

Sun™ Studio Development Suite on AMD Opteron™ Processors

A Complete, Optimized Environment for Developing High Performing Applications



Sun and AMD's Best-of-Breed Platform for Developing High Performing Applications

Through years of close collaboration, Sun and AMD have created a powerful platform that brings together Sun™ Studio 12 development software with the Sun Solaris™ Operating System (OS) and AMD Opteron™ processors. Each component is tuned and optimized to take full advantage of the strengths of the others, and the result is a complete, tightly integrated, highly optimized environment for software development and deployment that offers exceptional performance, scalability, and reliability.

Made for Multi-Core Opportunities

Multi-core development opens the door to a multitude of new opportunities for developers. Since Sun Studio 12 software is optimized for the AMD Opteron processor multi-core architecture, it can help simplify multi-core development in the following ways:

Processor and Compilers Optimized for Parallelism

Quad-Core AMD Opteron™ processors have four cores per chip, so code can be executed in parallel to a greater degree than ever before. At the same time, Sun Studio 12 compilers have been optimized to enable developers to take full advantage of this multi-core architecture for parallelism.

Additional Capabilities and Tools to Support Multi-Core Development

Sun continuously invests in compiler performance to optimize the Sun Studio 12 development environment for AMD Opteron processors and other x86 architecture-based systems. A number of compiler capabilities support multi-core development, including automatic vectorization, which enables operations that are normally performed

sequentially to be automatically performed in parallel. In addition, integrated developer tools for Sun Studio 12 software include a thread analyzer tool that detects data races and deadlocks in multi-threaded applications.

An Open Platform for Application Development

Sun and AMD team together to provide developers with the tools and resources for multi-platform support.

Support for Multiple Operating Systems

While Sun Studio 12 software running on the Solaris OS is an ideal environment for developing AMD Opteron processor-based applications, the Sun Studio 12 development environment also supports Linux® for customers' multi-platform environments. Sun Studio compilers on Linux offer the same features and components as on the Solaris OS.

OpenMP Open Platform Support

The de facto industry standard for writing shared-memory parallel applications in C/C++ and Fortran, OpenMP is fully supported by Sun Studio 12 software, which has consistently been a leader in supporting the latest version of the standard. OpenMP can

Highlights

- A comprehensive, integrated environment for application development and deployment
- Development environment optimized for the AMD Opteron™ processor architecture
- Compilers specifically optimized for multi-core and x86 development
- Open platform supporting multiple operating systems in heterogeneous environments
- Complete set of developer-dedicated resources available online

help to reduce programming effort and to increase performance and scalability.

Record-Breaking Performance on Multiple Platforms

Sun Studio 12 software compilers have set architecture records scaling from one core/one socket to 128 cores/64 sockets, both on AMD Opteron processors and on systems

Quad-Core AMD Opteron™ Processor Support in Sun Studio 12

Hardware Features vs. Compiler Optimizations

- Full 128-bit wide FPUs ▶ Smart code selection to use full 128 bits and avoid merge dependencies
- Four cores per processor ▶ Auto-parallelism to extend parallelism beyond dual cores
- Sideband Stack Optimizer ▶ Use PUSH/POP for both efficiency and small code size
- Expanded 32B fetch window ▶ Align small hot loops to be 32B aligned
- New ABM and SSE4a instructions ▶ Highly optimized bit and string lib calls
- Improved latency and bandwidth ▶ Instruction scheduling for the updated latency and bandwidth

Compilers are optimized in Sun Studio 12 to enable developers to take full advantage of the AMD Opteron™ processor's advanced features.



based on x64 processor technologies. They have also set world records for performance on SPEC benchmarks.

Supporting Resources from AMD Developer Central

AMD provides technical resources to help you develop high performance applications with Sun Studio 12 software on AMD Opteron™ processors. Visit AMD Developer Central (developer.amd.com/solaris), where you'll find:

Practical Guidance for Real World Solutions

AMD's developer site includes complete documentation, tutorials, and guides, as well as detailed technical articles, case studies, and forums and blogs where you can connect with other developers.

Free Tools and Resources

A variety of AMD tools to support application development with Sun Studio 12 software is available online. These include two advanced libraries, the open source Framewave library of runtime solutions and the AMD Core Math Library (ACML) for compute-intensive applications.

Sun™ Studio on AMD Opteron™ Processors Best Practices

- Adopt a higher design abstraction such as OpenMP.
- Don't hard code expected processor "core count" or "thread count."
- Use pass-by-value to communicate between threads.
- Design the data structure to limit the global variable usage.
- Restrict the access of shared memory in your design.

For more technical details, consult Coding Tips for Sun™ Studio on AMD64 Technology at developer.amd.com/solaris.

The AMD Opteron Processor: Building on a Proven Platform

Leading companies around the world trust AMD Opteron processor-based platforms for their most demanding enterprise computing needs. And AMD has increased its advantages with quad-core technologies and advanced innovations that further enhance energy efficiency.

Quad-Core AMD Opteron™ processors are designed to leverage the native x86 instruction set that enterprises trust. AMD's enhancements provide significant benefits, including industry-leading performance-per-watt and x86 virtualization, translating to low total cost of ownership. The ability to upgrade existing Dual-Core AMD Opteron™ processors to Quad-Core AMD Opteron processors within the same power and thermal envelope enables more powerful servers within existing data center footprints.

The Direct Connect Architecture found in Quad-Core AMD Opteron processors helps improve system performance and efficiency by directly connecting the processors, the memory controller and the I/O to the CPU. In addition, the memory controller is built directly onto the processor die, which can help reduce latency and increase performance. Quad-Core AMD Opteron processors can provide much higher levels of performance in the same power and thermal envelopes as Dual-Core AMD Opteron processors, providing easy upgradeability from dual to quad-core so you can leverage existing IT equipment.

Sun Studio Software: Outstanding Performance to Meet Developers' Evolving Needs

Sun Studio software delivers the premier development environment for the Solaris OS, with optimized compilers and other development tools to deliver outstanding performance for single and multithreaded application development.

Sun Studio 12 software is the latest version of the IDE. It's designed to support the newest multi-core architectures, with autoparallelism, thread analyzer, thread-aware debugger, and

improved performance analysis tools. It offers a simplified migration path, with source and object-level compatibility with prior releases, as well as ABI compatibility to leverage the newest compiler technology. An improved GUI simplifies application debugging by making it easy to access advanced debugging features.

Based on the NetBeans™ open source project, Sun Studio 12 works with the Linux® OS as well as the Solaris OS, enabling developers to create better-optimized applications for open source-created applications.

Get the Details

To learn more about developing applications with Sun Studio 12 software on AMD Opteron processor-based systems, visit developer.amd.com/solaris

To give Sun Studio 12 software a try, visit developers.sun.com/sunstudio

Find out more at developer.amd.com/solaris

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One AMD Place
Sunnyvale, CA 94088
T: 800.536.8450
www.amd.com

