

Cool Tools for Web-Tier Optimization

Building the next-generation Web tier



Highlights

- Sun SPARC® Enterprise T5120 and T5220 servers and Sun Blade™ T6320 server modules based on CoolThreads™ technology offer breakthrough performance and dramatic space and power efficiency
- The industry's first massively-threaded System on a Chip (SoC), the UltraSPARC® T2 processor delivers up to 64 threads for performance, scalability, and high levels of utilization for most Web-tier applications
- The proven and scalable Solaris™ Operating System (Solaris OS) with built-in consolidation and virtualization technology provides stability, security, and scalability
- Cool Tools for Sun CoolThreads servers accelerate application selection, development, tuning, debugging, and deployment for faster time to market
- The Sun CoolThreads server Try and Buy program offers no-risk, on-site proof of concept evaluation with extensive on-line support resources



Scalability and eco-efficiency are increasingly essential for Web-tier infrastructure.

Web-facing organizations need to provide fast time to market for new services, and agility to monetize emerging opportunities even as they respond to new demands. With Sun's Cool Tools for Web-tier consolidation and an innovative line of rackmount and modular servers based on the breakthrough UltraSPARC® T2 processor, organizations can provide needed capacity—letting datacenters consolidate to stay within physical, power, and cooling constraints.

Facing Web 2.0 with better infrastructure

There is no question that legacy x86 servers helped drive the first generation of Web applications. Unfortunately, much of the infrastructure that built the Web is proving insufficient to carry it forward. Demanding Web 2.0 applications along with millions of new users joining the Web each day are fueling the need for capacity and scalability. At the same time, organizations now face very real challenges in terms of rapidly deploying secure applications, managing complexity and server sprawl, and coping with power, cooling, and real estate limitations. It is clear that the next generation of Web-tier infrastructure must accomplish even more.

In the face of these challenges, Sun's Web-tier optimization offerings help organizations gain high compute density in a smaller footprint, with

lower power and cooling overhead to streamline and secure their Web infrastructure. Through consolidation, virtualization, and optimization, organizations can benefit from:

- Greater throughput in less space
- Up to 60 percent fewer systems required
- As little as 1/4 the power consumption of competitive systems
- Improved management and security of Web infrastructure

With innovative CoolThreads Chip Multithreading (CMT) technology, and one of the strongest commitments in the industry to transparency and open source solutions, Sun is ideally suited to help organizations build and optimize next-generation Web-tier infrastructure, with less risk than ever before.

Web-tier optimization from Sun

The crush of new Internet users and the advent of new Web 2.0 applications is changing the way that organizations view their Web-tier infrastructure. Business and on-line growth is demanding more capacity. New and stringent regulatory requirements such as Sarbanes Oxley are bringing their own requirements that must be met to protect the business and its executives. In particular, the inability of the Web tier to scale to meet new demands within fixed power, cooling, and real estate limits has become a dominant priority. Merely deploying more servers is increasingly not an answer.

With Cool Tools and Sun's Try and Buy program, customers can try a Sun CoolThreads server for 60 days with no risk.

In fact, the proliferation of power consumptive legacy servers has contributed directly to these problems. Server sprawl has its own costs, as large numbers of even the most inexpensive servers are causing massive operational inefficiencies along with excessive power loads, heat generation, and space consumption. With some data centers now consuming the power of small cities, and 80 percent of all data centers constrained by power and space, it is clear that something needs to change.

Many organizations now realize that most of TCO is related to management. Infrastructure complexity is now recognized as the real enemy of agile and cost-effective operations. Sun now estimates that 75 to 80 percent of costs are associated with back-end management, including acquisition, provisioning, operations, optimization, and migration to next-generation platforms and services.

Sun servers based on CoolThread technology and the Solaris OS

As organizations seek to scale their Web-tier infrastructure within a fixed footprint of power and cooling, Sun servers based on CoolThreads technology continue to provide a unique opportunity. Powered by a second-generation chip multithreaded UltraSPARC T2 processor with support for up to 64 active execution threads, these systems provide up to twice the throughput of their predecessors. Sun SPARC Enterprise T5120 and T5220 servers offer rackmount options while the Sun Blade™ T6320 server module adds UltraSPARC T2 processor support

to the Sun Blade 6000 modular system. The result is virtually unprecedented levels of scalability and operational efficiency and a choice of platforms.

Any of these UltraSPARC T2 based systems can be divided into multiple secure and isolated virtual machines, each with their own applications and resources. An integrated multithreaded hypervisor in each UltraSPARC T2 (and T1) processor allows fine-grained virtualization through Sun Logical Domains technology, with support for multiple guest operating systems. Designed for scalability and consolidation, the Solaris 10 OS tightly integrates with these capabilities, allowing OS-level virtualization, isolation, and resource management.

The benefits of these technologies for Web-tier infrastructure are many, including:

- Lower costs, better management, and economies of scale through consolidation
- Faster service deployment through a standardized environment
- A better foundation for isolation, disaster recovery, and business recovery
- Lower Total Cost of Ownership (TCO)

Cool Tools for Sun CoolThreads servers

No matter how compelling new hardware or OS 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 don't want to have 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's Cool Tools program (Figure 1) is designed specifically to take the cost and risk out of moving Web tier environments to the Solaris OS and Sun servers based on CoolThreads technology.

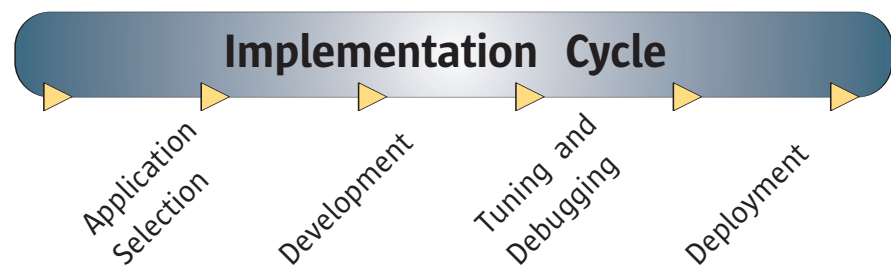


Figure 1: Sun's Cool Tools for CoolThreads servers provide a menu of options to help evaluate, tune, optimize, and deploy commercial and open source applications.

Cool Tools elements

The Cool Tools for Sun CoolThreads servers program features a menu of tools, letting organizations select only those elements that they need in order to evaluate, test, or optimize their applications.

Application selection

Application selection helps identify those applications that stand to benefit from CoolThreads technology.

- **CoolThreads Selection Tool (*coolst*)**. Coolst helps determine application suitability for the UltraSPARC T1 and T2 processor architectures, accelerating the understanding of application execution and helping to take the risk out of investment decisions. For example, the tool measures the number of light-weight processes (threads) to determine potential parallelism.

Development

Developers need to be able to build, test, and evaluate applications, producing the most effective code while advancing their productivity with their chosen tools.

- **GCC for SPARC® Systems (*GCC4SS*)**. Specifically tuned and optimized for SPARC systems, GCC4SS complements the popular GCC compiler suite, delivering up to three times the performance of compiled applications with even greater levels of reliability. At the same time, GCC4SS is 100 percent compatible with GCC, supporting all ABIs, language extensions, and flags.
- **Sun Studio 12**. Sun Studio 12 provides developers with the latest record-setting, high-performance, optimizing C, C++, and FORTRAN compiler compilers for the Solaris OS on SPARC and x86/x64 platforms. Command-line tools and a NetBeans-based Integrated Development Environment (IDE) are provided for application performance analysis and debugging of mixed source language applications. In addition to offering multi-platform support, Sun Studio 12 compilers are compatible with GCC, Visual C++, C99, OpenMP, and FORTRAN 2003.

- **Binary Improvement Tool (*BIT*) and Simple Performance Optimization Tool (*SPOT*)**. Used for code coverage analysis, BIT provides instruction and call count data at run time, helping to significantly improve developer productivity and application performance. BIT does not require source code, and works with both executables and libraries. SPOT also helps deliver improved developer productivity by automating the gathering and reporting of code data.

- **Sun Application Porting Assistant (*APA*)**. The Sun Application Porting Assistant is a static source code analysis and code scanning tool, mainly used to identify incompatible APIs that could cause potential porting issues between the Linux and Solaris platforms. Sun Application Porting Assistant's C/C++ and shell script parsers are able to parse these source files and produce reports that can be used in porting the applications.

- **Sun Memory Error Discovery Tool (*Discover*)**. The Discover Tool is designed to detect and report common memory access errors. Reported errors include accessing uninitialized memory, writing past the end of an array, or accessing freed memory.

Tuning and debugging

Administrators and developers alike need to monitor, analyze, and tune applications under real-world conditions.

- **Corestat**. Corestat provides an on-line monitoring tool for core utilization of the UltraSPARC T1 and T2 processors, providing a more accurate measure of processor and system utilization than tools that only measure the utilization of individual threads. Implemented as a Perl script, corestat aggregates instructions executed by all the threads on a single core, revealing the cycles per instruction of key workloads and indicating where more tuning is needed.
- **Automatic Tuning and Trouble-Shooting System (*ATS*)**. In the interest of automating application tuning, ATS automatically re-optimizes and re-compiles binaries with

no need for source code. A plug-in for GCC4SS and Sun Studio 12, ATS identifies inadequate optimization and then automatically rebuilds the application with the correct optimization options.

Deployment

Cool Tools deployment elements provide applications that are already optimized for Sun's CoolThreads technology, saving critical time in configuring systems for performance and consolidation.

- **CoolTuner**. CoolTuner provides an on-site "virtual" tuning expert, delivering system performance improvements by automatically applying current best practices including both patching and tuning. CoolTuner can save hours to weeks of effort tuning Sun servers based on Cool Threads technology.
- **Cool Stack**. Cool Stack represents a collection of the most commonly used free and open-source applications, pre-optimized for Sun CoolThreads servers running the Solaris OS. Including such popular applications as Apache, Perl, PHP, Squid, Tomcat, and MySQL, these applications have been recompiled with Sun Studio 12 compilers to deliver a 30 to 200 percent performance improvement over standard binaries compiled with GCC. Cool Stack applications also bring benefit any SPARC system.
- **Consolidation tools for Sun servers**. Powerful Sun Logical Domains combined with Solaris Containers technology offer myriad consolidation possibilities. Available Consolidation tools for Sun servers simplify and speed the deployment of these key technologies. With a wizard-based GUI, these consolidation tools automate the installation of consolidated applications, letting even novice administrators create a fully virtualized and consolidated environment using Sun Logical Domains and Solaris Containers. The result is fast and high-quality consolidated deployments.

“Joyent’s platform of Ruby on Rails applications, development tools, and unique collaboration offerings run at a greater throughput and lower operational costs on Sun’s CoolThreads servers running OpenSolaris. This allows us to give our community of users and developers access to a great platform at a low price, and offers our Web 2.0 developers a powerful environment where they can scale their applications.”

David Young

Chief Executive Officer, Joyent

Putting Cool Tools to work

Cool Tools are available free of charge for download from <http://cooltools.sunsource.net>, which also includes access to detailed documentation, presentations, and discussion forums. These tools are available for both new and existing customers of Sun SPARC and x64 servers. Some of the Cool Tools elements are also pre-loaded on new Sun SPARC Enterprise T5120, and T5220 servers (Figure 2).

More resources

Sun provides extensive on-line resources for CoolThreads technology, including white papers, analyst reports, and more at sun.com/servers/coolthreads/overview/index.jsp.



Learn More

Visit sun.com today or contact a Sun representative to learn more about:

- Powerful Sun servers based on CoolThreads technology
- The robust and proven open source Solaris OS
- Cool Tools for CoolThreads servers aiding open-source development, tuning, and rapid deployment
- Sun’s CoolThreads Try and Buy program

Uncensored testimonials

As more organizations experience the real-world performance of the Sun CoolThreads servers, the results are compelling indeed. Enthusiastic and uncensored testimonials can be viewed at: sun.com/servers/coolthreads/testimonials

With support for up to 64 threads, Sun SPARC Enterprise T5120 and T5220 servers and Sun Blade T6320 server modules for the Sun Blade 6000 modular system (not shown) provide dramatic scalability and consolidation opportunities for most Web-tier applications.

Sun CoolThreads server “Try and Buy” offer

For a limited time, Sun is offering the opportunity to qualify for a free 60-day trial of a Sun server with CoolThreads technology. Together with the availability of Cool Tools for CoolThreads servers, this program represents an ideal opportunity to evaluate the Solaris OS and UltraSPARC T2 processor technology on key applications, at no cost. Applicants to the Try and Buy program can avail themselves of Cool Tools and extensive on-line support sun.com/tryandbuy



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