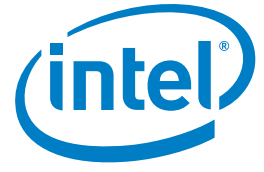


## CASE STUDY

Intel® Xeon® processor 5600 and 5500 series  
High-Performance Computing



# Delivering Scalable Performance

## SIMULIA advances customers' simulations with large Intel® Xeon® processor-based cluster from HP

From aerospace to plastics, engineers need greater scalability and performance to obtain faster turnaround times on higher-fidelity simulations. Engineering software leader SIMULIA has invested in an HP ProLiant® DL1000 cluster based on the Intel® Xeon® processor 5500 series to help meet those needs. SIMULIA uses the 512-core cluster to optimize and test its codes for scalability and performance, and to improve post-sales support for its fast-growing high-performance computing (HPC) customer base. SIMULIA plans to acquire a cluster based on the Intel® Xeon® processor 5600 series and expects to see another 15 to 20 percent increase in performance.



"If you're looking at the performance per unit of space and the amount of power you're consuming, benchmarks will demonstrate the obvious benefits of Intel® processors."

– Matt Dunbar  
Chief Architect  
SIMULIA

### CHALLENGES

- **Scalable software.** Provide steady increases in HPC performance and scalability so customers can tackle more complex design challenges and improve engineering productivity.
- **Expert support.** Replicate customers' larger clusters to support them effectively.
- **Delivering innovation.** Put innovative products in end users' hands quickly.

### SOLUTION

- **Industry-leading technologies from Intel and HP.** SIMULIA worked with Intel and HP to deploy a large-scale HP Cluster Platform\* based on HP ProLiant® DL1000 servers that met SIMULIA's budget and power requirements. The cluster has 128 quad-core Intel Xeon processors 5500 series and runs Novell SUSE Linux Enterprise\*.

### IMPACT

- **Scalable proof.** SIMULIA strengthens its HPC leadership by demonstrating that its realistic simulation solutions scale across large clusters and can be supported effectively.
- **Customer value.** Customers can improve engineering productivity with rapid turnaround times even as they run larger, more detailed models. Customers can control costs by running workloads on cost-effective, Intel® technology-based clusters that previously required expensive RISC or single-node, large-memory platforms.
- **Faster development cycles.** The cluster doubles SIMULIA's computing capacity, allowing its developers to deliver new capabilities more quickly.

### Do More, Faster

As a leader in computer-aided engineering software, SIMULIA knows its customers face rising pressure to do more, faster. If customers can run more detailed simulations and obtain results more quickly, they're positioned to minimize guesswork, reduce costly redesigns, increase the productivity of highly paid engineers, and create more robust and innovative products.

SIMULIA places a premium on using Intel® architecture to deliver the performance its customers need. Programmers use

Intel® compilers to develop codes and Intel® Parallel Studio to root out hard-to-find errors. The company collaborates with Intel® software experts to make full use of Intel® platform capabilities.

Now, strengthening its commitment to the strategic HPC market segment, SIMULIA has deployed a large-scale cluster that helps ensure the company's applications scale across larger systems. Using 128 cores of the cluster, SIMULIA ran a very large, nonlinear, aircraft-fuselage-loading simulation in under 2.5



## Intel and HP worked with SIMULIA to understand its priorities and craft a solution

hours. The same job took 20 hours when running on all cores of a single server and 120 hours on a single core. "To go from five days to less than one day using the multi-core capabilities of a modern server is a significant reduction," says Matt Dunbar, chief architect at SIMULIA. "When you reduce simulation time to 2.5 hours on a cluster of multi-core servers, you transform work on this type of simulation from exotic to routine."

### Collaborating with Intel and HP

In selecting the cluster, the SIMULIA team considered the performance gains its applications had already achieved on the Intel Xeon processor 5500 series. Dunbar says the company had benchmarked speedups of 70 percent for its Abaqus Unified Finite Element Analysis (FEA)/Explicit\* benchmarks when comparing the Intel® Xeon® processor 5570 against the previous-generation Intel® Xeon® processor 5482.

Since scalability was a major focus for the cluster, SIMULIA wanted to obtain as many cores as possible within its price and power constraints. The company turned to HP and Intel, which worked with SIMULIA to create an HP Cluster Platform configuration based on ProLiant DL1000 servers that met all requirements. With 128 Intel® Xeon® processors 5520 in 64 dense, power-efficient DL1000 servers, the rack-based system provides 512 cores in a compact, affordable solution.

### Next-Generation Performance

SIMULIA continues seeking the latest computing resources to test its applications' performance boundaries and enhance its developers' productivity. On the drawing boards: A smaller cluster based on the next-generation Intel Xeon processor 5600 series.

"With a 15 to 20 percent improvement over the Intel Xeon processor 5500 series on the geo means of Explicit and Standard's customer benchmarks, the six-core Intel Xeon processor 5600 series looks like the right processor for our near-term development computing and testing requirements," says Dunbar. "This processor basically gives us more cores for the same money, which provides economies of scale and allows us and our customers to get more work done per socket. It provides the right balance of performance and capacity to meet our test and development needs."

### Engineering Efficiency Delivers for the Bottom Line

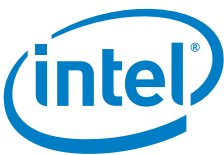
SIMULIA's work on the clusters translates to productivity benefits for its engineering customers, according to Dunbar. "There are some problems you just can't handle if you do not have a scalable solution," he comments. "Adding machines to a cluster and using scalable software, you can run larger models and do more iterations in the same amount of time. It's all about making designers more efficient. If you're the engineer who has 25 engine block analyses to run, it's going to make a big difference if you can run them in one day instead of five days."

### SPOTLIGHT ON SIMULIA

SIMULIA is the Dassault Systèmes brand that delivers a scalable portfolio of simulation solutions, including the Abaqus\* product suite for unified finite element analysis. SIMULIA is headquartered in Providence, Rhode Island, and provides sales, services, and support through a global network of regional offices and distributors. Dassault Systèmes is a world leader in 3D and product lifecycle management (PLM) solutions, bringing value to more than 115,000 customers in 80 countries.

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