



Enabling Grids for E-science

Biomed medical imaging session, 26 September 2006

# **GATE** (**G**eant4 **A**pplication for **T**omographic **E**mission) EVOLUTION ON THE EGEE GRID INFRASTRUCTURE

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



**GATE: Current installation on EGEE grid : (GATE-2.2.0 adapted to geant4.7.1)**

**TOTAL CPUs =1500, Users : 4 in LPC France and 2 in Spain IFIC**

**Short jobs: Gain=30 (Radiotherapy treatment)**

**Long jobs: Gain=800 ( Nuclear imaging, SPECT )**

Site name	project	Country	CE name	queue name	active	GATE-2.2.0
egee.fr.cgg.com	EGEE	France	ce1.egee.fr.cgg.com:2119	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS
in2p3.fr	EGEE	France	cc1cgceli02.in2p3.fr:2119	jobmanager-bqs-biomed_long	Yes	OK SUCCESS
in2p3.fr	EGEE	France	cc1cgceli02.in2p3.fr:2120	jobmanager-bqs-medium	Yes	OK SUCCESS
in2p3.fr	EGEE	France	cc1cgceli02.in2p3.fr:2121	jobmanager-bqs-short	Yes	OK SUCCESS
in2p3.fr	EGEE	France	clrlcgce01.in2p3.fr:2119	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS
in2p3.fr	EGEE	France	clrlcgce02.in2p3.fr:2119	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS
datagrid.cea	EGEE	France	node07.datagrid.cea.fr:2119/	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS
lal.in2p3.fr	EGEE	France	grid10.lal.in2p3.fr:2119	jobmanager-pbs-biomed	Yes	OK SUCCESS
mrs.grid.cnrs.fr	EGEE	France	marseillece01.mrs.grid.cnrs.fr:2119	jobmanager-pbs-biomed	Yes	OK SUCCESS
scai.fraunhofer.de	EGEE	Germany	scaic0.scai.fraunhofer.de:2119	jobmanager-torque-biomed	Yes	OK SUCCESS
ct.infn.it	EGEE	Italy	grid012.ct.infn.it:2119	jobmanager-lcgpbs-infinite	Yes	OK SUCCESS
ct.infn.it	EGEE	Italy	grid012.ct.infn.it:2119	jobmanager-lcgpbs-long	Yes	OK SUCCESS
ct.infn.it	EGEE	Italy	grid012.ct.infn.it:2119	jobmanager-lcgpbs-short	Yes	OK SUCCESS
ba.infn.it	EGEE	Italy	gridba2.ba.infn.it:2119	jobmanager-lcgpbs-short	Yes	OK SUCCESS
ba.infn.it	EGEE	Italy	gridba2.ba.infn.it:2119	jobmanager-lcgpbs-long	Yes	OK SUCCESS
ba.infn.it	EGEE	Italy	gridba2.ba.infn.it:2119	jobmanager-lcgpbs-infinite	Yes	OK SUCCESS
ca.infn.it	EGEE	Italy	grid002.ca.infn.it:2119	jobmanager-lcgpbs-grid	Yes	OK SUCCESS
na.infn.it	EGEE	Italy	griditce01.na.infn.it:2119	jobmanager-lcgpbs-grid	Yes	OK SUCCESS
fe.infn.it	EGEE	Italy	grid0.fe.infn.it:2119	jobmanager-lcgpbs-grid	Yes	OK SUCCESS
prod-ce-01.pd.infn.	EGEE	Italy	prod-ce-01.pd.infn.it:2119	jobmanager-lcglsf-grid	Yes	OK SUCCESS
pic.es	EGEE	Spain	ce01.pic.es:2119	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS
inta.es	EGEE	Spain	ce00.inta.es:2119	jobmanager-torque-biomed	Yes	OK SUCCESS
gridpp.rl.ac.uk	EGEE	UK	lcgce01.gridpp.rl.ac.uk:2119	jobmanager-lcgpbs-S	Yes	OK SUCCESS
gridpp.rl.ac.uk	EGEE	UK	lcgce01.gridpp.rl.ac.uk:2119	jobmanager-lcgpbs-bioL	Yes	OK SUCCESS
hep.ph.ic.ac.uk	EGEE	UK	gw39.hep.ph.ic.ac.uk:2119	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS
physics.ox.ac.uk	EGEE	UK	t2ce02.physics.ox.ac.uk:2119	jobmanager-lcgpbs-short	Yes	OK SUCCESS
physics.ox.ac.uk	EGEE	UK	t2ce02.physics.ox.ac.uk:2119/	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS
lanacs.ac.uk	EGEE	UK	fal-pygrid-18.lanacs.ac.uk:2119	jobmanager-lcgpbs-biomed	Yes	OK SUCCESS

**Next update: Install GATE-3.0.0 adapted to Geant4.8.0 (in progress) next month**

**GATE** : simulation for radiotherapy planning to improve cancer treatment

- **Services existing on previous GENIUS web portal**
  - jobs submission and monitoring
- **New data management services**
  - data access, copy and replication on the grid SEs
  - Provide and change LFN for files or group of files
  - Download or delete files/data
- **New medical images services (MIP functionalities)**
  - Upload medical images
  - Anonymize medical images
  - Image viewer






GENIUS3 tests are in progress with CLCC cancer treatment centre in Clermont-Ferrand

Welcome to the GENIUS Grid Portal - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop <https://clrpcsv12.in2p3.fr/> Search Print

Home Bookmarks Scientific Linux Distros







Grid Enabled web eNvironment for

site I independent User job Submission



Welcome thiam Resource Broker: biomed Virtual Organization: biomed Catalog Type: fileman Catalog Server: gilda Your Data Logout

Genius Services


- BIOMED GATE APPLICATION
  - GATE SUBMIT SERVICES
    - Create GATE files
    - Remove GATE files
    - Make JDLs
    - Submit GATE Jobs
    - Jobs Status
  - MEDICAL IMAGE SERVICES
    - File or single Image Upload
    - Copy on Grid (SE)
    - Replicate data/file
    - Delete data/file
    - Download a grid file
    - Images Upload
    - Images Anonymization
    - Images Viewer
- File
- Security
- Job
- Data
- Info
- Monitoring
- Interactive
- Preferences

**Welcome to GENIUS and Biomedical GATE Application Portal**

ver. 3.0  
compliant with [gLite-1](#) and [LCG-2](#) middlewares  
[Credits](#)

This portal is best viewed with Mozilla 1.7.12 or higher.  
Netscape (4.79, 4.80, 6 or Higher) and Internet Explorer (5 or Higher) can also be used.  
The use of any other web browsers could induce some visualization mismatches and is not currently suggested.  
powered by

  
Last update: Fri 09 February 2006

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Tue Mar 10:53

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https://clrpcsv12.in2p3.fr/ OK

Démarrage Dernières nouvelles



Grid Enabled web eNvironment for

site Independent User job Submission



Welcome thiam Your Data Logout

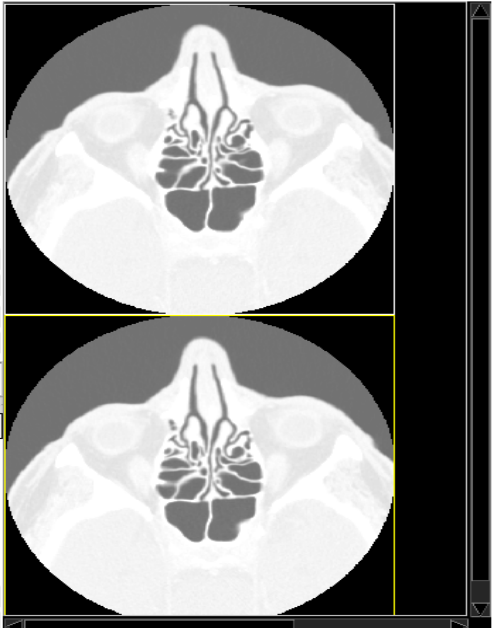
Genius Services

- BIOMED GATE APPLICATION
  - GATE SUBMIT SERVICES
  - MEDICAL IMAGE SERVICES
    - File or single Image Upload
    - Copy on Grid (SE)
    - Replicate data/file
    - ListReplicas
    - Delete data/file
    - Download a grid file
    - Images Upload
    - Images Anonymization
    - Images Viewer
- File
- Security
- Job
- Data
- Info
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**Images Viewer**

With this service you can view medicals images.

Mouse Manipulation  
☒ WL/WW(All Images)  
☐ WL/WW(Single)  
 Default WL/WW  
 Reverse  
☐ Move  
☐ Zoom  
 Reset Move/Zoom  
☐ Loupe  
 Reset Angle  
 Flip RL Flip UD  
 Cine Mode  
 << < > >>  
 ImageNo 6  
 LessFrame MoreFrame  
 Study Info.  
☐ Annotation  
 Show Tag Info  
 Back to file upload...



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Applet Main started

clrpcsv12.in2p3.fr Mon 9 10:39








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https://clrpcsv12.in2p3.fr/ OK

Démarrage Dernières nouvelles

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  - Images Anonymization**
  - Images Viewer
- File
- Security
- Job
- Data
- Info
- Monitoring
- Interactive
- Preferences

## Images Anonymization

With this service you can anonymize medicals images.

Select the files to anonymise

☒ Directory recursive anonymisation

<input type="checkbox"/>	S030077
<input type="checkbox"/>	S030078
<input type="checkbox"/>	S030079
<input type="checkbox"/>	S030080
<input type="checkbox"/>	S030081
<input type="checkbox"/>	S030082
<input type="checkbox"/>	S030083
<input type="checkbox"/>	S030084
<input type="checkbox"/>	S030085
<input type="checkbox"/>	S030086
<input type="checkbox"/>	S030087
<input type="checkbox"/>	S030088
<input type="checkbox"/>	S030089
<input type="checkbox"/>	S030090
<input type="checkbox"/>	S030091
<input type="checkbox"/>	S030092
<input type="checkbox"/>	S030093
<input type="checkbox"/>	S030094

Progress of anonymisation

100%

Anonymisation options

☐ Retrieve metadata

Anonymisation information Status : **OK**

Start of anonymisation  
 Number of files to anonymise : 6  
 Total files anonymised : 6  
 Anonymisation completed  
 End of anonymisation

Image(s) destination Start anonymisation Stop anonymisation

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Applet Main started clrpcsv12.in2p3.fr Mon Si 11:17

## Realistic needs for clinical applications

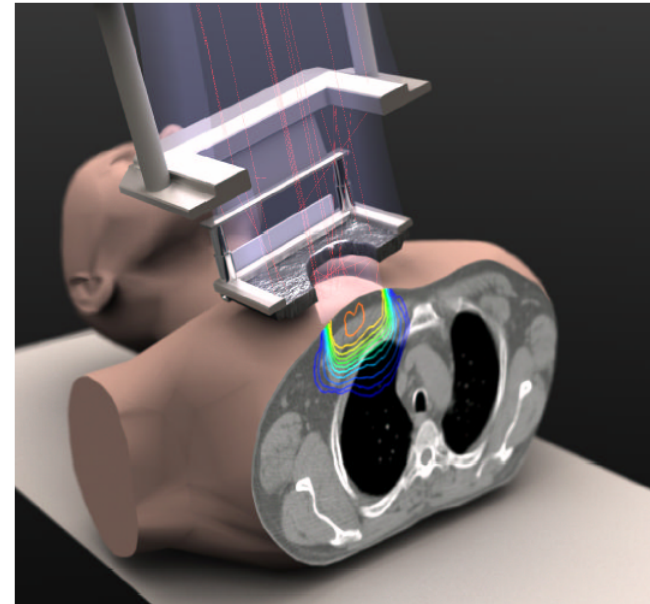
- Simulate patient body using DICOM RT data (DICOM3 + tumour and organ at risk contours information)

**PACS today:** medical images management system used in cancer treatment centers and hospitals, including

- patient medical data
- Medical Images in DICOM3 format
- Computing, storage and network

## Required next

- DICOM RT format integration in PACS system
- Direct and secure access to medical images
- Obtain PACS system testbed in LPC



- **Validation and installation of GATE-3.0.0 adapted to geant4.8.0**
- **Large scale grid deployment needs to be performed to evaluate failures and the gain in time occurring in a daily usage of the grid**
- **Concerning Genius3 web portal :**
  - Interface **PACS-Grid** : LifeGrid and Auvergrid projects
  - Radiotherapy treatment using GENIUS at hospital CLCC (cancer treatment center in Clermont Ferrand)
  - Easy approach of GENIUS portal for novice users