 GB (1 x 4 GB DIMMs) DDR3-1333 Registered ECC Memory, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8353A	8353A	8353A	8 GB (1 x 8 GB DIMMs) DDR3-1333 Registered ECC Memory, for Sun Fire X2270 Server, RoHS-5 Compliant	Announce TBD

X-Option	XATO	Customer Ready Program	Description	Notes
				RR TBD GA TBD
XRA-ST1CR-500G7K	RA-ST1CR-500G7K	RA-ST1CR-500G7K	Hot-Pluggable 500GB 3.5" SATA 7,200 RPM disk drive with Coral bracket. RoHS-6 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
XRA-ST1CR-1T7K	RA-ST1CR-1T7K	RA-ST1CR-1T7K	Hot-Pluggable 1TB 3.5" SATA 7,200 RPM disk drive with Coral bracket. RoHS-6 Compliant	Announce 03/30/09 RR 03/30/09 GA 04/30/09
XRA-ST1CR-32G2SSD	RA-ST1CR-32G2SSD	RA-ST1CR-32G2SSD	Hot-Pluggable 32GB 3.5" SATA SSD disk drive with bracket, RoHS-6 Compliant	Announce 06/23/09 RR 06/23/09 GA 06/23/09
XRA-ST3C-24G2FMD	RA-ST3C-24G2FMD	RA-ST3C-24G2FMD	24GB SATA Enterprise Class Flash Module, RoHS-6 Compliant	Announce TBD RR TBD GA TBD
X8340A	8340A	8340A	Sun Integrated Lights Out Management (ILOM) Service Processor Module using AST2100 on a mezzanine card option for Sun Fire X2270 x64 server.	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8346A	-	-	Cable management arm	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8347A	-	8347A	Tool-less rack mounting slide rail kit	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8348A	-	8348A	Rack mounting slide rail kit	Announce 03/30/09 RR 03/30/09 GA 04/30/09
-	8343A	8343A	Solaris 10 pre-install image	Announce 03/30/09 RR 03/30/09 GA 04/30/09
-	8341A	8341A	Hot-Pluggable disk bay filler panel	Announce 03/30/09 RR 03/30/09 GA 04/30/09
X8350A	-	-	Media and Doc Kit	Announce 03/30/09

X-Option	XATO	Customer Ready Program	Description	Notes
				RR 03/30/09 GA 04/30/09
SG-XPCIE2SCSIU320Z	-	SG-PCIE2SCSIU320Z	Ultra320 SCSI 2-port host bus adapter	Announce 04/15/08 RR 04/02/08
SG-XPCIE1FC-QF4	-	SG-PCIE1FC-QF4	4Gb single-port FC-AL PCI-Express card	Announce 04/15/08 RR 04/02/08
SG-XPCIE2FC-QF4	-	SG-PCIE2FC-QF4	4Gb dual-port FC-AL PCI-Express card	Announce 04/15/08 RR 04/02/08
SG-XPCIE1FC-EM4	-	SG-PCIE1FC-EM4	4Gb single-port FC-AL PCI-Express card	Announce 04/15/08 RR 04/02/08
SG-XPCIE2FC-EM4	-	SG-PCIE2FC-EM4	4Gb dual-port FC-AL PCI-Express card	Announce 04/15/08 RR 04/02/08
X1236A-Z	-	1236A-Z	Dual-port 4x Infiniband host channel adapter	Announce 04/15/08 RR 04/02/08
X4217A-Z	-	4217A-Z	Dual-port 4x Infiniband host channel adapter (No Memory)	Announce 04/15/08 RR 04/02/08
X7280A-2	-	7280A-2	Dual Gigabit-Ethernet PCI-Express card (copper)	Announce 04/15/08 RR 04/02/08
X7281A-2	-	7281A-2	Dual Gigabit-Ethernet PCI-Express card (fiber)	Announce 04/15/08 RR 04/02/08
X4446A-Z	-	4446A-Z	Quad Gigabit-Ethernet PCI-Express card (copper)	Announce 04/15/08 RR 04/02/08
X1027A-Z	-	1027A-Z	10 Gigabit-Ethernet PCI-Express card	Announce 04/15/08 RR 04/02/08
X5558A	-	5558A	10 Gigabit-Ethernet short range Transceiver	Announce 04/15/08 RR 04/02/08
X5560A-Z	-	5560A-Z	10 Gigabit-Ethernet long range Transceiver	Announce 04/15/08 RR 04/02/08
X1106A-Z	-	1106A-Z	10 GbE 1-port SR Oplin (Intel)	Announce 04/15/08 RR 04/02/08
X1107A-Z	-	1107A-Z	10 GbE 2-Port SR Oplin (Intel)	Announce 04/15/08

X-Option	XATO	Customer Ready Program	Description	Notes
				RR 04/02/08

General Configuration Notes:

1. Single processor systems can be expanded with a second processor of the identical model/speed only, e.g. 1X Quad-Core Intel Xeon E5540 processor based system can only use another Quad-Core Intel Xeon E5540 processor; mixing with a different processor is not supported.

2. DIMM Population rules and best practices

- Do not populate any DIMM sockets next to an empty CPU socket. Each processor contains a separate memory controller.

- Each CPU can support a maximum of:

    * Six dual-rank (DR) or single-rank (SR) DIMMs;

- Populate DIMMs by location according to the following rules:

    * Populate the DIMM slots for each memory channel that are the farthest from the CPU first. For example, populate D5/D3/D1 first; then D4/D2/D0 second;

    * Populate SR, or DR DIMMs in sets of three for each CPU, one per memory channel.

- For maximum performance, apply the following rules:

    * The best performance is ensured by preserving symmetry. For example: adding 3x of same kind DIMMs, one per memory channel; and, if the server has two CPUs, ensuring that both CPUs have the same size of DIMMs populated in the same manner.

- In certain configurations, DIMMs will run slower than their individual maximum speed. DIMMs are available in two speeds: 1066 MHz and 1333 MHz

    * 2x of the same kind of DIMMs per channel = 1066 MHz (for single-rank and dual-rank DIMMs)

    * 1x of the same kind of DIMMs per channel = 1333 MHz (if using 1333 MHz DIMMs)1

    * 1x of the same kind of DIMMs per channel = 1066 MHz (if using 1066 MHz DIMMs)

- The system operates all memory only as fast as the slowest DIMM configuration.

3. The Media and Documenation kit is available as an X-option.

4. The Sun Fire X2270 configurations will have no pre-installed OS. User can select only Solaris 10 for OS pre-install. A HDD are required to add pre-installed OS.

Sun Fire X2270 Server PCIe Card Support by OS

For the latest information on PCIe card support, go to http://www.sun.com/X2270/optioncards.jsp

PCIe Card	Sun P/N	Max Config	S10	RHEL 4	SLES 10	Win 2003	VMware
Software RAID 0,1 (Only with Windows)	Onboard SATA controller	N/A	No	No	No	Yes	No
8-port External SAS HBA	SG-XPCIE8SAS-E-Z	1	Yes	Yes	Yes	Yes	Yes
Ultra320 SCSI 2-port HBA	SG-XPCIE2SCSIU320Z	1	Yes	Yes	Yes	Yes	Yes
4Gb Single-Port FC-AL	SG-XPCIE1FC-QF4	1	Yes	Yes	Yes	Yes	Yes
4Gb Dual-Port FC-AL	SG-XPCIE2FC-QF4	1	Yes	Yes	Yes	Yes	Yes
4Gb Single-Port FC-AL	SG-XPCIE1FC-EM4	1	Yes	Yes	Yes	Yes	Yes
4Gb Dual-Port FC-AL	SG-XPCIE2FC-EM4	1	Yes	Yes	Yes	Yes	Yes
Dual Port 4x Infiniband HBA	X1236A-Z	1	Yes	Yes	Yes	No	No
Dual Port 4x Infiniband HBA (No Memory)	X4217A-Z	1	Yes	Yes	Yes	No	No
10 GbE 1-port SR Oplin (Intel)	X1106A-Z	1	Post GA	Yes	Yes	Yes	Post GA
10 GbE 2-port SR Oplin (Intel)	X1107A-Z	1	Post GA	Yes	Yes	Yes	Post GA
Dual Gigabit-Ethernet (copper)	X7280A-2	1	Yes	Yes	Yes	Yes	Yes
Dual Gigabit-Ethernet (fiber)	X7281A-2	1	Yes	Yes	Yes	Yes	Yes
Quad Gigabit-Ethernet (copper)	X4446A-Z	1	Yes	Yes	Yes	Yes	Yes
10 Gigabit-Ethernet (fiber)	X1027A-Z	1	Yes	No	No	No	No
10 Gigabit Ethernet SR XFP Transceiver	X5558A	1	N/A	N/A	N/A	N/A	N/A
10 Gigabit Ethernet LR XFP Transceiver	X5560A	1	N/A	N/A	N/A	N/A	N/A

Sun Fire X2270 Storage Options

Workgroup Storage Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
Sun StorageTek 2540 FC Array	ST2540	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorageTek 2530 SAS Array	ST2530	SG-XPCIE8SAS-E-Z	SG-XPCIE8SAS-E-Z	SG-XPCIE8SAS-E-Z	SG-XPCIE8SAS-E-Z
Sun StorageTek 1400 SAS Array	ST1400	SG-XPCIE8SAS-E-Z, SGXPCIESAS-R-EXT-Z	SG-XPCIE8SAS-E-Z, SGXPCIESAS-R-EXT-Z	SG-XPCIE8SAS-E-Z, SGXPCIESAS-R-EXT-Z	SG-XPCIE8SAS-E-Z, SGXPCIESAS-R-EXT-Z
Sun StorEdge 3320 SCSI (RAID)	XTA3320	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
Sun StorEdge 3320 SCSI (JBOD)	XTA3320	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
Sun StorEdge 3510 FC Array (RAID)	XTA3510	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorEdge 3510 FC Array (JBOD)	XTA3510	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorEdge 3120 SCSI (JBOD)	XTA3120	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
Sun StorageTek 2510 iSCSI Array	ST2510	Ethernet	Ethernet	Ethernet	Ethernet

Midrange Storage Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
Sun StorageTek 6140	ST6140	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorageTek 6540	ST6540	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4

The ST9900 High End Data Center Storage System supports a wide variety of Sun servers based on SPARC, AMD Opteron and Intel Xeon processors. Please refer to your local Sun Storage Sales or SE Specialist, and have them refer to the following documents:

• "What Works With What" document located at SunWin Token 344150
• "Feature Availability Report" document located at SunWin Token 385413

Data Center Storage Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
Sun StorEdge 9985	SE9985	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorEdge 9990	SE9990	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorEdge 9970	SE9970	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorEdge 9980	SE9980	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4

NAS Storage Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
Sun StorageTek 5220	XTB5220	Ethernet	Ethernet	Ethernet	Ethernet
Sun StorageTek 5320	XTB5320	Ethernet	Ethernet	Ethernet	Ethernet

Sun Fire X2270 Tape and Applications

Standalone Tape Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
DAT 72 Desktop (SCSI)	SG-XTAPDAT72-D2	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
DAT 72 Desktop (USB)	DAT72-USB-DTOP-Z	USB	USB	USB	USB
DAT 72 1-RU HH Rackmount	SG-XTAPDAT72-R-2	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
LTO 2 HH Desktop (SCSI)	SG-XTAPLT02V-D	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
LTO 3 FH Desktop (SCSI)	SG-XTAPLT03-D-2	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
LTO 2 1-RU HDD Rackmount (SCSI)	SG-XTAPLT02V-R	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z

Standalone Tape Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
LTO 3 2U FH Rackmount (SCSI)	SG-XTAPLT03-R-Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
SDLT 320 Desktop (SCSI)	SG-XTAPSDLT320-D-Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
SDLT 600 Desktop (SCSI)	SG-XTAPSDLT600-D-Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
SDLT 600 2U FH Rackmount (SCSI)	SG-XTAPSDLT6-R-Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
DLT S4 Desktop (SCSI)	DLTS4-DTOP-SC-DR-Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
LTO 4 FH Desktop (SCSI & SAS)	LTO4-HP-SC-DTOP-Z, LTO4-HP-SAS-DTOP-Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z

Tape and library support varies by backup storage applications listed below. Please refer to your local Sun Storage Sales or SE Specialist, and have them refer to the "Library, Tape and Application" support matrix.

Tape Library Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
Autoloader C2 (2RU) SCSI	SG-XAUTO8LTO3-C2, SG-XAUTO16LTO3-C2, SG-XAUTO8LSDTO3-C2, SG-XAUTO16LSDTO3-C2	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
Tape Library C4 (4RU) SCSI & FC	SG-XLIBLTOS-C4, SG-XLIBSDLTS-C4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Autoloader SL24 SCSI & FC	SL24-IL3-SCSI-Z SL24-IL3-FC-Z SL24-IL2H-SCSI-Z	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Tape Library SL48 SCSI & FC	SL48-IL3-SCSI-Z SL48-IL3-FC-Z SL48-IL2H-SCSI-Z	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4

Tape Library Options	Sun SKU	S10	RHEL 4, 5	SLES 10	Win 2003
StorageTek SL500 SCSI	SL500-30-SCSI-Z, SL500-50-SCSI-Z	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
StorageTek SL500 FC	SL500-30-FC-Z, SL500-50-FC-Z	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
StorageTek L180 SCSI & FC	YSL-180-140-HV-STK, YSL-180-174-HV-STK, YSL-184-84-HV-STK	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE2SCSIU320Z, SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
StorageTek L1400 SCSI	SL1400MA-STK-Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z	SG-XPCIE2SCSIU320Z
StorageTek L1400 FC	SL1400-M1-STK-Z	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4
Sun StorageTek SL8500 FC	SL8500-BASE-LIB-Z	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4	SG-XPCIE1FC-QF4, SG-XPCIE2FC-QF4, SG-XPCIE1FC-EM4, SG-XPCIE2FC-EM4

Tape Backup Storage Applications	S10	RHEL 4, 5	SLES 10	Win 2003
Symantec (Veritas) NetBackup	Client Only	Client/Server 32-bit/64-bit	Client Only	Client/Server 32-bit
Sun EBS / EMC (Legato) Networker	Client/Server 64-bit	Client/Server 32-bit/64-bit	Client/Server 64-bit	Client/Server 32-bit/64-bit
CA BrightStor ARCserve	Not supported	Client/Server 32-bit/64-bit	Client/Server 64-bit	Client/Server 32-bit/64-bit
IBM TSM	Client/Server 32-bit/64-bit	Client/Server 32-bit/64-bit	Not supported	Client/Server 32-bit/64-bit
Symantec (Veritas) Backup Exec	Not supported	Not supported	Not supported	Client/Server 32-bit
HP DataProtector	Not supported	Client/Server 64-bit	Client/Server 64-bit	Client/Server 64-bit
BakBone NetVault	Client/Server 32-bit/64-bit	Client/Server 32-bit/64-bit	Client/Server 64-bit	Client/Server 32-bit/64-bit

Services

Warranty Support

The Sun Fire X2270 server has a one year warranty.

Duration:	1 Year
HW Coverage Hours:	Business Hours
HW Response Times:	Next Business Day
Delivery Method:	Parts Exchange or Onsite
HW Phone Coverage:	Business Hours
HW Phone Response Time:	8 Hours

Why the Warranty Isn't Enough

While computer system warranties provide business customers with some assurance of product quality, they do not provide many essential system services or operating system support. In addition, warranties provide default repair times and coverage hours which may not suit customer needs. It's just that a warranty and a Service Plan are two very different things with two very different objectives. Break/fix is no way to live - make sure your customers have Service Plan coverage on all their active Sun systems. For more information, go to: www.sun.com/comparewarranty

SunSpectrum Service Plans

SunSpectrum Service Plans provide integrated hardware and Solaris OS support for Sun systems as well as comprehensive storage system support. For each Sun system, customers can choose the service plan that best fits their needs. Customers benefit from lower SunSpectrum Instant Upgrade (SIU) pricing when purchasing support at time of system sale.
More information at: www.sun.com/service/support/sunspectrum

SunSpectrum Service Plan Highlights:
• Integrated whole-system support, *including the operating system*
• All the essentials for one great price
• Priority service
• No "per incident" limits
• Includes Solaris Operating System releases and updates
• Resources for proactive system management
• A choice of four simple plans
• Proven return on investment * [1]

*1 Based on Total Economic Impact Study by Forrester Research. This study is available at: sun.com/service/support/sunspectrum

SunSpectrum Service Plans

Features	Platinum Service Plan Mission-critical Systems	Gold Service Plan Business-critical Systems	Silver Service Plan Basic System Support	Bronze Service Plan Self-Maintenance Support
Telephone and Online Technical Support	24/7 Live transfer	24/7 Live transfer	8-8, M-F Live transfer	8-5, M-F 4hr response
One-stop Interoperability Assistance	Yes	Yes	No	No
Hardware Service Coverage	24/7 2hr On-site Service	8-8, M-F 4hr On-site Service	8-5, M-F 4hr On-site Service	Replacement parts 2nd business day
Solaris™ Releases	Yes	Yes	Yes	Yes
On-demand Solaris™ Updates	Yes	Yes	Yes	Yes
Online System Admin Resources	Yes	Yes	Yes	Yes
Support Notification Services	Yes	Yes	Yes	Yes
SunSpectrum℠ eLearning Library	Yes	Yes	Yes	Yes
System Health Check Subscription	Yes	No	No	No
Additional Services for Qualifying Sites	Customer sites meeting an annual SunSpectrum contract minimum (approximately $160,000 USD) can receive additional services including the creation of a personalized support plan, periodic support reviews, patch assessments and educational services. For local qualification criteria, visit sun.com/service/support/localinfo.html			

- Availability of specific features, coverage hours and response times may vary by location or product.
- Response times are determined by customer-defined priority. The response times shown are for service requests designated by the customer as "Priority 1."
- To receive the best support, Sun recommends that customers install Sun Net Connect software on SPARC®-based systems. This software creates a secure, customer-controlled link to the Sun Solution Center which helps enable expedited Solaris OS troubleshooting, remote diagnostics, and a number of customer-enabled alerting and reporting functions.

Warranty Upgrade to SunSpectrum Service Plan for Sun Fire X2270 Server

The following are part numbers and descriptions for the warranty upgrade to SunSpectrum Service Plan

Part Number	Description
IWU-X2270-1S	Sun Fire X2270 server upgrade to 1 year of Silver support
IWU-X2270-1G	Sun Fire X2270 server upgrade to 1 year of Gold support
IWU-X2270-24-1G	Sun Fire X2270 server upgrade to Gold support + 7X24 On-Site support for 1 year
IWU-X2270-1P	Sun Fire X2270 server upgrade to 1 year of Platinum support
IWU-X2270-2S	Sun Fire X2270 server upgrade to 2 years of Silver support

IWU-X2270-2G	Sun Fire X2270 server upgrade to 2 years of Gold support
IWU-X2270-24-2G	Sun Fire X2270 server upgrade to Gold support + 7X24 On-Site support for 2 years
IWU-X2270-2P	Sun Fire X2270 server upgrade to 2 years of Platinum support
IWU-X2270-3S	Sun Fire X2270 server upgrade to 3 years of Silver support
IWU-X2270-3G	Sun Fire X2270 server upgrade to 3 years of Gold support
IWU-X2270-24-3G	Sun Fire X2270 server upgrade to Gold support + 7X24 On-Site support for 3 years
IWU-X2270-3P	Sun Fire X2270 server upgrade to 3 years of Platinum support

Warranty Upgrade to Sun HW Only Service for Sun Fire X2270 Server

Part Number	Description
IWU-X2270-SD-1H	Sun Fire X2270 server upgrade to 1 year of same day hardware only support
IWU-X2270-SD-2H	Sun Fire X2270 server upgrade to 2 years of same day hardware only support
IWU-X2270-SD-3H	Sun Fire X2270 server upgrade to 3 years of same day hardware only support
IWU-X2270-24-1H	Sun Fire X2270 server upgrade to 1 year of 7x24 hardware only support with 4 hour response
IWU-X2270-24-2H	Sun Fire X2270 server upgrade to 2 years of 7x24 hardware only support with 4 hour response
IWU-X2270-24-3H	Sun Fire X2270 server upgrade to 3 years of 7x24 hardware only support with 4 hour response
IWU-X2270-22-1H	Sun Fire X2270 server upgrade to 1 year of 7x24 hardware only support with 2 hour response
IWU-X2270-22-2H	Sun Fire X2270 server upgrade to 2 years of 7x24 hardware only support with 2 hour response
IWU-X2270-22-3H	Sun Fire X2270 server upgrade to 3 years of 7x24 hardware only support with 2 hour response

Installation Service for Sun Fire X2270 Server

Sun's exceptional support for server installation is also available for the Sun Fire X2270 server. This service can be purchased at the time of the server sale. Use the following part numbers to order the installation service.

Part Number	Description
EIS-2WYWGS-E	Install 2-way Workgroup Server
EIS-2WYWGS-E-AH	Install 2-way Workgroup Server-AH
EIS-2WYWGS-5-E	Install 5 2-way Workgroup Servers
EIS-2WYWGS-5-E-AH	Install 5 2-way Workgroup Servers-AH
EIS-2WYWGS-10-E	Install 10 2-way Workgroup Servers
EIS-2WYWGS-10-E-AH	Install 10 2-way Workgroup Servers-AH

For additional information about the server installation service see:

http://www.sun.com/service/support/install/entrylevel-server.html

Learning Services

Sun offers a wide range of expert training services, from consulting to courseware to certification, to improve expertise and accelerate productivity, to help enable maximum uptime for IT environments, & to provide lower total cost of ownership for technology investments.

All of these courses are available at:

https://slp.sun.com/sun

https://slp.sun.com/partners

HPC Quick Start Services

Sun provides a suite of services to help customers architect, deploy and manage their High Performance Computing (HPC) environments for faster time to deployment and with reduced risk. Our expertise includes installation, integration, training, and ongoing support of network connections, software stacks, and thousands of cores in a large-scale, high-density environment. More info.: http://sun.com/service/hpc

Sun HPC Quick Start Services

Sun HPC Quick Start Services — Implement

Speed design, and implementation of your HPC solution

- Reduce deployment time by up to 80%
- Prepare infrastructure for business
- Reduce risk
- Control & reduce cost

- **Key Included Services**
  - > Application Readiness Services (PS)
  - > Installation Services (EIS)
  - > Integrated Services for x4500, x4600, 8000, & 8000p servers (System Packs)
  - > Professional Services for your specific configuration & migration needs (PS)

Sun HPC Quick Start Services — Optimize

Accelerate the time to optimize and manage HPC solutions

- Speed time to achieve performance goals & improvement
- Reduce risk & cost
- Maximize IT assets

- **Key Included Services**
  - > Managed Services (MS)
  - > Performance analysis and tuning to business needs (PS)
  - > Professional Services (PS)
  - > Proactive & continued infrastructure monitoring (Mgd Ops)
  - > Control Tower Appliance included (Mgd Ops)
  - > Incident Response Services (Mgd Ops)

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Connected Services

Provision new systems. Manage updates and configuration changes with Sun Connection, the Solaris and Linux life cycle management tool.

http://www.sun.com/service/sunconnection/index.jsp

Glossary

1-RU or RU	One rack unit as defined by the Electronic Industries Alliances (EIA). A vertical measurement equal to 1.75 inches.
ATA	AT-Attachment. A type of hardware interface widely used to connect hard disks, CD-ROMs and tape drives to a PC.
ChipKill^T	ChipKill, or advanced ECC memory, is an IBM xSeries memory subsystem technology that increases memory reliability several times over, helping to reduce the chances of system downtime caused by memory failures.
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.
FRU	Field Replaceable Unit.
Hot-pluggable	A feature that allows an administrator to remove a 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.
EIDE	See ATA.
IKE	Internet Key Exchange. A method for establishing a security association that authenticates users, negotiates the encryption method and exchanges the secret key. IKE is used in the IPSec protocol.
I/O	Input/output. Transferring data between the CPU and any peripherals.
IPSec	IP Security. A security protocol from the IETF (Internet Engineering Task Force) that provides authentication and encryption over the Internet. Unlike SSL, which provides services at layer 4 and secures two applications, IPSec works at layer 3 and secures everything in the network.
IPMI	Intelligent Platform Management Interface. System management architecture for providing an industry-standard interface and methodology for system management.
L2 cache	Also referred to as Ecache or External Cache. A memory cache external to the CPU chip.

MTBF	Mean Time Between Failures. The average time a component works without failure.
RAM	Random Access Memory.
SAS	Serial Attached SCSI. A serial hardware interface that allows the connection of up to 128 devices and point-to-point data transfer speeds up to 3 Gbits/sec.
SATA	Serial Attached ATA. The resulting evolution of the ATA (IDE) interface from a parallel to a serial and from a master-slave to a point-to-point architecture with data transfer speeds up to 1.5 Gb/s.
SCSI	Small Computer Systems Interface. Pronounced "scuzzy." An ANSI standard hardware interface that allows the connection of up to 15 peripheral devices to a single bus.
SNMP	Simple Network Management Protocol. A set of protocols for managing complex networks. The first versions of SNMP were developed in the early 80s. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.
x86	Refers to the Intel 8086 family of microprocessor chips as well as compatible microprocessor chips made by Intel and others.

Materials Abstract

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

Collateral	Audience	Purpose	SunWIN Token #
Sales Tools			
• *Sun Fire X2270 Server Datasheet*	Customer	Sales Tool, Training	555879
• *Sun Fire X2270 Server Just the Facts*	Sales, SEs, Partners	Sales Tool, Training	557203
• *Sun Fire X2270 Server Customer Presentation*	Sales, SEs, Partners, Customer	Sales Tool, Training	547935
• *Sun Fire X2270 Server Technical Presentation*	Customer Presentation	Sales Tool, Training	557216
• *Sun Fire X2270 Server Sales Presentation*	Sales, SEs, Partners	Training	557497
• *Sun Fire X2270 Server Technical Whitepaper*	Sales, SEs, Partners, Customer	Sales Tool, Training	557215
• *Sun Fire X2270 Server Reviewer's Guide*	Customer	Sales Tool, Training	xxxxxx
External Web Sites			
• *Sun Fire X2270 Server Web Site*	http://www.sun.com/servers/x64/X2270		
Internal Web Sites			
• *Sun Fire X2270 Server Internal Web Site - MySales*	http://mysales.central.sun.com/public/systems/volume/X2270		
Reseller Web Site			
• *Sun Reseller General Information*	http://TBD		

Competitive Information

Positioning Sun Fire X2270 server

Elevator Pitch

The Sun Fire X2270 server is the best 1-RU 2-socket entry class x64 server in terms of performance, density and energy efficiency that runs Solaris, Linux, Windows and VMware.

Value Proposition

• Sun Fire X2270 can run a broad range of Solaris, Linux, Windows and VMware applications more efficiently and more quickly.

• Sun Fire X2270 has more memory capacity, internal storage and integrated flash module connectivity than other systems in the same class, leaving more headroom to grow overall.

• Sun Fire X2270 is energy efficient, consuming less power, requires less cooling ,and reduces negative impact to the environment.

• Sun Fire X2270 offers the Sun Integrated Lights Out Manager for system management and monitoring as an option.

• Sun Fire Xeon-based x64 servers run the gamut from 2-socket servers to the data-center class Sun Fire X4270 server to serve customer needs in nearly every x64 area. The Sun Fire X2270 in combination with these many servers can give customers both in-server and overall competitive advantage like less expensive storage, faster performance, etc...

• Sun Fire X2270 can accommodate both current and future Intel Xeon processors along with the low wattage 60W Xeon processors.

• Sun Fire X2270 density and expandability advantages allow customers to increase rack throughput and save valuable real estate compared to IBM, HP and Dell offerings.

Key Differentiators

• Highly expandable with more memory, internal storage and I/O within the same chassis compared to other systems. Sun Fire systems also enjoy better TCO with iLOM and Solaris x86 bundled. Competitors pay extra for these components.

    • 12 memory DIMM slots (96GB of memory with 8GB DIMMs), 6 DIMM slots per Socket

    • 4 internal disk drives (4 TB of internal storage) – 1-RU

    • 2 Flash modules

• Extreme I/O capabilities with 1 PCIe 2.0 slot within the 1-RU

• Integrated Lights Out Manager is Optional

• Solaris x86 bundled (no extra cost for virtualization and OS)

Sun Fire X2270 Server Primary Applications

- HPC/Grid Computing
- EDA
- MCAE
- Financial Modeling
- Web Server (Low End)
- IT Infrastructure (Security, DNS, Proxy, Caching, Firewall, Gateway)
- Messaging/Collaboration
- File/Print

Competitive Positioning – Sun Fire X2270

HP competitive offerings

HP DL160 G5p	The Sun Fire X2270 server has multiple strengths to offer, which one is the memory capacity can reach up to 96 GB. It can handle up to 4 HDDs within a 1-RU form factor. On the eco friendly side, the X2270 power supplies uses less power at only 600 W.
	However, the DL160 G5p server only offer up to 64 GB of memory max. Additionally, the DL160 G5p uses a higher rated power supply at 650 W.

HP touts the fact that it sells high energy efficient servers.

HP offers Eco-friendly products and services to help customers manage their power consumption of their data centers. With each product HP also provides documentation for use by end-of-life recyclers or treatment facilities. It provides the basic instructions for the disassembly of HP products to remove components and materials requiring selective treatment, as defined by EU directive 202/96/EC, Waste Electrical and Electronic Equipment (WEE).

HP sells the fact that their ProLiant systems are specifically designed for dense server environments by including lights-out technology for reduced reactive support time, fault resilient technologies for reduced downtime, and balanced performance architectures to handle greater transaction. workloads for various applications.

Pushes the fact that they have a broad choice of solutions for customers; Broad range of server & storage with related software & services.

Low cost through factory integrated pre-configured systems: bundled solutions to drive a higher revenue stream and lower-cost solution to users.

Highlights manageability as a strength of HP x86 based systems with iLO.

Promote their best-of breed capabilities with industry partners and the fact with these partnerships HP is able to drive innovation to deliver total solution with less R&D cost.

Claims that HP has the largest breathe of Opteron Products.

IBM competitive offerings

IBM x3450	The Sun Fire X2270 server has multiple strengths to offer, which one is the memory capacity can reach up to 96 GB. It can handle up to 4 HDDs within a 1-RU form factor. On the eco friendly side, the X2270 power supply uses less power at only 600 W.
	On the other hand, the x3450 servers only offer up to 64 GB of memory max with only half of the storage HDD slots available compared to the X2270. The Sun Fire X2270 has numerous expandability advantages like more DIMM slots and more hard disk spindles.

IBM will paint Sun as an Opteron only provider with an inadequate Xeon line. They will co-market with Microsoft and Red Hat. IBM sells at higher levels in a corporation, at times above a CIO. IBM will lose money on System x hardware when bundling with IBM middleware, storage, services or financing. IBM will sell its ability to deliver models to customers faster. IBM will use periodic web/hard drive/memory promotions to gain business. IBM will push its qualification matrix (more versions of OSes, more EMC storage, etc...) to its advantage in certain deals. IBM will use its better/longer/more-in-depth expertise in Windows/VMware to advantage to position Sun as a one dimension x86 player.

Competitive Positioning – Sun Fire X2270

IBM will also try to position Sun Microsystems as lacking and adequate blades solution without internal switches. IBM may attempt to convert standalone rack customers to its blade solution using lower cable or lower overall power arguments.

Dell competitive offerings

Dell PE 1950 III	The Sun Fire X2270 server has multiple strengths to offer, which one is the memory capacity can reach up to 96 GB. It can handle up to 4 HDDs within a 1-RU form factor.
	Then again, the PE 1950 III server only offer up to 64 GB of memory max with only half of the storage HDD slots available compared to the X2270.

Dell will always sell on price especially in the lower end units as this area is more price sensitive. Dell is looked at being more of a short-term investment with a higher TCO. Dell is not considered a leader in regards to support for integration and services. The PE 1950 III is also used in clustering for HPC applications due to the high number of flops. Specifically, Dell uses the PE 1950 III in a cluster configuration and again the same issues listed above are prevelant. The Dell deals in the HPC market are more on the public sector (education/healthcare/government) side or where price is the issue and they do provide excellent support for Dell products.

Competitive Landscape – Sun Fire X2270

Attribute	Sun Fire X2270	HP DL160 G5p	Dell PE 1950 III	IBM x3450
Form Factor	1-RU	1-RU	1-RU	1-RU
Processor	Intel Quad Core	Intel Quad Core	Intel Quad Core	Intel Quad Core
Socket	2-socket	2-socket	2-socket	2-socket
Memory	**12 DIMMs (96 GB max)**	16 DIMMs (64 GB max)	8 DIMMs (64 GB max)	16 DIMMs (64 GB max)
Disk Drives	**4x 3.5" SATA**	4x 3.5" SAS/SATA	2x 3.5" SAS/SATA	2x 3.5" SAS
RAID	**RAID 0,1**	RAID 0,1	RAID 0,1	RAID 0,1
GigE Ports	**2**	2	2	2
I/O Slots	**1x PCIe 2.0**	1x PCIe 2.0	2x PCIe	1x PCIe 2.0
PSU	**600 W**	650 W	2x 670 W	600 W
Management	ILOM (Optional)	iLO2	IPMI 2.0 (add-on option)	IPMI 2.0 (add-on option)
Warranty	1 Yr NBD	1 Yr NBD	1 Yr NBD	1 Yr NBD

How to Beat Your Competition

Visit http://competitive.central (or MySales > Systems > Competitive) for a broad range of tools available to counter competitive claims.

Engage the SSC War room for competitive deal support, sscwarrom@sun.com, x86484