

Sun™ Constellation System

Petascale computing arrives.

> Sun is ushering in a new era of open petascale computing with the Sun Constellation System. The Sun Constellation System is the result of a system-level innovation that builds on cost-effective, off-the-shelf components and state-of-the-art technologies, and delivers an open, petascale architecture. Using a holistic approach for an integrated, yet modular system that includes servers, software, storage, and services, Sun is creating one of the most powerful—if not the most powerful—High-Performance Computing (HPC) platforms in the world. In addition, the Sun Constellation System requires less energy to operate than competitive solutions because of its designed in power and cooling efficiencies. Applications can be quickly created using familiar tools and interfaces in small environments, and then rapidly scaled up and deployed to environments capable of providing up to 2.0 PetaFLOPS of computing power.

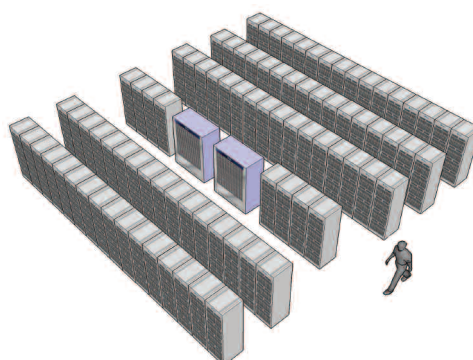
Highlights

- World's first open petascale computing architecture, with ultra-dense blade computing and InfiniBand switching, and high-performance storage
- Massive scalability – optimized compute, storage, networking and software technologies and services
- Dramatically reduced complexity – integrated connectivity and management to help reduce start-up, development and operational complexity
- Breakthrough economics – technical innovation resulting in fewer components in a tightly integrated solution
- Based on industry standard and open-source technologies that provide a familiar, portable, and extensible application environment
- Built on eco-computing principles – delivering more computing power per watt than alternative solutions
- First customer install of Sun Constellation System is the 500 + TeraFLOP TACC Ranger cluster at University of Texas at Austin/Texas Advanced Computing Center

First deployment: TACC Ranger cluster

The first customer install of the Sun Constellation System is the TACC Ranger cluster, the result of a partnership between the University of Texas at Austin/Texas Advanced Computing Center (TACC) and Sun Microsystems. With over 500 peak TeraFLOPS of CPU power, the Ranger cluster will be one of the most powerful general-purpose computing platforms in the world when it is fully deployed.

TACC supports a wide range of users in diverse lines of research—currently there are more than 600 active, funded projects. The Ranger cluster's flexibility enables users to access all or part of its computing capabilities, and will also be used in oil exploration, meteorology, materials science, and finance applications such as risk management.



TACC Ranger Cluster

Innovative components

Sun Constellation System includes the following components to bring production-ready capabilities to petascale computing:

- The Sun Blade 6048 Modular System
- The Sun Datacenter Switch 3456
- High-throughput, high-density storage and high capacity tape archival
- Factory integration services and design through Sun's Customer Ready program

“Sun and TACC are taking a leadership role in supercomputing.”

—Addison Snell, Tabor Research

Sun Blade 6048 Modular System

The Sun Blade 6048 Modular System is based on the Sun Blade™ 6000 technology, and designed for high scalability and performance. The Sun Constellation System offers a choice of UltraSPARC® T2 processors with CoolThreads™ technology, AMD Opteron™, and Intel® Xeon® processors. As it offers up to four times the memory capacity of competing solutions, the Sun Constellation System is ideal for memory intensive applications and environments such as the TACC Ranger cluster where the cluster will be shared across multiple projects.

“Product innovations like the Sun Blade 6048 Modular System and the Sun Datacenter Switch 3456 will enable scientists and researchers to expand and scale their science applications and knowledge.”
 —Earl Joseph, IDC technical computing program vice president

Sun Datacenter Switch 3456

Until now, the largest Infiniband (IB) switch available has had 288 ports. With 3456 ports, the Sun ultra-dense switch helps reduce cost and overcomes the complexity typically associated with large-scale HPC clusters. This single, fully non-blocking monolithic core IB switch replaces hundreds of discrete switching elements, helping to reduce the number of required leaf switches and vastly simplifying cabling and administration.

Storage systems without limits

The Sun Constellation System architecture uses state-of-the-art open storage technologies:

- Sun Fire X4500 delivers almost one-half Petabyte of storage in a single rack, all accessible from the same IB network
- Sun StorageTek® QFS shared file system software, for maximum scalability, data management, and throughput
- Sun StorageTek modular library systems, with hundreds of petabytes capacity, provide near-line and offline storage for the massive data sets and application stacks
- Open-source Lustre parallel file system from Sun for unmatched scalability

- The Sun StorageTek 5800 System is an integrated storage, server, OS, and management software that allows for massive storage for fixed content access

Sun Services makes it easy

Sun is providing a range of services to support Sun Constellation System to help enable a successful deployment, including:

- The Sun Customer Ready program, which integrates servers, networking, interconnects, and software at the factory
- Professional services, including project management and field installation support services for ongoing maintenance
- Sun HPC Quick Start Services make it easy for customers to adopt, implement and optimize HPC solutions and help decrease deployment time by up to 80 percent

Open software environment for petascale computing

As an open general-purpose HPC environment, Sun Constellation System takes advantage of a broad range of industry leading, industry standard, and open-software components and interfaces:

- OpenSolaris™ OS or Linux
- ROCKS
- Sun Grid Engine software
- Sun xVM Ops Center
- Sun HPC ClusterTools based on Open MPI
- CLI, IPMI, and SNMP protocols
- Sun Studio 12 development environment
- Fortress programming language

An underlying technology for petascale HPC environments is OpenSolaris, which offers key HPC functionality, including performance enhancements, system analysis tools, high-performance file systems such as ZFS.

Scalability and performance are achieved with Lustre, QFS and InfiniBand support.

Learn More

For more information on the Sun Constellation System, please visit sun.com/sunconstellationsystem. For more information on the Sun HPC solutions, see sun.com/hpc, sun.com/hpccluster, and sun.com/customerready

Sun Constellation System Reference Designs

A supercomputing system needs a lot more than fast compute engines. The Sun Constellation System Reference Designs contain blade compute nodes, fast parallel file systems using data servers for shorter-term data, efficient storage systems for longer-term archive, and state-of-the art visualization systems for analysis and collaboration.

Components	Design A	Design B	Design C
Interconnect (Sun Datacenter Switch 3456)	2	1	1
Compute	82 racks	30 racks	10 racks
Nodes	3936 nodes	1440 nodes	480 nodes
TeraFLOPS – peak	579 Tflops	210 Tflops	70 Tflops
Short Term Storage Capacity	3.55 PB	1.06 PB	288 TB
Long Term Storage	56 PB and up	2.4 PB and up	460 TB and up
Visualization Servers	8	3	1

Sun and HPC

With more than 25 years of open systems computing expertise, HPC experience, and innovation in software, systems, storage, and services, Sun is in the forefront of helping research and commercial customers implement and deploy leading, cost-effective HPC solutions.

