



# Ansys Mechanical on Azure Instances

## Why Intel for HPC in the Cloud

Technology partnerships with leading ingredient providers to ensure optimization to Intel® CPUs.

Deep ISV and HPC community collaborations focused on optimization for leading HPC codes.

Scalability and flexibility for varying workloads in the cloud environment.

## 3rd Gen Intel® Xeon® Scalable Processor

Intel® Turbo Boost Technology 2.0

Intel® Advanced Vector Extensions 512 (Intel® AVX-512)

Intel® Deep Learning Boost

## Intel Instances for HPC Workloads

The tests below were conducted on Azure instances that are based on various generations of **Intel® Xeon® processor** in a hyper-threaded configuration. This custom processor can reach an all-core Turbo clock speed of up to 3.5GHz and features **Intel® Turbo Boost Technology 2.0**, **Intel® Advanced Vector Extensions 512 (Intel® AVX-512)**, and **Intel® Deep Learning Boost**. These new offerings deliver a better value proposition for general-purpose and memory-intensive workloads compared to the prior generation (e.g., increased scalability and an upgraded CPU class), including better performance.

**Standard D96ds\_v5**  
3rd Gen Intel® Xeon® Scalable Processor

**Standard FX48mds**  
2nd Gen Intel® Xeon® Scalable Processor

**Standard HC44rs**  
Intel® Xeon® Platinum Processor

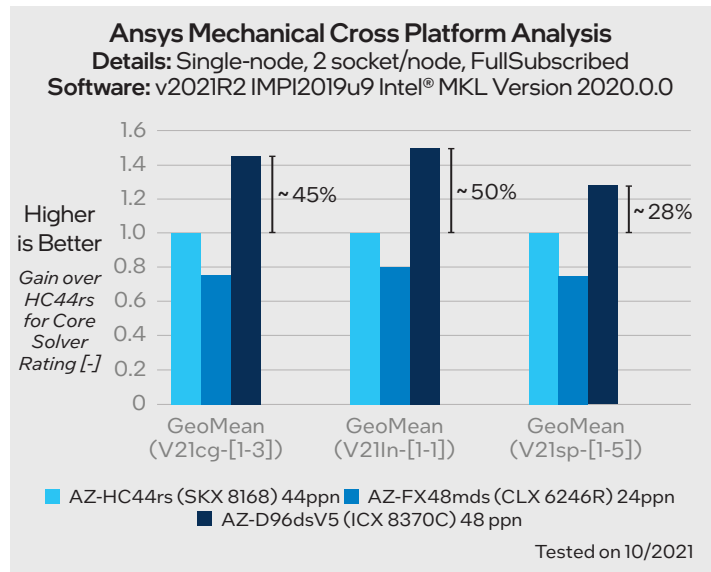
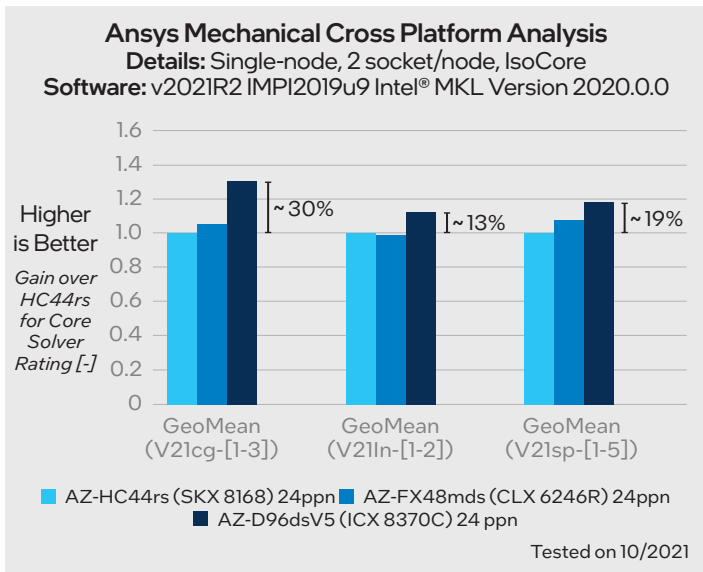
## What is Ansys Mechanical?

**Ansys Mechanical®** workloads have both memory bandwidth and compute intensive requirements that can vary for many reasons, including dataset size and the solver used.

**Ansys Mechanical** benchmark cases range in size from 650,000 degrees of freedom to over 14 million degrees of freedom. The suite contains both JCG/PCG and Sparse equation solver benchmark cases and covers a wide variety of analysis.

Ansys Mechanical performance is sensitive to MPI processes, processor generation, data locality, and memory bandwidth for some cases (in particular, the set of SP benchmarks). Mechanical leverages Intel AVX-512 performance, Intel® Math Kernel Library (Intel® MKL), and core processor performance.

## Ansys Mechanical Benchmarking on Azure Instances



See below for workloads and configurations. Results may vary.

**Configuration of AZ-D96dsV5** – Instance Type Standard D96ds\_v5, 96 vCPUs (numa=2, threads per core=1, socket=2) of Intel® Xeon® Platinum 8370C Processor @ 2.80GHz, 384GB Memory Capacity, Premium SSD Ephemeral, CentOS Linux release 8.1.1911 kernel 4.18.0-147.8.1.el8\_1.x86\_64, Ansys Mechanical 2021 R2, Intel® Compiler Version 19.0.0 (Build: 20190206), Intel® MPI Version 2019 Update 9, Intel MKL Intel® Math Kernel Library Version 2020.0.0, Tested by Intel on 10/7/2021

**Configuration of AZ-HC44rs** – Instance Type Standard HC44rs, 44 vCPUs (numa=2, threads per core=2, socket=2) of Intel® Xeon® Platinum 8168 Processor, 352GB Memory Capacity, Premium SSD Ephemeral, CentOS Linux release 8.1.1911 kernel 4.18.0-147.8.1.el8\_1.x86\_64, Ansys Mechanical 2021 R2, Intel® Compiler Version 19.0.0 (Build: 20190206), Intel® MPI Version 2019 Update 9, Intel MKL Intel® Math Kernel Library Version 2020.0.0, Tested by Intel on 10/8/2021

**Configuration of AZ-FX48mds** – Instance Type Standard FX48mds, 48 vCPUs (numa=2, threads per core=2, socket=2) of Intel® Xeon® Platinum 6246R Processor @ 2.80GHz, 384GB Memory Capacity, Premium SSD Ephemeral, CentOS Linux release 8.1.1911 kernel 4.18.0-147.8.1.el8\_1.x86\_64, Ansys Mechanical 2021 R2, Intel® Compiler Version 19.0.0 (Build: 20190206), Intel® MPI Version 2019 Update 9, Intel MKL Intel® Math Kernel Library Version 2020.0.0, Tested by Intel on 09/29/2021

## How to Get Intel Benefits

3rd Gen Intel Xeon Scalable processors provide significant performance gains for Ansys Mechanical workloads, benefiting from Intel AVX-512, Intel Math Kernel Library, and higher memory bandwidth. Customers running this Ansys Mechanical workload can realize significant performance gains by deploying on 3rd Gen Intel Xeon Scalable instance type AZ-D96dsV5 vs. running on previous generation Intel Xeon Scalable processors on Azure.

Resources: [www.intel.com/HPC](http://www.intel.com/HPC)

### Notices & Disclaimers

Performance varies by use, configuration and other factors. Learn more at [www.Intel.com/PerformanceIndex](http://www.Intel.com/PerformanceIndex).

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. No product or component can be absolutely secure.

Your costs and results may vary.

Intel technologies may require enabled hardware, software or service activation.

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