



Enabling Grids for E-science

# EGEE

## A multi-national, multi-science Grid infrastructure

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



- **Infrastructure operation**

- Currently includes >200 sites across 40 countries providing ~40K CPUs
- Continuous monitoring of grid services & automated site configuration/management
- Used by >200 VOs running ~100.000 jobs/day



- **Middleware**

- Production quality middleware distributed under business friendly open source licence



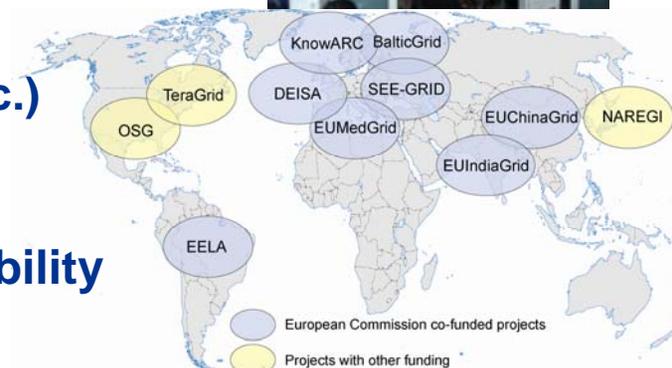
- **User Support - *Managed process from first contact through to production usage***

- Training
- Expertise in grid-enabling applications
- Online helpdesk
- Networking events (User Forum, Conferences etc.)

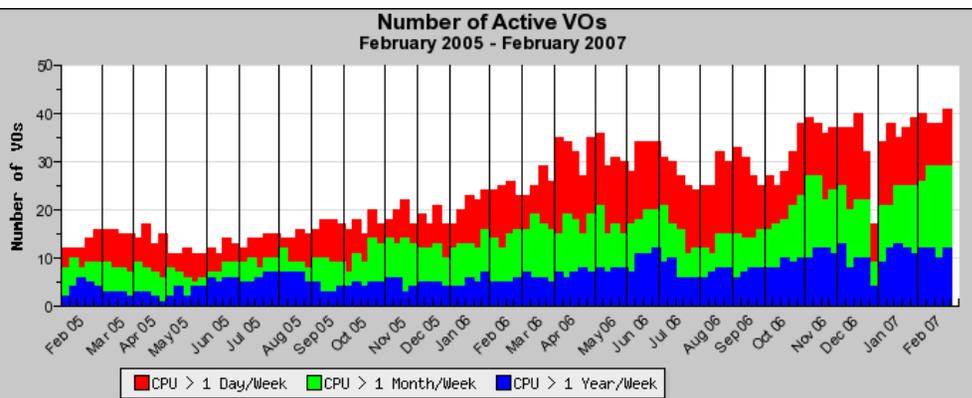
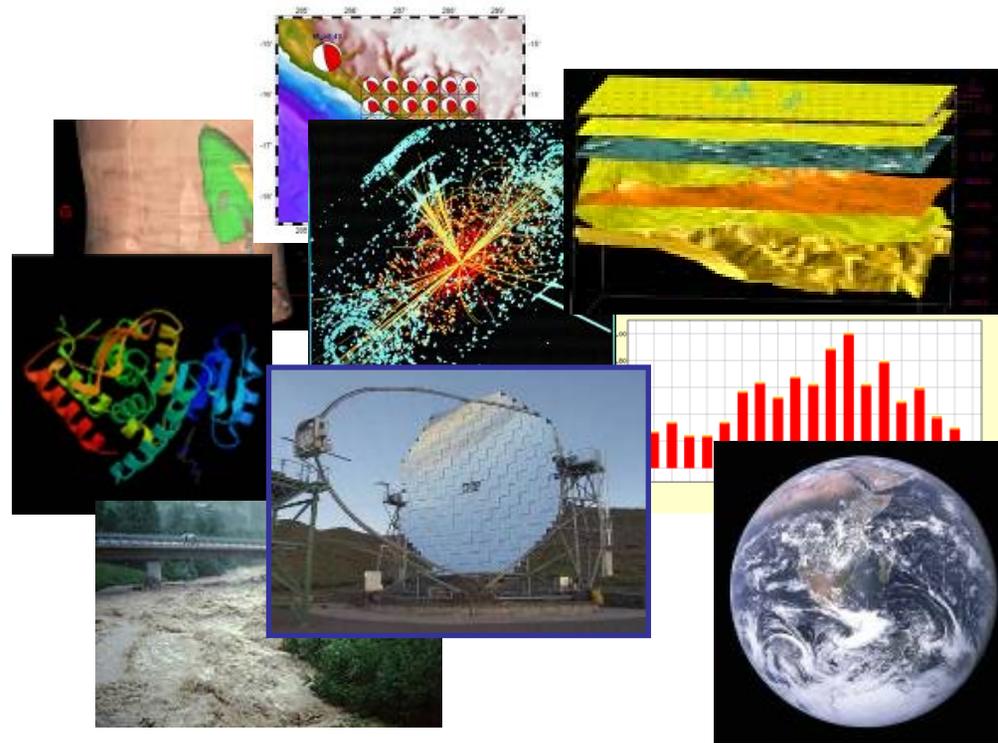


- **Interoperability**

- Expanding geographical reach and interoperability with collaborating e-infrastructures



- >200 VOs from several scientific domains
  - Astronomy & Astrophysics
  - Civil Protection
  - Computational Chemistry
  - Comp. Fluid Dynamics
  - Computer Science/Tools
  - Condensed Matter Physics
  - Earth Sciences
  - Fusion
  - High Energy Physics
  - Life Sciences



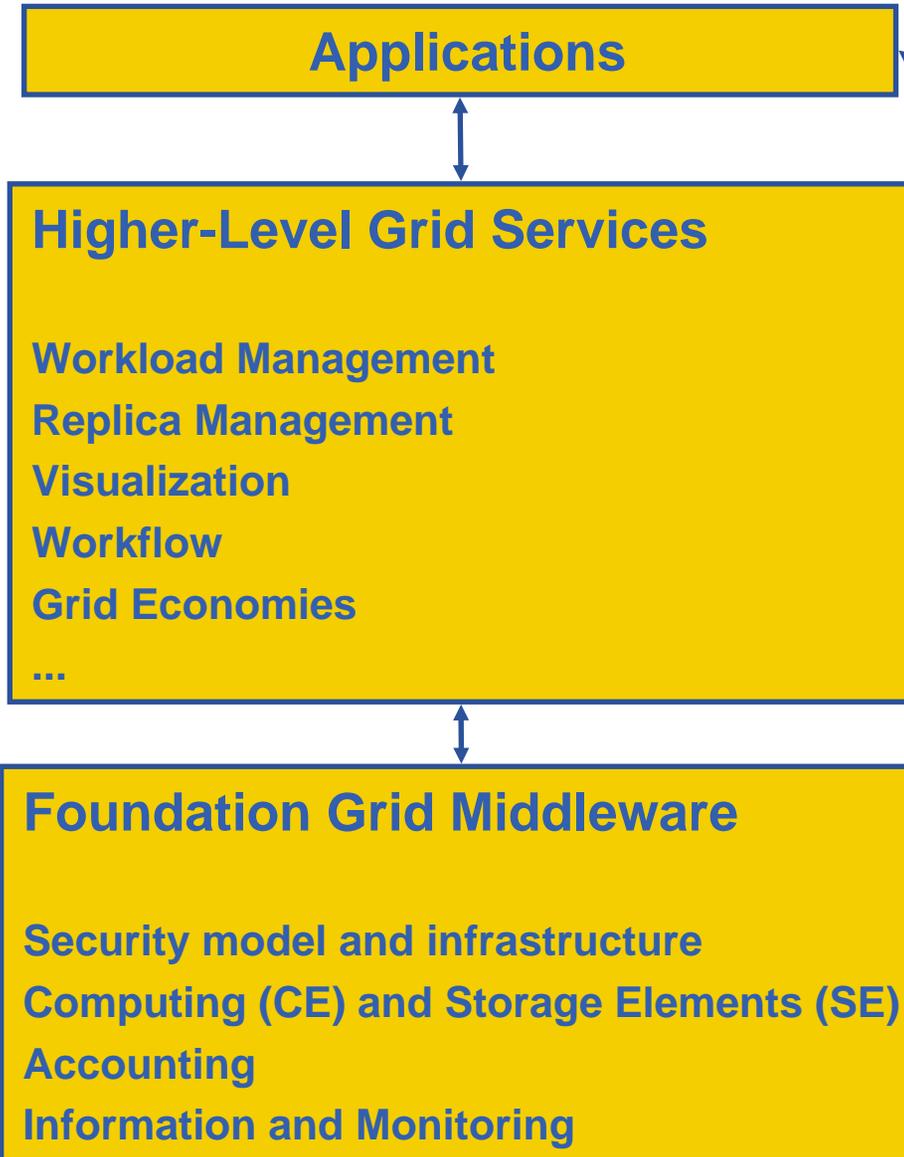


- **We currently see different flavors of Grids deployed worldwide**
  - Because of application needs, legacy constraints, funding, etc.
  - **Diversity is positive!** – Competition to find the best solutions
  
- **Many applications need to operate on more than one Grid infrastructure**
  - Pragmatic approach to interoperability is key
  - Applications need **interoperable Grid infrastructures now**
  - A production infrastructure cannot be an early adopter of quickly changing standards
    - Changing the infrastructure takes time and must not be disruptive
      - *For instance: following the OGSF – WSRF move would have had serious effects on EGEE's operation*



- APAC
- DEISA
- EGEE
- Naregi
- NDGF
- NGS
- OSG
- Pragma
- Teragrid





- Applications have access both to Higher-level Grid Services and to Foundation Grid Middleware
- Higher-Level Grid Services are supposed to help the users building their computing infrastructure but should not be mandatory
- Foundation Grid Middleware will be deployed on the EGEE infrastructure
  - Must be complete and robust
  - Should allow interoperation with other major grid infrastructures
  - Should not assume the use of Higher-Level Grid Services

- Allow same resources to be accessed via different WM systems
- Prototype by ICEAGE on GILDA training infrastructure

```

Applications Places System
emidio@bonnie:~
File Edit View Terminal Tabs Help
root@glite... emidio@bo... emidio@bo... emidio@bo... glabus@ice... gilda009@... giorgio@gl... root@grid0... root@voms... fmarco@bo... p1

Status info for the Job : https://glite-rb3.ct.infn.it:9000/PK45v-rqW0rz-8foThe2dA
Current Status: Scheduled
Status Reason: Job successfully submitted to Globus
Destination: iceage-ce-01.ct.infn.it:2119/jobmanager-lcgpbs-short
Submitted: Mon Mar 5 14:50:21 2007 CET

[bonnie] /home/emidio > glite-job-status https://glite-rb3.ct.infn.it:9000/PK45v-rqW0rz-8foThe2dA
.....
BOOKKEEPING INFORMATION:
Status info for the Job : https://glite-rb3.ct.infn.it:9000/PK45v-rqW0rz-8foThe2dA
Current Status: Done (Success)
Exit code: 0
Status Reason: Job terminated successfully
Destination: iceage-ce-01.ct.infn.it:2119/jobmanager-lcgpbs-short
Submitted: Mon Mar 5 14:50:21 2007 CET
.....
[bonnie] /home/emidio > glite-job-output https://glite-rb3.ct.infn.it:9000/
Retrieving files from host: glite-rb3.ct.infn.it ( for https://glite-rb3.ct.infn.it:9000/ )
.....
JOB GET OUTPUT OUTCOME
Output sandbox files for the job:
- https://glite-rb3.ct.infn.it:9000/PK45v-rqW0rz-8foThe2dA
have been successfully retrieved and stored in the directory:
/tmp/emidio_PK45v-rqW0rz-8foThe2dA
.....
[bonnie] /home/emidio > cat /tmp/emidio_PK45v-rqW0rz-8foThe2dA/stdout.log
iceage-vn-14.ct.infn.it
[bonnie] /home/emidio > voms-proxy-info -all
subject : /C=IT/O=GILDA/OU=Personal Certificate/L=INFN,CN=Emidio Giorgio/
issuer : /C=IT/O=GILDA/OU=Personal Certificate/L=INFN,CN=Emidio Giorgio/
identity : /C=IT/O=GILDA/OU=Personal Certificate/L=INFN,CN=Emidio Giorgio/
type : proxy
strength : 512 bits
path : /tmp/x509up_u500
timeleft : 8:22:32

```

```

Applications Places System
emidio@bonnie:~
File Edit View Terminal Tabs Help
root@glite... emidio@bo... emidio@bo... emidio@bo... glabus@ice... gilda009@... giorgio@gl... root@grid0... root@voms... fmarco@bo... p1

[bonnie] /home/emidio > grid-proxy-info
subject : C=IT/O=GILDA/OU=Personal Certificate/L=INFN/CN=Emidio Giorgio/emailAddress=emidio.giorgio@ct.infn.it/CN=proxy
issuer : C=IT/O=GILDA/OU=Personal Certificate/L=INFN/CN=Emidio Giorgio/emailAddress=emidio.giorgio@ct.infn.it
identity : C=IT/O=GILDA/OU=Personal Certificate/L=INFN/CN=Emidio Giorgio/emailAddress=emidio.giorgio@ct.infn.it
type : full legacy globus proxy
strength : 512 bits
path : /tmp/x509up_u500
timeleft : 8:20:49
[bonnie] /home/emidio >
[bonnie] /home/emidio > globusrun-ws -submit -F https://iceage-ce-01.ct.infn.it:8443/yrsf/services/ManagedJobFactoryService -F
t PBS -s -c /bin/hostname
Delegating user credentials...Done.
Submitting job...Done.
Job ID: uuid:eaf408be-cb3d-11db-b5b4-00304859-edb
Termination time: 03/06/2007 17:21 GMT
Current job state: Pending
Current job state: Active
Current job state: CleanUp-Hold
iceage-vn-14.ct.infn.it
Scientific Linux CERN Release 3.0.6 (SL)
Current job state: CleanUp
Current job state: Done
Destroying job...Done.
Cleaning up any delegated credentials...Done.
[bonnie] /home/emidio >

```

emidio@bonnie:~/OMICLIENT/cauchy

Running the Cauchy client...

OMII Distribution - Cauchy Demonstration (on bonnie.trigrid.it)

open middleware infrastructure institute

OMII Distribution: Cauchy Demonstration

Parameters

Account	Service Provider	Offer	Usage
Account-0503	http://grid009.ct.infn.it:180	240.00	1

Cauchy Demo

Status

Report

Cauchy Graph

gLite

GT4

OMII

- **As resource provider**
  - Distributed operations organized via Regional Operations Centers - ROCs (~10)
    - Support new sites in installing gLite foundation services etc.
    - Operation guides: <http://cern.ch/egee-sa1/joining.html>
    - Standardized tests run regularly to check service status
  
- **As community**
  - Application support activity provides documentation and help
  - <http://egeena4.lal.in2p3.fr/index.php>
  - Essential first steps:
    - Set up of a Virtual Organization and a VO mgmt service (VOMS)
    - Identification of requirements
      - *Resource usage*
      - *Software and services*
  - Most successful if supported via local EGEE sites and ROCs

- **Campus Grids**

- Co-location limited
  - gLite platform support
- Interoperation and standardization at infancy levels
  - Seamless interoperation between EGEE and OSG achieved
    - *Similar middleware stack*
  - Work through OGF essential to move forward

- **Community Grids**

- Customized, non-interoperable foundation services; sometimes difficult to interface with
  - Common interfaces and semantics key
- Hosting of application level services
  - VM technology could help
- Resource allocation mechanisms at infancy levels
  - Need to scale to ~500 VOs and sites

## Need to prepare permanent **Common Grid infrastructure**

- High quality of service for all user communities
- Independent of short project funding cycles
- Managed in collaboration with National Grid Initiatives (NGIs)

