Sun Fire™ V60x Server and Sun Fire™ V65x Server

Just the Facts

v4.0 — December 2003

(SunWIN token# 375850)

We make the net work.

Sun microsystems

Table of Contents

Sun Fire™ V60x Server and Sun Fire™ 65x Server

Sun Fire™ V60x Server and Sun Fire™ 65x Server

Positioning

Figure 1. Sun Fire™ V60x Server

Figure 2. Sun Fire™ V65x Server

Introduction

The Sun Fire™ V60x server and Sun Fire™ V65x server are Sun's next-generation, x86-based, entry-level servers. Capable of running Standard Linux Distributions, Red Hat Enterprise Linux, SuSE Enterprise Linux Server or the Solaris™ x86 Operating System, the Sun Fire V60x server and Sun Fire V65x server are designed for Tier 0, 1 and 2 applications. These 1U and 2U servers are powerful additions to the portfolio of Sun™ products designed for horizontally scaled compute environments.

With up to two Intel Xeon processors running at 2.8GHz, 3.06GHz or 3.2 GHz, the Sun Fire V60x server and Sun Fire V65x server utilize the latest x86 technology to run and drive Solaris-x86-based and Linux-based applications. Drivers for Standard Linux Distributions will be introduced over the next few quarters, enabling customers to choose the OS that best meets their requirements.

The Sun Fire V60x server and Sun Fire V65x server will also be available through the Sun Customer Ready Systems (CRS) program. The Sun CRS program helps provide customers factory integrated hardware and software products with custom options and services in order to deploy IT infrastructures more simply, safely and swiftly.

Among the firsts for the Sun Fire V60x server and Sun Fire V65x server:

- the first x86-based 2U server with 6 PCI-X expansion slots
- the first 2U Linux-based server capable of hosting up to 12GB of memory

Product Family Placement

The Sun Fire V60x server and Sun Fire V65x server are the latest additions to Sun's x86-based server product portfolio and provides an upgrade path for customers from the Sun LX50 server. Based on Intel Xeon technology and a 533-MHz Front Side Bus (FSB), the Sun Fire V60x server and Sun Fire V65x server provide customers with leading-edge compute power and fast-data-transfer throughput for its price point.

Product Shots of the Sun Fire V60x Server

Figure 3. Sun Fire V60x Server – Front View

Figure 4. Sun Fire V60x Server – Rear View

Product Shots of the Sun Fire V65x Server

Figure 5. Sun Fire V65x Server – Front View

Figure 6. Sun Fire V65x Server – Rear View

Feature Comparison Between the Sun LX50 Server, Sun Fire V60x Server and Sun Fire V65x Server

The nearest similar x86/Linux Sun product to the Sun Fire V60x server and the Sun Fire V65x server is the Sun LX50 server. The Sun Fire V60x server and the Sun Fire V60x server are, however, much higher-performing solutions than the Sun LX50 server. On the other hand, the Sun LX50 server offers an entry-level price that cannot be matched by the Sun Fire V60x server and the Sun Fire V65x server.

The following table compares the Sun LX50 server against the Sun Fire V60x server and the Sun Fire V65x server.

Features	Sun LX50 Server	Sun Fire V60x Server	Sun Fire V65x Server
CPU type	Pentium III	Intel Xeon	Intel Xeon
CPU speed	1.4GHz	2.8 / 3.06 / 3.2 GHz	2.8 / 3.06 / 3.2 GHz
Level 2 cache	256KB	512KB	512KB
Front Side Bus (FSB)	133MHz	533MHz	533MHz
Maximum memory	6GB	6GB	12GB
Hard Disk Drives	Three U160 SCSI	Three U320 SCSI	Six U320 SCSI
HW RAID	None	Optional	Optional
Network connections	Integrated 2 x 10/100 Mb/s NICs	Integrated 2 x 10/100/1000 Mb/s NICs	Integrated 2 x 10/100/1000 Mb/s NICs
Removable media	CD/Floppy	CD/Floppy	CD/Floppy
DVD option	No	Yes	Yes
Rack-unit height	1U	1U	2U
Depth	23.89 in (607 mm)	23.89 in (607 mm)	25.51 in (648 mm)
PCI (-X) slots	2 PCI	2 PCI-X	6 PCI-X
Power supply	250W PFC	350W PFC	500W PFC 1+1
O/S	Sun Linux 5.0 Solaris 8, x86 edition Solaris 9, x86 edition	Standard Linux Distributions / Solaris 9, x86 edition	Standard Linux Distributions / Solaris 9, x86 edition

Feature Comparison Between the Sun Fire V60x Server, Sun Fire V120 Server and Sun Fire V210 Server

Sun will continue to market entry-level SPARC®-powered servers concurrently with the Sun Fire V60x server and Sun Fire V65x server.

To assist in positioning the products, the following table compares the Sun Fire V60x server against the Sun Fire V120 server and the Sun Fire V210 server.

Features	Sun Fire V60x Server	Sun Fire V120 Server	Sun Fire V210 Server
Maximum number of CPUs	2	1	2
Processor	Xeon, P4	UltraSPARC® II	UltraSPARC IIIi
CPU speed	2.8 / 3.06 / 3.2 GHz	650MHz	1.06GHz
Level 2 cache	512KB	512KB	1MB
Memory	512MB–6GB	512MB–4GB	512MB–8GB
Operating System	Standard Linux Distributions / Solaris 9, x86 edition	Solaris 8 / Solaris 9	Solaris 8 / Solaris 9
Expansion slots	2 PCI-X	1 PCI	1 PCI
Network connections	Integrated 2 x 10/100/1000 Mb/s NICs	Integrated 2 x 10/100 Mb/s NICs	Integrated 4 x 10/100/1000 Mb/s NICs
USB ports	3	2	2
Serial ports	1	–	2
Rack-unit height	1U	1U	1U
Depth	23.89 in (607 mm)	24 in (610 mm)	24 in (610 mm)
Total Internal Storage	219GB	72GB	73GB
Power supply	350 Watts	–	320 Watts
Management	Sun Control Station	LomLite2	Advanced Lights Out Management (ALOM)

Feature Comparison Between the Sun Fire V65x Server, Sun Fire V240 Server and Sun Fire V280 Server

Sun will continue to market entry-level SPARC-powered servers concurrently with the Sun Fire V60x server and Sun Fire V65x server.

To assist in positioning the products, the following table compares the Sun Fire V65x server against the Sun Fire V240 server and the Sun Fire V280 server.

Features	Sun Fire V65x Server	Sun Fire V240 Server	Sun Fire V280 Server
Maximum number of CPUs	2	2	2
Processor	Xeon, P4	UltraSPARC IIIi	UltraSPARC III
CPU speed	2.8 / 3.06 / 3.2 GHz	1.06GHz	1.2GHz
Level 2 cache	512KB	1MB	8MB
Memory	512MB–12GB	512MB–16GB	512MB–16GB
Operating System	Standard Linux Distributions / Solaris 9, x86 edition	Solaris 8 / Solaris 9	Solaris 8 / Solaris 9
Expansion slots	6 PCI-X	3 PCI	4 PCI (1 @ 66MHz)
Network connections	Integrated 2 x 10/100/1000 Mb/s NICs	Integrated 4 x 10/100/1000 Mb/s NICs	Integrated 2 x 10/100 Mb/s NICs
USB ports	3	2	4
Serial ports	1	2	2
Rack-unit height	2U	2U	4U
Depth	25.51 in (648 mm)	24 in (610 mm)	25 in (635 mm)
Maximum Disk Size	73GB	73GB	73GB
Total Internal Storage	438GB	292GB	146GB
Power supply	500 Watts	400 Watts	810 Watts
Management	Sun Control Station	Advanced Lights Out Management (ALOM)	Advanced Lights Out Management (ALOM)

Software availability

Sun Microsystems is aggressively recruiting Linux- and Solaris-x86-based independent software vendors (ISVs) and selected hardware partners.

For an up-to-date list of software applications available for the Sun Fire V60x server, visit http://www.sun.com/servers/entry/v60x/ and click on "Solutions" link.

For an up-to-date list of software applications available for the Sun Fire V65x server, visit http://www.sun.com/servers/entry/v65x/ and click on "Solutions" link.

Visit the sites often as the list of available software applications will be updated on a regular basis.

Key Messages

With the introduction of the Sun Fire V60x server and the Sun Fire V65x server, Sun continues to offer customers value, innovation and choice.

VALUE

- **Sun's "One-Stop Shop":** Buy your x86 and UltraSPARC® server products, software, service, consulting and training from Sun's "One-Stop Shop." Sun makes it easy – we understand secure enterprise network computing, Sun has what you need and Sun's here to help you.

- **Price/Performance-competitive, high-throughput, x86-based platform for network computing:** The servers are based on the Intel Xeon processor, in a high-performance platform with a choice of operating system: either one of several Standard Linux Distributions, Red Hat Enterprise Linux, SuSE Enterprise Linux Server or Solaris 9, x86 8/03 or later, where greater security, predictability and reliability are needed.

  The Sun Fire V60x server and the Sun Fire V65x server are an advanced rackable solution with high-availability and management features.

- **Cradle-to-grave management support:** Both the Sun Fire V60x server and Sun Fire V65x server come with integrated management features that can be leveraged by the Sun Control Station v2.0 or other Lights Out Management (LOM) tools which will enable customers to manage these servers remotely. These tools also provide hardware-monitoring and control capabilities.

- **World-class Services:** Whether you have a sub-$3000 Sun Fire V60x server or a multi-million-dollar Sun Fire 15K server, both are supported by same world-class Services organization within Sun.

- **Investment protection:** Customers can use one of several Standard Linux Distributions or Solaris 9, x86 edition. Given the flexibility of either (a) compatibility with a customer's existing Solaris machines or (b) the advantages of an open-source operating system that is self-maintainable, low-cost and customizable, Sun offers added values that are consistent through the Volume Systems Products line, such as front-to-back cooling, integrated remote-management features and rack optimization.

INNOVATION

- **Latest Processor Technology:** The Sun Fire V60x server and Sun Fire V60x server are the first Sun platforms to deploy the latest Intel Xeon processor technology. The Sun Fire V60x server and the Sun Fire V65x server use 2.8GHz, 3.06GHz or 3.2 GHz processors. Sun will continue to aggressively follow Intel's processor-speed roadmap after launch, regularly introducing speed bumps to the processor line.

- **Robust and Compact Design:** The system architecture of the Sun Fire V60x server and the Sun Fire V65x server offer two built-in 10/100/1000BaseT ethernet ports, a single external Ultra320 SCSI port, two serial ports and two USB ports, all within a compact 1U and 2U form factor respectively.

- **Maximized Uptime:** In addition to the RAS features found on both the Sun Fire V60x server and Sun Fire V65x server, clustering will also be available with Red Hat Advanced Server (support is due to be offered in Q3,03), as well as CPU failover – if one CPU fails in a server with two processors, the server will reboot on the remaining functioning CPU. The Sun Fire V65x server also offers redundant, hot-swappable power supplies with independent power cords for mission-critical environments.

- **Expandability:** The Sun Fire V60x server expands up to a maximum of three internal hard disk drives, scales up to 6GB of memory and ships standard with two PCI-X slots. The Sun Fire V65x server expands up to a maximum of six internal hard disk drives, scales up to 12GB of memory and ships standard with six PCI-X slots.

CHOICE

Multiple Architectural Choices: Sun offers a family of low-end servers to accommodate customer IT requirements. Customers can choose among Solaris on UltraSPARC, Solaris on x86 or Red Hat Enterprise Linux, SuSE Enterprise Linux Server or Standard Linux Distributions on x86 platforms.

Target Users

The Sun Fire V60x server and Sun Fire V65x server are targeted at Solaris x86 customers who want to use the latest-generation Intel processors and to source their servers from Sun so that they can take advantage of Sun's developing x86-based Lights Out Management (LOM) functionality and other systems-management functionality as the N1 initiative is rolled out.

The Sun Fire V60x server and Sun Fire V65x server are also targeted at existing Sun customers contemplating using Standard Linux Distributions who want to take advantage of Sun's developing x86-based Lights Out Management (LOM) functionality and other systems-management functionality as the N1 initiative is rolled out.

Target Markets

According to IDC, the sub-$6K segment will grow faster than any other priceband under $50K in the next 4 years. This applies to both number of units and revenue.

IDC estimates the 2P Linux marketplace to be running at approximately 350K units per quarter as of Q3CY02. Today, this is a $1665-million market. By 2006, IDC expects it to be worth $3830 million.

IDC predicts that the Linux segment of the sub-$10K market will grow faster than any other segment at 25+% CAGR year-on-year until 2007. This is faster than the Windows market or the traditional UNIX® market.

IDC says the current 1U and 2U rack portion on the Lintel market stands at approximately 180K units per calendar.

> *Note: The figures above are taken from the IDC reports "Worldwide Server Market Forecast Update 2001–2006" (Nov. 2002, IDC #28257) and "Server Channel Forecast Analysis 2001–2006" (IDC #26918).*

Target vertical markets for both the Sun Fire V60x server and the Sun Fire V65x server include:

- Financial Services
- Life Sciences
- Oil and Gas
- Government
- Education
- Manufacturing
- Retail

The following are key features to highlight for these markets:

- High-performance server
- High system count per rack (2P/2RU)
- Dependable, affordable Sun hardware
- Horizontal scalability, availability, flexibility
- Manageability
- Serviceability

The Top 4 target application areas for the Sun Fire V60x server and the Sun Fire V65x server are:

- High-performance-technical-computing (HPTC) Cluster (EDA) (Synopsys, Cadence Design Systems, Mentor Graphics, Magma)
- Corporate Web Infrastructure Computing (Web Service and Customer Edge applications)
- Web Security (Firewall, Content Filtering, Intrusion Detection)
- Small Workgroup Server (Database, File, Print) (Oracle)

The Top 5 Solution Partners for Edge Computing are:

- Check Point Software Technologies (Firewall)
- PingTel (IP Telephony)
- SourceFire (Intrusion Detection)
- Symantec (Enteprise Intrusion Detection)
- BakBone (Backup, Storage Management)

Key ISVs include:

- Check Point Software Technologies (Firewall)
- Symantec Corporation (Security)
- BakBone Software (Backup, Storage Management)
- Oracle (Databases)
- Cadence Design Systems (IC and Board Design)
- Synopsys (IC Design)
- Mentor Graphics (Electronic Design Automation [EDA])
- Legato (Backup)
- Veritas Software Corporation (Backup)
- Computer Associates (Software Solutions)

Operating Systems

The Sun Fire V60x server and Sun Fire V65x server are currently scheduled to to have tested drivers and install documentation to enable running the following operating systems (OSs):

- Red Hat Linux 7.3
- Red Hat Enterprise Linux 2.1 ES/WS/AS
- Solaris 9 OS, U4, x86 edition
- Red Hat Linux 8.0 (Q3, CY03)
- SuSE Linux Enterprise Server 8.0 (Q3, CY03)
- Red Hat Linux 9.0 (Q4, CY03)

> *Note: Sun Microsystems will provide support for the qualified hardware and OS installation. For Linux 7.x and 8.0 support issues, the customer must contact their Linux supplier.*

Compatibility

If you are running Red Hat Enterprise Linux 2.1 on a Sun Fire V60x server or Sun Fire V65x server, the following URL lists the compatible hardware components:
http://hardware.redhat.com/hcl/?pagename=details&hid=5040.

If you are running SuSE Linux Enterprise Server 8.0 on a Sun Fire V60x server or Sun Fire V65x server, the following URL lists the compatible hardware components:
http://www.suse.com/de/business/certifications/certified_hardware/sun/index.html.

Licensing/Usage

Each Sun Fire V60x server or Sun Fire V65x server comes with a “"no additional cost” Solaris 9, x86 edition, user license for an unlimited number of users through 12/2003.

Open-Source Software

The Sun Fire V60x server and Sun Fire V65x server support open-source software. A few examples include:

- Apache Web server (http://www.apache.org)
- Samba file and print services for SMB/CIFS clients (http://www.samba.org/)
- MySQL database (http://www.mysql.com)
- BIND DNS server (http://www.isc.org/products/BIND/)

For information on Linux developments, visit http://www.linux.org.

SourceForge is an excellent resource for information about software-development projects in the open-source community (http://www.sourceforge.net/).

Sun ONE Applications

Depending on the operating system installed on your server, the following Sun Open Network Environment (Sun ONE) applications are available:

Red Hat Linux 7.3 (at RR)

- StarOffice™ 6.0

Red Hat Enterprise Linux 2.1 Advanced Server (Q3, CY03)

- StarOffice 7.0

Solaris 9 OS, u4, x86 edition (Q4, CY03)

- StarOffice 6.0
- Sun ONE App Server 7.0 Platform and Standard Editions
- Sun ONE Calendar Server 6.0
- Sun ONE Directory Server 5.1
- Sun ONE Directory Server 5.2
- Sun ONE Messaging Server 5.2

- Sun ONE Messaging Server 6.0
- Sun ONE Studio 7
- Forte™ Developer 6, Update 2

Red Hat Linux 8.0 (Q4, CY03)

- StarOffice 6.0

SuSE Enterprise Linux Server (Q3, CY03)

- No support planned at this time.

Support for Third-Party Software

Support for all third-party software running on the Sun Fire V60x server and the Sun Fire V65x server is the responsibility of the ISV or the developer who created the software. However, the operating systems that have been or will be qualified on the Sun Fire V60x server and Sun Fire V65x server are Standard Linux Distributions or Solaris 9 OS,8/03 x86 edition. Given this, and the fact that the Sun Fire V60x server and Sun Fire V65x server are based on a standard x86 architecture, all third-party applications that are compliant with the qualified Linux Distribution or Solaris 9 OS, x86 edition, will run on the Sun Fire V60x server and Sun Fire V65x server.

For the latest list of ISVs who have tested their application on the Sun Fire V60x server and Sun Fire V65x server, or for the list of ISVs who have qualified their software to run on various Linux distributions/Solaris x86, visit `http://solutions.sun.com`.

Relevant Standards Supported

The following standards are supported on the Sun Fire V60x server and Sun Fire V65x server:

- Linux operating system
- Java™ technology
- Intelligent Platform Management Interface (IPMI)
- GNOME desktop
- IEEE 802.3 - Ethernet (10Mb/s)
- IEEE 802.3U - Ethernet (100Mb/s)
- IEEE 803.2AB - Ethernet (1000Mb/s, Twisted Pair)

Features, Functions, and Benefits

Feature	Function	Benefit
• Intel Xeon 2.8GHz, 3.06GHz or 3.2 GHz Processors with 533Mhz FSB, integrated 512KB L2 cache and Hyper-Threading Technology support.	• Leading Edge Performance and multiprocessing computational power.	• Faster Web server response, faster database query response, better throughput.
• Additional testing and reliability engineered in by Sun.	• Fewer failures and better product integration than standard PC products.	• Less down time due to failures.
• 533 MHz Front Side Bus	• The Front Side Bus is the path from the CPU to main memory and provides a data-transfer rate of up to 4.2GB/s between the processor (s) and memory.	• Better performance for memory-intensive applications.
• The Sun Fire V60x server (1U) supports up to three 36GB 10K hard disk drives (HDDs)or three 73GB 10K HDDs.	• Supports up to 219GB of fast storage.	• Faster performance and plenty of storage space for I/O bound applications, such as database and intrusion detection.
• The Sun Fire V65x server (2U) supports up to six 36GB 10K HDDs or six 73GB 10K HDDs.	• Supports up to 438GB of fast internal storage.	• Faster performance and plenty of disk space for I/O bound applications, such as database and intrusion detection.
• The Sun Fire V65x server (2U) can have dual, redundant 500W power supplies.	• The redundant power supply keeps the server working if the first power supply fails.	• Provides uninterrupted performance when a power supply fails.
• These products can be mounted in 3 ways: four-post mount, two-post midmount, two-post front mount.	• Allows for easy storage in a rack.	• Flexibility of mounting options allows for use of many industry-standard racks.
• Systems Management solutions to provide day-to-day management, server monitoring and software provisioning.	• Perform initial setup of Sun Fire V60x server and Sun Fire V65x server. Configure the networking parameters. Provision the operating systems and software on Sun Fire V60x server and Sun Fire V65x server. Manage racks of Sun Fire V60x server and Sun Fire V65x server.	• Fast server deployments, updates and configuration. Allows system and network administrators to focus on higher-level tasks.
• Optional factory integration with qualified custom options. Systems are racked, cabled and delivered to the customer's site as a "ready-to-deploy" solution through Sun Customer Ready Systems (CRS) program (http://www.sun.com/products/integration).	• Hardware/software integration services now available as part of system-ordering process.	• Pre-integrated systems reduce the time and resources required for deployment. • Factory integration reduces system handling, thereby decreasing early-life system failures • Increased customer confidence, knowing that the integrated system has been checked for readiness at the factory before shipment • Cost effective.

Feature	Function	Benefit
• Support for 512MB to 12GB of Registered DDR-266 ECC SDRAM memory in the Sun Fire V65x server with six DIMM sockets. • Support for 512MB to 6GB of Registered DDR-266 ECC SDRAM memory in the Sun Fire V60x server with six DIMM sockets.	• Memory flexibility to support a wide range of applications and demands.	• Administrators can configure the system with the right amount of memory for their applications, upgrade their memory, and use off-the-shelf components.
• Dual interleaved memory architecture.	• High-performance memory subsystem.	• The Sun Fire V60x server and Sun Fire V65x server provides up to 2.1GB/s of data transfer between the CPU(s) and each memory bank. The aggregate data-transfer rate for the Sun Fire V60x server and Sun Fire V65x server memory subsystem is 4.2GB/s. This is twice that of traditional, non-dual interleaved systems.
• Two integrated 10/100/1000 Mb/s, server-class networking interfaces.	• Flexible networking capabilities.	• The Sun Fire V60x server and Sun Fire V65x server provide high-performance networking options, scalable bandwidth and/or redundant links.
• Dual-channel Ultra320 SCSI Interface.	• Fast access to storage.	• Advanced SCSI technology reduces the traditional hard-drive performance bottle neck and allows for the connection of external SCSI/RAID devices.
• Two internal, independent, high-performance 64bit/100MHz PCI-X I/O subsystems. ***Note:*** the speed of the bus is limited to slowest speed card on the bus; slow cards may reduce overall system performance.	• Interfaces to PCI add-on cards.	• Allows for the addition of third-party PCI cards or the Sun-offered RAID and Fibre Channel card. Two independent PCI-X buses double the traditional bandwidth available to the add-on cards.
• Integrated ATI Rage XL video controller with 8MB of video memory.	• Built-in Video Adapter.	• IT professionals can interface with the system using a standard VGA monitor to the front or the back of the machine without adding an additional card to the system.
• Rear-mounted serial port (RJ-45 connector) and three USB ports (1 front, 2 rear).	• Peripheral interconnects.	• Provides plenty of flexibility for connecting to external peripherals by adding multiple interfaces and allowing for system access from the front or the rear of the server.
• Fault-resilient booting.	• This is a component of the management subsystem that monitors the boot process. Upon failure of the bootstrap processor, this component marks the offending processor as offline and, using the second processor, reboots the Sun Fire V60x server or Sun Fire V65x server .	• A single CPU failure in a dual-processor system should not take a server down.

Feature	Function	Benefit
• Hot-swappable Power Subsystem in the Sun Fire V65x server (2U).	• Customers can remove a Power Supply if it fails.	• You can replace the power supply in real time in a 1+1 configuration without bringing down the server to make this change.
• Cost-effective, high-performance, zero-channel RAID adapter card option.	• Full-featured RAID system for the Sun Fire V60x server and Sun Fire V65x server. Supports RAID levels 0, 1, 4, 5 and 10 for maximum data protection and performance.	• Cost-effective, intelligent RAID option that is quick to install and provides for a flexible storage solution.
• Fibre Channel PCI card option.	• Provides an interface to Sun StorEdge™ T3 Array.	• Enables customers to use this popular Sun Storage solution.
• The Sun Fire V60x server and the Sun Fire V60x server are designed to run Standard Linux Distributions.	• Will run popular, off-the-shelf, Standard Linux Distributions and Linux packages from the top Linux vendors and Linux ISVs. (See details in this document for when drivers for various Linux Distributions will be available from Sun).	• Option of self-support for Operating System problems due to the open-source nature of Standard Linux Distributions. Will run Linux Distributions on which various enterprises have standardized.
• Solaris 9 OS, x86 edition 8/03 release.	• Run Solaris x86 applications, with the same administration environment as Solaris SPARC®.	• Customers can run popular Solaris applications using the high-performance processing capabilities of the Sun Fire V60x server and Sun Fire V65x server. The servers will have the same administration interface and utilities as customers' existing Solaris SPARC machines.

Enabling Technology

Technology Overview

The Sun Fire V60x server and the Sun Fire V65x server are two-way, symmetric, multi-processor, x86-based, rack-optimized servers.

Detailed Server Board Information

For detailed information on the Intel Server Board SE7501WV2 and hardware subsystems, visit http://www.intel.com/design/servers/se7501wv2/index.htm.

Storage

Internally, you can install up to three hard disk drives (HDDs) in the Sun Fire V60x server and up to six HDDs in the Sun Fire V65x server.

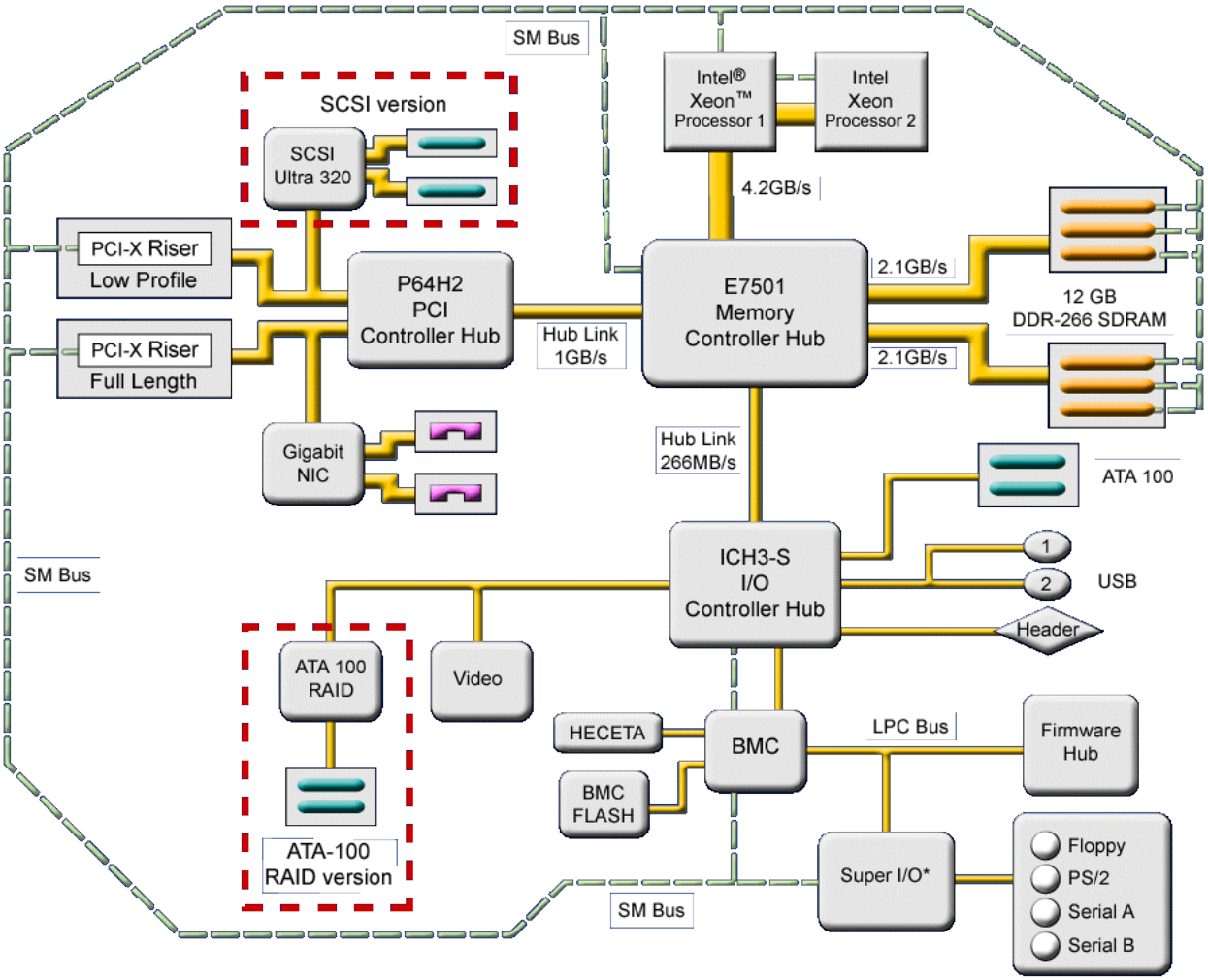
Hot-pluggable Hard Disk Drives

The system specifications, as defined by Intel, for the Sun Fire V60x and Sun Fire V65x servers state that the hardware supports the hot-plugging of hard disk drives (HDDs), both internal and external.

However, Sun has tested this feature and has determined that the feature does not work with either the Solaris 9.x or Redhat Linux 7.3 operating systems.

Intel Server Board SE7501WV2 Architecture

Note: *The Sun Fire V60x server and Sun Fire V60x server use the SCSI Ultra 320 version of the motherboard (see the section within the dashed box at the top-left corner of the following diagram). The ATA-100 version of the motherboard (see the section within the dashed box at the bottom-left corner) is not available in the Sun Fire V60x server and Sun Fire V65x server.*



PCI-X Expansion Slots

There are two 64-bit PCI-X riser slots. There is support for either 1U or 2U risers:

– slot P64-C supports low-profile riser

– slot P64-B supports full-height riser

– 1U risers – one PCI slot each

– 2U risers – three PCI slots each

***Note**: Risers are included with each server.*

The SCSI version of board supports zero-channel RAID on slot P64-C.

Populating the PCI-X Expansion Slots

The following table provides information on populating the PCI-X expansion slots in the Sun Fire V60x server and Sun Fire V65x server.

Note: If you populate all three PCI-X expansion slots in the Sun Fire V65x server, the speed of the relevant bus is reduced to 66MHz.

Conguration	***Sun Fire V60x Server (1U)***		***Sun Fire V65x Server (2U)***	
	Supports one slot (1 PCI card riser only) Maximum PCI cards: 2		**Supports three slots (3 PCI card risers only) Maximum PCI cards: 6**	
Number of adapter cards installed in addition to using onboard PCI devices	On Bus B (shared with Anvic dual NIC riser)	On Bus C (shared with AIC 7902 onboard SCSI)	On Bus B (shared with Anvic dual NIC riser)	On Bus C (shared with AIC 7902 onboard SCSI)
0	PCI-X 64/100	PCI-X 64/100	PCI-X 64/100	PCI-X 64/100
1	PCI-X 64/100	PCI-X 64/100	PCI-X 64/100	PCI-X 64/100
2	N/A	N/A	PCI-X 64/100	PCI-X 64/100
3	N/A	N/A	**PCI-X 64/66**	**PCI-X 64/66**
Number of adapter cards installed where the onboard PCI devices are DISABLED	On Bus B (shared with Anvic dual NIC riser)	On Bus C (shared with AIC 7902 onboard SCSI)	On Bus B (shared with Anvic dual NIC riser)	On Bus C (shared with AIC 7902 onboard SCSI)
1	PCI-X 64/100	PCI-X 64/100	PCI-X 64/100	PCI-X 64/100
2	N/A	N/A	PCI-X 64/100	PCI-X 64/100
3	N/A	N/A	**PCI-X 64/66**	**PCI-X 64/66**

System Architecture

Overview

The Sun Fire V60x server and the Sun Fire V65x server can both be mounted in industry-standard 19-inch equipment racks. A slide-rail/extension kit is available as an option; this slide-rail/extension kit allows you to mount each of these severs into a Sun Rack 900 or StorEdge Rack.

Sun Fire V60x server — Hardware Components

The Sun Fire V60x server is 1.69 inches (43 mm) high, 16.93 inches (430 mm) wide and 23.89 inches (607 mm) deep. The air-flow direction is from front to back and internal fans are included. I/O ports are located on both the front and rear panels. Informational LEDs are located on the front panel. Access to the power connection is at the rear of the chassis.

Sun Fire V65x server — Hardware Components

The Sun Fire V65x server is 3.50 inches (87 mm) high, 16.93 inches (430 mm) wide and 25.51 inches (648 mm) deep. The air-flow direction is from front to back and internal fans are included. I/O ports are located on both the front and rear panels. Informational LEDs are located on the front panel. Access to the two power connections are at the rear of the chassis.

Compatibility Issues

For information on compatibility issues concerning hardware, operating systems, memory and other items, visit: http://support.intel.com/support/motherboards/server/SE7501WV2/compat.htm.

> *Note: Cards mentioned by Intel are known to work but ARE NOT SUPPORTED BY SUN SERVICES.*

Reliability, Availability and Serviceability (RAS)

Reliability

- Your choice of reliable Solaris, x86 edition, update 4 or later, or Standard Linux Distribution operating systems (OSs)
- x86 architecture
- Fault-resilient booting
- Redundant, hot-swappable power supply (Sun Fire V65x server only)
- Hardware RAID option (with the Linux OS)

Availability

- The low cost and small form factor of the Sun Fire V60x server and Sun Fire V65x server allow redundant deployment in a compact space to increase overall service availability.
- Service providers can have a separate service per server and provide more services within the same footprint. This eliminates sharing servers and increases availability if the system goes down—only one server would be affected.
- Built-in dual gigabit ethernet ports provide redundancy.

Serviceability

- Toolless access allows for ease of service and maintenance.
- Front-accessible drives.
- Indicator LEDs on the front and back of the chassis allow problems to be detected and isolated easily.
- A fault indicator LED stays on following a fault even if the system has been powered off (but still connected to the power source).
- Diagnostic LEDs are included on the motherboard
- Rear power switch provides easy access.
- Rackmount slide rails for easy installation and removal of a unit are available as an X-option.
- Redundant, hot-swappable power supply (Sun Fire V65x server only)

Sun Fire V60x Server Specifications

Processors

Processor	One or two 2.8-GHz, 3.06-GHz or 3.2-GHz Intel Xeon processors
Cache	512-KB Level 2

Main Memory

6 DIMM slots, registered DDR-266 ECC SDRAM
System can support from 512 MB up to 6 GB

Standard/Integrated Interfaces

Network	Two 10/100/1000BaseT ethernet ports
Serial	One RJ-45 serial port
SCSI	One Ultra320SCSI multimode (SE/LVD)
USB	Two USB 1.1 ports
Expansion bus	Two internal PCI-X 64bit/100MHz

Mass Storage and Media

Internal disk	Up to three Ultra320SCSI 36GB or 73GB 10K HDDs
Internal DVD	One Slim-line ATAPI DVD-ROM/Floppy Combo (optional) • 8X DVD - Backward compatibility with CD formats • 24X CD-ROM
External disk	Sun StorEdge™ 3310 SCSI array Sun StorEdge 3510 Sun StorEdge T3 Sun StorEdge T3 arrays

Software

Operating system(s)	Solaris 9, x86 8/03 edition Standard Linux Distributions Red Hat Enterprise Linux, SuSE Enterprise Linux Server
Languages	C/C++, FORTRAN, Java™ programming language, all other standard Sun-supported languages
Networking	ONC™, NFS, TCP/IP, SunLink™, OSI, MHS, IPX™/SPX
Management	Sun Control Station v2.0 (optional)
Sun ONE components ***Note:*** These components are not bundled on the servers; installation is required.	Sun™ ONE Web Server (Trial Version), Sun ONE Application Server (Platform Edition), Sun ONE Messaging Server, Sun ONE Directory Server, Sun ONE Studio, Sun ONE ASP Server

Power Supply

One power supply required	
Maximum DC output	350 Watts

Environment

AC power	100-240 V, 50/60 Hz, 350 W PFC, dual (redundant) fans
Operating temperature	10º C to 35º C (50º F to 95º F) (*stand-alone server*) 10º C to 30º C (50º F to 86º F) (*in a rack-environment at sea level*) * Subtract 1º C from the maximum temperature for every 500-metre increase in altitude. (Tested to 3000m at 24º C [75.2º F]) 10% to 90% relative humidity, at 27º C max, wet bulb (noncondensing)
Nonoperating temperature	-40º C to 65º C (-40º F to 149º F), up to 93% relative humidity, noncondensing
Altitude (operating)	10º C to 35º C (50º F to 95º F) (*stand-alone server for all altitudes*) 10º C to 30º C (50º F to 86º F) (*in a rack-environment at sea level*) * Subtract 1º C from the maximum temperature for every 500-metre increase in altitude. (Tested to 3000m at 24º C [75.2º F])
Altitude (nonoperating)	Up to 12000 m
Acoustic noise	Undeclared – TBD

Regulations

Meets or exceeds the following requirements:	
Safety	IEC60950, UL/CSA60950, EN60950
RFI/EMI	FCC Class A, Part 15 47 CFR, EN55022, CISPR 22
Immunity	EN55024
Certifications Safety EMC	 cULus Mark, TUV GS Mark, CE Mark CE Mark (93/68/EEC), FCC authorized Class A, VCCI, BSMI, CTICK

Dimensions and Weight

Chassis • Height • Width • Depth • Weight	 1.69 in. (43 mm) 16.93 in. (430 mm) 23.89 in. (607 mm) Two-disk-drive server: • unpackaged: approximately 35 lbs (15.86 kg) • packaged: approximately 40 lbs (18.14 kg)
Enclosure	Fits into a standard 19-inch wide rack. Four-post rack kit adjustable between 720 mm and 925 mm

Sun Fire V65x Server Specifications

Processors

Processor	One or two 2.8-GHz, 3.06-GHz or 3.2-GHz Intel Xeon processors
Cache	512-KB Level 2

Main Memory

6 DIMM slots, registered DDR-266 ECC SDRAM
System can support from 512 MB up to 12 GB

Standard/Integrated Interfaces

Network	Two 10/100/1000BaseT ethernet ports
Serial	One RJ-45 serial port
SCSI	One Ultra320SCSI multimode (SE/LVD)
USB	Two USB 1.1 ports
Expansion bus	Two internal PCI-X 64bit/100MHz

Mass Storage and Media

Internal disk	Up to six Ultra320SCSI 36GB or 73GB 10K HDDs
Internal DVD	One Slim-line ATAPI DVD-ROM/Floppy Combo (optional) • 8X DVD - Backward compatibility with CD formats • 24X CD-ROM
External disk	Sun StorEdge 3310 SCSI array Sun StorEdge 3510 Sun StorEdge T3 Sun StorEdge T3 arrays

Software

Operating system(s)	Solaris 9, x86 8/03 edition, Standard Linux Distributions Red Hat Enterprise Linux, SuSE Enterprise Linux Server
Languages	C/C++, FORTRAN, Java programming language, all other standard Sun-supported languages
Networking	ONC, NFS, TCP/IP, SunLink, OSI, MHS, IPX/SPX
Management	Sun Control Station v2.0 (optional)
Sun ONE components ***Note:*** These components are not bundled on the servers; installation is required.	Sun ONE Web Server (Trial Version), Sun ONE Application Server (Platform Edition), Sun ONE Messaging Server, Sun ONE Directory Server, Sun ONE Studio, Sun ONE ASP Server

Power Supply

One power supply required	
Maximum DC output	500 Watts

Environment

AC power	100-240 V, 50/60 Hz, 350 W PFC, dual (redundant) fans
Operating temperature	10º C to 35º C (50º F to 95º F) (*stand-alone server*) 10º C to 30º C (50º F to 86º F) (*in a rack-environment at sea level*) * Subtract 1º C from the maximum temperature for every 500-metre increase in altitude. (Tested to 3000m at 24º C [75.2º F]) 10% to 90% relative humidity, at 27º C max, wet bulb (noncondensing)
Nonoperating temperature	-40º C to 65º C (-40º F to 149º F), up to 93% relative humidity, noncondensing
Altitude (operating)	10º C to 30º C (50º F to 86º F) (*stand-alone server for all altitudes*) 10º C to 25º C (50º F to 77º F) (*in a rack-environment at sea level*) * Subtract 1º C from the maximum temperature for every 500-metre increase in altitude. (Tested to 3000m at 19º C [66.2º F])
Altitude (nonoperating)	Up to 12000 m
Acoustic noise	Undeclared – TBD

Regulations

Meets or exceeds the following requirements:	
Safety	IEC60950, UL/CSA60950, EN60950
RFI/EMI	FCC Class A, Part 15 47 CFR, EN55022, CISPR 22
Immunity	EN55024
Certifications Safety EMC	 cULus Mark, TUV GS Mark, CE Mark CE Mark (93/68/EEC), FCC authorized Class A, VCCI, BSMI, CTICK

Dimensions and Weight

Chassis • Height • Width • Depth • Weight	 3.50 in. (87 mm) 16.93 in. (430 mm) 25.51 in. (648 mm) Two-disk-drive server: • unpackaged: approximately 50 lbs (22.68 kg) • packaged: approximately 55 lbs (24.95 kg)
Enclosure	Fits into a standard 19-inch wide rack. Four-post rack kit adjustable between 720 mm and 925 mm

System Management

System Administration

The primary method of system administration will be through the Sun Control Station. A Sun Control Station agent will be available to load onto the Sun Fire V60x server and Sun Fire V65x server in the July 2003 timeframe, initially for Red Hat 7.3, with support for other OSs to follow. The control modules on the Sun Control Station include Lights Out Management (LOM), Software Management, Health Monitoring, AllStart, and Performance and Inventory.

Sun will also make available other LOM tools (based on Intelligent Platform Manaement Interface [IPMI]) that will enable customers to manage a Sun Fire V60x server and Sun Fire V65x server remotely through the onboard controller.

Mean Time Between Failures (MTBF)

The Mean Time Between Failures (MTBF) for the Sun Fire V60x server and Sun Fire V65x server varies depending upon configuration.

For the Sun Fire V60x server, operating at 35º C, the MTBF is predicted by calculations to be up to 30 000 hours.

For the Sun Fire V65x server, operating at 35º C, the MTBF is predicted by calculations to be up to 35 000 hours.

Refer to `http://vsp.eng` for more information.

Performance Benchmarks—Reference

Refer to `http://vsp.eng` for information about performance benchmarks.

Ordering Information

The following are part numbers and descriptions for each configuration of the Sun Fire V60x server and Sun Fire V60x server. Prices for the Sun Fire V60x server start at $2,450.00 USD, while prices for the Sun Fire V65x server start at $2,550.00 USD.

Configurations

Sun Fire V60x Server

Order Number	Title and Description
A48-PCA1-1-512GC5	1x2.8GHz, 512MB, 1x36GB 10K RPM HDD, 1 power supply
A48-PCA2-1-1GGC5	2x2.8GHz, 1GB, 1x36GB 10K RPM HDD, 1 power supply
A48-PCA2-1-2GLC5	2x2.8GHz, 2GB, 2x36GB 10K RPM HDD, 1 power supply
A48-PDA2-1-2GLC5	2x3.06GHz, 2GB, 2x36GB 10K RPM HDD, 1 power supply
A48-PEA2-1-2GLC5	2x3.2 GHz, 2GB, 2x36GB 10K RPM HDD, 1 power supply

Sun Fire V65x Server

Order Number	Title and Description
A48-PCA1-2-512GG5	1x2.8GHz, 512MB, 1x36GB 10K RPM HDD, 1 power supply
A48-PDA2-2-1GGG5	2x3.06GHz, 1GB, 1x36GB 10K RPM HDD, 1 power supply
A48-PEA2-2-1GGG5	2x3.2 GHz, 1GB, 1x36GB 10K RPM HDD, 1 power supply

XATO Options

XATO-option number	XATO-option
Base Configurations (Basic Building Blocks [Chassis only])	
A48A-AA	1U Chassis
A48B-AA	2U Chassis
CPU	
5120A	2.8 GHz
5121A	3.06 GHz
5138A	3.2 GHz
Memory	
5122A	Pair 256MB ECC DDR266 Memory (total 512M)
5123A	Pair 512MB ECC DDR266 Memory (total 1G)
5124A	Pair 1GB ECC DDR266 Memory (total 2G)
5125A	Pair 2GB ECC DDR266 Memory (total 4G) (Sun Fire V65x server only)
Hard Disk Drives	

XATO-option number	XATO-option
5126A	36G Ultra320 10K RPM Drive
5127A	73G Ultra320 10K RPM Drive
Drive Options	
5130A	CD-ROM/Floppy Combo
5131A	DVD-ROM/Floppy Combo
5135A	Drive Sled (Sun Fire V60x server only)
PCI Cards	
5132A	HW RAID (Linux OS only)
5133A	Fiber channel
Power Supply (Sun Fire V65x server only)	
5134A	500W, AC Redundant power supply
Software Preload Options	
8068A	Solaris x86 Preloaded option

X-Options

X-option number	X-option
CPU	
X5120A	2.8 GHz CPU
X5121A	3.06 GHz CPU
X5138A	3.2 GHz CPU
Memory	
X5122A	Pair 256MB ECC DDR266 Memory (total 512M)
X5123A	Pair 512MB ECC DDR266 Memory (total 1G)
X5124A	Pair 1GB ECC DDR266 Memory (total 2G)
X5125A	Pair 2GB ECC DDR266 Memory (total 4G) (Sun Fire V65x server only)
Hard Disk Drives	
X5126A	36GB Ultra320 10K RPM Drive
X5127A	73GB Ultra320 10K RPM Drive
Drive Options	
X5130A	CD-ROM/Floppy Combo
X5131A	DVD ROM/Floppy Combo
PCI Cards	
X5132A	HW RAID (Linux OS only)

X-option number	X-option
X5133A	Fiber channel
Power Supply (Sun Fire V65x server only)	
X5134A	500W, AC Redundant power supply
Miscellaneous Options	
X5030A	Slide rail/extention kit
X5137A	Serial and RJ45 Dongle Kit
X312L	Localized Power Cord Kit, Continental Europe
X314L	Localized Power Cord Kit, Switzerland
X317L	Localized Power Cord Kit, United Kingdom

Field Replaceable Units

The following field-replaceable units (FRUs) are available for the Sun Fire V60x server and the Sun Fire V65x server.

FRU Part Number	FRU
F370-6035-01	FRU, ASSY, W/O HDD, DIMM, CPU, CD2U
F370-6037-01	FRU, ASSY, W/O HDD, DIMM, CPU, CD1U
F370-6038-01	FRU, ASSY, 256MB 266 DDR DIMM LP
F370-6039-01	FRU, ASSY, 512MB 266 DDR DIMM LP
F370-6040-01	FRU, ASSY, 1GB DIMM 266 DDR DIMM LP
F370-6041-01	FRU, ASSY, 2GB DIMM 266 DDR DIMM LP
F370-6042-01	FRU, ASSY, CD-ROM/FDD MODULE
F370-6043-01	FRU, ASSY, DVD-ROM/FDD MODULE
F370-6044-01	FRU, ASSY, CPU 2.8GHZ
F370-6045-01	FRU, ASSY, CPU 3.06GHZ
F370-6048-01	FRU, ASSY, POWER SUPPLY, 2U 500 W
F370-6050-01	FRU, ASSY, SYSTEM FAN 2U
F390-0106-03	FRU, ASSY, 73GB SCSI HDD 320 10K
F390-0109-03	FRU, ASSY, 36GB SCSI HDD 320 10K
F501-6639-01	FRU, ASSY, RAID CARD
F501-6640-01	FRU, ASSY, FIBER CHANNEL CARD
F540-5755-01	FRU, ASSY, SYSTEM FAN 1U
F540-5758-01	ASSY, POWER SUPPLY, 1U 350 W
F540-5762-01	ASSY, CABLE KIT 1U
F540-5763-01	ASSY, CABLE KIT 2U
F540-5764-01	ASSY, BEZEL 1U

FRU Part Number	FRU
F540-5765-01	ASSY, BEZEL 2U

Service and Support

Sun Services offers a full range of services to assist customers who deploy the Sun Fire V60x server and Sun Fire V65x server. Whether it is architecture services, implementation services, or services to help customers manage the servers once released to production, Sun has the right services during every phase of the project's life cycle.

Sun Services provides both standard SunSpectrum℠ for servers running Solaris™ and unbundled software and hardware support for added flexibility and choice. Support offerings for the Sun Fire V60x server and Sun Fire V65x server include: SunSpectrum Platinum℠, SunSpectrum Gold℠, SunSpectrum Silver℠, SunSpectrum Bronze℠ and Hardware Only for the hardware; and Sun Software Support Services for all Sun software.

SunSpectrum℠

SunSpectrum support provides in-warranty and post-warranty service coverage for Sun hardware, the Solaris Operating System, and some bundled and embedded software for a fixed monthly fee. Coverage can include technical support and on-site service, software releases, account-management services and expanded online technical resources. Flexible levels of support allow customers to choose the level of asssistance that meets their unique requirments.

For more information on SunSpectrum, visit the following Web sites:

Internal: `http://service.central/Lines_of_Business/Support_Services/Organizations/Marketing/SalesInfo/NorthAmerica.html`

External: `http://www.sun.com/service/support/sunspectrum/`

SunSpectrum Hardware-Only Support

For customers utilizing Linux or who prefer a support relationship on the hardware exclusively, the warranty can be upgraded to SunSpectrum Hardware-Only support which offers a next-business-day on-site response.

Sun Software Support Services

Sun℠ Software Standard Support

The Sun Software Standard Support offering provides customers with a comprehensive support plan. Features include:

- Extended local business hours (12 hour) for telephone and online support (5x12)
- Four (4) business hour response on Priority 1 (Urgent) requests
- Two (2) authorized contacts

- Online incident submission and tracking
- Software updates and patches
- Access to online self-solve resources

Sun[SM] Software Premium Support

The Sun[SM] Software Premium Support offering is designed for critical environments where high availability is a priority and round-the-clock support is a customer requirement. In addition to all of the features of the Standard support level, this level of service offers:

- 24/7 coverage with live call transfer for Priority 1 (Urgent) requests
- Three (3) authorized contacts per 8-hour shift

Optional Services

Both the Standard and Premium offerings give customers the option to purchase the following to enhance their service plans:

- Dedicated or Assigned Service Account Manager (SAM)
- Dedicated Technical Support Engineer (TSE)
- Additional authorized contacts

Additional support services may be available on a custom quote basis. For more information on Sun Support Services, visit `http://www.sun.com/service/support`.

Sun Software Support Part Numbers

The following table lists the part numbers for the Sun software support options.

Part Number	Description
SOE-CAT2-1ST	Sun Software Standard Support, 1year [add $540.00] http://www.sun.com/service/support/software/standard.html
SOE-CAT2-3ST	Sun Software Standard Support, 1 year [add $1,476.00] http://www.sun.com/service/support/software/standard.html
SOE-CAT2-1PR	Sun Software Premium Support, 1 year [add $648.00] http://www.sun.com/service/support/software/premium.html
SOE-CAT2-3PR	Sun Software Premium Support, 1 year [add $1,764.00] http://www.sun.com/service/support/software/premium.html

Red Hat Software Support Part Numbers

The following table lists the part numbers for the Red Hat software support options.

Note: This table applies to new licenses only.

Order Number	List Price	Discount Category	Software Support Price	Note(s)	Description
RHEIL-21P-A929	$2,499.00	B	N/A	1, 2, 3, 4	Red Hat Enterprise Linux 2.1, AS Premium Support Edition RTU License, 8 CPU and 16GB main memory maximum, Premium support subscription, One year service entitlement, No media. Pricing per RTU, one RTU needed for each system installed. DISA certified as COE-compliant
RHEIL-210-A929	$1,499.00	B	N/A	4	Red Hat Enterprise Linux 2.1, AS Standard Support Edition RTU License, 8 CPU and 16 GB main memory maximum, Standard support subscription, 1 year service entitlement, No media. Pricing per RTU, one RTU needed for each system installed. DISA certified as COE-compliant.
RHEIL-210-E929	$799.00	B	N/A	4	Red Hat Enterprise Linux 2.1, ES Edition RTU License, 2 CPU and 4GB main memory maximum, Standard support subscription, 1 year service entitlement, No media. Pricing per RTU, one RTU per system installed.
RHEIL-210-W929	$299.00	B	N/A	4	Red Hat Enterprise Linux 2.1, WS Edition RTU License, Desktop/client partner with 2 CPU maximum, Standard support subscription, 1 year service entitlement, No media. Pricing per RTU, one RTU per system installed.
Ordering Notes: 1. Red Hat Enterprise Linux AS is available in two levels of support: Premium (24 x 7) and Standard (12 x 5). 2. Red Hat Enterprise Linux AS is certified by DISA (US Defense Information Systems Agency) as COE (Common Operating Environment) Compliant. It is the only Linux distribution to date to have received this certification. 3. Premium offering is initially offered in the Americas. Premium offering will be available in Europe in January 2004. Check with Services for additional worldwide availability. 4. All versions include RTU, software updates and bundled support for 1 year (yearly renewable).					

Sun Hardware Support Part Numbers

The following table lists the part numbers for the Sun hardware support options.

Order Number	List Price	Discount Category	Sun Spectrum (SM) Price	Description
W9D-A48H-2H	$240.00	S	N/A	Sun Fire V60x and V65x upgrade to 2 years Hardware Only (HWON) Support
W9D-A48H-3H	$432.00	S	N/A	Sun Fire V60x and V65x upgrade to 3 years Hardware Only (HWON) Support
W9D-A48H-2B	$648.00	S	N/A	Sun Fire V60x and V65x upgrade to 2 years Bronze support
W9D-A48H-3B	$900.00	S	N/A	Sun Fire V60x and V65x upgrade to 3 years Bronze support
W9D-A48H-1S	$492.00	S	N/A	Sun Fire V60x and V65x upgrade to 1 year Silver support
W9D-A48H-2S	$936.00	S	N/A	Sun Fire V60x and V65x upgrade to 2 years Silver support
W9D-A48H-3S	$1,343.00	S	N/A	Sun Fire V60x and V65x upgrade to 3 years Silver support
W9D-A48H-1G	$804.00	S	N/A	Sun Fire V60x and V65x upgrade to 1 year of Gold support
W9D-A48H-2G	$1,528.00	S	N/A	Sun Fire V60x and V65x upgrade to 2 years Gold support
W9D-A48H-3G	$2,195.00	S	N/A	Sun Fire V60x and V65x upgrade to 3 years Gold support
W9D-A48H-24-1G	$960.00	S	N/A	Sun Fire V60x and V65x upgrade to 1 year of 7x24 On-Site Gold Support
W9D-A48H-24-2G	$1,824.00	S	N/A	Sun Fire V60x and V65x upgrade to 2 years of 7x24 on-site Gold support
W9D-A48H-24-3G	$2,621.00	S	N/A	Sun Fire V60x and V65x upgrade to 2 years of 7x24 on-site Gold support
W9D-A48H-1P	$1,164.00	S	N/A	Sun Fire V60x and V65x upgrade to 1 year Platinum support
W9D-A48H-2P	$2,212.00	S	N/A	Sun Fire V60x and V65x upgrade to 2 years of Platinum Support
W9D-A48H-3P	$3,178.00	S	N/A	Sun Fire V60x and V65x upgrade to 3 years Platinum support

The Online Support Center

The Online Support Center (OSC) provides Web-based solutions anytime, anywhere. Providing high-quality availability services has always been a top priority at Sun. As a pioneer in Web-based customer solutions, Sun continues to utilize the power and versatility of the Internet to offer customers a broad variety of online service offerings.

The online answer/transaction process can save customers valuable time by eliminating the time spent waiting on the phone for a customer service representative. The Online Support Center empowers the user by offering anywhere, anytime access to Web-based support, training and consulting solutions for Sun hardware and software products. The site serves as a portal for proactive service offerings, systems support features, and resource links.

For more information on the above support offerings, visit:
`http://www.sun.com/service/support`

Warranty

The hardware warranty for the Sun Fire V60x server and Sun Fire V65x server is as follows:

Duration	3 years
HW Coverage Hours	Business hours
HW Response Times	Year 1 — Next Business Day Years 2 and 3 — 15 Day Parts Exchange
Delivery Method	Year 1 — Onsite Years 2 and 3 — 15 Day Parts Exchange
HW Phone Coverage	Business hours
HW Phone Response Time	8 hours

Education and Learning Solutions

Sun helps customers to create and implement learning strategies that align with their business objectives to drive results and create competitive advantage. We provide a spectrum of learning solutions that help IT Managers optimize their Sun investments by helping ensure IT staff are properly skilled and certified in the use, implementation and management of Sun and partner products and technologies.

Solaris Operating Environment Courseware and Certification

Sun offers flexible training options for the Solaris Operating Environment ranging from individual courses to certifications. Sun provides students with the knowledge to successfully install, manage and troubleshoot the Solaris Operating Environment.

Sun Fire Server Skills Package

Sun Fire Skills Packages are prepackaged training solutions which contain the recommended courseware that will deliver the skills needed to effectively manage and optimize the customer's Sun Fire V60x server or Sun Fire V65x server in their computing environment. Once a skills package order has been received, an education manager will contact the customer to develop a tailored training program. Contact a local Sun Education representative for details on availability and pricing of these learning solutions.

Security Courseware

To ensure the data stored on a Sun server is implemented and maintained in a secure environment, Sun training helps enterprises understand how to develop and implement solid security strategies to protect their critical data. Sun's security courses listed below teach corporations how to deploy and manage Sun security products for maximum protection of the massive amounts of corporate data which will reside on their Sun server system.

Education Consulting Services

Education Consulting Services allows customers to make the most out of training and provide optimal return on total IT investment by assessing requirements, delivering solutions, and measuring results. And, customers can bridge the gap between training and organizational goals by aligning IT structure, people, and skills with business objectives. Sun's Education Consulting Services help companies change the way learning takes place by creating custom training solutions that allow people to develop the right skills at the right time.

For more information on training and the above courseware, visit:
`http://www.suned.sun.com`

Professional Services

Architecture Services

Sun's Architecture Services assist customers in identifying new IT solutions from concept, design, and deployment that are built against the customer's long-term technology strategy and architected for sustained business growth.

Architecture Services are comprised of an architecture workshop, assessment, and roadmap services.

- Architecture Workshop emphasizes the importance of building architectures with service-level requirements such as reliability, availability, scalability, and security. It can help customers accomplish their business goals and provide them with a high-level action plan for next steps.
- Architecture Assessment examines the technology stack from data center to applications to determine the architecture's ability to operate against a desired set of service level requirements.
- Architecture Roadmap focuses on identifying, prioritizing, and documenting functional and service level requirements of the customer's architecture.

SunReady℠ Availability Assessment Service (SRAA)

The SunReady℠ Availability Assessment (SRAA) Service assesses the ability of a customer's IT infrastructure and organization to sustain appropriate access, performance, function and service levels within limits and expectations defined by the customer and their end users. This service can be applied to a specific environment or business application. Sun's service consultants conduct a comprehensive review of the effectiveness of the customer's technical architecture and operational environment in meeting its availability goals for a particular application environment.

The SRAA helps customers determine their IT infrastructure's ability to meet its service level commitments to end users. It also prioritizes the gaps and risks to improve performance. The SRAA process includes the following:

- A gap analysis that details the IT infrastructure's ability to effectively and efficiently deliver the required service levels for the target application environment.
- A scorecard detailing the strengths and areas of risk followed by a recommended action plan. The scorecard is based upon the gap analysis conducted during the review.
- Recommendations and action plan from SRAA to identify and prioritize risk factors, set appropriate service level expectations for the target application environment, and justify future IT investment for the data center.

Performance and Capacity Planning Services

Sun's highly trained consultants can evaluate customers' server environments and develop a plan to help meet their current and future business needs. With the Sun Performance Analysis and Capacity Planning Services, customers can fully utilize their current assets. By understanding their current system performance and capacity needs, customers can become better informed when making future budgetary decisions related to hardware needs. These services cover server inventory and configuration, performance assessment, resource consumption and future growth potential, system monitoring, and hardware alternatives to accommodate future needs.

Enterprise Security Assessment Service

The Enterprise Security Assessment Service provides a comprehensive security review and assessment of the customer's current security environment to identify security exposures and risks within their policies, processes, procedures, networks and systems.

Storage Services

Sun's Storage Services can help customers to quickly determine storage issues that may be impacting their ability to meet Service Level Agreements or other goals. Sun can help customers improve total storage utilization across the enterprise as well as their ability to share data between applications.

Migration Services

Sun's migration services is focused on addressing two of the most critical business issues companies face today:

- Total cost of ownership
- Investment protection

Sun consultants can evaluate the best option for the customer's business for migrating applications, data or both to a new Sun platform.

It is recommended that Sun Professional Services attend SRT classes to better understand how the Sun Fire V60x server and Sun Fire V65x server will fit into current strategy. Professional Services will then work with the product team to determine the need for any Professional Services offerings and their content. For more information, visit `http://www.sun.com/service/sunps/index.html`

Customer Ready Systems (CRS) program

The Sun Fire V60x server and Sun Fire V65x server will both be available through the Sun™ Customer Ready Systems (CRS) program.

The Sun CRS program is an integration program designed to provide customers with the ability to buy Sun factory-integrated products with custom options and services in order to deploy solutions more simply, safely and swiftly.

The Sun CRS program combines Sun and agreed-to third-party hardware and software products into complete solutions. Configurations are built to the customer's order in Sun factories and shipped as a system ready to deploy. The Sun CRS program also incorporates a broad spectrum of integration services, ranging from a basic-integration-requirements assessment to solution design and life-cycle management.

The Sun CRS program offers the following benefits:

- Pre-integrated systems reduce the time and resources required for deployment.
- Factory integration reduces system handling, thereby decreasing early-life system failures.
- Customer confidence improves, knowing that the integrated system has been checked for readiness at the factory before shipment.
- The systems are more cost-effective.

For more information on Sun's CRS program, visit
`http://www.sun.com/products/architectures-platforms/`

Glossary

1U	One rack unit as defined by the Electronic Industries Alliances (EIA). A vertical measurement equal to 1.75 inches.
2U	Two rack units; a vertical measurement equal to 3.5 inches.
AC	Alternating Current.
ASIC	Application Specific Integrated Circuit. A chip that is custom designed for a specific application rather than a general-purpose chip such as a microprocessor. The use of ASICs improve performance over general-purpose CPUs because ASICs are hardwired to do a specific job and do not incur the overhead of fetching and interpreting stored instructions.
Density	Number of units in a given amount of space.
Ecache	External cache. Memory cache external to the CPU chip, also referred to as L2 cache.
ECC	Error Correcting Code. A type of memory that corrects errors on the fly.
Ethernet 10/100/1000BaseT	The most widely used LAN access method defined by the IEEE 802.3 standard; uses standard RJ-45 connectors and telephone wire. 100BaseT is also referred to as Fast Ethernet. 1000BaseT is also referred to as Gigabit Ethernet.
FRU	Field Replaceable Unit.
General-purpose server	A server designed to perform any type(s) of function(s). General-purpose servers typically require skilled IT professionals and system administrators to maintain them.
Host ID	The unique identifier assigned to the host computer.
Hot-swappable	A feature that allows an administrator to remove and/or replace a device without affecting software integrity. This means that, while the system does not need to be rebooted, the new component is not automatically recognized by the system.
I/O	Input/output. Transferring data between the CPU and any peripherals.
ISV	Independent software vendor
L2 cache	See Ecache.
MTBF	Mean Time Between Failures. The average time a component works without failure.
MTTR	Mean Time To Repair. The average time it takes to repair a component.
RAM	Random Access Memory.
SCSI	Small Computer Systems Interface. Pronounced “scuzzy.” A hardware interface that allows the connection of up to 15 peripheral devices to a single bus.

Materials Abstract

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

Collateral	Description	Purpose	Distribution	Token # or COMAC Order #
• *Sun Fire V60x Server/Sun Fire V65x Server Just the Facts*	Reference Guide for the Sun Fire V60x server and Sun fire V65x server (this document)	Training Sales Tool	SunWIN, Reseller Web	375850
Product Literature				
• *Sun Fire V60x Server Datasheet*	Datasheet	Sales Tool, Training	SunWIN, COMAC	373091
• *Sun Fire V65x Server Datasheet*	Datasheet	Sales Tool, Training	SunWIN, COMAC	373090
• *Sun Fire V60x Server/Sun Fire V65x Server Sales Force CD*	Positioning and System-Walkthrough Training Video	Sales Tool, Training	COMAC	WE415-0
• *Sun Fire V60x Server/Sun Fire V65x Server Customer CD*	Customer CD	Product Information	COMAC	WE416-0
• *Sun Fire V60x Server/Sun Fire V65x Server One Pager*	One Pager	Sales Tool, Training	SunWIN, COMAC	373092
Competitive Material				
• *IBM® Beat Sheet: Beating the xSeries 335 with the Sun Fire V60x server*	Competitive Information	Sales Tool	SunWIN	373279
• *IBM Beat Sheet: Beating the xSeries 345 with the Sun Fire V65x server*	Competitive Information	Sales Tool	SunWIN	373280
• *HP Beat Sheet: Beating the DL360-G3 with the Sun Fire V60x server*	Competitive Information	Sales Tool	SunWIN	373281
• *HP Beat Sheet: Beating the DL380-G3 with the Sun Fire V65x server*	Competitive Information	Sales Tool	SunWIN	373282
• *Dell Beat Sheet: Beating the PowerEdge 1650 with the Sun Fire V60x server*	Competitive Information	Sales Tool	SunWIN	373283
• *Dell Beat Sheet: Beating the PowerEdge 2650 with the Sun Fire V65x server*	Competitive Information	Sales Tool	SunWIN	373284

Collateral	Description	Purpose	Distribution	Token # or COMAC Order #
External Web Sites				
• *Sun Fire V60x Server/Sun Fire V65x Server External Web Sites*	`http://www.sun.com/servers/entry/v60x/` `http://www.sun.com/servers/entry/v65x/`			

Collateral	Description	Purpose	Distribution	Token # or COMAC Order #
Internal Web Sites	`http://vsp.eng/entry/fire/v60x/` `http://vsp.eng/entry/fire/v65x/`			
• *Sun Fire V60x Server/Sun Fire V65x Server Internal Web Sites*				
Reseller Web Site	`http://reseller.sun.com`			
• *Sun Reseller General Information*				

Sun Proprietary—Confidential: Internal Use Only

Competitive Information

Competitors

The major competitors to the Sun Fire V60x server and Sun Fire V65x server are:

- Dell PowerEdge servers (1U and 2U)
- IBM® xSeries servers (1U and 2U)
- HPQ ProLiant servers (1U and 2U)

We expect the key competitive products will be using Intel Xeon processors running Windows or Linux operating systems.

Few competitive advantages will come out of comparing Sun x86 hardware to that of Sun's competitors; however, differences can be found (for example, the Sun Fire V65x server's maximum memory size versus that of Dell, IBM or HPQ). Areas of differentiation and areas where Sun's partners should focus on adding value can come in the following areas:

- Solaris x86
- Pre-Installation and bundles of applications (for example, the SunONE stack)
- Systems Management
- Service/Support
- Enterprise Product Portfolio—the Sun Fire V60x server and Sun Fire V65x server complement a broad range of Sun's server products, ranging from the Sun Fire V100 through the Sun Fire 15K.

Strengths of the Sun Fire V60x server and Sun Fire V65x server

- Cost and space efficiency
- Will run Standard Linux Distributions
- Solaris has a track record of having high reliability, availability and security (compared to Wintel or Lintel)
- Sun's World-class Services organization supports from sub-$1000 Sun Fire V100 server to the multi-million-dollar Sun Fire 15K server.
- Availability of Sun ONE middleware when needed

Weaknesses of the Sun Fire V60x and Sun Fire V65x

- Price/Performance relative to Dell's products
- Racking options are sub-optimal for bulk installs

1U Entry-Level Servers

The following table shows how the Sun Fire V60x server stacks up against the 1U entry-level-server products from Sun's major competitors in this space.

Note: This is information was current at the time of printing (May 2003). For the most up-to-date information, refer to the Beat Sheets listed in the table under "Materials Abstract" on page 41.

	Sun	***Dell***	***IBM***	***HP/Compaq***
Platform	Sun Fire V60x	PowerEdge 1750	xSeries 335	ProLiant DL360G3
Max. number of processors	2	2	2	2
CPU	Intel Xeon	Intel Xeon	Intel Xeon	Intel Xeon
Speed	2.8GHz or 3.06GHz	1.8/2.4/2.8/3.0/3.06GHz	2.0/2.4/2.8/3.06GHz	2.8GHz or 3.06GHz
Front Side Bus (FSB)	533MHz	400MHz or 533MHz	400MHz	533MHz
L2 cache	512 KB	512 KB or 1MB	512 KB	512 KB or 1MB
Memory	512MB-6GB	256MB-8GB	512MB-4GB	512MB-8GB
Operating System	Red Hat 7.3 Red Hat AS 2.1 Red Hat 8.0 Solaris 9 x86	Anticipate: Red Hat 9.0 Red Hat AS 2.1 Netware 6 Windows 2K Server Windows Adv.Srvr	Windows 2K Adv Srvr NT Srvr 4.0 Red Hat AS 2.1 Red Hat 7.3 SuSE Linux 8	NetWare 5.1 NetWare 6 Windows 2K Srvr Windows Adv.Srvr Red Hat 7.3
Depth	23.89 in. (607 mm)	27 in. (686 mm)	25.7 in. (653 mm)	25 in. (635 mm)
Maximum storage	216 GB	438 GB (SCSI)	293.6 GB (SCSI) 240 GB (IDE)	291.2 GB
PCI slots	2	2	2	2
Ethernet ports	2 x 10/100/1000	2 x 10/100/1000	2 x 10/100/1000	2 x 10/100/1000
USB ports	3	2	3	2
Serial ports	1	2	2	1
Power consumption (Watts)	350 W	Anticipated: 325 W with Xeon	332 W	325 W
Remote management	Sun Control Station	Dell Open Manage	IBM Director	SmartStart and Insight Manager 7

In the 1U space, Dell, HPQ and Sun offer systems that host a 533MHz FSB. This gives the Sun Fire V60x server a 15-20% performance advantage over the IBM xSeries 335. However, there is nothing keeping IBM from offering their servers with a 533MHz FSB. It is anticipated that IBM will have 1U 2P server running with a FSB at 533MHz soon.

From a Linux OS perspective, only Dell pre-loads some of their Red Hat offerings. Dell also provides the Red Hat CDs/User Documentation in the box. IBM and HPQ will not pre-load their supported Linux offerings, although HPQ does claim you can purchase the Red Hat OS (CD/User Docs) directly from them. IBM expects their customer base to purchase and install any Linux-based OS separately on the xSeries 335.

HP provide Systems Management software with their 1U servers. Although IBM provides their systems-management software package (IBM Director) at no additional charge to their Windows 2000 customers, they do charge a fee ($594) to their Linux customers. IBM Director will provide systems-management capabilities to their Linux-based servers. Fopr Dell a system management card is a $399 option – Dell still bundle in their Openmanage software for free.

2U Entry-Level Servers

The following table shows how the Sun Fire V65x server stacks up against the 2U entry-level-server products from Sun's major competitors in this space.

Note: This is information was current at the time of printing (May 2003). For the most up-to-date information, refer to the Beat Sheets listed in the table under "Materials Abstract" on page 41.

	Sun	***Dell***	***IBM***	***HP/Compaq***
Platform	Sun Fire V65x	PowerEdge 2650	xSeries 345	ProLiant DL380G3
Max. number of processors	2	2	2	2
CPU	Intel Xeon	Intel Xeon	Intel Xeon	Intel Xeon
Speed	2.8GHz or 3.06 GHz	1.8-2.6/2.8 GHz	2.0/2.4/2.8 GHz	2.4GHz or 2.8 GHz
Front Side Bus (FSB)	533MHz	400 or 533MHz	400/533MHz	400MHz
L2 cache	512 KB	512KB or 1MB	512 KB	512 KB
Memory	512MB-12GB	256MB-12GB	512MB-8GB	512MB-6GB
Operating System	Red Hat 7.3 Red Hat 8.0 Red Hat AS 2.1 Solaris 9 x86	Red Hat 8.0 Red Hat AS 2.1 Netware 6 Windows 2K Server Windows Adv.Srvr	Windows 2K Server Windows Adv Srvr NT Srvr 4.0 Red Hat 7.2 Red Hat 7.3 Red Hat AS 2.1 SuSE Linux 8.0	NetWare 6 Windows 2K Srvr Windows Adv.Srvr SuSE Lnx ES 7 Red Hat 7.3 Rd Hat 8.0 Red Hat AS 2.1
Depth	25.51 in. (648 mm)	27.5 in. (699 mm)	27.5 in. (699 mm)	25.75 in. (705 mm)
Maximum storage	438 GB	730 GB	880 GB	880 GB
PCI slots	6	3	5	3
Ethernet ports	2 x 10/100/1000	2 x 10/100/1000	2 x 10/100/1000	2 x 10/100/1000
USB ports	3	2	3	2
Serial ports	1	2	1	1
Power consumption (Watts)	500 W	500 W	350 W	400 W
Remote management	Sun Control Station	Dell Open Manage	IBM Director	SmartStart and Insight Manager 7

In the 2U space, only IBM Dell and Sun offer systems that host a 533MHz FSB. This will give the Sun Fire V65x server a 15-20% performance advantage over the HPQ ProLiant DL380 G3. However, there is nothing keeping HPQ from offering their servers with a 533MHz FSB. It's anticipated that HPQ will have 2U 2P servers running with a FSB at 533MHz soon.

From a Linux OS perspective, only Dell pre-loads a Linux OS, offering Red Hat 8.0 as an option. Dell does not allow the pre-installation of Red Hat Advanced Server 2.1; however, customers can purchase the Red Hat AS 2.1 CD and docs directly from Dell for $799.

IBM and HPQ will not pre-load their supported Linux offerings, although HPQ does claim you can purchase the Red Hat OS (CD/User Docs) directly from them. When ordering a ProLiant DL380 G3, the only Linux OS that HPQ lists as an orderable item is SuSE SuSE Enterprise Linux Server 7. Although HPQ will not pre-install SuSE Enterprise Linux Server 7, the CD/Docs are available for $599.95.

IBM expects their customer base to purchase and install any Linux base OS separately on the xSeries 345. However, IBM supports the largest number of Linux packages on the market with the xSeries 345. IBM claims support for Red Hat Linux Advanced Server 2.1, Red Hat Linux 7.2, Red Hat Linux 7.3 and SuSE Linux 8.0 on their xSeries 345 model.

As with their 1U products, Dell and HP provide Systems Management software with their 2U servers. Although IBM provides their systems-management software package (IBM Director) at no additional charge to their Windows 2000 customers, they do charge a fee ($594) to their Linux customers. IBM Director will provide systems-management capabilities to their Linux-based servers.

Future/Roadmap

Visit `http://vsp.eng` for information about future enhancements or contact the product marketing manager.