



# **MENTOR GRAPHICS® SOFTWARE AND THE SOLARIS™ OPERATING SYSTEM**

A True Enterprise-Class EDA Solution for x86/x64 Systems

White Paper  
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## Achieving Design Success

Progressive gains in the number of available transistors continue to allow engineers to push more capabilities and complexity into individual electronic components. These technological advances have resulted in greater performance, increased functionality, and drastic miniaturization for modern electronic devices. As a side effect, designing these more complex systems with greater numbers of components has made tasks such as simulation and verification more extensive and demanding. An ever-increasing number of design iterations must be completed to ensure consistent quality and function. Regardless of these realities, organizations are still under pressure to release products rapidly in order to seize time-to-market business advantages over their competitors.

### The Importance of EDA Infrastructure

In this demanding and competitive environment, engineering teams rely heavily on state-of-the-art tools for Electronic Design Automation (EDA) as well as robust and capable compute infrastructure to support them. The stability and performance of an EDA solution plays a vital role in helping organizations work effectively, optimize quality, and speed product releases. Organizations need high-performance EDA systems that maximize the number of design cycles in the time available. Preservation of investments in EDA tools and training, as well as exceptional platform uptime and processing speed are essential to success. Technology transitions and upgrades must progress smoothly, allowing engineers to stay focused on the work at hand.

The marketplace offers a significant number of operating system choices for the EDA environment. Many organizations find the cost model and community benefits gained by adopting open-source operating systems to be appealing. Unfortunately, some open-source options can complicate production EDA operations with the following challenges:

- Frequent disruptive changes, updates, and upgrades
- A lack of binary compatibility between releases that can break applications
- A failure to provide long-term enterprise-grade stability
- Uncertainty with regard to intellectual property in the operating system and derivative applications

In contrast, the combination of technology leading EDA applications from Mentor Graphics®, the Solaris™ 10 Operating System (Solaris OS), and powerful Sun™ x64 workstations and servers creates an extremely robust and affordable design platform that avoids these issues (Figure 1).

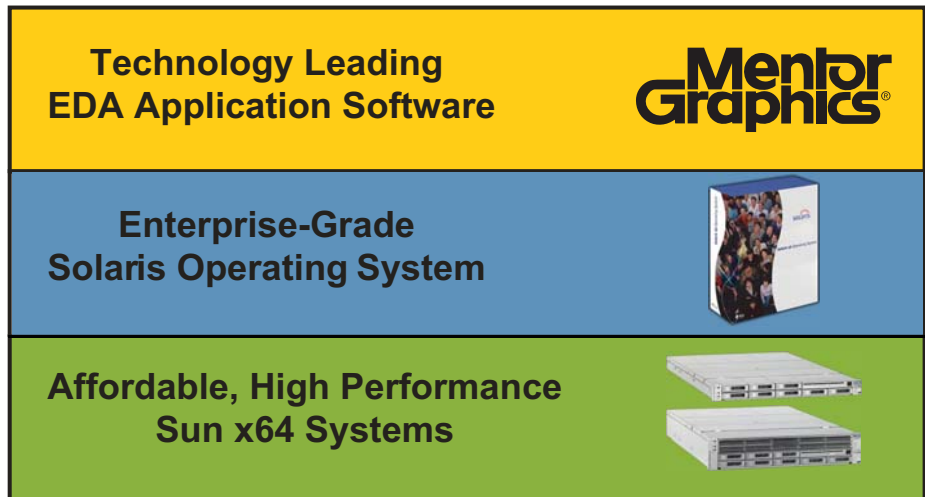


Figure 1. A high performance, dependable EDA solution from Sun and Mentor Graphics.

“Sun and Mentor Graphics have worked together for more than 15 years providing EDA solutions on the SPARC/Solaris platform. Our fresh portfolio of high-performance x64 servers and workstations together with Mentor Graphics’ design tools create another powerful platform for addressing the challenges of deep sub-micron design.”

— John Fowler, Executive Vice President, Systems Group, Sun Microsystems, Inc.

## An Ideal Solution Built on a Strong Partnership

Sun and Mentor Graphics provide organizations with the technology to create high-performance EDA solutions that are extremely dependable. This multifaceted partnership has prospered over more than 15 years of joint efforts. In addition to serving many mutual customers, Sun and Mentor Graphics rely on one another for success. Mentor Graphics utilizes Sun platforms for application development and Sun utilizes Mentor Graphics software for the creation of hardware designs — experience that drives even greater quality into EDA solutions.

Many organizations already enjoy the value of the Solaris OS and Mentor Graphics software on SPARC® hardware. Now, as a part of a strong and continued partnership, Mentor Graphics and Sun have collaborated to bring the power of the Solaris 10 OS on x64 and x86 platforms to the EDA marketplace. Market leading products from Mentor Graphics are now available for both Sun and non-Sun x64 and x86 platforms running the Solaris 10 OS in design areas covering physical verification, design for test, and verification and simulation solutions (Table 1). Mentor Graphics and Sun also plan to validate and support printed circuit design applications for the Solaris 10 OS on x64 and x86 platforms.

Table 1. Mentor Graphics supports a range of EDA applications on x64 and x86 platforms running the Solaris 10 OS.

Application Name	Product Family Description
<ul style="list-style-type: none"> <li>• Calibre™ Cl Op SW</li> <li>• Calibre DESIGNrev Ap SW</li> <li>• Calibre Interactive Ap SW</li> <li>• Calibre LVS AP SW</li> <li>• Calibre LVS-H OP SW</li> <li>• Calibre nmDRC AP SW</li> <li>• Calibre nmDRC-H OP SW</li> <li>• Calibre RVE/QDB-H Ap SW</li> <li>• Calibre xRC AP SW</li> </ul>	<ul style="list-style-type: none"> <li>• Calibre nmDRC is the solution to the physical verification challenges of nanometer design. Calibre nmDRC, with the new Hyperscaling processing architecture, produces best-in-class DRC run times with scalability to 100 CPUs.</li> <li>• Calibre LVS is unique among LVS tools as it measures actual device geometries for a complete accounting of physical parameters. These precise device parameters supply the information for back-annotation to the source schematic as well as the comprehensive data needed for running simulations.</li> </ul>
<ul style="list-style-type: none"> <li>• Design-For-Test</li> <li>• DFTAdvisor™</li> <li>• DFT ASIC Vector I/F</li> <li>• DFT FastScan™ ATPG</li> <li>• DFT FastScan CPA</li> <li>• DFT FastScan MacroTest</li> <li>• DFT FlexTest™ ATPG</li> <li>• DFT FlexTest FaultSim</li> <li>• DFTInsight</li> <li>• DFT TestKompress®</li> </ul>	<ul style="list-style-type: none"> <li>• A broad portfolio of Design-For-Test (DFT) solutions for today's System-on-Chip and deep submicron designs, including integrated solutions for scan, automatic test pattern generation (ATPG), electronic design and test (EDT), advanced memory test, boundary scan, logic built-in self-test and a variety of DFT-related flows.</li> </ul>
<ul style="list-style-type: none"> <li>• ModelSim® SE/LNL</li> <li>• ModelSim SE/Mixed Compile</li> <li>• ModelSim SE/PLUS</li> <li>• ModelSim SE/VHDL</li> <li>• ModelSim SE/VLOG</li> </ul>	<ul style="list-style-type: none"> <li>• ModelSim SE is a high performance HDL simulation solution for FPGA &amp; ASIC design teams that combines high performance with the most powerful and intuitive GUI in the industry.</li> </ul>
<ul style="list-style-type: none"> <li>• O-In® Assertion Checkerware® Add-on</li> <li>• O-In Assertion Comp AP SW</li> <li>• O-In Assertion Synthesis Ap SW</li> <li>• O-In CDC</li> <li>• O-In CDC FX</li> <li>• O-In Checkerware</li> <li>• O-In CW Eng</li> <li>• O-In CW Eng Pack Op SW</li> <li>• O-In Formal Verification</li> </ul>	<ul style="list-style-type: none"> <li>• The o-in Assertion products provide an effective solution that extends capabilities of existing verification environments and detects bugs faster and earlier than traditional verification methods.</li> <li>• The o-In CDC verification solution provides the three essential elements for a complete CDC verification solution: structural or static CDC analysis, CDC protocol verification, and CDC reconvergence verification.</li> <li>• O-In Formal Verification represents the leading edge in formal verification, aiding in improvements overall verification quality and also helping identify the most critical design bugs.</li> </ul>
<ul style="list-style-type: none"> <li>• Questa® AFV AP SW</li> <li>• Questa AFV Option SW</li> <li>• Questa SV AP SW</li> <li>• Questa SV Option SW</li> </ul>	<ul style="list-style-type: none"> <li>• The Questa platform is a mixed-language verification solution that supports simulations, assertions, coverage, and testbench automation.</li> </ul>

## Mentor Graphics® Applications, the Solaris™ OS, and Sun™ x64 Systems

Sun and Mentor Graphics create dependable products, ready for mission-critical EDA projects. In combination, Mentor Graphics applications, the Solaris OS, and Sun x64 systems form an affordable and powerful solution that delivers outstanding dependability and throughput. By taking advantage of a Sun and Mentor Graphics solution, organizations can build best-in-class EDA infrastructure ready for the rigors of next generation system designs.

“The combination of our market leading applications, and Sun’s powerful x64/x86 workstations and servers running the Solaris 10 OS are anticipated to provide optimal solutions for engineering teams developing next-generation system-on-chip and printed circuit board designs.”  
— Greg Hinckley, President, Mentor Graphics

- ***Technology Leading Mentor Graphics Applications***

Mentor Graphics offers applications with industry-leading stability and performance for a broad range of EDA design tasks. Innovative Mentor Graphics products and solutions help engineers overcome the design challenges of the increasingly complex worlds of board and chip design. By taking advantage of technology from Mentor Graphics, companies can develop better electronic products faster and more cost-effectively.

- ***Enterprise-Grade Solaris 10 OS***

Distributed under a commercial and open source licensing model and packed with advanced features, the Solaris 10 OS is ready to help enterprises tackle tough engineering problems. Free for download without requirement to purchase a support contract, the Solaris 10 OS provides an economic advantage over other community-based operating system offerings. In addition, the many advanced capabilities of the Solaris 10 OS, including Solaris Containers, Solaris Trusted Extensions, Solaris Dynamic Tracing (DTrace), Solaris Predictive Self Healing software, and the Solaris ZFS file system are included in a standard Solaris OS license at no additional cost. Ideal for EDA environments, Sun Grid Engine distributed resource management software is also available free of charge.

Adoption of the Solaris OS within existing EDA infrastructures can be very straightforward. In addition to Sun servers, the Solaris 10 OS runs on over 900 x86 and x64 systems from Dell, HP, IBM, Lenovo, Fujitsu, Toshiba, Sony, Acer, and many others. Support for a wide range of x86 and x64 systems allows organizations to add the stability of the Solaris 10 OS to many existing EDA environments while retaining current investments in hardware.

- ***Affordable, High Performance Sun x64 Systems***

Affordable Sun Ultra™ workstations, Sun Fire™ x64 rackmount servers, and Sun Blade™ modular systems add further power and reliability, as well as energy efficiency to help address the largest design challenges. Design firms can choose from a broad range of powerful, scalable, and efficient Sun x64 platforms (Table 2). Sun delivers uni- and multi-socket enterprise servers and workstations based on dual- and quad-core Intel® and AMD™ processors. With a balanced architectural design, these systems provide breakthrough compute, memory, storage, and I/O density for EDA environments. Sun Fire x64 systems are available in both traditional rack-mount and the latest blade form-factors which are ideal for the EDA environment. Powerful Sun workstations and servers are able to address the largest of today’s, and even tomorrow’s, design problems.

Reliable and innovative Sun x64 systems also offer price and performance advantages and levels of energy efficiency that maximize compute power while minimizing expenses. Most importantly, Sun x64 systems and the Solaris 10 OS are backed by enterprise-class support programs and life cycle policies that provide

investment protection to organizations and facilitate long-term stability within EDA compute infrastructure.

Table 2. Sun offers a full x64 system product line with Intel and AMD processors in workstation, rack-mount server, and blade form factors<sup>1</sup>

	System	Processors	Memory
Sun Ultra Workstations	• Sun Ultra 24 Workstation	• One Intel Core 2 Duo, Quad, or Extreme processor	• Up to 8 GB
	• Sun Ultra 20 Workstation	• One dual-core AMD Opteron™ processor	• Up to 8 GB
	• Sun Ultra 40 M2 Workstation	• Up to two dual-core AMD Opteron processors	• Up to 32 GB
Sun x64 Rackmount Servers	• Sun Fire X4150 Server	• Up to two quad-core Intel Xeon® processors	• Up to 64 GB
	• Sun Fire X4450 Server	• Up to four quad-core Intel Xeon processors	• Up to 128 GB
	• Sun Fire X4500 Server	• Up to two dual-core AMD Opteron processors	• Up to 16 GB
	• Sun Fire X4600 Server	• Up to eight AMD Opteron processors	• Up to 256 GB
	• Sun Fire X4100 Server	• Up to two dual-core AMD Opteron processors	• Up to 32 GB
	• Sun Fire X4200 Server	• Up to two dual-core AMD Opteron processors	• Up to 32 GB
	• Sun Fire X2100 M2 Server	• One dual-core AMD Opteron processor	• Up to 8GB
	• Sun Fire X2200 M2 Server	• Up to two dual-core AMD Opteron processors	• Up to 64 GB
Sun Blade 6000 and 6048 Modular Systems	• Sun Blade X6250 Server Module	• Up to two quad-core Intel Xeon processors	• Up to 64 GB
	• Sun Blade X6220 Server Module	• Up to two AMD Opteron processors	• Up to 64 GB

1. Sun's x64 product line is constantly evolving, please see [sun.com/x64](http://sun.com/x64) for the latest Sun x64 systems and specifications.

## A True Enterprise-Class Open Source Platform

Sun products are designed and developed to help organizations retain investments and maximize long-term value. With industry-leading reliability, a predictable life cycle, and enterprise-class service offerings, the Solaris 10 OS and Sun x64 systems provide levels of stability that far exceed other open-source offerings. In addition, strong vendor support and guaranteed binary compatibility help ensure that EDA applications execute smoothly and predictably from release to release. Organizations also gain full indemnification and warranty for the Solaris 10 OS, allowing them to incorporate technology into new solutions without risk of infringing on intellectual property rights.

### Industry-Leading Reliability

Electronic design teams need dependable EDA solutions that effectively support product development efforts without interruption or delay. Project teams can not afford downtime at critical points in the design cycle, such as the physical verification process. Sun Fire x64 server features, including redundant and hot-swap components and built-in system management tools help avoid service interruptions. In addition, Sun's focus on maximizing the power and cooling efficiencies of every Sun system helps reduce the cost of the overall engineering infrastructure.

With a small and compact kernel, the design of the Solaris 10 OS limits exposure to errors that can lead to instability and downtime. 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. Sun systems running the Solaris OS are also among the most secure platforms in the industry, providing enterprises with enhanced protection of priceless information assets. As a tribute to this reliability, Intel has provided a full endorsement, recognizing that the Solaris 10 OS offers a best-in-class choice for mission-critical projects on Intel Xeon platforms.

### Predictable Technology Life Cycle

Product life cycles that evolve rapidly and provide few provisions for easing transitions from one version to the next place strain on administrative resources and add risk to design projects. Understanding the consequences of forced migrations and technology interruptions, Sun invests extra effort to create a long life cycle for Sun servers and each revision of the Solaris OS. Sun maintenance programs for hardware and software offerings often exceed expectations, providing support throughout the sales life of the product plus an additional five years.

The Solaris OS life cycle — from when a milestone product version (e.g. Solaris 10) becomes widely available to when Sun stops broad support of that version — is at least ten years<sup>1</sup>. 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 organizations minimize transitions, saving time, money, and needless distractions.

## Enterprise-Class System and Software Support

The importance of EDA computing environments warrants enterprise-class platform support. Sun's ability to provide integrated hardware and software services helps get systems back online as quickly as possible when problems occur. Backed by over 20 years of experience delivering comprehensive hardware and software service to organizations worldwide, Sun experts utilize proven processes to deliver effective and rapid resolutions to critical issues.

SunSpectrum<sup>SM</sup> service plans include preemptive services, hardware support, and Solaris OS upgrades. Sun offers a wide range of flexible support plans that can be tailored to meet specific organizational requirements, giving organizations confidence that their compute environments are ready for the non-stop rigors of electronic design projects. Furthermore, pairing service offerings from Sun with Mentor Graphics' award winning customer support provides organizations with an end-to-end solution for meeting demanding EDA challenges.

## Strong Software Vendor Relationships

Organizations count on a strong partnership between platform vendors and software application suppliers to help ensure that solution components function together optimally. For more than 15 years, technology companies have created powerful EDA solutions that reap the benefits of the Sun and Mentor Graphics relationship. Sun's solid alliance with Mentor Graphics facilitates optimal execution, and helps improve performance and reliability when using Mentor Graphics EDA applications on Sun SPARC and x64 platforms.

EDA applications rarely run in isolation, and platforms that support a full suite of software applications are of greater value to design staff. Sun works proactively with thousands of Independent Software Vendors (ISVs), simplifying the deployment of software stacks that address the full functional requirements of enterprise solutions. Applications are widely available for the Solaris 10 OS on both SPARC and x64 systems, supporting more than 2,700 commercial applications on x86/x64 systems and more

1. Please see <http://www.sun.com/software/solaris/lifecycle.xml> for additional information.

than 4,200 applications on platforms with SPARC processors. The Solaris 10 OS also includes more than 180 applications from the free and open source software (F/OSS) community, and thousands of others are freely available for download over the Internet.

## Guaranteed Compatibility

Software application and operating system incompatibilities often stall progress, inhibit upgrades, and cause dilemmas for operational staff. In order to help avoid these pitfalls, Sun maintains binary compatibility from one version of the Solaris OS to the next. Binary compatibility provides organizations the freedom to incorporate multiple tools into the design flow without fear of operating system incompatibility.

The Solaris Application Guarantee Program — unmatched by any other industry offer — guarantees application compatibility from release to release of the Solaris OS. This unique approach protects investments and provides the potential to vastly simplify enterprise testing, certification, and porting projects. If an application runs on the Solaris 2.6, 7, 8, or 9 OS, it can run on the Solaris 10 OS, even if it has not been specifically recompiled for the Solaris 10 OS. Sun also offers the Solaris Source Code Application Guarantee Program that guarantees application compatibility between x64 and SPARC platforms. A 64-bit application that runs on a platform with SPARC processors, can be easily recompiled to run on x64 platforms.

If an application experiences binary or source compatibility problems when running on the Solaris 10 OS, Sun can be engaged to analyze the problem and provide the appropriate remedy as set forth in the Solaris Application Guarantee Program Terms and Conditions<sup>1</sup>. In fact, Sun's binary compatibility guarantee helps Mentor Graphics accelerate the process of validation and support of EDA applications on new versions of the Solaris OS. Through Sun's unwavering commitment to consistency within the Solaris OS, organizations can confidently adopt the latest technology without fear of compatibility problems that might disrupt the true business of creating next-generation electronic system designs.

## Excellent EDA Application Performance

Within the electronics industry, the ability to bring new designs to market before the competition can mean all the difference in market share capture. In many cases, maximizing design productivity depends upon the performance of the EDA infrastructure. As a part of an ongoing commitment to helping organizations achieve the highest performance, Mentor Graphics regularly tests the capabilities of a variety of operating systems and compilers. Application benchmark comparisons consistently

1. Please see [http://www.sun.com/software/solaris/programs/binary\\_guarantee\\_terms.xml](http://www.sun.com/software/solaris/programs/binary_guarantee_terms.xml) and [http://www.sun.com/software/solaris/programs/source\\_code\\_guidelines.xml](http://www.sun.com/software/solaris/programs/source_code_guidelines.xml) for complete details.

reveal that the Solaris 10 OS on x64 platforms delivers comparable and at times slightly better throughput than other systems in the test suite. Internal tests also show that the Solaris 10 OS on x64 platforms manages threads and scales particularly well for systems with between eight and sixteen CPUs. When considering the overall better stability, reliability, and robust support programs, the Solaris 10 OS clearly provides a greater value than many other x64 operating systems.

## The Right Enterprise EDA Solution

Electronic design teams need powerful EDA environments and tools in order to successfully launch high-quality products ahead of the competition. For over 15 years Sun and Mentor Graphics have joined forces to deliver exceptional and robust EDA solutions. Technology leading Mentor Graphics products aid engineers in overcoming some of the most complex board and chip design challenges. Sun's innovative x64 systems and the Solaris OS help organizations create a robust and agile EDA infrastructure. Low cost Sun Fire x64 systems stand out from the pack of competing systems, providing enterprises with outstanding performance, scalability, power efficiency, and manageability benefits. The predictable life-cycle model and binary compatibility guarantee of the Solaris OS foster further solution stability. By combining Sun's affordable volume market platforms, the robust and secure Solaris OS, and powerful Mentor Graphics applications, design firms can create a high-performance EDA solution with true enterprise-grade stability.

## For More Information

To learn more about products and solutions from Sun and Mentor Graphics contact a Sun sales representative or consult the related Web sites listed in Table 3 below.

*Table 3. Related Web Sites*

Web Site URL	Title
<a href="http://sun.com/aboutsun/pr/2007-01/sunflash.20070130.1.xml">sun.com/aboutsun/pr/2007-01/sunflash.20070130.1.xml</a>	Sun and Mentor Graphics Announcement
<a href="http://mentor.com/">mentor.com/</a>	Mentor Graphics
<a href="http://sun.com/x64">sun.com/x64</a>	Sun x64 Systems
<a href="http://sun.com/solaris">sun.com/solaris</a>	The Solaris Operating System
<a href="http://sun.com/software/solaris/guarantee.jsp">sun.com/software/solaris/guarantee.jsp</a>	Solaris Application Guarantee Program
<a href="http://sun.com/service/serviceplans">sun.com/service/serviceplans</a>	SunSpectrum Service Plans
<a href="http://partneradvantage.sun.com/">partneradvantage.sun.com/</a>	Sun Partner Directory

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



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