



Compagnie Générale de Géophysique (CGG, France)



**EGEE 1st Industry Day
Paris, 27th April 2006**

**Gaël Youinou
CGG
Data processing & Reservoir Services
gyouinou@cgg.com**



Agenda



- **CGG**
 - **CGG in the Oil and Gas industry**
 - **Seismic processing**
 - **Storage and Computing**
 - **Cluster to Grid Computing**

- **Involvement in EGEE**
 - **IT side**
 - **Software side**
 - **V.O. side**

- **Status & Challenges towards full production**

- **Future**



CGG



- **CGG is a leading supplier of applied reservoir solutions, geophysical services and products to the worldwide oil & gas industry**

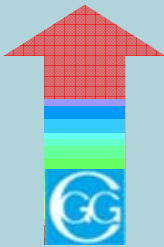
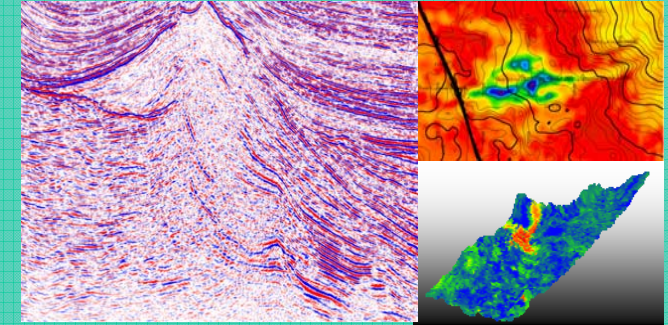




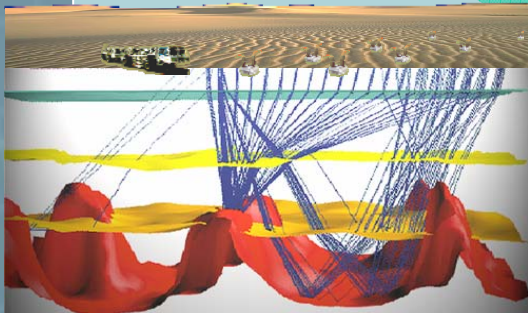
CGG in the Oil and Gas industry



*Reservoir services
Spec data*



*Processing
(software, site design
& services)*



*Acquisition
(equipment & services)*





Seismic processing



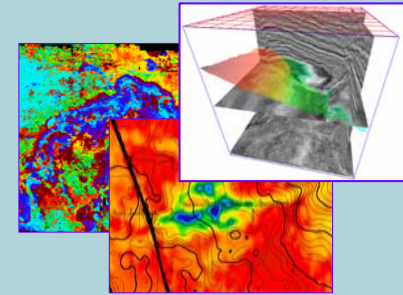
Acquisition 1-10 TB/proj
(IBM 34/3590)



Processing 10-100 TB/proj (SAN)



Interpretation << 1 TB/proj



Paris, 27th april 2006



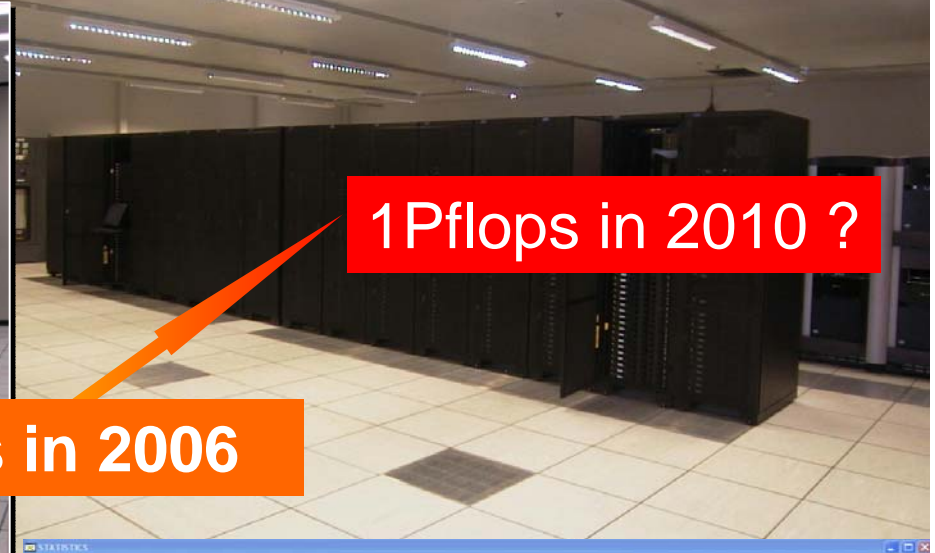
EGEE Industry Day



Gaël YOUINOU

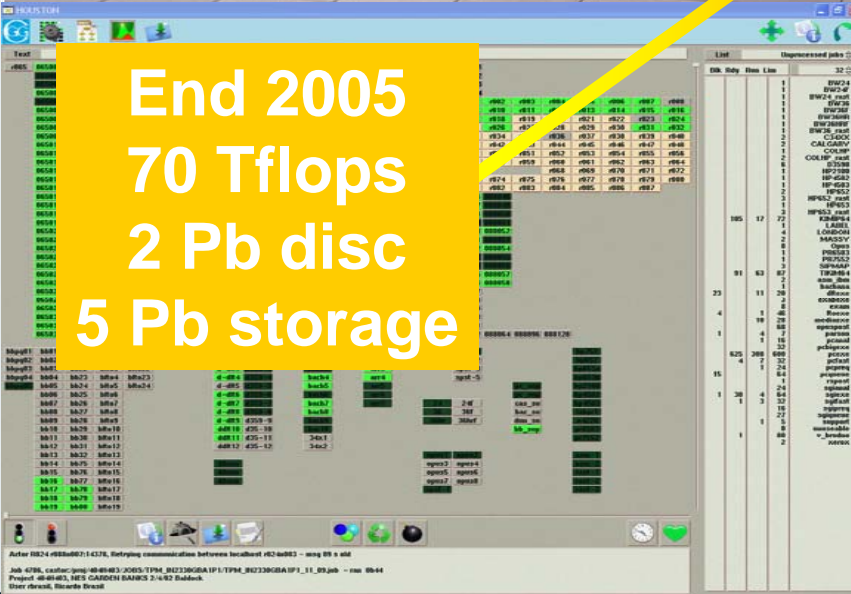


Storage and Computing

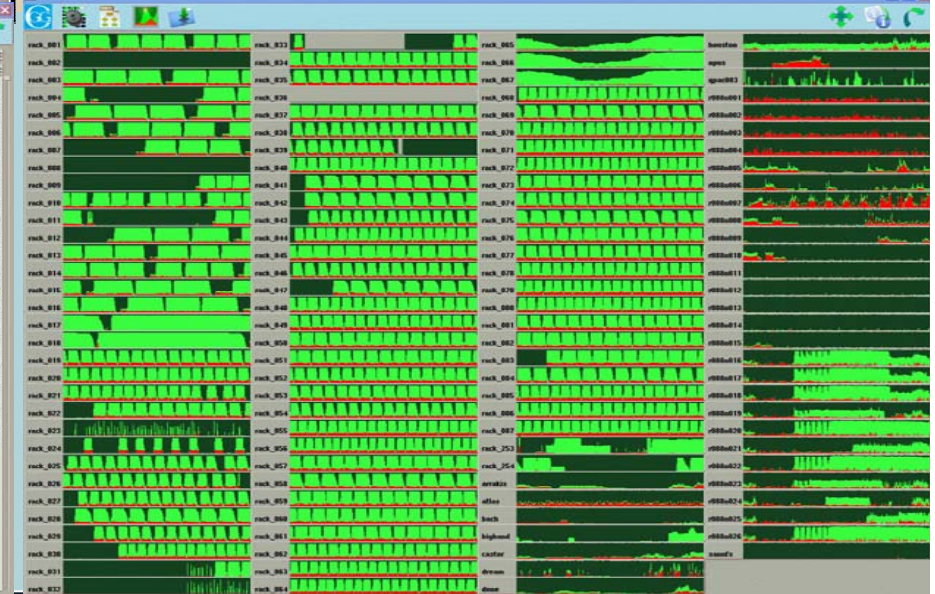


1 Pflops in 2010 ?

100+ Tflops in 2006



End 2005
70 Tflops
2 Pb disc
5 Pb storage





Cluster to Grid Computing



- **More Computing & Storage resources to solve complex problems**
 - **Capability to solve complex problems and to validate innovative algorithms on real size data sets**
 - **Close the gap between Research and Industrial environment**
 - **Framework for Industry/Research collaborations**

- **To optimise IT infrastructure**
 - **Lower the total cost of IT by sharing available resources**
 - **Load balancing between CGG Processing Centres**
 - **Smoothing peaks of production**
 - **Service continuity – Business Continuity Plan**
 - **Better fault tolerant system and applications**

- **To share and acquire knowledge**
 - **Best practices and programming models**
 - **Enable cross-organizational teamwork and partnership**



Involvement in EGEE



- **IT side**
 - Create a node of the European grid EGEE
 - Learn how to install/use/administrate and improve the middleware
 - Evaluate the cost of Managing grid infrastructure
 - Create an Internal Technology grid

- **Software side**
 - Connect an application on top of the middleware
 - License management and compilation server
 - Understand and validate new programming models in real situation
 - Robustness, portability, performances, difficulty to develop, ...
 - Explore new ways for end user (web services,...)

- **V.O. side**
 - EGEODE: Expanding GEosciences On DEMand
 - Dedicated to Research in Geosciences



CGG/EGEE – IT side

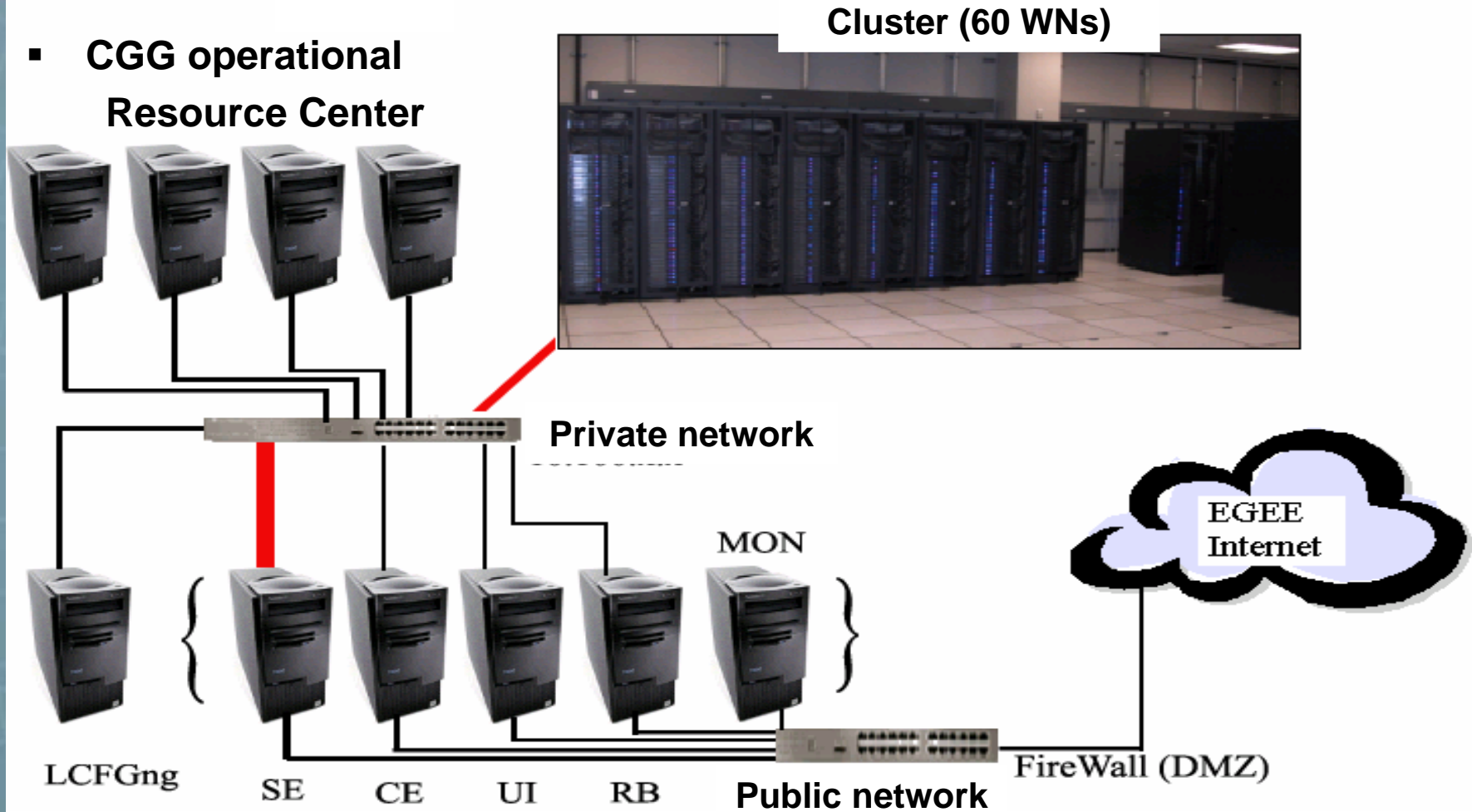




CGG/EGEE – IT side



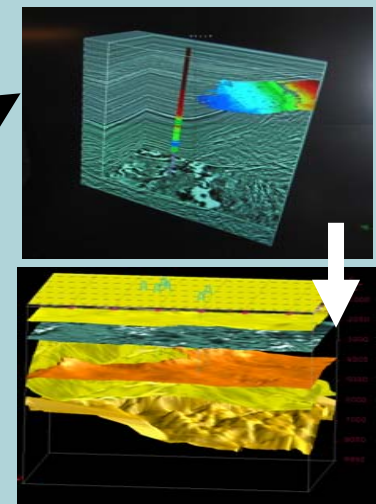
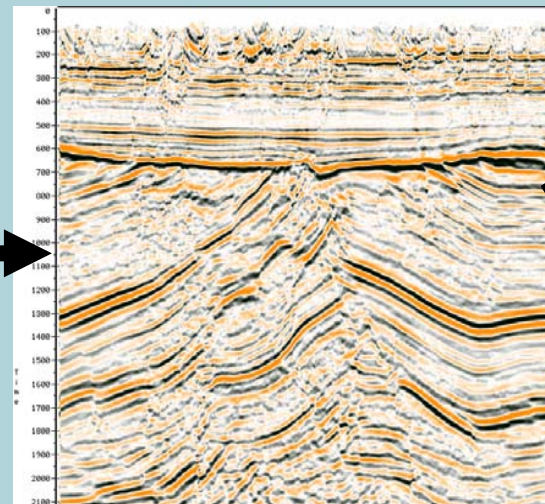
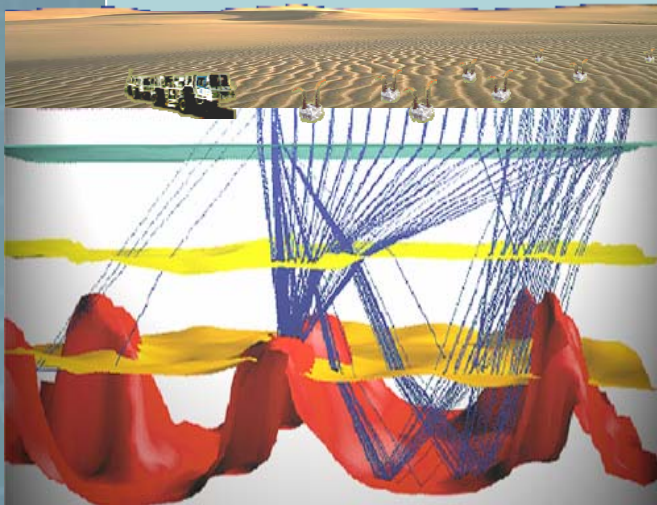
- CGG operational Resource Center



- Computing Element: gateway to local computing resources
- Storage Element: gateway to local storage (disk, tape)
- User Interface: user's access point to the grid



- **Seismic processing Generic Platform**
 - Based on Geocluster©, an industrial application, used in production at CGG
 - Include several standard tools for signal processing, simulation and inversion (model optimisation)
 - Being ported to EGEE for Industry and Academia





CGG/EGEE – Software side



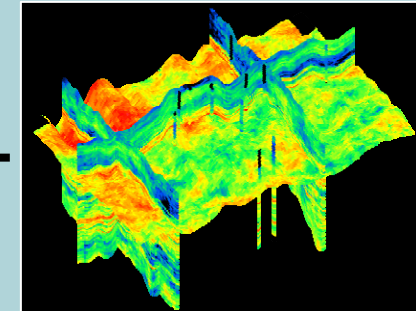
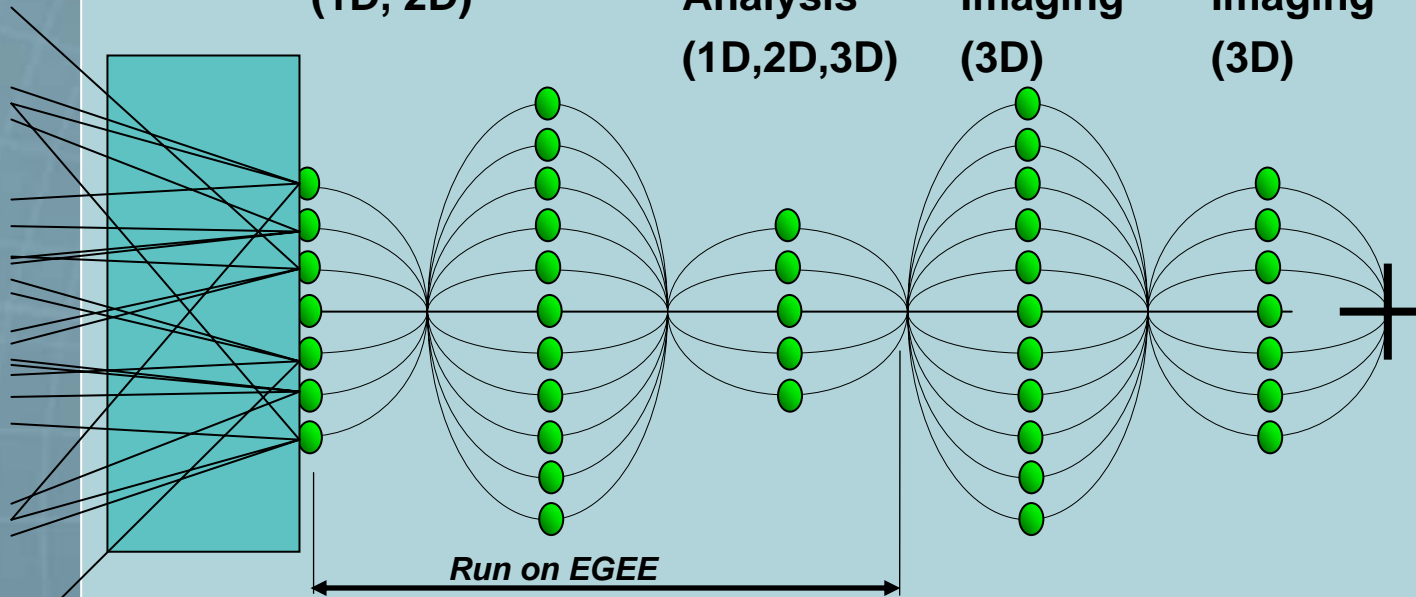
**Pre-processing
(1D, 2D)**

**Velocity
Analysis
(1D,2D,3D)**

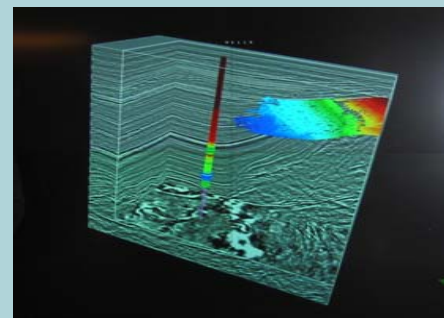
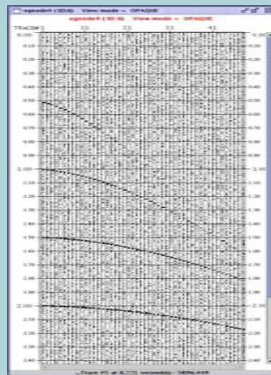
**Time
Imaging
(3D)**

**Depth
Imaging
(3D)**

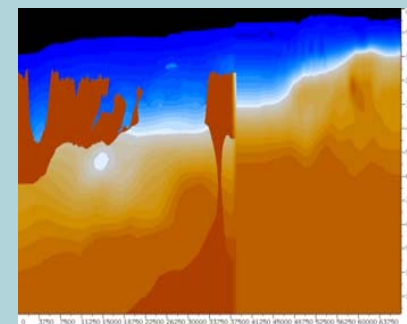
**Reservoir
Geophysics**



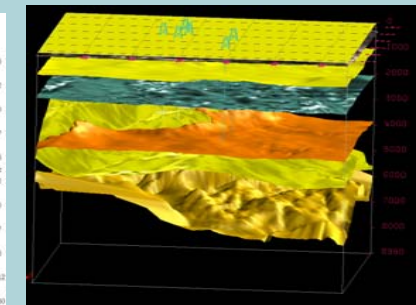
Rock properties



3D seismic



Velocity model



Structural model



CGG/EGEE – V.O. side



- **« Expanding Geosciences On Demand » : EGEODE VO**
Virtual Organization to share IT resources and best-practices
Opened to all Research centers in environmental geophysics from both Industrial (public-private) and Academic world
 - **Open: any user can write new algorithms in new modules**
 - **Free access for academic research**
 - **Controlled by license keys**

Based on EGEE Infrastructure





CGG/EGEE – V.O. side



- **Geophysics and Reservoir Simulation are key technologies for earth sciences in Oil&Gas and Environment**
- **Geosciences community is large (thousands of researchers) but very scattered**
 - **Capability to solve complex problems and to validate innovative algorithms on real size data sets**
 - **Close the gap between Research and Industrial environment**
 - **Attract and keep brightest researchers**
 - **Framework for Industry/Research collaboration**



Status & Challenges towards full production



- **Lessons learned**
 - It works
 - The learning curve is significant

- **What's missing to go to full production**
 - Disc and network bandwidth

 - An economical/usage model (and accounting tool)
 - ✓ To support a good balance between users and providers of resources
 - ✓ To include cost of network transfer

 - A mean to manage projects inside a VO: authorization for a user to access a project, accounting management at a project or user level.

 - Middleware to implement local policies about dynamic priorities and resources allocation to VOs or Projects



It's up to us to define what we want to do with the Grid

- **Geosciences community**
 - Collaborative research
 - E-Learning : t-Infrastructure
 - E-Processing

The best way to understand a new technology is to participate in its evolution

- **EGEE II**
- **DEGREE**
- **BEinGRID (BE18)**
Seismic imaging and reservoir simulation



EGEODE VO - Home - Mozilla Firefox

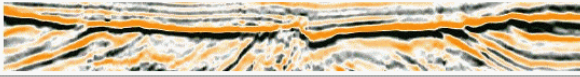
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Welcome to the EGEODE portal

Geocluster, the leading industry seismic processing solution, is the first industrial application successfully running on the Enabling Grids for E-science (EGEE) Grid Production Service, within the Expanding GEosciences on DEMand (EGEODE) Virtual Organisation (VO). EGEODE is dedicated to research in geoscience for both public and private industrial research & development and academic laboratories. [read more](#)

Home

CERN Courier : First industrial application runs on EGEE project infrastructure

Contributed by Gerard Velozo
Tuesday, 15 November 2005

First industrial application runs on EGEE project infrastructure

The seismic processing software Geocluster is the first industrial application successfully running on the computing Grid infrastructure of the Enabling Grids for E-science (EGEE) project. Geocluster is developed and marketed by the Compagnie Générale de Géophysique (CGG) in France, a leading supplier of geophysical products and services to the worldwide oil, gas, mining and environmental industries.

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, CGG develops, markets and supports a broad range of geoscience software systems covering seismic data acquisition and processing, as well as geoscience interpretation and data management.



3D visualization

The EGEE project is developing a Grid infrastructure to provide researchers in both academia and industry with access to major computing resources, independent of their location, 24 hours a day. To date, there are six different scientific disciplines running on the EGEE Grid infrastructure.

Dominique Thomas, CGG software development manager, pointed out: "There are numerous benefits in operating on the EGEE infrastructure, not least the fact that you can share IT resources and software. It frees the researcher from the additional burden of managing IT hardware and software complexity and limitations. Thanks to EGEE, providing the geosciences research community with easy access to comprehensive and commercial seismic processing software is now a reality."

Author:
Compiled by Hannelore Hämmerle and Nicole Crémeil

Reference link : <http://www.cerncourier.com/main/article/45/5/19>

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EGEE web site
<http://public.eu-egee.org/>

EGEODE web site
<http://www.egeode.org/egeode/>

For any information
vo-egode-manager@cgg.com