SPARC M7-8 Server

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SPARC SERVERS

Oracle's SPARC M7 servers are the world's most advanced high-end systems for enterprise workloads, with unique capabilities for information security, database and Java acceleration. Breakthrough Software in Silicon technology in Oracle's new SPARC processor provides full speed encryption, plus detection and prevention of attacks to critical data in memory. It also enables real time analytics to be performed on OLTP databases by accelerating Oracle Database In-Memory queries in Oracle Database 12*c*. The combination of the world's highest performance with breakthrough Software in Silicon features is the foundation to building the best and most secure mission critical clouds.

Product Overview

Oracle's SPARC M7-8 server enable organizations to respond to IT demands with extreme security and performance, at a lower cost compared to alternatives. It is ideal for a wide range of enterprise-class workloads, including database, applications, Java, and middleware, especially in a cloud environment. The system is based on the SPARC M7 processor, the first to use a revolutionary technology from Oracle referred to as Software in Silicon.

Software in Silicon technology is a breakthrough in microprocessor and server design, enabling databases and applications to run faster and with unprecedented security and reliability. The Silicon Secured Memory feature of Oracle's SPARC M7 processor provides the capability of detecting and preventing invalid operations to application data, through hardware monitoring of software access to memory. This can stop malware from exploiting software vulnerabilities, such as buffer overflows. The hardware approach of Silicon Secured Memory is much faster than traditional software-based detection tools, meaning that security checks can be done in production without significant impact to performance. In addition, each processor core contains the fastest cryptographic acceleration in the industry, allowing IT organizations to deliver end-to-end data encryption and secure transactions with near-zero performance impact. In summary: you can easily activate data protection and encryption security, by default, without additional hardware investment.

In-memory Query Acceleration is another unique Software in Silicon feature in SPARC M7-based servers. It is implemented through accelerators specifically designed into the chip's silicon to handle SQL primitives, such as those used by Oracle Database In-Memory in Oracle Database 12*c*. The accelerators operate on data at full memory speeds, taking advantage of the very high memory bandwidth of the processor. This produces extreme acceleration of in-memory queries while processor cores are freed up to do other useful

KEY BENEFITS

- Unique protection of application data from memory attacks or exploits of software vulnerabilities

- End-to-end encryption of data with near-zero performance impact

- Easy compliance management of application environments throughout their lifecycles, ensuring security of cloud infrastructure

- Extreme acceleration of Oracle Database In-Memory queries,

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especially for compressed databases

- Ability to run analytics on OLTP databases, enabling real-time insight on transactional data

- Optimized for Java applications, middleware software, database, and enterprise applications

- Near-zero overhead virtualization for deploying more than 100 virtual machines per processor, lowering the cost per virtual machine

- Engineered for high availability and serviceability, for extreme uptime demands

KEY FEATURES

- Based on the advanced SPARC M7 processor, with first-ever Software in Silicon technology for security, performance, and efficiency

- 2 times faster performance per processor compared to current competitive processors, or previous-generation SPARC processors[1]

- Scalability within the same family of servers from 1 to 16 sockets with complete compatibility for applications and management

- Runs the Oracle Solaris 11 operating system for secure and compliant application deployment through single-step patching and immutable zones

- Agile and open cloud management with OpenStack, and powerful application-driven software-defined networking

- Built-in, no-cost virtualization technology with Oracle Solaris Zones and Oracle VM Server for SPARC

- Guaranteed binary compatibility and support for legacy applications that run under Oracle Solaris 10, 9, and 8

- One or two physical domains for electrically isolated partitioning

- Designed for the highest levels of reliability, availability, and serviceability (RAS) and uptime

work. In addition, the ability of these accelerators to handle compressed data on the fly means that larger databases can be kept in memory, or that less server memory needs to be configured for a given database size. Consider the result: you can run fast in-memory analytics on your database, using much less memory than the size of your data, without significantly increasing server utilization rates or affecting your OLTP operations.

The record-breaking performance of the servers based on SPARC M7 processors comes from their 32 cores, each handling up to 8 threads using unique dynamic threading technology. The processor can dynamically adapt to provide extreme single-thread performance, or enable massive throughput by running up to 256 threads. The processor cores are designed to accelerate Java workloads, especially Java 8 applications and beyond, and enterprise applications. Using this efficient design, together with Oracle Solaris virtualization technology with near-zero overhead, a much larger number of virtual machines can be supported on Oracle's SPARC servers compared with Intel Xeon-based systems, resulting in a significant decrease in the cost per virtual machine.

The technology breakthrough in SPARC servers is enabled by the Oracle Solaris operating system. Oracle Solaris 11 is a secure, integrated, and open platform engineered for large-scale enterprise cloud environments, with unique optimization for Oracle Database, middleware, and application deployments. Security can be easily set up and enabled by default, while single-step patching and immutable zones allow compliance to be maintained with simplicity. You can create complete application software stacks, lock them securely, deploy them in a cloud, and update them in a single step, all while maintaining compliance and easily generating audit reports. Oracle Solaris 11 combines OpenStack with powerful application-driven software-defined networking for agile deployment of cloud infrastructure. The near-linear performance scalability of the SPARC M7-8 server can be achieved only by the multiprocessing technology in Oracle Solaris 11.

Built-in virtualization capabilities in Oracle's SPARC servers include both Oracle Solaris Zones and Oracle VM Server for SPARC. These allow enterprise workloads to be run within a virtual environment with near-zero performance impact. You can virtualize and consolidate many servers onto one, reducing the physical footprint of the data center as well as lowering the costs of operation, power, and cooling. Oracle Solaris Zones technology provides the capability to run legacy applications that require earlier versions of Oracle Solaris.

The SPARC M7-8 server offers one or two physical domains. This feature allows the flexibility to isolate applications or workloads within a single managed system. When using two physical domains, the server offers up to 4 processors per domain. When using a single physical domain with up to 8 processors, the SPARC M7-8 server allows for high scalability in a large memory footprint.

Other advanced capabilities of the SPARC M7-8 server is large memory capacity, higher bandwidth, and minimal latency, which are achieved through four enhanced memory controllers per socket, faster and reduced power DDR4 memory, and prefetch acceleration techniques. The I/O subsystem supports low-profile PCIe 3.0 adapters and industry-standard NVMe flash technology to provide high-capacity storage with minimal latency.

All Oracle servers ship with comprehensive server management tools at no additional cost. Oracle Integrated Lights Out Manager (Oracle ILOM) utilizes industry-standard protocols to provide secure and comprehensive local and remote management, including power management and monitoring, fault detection, and notification. Oracle Premier Support

customers have access to My Oracle Support and multiserver management tools in Oracle Enterprise Manager Ops Center, a system management tool that, in conjunction with Oracle Enterprise Manager, coordinates servers, storage, and networking for a complete cloud infrastructure as a service (IaaS). Oracle Enterprise Manager Ops Center also features an automated service request capability, whereby potential issues are detected and reported to Oracle's support center without user intervention, assuring the maximum service levels and simplified support.

SPARC M7-8 Server Specifications

ARCHITECTURE

Processor

- *Thirty-two core, 4.13 GHz SPARC M7 processor*
- *Two hundred fifty-six threads per processor (eight threads per core)*
- *Thirty-two floating-point units per processor (one per core)*
- *Thirty-two on-chip encryption instruction accelerators with direct nonprivileged support for 15 industry-standard cryptographic algorithms: AES, Camellia, CRC32c, DES, 3DES, DH, DSA, ECC, MD5, RSA, SHA-1, SHA-224, SHA-256, SHA-384, SHA-512 (one per core)*
- *Eight accelerators per processor, each supporting four concurrent query operations with decompression*
- *One random number generator (one per processor)*

Cache Per Processor

- *Level 1: 16 KB instruction and 16 KB data per core*
- *Level 2: 256 KB L2 I$ per four cores, 256 KB L2 D$ per core pair*
- *Level 3: 64 MB L3$ on chip*

System Configurations

- *Two to eight processors per system*
- *Sixteen dual inline memory modules (DIMM) slots per processor supporting half and fully populated memory configurations using either 16, 32 or 64 GB DDR4 DIMMs*
- *Eight TB maximum memory per system using 64 GB DIMMs*
- *Can be ordered with either one or two physical domains; this option is set at the factory, and cannot be changed on-site*

System Architecture

- *SPARC V9 architecture, ECC protected*

STANDARD/INTEGRATION INTERFACES

- *Up to 24 low-profile PCIe 3.0 (x16) slots, each accessed via a hot-plug carrier*

MASS STORAGE AND MEDIA

External storage: Oracle offers a complete line of best-in-class, innovative storage, hardware, and software solutions, along with renowned world-class service and support. For more information, please refer to oracle.com/storage.

POWER SUPPLIES

- *6x 3,000 W hot-swappable AC 3,000 W power supplies with N+N redundancy*
- *Nominal AC operating voltage range 200 to 240 VAC*
- *For systems that are factory configured in a rack there are two PDU options with two PDU's each:*
  - *Low Voltage (3x 115/200 – 127/220 VAC 3 phase, 50/60 Hz, max. 24A per phase)*
  - *High Voltage (3x 220/380 -240/415 VAC 3 phase, 50/60 Hz, max. 16A per phase)*

KEY RAS FEATURES

- *Hardware physical partitions with electrical isolation when ordered with two physical domains*
- *Hot-plug PCIe card carriers*

- *Redundant, hot-swappable power supplies and fans*
- *Environmental monitoring*
- *Extended ECC, error correction, and parity checking*
- *DIMM sparing enabled with fully populated memory slots, increasing system reliability and uptime*
- *Easy component replacement*
- *Fault Management Architecture including Predictive Self Healing — both are features of Oracle Solaris*
- *Redundant system clock synthesizers on each CPU-memory-I/O board*
- *Redundant hot-swappable service processors with automatic failover*
- *Dedicated PCIe root complexes per every slot for isolated I/O virtualization*
- *Auto frame retry, auto link retrain, and single-lane failover*

SOFTWARE

Operating System

Oracle recommends Oracle Solaris 11.3 or later for enhanced performance and functionality, including features enabled by Software in Silicon technology

- *Control domain: Oracle Solaris 11.3 or later*
- *The following versions are supported within guest domains:*
  - *Oracle Solaris 11.3 or later*
  - *Oracle Solaris 10 1/13**
  - *Oracle Solaris 10 8/11**
  - *Oracle Solaris 10 9/10**
  - ** Plus required patches*

Applications certified for Oracle Solaris 9 or 8 only may run in an Oracle Solaris 9 or 8 branded zone running within an Oracle Solaris 10 guest domain.

Software Included

- *Oracle Solaris 11.3 or later, which includes Oracle VM Server for SPARC*
- *Oracle Solaris ZFS (default file system)*

Virtualization

Built-in, no-cost Oracle VM Server for SPARC provides the flexibility and power of running multiple logical domains in a single server. Multiple Oracle Solaris Zones may be run within a single Oracle VM Server for SPARC logical domain.

ENVIRONMENT

Operating temperature

- *5˚ to 35˚ C (41˚ to 95˚ F) at 0 to 500 m (0 to 1,640 ft.)*
- *5˚ to 33˚ C (41˚ to 93.2˚ F) at 501 to 1,000 m (1,664 to 3,281 ft.)*
- *5˚ to 31˚C (41˚ to 87.7˚ F) at 1,001 to 1,500 m (3,284 ft to 4,921 ft.)*
- *5° C to 29° C (41° F to 84° F) up to 3,000 m (10,000 ft.)*
- *Except in China markets where regulations might limit installations to a maximum altitude of 2 km (6,560 ft.)*

Nonoperating temperature: 0° C to 50° C (32° F to 122° F), maximum altitude 12,000 m (40,000 ft.)

Operating relative humidity: 20% to 80%, 27˚ C (81˚ F) max. wet bulb temperature, noncondensing
 Note: Humidity ramp rate must not exceed 30% per hour.

Nonoperating relative humidity: up to 85%, 40˚ C (104˚ F) max. wet bulb temperature, noncondensing
Max. dew point: 28˚ C (82˚ F). Note: Humidity ramp rate must not exceed 20% per hour.

Operating altitude: 0 m to 3,000 m (10,000 ft.) — except in China markets where regulations may limit installations to a maximum altitude of 2 km (6,560 ft.)

Nonoperating altitude: up to 12,000 m (40,000 ft.)

Acoustic noise (idle/max. power)

- *Bystander – 76.7/85.7*
- *Sound power- 85.3/93.1*

Heat dissipation and airflow requirements

- *35,500 BTUs/hr. (37,455 kJ/hur)*
- *Maximum: 860 CFM; typical: 590 CFM*

REGULATIONS (MEETS OR EXCEEDS THE FOLLOWING REQUIREMENTS)

Safety: UL/CSA 60950-1, EN 60950-1, IEC 60950-1 CB Scheme with all country differences

EMC:

- *Emissions: FCC 47 CFR 15, ICES-003, EN55022, EN61000-3-11, EN61000-3-12*
- *Immunity: EN 55024*

Certifications: North America Safety (NRTL), European Union (EU), International CB Scheme, HSE Exemption (India), BSMI (Taiwan), RCM (Australia), MSIP (Korea), VCCI (Japan)

European Union directives: Restriction of Hazardous Substances (RoHS) Directive 2014/35/EU Low Voltage Directive, 2014/30/EU EMC Directive, 2011/65/EU RoHS Directive, 2012/19/EU WEEE Directive

All standards and certifications referenced are to the latest official version. For additional detail, please contact your sales representative.

Other country regulations/certifications may apply.

DIMENSIONS AND WEIGHT

- *Height racked: 78.66 in. (1,998 mm); without rack: 17.2 in. (438 mm)*
- *Width racked: 23.62 in. (600 mm); without rack: 19.0 in. (483 m)*
- *Depth racked:47.24 in. (1,200 mm); without rack: 32.0 in. (813 mm)*
- *Maximum weight racked: approx. 824 lb. (374 kg); without rack: 405 lb. (184 kg)*

Warranty

The SPARC M7-8 server come with a one-year warranty. Visit oracle.com/us/support/policies/ for more information about Oracle's hardware warranty.

Complete Support

With Oracle Premier Support, you'll get the services you need to maximize the return on your investment in Oracle's SPARC server. Complete system support includes 24/7 hardware service, expert technical support, proactive tools, and updates to Oracle Solaris, Oracle VM, and integrated software (such as firmware) — all for a single price. Learn more at oracle.com/support.

CONTACT US

For more information about the SPARC M7-8 servers, visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.

[1] For Java and database workloads, at product release time. See the product benchmark pages.

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