

# Funded Projects



GEFÖRDERT VOM

Bundesministerium  
für Bildung  
und Forschung

## ISAR – Integrated system and application analysis for massive parallel computer

The maintenance of massively parallel computers providing performance in the petaflop range like the ones in the Gauss Alliance and the PRACE community is very expensive. Therefore, the computational time should be used as effectively as possible. This requires a continuous search for optimization potential and tuning on both the system and application level. The goal of the threeyear BMBF project ISAR was the realization of an integrated scalable system and application analysis software for the use in production environments.

The Leibniz Rechenzentrum together with the Chair of Computer Architecture of the TU München and the ParTec Cluster Competence Center GmbH implemented a scalable system monitoring software solution based on Periscope. Using autonomous agents, it is able to do selective search of performance bottlenecks and problems. It has been integrated with the existing monitoring system at LRZ as well as Nagios and the ParaStation GridMonitor.

## ee-Clust – Energy efficient cluster computing

The Project „Energy-Efficient Cluster-Computing“ (eeClust) has been funded by the German Ministry of Education and Research. The goal was to determine relationships between the behavior of parallel programs and the energy consumption of their execution on a compute cluster. Various tools were developed to control power states of hardware components based on hints in instrumented parallel programs. Thus, unutilized components can be put into lower power levels or even temporarily disabled to gain energy savings.



ParTec was especially involved in the live visualization of hardware utilization and energy consumption in the ParaStation GridMonitor but also in the development of the power saving daemon.





## DGI-2 – German Grid-Initiative 2

The D-Grid Initiative, which was launched and funded by the Federal Ministry of Education and Research (BMBF), is on the right track to turning the grid from a science-oriented instrument into a universal tool. In January 2008 a second group of D-Grid collaborative projects was launched with the aim of integrating businesses more strongly in the development of grid services based on a sustainable grid infrastructure.



To cope with the growing demands of using cluster computer in a grid the work package 2.6 aims to improve this integration into the grid infrastructure. A central aspect is to control and monitor the resource assignment inside a cluster. For the tight integration of ParaStation into the PBS batch system, the PBS execution daemon `pbs_mom` is completely replaced by the ParaStation MOM plugin. The ParaStation process-management software is therefore able to communicate with the batch system server and is the only piece of software needed on the compute nodes for batch integration. As a result of the close integration the ParaStation MOM provides advanced resource control and clean-up functionalities. In addition an authorization control mechanism of SSH connections to the compute nodes on a per job-bases was implemented. The ParaStation MOM has demonstrated to scale beyond 3000 nodes and is the next step in reducing operating system jitter.

## ISAR – Integrated system and application analysis for massive parallel computer

Members:  University of Munich  
 Leibniz Compute Center (LRZ)  
 Compute Center Garching (Max-Planck)  
 ParTec CCC GmbH

Workpackage 3: Scalable system monitoring tools, porting and testing on ParaStation cluster

The Federal Ministry of Education and Research (BMBF) is funding this project.

Duration Jan. 2009 to Dec. 2011, URL: <http://www.in.tum.de/index.php?id=isar>



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## ee-Clust – Energy efficient cluster computing

Members:  DKRZ Hamburg  
 TU Dresden  
 Forschungszentrum Jülich  
 ParTec CCC GmbH






Workpackage 3: software based collection, monitoring and control of energy specific system and application data, new features for GridMonitor.

The Federal Ministry of Education and Research (BMBF) is funding this project

Duration: April 2009 to March 2012, URL: <http://www.eeclust.de>

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## DGI-2 – Deutsche Grid-Initiative 2

Members:  Fraunhofer FIRST  
 Fraunhofer ITWM  
 Forschungszentrum Jülich  
 FZ-Karlsruhe (IWR)  
 Leibniz Compute Center (LRZ)

Workpackage 2.6: Cluster process management in the Grid

The Federal Ministry of Education and Research (BMBF) is funding the development of Grid related software modules.

Duration: Jan 2008 to Dec. 2010; Project successfully finished, see overview next page. URL: <http://www.d-grid.de>