

Case Study

High-Performance Computing (HPC)
Intel® Xeon® Scalable Processors



JSP Boosts High-Tech Manufacturing Simulations with Intel Xeon Scalable Processors

Intel technology and a managed HPC appliance from TotalCAE help a leading plastics innovator speed performance and simplify its engineering simulation environment

At a Glance

- Managed HPC appliance from TotalCAE
- Powered by Intel Xeon Gold 6238 processors and based on Dell EMC PowerEdge R640 servers
- Provides high LS-DYNA performance for a leading global plastics manufacturer



Executive Summary

JSP invented ARPRO Expanded Polypropylene (EPP) plastics and leads in its production. Needing more performance for its computer-aided engineering (CAE) analysis, JSP chose a TotalCAE appliance built on Intel Xeon Gold 6238 processors. JSP says the appliance improves Ansys LS-DYNA performance by up to 35 percent compared to its previous system, which used dual Intel Xeon processors E5-2697 v3. The appliance helps JSP keep pace with its growing CAE requirements while saving time and accelerating time-to-insights for the company's CAE team.

Challenge

JSP is a leading supplier of advanced polymer-based engineering materials used in the automotive, construction, civil engineering, packaging, and other industries. The Tokyo-based company pioneered its flagship EPP technology in the 1970s, and along with its customers, it continues to develop innovative ways of using it. EPP materials are valued for their light weight, structural strength, and energy absorption capabilities. The technology also tends to be less expensive and faster to implement than conventional injection molding, and is 100 percent recyclable.

JSP manufactures tiny beads of EPP foam that are the raw materials for everything from food packaging containers to furniture to car bumpers. The company also provides sheets, boards, and other formats based on a range of expanded polymers under ARPRO and other brands. Depending on the customer's requirements, JSP can provide the raw materials themselves or can mold them into parts and products.

CAE is an essential part of JSP's business success. A small team at JSP's North American headquarters in Madison Heights, Michigan, performs all the company's CAE work, using Ansys LS-DYNA software to run a variety of static and dynamic analyses. These CAE studies go into the development of end-products as well as optimization of the tools (or molds) used for manufacturing products. As part of its customer support commitment, the group also provides each customer with a CAE model of the materials. "Customers can incorporate this model into their own design and engineering efforts," says Nurul Huda, lead product development engineer at JSP. "An automotive customer, for example, can predict how its bumper design will handle the impact from a collision at various speeds."

The CAE team performed its analyses on an Intel Xeon Scalable processor based HPC cluster, but the system was several generations old, and the team's workloads were growing. "As our business grows, so does our need for CAE," Huda says. "We have more job requests internally and more customers to support. Where we used



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to work with models that were represented by thousands of elements, now we're building models with millions of elements. We are a small group with a big responsibility, and HPC is essential for our work. We were at a point where we needed much more CPU power."

The CAE team also wanted a vendor that could help them deploy and manage a new HPC system. "Our IT department supports standard business computing for the company, but it lacked the expertise to meet the specialized needs of HPC and engineering analysis," says Huda. "The CAE group struggled as a result."

Solution

JSP chose a managed HPC cluster appliance from TotalCAE—a turnkey solution that resides in JSP's Michigan data center and is managed remotely by TotalCAE. The hardware is based on a Dell EMC PowerEdge R640 system with Intel Xeon Gold 6238 processors, and the software enables simulation as a service using engineering simulation applications from Ansys and other companies.

"We wanted a system that would give us accurate simulations and better, efficient performance," Huda says. "We chose Intel technologies from Dell and TotalCAE to have an optimized system that gives us faster and correct results."

TotalCAE's managed HPC cluster appliance gives JSP a single interface for job submission, usage analytics, data management, simulation software license management, and simulation backups. JSP also has the option to expand to TotalCAE's managed cloud on Azure or Amazon Web Services (AWS).

TotalCAE president Rod Mach says Intel technologies provide solid value for TotalCAE and its customers. "Our clients need proven technologies that provide consistent, reliable high performance," Mach states. "Since we support the client's production engineering environment, it's important for us as well. We can't afford to be guinea pigs for unproven technology. Still, we keep a close eye on anything that might give our clients a competitive advantage."

TotalCAE tests system performance so it can advise its clients on hardware choices. TotalCAE [recently compared](#) an Intel Xeon Platinum 8168 processor with 24 cores at 2.7 GHz and an AMD EPYC 7V12 64-core processor at 2.45 GHz. The test team ran LS-DYNA on the car2car benchmark.

"We found the 120 cores of AMD EPYC took a bit longer than the 88 cores of the Intel Xeon Platinum processor," says Mach. "Even though they have similar clock rates, the Intel processor did the job in less time and on fewer cores. This provides a benefit in performance and a potential price/performance advantage on software licensing. Those are good reasons for us to continue relying on Intel Xeon processors for our managed HPC cluster appliance and cloud solutions."

Results

The TotalCAE HPC appliance with 2nd Gen Intel Xeon Scalable processors has given JSP's CAE team a performance boost that is helping the company meet key business goals. "JSP is a leader, and we're committed to staying ahead of our competition," Huda says. "CAE is an important tool to help us do that. The new system gives us state-of-the-art computing for our CAE workloads."

Intel Xeon Scalable processors are optimized for data-intensive and compute-intensive workloads. The processors' flexible performance is well suited to the varied workloads JSP's CAE team encounters each week.



The HPC cluster appliance from TotalCAE, based on a Dell EMC PowerEdge system with Intel Xeon Gold processors, enables simulation as a service using engineering simulation applications.

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“Because JSP’s products are so versatile, we have many different types of customers,” Huda explains. “This means every CAE job is different. Today, I’m doing a bumper application. Tomorrow, it might be concrete filling for a house. The next day, it might be a frontal impact analysis for a car seat. There is tremendous variety in the simulations we perform. The new system saves time for us as we set up and run these varied jobs.”

The performance of the Intel Xeon Scalable processors has exceeded JSP’s expectations.

“We expected to see a 15-20 percent increase in performance over our previous system. We did an apples-to-apples comparison between the old and new systems, and the improvement in the overall application runtime was as much as 35 percent.”

–Nural Huda, lead product development engineer at JSP

Huda says JSP’s older system used dual Intel Xeon processors E5-2697 v3 at 2.60 GHz.

The improved performance provides a faster time-to-insight for the JSP team. “Time is our biggest enemy,” Huda says. “To have an optimized system that gives us correct results and a 35 percent jump in simulation performance—that is critical.”

The enhanced performance also relieved a significant bottleneck for JSP. “Analysis is the bottleneck in our pipeline, and that is where the Intel performance really matters,” Huda says. “It lets us keep up with all the new jobs that are coming our way. It handles the increased complexity that we’re adding into our simulation analysis. It gives us greater throughput and a faster time to solution. All those things help JSP create better products and stay ahead of our competition.”

TotalCAE’s HPC appliance has also relieved JSP of the pressures of do-it-yourself cluster deployment and administration. “There’s a lot of work involved in figuring out what hardware we need, managing the license servers, installing and optimizing the cluster, and troubleshooting problems,” Huda says. “Now, this big burden is taken off my shoulders. I have more time for analysis. If any problems come up, TotalCAE responds very, very quickly.”

In addition to freeing the time that was formerly devoted to system management, the appliance helps JSP improve

productivity by making better use of HPC resources. “With our previous cluster, we might have one job that used 18 of our 28 cores,” Huda recalls. “We couldn’t use the other 10 until the first job finished. It was frustrating. Now, we can use all the cores at the same times. We can create a script to set up a mesh, make a model, get the results, and analyze them—all in just a few clicks. We’re making better use of the system’s resources, and we can get more jobs done. That’s a major advantage as our use of CAE continues to expand.”

Solution Ingredients

- TotalCAE Platform
- Dell EMC PowerEdge R640 servers
- Intel Xeon Gold 6238 processors with 192 GB of memory for compute
- Ansys LS-DYNA

For More Information

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