FUJITSU

Case Study
Hyundai Motor Europe Technical Center

»The project was a complete success. The time savings we estimated
for complex simulations proved to be very accurate.«

Matthias Uhlig, CAS Design Manager, Hyundai Motor Europe Technical Center

The customer

Country: Germany
Sector: Automotive
Founded in: 1991 (Hyundai Motor
Deutschland GmbH)
Employees (in Germany): 198
Website: www.hyundai.de

The challenge

Hyundai has five design centers worldwide. The German development center recently installed a PRIMEFLEX for HPC cluster solution from Fujitsu to improve its competitive position. This involved converting its workstation environment into a cluster environment, a move that would enable the company to fully utilize the features of its Autodesk VRED ray tracing software. The project involved close collaboration between developer teams from Fujitsu, its subsidiary ict GmbH, the software provider Autodesk and Hyundai's project partner CSW - Customer Service Wilhelm GmbH.

The solution

This PRIMEFLEX for HPC cluster solution comprises FUJITSU Server PRIMERGY CX400, CX250 and RX200 systems, which are connected to one another via a Mellanox InfiniBand network. The systems can be installed and managed easily using the FUJITSU Software HPC Cluster Suite (HCS), and everything is optimized for Autodesk's ray tracing software VRED.

The customer

The customer is Korean automotive expert Hyundai Motor Company's German design center. Hyundai was founded by Chung Ju-yung in 1967 and quickly established itself as one of the world's largest automotive manufacturers. Hyundai invests heavily in alternative and environmentally friendly concepts for vehicles.

The challenge

For large automotive companies, the ability to quickly adjust the designs of chassis and interiors for individual models is absolutely essential. Autodesk VRED is a software package that enables companies to process and assess changes using digital visualizations. The German design center was looking for support for its existing infrastructure that would both optimize these visual representations and accelerate the process of creating them. The company decided on an HPC cluster, a system it believed would reduce computing times for the visualizations.

The solution

Visualization, including ray tracing, is a popular method used by the automotive industry to assess new models and model versions and demonstrate them to customers. Light distribution and any possible reflections on the chassis, interior and individual components of new vehicle models are displayed precisely and realistically on the computer screen. A design department can use the software to quickly analyze different variants and use the results to optimize its designs. Hyundai's German design department had been using workstations to run these simulations, but the machines could not keep up with the growing demands on them. The computing capacity of the CPUs was no longer sufficient for tasks such as ray tracing and assessing reflections and mirroring. Hyundai's previous solution had 24 processors available on the workstations. "It was clear that it had reached its limits," says Marc Hoffmann of CSW, Hyundai's project partner. The time required to run the calculations was enormous: "It used to take 38 minutes of computing time to process an A2 sized image at a resolution of 300 dpi," says Matthias Uhlig, CAS Section Manager at Hyundai. There are now 64 processors in the computing cluster – almost three times as many as before. "Computing time has reduced linearly – that same task now takes just one minute," explains Uhlig. He adds that the company is now able to offer and assess many more different options.

The benefit

- Conversion from a workstation environment to a performant cluster environment
- Customer's pre-installed user environment guaranteed fast setup and risk-free implementation
- Service, hardware and software from a single source
- Fast processing, visualization and optical analysis of designs
- Changes to designs can now be made quickly and visualized on-screen for marketing purposes

Products and services

PRIMEFLEX for HPC cluster solution:
- FUJITSU Server PRIMERGY CX400
- FUJITSU Server PRIMERGY CX250
- FUJITSU Server PRIMERGY RX200
- InfiniBand network
- FUJITSU HPC Cluster Suite (HCS) software

Hyundai now uses a PRIMEFLEX for HPC cluster solution from Fujitsu with high performance PRIMERGY servers, and the software HPC Cluster Suite (HCS) to operate and manage the cluster. The Fujitsu Server RX200 acts as a control center for the eight CX400 systems with a total of 32 CX250 server nodes providing the computing power. The solution was optimized for the VRED visualization software package.

This change to the infrastructure has significantly strengthened the position of Hyundai's German design center. The Korean car manufacturer's five design centers are all in competition with one another. So they all need to fully utilize their creative potential in their designs and developments. The new solution has put the German development center in an excellent position: "It's a critical success factor for us," stresses Uhlig. It has also benefitted the center in terms of direct cost savings, as renderings for marketing presentations are now produced in-house rather than outsourced.

The success of the project is down to the excellent cooperation between all of the parties involved. These included the developer team from Fujitsu Systems Europe, Fujitsu subsidiary ict GmbH, Fujitsu SELECT Expert HPC Partner CSW and a team from software developer Autodesk.

It was incredibly important that the hardware provider, software manufacturer and the onsite partner, CSW, could work well together. "It was also important for us to be able to bring the customer into the benchmark center in Paderborn," says Marc Hoffmann from CSW. Uhlig agrees: "It was absolutely key for us. The support team was knowledgeable and competent, and we felt like we were in good hands there." The high performance cluster was assembled in the benchmark center. The team from Hyundai could then test the performance with real data on real systems, and see the possible benefits for themselves.

"We are able to perform comprehensive tests at the center, so the customers can see exactly what kind of performance they can expect," says Ramona Wiederstein, ict GmbH.

"This live test gave us the answers we needed, and convinced the customer that it was the right solution," says Hoffmann. Many other medium sized companies are now beginning to realize that their existing workstation solutions are reaching their limits. "Many want to make the leap to high performance computing, but they simply aren't sure how to go about it. This is why the test center is so important," says Hoffmann.

The entire project was completed in just a little over six months, and Fujitsu beat out a number of high profile competitors during the selection phase.

The benefit
With the PRIMEFLEX for HPC cluster solution from Fujitsu, the customer now not only benefits from substantially greater computing power than before, but also has a solution that gives it a competitive advantage. Marketing teams are able to assess designs much faster, observing them from all sides, and can then work on optimizing them. Errors can be rectified quicker, and new versions can be visualized without losing enormous amounts of time on processing the data. Now that the time between changing a design and receiving the visualization is so much shorter, the team can fully utilize its potential to optimize its products. The optimized visualization process also makes marketing easier as different versions can now be shown to customers more quickly. And one last advantage: The solution all comes from a single source – the software manufacturer, hardware provider and partner company responsible for installing and managing the system all work closely together to ensure that Hyundai achieves the best results possible.

Conclusion

"The project went very well, and the implementation was smooth. We are consistently achieving the benchmarks we calculated during the test phase."
Matthias Uhlig, CAS Design Manager, Hyundai Motor Europe Technical Center

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