

Siemens Simcenter STAR-CCM+®

TECHNICAL COMPUTING

Powered by 4th Gen AMD EPYC™ Processors

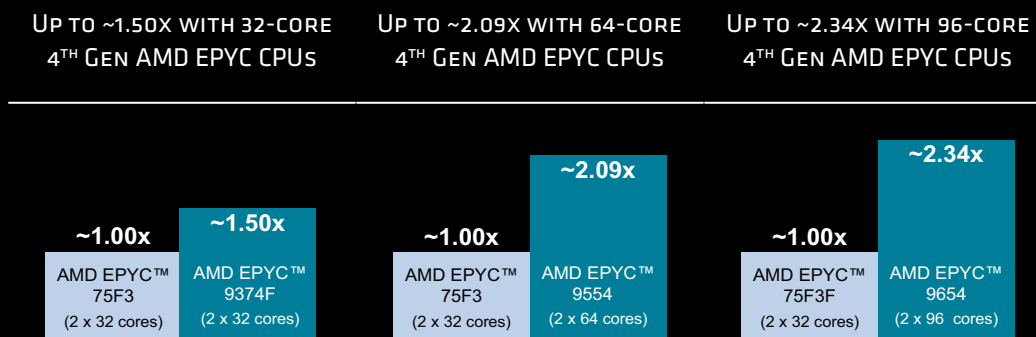
November 2022

AT A GLANCE

Systems powered by dual 96, 64, and 32-core 4th Gen AMD EPYC™ processors demonstrate superb generational performance uplifts compared to dual 32-core 3rd Gen AMD EPYC 75F3 processors running Siemens Simcenter STAR-CCM+® benchmarks.

PERFORMANCE HIGHLIGHTS

These charts show the average generational performance uplifts provided by 4th Gen AMD EPYC processors across a variety of benchmarks for Simcenter STAR-CCM+:



KEY TAKEAWAYS

Comparing the performance of single-node servers powered by dual 4th Gen AMD EPYC 9374F (32-core) processors yields the impressive ~1.50x generational performance uplift shown above. This single-node uplift while using the same number of cores demonstrates the real-world business value of the revolutionary technologies incorporated into 4th Gen AMD EPYC processors when running technical computing¹ workloads. Using 4th Gen AMD EPYC processors with higher core counts allows even higher performance uplifts. For example, the AMD EPYC 9554 (64-core) provides an uplift of ~2.09x versus the prior-generation AMD EPYC 75F3, and the AMD EPYC 9654 (96-core) delivers an even higher uplift of ~2.34x. 4th Gen AMD EPYC processors feature:

- 1MB L2 cache vs. 512 KB in “Zen 3.”
- Up to 4 links of Gen 3 Infinity Fabric™ at up to 32 Gbps.
- 12 memory channels that support up to 6TB of DDR5-4800 memory.
- Support for PCIe® Gen 5 at up to 32 Gbps.
- AVX-512 instruction support for enhanced HPC and ML performance.
- AMD Infinity Guard technology to help protect your data.²

RELATED LINKS

- [Simcenter STAR-CCM+*](#)
- [AMD EPYC™ Processors](#)
- [AMD EPYC™ Tech Docs and White Papers](#)

FOR ADDITIONAL INFORMATION

Please see the following additional resources for more information about 4th Gen AMD EPYC features, architecture, and available models:

- [AMD EPYC™ Tuning Guides](#)
- [AMD EPYC™ Products](#)

TEST METHODOLOGY

Siemens provides a standard set of benchmarks that evaluate the performance of different platforms running Simcenter STAR-CCM+.³ These benchmark cases represent typical usage and cover a range of sizes. The uplift is calculated as the ratio of the systems under test (*sut*) to the reference system (*ref*). In this Summary Brief, the 3rd Gen AMD EPYC 75F3 processor is the *ref* and the 4th Gen AMD EPYC 9374F, AMD EPYC 9554, and AMD EPYC 9654 processors are the *sut*.⁴ The total amount of variability between individual runs was < 1%.

REFERENCES

1. "Technical Computing" or "Technical Computing Workloads" as defined by AMD can include: electronic design automation, computational fluid dynamics, finite element analysis, seismic tomography, weather forecasting, quantum mechanics, climate research, molecular modeling, or similar workloads. GD-204
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
3. Benchmarks used: EmpHydroCyclone_30M, VTM_Underhood_64M_v2, LeMans_105M_Coupled, LeMans_105M_Segregated, VTM_Underhood_178M_v2, Civil_Airliner, KCS_Hull, HiMach10Sou_V2_6M, LeMans_Poly_17M, Reactor, Turbocharger_7M with OpenMPI 4.1.2
4. System configurations:
 - System 1 CPUs: 2 x AMD EPYC 9654 (96 cores/socket, 192 cores/node); Base Freq: 2.4 GHz; 384 MB L3; 1.5 TB (24x) Dual-Rank DDR5-4800 64GB DIMMs, 1DIMM per channel; 1 x 256 GB SATA (OS) | 1 x 1 TB NVMe (data); BIOS Version 1001C, SMT=off, Determinism=performance, NPS=4, TDP/PPT=400; RHEL 8.6; OS settings: Clear caches before every run, NUMA balancing 0, randomize_va_space 0
 - System 2: CPUs: 2 x AMD EPYC 9554 (64 cores/socket, 128 cores/node); Base Freq: 3.10 GHz; 256 MB L3; 1.5 TB (24x) Dual-Rank DDR5-4800 64GB DIMMs, 1DIMM per channel; 1 x 256 GB SATA (OS) | 1 x 1 TB NVMe (data); BIOS Version 1001C, SMT=off, Determinism=performance, NPS=4, TDP/PPT=400; RHEL 8.6; OS settings: Clear caches before every run, NUMA balancing 0, randomize_va_space 0
 - System 3: CPUs: 2 x AMD EPYC 9374F (32 cores/socket, 64 cores/node); Base Freq: 3.85 GHz; 256 MB L3; 1.5 TB (24x) Dual-Rank DDR5-4800 64GB DIMMs, 1DIMM per channel; 1 x 256 GB SATA (OS) | 1 x 1 TB NVMe (data); BIOS Version 1001C, SMT=off, Determinism=performance, NPS=4, TDP/PPT=400; RHEL 8.6; OS settings: Clear caches before every run, NUMA balancing 0, randomize_va_space 0
 - System 4: CPUs: 2 x AMD EPYC 75F3 (32 cores/socket, 64 cores/node); Base Freq: 2.95 GHz; 256 MB L3; 1 TB (16x) Dual-Rank DDR4-3200 64GB DIMMs, 1DIMM per channel; 1 x 256 GB SATA (OS) | 1 x 1 TB NVMe (data); BIOS Version 1009B, SMT=off, X2APIC=on, IOMMU=off, APBDIS=1, Fixed SOC P-state=0, Determinism=power, NPS=4, DF C-states=off, PIO, EPIO, TSME=off, PCIe 10 bit tag=on; RHEL 8.6; OS settings: Clear caches before every run, NUMA balancing 0, randomize_va_space 0

Alvaro Fernandez contributed to this Summary Brief.

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