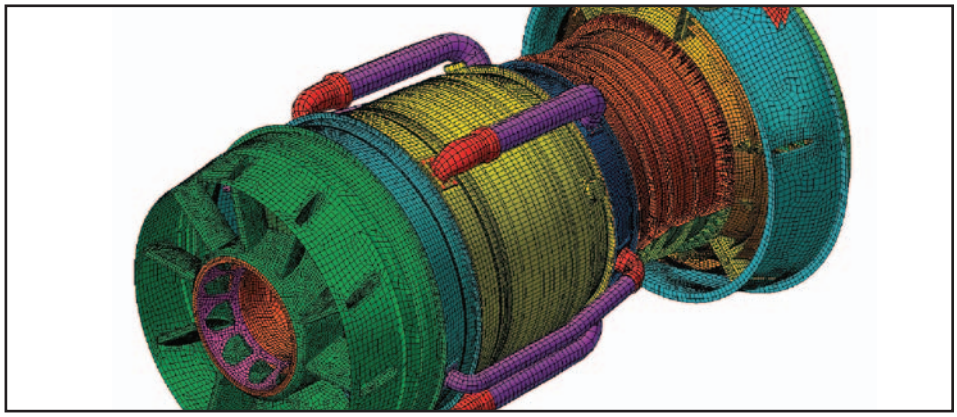
Success Story

Altair Engineering



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– Dieter Featherman, Lead Engineer, Altair

SGI® Altix® Technology at Altair® Engineering

Cost-Effective Compute Power for A Global Workforce

Altair Engineering's client list reads like a Who's Who of manufacturers, including most Fortune 500 companies. The company's recent accomplishments include a design award from Ford for the development of a concept car and the selection of Altair PBS Professional™ as workload management software for NASA's 10,240-processor SGI Altix supercomputer.

Altair's Product Design and Development (PDD) business unit provides innovative engineering services to manufacturing clients worldwide through its 150 engineers, who are subject matter experts in impact analysis, NVH (noise, vibration and harshness) analysis and optimization of processes.

"Our Product Design and Development engineers use Altair software products and a variety of third-party software to do high-end computer-aided engineering analysis for our customers," says Mike Heskitt, VP Engineering at Altair. "They use Altair Hyperworks for pre- and post-processing and Altair HyperStudy™ and Optistruct® for Optimization. Our entire worldwide compute infrastructure is managed by our own PBS Professional and accessible through Altair e-Compute™." Altair uses SGI Altix servers to develop these and other software products.

Filling the Engineering Need for High-Performance Computing

Altair's regional offices and field consultants around the world generate compute-intensive, project-related work that demands powerful corporate HPC resources. Altair has filled this need with a variety of platforms, including an SGI Origin® server that has been an HPC workhorse for the company over the past few years. But the company's robust growth now demands more and faster compute cycles.

"Our needs for computing were obviously growing because the number and size of jobs was increasing as our business grew," says Altair Lead Engineer Dieter Featherman. "We acquired some Linux® clusters a few years back, and they

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handled some of the mounting load. But we really needed to find a new computing system that offered extreme scalability, capacity, and speed, and was easy to work with."

Altair's engineering and IT groups evaluated Linux clusters, Windows® clusters, UNIX® systems, and hybrid systems. One consideration was the performance of LS-DYNA, a finite element analysis (FEA) software product from LSTC that Altair uses extensively for crash-worthiness studies of vehicle designs. "LS-DYNA is more flexible on the SGI Altix system than on commodity-based Linux clusters," says Altair Director of Engineering John Brink. "The reality of it was, if we wanted to run symmetric multi-processing jobs on our Xeon or Opteron clusters, we were limited to two CPUs. We wanted the ability to run SMP and massively parallel processing versions of the LS-DYNA solver without penalty. Altix technology gave us both worlds."

Another major metric, as always, was cost. Altair found that although some cluster technologies were less expensive than Altix systems in terms of capital outlay, performance and total cost of ownership comparisons favored the Altix platform.

"We found that when you added up all the cost components, the system administration costs made a big difference to our total cost of ownership," said Featherman. "With our commodity Linux clusters, we have to install and maintain many nodes individually, whereas the Altix platform has one instance of Linux that spans a large NUMA (non-uniform memory access) system. On our older Linux cluster, each 2-CPU node is its own computer. Potentially, you have dozens of computers to be maintained as opposed to one with the Altix system. The human factor weighed heavily in favor of the Altix platform."

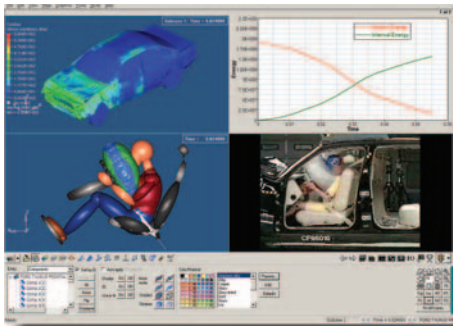
Altair subsequently acquired a 4-CPU Altix system on an evaluation basis for several months. "That gave us a taste of it, and we were spoiled," says Brink. Altair retained the 4-CPU system and subsequently purchased a 12-processor Altix 3300 server and several additional Altix 350 systems.

The Other Metrics: Scalability and I/O Throughput

Another reason Altair engineers liked the Altix platform was its scalability – the opportunity to run a single system image using whatever number of processors can be available. That, combined with the platform's superior I/O, gave Altair capability and performance that was not available with cluster technologies.

"Even if you assume the same processor speed as another Linux cluster type, the Altix platform is just a whole lot faster from the benchmarks we've looked at," says Brink. "Its memory bandwidth and I/O speed provide superior performance.

"We have other servers based on the Intel® Itanium® 2 processors, and on paper they seem to be competitive. But for running ABAQUS, for example, the Altix 3300 system just crushes them. We've had cases where it was twice as fast. Even with fast scratch arrays, the other systems just can't compete. People only run jobs on the other systems if they can't get time on the Altix server."



PBS Professional and eCompute: Accessing the Altix System from Anywhere

Engineers and consultants from Altair's headquarters and its 11 offices around the world run FEA simulations on the Altix systems. Altair's own software products simplify global access. PBS Professional handles job execution and resource management; e-Compute, a Web-based Grid portal, provides access to the system across the company's intranet and, through secure http, from remote sites in many time zones.

"When I go home at night," says Brink, "I can enter through our e-Compute portal, see my jobs, and manage them. I can submit a job to the Altix system using secure http. That's a huge efficiency that helps us to leverage the resource more effectively.

"We used to have overnight jobs that took seven or eight hours to run. But the Altix is fast enough to give us turnaround in an hour or two on much of our day-to-day work. We need that kind of turnaround because our country offices in Germany and India are working while our Michigan headquarters is sleeping. Fast turnaround for a major enterprise resource like this was critical for us."

This combination of SGI Altix technology and innovative Altair software provides the company a highly efficient global HPC resource for its core capability: industry-leading product development expertise.

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Corporate Office
1500 Crittenden Lane
Mountain View, CA 94043
(650) 960-1980
www.sgi.com

North America +1 800.800.7441
Latin America +55 11.5509.1455
Europe +44 118.912.7500
Japan +81 3.5488.1811
Asia Pacific +1 650.933.3000

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