High Performance Computing

Optimizing Altair Radioss™ Performance with AMD EPYC™ 7Fx2 Processors

AMD EPYC

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AMD EPYC Processors for HPC

AMD EPYC™ 7Fx2 processors bring high frequencies and very high ratios of cache per core to the 2nd Gen EPYC™ family of processors. EPYC 7Fx2 processors build on the large memory capacity, extreme memory bandwidth and massive I/O of the 2nd Gen EPYC family to deliver exceptional HPC workload performance.

High Frequency

Many HPC applications scale very well with frequency. EPYC 7Fx2 series processors offer both base and boost frequencies[4] up to 500 MHz faster than the current EPYC 7002 series models, enabling significant per-core performance.

High Cache Per Core

The 16-core EPYC 7F52 and 8-core EPYC™ 7F32 processors each boast 16 MB of cache for each core. The 24-core EPYC 7F72 processor offers 8 MB of cache per-core.

Model	Cores	Base Freq (GHz)	Boost Freq (Up to)[4]	Cache (MB)
7F72	24	3.2 GHz	3.7 GHz	192
7F52	16	3.5 GHz	3.9 GHz	256
7F32	8	3.7 GHz	3.9 GHz	128

A high ratio of cache per core helps feed data into HPC applications using very high-speed cache memory.

Scalability

With leadership architecture, 2nd Gen EPYC Series Processors demonstrate very high scalability for HPC applications by supporting 8 channels of memory per processor and PCIe® 4.

Non-Linear Problem Solving with Radioss and AMD

Altair Radioss™ is a leading structural analysis solver for highly non-linear problems under dynamic loadings. Radioss has established itself as a leader and an industry standard for automotive crash, drop & impact analysis, terminal ballistic, blast and explosion effects and high velocity impacts.

With a sophisticated customer base that values performance, reliability, safety, and innovation, the Radioss team is committed to supporting the most up-to-date, advanced computing architectures and integrating new technologies to improve performance, scalability, and usability.

Single-Node Performance: AMD vs. Intel®

Figure 1 shows the 16-core AMD EPYC™ 7F52 CPUs and the 24-core EPYC™ 7F72 CPUs outperforming the 16-core Intel® Xeon® Gold 6242 CPUs by up to an average of 35% and 65%, respectively. Testing was performed by AMD engineering.[1,2,3] Five runs were made for each test, with the average score shown.

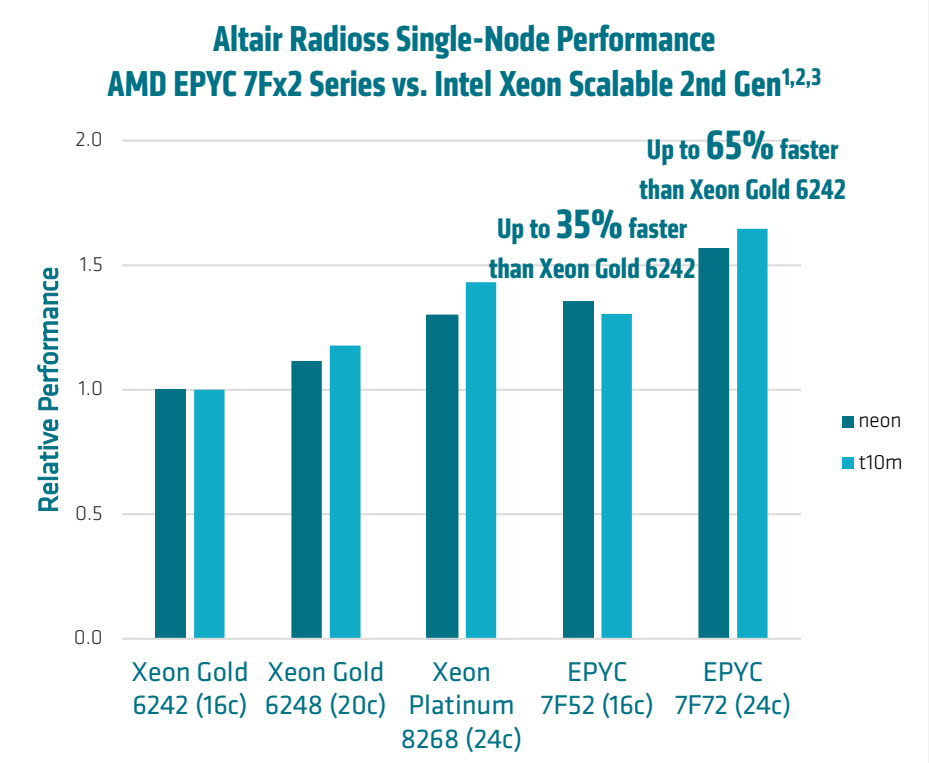

Figure 1 - Single-node AMD EPYC 7Fx2 processors vs. 2nd Gen Intel Xeon Scalable processors.

Performance Per Core

The 16-core EPYC 7F52 CPUs demonstrate up to an average ~35% per-core advantage vs. the 16-core Xeon Gold 6242 CPUs. The 24-core EPYC 7F72 CPUs also handily beats the 24-core Xeon Platinum 8268 CPUs. This critical metric, performance per core, helps to maximize your software investment.

Radioss Scaling Performance

In order to understand scaling performance AMD engineers used the much larger t10m model. Figure 2 demonstrates how EPYC 7F52 CPUs efficiently scale up to at least 16 nodes. This scaling performance running the large t10m benchmark is exceptional for an FEA application.

Whether you are running jobs on a single node, or scaling out on a large cluster, AMD EPYC 7Fx2 CPUs are the right choice for optimizing your performance per core and per node.

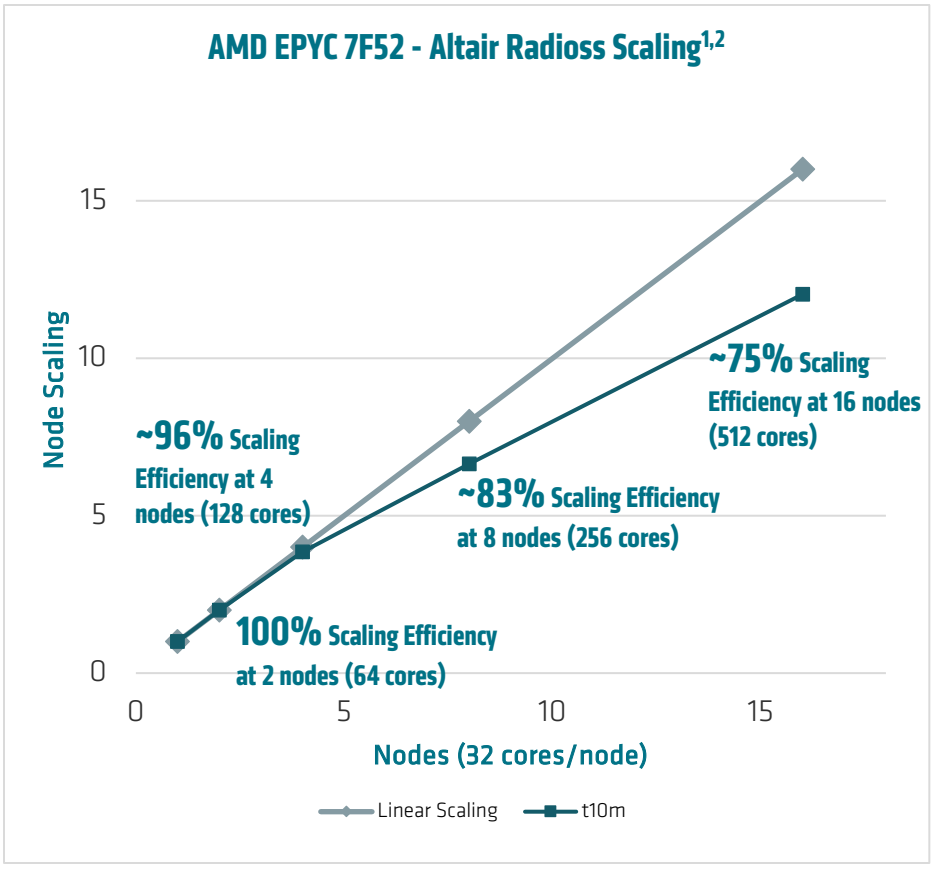

Figure 2 - AMD EPYC 7F52 demonstrates excellent scalability: Altair Radioss: t10m model

Get started with Altair Radioss and AMD EPYC today

- 2nd Gen EPYC Processors - https://www.amd.com/en/processors/epyc-7002-series
- AMD EPYC Family of Processors for HPC - https://www.amd.com/en/processors/epyc-for-hpc
- Altair - http://www.altair.com *

*Links to third party sites are provided for convenience and unless explicitly stated, AMD is not responsible for the contents of such linked sites and no endorsement is implied.

FOOTNOTES

1. Performance measured with Altair Radioss version 2018 on RHEL 7.7 (3.10.0-1062.el7.x86_64), running the NEON1M11 and T10M benchmarks.
2. AMD EPYC Processor-based System - CPUs: 2x 7F72, 2x 7F52, 16x Micron™ 64GB DDR4-3200 DR 1DPC, Mellanox™ CX-6 HDR 200 Gb/s IB x16 PCIe® Gen 4, 1x Micron 1100 256 GB SATA (OS), 1x1 TB NVMe (Data), BIOS settings: Defaults, plus NPS=NPS4 (7F52), NPS=NPS2 (7F72), SMT = Off, Boost = On, APBDIS=1, Fixed SOC P state=P0, DLWM=off, X2APIC = On, Determinism Slider = Performance, Preferred IO=Enabled.
3. Intel Xeon Scalable Processor-based System - CPUs: 2x Platinum 8268, 2x Gold 6242, 12x 64GB DDR4-2933 DR 1DPC, 1x Micron 1100 256 GB SATA (OS), 1x1 TB NVMe (Data), BIOS settings: Defaults, plus Power Management=Extreme Performance, Hyper-threading=Off, SNC=On, ADDDC=Off.
4. Max boost for AMD EPYC processors is the maximum frequency achievable by any single core on the processor under normal operating conditions for server systems. EPYC-18