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Expanding GEOsciences on DEMand

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Worldwide population faces difficult challenges for the coming years to produce enough energy to sustain global growth and predict main evolutions of the Earth such as earthquakes. Seismic data processing and reservoir simulation are key technologies to help researchers in geosciences to tackle these challenges.

Modern seismic data processing and geophysical simulations require greater amounts of computing power, data storage and sophisticated software. The research community hardly keeps pace with this evolution, resulting in difficulties for small or medium research centres to exploit their innovative algorithms.

Grid Computing is an opportunity to foster sharing of computer resources and give access to large computing power for a limited period of time at an affordable cost, as well as sharing data and sophisticated software.

The capability to solve new complex problems and validate innovative algorithms on real scale problems is also a way to attract and keep the brightest researchers for the benefit of both the academic and industrial R&D geosciences communities.

Under the “umbrella” of the EGEE Infrastructure project was created EGEODE, “Expanding Geosciences On Demand” Open Virtual Organization.

EGEODE is dedicated to research in geosciences for both public and private industrial research & development and academic laboratories.

The Geocluster software, which includes several tools for signal processing, simulation and inversion, enables researchers to process seismic data and to explore the composition of the Earth’s layers. In addition to Geocluster, which is used only for R&D, CGG (<http://www.cgg.com>) develops, markets and supports a broad range of geosciences software systems covering seismic data acquisition and processing, as well as geosciences interpretation and data management.

Many typical Grid Computing projects aim pure Research domains in infrastructure, middleware and usage such as High Energy Physics, Bio informatics, Earth Observation. EGEODE moves the focus towards collaboration between Industry and Academia.

There are two main potential impacts:

- 1 - The transfer of know-how and services to industry.
- 2 - The consolidation and extension of EGEODE community, which includes both industrial and academic research centres.

The general benefits of grid computing are:

- Access to computing resources without investing in large IT infrastructure.
- Optimise IT infrastructure
 - o Load balancing between Processing Centres
 - o Smoothing peaks of production
 - o Service continuity; Business Continuity Plan
 - o Better fault tolerant system and applications
 - o Leverage Processing Centres capacity

- Lower the total cost of IT by sharing available resources with other members of the community.

And the specific benefits for the Research community:

- Easy access to academic software and comprehensive, industrial software.
- Free the researcher from the additional burden of managing IT hardware and software complexity and limitations.
- Create a framework to share data and project resources with other teams across Europe and worldwide.
- Share best practices, support, and expertises.
- Enable cross-organizational teamwork and partnership.

Some of these benefits have been demonstrated through other Grid Projects and need to be validated in our Geosciences community. Sharing IT resources and Data is typically the primary goal of a Grid Project. Early indicators in our V.O. show that facilitating access to software and simplifying management of hardware and software complexity are also extremely important.

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