

Case study

Improving safety through simulation



HP impresses scientists with its reliable devices and excellent support

Industry

Research, automotive industry

Objective

To create a stable, fast IT infrastructure to enable the company to run demanding applications for calculating fluid dynamics, assessing the acoustics within vehicles and running crash simulations

Approach

The Virtual Vehicle Research Center relies on hardware sourced from a single provider in order to simplify support and management

IT matters

- The IT platforms are used to run crash tests and fluid dynamics and acoustic simulations

Business matters

- Virtual Vehicle works with other research institutes and companies on a range of international projects



“We use the entire range of Z series devices from HP, and are very happy with the concept as a whole. The devices can easily cope with our demanding pre- and post-processing requirements.”

– Martin Plöchl, head of IT, Virtual Vehicle Research Center

Stable infrastructure from one source

As a large research institute working in the automotive industry, the Virtual Vehicle Research Center relies on a stable IT infrastructure sourced from a single provider.



Challenge

Simulation and testing

If you're a European automotive company and need to run simulations to assess your latest development, the Virtual Vehicle Research Center in Graz is one of your first ports of call. One of the Center's unique strengths is that it is able to offer numerical simulations on high-performance computers and experimental validation procedures at a single site. Together with automotive and vehicle manufacturers and their suppliers, scientists at the Research Center are currently working on a number of national and international projects with well-known companies from all over the world. The projects' objectives cover a wide range of areas, from improving energy efficiency in vehicles to increasing safety and optimising vehicle features, for example by precision tuning the acoustics.

To be able to offer the facilities the companies need to run these complex simulations reliably, the Virtual Vehicle Research Center relies on its enormously resilient and incredibly powerful IT infrastructure.

The company's network currently includes over 90 industrial partners such as; Audi, AVL, BMW, MAN, Porsche, Siemens and VW, as well as over 30 scientific partners including Graz University of Technology, Karlsruhe Institute of Technology (KIT), the Royal Institute of Technology in Stockholm, the Polytechnic University of Valencia, the Technische Universität München and the Computer Research Institute of Montreal.

The Center not only carries out research into individual areas such as optimising engines, but also into how areas covering the entire automotive spectrum can be combined. One of its most recent projects, for example, involved combining different simulation methods for different components and systems in real-time. The researchers believe this will help to increase vehicle safety and make it easier to test complete systems. "These types of simulations are very demanding in terms of hardware speed and reliability," explains Martin Plöchl, head of IT, Virtual Vehicle Research Center. This means that computers of all performance classes have to work together in perfect harmony.



This consistent infrastructure was also needed for the VeTeSS research project, which involved 22 partners from the research and industrial sectors spread across eight countries working together. Their aim was to develop tools and methods to verify the safety features of the systems embedded in vehicles.

As an expert in the automotive industry, Industry 4.0 is another key topic for the Graz-based Center. Its experts have recently begun working on coordinating on the EU's FACTS4WORKERS research project, which aims to design the industrial workspaces of the future. FACTS4WORKERS puts people at the centre of pioneering production concepts. It aims to make manufacturing jobs more attractive and improve the competitiveness of European companies.

Solution

HP is in the hardware selection of choice

In order to provide the computing capacities and stable IT infrastructure required to run the simulations, the researchers have invested in a complete package of HP hardware covering everything from desktops to workstations and servers. For Plöchl, choosing to source the hardware from HP was an easy decision to make: "We use Z series devices from HP, and are very happy with the concept as a whole. The devices meet all of our requirements and can easily handle the calculations we need to run for areas such as pre- and post-processing."

Plöchl is very satisfied with HP's overall concept and comprehensive package of hardware. He quickly ended experiments with platforms from other manufacturers as he was simply not satisfied with the support and lifespan of the devices they provided.

For the server landscape he chose a cluster with a total of 500 CPUs, adding HP Z820 and HP Z640 series computers for the workstations. In total, the company now has many hundreds of HP devices running. HP devices were also needed for another of its large projects which launched in September. Its aim is to combine a variety of simulation processes used within the automotive sector. One key part of preparing for the project was to discuss with the project leader whether new hardware would be required to meet its objective.

Looking ahead to the future, one of the main challenges the company will be facing is self-driving cars. The Center is currently working on solutions for this part of the industry, and can see enormous opportunities for both Steiermark and Austria as a whole. Jost Bernasch, managing director, Virtual Vehicle Research Center explains: "Self-driving cars will change the global automotive market dramatically in the next 20 years. Studies predict that by 2040, there will be up to 70 million highly-automated, fully-automated and autonomous vehicles on the market."

Customer solution at a glance

Primary applications

Modular Information Management
Vehicle Safety
Materials & Forming Technologies
Aerodynamics & 3D Simulation
Thermal Management & 1D Simulation
Embedded Systems
Co-Simulation
NVH Material and Technology
Vehicle Noise Reduction

Hardware

- HP Z820 Workstations
- HP Z640 Workstations
- HP Z420 Workstations
- HP Z Books
- HP EliteDesk 800
- HP Elite Notebooks
- HP Servers (HP BladeSystem c7000, HP ProLiant ML350, HP ProLiant DL380)

Software

- Open source software

HP services

- HP Hardware support

“Here in Steiermark, we believe we can make a huge contribution by working with our partners to develop technical solutions.” Steiermark is also set to become a test region for autonomous vehicles. This would be an ideal addition to the Center’s virtual testing of technical solutions, and an area where its many years of experience could be of real benefit.

Benefits

Speed and reliability are high

Having a stable, reliable IT infrastructure is incredibly important for the Center’s projects with international partners. Demanding, CPU-intensive programs such as the open source software OpenFOAM for solving fluid dynamics problems, alongside industry standard software from a variety of manufacturers and Microsoft® Office software must be able to run efficiently and reliably on every computer.

“The fact that the servers are so easy to manage was a clear plus point for HP in our book.”

– Daniel Rühl, system administrator,
Virtual Vehicle Research Center

Plöchl believes that the key to this is using standardised hardware from a single provider as this reduces support requirements dramatically. HP’s consistently high-quality machines, from HP Elite notebooks to HP servers, helped to convince him that they were the right way to go. Another deciding factor was the user-friendly system administration: “The fact that the servers are so easy to manage was a clear plus point for HP in our book,” says Daniel Rühl, system administrator, Virtual Vehicle Research Center. Performance figures and error rates can be brought together and viewed at a glance. The operators in the Virtual Vehicle Research Center’s data centre are then able to use the information to detect availability issues and system errors before they can affect the applications.

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4AA6-3818EEW, March 2016

