

EGEODE

« Expanding Geosciences On Demand »



- Dominique Thomas;
- Compagnie Générale de Géophysique (CGG, France) R&D





Web data browser

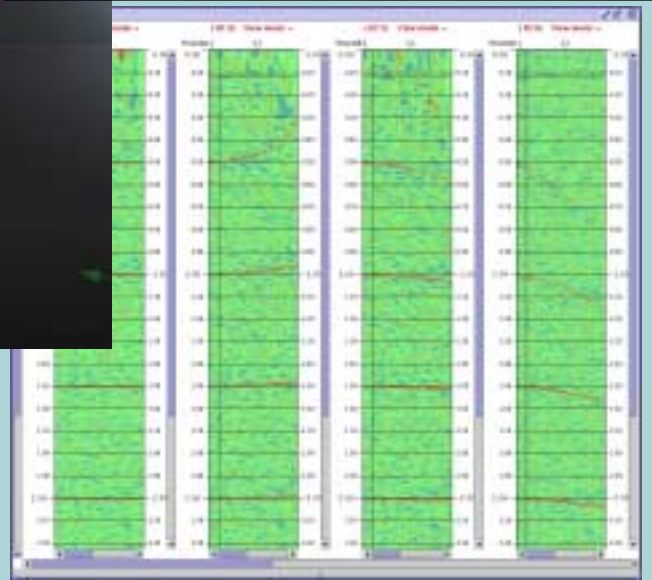
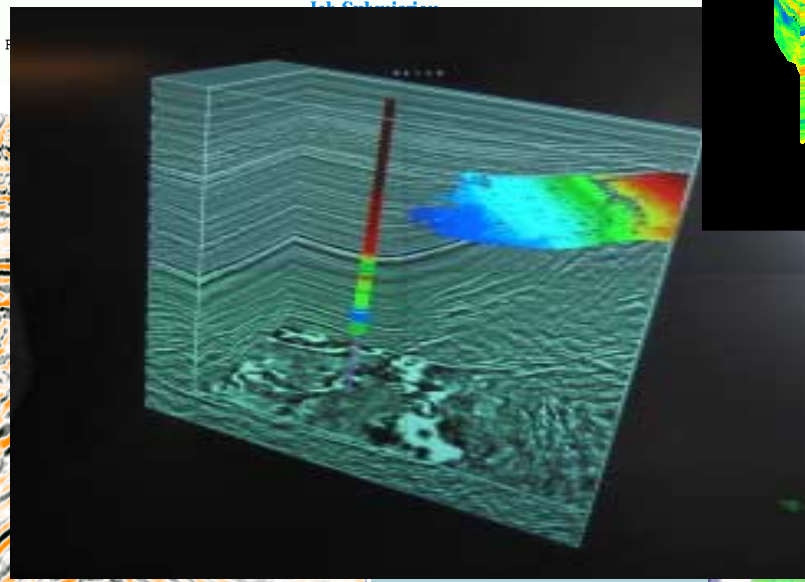
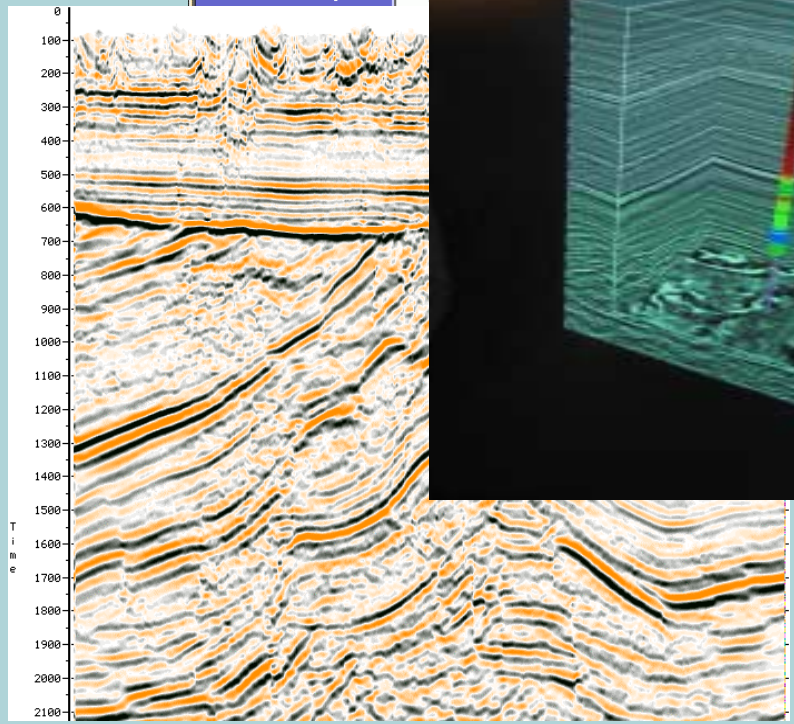
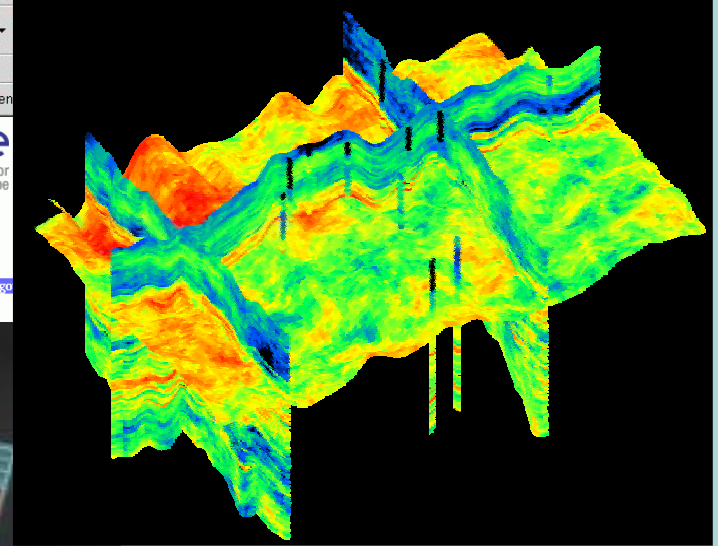
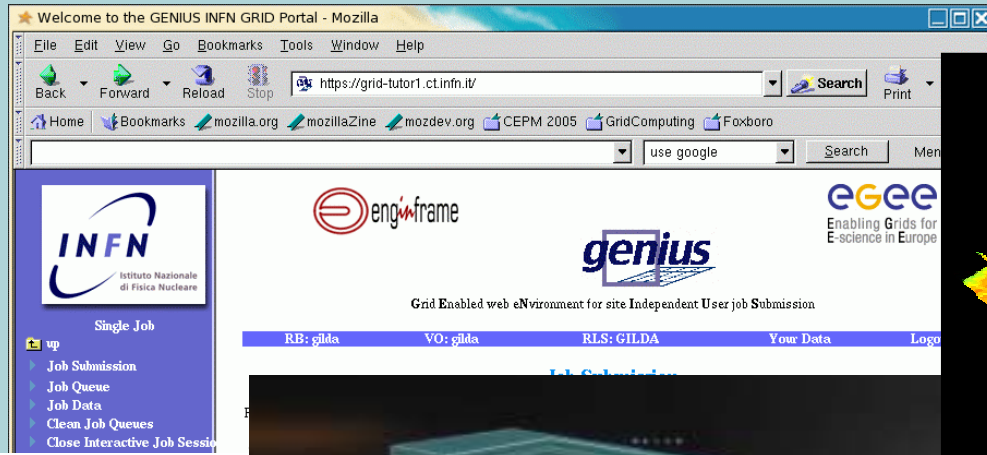
The image shows two overlapping browser windows. The background window is the GENIUS INFN GRID Portal, displaying the INFN logo and a navigation menu with items like 'Job Submission', 'Job Queue', and 'Job Data'. The foreground window is the GILDA Testbed registration form, titled 'GILDA Testbed - Grid INFN Laboratory for Dissemination Activities'. The form includes a navigation bar with buttons for 'HOME', 'TESTBED', 'CERTIFICATION AUTHORITY', 'REGISTER to the GILDA VO', 'Go to the GRID DEMONSTRATOR', 'GENIUS PORTAL', 'MONITORING', and 'CONTACTS'. Below the navigation bar, there are links for 'Grid tutorials', 'Instructions for users', 'Instructions for sites', 'Useful links', and 'Usage Statistics'. The registration form itself has the following fields:

- Home e cognome / First name and family name: Roberto Barbera
- Istituto/Institute: GILDA-INFN Catania
- Telefono/Phone number: +390951234567
- E-mail: roberto.barbero@ct.infn.it
- Selezione VO / VO choice: (empty)

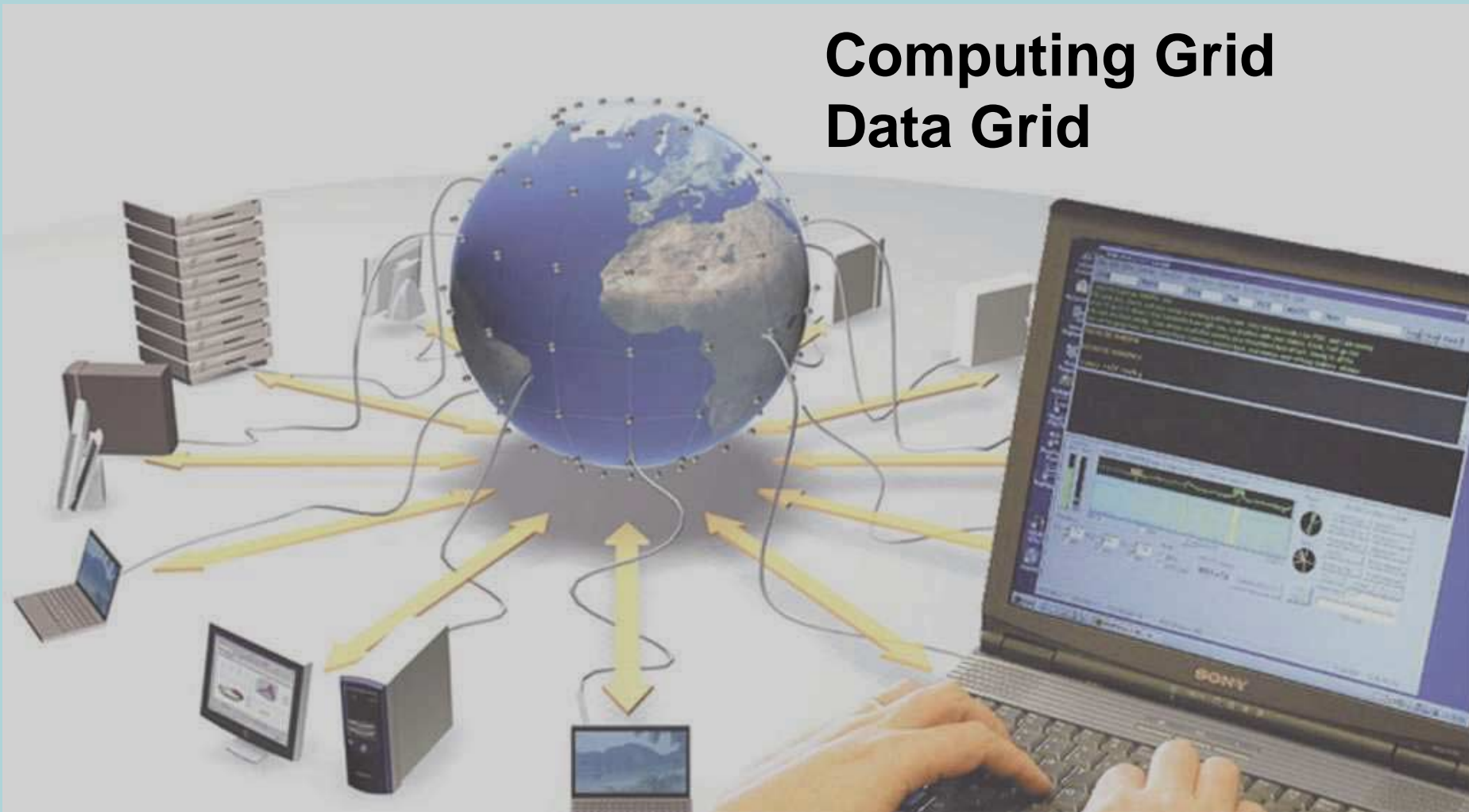
At the bottom of the form, there is a disclaimer in Italian: 'La sottomissione della domanda implica l'obbligo ad un corretto uso delle risorse messe a disposizione dell'utente.' and two buttons: 'Clear Form' and 'Register'.



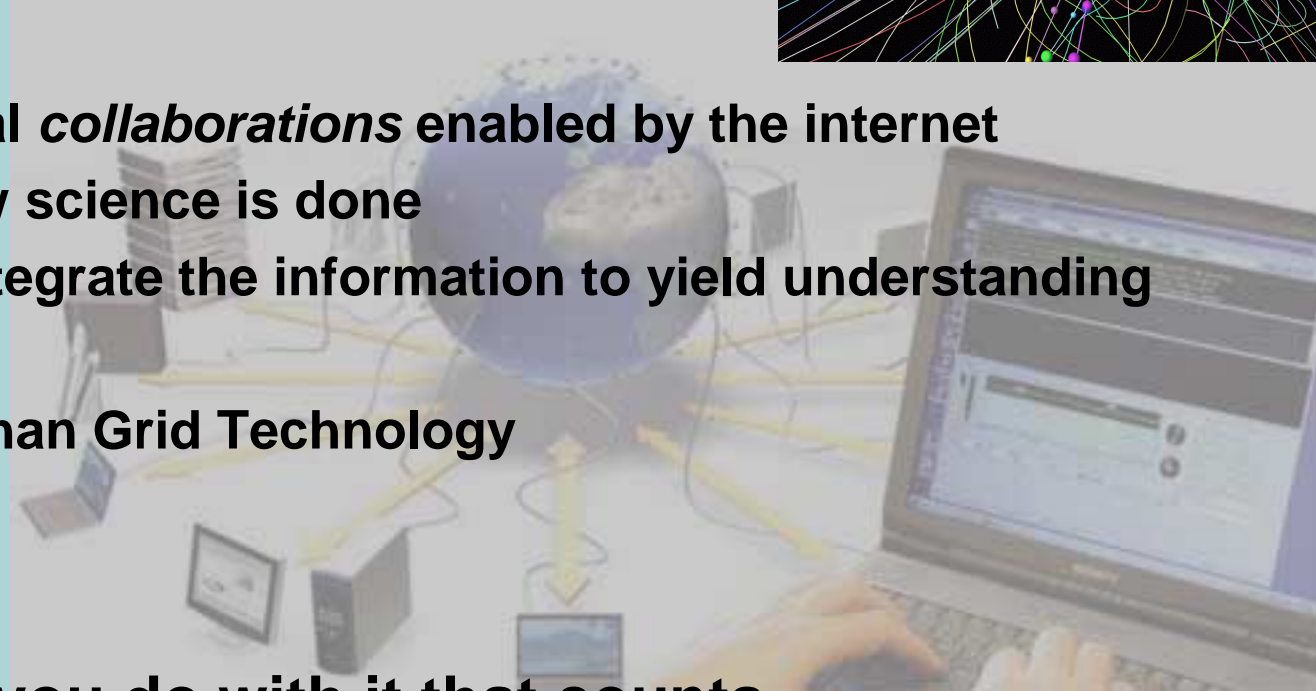
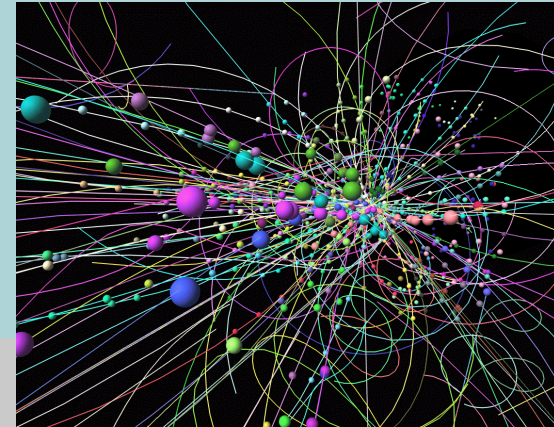
Data processing?



Computing Grid Data Grid



- **Grids provide *access* to:**
 - **Very large data collections**
 - **Terascale computing resources**
 - **High performance visualisation**
 - **Connected by high-bandwidth networks**
- **Grids support global *collaborations* enabled by the internet**
 - **increasingly how science is done**
 - **Necessary to integrate the information to yield understanding**
- **e-Science is more than Grid Technology**

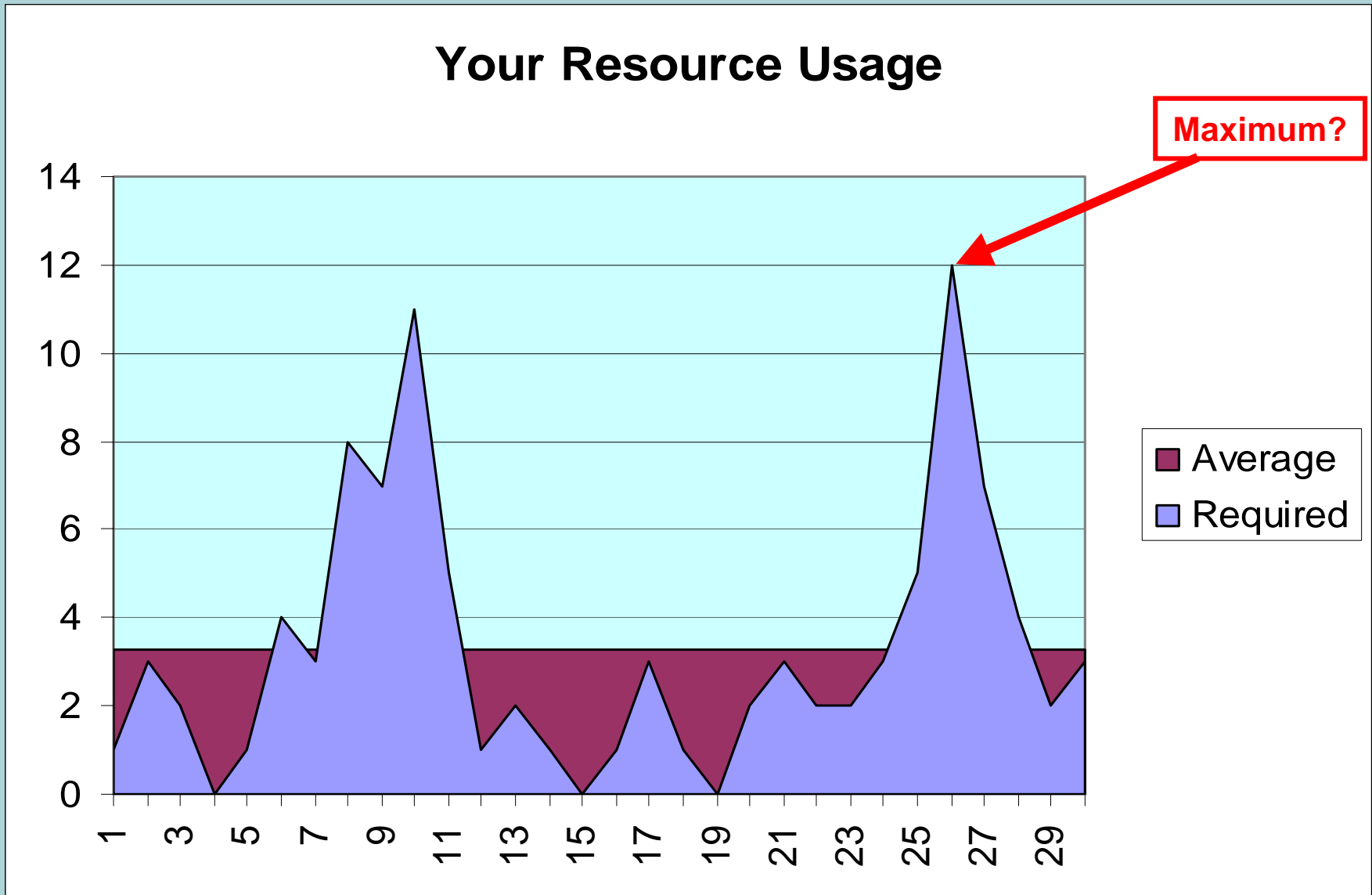


It is what you do with it that counts



- The general benefits of grid computing:
 - ***Access to computing resources without investing in large IT infrastructure***
 - Lower the total cost of IT by sharing available resources

 - And the specific benefits for Research and Education community:
 - ***Access to comprehensive, commercial software***
 - Free the researcher from the additional burden of managing IT hardware and software complexity and limitations.
 - Have a framework to share data and project resources with other teams across Europe and worldwide,
 - Share best practices, support and training more easily.
- => t-Infrastructure.***

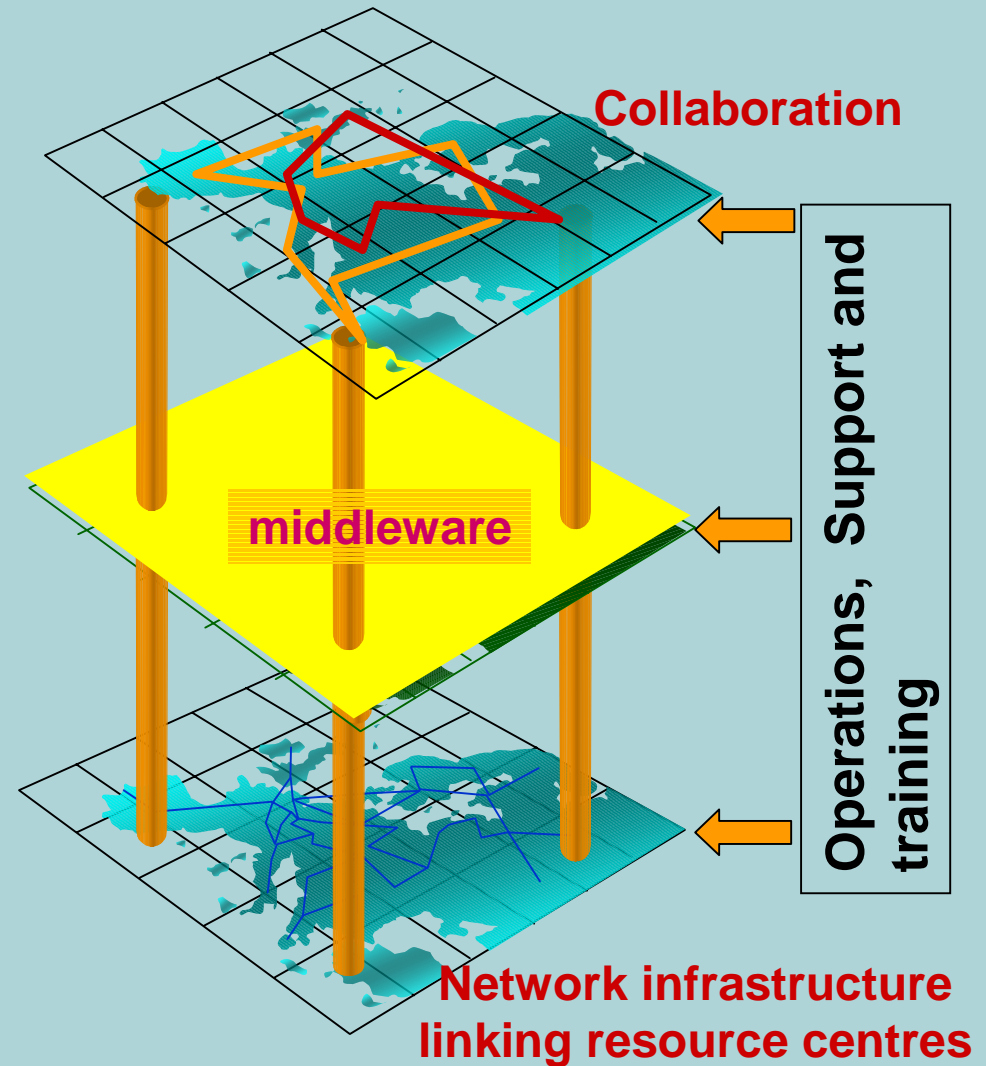


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Enabling Grids for E-scienceE: EGEE

- To underpin European science and technology in the service of society
- To link with and build on
 - National, regional and international initiatives
 - Emerging technologies (e.g. fibre optic networks)
- To foster international cooperation
 - both in the creation and the use of the e-infrastructure





Multi-Gigabit Pan-European Research Network

Capacity in the range of
34Mb/s to 10Gb/s

Connecting 33 countries

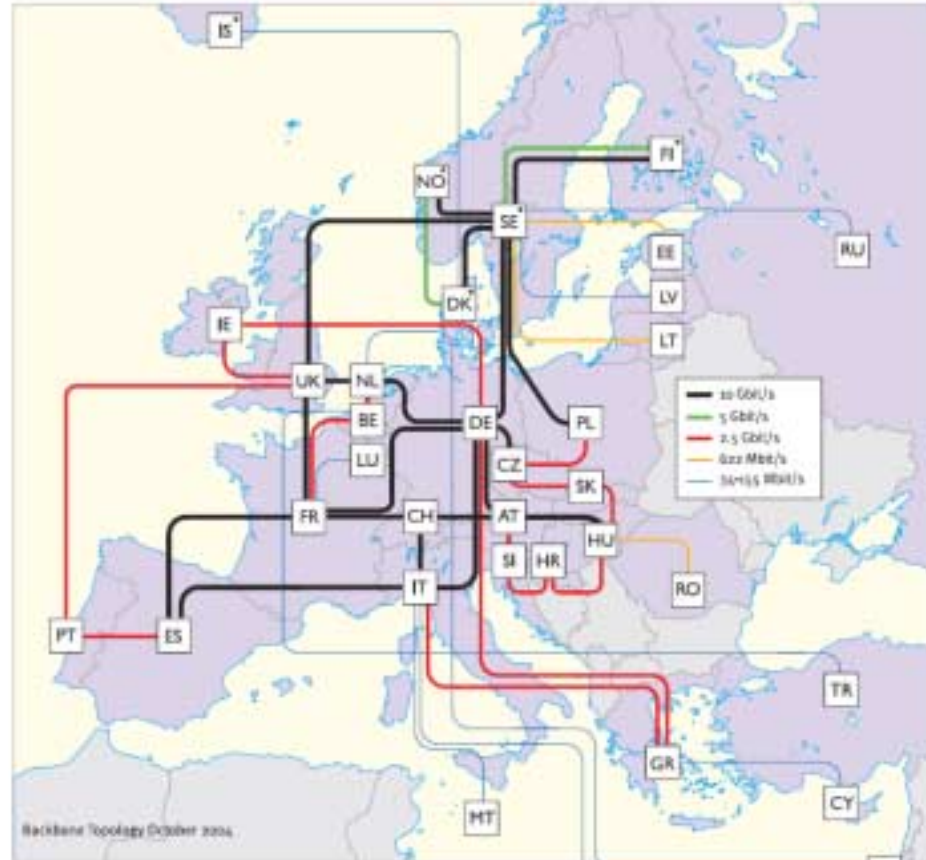


GÉANT



The world's most advanced international research network

Providing pan-European and international connectivity for research and education



GÉANT is operated by DANTE on behalf of Europe's research and education networks

IS	IS	IS	IS	IS	IS	IS	IS	IS	IS
Austria	Belgium	Denmark	France	Germany	Greece	Italy	Spain	Sweden	Switzerland
Czech Republic	Finland	Poland	Portugal	Romania	Slovakia	Slovenia	Turkey	United Kingdom	
Croatia	Hungary	Belarus	Latvia	Lithuania	Malta	Netherlands	Poland	Russia	
Finland	France	Germany	Italy	Spain	Sweden	Switzerland			

*Connections between these countries are part of NSI flow the Nordic regional network

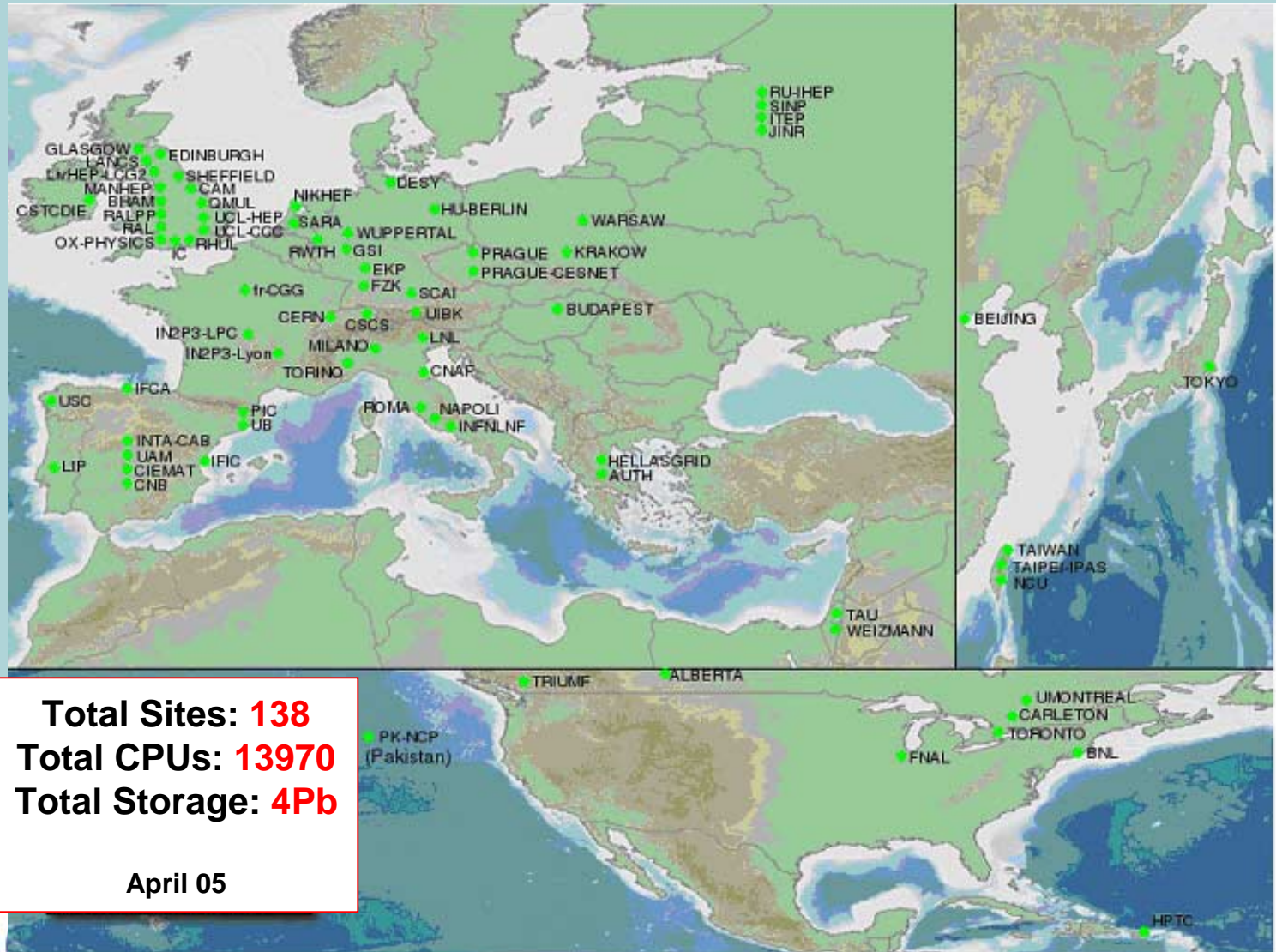


GÉANT is co-funded by The European Commission within its 5th R&D Framework programme





EGEE: Enabling Grid for E-science

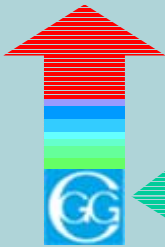
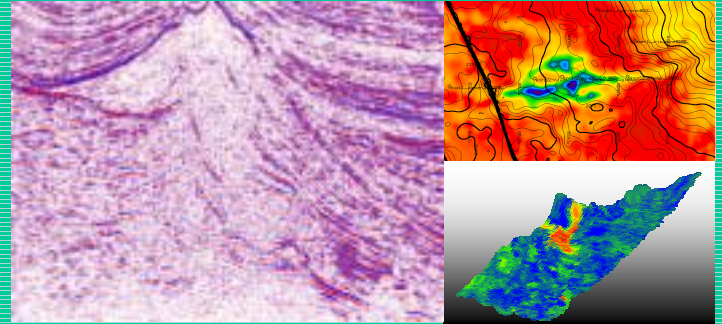




CGG in the Oil & Gas Industry



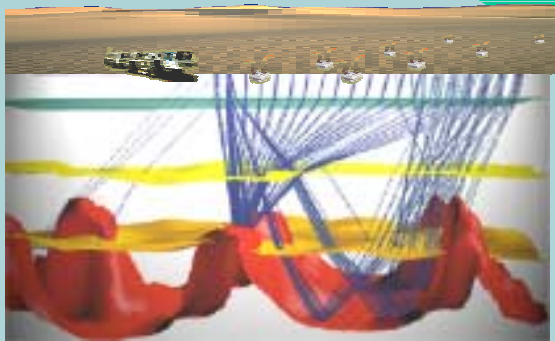
*Reservoir services
Spec data*



*Processing
(software, site design
& services)*



*Acquisition
(equipment & services)*





CGG: Compagnie Générale de Géophysique

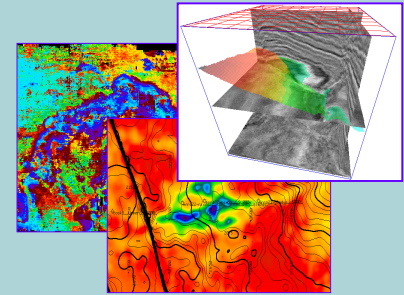
Acquisition 1-10 TB/proj
(IBM 34/3590)



Processing 5-50 TB/proj (SAN)



Interpretation << 1 TB/proj

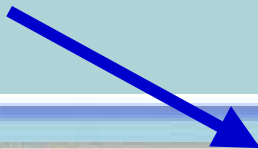




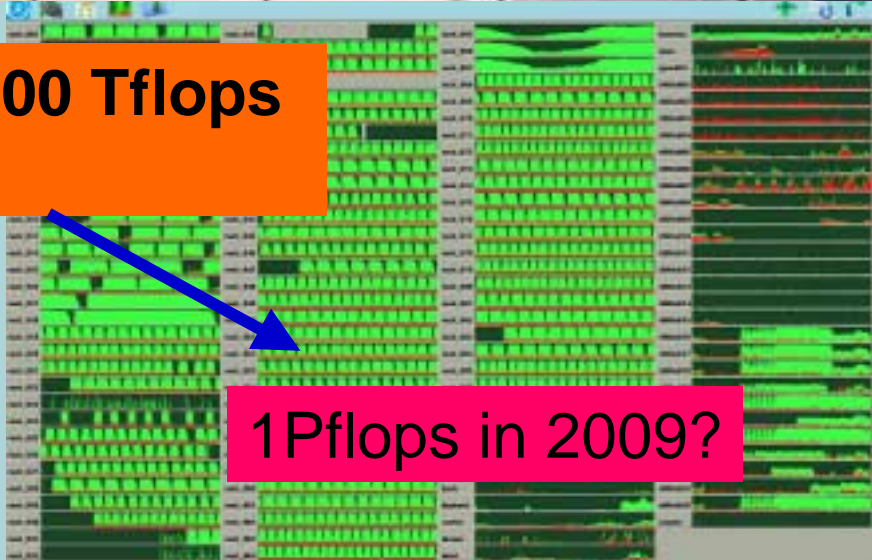
CGG - Storage and Computing for commercial activity



End 2004
20000+ cpus = 45 Tflops
1,5 Pb disc
5 Pb storage



100 to 200 Tflops
in 2006



1Pflops in 2009?





- **We all have several research projects with partners =>**
 - **To Stop re-inventing the wheel to organize our work each time**
 - **To Attract the brightest people by using state of the art technology**

- **We need:**

- **A *Standard* Infrastructure to share**
 - **CPU power**
 - **Data sets**
 - **Software**

- **For**
 - **Collaborative research**
 - **Education**

« *Expanding Geosciences On Demand* »

Virtual Organization to share IT resources and best-practices. Opened to all Research centers in geosciences, initially geophysics,

from both **Industrial (public-private) and Academic** world.

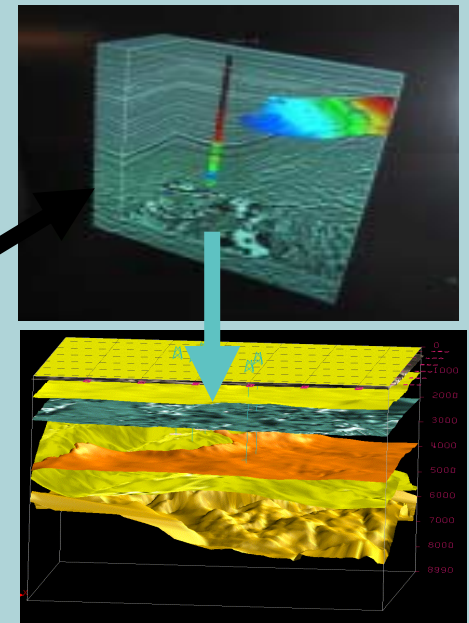
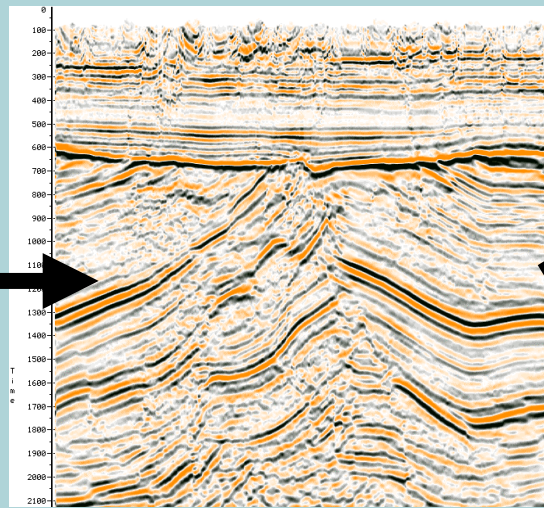
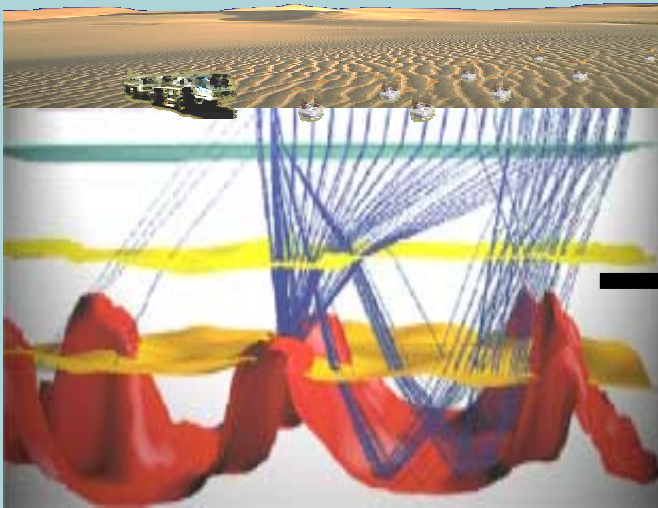
Based on EGEE Infrastructure





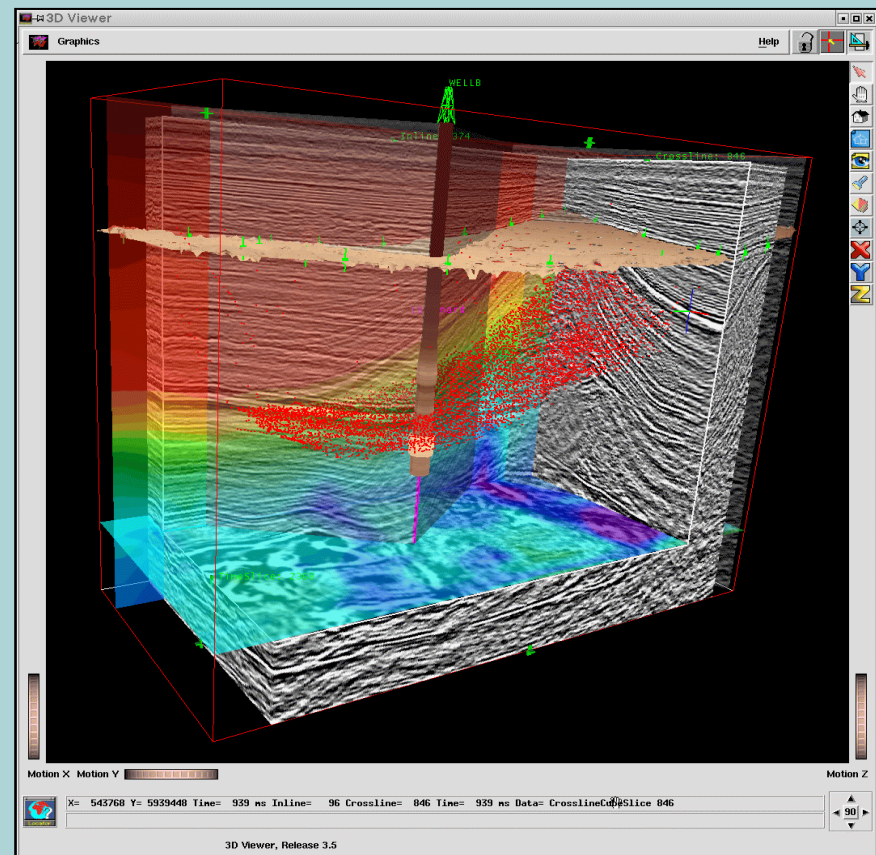
Overview of some applications

- **Geocluster, the *seismic processing* generic platform from CGG**
 - The initial focus of EGEODE Virtual Organization
- **Reservoir Simulation**
- **Subsurface data sharing**
- **Close collaboration with ESR « Earth Sciences Research » VO.
(Earth Observation, Climate, Hydrology, Solid Earth Geophysics)**



Seismic processing Generic Platform:

- Based on Geocluster, an industrial, production grade, application
- Include several standard tools for signal processing, simulation and inversion (model optimization).
- Open: any user can write new algorithms in new modules (shared or not)
- Free access for academic Research and Education
- Controlled by license keys





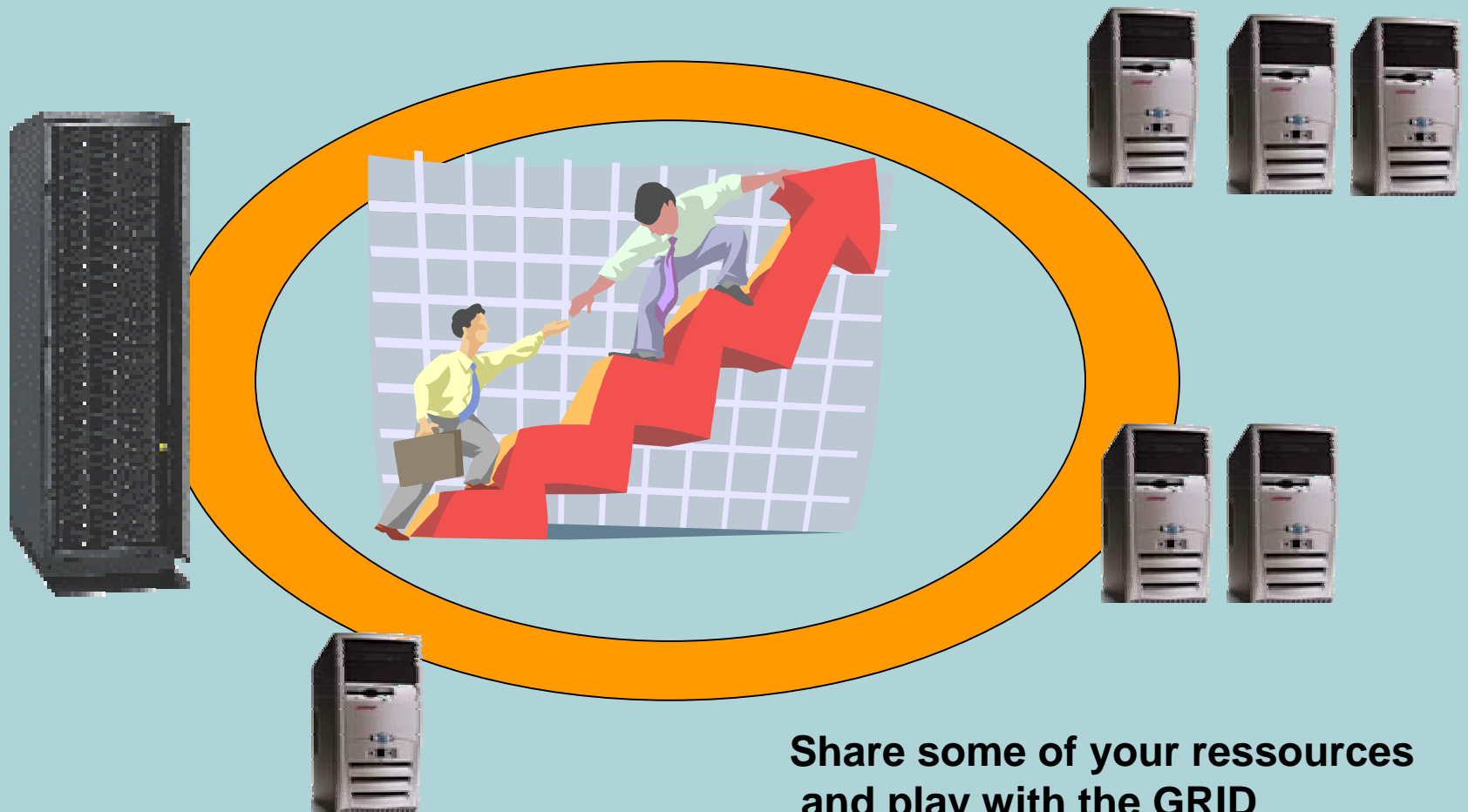
Geophysics and Reservoir Simulation are key technologies for earth sciences in Oil&Gas and Environment. Geosciences community is large (thousands of researchers) but very scattered.

- ❖ **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**



How to join

- Certificate identification (user + PC node)
- VO membership: vo-egeode-manager@cgg.com



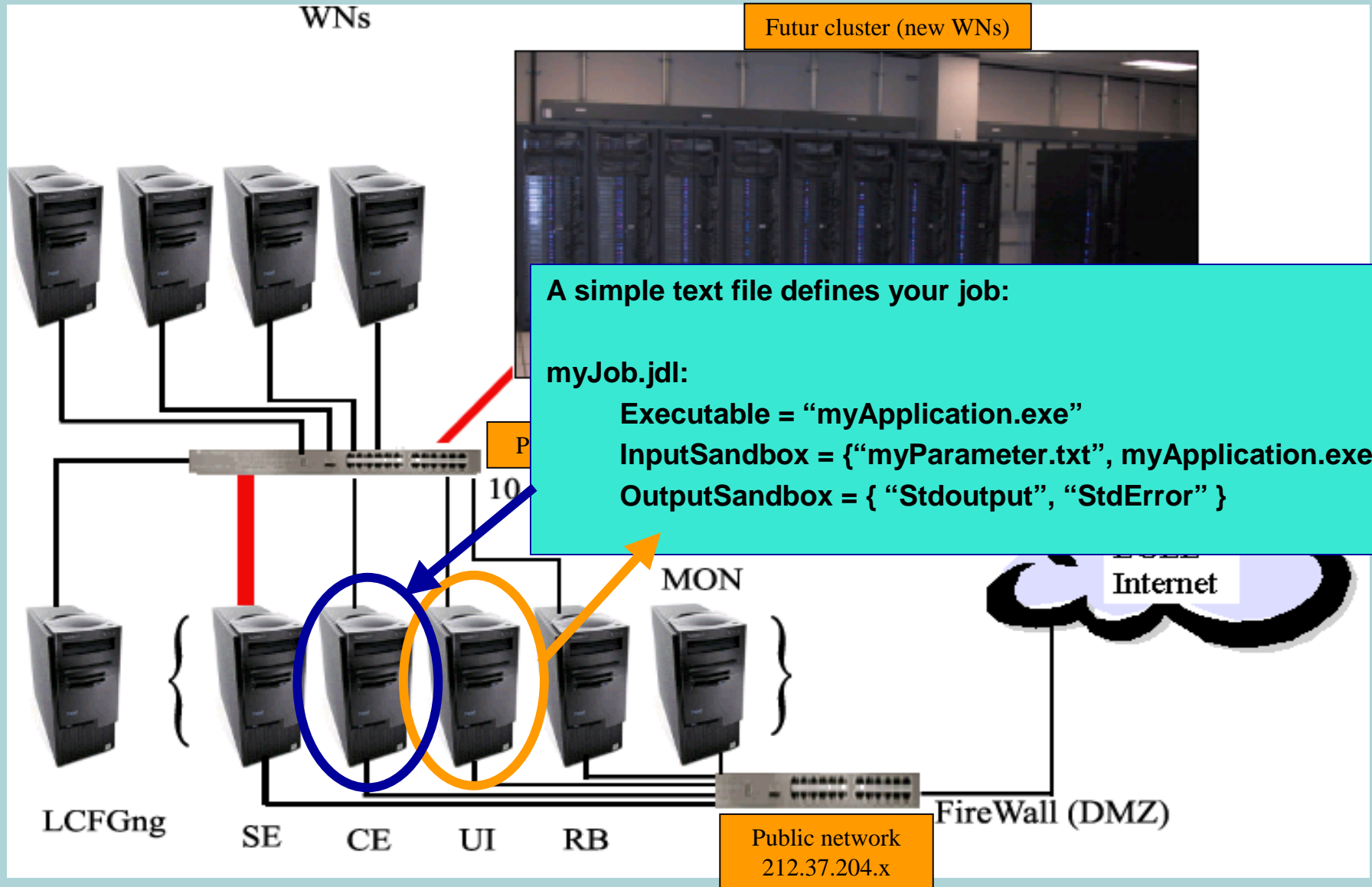
**Share some of your resources
and play with the GRID**



- **Authentication and authorization**
 - > Secure and recognized identity: digital personal certificate
 - > Registration to the VO
- **Sharing resources**
 - > Bring a small part of the resources
(adapt to your best Economic Model)
 - > Assume that in average you bring what you use
 - > Connect your frond end machines
- « *User Interface* » UI node and « *Compute Element* » CE node and/or “Storage Element” SE node to the Network – GEANT or through your Internet provider
- **Running available application of porting your own**

For any information:

vo-egeode-manager@cgg.com





Future

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

- Collaborative research
- E-Learning : t-Infrastructure
- E-Processing

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



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