ORACLE

SPARC M8 Processor

Oracle's SPARC M8 processor, with Oracle's second-generation Software in Silicon technology, is the industry's most advanced multithread, multicore processor with unique capabilities for database acceleration, Java acceleration, and information security. It sets the foundation for mission-critical cloud-ready infrastructure with unprecedented levels of efficiency, performance, and security.

PRODUCT OVERVIEW

With its proven Software in Silicon capabilities coupled with fifth generation core design, the SPARC M8 processor delivers world record processing speed and revolutionary protection against malware and software errors.

The SPARC M8 processor is coengineered with Oracle software for best performance, efficiency, and security when running enterprise applications, OLTP, and analytics. Breakthrough second-generation Software in Silicon technology in the SPARC M8 processor enables real-time analytics to be performed on OLTP databases by accelerating Oracle Database In-Memory queries starting in Oracle Database 12c, and it delivers extreme acceleration of Java streams processing.

The SPARC M8 processor incorporates 32 on-chip Data Analytics Accelerator (DAX) engines. The accelerators offload query processing and perform real-time data decompression, capabilities that are also referred to as SQL in Silicon. With such acceleration, Oracle Database 12c delivers performance that is up to 7 times faster than with other processors[1]. In addition, the inline decompression feature allows storage of up to twice as much data in the same memory footprint, without a performance penalty.

The Security in Silicon technologies of the SPARC M8 processor include Silicon Secured Memory, which provides real-time data integrity checking to guard against pointer-related software errors and malware. It replaces very costly software instrumentation with near-zero overhead hardware monitoring. Silicon Secured Memory enables applications to identify erroneous or unauthorized memory access, diagnose the cause, and take appropriate recovery actions.

The Security in Silicon technologies also encompass cryptographic instruction accelerators, which are integrated into each processor core of the SPARC M8 processor. These accelerators enable high-speed encryption for more than a dozen

Key Benefits

- Extreme acceleration of Oracle Database In-Memory queries, especially for compressed databases
- Ability to accelerate analytics on online transaction processing (OLTP) databases and Java applications, enabling real-time insight on transactional data
- Unique protection of application data from memory attacks or exploits of software vulnerabilities
- End-to-end encryption of data with near-zero performance impact
- Improved database performance with Oracle Numbers and database scan acceleration
- Cost-effective scalability for growing data center requirements
- Reduced power consumption through fine-grained power management
- Investment protection through guaranteed binary compatibility with previous-generation systems

industry-standard ciphers—including DES, 3DES, AES, SSL, RSA, and SHA—to eliminate the performance and cost barriers typically associated with secure computing.

The SPARC M8 processor includes 32 cores supporting up to 256 hardware threads. It is ideal for virtualized cloud computing environments, supporting a large number of virtual machines and delivering excellent multithreaded performance.

The per-thread performance is improved with the new on-chip L2 and L3 cache design and increased processor frequency. The 64 MB L3 cache is fully shared, and hot cache lines are migrated to the closest partition to minimize latency and maximize performance.

The processor can dynamically trade per-thread performance for throughput by running up to 256 threads, or it can run fewer higher-performance threads by devoting more resources to each thread. This allows the system to balance overall throughput versus per-thread performance for optimal results.

SPARC M8 PROCESSOR SPECIFICATIONS

- 32 SPARC V9 cores, maximum frequency: 5.0 GHz
- Up to 256 hardware threads per processor; each core supports up to 8 threads
- Total of 64 MB L3 cache per processor, 16-way set-associative and inclusive of all inner caches
- 128 KB L2 data cache per core; 256 KB L2 instruction cache shared among four cores
- 32 KB L1 instruction cache and 16 KB L1 data cache per core
- Quad-issue, out-of-order integer execution pipelines, one floating-point unit, and integrated cryptographic stream processing per core
- Sophisticated branch predictor and hardware data prefetcher
- 32 second-generation DAX engines; 8 DAX units per processor with four pipelines per DAX unit
- Encryption instruction accelerators in each core with direct support for 16 industry-standard cryptographic algorithms plus random-number generation: AES, Camellia, CRC32c, DES, 3DES, DH, DSA, ECC, MD5, RSA, SHA-1, SHA-3, SHA-224, SHA-256, SHA-384, and SHA-512
- 20 nm process technology
- Open Oracle Solaris APIs available for software developers to leverage the Silicon Secured Memory and DAX technologies in the SPARC M8 processor

Key Features

- Second-generation Data Analytics Accelerator technology
- Silicon Secured Memory
- Cryptographic instruction accelerators integrated into the pipeline
- On-chip database query accelerators
- Integrated data decompression with query acceleration
- Oracle Numbers unit in every core
- Database dictionary scan acceleration
- 32 multithreaded cores and up to 256 hardware threads
- L3 hot cache line migration to nearest partition
- Oracle Solaris binary application guarantee and Oracle Solaris source code guarantee
- Open Oracle Solaris APIs available for software developers to leverage Silicon Secured Memory and Data Analytics Accelerator technologies

Related Products

The following Oracle systems are based on the SPARC M8 processor:

- SPARC T8-1 server
- SPARC T8-2 server
- SPARC T8-4 server
- SPARC M8-8 server
- Oracle SuperCluster M8

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

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