

Compagnie Générale de Géophysique (CGG, France)

EGEE 1st Industry Day
Paris, 27th April 2006

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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**

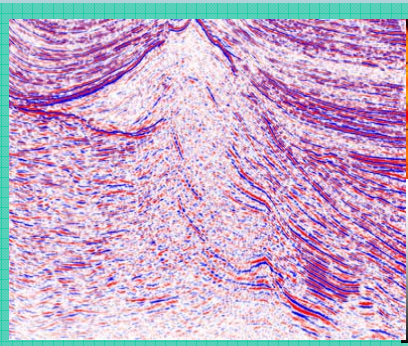
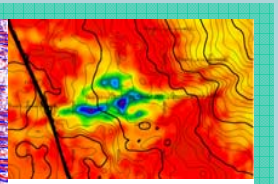
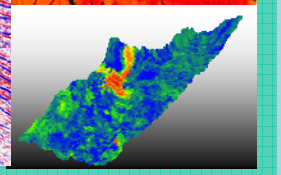
CGG

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

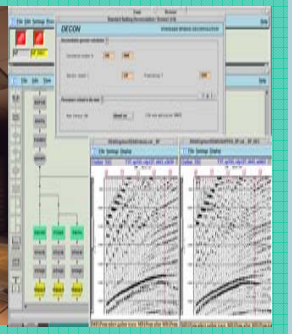
1931-2006 CGG Making it possible

CGG in the Oil and Gas industry

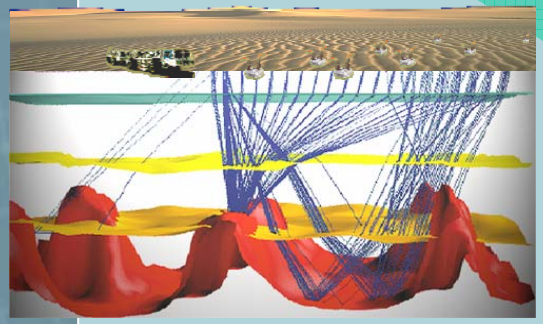

Reservoir services
Spec data

Processing
(software, site design & services)

Acquisition
(equipment & services)



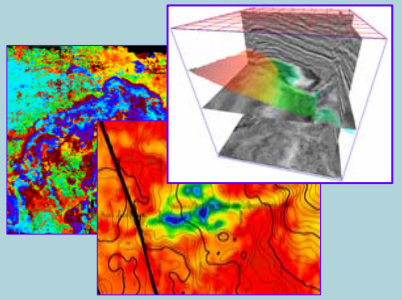


Seismic processing

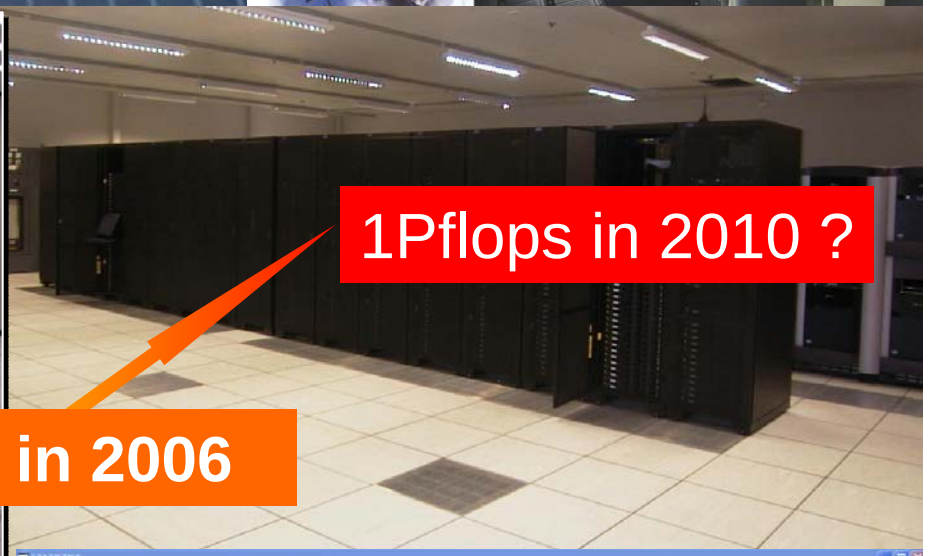
Acquisition 1-10 TB/proj (IBM 34/3590)

Processing 10-100 TB/proj (SAN)

Interpretation << 1 TB/proj

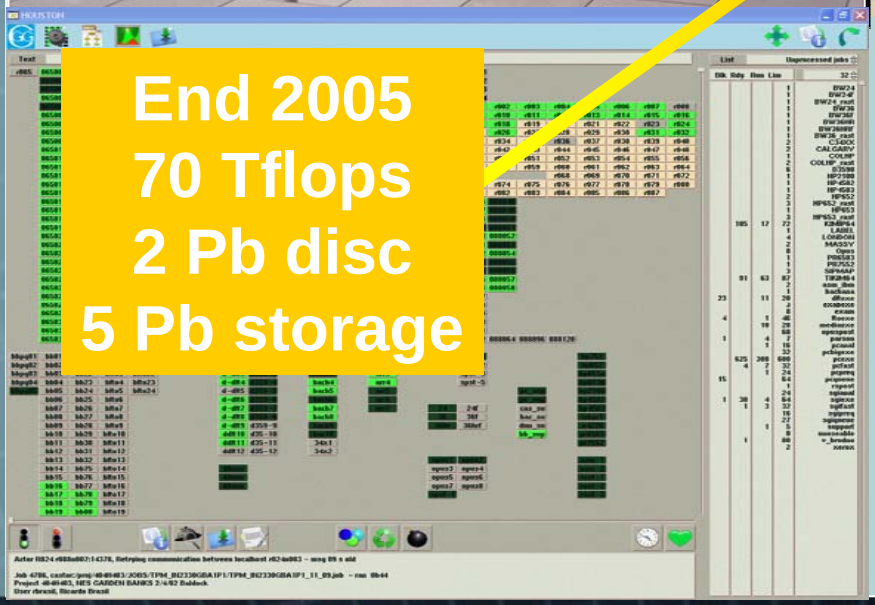


Storage and Computing



1Pflops in 2010 ?

100+ Tflops in 2006



End 2005
70 Tflops
2 Pb disc
5 Pb storage

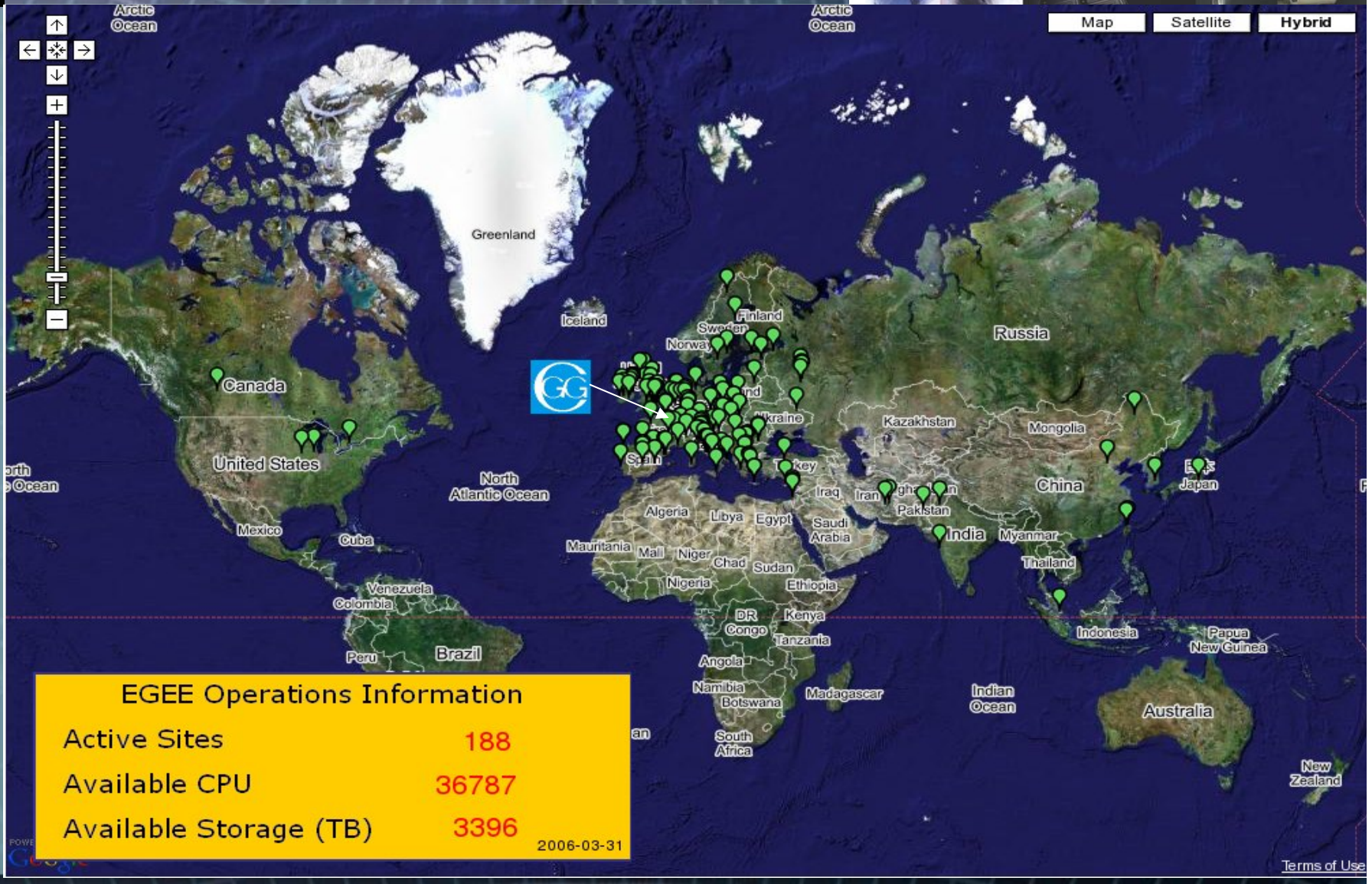
Cluster to Grid Computing

- **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

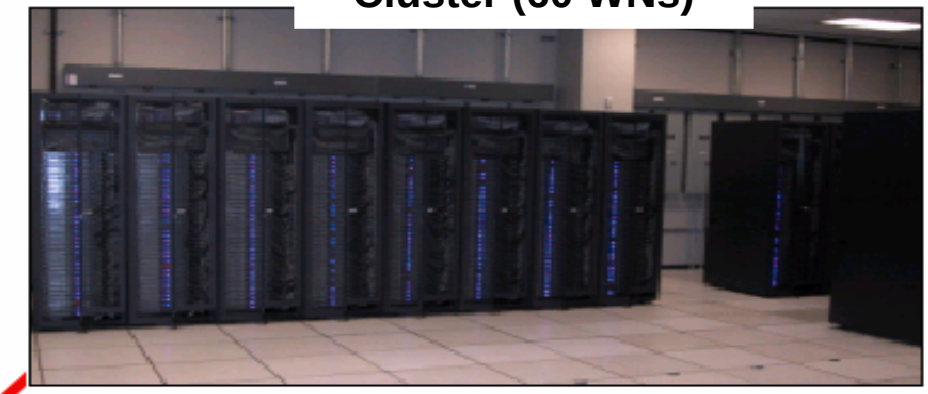
- **IT side**
  - Create a node of the European grid EGEE
  - Learn how to install/use/administrate and improve the middleware
  - Evaluate the cost of Managing grid infrastructure
  - Create an Internal Technology grid
- **Software side**
  - Connect an application on top of the middleware
  - License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

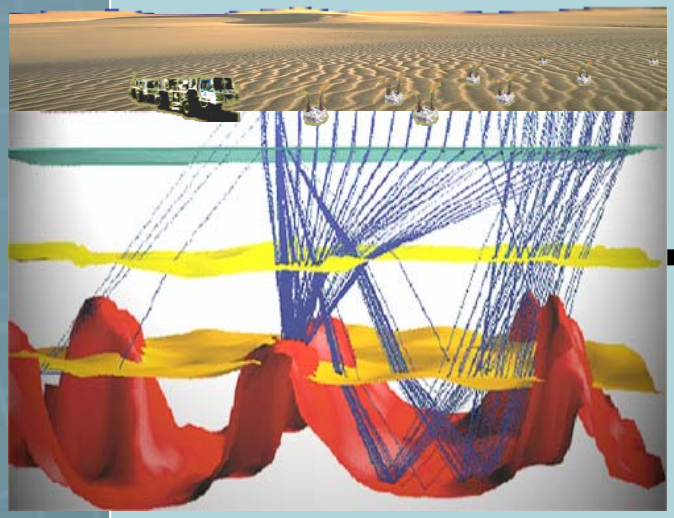
- CGG operational Resource Center

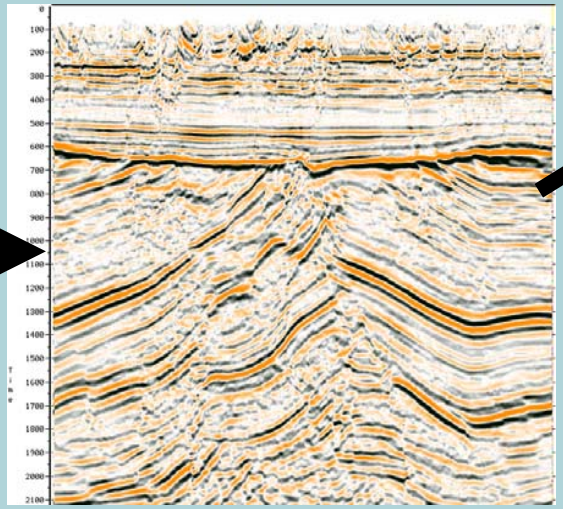


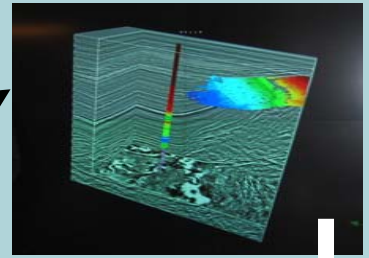
- Computing Element: gateway to local computing resources
- Storage Element: gateway to local storage (disk, tape)
- User Interface: user's access point ti the grid

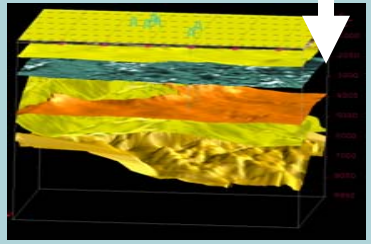
CGG/EGEE – Software side

- **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

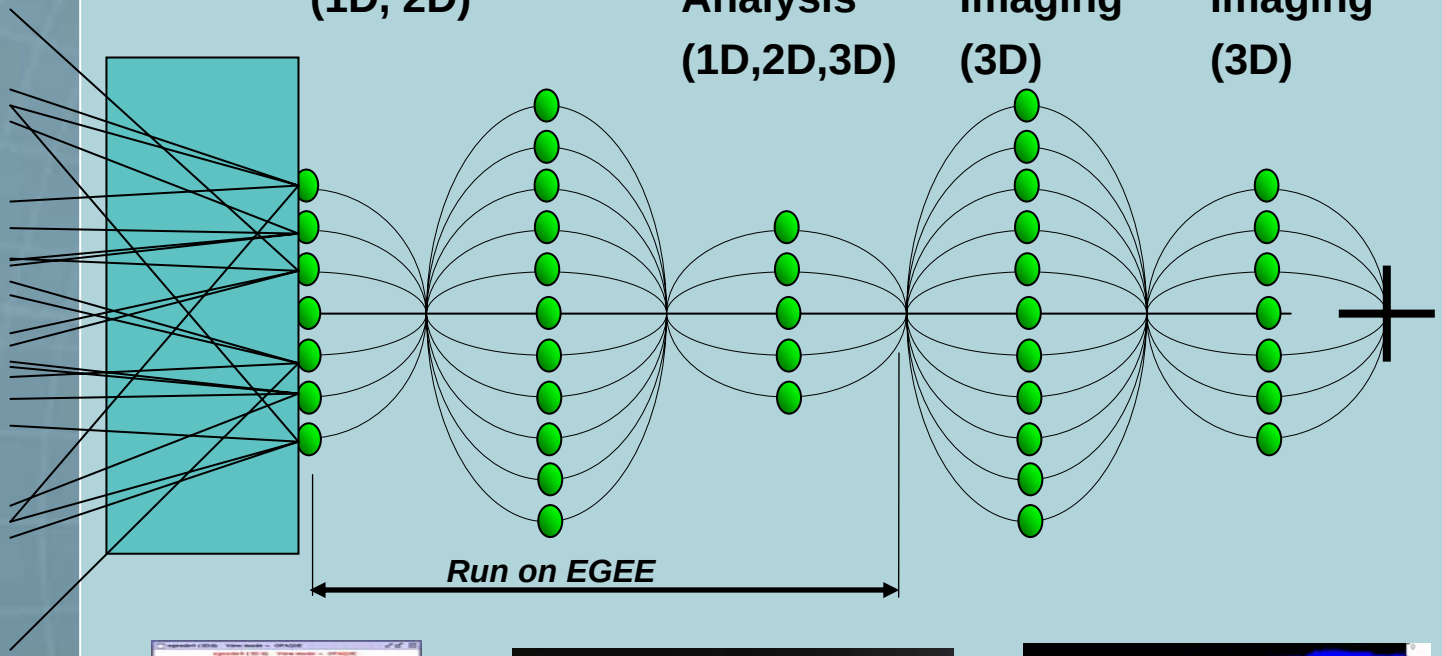
Pre-processing (1D, 2D)

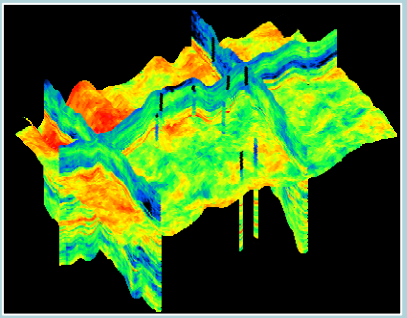
Velocity Analysis (1D,2D,3D)

Time Imaging (3D)

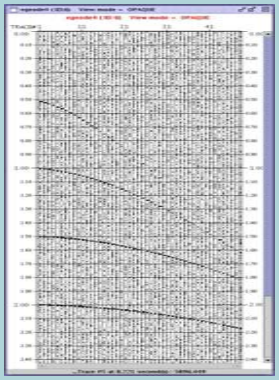
Depth Imaging (3D)

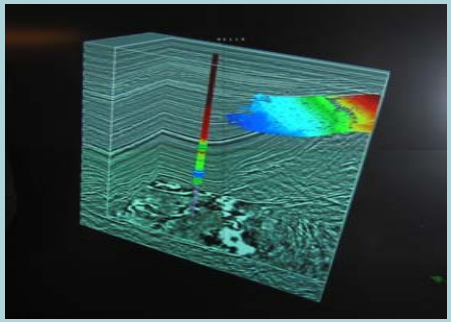
Reservoir Geophysics



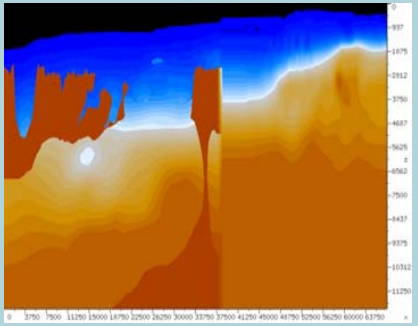


Rock properties

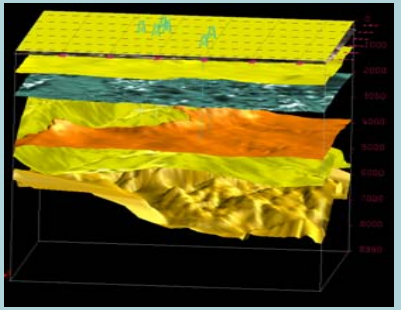




3D seismic



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**

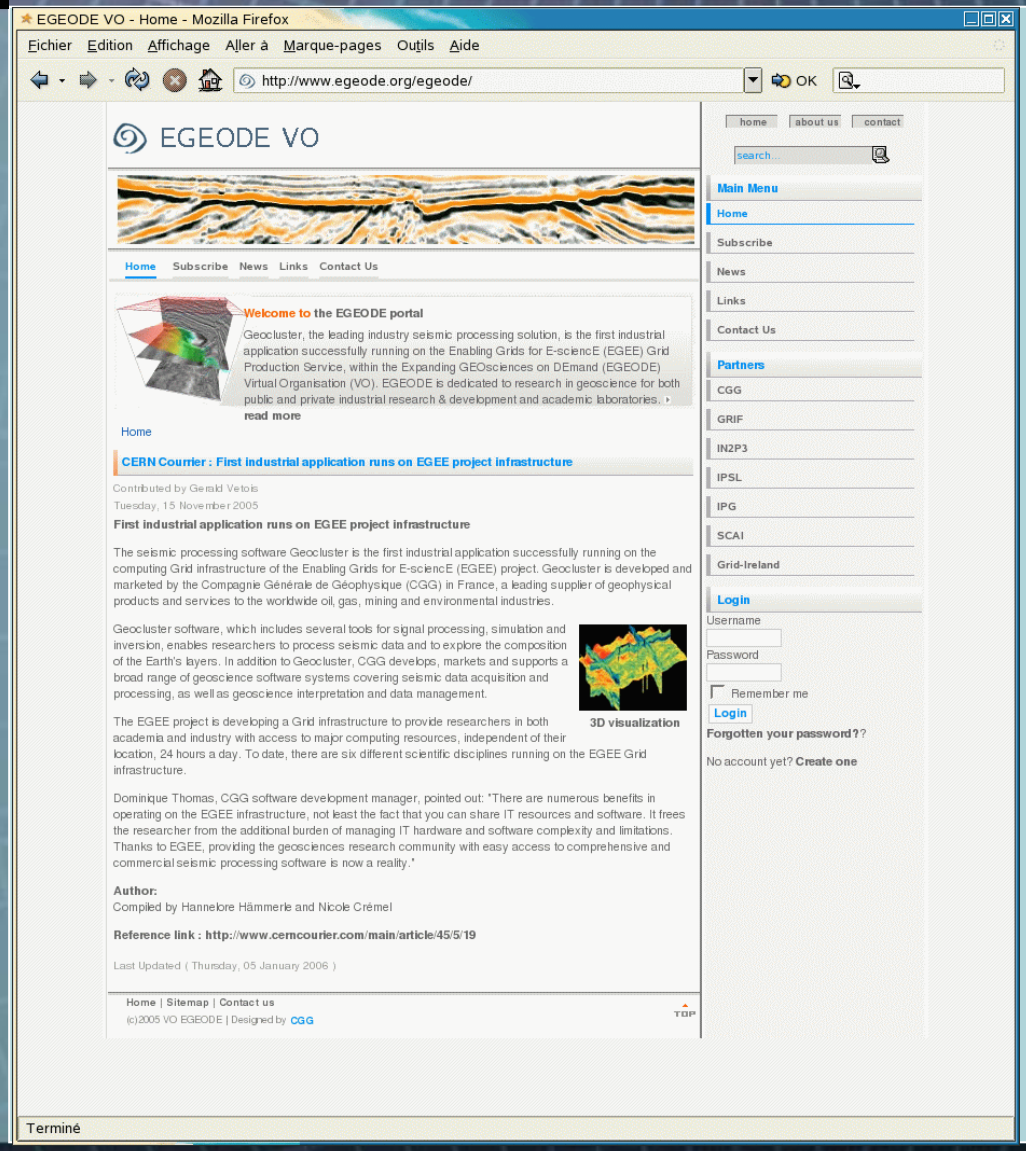
CGG/EGEE - Future

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



EGEE web site

http://public.eu-egee.org/

EGEODE web site

http://www.egeode.org/egeode/

For any information

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