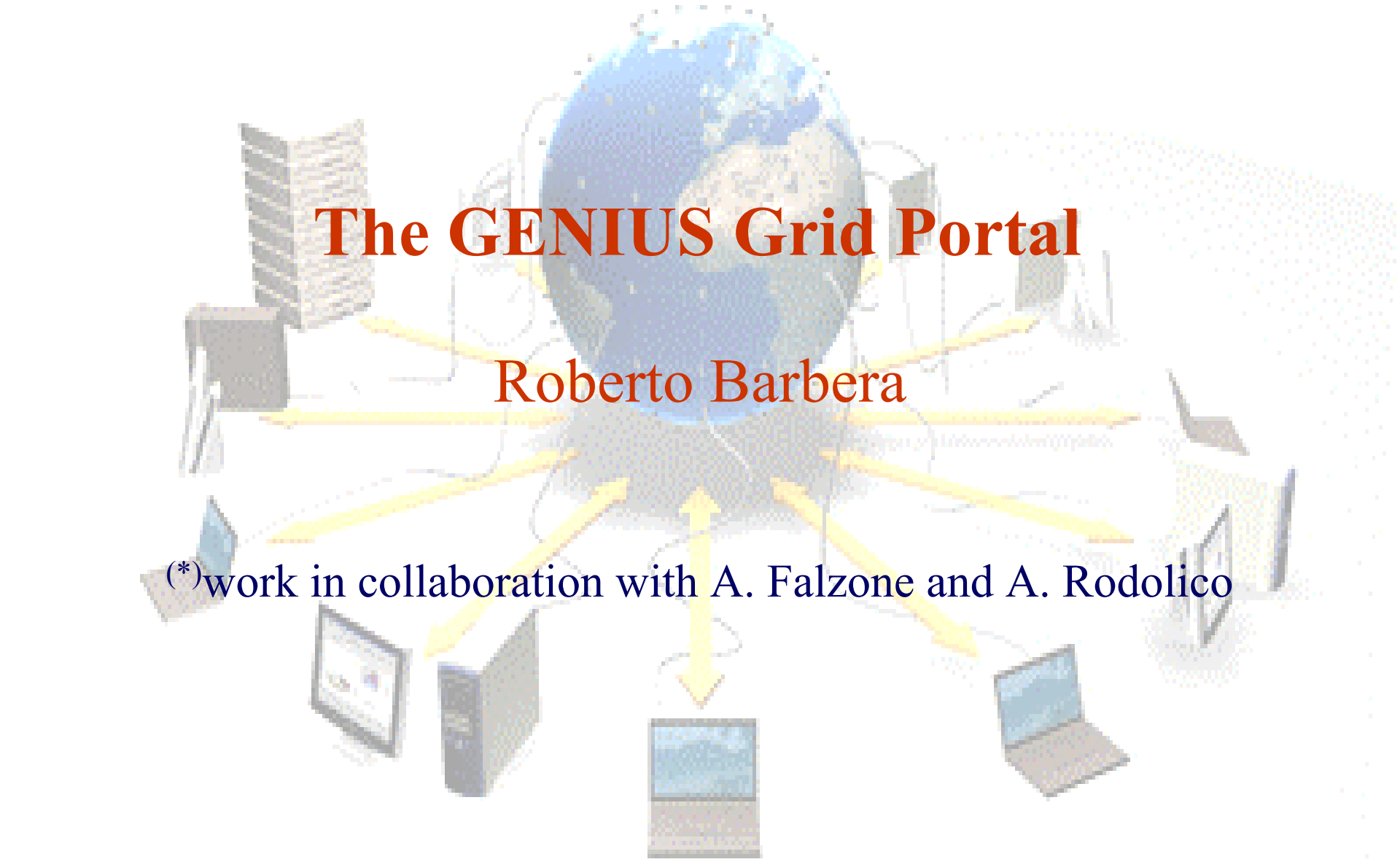
Università di Catania and INFN Catania - Italy
ALICE Collaboration and DataGrid Project



The GENIUS Grid Portal

Roberto Barbera

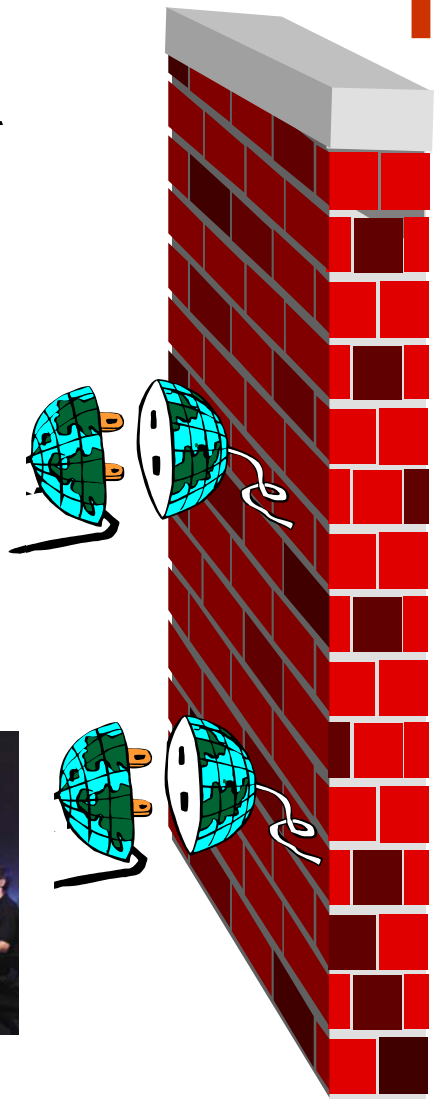
(*)work in collaboration with A. Falzone and A. Rodolico

Outline

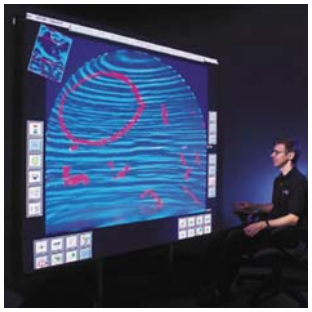
- Introduction
- Grid portal architecture and requirements
- GENIUS: current status and supported applications
- Future developments

The Grid metaphor

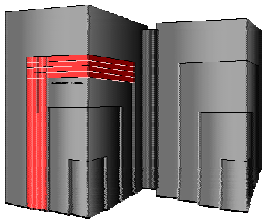
Mobile Access

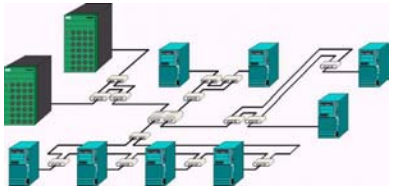


Workstation

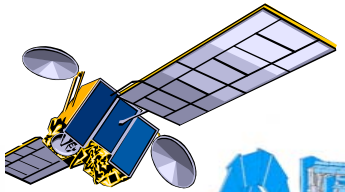


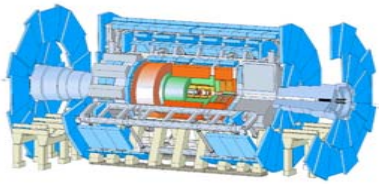
Visualising



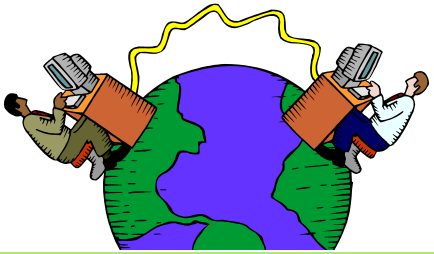


Supercomputer, PC-Cluster



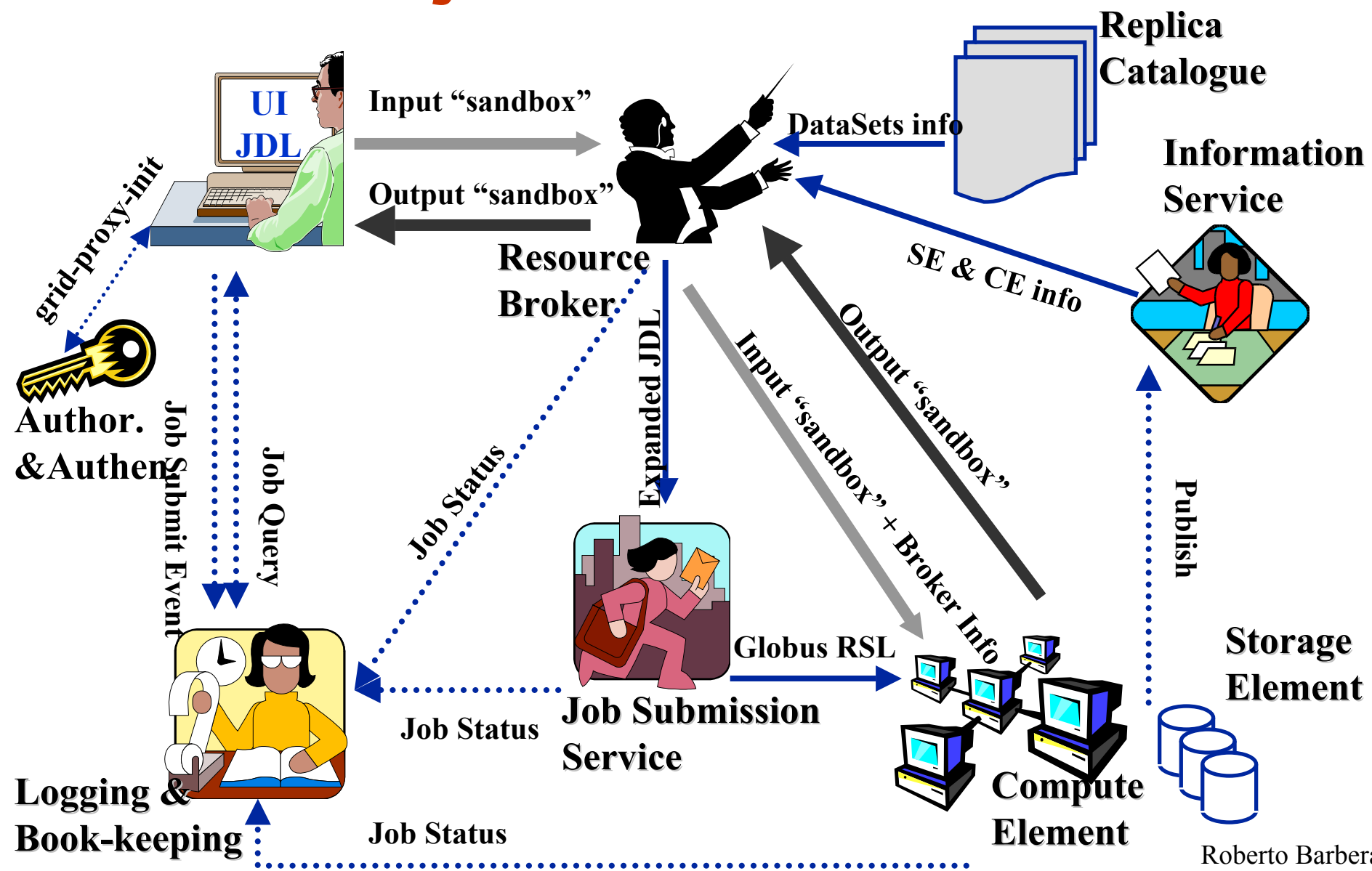


Data-storage, Sensors, Experiments

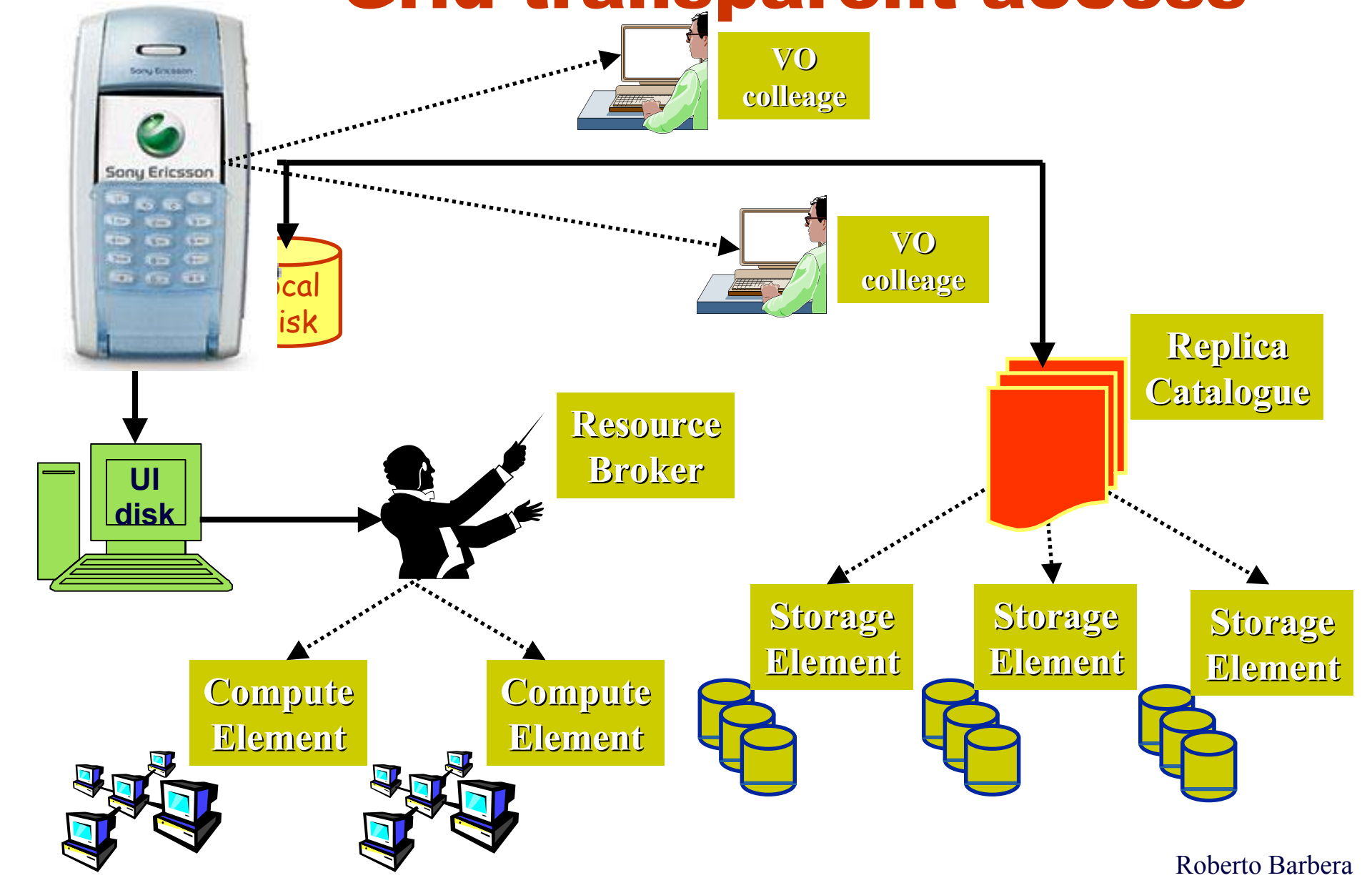


Internet, networks

DataGrid job submission work-flow



Grid transparent access



A web portal: why and how ?

- It can be accessed from everywhere and by “everything” (desktop, laptop, PDA, WAP phone).
- It can keep the same user interface to several back-ends (grid “dialects” ⇔ command-line UI’s).
- It must be redundantly “secure” at all levels: **1)** secure for web transactions, **2)** secure for user credentials, **3)** secure for user authentication, **4)** secure at VO level.
- All available grid services must be incorporated in a logic way, just “one mouse click away”.
- Its layout must be easily understandable and user friendly.

A little bit of history

- 1998-1999
  - graphic interface to LSF (multi) clusters for ALICE jobs
- 2000-2001
  - simple but effective web portal to submit ALICE jobs to the grid using EnginFrame and GLOBUS
- 2002-now
  - official grant of the INFN Grid Project to collaborate with NICE srl to integrate in a web portal all services offered by the DataGrid middle-ware; adoption/contributions by other experiments

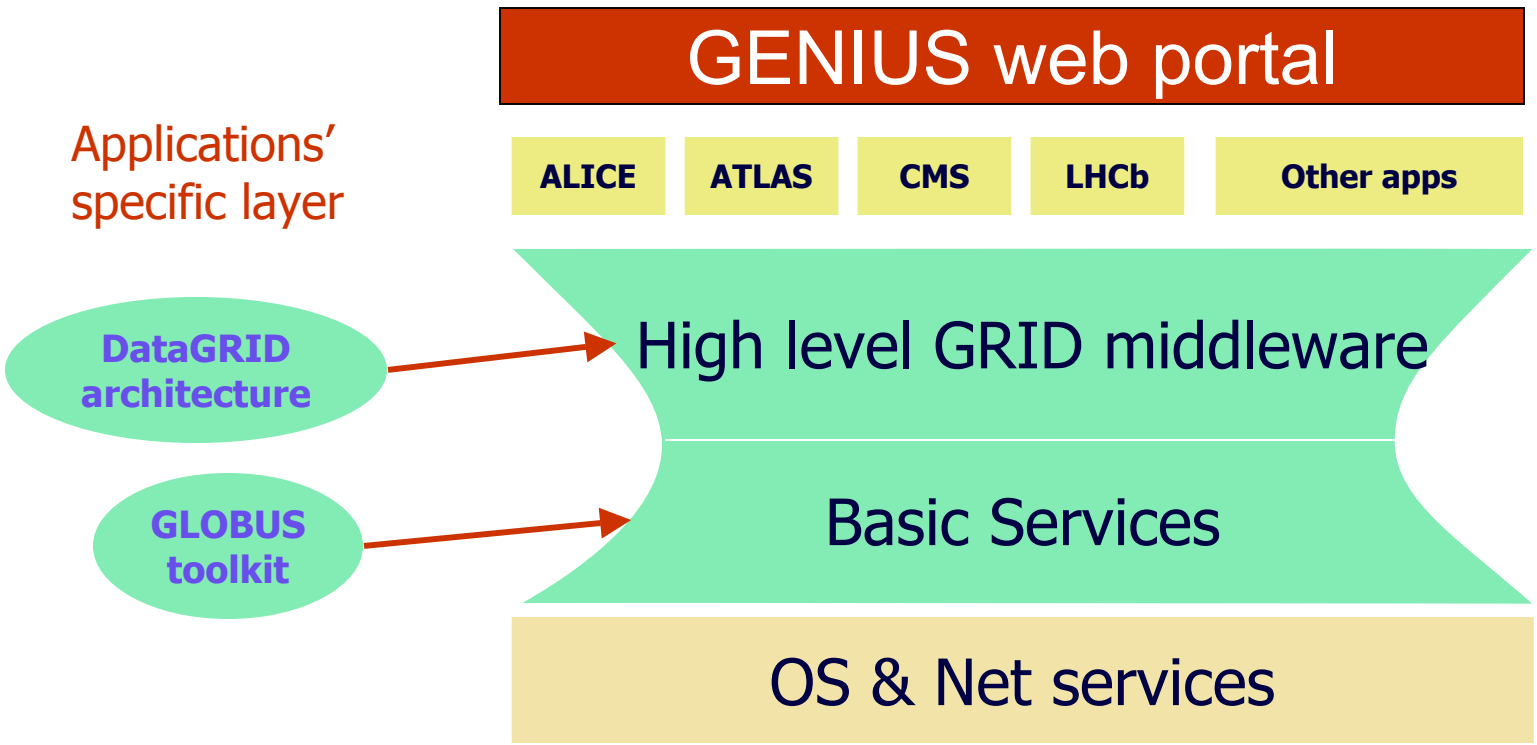
Università di Catania and INFN Catania - Italy
ALICE Collaboration and DataGrid Project

GENIUS®

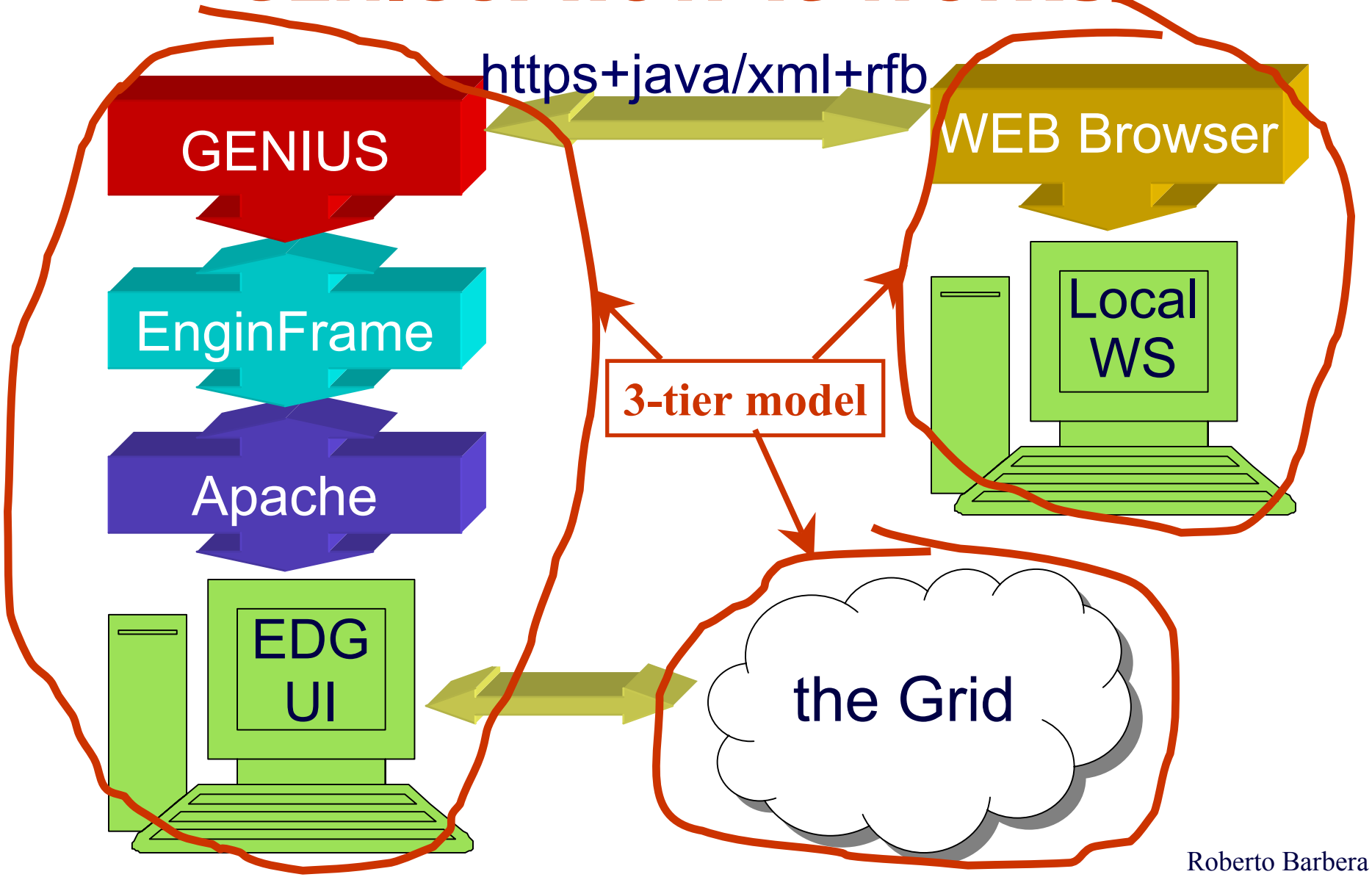
Grid Enabled web eNvironment for Independent User job Submission

https://genius.ct.infn.it

INFN/NICE collaboration



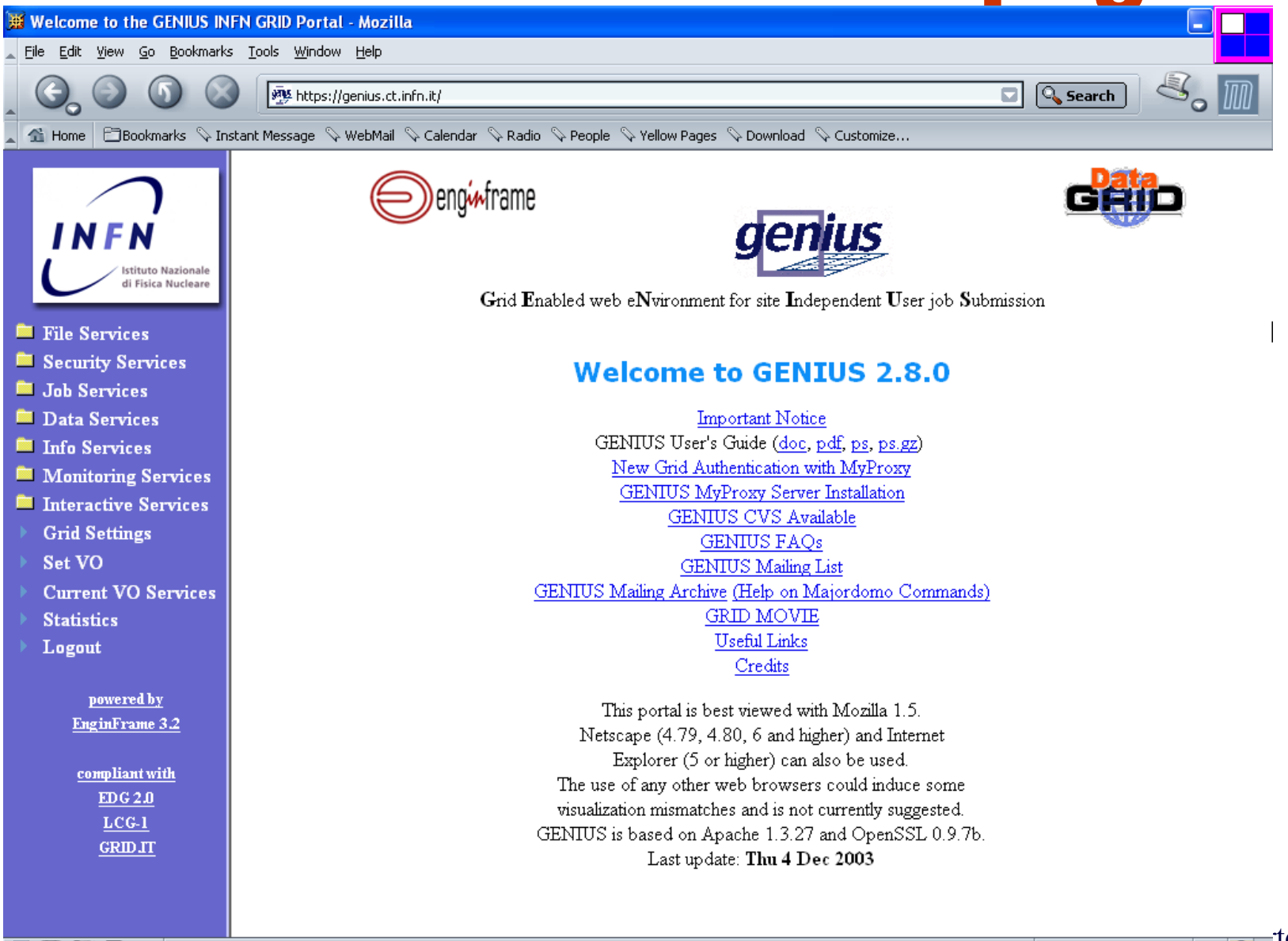
GENIUS: how it works



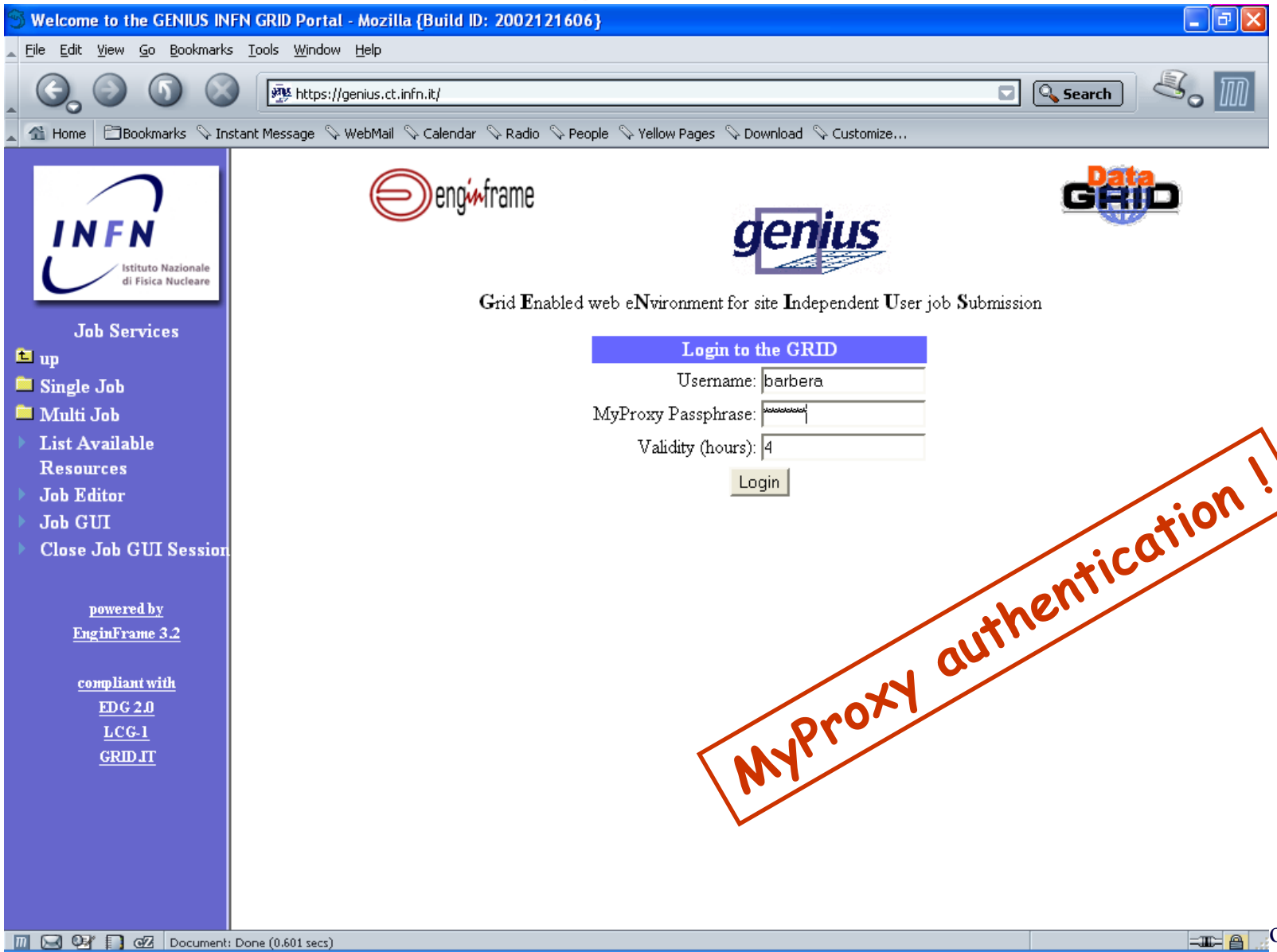
EnginFrame in brief

- Standards-based GRID portal
  - Java, Tomcat, Apache, XML/XSL → GridML
- Solves back-end integration problems
  - **Visual rendering** for most Grid objects
    - jobs, job arrays, hosts, services, databases, etc.
  - **Multiple Grid technologies** support
    - EDG, GLUE, Globus, Condor (soon)
  - **Authentication delegation** (GSI,MyProxy, NIS,NT, Kerberos V, ...)
  - **Data management**: UL/DL + remote (multi-) file browsing
  - **Integration** with interactive apps
- **End-user oriented focus**!
  - application integration

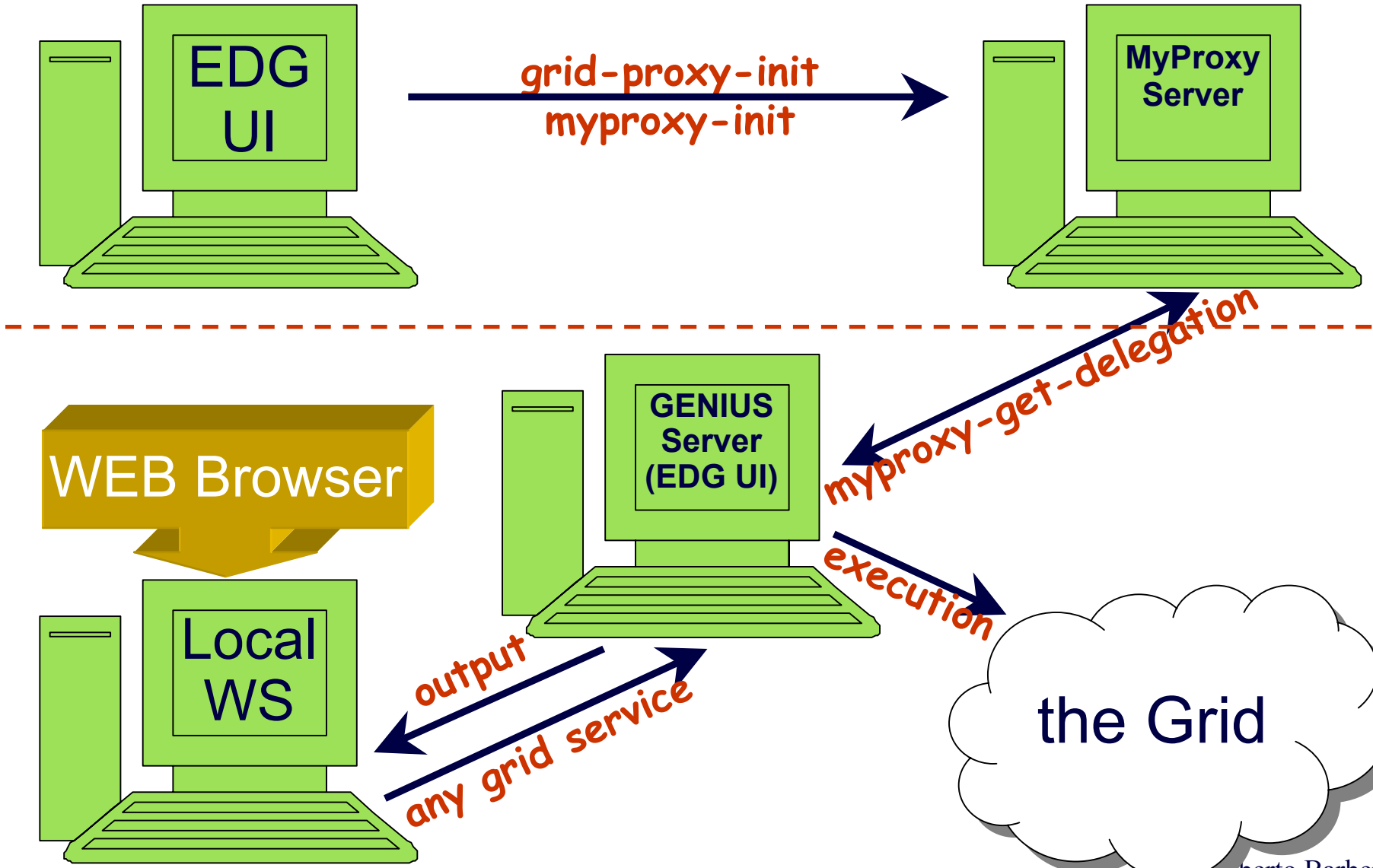
GENIUS: the main page



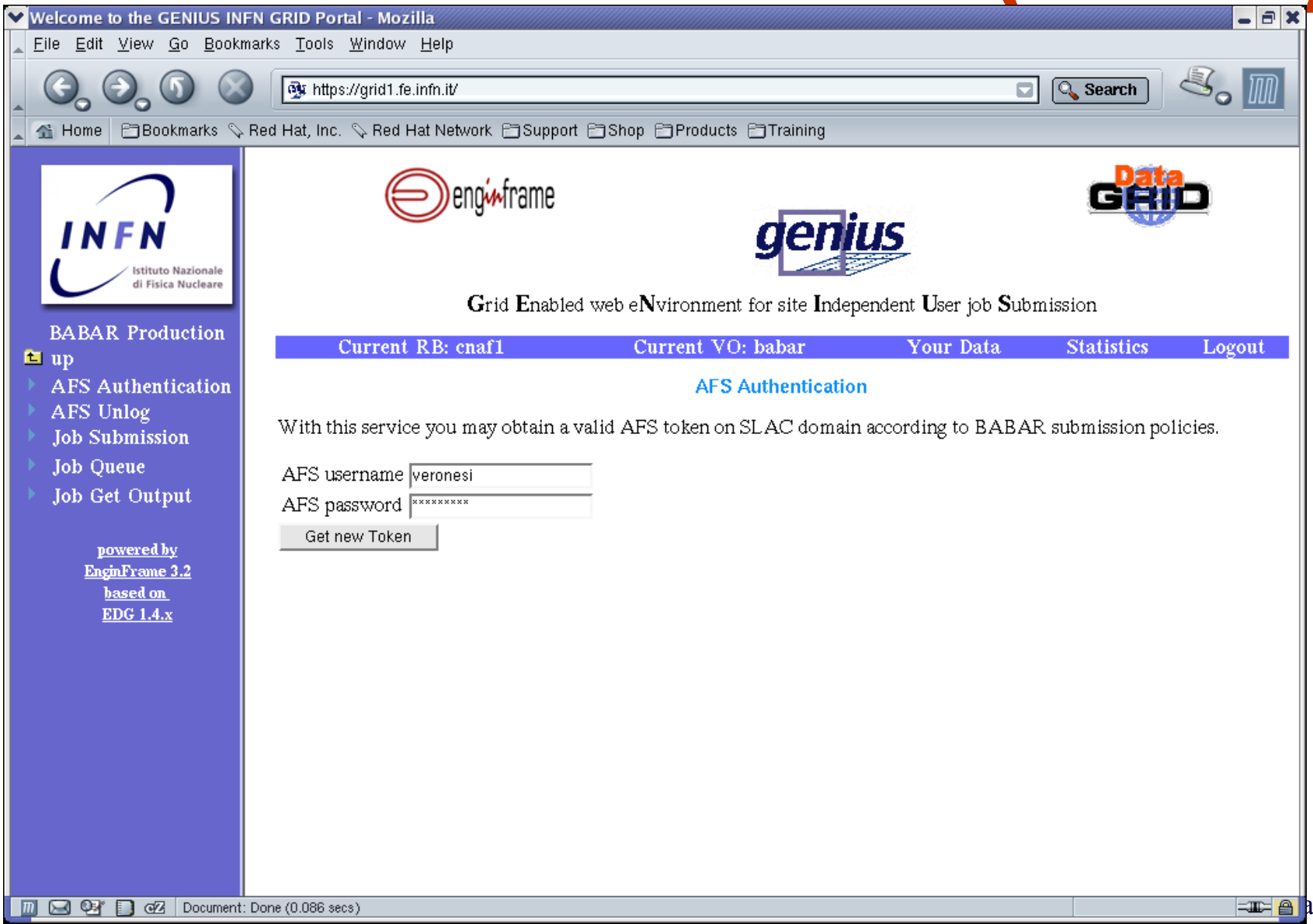
GENIUS show: grid authentication



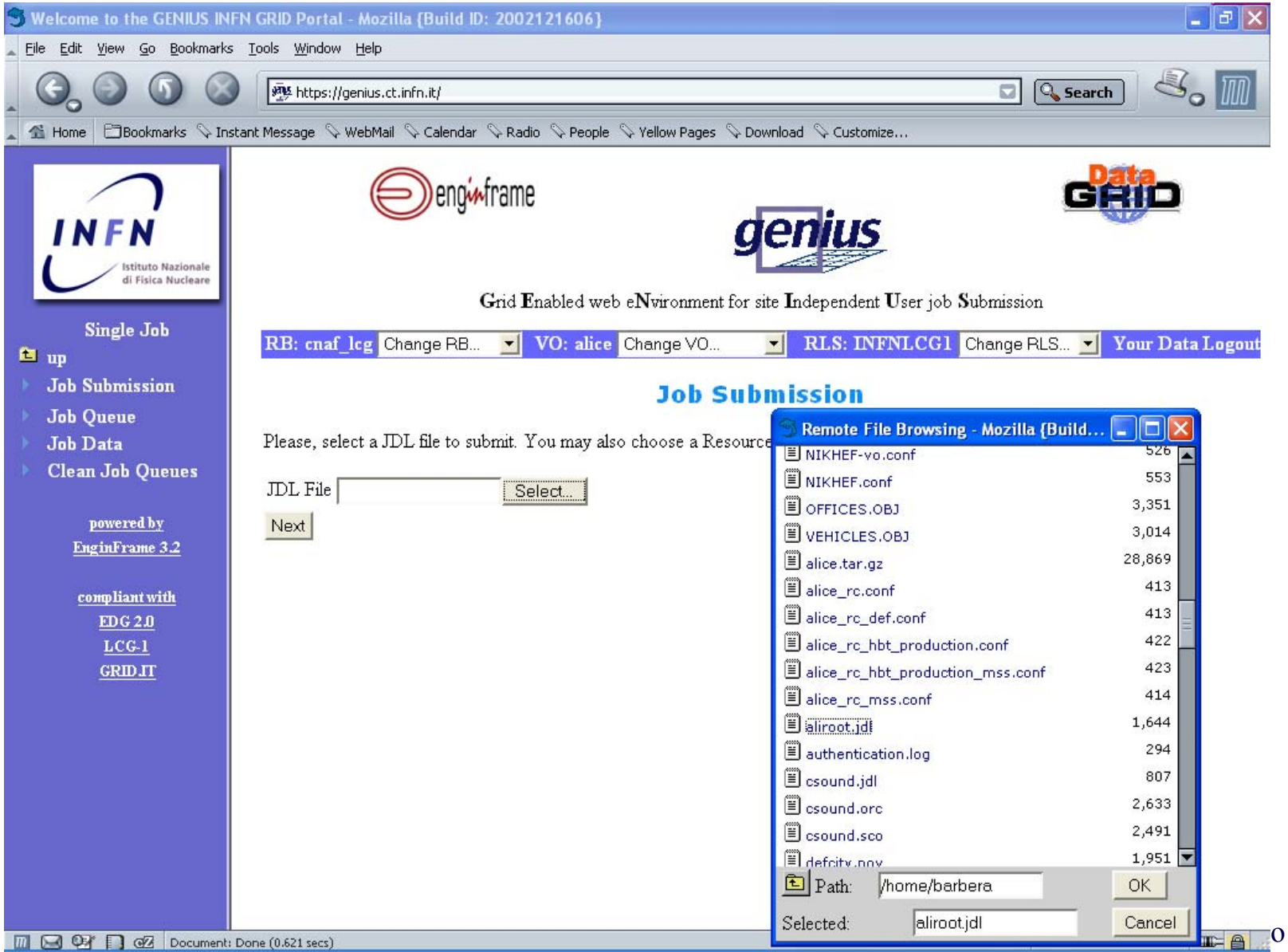
Grid authentication with MyProxy



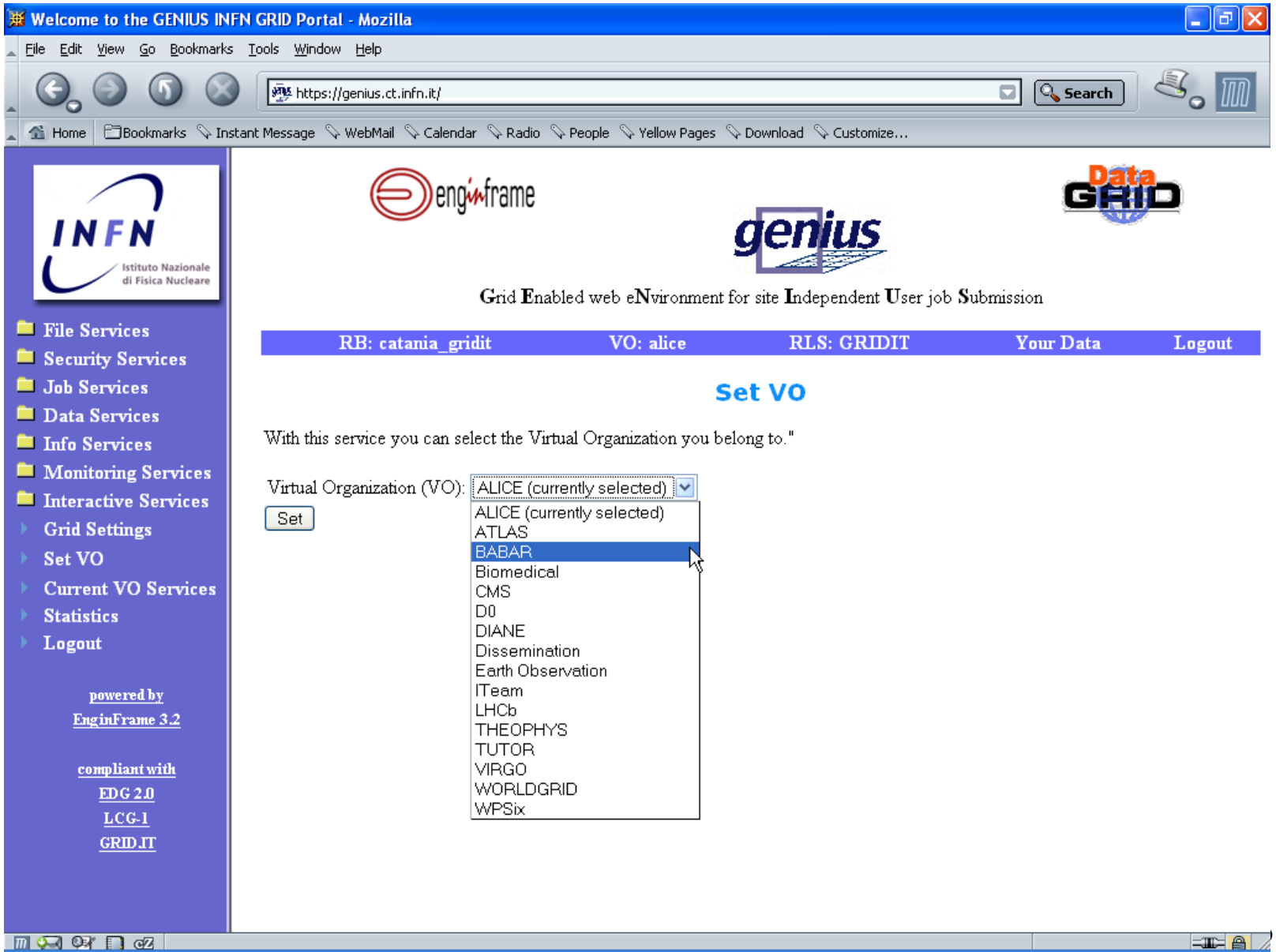
GENIUS/AFS interface (BaBar)



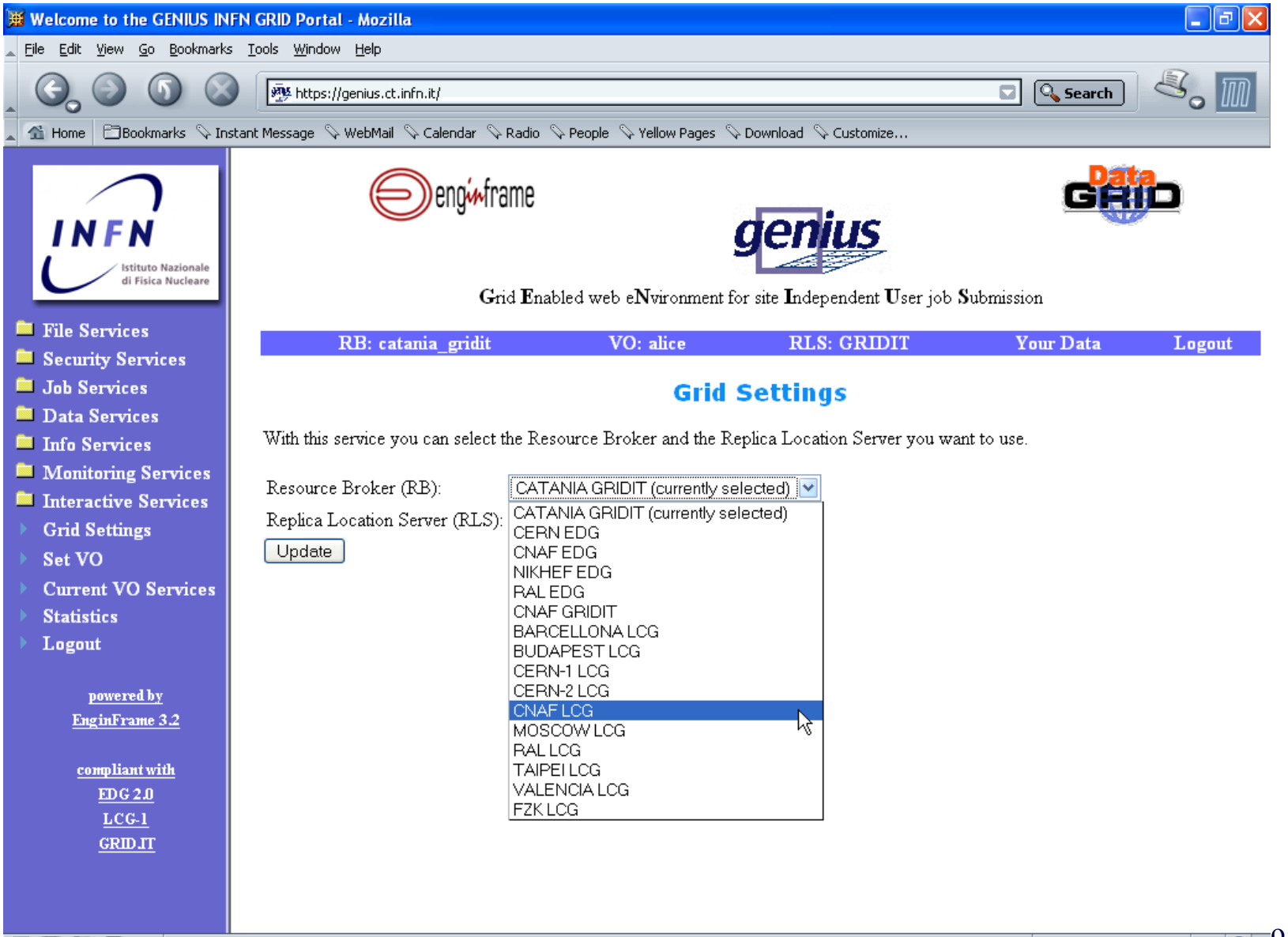
GENIUS: remote file browser



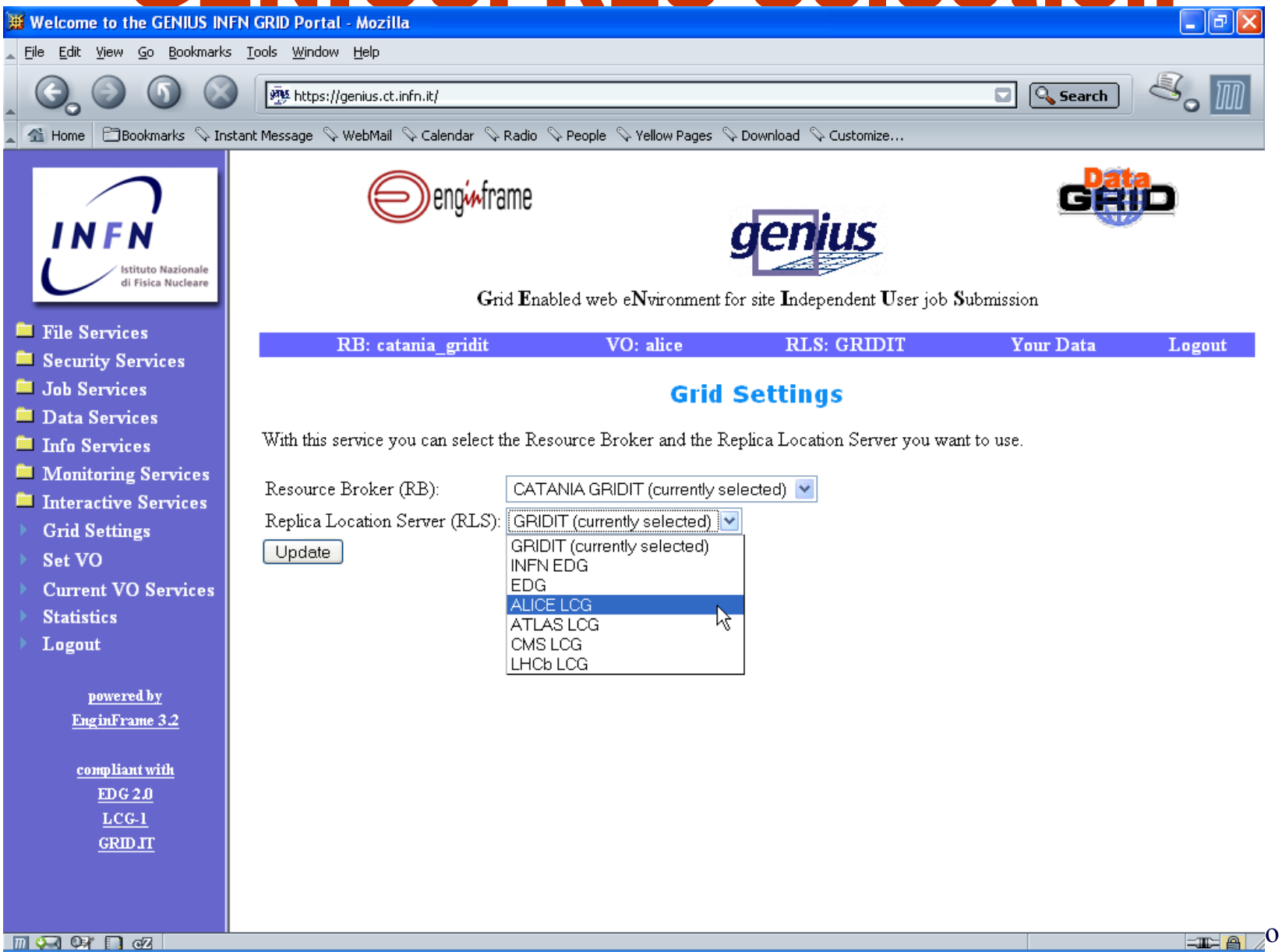
GENIUS: VO Selection



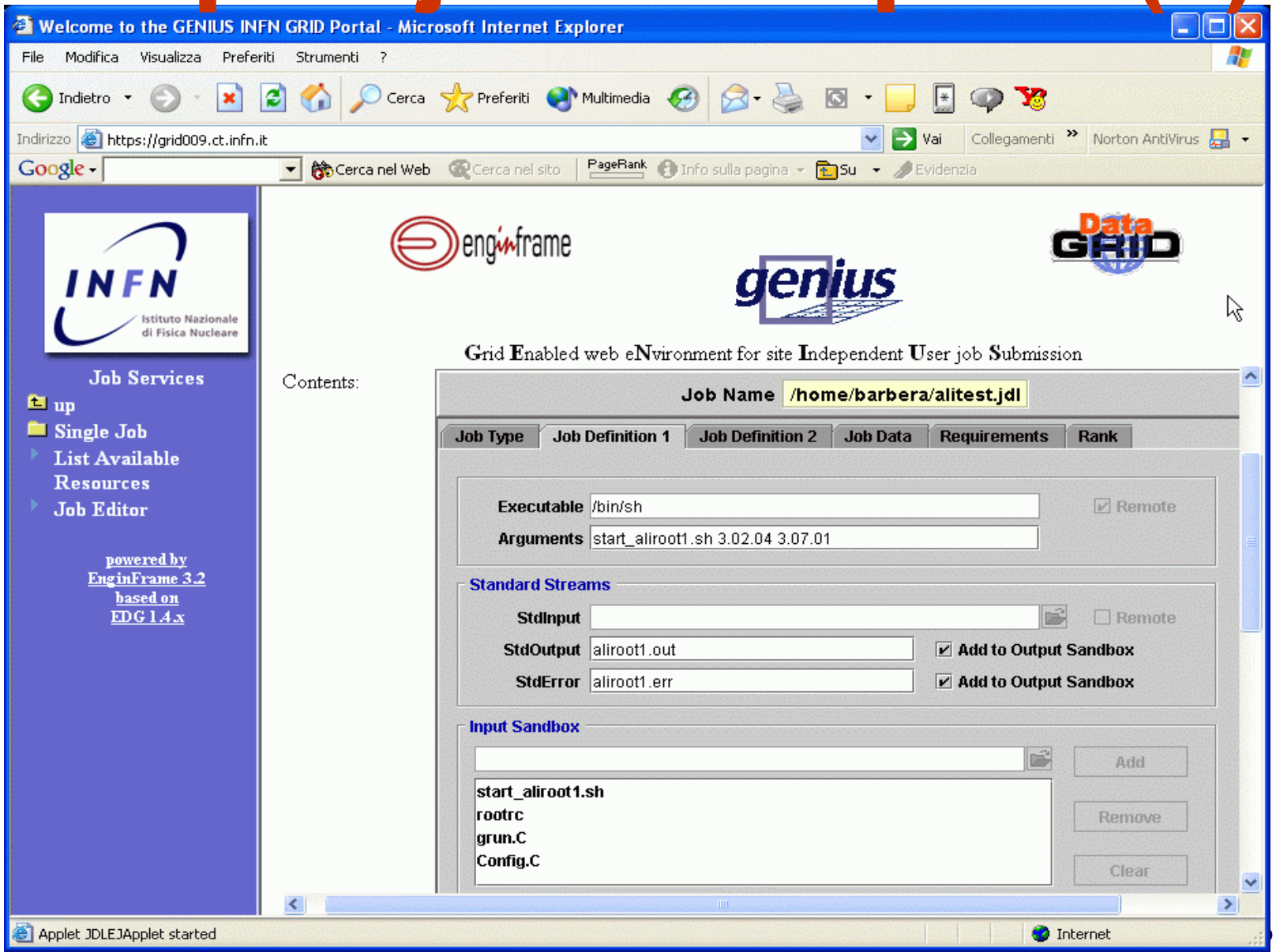
GENIUS: RB Selection



GENIUS: RLS Selection

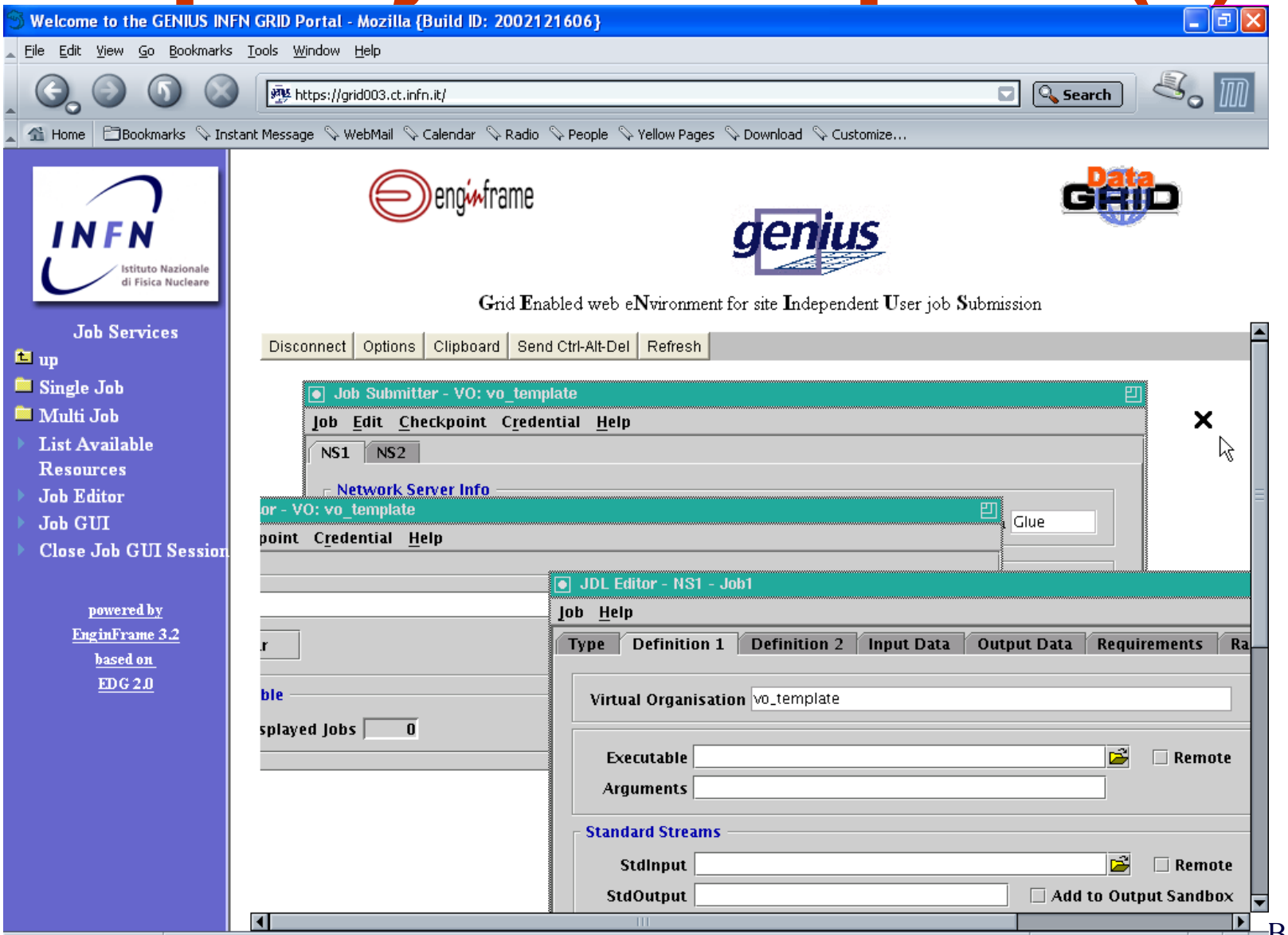


Graphic job description (1)



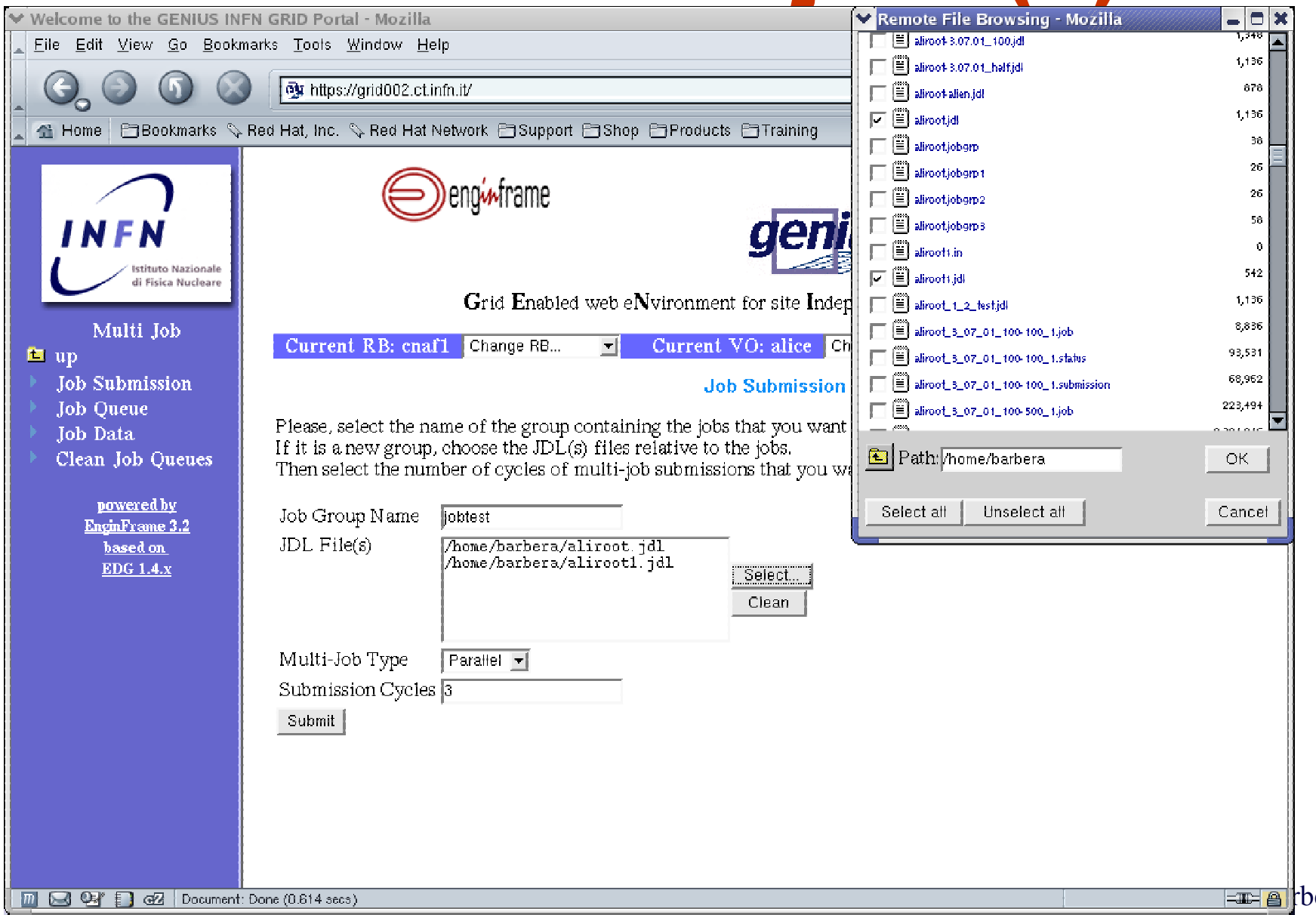
In collaboration with DATAMAT, Italy

Graphic job description (2)

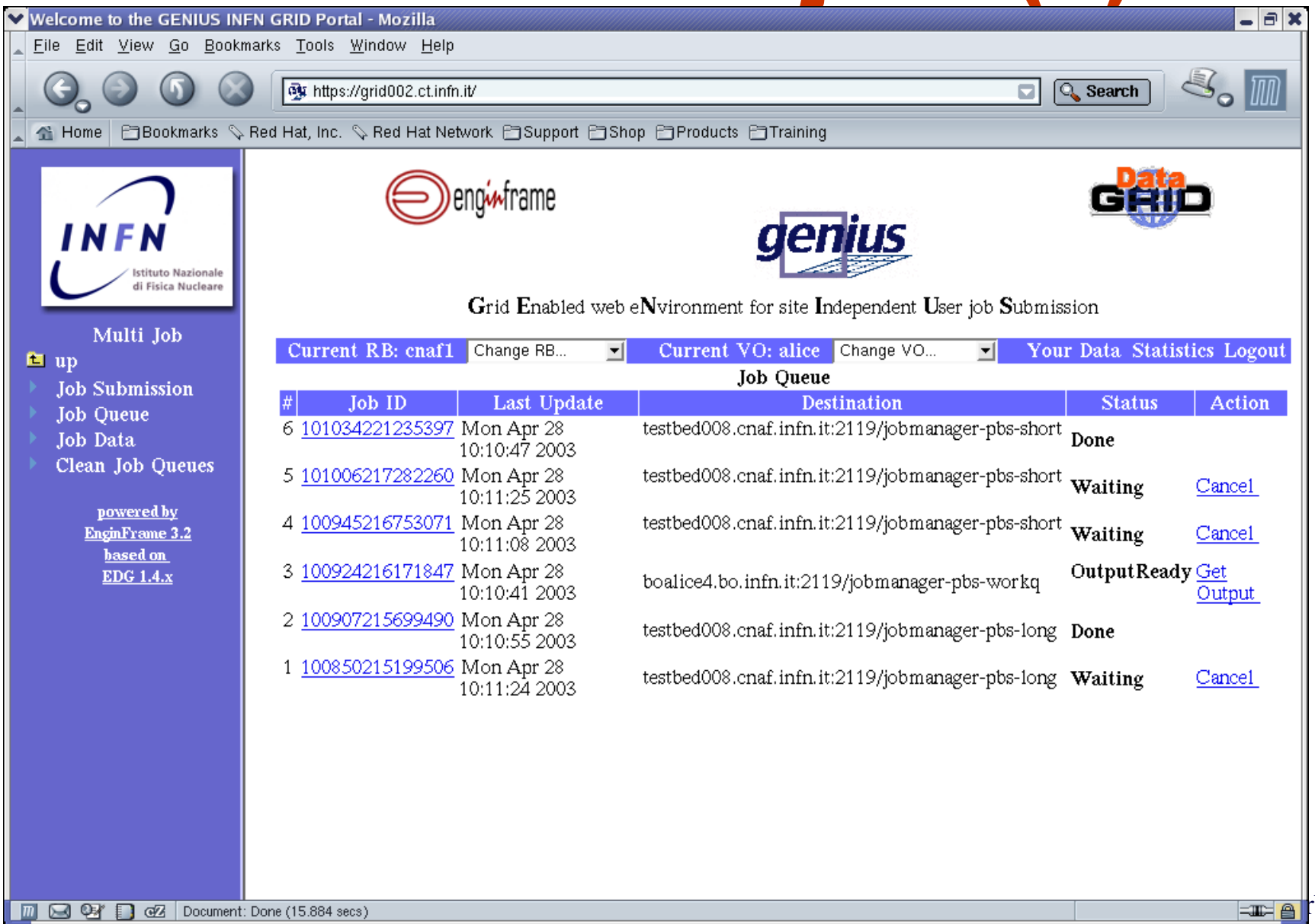


In collaboration with DATAMAT, Italy

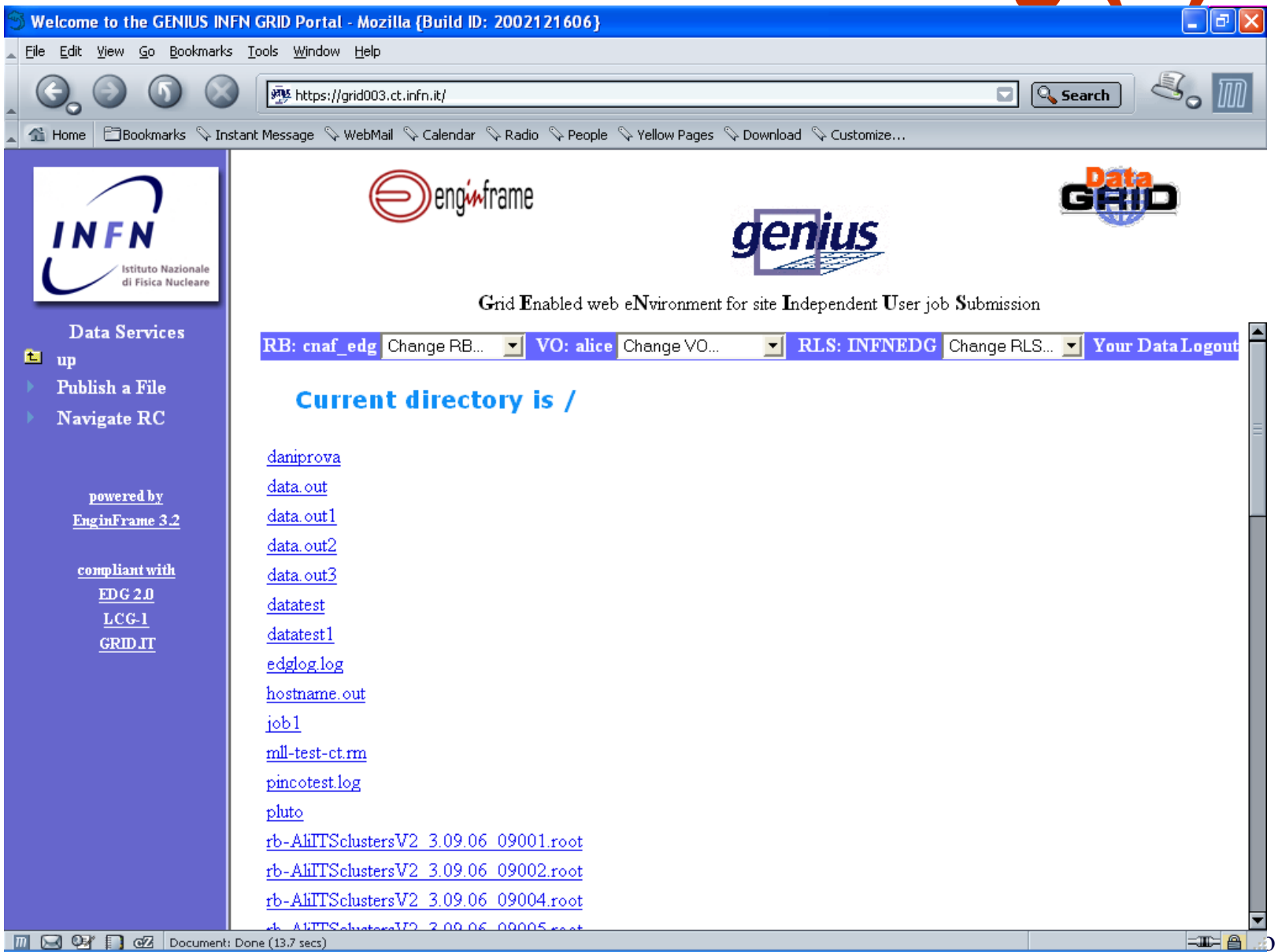
GENIUS multi-jobs (1)



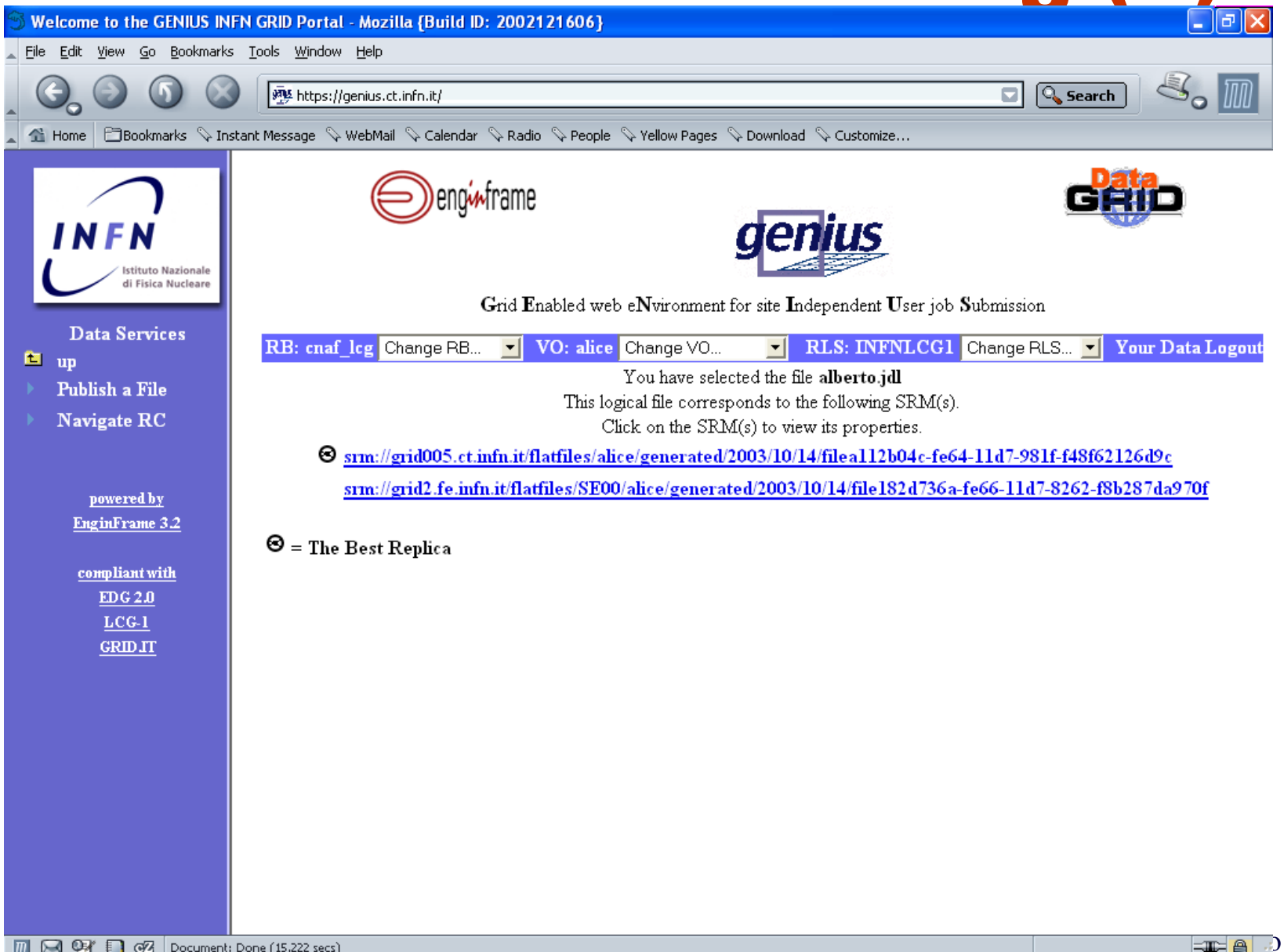
GENIUS multi-jobs (2)



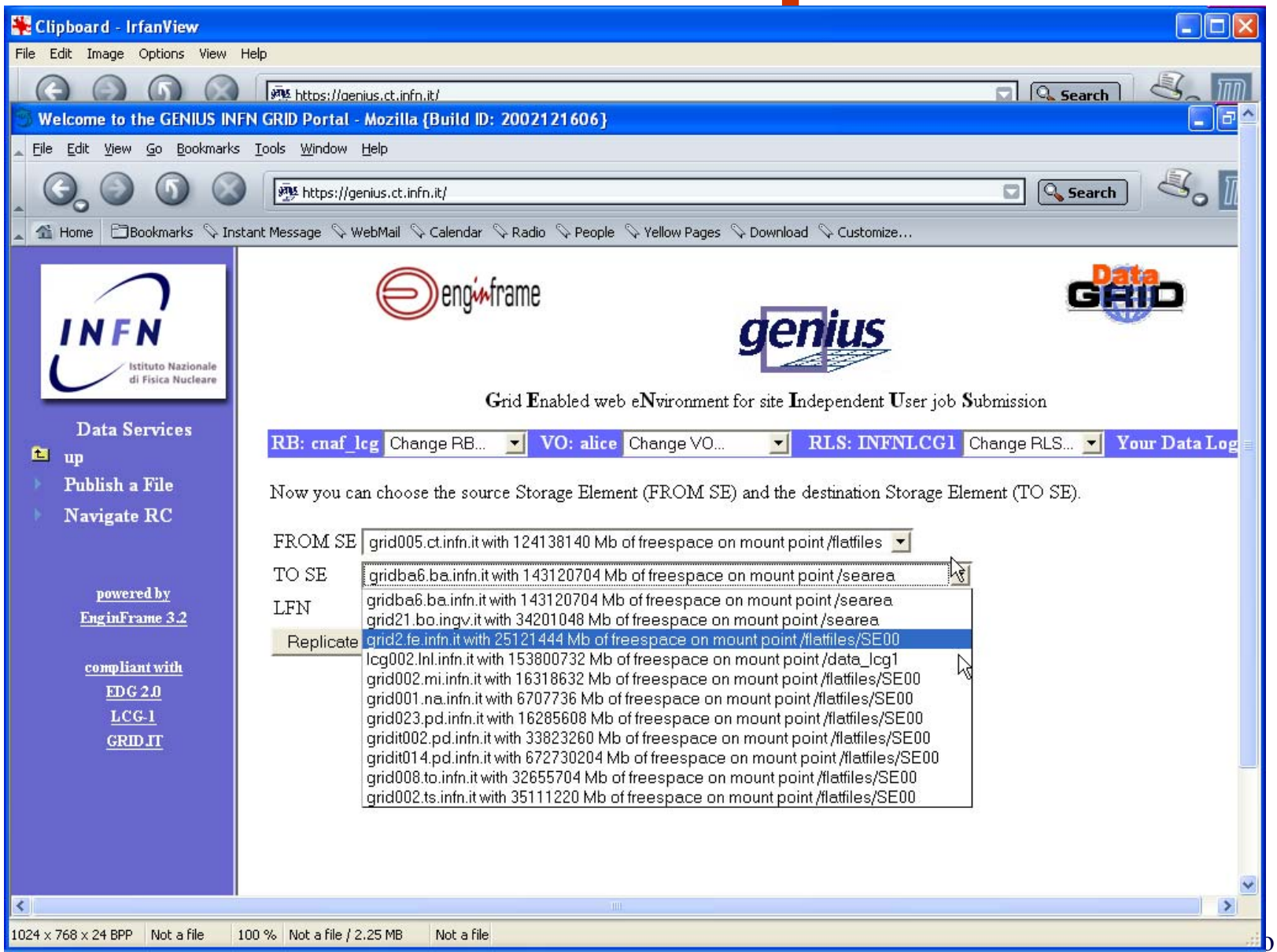
GENIUS: file browsing (1)



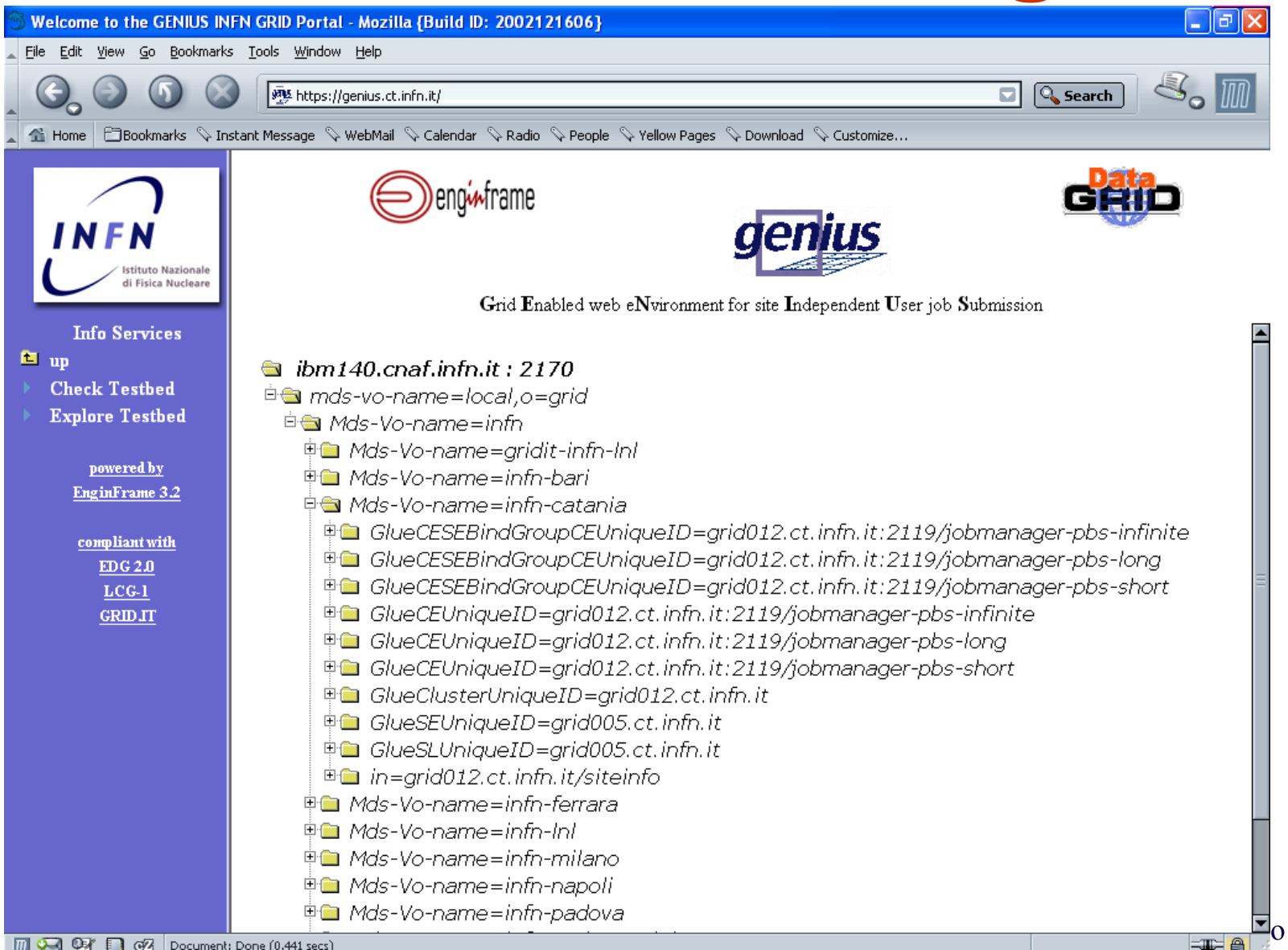
GENIUS: file browsing (2)



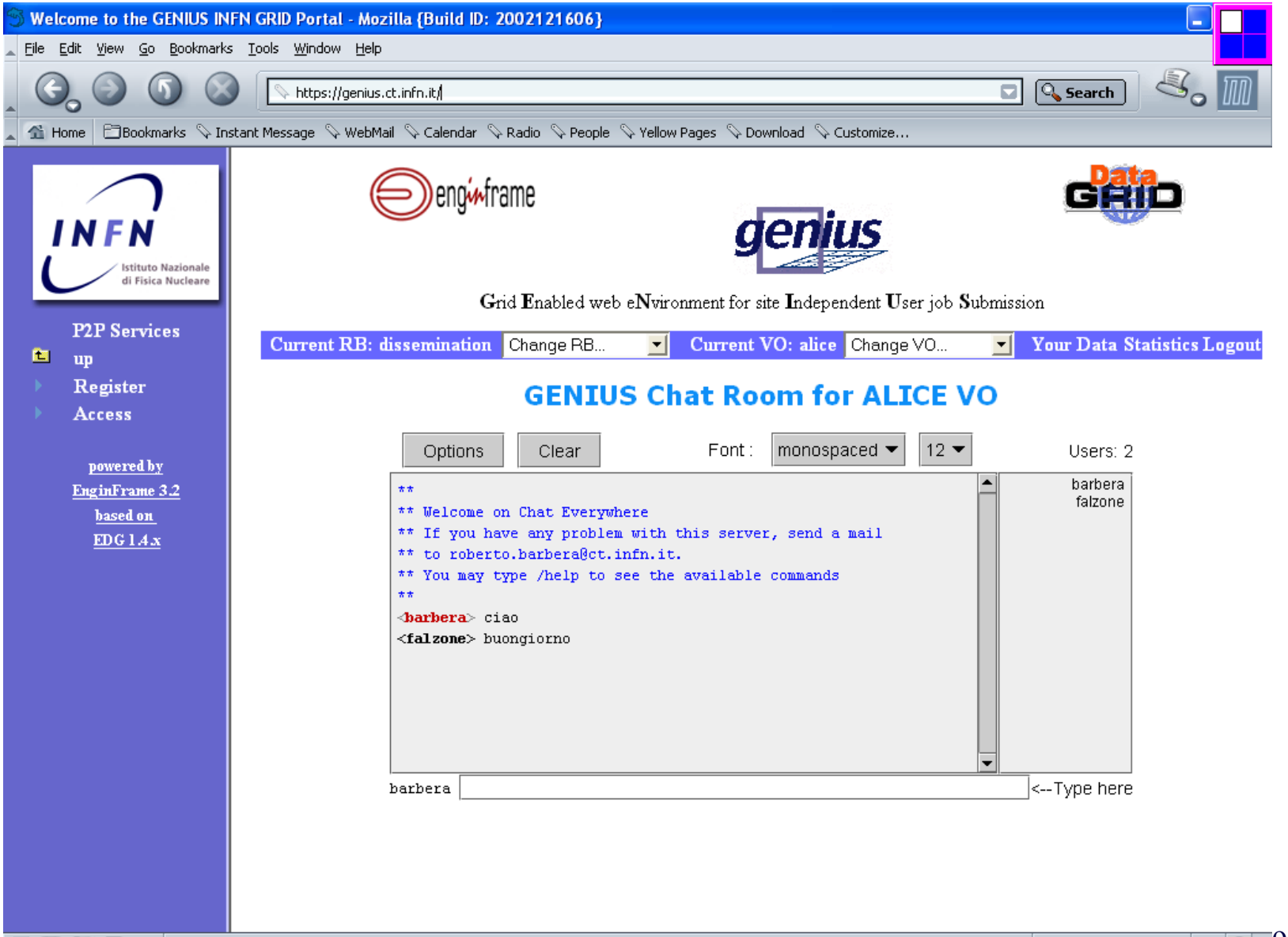
GENIUS: file replication



GENIUS: testbed navigation



GENIUS: P2P services



GENIUS: GridICE monitoring

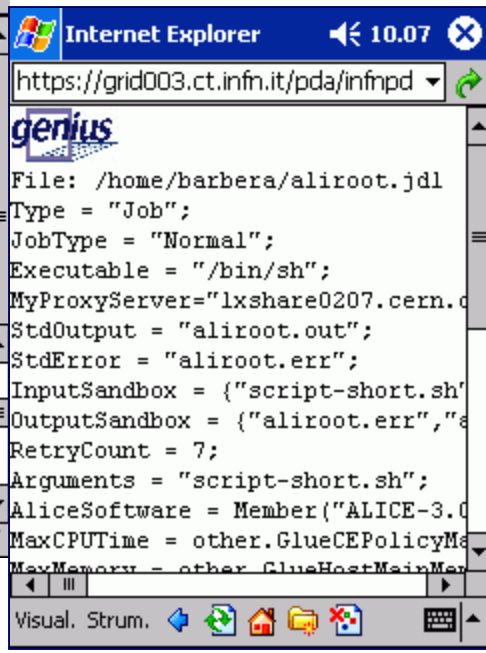
GENIUS: PDA version (1)

Home Page

Services

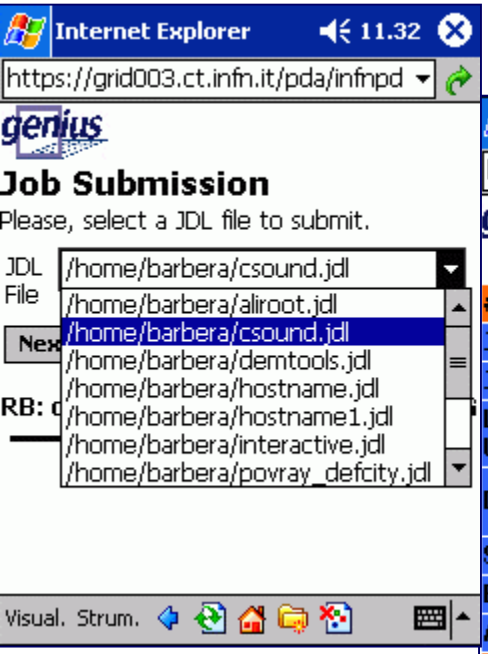
Remote file browsing

Remote file inspection

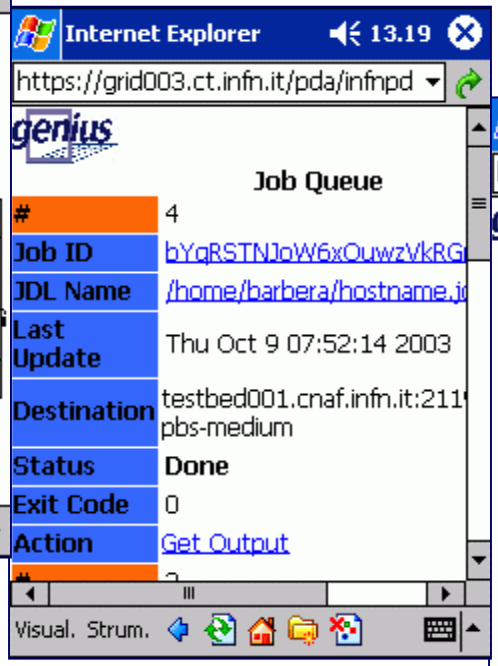


GENIUS: PDA version (2)

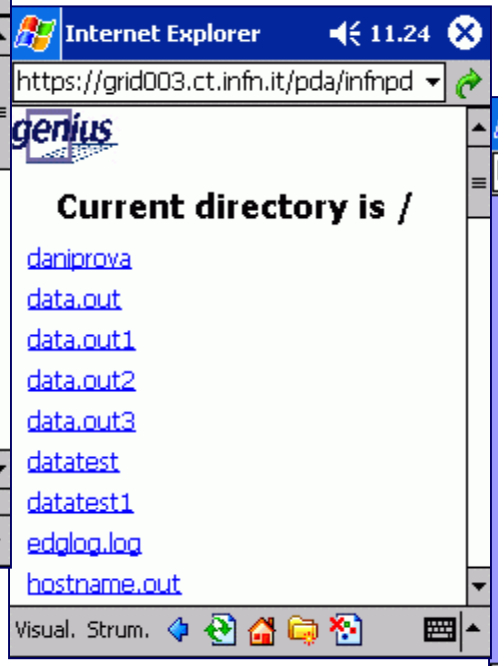
Job submission



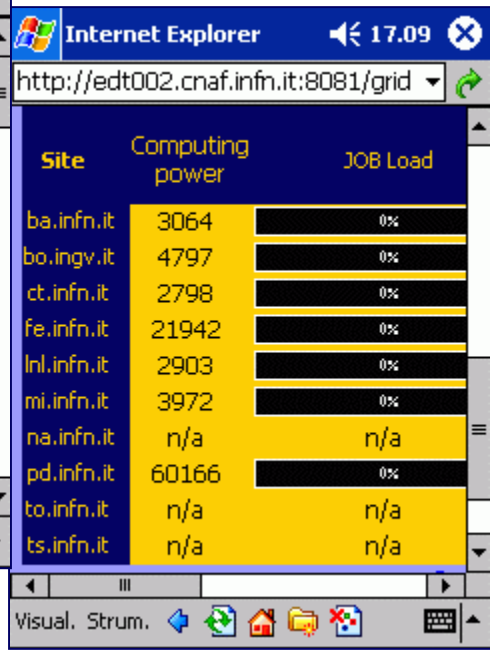
Job monitoring



RC browsing

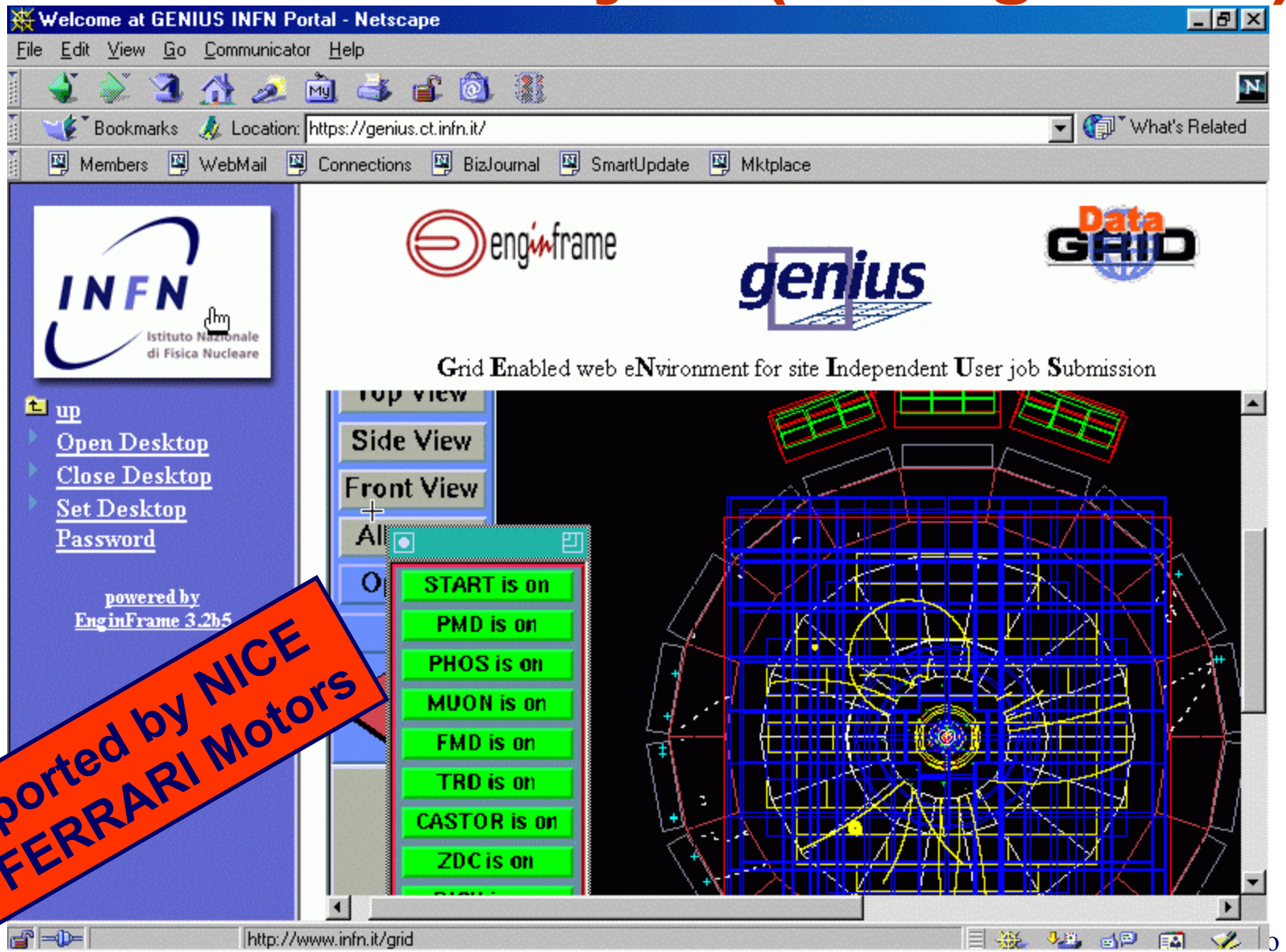


GridICE integration



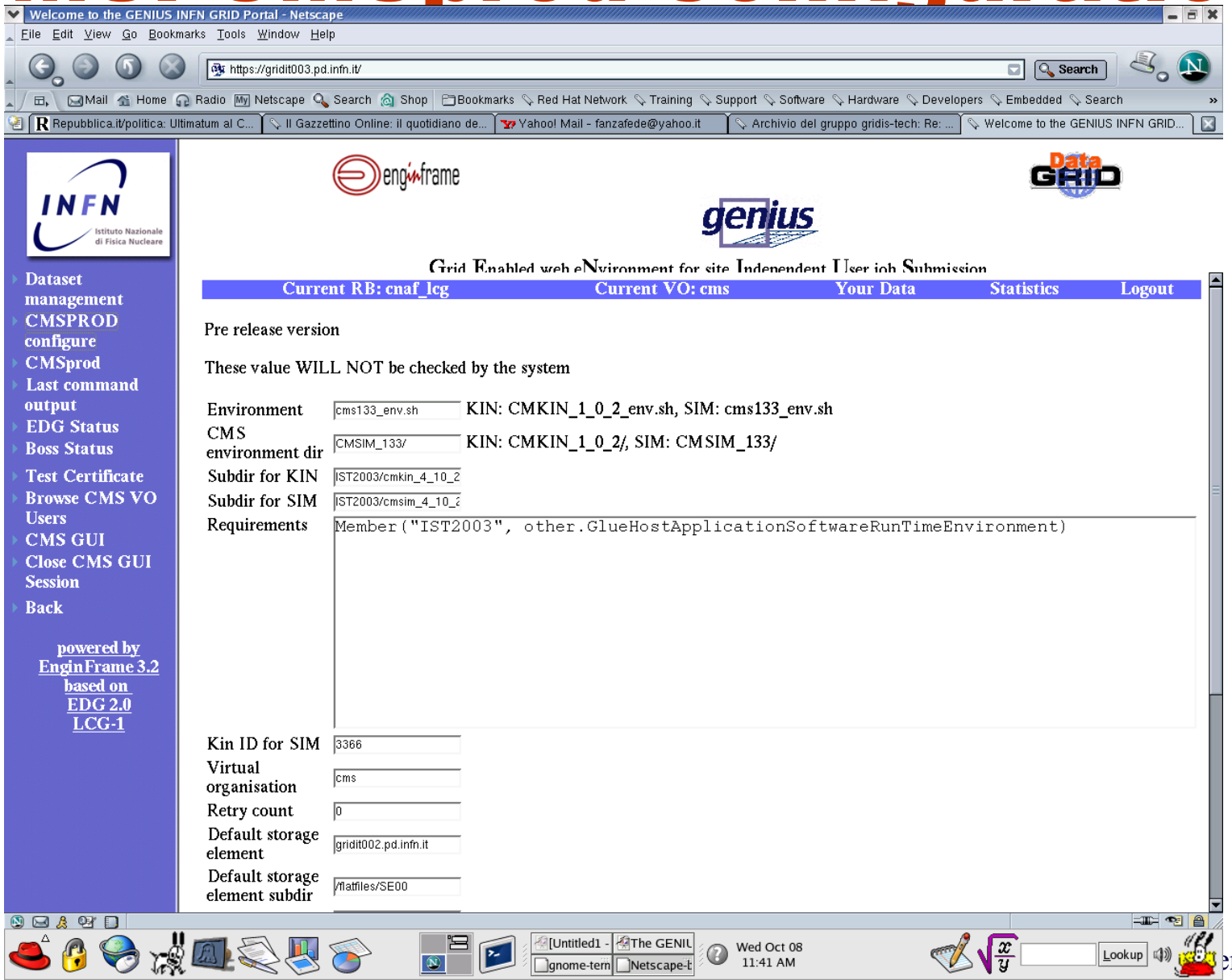
GENIUS: PHONE version

Interactive analysis (via TightVNC)



Exported by NICE to FERRARI Motors

CMS: CMSprod configuration



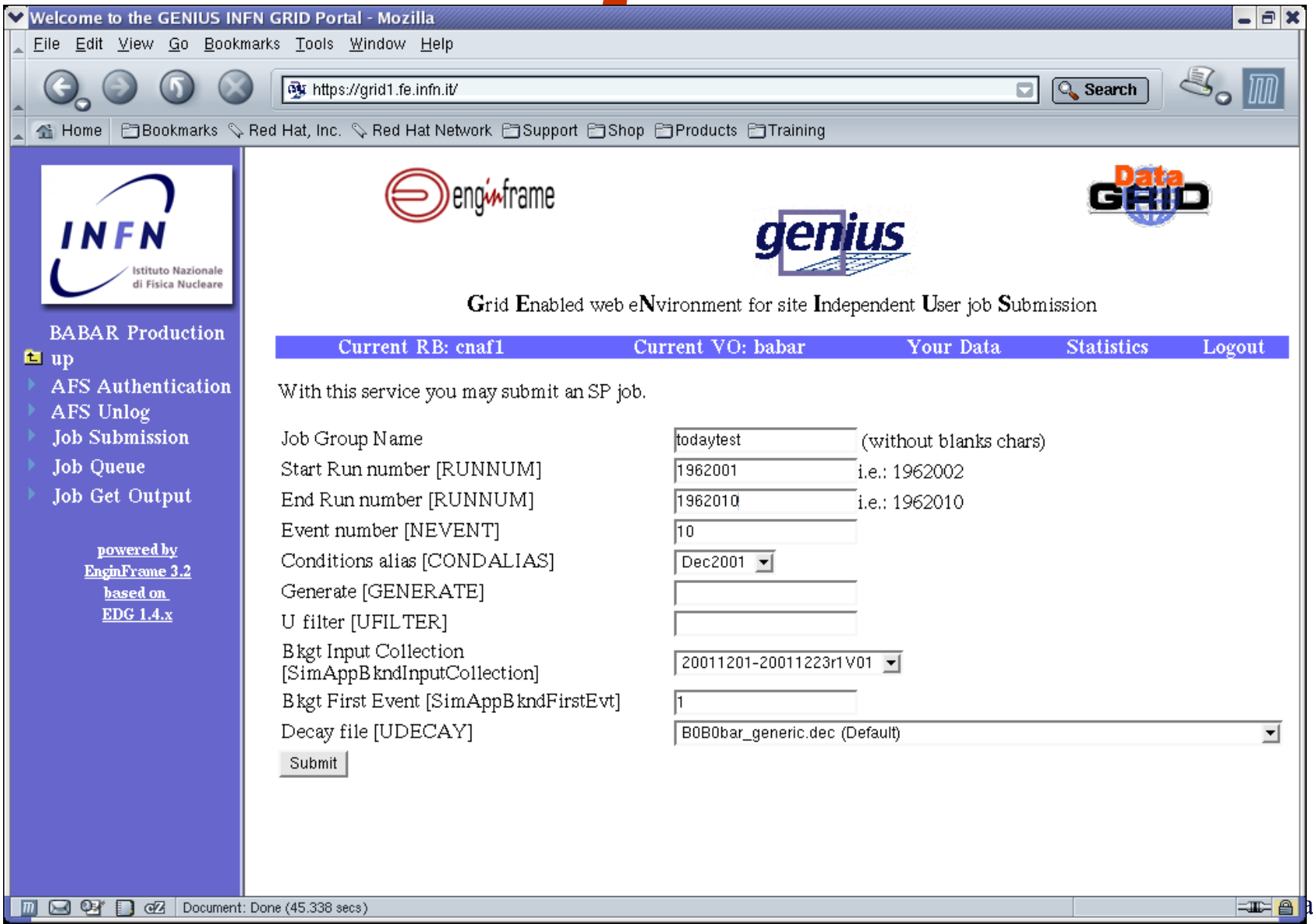
CMS: GENIUS/Boss interface

Current RB: cnaf_lcg	Current VO: cms	Your Data	Statistics	Logout

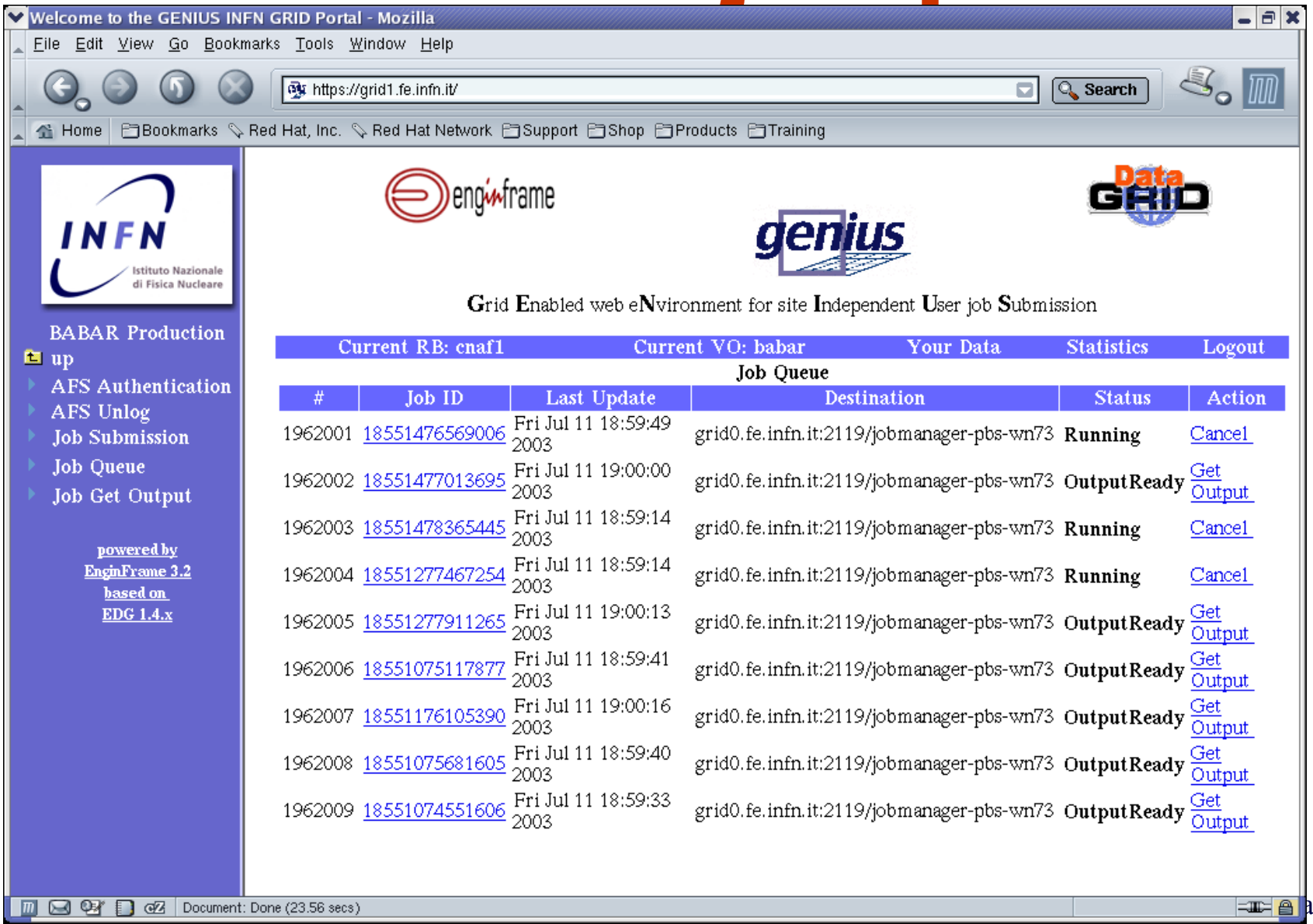
BOSS ID	Job type	Dataset	Submit time	Execution host	Start time	Stop time	Job status	Exe status	# Ev.nts	Copy status	Storage element
377	CMKIN	Play_Padova	2003/10/01 19:05:53	gridba2.ba.infn.it	2003/10/01 19:06:25	2003/10/01 19:07:22	finished	exit_status0	100	ok	gridba6.ba.infn.it
378	CMKIN	Play_Padova	2003/10/01 19:06:06	grid003.mi.infn.it	2003/10/01 19:06:31	2003/10/01 19:07:18	finished	exit_status0	100	ok	grid002.mi.infn.it
386	CMKIN	Play_Padova	2003/10/02 12:09:18	gridba3.ba.infn.it	2003/10/02 12:12:40	0	running	exit_status0	100		gridba6.ba.infn.it
387	CMKIN	Play_Padova	2003/10/02 12:09:31	gridba2.ba.infn.it	2003/10/02 12:17:45	2003/10/02 12:19:08	running	exit_status0	100		
388	CMKIN	Play_Padova	2003/10/02 12:09:45	grid001.mi.infn.it	2003/10/02 12:10:36	2003/10/02 12:11:14	finished	exit_status0	100	ok	grid002.mi.infn.it
389	CMKIN	Play_Padova	2003/10/02 12:10:11	gridit006.pd.infn.it	2003/10/02 12:11:06	2003/10/02 12:11:42	finished	exit_status0	100	ok	gridit002.pd.infn.it

BOSS ID	Job type	Dataset	Submit time	Execution host	Start time	Stop time	Job status	Exe status	Copy status
379	CMSIM	Play_Padova	2003/10/02 09:29:40	grid003.mi.infn.it	2003/10/02 09:30:05	2003/10/02 09:41:20	finished	exit_status0	ok
380	CMSIM	Play_Padova	2003/10/02 09:29:52	grid001.mi.infn.it	2003/10/02 09:30:16	2003/10/02 09:36:13	finished	exit_status0	ok
402	CMSIM	Play_Padova	2003/10/03 09:43:17	grid003.mi.infn.it	2003/10/03 09:43:43	2003/10/03 09:52:42	finished	exit_status0	ok
403	CMSIM	Play_Padova	2003/10/03 09:43:29	grid001.mi.infn.it	2003/10/03 09:43:53	2003/10/03 09:54:50	finished	exit_status0	ok
427	CMSIM	Play_Padova	2003/10/04 10:33:36	grid001.mi.infn.it	2003/10/04 10:34:01	2003/10/04 10:42:03	finished	exit_status0	ok

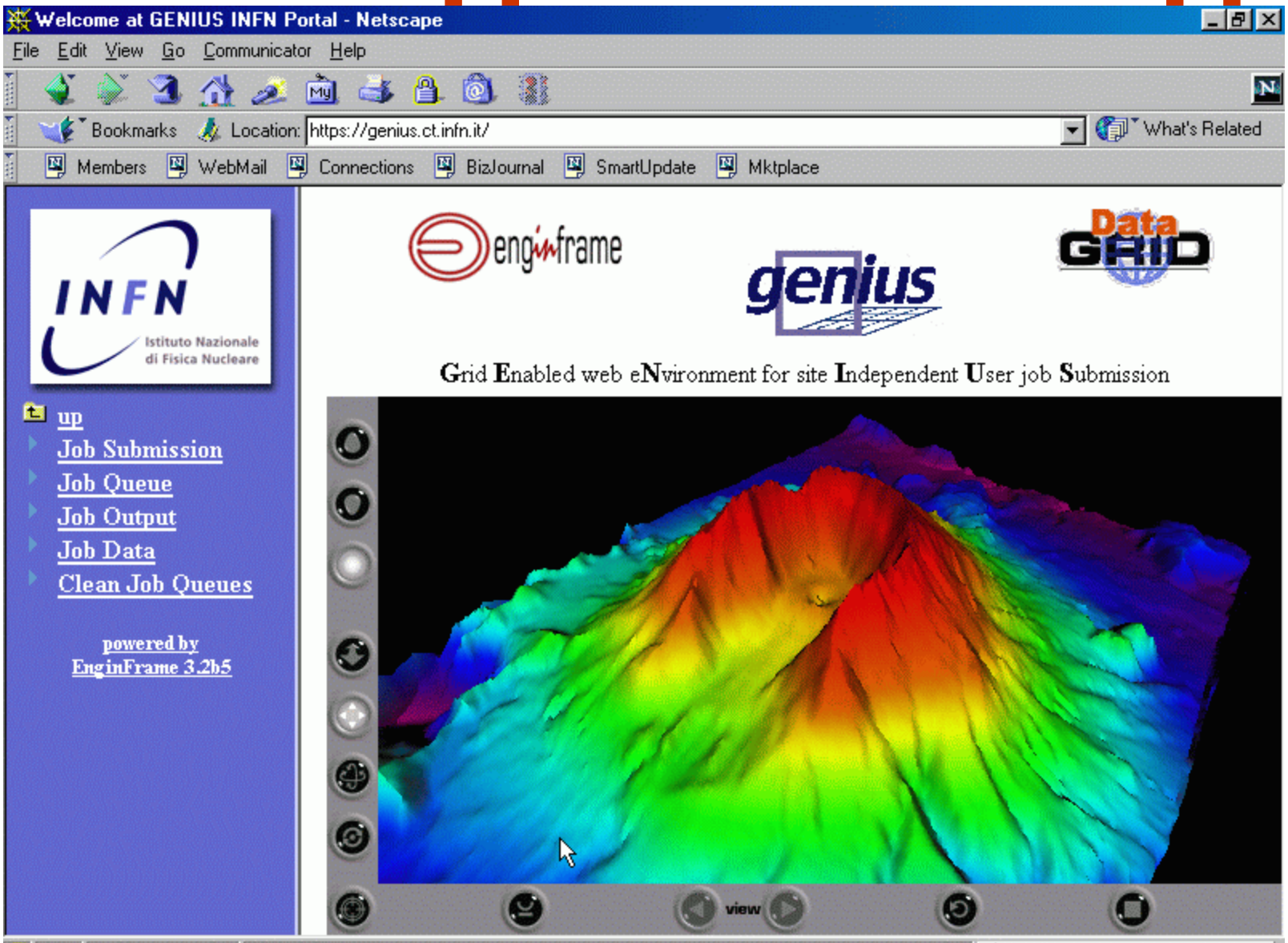
BaBar: multi-job submission



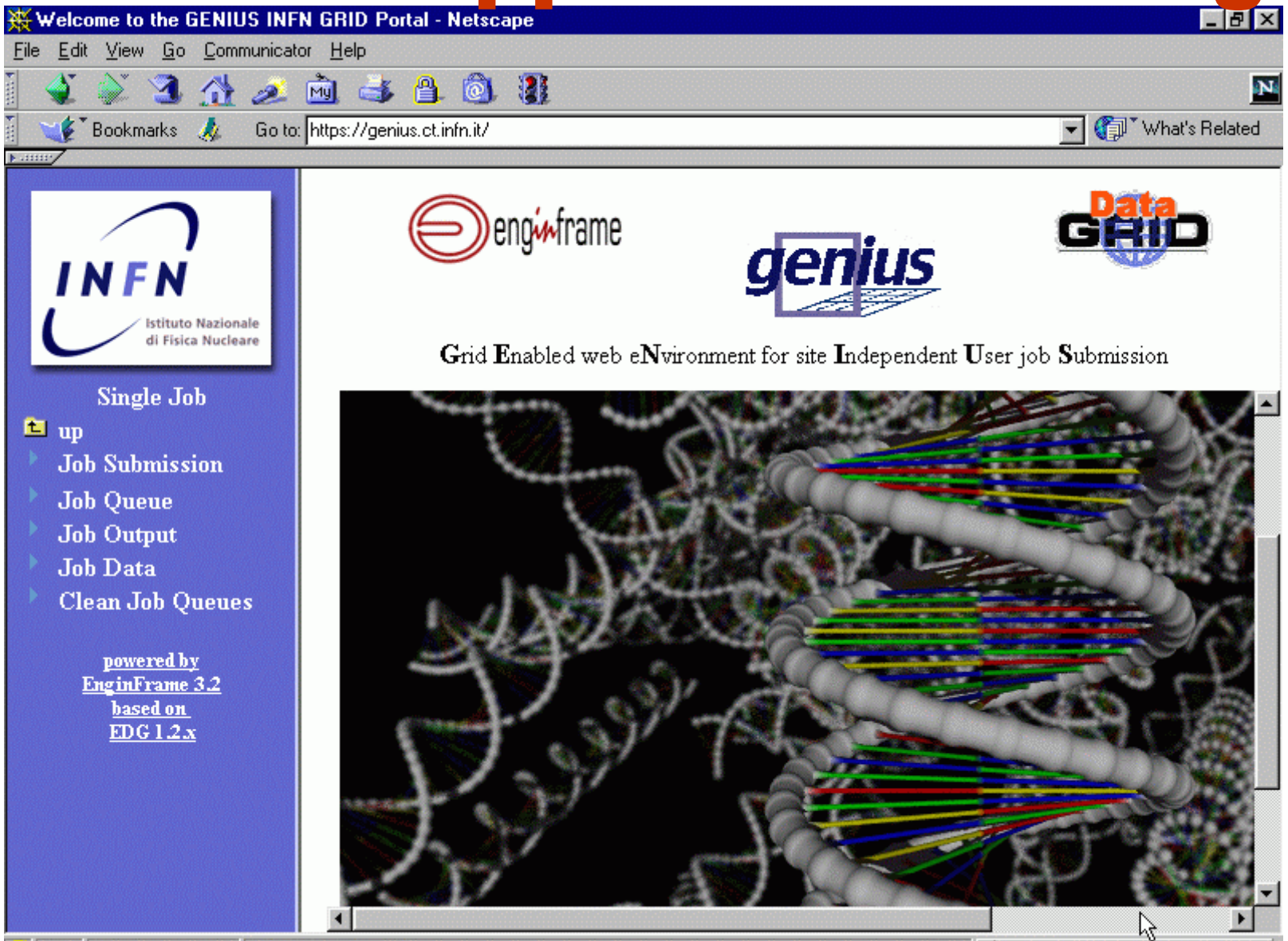
BaBar: multi-job queue



GENIUS app.: Earth Ob. app.



GENIUS app.: 3D rendering



GENIUS app.: sound compiler

- The Sound Laboratory of the University of Salerno (D. Vicinanza and V. Cafagna) starts in September 2003 the first tests of sound production using GRID infrastructures
- A test installation of CSound has been performed in Catania and other EDG sites in Europe
- CSound is an *acoustic compiler*, running on Linux, Mac OS, Win, Unix: a software framework for sound production, acoustics experiments, electronic music composition
- Its philosophy is quite similar to packages like Povray: two ASCII files, named *orchestra* and *score*, containing the description of the virtual instruments (and audio post-processors like filters, resonators, …) and of the musical events, are processed by CSound
- The computing phase take a time depending on the complexity of the score to be performed (spacing from some minutes to hours)
- The output is a high quality audio file (AIFF, WAV or SND allowed). Up to 100+ MB per minute of execution (comparable with HEP output files!)

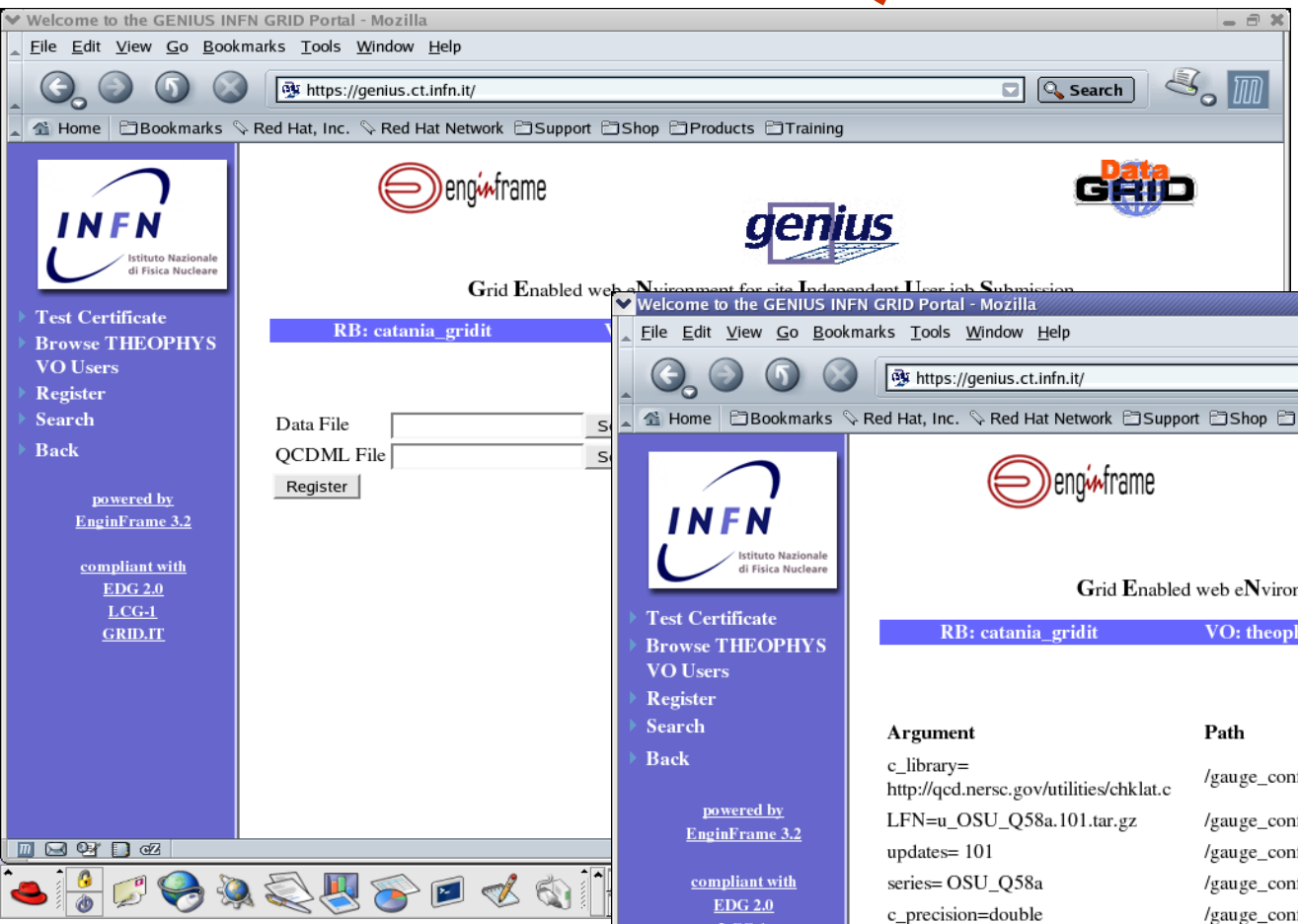
GENIUS app.: L-QCD grid

- XML interpreter with HTML renderer for lattice QCD “configuration” files (several hundreds of MB each and several CPU days to be created!)
- Full set of data management services to publish, register and share configuration files among theoretical physicists belonging to the same VO
- The first prototype has been demonstrated at ACAT03 two weeks ago

Università di Catania and INFN Catania - Italy

ALICE Collaboration and DataGrid Project

GENIUS: L-QCD integration



Present status

- Current implementation of **GENIUS** includes more than 100 services. Among them:
  - **grid authentication with MyProxy !**
  - **several Resource Brokers, VO's and RLS available;**
  - **full support for "interactive" and "parallel" multi-jobs**
  - **web guided job description, submission and monitoring (in collaboration with DATAMAT)**
  - **P2P services added**
  - **PDA version available (runs also on last generation cellular phones, e.g. Sony Ericsson P800 and Nokia 3650)**
  - **Transparently compliant with EDG2, LCG1 and Grid.it middlewares/VO's**
  - **Interfaced to many generic applications and to the CMS and BaBar grid environments**

Università di Catania and INFN Catania - Italy
ALICE Collaboration and DataGrid Project

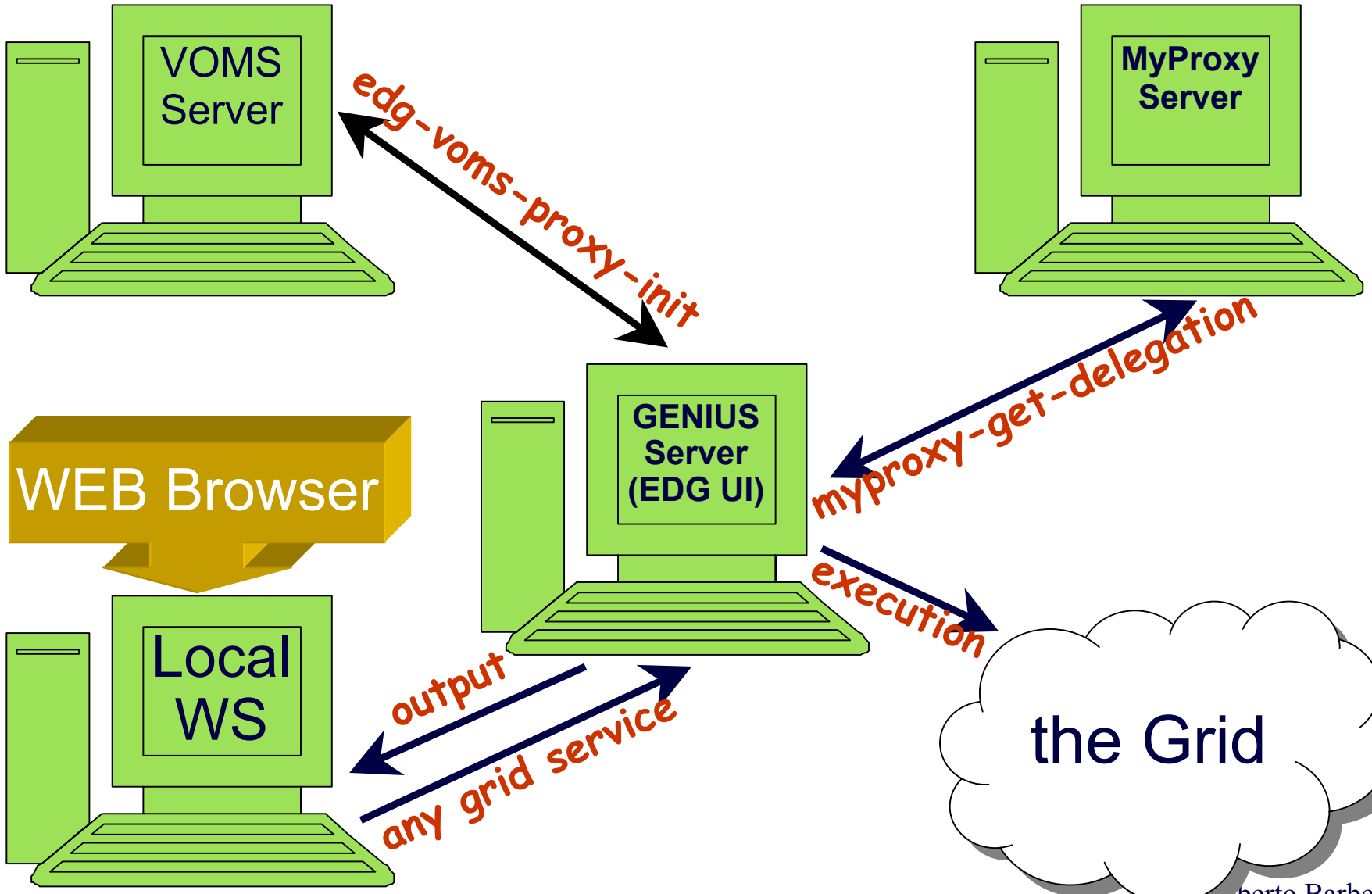
Grid activities at INFN Catania: dissemination & tutoring

Almost 100 people trained so far to use GENIUS and EDG middle-ware

Future devel. and activities

- GENIUS has been targeted as the grid portal for EGEE NA2 (dissemination/tutorials) and NA4 (generic applications) activities:
  - Graphic creation/publication of new services
  - Integration of VOMS/VOX and DGAS tools for AAA
  - Integration of graphic job workflow creators (work already started in Catania)
  - Customized version for the dissemination test-bed
  - Integration with GAT from GridLab2 (EGEE NA5)
  - Close look at the technology of portlets as containers of grid services (see how to match them with GENIUS services) → evolve towards OGSA/OGSI
- Reference portal for the INFN-INAF collaboration at Catania

Future dev.: GENIUS-VOMS integration



Summary and conclusions

- GENIUS, notwithstanding its “youth”, is “well on track” and seems to have a recognized present and a promising future
- It tries to merge the concepts of “user portal” and “science portal” and can easily evolve into a graphic “problem solving environment”
- It is the most advanced suite “on the market” for transparent access to several grid middlewares
- GENIUS is not only intended for a scientist day-by-day use. It has expressly been included in the EU EGEE Proposal and Technical Annex as a dissemination and tutoring tool for non expert users (in the last months, during the Catania and Rome EDG Tutorials, almost 100 people have been trained to use it) and as the grid portal for generic applications

FAQ's...and answers (1)

- **Q:** I want to use GENIUS. Do I have to pay for it ?
- **A:** No. GENIUS is "open source" and the underlying portal framework EnginFrame is **free** for education and research communities.
- **Q:** I want to use GENIUS. Do I need any software running on my laptop ?
- **A:** No client software needs to be installed apart from the web browser. GENIUS can really be accessed from everywhere.
- **Q:** Do I have to be afraid about cached password sent over the web ?
- **A:** Access passwords are securely "streamed" only when needed and then destroyed. Only temporary sessions are possible.
- **Q:** Can new authentication methods implemented into GENIUS ?
- **A:** Of course. Kerberos V is a good example. EnginFrame is compliant with Kerberos authentication and GENIUS with AFS.

FAQ's...and answers (2)

- **Q:** I want to add a new VO to GENIUS and customize new services for that VO. How can I do that ?
- **A:** A new VO can be added to GENIUS in just minutes. New VO specific services can be added just modifying only two files: an XML file and a shell script.
- **Q:** Can I use GENIUS to interface other m/w's ?
- **A:** Yes. Although GENIUS is currently based on the DataGrid middleware(w/ and w/o GLUE extensions), it can be very easily interfaced to others. A direct interface to the Globus Toolkit already exists and another one to Condor is in progress.
- **Q:** How can I start downloading/using GENIUS ?
- **A:** Go to the reference site https://genius.ct.infn.it, click on "GENIUS CVS available" and follow the instructions.