

# Speed Fluid Dynamics Simulations on Oracle Cloud Infrastructure OCI-BM.Optimized3.36 Instances with 3<sup>rd</sup> Gen Intel<sup>®</sup> Xeon<sup>®</sup> Scalable Processors

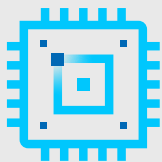


Ansys Fluent



**Boost Performance for Modeling Flow Through a Combustor by up to 1.30x with OCI-BM.Optimized3.36 Instances with 3<sup>rd</sup> Gen Intel Xeon Scalable Processors**

*vs. OCI-BEM.HPC2.36 Instances with 2<sup>nd</sup> Gen Intel Xeon Scalable Processors*



**Boost Performance for Modeling External Flow Over an Aircraft Wing by up to 1.32x with OCI-BM.Optimized3.36 Instances with 3<sup>rd</sup> Gen Intel Xeon Scalable Processors**

*vs. OCI-BEM.HPC2.36 Instances with 2<sup>nd</sup> Gen Intel Xeon Scalable Processors*

## On Benchmarks Simulating Models of Combustor Flow and Aircraft Wing, OCI-BM.Optimized3.36 Instances Boosted Performance Compared to OCI-BM.HPC2.36 Instances with Older Processors

Businesses across many verticals, from industrial engineering to healthcare to automotive and aerospace engineering, use Ansys tools and similar software for real-world simulations and modeling. These simulations are extremely compute-intensive, so when choosing a solution on which to run them, high performance is critical. A cloud service provider such as Oracle Cloud Infrastructure (OCI) offers many options—which instance will work best for these complex use cases?

Testing at multiple node counts showed that bare-metal OCI-BM.Optimized3.36 instances enabled by 3<sup>rd</sup> Gen Intel Xeon Scalable processors improved performance of two Ansys Fluent simulation cases compared to OCI-BM.HPC2.36 instances with 2<sup>nd</sup> Gen Intel Xeon Scalable processors. With such consistent performance improvements, companies running fluid dynamics workloads on OCI should consider OCI-BM.Optimized3.36 instances enabled by 3<sup>rd</sup> Gen Intel Xeon Scalable processors.

### Better Performance Modeling Flow Through a Combustor

On the combustor\_71m benchmark, which models flow through a combustor, OCI-BM.Optimized3.36 instances enabled by 3<sup>rd</sup> Gen Intel Xeon Scalable processors offered consistently higher performance than OCI-BM.HPC2.36 instances with 2<sup>nd</sup> Gen Intel Xeon Scalable processors. Improvements ranged from 1.26x at sixteen nodes up to 1.30x at a single node (see Figure 1).

#### Relative Ansys Fluent combustor\_71m performance

Higher is better

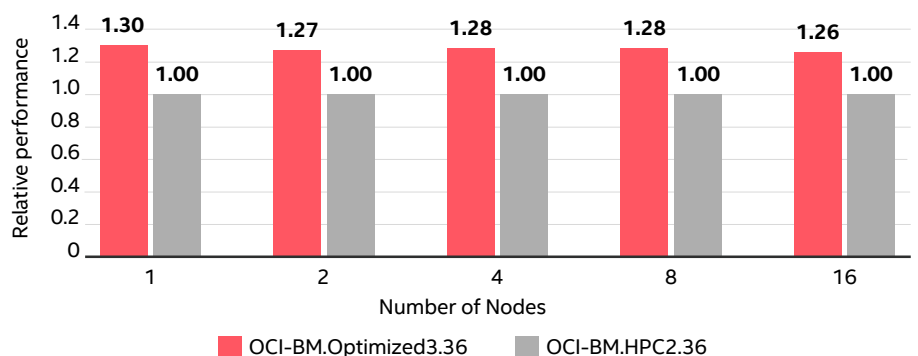


Figure 1. Relative Ansys Fluent combustor\_71m performance of OCI-BM.Optimized3.36 instances versus that of OCI-BM.HPC2.36 instances at one, two, four, eight, and sixteen nodes. Higher numbers are better.

## Better Performance Modeling External Flow Over an Aircraft Wing

As Figure 2 shows, the aircraft\_wing\_14m benchmark, which models external flow over an aircraft wing, also highlighted stronger performance from the OCI-BM.Optimized3.36 instances enabled by 3<sup>rd</sup> Gen Intel® Xeon® Scalable processors. At a single node, the OCI-BM.Optimized3.36 instances delivered 1.32x the performance of the OCI-BM.HPC2.36 instances with 2<sup>nd</sup> Gen Intel Xeon Scalable processors.

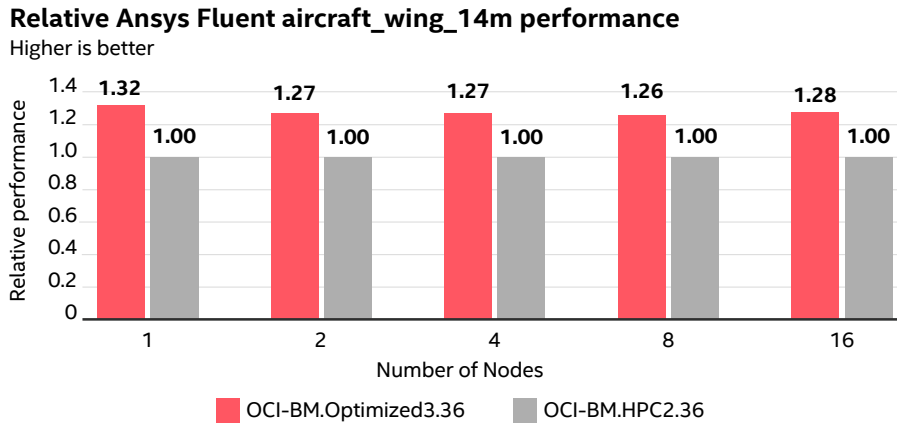


Figure 2. Relative Ansys Fluent aircraft\_wing\_14m performance of OCI-BM.Optimized3.36 instances versus that of OCI-BM.HPC2.36 instances at one, two, four, eight, and sixteen nodes. Higher numbers are better.

## Conclusion

Complex models and simulations require enormous amounts of compute power, meaning that for organizations using Oracle Cloud Infrastructure for their fluid dynamics workloads, the choice of instance is especially important. Testing at five different node counts on two different Ansys Fluent benchmarks showed that OCI-BM.Optimized3.36 instances with 3<sup>rd</sup> Gen Intel Xeon Scalable processors consistently improved performance over OCI-BM.HPC2.36 instances with older processors, with performance boosts of up to 1.32x.

## Learn More

To begin running your fluid dynamics workloads on bare-metal OCI-BM.Optimized3.36 instances with 3<sup>rd</sup> Gen Intel Xeon Scalable processors, visit <https://docs.oracle.com/en-us/iaas/Content/Compute/References/computeshapes.htm>.

Test by Intel on 4/5/2022. Software: CentOS Linux release 7 kernel 3.10.0-1160.25.1.el7.x86\_64, Intel Compiler Version 19.0.0 (Build: 20190206), Intel MPI Version 2019 Update 8 and Version 2018 Update 3, Intel MKL Intel Math Kernel Library Version 2020.0.0 where applicable, Ansys Fluent 2021 R2. Instance details: OCI-BM.HPC2.36: Intel Xeon Gold 6154 CPU @ 3.00GHz, 72 vCPUs, 284GB RAM, NVMe SSD NFS, MLX ConnectX5 RoCEv2 100Gbps; OCI-BM.Optimized3.36: Intel Xeon Gold 6354 CPU @ 3.00GHz, 512GB RAM, NVMe SSD NFS, MLX ConnectX5 RoCEv2 100Gbps.



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