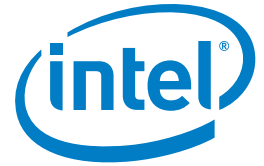




CASE STUDY
Intel® Cluster Ready
Intel® Xeon® processor 5500 series
Performance: Data-Intensive Computing



Strengthening product design with HPC

Simpson Strong-Tie selects an Intel® Cluster Ready system to accelerate innovation without adding IT complexity

For Simpson Strong-Tie, high-performance computing (HPC) plays a key role in creating the structural products that help people build stronger, safer buildings. As the company's existing HPC system approached the end of its life, the R&D engineering group sought a new processing platform that could handle more detailed design simulation and deliver faster results without adding IT complexity. Working with systems integrator Silicon Mechanics, the IT group selected an Intel® Cluster Ready system equipped with Intel® Xeon® processors, running SIMULIA Abaqus/Explicit* software, and managed with Platform Computing management software. The new cluster provides more than two times the processing cores in half the data center footprint as the previous system. Deployed in just two days, the new system enables product developers to run complex models and get results two to three times faster than before, while reducing the total cost of ownership. The company is producing more products with reduced time to market.



“With the new Intel® processor-based cluster, we can run larger, more complex simulations and get results between two and three times faster than before.”

– Frank Ding,
R&D Engineer, Simpson Strong-Tie

CHALLENGES

- **Enhance simulation, accelerate results.** Run more complex models and achieve faster results to facilitate innovation and accelerate product development.
- **Simplify deployment.** Implement a powerful computing system, while reducing the time required for the small IT department to design, test, configure, and manage an HPC cluster.
- **Control costs.** Provide product developers with outstanding performance while controlling the costs of acquiring and running the cluster.

SOLUTION

- **Intel® Cluster Ready system with Intel® Xeon® processors.** Simpson Strong-Tie worked with Silicon Mechanics to select and deploy a Hyperform HPCi for SIMULIA* cluster—an Intel Cluster Ready HPC system equipped with the Intel® Xeon® processor 5500 series, running SIMULIA Abaqus/Explicit* software, and managed with Platform HPC software from Platform Computing.

IMPACT

- **More products, faster time to market.** The new cluster runs complex models and delivers results two to three times faster than before, helping product developers deliver innovative products quickly.
- **Rapid implementation.** With help from Silicon Mechanics, the company deployed the Intel Cluster Ready system in just two days—less than half the time of the previous system—enabling the company to achieve a faster time to productivity.
- **Reduced costs.** The new system delivers substantially improved performance while significantly decreasing the total cost of ownership.



Intel® Xeon® Processors Accelerate Simulation Results

“By offering Intel® Cluster Ready systems, we can provide powerful computing systems to a broad range of organizations, even companies with small IT groups or limited experience with HPC.”

– Shane Huntress
Sales Manager, Silicon Mechanics

Producing structural connectors and fasteners might not seem to require cutting-edge computing technology, but the Simpson Strong-Tie team knows the value of HPC. “Using HPC for modeling is critical in product design,” says Frank Ding, R&D engineer at the company. “To build a physical test specimen with concrete, we would need 28 days just for the concrete to reach design strength. With HPC, we can simulate that environment in two days. Product developers use HPC to design and optimize products for their specific goals in a very short time frame.”

As the company’s existing cluster neared the end of its life, Ding looked for the processing platform that could deliver the best performance running the SIMULIA Abaqus/Explicit* software used for product design. A component of the Abaqus product suite for Unified Finite Element Analysis (FEA), Abaqus/Explicit helps Simpson Strong-Tie simulate nonlinear behavior and conduct failure analysis for products. The Abaqus FEA suite can capitalize on the latest high-performance parallel computing environments to deliver extremely detailed models that were impossible in the past.

“Achieving optimum and efficient performance for Abaqus is our top priority,” says Ding. “Fortunately, SIMULIA provides benchmarks that allow us to find the best processing architecture easily.”

As the primary operator of the HPC system, Ding also wanted to work with a system integrator that could deliver a turnkey solution. “I needed a third party that could provide a complete, integrated system, optimized for Abaqus, and have it up and running quickly,” says Ding.

Simpson Strong-Tie selects Intel® Xeon® processors to maximize Abaqus performance

Benchmarking data provided by SIMULIA led Ding to select a new cluster based on Intel® Xeon® processors. “The Abaqus benchmarks clearly showed that the Intel Xeon processors delivered better

performance than the competing processing architecture, which we were using in our existing cluster,” says Ding. “To be sure, we submitted sample jobs to SIMULIA to see how our workloads would perform, and the results showed significant performance improvement on Intel processors compared with our existing platform. It was an easy decision to move to Intel processors.”

Silicon Mechanics offers a turnkey Intel® Cluster Ready system

The Abaqus benchmarking information also led Ding to system integrator Silicon Mechanics. “We discovered Silicon Mechanics through SIMULIA, and we gathered strong recommendations from our industry contacts,” says Ding. “The Silicon Mechanics team was very responsive and helped us acquire a complete, integrated software and hardware solution.”

To simplify design and configuration of the cluster, Ding selected a certified Intel® Cluster Ready system. Certified Intel Cluster Ready systems are built according to the Intel Cluster Ready Specification and rigorously tested for component interoperability. The Abaqus/Explicit application is a registered Intel Cluster Ready application, which means it has been validated on a certified cluster. Platform Computing’s Platform HPC software—also registered for Intel Cluster Ready systems—helps simplify management, making it easy to harness the power, flexibility, and scalability of the cluster.

“By offering Intel Cluster Ready systems, we can provide powerful computing systems to a broad range of organizations, even companies with small IT groups or limited experience with HPC,” says Shane Huntress, sales manager at Silicon Mechanics.

Ding used the configuration tool on the Silicon Mechanics Web site to design the cluster, and the Silicon Mechanics team helped fine-tune the configuration. The new cluster uses a Silicon Mechanics Rack-form iServ R346* head node and four more

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– Frank Ding, R&D Engineer, Simpson Strong-Tie

R346 servers for the compute nodes. All of the nodes are equipped with the Intel Xeon processor 5500 series. The servers run Abaqus/Explicit software on the Red Hat Enterprise Linux* operating system.

Simpson Strong-Tie deploys the new solution in two days

Silicon Mechanics helped install the cluster and completed training in just two days—less than half of the time it took Simpson Strong-Tie to deploy the previous system. “By choosing an Intel Cluster Ready system from Silicon Mechanics, we received a turnkey solution,” says Ding. “The Silicon Mechanics team configured the system, installed the software, and handled all the licensing before it even arrived. To deploy the cluster, we just needed to move the box into the server room, establish the network connections, and power it up.”

Once the cluster was up and running, Platform HPC software helped simplify ongoing administration. The Simpson Strong-Tie team can focus on new projects instead of managing the cluster.

Improved performance delivers results up to three times faster than before

By moving to the Intel Xeon processor 5500 series, Simpson Strong-Tie increased the number of processing cores from 12 to 32 without adding more compute nodes. As a result of SIMULIA’s extensive efforts to optimize its software for Intel Xeon processor-based clusters, Abaqus capitalizes on that increased core count to deliver exceptional performance. “In the years since we began using HPC, the Abaqus parallel performance has improved

significantly,” says Ding. “As a result, using more cores enables us to achieve a substantial performance boost compared with our previous cluster.”

That performance boost is having a tremendous impact on the productivity of product development at Simpson Strong-Tie. “With the new Intel processor-based cluster, we can run larger, more complex simulations and get results between two and three times faster than before,” says Ding. “In the past, it might have taken a day or more to see results for some workloads. Now we have answers in three or four hours. That speed has a huge impact on productivity.”

Simpson Strong-Tie gains performance while reducing TCO by 50 percent

Simpson Strong-Tie enjoys that improved performance while controlling costs. “We were able to acquire this 32-core cluster at half the cost of the 12-core cluster we purchased four years ago,” says Ding. “The new Intel Cluster Ready system also consumes less power and uses half the space as our previous cluster, even with the same number of nodes.”

Product developers deliver more products, faster

By accommodating more complex simulations and delivering rapid results, the new cluster is facilitating product innovation at Simpson Strong-Tie. “Product developers can explore more alternatives now,” says Ding. “Ultimately, they will produce more efficient, robust products and bring them to market even faster than before.”

SPOTLIGHT ON SIMPSON STRONG-TIE

For more than 50 years, Simpson Strong-Tie has produced structural products for building safer, stronger homes and buildings. A growing global company, Simpson Strong-Tie today is one of the largest suppliers of structural building products in the world.

SILICON MECHANICS

Silicon Mechanics is a leading provider of rackmount servers, storage, and HPC solutions. Customers can select and configure certified Intel® Cluster Ready clusters easily from the Silicon Mechanics Web site.

SIMULIA

SIMULIA delivers a scalable portfolio of Realistic Simulation solutions including the Abaqus product suite, multiphysics solutions, and SIMULIA SLM for managing simulation data, processes, and intellectual property.

PLATFORM COMPUTING

With more than 2,000 customers and 5 million CPUs under management, Platform Computing is a global leader in cluster, grid, and cloud management software.

INTEL® CLUSTER READY

The Intel Cluster Ready program makes it easy for organizations to select, deploy, and manage an HPC cluster. Using a standards-based Linux* architecture, Intel Cluster Ready systems provide the flexibility for choosing components and applications that suit specific needs. Rigorous testing gives organizations the confidence that their certified Intel Cluster Ready cluster will operate as it should, right away, letting users get to work fast. With Intel Cluster Ready, organizations can move beyond the limitations of desktops and workstations to capitalize on the increased productivity of HPC.

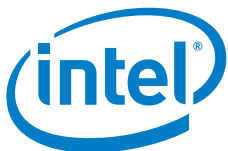
Visit www.intel.com/go/cluster to read more about the Intel Cluster Ready program and to learn more about Intel Cluster Ready partners.

Visit any Silicon Mechanics product page at www.siliconmechanics.com to custom-configure your server, storage, or certified Intel® Cluster Ready cluster solution.

Visit www.simulia.com for additional information about the Abaqus Unified FEA suite and other products in the scalable portfolio of Realistic Simulation solutions from SIMULIA.

Visit www.platform.com to learn more about Platform Computing solutions for cluster, grid, and cloud management.

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