

Sun Fire™ Servers — Harnessing the Net Effect for Business

White Paper

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The last several years have witnessed a profound transition in computing. With users demanding new on-line services, and businesses rushing in to provide them, the Internet is growing explosively. A few of the more important trends include:

- Enterprises using the Internet to distribute product data to customers, take orders, improve efficiency, enhance communications with employees, and collaborate with partners
- A boom in the growth of Applications Service Providers (ASPs) who provide applications to individuals and enterprises over networks, both public and private
- A large and fast-growing base of users who use the Internet daily to shop, communicate, and obtain information. Increasingly, such users are doing so with a wider variety of wireless, Web-enabled devices, including PDAs and cell phones.

Sun™ aptly calls the result of these collective changes The Net Effect. Not a Sun product or an industry initiative, or a new standards committee specification, the Net Effect is a macroeconomic trend that is a direct result of the growth in network computing.

Aside from these factors, other considerations are driving the Net Effect. These include a variety of new devices on the network, the number and bandwidth of connections, the growing base of users, and the amount and type of content being moved, managed, and manipulated.

The consequence is an overwhelming rate of growth and complexity and a need for a new way of developing and delivering computing itself. A crucial element in this approach centers on the notion of network services and their effect on the systems we build.

By extending computer rooms out into the network, monolithic software systems are disintegrated — broken into loosely-coupled services distributed across the network. The applications become application services, and the system software becomes system services. Sun calls this a service grid. Service grids are simply the web of applications and systems needed to run a business. A loosely-coupled set of network services that crosses departmental and organizational boundaries, service grids can be extended beyond the enterprise to third-party providers, partners, and customers.

The Net Effect gives senior managers both reason to be hopeful and reason to be concerned. The greater interconnectedness of a more highly integrated and interdependent Net promises a whole host of new services for customers and greater opportunities for business. But at the same time, the resulting need for additional resources, improved quality of service, and better trained personnel is causing enterprises to worry that they won't be able to keep up.

Network-centric computing and service grids will place huge demands on enterprises that rely on a competitive advantage to stay in business. Yet to ignore the problem is just as sure a prescription for failure. Sun believes that properly addressing several important requirements will govern the success of companies that wish to transform the challenge of the Net Effect into business opportunities.

Greatly Enhanced Availability

With many businesses now seeing an increased reliance on the Net, the demand for uninterrupted operation has never been greater. Where around-the clock operations were once a requirement for a select few, it is now standard operating procedure for most. Studies show that more reliable, fault-tolerant products are an important, but incomplete answer. All too frequently, failures in system availability can be linked to failures of people and process. A truly comprehensive solution requires services that help people respond correctly when problems occur, that can create processes that are less prone to error, and that quickly restore interrupted systems to full service.

Agile Resource Management

Building a service grid means creating agile systems — systems that can be quickly transformed to meet the rapidly changing needs of business. Infrastructure to build an effective service grid includes enhanced network-oriented services and mechanisms for their delivery — browsers, directory and naming services, network-oriented development tools, platform-independent technologies like the Java™ programming language, and powerful servers. It also includes products and services that simplify management through streamlined procedures, enhance existing skill sets with more powerful tools, and enable the creation of processes to prevent failures and increase efficiency.

Greater Scalability and Performance

The Net Effect is driving a seemingly never-ending demand for more performance and scalability. Sun believes that meeting these demands is best thought of in terms of three-dimensional model (figure 1-1). The first dimension, vertical scalability, refers to the traditional, and still very relevant, idea of adding capacity by enhancing single-system performance. Vertical scalability requires more and faster processors, higher performance interconnects, and highly optimized system software.

The second, horizontal dimension of scalability results when the power of multiple systems can be brought to bear on problems that require more performance than a single system can provide. N-tier systems design, compute farms, and clustered servers are just three examples of how horizontal scalability can add massive amounts of performance as well as greater security and availability.

The transition to service grids has resulted in a new set of requirements that form a third dimension of improvement that calls for greater bandwidth, reduced latencies, and better data coherency. Network scaling requires products and services to help implement and manage a more dynamic environment, and features like load balancing, rapid reconfiguration of resources, and support for heterogeneous system architectures and applications.

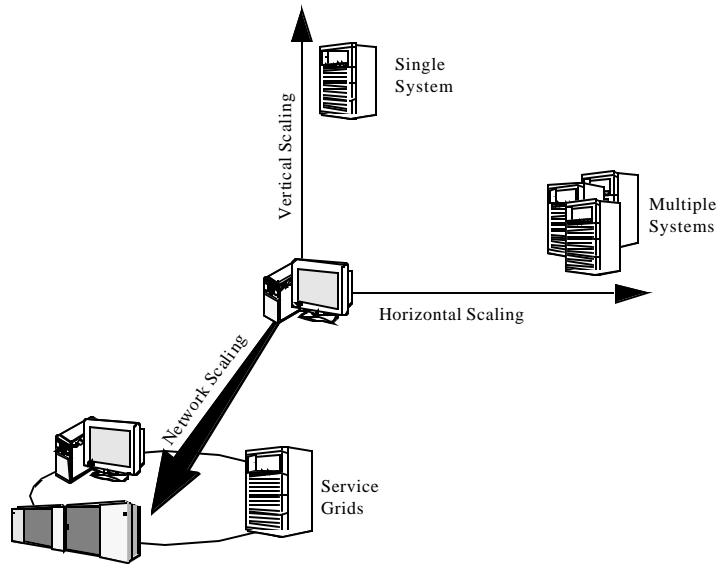


Figure1-1 Scalability to meet demands for more performance is best thought of in terms of a three dimensional model.

Investment Protection

The sophistication, power, and complexity of computing does not excuse it from meeting the basic standards of good business sense. Perhaps most important of these is investment protection — the ability to know that the costs of purchasing hardware, developing applications, and training people will continue to pay far into the future.

While it represents an exciting new prospect for the quality and kinds of computing services we can expect in the future, the Net Effect presents some formidable challenges to developers, MIS directors, administrators, and executive management. In addition to a need for tools to help implement service grids, it is not at all clear that the current generation of products and services are up to this task.

Sun understood that such a day would come, and has been preparing a comprehensive offering of products and services designed to address these concerns.

Harnessing the Net with Sun Technologies and Services



Requirements such as those mentioned in the previous chapter are a tall order. Fortunately, years ago, Sun understood that the coming network economy would require an all-new generation of computing systems — from workgroup servers to the largest multiprocessor and clustered systems. But only if these systems were carefully architected and engineered to address ambitious goals could Sun hope to fully exploit the promise of network computing.

The Sun Fire™ Server Family

In September of 2000, Sun unveiled its first systems built around the UltraSPARC™ III processor. Engineered to provide the highest levels of performance for technical and workgroup computing, the Sun Blade™ 1000 workstation and Sun Fire™ 280R workgroup server also provided a compelling preview of some of the technologies being incorporated into a new generation of mid-range servers from Sun.

With the March, 2001 announcement of the Sun Fire 3800-6800 server family, Sun has unveiled the second phase of its planned rollout of next-generation computing architectures. Offering mainframe features, design, and software environment in a midrange package, the Sun Fire 3800-6800 servers represent a new class of systems — the Midframe.

Advanced Technologies and Products

Sun's new generation of Sun Fire servers rely on a strong foundation of technologies and services that are the result of nearly two decades of innovation from Sun. Yet, while sophisticated operating environments, powerful processor architectures, and faster interconnects are fundamental to such products, they owe their very existence to requirements familiar to any business person — the need to do more with less, to create better products and services, and to grow and prosper in an intensely competitive world.

Next Generation UltraSPARC™ III processors

The SPARC™ architecture has been employed in a wide range of systems from workstations to supercomputers. As a result, SPARC microprocessors boast the support of thousands of compatible software and hardware products. Furthermore, SPARC processors protect investments in software and training by maintaining binary compatibility with previous SPARC architecture implementations. As a result, owners of SPARC systems have been able to consistently avoid the high costs of switching architectures without compromising their requirements for performance and throughput.

The award-winning UltraSPARC III processor is one of a third generation of microprocessor products from Sun. In addition to using a new process technology, the UltraSPARC III microprocessor's high performance design incorporates a higher clock frequency, reduced on-chip latencies, greater amounts of cache, and high levels of integration. Other new features include support for more scalable multiprocessor systems, as well as technologies designed to support increased reliability through enhanced error detection and correction.

The future of the award-winning UltraSPARC III processor is bright, its roadmap including clock rates up to 1.5 GHz., with future generations offering even higher levels of performance. UltraSPARC III is a foundation technology for harnessing the Net Effect, with numerous enhancements that contribute to increased system performance, reliability, system scalability, and investment protection.

Sun™ Fireplane Interconnect

High performance relies on bandwidth — moving data between memory, processors, and I/O devices. While individual components of a system can employ high performance designs, if the interconnect between them acts as a bottleneck, their

potential is wasted. The Sun™ Fireplane interconnect supports balanced performance, with memory, processor, and backplanes carefully matched to prevent the occurrence of bottlenecks. As a result, the Sun Fireplane interconnect permits the full utilization of the Sun Fire server's high performance components and systems.

Despite their sophistication, interconnects are traditionally very reliable components. But with a higher standard of availability at stake, Sun knew that no part of its new server design, including the interconnect, could escape scrutiny. In conjunction with Sun's exclusive Dynamic System Domains, a properly configured Sun server can even survive the failure of a component on the Fireplane interconnect itself. By splitting the interconnect into two segments, system administrators can isolate failures to a designated domain, allowing them to reassign tasks from a failed segment to one that is still operating.

Technologies for Availability

Today, more applications than ever are mission-critical. With an increasing amount of commerce taking place over the Internet, the stakes are higher than ever. Missed sales opportunities, idle employees, broken service-level agreements, and customer dissatisfaction can result in huge losses of revenue and tarnished reputations. The industry is learning what administrators already know — 24 x 7 availability is the new standard. To better address this reality, Sun has incorporated a variety of innovations in its newest generation of servers to increase system availability.

Full Hardware Redundancy

A basic strategy for mitigating the disruptions caused by failures is redundancy. By maintaining multiple integrated, configured components that can accept the load should one fail, processing can generally continue with minimal downtime or interruption. All Sun Fire servers incorporate support for greater levels of redundancy.

Sun Fire 3800-6800 systems are able to recover from any hardware failure — often with no impact to users or system functionality. These systems can be configured so that failure of components such as power supplies, fans, AC power, or the even the system clock or system interconnect can occur without interrupting key services. With proper configuration, even a CPU or a critical ASIC failure may only cause a reboot with the system automatically configuring around failed components.

Concurrent Maintenance

In addition to redundancy, Sun systems provide support for hot plug and hot swap components to help reduce planned downtime for maintenance. Support for hot plug allows for the removal of failed components and insertion of replacements without first powering down the system. Hot swap extends this idea by allowing newly-inserted devices to be added to a running system without interruption. Together, Sun Fire server support for hot plug and hot swap increases the availability of the system by allowing upgrades and replacement of failed or degraded parts while the system continues to operate.

In conjunction with online maintenance for hardware, Sun's Solaris™ Operating Environment offers parallel capabilities for systems software. Features like Hot Relief allow system software to be maintained without interrupting service.

Online Upgrades

Beyond on-line maintenance, on-line upgrades enable administrators to rapidly increase the capacity and capabilities of their systems without interruption. This ability is increasingly important as essential systems must respond quickly to unpredictable loads while they continue to deliver critical services. Working in concert with Sun's hot-plug, Hot CPU Upgrade, and Dynamic Reconfiguration technologies, Sun Fire servers allow selected components to be activated or deactivated while the system continues to run — precluding the need for a system reboot. With this online upgrade capability, selected resources may be added to a system to increase capacity on an as-needed basis, avoiding downtime when the system is needed the most.

Even the Solaris Operating Environment permits upgrades without first interrupting operations. Solaris Live Upgrade and Dynamic Upgrade to Kernel allow key components of the operating system — including the kernel, to be upgraded while systems continue to run.

End-to-End Data Protection

Modern computer systems routinely store and move huge amounts of data. Even with the most reliable components, soft errors are bound to occur from time to time. With ECC (Error Correcting Code) technology, such errors can be detected, and often corrected, before they adversely affect system operations or result in lost or corrupted data. Sun servers employ ECC protection mechanisms in memory, E-cache, and all data paths.

Automatic System Recovery

Despite numerous systems designed to increase system availability, certain types of faults may still bring a system down. Automatic System Recovery (ASR) enables Sun server systems to reboot immediately after a failure, run diagnostics to isolate the problem, and to automatically configure around a failed component. In this way, ASR can prevent faulty hardware from keeping an entire system down or causing it to fail repeatedly.

Clustering

With the high availability of data and services a critical necessity, clusters are a new and important tool. A cluster is a group of nodes (a node being a single server running its own instance of the operating system) that are interconnected to work as a single, highly available, and scalable system.

Sun™ Cluster software is fully supported on all Sun Fire servers. Sun Cluster software delivers high availability through automatic fault detection and recovery — ensuring that mission-critical applications and services are available when needed. Sun Cluster software allows multiple nodes in a cluster to handle growing numbers of simultaneous users and access to large databases. With Sun Cluster software, administrators can add or remove nodes while on-line, and mix and match servers to meet specific needs.

Resource Management Tools

Dynamic System Domains

First introduced on the Sun Enterprise™ 10000 server, Dynamic System Domains allow selected Sun servers to be divided into separate, virtual systems. Each runs its own copy of the Solaris Operating Environment and has exclusive use of its own I/O devices and CPU/Memory boards. With this capability, domains can essentially be regarded as separate systems, each isolated from the effect of errors that occur in other domains (Figure 2-1). The benefits are clear:

- Domains have profound consequences for improving availability, isolating application errors or system faults within one domain, away from the applications running in other domains on the same system.
- Domains provide direct economic benefits by allowing multiple applications to be consolidated on a single, easier-to-manage, less-expensive-to-operate server.

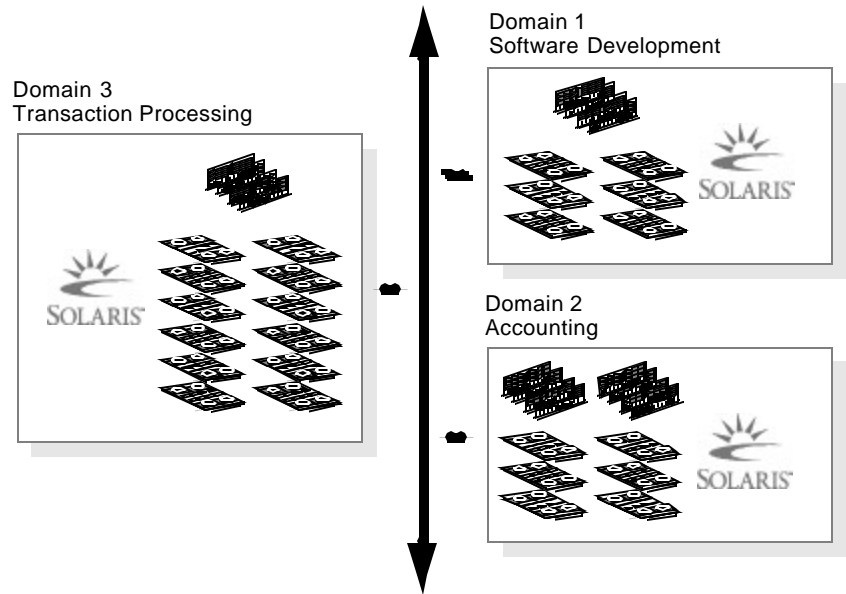


Figure2-1 Dynamic System Domains allow a single system to be divided into separate, virtual servers.

- Domains also represent an important economic advantage in ISP and ASP environments, where the shared resources of larger systems offer greater economies of scale than many smaller systems, but the strict isolation of data and programs are necessary in order to ensure privacy and guaranteed levels of service.
- Domains are an important asset in maintaining flexibility and agility in rapidly changing business conditions. Resources (processors, memory, and I/O devices) can be shifted from one domain to another based on a variety of criteria — time of day, workloads, or to step in for a failed system. Reconfiguration is simple and can be administered remotely through a Web-based interface.

Domains have been used with great success in the mainframe world for years, and Sun Enterprise 10000 users demonstrated their utility in the world of open systems computing. Now, with the introduction of Sun’s new generation of advanced midframe server systems, even greater numbers of enterprises can benefit from the advantages of domains.

Solaris Resource Manager™ Software

Driven by the increasing popularity of applications and network service providers, customers are demanding service level agreements to ensure processing, storage, and throughput resources will be available during periods of peak usage. At the same time, managers must strive to ensure that meeting the demands of one user does not unfairly starve another.

Available across the Sun Fire server product lineup, Solaris Resource Manager™ (SRM) software allows system managers to allocate resources within a single domain to individual tasks and users in a structured, policy-driven fashion. SRM software can allocate shares of processor time, priority, virtual memory, and number of processes. This allows the system manager to better predict and guarantee the level of service available to a particular task. In addition, when additional resources are required to meet urgent demands, allocations can be easily shifted to ensure needed levels of service.

The Solaris Operating Environment provides other standard tools that can be used in conjunction with Solaris Resource Manager software or as stand-alone tools to help make resources available to meet needed service levels. One example of these is processor sets, which allow specific processors to be assigned to particular applications.

Technologies for Manageability

In addition to product features designed to improve the reliability of computing systems, system managers also need better, more powerful tools to help them gain an added measure of monitoring and control. Better control means faster response to changing business requirements, greater efficiency, and fewer errors. Incorporating innovations from previous Sun Enterprise servers, Sun Fire server administrators and users will find a variety of technologies — Sun™ Management Center software, Sun™ Remote Services, Remote Monitoring and Control, and many others — all designed to help them improve the manageability and agility of their systems.

Sun™ Management Center Software

Sun Management Center software offers a single point of management for all Sun systems and the Solaris Operating Environment. Sun Management Center software provides a platform upon which the enterprise can base its administrative and management operations, helping make the systems and the services they provide highly available. A powerful and flexible tool for managing networks, Sun Management

Center software enables system administrators to easily perform remote system configuration, monitor performance, and detect and isolate hardware and software faults all through an intuitive graphical or command-line interface.

Sun Management Center software can also be used as the interface to manage Dynamic Reconfiguration within Sun servers, including domain creation, dynamic board attach, and dynamic detach. To support legacy networks and heterogeneous environments, Sun Management Center software is tightly integrated with major enterprise management frameworks like CA Unicenter TNG, HP Open-View, IBM Tivoli, and software monitoring tools such as BMC PATROL and Halcyon.

Remote Monitoring and Control

One of the many benefits of advanced technology servers like those available from Sun is the ease with which they can be deployed into locations closer to their users. In addition, the “lights out” data center, where expensive support staff need not be on-site 24 hours a day, is becoming increasingly common. Both of these trends have the same effect — remote monitoring and control of systems is an important capability.

Sun Fire™ midframe servers include a comprehensive ability to be remotely monitored and controlled through a network or a serial connection. Remote connections to Sun Fire servers are not just simple sessions into a running domain, but have the full control and authority associated with an on-site systems console.

Capacity on Demand

In the face of increasingly dynamic demands for performance, many enterprises are finding it difficult to predict future resource requirements. Underestimate actual need, and performance and availability suffer; overestimate need, and precious resources sit idle and unused. Sun’s Capacity-on-Demand (COD) represents an innovative procurement model designed to solve this problem. Intended for customers who need immediate access to additional system resources, COD enables system capacity to grow quickly in the event of unforeseen workload increases or failed components. With COD, systems are shipped with only a portion of their resources enabled. Additional processors and memory are installed but disabled through a special licensing mechanism.

When additional capacity is needed, latent resources can be quickly enabled by simply purchasing a right-to-use license. This approach avoids the potentially costly proposition of overburdened critical systems, system outages, or time-consuming upgrades.

The Solaris™ Operating Environment

The Solaris™ Operating Environment Version 8 is supported by all Sun systems, with over 500,000 registered installations world-wide. Version 8 includes a proven, scalable 64-bit kernel, standards-based networking, and Java™ technology support. These technologies provide the foundation for building and deploying enterprise-class systems for multi-vendor, multi-client workgroup environments, high performance commercial and technical computing systems, and highly available Internet data center environments. The traditional strengths of the Solaris Operating Environment lie in its enterprise-class reliability, scalability, and performance, and Solaris 8 Operating Environment extends and expands upon these strengths.

The Solaris Operating Environment employs full 64-bit support that provides enhancements in overall performance, scalability, reliability, availability, security, and ease-of-use while maintaining backward compatibility for all existing 32-bit applications. The Solaris 8 Operating Environment continues the tradition of providing exceptional functionality and performance by delivering the following important capabilities:

- Mission-critical availability for systems of all sizes. Includes support for Dynamic System Domains, Dynamic Reconfiguration, hot swap components, IP Network Multipathing, and live upgrades.
- Higher performance, greater capacity, and precision through its complete 64-bit computing environment
- Enhanced scalability and support for symmetric multiprocessing enables access to more system resources and the ability to consolidate applications onto a single server
- Greater ease-of-use, including Web-based installation, text and voice notes, and a graphical process manager
- Improved features to support networked enterprises including support for IPV6 protocols, mobile IP, and optimized Java Virtual Machine (JVM™)
- Comprehensive international support, including support for the Euro currency symbol, complex text formats for Arabic, Thai, and Hebrew languages, and support for the development of multilingual applications
- Investment protection through complete binary compatibility that enables all of today's 32-bit applications to run without modification

- Extended security features through authentication, data integrity, data privacy, and single sign-on capabilities so that tampering, snooping, and eavesdropping do not compromise data or associated transactions. Support for IPSec helps prevent unauthorized access and is a foundation technology for building virtual private networks.

Designed to deliver the power, flexibility, availability, and compatibility to support enterprise-wide computing, the Solaris Operating Environment combines key computing elements — operating system, networking, and user environment — into a stable, high-quality foundation that enables the development, delivery, and management of a wide range of computing solutions.

Services – Transforming Technology into Business Results

In the age of service grids and the Net Effect, availability is of paramount importance, and keeping availability high means relying on people and processes even more than products. Sun experts can help integrate the methodologies, expertise, products, and services needed to craft the kind of high availability environment required to make service grids work smoothly. Indeed, Sun's comprehensive portfolio of consulting, training, and support services is one of the many reasons that the majority of Internet traffic runs through Sun servers.

Key elements of Sun's service offering include:

- Sun Professional Services to assist in planning, designing, and implementing e-commerce, portal computing, customer relationship management, supply-chain management, and service provider solutions.
- Sun Educational Services to analyze skill sets, build customized education plans, and certify staff for optimal performance through comprehensive skills analysis, training, education, and certification offerings.
- Sun Support Services to help meet 24x7 mission-critical requirements for maximum uptime with flexible, custom support plans.

Sun Professional Services

The possibilities of advanced networks are profound — superior customer service, competitive advantage, increased market share, improved productivity, and reduced costs. But experienced IT professionals know that turning these possibilities into bottom-line results requires more than just will.

Sun Professional Services provides the technology and business expertise to turn plans into real business solutions. By aligning people, processes, and technology with business strategies, Sun Professional Services consultants can help enterprises achieve the highest return on their technology investment with expertise that covers everything needed to plan, implement, and manage distributed network computing environments.

Platform Integration

Sun Professional Services offers the focused expertise and best practices to help assess, design, and deploy the most effective network computing solutions for running a business. Sun's platform integration services can help enterprises build or restructure their IT infrastructure for maximum performance and high availability; integrate new components into existing or planned IT infrastructure to take advantage of emerging technologies; consolidate servers for more efficient management and reduced cost of ownership; and migrate to a Sun platform for more effective distributed computing.

Enterprise Operations

Sun Professional Services offers a comprehensive suite of services designed to forge a strategic approach to enterprise operations management. The program begins with a assessment of current operations, identifying strengths and weaknesses. From this comes a design for an operations management strategy that addresses both technical requirements and business goals. This design can result in recommendations for enhancement or modification of systems and network management, security policy, data and storage management, performance and capacity management, recovery strategies, change control, user support, software distribution and version control, and asset management.

Application and Data Center Readiness Services

To help enterprises ready themselves for the new capabilities of Sun Fire servers, Sun has also introduced a variety of service offerings designed to raise the preparedness of people and processes for Internet commerce. Sun believes that these services are relevant to specific levels of readiness that enterprises need to consider:

- Application readiness refers to the preparation of systems and applications for higher availability roles. New Sun service offerings to address applications readiness include Sun Installation Services for Sun Fire servers and the Sun Fire

Application Readiness program — both designed to help craft hardware and software implementations that can support the availability needed by critical applications.

- Data center readiness is a measure of the preparation of the administrative and systems management environment for higher availability challenges. Relevant Sun programs includes SunReadySM service solutions to assess and tune production environments; Sun Fire Data Center Readiness to provide specialized testing, best practices, and documentation to support operations; Sun RAS Profile, a preemptive service to evaluate the reliability, availability, and serviceability of enterprise computing operations; the SunReady Availability Assessment to identify improvements for meeting higher levels of availability; and Sun Fire Administration and Maintenance training coursework to help improve the efficiency and expertise of operations staff.
- Managed Quality of Service (QoS) refers to a proactive set of policies designed to allow enterprises to guarantee a set level of availability and service to customers. Sun Remote Services allows Sun to help enterprises meet such agreements through a program of active monitoring of system performance and availability and initiating actions to restore service when problems are detected. Also offered is Sun's collection of services that include installation verification, system health and patch assessments, special services for systems administrators, asset surveys, and patch management services.

Consulting Services

Sun Professional services employs a service-driven architectural approach that combines products, standards, techniques, and methodologies to create versatile, manageable Internet environments. Sun's approach is open, flexible, and designed to easily incorporate new services that can scale to handle volume growth and maintain comprehensive security. Sun consultants provide fast, customized implementations that can help enable innovative Internet business solutions that are differentiated from the competition, faster to market, and are more economical.

Sun consultants can help enterprises plan, design, and implement the right architecture to support a wide range of flexible, reliable, and secure Net solutions including, eCommerce, customer relationship management, supply chain management, portal computing, and service provider solutions.

Sun Educational Services

Well-trained staff can help ensure high levels of availability, fast and accurate deployment of new products and services, quick identification of problems, and rapid response to system failures and interruptions. As a leading supplier of training solutions around the world, Sun can help organizations take full advantage of their hardware and software investment.

Sun Educational Services offerings include:

- Professional certification programs that support and endorse the proficiency of skilled personnel, which can be delivered at one of Sun's world-wide training centers, via the Web or CD-ROM, or on-site.
- Expert consulting and skills assessment programs to help ensure that people are at the right place at the right time to support key transitions and activities.
- A complete, integrated development solutions set — from development tools and deployment environments, companion business applications, to software architects and methodology to code technologies and APIs.

Support Programs

Planning, education, characterization, integration. While the help of Sun Professional Services and Sun Educational services will make operations more available, economical, and scalable, only ongoing support expertise can keep it that way. Sun offers a variety of support programs designed to simplify and streamline the installation of modern data centers and to keep them running smoothly around the clock.

Sun Installation Services

Support offerings begin with Sun Installation Services, with Sun experts helping with the configuration and timely completion of even the most complex installations. Sun provides a comprehensive suite of offerings, including site preparation review, installation planning, verification and installation of hardware, configuration and customization, tutorial and reference documentation, and system turnover.

SunSpectrumSM Support

Once installed, the SunSpectrumSM support program can keep systems running. Covering the entire Sun product offering, all levels of SunSpectrum support include Solaris Operating Environment enhancement releases, patches, and maintenance updates, as well as four distinct support levels designed to balance response time requirements and budgets:

- SunSpectrum PlatinumSM. Designed to support around-the-clock, mission-critical computing environments, SunSpectrum Platinum support is Sun's comprehensive high-availability system support solution.
- SunSpectrum GoldSM. In addition to traditional system maintenance, SunSpectrum Gold support helps customers proactively resolve system problems and better manage key business systems.
- SunSpectrum SilverSM. Delivering basic Sun system support, SunSpectrum Silver provides telephone support, 24x7 access to the SunSolveSM technical knowledge database, and on-site hardware service with an average 4-hour response for urgent calls.
- SunSpectrum BronzeSM. Designed to support companies that utilize in-house personnel to perform hardware service, SunSpectrum Bronze support provides tech support, tools, and ready-access to Sun-authorized replacement parts.

Availability Profiles

One of the greatest challenges facing IT management today is the internal or external customer expectation for service availability. Whether specifically stated as a business requirement or simply implicit in the utilization of an IT infrastructure, these expectations often lead to hard and fast service level commitments. The ability to meet these commitments can become the determining factor between success and failure. As a result, understanding the reliability and availability of systems takes on even greater importance.

Sun RAS (Reliability, Availability, Serviceability) Profile is a preemptive service designed to identify those areas where, based on industry standards and best practices, enterprises can improve operational efficiency, increase business and mission-critical system reliability, and reduce unscheduled outages. Sun RAS Profile is has five components: data collection, data analysis, report generation, customer presentation, and action-plan management. This analysis includes both physical site inspection and Sun-proprietary script execution.

Sun Remote Services

Sun Remote Services methodologies allow managers to detect and manage to events on Sun systems faster and more proactively, helping to resolve potential problems before they impact business operations. With Sun Remote Services, this rapid response can be accomplished through remote, real-time monitoring of systems and improved, ongoing communication between Sun and its customers' IT staff. As an added benefit, Sun Remote Services provides enterprises with increased access to monitoring data, alerts, and reports, and increased access to technical support from Sun.

Proactive, Preemptive Services to Help Increase Availability

With foundation support service provided by SunSpectrum and system monitoring available through Sun Remote Services, Sun recognizes the need to help customers plan for high availability. A portfolio of proactive services is available to help customers with installation, change management, and system planning — all with the goal of improving system uptime. This group of services will continue to grow with customer needs.

Strategic Alliances and SunVIPSM

Modern systems are rarely comprised of components from just one vendor. Computing platforms from Sun, applications from another vendor, network gear from another. The list goes on. What every manager fears is not knowing whom to call when something goes wrong — is it the application? the database? the network? Sun understands this concern, and along with other leading vendors, has forged the Sun Vendor Integration Program (SunVIPSM) to help quickly diagnose interoperability issues. Under SunVIP, Sun takes responsibility and then works in tandem with other vendors to resolve them without putting customers in the middle. In concert with participating vendors, the SunVIP programs' formalized support arrangements, Joint Escalation processes, and resolution centers helps enable the efficient handling of service requests and the quick resolution of problems.

Initiatives

In addition to specific support, service, and training offerings, Sun has developed several broad-based initiatives that integrate all of the services needed to tackle some of the common problems associated with implementing large commercial networked solutions.

iForceSM Solution Sets

The process of transitioning a business to a networked world has become increasingly complex. Many companies who have experienced first-hand the difficulties of creating their own solutions now believe that carefully selected partnerships are a better way, promising faster completion and lower costs. Where they did exist, partnerships often came too late. Today, the winners are forging their alliances up-front, leveraging the expertise of technology leaders and utilizing best-of-breed solutions and partners.

Sun's iForceSM Initiative is a far-reaching program in which Sun and a host of certified partners are expediting the process of moving customers to networked computing, providing all the products, methodologies, services, and programs necessary to get the job done quickly. A one-stop shopping environment, iForce services allow both large enterprises and start-ups to obtain comprehensive, customized, and reliable services. In short, the iForce Initiative places under one umbrella dozens of programs and services designed to make the movement to networked computing easier, quicker, simpler, and more reliable.

SunReadySM Lifecycle Advantage

Companies understand that information technology must reliably and predictably meet the levels of application access and performance demanded by their end users. Implementing such an IT environment — especially for mission-critical applications — involves far more than simply selecting the best hardware and software.

That is why Sun developed the SunReadySM Lifecycle Advantage— a unique step-by-step process designed to help companies assess the service level requirements of their end users and build a customized production environment to meet those needs. Through a phased approach, the SunReady Lifecycle Advantage helps enterprises assess, plan, design, and implement a customized technology environment. It also takes into consideration the people and processes that are critical for maintaining the integrity and availability of the system. When the production environment is fully implemented, Sun manages the transition to a sustaining support environment, providing fully documented processes and procedures and, if needed, sustaining services.

With the SunReady Lifecycle Advantage, Sun professionals design a system to meet the service-level commitments that are established between businesses and end users at the beginning of the process. The result is a technology infrastructure that is aligned

with business strategies and service level objectives — one that offers the required availability, reliability, and flexibility for today, and scales to help meet future demands.

SunToneSM Certification

In conjunction with their customers, Internet Service Providers (ISPs), wholesale Internet providers, and Application Service Providers (ASPs) all share a common worry — ensuring that service level commitments will be kept. In addition to their comprehensive consulting, education, and support services tailored to helping enterprises attain high levels of uptime and service, Sun offers SunToneSM certification. SunTone certification means that applications and providers have passed a rigorous set of assessments that focus on the impact of people, products, and processes across multiple dimensions of the service delivery environment. Having achieved this certification, service providers can differentiate themselves from the competition by demonstrating to their customers that they have earned recognition for their ability to maintain the highest levels of service and availability.

Sun BluePrintsTM

In addition to a wide variety of services that include direct, hands-on assistance in planning and implementing sophisticated computing solutions, Sun offers its customers the expertise of its engineers and support teams in printed form. Sun researches, develops, and publishes best practices texts and guides called Sun BluePrintsTM. Such materials can be valuable resources when creating high performance, highly available, highly reliable datacenters using Sun products.

Sun Fire 3800-6800 Servers — Introducing the Midframe



In 1996, Sun introduced the Sun Enterprise server family, a highly successful line of open, binary-compatible, mid-range multiprocessing server systems. These new servers enabled the creation of networked computing systems for business, education, science, and government that set new standards of performance, reliability, availability, and scalability.

Building on the success of the Sun Enterprise server family, Sun has introduced a new line of servers specifically designed to support the creation of increasingly sophisticated, mission-critical, networked computing solutions. Offering mainframe-class availability and manageability in a mid-range server, the Sun Fire 3800-6800 servers are the first of a new class of systems, the Midframe.

Meeting the Needs of Internet Computing

Like their predecessors, the Sun Fire 3800-6800 server line is a family of large-scale, shared memory, symmetric multiprocessor systems based on the SPARC processor architecture (figure 3-1). What is new is that Sun Fire servers provide the sophisticated availability and manageability features needed to support commercial computing needs along with the higher levels of performance demanded by the high-performance and Internet computing community.



Figure3-1 The Sun Fire 3800-6800 server line is a family of large-scale, shared memory, symmetric multiprocessor systems based on the SPARC processor architecture.

There are four members of the Sun Fire 3800-6800 server product line, including a new eight-processor entry-level departmental server, a mid-sized 12-processor departmental server system, a version of the 12-processor server designed for Internet data centers, and a large 24-processor server for data center tasks such as database, data mining, or server consolidation applications. Additional features are summarized in table 3-1.

Greatly Enhanced Availability

Engineered to improve upon previous generations of Sun servers, the Sun Fire server incorporates fully redundant hardware components designed to avoid single points of failure. Redundant components include the Fireplane interconnect, CPU/Memory cards, I/O assemblies, system clock and controller, power supplies, and fan trays.

	Sun Fire 3800 Server	Sun Fire 4800/4810 Server	Sun Fire 6800 Server
CPU	2-8	2-12	2-24
Maximum Memory (GB)	64	96	192
PCI slots (maximum)	-	16	32
cPCI slots (maximum)	12	8	16
Dynamic System Domains	1-2	1-2	1-4

Table3-1 Key features of the Sun Fire 3800-6800 servers.

Now in a fourth-generation design, support for Dynamic System Domains in the Sun Fire 3800-6800 server lineup allow the creation of independent, fault-isolated environments that can be quickly configured and reconfigured to meet changing demands for performance and resources. In conjunction with Dynamic System Domains, Sun Fire 3800-6800 servers offer concurrent maintenance, Hot CPU Upgrades, and online upgrades.

The highest levels of availability are possible only when there is tight integration between the hardware and operating system. Such is the case with Sun Fire servers and the Solaris Operating Environment, which has been enhanced to support the advanced availability features in the Sun Fire server line, including clustering, Dynamic System Domains, Dynamic Reconfiguration. Other features unique to Solaris Operating Environment include live upgrades, support for redundant networks (IP multipathing), and hardened kernel and I/O drivers.

Better Manageability and Agility

Many of the manageability features pioneered in the Sun Enterprise 10000 server are now available in the Sun Fire 3800-6800 family of servers. These include Dynamic System Domains and dedicated system controllers, both extended and enhanced to provide greater configuration flexibility and control. Dynamic Reconfiguration, originally available only in the Sun Enterprise 10000 and later in the Sun Enterprise 3500-6500 servers, is also available in Sun Fire 3800-6800 servers.

Greater ease of management is also supported with tools that feature graphical, Web-based system interfaces. Previously accessed through several tools, they are now consolidated under Sun's flagship management product, Sun Management Center software. With Web-based management tools, administrators can monitor and control Sun Fire servers from a variety of platforms using a simple network or Internet connection.

Streamlined management also applies to the routine maintenance of systems. Based around a standard design for CPU/Memory boards, I/O cards, cabinets, power supplies, and peripherals, Sun Fire 3800-6800 system components are highly modularized to support rapid fault isolation and replacement, easy reconfiguration, minimized procurement complexity, more economical stockpiling of spares, and lower overall system costs.

Continued Investment Protection

Investment protection is an idea that every business person understands. Especially important in an age when technology can quickly obsolete recently acquired assets, Sun has made a special effort to find ways to extend the life of investments made in software, training, and system components.

Sun's investment protection strategy begins with a complete family of servers. The Sun Fire family, with its common architecture and use of common components, is the first server product offering to feature the powerful UltraSPARC III processor in a package which also places great importance on availability and manageability. Managers can pick the Sun Fire server model that meets their requirements for capacity and performance, and as business grows and demand for service increases, the modular Sun Fire design allows resources to be easily moved to higher capacity models. And for those thinking of upgrading from an earlier line of Sun servers, the UltraSPARC III processor is binary compatible with earlier generations of UltraSPARC processors, precluding the need to re-engineer applications or retrain staff.

Smooth transitions from one member of the Sun Fire family to another has another benefit — seamless scalability. In conjunction with Sun's commitment to multiprocessor architectures, programs like Capacity on Demand allow administrators and managers to quickly add resources in response to the growing workloads of a successful business — all without interrupting operations.

Applications hosted on Sun Fire servers are not locked within their product family. All Sun servers run the Solaris Operating Environment — a benchmark implementation of the UNIX[®] operating system that has won wide praise throughout the industry for its performance, reliability, and applications availability.

Higher Performance

For many users, performance remains the bottom line, and with the Sun Fire 3800-6800 server family, the numbers are impressive — support for up to 24 third-generation UltraSPARC III processors and 192 GB of main memory; an all-new high speed Sun Fireplane interconnect with a sustained bandwidth of 9.6 GB/sec; and an I/O subsystem that incorporates 64-bit, PCI technology clocked at 66 MHz. But perhaps most important, Sun Fire 3800-6800 servers are designed to deliver all of their performance potential — with subsystems and a 64-bit operating system carefully matched and balanced to avoid bottlenecks that can prematurely starve system throughput.

Conclusion



Even now, the Net Effect is overtaking the industry. Enabled by the World Wide Web and Internet technologies, computing is changing forever. Soon, on-line experiences will be built from the instantaneous integration of multiple services, their content and appearance always changing to reflect new business realities.

The coming transformation will surely be a profound one — one that results in a new burst of creativity for enterprises and a multitude of tangible, measurable benefits, including shortened time to market, increased quality, lower risk, and greater productivity.

A truth dizzying for both its potential and its complexity.

Sun understands that along with this change has come a shift in expectations — performance alone is not enough. Availability and agility will be absolute prerequisites to participation in the coming dynamic, networked economy. And it will take both powerful computing products and a full suite of expert services to help enterprises harness the Net Effect rather than being harnessed by it. Those unfamiliar with Sun Microsystems are invited to find out what our existing customers already know — in Sun, enterprises have a reliable ally to help them solve their most urgent enterprise computing concerns:

- Sophisticated and powerful network-based computing systems that are able to fully harness the potential of the Net Effect.
- Processes that are efficient, effective, and flexible
- Training, retaining, and making the most of hard-to-find, hard-to-retain, costly personnel.

- Keeping systems running around the clock, 365 days a year.

For nearly 20 years, we have been busy moving our customers towards the Network Age, proclaiming that “The Network is the Computer™”. Today, we are helping enterprises capture the potential of the Internet to connect together customers, suppliers, partners, and employees.

As the company that powers the Internet, Sun is a recognized leader to those making the transformation to computing in the Network Economy.

References



Sun Microsystems posts product information in the form of data sheets, specifications, and white papers on its Internet World Wide Web Home page at: <http://www.sun.com>.

Look for the these and other Sun technology white papers:

Sun Fire™ 3800-6800 Servers — Computing for the Net Effect, Sun Technical White Paper.

High Availability with Sun Fire™ 3800-6800 Servers, Sun Technical White Paper

To The Reader



As of this writing, Dynamic Reconfiguration, Dynamic System Domains, Capacity on Demand, Sun Cluster 3.0 software, Mixed-speed CPU support, and Hot CPU Upgrades are awaiting certification by Sun engineering, and as a result, are not yet supported in the Sun Fire™ 3800-6800 product line. These important capabilities will be supported in 2001.

Please contact your sales representative for the latest information about availability of these features.





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