

# **TRANSITION FROM LINTEL TO SUN REVITALIZE THE WEB TIER AND BUILD A COMPETITIVE EDGE**

Executive Brief  
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## Raising the Bar for Business-Critical Web Infrastructures

The last decade brought dramatic changes in the nature of business and IT operations. Enterprises grew increasingly dependent on network based transactions, forcing the creation of entirely new layers of compute infrastructure. The amount and importance of services delivered over the network continues to increase, and many infrastructures are failing to provide the needed throughput and agility within budget constraints. Organizations must raise standards and rethink current technology choices in order to confront these challenges.

### Web Services — Extending the Enterprise

In today's global economy, competitive pressures are forcing organizations to find new ways to reach customers more readily, speed products to market, and reduce the cost of operations. Toward this end, enterprises are turning to Web services and capitalizing on the ability to transact business over the network. With the ability to ease application integration, reduce development costs, and extend the usefulness of legacy assets by bridging software communication gaps between systems, Web services have proven to be a critical technology in the IT arsenal. As a result, companies continue to transform increasing numbers of business applications into network services. With these changes, IT organizations are challenged to keep tight control of overhead expenses and still deliver a secure, stable, and high performance infrastructure that supports the business-critical nature of the Web tier.

### Technology Choices in a Cost Conscious Business Environment

With an increasing demand for Web services compute power, IT managers often look to low cost technology choices, such as Linux and x86-based servers, as means to address budget constraints. In addition to reduced acquisition costs, Linux on x86 solutions promise many enterprises open source benefits and the dependable throughput, extensive flexibility, and other features necessary to address competitive business climates. While deploying these platforms in a horizontally scaled, redundant architecture provides a functional Web tier, large volumes of these servers prove costly to operate, are difficult to manage, and fail to deliver the stability and performance needed in business-critical environments.

### The True Expense of Some Low Cost Options

The deployment of Linux on x86 systems produces a few cost advantages for some enterprises but surprising side effects for others. The proliferation of servers equipped with power hungry single- and dual-core Intel-based processors leaves many CIOs grappling to devise solutions to accommodate the skyrocketing demands for power, cooling, and floor space infrastructure. In addition, managing huge Linux on x86 (Intel) Web farms often becomes cumbersome, raising administrative expense. Furthermore, while some IT organizations reap the financial benefits of Linux as free software, others find the mission-critical demands of Web services force the purchase of

expensive support contracts. In the end, the cost benefits of Linux and x86 systems elude many enterprises.

### **Operational Issues Worth Avoiding**

Organizations with Linux environments on x86 servers encounter a number of operational issues which distract from the focus of building a Web tier that drives true business advantage. For example, Linux revision cycles are often relatively short with few provisions included to ease transitions from one version to the next — putting additional strain on administrative resources and adding risk to daily IT operations. Adding more vulnerability, Linux system recovery options sometimes fall short of meeting availability requirements, especially when paired with server designs that lack redundant hardware components. Furthermore, a demanding Web service computing environment requires best-in-class system support, and some Linux help desks fail to meet the standards expected for mission-critical enterprise operations. Managing exposure to these risks hinders progress and creates needless pressure for IT organizations.

### **Fundamental Barriers to Performance**

Technical barriers often limit Linux on x86 environments from reaching peak performance potential. Many low cost servers do not provide innovations that deliver the highest speeds within a reasonable power and cooling envelope. In addition, the dependence of Linux on the open source community means there is often a lag between new hardware performance gains and the ability of Linux or the particular layered application to take advantage of those enhancements. As a result, Web services often operate at less than optimal performance, reducing effectiveness and possibly leading to stalled transactions, lost opportunities, and customer dissatisfaction.

### **Sun Systems — An Even Better Value**

Migrating Web services from Linux on x86 platforms to Sun servers and the Solaris™ Operating System (OS) enables organizations to create lower cost, easier to manage, higher performance infrastructures without relinquishing the benefits of open source. With Sun systems, enterprises can rebuild and virtualize Web tiers to address the security, efficiency and availability needs of today's global marketplace. In addition, Sun platforms deliver better investment protection and provide the innovative technology needed to create a competitive edge. More businesses discover the value of Sun servers and the Solaris OS every day, creating momentum in the marketplace and a shift to Sun systems.

## Sun Technology — Advancing Business Operations

With businesses relying upon the network more heavily than ever before, IT choices for Web tier infrastructures can directly impact revenue and the overall progress of enterprise initiatives. By partnering with Sun to deliver Web services, businesses move ahead more rapidly, achieving faster results and increased stability with lower costs.

### Get Ahead with Sun Innovation

Markets pressures are driving IT managers to seek technology that enables enterprises to get ahead and stay ahead of competitors. Sun's innovative servers, processor architectures, and operating systems fulfill this need by providing more robust and agile infrastructures. Advancements found in Sun products culminate from significant investments in research and development as evidenced by technologies such as Sun Fire™ x64 servers, Sun Fire servers with CoolThreads™ technology, the Solaris OS, and Solaris™ Containers (Figure 1). With these and other Sun technologies, enterprises can create superior Web tier solutions and build a competitive business advantage.

- Sun's low cost, broad line of Sun Fire x64 systems with AMD Opteron™ processors stand out from the pack of competing x86 systems, providing enterprises with outstanding performance, scalability, power efficiency, and manageability benefits, as well as the flexibility to natively run the Solaris OS, Linux, or Windows.
- The unique multi-core design of the UltraSPARC® T1 processor with CoolThreads technology enables Sun Fire T1000 and Sun Fire T2000 servers to run up to 32 threads simultaneously, delivering outstanding Web and application server performance with remarkable energy and space efficiencies.
- The Solaris 10 OS provides the most efficient, secure, and reliable operating platform to enterprises. In addition to delivering world-record performance across all workloads and on numerous hardware platforms, the Solaris OS enables enterprises to gain unmatched security and availability through features such as Predictive Self Healing.
- Solaris Containers are a breakthrough approach to virtualization and software partitioning, enabling secure isolation of applications and services using flexible, software defined boundaries.



*Figure 1. Innovative Sun Fire servers running the Solaris OS provide a superior foundation for Web tier solutions*

## Reduce Acquisition Costs with Open Source

Organizations desire the community benefits offered by open source and are compelled to take advantage of no-cost software licensing. At the same time, mission-critical Web infrastructures require a stable and agile operating environment. Now available as open source, the Solaris OS provides best-in-class reliability, availability, security, and performance with the open access many organizations demand. Giving developers access to advanced technology in the Solaris OS, the OpenSolaris™ Project provides a source of innovation, expanded community, and an opportunity for direct feedback. Furthermore, Sun's commitment to the open source community is evidenced by the OpenSPARC™ initiative, and Sun's involvement in GNOME, Mozilla™, NetBeans™, OpenSSO (Single Sign On) and, of course, Linux efforts.

The Solaris 10 OS is the latest version of Sun's tested, certified, and supported enterprise operating system, available free for download and deployment. Looking to the future, Sun intends to base subsequent versions of the Solaris OS on technology from OpenSolaris efforts. Extensive investments in stringent testing and security protection assurance enable Sun to use this plan to deliver a top quality, highly secure, and reliable commercial Solaris OS that also incorporates many of the benefits of open source collaboration. Service plans for the Solaris OS are optional, with stand alone contracts available that are less costly than many mandatory Linux service programs.

Sun has taken measures to simplify the process of making a transition from Linux to the Solaris OS for hosting open source software programs. To this end, the Solaris OS distribution includes pre-compiled versions of many leading open source applications including Apache, MySQL, PHP, Perl, and Tomcat, enabling enterprises to easily reproduce current software infrastructures on Sun platforms. Even better, Sun testing indicates that organizations can experience as much as three times the performance of generically compiled open source binaries by using Sun's CoolStack pre-optimized and pre-compiled open source applications, available free for download at <http://cooltools.sunsource.net>. For enterprises that use custom open source applications, Linux binaries can execute unmodified on the Solaris OS using Solaris Containers virtualization technology. With this technology, enterprises can reap the benefits of the Solaris OS without the need to port existing Linux applications. Whether executing open source applications built for Linux or the Solaris OS, organizations can migrate to Sun platforms and benefit financially over traditional licensing models.

## Lower Operational Expenses

Containing costs is of paramount importance to staying competitive in today's economic climate. Horizontal scaling provides one method for creating an available and flexible infrastructure at lower cost. However, horizontally scaled architectures often result in a proliferation of inefficient systems that create unanticipated power and real estate demands, as well as increase administrative expenses. Energy and

space efficient Sun servers with built in systems management capabilities increase the viability of this money saving strategy.

### Reduce Utility and Real Estate Expenses

The economic effects of deploying vast quantities of energy inefficient servers are far reaching and sometimes go unnoticed. Factors such as wasted rack and floor space, rising utility costs, and the need for additional cooling units or larger backup power generators, adds up quickly. Using power efficient Sun servers helps mitigate these concerns. The revolutionary Sun Fire T1000 and Sun Fire T2000 servers are so effective at conserving power that Pacific Gas and Electric (PG&E), a major California based power company, is now offering cash rebates to customers who upgrade to this new technology. As another example, Sun Fire x64 servers provide significant energy savings as compared to competing servers which use an equivalent number of Intel Xeon MP processors.

Understanding the impact of a server in the data center is imperative if organizations are to be able to evaluate systems and make the right buying decisions. Toward this end, Sun devised the Space, Watts, and Performance (SWaP) metric to calculate server performance in relation to power and space efficiency. The calculation is expressed as  $SWaP = \text{performance} / (\text{space} \times \text{power})$ . For example, the superior performance and energy efficiency of the Sun Fire T1000 server can be evidenced by the SWaP metric as highlighted in Figure 2 below<sup>1</sup>. In many additional cases, the SWaP metric demonstrates that the Sun Fire T1000 and Sun Fire T2000 servers far surpass systems from IBM, Dell, and HP, sometimes using less than one-third the energy and occupying one-half the space — all while meeting or exceeding performance levels. Because the SWaP metric uses standard, published metrics as its baseline, its methodology has been endorsed by leading IT industry analyst firms.



*Figure 2. Powerful, energy efficient Sun Fire T1000 servers win in every category, including overall impact on the data center.*

1. Sun Fire T1000 (8 cores, 1 chip) 10466 SPECweb2005. IBM System x3650 (4 cores, 2 chips) 9182 SPECweb2005. Dell PowerEdge 1950 (4 cores, 2 chips) 9808 SPECweb2005. SPECweb reg tm of Standard Performance Evaluation Corporation. Results from [www.spec.org](http://www.spec.org) as of 9/23/06. IBM x3650 power rating estimated by calculating 70% of the power supply data reported in the product brochure. Dell Power Measurements taken from the Dell Power Calculator, 09/23/06, posted: [http://www1.us.dell.com/content/topics/topic.aspx/global/products/pedge/topics/en/config\\_calculator](http://www1.us.dell.com/content/topics/topic.aspx/global/products/pedge/topics/en/config_calculator). System configured with 2 x Dual Core 3.0GHz processors, 8GB RAM, 2 x SAS disks. Sun Fire T1000 server power consumption taken from measurements made during the benchmark run.

### **Economize with Consolidation and Virtualization**

The economic need to maximize the use of every IT asset often necessitates consolidating multiple Web services onto each server in the Web tier infrastructure. Virtualization techniques enhance consolidation strategies one step further by enabling organizations to create administrative and resource boundaries between applications within a system. A variety of tools exist to accomplish virtualization, each providing varying degrees of flexibility, availability, and security. Careful selection and implementation of these technologies proves critical to meeting consolidation objectives and supporting changing business priorities.

Sun is constantly looking to, and shaping, the future of computing by investing in new technology and gaining expertise. A leader in server virtualization technology, Sun invented a number of techniques and embraces other third-party tools to deliver a diverse set of powerful advantages to enterprises. Sun service programs help organizations to use the following tools to architect, implement, and manage a virtualized data center that strikes the proper balance between absolute isolation and soft, flexible separation of applications as appropriate to each system, (Figure 3).

- **Hard Partitioning** — Sun's mid-range and high-end Sun Fire servers include the capability to create Dynamic System Domains which physically divide a single system into multiple electrically isolated partitions, each running its own instance of the operating environment. Hardware or software failures in one domain do not affect applications running in other domains, increasing availability and providing a reliable, secure platform for running multiple applications simultaneously.
- **Operating System Virtualization** — Solaris Containers technology can enable IT organizations to quickly harness and provision idle compute power into a secure, isolated runtime environment for a new Web services deployment without increasing the number of operating system instances to manage. Linux applications can even run within a Solaris Container without modification, enabling organizations to consolidate Solaris and Linux applications on a single system to affect better resource utilization. In addition, hosting applications within individual Solaris Containers provides administrators the ability to exert fine-grained control over rights and resources within a consolidated server.
- **Virtual Machines** — Third-party tools certified for the Solaris OS and Sun platforms, such as VMware and Xen, as well as Sun's recently announced Logical Domain (LDom) technology use a lightweight hypervisor software layer to virtualize machine hardware and isolate the OS from register-level executions. This virtual machine software enables multiple, diverse operating systems to be hosted simultaneously on a single platform, increasing flexibility and the potential for maximum server utilization.
- **Resource Management** — The Sun N1™ Grid Engine software enables the pooling of server and storage resources into larger enterprise grids, helping multiple users,

teams, and departments share common resources while working on different projects. In addition, the Solaris Resource Manager software helps enterprises to regularly set new priorities for the use of compute resources to fit changing business needs. Sun N1 Grid Engine and Solaris Resource Manager software can be used in conjunction with other virtualization technologies to enable enterprises to optimize the use of compute resources.

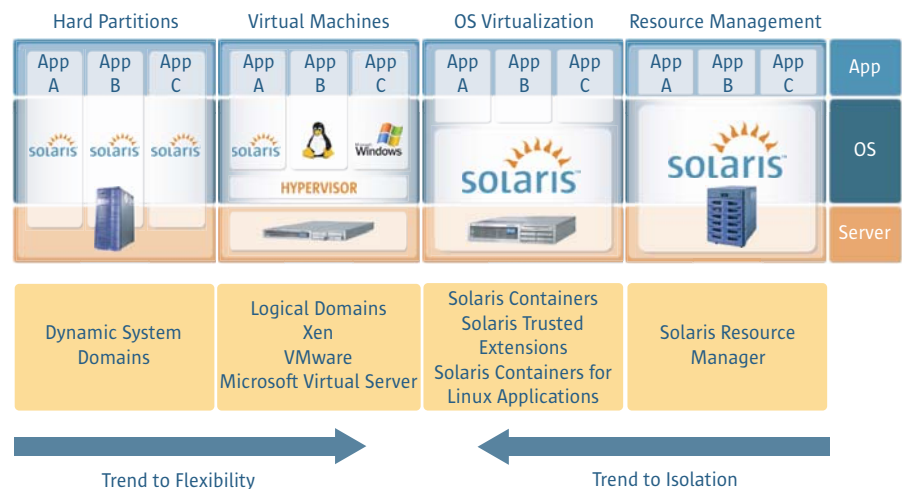


Figure 3. Sun provides innovative server virtualization technology choices to enterprises, enabling the creation of more effective consolidation projects.

“The UltraSPARC T1 has completely overturned the way we plan services and scalability.”

- Dale Williams, CEO  
DigiTar, Inc.

Using Sun servers brings further benefit to consolidation projects. Indeed, the workload of as many as 10 Intel Xeon servers can be handled by a single Sun Fire T1000 or Sun Fire T2000 server. According to an Information Week article, DigiTar, a messaging services outsourcer, has consolidated the operation of 20 Hewlett-Packard servers onto two T2000s, with about 50% headroom remaining<sup>2</sup>. Powerful Sun Fire x64 servers also deliver scalability and efficiency to consolidation projects. For instance, the Sun Fire x4600 server scales up to 16 cores within a 4U chassis, delivering double the data center capacity of any server in its class. All combined, Sun technologies and expertise help organizations create a less complex IT environment and significantly improve efficiencies, increase resource utilization, simplify maintenance, and foster increased availability and manageability.

### Lower Administrative Expense

Managing any number of servers without proper tools strains resources and budgets. Sun Fire x64 servers and Sun Fire servers with CoolThreads technology provide value to enterprises with free remote system management capabilities. Equipped with a dedicated on-board processor, these Sun servers provide administrators with remote access and system status information. Using additional software products, such as Sun N1 System Manager software, further eases operations by handling system

2. Darrell Dunn, Sun's 'Try Before You Buy' Program Wins Back DigiTar, <http://www.informationweek.com/news/showArticle.jhtml?articleID=190300613> (July 2006).

provisioning, monitoring, and management. Free to download and designed specifically to address the challenges associated with large Web tier infrastructures, the Sun N1 System Manager software enables economical consolidated management of hundreds of Sun Fire x64 and SPARC® servers from a single management console from anywhere on the network. By automating server and application life cycle management, Sun servers and software help enterprises lower costs and ease administrative burdens.

### Accelerate Business Operations

In today's fast paced economy, completing more Web-based transactions in less time can make operational resources more efficient as well as provide an added level of service for customers, thereby providing the business with the competitive edge needed for success. With this imperative in mind, IT organizations constantly seek methods to speed system processing. To help this effort, Sun servers and software deliver superior system performance as demonstrated in numerous industry-standard benchmark results. In fact, Sun Fire servers with CoolThreads technology exhibit unmatched speed and scalability. These servers run up to 32 threads concurrently on a simple eight core processor to deliver dramatic results. As another example, Sun Fire x64 servers provide exceptional throughput — up to twice the performance of dual-core Intel Xeon servers<sup>3</sup> — and deliver extremely fast, secure Web serving capabilities.

High performance Sun servers provide only the first step. Getting the most out of system hardware and delivering that power to applications requires an advanced operating system. The capabilities and features of the Solaris OS boost application performance. The Solaris OS Enhanced Network Stack with built-in network cache accelerator provides exceptional response times, essential for delivering high powered Web services. In addition, the Solaris Dynamic Tracing (DTrace) facility gives organizations a comprehensive, advanced tool for troubleshooting systematic problems in real time. With DTrace, IT organizations can reveal insights into performance gains without taking systems out of production or disrupting business operations. By using these and other Sun technologies to increase throughput, enterprises can deliver more services at a faster rate to greater numbers of customers.

But it is not just about technologies. Sun is a proven leader in helping customers deploy and run network-based applications and services. Sun's global service organization can help assess the processing potential of an existing server environment and identify enhancements required to meet future business requirements.

### Maximize Business Uptime

In modern enterprises, keeping the business running depends upon keeping IT systems in operation. System downtime causes great expense in the form of failed transactions and lost revenue opportunities. Sun servers, the Solaris OS, and Sun support programs all contribute to high levels of system availability.

3. The Sun Fire X4200 server (2x AMD Opteron processor Model 285SE, 2 chip, 2 core/chip, Solaris 10): SPECfp2000 - 82.4 HP ProLiant DL380 G4 (2x3.6GHz Xeon, 2 chips, 2 core/chip, MS Windows 2003 Server): SPECfp\_rate2000 - 40.3.(04/06/06)

### Rock Solid Systems

Catastrophic downtime threatens the very viability of some businesses. Understanding the importance of stability, Sun offers a robust lineup of servers built with redundant hardware components, including power supplies, fans, and hard disk drives, providing better reliability and availability features as compared to some Intel Xeon and other x86 hardware platforms. Once more, the Sun Fire T2000 server delivers additional advanced features to enterprises such as chipkill and ECC protection. These powerful Sun servers combine with mature clustering and disaster recovery options to eliminate single points of failure and create additional redundancies, helping to facilitate maximum uptime.

### Smart, Proactive Software

While most operating systems provide methods to determine likely causes of system crashes, the Solaris OS works in a proactive manner to avoid system faults. The Predictive Self-Healing capability in the Solaris 10 OS enables Sun systems to accurately predict CPU, memory, and application failures and mitigate any serious problems before they actually occur. For example, Predictive Self-Healing technology enables individual CPU cores or multiple cores of the same socket to be taken offline, helping the operating system survive the failure of a component without requiring a system reset. In addition, the Solaris 10 OS issues easy-to-understand diagnostic messages that map to detailed descriptions of the failure and recommended resolution. This type of automation and in-depth error information helps IT managers raise system availability and eliminate lengthy administrative processes.

### Dependable, Fast, Enterprise Support

Of course, technology alone cannot avoid all operational risks. Partnership with a solutions provider who can offer integrated hardware and software support plans is essential to help resolve technical issues quickly and effectively. SunSpectrum<sup>SM</sup> combines preemptive services, hardware support, and Solaris OS upgrades, from mission-critical services to basic self-maintenance support, meeting enterprise demands for service availability. By taking advantage of technology and service programs from Sun, enterprises can create Web infrastructures that are ready for the non-stop pace of business operation.

### Reduce Risk — Investment Protection from Sun

Breaks in software compatibility and transitions in technology disrupt the real work which contributes to business productivity. Sun helps enterprises to minimize these interruptions through the Solaris Application Guarantee Program and lengthy product support periods. These long standing Sun programs and policies protect enterprise investments in hardware, software, and skills.

### **Solaris Application Guarantee Program**

Software application and operating system incompatibilities stall progress, inhibit upgrades, and cause dilemmas for enterprises. In order to help enterprises avoid these pitfalls, Sun maintains binary compatibility from one version of the Solaris OS to the next. As a result, existing Solaris applications run unmodified from release to release. This means that Solaris applications developed years ago run on the most up to date version of the Solaris OS unchanged, taking full advantage of new and advanced operating system features. With the Solaris 10 OS, Sun now guarantees source code compatibility between SPARC and x86 processors, ensuring applications run across platforms with a simple recompile. Together, these programs enable applications to run on all Solaris certified Sun and third-party platforms — SPARC, x64, or x86 — with the Solaris OS release that best matches organizational needs now and in the future. By taking advantage of the Solaris Binary Application Guarantee and Solaris Source Code Guarantee programs, companies can protect technology investments while lowering development, testing, and deployment costs.

### **Product Support Longevity**

Forced migrations cause disruption to IT operations. Understanding the consequences of these interruptions, Sun invests extra effort to maintain support policies that create a long life cycle for Sun server systems and each revision of the Solaris OS. Sun maintenance programs for hardware and software often exceed expectations, providing support throughout the sales life of the product plus an additional 5 years. In an effort to help enterprises take advantage of the latest technology, operating system updates are made available at regular intervals during the life cycle of each version of the Solaris OS. These updates incorporate a set of tested and integrated patches, as well as innovative features and support for new hardware components. Sun's long product life cycles help enterprises minimize transitions, saving organizations time, money, and needless distractions.

### **Protect Information Assets**

Under the pressure of an increasingly connected business economy, regulatory compliance, and public demand for the protection of consumer information, IT organizations vigilantly seek the best available methods for guarding against security breaches. Using technology and services from Sun, companies can increase the security of a Web tier infrastructure. For example, the Solaris OS includes powerful Process Rights Management that provides fine-grained control over users and rights for secure access, delivering a level of protection unmatched by any other commercial operating system and enabling organizations to create a Web infrastructure fortified against attacks from viruses, worms, or trojan horses. In addition, Solaris Containers technology allows multiple Web services to be hosted on a single Sun system with complete fault and security isolation between applications. These and other technologies help rank Sun systems running the Solaris OS among the most secure

platforms in the industry, providing enterprises with enhanced protection of priceless information assets.

## Easing the Migration to a Sun Web Services Infrastructure

Executing on technology refresh plans while continuing to meet business needs provides challenges for many enterprises. Sun's comprehensive portfolio of services and programs ease migration efforts. From the initial IT assessment through the design and implementation phases, Sun offers the appropriate levels of support — be it a simple box upgrade or complex architectural changes to an existing business service application. Furthermore, by providing innovative programs such as Try and Buy, as well as compelling financial incentives like the Sun™ Upgrade Advantage Program, Sun enables organizations to improve data center infrastructures without impacting ongoing business operations, (Figure 4).



Figure 4. Sun offers a variety of educational and financial programs, tools, and services that help enterprises achieve results faster at lower costs with less risk.

## Accelerate Progress by Leveraging Programs from Sun

The advantages of moving to a better platform are sometimes obvious, but organizations are often thwarted by the evaluation, testing, and deployment process. Understanding this, Sun created a number of programs to eliminate barriers to entry, lower implementation risks, and speed deployment.

### Sun Try and Buy Program

In today's cost conscious business climate, businesses possess little extra capital to expend on purchasing new server systems for in-house evaluations. To ease this financial strain, Sun's Try and Buy program allows for no risk trials of many server and storage platforms including the Sun Fire T1000, Sun Fire T2000, and Sun Fire x64

servers, providing enterprises with the opportunity to test new technology with no obligation to purchase. This innovative program provides organizations of every kind, from small software development groups to large data center operations, with units to evaluate and test at no charge for 60 days. Dedicated online technical support and resources enhance the program by answering questions and supplying access to getting started guides, installation documentation, application tuning information, software downloads, developer services, and hardware support. Plus, this risk-free trial provides easy options for returning the systems at Sun's expense when needed. As a result, Sun's Try and Buy program supplies organizations with the opportunity to experience the value of Sun products where it counts — in real enterprise environments.

### **Sun Solution Centers**

Given the rapid pace of business, organizations need to reduce risk as much as possible and take the guesswork out of implementing projects. Fortunately, over 70 Sun Solution Centers around the globe provide enterprises assistance with these goals. Sun Solution Centers bring together the expertise of Sun and its partners in state-of-the-art computing environments, enabling organizations to try new architectures without impacting production environments. Visits to the centers provide for collaboration with Sun engineers and experts to validate proof-of-concept scenarios, test performance and scalability, and build working prototypes of business solutions. By taking advantage of Sun Solution Centers, organizations can dramatically improve the odds of project success and increase overall satisfaction with eventual in-house implementations.

### **Sun™ Customer Ready Systems**

Given the importance of being first to market, IT organizations need to deploy new systems as quickly as possible. Once a solution architecture is created, Sun™ Customer Ready Systems (CRS) implementations are one way to execute installations more rapidly. The Sun CRS program integrates Sun and third-party components on the factory floor to help enterprises move more quickly past design validation, integration, and system testing phases. The systems leave the Sun factory ready-to-deploy, enabling organizations to lower administrative costs and deploy systems faster while taking on less risk.

### **Simplify the Transition Process**

Already constrained in keeping up with day to day operations, IT organizations often find few resources for technology refresh projects. Sun's broad portfolio of services and tools help ensure a smooth transition to Sun servers and software.

### **Sun Services**

The uninterrupted nature of Web services delivery presents challenges for managing infrastructure changes and migrations. Pressure to complete tasks quickly places strain on resources and often holds back entire projects. The Sun<sup>SM</sup> Enterprise Migration Suite

(EMS) provides assistance using proven methodologies to justify, architect, implement, and manage projects, speeding up the migration process. In addition, Enterprise Installation Services and Sun™ Interim Operations Management services can reduce resource contention by providing enterprises with just the right amount of assistance to augment in-house IT organizations. By taking advantage of Sun's experienced experts and service programs, organizations are better able to minimize the time, risk, and costs of the migration process.

### **Sun Learning Solutions**

Organizations need to keep operations staff ahead of the learning curve and continually identify new technologies worthwhile to the business. World-class educational services from Sun bring IT resources up-to-date and ready for the future. Sun's portfolio of learning solutions includes on-line and instructor-led courses and knowledge certification programs. Dedicated or on-site delivery of these courses are available in order to better serve the needs of individual organizations. In fact, Sun's course offering list includes the Solaris 10 OS UNIX® System Administration Migration Learning Path which prepares experienced UNIX and Linux technical staff to perform equivalent administration tasks on the Solaris 10 OS. In addition, Sun's Training Solutions for IT Teams provides comprehensive customized training to help enterprises design, staff, train, and manage IT teams. With educational services from Sun, IT staff benefit business operations by staying smarter than the competition.

### **Software Tools**

No matter how compelling new hardware or operating system platforms may be, organizations must be assured that the costs and risks of adoption are in line with the rewards. In particular, organizations want to be able to continue to leverage the considerable advantages of popular commercial and open source software. Developers do not want to switch compilers and basic development tools. Administrators can scarcely afford a more complex support matrix or more time spent getting applications to run effectively in a new environment. Sun provides several open source software development tools on SPARC systems to ease the migration of Linux applications. In addition, Sun's Cool Tools program is designed specifically to take the cost and risk out of moving Web tier environments to the Solaris OS and Sun Fire servers. Cool Tools for SPARC systems help accelerate application selection, development, tuning, debugging and deployment of key applications. In addition, Sun experience shows that by taking advantage of Sun's Cool Tools software, organizations can experience up to five times faster application performance and development cycles, enabling organizations to accelerate the delivery of products and services to market.

## Benefit the Bottom Line — Financial Incentives from Sun

Budget pressures often dictate that an IT project either pay for itself or provide a rapid return on investment. Sun financial tools and incentives help organizations make these calculations and reduce overall costs.

### Sun<sup>SM</sup> Enterprise Migration Justification Review Service

Working up-front to ensure a good return on investment proves important for IT projects. To make this job easier, the Sun Enterprise Migration Suite includes a Justification Review Service which helps enterprises to scope the project, select the best migration strategy, and obtain order-of-magnitude estimates for overall project complexity and size. This service simplifies the process of quantifying the total cost of ownership (TCO) savings for migration projects. Using these estimates, organizations are better able to compare financial benefits against constraints and articulate a solid business case for the transformation.

### Flexible Lease Plans

Once the business needs analysis is completed, optimizing the use of allocated funds becomes essential to moving forward. Providing single-source worldwide finance and 100 percent financing for Sun and third-party hardware, software and services, Sun Microsystems™ Global Financial Services (SMGFS) offers flexible lease plans that enable custom mix and match lease term lengths, purchase options, and payment structures. These offerings can be used to create an individualized, flexible way to maximize an IT procurement budget and reduce initial acquisition outlays. The Sun ValuePlus<sup>SM</sup> family of offerings provides a single point of contact and one monthly invoice for one-stop IT shopping. These tailored solutions also include options such as “pay-by-use” utility computing, as well as migration management as needed, independent of current organizational cash flow.

### Sun<sup>SM</sup> Upgrade Advantage Program and Promotions

Whether using a leasing option or making a direct purchase, numerous offers and programs from Sun help reduce acquisition expenses even further. The Sun Upgrade Advantage Program (UAP) offers up-front, scalable trade-in allowances for virtually any Sun or non-Sun system without special negotiations. Sun even covers shipping from the customer dock and manages the environmentally safe disposal of legacy equipment. Sun also regularly offers special time-bound promotions on specific product offers or trade-ins. Local Sun or Sun partner representatives can provide information regarding the latest offers. Using these financial tools and services from Sun, enterprises can justify migrations more easily and receive an even better return on investment.

## **Sun's Commitment — Making the Extra Investment**

Organizations need technology which enables differentiation and enhances the competitiveness of current business offerings. Using equipment that is characterized as adequate or “good enough” rarely creates the best infrastructure for these purposes. In contrast, systems engineered with true innovation provide opportunities to create a competitive advantage.

Sun’s strong record of bringing forward breakthrough ideas, approaches, and products — an early focus on networking, the invention of Java™ technology, the unmatched capabilities of the Solaris OS, and a multitude of hardware advancements — provide organizations with the capabilities needed to respond to the ever-changing computing landscape. Sun products and services keep enterprises ready to adapt and compete. Adding even more value, the technology advancements and inventions created at Sun are affordable and open. Sun remains relentless, committed on delivering advanced network computing solutions — without breaking IT budgets. Sun's winning portfolio of products, technologies, programs, and expertise improve IT operations and help enterprises move past the latest challenges.

## For More Information

To learn more about innovative Sun products and the benefits of migrating Linux on x86 environments to Sun servers and the Solaris OS, contact a Sun sales representative or consult the related documents and Web sites listed in Table 1 and Table 2 below.

*Table 1. Related Documents*

Web Site URL	Title
<a href="http://sun.com/software/whitepapers/solaris10/classbyitself.pdf">sun.com/software/whitepapers/solaris10/classbyitself.pdf</a>	Solaris 10 White Paper
<a href="http://sun.com/servers/coolthreads/swap/datasheet.pdf">sun.com/servers/coolthreads/swap/datasheet.pdf</a>	SWaP Datasheet
<a href="http://sun.com/servers/coolthreads/overview/docs/Crossover_solnbrief_Final4.pdf">sun.com/servers/coolthreads/overview/docs/Crossover_solnbrief_Final4.pdf</a>	Cool Tools for Web-tier Optimization
<a href="http://sun.com/datacenter/consolidation/WebConsolidation-SunFireT1000server.pdf">sun.com/datacenter/consolidation/WebConsolidation-SunFireT1000server.pdf</a>	Web Consolidation on the Sun Fire T1000 Server using Solaris Containers
<a href="http://sun.com/datacenter/consolidation/SunStore-T2000-BP.pdf">sun.com/datacenter/consolidation/SunStore-T2000-BP.pdf</a>	Consolidating the Sun Store onto Sun Fire T2000 Servers
<a href="http://sun.com/datacenter/consolidation/consolidation-sol-br.pdf">sun.com/datacenter/consolidation/consolidation-sol-br.pdf</a>	Consolidating Legacy Application onto Sun x64 Servers

*Table 2. Related Web Sites*

Web Site URL	Title
<a href="http://sun.com/servers">sun.com/servers</a>	Sun Servers
<a href="http://sun.com/software/solaris">sun.com/software/solaris</a>	The Solaris Operating System
<a href="http://sun.com/servers/coolthreads/overview">sun.com/servers/coolthreads/overview</a>	Sun Fire Servers with CoolThreads Technology
<a href="http://sun.com/servers/coolthreads/swap">sun.com/servers/coolthreads/swap</a>	The SWaP Metric
<a href="http://sun.com/service/about">sun.com/service/about</a>	Sun Services Overview
<a href="http://sun.com/solutioncenters">sun.com/solutioncenters</a>	Sun Solution Centers
<a href="http://sun.com/service/crs">sun.com/service/crs</a>	Sun Customer Ready Systems
<a href="http://sun.com/tryandbuy">sun.com/tryandbuy</a>	Sun Try and Buy Program
<a href="http://sun.com/tradeins">sun.com/tradeins</a>	Sun Trade-In Program
<a href="http://sun.com/service/migration">sun.com/service/migration</a>	Sun Migration Services
<a href="http://sun.com/training">sun.com/training</a>	Sun Educational Services
<a href="http://sun.com/software/solaris/guarantee.jsp">sun.com/software/solaris/guarantee.jsp</a>	Solaris Application Guarantee Program
<a href="http://cooltools.sunsource.net">cooltools.sunsource.net</a>	Cool Tools
<a href="http://opensolaris.org">opensolaris.org</a>	The OpenSolaris Project
<a href="http://opensparc.org">opensparc.org</a>	The OpenSPARC initiative

**Sun Microsystems, Inc.** 4150 Network Circle, Santa Clara, CA 95054 USA **Phone** 1-650-960-1300 or 1-800-555-9SUN (9786) **Web** [sun.cc](http://sun.cc)



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