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Cisco Sets 14 New Performance Records

Cisco UCS with 3rd Gen AMD EPYC Processors

**World-record-setting
integer performance**

**World-record-setting Java Server
Business benchmark performance**

The world's fastest processors bring your workloads to life on Cisco UCS®.

With our new Cisco UCS C225 and C245 Rack Servers equipped with 3rd Gen AMD EPYC™ processors, your most compute-intensive workloads come to life with the simplicity of Cisco Unified Computing System™. Whether you run CPU-bound applications or Java technology-based applications, our world-record-setting performance as measured by industry-standard benchmarks suggest that your workloads will run faster on Cisco UCS servers.

When choosing the world's fastest processors, you get a choice of two rack servers from Cisco. Optimized for 1-processor configurations, the Cisco UCS C225 M6 Rack Server supports up to two processors in a compact form factor. The Cisco UCS C245 M6 Rack Server is a 2-socket, 2RU server designed to support large amounts of direct-attached storage with room for up to 8 PCIe Gen 4 cards.

**AMD
EPYC**

Gain more with AMD EPYC Processors and Cisco UCS servers

· More instructions per cycle from AMD 'Zen 3' cores

· Up to 128 cores per server

· Up to 32 DDR4-3200 DIMMs (8 TB) of memory

· Up to 128 lanes of PCIe Gen 4 I/O connectivity

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Cisco UCS C245 M6 Rack Server

The world-record-setting server used in all of the measurements discussed in this paper, the Cisco UCS C245 M6, is well suited for a wide range of storage- and I/O-intensive applications such as big data analytics, databases, collaboration, virtualization, and server consolidation.

- Up to two 3rd Gen AMD EPYC Processors with up to 64 cores per socket

- 32 DIMM slots for up to 8 TB of memory

- Up to 24 front-facing small-form-factor (SFF) SAS or SATA drives including up to 4 NVMe drives

- 4 optional rear-facing NVMe drives

- Up to 8 PCIe Gen 4 slots

- Support for 1400 series Cisco virtual interface cards and OCP 3.0 network cards

- RAID controller and GPU options

- Internal dual M.2 drive options

Real-world performance

Our 14 world records reflect real-world performance that can propel your data center to new levels of efficiency. We demonstrate the gains that you can achieve by moving to 3rd Gen AMD EPYC Processors with results that span the needs of today's data centers. All of these world records were set by the Cisco UCS C245 M6 Rack Server and AMD EPYC 7763 processors with 64 cores per CPU. We used 1 TB of main memory to achieve these single-socket results and 2 TB for the 2-socket results.

Integer and floating-point performance

Raw CPU performance is a good predictor of overall performance. In particular, enterprise applications such as SAP track very well with integer performance benchmarks. Scientific software tracks very well with floating-point performance. The Cisco UCS C245 M6 scores world records in both areas.

Our record-setting benchmarks (Table 1) are a matter of good engineering. With power and cooling designed to support the fastest x86-architecture CPUs anywhere, you gain the best that 3rd Gen AMD EPYC Processors have to deliver. Firmware settings that control boost

Table 1. Integer and floating-point performance are good predictors of general business application performance

Benchmark	Result	Achievement
SPEC CPU® 2017	SPECrate®2017_int_base=428	Best 1-socket server
SPEC CPU 2017	SPECrate2017_int_peak=452 SPECrate2017_int_base=426	Best 1-socket server
SPEC CPU 2017	SPECrate2017_int_base=852	Best 2-socket server
SPEC CPU 2017	SPECrate2017_int_peak=892 SPECrate_int_base2017=850	Best 2-socket server peak result
SPEC CPU 2017	SPECrate2017_fp_base=651	Best 2-socket server
SPEC CPU 2017	SPECspeed®2017_fp_base=174	Best 1-socket server

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frequencies are set through the Cisco Intersight™ cloud operations platform, so you can enjoy consistently good performance.

Java server performance

The SPECjbb®2015 benchmark provides physical and virtual performance measurements to give you a more accurate assessment of the way that Java server applications will perform in your IT environment. The max-jOPS results show the overall throughput that servers can produce. The critical-jOPS results give a response-time measurement. This result shows the throughput that can be achieved with responses falling into a strict quality-of-service requirement.

MultiJVM results are shown in Table 2. These show how well the server can multitask between multiple Java virtual machines (JVMs).

Composite results are illustrated in Table 3. These results show the excellent vertical scalability of the server in terms of how well a single JVM utilizes the server's cores. For the Composite benchmark, all of the benchmark components must run within a single JVM.

3rd Gen AMD EPYC Processors

Having established a performance leadership position for three generations of processors, the AMD EPYC 7003 Series processors bring performance to a new level. With industry-leading 7-nm process technology and the new 'Zen 3' architecture, these processors deliver up to 19 percent more instructions per clock cycle compared to the previous generation. This helps you drive faster time to results, more and better decision making, and better business outcomes.

Table 2. Java server performance as measured by the SPECjbb®2015 MultiJVM benchmark

Benchmark	Result	Achievement
SPECjbb®2015 MultiJVM	max-jOPS=211379 (critical-jOPS=102326)	Best 1-socket server for max-jOPS
SPECjbb2015 MultiJVM	max-jOPS=411627 (critical-jOPS=194793)	Best 2-socket server for max-jOPS
SPECjbb2015 MultiJVM	(max-jOPS=185453) critical-jOPS=155378	Best 1-socket server for critical-jOPS
SPECjbb2015 MultiJVM	(max-jOPS=327501) critical-jOPS=307324	Best 2-socket server for critical-jOPS

Cisco UCS C225 M6 Rack Server

Optimized to deliver uncompromised I/O capacity whether one or two CPUs are installed, the Cisco UCS C225 M6 is one of the most versatile in the industry. This high-density, 1RU, 2-socket rack server supports a range of workloads including virtualization, engineering design automation (EDA), software-defined storage, big data, and edge-centric workloads.

· Optimized for deployment with one 3rd Gen AMD EPYC Processor with up to 64 cores (capable of supporting two processors with up to 128 cores)

· 32 DIMM slots for up to 8 TB of memory

· Up to 10 SFF NVMe, SAS, or SATA drives

· Up to 3 PCIe Gen 4 slots

· Support for 1400 series Cisco virtual interface cards and OCP 3.0 network cards

· RAID controller and GPU options

· Internal dual M.2 drive options

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3rd Gen AMD EPYC Processors—what's new

· Improved 'Zen 3' core executes more instructions per clock than 2nd Gen AMD EPYC Processors

· Enhanced memory performance with synchronization between AMD Infinity Fabric and memory clocks

· Virtualization security is enhanced with secure nested paging

· High-frequency CPU options deliver even higher per-core performance

· Multilevel (4, 6, and 8) memory interleaving helps optimize low-core-count CPUs with lower memory costs

With the world's highest performance server CPU, the AMD Infinity Architecture delivers innovation with up to 32 MB of shared Level 3 cache per core, enhanced memory synchronization between AMD Infinity Fabric™ and DRAM clocks, multilevel memory channel interleaving for lower-bin processors, and all of this with high performance per Watt of energy.

AMD Infinity Guard security technology supports a secure root-of-trust boot process. Both full-memory encryption and secure encrypted virtualization help to keep your bare-metal and virtualized environments safe from intruders. Enhanced features to protect virtualized environments include encrypted guest OS register state and secure nested paging.

Learn more

· Cisco Unified Computing System
· Cisco UCS with AMD EPYC processors
· Cisco UCS C245 M6 Rack Server
· Cisco UCS C225 M6 Rack Server

Table 3. Java server performance as measured by the SPECjbb2015 Composite benchmark

Benchmark	Result	Achievement
SPECjbb2015 Composite	max-jOPS=193086 (critical-jOPS=176283)	Best 1-socket server for max-jOPS
SPECjbb2015 Composite	max-jOPS=334561 (critical-jOPS=288551)	Best 2-socket server for max-jOPS
SPECjbb2015 Composite	(max-jOPS=193086) critical-jOPS=176283	Best 1-socket server for critical-jOPS
SPECjbb2015 Composite	(max-jOPS=330326) critical-jOPS=293968	Best 2-socket server for critical-jOPS