AMD Reference Configuration: Ansys on Supermicro H13 Hyper Servers

AMD Value Proposition for Ansys

Better performance with 4th Gen AMD EPYC™ CPUs* vs. 3rd Gen Intel® Xeon® Platinum CPUs*

- Up to ~1.5x speedup[1] for Ansys® Mechanical™
- Up to ~1.76x speedup [2] for Ansys® LS-DYNA®
- Up to ~2.17x speedup [3] for Ansys® CFX®
- Up to ~1.75x speedup [4] for Ansys® Fluent®

*2P 32-core 4th Gen EPYC 9374F vs. 2P 32-core 3rd Gen Xeon Platinum 8362

Supermicro H13 Hyper Servers for Ansys

2U A+ Server 2125HS-TNR (NVMe/SAS/SATA)

2U A+ Server 2025HS-TNR (NVMe/SAS/SATA)

Performance node, Supermicro H13 Hyper Servers

- 2U Rack Server
- Dual AMD EPYC 9004 Series Processors
- Up to 6TB DDR5-4800MHz in 24 DIMMS
- Flexible NVMe, SAS, and SATA drive options
- Configurable PCIe 5.0 expansion capabilities with CXL™ 1.1+ memory expansion
- AIOM slots with OCP 3.0 support
- Titanium-Level efficiency power supplies

Why run Ansys applications on AMD processors?

Companies are investing in high-performance compute infrastructure with the best-performing processors to maximize the value of game-changing Ansys applications. The 4th Gen AMD EPYC processors deliver the optimal architecture for Ansys and help reduce constraints on the number, size, and complexity of simulation models while helping provide faster time to results. In addition, with AMD CPU-based systems, engineers can improve design quality and prototype performance and significantly reduce total cost of ownership (TCO) by using fewer servers to do the same work, helping reduce power and lower related emissions.

How does AMD improve Ansys applications' performance?

Compared to the prior generation, the new AMD EPYC 4th Gen processors achieve better performance[5] for Ansys applications with up to 50% more cores, higher frequencies, support for AVX-512 instructions, more memory bandwidth, and faster PCIe® and Infinity Fabric™ data transfer rate. In addition, optimizing Ansys applications with AMD compilers and libraries can help enhance performance further.

Supermicro H13 Hyper compute node systems configurations with AMD processors for Ansys

Table 1 shows recommendations for Computational Fluid Dynamics (CFD) applications like Ansys CFD, including CFX and Fluent. Supermicro with 4th Gen EPYC processors with 12 memory channels per processor and support for AVX-512 instructions can deliver high throughput per node for Ansys CFD applications since they benefit from multicore parallelism and greater memory bandwidth.

Table 1 Sample Supermicro H13 Hyper servers configurations for CFD (CFX, Fluent)

	Server/Processor	Memory	Storage/Network
Air Cooled	• Dual Socket AS -2125HS-TNR • 2x EPYC 9654 • 192 cores/node • 2.0 GHz - 2.15 GHz • L3 Cache of 384MB • TDP 360W	• Up to 6TB 3DS ECC DDR5-4800MHz in 24 DIMMs	• 24 hot-swap 2.5" NVMe/SAS/SATA drives[6] • 2 M.2 NVMe PCie 3.0 x4 • 1 AIOM/OCP 3.0 network interface slot

Table 2 shows recommendations for structural analysis using implicit Finite Element Analysis (FEA), like Ansys Mechanical. Supermicro servers with lower-core count EPYC processors with high frequencies with support for AVX-512 instructions help efficiently utilize per-core software licenses and offer very high performance per core.

Table 2: Sample Supermicro H13 Hyper servers configurations for Structural Mechanics: Ansys Mechanical

	Server/Processor	Memory	Storage/Network
Air Cooled	• Dual-Socket AS -2025HS-TNR • 2x EPYC 9354 • 64 cores/node • 3.25 GHz – 3.80 GHz • L3 Cache of 256MB • TDP 280W	• Up to 6TB 3DS ECC DDR5-4800MHz in 24 DIMMs	• 12 hot-swap 3.5" NVMe/SAS/SATA drives[6] • 2 M.2 NVMe PCie 3.0 x4 • 1 AIOM/OCP 3.0 network interface slot

Table 3 shows recommendations for crash applications using explicit FEA like Ansys LS-DYNA. Supermicro systems with medium-core count EPYC processors with high frequencies and high cache-per-core and support for AVX-512 instructions offer very high performance per core to help efficiently utilize per-core software licenses.

Table 3: Sample Supermicro H13 Hyper servers configurations for Explicit Finite Element Analysis (FEA): Ansys LS-DYNA

	Server/Processor	Memory	Storage/Network
Air Cooled	• Dual-Socket AS -2025HS-TNR • 2x EPYC 9354 • 64 cores/node • 3.25 GHz – 3.80 GHz • L3 Cache of 256MB • TDP 280W	• Up to 6TB 3DS ECC DDR5-4800MHz in 24 DIMMs	• 12 hot-swap 3.5" NVMe/SAS/SATA drives[6] • 2 M.2 NVMe PCie 3.0 x4 • 1 AIOM/OCP 3.0 network interface slot

Benefits: AMD CPU-based Supermicro H13 Hyper servers with Ansys

- **Validated and optimized** solution with compute, storage, software, services, and financial options.
- **On-site install, start-up, and integration services** delivered by Supermicro or a certified Supermicro business partner.
- **Remote management** is available with proactive monitoring and remediation of any Ansys operational issues.

Key Contacts

SUPERMICRO	Ansys	AMD
Allen Huang Sr. Marketing Manager allen.huang@supermicro.com www.supermicro.com	**Wim Slagter** *Director, Strategic Partnerships* wim.slagter@ansys.com www.ansys.com/hpc	**Mary Bass** *Senior Manager, HPC Product Marketing* mary.bass@amd.com www.amd.com

DISCLAIMER:

The information contained herein is for informational purposes only and is subject to change without notice. While every precaution has been taken in the preparation of this document, it may contain technical inaccuracies, omissions, and typographical errors, and AMD is under no obligation to update or otherwise correct this information. Advanced Micro Devices, Inc. makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and assumes no liability of any kind, including the implied warranties with respect to the operation or use of AMD hardware, software or other products described herein. No license, including implied or arising by estoppel, to any intellectual property rights is granted by this document, Terms and limitations applicable to the purchase or use of AMD's products are as set forth in a signed agreement between the parties or in AMD's Standard Terms and Conditions of Sale.

[1] SP5-130: Mechanical® Release 2022 R2 test cases benchmark comparison based on AMD measurements as of 10/19/2022. Configurations: 2x 32-core Intel Xeon Platinum 8362 vs. vs. 2x 32-core EPYC 9374F for ~1.5x the rating performance. System Configurations:
2P AMD EPYC 9374F (32 cores/socket, 64 cores/node); 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 1002, 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 vs. 2P Intel Xeon Platinum 8362 (32 cores/socket, 64 cores/node); 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
1.6.5, SMT=off, HPC Profile; OS settings: Clear caches before every run, NUMA balancing 0, randomize_va_space 0. Results may vary based on factors such as software version, hardware configurations and BIOS version and settings.

[2] SP5-112: LS-DYNA® Version 2021 R1 Nonlinear FEA benchmark comparison based on AMD measurements as of 09/18/2022. Tests run: obd10m, car2car, obd10m-short, ls-3cars and ls-neon. System Configurations: 2P AMD EPYC 9374F (32 cores/socket, 64 cores/node); 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 1002C, SMT=off, Determinism=performance, NPS=4, TDP/ PPT=400 versus 2P Intel Xeon Platinum 8362 (32 cores/socket, 64 cores/node); 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 1.6.5, SMT=off, HPC Profile. Common: RHEL 8.6 OS settings: Clear caches before every run, NUMA balancing 0, randomize_va_space 0. Results may vary due to factors including system configurations, software versions and BIOS settings.

[3] SP5-116: CFX 2022 R2 Solver, Nonlinear CFD benchmark comparison based on AMD measurements as of 9/16/22. Tests used: cfx_100, cfx_50, cfx_10, cfx_lmans, cfx_pump. Configurations: 2P AMD EPYC 9374F (32 cores/socket, 64 cores/node); 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 1002C, SMT=off, Determinism=performance, NPS=4, TDP/ PPT=400 versus 2P Intel Xeon Platinum 8362 (32 cores/socket, 64 cores/node); 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 1.6.5, SMT=off, HPC Profile. Common: RHEL 8.6 OS settings: Clear caches before every run, NUMA balancing 0, randomize_va_space 0. Results may vary due to factors including system configurations, software versions and BIOS settings.

[4] SP5-035A: Fluent® Release 2022 R2 test cases benchmark comparison based on AMD measurements as of 10/19/2022. Configurations: 2x 32-core Intel Xeon Platinum 8362 vs. vs. 2x 32-core EPYC 9374F for ~1.75x the rating performance. Results may vary.

[5] https://www.amd.com/system/files/documents/epyc-9004-pb-ansys-generational.pdf

[6] Certain CPUs with high TDP may be supported only under specific conditions. Please contact Supermicro Technical Support for additional information about specialized system optimization