Oracle Solaris Studio 12.4

Oracle Solaris Studio is the #1 development environment for building C, C++ and Fortran applications for Oracle Solaris and Oracle Linux operating systems. Oracle Solaris Studio is optimized for Oracle Systems (SPARC and x86) and offers an advanced integrated toolset that leverages system features, enabling developers to build high-performance scalable and reliable applications faster.

**Introduction**

Oracle Solaris Studio delivers a complete and comprehensive development platform with high performance, high efficiency and high value. The Oracle Solaris Studio compilers are optimized to deliver the highest performance on the latest Oracle systems. All of the components of Oracle Solaris Studio are designed, tested, and integrated to work together to help maximize developer efficiency. In addition, with Oracle Solaris Studio customers are able to leverage innovations across the Oracle technology stack, including custom extensions for Oracle Database and Oracle Tuxedo development.

Oracle Solaris Studio contains two major suites of tools, a Compiler Suite and an Analysis Suite. The tools within each of the suites are designed to work together to provide an optimized development environment for the development of serial and parallel applications. Oracle Solaris Studio also comes with an integrated development environment (IDE) tailored for use with the compilers and tools from both suites. Oracle Solaris Studio provides a robust and reliable development environment with tools that are optimized for the underlying operating system and hardware to help you create high-performance, scalable and reliable applications.
Figure 1. Oracle Solaris Studio Overview

**Compiler Suite**

The Compiler Suite helps customers create faster applications in less time. The Compiler Suite includes the following components: C & C++ Compilers, Fortran Compiler, Debugger, and Performance Library.

**C, C++ Compilers**

Oracle Solaris Studio delivers compilers that produce record-setting application performance—consistently exceeding that of open source alternatives. The C and C++ compilers provide a solid foundation for building robust, high performance code for the latest generation of Oracle SPARC and x86-based Oracle systems.

Oracle Solaris Studio includes support for C++ 2011, a significant update to the C++ programming language standard defined in the ISO/IEC 14882:2011 specification. It also has enhanced support for popular open source BOOST libraries and provides compatibility with GCC-generated shared libraries, making it easy to deliver feature-rich, portable applications. Oracle Solaris Studio also includes support for C 2011, an update to the C programming language standard. In addition to supporting the latest language standards, Oracle Solaris Studio software is compatible with prior releases.

To take advantage of hardware concurrency in multicore systems, the compilers simplify the creation of parallel applications with auto-parallelization features. These features enable the compiler to identify safe and profitable parallelization opportunities in single-threaded code and automatically convert those segments into multithreaded code. In addition, the compilers support the OpenMP 4.0 parallel programming specification for shared memory parallelism.

The compilers in Oracle Solaris Studio include an array of optimization options for increasing application performance. For generating everything from microarchitecture-specific instructions and profile feedback to whole-program optimizations, the compilers provide both a wide selection of individual options and easy-to-use meta options for aggressively optimizing application performance.

**Fortran Compiler**

Oracle Solaris Studio delivers a Fortran compiler that produces record-setting runtime...
performance. The compiler provides support for the Fortran77, Fortran90, and Fortran95 standards to support the existing base of codes in the technical market. It also delivers partial support for the Fortran 2003 standard. Support for the OpenMP 4.0 specification is also included. The Fortran compiler uses the same high-performance code generation technology as the C and C++ compilers, ensuring that the resulting application generates the highest-performance code for the newest SPARC and x86-based Oracle systems.

Debugger
The dbx debugger is an interactive, source-level, postmortem and real-time debugging tool available through both a command line and graphical interface. It is also integrated into the Oracle Solaris Studio IDE. Ensuring application reliability, the dbx debugger is scriptable and multithread-aware.

Performance Library
The Oracle Solaris Performance Library includes a set of optimized mathematical subroutines for solving linear algebra and other numerically intensive problems. It provides a performance boost to high-performance computing, financial, and other compute-intensive applications. The Oracle Solaris Performance Library contains enhanced and newly added standard routines such as BLAS1/2/3, LAPACK, Sparse BLAS, SuperLU, FFTPACK, and VFFTFPACK.

Analysis Suite
The Analysis Suite includes an advanced suite of tools to help developers gain increased observability into their applications. The Analysis Suite includes the following tools: Performance Analyzer, Code Analyzer, and Thread Analyzer.

Performance Analyzer
The Performance Analyzer is a powerful market leading performance analysis tool for optimizing application performance and scalability. It provides in-depth analysis that enables you to quickly understand your application’s behavior, allowing you to easily eliminate hotspots and areas of high resource consumption.

The Performance Analyzer identifies application performance bottlenecks, by specifying not only which functions, code segments, and source lines are having an impact on performance but by also providing the tools necessary to tune for optimal performance. From annotated listings showing what optimizations the compiler performed to optimization status and runtime thread performance, users can easily visualize performance hotspots. The Performance Analyzer can profile single-threaded as well as multithreaded applications. The Performance Analyzer also handles multiple concurrent processes to collect system-wide performance data, providing application insights down to the OS kernel, presenting a graphical identification of bottlenecks and helping improve application performance by orders of magnitude. In addition to supporting C, C++ and Fortran applications, the Performance Analyzer also includes support for Java code. Now, developers can use a single tool to seamlessly measure and tune their server and web-based application code. The Performance Analyzer also delivers cross-architecture and remote analysis support, helping increase overall developer efficiency.
Figure 2. Performance Analyzer Timeline View, demonstrates where time is being spent across multiple threads

**Code Analyzer**

The Code Analyzer helps ensure application reliability by utilizing dynamic, static and code coverage analysis to detect 45+ common coding errors, including memory leaks and memory access violations faster than competitive alternatives. The Code Analyzer utilizes static analysis at compilation and dynamic analysis from application runtime to identify code quality issues. In addition, the tool incorporates code coverage data to provide information about functions that are not covered by your test suite and guidance on the type of benefit you could achieve by covering those functions. The Code Analyzer provides a comprehensive view of application vulnerabilities by synthesizing the data collected from these three types of analysis, enabling you to improve application correctness and reliability. It also provides advanced error filtering and sorting capabilities, enabling you to track, detect, and fix issues faster.
Thread Analyzer

Improving developer productivity and software robustness, the Thread Analyzer identifies hard-to-detect threading errors before they occur. It can detect potential race and deadlock conditions at runtime, map them to source lines in the application, and then enable the user to view the results by using command-line or graphical user interface (GUI) options.

Integrated Development Environment

In addition to the Compiler Suite and the Analysis Suite, Oracle Solaris Studio also offers an integrated development environment (IDE) tailored for C, C++ developers that helps increase developer productivity.

The Oracle Solaris Studio IDE is built on the NetBeans platform and has a variety of
advanced features that help increase developer productivity including an intelligent language aware code editor, code completion, code folding, syntax highlighting and much more.

It also includes remote development features that enable the creation of Oracle Solaris applications from Microsoft Windows, Apple Mac or other Unix desktops, allowing you to leverage award-winning IDE features to remotely build, debug, run and analyze your applications.

In addition, the Oracle Solaris Studio IDE supports Oracle Database application development on Oracle Solaris with Oracle Database connection management, database browsing, and Pro*C support. It also provides support for developing Oracle Tuxedo applications using ATMI and SCA programming models.

Figure 5. Oracle Solaris Studio IDE

**System Requirements**

Oracle Solaris Studio 12.4 is available for the following platforms:

- Oracle Solaris 10 & 11 (SPARC and x86)
- Oracle Linux 5 & 6 (x86)

**Licensing and Support**

Oracle Solaris Studio software is available for download for production use from the Oracle Technology Network (OTN). There you will find Oracle Solaris Studio software in a variety of formats, including SVR4 and RPM packages, including instructions for acquiring Oracle Solaris Studio via the Oracle Solaris Image Packaging System (IPS).

Support for Oracle Solaris Studio is available with the Oracle Solaris Development Tools Support offering available through the Oracle Store to ensure high developer and team productivity.
CONTACT US
For more information about Oracle Solaris Studio, visit oracle.com/goto/solarisstudio or call +1.800.ORACLE1 to speak to an Oracle representative.

Hardware and Software, Engineered to Work Together

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