

## Sun SPARC® Enterprise T5440 Server

An ideal platform for midsize to large SAP deployments

Today's enterprises are facing ever increasing challenges to the ability to deliver high-quality, high-performance services while keeping costs down. Workloads are accelerating rapidly, generating demand for more computing power, additional storage, and faster networks. Other critical areas can also strain operating efficiency and budgets, including maintaining service availability and uptime, meeting service level agreements (SLAs), and being able to ensure future growth and scalability.

### SAP deployments face similar challenges

Many businesses use SAP solutions to help sustain growth and innovation. A leading software provider, SAP offers a comprehensive range of solutions that power every aspect of business operations. Initially focused on enterprise resource planning (ERP), SAP also offers related applications such as supply chain management (SCM), customer relationship management (CRM), product lifecycle management (PLM), supply chain management (SCM), business intelligence (BI), and business objects (BO).

Sun SPARC Enterprise T5440 servers deliver exceptional throughput for SAP applications, facilitating the delivery of enterprise computing solutions with breakthrough performance at lower cost.

### Highlights

- Sun SPARC® Enterprise T5440 servers combine scalability and reliability with breakthrough performance, eco-efficiency, and cost-effectiveness in a radically compact footprint well-suited to SAP landscapes
- Sun's revolutionary chip multithreading technology helps to increase application performance
- Sun's UltraSPARC® T2 Plus processors deliver powerful features that redefine midrange computing
- Sun SPARC Enterprise T5440 servers leverage hardware and Solaris™ Operating System (OS) features to provide server and resource virtualization and support SAP landscape consolidation

These factors, along with datacenter space, power, cooling, and eco-efficiency requirements, can cause rapidly rising datacenter capital and operating costs and if left unaddressed can inhibit deployment of new services and limit the ability to compete successfully.

The answer for many organizations is to consolidate infrastructure onto systems that can run more services faster, in less space, and at lower cost in order to eliminate redundant systems, simplify administration, and increase resource utilization.

As datacenters add systems to SAP landscapes to accommodate new SAP applications and additional users, ad hoc growth can lead to server sprawl. Datacenters building out SAP deployments using multiple servers can see space, operations, licensing, maintenance, and administrative costs skyrocket, especially now that energy prices are out of control.

### Sun SPARC Enterprise T5440 servers tackle today's challenges

Sun SPARC Enterprise T5440 servers combine the scalability and reliability of traditional enterprise systems with breakthrough performance, eco-efficiency, and cost effectiveness in a 4 RU form factor that redefines midrange computing.



*Figure 1. Scalable Sun SPARC Enterprise T5440 servers offer extreme compute power in just 4 RU of space.*

### **Rule-changing chip multithreading technology**

Many Web and online transaction processing (OLTP) applications provide mission-critical business functions, so users must be able to count on timely performance. But simply throwing CPUs at the problem is not enough. Memory speeds are lagging behind processor speeds, keeping conventional single-threaded processors and applications waiting. A new approach lets multiple threads per processor core run in parallel, helping applications process large data sets and solve peak performance problems.

The revolutionary chip multithreading (CMT) technology in Sun's UltraSPARC T1 and UltraSPARC T2 processors enhances the utilization of processor and memory subsystems. Delivering significant processor performance gains generation to generation over a period of two and a half years, CMT technology changes the rules — outstripping Moore's Law and out-scaling systems from other vendors.

### **A superior platform for SAP deployments**

With next generation UltraSPARC T2 Plus processors, Sun SPARC Enterprise T5440 servers extend the benefits of CMT designs into multi-socket implementations. Ideal for modern IT architectures and server consolidation, server refresh, and SAP upgrade efforts, Sun SPARC Enterprise T5440 servers can help increase datacenter efficiency and speed application throughput.

### **An innovative server-on-a-chip design**

The UltraSPARC T2 Plus processor takes the CMT model to the next level, providing up to eight cores per processor with each core supporting up to eight threads via two independent pipelines per core. Each core also contains a floating point unit, resulting in additional power to accelerate simple and complex computations. Doubling the throughput of systems with previous generation processors without increasing clock speeds, Sun SPARC Enterprise T5440 servers deliver the horsepower to support compute-intensive applications like SAP.

The UltraSPARC T2 Plus also has on-chip, per-core cryptographic accelerators that enhance cryptographic performance and provide no-cost security. An eight lane on-chip PCI Express interface provides integrated I/O to move data in and out of the processor. On-chip I/O and networking capabilities significantly reduce data movement overhead compared to traditional systems, and are a good fit for high bandwidth secure network applications. With multiple cores, threads, I/O, and cryptographic acceleration integrated within each processor, the massively threaded server-on-a-chip (SoC) design greatly increases performance and reliability while it reduces power consumption, costs, and components.

### **Performance to drive SAP environments**

With power to address the most demanding datacenter challenges, Sun SPARC Enterprise T5440 servers are the industry's first quad-socket systems to support CMT. The chip multithreading technology at the heart of the UltraSPARC T2 Plus processor helps the server set a new bar for midrange server performance. Running up to four times faster than other server offerings at a fraction of the cost, Sun SPARC Enterprise T5440 servers can help augment the throughput of SAP environments. In addition to I/O and cryptographic performance enhancements, the built-in Gigabit Ethernet interfaces on Sun SPARC Enterprise T5440 server motherboards

can be used to accelerate the network performance of virtualized environments. This feature helps power faster networking to serve new network-intensive content.

### **Scalability that accommodates SAP growth**

The first symmetrical multiprocessing servers (SMP) to increase performance by scaling with threads rather than clock speed, Sun SPARC Enterprise T5440 servers are designed to facilitate scalability in multiple ways. Supporting up to four UltraSPARC T2 Plus processors, 512 GB of memory, and massive I/O bandwidth in just 4 RU, Sun SPARC Enterprise T5440 servers are ultra dense and deliver massive computing power.

The exceptional 512 GB memory capacity of Sun SPARC Enterprise T5440 servers is twice that of most other quad-socket servers. The eight lane on-chip PCI Express port provides extra headroom and facilitates the scaling of I/O throughput as processors are added to the system. With up to 10 GB/sec of raw I/O bandwidth, Sun SPARC Enterprise T5440 servers offer massive I/O performance and expandability. Utilizing an optional Sun I/O expansion unit increases the number of available PCI Express slots to 28, resulting in two and a half times more slots than an equivalent quad-socket server from other vendors.

### **An ideal platform for consolidating SAP landscapes**

A highly scalable hardware design coupled with virtualization technologies included in the Solaris 10 OS makes Sun SPARC Enterprise T5440 servers an excellent platform for consolidating hundreds of existing server loads. By using features such as open source, no cost Solaris Containers and Sun™ Logical Domains (LDoms), organizations can virtualize ample system resources to create multiple fine-grained execution environments. Containing different elements such as processors, virtualized networks, and I/O, these environments can be used to

host business-critical applications, multiple SAP instances, and several design and test environments on a single system.

#### Sun™ Logical Domains

Sun LDom technology is free and open source and can help save organizations up to \$10K per system. Providing fully isolated virtual machines, Sun LDom runs an independent operating system instance and contains virtualized CPU, memory, I/O, storage, console, and cryptographic devices. The complete isolation of logical domains makes it possible to deploy multiple operating systems simultaneously on a single server. Underlying Sun LDom is the SPARC hypervisor, a firmware layer that presents a stable, virtualized representation of the underlying hardware to the operating system hosted in each logical domain. This design facilitates context switching between multiple threads in a single core and makes logical domains possible.

Sun LDom is built on top of a hypervisor, resulting in parallelization and virtualization at every level — from the processor and hypervisor, to networking and the Solaris ZFS™ file system (Figure 2). The advanced Solaris ZFS file system provides storage virtualization, delivering virtually unlimited scalability and capacity, robust data integrity, and near-zero administration.

Each layer of the architecture is fully multithreaded, and the combination of Sun LDom and Solaris Containers allows applications to receive the exact resources needed. Up to 128 logical domains are supported on Sun SPARC Enterprise T5440 servers, providing a powerful consolidation platform with resources to sustain midsize to large SAP landscapes.

#### Solaris Containers

Providing virtualization at the operating system level, Solaris Containers can further isolate software applications and services using flexible, software-defined boundaries. Allowing the creation of many complete, isolated, secure execution environments within a single Solaris OS instance or within a logical domain, each Solaris Container can be managed independently, facilitating granular control and dynamic reallocation of system resources. Unused resources can be shifted among containers or reserved for critical workloads, contributing to high quality of service.

The software fault and security isolation features of Solaris Containers fence off applications within each container, preventing even a superuser process from viewing or affecting activity and prohibiting poorly-behaved applications from impacting other containers. Representing a breakthrough approach to virtualization and software partitioning, Sun SPARC Enterprise T5440 servers with Solaris Containers and Sun LDom technology can help improve system uptime and increase server utilization by dynamically controlling application and resource priorities.

These software advancements combined with Sun SPARC Enterprise T5440 server innovations can greatly reduce energy, space, and cooling demands and simplify server and application management.

#### Consolidation reduces SAP landscape costs

Organizations that consolidate onto Sun SPARC Enterprise T5440 servers can save on datacenter space, capital expenditures, and ongoing operating expenses, such as hardware service contracts and energy and cooling costs. In addition to eliminating server sprawl, server virtualization and consolidation strategies can also reduce the number of processors incurring software and operating system licensing fees. Unlike other vendor environments, individual Solaris OS instances running within Sun LDom can be licensed free of charge.

#### Safeguards to secure SAP environments

With exemplary security, Sun SPARC Enterprise T5440 servers can help protect valuable corporate data. Zero cost elements built into the system hardware, coupled with exceptional Solaris 10 OS security features help to ensure a secure environment. Ten industry standard, NSA-approved security

ciphers are available via the on-chip, integrated cryptographic accelerators of the UltraSPARC T2 Plus processor for end-to-end encryption with virtually no penalty in either performance or cost. Accelerated cryptography is supported through the Solaris Cryptographic Framework.

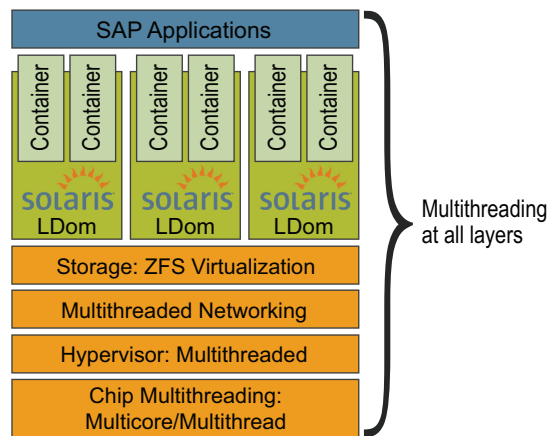


Figure 2. Sun LDom facilitates consolidation with virtualization of system resources.

Applications such as SAP CRM or SAP Enterprise Portal can help businesses to better manage relationships with employees, customers, and partners. Running the applications on Sun SPARC Enterprise T5440 servers can make it possible to bring more services online and create secure connections, both internally and outside the organization. Data can be stored securely by encrypting it before sending to storage systems or out over the network, helping to ensure privacy, high security levels, and business compliance. Lastly, domain minimization support included in Sun LDOMs helps to harden the Solaris OS and streamline installation for higher security and ease of maintenance.

### **Reliability, availability, and serviceability features deliver improved uptime**

Enterprises supporting critical business functions on SAP applications need to be able to rely on system availability without hesitation. Sun SPARC Enterprise T5440 servers deliver enterprise-class reliability, availability, and serviceability features to help maintain vital business services. Greater processor and system integration in Sun SPARC Enterprise T5440 servers lowers the number of parts, which can directly reduce service interruptions due to component failure. Processor RAS features such as extended ECC enhance system uptime by maintaining data integrity across on-chip memory — a unique capability previously only available in mainframes and other large enterprise systems. Redundant modules such as power supplies, fans, and disks allow hot-plugging and swapping of key components without service interruption.

The virtualization features that facilitate server consolidation also contribute to maintaining system uptime. Unlike many virtualization solutions that require a full system reset to reboot a control or service domain, Sun LDOMs technology supports reboots and resets of any single domain.

Moreover, virtual I/O interfaces can be connected and disconnected to domains without impacting other logical domains on the same platform. Administrators can even dynamically add and remove virtual CPUs on a logical domain while the operating system instance continues to execute, helping to minimize the need for planned downtime.

Solaris Predictive Self-Healing features result in significant reliability improvements. Automatically diagnosing, isolating, and recovering from many hardware and application faults, Solaris Predictive Self-Healing software helps business-critical applications and essential system services to continue uninterrupted in the event of software failures, major hardware component failures, and even software configuration problems. Sun SPARC Enterprise T5440 servers leverage the Predictive Self-Healing response agents in the Solaris 10 OS to enhance monitoring and management capabilities. Extending fault handling to logical domains, faulty CPUs, cores, or threads can be taken offline and kept offline until the CPU is replaced. The result is an even more powerful tool that can help limit the impact of component or application failures and maintain system and application uptime.

### **Configurations for every size SAP landscape**

Sun offers systems to suit small, medium, and large SAP implementations. Sun's SPARC Enterprise T5140 or Sun SPARC Enterprise T5240 servers are also powered by UltraSPARC T2 Plus processors. With features similar to the midrange Sun SPARC Enterprise T5440, these dual-socket, general-purpose servers are well-suited to datacenter consolidation in smaller SAP environments where high throughput is valued over extremely fast response time.

### **Learn More**

For more information, visit [sun.com](http://sun.com), [sun.com/sap](http://sun.com/sap), [sun.com/partners](http://sun.com/partners), [sun.com/coolthreads](http://sun.com/coolthreads), [sun.com/T5440](http://sun.com/T5440), or contact your local Sun sales representative or Sun partner.

Larger SAP installations can take advantage of the power and high performance of high-end Sun SPARC Enterprise M Series servers. This innovative line of servers frees organizations from the constraints of mainframes, offering massive scalability, consolidation, virtualization, and investment protection features. Ideal platforms for large-scale database, ERP, CRM, and business intelligence and data warehouse (BIDW) applications, the Sun SPARC Enterprise M Series server family delivers improved performance on commercial applications and high-performance computing (HPC) workloads while using less energy per core.

### **About Sun**

Leveraging people, expertise, and technology, Sun designs computing environments for SAP solutions that bring manageability and flexibility to the datacenter, security to the business, and integration within heterogeneous IT landscapes. Now, the latest Sun SPARC Enterprise T5440 servers incorporate technologies that can help transform the enterprise and prepare organizations for the datacenter of the future. With innovative approaches that offer creative solutions and help to overcome technological challenges, Sun's groundbreaking server platforms help organizations perform more work at less cost while delivering speed, scalability, reliability, security, and eco-efficiency in less space.