



Sun™ Compute Cluster for High Performance Trading

Open, reliable, simple, scalable

Highlights

- Modular, blades-based solution with compute and storage options pre-integrated to run multiple pre-trade analytics, surveillance, and trading applications consolidated on a single rack
- Flexibility to mix and match server (AMD/Intel/SPARC®) modules based on application workload with any operating system of choice all running on and managed in the same rack
- 80% fewer switches in Sun Blade™ architecture improves performance and lowers latency by eliminating the entire sublayer of switching while reducing network management and maintenance costs by 4x and acquisition costs up to 50% — even with supposed cable consolidation savings
- Reduce overall TCO by providing up to 7 Teraflops of compute power with up to 28% savings in power and cooling costs as compared to equivalent rack mount servers and up to 50% reduction in service costs compared to competition

> Financial industry firms are facing an unprecedented number of market-wrenching challenges due to growing volumes of market data, algorithmic trading, enactment of trading regulations, higher demands of real-time processing, and ultra low latency requirements. These institutions are under tremendous pressure to constantly re-architect their systems, find innovative ways to stay ahead of the competition, and deal with the highly volatile market dynamics. Today's financial institutions require a new type of IT solution that can adapt immediately, deliver extreme real-time security and availability, and ensure data integrity with full accountability at lower total cost-of-ownership (TCO) and faster deployment speeds.

The Sun™ Compute Cluster for High Performance Trading is a pre-integrated yet flexible platform for organizations to deploy pre-trade analytics, surveillance, and trading applications out of a single rack. Built on a foundation of design excellence and choice of industry-standard components consisting of servers, networking, interconnects, and software — all integrated at the factory — the Sun Compute Cluster for High Performance Trading is an easy-to-deploy solution that brings new levels of performance, efficiency, and scalability to the infrastructure at lightening-fast deployment speeds. The result: breakthrough economics plus the power to run multiple applications at faster speeds, reducing overall latency at a lower TCO.

Traditionally, the trading platforms at both the buy-side and sell-side firms have been architected as non-monolithic distributed application systems that are usually deployed in their data centers (see Figure 1). Trading firms are trying to stay ahead of the competition by continuously innovating to increase the transaction speeds of their trading platforms. Strong competitive pressures demand the lowest cost per transaction while the same competitive pressures require that systems provide ever more sophisticated trading

opportunities and a richer supply of information to the customer. Higher trading volumes and new regulatory requirements place heavy demands on both hardware and software while Algorithmic trading (machine-based trading) is driving firms to re-architect their trading systems for low latency and performance. As a result, firms are automating trade processes and adding throughput and processing power to their trading platforms, so next-generation trading architectures have to respond to the increased demands for speed, volume, and efficiency. Sun's pre-built and pre-configured blades-based cluster can help in not only reducing the TCO for the next-generation trading platform but also help in reducing the latencies across different trading components deployed in the blades cluster.

The Sun Compute Cluster for High Performance Trading offers the flexibility to choose between multiple configurations of storage (network attached or direct attached) based on the application workload and the latency requirements. Block storage can be provided to each node for low latency applications such as pricing and algorithmic trading. These applications require large numbers of I/Os per second

(IOPs) combined with low I/O response times. File-based NAS storage is provided as a shared resource for reference data and tick data repositories. These applications require large capacities of shared storage that is most easily accessed as files. By default, the cluster uses the Solaris™ 10 Operating System (OS) as the base OS, which includes leading Sun technologies such as Solaris Containers and DTrace — for low-latency virtualization/server consolidation and for observability, analysis, and performance tuning of home-grown and off-the-shelf trading applications.

Solution benefits

Open

Most open portfolio — avoid vendor lock-in and enjoy the benefits of an open, modular architecture with industry-standard independent I/O and open source software. With included open software, all the benefits of open source software — modifying or tuning the source code, or reaching out to a community for specific expertise and advice — are automatically available.

Built on open storage standards — Sun Open Storage combines open source software with industry-standard hardware, enabling you to reduce your reliance on high-priced systems and save up to 90% on storage costs.

Reliable

High quality, reduced risk — reduce installation issues by leveraging Sun's enterprise-class factory testing and real-world experience in cluster computing projects. As a result, you can concentrate on your core businesses while leaving the racking, stacking, and cabling tasks to the specialists at Sun's factory.

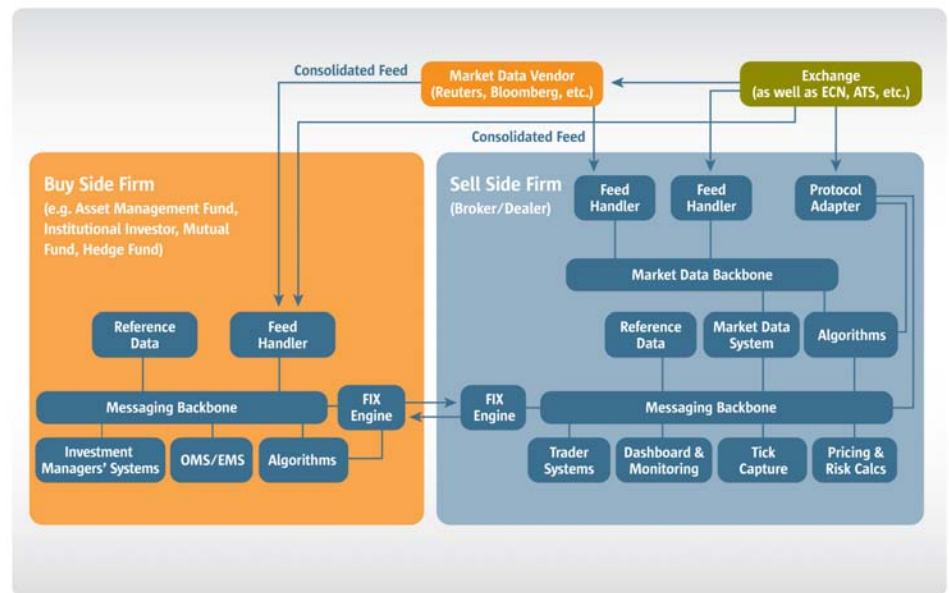


Figure 1. Trading Floor Architecture

Optimized utilization — aggregation of multiple servers, common power, cooling, and I/O improves efficiency and reliability while the modular hot-swappable form factor improves serviceability. Use the Sun xVM Server and Ops Center to easily manage the cluster.

Scalable

Scalable compute power — scaling from 1 to 8 racks and 30 to 240 nodes (blades) or 32-256 nodes with 1 RU rack mounts, the Sun Compute Cluster for High Performance Trading is designed to grow along with your needs.

Scalable architecture — open, modular architecture with industry-standard independent I/O, interfaces, off-the-shelf components and a flexible Sun Rack solution make the system easy to adapt and scale as needs change. Increase computational power as required. Even larger clusters, with potentially thousands

of nodes, can be created with Sun Constellation system by combining multiple racks with 48 blade servers per Sun Blade™ 6048 system rack for ultimate scalability and density.

Simple

Fast deployment — Sun Customer Ready program combines Sun and approved third-party products into complete systems through factory integration. The Sun Compute Cluster for High Performance Trading arrives ready to be switched on, accelerating time-to-productivity by reducing time-to-deployment by up to 90 percent.

Easy to manage — preloaded software tools from Sun make provisioning and administration even simpler. Sun's reliance on a simple open architecture, industry-standard open I/O, and open industry-standard management tools enables seamless integration into your existing network architecture, preventing any kind of proprietary vendor lock in.

Solution components

Hardware components

Server nodes options

Sun Blade 6000 family, the industry's most open, versatile enterprise blade platform delivering the fastest performance, ease of scalability, energy efficiency, and longevity. Up to 10 server modules per SB6000 chassis (up to a total of 30 for the rack) when data and management networks are installed.

Network switches

Data and management networks can be configured using GbE (1 GigE) and fast Ethernet switches. A variety of products from third-party vendors are available. Future options to include 10 GigE and IB.

Software components

Operating systems

Solaris 10 OS, Java™, or SUSE Linux Enterprise Server.

Systems management

Sun xVM Ops Center helps simplify discovery, monitoring, operating system provisioning, comprehensive updates and patch management, firmware updates, and hardware management from power up to production in cross-platform Linux and Solaris Operating System-based x86 and SPARC environments.

HPC tool pack (Optional)

Sun Grid Engine, Sun Studio, and Sun HPC Cluster Tools.

Storage components

Block storage

Direct attached storage provided by the Sun Blade 6000 Disk Module. These storage modules are plugged and managed just like any blade server in the Sun Blade 6000 chassis. Get up to

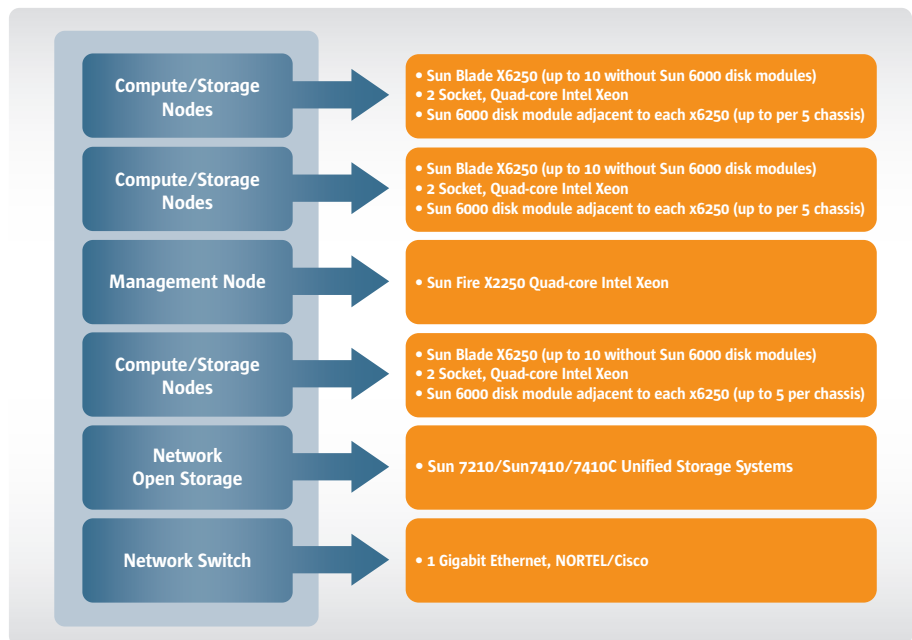


Figure 2. Sun Compute Cluster for High Performance Trading

1.75 TB of total block storage per node protected by either Raid 1 or 5. Drives are front accessible, hot swappable, and can be deployed quickly.

Each disk module is factory matched to the adjacent blade server, and there can be up to a total of 5 disk modules per chassis. Future enhancements include Solid State Drives for high performance, and SATA drives for greater capacity.

Network open storage

The Sun Storage 7000 Unified Storage System family of products provides an open, non-proprietary, affordable solution that utilizes SSD-enabled Hybrid Storage Pool technology, Storage Analytics, and Fault Management Architecture with the ZFS filesystem for purposes of providing highly reliable file-based high performance I/O services for applications utilizing the Sun Compute Cluster for High Performance Trading.

Partner ecosystem and performance results

Sun's partnerships with industry leaders and key trading ISVs enable us to bring to our customers the best performance for their trading needs. Our initial tests on the trading platform with ISVs like Reuters and Tibco have generated some of the best latency numbers for RMDS on a 1GbE standard network infrastructure in a blades environment with Solaris when compared to the numbers published till date by competition on a similar 1GbE infrastructure. This is true especially at market data rates above 500,000 messages per second and with the current market data volumes over 500,000 messages/sec, having a predictable latency at these rates are very important to our customers. Also, note that Solaris is the only platform today that is able to capture RMDS latency at 700,000 messages/sec with a end-to-end latency of less than 1.5 Millisecond in a 1 GbE blades environment.

For a more detailed discussion on benchmark results, please go to:
<http://www.sun.com/reuters>

Services and support

Configured at the factory — installed and implemented on-site:

Sun delivers your high performance trading solution through the Sun Customer Ready program, making life easier for your entire IT team. We simplify implementation, accelerate deployment, and reduce risk by configuring, installing, racking, cabling, testing, and integrating your system for you. Carried out in ISO 9000 and TL 9000 certified factories, your system will be shipped fully configured and ready to run.

Additionally, Prescribed Services are essential for your Sun Compute Cluster solution. These services provide a custom Delivery and Supportability Cookbook, Acceptance Test Plan and Procedure, and an Operational RunBook. Prescribed Services include Enterprise Installation Services for proactive planning — including a site audit, to get you ready for installation fast and effectively — and Sun Datacenter Express Onsite Implementation Service for project management of all elements of service delivery, including installation, integration, acceptance testing, and a transfer of information. For long-term satisfaction within your complete environment, upgrade to SunSpectrumSM hardware support and software service plan, and Sun Single Point of Contact Service for incident management with support contracts from multiple vendors.

For more information

Warranty, services, and support

For component warranty and support information, visit <http://www.sun.com/service/warranty/index.xml> and <http://www.sun.com/service/serviceplans/index.jsp>.

Sun Customer Ready program

Sun Customer Ready program combines Sun and approved third-party products into complete systems through factory integration, allowing customers to deploy solutions simply, safely, and swiftly.

To learn more, go to <http://www.sun.com/customerready>.

Learn More

For a more detailed discussion of the High Performance Trading cluster, visit <http://www.sun.com/servers/hpc/computecluster/index.jsp>.