



Enabling Grids for  
E-science in Europe

[www.eu-egee.org](http://www.eu-egee.org)

*Induction to Grid Computing  
and the EGEE Project, Vilnius, 5-6.10.2004*

# GENIUS and GILDA

**Guy Warner**  
NeSC Training Team



EGEE is a project funded by the European Union under contract IST-2003-508833

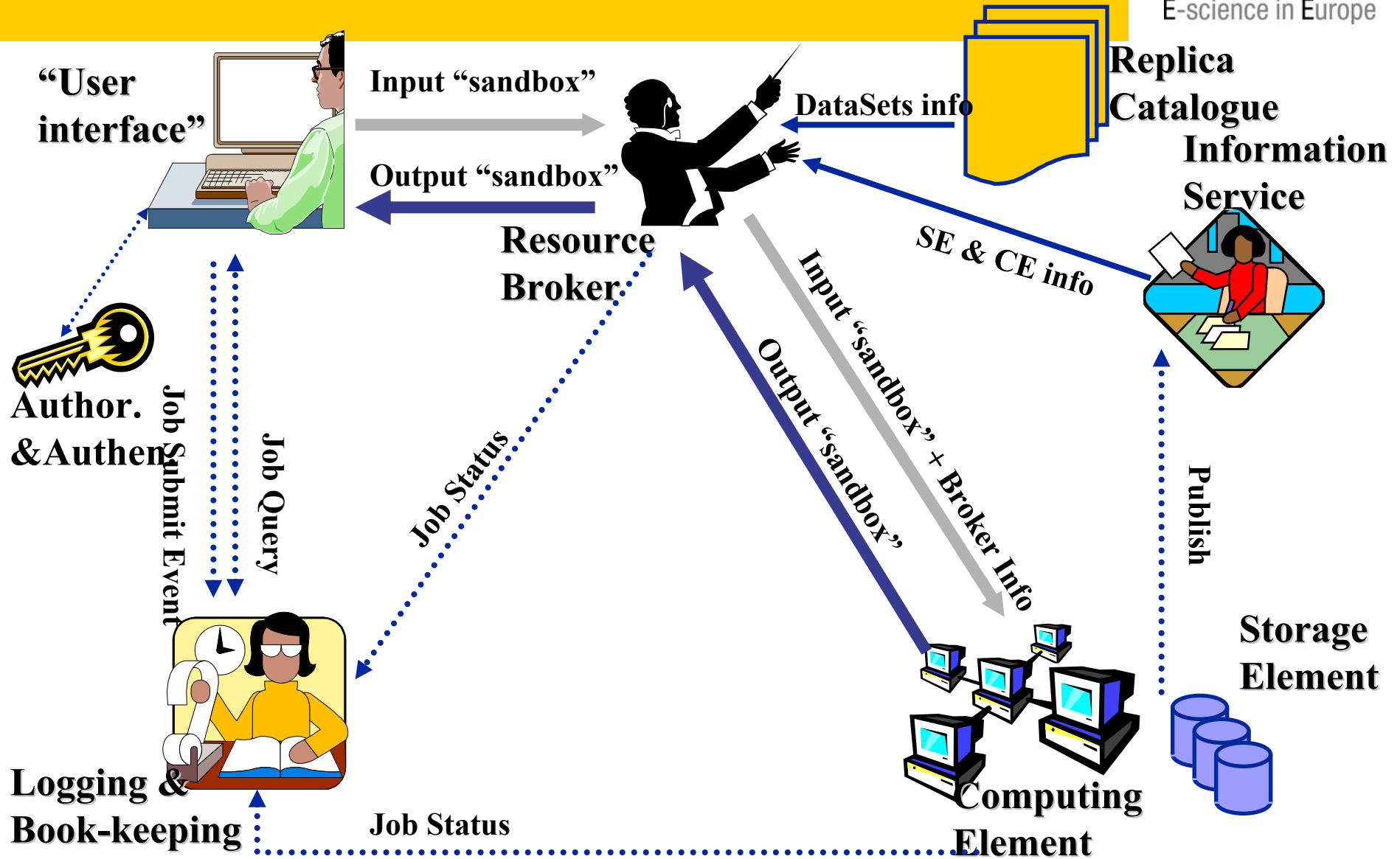
# Contents

- Why GENIUS is needed
- GILDA
- GENIUS (functionality and how it works)
- Example Applications
- Introduction to the Practical

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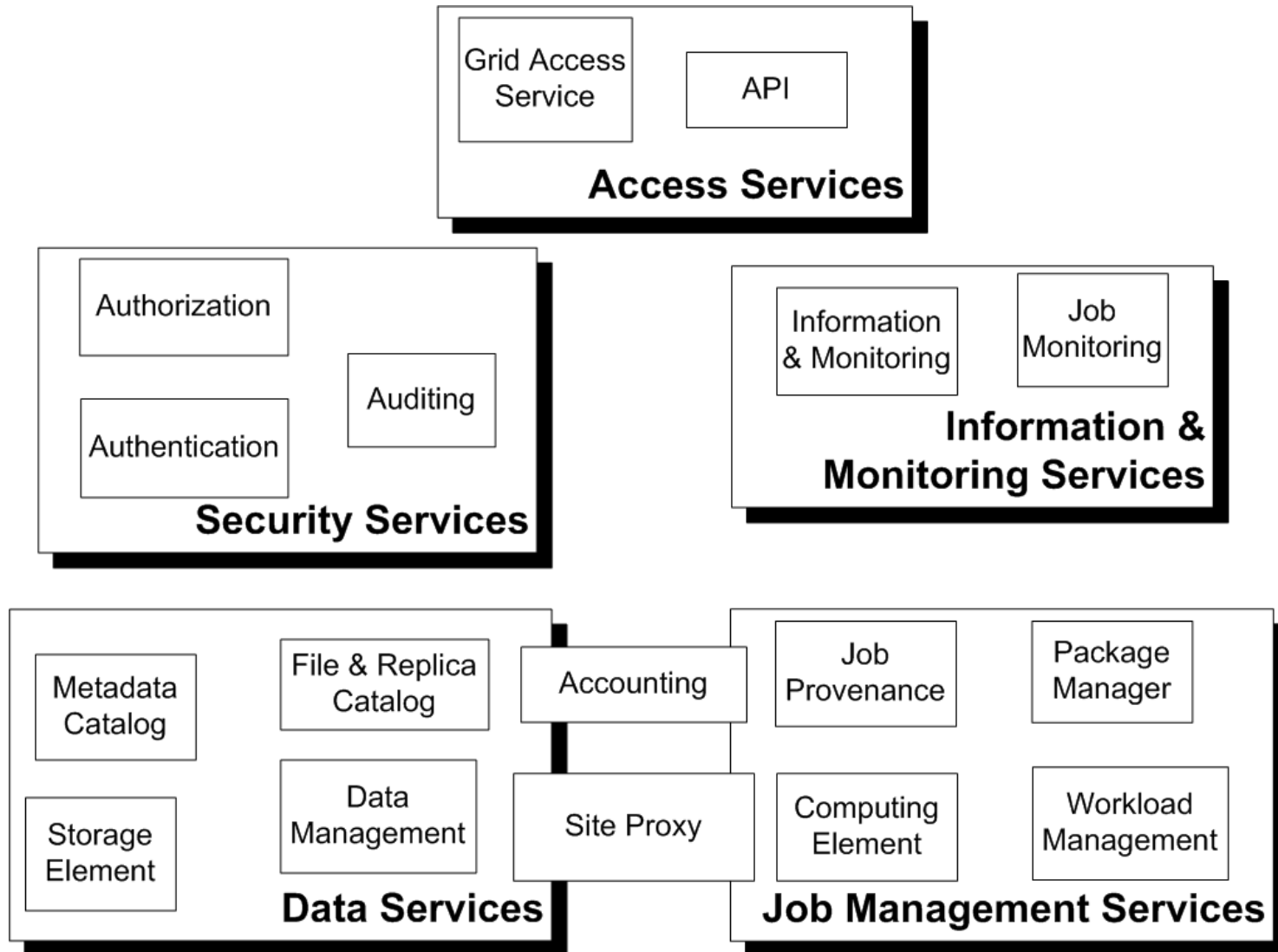
# Middleware components



# LCG2 Command Line

- **edg-job-list-match -vo gilda HelloWorld.jdl**
- **edg-job-submit --vo gilda -o job.id HelloWorld.jdl**
- **edg-job-status -v 1 -i job.id**
- **edg-job-get-output -i job.id --dir .**

# The New EGEE Middleware



# GENIUS: A grid portal

Grid Enabled web eNvironment for site Independent User job Submission



- Avoids users needing to learn complex command line interfaces to the Grid
- It can be accessed from everywhere and by “everything” (desktop, laptop, PDA, mobile phone).
- It can keep the same user interface to several back-ends (including the switch to new EGEE middleware).
- It must be redundantly “secure” at all levels
- Grid services “a mouse click away”.



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A virtual laboratory to demonstrate/disseminate the strong capabilities of grid computing.

GILDA incorporates:

- The Gilda Testbed
- GENIUS
- Grid-Demonstrator
- Grid-tutor
- A monitoring system using GridICE



# The GILDA home page (<https://gilda.ct.infn.it>)



The screenshot shows a Mozilla browser window titled "GILDA Testbed - Grid INFN Laboratory for Dissemination Activities - Mozilla". The address bar contains "http://gilda.ct.infn.it/". The page features the INFN GRID logo on the left, the GILDA logo in the center, and the eGEE logo on the right. Below the logos is a navigation menu with buttons for HOME, TESTBED, GRID DEMONSTRATOR, 1) CERTIFICATION AUTHORITY, 2) VIRTUAL ORGANIZATION, 3) GRID TUTOR, MONITORING, and CONTACTS. The main content area has a heading "GILDA ( Grid Infn L aboratory for D issemination A ctivities )" and a sub-heading "is a virtual laboratory to demonstrate/disseminate the strong capabilities of grid computing." To the left of the main text is a sidebar with a list of links: Instructions for users, Instructions for sites, Useful links, and Usage Statistics. Below the sub-heading, there is a section titled "GILDA consists of the following elements:" followed by a bulleted list of seven items, each describing a component of the GILDA Testbed. At the bottom of the page, there is a paragraph stating that GILDA is an activity of the Italian Istituto Nazionale di Fisica Nucleare (INFN) carried on in the context of both the Italian INFN Grid and European EGEE Projects.

**GILDA ( Grid Infn L aboratory for D issemination A ctivities )**

is a virtual laboratory to demonstrate/disseminate the strong capabilities of grid computing.

**GILDA consists of the following elements:**

- [the GILDA Testbed](#): a series of sites and services (Resource Broker, Information Index, Replica Location Server, Monitoring tool, Computing Elements, and Storage Elements) spread all over Italy on which the last version of the [INFN Grid](#) middle-ware is installed;
- [the Grid Demonstrator](#): a customized version of the full [GENIUS web portal](#), jointly developed by INFN and [NICE](#), from where **everybody** can submit a pre-defined set of applications to the GILDA Testbed;
- [the GILDA Certification Authority](#): a fully functional Certification Authority which issues 14-days X.509 certificates to everybody wanting to experience grid computing on the GILDA Testbed;
- [the GILDA Virtual Organization](#): a Virtual Organization gathering all people wanting to experience grid computing on the GILDA Testbed;
- [the Grid Tutor](#): based on a full version of the [GENIUS web portal](#), to be used only during [grid tutorials](#);
- [the monitoring system](#): a versatile monitoring system completely based on [GridICE](#), the grid monitoring tool developed by INFN;
- [the GILDA mailing list](#): [gilda@infn.it](mailto:gilda@infn.it), also archived on the web [here](#).

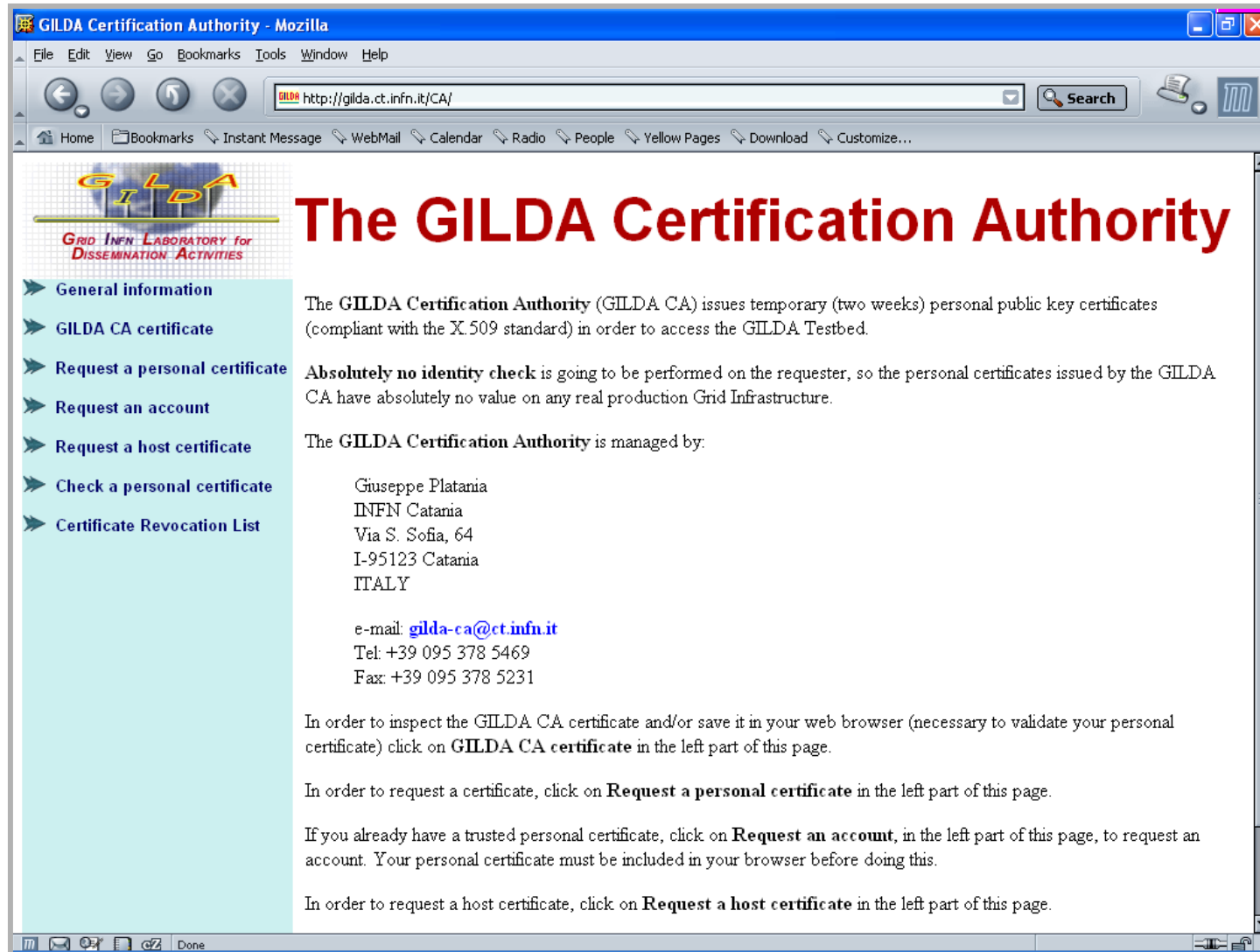
GILDA is an activity of the Italian [Istituto Nazionale di Fisica Nucleare \(INFN\)](#) carried on in the context of both the Italian [INFN Grid](#) and European [EGEE](#) Projects.

# The GILDA Virtual Organization

The screenshot shows a Mozilla browser window titled "GILDA Testbed - Grid INFN Laboratory for Dissemination Activities". The address bar contains "http://gilda.ct.infn.it/". The page layout includes:

- Logos:** INFN GRID on the left, GILDA logo in the center, and EGEE logo on the right.
- Navigation Menu:** HOME, TESTBED, 1) CERTIFICATION AUTHORITY, 2) REGISTER to the GILDA VO, 3) Go to the GRID DEMONSTRATOR, GENIUS PORTAL, MONITORING, CONTACTS.
- Left Sidebar:** Grid tutorials, Instructions for users, Instructions for sites, Useful links, Usage Statistics.
- Registration Form:** A form titled "Registration Form" with fields for:
  - Nome e cognome / First name and family name: Roberto Barbera
  - Istituto/Institute: GILDA-INFN Catania
  - Telefono/Phone number: +390951234567
  - E-mail: roberto.barbera@ct.infn.it
- Footer:** "Selezione VO / VO choice:" and a disclaimer: "La sottomissione della domanda implica l'obbligo ad un corretto uso delle risorse messe a disposizione dell'utente." with "Clear Form" and "Register" buttons.

# The GILDA Certification Authority



The screenshot shows a Mozilla browser window displaying the GILDA Certification Authority website. The browser's address bar shows the URL <http://gilda.ct.infn.it/CA/>. The website features a navigation menu on the left with the following items: [General information](#), [GILDA CA certificate](#), [Request a personal certificate](#), [Request an account](#), [Request a host certificate](#), [Check a personal certificate](#), and [Certificate Revocation List](#). The main content area is titled "The GILDA Certification Authority" and contains the following text:

The **GILDA Certification Authority** (GILDA CA) issues temporary (two weeks) personal public key certificates (compliant with the X.509 standard) in order to access the GILDA Testbed.

**Absolutely no identity check** is going to be performed on the requester, so the personal certificates issued by the GILDA CA have absolutely no value on any real production Grid Infrastructure.

The **GILDA Certification Authority** is managed by:

Giuseppe Platania  
INFN Catania  
Via S. Sofia, 64  
I-95123 Catania  
ITALY

e-mail: [gilda-ca@ct.infn.it](mailto:gilda-ca@ct.infn.it)  
Tel: +39 095 378 5469  
Fax: +39 095 378 5231

In order to inspect the GILDA CA certificate and/or save it in your web browser (necessary to validate your personal certificate) click on **GILDA CA certificate** in the left part of this page.

In order to request a certificate, click on **Request a personal certificate** in the left part of this page.

If you already have a trusted personal certificate, click on **Request an account**, in the left part of this page, to request an account. Your personal certificate must be included in your browser before doing this.

In order to request a host certificate, click on **Request a host certificate** in the left part of this page.

# The GILDA Certification Authority 2

Request a GILDA CA personal certificate - Mozilla  
https://gilda.ct.infn.it/CA/mgt/restricted/ucert.php

**Request an account**  
In order to correctly generate a request it is mandatory to fill all fields in the form below. Please, double check the correctness of the e-mail address that you are going to provide since **no verification** will be performed by the server.

**Request a host certificate**  
The password you are prompted about in the form below is the password of your personal account on the **GENIUS Portal** from where you will access the GILDA Testbed and it is **NOT** the passphrase of your personal certificate.

**Check a personal certificate**

**Certificate Revocation List**  
When the certificate will be signed by the GILDA CA manager you will be notified by e-mail with the instructions to download your GILDA CA personal certificate and access the GILDA Testbed.

Institute/University/Company:	INFN Catania
First name and last name:	Roberto Barbera
Account username (max 8 characters, only not-accented letters and digits are allowed, both lowercase and uppercase):	barbera
Account password (only not-accented letters and digits are allowed, both lowercase and uppercase):	*****
Confirm account password (only not-accented letters and digits are allowed, both lowercase and uppercase):	*****
E-mail:	roberto.barbera@ct.infn.it
KeySize:	2048 (High Grade)

Submit the request Clear form

Mozilla  
https://gilda.ct.infn.it/CA/mgt/restricted/srvreq.php

**The GILDA Certification Authority**

**Request a GILDA host certificate**

**General information**

**GILDA CA certificate**

**Request a personal certificate**  
When the certificate will be signed by the GILDA CA manager you will be notified by e-mail with the instructions to download your GILDA host certificate.

**Request an account**

**Request a host certificate**

Institute/University/Company:	INFN Catania
Full server hostname (do not use generic names from Internet Providers):	grid-ce.ct.infn.it
E-mail address of server administrator (do not use generic addresses but only personal ones):	roberto.barbera@ct.infn.it

Submit the request Clear form

# Contents

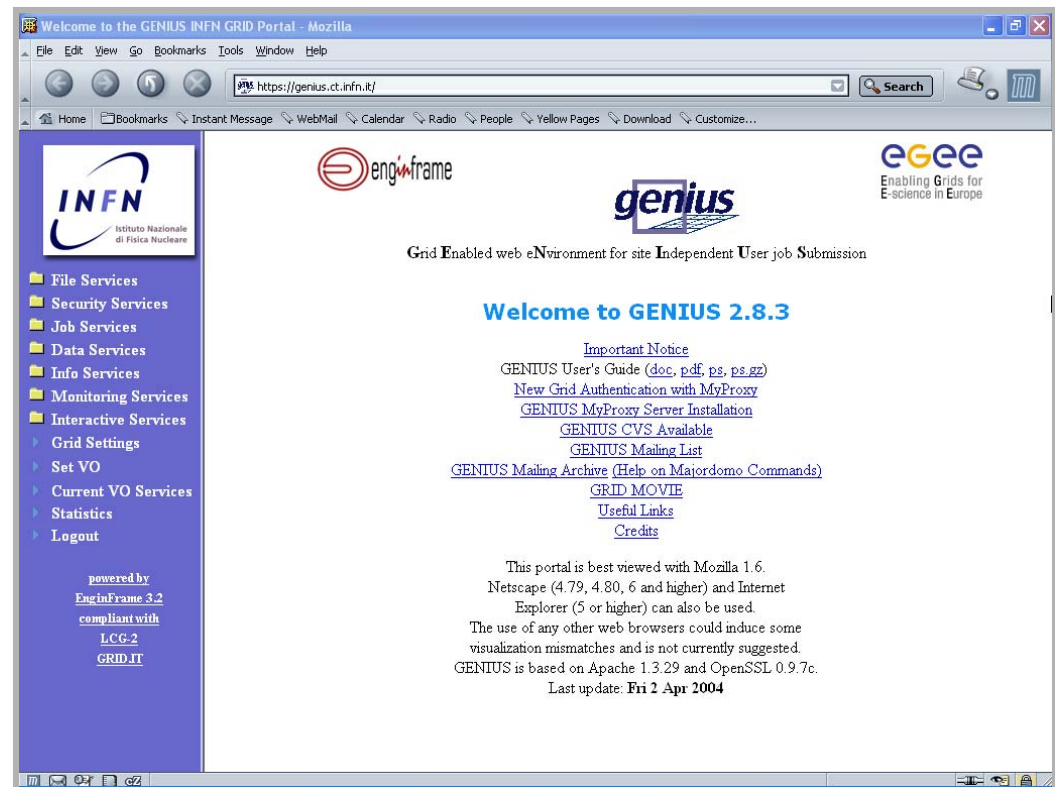
- Why GENIUS is needed
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# Accessing GENIUS 1

## Web Sites using Secure http

- GENIUS  
<https://genius.ct.infn.it>
- Grid Demonstrator  
<https://grid-demo.ct.infn.it>  
(open access)
- Grid Tutor  
<https://grid-tutor.ct.infn.it>



# Accessing GENIUS 2

## PDA



## Mobile Phone





# The GENIUS hourglass model

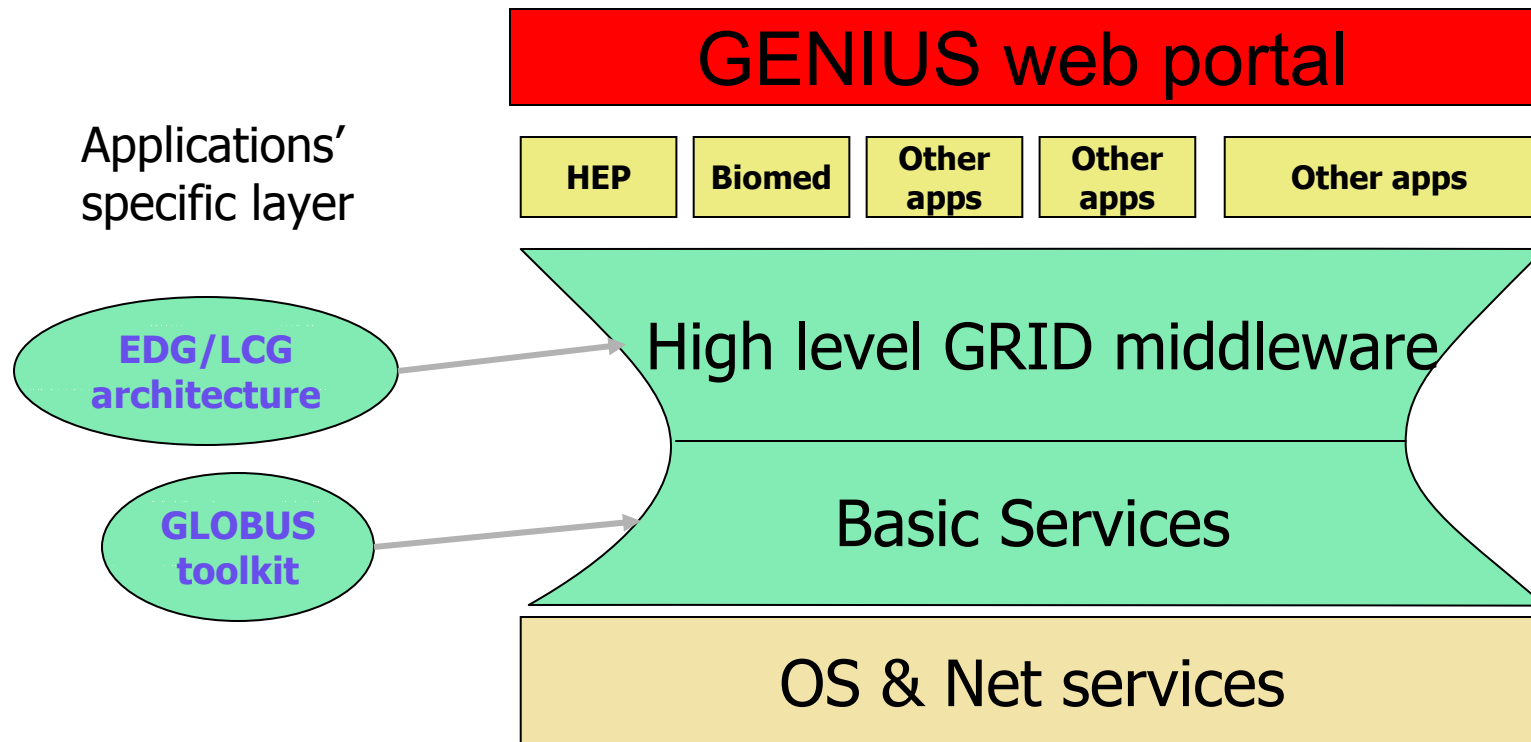


## GENIUS®

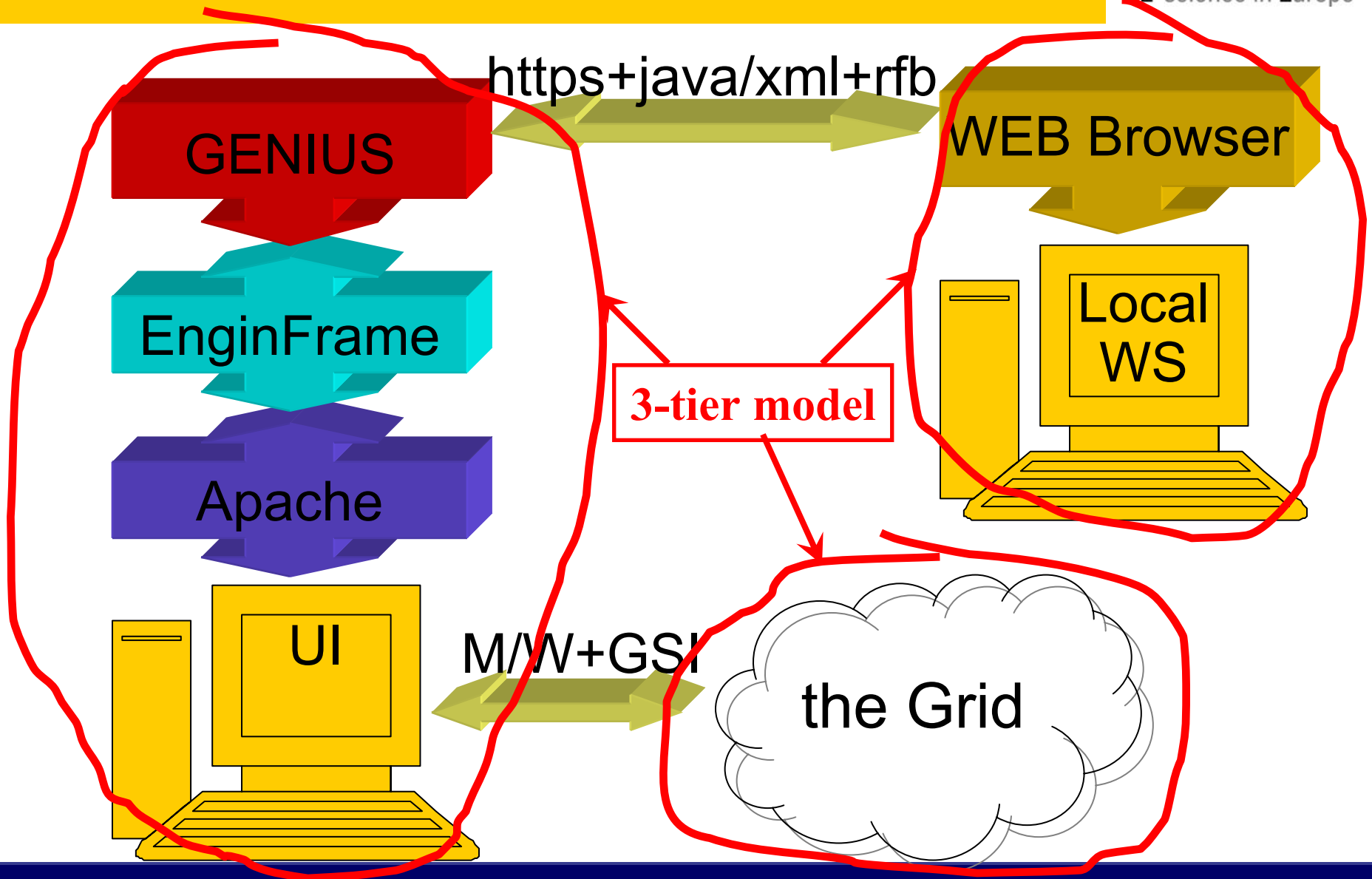
(Grid Enabled web eNvironment for  
site Independent User job Submission)

[<https://genius.ct.infn.it>]

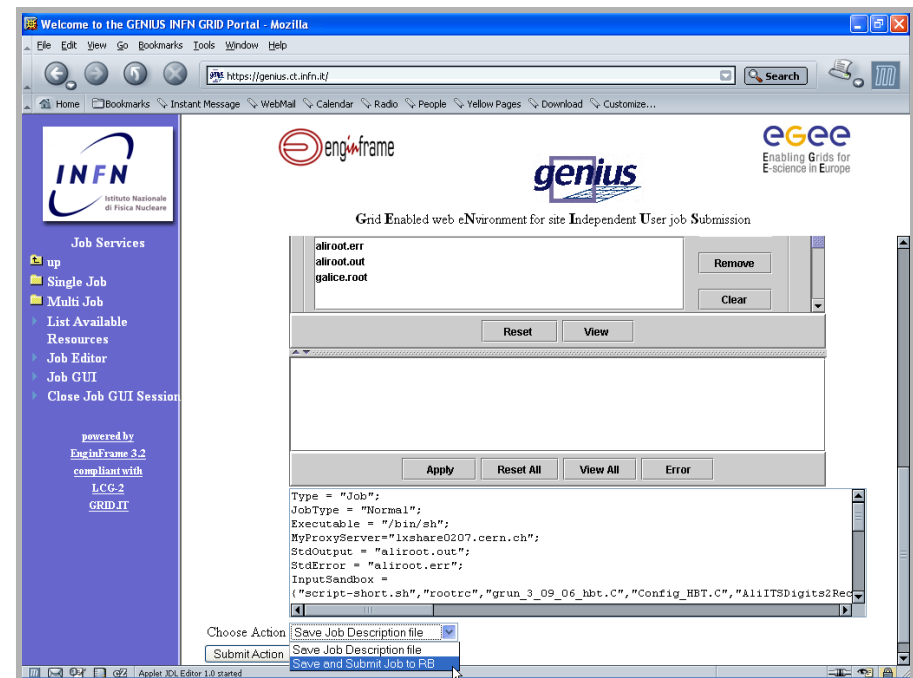
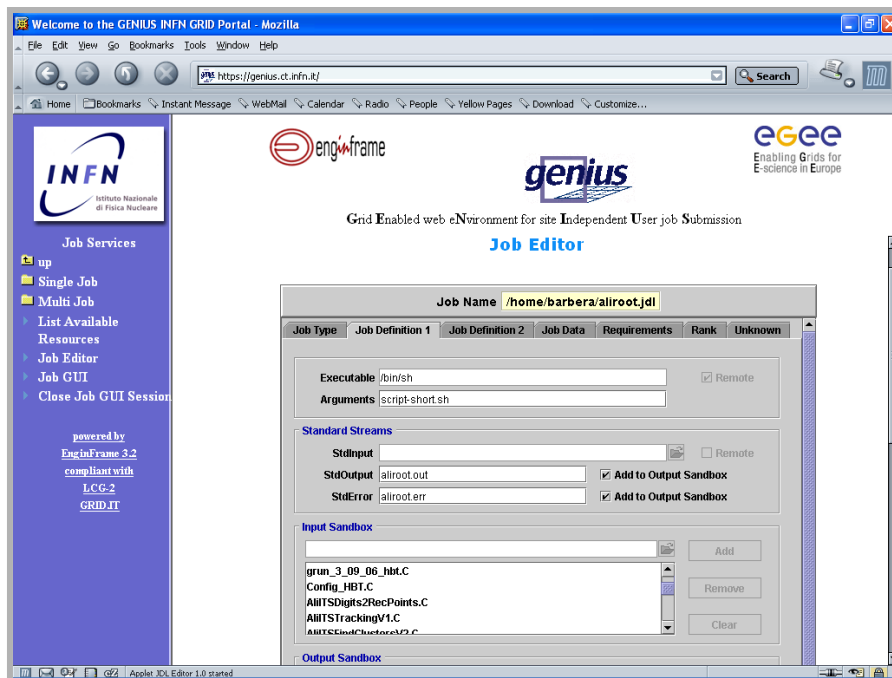
## INFN/NICEsrl collaboration



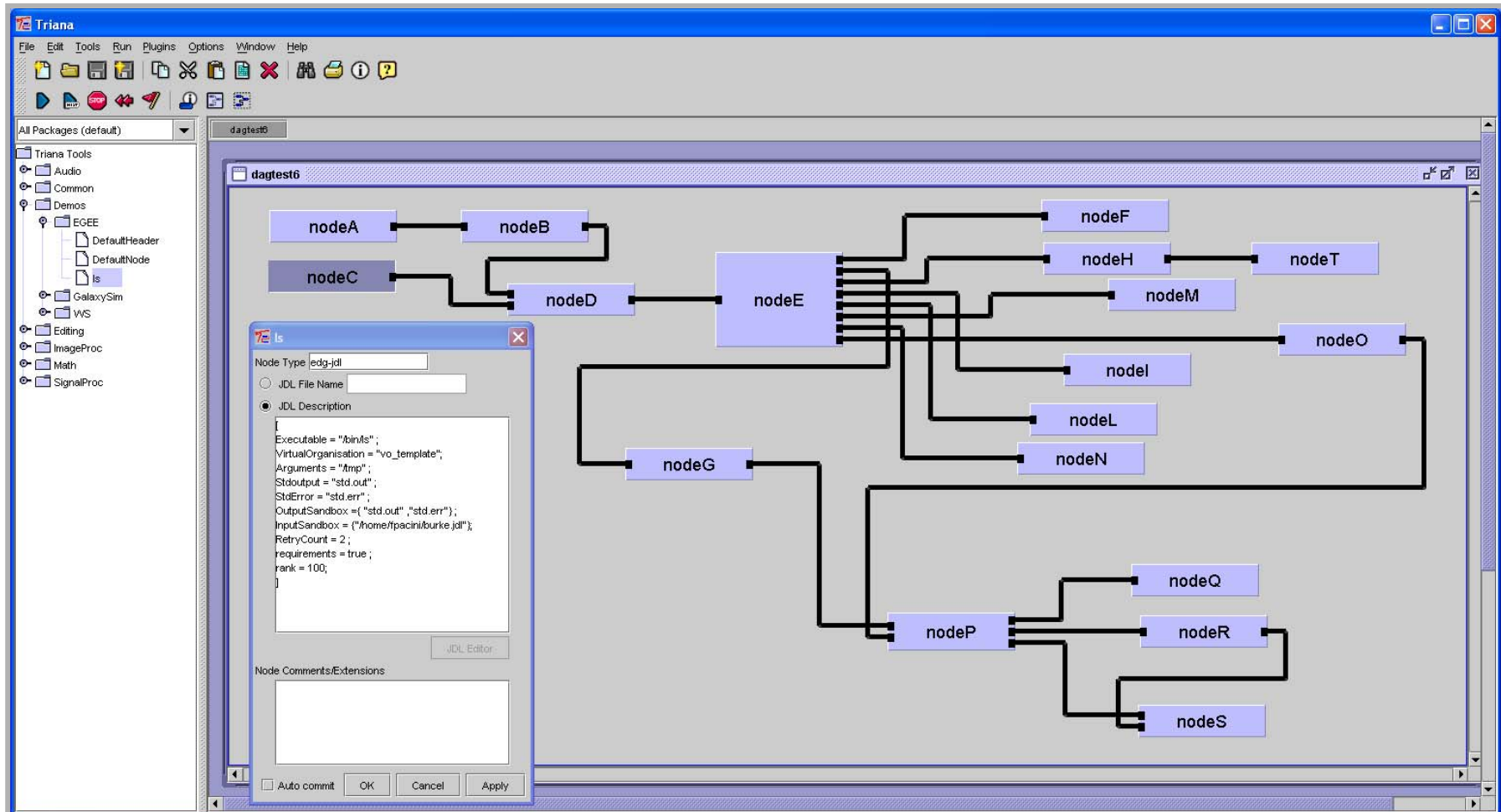
# GENIUS: how it works



# GENIUS graphic job editor (work in collaboration with DATAMAT)



# GENIUS graphic workflow editor (integration of TRIANA from GridLab)



# GENIUS interactive services

Welcome to the GENIUS INFN GRID Portal - Mozilla

File Edit View Go Bookmarks Tools Window Help

https://genius.ct.infn.it/ Search

Home Bookmarks Instant Message WebMail Calendar Radio People Yellow Pages Download Customiz...

**INFN**  
Istituto Nazionale  
di Fisica Nucleare

**enginframe**

**genius**

**EGEE**  
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Grid Enabled web eNvironment for site Independent User job Submission

Disconnect Options Clipboard Send Ctrl-Alt-Del Refresh

barbera@genius:~

- csound.orc
- csound.sco
- defcity.pov
- dentools.jdl
- dna.pov
- edg-1.4
- edg\_wl\_ui\_gui\_log4j.log
- edglog.log
- file\_09003.txt
- generated
- golden\_C0.dem
- grand\_canyon\_A2.dem
- grun\_3\_09\_06\_hbt.C
- grun\_4\_01\_00.C
- hadrontherapy.jdl
- genius:> ned hadrontherapy.jdl
- bash: ned: command not found
- genius:> nedit hadrontherapy.jdl
- bash: nedit: command not found
- genius:> nedit
- bash: nedit: command not found
- genius:> emacs hadrontherapy.jdl
- genius:> emacs hadrontherapy.jdl

test-ist2003-1\_02102003\_095622

- test.jdl
- test.sh
- test1.txt
- test10tris\_23012004\_172110
- test2.txt

emacs@genius.ct.infn.it

File Edit Options Buffers Tools Help

```
type = "Job";
JobType = "Normal";
Executable = "/bin/sh";
MyProxyServer="lxshare0207.cern.ch";
StdOutput = "hadrontherapy.out";
StdError = "hadrontherapy.err";
InputSandbox = {"hadrontherapy.sh","macro.mac"};
OutputSandbox = {"hadrontherapy.err","hadrontherapy.out","picco.dat","disAr
", "disEn.dat"};
RetryCount = 7;
Arguments = "hadrontherapy.sh";
Requirements =
Member("GEANT4-6",other.GlueHostApplicationSoftwareRunTimeEnvironment) && c
GlueCEPolicyMaxCPUTime>100 && other.GlueCEStateStatus == "Production" && ot
GlueHostNetworkAdapterOutboundIP ;
#CEId = other.GlueCEUniqueID == "grid012.ct.infn.it:2119/jobmanager-pbs-inf
";
```

Applet VncViewer started

# GENIUS P2P services

The screenshot shows a Mozilla browser window titled "Welcome to the GENIUS INFN GRID Portal - Mozilla" with the address bar set to "https://genius.ct.infn.it/". The page features logos for INFN (Istituto Nazionale di Fisica Nucleare), EnginFrame, genius, and eGEE. A navigation bar includes links for RB: catania\_gridit, VO: alice, RLS: GRIDIT, Your Data, and Logout. The main content area is titled "GENIUS Chat Room for ALICE VO" and contains a chat interface with a text area, a "barbera" user name, and a "Type here" input field. The chat text includes a welcome message and a user message: "<barbera> hello everyone !". The interface also includes "Options" and "Clear" buttons, a font size selector set to "monospaced" and "12", and a "Users: 1" indicator. The footer of the chat area says "Powered by Chat Everywhere". The browser's status bar at the bottom indicates "Applet Chat started".

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# Example Application: ALICE

## A Large Ion Collider Experiment

- Collide heavy nuclei to attempt to melt them into Quark-Gluon Plasma (the state of the universe before particles had formed).
- Each collision (event) will generate a data file approximately 2GB large.
- There is expected to be about  $10^9$  events per year.
- Expected data produced of order 2 PetaBytes per year.



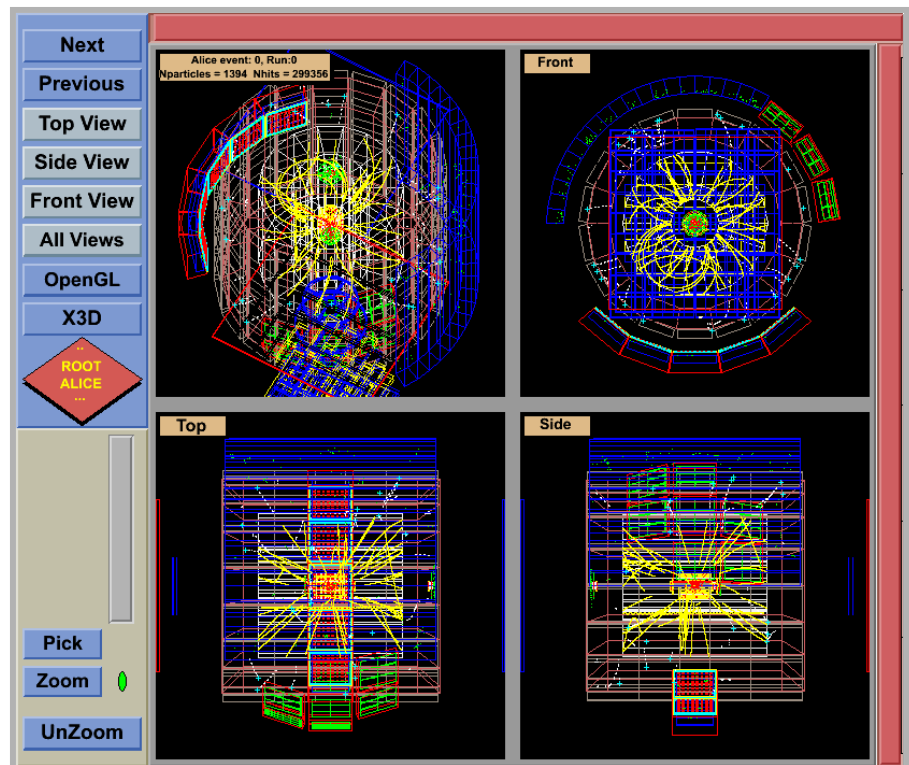
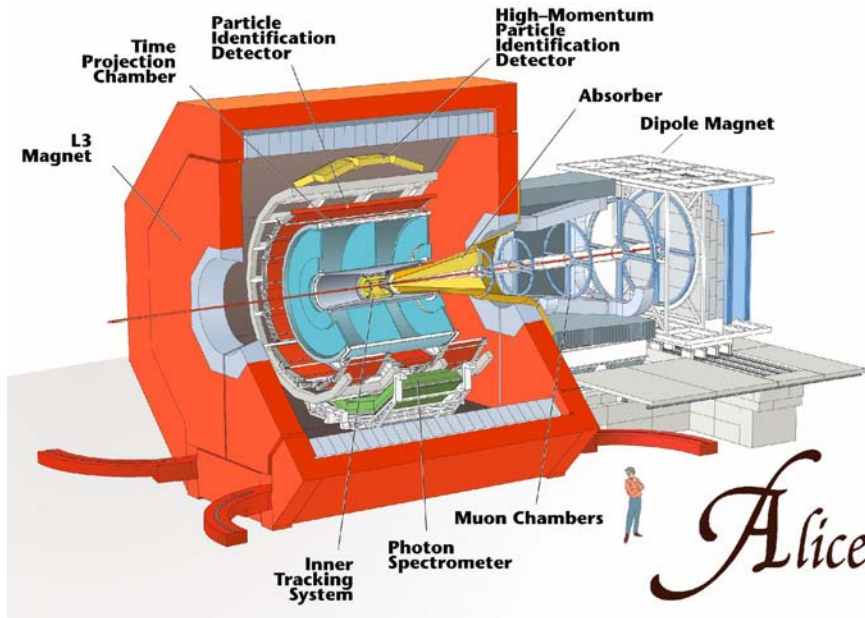
# GENIUS and ALICE

RB: catania_gridit		VO: alice		RLS: GILDA		Your Data		Logout	
<b>Job Submission</b>									
Please, select the name of the Production containing the ALICE jobs that you want to submit. The First Event parameter must be less than Last Event one.									
Production Name	<input type="text" value="Test_Production"/>								
AliRoot Version	<input type="text" value="4.01.00"/> ▼								
Root Version	<input type="text" value="3.10.02"/> ▼								
Geant3 Version	<input type="text" value="0.5"/> ▼								
Configuration File	<input type="text" value="Config_4.01.00.C"/> ▼								
First Event	<input type="text" value="23001"/> [1 - 999999]								
Last Event	<input type="text" value="24000"/> [First Event - 999999]								
Specify the CE Resource	<input type="text" value="Let the CATANIA_GRIDIT Resource Broker choose"/> ▼								
<input type="button" value="Submit"/>									

- EDG/LCG
- up
  - ▶ Job Submission
  - ▶ Job Queue
  - ▶ Job Data
  - ▶ Clean Job Queues
  - ▶ Job Output Viewer
  - ▶ Triana Viewer
  - ▶ Close Desktop

# ALICE and Aliroot

## ALICE and its visualisation in Aliroot



# Example Application: GATE, A BioMed Application

Welcome to the GENIUS INFN GRID Portal - Microsoft Internet Explorer

Eichier Edition Affichage Favoris Outils ?

← Précédente → Recherche Favoris Média

Adresse <https://grid011.ct.infn.it> OK Liens »

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**genius**

**egee**  
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Grid Enabled web eNvironment for site Independent User job Submission

RB: catania\_gridit VO: bio RLS: GRIDIT Your Data Logout

### Create GATE files

With this service it will be created/checked your GATE Repository and Settings

Repository Name

InputSandbox Files (3 files)

- 
- 

Select.. Clean

InputData lfn:

macro (.mac)  Select..

Number of Partitions

Status Files (=Number of Partitions)

- 
- 
- 
- 
- 

Select.. Clean

Create

powered by  
EnginFrame 3.2  
compliant with  
LCG-2  
GRID.IT

Terminé Internet


# GENIUS and GATE

Welcome to the GENIUS INFN GRID Portal - Microsoft Internet Explorer


Eichier Edition Affichage Favoris Outils ?


← Précédente → Recherche Favoris Média


Adresse <https://grid011.ct.infn.it> OK Liens »



Istituto Nazionale di Fisica Nucleare







Enabling Grids for  
E-science in Europe

Grid Enabled web eNvironment for site Independent User job Submission

Job ID	Last update	Destination	Status
<a href="https://grid014.ct.infn.it:9000/gKL5BHkh3nllT26wiCnnKg">https://grid014.ct.infn.it:9000/gKL5BHkh3nllT26wiCnnKg</a>	Fri Apr 16 08:07:32 2004	grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite	Scheduled
<a href="https://grid014.ct.infn.it:9000/EoY3T3MxJEFOuUAB8MVQDQ">https://grid014.ct.infn.it:9000/EoY3T3MxJEFOuUAB8MVQDQ</a>	Fri Apr 16 08:06:37 2004	grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite	Scheduled
<a href="https://grid014.ct.infn.it:9000/hbtma7zWlXMTKpOTdg65tQ">https://grid014.ct.infn.it:9000/hbtma7zWlXMTKpOTdg65tQ</a>	Fri Apr 16 08:05:53 2004	grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite	Scheduled
<a href="https://grid014.ct.infn.it:9000/ApwHH5r19KLHecxhjoXeTQ">https://grid014.ct.infn.it:9000/ApwHH5r19KLHecxhjoXeTQ</a>	Fri Apr 16 08:05:19 2004	grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite	Scheduled
<a href="https://grid014.ct.infn.it:9000/gKN99_RfaThA5stPsxkYUQ">https://grid014.ct.infn.it:9000/gKN99_RfaThA5stPsxkYUQ</a>	Fri Apr 16 08:07:54 2004	grid012.ct.infn.it:2119/jobmanager-lcgpbs-infnite	Running

powered by EnginFrame 3.2  
compliant with LCG-2 GRID.IT

Terminé Internet

# Summary

- GILDA is a complete suite of grid elements (RB, BDII, RLS, CA, VO, monitoring system, web portal) and applications fully dedicated to dissemination purposes.
- GILDA runs and will run the last production (stable) version of the grid middleware (currently Grid.it 2.2.0 based on LCG 2.2.0).
- GILDA is the dissemination tool which will be used during induction courses and tutorials
- GENIUS is a well established tool which will be fundamental in the process of interfacing new applications with the EGEE middleware hiding its complex internals to non-experts users from new communities.

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# Job Description Language (JDL)

- The supported attributes are grouped in two categories:
  - Job Attributes
    - Define the job itself
  - Resources
    - Taken into account by the RB for carrying out the matchmaking algorithm (to choose the “best” resource where to submit the job)
    - *Computing Resource*
      - Used to build expressions of Requirements and/or Rank attributes by the user
    - *Data and Storage resources*
      - Input data to process, SE where to store output data, protocols spoken by application when accessing SEs