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Cisco UCS with AMD EPYC 4th Generation Processors: 20 World Performance Records

The world's fastest processors from AMD bring your workloads to life on Cisco UCS® with unparalleled speed and efficiency.

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Overview

Our Cisco UCS C245 M8 Rack Servers powered by 4th Gen AMD EPYC™ processors offer a potent combination of performance and simplicity, ideal for handling compute-intensive tasks across varying applications and workloads. Our industry-standard benchmark results showcase world-record-setting performance in 20 standard tests. It's impressive how the Cisco Unified Computing System™ provides a high-performance computing infrastructure for the most demanding compute environments.

The 4th Gen AMD EPYC processor family includes general purpose and workload-optimized solutions. These processors include up to 128 "Zen 4" or "Zen 4c" cores with exceptional memory bandwidth and memory capacity. The innovative AMD chiplet architecture enables high performance, energy-efficient solutions optimized for your different computing needs.

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, powered by the Cisco Intersight® cloud-operations platform. Be ready for the future with a solution that is engineered to be "future-proofed", as it will incorporate new technologies when they become available.

Benefits

If you want performance from 4th Gen AMD EPYC processors, choose Cisco UCS.

- Top Linux score for integer and floating-point performance.
- Top result for Java enterprise middleware performance.
- Top results for high- performance computing with OMP and MPI models.
- Top results for OpenMP performance of high-intensity shared memory parallel-processing applications.
- Top result for SPECaccel benchmark performance for computationally intensive parallel applications.

Well-suited for AI/ML and enterprise application workloads

You have the flexibility to deploy Cisco UCS C-Series rack servers in multiple configurations to suit your needs. Whether integrated into the Cisco Unified Computing System managed by Cisco Intersight or Cisco UCS Manager, or deployed standalone, these rack servers leverage Cisco's standards-based unified computing to reduce your Total Cost of Ownership (TCO) and deliver to your needs for business agility.

AMD EPYC 97x4 processors offer the performance, density, and energy efficiency needed to provide no-compromise computing for growing cloud-native environments, with system-level thread density for the scalable performance that is needed for cloud-native workload growth and infrastructure consolidation. They have extensive x86 software compatibility and a full ecosystem of services to support fast, seamless deployment.

The Cisco UCS C245 M8 Rack Server brings new innovations such as PCIe Gen 5.0 expansion slots for high-speed I/O, a DDR5 memory bus, and expanded storage options and capabilities. These all deliver the performance and efficiency gains you have come to expect. In addition, you can deploy innovative security features from AMD, such as AMD Secure Processor, AMD Secure Memory Encryption (SME), and AMD Secure Encrypted Virtualization (SEV), as part of your configuration policies in Intersight. Simplify with a system engineered for the future.

With their high core counts and memory capacity, Cisco UCS rack servers can handle multiple database instances simultaneously, ensuring smooth and responsive performance. They can meet the needs of emerging AI and ML workloads as easily as they support traditional enterprise applications.

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- Simplify your data center while adapting to the unpredictable needs of modern applications.
- Deliver optimal performance with an efficient thermal and cooling design to ensure optimal performance and reliability while maintaining safe operating temperatures.
- Drive exceptional time-to-results for your business-critical applications with AMD EPYC 9004 processors. This flagship CPU series features leadership performance and is optimized for a wide range of workloads spanning from the enterprise to the cloud.
- Accelerate your workloads with the world's highest-per-core-performance x86 CPU.

Top industry results for integer and floating-point performance

The top integer and floating-point records for 4th Gen AMD EPYC processors were set by the Cisco UCS C245 M8 Rack Server. We used 1.5 TB of main memory to achieve these 2-socket server results.

In addition to the power of 4th Gen AMD EPYC processors, we differentiate our performance through a 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 exceed the SPEC CPU results of other server vendors.

Firmware settings, such as those that control boost frequencies, are set through the Cisco Intersight IT-operations platform, ensuring consistent performance as an outcome of the policies that you establish.

Table 1. Integer and floating-point performance results

Benchmarks	AMD EPYC processor	Result	Achievement
SPEC CPU 2017 (floating-point speed)	9684X 96 cores	fp_base=476	**#1 AMD** result on Linux for 2 sockets (tie)
SPEC CPU 2017 (floating-point speed)	9684X 96 cores	fp_base=357	**#1 AMD** result on Linux for 1 socket (tie)
SPEC CPU 2017 (Integer speed)	9174F 32 cores	Int_base=16.6	**#1 AMD** result on Linux for 2 sockets (tie)

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- Two 4th Gen AMD EPYC processors.
- Up to 6 TB of main memory.
- Up to 28 hot-pluggable SSD or NVMe drives with enterprise RAID.
- Two M.2 SATA drives.
- One dedicated PCIe Gen4x16 slot that can be used to add an mLOM or OCP 3.0 card for additional rear-panel connectivity.
- mLOM slot that can be used to install a Cisco UCS Virtual Interface Card (VIC) without consuming a PCIe slot, supporting quad-port 10/25/50 Gbps or dual-port 40/100/200 Gbps network connectivity.

Leading results for Java enterprise middleware performance

The SPECjbb2015 benchmark provides bare metal and virtual performance measurements to give you a more accurate assessment of how well Java enterprise middleware performs in your environment.

The max-jOPS results reflect the overall throughput the server can deliver. The critical-jOPS results give a response-time measurement. These results demonstrate throughput that is achievable while maintaining strict quality-of-service requirements for response times.

Our MultiJVM results show how well the server can multitask between multiple Java Virtual Machines (JVMs).

Our Cisco UCS C245 M8 Rack Server with AMD EPYC processors took the number-one result when running Microsoft Windows and the number-two result when running on Linux.

Table 2. Java enterprise middleware performance as measured by the SPECjbb2015 MultiJVM benchmark

Benchmarks	AMD EPYC processor	Result	Achievement
SPECjbb2015 (MultiJVM – maximum)	9684X 96 cores	max-jops=967587 (critical-jops)=373830	**#2 AMD** result on Linux for 2 sockets
SPECjbb015 (MultiJVM – maximum)	9684X 96 cores	max-jops=416776 (critical-jops)=258123	**#1 AMD** result on Microsoft Windows for 1 socket

Top SPECompG 2012 result for shared-memory parallel-processing applications

The SPECompG_base2012 benchmark measures the performance of high-intensity shared-memory parallel-processing applications. It includes 14 samples from science and engineering environments, including computational fluid dynamics, molecular modeling, and image manipulation. You can use the results for the SPECompG_base2012 benchmark to evaluate your own likely performance if you run highly parallelized CPU-intensive applications.

Our SPECompG_base2012 result of 104 claims the top AMD EPYC score running on Linux. We achieved this result with two 128-core AMD EPYC 9754 processors with 1.5 TB of main memory.

Table 3. High-performance computing performance as measured by SPECompG_base2012 benchmark

Benchmarks	AMD EPYC processor	Result	Achievement
SPEC OMPG 2012 base	9754 128 cores	base=104	**#1 AMD** result on Linux for 2 sockets
SPEC OMPG 2012 base	9754 128 cores	base=61.7	**#1 AMD** result on Linux for 1 socket
SPEC OMP® 2012 Peak	9754 128 cores	Peak=108	**#1 AMD** result on Linux for 2 sockets
SPEC OMP® 2012 Peak	9754 128 cores	Peak=64.2	**#1 AMD** result on Linux for 1 socket

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Technical computing

Reach new heights to help solve some of today's most complex design and simulation challenges with 4th Gen AMD EPYC 9004 Series Processors with 3D V-Cache™ Technology.

- Deliver breakthrough performance with up to 96 "Zen 4" cores and 1152 MB of L3 cache per socket.
- Boost the productivity of your demanding design and simulation workloads with the world's highest performance x86 server processors for technical computing.

Top SPEChpc results for high-performance computing

The SPEChpc 2021 Benchmark Suites provide a set of application benchmark suites using a comprehensive measure of real-world performance for state-of-the-art HPC systems. They offer well-selected science and engineering codes that are representative of HPC workloads and are portable across CPU and accelerators, along with certain fair comparative performance metrics.

The four suites; Tiny, Small, Medium, and Large, include groups of full applications covering a wide range of scientific domains and Fortran/C/C++ programming languages. Each suite uses increasingly larger workloads to allow for appropriate evaluation of HPC systems at different sizes, ranging from a single node to multiple nodes.

All codes in the suites support multiple programming models, including MPI, MPI+OpenACC, MPI+OpenMP, and MPI+OpenMP with target offloads, for measuring performance on different platforms.

Table 4. High-performance computing performance as measured by the SPEChpc 2021 Benchmark Suite

Benchmarks	AMD EPYC processor	Result	Achievement
SPEC HPC 2021 (Tiny MPI)	9754 128 cores	MPI=13.2	**#1 AMD** result on Linux for 2 sockets
SPEC HPC 2021 (Tiny OMP)	9754 128 cores	OMP=16.4	**#1 AMD** result on Linux for 2 sockets
SPEC HPC 2021 (Tiny MPI)	9754 128 cores	MPI=6.39	**#1 AMD** result on Linux for 1 socket
SPEC HPC 2021 (Tiny OMP)	9754 128 cores	OMP=7.32	**#1 AMD** result on Linux for 1 socket
SPEC HPC 2021 (Small MPI)	9754 128 cores	MPI=1.32	**#1 AMD** result on Linux for 2 sockets
SPEC HPC 2021 (Small OMP)	9754 128 cores	OMP=1.59	**#1 AMD** result on Linux for 2 sockets
SPEC HPC 2021 (Small MPI)	9754 128 cores	MPI=0.691	**#1 AMD** result on Linux for 1 socket
SPEC HPC 2021 (Small OMP)	9754 128 cores	OMP=0.823	**#1 AMD** result on Linux for 1 socket

Cloud-native computing

4th Gen AMD EPYC 97x4 processors offer the performance, density, and energy efficiency to provide no-compromise computing for growing cloud-native environments.

- System-level thread density for the scalable performance that is needed for cloud-native workload growth and infrastructure consolidation.
- Extensive x86 software compatibility.
- A full ecosystem of services to support fast, seamless deployment.

Leading SPECaccel results for parallel workload performance

The SPECaccel benchmark suite is a comprehensive tool for evaluating the performance of components involved in accelerating computational tasks. By testing applications under OpenCL, OpenACC, and OpenMP 4 target offloading APIs, it provides valuable insights into how well different hardware and software components interact to execute parallel workloads efficiently.

The suite covers a range of performance aspects including the accelerator itself, the host CPU, memory transfers between the host and accelerator, support libraries, drivers, and compilers. This holistic approach ensures that developers and users can gain a thorough understanding of the overall system performance and identify potential bottlenecks or areas for optimization.

Table 5. High-performance computing performance as measured by the SPECaccel benchmark

Benchmarks	AMD EPYC processor	Result	Achievement
SPEC ACCEL 2023 LOP	9684X 96 cores	LOP=1.48	**#1 AMD** result on Linux for 2 sockets
SPEC ACCEL 2023 SMD	9684X 96 cores	SMD=1.50	**#1 AMD** result on Linux for 2 sockets
SPEC ACCEL 2023 LOP	9754 128 cores	LOP=0.837	**#1 AMD** result on Linux for 1 socket
SPEC ACCEL 2023 SMD	9754 128 cores	SMD=0.875	**#1 AMD** result on Linux for 1 socket

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SPEC performance validation summary

SPECspeed 2017 Integer and SPECspeed 2017 floating-point suites are used to compare the times a computer takes to complete single tasks.

- SPECjbb 2015 benchmark has been developed from the ground up to measure performance based on the latest Java application features.
- SPEC OMPG 2012 benchmark is designed for measuring application performance based on the OpenMP 3.1 standard for shared-memory parallel processing.
- SPEChpc 2021 Benchmark Suites address these challenges by providing a set of application benchmark suites using a comprehensive measure of real-world performance for state-of-the-art HPC systems.
- SPECaccel 2023 benchmark suite measures the performance of key system components using computationally intensive parallel applications.

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Cisco Capital

Financing to help you achieve your objectives

Cisco Capital can help you acquire the technology you need to achieve your objectives and stay competitive. We can help you reduce CapEx. Accelerate your growth. Optimize your investment dollars and ROI. Cisco Capital financing gives you flexibility in acquiring hardware, software, services, and complementary third-party equipment. And there's just one predictable payment. Cisco Capital is available in more than 100 countries. Learn more.

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C22-4471001-00 06/24