Sun Fire X2250 Server
Just the Facts

SunWIN Token # 535317

Author: Brian Huynh (Product Manager)

Reviewers:

David Dalrymple, Matthew Koeher, Mary Matyak, Arvie Martin, Jr., Pierre Reynes, Ron Graham, Michelle Clopton

Table of Contents - Sun Fire X2250 Server Just the Facts

Please read these documents before reading Sun Fire X2250 Server Just the Facts

Title	URL, Sunwin Token #, or Document #
Sun Fire X2250 Server FAQ	https://cetwo.sfbay.sun.com/display/Onestop/Sun Fire X2250 Server+FAQ
Sun Fire X2250 Server Onestop Page	https://onestop-stage.sfbay.sun.com/hw/Sun Fire X2250 Server/index.shtml
Sun Fire X2250 Server – Architecture White Paper	535319
Sun Fire X2250 Server – Product Data Sheet	535318
Sun Fire X2250 Server – Customer Presentation	535320
Sun Fire X2250 Server – Technical Presentation	535321
Sun Fire X2250 Server – Reviewer's Guide	TBD
Sun Fire X2250 Server – Benchmark Results	http://www.sun.com/servers/x64/x2250/benchmarks.jsp
Sun Fire X2250 Server – Just the Facts	535317
Sun Fire X2200 Server – Just the Facts	478548
Sun Fire X4150 Server – Just the Facts	508674
Solutions Brief for EDA	429802
Solutions Brief for MCAE	429805
Solutions Brief for MCAD	450625
Success Stories	http://www.sun.com/x64/success-stories/http://www.sun.com/servers/hpc/index.jsp
Sun Fire X2250 Server Service Manual	http://docs.sun.com (Document #820-4593-10)
Sun Fire X2250 Server Installation Guide	http://docs.sun.com (Document #820-4591-10)
Sun Fire X2250 Server Product Notes	http://docs.sun.com (Document #820-4594-10)
Sun Fire X2250 Server OS Installation Guide (Windows, Linux, Solaris)	http://docs.sun.com (Document #820-4592-10)
Sun Fire X2250 Server – Safety and Compliance Guide	http://docs.sun.com (Document #820-4595-10)
Sun Fire X2250 Server – ILOM Supplement	http://docs.sun.com (Document #820-4596-10)
Sun ILOM 2.0 User's Guide	http://docs.sun.com (Document #820-1188-11)
Addendum to the ILOM 2.0 User's Guide	http://docs.sun.com (Document #820-4198-10)
Sun Installation Assistant (SIA) for Windows and Linux	http://docs.sun.com (Document #820-3357-TBD)
Where to Find Sun Fire X2250 Server Documentation	http://docs.sun.com (Document #820-4590-10)

Introduction

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.

Figure 1 – Angled view of Sun Fire X2250 Server

Sun Fire X2250 Server demonstrates Sun's commitment in delivering one of the most compelling entry-level HPC 1U rack-mount server in the industry. Designed to benefit companies with massively parallel technical computing workloads, Sun Fire X2250 Server offers a powerful compute node at a starting price under $1,500 USD. Sun Fire X2250 Server is an entry-level (no redundant PSU & fans) 2-socket server from Sun based on Intel's "Stoakley" platform (the only platform from Intel supporting 1600Mhz FSB processors and 800Mhz FBDIMMs). Within a 1U form-factor, Sun Fire X2250 Server supports leading operating systems and applications, the fastest processor speed grades available, and the fastest memory available. Above all, Sun Fire X2250 Server 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 X2250 Server is inherently a server worthy to be placed in the critical path of mission-critical projects.

Figure 2 – Photo of Sun Fire X2250 Server installed in a rack

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 SPEC processor2006 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. Last, IT managers supporting web infrastructure companies values 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 Table 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

Wall Street Financial Services Firms must balance multiple objectives: maximize return, mitigate risk, improve performance and increase agility. Financial services companies have an insatiable need for processor performance and more importantly, precision, to performance daily task such as risk portfolio analysis, simulations, and financial modeling. 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. For example, pricing 150,000 equity options are massively parallel mathematical computing problems for which servers are peculiarly equipped. Another aspect is precision and integrity, both the processor and memory level. These customers demand single-precision and double-precision calculations from the processors and ECC memory 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, 800MHz 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.

Table 1 - Target Markets and Customers of Sun Fire X2250 Server

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 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	Performance 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
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	Price-sensitive Low power, high performance servers Real-time encryption and decryption to secure e-commerce & protect private or classified data.

Sun Fire X2250 Server Non-Goals

It is important to point out certain workloads and processors Sun Fire X2250 Server was not designed to target.

- Sun Fire X2250 Server was not designed for consolidation due to its eight DIMM slots (maximum memory capacity of 32GB) and two drive bays (maximum local storage of 2TB).
- Sun Fire X2250 Server was not designed for virtualization due to its modest I/O capabilities (two on-board Gigabit Ethernet ports, one PCIe x16 slot) and SATA-only local storage (VM Ware requires SAS local hard drives).
- Sun Fire X2250 Server was not designed for high-availability due to its single power supply and lack of redundant fans

These aforementioned workloads are best suited for the Sun Fire X4150 Server, a 1RU server with 16 DIMM slots, eight drive bays, four on-board Gigabit Ethernet ports, three PCIe x16 slots (all x8 electrical), SAS local storage, and redundant power supplies. If you're looking for maximum compute density, leading storage capacity, and networking connectivity in a single rack unit, the Sun Fire X4150 Server meet or exceeds these requirements.

- Sun Fire X2250 Server was not design to accept the Intel Xeon Processor 5300-series ("Tigerton") and Intel Xeon Processor 5100-series ("Woodcrest")

Although the Intel 5400 Chipset used on Sun Fire X2250 Server is compatible with the Xeon 5300 processor series and Intel Xeon 5100 processor series, Sun Fire X2250 Server does not support these processors. Please do not install these processors into Sun Fire X2250 Server.

Features

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 high-performance 1600MHz FSB, 12MB L2 cache, quad-core Intel Xeon processor 5400 series (previously code-named "Harpertown"), the dual-core Intel Xeon processor 5200 Series (previously code-named "Wolfdale-DP"), Intel 5400 Chipset (previously code-named "Seaburg") with 24MB snoop cache filter and 800MHz FBDIMMs, were selected to benefit customers deploying technical compute (HPC) servers. Technologies such as 50W Xeon 5400-processors (previously code-named "Harpertown LV") were selected to benefit customers deploying mainstream (Web) servers. Equally important, resellers have asked for configuration flexibility from Sun and we listened. The majority of Sun Fire X2250 Server's PTO configurations were minimally configured for resellers to add more memory, hard disk drives, 2nd processor. Another aspect of Sun Fire X2250 Server 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. Sun Fire X2250 Server has a feature set as described in Table 2.

Table 2 – Feature Summary of Sun Fire X2250 Server

Features	Sun Fire X2250 Server
Form-Factor (H x W x D)	1RU 44.0 mm (1.75 inches) x 425.5 mm (16.8 inches) x 633.7mm (25.40 in)
Weight	13.3 kilograms (27.2 pounds): 2 HDDs, 2 processors, 8 DIMMs, add-in card, DVD installed 9.8 kilograms (21.7 pounds): No HDD, 1 processor, 2 DIMMs, no add-in card, no DVD
Processor	Intel Xeon processor 5400 series (45nm Quad Core) Intel processor 5200 series (45nm Dual Core)
Number of Sockets	Two
Processor Models	1600MHz FSB X5482 (Quad Core 3.20GHz, 1600MHz FSB, 120W) E5472 (Quad Core 3.00GHz, 1600MHz FSB, 80W) X5472 (Quad Core 3.00GHz, 1600MHz FSB, 120W) E5462 (Quad Core 2.8GHz, 1600MHz FSB, 80W) X5272 (Dual Core 3.40Hz, 1600MHz FSB, 80W) 1333MHz FSB X5460 (Quad Core 3.16GHz, 1333MHz FSB, 120W) E5405 (Quad Core 2.00GHz, 1333MHz FSB, 80W) L5420 (Quad Core 2.50GHz, 1333MHz FSB, 50W)
Front Side Bus	1600MHz FSB and 1333MH
Chipset	Intel 5400 Chipset (previously code-named "Seaburg")
Memory	Fully-Buffered DIMMs 8 DIMM slots total per system 32GB maximum Two DIMM sizes at 800MHz: 2x4GB, 2x2GB Two DIMM sizes at 667MHz: 2x4GB, 2x2GB
PCI Express Slots	One 16-lane half- length, low-profile slot (PCIe 1.0. 8GBps)
Graphics Controller	2D graphics controller embedded in service processor Support remote console at resolution up to 1600x1200x16bits@60Hz
Hard Disk Drives	Up to two hot-plug SATA drives, 2TB maximum: 250GB, 500GB, 1TB (7,200-rpm)
Optical Disk Drive	Tray-loading, slim DVD-ROM or DVD Burner
Networking	Two Gigabit Ethernet ports integrated on motherboard.
Serial Port	One TIA/EIA-232-F asynchronous RJ45 Port (rear)
USB ports	Five USB 2.0 ports - two front, two rear, one internal
Service Processor	ASPEED AST2000 (IPMI 1.5/2.0 compliant Service Processor with Integrated Lights Out Management offering remote power, KVM, and media capability)
Power Supply	500W (Non-redundant 80% efficiency)
Operating Systems Validated by Sun	Red Hat Enterprise Linux 4 & 5 AS (Advanced Server) SuSe Linux Enterprise Server 10 windows server 2003/2008 x64 Standard & Enterprise Solaris 10 – 8/07 (aka Update 5) or later No VM Ware ESX Server 3.5
Warranty	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site
Price Range	$1,499 to $3,499 (USD)

Value Propositions

The selection of components inside Sun Fire X2250 Server and the value-add activities, i.e. factory-integration, ISV certification, driver optimization, and support, were focused, above all else, to benefit HPC customers and web service providers. Examples of value propositions for each market segment are described in the following paragraphs.

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

Sun Fire X2250 Server has a large, fast, and reliable memory footprint.   Based on 800MHz FBDIMMs, Sun Fire X2250 Server delivers a maximum memory bandwidth of 25.6GB per second. Sun Fire X2250 Server 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 32GB memory capacity of Sun Fire X2250 Server 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 800MHz FBDIMMs, a feature found only on Sun Fire X2250 Server, among Sun's server offerings. Analyzing genetic sequence are computational-demanding jobs suited for 1600MHz FSB-version of the Xeon processor 5400 series and 5200 series, another feature found only Sun Fire X2250 Server, among Sun's portfolio of servers. Additionally, rigorous testing with SuSE Linux Enterprise Server 10 ("SLES 10") and Red Hat Enterprise Server 4 &5 ("RHEL 4 & 5") ensures Sun Fire X2250 Server 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 1600MHz FSB-version of Xeon 5400 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 X2250 Server help reduce their dependence on physical prototypes. 1600MHz FSB, 20% faster than previous version of 1333 MHz FSB, provides the connection between each processor and the Intel 5400 Chipset ("Seaburg"). Another feature found on Sun Fire X2250 Server is the 24MB snoop cache filter found on the Intel 5400 Chipset. Besides reducing snoop traffic, the 24MB snoop cache filter allows for more efficient cache indexing and extracts more bandwidth over the same FBDIMMs. Also, the Intel 5400 processor has a faster 4-bit divider (Radix-16) instead of 2-bit divider found on other version of Xeon processors. This 4-bit divider (Radix-16) accelerates scientific computations, 3D transformations and other math-intensive functions such as square root often used in HPC. Last, Sun Fire X2250 Server will have a PCI Express 1.0 16-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)

The 1600MHz FSB-version of Harpertown and 800MHz FBDIMMs on Sun Fire X2250 Server satisfy the insatiable needs of financial services companies for processor performance to do daily task such as risk portfolio analysis, simulations, and financial modeling.   More importantly, the interoperability of Sun Fire X2250 Server with third-party GPU-computing external solutions such as NVIDIA Tesla provides the precision and precision required by financial services companies to recalculate pricing for millions of equity option daily.   These values of Sun Fire X2250 Server allow financial services companies to concentrate on what they do best—maximize returns, mitigate risk, improve performance—instead of worrying about computing resources.

Deploy With Confidence (Market Segment: Web Service Providers)

Sun Fire X2250 Server has been designed to help IT organizations support their environment. Sun Fire X2250 Server 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 X2250 Server, 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 X2250 Server supports Solaris 10, Red Hat Enterprise Linux , SUSE Linux Enterprise Server, and Microsoft windows server 2003/2008 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) of Sun Fire X2250 Server is five days or less. Factory lead time for Assemble to Order (ATO) and X-Options of Sun Fire X2250 Server is seven 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 NTE list price (U.S.) under $1,500, Sun Fire X2250 Server competes head-to-head with any 2-socket entry-level servers based on the Stoakley platform. With price points similar to 2U rack-mount servers based on the Intel Xeon processor 5400 series or 5200 series, Sun Fire X2250 Server effectively replaces any competing servers. Every Sun Fire X2250 Server 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 X2250 Server.

Last, Sun Fire X2250 Server is economical to operate. Featuring the "Harpertown LV", each processor dissipates 50W (TDP). That is only 12.5W per core and 35% lower than standard 80 W parts (or 60% lower than 120W parts). These capabilities add up to higher performance, lower power consumption, and better energy efficiency, making Sun Fire X2250 Server ideal for highly dense,power-sensitive environments

System Architecture

Sun Fire X2250 Server is Sun's first and only rack-mount server based on Intel's Stoakley platform, targeted toward HPC customers and mainstream server customers. Featuring the quad-core Intel Xeon Processor 5400-series and dual-core Intel Xeon Processor 5200-series, Sun Fire X2250 Server retains the familiar, highly integrated, system architecture as the Sun Fire X2200 M2 Server, while improving key features such as performance, memory, I/O, and power density. Compared to the Sun Fire X2200 M2 Server, has higher overall performance (via the Enhanced Intel Core Architecture, 12MB L2 cache, 24MB snoop filter cache), memory bandwidth (via 800MHz Fully-Buffered DIMMs), and dissipates lower power with a 50W version of the processor.   However, the Sun Fire X2200 M2 does exceed Sun Fire X2250 Server in some areas. Please see Table 28 for a side-by-side comparison of Sun Fire X2250 Server versus the Sun Fire X2200 M2 Server.
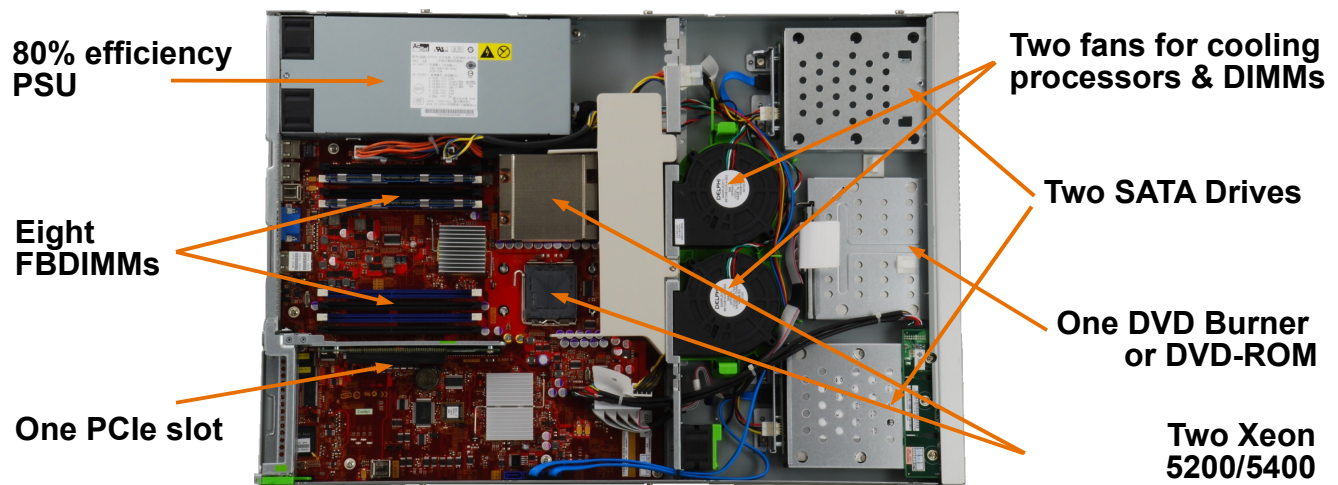
Figure 3 – Internal View of Sun Fire X2250 Server.

Figure 4 shows the block diagram of Sun Fire X2250 Server. The Intel Xeon 5400 Processor ("Harpertown") or 5200 Processor ("Wolfdale-DP") are connected to the Intel 5400 Chipset ("Seaburg" North Bridge). Seaburg North Bridge and ESB2 South Bridge provide the memory controller, as well as bridging interfaces, such as PCI Express, gigabit Ethernet, SATA, and USB, to the Intel Xeon processor 5400 series & Intel Xeon processor 5200 series. These three highly integrated components (processor, Seaburg, ESB2) drive the system architecture of Sun Fire X2250 Server.
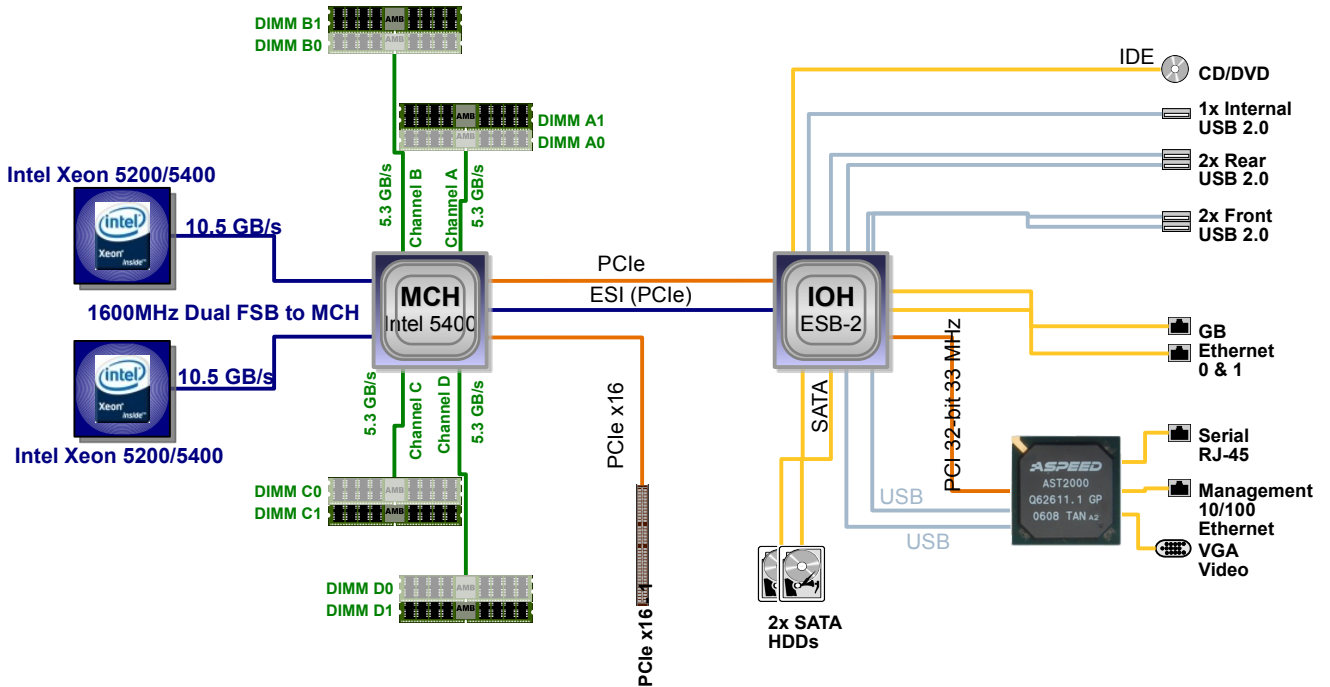
Figure 4 – Block Diagram of Sun Fire X2250 Server

The Intel Xeon Processor 5400 series & 5200 series

Sun Fire X2250 Server is powered by the quad-core Intel Xeon processor 5400 series (previously code-named "Harpertown") or the dual-core Intel Xeon processor 5200 Series (previously code-named "Wolfdale-DP"), Intel's 45nm processors, designed for technical compute servers (HPC) and mainstream enterprise servers. The Intel Xeon processor 5400 series has four key enhancements over Intel Xeon processor 5300 series (previously code-named "Clovertown") originally offered on the Sun Fire X4150 Server: 1) It is based on a 45nm process, whereas the Intel Xeon processor 5300 series is based on 65nm, 2) It supports 1600MHz FSB, where as the Intel Xeon processor 5300 series supports only 1333 MHz FSB, 3) it is based on the Enhanced Intel Core Micro-architecture (previously code-named "Penryn") with faster divider, new SSE4 instructions, and a new engine to improve existing SSE2 & SSE3 instructions), 4) it has a 12MB L2 cache, where as the Intel Xeon processor 5300 series has only 8MB L2 cache, 5) it has been designed to work only with the Intel 5400 Chipset, where as the Intel Xeon processor 5300 series has been designed to work only with the Intel 5000P Chipset. "Chipsets" serves a crucial function in computing platforms. The Intel 5400 Chipset supports faster memory, FSB, snoop filter, I/O, compared to the Intel 5000P Chipset. The next chapter will describe the Intel 5400 Chipset in more detail.

Why Dual-Core at All?

The dual-core Intel Xeon Processor 5200-series is a good value proposition to customers looking for highest performance per core, instead of performance per processor socket. For example, the dual core model X5272 (3.40Hz, 1600MHz FSB) outperform the quad-core model X5472 (3.0GHz, 1600MHz FSB), due to its 400MHz advantage. Another reason is software licensing policy. Customers with ISVs who licenses software, per core, instead of per processor socket, will find good fit due to the granularity of the dual-core Intel Xeon Processor 5200-series
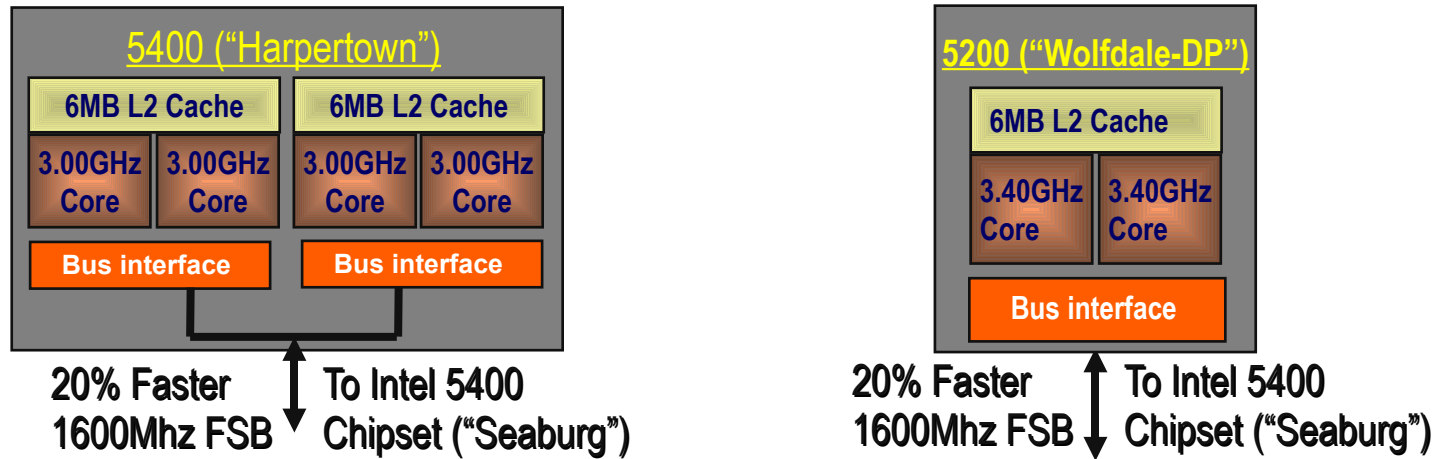
Figure 5 – Block Diagram of the Intel Xeon processor 5400 series and Intel Xeon processor 5200 series

Table 3 shows the key features and benefits of the Intel Xeon processor 5400 series & Intel Xeon processor 5200 series. For more details, including block diagrams and specifications, please visit http://download.intel.com/products/processor/xeon/dc54kprodbrief.pdf

Table 3 - Features and Benefits of the quad-core Intel Xeon processor 5400 series & dual-core Intel Xeon processor 5200 series

Feature	Benefit
45nm Process Technology	• Lower power dissipation (as low as 12.5W per core, at 2.5GHz) • Higher clock speeds (up to 3.4GHz on dual core model)
Enhanced Intel Core Micro-architecture	• High-performance Radix-16 (4-bit) dividers has twice the divider speed (2-bit) over previous generation processors. Useful for scientific computations, 3D transformations, & math-intensive functions used in HPC (such as square root) • New 47 SSE4 instructions to encode video faster. • Super Shuffle Engine: a 128-bit wide shuffle unit that can perform in a single cycle, significantly improves performance for existing SSE2, SSE3, and new SSE4 instructions that have shuffle-like operations such as pack, unpack, and wider pack shifts. Improves performance for Digital Content Creation, imaging, video, and HPC
1600MHz FSB	• Significantly improves data throughput • 25.6 GB/sec (20% faster than 1333Mhz FSB bandwidth on Sun Fire X4150 Server)
12MB L2 Cache	• Increases efficiency of L2-to-core data transfers, maximizing main memory to processor bandwidth. • Reduces latency by storing larger data sets closer to the processor, reducing the number of trips to main memory for greater performance across most workloads.
Works only with Intel 5400 Chipset	• 1600MHz FSB Processors • 800MHz FB-DIMM • 24MB snoop filter

The Intel 5400 Chipset

Sun Fire X2250 Server uses the high-performance Intel 5400 Chipset to improve data movement across the quad-core Intel Xeon processor 5400 series & the dual-core Intel Xeon processor 5200 series. The Intel 5400 Chipset, essentially a "traffic cop", increases the interconnect bandwidth, optimizes system bandwidth, increases memory capacity, and improves network traffic processing and reduces I/O latency of Sun Fire X2250 Server. The Intel 5400 Chipset consisting of the 5400 Memory Controller Hub (aka "MCH" or aka "North Bridge") and the 632xESB I/O Controller Hub (aka "ICH" or aka "ESB2" aka "South Bridge") offers a highly-integrated two-chip design for high performance and reliability.

The Intel 5400 Chipset has four key enhancements over Intel 5000P Chipset (previously code-named "Blackford") originally offered on the Sun Fire X4150 Server: 1) It supports 1600MHz FSB processors, whereas the Intel 5000P Chipset only support 1333 MHz FSB, 2) it supports 800MHz FBDIMMs whereas the Intel 5000P Chipset only supported 667MHz FBDIMMs, 3) it has a 24 MB snoop filter, where as the Intel 5000P Chipset has none, 4) it its optimized for the quad-core Intel Xeon processor 5400 series & the dual-core Intel Xeon processor 5400 series, where as the Intel 5000P Chipset has been optimized for the Intel Xeon processor 5300 series. The pairing of chipset to processor is critical to deliver optimal platform improvements. These aforementioned improvements on the Intel 5400 Chipset were designed to complement the improved performance of the quad-core Intel Xeon processor 5400 series and the dual-core Intel Xeon processor 5200 series.

To Xeon 5400/5200   To Xeon 5400/5200

1600Mhz FSB

Larger Snoop Filter

24M Snoop Filter Cache

Intel® 5400 Chipset ("Seaburg")
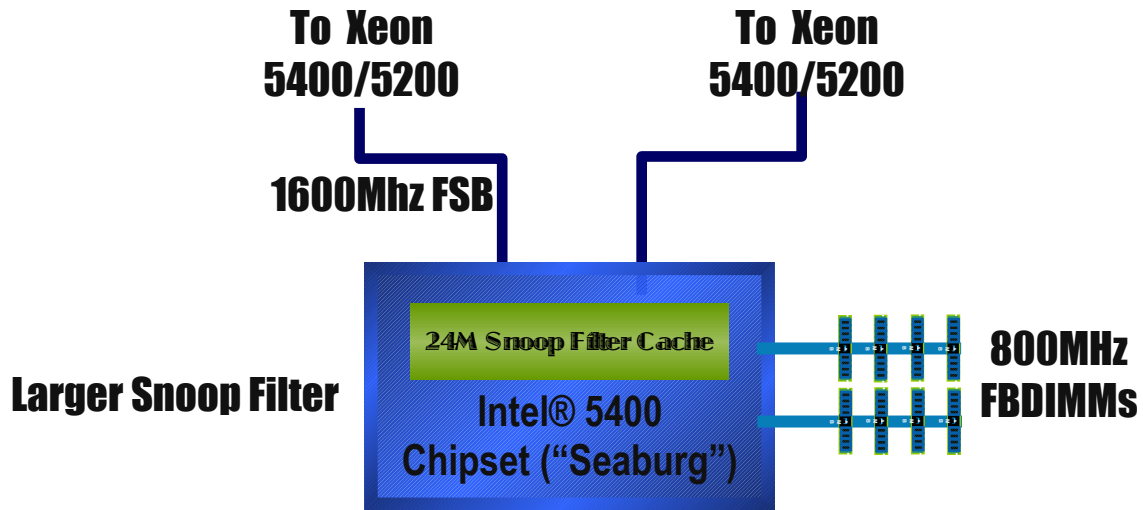
800MHz FBDIMMs

Figure 6 – Block diagram of the Intel 5400 Chipset

Table 4 shows the key features and benefits of the Intel 5400 Chipset. For more details, including block diagrams and specifications, please visit http://www.intel.com/products/chipsets/5400/index.htm

Table 4- Features and Benefits of the Intel 5400 Chipset

Expansion Slots

Sun Fire X2250 Server has one x16 (aka "16-lane") PCIe slot. Like the Sun Fire X2200 M2 Server, this slot is low-profile and half-length. Like the Sun Fire X2200 M2 Server, Sun Fire X2250 Server does have a riser card option to switch between two 8-lane slots or one 16-lane slot. Table 5 compares the expansion slot properties of Sun Fire X2250 Server and Sun Fire X2200 Server .

Table 5 – Slot Comparison of Sun Fire X2250 Server versus Sun Fire X2200 Server

Slot	Sun Fire X2250 Server	Sun Fire X2200 Server
Bus Architecture	PCI Express 1.0	PCI Express 1.0
Slot Bandwidth	8GB/sec	8GB/sec
Slot Height?	Low-profile only	Low-profile only
Slot Length?	Half-length only	Half-length only
Power	35W	35W
Options	One 16-lane slot only. No optional riser card to provide two 8-lane slots	Two 8-lane slots, standard Optional riser card to provide one 16-lane slot

NOTES:

1. The PCI Express x16 slot on Sun Fire X2250 Server supports up to 35 Watts. Please do not install into this slot, any adapters exceeding this power budget, including graphics accelerators such as NVIDIA Quadro FX accelerators.
2. The PCI Express x16 slot on Sun Fire X2250 Server can accept interface cards required for connecting to external graphics accelerators such as NVIDIA QuadroPlex or external GPU-Computing solutions such as NVIDIA Tesla

Memory

All memory operations on Sun Fire X2250 Server are performed by the memory controller found on the Intel 5400 Chipset. Sun Fire X2250 Server implements four channels of memory over eight FD-DIMM slots. The FD-DIMM memory controller is capable of yielding a memory bandwidth of 25.6GB/s (if using 800MHz FBDIMMs) or 21.2GB/s (if using 667MHz FBDIMMs). The 24MB Snoop Filter in 5400 Chipset improves the way the memory controller access main memory by reducing snoop traffic, allowing for more efficient cache indexing, and extract more bandwidth over the same FBDIMMs. The result is increased bandwidth, reduced memory latencies, and increased processor performance.   Sun Fire X2250 Server can reach up to a maximum of 32GB using its 8 DIMM slots. Sun Fire X2250 Server supports four memory kits: 2x 4GB @ 800MHz, 2x2GB @ 800MHz, 2x 4GB @ 667MHz, and 2x 2GB @ 667MHz. Each memory kit contains two identical DIMMs and should be installed at the same time to ensure proper electrical matching and to deliver full memory bandwidth. Sun recommends 1GB per processor core, in general.   Table 6 explains the upgrade paths, for the most popular memory footprint of Sun Fire X2250 Server:

Table 6 – Memory Upgrade Paths for Sun Fire X2250 Server

From	To	Actions	Remaining DIMM Sockets
Sun Fire X2250 Server w/ 4GB (2x 2GB DIMMs)	8GB	• Do not remove existing 2x 2GB • Install four 1GB DIMMs or two 2GB DIMMs	• Two, if installing 1GB DIMMs • Four if installing 2GB DIMMS
	16GB	• Do not remove existing 2x 2GB • Install two 2GB DIMMS and two 4GB DIMMS	• Two
	32GB	• Remove existing 2x 2GB • Install eight 4GB DIMMs	• None
Sun Fire X2250 Server w/ 4GB (2x 4GB DIMMs)	16GB	• Do not remove existing 2x 4GB • Install two 4GB DIMMs or four 2GB DIMMs	• Four, if installing 4GB DIMMs • Two, if installing 2GB DIMMs
	32GB	• Remove existing 2x4GB • Install eight 4GB DIMMs	• None

Note: The pairing of processors frequencies and memory frequencies is important. Sun Fire X2250 Server will the only Intel-based server from Sun offering processors with different Front Side Bus (FSB) frequencies and FBDIMMs frequencies. 800MHz FBDIMMs should be paired with processors having 1600MHz FSB only. 667MHz FBDIMMs should be paired with processors having 1333MHz FSB only. Please follow these rules:

1. Pair 1600MHz FSB processors with 800MHz DIMM kits only. i
1. Pair 1333MHz FSB processors with 667Mhz DIMM kits only.
2. 667MHz and 800Mhz DIMM kits can be mixed but will be clocked down to 667MHz.
3. Memory kits with different densities can be mixed
4. Minimum of no additional DIMM kits per system / Maximum of additional three DIMM kits per system.
5. Note #1: Sun Fire X2250 Server has eight DIMM sockets, unlike 16 DIMM sockets on Sun Fire X2200M2.
6. Note #2: Sun Fire X2250 Server does not need to add a 2nd CPU to recognize the second set of four DIMMs, like Sun Fire X2200M2.
7. DIMM kits comes in packs of two DIMMS (same size & vendor)

Local Hard Disk Drives (HDDs)

Sun Fire X2250 Server can reach up to a maximum of 2TB using its two internal drive bays. Sun Fire X2250 Server supports drive three HDD sizes: 250GB, 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 X2250 Server. Sun Fire X2250 Server can accommodate up to two 3.5-inch SATA drives . These two SATA drives can be configure for RAID 0 or RAID 1, via the RAID controller embedded inside the ESB2 South Bridge.   The RAID controller embedded inside the ESB2 South Bridge supports RAID under windows server 2003/2008 only. Linux mode of operation for embedded RAID controller (inside ESB2) is to use "mdraid", a software -based RAID method. Solaris will not have driver support for RAID using the RAID controller embedded inside ESB2.

Sun Fire X2250 Server will not qualify any RAID adapters or any internal SAS drives.

Sun Fire X2250 Server supports Serial Attached SCSI (SAS), as well as SCSI, Fiber Channel (FC), but only as an external option. Sun Fire X2250 Server interfaces to a wide variety of StorageTek SAS JBODs, SCSI Array, FC Array, through different Host Bus Adapters. Please see Table 24 for a complete list of external storage support.

Figure 7 – Two Internal Hard Disk Drives of Sun Fire X2250 Server

Figure 8 – Internal Optical Disk Drive of Sun Fire X2250 Server

Optical Disk Drives (ODDs)

Sun Fire X2250 Server offers two types of optical drives, DVD-ROM (plays DVD/CD only, does not record) and the DVD Burner Dual (records DVD in +/- format, on both layers). Sun Fire X2250 Server does not support CD-ROM, CD-RW, or DVD-ROM/CD-RW drives. Sun Fire X2250 Server employs the familiar tray-loading mechanism from the Sun Fire X2200 M2 Server.

Table 7 – Specifications of Sun Fire X2250 Server's Optical Disk Drives

Format	DVD Burner (records in +/- format, on both layers)	DVD-ROM (plays DVD only, does not record)
Maximum Transfer Rate	TBD	TBD
DVD-ROM	TBD	TBD
CD-ROM	TBD	TBD
Maximum Transfer Rate	TBD	TBD
DVD+/-R	TBD	TBD
DVD+/-R DL	TBD	TBD
DVD+/-RW	TBD	TBD
DVD-RAM	TBD	TBD
CD-R	TBD	TBD
CD-RW	TBD	TBD

Connectivity

Sun Fire X2250 Server shares the same chassis, with minor modifications, as the Sun Fire X2250 M2 Server. Therefore, the locations and quantity of the internal drive bays remained unchanged. Key I/O ports have changed slightly as described later. Figure 9 shows the front I/O ports, LEDs, bays, and buttons of Sun Fire X2250 Server. Starting from the left, the first LED is the locator light. The Status LED is located immediately to the right of it, followed by the Power button. Below the LEDs and Power button is the first 3.5-inch SATA drive. To the right of the SATA drive are the two front USB ports. The tray-loading DVD-ROM or the DVD Burner always occupies the center drive bay. Finally, the second 3.5-inch SATA occupies the final drive bay of Sun Fire X2250 Server. The various LEDs show the activity of the system and blinks to alert the system administrator (Table 9 describes the LEDs and its functions)   The LED in the front panel provides only limited information. PC-Check, a utility software to check system hardware (included with Sun Fire X2250 Server) should be used to gain detailed information about the system.

Locator light

3.5-inch SATA

2 front USB ports

3.5-inch SATA

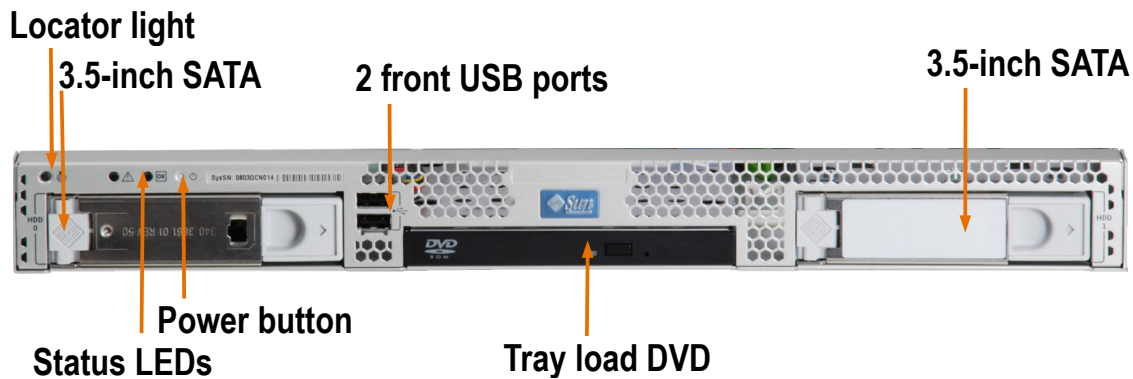**Power button**

Status LEDs

Tray load DVD

Figure 9 – Front view of Sun Fire X2250 Server

Figure 10 shows the rear view of Sun Fire X2250 Server. It contains the remaining USB ports, manageability ports, and Gigabit Ethernet ports mentioned earlier. Starting from the left of the chassis, the first RJ-45 port is used for network manageability while the second RJ-45 port is used for serial management. They are followed by two USB ports, a VGA port supporting resolution of 1600x1200x16-bits. Finally, the two RJ-45 ports are the Gigabit Ethernet ports. Table 8 summarizes differences of the I/O port of Sun Fire X2250 Server and Sun Fire X2200the F M2 Server. One internal USB port is available on motherboard inside Sun Fire X2250 Server.

500W PSU   **Net Mgmt**

HD-15 VGA

x16 PCIe slot

Ser Mgmt

2 Intel GigE Ethernet

2 rear USB ports   **Locate LED**   **Power LED**

Fault LED
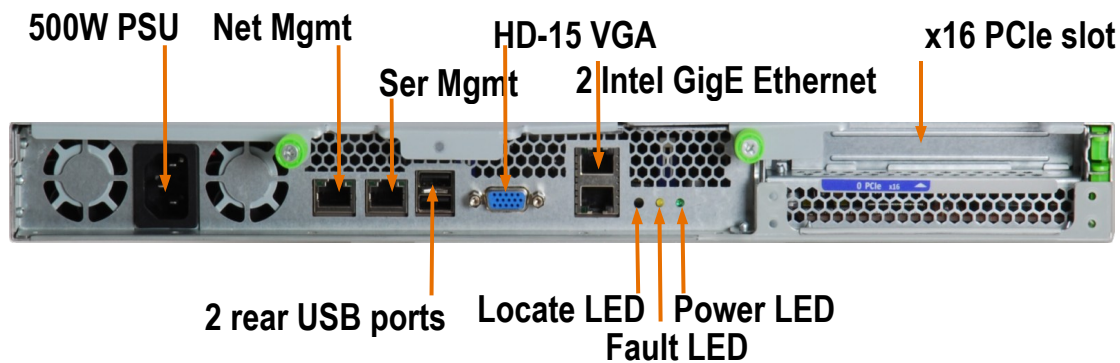
Figure 10 – Rear view of Sun Fire X2250 Server

Notes:

1. Networking: Unlike the Sun Fire X2200 M2 Server, Sun Fire X2250 Server's 10/100BaseT RJ-45 management port is not shared with the 10/100/1000BaseT RJ-45 networking port. A nice feature on the Sun Fire X2200 M2 Server is the combination of the RJ45 port from the Service Processor's 10/100BaseT and the RJ-45 port from NIC's 10/100/1000BaseT ports, thus saves money for only having to use 1 switch port and 1 cable for both management and host. Sun Fire X2250 Server cannot combine these ports due to it using the Intel Gigabit Ethernet solution and Sun Fire X2200 M2 Server using the Broadcom Gigabit Ethernet solution. Broadcom's Universal Management Port (UMP) specially designed for the purpose of sharing. The UMP port allows an internal device such as the service processor to share a host Ethernet interface without significantly affecting traffic flows to either unit.

2. RS-232 Serial Port: Unlike the Sun Fire X2200 server, Sun Fire X2250 Server uses an RJ45 connector for accessing the Service Processor and Server Console. The Sun Fire X2200 M2 Server include one asynchronous serial port with a DB-9 connector. Sun Fire X2250 Server includes one asynchronous serial port with a RJ-45 connector. This RS-232 serial port enables serial line access to both the server console and the on-board service processor command line interface.

Table 8 – Description of Ports on Sun Fire X2250 Server

Port	Connector	Quantity (Location)	Function
USB	USB Type A	7 (2 back, 2 front, 1 internal)	Handheld devices for configuration management
RS-232	RJ-45	1 back	Serial Management. Provides command line interface access to Service Processor and Sun Fire X2250 Server server console
10/100/1000BaseT Ethernet	RJ-45	2 back	Networking: Gigabit Ethernet
10/100BaseT Ethernet	RJ-45	1 back	Network Management: Console redirection (redirect server video screen, keyboard, and mouse data to administrative console) using Keyboard Video Mouse over IP (KVMoIP), remote storage - ISO, CD_ROM, Floppy Disk Drive.
VGA	HD-15	1 back	Video: Resolution up to 1600x1200x16bits@60Hz

Table 9 – Description of LEDs on Sun Fire X2250 Server

LED Function	Color	Location	What it does
Power	Green	Front & Back	CONSTANT ON indicates the main board power is on. Blinks SLOWLY when in SUSPEND mode. Blinks VERY SLOWLY (1Hz) during POST (Power On Self Test). TURNS OFF during power off.
System Fault / Service	Yellow	Front & Back	If Service Processor detects an abnormal onboard sensor reading, this LED will turn on and blink VERY SLOWLY (1Hz) , even the system has been shut down. Onboard sensors detect errors on the following components and parameters: Voltages (memory, processor, system 3.3V/ 5V/ 12V), fans (processor & system), temperature (chassis, processor). LED stays CONSTANT ON if the problems still requires attention.
System Locator	White	Front & Back	TURNS OFF during normal operation. Blinks QUICKLY (4Hz) when the user manually presses the locator button or the BMC receives the chassis indicator command to light the LED to allow the user to locate the particular server in a rack of multiple servers. Will TURN OFF AUTOMATICALLY after 30 minutes When held down for five seconds, this button will turn on all LED's (except disk activity LED's and power supply LED's) for 15 seconds, to test all functionality of Wasp

Manageability

Note: Please read document: "Integrated Lights Out Manager (ILOM) Supplement for Sun Fire X2250 Server Server (Document #820-4596-05), before reading this section.

Performance alone will not makes a server successful. With the x64 server market consolidating to a pool of several chipsets and two processor architectures, performance across several similar servers from different vendors does not fluctuate greatly. However, the manageability of those servers are what can set them apart.

Sun provides ILOM (Integrated Lights Out Manager) to manage Sun Fire X2250 Server. ILOM consists for four components:

- **ILOM Service Processor (SP) Hardware.**   Monitors Sun Fire X2250 Server's status and configuration of components and provides serial and Ethernet connections to external terminals or LANs.
- **ILOM Service Processor (SP) Firmware:** A set of system management applications installed on the firmware of the SP. Completely OS-independent, these applications provide several different system management interfaces into Sun Fire X2250 Server
- **Remote Console Application:**   This application allows remote clients to view the graphical console of Sun Fire X2250 Server as though they were directly
attached to its video connector. The Remote Console is a mirror of the 1024x768 output from Sun Fire X2250 Server's VGA video connector. The remote keyboard,mouse, CD drive, or diskette drive will appear as standard USB devices.
- **Client Side Secure Shell Application:** To access the ILOM SP through a remote Secure Shell (SSH), you must install a Secure Shell communications application onthe remote client system (server, workstation, or laptop). Many Secure Shell communications applications are available from commercial or open-source distribution.

More details on Sun Fire X2250 Server Service Processor

Sun Fire X2250 Server integrates, directly on its motherboard, a hardware-based SP named Aspeed AST2000. 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 and key interfaces such as USB ports (for virtual devices), RJ45 RS-232 serial interface (for console redirection), a dedicated 10/100 Ethernet interface (for manageability), and a HD-15 SVGA video port (for video reproduction).

Within the chassis of Sun Fire X2250 Server 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 X2250 Server 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.
- 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, 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 native and 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.

- **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 Sun Fire X2250 Server. The service processor incorporates a USB 2.0 device controller that connects to the USB host controller on the ESB2 South Bridge of the Intel 5400 Chipset. By using the Java Webstart remote console application to launch the virtual storage function at an administrative workstation, Sun Fire X2250 Server detect 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.

Operating Systems

Interoperability in a heterogeneous environment is important to IT managers. Sun Fire X2250 Server is offers one of the widest available range of operating systems support. Table 10 shows the operating systems supported on Sun Fire X2250 Server**.**

Table 10 - Supported Operating Systems on Sun Fire X2250 Server

Operating System	Version	Sold by Sun?	Supported by Sun ?
Solaris 10	Update 5 & later	Yes	Yes
Red Hat Enterprise Linux 4 AS (Advanced Server)	Update 6 & later	Yes	Yes
Red Hat Enterprise Linux 5 AS (Advanced Servert)	Update 1 & later	Yes	Yes
SuSE Linux Enterprise Server 10	Service Pack 1 & later	Yes	Yes
Windows Server 2003 Enterprise	Release 2 and later	Yes	Yes
Windows Server 2008 Enterprise	TBD	TBD	TBD

All operating systems in Table 10 can be ordered from Sun. Support contracts are also available for these operating systems.

Sun Fire X2250 Server will also be listed in the Windows Catalog as being fully certified for the windows server 2003/2008 Operating Systems. It has earned the "Compatible with Windows" designation as a certified platform to run the Microsoft windows server 2003/2008 Operating system. Sun Fire X2250 Server will be listed on the Microsoft Hardware Compatibility List (HCL) which can be seen by visiting the Microsoft Windows Hardware and Driver Central (WHDC) at http://www.microsoft.com/whdc/hcl/search.mspx.

Straight Talk About Competition

2-socket entry-level servers are fairly commoditized and there is not a great deal that distinguishes one vendor's offering from another. Certainly, there are differences such as system management software, but for the most part, it's about the channels, the partners and what's offered around the server, such as convenience (one-stop shopping) , integration capability, time-to-delivery, and promotions. Needless to say, Sun Fire X2250 Server wiill compete against x86 equipment providers vendors with differentiated product features, established channels, and decades of experience.

What this section is and what it is not

This section will explain the feature advantages of Sun Fire X2250 Server and equally important, the feature advantages of its competitors, i.e. similar 2-socket/1U entry-level servers such as the HP Proliant DL160 G5 Server and the IBM System X3450. This section also will separate the objection of the customers from the real issue, and suggest ways to overcome the customer's objections. This section will not compare performance.

Table 11 – Comparison of Sun Fire X2250 Server to HP Proliant DL 160 G5 Server and IBM System x3450 Server

Features	Sun Fire X2250 Server	HP Proliant DL 160 G5 Server	IBM System X3450 Server
Form-Factor	1U	1U	1U
H x W x D	44.0 mm (1.70-in) x 425.5 mm (16.8- in) x 633.7mm (25.4- in)	43.2 mm (1.70- in) x 448.1 mm (17.64 in) x 682.0mm (26.85-in)	43.6 mm (1.72-in) x 424.0 mm (16.7- in) x 696.0mm (27.4- in)
Weight	13.3 kilograms (27.2 pounds): maximum 9.8 kilograms (21.7 pounds): minimum	16.78 kilograms (37.00 pounds) maximum 13.79 kilograms (30.69 pounds) minimum	38 kilograms (84 pounds) maximum 20 kilograms (42 pounds) minimum
Processor	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series
No. of Sockets	Two	Two	Two
Processor Models	Quad Core: X5482 (3.2GHz, FSB1600, 120W), E5472 (3.0GHz, FSB1600, 80W), X5472 (3.00GHz, FSB1600, 120W), E5462 (2.80GHz, FSB1600, 80W), X5460 (3.16GHz, FSB1333, 120W), E5462 (2.80GHz, FSB1600, 80W) E5405 (2.00GHz, FSB1333, 80W) Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W) Dual Core: X5272 (3.40GHz, FSB1600, 80W)	Quad Core: X5482 (3.2GHz, FSB1600, 120W), X5472 (3.00GHz, FSB1600, 120W), X5460 (3.16GHz, FSB1333, 120W), E5472 (3.00GHz, FSB1600, 80W) E5462 (2.80GHz, FSB1600, 80W), E5430 (2.66GHz, FSB1333, 80W), E5405 (2.00GHz, FSB1333, 80W) Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W), L5410 (2.33GHz, FSB1333, 50W) Dual Core: X5272 (3.40GHz, FSB1600, 80W) Low Voltage Dual Core: L5240 (3.00GHz, FSB1333, 40W)	Quad Core: X5482 (3.2GHz, FSB1600, 120W), E5472 (3.0GHz, FSB1600, 80W), X5472 (3.00GHz, FSB1600, 120W), E5462 (2.80GHz, FSB1600, 80W) Dual Core: X5272 (3.40GHz, FSB1600, 8W)
Front Side Bus	1600MHz FSB & 1333 MHz FSB	1600MHz FSB & 1333 MHz FSB	1600MHz FSB & 1333 MHz FSB
Chipset	Intel 5400 Chipset	Intel 5400 Chipset	Intel 5400 Chipset
Memory	Fully-Buffered DIMMs 8 DIMM slots total per system 32GB maximum Two DIMM sizes at 800MHz: 2x4GB, 2x2GB Two DIMM sizes at 667MHz: 2x4GB, 2x2GB	Fully-Buffered DIMMs with ECC. 8 DIMM slots per system. 32GB maximum. Three DIMM sizes at 667MHz: 4GB, 2GB, 1GB. Two DIMM sizes at 800MHz: 4GB, 2GB	Fully-Buffered DIMMs with ECC. 16 DIMM slots per system. 64GB maximum. Three DIMM sizes at 667MHz: 4GB, 2GB, 1GB, and 512MB No DIMM sizes at 800MHz
Expansion Slots	PCIe 1.0 One 16-lane half- length, low-profile slot	Non-Hot Plug Models: Two PCIe 2.0 slots: Slot 1 = Full-length/full-height 16-lane. Slot 2 = Low-profile/half-height 16-lane. Hot Plug Models: One available PCIe 2.0 slot. Slot = Full-length/full-height 16-lane. Slot 2 = Low-profile/half-height PCI-X slot populated by the SAS/SATA storage controller	PCIe 2.0: Standard one 16-lane full-height, full-length slot PCIe 1.0: Optional one 8-lane half-length low-profile slot
Basic Graphics	2D graphics controller embedded in service processor Support remote console at resolution up to 1600x1200x16bit@60Hz	Integrated graphics controller w/ 8MB video memory supporting 1600x1200 resolution	unknown
Mid Graphics	None	NVIDIA Quadro FX3500 & FX1500	unknown
High Graphics	QuadroPlex	Unknown	unknown
Local Hard Disk Drives	Up to two hot-plug SATA drives, 2TB maximum: 250GB, 500GB, 1TB (7,200-rpm) No SAS drives	Up to four hot-plug or non hot-plug 3.5" SATA drives, 1.5TB maximum: 250GB, 500GB, 750GB (7,200-rpm) Up to four hot-plug 3.5" SAS drives, 1.2TB maximum: 146GB, 300GB (15,000-rpm)	Up to two "simple-swap" 3.5" SATA drives, 1.5TB maximum: 250GB, 500GB, 750GB (7,200-rpm)
Storage Controllers Support	No SAS internal HBA support Supports range of HBAs to interface StorageTek RAID Arrays, JBODs, Tapes	HP Embedded SATA RAID on Non-Hot Plug SATA Models HP SC40Ge 4-port Internal SAS HBA with RAID 0,1 on Hot Plug SAS/SATA Models HP Smart Array E500 Controller, HP Smart Array E200 Controller HP SC11xe Host Bus Adapter, HP SC44Ge Host Bus Adapter	unknown
Optical Disk Drive	Tray-loading, slim DVD-ROM or DVD Burner. Unknown speed. No floppy diskette drive support	Tray-loading, slim 8x IDE DVD-ROM. Tray-loading, slim 24x IDE DVD/CD RW. Floppy diskette drives via USB only	Slot-loading, slim DVD-ROM
Networking	Two Gigabit Ethernet ports integrated on motherboard.	"Two embedded NC105i PCIe Gigabit Server Adapters" One 10/100 for Lights-Out 100i Remote Management Three RJ-45 ports (rear)	Integrated dual Gigabit Ethernet (Broadcom 5721) One 10/100 for Lights-Out 100i Remote Management Three RJ-45 ports (rear)
Serial Port	One TIA/EIA-232-F asynchronous RJ45 Port (rear)	One Serial DB-9 Port rear)	One TIA/EIA-232-F asynchronous RJ45 Port (rear)
USB ports	Five USB 2.0 ports - two front, two rear, one internal	Five USB 2.0 ports - 2 front, 2 rear, 1 internal	Four USB 2.0 ports - 1 front, 2 rear, 1 internal
PS/2	None	Two ports: Mouse & keyboard	Two ports: Mouse & keyboard
Service Processor	ASPEED AST2000 (IPMI 1.5/2.0 compliant Service Processor with Integrated Lights Out Management offering remote power, KVM, and media capability)	HP Lights Out 100i (Virtual KVM & virtual media support, including: IPMI 2.0 & SMASH CLP, ROM Setup Utility, USB 2.0 drives. Enhanced browser UI and embedded KVM over IP	unknown ("Intel BMC w/ full IPMI 2.0")
Power Supply	500W (Non-redundant 80% efficiency)	650W (Non-redundant, Non-Hot Plug). Optional 1200W H/E	600W (Non-redundant, Non-Hot Plug)
Operating Systems Validated by Sun	Red Hat Enterprise Linux 4 & 5 AS (Advanced Server) SuSe Linux Enterprise Server 10 windows server 2003/2008 x64 Enterprise VM Ware ESX Server 3.5 Solaris 10 Update 5 or later	Microsoft windows server 2003/2008 Standard Edition (32-bit) Microsoft windows server 2003/2008 Enterprise Edition (32-bit) Microsoft windows server 2003/2008 Web Edition (32-bit) Red Hat Enterprise Linux (unknown version) SUSE Linux Enterprise Server (unknown version) Solaris 10	Red Hat Enterprise Linux 5 Microsoft Windows Server 2003 Standard, Enterpricse, & Web SUSE Linux Enterprise Server 10 (SP1)
Warranty	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site	One-year customer replaceable unit and onsite limited warranty

Competing against the HP Proliant DL 160 G5 Server

The HP Proliant DL 160 G5 Server is part of HP's ProLiant 100 series, a simple, powerful, affordable 1-2 processor rack-mounted and tower servers suited for SMB and single-tier architectures such as HPC clusters. When targetting SMB, they are ideal for companies with 100 to 500 employees. The HP ProLiant DL160 G5 is based Intel's 5400/5200 processor. It has four drive bays, two x16 PCI Express 2.0 slots, 3TB storage capacity in a 1U form.

Table 12 – Comparison of Sun Fire X2250 Server to the HP Proliant DL 160 G5 Server

Features	Sun Fire X2250 Server	HP Proliant DL 160 G5 Server
Form-Factor	1U	1U
H x W x D	44.0 mm (1.70-in) x 425.5 mm (16.8- in) x 633.7mm (25.4- in)	43.2 mm (1.70- in) x 448.1 mm (17.64 in) x 682.0mm (26.85-in)
Weight	13.3 kilograms (27.2 pounds): 2 HDDs, 2 processors, 8 DIMMs, add-in card, DVD installed 9.8 kilograms (21.7 pounds): No HDD, 1 processor, 2 DIMMs, no add-in card, no DVD	16.78 kilograms (37.00 pounds): 4 HDDs, 2 processors, two add-in cards, DVD installed 13.79 kilograms (30.69 pounds): 1 HDD, 1 processor installed
Processor	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series
No. of Sockets	Two	Two
Processor Models	Quad Core: X5482 (3.2GHz, FSB1600, 120W), E5472 (3.0GHz, FSB1600, 80W) , X5472 (3.00GHz, FSB1600, 120W), E5462 (2.80GHz, FSB1600, 80W), X5460 (3.16GHz, FSB1333, 120W), E5462 (2.80GHz, FSB1600, 80W) E5405 (2.00GHz, FSB1333, 80W) Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W) Dual Core: X5272 (3.40GHz, FSB1600, 80W)	Quad Core: X5482 (3.2GHz, FSB1600, 120W), X5472 (3.00GHz, FSB1600, 120W), X5460 (3.16GHz, FSB1333, 120W), E5472 (3.00GHz, FSB1600, 80W) E5462 (2.80GHz, FSB1600, 80W), E5430 (2.66GHz, FSB1333, 80W), E5405 (2.00GHz, FSB1333, 80W) Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W). L5410 (2.33GHz, FSB1333, 50W) Dual Core: X5272 (3.40GHz, FSB1600, 80W) Low Voltage Dual Core: L5240 (3,00GHz, FSB1333, 40W)
Front Side Bus	1600MHz FSB & 1333 MHz FSB	1600MHz FSB & 1333 MHz FSB
Chipset	Intel 5400 Chipset	Intel 5400 Chipset
Memory	Fully-Buffered DIMMs 8 DIMM slots total per system 32GB maximum Two DIMM sizes at 800MHz: 2x4GB, 2x2GB Two DIMM sizes at 667MHz: 2x4GB, 2x2GB	Fully-Buffered DIMMs with ECC. 8 DIMM slots per system. 32GB maximum. Three DIMM sizes at 667MHz: 4GB, 2GB, 1GB. Two DIMM sizes at 800MHz: 4GB, 2GB
Expansion Slots	PCIe 1.0 One 16-lane half- length, low-profile slot	Non-Hot Plug Models: Two PCIe 2.0 slots: Slot 1 = Full-length/full-height 16-lane. Slot 2 = Low-profile/half-height 16-lane. Hot Plug Models: One available PCIe 2.0 slot. Slot = Full-length/full-height 16-lane. Slot 2 = Low-profile/half-height PCI-X slot populated by the SAS/SATA storage controller
Basic Graphics	2D graphics controller embedded in service processor Support remote console at resolution up to 1600x1200x16bit@60Hz	Integrated graphics controller w/ 8MB video memory supporting 1600x1200 resolution
Mid Graphics	None	NVIDIA Quadro FX3500 & FX1500
High Graphics	QuadroPlex	Unknown
Local Hard Disk Drives	Up to two hot-plug SATA drives, 2TB maximum: 250GB, 500GB, 1TB (7,200-rpm) No SAS drives	Up to four hot-plug or non hot-plug 3.5" SATA drives, 1.5TB maximum: 250GB, 500GB, 750GB (7,200-rpm) Up to four hot-plug 3.5" SAS drives, 1.2TB maximum: 146GB, 300GB (15,000-rpm)
Storage Controllers Support	No SAS internal HBA support Supports range of HBAs to interface StorageTek RAID Arrays, JBODs, Tapes	HP Embedded SATA RAID on Non-Hot Plug SATA Models HP SC40Ge 4-port Internal SAS HBA with RAID 0,1 on Hot Plug SAS/SATA Models HP Smart Array E500 Controller, HP Smart Array E200 Controller HP SC11xe Host Bus Adapter, HP SC44Ge Host Bus Adapter
Optical Disk Drive	Tray-loading, slim DVD-ROM or DVD Burner. Unknown speed. No floppy diskette drive support	Tray-loading, slim 8x IDE DVD-ROM. Tray-loading, slim 24x IDE DVD/CD RW. Floppy diskette drives via USB only
Networking	Two Gigabit Ethernet ports integrated on motherboard.	"Two embedded NC105i PCIe Gigabit Server Adapters" One 10/100 for Lights-Out 100i Remote Management Three RJ-45 ports (rear)
Serial Port	One TIA/EIA-232-F asynchronous RJ45 Port (rear)	One Serial DB-9 Port rear)
USB ports	Five USB 2.0 ports - two front, two rear, one internal	Five USB 2.0 ports - 2 front, 2 rear, 1 internal
PS/2	None	Two ports: Mouse & keyboard
Service Processor	ASPEED AST2000 (IPMI 1.5/2.0 compliant Service Processor with Integrated Lights Out Management offering remote power, KVM, and media capability)	HP Lights Out 100i (Virtual KVM & virtual media support, including: IPMI 2.0 & SMASH CLP, ROM Setup Utility, USB 2.0 drives. Enhanced browser UI and embedded KVM over IP
Power Supply	500W (Non-redundant 80% efficiency)	650W (Non-redundant, Non-Hot Plug). Optional 1200W H/E
Operating Systems Validated by Sun	Red Hat Enterprise Linux 4 & 5 AS (Advanced Server) SuSe Linux Enterprise Server 10 windows server 2003/2008 Enterprise VM Ware ESX Server 3.5 Solaris 10 Update 5 or later	Microsoft windows server 2003/2008 Standard Edition (32-bit) Microsoft windows server 2003/2008 Enterprise Edition (32-bit) Microsoft windows server 2003/2008 Web Edition (32-bit) Red Hat Enterprise Linux (unknown version) SUSE Linux Enterprise Server (unknown version) Solaris 10

Features	Sun Fire X2250 Server	HP Proliant DL 160 G5 Server
Warranty	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site

Table 14 - Where Sun Fire X2250 Server beats the HP Proliant DL 160 G5 Server

Advantages	Real Issue	Key Points
Sun Fire X2250 Server has 800Mhz FBDIMMs	• HPC Performance	• As of June 2, 2008, Sun Fire X2250 Server is the only 2S/1U server with 800MHz FBDIMMs. • HP, IBM, and Dell has 1600MHz processors, but no 800Mhz FBDIMMs. In fact, 1600MHz FSB processors paired with 667Mhz FBDIMMs will run slower than 1333Mhz FSB processors paried with 667MHz FBDIMMs.
Sun Fire X2250 Server has the Xeon 50W Xeon L5420	• Low power consumption & not compromising performance	• Sun Fire X2250 Server has the fastest 50W quad-core processor available (2.5GHz) • The Xeon L5420 dissipates only 12.5W per core. This is 35% lower than standard 80W parts (or 60% lower than 120W pa

Table 13 – Feature Advantages of the HP Proliant DL 160 G5 Server and How to Overcome Them.

Customer Objections	Real Issue	Overcoming Customer Objections
Sun Fire X2250 Server has one expansion slot	• Forces some customers in position of unacceptable trade-off. • Use slot to get QuadroPlex, but no slot remaining for 10GB or IB • Use slot get to storage but no slot remaining for cluster interconnect • Cannot connect to Tesla S870	• Explain to customer that Sun Fire X2250 Server was not designed for visualization-class workload. • Sell up to Sun Fire X4150 Server. It has three three 16-lane (8-lane electrical) half length slots
Sun Fire X2250 Server has no PCIe 2.0 slots	• Enough bandwidth for Infinfband HBAs, 10GbE NICs, graphics, and external GP-GPU accelerators	• Ask the customer to consider the availability of PCIe 2.0 adapters & whether these new PCIe 2.0 adapters can truly saturate the 16GB/sec bandwidth • Ask customer to consider "Wasp" (successor to Sun Fire X2250 Server). It will have PCIe 2.0 and it will be available six months after Sun Fire X2250 Server. See document "x64 Rackmount and Workstations" Token #43250
Sun Fire X2250 Server has two drive bays	• No RAID 5, 10, and 0+1. • With two local disks, Sun Fire X2250 Server can do only RAID levels 0 and 1. With four local disks, the HP Proliant DL 160 can do RAID Levels 5, 10, and 0+1, in addition to RAID levels 0 and 1, like Sun Fire X2250 Server.	• Ask customer to consider that nearly all applications for Sun Fire X2250 Server will involve external disk in the form of direct-attached SCSI or a Fibre Channel or iSCSI SAN, and the local disk will be used only for booting and file-swapping. • Sell customer to Sun Fire X4150. It has eight drive bays. • Acknowledge RAID 5 does gives the highest read and write data transaction rate, at a low ratio of parity-to-data disks. However, RAID 5 is difficult to rebuild in the event of a disk failure (compared to RAID 1). • RAID 10 implementation is irrelevant to servers like Sun Fire X2250 Server and HP DL 160 G5 because RAID 10, a high-reliability methodology combined with high-performance, is expensive to implement and is used on servers such as Sun Fire X4600 or Sun Fire X4450
Sun Fire X2250 Server has no SAS	• Local disk performance • Won't work with VM Ware (VMFS requires SAS as the local HDD)	• Again, ask customer to consider external disks and the local disk will be used only for booting and file-swapping. • Emphasize that Sun did not design Sun Fire X2250 Server for virtualization. Virtualization is suited for the Sun Fire X4150, with its 4 NICs and 8 SAS drives.
Sun Fire X2250 Server has no 1200W PSU	• Headroom	• Ask the customer to consider why HP offered this 1200W PSU. It is because the Proliant DL 160 needs the power to drive up to four hard disk drives and two FX3500 graphics cards
Sun Fire X2250 Server has no PCI-X slots	• Legacy card support	• HP Proliant DL 160 G5 Server offers PCI-X only on its Hot Plug model. However, this slot is occupied by the SAS/SATA storage controller

Customer Objections	Real Issue	Overcoming Customer Objections
Sun Fire X2250 Server does not support NVIDIA Quadro FX3500	• Graphics support	• FX3500 is a midrange performance graphics card. Visualization clusters require higher graphics performance such as NVIDIA QuadroPlex. Sun Fire X2250 Server will be qualified for QuadroPlex.

Where they are even:

- 800MHz Memory. The HP Proliant DL 160 G5 Server and Sun Fire X2250 Server supports 800MHz FBDIMMs. Both systems offer 2x4GB and 2x2GB memory kits at 800Mhz.

- Drive type: The HP Proliant DL 160 G5 Server and Sun Fire X2250 Server have internal SATA HDDs only. Both systems do not offer internal SAS HDDs

- Number of Gigabit Ethernet Ports: The HP Proliant DL 160 G5 Server and Sun Fire X2250 Server have two Gigabit Ethernet ports (rear)

Competing against the IBM System X3450 Server

The IBM System X3450 Server is part of IBM System X3000 series, a simple, powerful, affordable 1-2 processor rack-mounted (no tower servers) suited for SMB and single-tier architectures such as HPC clusters. When targetting SMB, they are ideal for companies with 100 to 500 employees. The IBM System X3450 Server is based Intel's 5400/5200 processor. It has two drive bays, one full-heigh, full-length x16 PCI Express 2.0 slots, 1.5TB storage capacity in a 1U form.

Table 15 – Comparison of Sun Fire X2250 Server to the IBM System X3450 Server

Features	Sun Fire X2250 Server	IBM System X3450 Server
Form-Factor	1U	1U
H x W x D	44.0 mm (1.70-in) x 425.5 mm (16.8- in) x 633.7mm (25.4- in)	43.6 mm (1.72-in) x 424.0 mm (16.7- in) x 696.0mm (27.4- in)
Weight	13.3 kilograms (27.2 pounds): 2 HDDs, 2 processors, 8 DIMMs, add-in card, DVD installed 9.8 kilograms (21.7 pounds): No HDD, 1 processor, 2 DIMMs, no add-in card, no DVD	38 kilograms (84 pounds) maximum configuration 20 kilograms (42 pounds) minimum configuration
Processor	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series
No. of Sockets	Two	Two
Processor Models	Quad Core: X5482 (3.2GHz, FSB1600, 120W), E5472 (3.0GHz, FSB1600, 80W), X5472 (3.00GHz, FSB1600, 120W), E5462 (2.80GHz, FSB1600, 80W), X5460 (3.16GHz, FSB1333, 120W), E5462 (2.80GHz, FSB1600, 80W) E5405 (2.00GHz, FSB1333, 80W) Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W) Dual Core: X5272 (3.40GHz, FSB1600, 80W)	Quad Core: X5482 (3.2GHz, FSB1600, 120W), E5472 (3.0GHz, FSB1600, 80W), X5472 (3.00GHz, FSB1600, 120W), E5462 (2.80GHz, FSB1600, 80W) Dual Core: X5272 (3.40GHz, FSB1600, 80W)
Front Side Bus	1600MHz FSB & 1333 MHz FSB	1600MHz FSB & 1333 MHz FSB
Chipset	Intel 5400 Chipset	Intel 5400 Chipset
Memory	Fully-Buffered DIMMs 8 DIMM slots total per system 32GB maximum Two DIMM sizes at 800MHz: 2x4GB, 2x2GB Two DIMM sizes at 667MHz: 2x4GB, 2x2GB	Fully-Buffered DIMMs with ECC. 16 DIMM slots per system. 64GB maximum. Three DIMM sizes at 667MHz: 4GB, 2GB, 1GB, and 512MB No DIMM sizes at 800MHz
Expansion Slots	PCIe 1.0 One 16-lane half- length, low-profile slot	PCIe 2.0: Standard one 16-lane full-height, full- length slot PCIe 1.0: Optional one 8-lane half-length low-profile slot
Basic Graphics	2D graphics controller embedded in service processor Support remote console at resolution up to 1600x1200x16bit@60Hz	unknown
Mid Graphics	None	unknown
High Graphics	QuadroPlex	unknown
Local Hard Disk Drives	Up to two hot-plug SATA drives, 2TB maximum: 250GB, 500GB, 1TB (7,200-rpm) No SAS drives	Up to two "simple-swap) 3.5" SATA drives, 1.5TB maximum: 250GB, 500GB, 750GB (7,200-rpm)
Storage Controllers Support	No SAS internal HBA support Supports range of HBAs to interface StorageTek RAID Arrays, JBODs, Tapes	unknown
Optical Disk Drive	Tray-loading, slim DVD-ROM or DVD Burner. Unknown speed. No floppy diskette drive support	Slot-loading, slim DVD-ROM
Networking	Two Gigabit Ethernet ports integrated on motherboard.	Integrated dual Gigabit Ethernet (Broadcom 5721) One 10/100 for Lights-Out 100i Remote Management Three RJ-45 ports (rear)
Serial Port	One TIA/EIA-232-F asynchronous RJ45 Port (rear)	One TIA/EIA-232-F asynchronous RJ45 Port (rear)
USB ports	Five USB 2.0 ports - two front, two rear, one internal	Four USB 2.0 ports - 1 front, 2 rear, 1 internal
PS/2	None	Two ports: Mouse & keyboard

Features	Sun Fire X2250 Server	IBM System X3450 Server
Service Processor	ASPEED AST2000 (IPMI 1.5/2.0 compliant Service Processor with Integrated Lights Out Management offering remote power, KVM, and media capability)	unknown ("Intel BMC w/ full IPMI 2.0")
Power Supply	500W (Non-redundant 80% efficiency)	600W (Non-redundant, Non-Hot Plug)
Operating Systems Validated by Sun	Red Hat Enterprise Linux 4 & 5 AS (Advanced Server) SuSe Linux Enterprise Server 10 windows server 2003/2008 Enterprise VM Ware ESX Server 3.5 Solaris 10 Update 5 or later	Red Hat Enterprise Linux 5 Microsoft Windows Server 2003 Standard, Enterpricse, & Web SUSE Linux Enterprise Server 10 (SP1)
Warranty	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site	One-year customer replaceable unit and onsite limited warranty

Table 17 - Where Sun Fire X2250 Server beats the HP Proliant DL 160 G5 Server

Advantages	Real Issue	Key Points
Sun Fire X2250 Server has 800Mhz FBDIMMs	• HPC Performance	• As of June 9, 2008, Sun Fire X2250 Server is the only 2S/1U server with 1600MHz FBDIMMs. • HP, IBM, and Dell has 1600MHz processors, but no 800Mhz FBDIMMs. In fact, 1600MHz FSB processors paired with 667Mhz FBDIMMs will run slower than 1333Mhz FSB processors paried with 667MHz FBDIMMs.
Sun Fire X2250 Server has a processor selection, including the 50W Xeon L5420	• Low power consumption & not compromising performance	• Sun Fire X2250 Server has the fastest 50W quad-core processor available (2.5GHz) • The Xeon L5320 dissipates only 12.5W per core. This is 35% lower than standard 80W parts (or 60% lower than 120W pa

Table 16 – Feature Advantages of the IBM System X3450 and How to Overcome Them.

Customer Objections	Real Issue	Overcoming Customer Objections
Sun Fire X2250 Server has only eight DIMM slots	• Sun Fire X2250 Server cannot reach 64GB	• Ask the customer to explain which applications will need 64GB of local memory. Let customers know we will review their request carefully and may offer 8GB DIMMs. Please contact brian.huynh@sun.com (Sun Fire X2250 Server Product Manager) • Meanwhile, upsell customers to Sun Fire X2200 M2 Server, an entry-level 2S/1U server with 16 DIMM sockets
Sun Fire X2250 Server has no PCIe 2.0 slots	• Enough bandwidth for Infinfband HBAs, 10GbE NICs, graphics, and external GP-GPU accelerators	• Ask the customer to consider the availability of PCIe 2.0 adapters & whether these new PCIe 2.0 adapters can truly saturate the 16GB/sec bandwidth • PCIe 2.0 adapters are 100% compatible (mechanical, electrical) with PCIe 1.0
Sun Fire X2250 Server does have full-length, full-height slot	• Graphics card support	• Explain to customers that based on Sun analysis, the highest-level graphics card the IBM System x3450 can likely support is the NVIDIA Quadro FX3500. This is a midrange performance graphics card. Visualization clusters require higher graphics performance such as NVIDIA QuadroPlex. Sun Fire X2250 Server will be qualified for QuadroPlex.
Sun Fire X2250 Server has a bigger 600W PSU	• Headroom	• Ask the customer to consider why IBM offered this 600W PSU. It is because the System X3450 needs the power to drive 16 DIMM slots and a full-length full-height PCI Express card

Where they are even:

- Drive type: The IBM System x3450 Server and Sun Fire X2250 Server have internal SATA HDDs only. Both systems do not offer internal SAS HDDs

- Drive bays: The IBM System x3450 Server and Sun Fire X2250 Server have two drive bays.

- Number of Gigabit Ethernet Ports: The IBM System x3450 Server and Sun Fire X2250 Server have two Gigabit Ethernet ports (rear)

Availability & Ordering

PRESTO

The Sun Fire X2250 Server has been announced to Sun Field Sales and Sun's Partners on July 22, 2008. PRESTO is a cross-Sun review prior to launch that is designed to ensure that Sun products are ready for sale: quotable, orderable, and shippable to Sun customers & partners worldwide, including through online vehicles such as the Sun Catalog, Sun Store and European Portals. The EZ Launch ID is #8842.

Webdesk

Webdesk provides the capability to quote and order Sun Fire X2250 Server. Inside Webdesk, the user can place an order for Sun Fire X2250 Server in any configuration. Webdesk has been available to accept orders since July 22, 2008

Revenue Release

The Sun Fire X2250 Server reached Revenue Release (RR) in mid July 2008. RR is the term associated with the first product unit shipped for revenue. RR indicates that Sun Fire X2250 Server meets all of its planned and approved functional feature and quality requirements.

General Availability

The Sun Fire X2250 Server reached General Availability (GA) on July 18, 2008. GA refers to the dates when Sun Fire X2250 Server is available in all planned languages and on all planned media types, with standard processes in place to order, build, deliver and bill for any of them on a worldwide basis. (All orders taken and still pending shipment when GA is declared are to be filled on a first priority basis using standard lead times).

End Of Life (EOL)

End of Life (EOL) is the date in which Sun announces the end-of-life schedule for a stated product. Sun Fire X2250 Server will be EOL-announce in August 2009. Last Order Date (LOD), the final date Sun can take an order for Sun Fire X2250 Server, will be November 2009. Last Ship Date (LSD), the final date Sun will ship Sun Fire X2250 Server, will be February 2010.

Factory Lead Time (FLT)

No amount of standard configurations (configurations pre-built in factory) can meet the various workloads and budget intended for customers of Sun Fire X2250 Server. Sun strongly advises resellers and direct customers to order via ATO (Assemble to Order) to get exactly what they want. It is the goal to have nearly zero lead time penalties for ATO and nearly zero price premiums for ATO, when compared to standard configurations. Table 14 describes the factory lead time of Sun Fire X2250 Server.

Table 18 – Factory Lead Time of Sun Fire X2250 Server

	Factory Lead Time (Number of Days)	Orders Received by Monday 8am PDT will direct ship to customers or arrive at Sun cross-dock by:

ATO Configurations
    US
    EMEA
    APAC
	
	5
	8
	8
		
		Friday
		Wednesday of following week
		Wednesday of following week

Standard Configurations
    US
    EMEA
    APAC
	
	5
	8
	8
		
		Friday
		Wednesday of following week
		Wednesday of following week

X-Options
    US
    EMEA
    APAC
	
	TBD
	TBD
	TBD
		
		TBD
		TBD
		TBD

Field Replacement Units	TBD	TBD

Assemble to Order (ATO)

Table 15 shows the part numbers and descriptions for Sun Fire X2250 Server ATO. ATO provides the ultimate flexibility to Sun's customers, at nearly zero price premium and nearly zero added factory lead time. ATO is available only via WebDesk. ATO is not available via store.sun.com. An ATO Sun Fire X2250 Server order will be built in Sun's factory according to the content specified by the customer.

Table 19 - Sun Fire X2250 Server ATO options

ATO Part Number	NTE Price (U.S)	Discount Category	Description
X2250-H1-AA	$800	F	ATO Base for Sun Fire X2250 Server (Chassis , Motherboard, Power supply, Getting Started Guide, Where-to-Find Document, Solaris Entitlement, RoHS China document, Safety documentation, SMI software license agreement)
5117A	$1799	F	Intel Xeon Processor Model X5482 (45nm Quad Core 3.20GHz FSB1600 120W)
5116A	$1449	F	Intel Xeon Processor Model E5472 (45nm Quad Core 3.00GHz FSB1600 80W)
5106A	$1449	F	Intel Xeon Processor Model X5472 (45nm Quad Core 3.00GHz FSB1600 120W)
5107A	$1699	F	Intel Xeon Processor Model X5272 (45nm Dual Core 3.40GHz FSB1600 80W)
5108A	$1199	F	Intel Xeon Processor Model E5462 (45nm Quad Core 2.80GHz FSB1600 80W)
5112A	$1599	F	Intel Xeon Processor Model X5460 (45nm Quad Core 3.16GHz FSB1333 120W)
5113A	$619	F	Intel Xeon Processor Model L5420 (45nm Quad Core 2.50GHz FSB1333 50W)
5109A	$349	F	Intel Xeon Processor Model E5405 (45nm Quad Core 2.00GHz FSB1333 80W)
5110A	$1100	F	8GB Fully-Buffered ECC DDR2-800 (Memory Kit (2x 4GB)
5111A	$400	F	4GB Fully-Buffered ECC DDR2-667 Memory Kit (2x 2GB)
6382A	$845	F	8GB Fully-Buffered ECC DDR2-667 Memory Kit (2x 4GB)
6381A	$255	F	4GB Fully-Buffered ECC DDR2-667 Memory Kit (2x 2GB)
5114A	$0	F	Solaris 10 Update 5 Pre-Install Image for Sun Fire X2250 Server
RB-ST1CE-1T7K	$949	F	1TB Internal SATA 3Gbps 7,200-RPM 3.5-inch HDD
RB-ST1CE-500GB7K	$359	F	500GB Internal SATA 3Gbps 7,200-RPM 3.5-inch HDD
RC-ST1CE-250GB7K	$179	F	250GB Internal SATA 3Gbps 7,200 RPM 3.5-inch HDD
8088A-Z	$0	F	HDD Filler panel
5286A-Z	$145	F	DVD Burner (Reads and Writes)
5294A-Z	$95	F	DVD ROM (Reads only)
5291A-Z	$0	F	ODD Filler panel
8029A-Z	$150	F	Rack-mounting Slide Rail Kit
8028A-Z	$95	F	Cable-management Arm
8029A-EZ	$150	F	Tool-less Rack-mounting Kit

Standard Configurations

Sun Fire X2250 Server has three standard configurations. Table 20 shows the part numbers and descriptions for each standard configuration of Sun Fire X2250 Server.

Table 20 - Sun Fire X2250 Server standard configurations

Part Number	NTE Price (U.S.)	Discount Category	Description
X2250-14-H300-24-A	$3395	F	One Intel Xeon X5472 (Quad Core, 3.00GHz, 1600MHz FSB, 120W) + 8GB (2x4GB, Fully-Buffered DIMM, ECC, DDR2-800MHz)
X2250-14-H316-22-A	$2995	F	One Intel Xeon X5460 (Quad Core, 3.16GHz, 1333MHz FSB, 120W) + 4GB (2x2GB, Fully-Buffered DIMM, ECC, DDR2-667)
X2250-14-M200-22-A	$1495	F	One Intel Xeon E5405 (Quad Core, 2.00GHz, 1333MHz FSB, 80W) 4GB (2x 2GB, Fully-buffered DIMM, ECC, DDR2-667)
X2250-14-L250-22-A	$1995	F	One Intel Xeon L5420 (Quad Core, 2.50GHz, 1333MHz FSB, 50W). 4GB (2x2GB, Fully-Buffered DIMM, ECC, DDR2-667)

X-Options

Table 21 and Table 22 shows the part numbers and descriptions for Sun Fire X2250 Server X-options. X-Option are upgrade components such as storage HBAs, hard disk drives, memory, and are deemed by Sun to be end-user installable. X-Options may be purchased directly at store.sun.com or Webdesk. X-Options comes in individual packaging and contain end-user friendly instructions to aid installation. Some items such as processors, are available via ATO only and not X-Options because these items must be installed in Sun Fire X2250 Server before shipped to customer.

Table 21 - Sun Fire X2250 Server X-Options

X-Option Part Number	List Price	Discount Category	Description
SG-XPCIE1FC-EM4	$1110	H	4Gb Single Fiber Channel PCIe Host Bus Adapter, Emulex, includes Standard and Low Profile Brackets

X-Option Part Number	List Price	Discount Category	Description
SG-XPCIE1FC-QF4	$1110	H	Sun StorageTek PCIe Enterprise 4 Gb Fiber Channel Host Bus Adapter, Single Channel includes standard and low profile brackets, low profile form factor
X7280A-2	$269	F	Sun 2-port Gigabit Ethernet NIC (Copper)
X7281A-2	$889	F	Sun 2-port Gigabit Ethernet NIC (Fiber)
X4446A-Z	$590	E	Sun 4-port Gigabit Ethernet NIC (Copper)
X6000A	$1350	H	Sun Crypto Accelerator 6000 SSL/IPsec Accelerator

Table 22 - Sun Fire X2250 Server X-Options

X-Option Part Number	List Price	Discount Category	Description
X5115A	$6	F	Optional Media and Documentation Kit: Installation Guide, Tool & Driver CD, Sun Installation Assistant (SIA) CD, Sun Validation Test Suite (VTS) CD, SMI Software License Agreement
X 5117A	$1799	F	Intel Xeon Processor Model X5482 (45nm Quad Core 3.20GHz FSB1600 120W)
X5116A	$1449	F	Intel Xeon Processor Model E5472 (45nm Quad Core 3.00GHz FSB1600 80W)
X5106A	$1495	F	Intel Xeon Processor Model X5472 (45nm Quad Core 3.00GHz 1600MHz FSB 120W)
X5107A	$1695	F	Intel Xeon Processor Model X5272 (45nm Dual Core 3.40GHz 1600MHz FSB 80W)
X5108A	$1195	F	Intel Xeon Processor Model E5262 (45nm Dual Core 2.80GHz 1600MHz FSB 80W)
X5112A	$1595	F	Intel Xeon Processor Model E5460 (45nm Quad Core 3.16GHz FSB1333 80W)
X5113A	$619	F	Intel Xeon Processor Model L5420 (45nm Quad Core 2.50GHz FSB1333 50W)
X5109A	$349	F	Intel Xeon Processor Model E5405 (45nm Quad Core 2.00GHz FSB1333 80W)
X5110A	$1100	F	8GB Fully-Buffered ECC DDR2-800 (Memory Kit (2x 4GB)
X5111A	$400	F	4GB Fully-Buffered ECC DDR2-800 Memory Kit (2x 2GB)
X6382A	$845	F	8GB Fully-Buffered ECC DDR2-667 Memory Kit (2x 4GB)
X6381A	$255	F	4GB Fully-Buffered ECC DDR2-667 Memory Kit (2x 2GB)
XRB-ST1CE-1T7K	$995	F	1TB Internal SATA 3Gbps 7,200-RPM 3.5-inch HDD
XRB-ST1CE-500GB7K	$359	F	500GB Internal SATA 3Gbps 7,200-RPM 3.5-inch HDD
XRC-ST1CE-250GB7K	$179	F	250GB Internal SATA 3Gbps 7,200 RPM 3.5-inch HDD
X5286A-Z	$145	F	DVD Burner (Reads/Writes)
X5294A-Z	$95	F	DVD ROM (Reads only)
X8029A-Z	$150	F	Rack-mounting Slide Rail Kit
X8028A-Z	$95	F	Cable-management Arm
X8029A-EZ	$150	F	Tool-less Rack-mounting Kit
X1236A-Z	$1398	E	Sun Dual Port 4x IB Host Channel Adapter PCIe. Low profile. Provides 4x(10Gbps) connectivity to InfiniBand Fabric Network. RoHS Compliant. Short bracket and regular bracket.
X4127A-Z	$995	unknown	Sun Dual Port DDR IB Host Channel Adapter PCIe
X1027A-Z	$998	F	Sun 10 Gigabit Ethernet NICSun Multithreaded 10 GbE card, RoHS-6 Compliant
X1106A-Z	$1795	unknown	Sun 10GbE XFP SR PCIe Card with Intel 82598 10 Gigabit Ethernet Controller Includes Single-Port 10GbE Card with 1 XFP SR Fixed Transceiver, Non Pluggable
X1107A-Z	$2495	unknown	Sun Dual 10GbE XFP 2 SR PCIe Card with Intel 82598 10 Gigabit Ethernet Controller Includes Dual-Port 10GbE Card with 2 XFP SR Fixed Transceivers, Non Pluggable
SG-XPCIE2SCSIU320Z	$510	F	Sun StorageTek PCI Express x4 Dual Channel Ultra320 SCSI Host Bus Adapter
SG-XPCIE2FC-QF4	$1995	unknown	Sun StorageTek PCIe Enterprise 4Gb FC Host Bus Adapter, Dual channel includes standard and low profile brackets, low profile form factor, RoHS-6 Compliant
SG-XPCIE1FC-EM4	$1110	H	4Gb Single Fiber Channel PCIe Host Bus Adapter, Emulex, includes Standard and Low Profile Brackets
SG-XPCIE1FC-QF4	$1110	H	Sun StorageTek PCIe Enterprise 4 Gb Fiber Channel Host Bus Adapter, Single Channel includes standard and low profile brackets, low profile form factor
X7280A-2	$269	F	Sun 2-port Gigabit Ethernet NIC (Copper)
X7281A-2	$889	F	Sun 2-port Gigabit Ethernet NIC (Fiber)
X4446A-Z	$590	E	Sun 4-port Gigabit Ethernet NIC (Copper)
X6000A	$1350	H	Sun Crypto Accelerator 6000 SSL/IPsec Accelerator

Field Replacement Units (FRUs) and Customer Replacement Units (CRUs)

Table 23 shows the part numbers and descriptions for Sun Fire X2250 Server Field Replacement Units (FRUs) and Customer Replacement Units (CRUs). CRUs are components that can be serviced by the customer. FRUs should be serviced by an authorized Sun engineer. FRUs and CRUs may be purchased from Sun via store.sun.com.

Table 23 - Sun Fire X2250 Server FRUs and CRUs

FRU Part Number	FRU or CRU	Price	Description
#371-3587	FRU	TBD	Motherboard Assembly
#300-2178	FRU	TBD	500W Power Supply
#310-0206	FRU	TBD	Processor Heatsink (Passive)
#310-0065-01	FRU	TBD	Thermal Grease Syringe
#371-2210	FRU	TBD	CR2032 Battery
	CRU	TBD	Rack-Mount Kit
#371-4188	FRU	TBD	PCIe X16 Slot Riser Card
#371-2098	FRU	TBD	SATA/SAS Connector Backplane – Same as Sun Fire X2200 M2 Server ("Taurus")
#371-4189	FRU	TBD	5 Cables:HDD Pwr Harness,ODD Signal,Front I/O,HDD x 2
#371-2095		TBD	Axial Fan – Same as Sun Fire X2200 M2 Server ("Taurus")
#371-2096	FRU	TBD	Cooling Blower Assembly (Dual Unit, 1 per system) – Same as Sun Fire X2200 M2 Server ("Taurus")
#371-2097	FRU	TBD	Front I/O Board – Same as Sun Fire X2200 M2 Server ("Taurus")
#371-4457	FRU	TBD	Intel Xeon Processor Model X5482 (45nm Quad Core 3.20GHz FSB1600 120W)
#371-4457	FRU	TBD	Intel Xeon Processor Model E5472 (45nm Quad Core 3.00GHz FSB1600 80W)
#371-4183	FRU	TBD	Intel Xeon Processor Model X5472 (45nm Quad Core 3.00GHz 1600MHz FSB 120W)
#371-4181	FRU	TBD	Intel Xeon Processor Model X5272 (45nm Dual Core 3.40GHz 1600MHz FSB 80W)
#371-4184	FRU	TBD	Intel Xeon Processor Model E5262 (45nm Dual Core 2.80GHz 1600MHz FSB 120W)
#371-3952	FRU	TBD	Intel Xeon Processor Model E5460 (45nm Quad Core 3.16GHz FSB1333 80W)
#371-4182	FRU	TBD	Intel Xeon Processor Model E5405 (45nm Quad Core 2.00GHz FSB1333 80W)
#371-3951	FRU	TBD	Intel Xeon Processor Model L5420 (45nm Quad Core 2.50GHz FSB1333 50W)
#540-7714	CRU	TBD	8GB Fully-Buffered ECC DDR2-800 Memory Kit (2x 4GB)
#540-7713	CRU	TBD	4GB Fully-Buffered ECC DDR2-8007 Memory Kit (2x 2GB)
#540-7348	CRU	TBD	8GB Fully-Buffered ECC DDR2-667 Memory Kit (2x 4GB)
#540-7347	CRU	TBD	4GB Fully-Buffered ECC DDR2-667 Memory Kit (2x 2GB)
#540-7506	CRU	TBD	1TB Internal SATA 3Gbps 7,200-RPM 3.5-inch HDD
#540-6645	CRU	TBD	500GB Internal SATA 3Gbps 7,200-RPM 3.5-inch HDD – Same as Sun Fire X2200 M2 Server and Sun Fire X2100 M2 Server
#540-7511	CRU	TBD	250GB Internal SATA 3Gbps 7,200 RPM 3.5-inch HDD – Same as Sun Fire X2200 M2 Server and Sun Fire X2100 M2 Server
#371-2205	CRU	TBD	DVD Burner (Reads/Writes) - Same as Sun Fire X2200 M2 Server and Sun Fire X2100 M2 Server
#371-2283	CRU	TBD	DVD ROM (Reads only) – Same as Sun Fire X2200 M2 Server and Sun Fire X2100 M2 Server
#370-7669	CRU	TBD	Rack-mounting Slide Rail Kit - Same as Sun Fire X2200 M2 Server
#370-7668	CRU	TBD	Cable-management Arm - Same as Sun Fire X2200 M2 Server
#371-2374	CRU	TBD	Tool-less Rack-mounting Kit - Same as Sun Fire X2200 M2 Server

Country Kits (Mouse, Keyboard, Power Cords)

Sun Fire X2250 Server has been fully validated with 27 different Sun Country Kits shown in Table 20. Country kits include the keyboard, mouse, and power cord compatible to a specific geography. Sun Fire X2250 Server has been validated with Type 7 keyboards and Type 7 mice only. Type 6 keyboards and Type 6 mice have been discontinued and have never been validated on Sun Fire X2250 Server.

Sun Type 7 Keyboard	Full size keyboard with Solaris short-cut keys
	• Tilt legs for adjustable typing angles • 6.5 ft. (2 meter) Cable • UNIX and PC layouts available (UNIX layout uses different layout for non-standard keys, such as ESC, Backspace, Caps Lock and Control functions) • Multi-language support (support for 25 different languages) • Includes 2 USB hubs for plugging in other devices such as mouse and smart card reader • RoHS-6 (Lead Free) Compliant • Sleek new Sun industrial design • Fully tested for compatibility with Sun server and Sun Ray thin clients
Sun Type 7 Mouse	Three button with optical tracking and scroll wheel
	• Optical sensor records motion more precisely than a traditional mouse • Ease-of-use and increased reliability because there are no moving parts to wear out or collect dust/dirt • No mouse pad needed for this device • Convenient, faster scrolling through documents without clicking on scroll bar • Ergonomic design • RoHS-6 (Lead Free) Compliant • Sleek, intuitive new Sun industrial design • Fully tested for compatibility with Sun servers and Sun Ray thin clients

Table 24 - Sun Type 7 Country Kits

Country Kit	Part Number	Country Kit	Part Number
Type 7 Arabic	X3791A	Type 7 Norwegian	X3760A
Type 7 Australian	X3766A	Type 7 Portuguese	X3761A
Type 7 Belgian	X3790A	Type 7 Russian	X3785A
Type 7 Chinese	X3782A	Type 7 Spanish	X3762A
Type 7 Danish	X3763A	Type 7 Swedish	X3736A
Type 7 Dutch/Netherlands	X3765A	Type 7 Euro Universal	X3868A
Type 7 Euro Universal	X3868A	Type 7 Euro UNIX	X3759A
Type 7 Euro UNIX	X3759A	Type 7 Swiss-French	X3734A
Type 7 Finnish	X3767A	Type 7C Swiss-German	X3735A-COM
Type 7 French	X3732A	Type 7C Taiwanese	X3754A-COM
Type 7 German	X3733A	Type 7C Turkish-Q	X3787A-COM
Type 7 Italian	X3764A	Type 7C UK	X3737A-COM
Type 7 Japanese	X3756A	Type 7C US PC	X3731A-COM
Type 7 Korean	X3755A		

Table 25 - Sun Power Cords

Power Cord	Part Number
US/Asia	X311L
Continental Europe	X312L
Australia	X386L
UK	X317L
Switzerland	X314L
Italy	X384L
Denmark	X383L
Chinese	X312E
Argentina, AC	X312F
Korean. 250V	X312G

Appendix

Comparison: Sun Fire X2250 Server versus Sun Fire X2200 M2 Server

Sun Fire X2250 Server complements the Sun Fire X2200 M2 Server. Sun Fire X2250 Server, featuring the Enhanced Intel Core Micro-architecture, 800MHz FBDIMMs, and 1600MHz FSB, represents the highest system performance, memory bandwidth, and I/O bandwidth found in a 2-socket entry-level server. The Sun Fire X2200 M2 Server, featuring AMD Opteron 2300 processor (previously code-named "Barcelona") uses registered 667MHz DDR2 memory instead of 800MHz FB-DIMM. For customers requiring the lowest cost, most energy-efficient, and modest memory performance, registered 667MHz DDR2 memory offers superior performance-per-watt and cost-to-performance ratios, because registered DDR2 memory costs about $10 less per module compared to FB-DIMM and generates less heat.   Table 26 compares the differences of these two servers.

Table 26 – Key Differences of Sun Fire X2250 Server to the Sun Fire X2200 M2 Server

Features	Sun Fire X2250 Server	Sun Fire X2200 Server
Form-Factor	1RU	
(Height x Width x Depth)	44.0 mm (1.75 inches) x 425.5 mm (16.8 inches) x 633.7mm (25.40 in)	43.0 mm (1.70 inches) x 425.5 mm (16.8 inches) 633.7mm (25.40 in)
Processor	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series	65nm AMD Opteron 2300-series (Quad Core) 65nm AMD Opteron 2200-series (Dual-core)
Number of Sockets	Two	
Processor Models	Quad Core: X5472 (3.00GHz, FSB1600, 120W), X5460 (3.16GHz, FSB1333, 120W), E5462 (2.80GHz, FSB1600, 80W) E5405 (2.00GHz, FSB1333, 80W) Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W) Dual Core: X5272 (3.40GHz, FSB1600, 80W)	Quad Core: 2356 (2.3GHz, 95W) Dual Core: 2222 (3.00GHz, 95W), 2220 (2.8GHz, 95W) 2218 (2.6GHz, 95W), 2210 (1.8GHz, 95W) 2218HE (2.6GHz, 68W)
Chipset I/F	1600MHz FSB & 1333 MHz FSB	HyperTransport 2.0
Chipset	Intel 5400 Chipset	NVIDIA Nforce Professional 3600
Memory	Fully-Buffered DIMMs 8 DIMM slots total per system 32GB maximum Two DIMM sizes at 800MHz: 2x4GB, 2x2GB **Two DIMM sizes at 667MHz: 2x4GB, 2x2GB**	Registered DIMMs with ECC 16 DIMM slots per system 64GB maximum Three DIMM sizes at 667MHz (1GB ECC, 2GB ECC, 4GB ECC)
PCI Express Slots	PCI Express 1.0 512MBps per lane One 16-lane half length slot No optional riser for two x8 slots	PCI Express 1.0 512MBps per lane Two 8-lane half length slots Optional riser card with one 16-lane slot
Graphics Controller	2D graphics controller embedded in service processor Support remote console at resolution up to 1600x1200x16bit@60Hz	
Hard Disk Drives	Up to two hot-plug SATA drives, 2TB maximum: 250GB, 500GB, 1TB (7,200-rpm) No SAS	Up to two hot-plug SATA drives, 1TB maximum: 250GB, 500GB (7,200-rpm) Up to two hot-plug SAS drives, 600GB maximum: 146GB, 300GB (15,000-rpm)
Optical Drive	Tray-loading, slim DVD-ROM or DVD Burner	
Networking	Two Gigabit Ethernet ports integrated on motherboard. One 10/100 port for remote management Three RJ-45 ports (rear)	Four Gigabit Ethernet port integrated on motherboard One 10/100 port for remote management
Serial Port	One TIA/EIA-232-F asynchronous RJ45 Port (rear)	One Serial DB-9 Port rear)
USB ports	Five USB 2.0 ports – 2 front, 2 rear, 1 internal	Six USB 2.0 ports - 2 front, 4 rear
Service Processor	ASPEED AST2000 IPMI 1.5/2.0 compliant Service Processor with Integrated Lights Out Management (ILOM) offering remote power, KVM, and media capability	ASPEED AST2000 IPMI 1.5/2.0 compliant Service Processor with Embedded Lights Out Management (ELOM) offering remote power, KVM, and media capability
Power Supply	500W (Non-redundant 80% efficiency)	450W (Non-redundant)
Operating Systems Validated by Sun	Red Hat Enterprise Linux 4 & 5 AS SuSe Linux Enterprise Server 10 windows server 2003/2008 Enterprise Solaris 10 Update 5 or later No VM Ware ESX Server 3.5	Red Hat Enterprise Linux 4 & 5 AS SuSe Linux Enterprise Server 9 & 10 windows server 2003/2008 x64 Solaris 10 VM Ware ESX Server 3.5
Warranty	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site	
Starting List Price	$1,499	$1,455

Comparison: Sun Fire X2250 Server versus Sun Fire X4150 Server

Sun Fire X2250 Server complements the Sun Fire X4150 Server. Sun Fire X2250 Server, featuring the Enhanced Intel Core Micro-architecture, 800MHz FBDIMMs, and 1600MHz FSB, represents the highest system performance, memory bandwidth, and I/O bandwidth found in a 2-socket server designed for HPC customers and mainstream server customers. The Sun Fire X4150 Server, featuring power supply redundancy and system fan redundancy, eight internal disks, four Gigabit Ethernet ports, is ideal for virtualization and consolidation, and the high-availabilty required by data centers.   Table 27 compares the differences of these two servers

Table 27 - Comparison of Sun Fire X2250 Server to the Sun Fire X4150 Server

Features	Sun Fire X2250 Server	Sun Fire X4150 Server
Intel Platform	"Stoakley"	"Bensley"
Form-Factor	1RU	
(Height x Width x Depth)	44.0 mm (1.75 inches) x 425.5 mm (16.8 inches) x 633.7mm (25.40 in)	44.0 mm (1.73 inches) x 425.5 mm (16.8 inches) 711.2mm (28.40 in)
Processor	45nm Quad-core Intel Xeon processor 5400 series 45nm Dual-core Intel Xeon processor 5200 series	45nm Quad-core Intel Xeon processor 5400 series 45 nm Dual-core Intel Xeon processor 5200 series 65nm Quad-core Intel Xeon processor 5300 series 65nm Dual-core Intel Xeon processor 5100 series
No. of Sockets	Two	Two
Processor Models	45nm Quad Core: X5482 (3.2GHz, FSB1600, 120W), E5472 (3.0GHz, FSB1600, 80W), X5472 (3.00GHz, FSB1600, 120W), X5460 (3.16GHz, FSB1333, 120W), E5462 (2.80GHz, FSB1600, 80W) E5405 (2.00GHz, FSB1333, 80W) 45nm Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W) 45nm Dual Core: X5272 (3.40GHz, FSB1600, 80W)	45nm Quad Core ("Harpertown") X5460 (3.16GHz, 1333MHz FSB, 120W) E5440 (2.83GHz, 1333MHz FSB, 80W) E5410 (2.33GHz, 1333MHz FSB, 80W) 45nm Low Voltage Quad Core: L5420 (2.5GHz, FSB1333, 50W) 45nm Dual Core ("Wolfdale-DP") X5260 (3.33GHz, 1333MHz FSB, 80W) 65nm Quad Core ("Tigerton") X5355 (2.66GHz, 1333MHz FSB, 120W) E5345 (2.33GHz, 1333MHz FSB, 80W) E5320 (1.86GHz, 1066FSB, 80W) 65nm Low Voltage Quad Core ("Tigerton LV") L5310 (1.60GHz, 1066FSB, 50W) L5335 (2.0GHz, 1333MHz FSB, 50W) 65nm Dual Core ("Woodcrest") E5160 (3.00GHz, 1333MHz FSB, 80W))
Chipset I/F	1600MHz FSB & 1333 MHz FSB	FSB1333 MHz FSB only
Chipset	Intel 5400 Chipset	Intel 5000P Chipset
Memory	Fully-Buffered DIMMs 8 DIMM slots total per system 32GB maximum Two DIMM sizes at 800MHz: 2x4GB, 2x2GB **Two DIMM sizes at 667MHz: 2x4GB, 2x2GB**	667MHz FB-DIMM only Fully-Buffered DIMMs with ECC 16 DIMM slots per system 64GB maximum Three DIMM sizes at 667MHz: 4GB, 2GB, 1GB
PCI Express Slots	PCI Express 1.0 512MBps per lane One 16-lane half length slot No optional riser for two x8 slots	PCI Express 1.0 512MBps per lane Three 16-lane (8-lane electrical) half length slots
Graphics Controller	2D graphics controller embedded in service processor Support remote console at resolution up to 1600x1200x16bit@60Hz	
Hard Disk Drives	Up to two hot-plug SATA drives, 2TB maximum: 250GB, 500GB, 1TB (7,200-rpm) No SAS	No SATA drives Up to eight hot-plug 2.5-inch SAS drives, 1.18TBGB maximum: 146GB, 73GB (10,000-rpm)
Optical Disk Drive	Tray-loading, slim DVD-ROM or DVD Burner	Slot-loading, slim DVD-ROM or DVD Burner
Networking	Two Gigabit Ethernet ports integrated on motherboard. One 10/100 port for remote management Three RJ-45 ports (rear)	Four Gigabit Ethernet ports integrated on motherboard. Four RJ-45 ports (rear)
Serial Port	One TIA/EIA-232-F asynchronous RJ45 Port (rear)	
USB ports	Five USB 2.0 ports – 2 front, 2 rear, 1 internal	Five USB 2.0 ports - 2 front, 2 rear, 1 internal
Service Processor	ASPEED AST2000 IPMI 1.5/2.0 compliant Service Processor with Integrated Lights Out Management (ILOM) offering remote power, KVM, and media capability	ASPEED AST2000 IPMI 1.5/2.0 compliant Service Processor with Embedded Lights Out Management (ELOM) offering remote power, KVM, and media capability
Power Supply	500W (Non-redundant 80% efficiency)	Redundant 650W power supply

Features	Sun Fire X2250 Server	Sun Fire X4150 Server
Operating Systems Validated by Sun	Red Hat Enterprise Linux 4 & 5 AS SuSe Linux Enterprise Server 10 windows server 2003/2008 Enterprise Solaris 10 Update 5 or later No VM Ware ESX Server 3.5	Red Hat Enterprise Linux 4 & 5 AS (Advanced Server) SuSe Linux Enterprise Server 9 & 10 windows server 2003/2008 x64 Standard & Enterprise VM Ware ESX Server 3.5 Solaris 10
Warranty	One Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site	Three Year Next Business Day HW Coverage Hours: Business Hours HW Response Times: Next Business Day Delivery Method: Parts Exchange or On-site
Starting List Price	$1,499	$2,495

Sun Services

Sun offers three key areas of services to optimize the performance of the Sun Fire X2250 Server and its HPC capabilities, including:

1. World-class Heterogeneous Support:

SunSpectrum Support is a portfolio of Service Plans that provide heterogeneous OS and hardware support. The offerings help boost system availability, create IT efficiencies, reduce budgetary risk, squeeze more value from IT assets, and eliminate separate operating system (OS) licensing/subscription costs.

Whether customers are running the Solaris, Windows, or Linux, Sun's support services offer world-class heterogeneous support. With this integrated hardware and OS support, customers can choose from multiple levels of service to best match their business needs, from basic to mission-critical support.

SunSpectrum Support

SunSpectrum Support is a portfolio of Service Plans that helps boost system availability, create IT efficiencies, reduce budgetary risk, squeeze more value from IT assets, and eliminate separate operating system (OS) licensing/subscription costs. The total-system approach provided by a Sun System Service Plan remains the best option if your customers are running the Solaris or Windows OS on their Sun Fire X2250 servers.

Sun System Service Plans for Solaris OS

Customers can enjoy the value and ease of fully-integrated hardware and Solaris OS support, for one price per system per year, as well as resources for proactive system management so they they keep their environments -- and businesses -- running efficiently. Through a combination of hardware service coverage, telephone and online
technical support, and Solaris updates, Sun can help customers resolve technical issues quickly and effectively.

Sun System Service Plans for Windows OS

Customers can take advantage of a single point of contact for heterogeneous support through Sun's world-class services organization. If your customers are running Microsoft Windows on their Sun Fire X2250 servers, Sun System Service Plans for the Windows OS let them run their operations with greater confidence, knowing that bothhardware and operating systems (OS) are covered by the same world-class services organization known for its outstanding support.

Sun Support for Linux

If customers are running Linux, Sun offers software support plans and hardware support to provide both OS and hardware coverage.

2. HPC Services:

HPC Quick Start Services are 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.

Sun Datacenter Express Services for HPC allow customers to choose the HPC hardware and software needed -- without having to source the products. Sun ISO-certified factories assemble, integrate, and deliver the products according to user specifications, which means new HPC systems can be deployed in a matter of days rather than weeks or months.

Sun Single Point of Contact (SPOC) Service is an existing Sun Managed Service that has recently been enhanced and updated for HPC customers. SPOC helps ease customers' burden of managing multiple HPC support vendors. SPOC is a one-stop service that allows customers to contact Sun when support is needed for HPC solutions, and Sun will manage the coordination of the key vendors on the customer's behalf.

3. Training:

Sun Learning Services includes 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.