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Oracle Unleashes Line-up of Enterprise Servers — New SPARC M7 Microprocessor Leads the Way

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Management Summary

Shopping has been, is, and always will be an adventure. You know what size you are, or at least, what size you were (forget about what size you are going to be). You go to the correct rack and find the pants/jacket/shirt marked with that size. Then you try it on and discover that maybe that size no longer fits just right. Finding the garment that does fit just right usually takes longer than expected, even if you decide to settle for something that is *almost* just right. Wouldn't it be great if everything were like socks, where "one size fits all"; unfortunately, even with socks, it may be more accurate to say "one size fit all, just not very well". At work, trying to find a right-sized solution is even more important, because the number of users might vary greatly, from day-to-day or moment-to-moment. Thus, adopting a strategy of *one-size fits many needs* tends to be problematic. The management of every enterprise data center always is looking for an infrastructure that fits the environment perfectly, but will not destroy the budget. The data center staff is seeking the right amount of processing power, memory, and storage, not only to handle today's workloads, but also be ready to handle the additional workloads that will come tomorrow, when a greater demand might arise. However, this does not mean that the data center wants to pay one dollar more than what has been budgeted for today.

In today's complex environment of clouds, data centers, branch offices, and remote sites, there is no single blueprint for a "data center". In order for any enterprise to be successful in today's highly interactive society, it needs to be prepared with the right infrastructure, sized to the needs of each specific use. The enterprise must be ready to engage the customer when s/he wants to be engaged, without delay, but with cost-efficient infrastructure. The level of performance (the ability to make real-time decisions from immediate data analysis) that is delivered by your IT infrastructure can make the difference between success and failure in the marketplace. Your IT infrastructure is crucial in attaining your business objectives. The deployment of the largest infrastructure possible will certainly ensure sufficient performance but the cost of that deployment could put you out of business.

Oracle, with its newest microprocessor, the *SPARC M7*, claims to have the most powerful microprocessor available today, as a result of embedding software functions and accelerators on the CPU. Configured within the *Oracle SuperCluster*, it most certainly is scalable for the largest enterprise. However, Oracle does not have to force fit the deployment of a SuperCluster into an environment where it is not required. With its *Oracle SPARC T7* and *Oracle SPARC M7* servers, Oracle can enable any enterprise to match their infrastructure needs by right-sizing servers to the amount of work that is required today, but with a buffer of additional performance to handle both growth and unexpected workloads that may arise. To learn more about the SPARC M7 microprocessor and its use in Oracle's disparate server families, please read on.

Enterprise Data Center Requirements

Today's enterprise is looking toward its data center to meet the needs of an ever-increasing access demand from a growing number of users.

IN THIS ISSUE

- > Enterprise Data Center Requirements.. 1
- > Oracle SPARC M7 Microprocessor..... 2
- > Oracle Enterprise Server Lineup 3
- > Conclusion 5

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Staff, partners, and customers all need access to the most current information available in order to maximize their own profitability. The innovative enterprise now is collecting more data continually, including both structured and unstructured data. This data and the increasing volume and complexity of the queries into it have been doubling in volume every 12-to-18 months, with no end in sight. The need for more processing power, more throughput, and more data analysis has never been greater.

Access to this infrastructure can vary depending upon where the server and storage environment is located: within the corporate data center, within a private or public cloud, within a branch office, or even at a remote location. It may be essential for the enterprise to reduce the distance between the user and the mission-critical solution to accelerate response time and reduce communications costs, and the smaller servers with M7 processor(s) may be the right way to achieve this. However, no matter where it is, the data center staff must provide the highest and most efficient application performance possible, with security features to build the best and most secure mission-critical enterprise environment, regardless of access path.

Obviously, if you are looking for a server that can support the highest number of transactions against the largest databases, then any number of vendors would be more than happy to provide you with their one-size-fits-all platform, ensuring that you can meet your performance goals. Unfortunately, not every enterprise has the budget to acquire and deploy a single high-end solution or the need to support thousands of users from a corporate data center or from some private cloud. These enterprises need a server solution right-sized to meet their needs, such as branch office or remote locations, not every enterprise requires the largest solution.

Oracle is one vendor that can provide the processing platform scaled to meet *your* needs with a server based upon its new *SPARC M7* microprocessor. This includes every computing requirement from entry-level, to mid-range, to the largest corporate infrastructure.

Oracle SPARC M7 Microprocessor

With its claim to be the world's fastest processor, the *Oracle SPARC M7* microprocessor is the next step in the evolution of 32-core processors, with the key word being "more". The SPARC M7 has 32 multi-threaded cores, a higher core frequency, more cache, more cache per

core, more memory bandwidth, more I/O bandwidth, and more PCIe lanes, with a lower cache and memory latency, than previous SPARC processors. What does all of this "more" mean to the mission- and business-critical enterprise applications on which your business depends? **It means more throughput performance (i.e., more work can be done) with a higher single thread performance rating (i.e., without needing to divide the work among several-to-many servers).**

The SPARC M7 provides the critical functionality required by today's enterprise data center *within* the microprocessor. This means that the M7 not only provides the necessary encryption bandwidth to keep data protected, but it also provides the fastest cryptographic acceleration in the industry¹ with end-to-end wide key encryption with near-zero performance impact. Critical applications are secured by 32 internal crypto accelerators in each processor, one per core; there is sufficient processing power to do inline decompression; and SQL queries are whisked to completion without requiring additional hardware or software support. M7-based servers provide support for 15 industry-standard cryptographic algorithms, including AES, DES, ECC, and RSA. According to Oracle, M7 provides magnitude-faster end-to-end encryption for database, Java, and other applications than competitive server infrastructure, including those using IBM's *Power8* processor. In addition, as you would expect, Oracle's SPARC M7 provides outstanding acceleration for the *Oracle Database 12C*, providing faster in-memory response than with flash storage. When the data center deploys a server based upon Oracle's M7, everything needed is already inside with Oracle's *Software in Silicon!*

Software in Silicon is Oracle's unique technology in microprocessor and server design. It enables databases and applications to perform faster, with outstanding security and reliability, with out-of-the-box security controls. According to Oracle, the M7 contains the first ever hardware-based memory protection with negligible performance impact. This enables the data center to deploy applications with in-memory databases supporting terabytes of data without concern for unauthorized access or data leakage by other means. M7 will prevent malicious programs from accessing the memory of other

¹ According to Oracle, more than three times faster than competitors.

Exhibit 1 — SPARC T7/M7 Server Highlights

- **Fastest cryptographic acceleration** – delivers end-to-end data encryption and secures transactions with near-zero performance impact, at no additional cost.
- **Secure, encrypted, live migration of workloads between systems** – helps ensure that secure data is not exposed while maintaining the necessary uptime for efficient operation.
- **Silicon secured memory** – prevents malicious attacks and helps to ensure the integrity of the application data, improving developer efficiency.
- **Execute OLTP transactions and data analytics on a single SPARC M7-based server with in-memory technology** – enables rapid access to analyze data to obtain new insights in real time.
- **SPARC M7 acceleration engines improve Oracle Database 12c In-Memory and the processing of uncompressed and compressed data** – results in unparalleled performance gains.
- **Built-in virtualization for mission-critical cloud infrastructures at no added cost** – enables workload consolidation and a simplified IT infrastructure.
- **Comprehensive lifecycle management with Oracle Enterprise Manager Ops Center** – delivers for complete integration across the entire stack with outstanding value and business agility.

Source: Oracle

applications. This enables improved developer efficiency, more secure applications, and higher availability (because meddling by other programs is prevented). In addition, M7 enables a secure live migration of mission-critical VMs that are encrypted before transmission over the network, thus ensuring that secure data is not exposed during migration.

With Oracle SPARC M7, Oracle now has a complete range of enterprise servers – from entry level to the largest cloud requirement – that share all of these capabilities. Thus, you get all of the benefits regardless of the scale of the solution that is right for you.

Oracle Enterprise Server Lineup

The Oracle SPARC M7 processor is at the heart of a new series of SPARC enterprise server families ranging from the *T7* and *M7*, which are positioned and priced for the SME enterprise, to the *SuperCluster*, to meet the needs of the largest enterprise. SPARC M7 provides the same high-end processing capability throughout the family. These servers have been designed with a balanced architecture that takes full advantage of the available cores, threads, memory, and I/O bandwidth provided by the M7 CPU. These platforms are among the most advanced servers designed specifically for enterprise workloads, with unique capabilities for information security, database, and Java acceleration. They enable the enterprise to respond to IT demands with the highest security and performance, and at a lower cost than was possible previously. With multiple platforms to choose from, the enterprise can match its enterprise workloads to the correct configuration of *SPARC T7*, *M7*, or *SuperCluster*

server.

Oracle's Software in Silicon technology enables its server platforms to provide high-speed encryption and decryption, plus detection and prevention of attacks to critical data in memory. This also enables real time analytics to be performed on OLTP databases by accelerating *Oracle Database In-Memory* queries in *Oracle Database 12c*, no matter how small or large the environment. See Exhibit 1, above, for a summary of the highlights of the SPARC T7 and SPARC M7 servers.

Oracle SPARC T7 Servers

The SPARC T7 family provides a smaller data center or branch office/remote location with the ability to scale from one to four CPUs, containing up to 128 cores, with up to 1024 threads, on three separate server platforms – the *T7-1*, *T7-2*, and *T7-4*, which are priced specifically for the environment into which it will be deployed.

Oracle SPARC T7-1 Servers

The SPARC T7-1 server is deployed as a 2U chassis with a single SPARC 32-core M7 processor and is not expandable. It can utilize up to 256 threads with up to .5 terabytes of memory. The T7-1 server utilizes six low-profile PCIe 3.0 slots, with up to two slots with x16 capability. It has eight hot-swap 2.5" disk bays, supporting up to eight 600GB or 1,200GB SAS HDDs/SSDs or four 1.6TB NVMe SSDs. A mix of different drives also is supported. It has one on-board SAS-3 HBA for RAID and one factory optional NVMe PCIe switch. The SPARC T7-1 server is priced starting at \$39,437.

Oracle SPARC T7-2 Servers

The SPARC T7-2 Server is deployed as a

3U chassis with two SPARC 32-core M7 processors. It can utilize up to 512 threads with up to one terabyte of memory. The T7-1 server utilizes eight low-profile PCIe 3.0 slots, with up to four slots with x16 capability. It has six hot-swap SFF disk bays, supporting up to six SAS HDDs/SSDs or four NVMe SSDs. A mix of drives is also supported. It has two on-board SAS-3 HBA for RAID and up to two optional factory-installed NVMe PCIe switches. The SPARC T7-2 server is priced starting at \$81,092.

Oracle SPARC T7-4 Servers

The SPARC T7-4 Server is offered as a 5U chassis with two or four SPARC 32-core M7 processors. It can utilize up to 1024 threads with up to two terabytes of memory. The T7-4 server utilizes 16 low-profile PCIe 3.0 slots, in hot-plug carriers, with up to eight slots with x16 capability. It has eight hot-swap 2.5" SFF disk bays, supporting up to eight SAS HDDs/SSDs and/or eight NVMe SSDs. A mix of drives is also supported. It has two on-board SAS-3 HBAs and up to two optional factory-installed NVMe PCIe switches.

Oracle SPARC M7 Servers

The SPARC M7 server family provides data center locations with the ability to scale from eight to 16 CPUs, up to 512 cores, with up to 4096 threads, and available as two separate server platforms, the *M7-8*, and the *M7-16*, priced appropriately for the target environment.

Oracle SPARC M7-8 Servers

The SPARC M7-8 Server can be deployed factory-mounted in a *Sun Rack II 1242* form factor or as a standalone 10U chassis with two to eight SPARC 32-core M7 processors. It can utilize up to 2048 threads with up to four terabytes of memory. The M7-8 server utilizes up to 24 PCIe 3.0 slots (with 3 PCIe slots per processor). It has redundant hot-swappable power supplies with automatic failover. The SPARC M7-8 server starts at \$147,184.

Oracle SPARC M7-16 Servers

The SPARC M7-16 Server will be offered in a single, unique cabinet with Sun Rack II 1242 form factor with four to 16 SPARC 32-core M7 processors. It can utilize up to 4096 threads with up to eight terabytes of memory. The M7-16 server can include up to 48 PCIe 3.0 slots with 3 PCIe slots per processor. It has redundant hot-swappable power supplies with automatic failover. Pricing will be announced for the SPARC M7-16 when it reaches general availability.

Oracle SuperCluster M7

The new Oracle SuperCluster M7 is a completely engineered system. It provides the enterprise with a secure private cloud infrastructure and is optimized for Oracle's database and application offerings. It provides an integrated environment for compute, storage, networking, virtualization, operating system, and management. The SuperCluster already has established itself across the globe in every vertical industry. Now, Oracle has improved the platform with their M7 microprocessor, enabling significant improvements in its price/performance ratio (Oracle has reported a 2.2 times price/performance increase over its SuperCluster T5-8) and an improved, secure multi-tenancy environment with IaaS and DBaaS, providing an out-of-the-box private cloud for increased productivity with higher efficiency and better security, and available in all new SPARC servers.

The SuperCluster M7 combines the fastest processors with *Oracle InfiniBand* (an ultra-fast networking fabric), *Oracle ZS3* (for powerful application and system storage,) and *Oracle Exadata Storage*, for the best Oracle database storage. This immediately enables the data center to improve application response times. In fact, the SuperCluster has been engineered specifically for Oracle 12c database in-memory, with up to a ten times improvement in Oracle SQL acceleration and up to a six times improvement for in-line memory decompression. With the exception of Exadata, these features are also available for the T7 and M7.

With the SuperCluster M7, the enterprise also saves in software licensing costs as the data center only has to license the cores it is using. This is applicable to both *Solaris Zones* and *Oracle VM*. This enables the enterprise to scale the SuperCluster incrementally for both compute and storage elasticity. The Oracle SuperCluster M7 pricing starts at \$237,000.

Oracle Solaris 11.3

The unique technology in SPARC servers is enabled by the Oracle *Solaris* operating system. Oracle Solaris 11.3 is a secure, integrated, and open platform designed for the largest enterprise cloud environment. It delivers security, speed, and simplicity for enterprise applications and DevOps. It includes specific optimizations for Oracle Database, middleware, and application deployments. Security can be setup easily and is enabled by default.

Conclusion

Quite clearly, Oracle is driving unique innovation across its entire portfolio with their latest breakthrough technology, the SPARC M7 microprocessor. It has developed an integrated, enterprise application platform designed specifically to improve the performance and efficiency of mission-critical Oracle database applications to achieve a higher level of analytics response for all users. If your data center staff is looking for the system they need to deliver business-critical data to an executive level that has to make their critical business decisions faster, you need not look any further. Oracle's M7 servers may be just the answer that you have been seeking.



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