Frequently Asked Questions
SPARC S7 Servers: SPARC S7-2 and SPARC S7-2L

Overview

Oracle's SPARC S7-2 and S7-2L servers, based on Oracle's SPARC S7 processor, extend the world's most advanced systems for enterprise computing into scale-out and cloud applications, with unique capabilities for information security, core efficiency, and data analytics acceleration. Hardware security in silicon combined with platform support provides unmatched protection against data hacking. Up to 1.7x better core efficiency than x86 systems lowers costs for running Java applications and databases[1], while hardware acceleration on data analytics, big data, and machine learning deliver 10x faster time-to-insight. The combination of Oracle's breakthrough Software in Silicon features and the highest performance is the foundation for building the most secure and efficient enterprise clouds.

The Silicon Secured Memory feature of Oracle's SPARC S7 processor provides the capability of detecting and preventing unauthorized access to application memory in real time, creating a unique barrier to data hacking, malicious memory attacks, and software errors. Full-speed wide key encryption allows transactions to be secured by default with near-zero performance impact. Coupled with the security features of Oracle Solaris 11, storage, database, and application software, Oracle provides a layered defense against hacking and business-damaging attacks.

Oracle's SPARC S7 systems offer tremendous efficiency in running enterprise workloads. They show up to 1.7x better per core performance than x86 systems for running Java, database, and analytics, which are the bases of cloud applications[1]. By bringing memory and PCIe controllers into the processor's silicon, the SPARC S7 architecture creates very low-memory latencies, extremely high-memory bandwidth, and efficient I/O expansion. Moreover, the Data Analytics Accelerator engines in the SPARC S7 processor offer performance without compromise, by handling scans, filters, stream operations, and SQL primitive functions on hardware.

Powered by the SPARC S7 and SPARC M7 processors, Oracle's family of SPARC servers is the fastest in the world, accelerating database performance and developer productivity to help achieve greater efficiency and scalability for your cloud infrastructure.

Customer Benefits

Secure Cloud. Secure Data. Secure Business.

Addressing data security issues is becoming an increasingly critical function for any IT organization. Servers based on SPARC S7 and SPARC M7 processors include a feature called Silicon Secured Memory to protect data from both intrusive memory attacks and programming errors. It is the first-ever end-to-end implementation of memory-access validation in hardware, enabling hardware monitoring of memory requests by software processes in real time. It also

helps accelerate code development and ensure software quality, reliability, and security. The SPARC S7 servers also offer integrated on-chip cryptographic support that provides wire-speed encryption capabilities for secure data center operation; you do not have to pay a performance penalty for encrypting large amounts of data at rest or in motion.

Efficiency and Value for Scale-out and Cloud

Enterprise big data, machine learning, and cloud applications focus on demanding workloads that cannot be addressed efficiently by generic computing. The outstanding efficiency delivered by the SPARC S7 servers allows them to outperform competitors' hardware running Java, database, and analytics, which are the bases of cloud applications. With faster time-to-insight and up to 1.7x better core performance than x86, SPARC S7 systems will drastically increase business productivity on cloud and scale-out infrastructure.

Run Your Software Faster. Run Your Business Faster.

Oracle's SPARC S7 servers provide extreme performance to compete in today's high-speed, always-on world. Innovative Data Analytics Accelerator (DAX) technology implements accelerators directly in the processor to deliver a rich feature set that enables analytics applications and databases to run extremely fast, while offloading processor cores to run other workloads. By accelerating primitive functions that are at the core of analytics processing—data scans, filters, joins, and stream operations—SPARC S7 servers accelerate new applications such as big data, machine learning, risk analysis, fraud detection, and clickstream analysis, to name a few. The DAX technology also accelerates in-memory SQL queries, allowing Oracle Database In-Memory in Oracle Database 12*c* to run 10x faster in SPARC S7 servers, while running other workloads such as OLTP. Inline decompression units in the DAX engines significantly increase usable memory capacity by allowing compressed databases to be stored in memory while being accessed and manipulated at full performance.

Frequently Asked Questions

Q: What servers are based on the SPARC S7 processor?

A: The servers based on the SPARC S7 processor extend the world's most advanced systems into scale-out and cloud applications. Integrating highly efficient cores (the same as the record-breaking SPARC M7 processor) and on-chip interfaces, and leveraging the revolutionary Software in Silicon features, these servers provide outstanding performance for data analytics, big data, and cloud applications, on a secure and efficient platform that scales effortlessly.

Q: Which scale-out and cloud computing products are based on the SPARC S7 processor?

A: Oracle offers two servers based on the SPARC S7 processor for scale-out and cloud infrastructure:

- The SPARC S7-2 server offers single or dual eight-core processors, on a compact 1U chassis. It scales up to 1 TB of memory and eight 2.5-inch SAS-3 drive bays (four bays support NVMe drives; system supports SAS/NVMe mixing). Disk drives are hot swappable.The server has three PCIe 3.0 slots and four 10GBase-T ports.
- The SPARC S7-2L server offers two eight-core processors, on a compact 2U chassis. It scales up to 1 TB of memory and offers currently two possible chassis configurations:
  1. Eight 2.5-inch SAS-3 drive bays (four bays support NVMe drives; system supports SAS/NVMe mixing).
  2. Twenty-four front plus two rear 2.5-inch SAS-3 drive bays (four bays support NVMe drives; system supports SAS/NVMe mixing).

  All SPARC S7-2L configurations have six PCIe 3.0 slots and four 10GBase-T ports. Disk drives are hot swappable.

Q: What are the common characteristics of servers based on SPARC S7 processors?

A: The servers contain the following common characteristics:

- SPARC S7 processor: with 4.27 GHz of speed, eight fourth-generation cores (same as the SPARC M7 processor), up to 64 threads per processor, interface integration (memory and PCIe), and the innovative Software in Silicon features.
- DDR4 memory: speed with low power consumption.
- Available PCIe slots: x8 and x16 I/O throughput.
- 10GBase-T ports: fast and efficient networking.
- RJ45 serial ports: for server management.
- Internal storage: SAS hard disk drives, solid-state drives or accelerated NVMe flash drives.

Q: What is Software in Silicon?

A: Software in Silicon is a set of features that place software functions directly into the processor chip, implemented as

coprocessors or offload engines. Because specific functions are performed in hardware, software applications run much faster. And because the cores of the processor are freed to perform other functions, overall operations are speeded up as well. This technology is leveraged by both the SPARC S7 and SPARC M7 processors.

Q: What are the key features of the SPARC S7 processor?

A: The SPARC S7 processor is designed to offer outstanding security, efficiency, and performance capabilities for scale-out and cloud infrastructures.

Security is enforced by leveraging the Security in Silicon feature of Oracle's SPARC M7 processor, as well as software platform support.

Security in Silicon includes two concepts: Silicon Secured Memory and cryptographic acceleration.

- **Silicon Secured Memory:** This Software in Silicon functionality ensures that every part of an application is able to access only its own memory region, which lets software programmers identify issues related to memory allocation. Designed to help prevent security bugs such as Heartbleed from putting systems at risk, it enables hardware monitoring of memory requests by software processes in real time. And it stops unauthorized access to memory whether that access is due to a programming error or a malicious attempt to exploit buffer overruns. It also helps accelerate code development and helps ensure software quality, reliability, and security.
- **Cryptographic acceleration**: Encryption accelerators enable wire-speed cryptography capabilities for secure transactions without a performance penalty. This is enabled by the SPARC on-chip crypto accelerators and Cryptographic Framework feature of Oracle Solaris. The encryption accelerators on the SPARC S7 processor support 15 industry-standard cryptographic algorithms plus random number generation: AES, Camellia, CRC32c, DES, 3DES, DH, DSA, ECC, MD5, RSA, SHA-1, SHA-224, SHA-256, SHA-384, SHA-512.

Core efficiency is achieved by leveraging powerful SPARC fourth-generation cores and integrating key hardware interfaces and accelerators on the processor itself to optimize Java applications and databases.

The on-chip interfaces of the SPARC S7 processor are:

- **Direct-attached memory interface on the chip:** This functionality enhances the connectivity between the processor and the DDR4 DIMMs, minimizing the latency and allowing high bandwidth between processor and memory.
- **PCIe interface on the chip:** The SPARC S7 processor integrates the PCIe interface between the processor and output devices, maximizing the connectivity and throughput, and allowing systems to communicate at maximum speed.

Data acceleration on cloud and scale-out workloads is obtained by leveraging the powerful SPARC S7 processor technology known as Data Analytics Accelerators.

- **Data Analytics Accelerators** (DAX) are on-chip accelerator engines that offload both data analytics functions and in-line decompression from the processor cores. There are four accelerators per SPARC S7 processor, each with four pipelines, for a total of 16 in-silicon accelerator engines that are available to all eight processor cores. The DAX technology allows data to be streamed directly from memory into specialized pipeline engines that accelerate operations such as scans, joins, and filters. These primitives are the bases for many analytics applications in big data and machine learning, resulting in 10x performance gains when compared with architectures with no hardware acceleration.
- **In-Memory Query Acceleration:** The DAX feature also increases the performance of in-memory database queries, such as those performed by Oracle Database In-Memory in Oracle Database 12*c*, by operating on data that is streamed directly from memory via extremely high-bandwidth interfaces—with speeds up to 160 GB/sec—and accelerating SQL primitives.
- **In-line Decompression:** In-line Decompression is a Software in Silicon feature that significantly increases usable memory capacity. The SPARC S7 DAX engines run data decompression with performance that is equivalent to 32 additional CPU cores. This capability allows compressed databases to be stored in memory while being accessed and manipulated at full speed.

Q: What types of applications are ideal for the servers based on the SPARC S7 processor?

A: The servers are ideal platforms for cloud-based Java applications and database, as well as analytics applications such as big data, web analytics, machine learning, fraud detection, risk and trend analysis, and clickstream analysis.

Q: Can I run in-memory applications on the servers based on the SPARC S7 processor?

A: Absolutely! The outstanding performance of the innovative SPARC S7 processor coupled with high-memory footprint allows many applications to run in-memory on these servers. Running Oracle In-Memory Applications on the

servers provides significant application performance boosts.

A: Is Oracle's Software in Silicon technology open?

A: Yes, software developers can leverage Silicon Secured Memory, the cryptographic instruction accelerators, and the DAX units. Oracle has released open APIs for both Silicon Secured Memory and the DAX units. In addition, the cryptographic accelerators are enabled via industry-standard APIs such as PKS#11, OpenSSL, and others, and by using the Oracle Solaris Cryptographic Framework. Learn more here.

Q: Is there a choice in system configurations?

A: Yes, servers based on SPARC S7 processors can be customized to the configuration required through the Oracle assemble-to-order process.

Q: What operating systems are certified to run on the servers?

A: Oracle Solaris 11.3 or later is required for SPARC S7-2 and S7-2L servers, non-virtualized, or in an Oracle VM Server for SPARC control domain.

The following versions are supported in the guest domains:

- Oracle Solaris 11.3 or later
- Oracle Solaris 10 1/13*

* Plus required patches

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

Q: What is the recommended operating system for the servers?

A: Oracle recommends the latest version of Oracle Solaris 11 for enhanced performance and functionality.

Q: What software is preinstalled on the servers?

A: The latest available version of Oracle Solaris 11, which includes Oracle VM Server for SPARC, is preinstalled.

Q: What virtualization technologies are supported on the servers?

A: With the use of Oracle VM Server for SPARC, multiple application stacks can be deployed on both Oracle Solaris 11 and Oracle Solaris 10, and they are fully supported side by side. Additionally, individual Oracle Solaris 11 and Oracle Solaris 10 instances can be virtualized with Oracle Solaris Zones for optimal utilization and application performance. Even applications running on Oracle Solaris 9 and Oracle Solaris 8 can be virtualized on legacy Oracle Solaris Containers.

Q: What are the systems management options on the servers?

A: Servers based on SPARC S7 processors include Oracle Integrated Lights Out Manager (Oracle ILOM), which is driven by an integrated system service processor that also has power-management and power-capping capability to help reduce energy cost.

Oracle ILOM provides full remote keyboard, video, mouse, and storage (KVMS) support together with remote media functionality.

Oracle ILOM works together with Oracle Enterprise Manager Ops Center, which provides the most comprehensive management across Oracle servers, operating systems, and Oracle Solaris virtualization technologies. Together they dramatically improve the efficiency of IT operations with its integrated lifecycle management and built-in automation.

In addition to Oracle ILOM, unified server virtualization management is achieved with Oracle VM Manager. Oracle VM Manager can be used to discover SPARC servers running Oracle VM for SPARC and perform virtual machine management tasks. Users can create SPARC server pools and virtual machines, as well as manage networking and storage.

Q: Can SPARC servers be managed with Oracle Enterprise Manager Ops Center 12*c*?

A: Yes. Oracle Enterprise Manager Ops Center 12*c* is an end-to-end management solution that can monitor and manage all aspects of hardware and virtualization configurations on the servers. It provides a complete cloud lifecycle management solution including self-service provisioning and integrated chargeback and capacity planning.

Q: What are the power and cooling requirements for the servers?

A: The online power calculator provides guidance for estimating the electrical and heat loads for typical operating conditions.

Q: Where can I obtain information about performance benchmarks?

A: Oracle's SPARC system benchmarks are available here.

Q: Where can I find official end-user documentation for the family of servers based on the SPARC S7 processor?

A: Product documentation can be found at docs.oracle.com.

Q: What is the hardware warranty on these servers?

A: The servers come with a one-year warranty. Visit oracle.com/us/support/policies for more information about Oracle's hardware warranty.

As with all product warranties, this warranty is designed to offer consumers basic recourse should a product defect be discovered. For more complete support, purchase the recommended support coverage at the point of purchase to gain access to the services and resources you need and avoid potential reinstatement fees at a later date.

Q: What is the recommended support for the servers based on Oracle's SPARC S7 processor?

A: For all SPARC server products being used in critical production and test environments, Oracle recommends Oracle Premier Support for Systems. Features include:

- Award-winning, 24/7 service and support to help you keep your Oracle systems running at peak performance
- Comprehensive systems coverage that includes single-point accountability for Oracle server and storage hardware; integrated software (for example, firmware); and operating system software (Oracle Solaris, Oracle Linux, and Oracle VM)
- Fast answers and prompt resolution with around-the-clock access to Oracle product experts, hardware service, and self-help technical resources
- Tools and resources to proactively mitigate risk, simplify day-to-day IT operations, and maximize system performance including Oracle Enterprise Manager Ops Center software
- Access to Oracle operating system patches, security updates, enhancements, and upgrades without additional license or support fees

For more information, visit Oracle Premier Support for Systems on oracle.com.

Q: Where can I obtain additional information?

A: Contact your Oracle sales representative directly or call 1-800- Oracle1. Additional information about Oracle's SPARC servers is available on oracle.com.

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

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