

gLite – Tutorial

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- **Basic Command Line Interface:**
 - User Interface machine
 - Proxy generation
 - Job execution management
 - Data management

- **User Interface (UI)** machine – the access point to the WLCG/EGEE Grid – any machine where the WLCG/EGEE UI software is installed, users have a personal account and where their user certificate is placed
- From a UI the user can be authenticated and authorized to use the WLCG/EGEE Grid resources and can access functionalities offered by the Information, Workload and Data management systems
- CLI and APIs are available on the UI to allow the development of Grid-enabled applications

- **UI CLI tools** – provide the following Grid operations:
 - list all the resources suitable to execute a given job
 - submit jobs for execution
 - show the status of submitted jobs
 - retrieve the output of finished jobs
 - cancel jobs
 - copy, replicate and delete files from the Grid
 - retrieve the logging and bookkeeping information of jobs
 - retrieve the status of resources from the Information System

- **Getting started** – before using the WLCG/EGEE Grid, the user must do the following:
 1. Obtain a X.509 certificate from a CA recognized by WLCG/EGEE
 2. Get registered with WLCG/EGEE by joining one or more VOs
 3. Obtain an account on a WLCG/EGEE UI machine and copy the user certificate to it (into `~/.globus`)
 4. Create a Proxy certificate on the UI to authenticate himself in subsequent secure interactions

- **Environment Variables**

```
$ export LCG_GFAL_INFOSYS=glite-rb.ct.infn.it:2170
```

```
$ export LCG_CATALOG_TYPE=lfc
```

```
$ export LFC_HOST=lfc-gilda.ct.infn.it
```

```
$ export MYPROXY_SERVER=grid001.ct.infn.it
```

```
$ export VO_GILDA_DEFAULT_SE=aliserv6.ct.infn.it
```

```
$ export LCG_GFAL_VO=gilda
```

- **Creating a VOMS proxy**

```
$ voms-proxy-init -voms gilda
```

```
Enter GRID pass phrase: ???
```

```
Your Identity: /C=IT/O=GILDA/OU=Personal Certificate/L=Institute of
  Informatics/CN=Viera Sipkova/Email=viera.sipkova@savba.sk
```

```
Creating temporary proxy ..... Done
```

```
Contacting voms.ct.infn.it:15001 [/CT=IT/O=INFN/OU=Host/L=Catania/
  CN=voms.ct.infn.it] "gilda" Done
```

```
Creating proxy ..... Done
```

```
Your proxy is valid until: Wed Oct 8 04:24:00 2008
```

- **Printing information on a VOMS proxy**

\$ voms-proxy-info

```
subject : /C=IT/O=GILDA/OU=Personal Certificate/L=Institute of Informatics/CN=Viera Sipkova/Email=viera.sipkova@savba.sk/CN=proxy
issuer  : /C=IT/O=GILDA/OU=Personal Certificate/L=Institute of Informatics/CN=Viera Sipkova/Email=viera.sipkova@savba.sk
identity : /C=IT/O=GILDA/OU=Personal Certificate/L=Institute of Informatics/CN=Viera Sipkova/Email=viera.sipkova@savba.sk
type    : proxy
strength : 512 bits
path     : /tmp/X509up_u9224
time left : 11:50:49
```


- **Creating a long-term proxy** (in a MyProxy server)

```
$ myproxy-init -s grid001.ct.infn.it -d -n
```

```
$ myproxy-init -d -n
```

-d – instruct the server to associate the user DN to the proxy

-n – x the use of passphrase by the automatic renewal

```
Your Identity: /C=IT/O=GILDA/OU=Personal Certificate/L=Institute of
Informatics/CN=Viera Sipkova/emailAddress=viera.sipkova@savba.sk
```

```
Enter GRID pass phrase for this identity: ???
```

```
Creating proxy ..... Done
```

```
Proxy Verify OK
```

```
Your proxy is valid until: Wed Oct 15 12:11:18 2008
```

```
A proxy valid for 168 hours (7.0 days) for user /C=IT/O=GILDA/OU=
Personal Certificate/L=Institute of Informatics/CN=Viera Sipkova/...
now exists on grid001.ct.infn.it
```

- **Deleting a long-term proxy**

```
$ myproxy-destroy -s grid001.ct.infn.it -d
```

```
$ myproxy-destroy -d
```

Default MyProxy credential for user /C=IT/O=GILDA/OU=Personal Certificate/L=Institute of Informatics/CN=Viera Sipkova/emailAddress=viera.sipkova@savba.sk was successfully removed.

- **Deleting a temporary proxy**

```
$ voms-proxy-destroy
```

- **Delegating a Proxy to WMPProxy**

```
$ glite-wms-job-delegate-proxy -d delegID
```

```
Connecting to the service https://glite-lb.ct.infn.it:7443/
glite_wms_wmproxy_server
```

```
===== glite-wms-job-delegate-proxy Success =====
```

```
Your proxy has been successfully delegated to the WMPProxy:
https://glite-lb.ct.infn.it:7443/glite_wms_wmproxy_server
with the delegation identifier: delegID
```

```
=====
```

- Listing available Computing Elements

```
$ lcg-infosites --vo gilda ce
```

#CPU	Free	Total Jobs	Running	Waiting	Computing Element
52	48	0	0	0	grid010.ct.infn.it:2119/ jobmanager-lcgpbs-long
16	16	1	0	1	gilda-01.pd.infn.it:2119/ jobmanager-lcgpbs-gilda
56	54	2	2	0	iceage-ce-01.infn.it:2119/ jobmanager-lcgpbs-short
16	12	1	1	0	gn0-hpcc.sztaki.hu:2119/ jobmanager-lcgpbs-gilda
...					

- Listing available Storage Elements

```
$ lcg-infosites --vo gilda se
```

Avail Space (Kb)	Used Space (Kb)	Type	SEs
71630000	8497445	n.a	egee016-cnaf.infn.it
316510000	54710471	n.a	aliserv6.ct.infn.it
30510000	3198671	n.a	gilda-02.pd.infn.it
63290000	428552	n.a	iceage-se-01.ct.infn.it
100120000	30	n.a	fn2.hpcc.sztaki.hu

- **JDL-description of a simple job**

maxcut.jdl

```
Type = "Job";  
JobType = "Normal";  
Executable = "maxcut";  
Arguments = "matrix17.dat";  
StdOutput = "mstd.out";  
StdError = "mstd.err";  
InputSandbox = { "maxcut", "matrix17.dat" };  
OutputSandbox = { "mstd.out", "mstd.err", "maxcut.out" };  
#Requirements = other.GlueCEInfoHostName=="grid010.ct.infn.it";
```

- **JDL-description of MPI job**

pmaxcut.jdl

```
Type = "Job";  
JobType = "MPICH";  
CpuNumber = 2;  
Executable = "parmaxcut";  
Arguments = "matrix17.dat";  
StdOutput = "pstd.out";  
StdError = "pstd.err";  
InputSandbox = { "parmaxcut", "matrix17.dat" };  
OutputSandbox = { "pstd.out", "pstd.err", "pmaxcut.out" };  
#Requirements = other.GlueCEInfoHostName=="grid010.ct.infn.it";
```

- Listing CEs matching the job description

```
$ glite-wms-job-list-match -a maxcut.jdl
```

```
$ glite-wms-job-list-match -d delegID maxcut.jdl
```

```
Connecting to the service https://glite-lb.ct.infn.it:7443/
glite_wms_wmproxy_server
```

```
=====
```

COMPUTING ELEMENT IDs LIST

The following CE(s) matching your job requirements have been found:

CEId

- gn0.hpcc.sctaki.hu:2119/jobmanager-lcgpbs-gilda
- grid010.ct.infn.it:2119/jobmanager-lcgpbs-long
- grid010.ct.infn.it:2119/jobmanager-lcgpbs-short
- iceage-ce.01.ct.infn.it:2119/jobmanager-lcgpbs-infinite

```
=====
```


- **Submitting a Job**

```
$ glite-wms-job-submit -d delegID -o jobID maxcut.jdl
$ glite-wms-job-submit -a -o jobID maxcut.jdl
```

Connecting to the service <https://glite-lb.ct.infn.it:7443/>
 glite_wms_wmproxy_server

```
===== glite-wms-job-submit Success =====
The job has been successfully submitted to the WMPProxy.
Your job identifier is:
https://glite-lb.ct.infn.it:9000/Yjh0_F3SSRH0pK5Tzrdj7w
The job identifier has been saved in the following file:
/home/sipka/testing/jobID
=====
```

- Retrieving the Job Status

```
$ glite-wms-job-status -i jobID
```

```
*****
```

```
BOOKKEEPING INFORMATION:
```

```
Status info for the Job:
```

```
https://glite-lb.ct.infn.it:9000/Yjh0\_F3SSRH0pK5Tzrdj7w
```

```
Current status: Running
```

```
Status Reason: Job successfully submitted to Globus
```

```
Destination: grid010.ct.infn.it:2119/jobmanager-lcgpbs-infinite
```

```
Submitted: Tue Oct 7 17:38:20 2008 CEST
```

```
*****
```

- Retrieving the Job Status

```
$ glite-wms-job-status -i jobID
```

```
*****
```

BOOKKEEPING INFORMATION:

Status info for the Job:

https://glite-lb.ct.infn.it:9000/Yjh0_F3SSRH0pK5Tzrdj7w

Current status: **Done** (Success)

Exit code: 0

Status Reason: Job terminated successfully

Destination: grid010.ct.infn.it:2119/jobmanager-lcgpbs-infinite

Submitted: Tue Oct 7 17:38:20 2008 CEST

```
*****
```

- Retrieving the Job Output

```
$ glite-wms-job-output --dir output -i jobID
```

```
Connecting to the service https://glite-lb.ct.infn.it:7443/
glite_wms_wmproxy_server
```

```
=====
```

JOB GET OUTPUT OUTCOME

```
Output sandbox files for the job:
https://glite-lb.ct.infn.it:9000/Yjh0_F3SSRH0pK5Tzrdj7w
have been successfully retrieved and stored in the directory:
/home/sipka/testing/output
```

```
=====
```

- **Canceling a Job**

```
$ glite-wms-job-cancel -i jobID
```

```
Are you sure you want to remove specified job(s)? [y/n] : y
```

```
Connecting to the service https://glite-lb.ct.infn.it:7443/  
glite_wms_wmproxy_server
```

```
===== glite-wms-job-cancel Success =====
```

```
The cancellation request has been successfully submitted for the  
following job(s):
```

```
- https://glite-lb.ct.infn.it:9000/p8S05vQhDTER4QbZUk35w
```

```
=====
```

- Retrieving the Job Status

```
$ glite-wms-job-status -i jobID
```

```
*****
```

```
BOOKKEEPING INFORMATION:
```

```
Status info for the Job:
```

```
https://glite-lb.ct.infn.it:9000/p8S05vQhDTER4QbZUk35w
```

```
Current status: Cancelled
```

```
Logged Reason(s): - Aborted by user
```

```
Status Reason: Aborted by user
```

```
Destination: iceage-ce-01.ct.infn.it:2119/jobmanager-pbs-long
```

```
Submitted: Tue Oct 7 17:59:27 2008 CET
```

```
*****
```

- **Retrieving Logging Information** (a complete history of submitted jobs is permanently stored in L&B service)

\$ **glite-wms-job-logging-info** -i jobID

LOGGING INFORMATION:

Printing info for the Job:

https://glite-lb.ct.infn.it:9000/Yjh0_F3SSRH0pK5Tzrdj7w

--- *Sequence of events:* RegJob/Accepted/EnQueued/DeQueued/Match/Transfer/ReallyRunning/Running/Done/Clear/...

Event: RegJob

- Source = NetworkServer

- TimeStamp = Tue Oct 7 17:38:20 2008 CEST

- **LFC Directory Structure**

/grid/VO/<subpath>

- **LFC Commands**

```
$ lfc-mkdir /grid/gilda/users/sipka
```

```
$ lfc-ls /grid/gilda/users/sipka
```

```
$ lfc-rm /grid/gilda/users/sipka
```

```
$ lfc-rename
```

```
$ lfc-chmod
```

```
$ lfc-chown
```

```
$ lfc-setcomment
```


- **Upload a file to a SE and register it in the LFC**

```
$ lcg-cr -v -d aliserv6.ct.infn.it
    -l lfn:/grid/gilda/users/sipka/matrix17.dat
    file:///home/sipka/testing/matrix17.dat
```

Using grid catalog type: lfc

Using grid catalog: lfc-gilda.ct.infn.it

Using LFN: /grid/gilda/users/sipka/matrix17.dat

Using SURF: srm://aliserv6.ct.infn.it/dpm/ct.infn.it/home/gilda/
generated/2008-10-07/file20c96d97-e55d-4530-b03d-2c742f560f8f

Destination URL for copy: gsiftp://aliserv6.ct.infn.it/aliserv6.ct.infn.it/
data01/gilda/2008-10-07/file20c96d97-...-2c742f560f8f.358322.0

Destination URL registered in Catalog: srm://aliserv6.ct.infn.it/dpm/ct...
guid:415954a2-e606-42d3-ab37-eef0e13688f7

- **Download a file from a SE**

```
$ lcg-cp -v lfn:/grid/gilda/users/sipka/matrix17.dat  
file:///home/sipka/testing/matrix17.dat
```

Using grid catalog type: lfc

Using grid catalog: lfc-gilda.ct.infn.it

VO name: gilda

Source SE type: SRMv1

Source URL: lfn:/grid/gilda/users/sipka/matrix17.dat

File size: 871

Source URL for copy: gsiftp://aliserv6.ct.infn.it/aliserv6.ct.infn.it:/data01
/gilda/2008-10-07/file20c96d97-e55d-4530-b03d-2c742f560f8f.358322.0

Destination URL: /home/sipka/testing/matrix17.dat

...

- **Delete files** (either one replica or all replicas)

```
$ lcg-del -v -s aliserv6.ct.infn.it  

lfn:/grid/gilda/users/sipka/matrix17.dat
```

VO name: gilda

Timeout: 0 seconds

SE Type: SRMv1

[guid:415954a2-e606-42d3-ab37-eef0e13688f7]

srm://aliserv6.ct.infn.it/dpm/ct.infn.it/home/gilda/generated/2008-10-07/file20c96d97-e55d-4530-b03d-2c742f560f8f - DELETED

srm://aliserv6.ct.infn.it/dpm/ct.infn.it/home/gilda/... - UNREGISTERED

lfn:/grid/gilda/users/sipka/matrix17.dat - UNREGISTERED

- **EGEE:** <http://www.eu-egee.org>
- **gLite:** <http://glite.web.cern.ch/glite>
- **Gilda:** <http://gilda.ct.infn.it>
- **Genius:** <http://genius.ct.infn.it>
- **WLCG:** <http://cern.ch/LCG>

Thank you for your attention!

Questions?



Lightweight Middleware for
Grid Computing