



FARO – Fast Access to Remote Objects

The Web portal to access ENEA-GRID Computational Infrastructure

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ENEA-GRID

ENEA, the Italian National agency for new technologies, Energy and sustainable economic development, has 12 research sites, 6 of them with computer centers. All ENEA main computational resources are integrated in the ENEA-GRID infrastructure which provides to ENEA researchers and their collaborators an easy access to the available multiplatform resources.

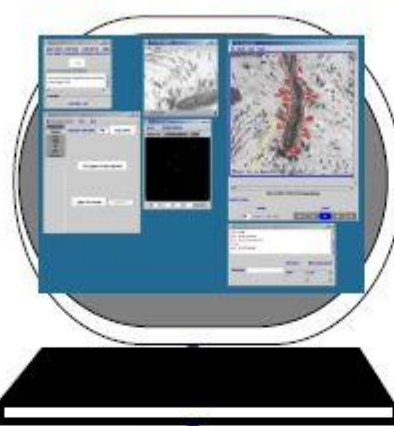


ENEA-GRID Infrastructure

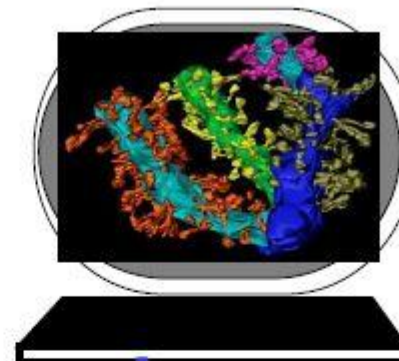
DATA ACQUISITION



DATA ANALYSIS



ADVANCED COMPUTER GRAPHICS



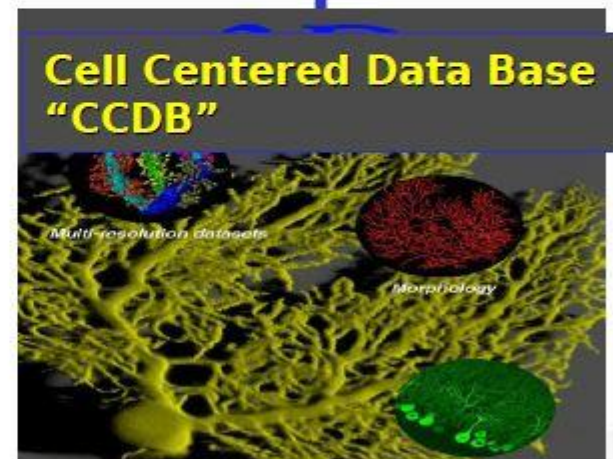
NETWORK



IMAGING INSTRUMENTS



COMPUTATIONAL RESOURCES



MULTI-SCALE DATABASES

HARDWARE

- **Most relevant:** CRESCO HPC system, located in Portici (NA) ~ 17.1 Tflops, 300 hosts, ~ 3000 cores, InfiniBand 4xDDR
- **Others:** ~100 hosts ~650 cpu
 - AIX: IBM SP5 256 cpu (12 p575 1.5GHz, 16 cpu + 1 p595 1.9 Ghz, 64 cpu, 1.5 Tflops); SP4, 96 cpu
 - SGI Altix 350 (IA64) 32 cpu & Onyx
 - Cray XD1 24 cpu
 - Linux clusters 32/x86_64; Apple cluster; Windows servers....
- **Graphic cluster** for remote 3D rendering + stereo display
- **Instruments:** Electron Microscopy, Seismic Table ...

SOFTWARE:

- Commercial codes (Fluent, Ansys, Abaqus,...)
- Research codes and open source (CPMD, MCNP, OpenFoam,...)
- Computational environments (Matlab, IDL,...),
- Visualization software (AVS/Express, Visit,...)

ENEA-GRID Architecture



GRID functionalities (authentication, authorization, resource discovery & management) are provided by mature multiplatform components (ENEA-GRID Middleware):

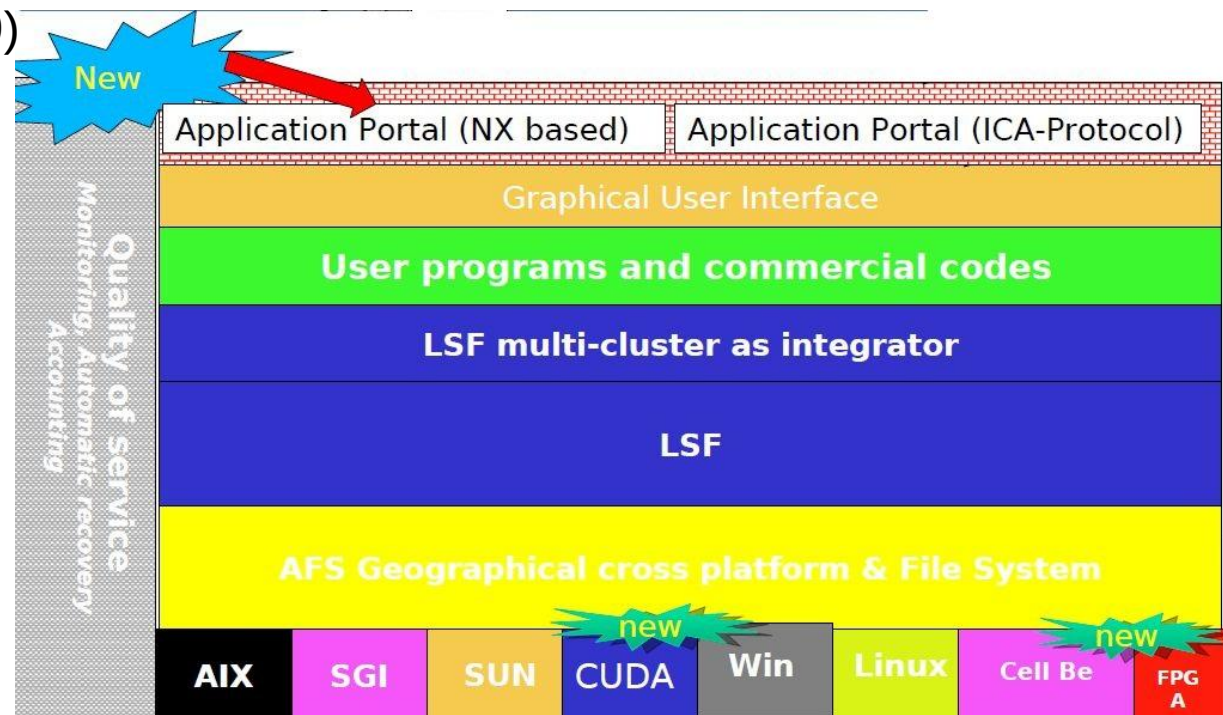
Distributed File System : **OpenAFS/Kerberos 5 integrated**

WAN resource manager: **LSF Multicluster [www.platform.com]**

User Interface: **Java & Citrix Technologies, now also Freenx**

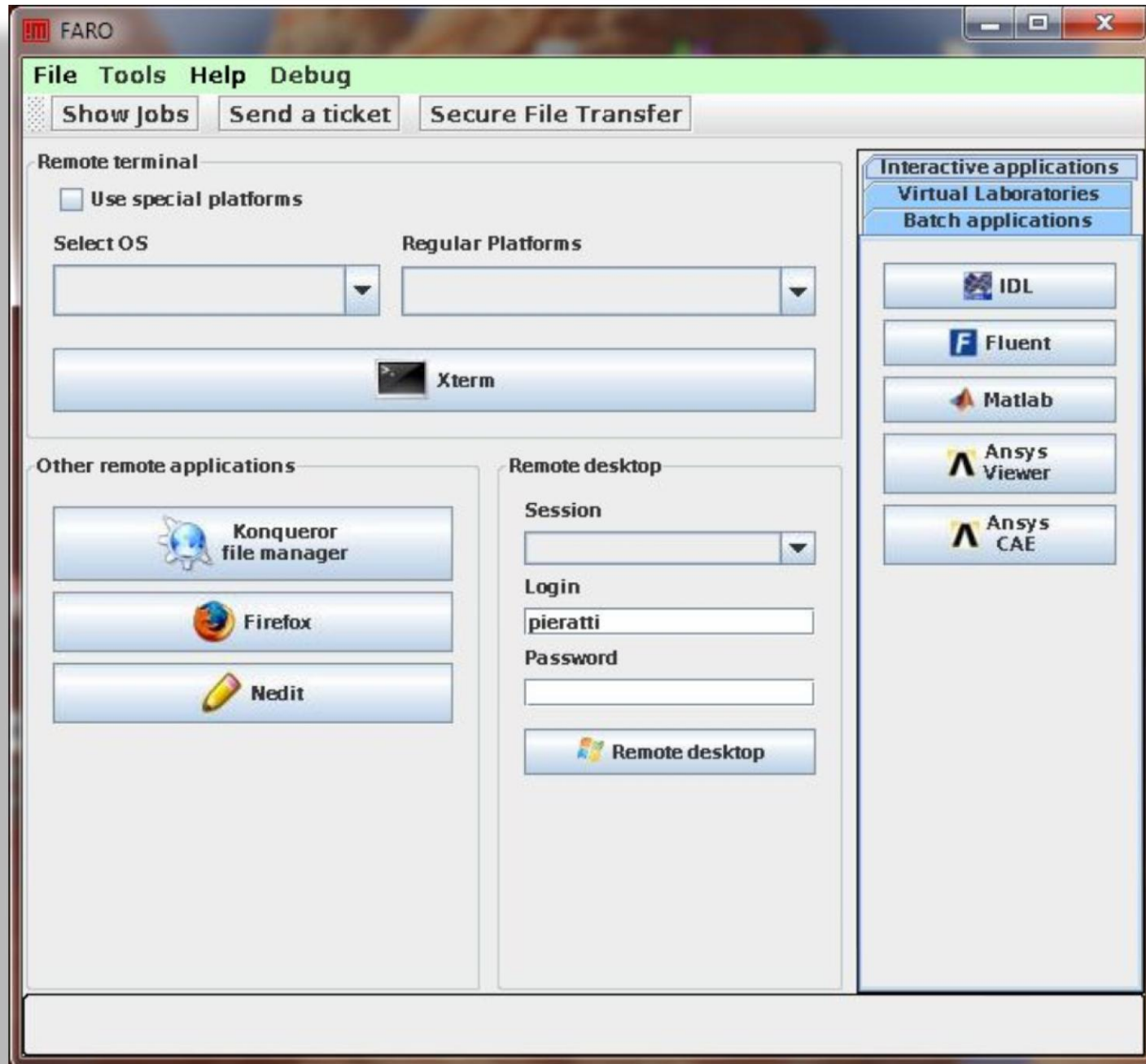
These production ready components have permitted to integrate reliably over the years (ENEA-GRID started in 1999) the state of the art computational resources.

ENEA participates in GRID projects (Datagrid, EGEE, EGEE-II & III, BEINGRID, PON projects, GRISU..) focusing on **interoperability solutions** with other middleware (gLite, Unicore): a **gateway implementation method** (Shared Proxy Approach for GRID Objects) has been developed and applied to interoperability with gLite based grids.



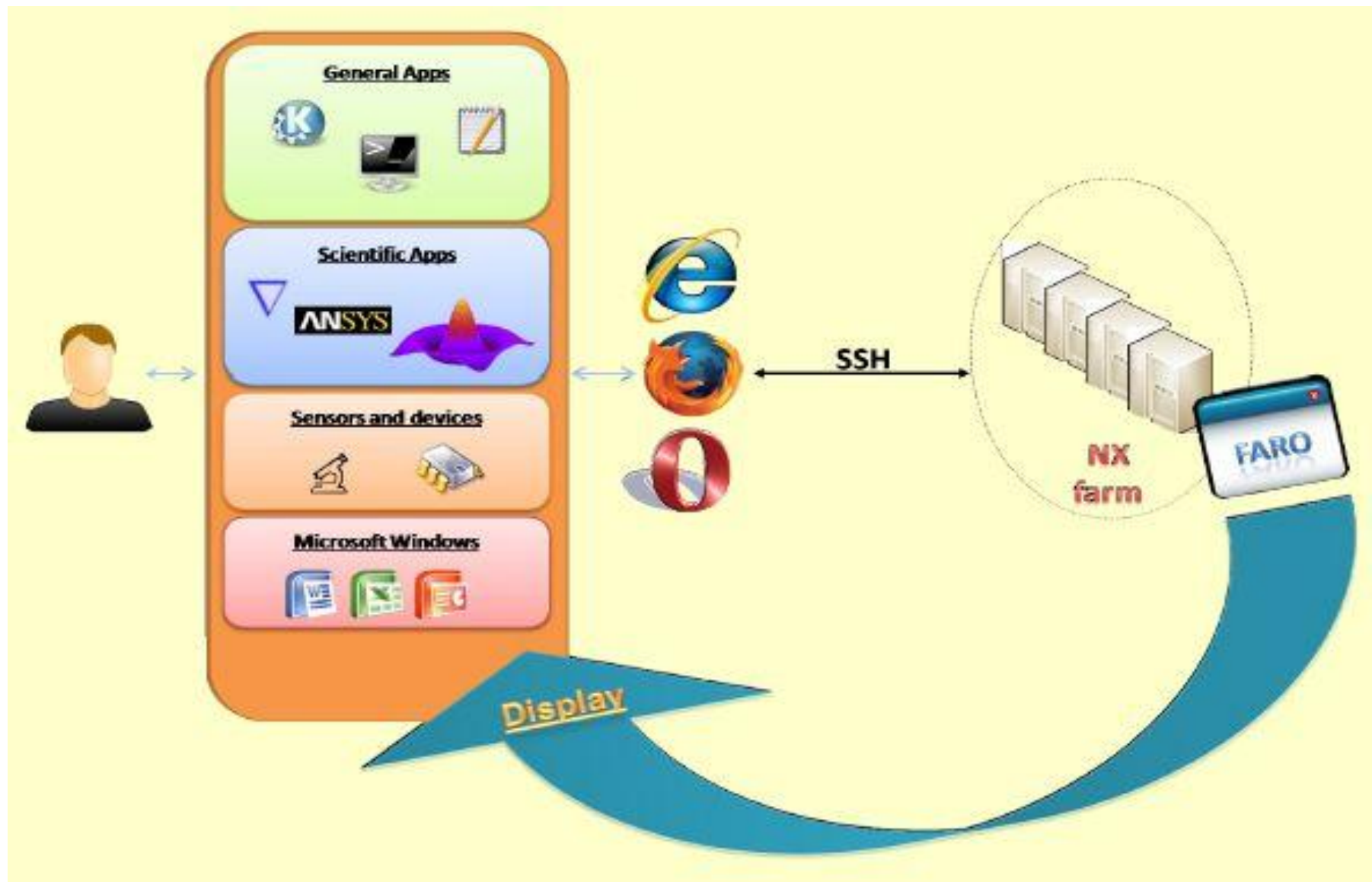
- ENEA-GRID & Research: ENEA Examples
 - Computational Chemistry
 - Nuclear Fusion, plasma stability
 - Climate/Weather/Ocean Simulations
 - Pollutant Atmospheric Diffusion
 - Combustion Simulation
 - Remote 3D Rendering
 -
- Requirements
 - Computing power: High Performance / High Throughput Computing
 - Direct access to your environment and application
 - Reliable and stable user environment
 - Security and traceability
 - Intellectual property protection

FARO – Fast Access to Remote Objects



FARO – Fast Access to Remote Objects

FARO allows easy Web Access to any application!



FARO – Fast Access to Remote Objects

Access to terminal frontends all S.O. and special platforms

```
pieratti@cresco1-f2.portici.enea.it-17015

Welcome to ENEA--GRID!
=====

ENEA-GRID is the infrastructure providing the access to the
computational resources belonging to the ENEA-INFO Service
(Servizio Centralizzato Informatica e Reti)

Information about ENEA-GRID can be found at the page
http://www.eneagrid.enea.it

A primer for ENEA-GRID can be found at:
http://www.eneagrid.enea.it/ENEAGRID_info.html

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|Space on your afs home is employed in excess 90%.
|If the quota reaches 100%, you will not be able
|to access to ENEA GRID by FARO/NX and also some
|applications available on afs may no longer
|be accessible. To increase your home space contact
|your GRID administrator
|-----

Your employed quota is: 91%
/afs/enea.it/fra/user/pieratti>
```

Remote terminal

☐ Use special platforms

Select OS: LINUX

Regular Platforms: Intel Cresco Portici

Other remote applications: AMD Cresco (Graphic frontends), AMD Cresco Casaccia, Intel Cresco Brindisi, Intel Cresco Trisaia, Intel (32 bit) BW Frascati, Intel Campus03

FARO

File Tools Help Debug

Show Jobs Send a ticket Secure File Transfer

Remote terminal

☐ Use special platforms

Select OS: Regular Platforms:

Xterm

Other remote applications: Konqueror file manager, Firefox, Nedit

Remote desktop

Session: Login: pieratti Password: Remote desktop

Interactive applications: Virtual Laboratories, Batch applications

IDL, Fluent, Matlab, Ansys Viewer, Ansys CAE

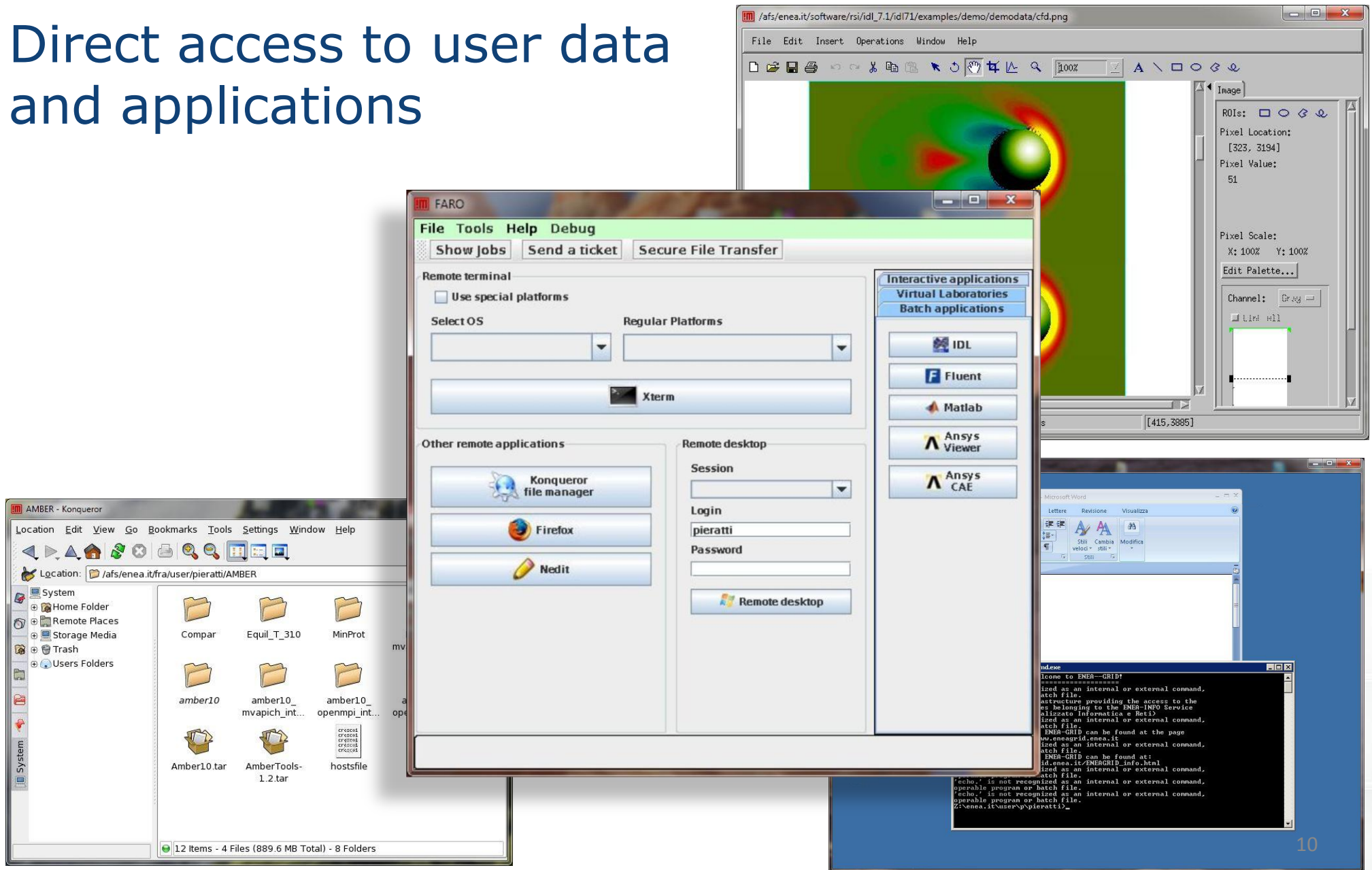
Remote terminal

☒ Use special platforms

Special platforms: Cell BE Cresco, FPGA Cresco, Nvidia CUDA Cresco, Nvidia Cresco, Intel Altix (Turan - DOWN), AMD Cray (Laran), AMD Quadrics (Feronix)

FARO – Fast Access to Remote Objects

Direct access to user data
and applications



The image displays the FARO application interface, which provides direct access to user data and applications. The main window is titled "FARO" and features a menu bar with "File", "Tools", "Help", and "Debug". Below the menu bar are three tabs: "Show jobs", "Send a ticket", and "Secure File Transfer".

The interface is divided into several sections:

- Remote terminal:** Includes a checkbox for "Use special platforms" and a "Select OS" dropdown menu. Below this is a "Regular Platforms" section with a dropdown menu and a button labeled "Xterm".
- Other remote applications:** Contains buttons for "Konqueror file manager", "Firefox", and "Nedit".
- Remote desktop:** Includes a "Session" dropdown menu, "Login" and "Password" input fields, and a "Remote desktop" button.
- Interactive applications:** A sidebar on the right containing buttons for "Virtual Laboratories", "Batch applications", "IDL", "Fluent", "Matlab", "Ansys Viewer", and "Ansys CAE".

In the background, a file manager window (Konqueror) is visible, showing a directory structure with folders like "Compar", "Equil_T_310", and "MinProt", and files like "Amber10.tar" and "AmberTools-1.2.tar". A terminal window is also open, displaying a command prompt and some output text.

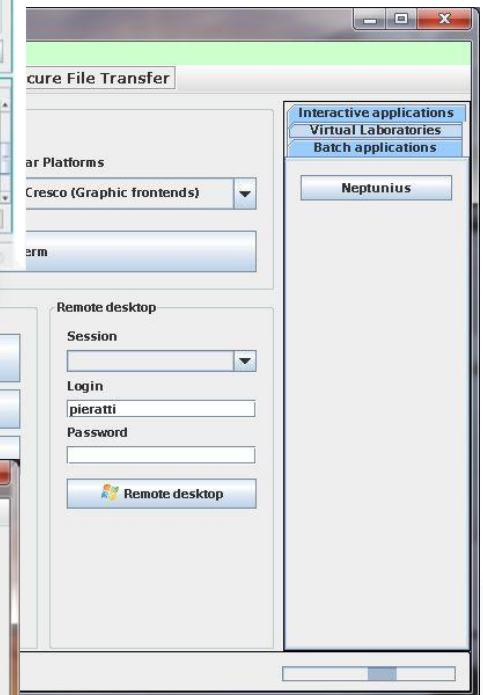
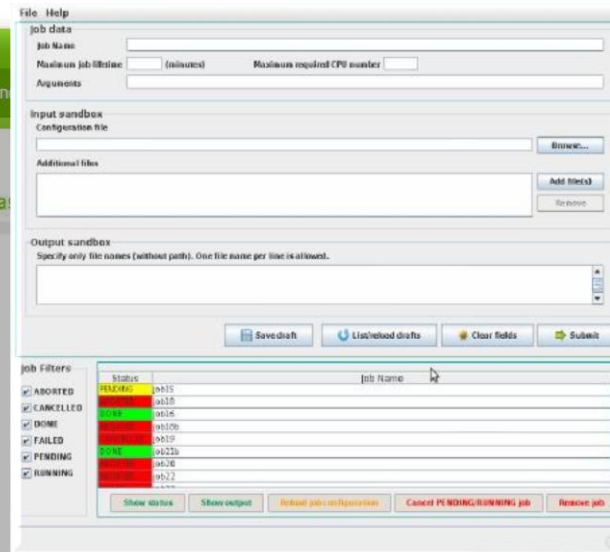
FARO and the Virtual Labs



welcome to cresco virtual lab cmast
computational materials science and technology

thematic areas

The FARO service: custom web-based access to computing platforms and to the software of interest for Virtual Lab specialized applications.



Welcome to CRESCO Virtual Lab
NEPTUNIUS:
Numerical codes for computational fluid
dynamics and fluid structure interactions

Documents

Presentations

Publications

Image gallery

Documents

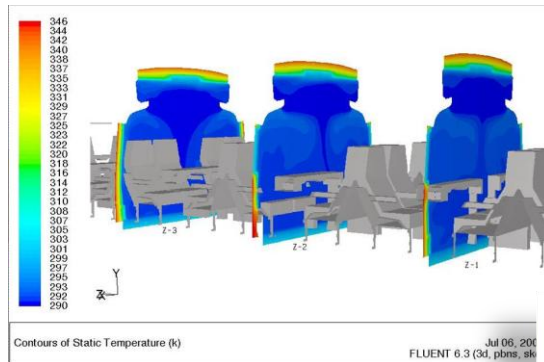
Our video streams

The project aims to collect and share resources in the field of Computational Fluid Dynamics CFD and Fluid Structure Interactions FSI.

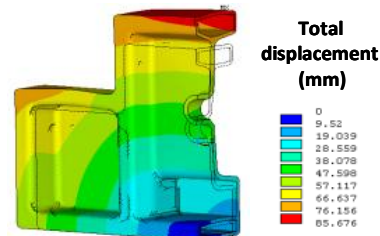


FARO and Remote 3D

Examples of Remote 3D Rendering



Post Processor

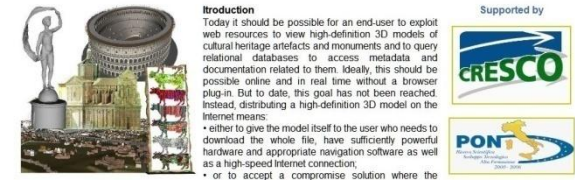
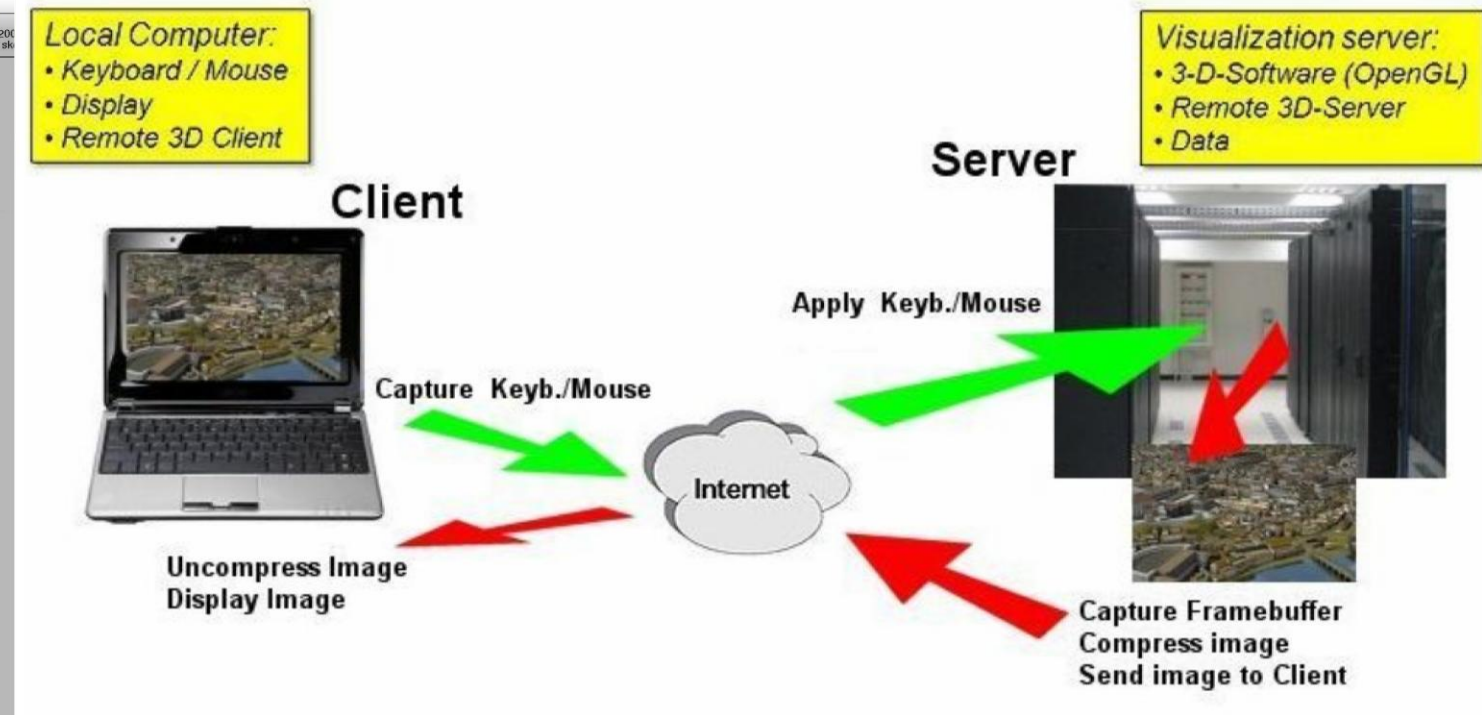
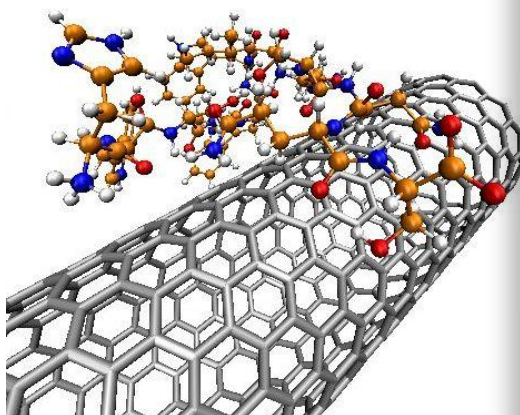


Local Computer:

- Keyboard / Mouse
- Display
- Remote 3D Client

Visualization server:

- 3-D-Software (OpenGL)
- Remote 3D-Server
- Data



Conclusion

- Web-based: no local installation and configuration required
- Remote access: only port 22 for ssh and 80 for web
- Centralized system management, software update, all technical issues professionally cared for
- Researchers and industrial users may focus on their job
- TCO is greatly reduced

FARO – Fast Access to Remote Objects



References

- www.enea.it
- www.cresco.enea.it
- www.eneagrid.enea.it
- www.afs.enea.it



Thank you for your attention
Any Questions?