

# SPARC M8-8 Server



Oracle's SPARC M8-based servers are the world's most advanced systems for enterprise workloads. Coengineering of hardware and software results in significantly faster performance for databases and Java applications compared with competitors' systems, leading to more efficient software utilization. Oracle's breakthrough second-generation Software in Silicon technology in the SPARC M8 processor accelerates Oracle Database In-Memory queries in Oracle Database 12c, and enables real-time analytics to be performed on OLTP databases and Java streams applications. Security in Silicon provides full-speed wide-key encryption, plus detection and prevention of attacks to application data in memory. The combination of the world's highest performance with unique Software in Silicon features is the foundation for building the best and most secure mission-critical cloud infrastructure.



## KEY BENEFITS

- Up to 2x faster performance than competitor systems for Java software, databases, and enterprise applications<sup>1</sup>
- Extreme acceleration of Oracle Database In-Memory queries, especially for compressed databases

## Product Overview

Oracle's SPARC M8-8 server is an eight-processor system that enables 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 databases, applications, Java, and middleware, especially in a cloud environment. This system is based on the SPARC M8 processor, using the revolutionary Software in Silicon technology from Oracle.

Oracle's SPARC servers are coengineered with Oracle software for the best performance, efficiency, and security when running enterprise applications, OLTP, and analytics. With up to 2x better performance than competitor products, Oracle's SPARC servers allow IT organizations to make the most of their investment in Java applications and database software.

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. Now in its second generation, this innovative Software in Silicon design includes Data Analytics Accelerator (DAX) engines designed directly into the SPARC M8 processor silicon to handle SQL primitives, such as those used by Oracle Database In-Memory in Oracle Database 12c. The DAX units can also be leveraged by Java applications operating on streams of data through the use of open APIs. The accelerators operate on data at full memory speeds, taking advantage of the very high

- Ability to accelerate analytics on OLTP databases and Java applications, enabling real-time insight on transactional data
- Unique protection of application data from memory attacks or exploits of software
- End-to-end encryption of data with near-zero performance impact
- Easy compliance management of application environments throughout their lifecycles, ensuring the security of cloud infrastructure
- Near-zero overhead virtualization for deploying more than 100 virtual machines per processor, lowering the cost per virtual machine

#### KEY FEATURES

- Based on the advanced SPARC M8 processor, with proven second-generation Software in Silicon technology for efficiency, performance, and security
- Scalability within the same family of servers from 32 to 256 cores with complete compatibility for applications and management
- Oracle Solaris 11 operating system for secure and compliant application deployment through single-step patching and immutable zones
- 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
- Up to 76 TB of accelerated storage utilizing industry-standard NVMe technology in order to satisfy the most demanding I/O requirements
- The highest levels of reliability, availability, and serviceability (RAS) in a compact, energy-efficient footprint

memory bandwidth of the processor. This produces extreme acceleration of in-memory queries and analytics operations while processor cores are freed up to do other useful work. In addition, the ability of the DAX units 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. Lastly, the SPARC M8 processor introduces Oracle Numbers units, which greatly accelerate Oracle Database operations involving floating point data. 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 Silicon Secured Memory feature of the SPARC M8 processor provides the capability of detecting and preventing invalid operations on 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.

Software in Silicon features can be easily integrated with existing applications, during development, testing, and production. Developers can use and validate Software in Silicon features by using Oracle's Software in Silicon open APIs, which are supported by a community of collaboration among developers, engineers, and experts offering resources to help you understand and integrate this revolutionary open technology.

The record-breaking performance of the servers based on the SPARC M8 processor comes from its 32 cores, each of which handles up to 8 threads using unique dynamic threading technology. The processor can dynamically adapt to provide extreme single-thread performance, or it can enable massive throughput by running up to 256 threads. The processor cores are designed to accelerate Java workloads, especially Java 8 applications or later, as well as database operations. 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. This results 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 unique management options with powerful application-driven software-defined networking for agile deployment of cloud infrastructure.

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 M8-8 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 four processors per domain. When using a single physical domain with up to eight processors, the SPARC M8-8 server allows for high scalability in a large memory footprint.

Other advanced capabilities of the SPARC M8-8 server are 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, ensuring the maximum service levels and simplified support.

## SPARC M8-8 Server Specifications

### ARCHITECTURE

#### Processor

- *Thirty-two core, 5.0 GHz SPARC M8 processor*
- *Up to 256 threads per processor (up to 8 threads per core)*
- *Eight Data Analytics Accelerator units per processor, each supporting four concurrent in-memory analytics engines with decompression*
- *Thirty-two on-chip encryption instruction accelerators (one per core) with direct non-privileged support for 16 industry-standard cryptographic algorithms: AES, Camellia, CRC32c, DES, 3DES, DH, DSA, ECC, MD5, RSA, SHA-1, SHA-224, SHA-256, SHA-3, SHA-384, and SHA-512*
- *Thirty-two floating-point units and thirty-two Oracle Numbers units per processor (one per core)*
- *One random number generator (one per processor)*

#### Cache per Processor

- *Level 1: 32 KB instruction and 16 KB data per core*
- *Level 2: 256 KB L2 I\$ per four cores, 128 KB L2 D\$ per core*

- Level 3: 64 MB L3\$ on chip

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#### System Configuration

- Two to eight processors per system
- Sixteen dual inline memory modules (DIMM) slots per processor supporting half and fully populated memory configurations using either 32 or 64 GB DDR4 DIMMs
- 8 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 onsite

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#### System Architecture

- SPARC V9 architecture, ECC protected

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#### STANDARD/INTEGRATION INTERFACES

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

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#### 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](http://oracle.com/storage).

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#### POWER SUPPLIES

- Six 3,000 W hot-swappable AC 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 power distribution unit (PDU) options with two PDUs each
  - » Low voltage (3Ø, three input cables, 200–220 VAC phase to phase, 60 Hz, max line current 24 A)
  - » High voltage (3Ø, three input cables, 200–240 VAC phase to neutral, 50 Hz, max line current 16 A)

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#### KEY RAS FEATURES

- Hardware physical partitions with electrical isolation when the server is ordered with two physical domains
- Hot-pluggable PCIe card carriers
- Redundant, hot-swappable power supplies and fans
- Environmental monitoring
- Extended memory protection with error correction within single SDRAM, triple-bit detection across SDRAMs, page retirement, memory scrubbing, cyclic redundancy check (CRC), message retry, and lane retire in hardware
- DIMM sparing enabled with fully populated memory slots, increasing system reliability and uptime
- System Interconnect: message retry, link retrain, and lane failover
- Easy component replacement
- Fault Management Architecture and Predictive Self Healing
- Live operating system upgrades
- Firmware updates during system operation
- Redundant system clock synthesizers on each CPU-memory-I/O board
- Redundant hot-swappable service processors with automatic failover
- Dedicated PCIe root complexes for every slot for isolated I/O virtualization

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#### SOFTWARE

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##### Operating System

Oracle recommends the latest version of Oracle Solaris 11.3 for enhanced performance and functionality, including features enabled by Software in Silicon technology

- Control domain: Oracle Solaris 11.3 SRU 24 or later
  - The following versions are supported within guest domains:
    - Oracle Solaris 11.3 SRU 24 or later
    - Oracle Solaris 10 1/13\*
- \* Plus required patches

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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.

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#### Software Included

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- Oracle Solaris 11.3 (latest version), which includes Oracle VM Server for SPARC
  - Oracle Solaris ZFS (default file system)
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#### Virtualization

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Built-in, no-cost Oracle VM Server for SPARC provides the flexibility and power for 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.

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#### ENVIRONMENT

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Operating temperature: 5° C to 35° C (41° F to 95° F)

Note: Temperature ramp rate must not exceed 15° C (27° F) per hour.

Maximum Ambient:

- 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 84.2° F) at 1,501 m to 3,000 m (4,924 ft. to 10,000 ft.)
- (Except in China markets where regulations might limit installations to a maximum altitude of 2 km/6,560 ft.)
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Nonoperating temperature: 0° C to 50° C (32° F to 122° F), maximum altitude 12,000 m (40,000 ft.)

Note: Temperature ramp rate must not exceed 20° C (36° F) per hour.

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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.

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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.

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Operating altitude: Up 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.)

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

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Acoustic noise (idle/max. power)

- Bystander: 76.7/85.7
  - Sound power: 85.3/93.1
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Airflow requirements

- Maximum: 860 CFM; typical: 590 CFM
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#### REGULATIONS (MEETS OR EXCEEDS THE FOLLOWING REQUIREMENTS)

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

**EMC:**

- Emissions: FCC 47 CFR 15, ICES-003, EN55022, EN61000-3-11, and 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), and 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, and 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.

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#### DIMENSIONS AND WEIGHT

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- Height racked: 78.74 in. (2,000 mm); without rack: 17.2 in. (438 mm)
  - Width racked: 23.62 in. (600 mm); without rack: 19.0 in. (483 mm)
  - Depth racked: 47.24 in. (1,200 mm); without rack: 32.0 in. (813 mm)
  - Maximum weight racked: approx. 917 lb. (416 kg); without rack: 425 lb. (193 kg)
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## Warranty

The SPARC M8-8 server comes with a one-year warranty. Visit [oracle.com/us/support/policies/](http://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 M8-8 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](http://oracle.com/support).



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#### CONTACT US

For more information about SPARC M8-8 servers, visit [oracle.com](http://oracle.com) or call +1.800.ORACLE1 to speak to an Oracle representative.

<sup>1</sup> For Java and database workloads, at product release time. See the [performance blog](#).

## Integrated Cloud Applications & Platform Services

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