Main focus

- Green by IT
- Fraunhofer parallel file system (BeeGFS)
- Visualization
- Seismic data processing
- Data analysis and machine learning
- Scalable parallel programming
Our IT systems are among the largest single energy consumers and CO2 emitters, with energy consumption continuing to rise. Currently, this accounts for five to ten percent of electricity consumption. However, this share will probably grow to twenty percent – this is in the order of a completely electrified private car traffic. Most of the time, the focus is on “green” data centers, which are powered by electricity from renewable sources, and on efficient cooling technology. However, the much greater potential lies in the software and how it is used on which processors, and thus in its effect on the majority of the remaining IT systems.

In high-performance computing, energy costs are already a crucial factor in hardware procurement. However, the efficiency of the software used is even more important. Software that does not take advantage of the parallelism of modern processors and their architecture quickly loses an order of magnitude in energy efficiency here as well. For us in the HPC department, High Performance Computing means the use and development of highly optimized software on suitable hardware. In 2008, the Pegasus system by ITWM was already among the TOP 500 of the fastest HPC systems and number one in the Green 500! Our software was orders of magnitude more efficient than the original customer software. Here, the saved energy costs of one year of operation alone would have financed the Pegasus computer and the development of the software. Our experience in many industrial projects shows that non-optimized software can often be improved by at least one order of magnitude. Today, we are the specialists in energy-efficient programming, i.e. green computing. However, it must become easier for everyone to write efficient software. The STX processor, which we developed in the EPI project, brings us a great deal closer to this goal. Its design makes it easy for a large class of algorithms to save energy and costs with the support of the compiler. Energy Efficient Computing today means the perfect utilization of parallelism, optimal data transport as well as suitable algorithms in combination with the right hardware. This holistic approach to Green Computing is the core of our self-image and motivation for the employees of the HPC department.

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