Solution Snapshot

Intel® Select Solutions for Simulation and Modeling

intel SELECT SOLUTIONS

The Challenge

Computer Aided Engineering is projected to be worth
$2.46 billion in 2024[1]

Manufacturers need

- Well-designed products
- Reduced time to market
- Reduced TCO *(total cost of ownership)*

Requirements

- Complex, demanding workloads
- Varying performance factors
- Throughput vs per-core performance needs
- Massive million-element models
- Time-to-market pressure
- Costly software licenses

Use Cases:

- **Computational Fluid Dynamics** (CFD)
- **Structural Analysis**
- **Finite Element Analysis** (FEA)
- **Mechanical Engineering**

Simulation and Modeling Overview + Benefits

Lowering the barrier to entry to HPC

- Harness more compute power beyond workstations to solve larger simulation problems, with more geometric detail, and integrate complex physics.
- Scale complex modern analytical problem sets requiring many billions of computations per second.
- Avoid common barriers of hardware limitations and system bottlenecks that slow performance of these larger and more complex simulation runs.

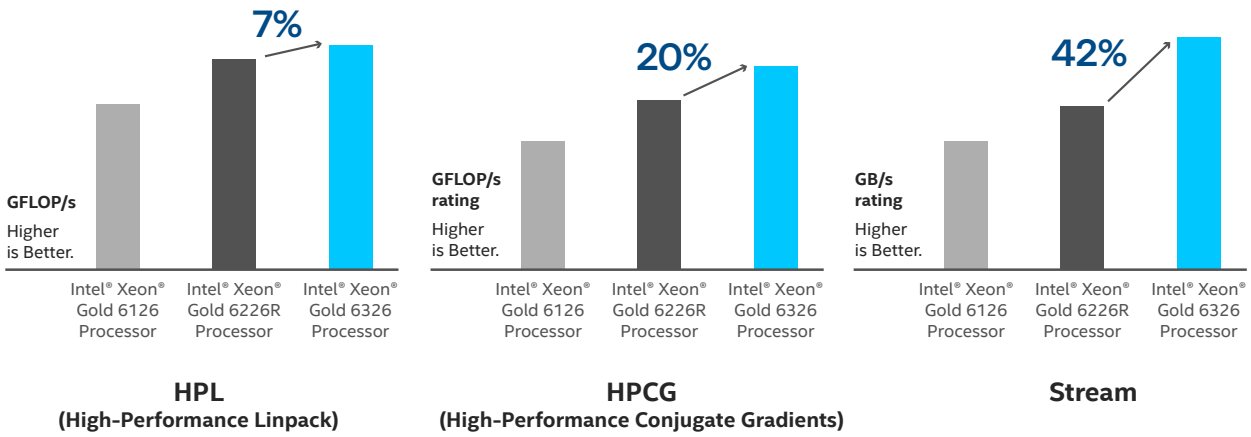
High-performance computing (HPC) simulation and modeling can be the key element of success for manufacturing and research companies facing an increasingly competitive environment. Numerous HPC applications provide capabilities to explore design parameters, reduce prototype costs, and produce optimized products in shorter amounts of time. In addition, many of these applications can distribute computation across multiple machines that are configured to act as one large unit: an HPC cluster.

An HPC cluster can provide a scalable resource that enables faster results, finer-grained models, and ultimately, higher productivity compared to using a single system for simulation workloads. But for many organizations, the skills or expertise to deploy and maintain scalable HPC clusters for simulation and modeling workloads present a barrier to adoption.

Building an HPC cluster involves more than choosing the right processor, core count, and memory. Storage, remote-visualization, job scheduling, and workload management software all need to be considered.

In addition, integrating the hardware and software to meet the requirements for simulation and modeling applications is highly complex. In the end, businesses can spend weeks or more researching and assembling the components needed for their solutions.

Simulation & Modeling Performance



HPL
(High-Performance Linpack)

HPCG
(High-Performance Conjugate Gradients)

Stream

Solutions On-Premises and in the Cloud

Intel® Select Solutions can be deployed easily on premises and in the cloud. End users will have the confidence that they get the same predictable and scalable performance regardless of location.

Intel® Select Solutions for Simulation & Modeling are validated to ensure:

- The solutions include key hardware and software components important for HPC
- The solutions are compliant with industry standards and best practices for Intel-based clusters as defined in the Intel HPC Platform Specification
- The solutions meet or exceed defined performance levels in targeted characteristics important to HPC applications

Intel Select Solutions for Simulation & Visualization

Intel-Developed Open Source Libraries Available for Third Party Applications to Adopt:

- Optimized for parallel processing architectures in Intel CPUs for increased performance
- Open-sourced technology delivering vivid visualization of complex, enormous data sets
- High-fidelity images for gaining deeper insights in science and industry, faster

Reduces Hardware Cost by Minimizing Single Purpose Hardware:

- Single system for simulation & visualization

What are Intel® Select Solutions for HPC?

Intel® Select Solutions for Simulation & Modeling offer an easier path and quick-to deploy infrastructure that significantly reduces this complexity for the purchaser. Using a standards-based approach defined in the Intel HPC Platform Specification, these solutions provide verified interoperability with common applications used in simulation and modeling.

Want More Information?

Resources

Simulation & Modeling

High Performance Computing

1 2020 HPC Multi-Client Study: Vertical/Application Workload Areas July 2020 Hyperion Research.

6226R configuration: Test by Intel as of 1/21/2020. 4-nodes, 2x Intel® Xeon® Gold 6226R. Processor; 1x Intel® Server Board S2600WFT; Total Memory 192 GB, 12 slots/16 GB/2933 MT/s DDR4 DRAM Memory; Intel® Hyper-Threading Technology: Enable; Turbo: Enable; Storage(boot): Intel® SSD DC S3520 Series; 1x one-port, low-profile Intel® Omni-Path Host Fabric Interface Adapter 100 Series (100HFA016LS) x16, PCIe; 24 Port Intel Omni-Path Edge Switch 100 Series; 16-port 1Gbps Ethernet switch. BIOS version: SE5C620.86B.02.01.0009.092820190230, microcode: 0x5000029, CentOS* 7.7 (3.10.0-1062.9.1.el7.x86_64), Intel® Cluster Checker 2019 Update 6, compilers_and_libraries_2020.0.166, psxe_runtime_2020. CPU governor set to "performance".

6126 configuration: Base Configuration 4 Nodes; 2x Intel® Xeon® Gold 6126 CPU at 2.60 GHz; 1x Intel® Server Board S2600WFT; 96 GB (DDR4 2666 MHz DIMM); Intel® Omni-Path Host Adapter 1 Port PCIe x16 Low Profile 100HFA016LS; Intel® SSD DC S4500 Series; 24 Port Intel® Omni-Path Managed Edge Switch; 16 Port 1 GbE Ethernet Switch. Microcode 0x2000043; BIOS Version 00.01.0013; BMC Version: 1.43.660A4315; Intel® ME Version 04.00.04.294; Fabric Software Intel® Omni-Path Fabric (Intel® OP Fabric) software version 10.7.0.0.145; Cluster Software Stack OpenHPC* 1.3.4

Performance varies by use, configuration and other factors. Learn more at www.Intel.com/PerformanceIndex. Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure. Your costs and results may vary. Intel technologies may require enabled hardware, software or service activation.