Sun Fire™ T1000 Server Overview

Sun Microsystems, Inc.
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Contents

Preface

This document describes the hardware and software features, options, and specifications for the Sun Fire™ T1000 server.

Server Documentation

You can view and print the following manuals from the Sun™ documentation web site at http://www.sun.com/documentation

Title	Description	Part Number
Sun Fire T1000 Server Site Planning Guide	Site planning information for the server	819-3749
Sun Fire T1000 Server Product Notes	Late-breaking information about the server. The latest notes are posted at: http://www.sun.com/documentation	819-3246
Sun Fire T1000 Server Getting Started Guide	Information about where to find documentation to get your system installed and running quickly	819-3244
Sun Fire T1000 Server Installation Guide	Detailed rackmounting, cabling, power-on, and configuration information	819-3247
Sun Fire T1000 Server Administration Guide	How to perform administrative tasks that are specific to this server	819-3249
Sun Fire T1000 Server Service Manual	How to run diagnostics to troubleshoot your server and how to remove and replace parts	819-3248
Advanced Lights Out Management (ALOM) CMT Guide	How to use the Advanced Lights Out Manager (ALOM) CMT software on this server	Varies, depending on the version
Sun Fire T1000 Server Safety and Compliance Guide	Provides safety and compliance information that is specific to this server	819-6674

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Sun Fire T1000 Server Overview, part number 819-3245-12

Server Features

This chapter describes the features of the server.

Server Features

The Sun Fire™ T1000 server is a scalable and reliable high-performance, entry-level server, offering the following characteristics:

- Space efficient, rack-optimized 1U form factor for horizontally scaled environments.
- Chip multithreading technology (CMT) in the UltraSPARC® T1 processor with CoolThreads™ technology offering six or eight cores, with four threads per core for improved throughput and reduced power consumption.
- Four on-board Ethernet ports providing efficient integration and connectivity.
- Investment protection with SPARC® V9 binary application compatibility and the Solaris™ 10 Operating System. The Solaris 10 OS also provides features such as Solaris Predictive Self-Healing, Solaris Dynamic Tracing, and support across UltraSPARC platforms.

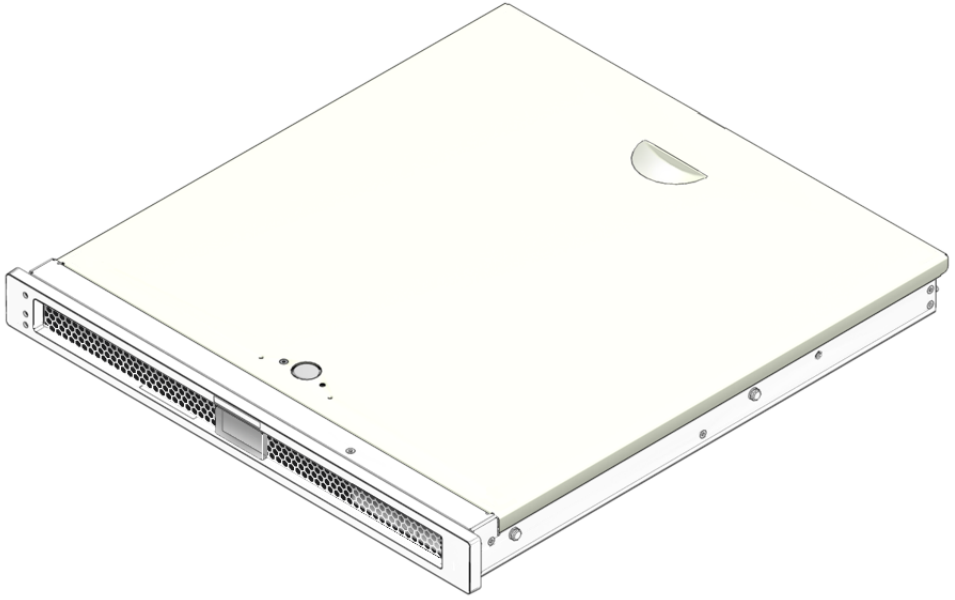

FIGURE 1 Sun Fire T1000 Server

Feature Specifications at a Glance

TABLE 1 Feature Specifications at a Glance

Feature	Description
Processor	1 UltraSPARC T1 multicore processor (6 or 8 cores)
Memory	8 slots that can be populated with one of the following types of DDR-2, 400 MHz DIMMS with ECC: • 512 MB (4 GB maximum) • 1 GB (8 GB maximum) • 2 GB (16 GB maximum) • 4 GB (32 GB maximum)
Ethernet ports	4 ports, 10/100/1000 Mb autonegotiating
Internal hard drives	2 SAS 73GB 2.5-inch form factor hard drives or 1 SATA 80 GB or higher capacity, 3.5-inch form factor hard drive
Cooling	4 system fans and 1 fan in the power supply unit
PCI interface*	1 PCI Express (PCI-E) expansion slot for low-profile cards (supports x1, x4, and x8 width cards)
Power	1 300-watt power supply unit (PSU)
Remote management	System controller with a serial and 10/100 Mb Ethernet port for access to the ALOM CMT remote management interface.
Firmware	OpenBoot™ PROM establishing settings and for power-on self-test (POST) support ALOM CMT for remote management administration
Cryptography	Hardware-assisted cyptographic acceleration
Operating system	Solaris 10 Operating System preinstalled on disk 0 (if a hard drive is purchased with the system). Refer to the *Sun Fire T1000 Server Product Notes* for information on the supported Solaris OS versions and required patches.
Other software	Java Enterprise System with a 90-day trial licence
Other	Some models of this server comply with the Restriction of Hazardous Substances (RoHS) directive 2002/95/EC.H.

* PCI Express specifications described in this table list the physical requirements for PCI cards. Additional support capabilities must also be provided (such as device drivers) for a PCI card to function in the server. Refer to the specifications and documentation for a given PCI card to determine if the required drivers are provided that enable the card to function in this server.

Chip-Multithreaded Multicore Processor and Memory Technology

The UltraSPARC T1 multicore processor is the basis of the Sun Fire T1000 server. The UltraSPARC T1 processor is based on chip multithreading (CMT) technology that is optimized for highly threaded transactional processing. The processor improves throughput while using less power and dissipating less heat than conventional processor designs.

Depending on the model purchased, the processor has six or eight UltraSPARC cores. Each core equates to a 64-bit execution pipeline capable of running four threads. The result is that the 8-core processor handles up to 32 active threads concurrently.

Additional processor components (FIGURE 2), such as L1 cache, L2 cache, memory access crossbar, DDR2 memory controllers, and a JBus I/O interface have been carefully tuned for optimal performance.

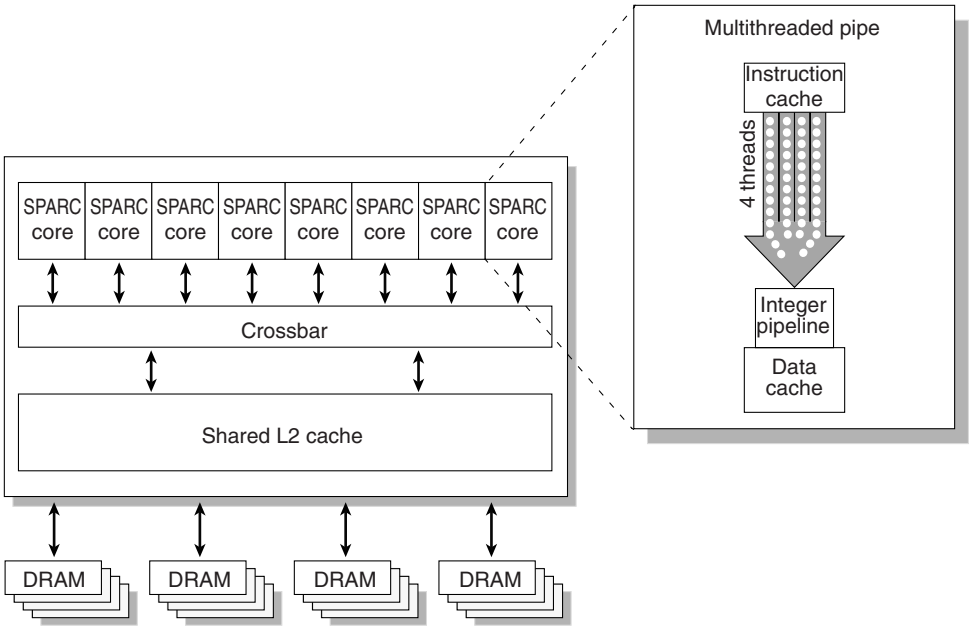

FIGURE 2 UltraSPARC T1 Multicore Processor Block Diagram

Performance Enhancements

The Sun Fire T1000 server introduces several new technologies with its sun4v architecture and multicore multithreaded UltraSPARC T1 multicore processor.

Some of these enhancements are:

- Large page optimization
- Reduction on translation lookaside buffer (TLB) misses
- Optimized block copy

Preinstalled Solaris Operating System

The Sun Fire T1000 server is preinstalled with the Solaris 10 Operating System (Solaris OS), and offers the following Solaris OS features:

- Stability, high performance, scalability, and precision of a mature 64-bit operating system.
- Support for over 12,000 leading technical and business applications.
- Solaris Containers – Isolate software applications and services using flexible, software-defined boundaries.
- DTrace – A comprehensive dynamic tracing framework for tuning applications and troubleshooting systemic problems in real time.
- Predictive Self-Healing – Capability that automatically diagnoses, isolates, and recovers from many hardware and application faults.
- Security – Advanced security features designed to protect the enterprise at multiple levels.
- Network Performance – Completely rewritten TCP/IP stack dramatically improves the performance and scalability of your networked services.

If you prefer to install the Solaris OS rather than use the preinstalled Solaris OS, you can do so. The Sun Fire T1000 server uses the Solaris 10 OS. For specific supported Solaris releases, refer to the *Sun Fire T1000 Server Product Notes*.

Preloaded Java Enterprise System Software

The server is preinstalled with Java Enterprise System software and includes a free 90-day evaluation license for the following Java Enterprise System software applications:

- Access Manager – A security foundation that helps manage secure access to an enterprises' Web applications by offering single sign-on (SSO) as well as enabling federation across trusted networks.
- Application Server – Provides a Java 2 Platform, Enterprise Edition (J2EE™ platform) 1.4 compatible platform for developing and delivering server-side Java applications and web services.
- Calendar Server – A web-based tool that facilitates team collaboration by enabling users to manage and coordinate appointments, events, tasks, and resources.
- Cluster software – Delivers high availability to enterprise system applications.
- Directory Server – User-management infrastructure for enterprises that manage high volumes of user information by providing a centralized repository for storing and managing user profiles and access privileges, as well as application and network resource information.
- Directory Proxy Server – Provides secure firewall-like services for the Directory Server.
- Instant Messaging – A standards-based, real-time communication and collaboration application.
- Message Queue – An enterprise-level message server using a standards-based (JMS) messaging solution.
- Messaging Server – A high-performance, highly secure messaging platform that provides security features that help ensure the integrity of communications.
- Portal Server – Provides portal services that identify users through centralized identity services using roles, and policies.
- Web Server – A secure, reliable, easy-to-use web server designed for medium and large business applications.

To gain the benefits of the Java Enterprise System, you can buy a subscription license for a Java Enterprise System Suite, or a combination of Java System Suites.

Note – The specific Java Enterprise System software applications vary depending on the version of Java Enterprise System software installed on the server.

Hardware-Assisted Cryptography

The UltraSPARC T1 multicore processor provides hardware-assisted acceleration of RSA and DSA cryptographic operations. The Solaris 10 Operating System provides the multithreaded device driver (`ncp` device driver) that supports the hardware-assisted cryptography.

Remote Manageability With ALOM CMT

The Advanced Lights Out Manager (ALOM CMT) feature is a system controller that enables you to remotely manage and administer the Sun Fire T1000 server.

The ALOM CMT software is preinstalled as firmware, and therefore, ALOM CMT initializes as soon as you apply power to the system. You can customize ALOM CMT to work with your particular installation.

ALOM CMT enables you to monitor and control your server over a network, or by using the dedicated serial port. ALOM CMT provides a command-line interface that you can use to remotely administer geographically distributed or physically inaccessible machines. In addition, ALOM CMT enables you to run diagnostics (such as POST) remotely that would otherwise require physical proximity to the server's serial port.

You can configure ALOM CMT to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ALOM CMT. The ALOM CMT circuitry runs independently of the server, using the server's standby power. Therefore, ALOM CMT firmware and software continue to function when the server operating system goes offline or when the server is powered off. ALOM CMT monitors the following server components:

- CPU temperature conditions
- Enclosure thermal conditions
- Fan speed and status
- Power supply status
- Voltage conditions

For information about configuring and using the ALOM system controller, refer to the *Advanced Lights Out Management (ALOM) CMT guide*.

System Reliability, Availability, and Serviceability

Reliability, availability, and serviceability (RAS) are aspects of a system's design that affect its ability to operate continuously and to minimize the time necessary to service the system. Reliability refers to a system's ability to operate continuously without failures and to maintain data integrity. System availability refers to the ability of a system to recover to an operational state after a failure, with minimal impact. Serviceability relates to the time it takes to restore a system to service following a system failure. Together, reliability, availability, and serviceability features provide for near continuous system operation.

To deliver high levels of reliability, availability, and serviceability, the Sun Fire T1000 server offers the following features:

- Environmental monitoring
- Error detection and correction for improved data integrity
- Easy access for most component replacements
- Support for hard drive mirroring (RAID 1) on redundant SAS hard drive configurations

For more information about using RAS features, refer to the *Sun Fire T1000 Server Administration Guide*.

Environmental Monitoring

The Sun Fire T1000 server features an environmental monitoring subsystem designed to protect the server and its components against:

- Extreme temperatures
- Lack of adequate airflow through the system
- Power supply failures
- Hardware faults

Temperature sensors are located throughout the system to monitor the ambient temperature of the system and internal components. The software and hardware ensure that the temperatures within the enclosure do not exceed predetermined safe operation ranges. If the temperature observed by a sensor falls below a low-temperature threshold or rises above a high-temperature threshold, the monitoring subsystem software lights the amber Service Required LEDs on the front and rear panel. If the temperature condition persists and reaches a critical threshold, the system initiates a graceful system shutdown. In the event of a failure of the ALOM system controller, backup sensors are used to protect the system from serious damage, by initiating a forced hardware shutdown.

All error and warning messages are sent to the system controller (sc), system console, and logged in the ALOM CMT console log file. Service Required LEDs remain lit after an automatic system shutdown to aid in problem diagnosis.

The power subsystem is monitored in a similar fashion by monitoring power supplies and reporting any fault in the front and rear panel LEDs.

If a power supply problem is detected, an error message is sent to the SC system console and logged in the ALOM CMT console log file. Additionally, LEDs located on each power supply light to indicate failures. The system Service Required LED lights to indicate a system fault.

Error Correction and Parity Checking

The UltraSPARC T1 multicore processor provides parity protection on its internal cache memories, including tag parity and data parity on the D-cache and I-cache. The internal 3MB L2 cache has parity protection on the tags, and ECC protection on the data.

Advanced ECC, also called *chipkill*, corrects up to 4-bits in error on nibble boundaries as long as they are all in the same DRAM. If a DRAM fails, the DIMM continues to function.

Fault Management and Predictive Self Healing

The server features the latest fault management technologies based on a new architecture for building and deploying systems and services capable of *Predictive Self-Healing*. Self-healing technology enables systems to accurately predict component failures and mitigate many serious problems before they actually occur. This technology is incorporated into both the hardware and software of the server.

At the heart of the Predictive Self-Healing capabilities is the Solaris Fault Manager, a new service that receives data relating to hardware and software errors, and automatically and silently diagnoses the underlying problem. Once a problem is diagnosed, a set of agents automatically logs the event, and if necessary, takes the faulty component offline. By automatically diagnosing problems, business-critical applications and essential system services can continue uninterrupted in the event of software failures, or major hardware component failures.

Rackmountable Enclosure

The server uses a space-saving 1U-high rackmountable enclosure that can be installed into a variety of industry standard racks.

Chassis Identification

The following figures show the physical characteristics of the Sun Fire T1000 server.

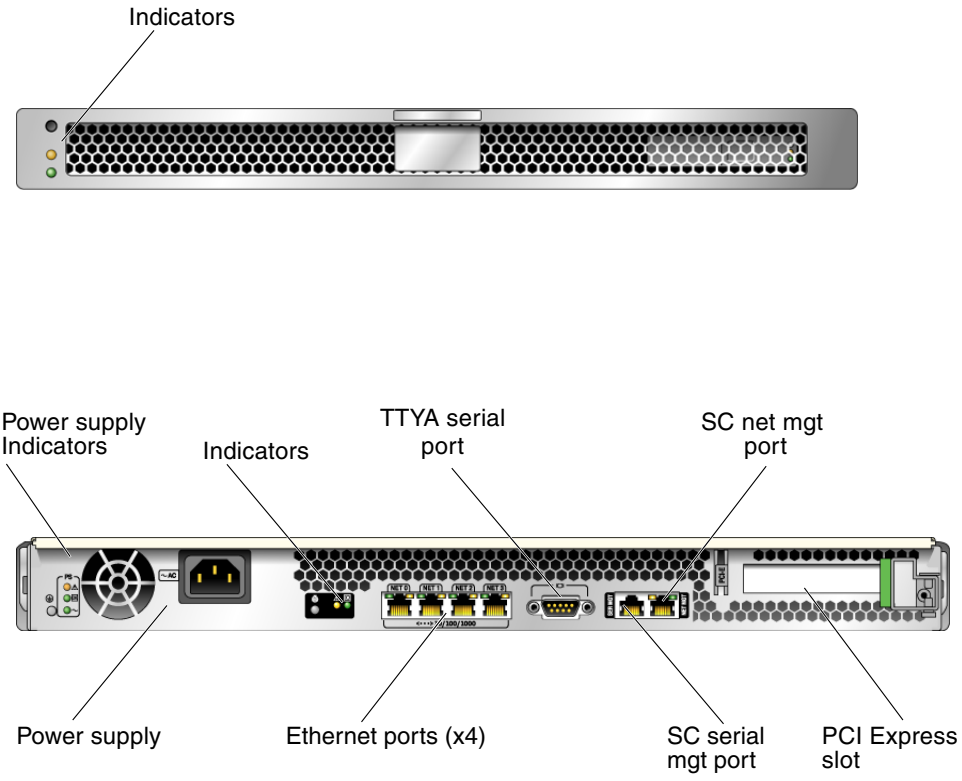

FIGURE 3 Sun Fire T1000 Server Front and Rear Panels