Currently Einstein@Home runs on the D-Grid Globus Ressources:

- srvgrid01.offis.uni-oldenburg.de
- udo-gt03.grid.tu-dortmund.de
- lxgt2.lrz-muenchen.de
- emilia.zih.tu-dresden.de
- juggle-glob.fz-juelich.de
- gramd1.d-grid.uni-hannover.de
- gridmon.gwdg.de
- iwrgt4.fzk.de
- gt4-fzk.gridka.de

Two of the HPC clusters that have been used for the data analysis are operated by the GCS partners FZJ and LRZ. In addition to the provision of D-Grid compute resources, both GCS members provide central D-Grid services which are required for the operation of the D-Grid infrastructure and therewith for the submission of jobs to D-Grid compute resources.

The GEO600 use case has not been running properly in production mode in its beginning. In a first approach it was planned to store all the checkpoint files of the Einstein@Home client jobs (the GEO600 tasks) on a central database at the AIP, the so-called "AstroData-Server". However, this approach led to a huge net traffic that ended up in longer times for transferring the checkpoint files from this central database to the execution hosts than the real execution times afterwards. So we decided to store the checkpoint files on the local file systems on the execution hosts.

The "Gridification" of the Einstein@Home brought a substantial breakthrough for Grid computing in Germany. In July 2010, a radio pulsar has been discovered in data recorded with the Arecibo Observatory in Puerto Rico by means of the Einstein@Home project. The data analysis on the D-Grid clusters is worldwide one of the largest contributions to the Einstein@Home project. On the other hand, Einstein@Home is the most successful scientific application of D-Grid. Without the Grid contribution to Einstein@Home, it would not have been possible to analyze sufficiently large amounts data to discover the pulsar. Figure 2 shows the discovery plot of this pulsar, obtained from Knispel et al. 2010.

For the future we are planning to extend the Einstein@Home job submission also to gLite and UNICORE based D-Grid resources. In order to get the job submission control independent of the addressed Grid middleware, larger changes are necessary. We would like to use the Grid Application Toolkit (GAT, see: www.cs.vu.nl/ibis/javagat.html). However, this requires converting the job control mechanism from Perl to Java.

References

[1] **Pulsar Discovery by Global Volunteer Computing: Knispel, B., Allen, B., Cordes, J. M., Deneva, J. S., Anderson, D., Aulbert, C., Bhat, N. D. R., Bock, O., Bogdanov, S., Brazier, A., Camilo, F., Champion, D. J., Chatterjee, S., Crawford, F., Demorest, P. B., Fehrmann, H., Freire, P. C. C., Gonzalez, M. E., Hammer, D., Hessels, J. W. T., Jenet, F. A., Kasian, L., Kaspi, V. M., Kramer, M., Lazarus, P., van Leeuwen, J., Lorimer, D. R., Lyne, A. G., Machenschalk, B., McLaughlin, M. A., Messenger, C., Nice, D. J., Papa, M. A., Pletsch, H. J., Prix, R., Ransom, S. M., Siemens, X., Stairs, I. H., Stappers, B. W., Stovall, K., Venkataraman, A.**
ScienceExpress: www.sciencexpress.org, August 12, 2010, page 1, 10.1126, science.1195253

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H4H Project launched

The European ITEA2 project "Hybrid Programming for Heterogeneous Architectures" (H4H), partly funded by the Federal Ministry of Education and Research (BMBF) in Germany, was launched on October 1, 2010. The objective of this project is to provide compute-intensive application developers with a highly efficient hybrid programming environment for heterogeneous computing clusters composed of a mix of classical processors and hardware accelerators such as GPUs.

To meet this challenge, the project will leverage and consistently advance the state of the art in several key software areas: programming models and associated run-time systems, performance measurement and correctness tools, smart translation in particular from OpenMP to CUDA or OpenCL, combined use of MPI and OpenMP, dynamic automatic tuning, and prediction of the execution time of a parallel application on different platforms. To achieve its objective, this project has attracted 25 project partners from France, Germany, Spain and Sweden, including a wide range of HPC users to validate the proposed technology in applications from various domains. For GCS, teams from HLRS and JSC are participating in H4H and contribute their long-term experience in hybrid programming and performance analysis for parallel programs. The project will run for three years and has a total volume of € 15.6 million.

HOPSA Project launched

The new HOPSA project ("HOlistic Performance System Analysis") is funded in the EU 7th framework programme for two years (2011/2012) and as part of a special EU-Russia call, it is also coordinated with a matching Russian project. The objective of this twin project is to create an integrated performance diagnosis infrastructure for a combined system and application tuning. The Russian partners are responsible for the first part, the European for the second. Based on a system-wide basic screening of the performance properties of individual jobs, an automated workflow will route findings on potential performance bottlenecks either to system administrators or application programmers together with recommendations on how to identify their root cause using more powerful diagnostic tools. For this, the European performance tools ThreadSpotter (RogueWave AB, formerly Acumem), Paraver (BSC), Vampir (TU Dresden) and Scalasca (JSC/GRS) will be more tightly integrated. On the Russian side, the HPC computing centres of Moscow State University and the Russian Academy of Science, T-Platforms, and the Southern Federal University in Taganrog are participating in the HOPSA project.

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