esi
get it right®

Audi excels in Safety standards with support from ESI Group and HP

THE CHALLENGE

- Safety standards at an optimum: meet the stringent safety requirements of automotive industry

- Build the automotive industry's fastest supercomputer ever

- Help industrial partners improve their product lifecycle

THE STORY

*"ESI Group consistently provides customers with **affordable simulation turnaround time, greater accuracy and increasingly larger simulation models.** This versatility allows Audi to find a balance between performance and the increased number of realistically simulated design variations for the complete car range."*

Peter Ullrich, Crash, Impact and Safety Product Manager at ESI Group.

THE BENEFITS

- Optimize car safety

- Improve the precision of crash, safety and impact simulations

- Guarantee an effective design process including vehicle safety analysis

- Save days of computing time and unnecessary costs.

Audi AG is a premium luxury automobile manufacturer and also one of the oldest-established German car manufacturers. Since 1899, Audi has been proposing attractive and sophisticated car models that embody technological perfection.

In 2008, Audi delivered over 1 million vehicles worldwide, up 4.1% compared to 2007.

Audi A4: Comfort testing with Dummies. Courtesy of Audi AG.

ENSURING OPTIMAL SAFETY STANDARDS

It is crucial for car manufacturers to ensure that their safety standards are always at an optimum to meet the stringent safety requirements of today's automotive industry. Audi, one of the safest vehicle manufacturers, is constantly implementing enhanced technology to perfect the safety of its cars.

BENEFITING FROM THE BEST HARDWARE AND SOFTWARE TECHNOLOGIES TO BUILD THE FASTEST SUPERCOMPUTER

Audi has recently invested in hardware and software to build the automotive industry's fastest supercomputer. This new system is based on ESI's PAM-CRASH simulation software and HP Cluster Platform 3000BL BladeSystem providing 29.18 teraflop/s of computing performance for Audi's crash simulation models. The HP Message Passing Interface (HP-MPI) provides the critical layer of middleware between PAM-CRASH and the InfiniBand fabric.

PAM-CRASH, ESI's flagship solution for crash simulation, offers realistic virtual testing across the extended enterprise. Audi's partnership with ESI Group has been primarily aimed at establishing and driving its global vehicle safety projects all over the world. **Audi has recognized the unparalleled computing efficiency and ease-of-use of PAM-CRASH and, as a result, the implementation has improved the reliability of its crash, safety and impact simulations.**

IMPROVING PRODUCT LIFECYCLE

ESI's software also helps industrial partners improve their product lifecycle while saving time and money. PAM-CRASH enhancements combined with compact, fast and power-efficient HP hardware have enabled Audi to run its refined models overnight, thus guaranteeing an effective design process that includes analyzing vehicle safety elements. The latest algorithms in the software have also encouraged Audi to raise its expectations for Simulation-Based Design.

"ESI products at large rely on HP-MPI for their message-passing layer. HP-MPI's performance, reliability and flexibility significantly help ESI deliver best value solutions to our customers. Recently, our flagship product PAM-CRASH set HP-MPI as the default MPI environment, while maintaining the support of others at the same time."

Antoine Petitet, PhD, HPC lead of ESI's Computational Structure Mechanics Development Group, ESI Group.

For example, airbag models now routinely take into account fluid-structure interactions, leading to realistic interactions of the airbag with structures and occupants. In addition, prediction testing for material rupture, which usually requires high resolution models, can now be treated using a multi-scale approach. All this helps save days of computing time and unnecessary costs.

HP support has also been essential in implementing technology that provides enhanced reliability, high server density and the tremendous computing power required to process the volume of simulation data generated. Audi installed the HP Cluster Platform 3000BL, a system built using 320 nodes based on HP ProLiant BL460c server blades and the InfiniBand cluster interconnect, as well as HP-MPI. This allows for high performance and production quality implementation of the MPI standard for the HPC (High Performance Computing) server. With this HPC system, the supercomputer implemented requires a quarter less floor space and consumes a quarter less power than a traditional rack-based configuration. In addition, the blade configuration provides simple hardware maintenance, cabling and system administration and has outstanding scalability.

The combination of ESI software and HP hardware has enabled Audi to implement the automotive industry's fastest supercomputer and at the same time maintain its position as one of the safest vehicle manufacturers in the world.
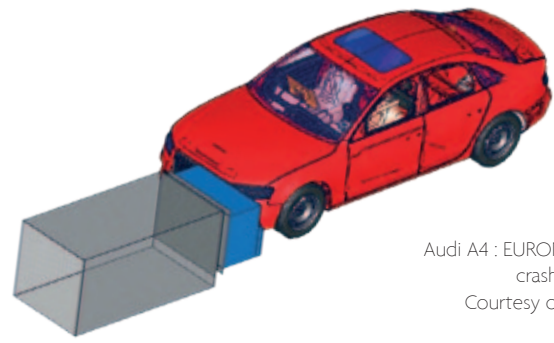
Audi A4 : EURONCAP front
crash simulation
Courtesy of AUDI AG.

"Providing Audi with a high-performance computing solution helps them design better and safer cars while reducing their power consumption and costs. HP has a long history of knowledge and expertise in providing automotive customers high-performance computing that fosters innovation."

Christine Martino, VP & GM, Scalable Computing & Infrastructure Organization, Hewlett-Packard Company

ABOUT AUDI AG

AUDI AG is a premium luxury German automobile manufacturer which is part of the Volkswagen Group since 1964. It manufactures exquisite cars – attractive, sophisticated and technically perfect. Audi's corporate tagline worldwide is "Vorsprung durch Techn" meaning "Advancement through Technology". For more information: www.audi.com

ABOUT HP

HP is a technology company that operates in more than 170 countries around the world. It offers a complete and comprehensive technology product portfolio to consumers from digital photography to digital entertainment and from computing to home printing. For more information: www.hp.com/go/cae

ABOUT ESI GROUP

ESI is a world-leading supplier and pioneer of digital simulation software for prototyping and manufacturing processes that take into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product's behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment's impact on product performance. ESI's products represent a unique collaborative and open environment for Simulation-Based Design, enabling virtual prototypes to be improved in a continuous and collaborative manner while eliminating the need for physical prototypes during product development. The company employs over 750 high-level specialists worldwide covering more than 30 countries. ESI Group is listed in compartment C of NYSE Euronext Paris. For further information, visit www.esi-group.com.

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