Of Clouds and Supercomputers

HLRS Well-Represented in EU-Funded Success Stories

In the field of information and communications technology (ICT), an annual report recently highlighted selected examples of success stories in EU-funded projects conducted by German research institutes and enterprises. With two of eight success stories being related to the University of Stuttgart-based High-Performance Computing Center Stuttgart (HLRS), the center demonstrates Stuttgart's strong position as a technology innovation hub.

University Communications

Head of University Communications and Press Spokesperson
Dr Hans-Herwig Geyer

Contact
T +49 711 685-82555
hkom@uni-stuttgart.de
www.uni-stuttgart.de

The national point of contact for the EU-based technology innovation program Horizon 2020 (NKS-IKT) recently published an annual report highlighting success stories in EU-funded ICT-research. Two of the highlighted projects used resources at the University of Stuttgart-based High-Performance Computing Center Stuttgart (HLRS).

 "The High-Performance Computing Center Stuttgart is one of the beacons of the Baden-Württemberg digitalization strategy," said Baden-Württemberg Science Minister Theresa Bauer. "One of our goals is to foster the conditions to make high-performance computing usable for industries. These two European success stories prove this point: the HPC resources in Stuttgart are extremely relevant for innovation and competitiveness for small- and medium-sized businesses. Beyond this, this annual report confirms the overall success of our supercomputing center and solidifies its leading position in this very important cutting-edge research field."

For many years, the European Union and Germany have cooperated in financially supporting cutting-edge science that contributes to economic development. Now, two projects with contribution of the University of

Stuttgart-based High-Performance Computing Center are being acknowledged in an annual report of German success stories.

EU-project Fortissimo 2 paves the way to HPC

Generally speaking, modeling and simulation in product development or process optimization help those in the engineering industry improve efficiency and save money. For such complex computations, companies need HPC to help get fast, accurate results. Many bigger enterprises possess their own HPC-systems, but small and medium-sized enterprises (SMEs) face significant barriers when it comes to using HPC. "The problem of accessing HPC in SMEs all boils down to a lack of viability, considering the high cost of maintaining an HPC infrastructure and the fact that smaller companies typically use it less frequently than bigger companies in the engineering industry," explains HLRS Department Head and Marketplace Development and Operations Work Package Leader Michael Gienger. "In addition, a shortage of in-house HPC knowledge and skills don't help solve the problem."

Fortissimo 2, the successor of Fortissimo, aims to support SMEs in using advanced methods in modeling, simulation, and data analysis to improve their competitive positions in the global market. To that end, HLRS developed and currently operates a "one-stop-shop" channel called the Fortissimo Marketplace. After creating an account, users can choose from HPC resources, software applications, and tools they would need in order to run a specific compute job, then collaborate with partners representing HPC centers, software companies, and other technology providers.

The complex nature of supercomputing requires robust training programs to prepare users to make the best use of these machines. The High-Performance Computing Center of the University of Stuttgart is a European leader in HPC training, informing industrial users about regular training program for enterprises and SMEs.

In 2016, Fortissimo project collaborators working at the University of Edinburgh created the spin-off company Fortissimo Marketplace Ltd. in

order to ensure the market's existence and expansion long into the future.

MIKELANGELO provides virtual environments for HPC

Cloud-based data services are attractive to small businesses and HPC centers alike due to their increasing availability, flexibility, and cost savings. However, when it comes to the compute- and data-intensive tasks prevalent in HPC, a cloud starts to reach its performance limits.

MIKELANGELO is an EU-funded project aimed at developing a software framework, that enables Big Data and HPC-applications to be carried out in cloud-based system environments via virtual infrastructures. These virtual machines are monitored by a hypervisor which helps efficiently divide up a virtual environment by better allocating hardware resources such as CPU and memory. That enables users to connect their systems to the virtual machine and make use of their resources without requiring the presence of a hosting system.

In the MIKELANGELO project, HLRS staff members successfully integrated the software framework into cloud-based environments as well as HPC-based system environments, allowing compute jobs to be flexibly rearranged, paused and started again without interfering with HPC system performance. With this software integration, the flexibility of cloud computing can be united with the high efficiency of HPC-infrastructures.

Contact

Lena Bühler
Höchstleistungsrechenzentrum (HLRS) der Universität Stuttgart
buehler[at]hlrs.de
phone +49-711-685-65858