

World-Record-Setting Performance

Three new world records for Cisco UCS powered by AMD EPYC processors



**World-record-setting
decision-support results**



**World-record-setting Java enterprise
middleware performance**

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

With our Cisco UCS® C225 M6 and C245 M6 rack servers powered by 3rd Gen AMD EPYC™ processors, your most compute-intensive workloads come to life with the simplicity of Cisco Unified Computing System™. Whether you are running CPU-bound decision-support applications or Java enterprise middleware, our world-record-setting performance as measured by industry-standard benchmarks suggest that your workloads will run faster on Cisco UCS servers.

When you choose Cisco UCS servers to run your mission-critical workloads, you get more than just high performance. You gain the simplicity and scalability of our operating model. All of our servers—including those powered by AMD EPYC processors—are integrated into the Cisco Intersight™ cloud-operations platform, making it easy to consistently deploy innovative features such as AMD Secure Encrypted Virtualization (SEV) as part of your configuration policies.

Learn about our latest world records

- Top SPECjbb®2015 critical-jOPS records for both MultiJVM and Composite configurations on our single-socket-optimized Cisco UCS C225 M6 Rack Server
- Top TPC-H 30-TB performance on our Cisco UCS C245 M6 Rack Server
- New records propelled by 3rd Gen AMD EPYC processors with AMD 3D V-Cache™ technology

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 Rack Server is one of the most versatile servers 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.



- 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 10 SFF NVMe, SAS, or SATA drives
- Up to 3 PCIe Gen 4 slots
- Support for Cisco UCS Virtual Interface Cards 1400 Series and OCP 3.0 network cards
- RAID controller and GPU options
- Internal dual M.2 drive options

Real-world performance with Cisco UCS servers

Our world records demonstrate that Cisco UCS servers with AMD EPYC processors are versatile platforms for just about any application. Our servers are the world's fastest on both decision-support benchmarks and Java enterprise middleware (Table 1).

In today's world of complex, distributed systems, you need a way to predict how your servers will respond to the complexity of intermixing not just arithmetic performance but real-world operations including I/O and context switching between the many parallel threads that are active in enterprise Java middleware. That's where our SPECjbb2015 and TPC-H V3 results predict world-record-setting performance for your enterprise data center. Our latest single-socket records with the Cisco UCS C225 M6 Rack Server demonstrate the value of a single-socket-optimized server that delivers the same I/O capacity whether

Figure 1. Cisco UCS C225 M6 Rack Server



The bridge to possible

one or two CPUs are installed. Our latest two-socket record on the TPC-H 30 TB benchmark shows excellent support for database queries and computation with the Cisco UCS C245 M6 Rack Server. This gives you even greater flexibility to choose the platform that best propels your workloads.

Our records achieved since the release of 3rd Gen AMD EPYC processors, 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.

3rd Gen AMD EPYC processors

Having established performance leadership for three processor generations, the AMD EPYC 7003 Series processors bring performance to a new level. With industry-leading 7-nm process

Table 1. Java enterprise middleware performance as measured by the SPECjbb2015 benchmark and decision-support performance as measured by the TPC-H V3 benchmark

Benchmark	Cisco UCS server	Result	Achievement
SPECjbb2015 MultiJVM	New result: C225 M6	(max-jOPS=186968) critical-jOPS=175561	Best 1-socket server for critical-jOPS as of March 2022
SPECjbb2015 Composite	New result: C225 M6	(max-jOPS=223558) critical-jOPS=211094	Best 1-socket server for critical-jOPS as of March 2022
TPC-H 30 TB Results	New result: C245 M6	1,650,802 QphH (830.54 USD per kQphH)	Best 2-socket server for TPC-H 30 TB result as of April 2022

technology and the new 'Zen3' architecture, these processors deliver up to 19 percent more instructions per clock cycle compared to the previous generation.^{[MLN-003](#)} This helps you drive faster time to results, more and better decision making, and better business outcomes.

With the world's highest performance x86-architecture server CPU,¹ the AMD Infinity Architecture delivers innovation with up to 32 MB of shared Level 3 cache per core in the mainstream products, and up to 768 MB of L3 cache in processors equipped with AMD 3D V-Cache technology. All 3rd Gen AMD EPYC processors offer:

- Enhanced memory synchronization between AMD Infinity Fabric™ and DRAM clocks
- Multilevel memory channel interleaving for lower-bin processors

We deliver all of this to give you high performance per watt of energy.

AMD Infinity Guard security features a secure root-of-trust boot process.² 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.

Decision-support results

The world's fastest 2-socket TPC-H 30 TB records were set by the Cisco UCS C245 M6 Rack Server and AMD EPYC 7763 processors

with 64 cores per CPU. Microsoft SQL Server 2019 was used as the database manager running on Red Hat Enterprise Linux 8.4.

The [TPC-H benchmark](#) is a decision-support benchmark. It consists of a suite of business-oriented ad-hoc queries and concurrent data modifications. The benchmark models decision-support systems that examine large volumes of data, execute queries with a high degree of complexity, and give answers to critical business questions.

Figure 2. Cisco UCS C245 M6 Rack Server

Java enterprise middleware performance

The SPECjbb2015 benchmark provides bare-metal and virtual performance measurements to give you a more accurate assessment of the way that Java enterprise middleware can perform in your IT environment.

The max-jOPS results reflect the overall throughput that the server can deliver. The critical-jOPS results give a response-time measurement. Our results show the throughput that can be achieved with responses falling into a strict quality-of-service requirement (Table 1).

- **MultiJVM results** show how well the server can multitask between multiple Java virtual machines (JVMs).
- **Composite 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 instances must run within a single JVM.

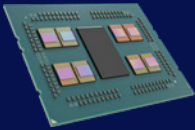
Cisco UCS C245 M6 Rack Server

This server 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 Cisco UCS Virtual Interface Cards 1400 Series and OCP 3.0 network cards
- RAID controller and GPU options
- Internal dual M.2 drive options

AMD 3D V-Cache technology



The AMD EPYC 7003 Series processors equipped with AMD 3D V-Cache use 3D die stacking to deliver

768 MB L3 cache per processor. The technology is built on AMD's groundbreaking 3D Chiplet architecture and uses 7-nm process technology. These processors employ industry-leading logic stacking based on a copper-to-copper hybrid bonding 'bumpless' chip-on-wafer process to enable over 200x the interconnect densities of current 2D technologies, which translates to lower latency, higher bandwidth, and greater power and thermal efficiencies.^{EPYC026}

For details on the footnotes used in this document, visit amd.com/en/claims/epyc

1. For a current list of world records see amd.com/worldrecords.
2. AMD Infinity Guard features vary by EPYC™ Processor generations. Infinity Guard security features must be enabled by server OEMs and/or Cloud Service Providers to operate. Check with your OEM or provider to confirm support of these features. Learn more about Infinity Guard at <https://www.amd.com/en/technologies/infinity-guard>. GD-183

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Our newest results, established on the Cisco UCS C225 M6 Rack Server, use a single 64-core AMD EPYC 7773X processor with AMD 3D V-Cache technology. This additional cache propels Java middleware performance to new heights. These new world records eclipse our prior world-record results by 13 percent on the MultiJVM critical-jOPS benchmark, and by almost 20 percent on the Composite critical-jOPS benchmark.

Figure 3. AMD 3D V-Cache

Originally designed to speed high-performance computing applications, AMD 3D V-Cache technology proves its value by setting new performance records for multithreaded environments such as Java enterprise middleware. These results also demonstrate how you can set world records on single-socket-optimized servers, helping to increase data center efficiencies.

Why Cisco?

The Cisco advantage is our architecture and close working relationships with AMD and OS and software vendors.



The bridge to possible

In addition to the power of the 3rd Gen AMD EPYC processors, we can get differentiated performance through our unique design of hardware and firmware elements. The CPU voltage regulator delivers load-step and load-release current for CPU transients—a feature above and beyond the CPU power requirements. And our thermal design can operate, handle, and sustain peak performance within the thermal operating region. This, combined with BIOS tuning, helped us to deliver exceptional results compared to other server vendors.

Firmware settings, such as those that control boost frequencies, are set through the Cisco Intersight cloud-operations platform, helping you enjoy consistently good performance as a matter of the policies that you establish.

Learn more

- [Cisco Unified Computing System](#)
- [Cisco UCS C225 M6 Rack Server](#)
- [Cisco UCS C245 M6 Rack Server](#)
- [AMD EPYC processors](#)