Case Study
HELLA KG Hueck & Co.

"Fujitsu delivered our PRIMEFLEX® for HPC cluster very quickly – within just a few weeks."

Klaus Kister, Responsible for Lighting Technology Simulation and Validation, HELLA KG Hueck & Co.

The customer

Country: Germany
Industry: Automotive, electronics
Founded: 1899
Employees: Almost 32,000
(6,000 work in Research and Development)
Website: www.hella.de

The challenge

Significantly greater performance was required at short notice to run more complex numerical simulations. To safeguard innovation and enable rapid project completion, new processing resources were urgently needed.

The solution

Following intensive customer benchmarks, a high-performance PRIMEFLEX® for HPC solution was installed that is optimally adapted to the simulation software.

The customer

HELLA is a global and independent family company. Its activities are divided into three segments: Automotive, Aftermarket, and Special Applications. In its automotive segment, HELLA bundles the development, production, and marketing of lighting technology and electronics components and systems for vehicle manufacturers and other suppliers. The company follows the trends in the automotive industry and meets them with products such as intelligent battery sensors, radar-based driver assistance systems, and adaptive lighting systems. With sales of around EUR 5.8 billion in the 2014/2015 financial year, the company is one of the top 40 automotive suppliers.

The challenge

The wide variety of modern vehicles and short product cycles require automotive suppliers like HELLA to offer more and more variants and perform simulations during development. In HELLA's development department, numerical heat flow simulations are essential in shortening the headlight development process. The STAR-CCM+ software from CD-adapco is used for this. "Over the last few years, requirements in this area have once again grown enormously; for example, the use of LEDs has increased complexity," reports Dr. Michael Köster, an expert in heat flow simulations and HPC applications at HELLA. The existing High Performance Computing (HPC) cluster was no longer able to handle the more complex computational models with sufficient speed.

The company's growth over the previous years was another reason to expand its computing power. More employees need to access the systems. Also, the time constraints for installing the HPC cluster were high. The system was available on site and ready for operation within four weeks.

The benefit

- Significant increase in computing speed
- Boost to innovation
- Competitive advantages generated
- Order security

Products and services

- FUJITSU Integrated System PRIMEFLEX® for HPC
- 4 x FUJITSU Server PRIMERGY CX400, including 16 x FUJITSU Server PRIMERGY CX2550 and Mellanox InfiniBand switch (18-port FDR) with redundant power supply
- Complete selection of components for the High Performance Computing cluster, taking into account the software packages used by the customer
- Benchmark calculation by ict GmbH, a Fujitsu HPC Competence Center, using the customer's own models

The solution

With the new HPC cluster – which comprises four FUJITSU Server PRIMERGY CX400, including 16 FUJITSU Server PRIMERGY CX2550 – HELLA has doubled its computing power compared with the systems previously installed. "There is an exponential component to the mathematical equations involved in the heating technology problems our company tackles," explains Dr. Michael Köster. "This means that, in general, doubling computing power does not halve the computing time for a simulation. Even if the hardware is faster, the wrong hardware configuration can be slower than a system from ten years ago.

"However, we aimed to procure a system that would not only speed up our calculations in general, but would actually halve computing time for highly complex devices in the next generations of headlights." The newly installed HPC cluster achieved this goal. The performance of the systems as well as quick delivery times and good service set the Fujitsu team apart in the selection process. "We need clusters with hardware and middleware that fit in perfectly with our requirements and the simulation software we use. Several dozen benchmark tests in various configurations were performed to find the right mix," says Klaus Kister, who is responsible for mechanical and thermal simulations at HELLA.

To do this, the hardware was rigorously tested on an HPC benchmark system operated by Fujitsu with simulation models provided by HELLA. "The Fujitsu HPC Competence Center's experience in selecting the right configuration and Fujitsu's close collaboration with CD-adapco were extremely valuable to us," emphasizes Kister. Dr. Michael Köster also had very positive experiences with Fujitsu's support team: "It worked very well when we needed rapid support. The Fujitsu team looked at everything on site and quickly found solutions."

The benefit

The new PRIMEFLEX® for HPC cluster from Fujitsu runs 24 hours a day and has, in practice, achieved the precise throughput generated in the benchmark results. After the installation, further consulting via the Benchmark Center led to further cluster optimization that boosted the performance of the machines even more. Models can now be calculated at twice the previous speed. The previous, smaller Fujitsu clusters are still used to buffer peak loads.

Conclusion

The PRIMEFLEX® for HPC cluster was installed within a very short time. The expertise and HPC know-how employed to find a solution have made the performance anticipated in the benchmark tests a reality. "We are well-positioned for the years to come," says Klaus Kister.

"In live operations, the HPC cluster provides the exact same performance calculated in the benchmark tests. This has allowed us to significantly reduce the computing time required for highly complex models in the next generations of headlights."

Dr. Michael Köster, expert in heat flow simulations and HPC applications, HELLA KG Hueck & Co.

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