The Solaris™ 10 Operating System

Delivering Relentless Availability, Optimal Utilization, Extreme Performance, and Unparalleled Security

Key feature highlights

The Solaris™ 10 OS runs on a broad range of SPARC® and x86-based systems, including the new AMD Opteron processor; compatibility with existing applications is guaranteed. This combination provides Solaris users with the best range of choices and investment protection in the industry.

Available on all systems supported by the Solaris 10 OS, Solaris Containers (formerly N1™ Grid Containers) enable as much as a 4X increase in system utilization by making it possible to efficiently and securely support thousands of applications per system with no performance hit.

Predictive Self-Healing technologies provide new levels of application availability:

• *Solaris Fault Manager* proactively handles system problems — before they can cause downtime.
• *Solaris Service Manager* manages application software running on the system, monitoring applications and restarting entire application trees if necessary.

Solaris ZFS (zettabyte file system) provides simplified file system management, self-healing data, and 16 billion billion times the capacity of current solutions.

Process Rights Management enables precise control of system privileges, significantly reducing exposure to system intrusion and limiting unauthorized access to administrative functions, sensitive data, and other critical system elements.

DTrace provides "always-on" rapid evaluation and resolution of system problems and bottlenecks, reducing downtime and yielding dramatic performance improvements.

Moving into the next generation of computing, IT professionals face an increasingly complex set of challenges and opportunities. Information technology is no longer an ancillary service in most organizations; today it's an integral part of the way business is done. In fact, organizations so thoroughly depend on their IT infrastructure that it is no longer an exaggeration to say that they bet their future every day on its quality: Its ability to keep their data safe and private, its ability to remain available every working moment, and its ability to provide all the services and data the organization needs — at the lowest possible cost.

Sun understands these challenges, and we are positioning ourselves to be the single best source for IT organizations worldwide. We are absolutely committed to delivering technology solutions that enable all our customers to deploy computing systems with maximum security and relentless availability — at the lowest possible total cost. Our goal is to give our customers the competitive advantage they'll need in the new business cycle.

Nowhere is that commitment more apparent than in Sun's flagship software product, the Solaris™ 10 Operating System (OS).

The operating system's unique position in the hardware/software solution stack makes it a critical element in delivering reliable application services. While the Solaris OS is already recognized as leading the industry in reducing the costs, complexity, and risk associated with today's computing environments, the Solaris 10 OS significantly extends — and adds to — these capabilities. The Solaris 10 OS adds new functionality to deliver optimal utilization, relentless availability, unparalleled security, and extreme performance for both vertically scaled and horizontally scaled environments.

Solaris 10 OS Provides Relentless Availability

Predictive Self-Healing delivers a breakthrough approach to service availability with online error detection and auto recovery. The Solaris 10 OS, via Solaris Fault Manager, proactively removes components before failure. CPU, memory, and I/O problems are diagnosed and corrected in seconds rather than hours. Hardware and application monitoring is transparent to system administrators and users, while error reporting is simplified with all service information and dependencies stored in one central repository.

The Solaris 10 OS shows that innovation pays — using technology to drive down cost, complexity, and risk in the modern data center.

The Solaris 10 OS goes beyond mere system availability to application availability. It can automatically restart applications — via Solaris Service Manager — that may be affected by a system fault, so no more 2 a.m. calls to sysadmins to restart an application.

The Solaris OS continues to build on its long history of minimizing both planned and unplanned downtime. To minimize planned downtime, boot times for large systems have been reduced significantly — up to 65 percent. In conjunction with existing Solaris OS features, such as Solaris Live Upgrade and Solaris Flash archives, this can significantly reduce downtime for planned maintenance.

Solaris 10 OS Enables Optimal Utilization

Solaris Containers (formerly N1™ Grid Containers) technology provides an innovative approach to server virtualization. With multiple software partitions per single instance of the OS, Solaris Containers make consolidation simple, safe, and secure. To deliver maximum utilization of computing resources, Solaris Containers can dynamically adjust resources to business goals within and across Containers. With little system overhead (less than one percent), it can be used to create over 8000 Containers per system or Dynamic System Domain. At the same time, applications are isolated from each other and from system faults, so a problem in one application cannot affect the system or the other applications on the system.

Using Instant Restart, each Solaris Container can be rebooted in just seconds, minimizing application downtime. Solaris Containers simplify and accelerate consolidation, and significantly reduce system administration and maintenance overhead.

Because Solaris Containers are enabled entirely by software, they are platform independent, so they can be used on SPARC® or x86-based 64-bit platforms — from the largest servers all the way down to blades. Solaris Containers also make use of the resource management capabilities of the Solaris OS to allow resources to be dynamically moved between Containers, ensuring optimal utilization. Finally, Solaris Containers are highly configurable, so even though all Solaris Containers on a system run under a single instance of the OS, each Container can be uniquely configured to provide the exact execution environment needed for the application.

The Solaris 10 OS Delivers the Extreme Performance Needed for the Data Center

A key element of the performance gains in the Solaris 10 OS is optimization for the latest in processor technologies. Support for the new UltraSPARC® IV processor enables systems upgraded from UltraSPARC III processors to double their previous performance, while new optimizations specific to AMD Opteron and Intel Xeon processors can provide up to twice the overall performance on x86 systems in scientific workloads. A rearchitected TCP/IP stack delivers from 30- to 50-percent improvement in the network throughput, doing so at 10- to 15-percent lower CPU load while still maintaining the reliability for which the Solaris OS is known. Overall, customers can experience performance improvements of up to 10 percent for Web servers and up to 50 percent for application servers — showing that significant gains can be found just by moving to the latest release of the Solaris OS.

Dynamic Tracing (DTrace) is a powerful tool for analyzing and diagnosing elusive problems and increasing system performance. The new DTrace tool built into the Solaris 10 OS solves one of the most critical problems in software development and system management: How to debug applications and resolve performance issues on production systems.

DTrace is designed for live use in production situations; it is noninvasive, and has no system overhead when not in use. With pervasive coverage ranging from the heart of the kernel to the Java™ thread, it provides a unified view of the kernel and all applications, eliminating the need to:

• Change the system or application
• Induce failures to debug the system with postmortem tools
• Re-create the problem on test systems

Since debugging takes place in real time on the actual system where the problem is occurring, root cause of intermittent problems can be found in minutes or hours, not days or weeks. Performance gains yielded by this new level of visibility can be significant: Using DTrace, real-world applications have been optimized to run as much as *30 times* faster.

Solaris 10 OS Delivers Unparalleled Security
The Solaris 10 OS delivers a breakthrough approach to system security that is easy to use and fully compatible with existing applications and administration practices. The Solaris 10 OS provides stronger mechanisms for controlling access to critical facilities, starting at login with more sophisticated authentication and smart-card interfaces to verify user identities, and extending to Process Rights Management, which obsoletes the traditional UNIX® "all or nothing" root mechanism and replacing it with a fine-grained set of privileges.

The Solaris 10 platform's new cryptographic infrastructure secures data flows by providing a set of programming interfaces, making it easy for application developers to utilize highly optimized cryptographic algorithms and providing transparent automatic utilization of hardware acceleration when available. In addition, Process Rights Management limits unauthorized access to system resources for processes and lowers the risk of exploits. To further protect every system in the data center, the Solaris 10 OS also includes integrated IP-filtering capabilities.

Solaris Containers offer an even greater measure of security by isolating applications and data from error propagation or security intrusions. Each Container is an isolated, virtual environment; processes running in a Container cannot access processes or resources outside of that Container.

The Solaris 10 OS is designed to be secure right out of the box, with default settings within the system easily set for maximum security. As you would expect from the leader in open systems, many of the security features in the Solaris 10 OS are based on open source components and standards, including OpenSSH, PAM, IPSec/IKE, IP Filter, and Kerberos. Solaris 10 authentication is designed for interoperability with existing schemas, such as those provided with Microsoft Windows.

Sun has over 20 years of experience in building security into its design, testing, and refinements of the Solaris OS.

Solaris 10 Provides the Right Platform Choices for the New Data Center
The Solaris 10 OS is an open standards operating system, built from a single source base and optimized to run on multiple platforms:

• The SPARC platform, the #1 64-bit architecture in the world and the most scalable platform available

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- The x86 platform for low-cost 32-bit performance
- The Opteron AMD64 platform for extending customers' investments in x86 systems with new, 64-bit functionality

Because the Solaris OS is built from a common source base, delivering the same programming interfaces on any platform or system, developers can in turn maintain one source base with just a recompile necessary to support both SPARC and x86-based platforms. To protect your software investment, Sun continues to offer the Solaris Application Guarantee program, guaranteeing binary compatibility between versions of Solaris on each platform. The Solaris Application Guarantee program has now been simplified and extended to cover application source code compatibility as well.

How to Get the Solaris 10 OS Today

The Solaris 10 OS is scheduled for release in the first quarter of 2005, but you can start using it today through the Software Express program. Previews of the Solaris 10 OS are available at sun.com/softwareexpress, with new updates made monthly as new features are placed into the code base. You can download this early preview of the Solaris 10 OS, try out the new features, see how it works in your data center today, and be ready to go when the software is released.

The Solaris 10 OS: A Generation Ahead

Sun's customers have depended on the Solaris OS for years to power their solutions, including the most mission-critical parts of their organizations large and small, commercial, nonprofit, and governmental, around the globe. With the Solaris 10 OS, Sun is moving aggressively to solve not just the problems our customers see today, but the challenges still to come. The Solaris 10 OS provides a combination of technological advancement and real, long-term cost savings to propel your business into the future.

Serious Software Made Simple

Sun provides a complete portfolio of affordable, interoperable, and open software systems designed to help you maximize the utilization and efficiency of your IT infrastructure. Built from the secure, highly available foundations of UNIX and Java, these systems deliver implementations that are preintegrated and backward compatible.

Sun's portfolio consists of Solaris and Linux software for SPARC and x86 platforms, the N1 Grid platform for dynamic and utility computing, and the Sun Java™ System — five integrated software systems for the data center, the desktop, the developer, mobile devices, and identity implementations.

The Java System is a radical new approach that changes forever the way businesses acquire, develop, and manage software. Only Sun has the experience and the end-to-end portfolio to deliver such a unique and industry-revolutionizing strategy. With the Java System, network services and critical business applications are up and running faster, easier, and at a lower cost than ever before, so you can focus on innovation, competition, and bottom-line results.

About Sun Microsystems, Inc.

Since its inception in 1982, customers have continually turned to Sun to help them grow their business, lower their costs, and gain competitive advantage. Sun is a leading provider of industrial-strength hardware, software, services, and technologies that make the Net work.