



Enabling Grids for E-scienceE

Practicals on LFC and gLite DMS

Tony Calanducci

Emidio Giorgio

INFN

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- **Set the following environment variables according to which catalog you want to use:**
 - LFC Catalog
 - `export LCG_CATALOG_TYPE=lfc`
 - `export LFC_HOST=lfc-gilda.cern.ch`
 - RLS Catalog
 - `export LCG_CATALOG_TYPE=edg`
 - FireMan Catalog
 - No particular settings are required if you UI is installed properly
- **Initialize your proxy with `grid-proxy-init` or `voms-proxy-init`**

Listing the entries of a LFC directory

```
lfc-ls [-cdiLIRTu] [--class] [--comment] [--deleted] [--display_side]
      [--ds] path...
```

where *path* specifies the LFC pathname (mandatory)

- Remember that LFC has a **directory tree structure**
- */grid/<VO_name>/<you create it>*



- All members of a given VO have read-write permissions under their directory
 - Examples:
 - > *lfc-ls /grid/gilda*
 - > *lfc-ls -l /grid/gilda*
 - > *lfc-ls -l -R /grid/gilda*
- l long listing
- R list the contents of directories recursively

Creating a symbolic link

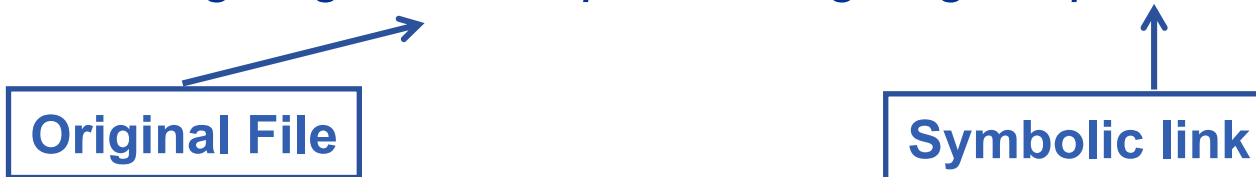
lfc-ln -s file linkname

lfc-ln -s directory linkname

Create a link to the specified *file* or *directory* with *linkname*

– *Examples:*

> *lfc-ln -s /grid/gilda/iome/prova.txt /grid/gilda/prova/test.txt*



Let's check the link using *lfc-ls* with long listing (-l)

> *lfc-ls -l /grid/gilda/prova*

Creating directories in the LFC

lfc-mkdir [-m mode] [-p] path...

- Where *path* specifies the LFC pathname
- Remember that while registering a new file (using `lfc-cr`, for example) the corresponding destination directory must be created in the catalog before
- Examples:
 - > ***lfc-mkdir /grid/gilda/Examples***
 - You can just check the directory with:
 - > ***lfc-ls -l /grid/gilda***

Adding/deleting metadata information

lfc-setcomment path comment

lfc-delcomment path

lfc-setcomment adds/replaces a *comment* associated with a file/directory in the LFC Catalog

lfc-delcomment deletes a comment previously added

- Examples:
 - > ***lfc-setcomment /grid/gilda/prova/prova.txt "weather conditions in Catania"***
- Let's see what happened:
 - > ***lfc-ls -comment /grid/gilda/prova/prova.txt***

Exercise:

- Log onto an UI and initialize your proxy credentials
- set up properly the environment variables to use lfc-gilda.cern.ch catalog
- have a look inside the catalog
- create a directory with your surname
- put inside the just created dir a link to an existing file
- add a comment to that file and verify it

Summary of the LFC Catalog commands

lfc-chmod	Change access mode of the LFC file/directory
lfc-chown	Change owner and group of the LFC file-directory
lfc-delcomment	Delete the comment associated with the file/directory
lfc-getacl	Get file/directory access control lists
lfc-ln	Make a symbolic link to a file/directory
lfc-ls	List file/directory entries in a directory
lfc-mkdir	Create a directory
lfc-rename	Rename a file/directory
lfc-rm	Remove a file/directory
lfc-setacl	Set file/directory access control lists
lfc-setcomment	Add/replace a comment

- The LCG Data Management tools (usually called *lcg-utils*) allow users to copy files between UI, CE, WN and a SE, to register entries in the File Catalogs and replicate files between SEs.
- Set up LCG_GFAL_INFOSYS environment variable to point to the GILDA Information Index (BDII)
 - **export LCG_GFAL_INFOSYS=grid004.ct.infn.it:2170**
- Again, choose which catalog you want to work with (see slide No 2). The two catalogs are not simultaneously accessible !

Upload a file to a SE and register it into the catalog

- `lcg-cr -d dest_file | dest_host -l lfn [-g guid] [-l lfn]`
`[-v | --verbose] --vo vo src_file`

where

- ***dest_host*** is the fully qualified hostname of the destination SE
- ***dest_file*** is a valid SURL (both `sfn://` or `srm://` format are valid)
- ***guid*** specifies the Grid Unique Identifier. If this option is not present, a GUID is generated internally
- ***lfn*** specifies the Logical File Name associated with the file
- ***vo*** specifies the Virtual Organization the user belongs to
- ***src_file*** specifies the source file name: the protocol can be `file:///` or `gsiftp:///`

- To discover which SEs the user is allowed to use, a useful command is **lcg-infosites**.

> **lcg-infosites --vo gilda se**

The output is a list of SEs and related information on available/used space

- **lcg-cr usage example:**

> **lcg-cr -v --vo gilda -d gildase.ct.astro.it**

-I lfn:/grid/gilda/Example/release.txt file:`pwd`/release

- P.S.: Here it's supposed you are using an LFC catalog as you can notice from the format of the used lfn. Remember, RLS catalog entries are not organized in a hierarchical structure.

Adding an alias for a given GUID

```
lcg-aa --vo vo guid lfn
```

where

- **vo** specifies the Virtual Organization the user belongs to
- **guid** specifies the Grid Unique Identifier of the file you want to add the alias to
- **lfn** specifies the new alias
- *Example:*
 - > **lcg-aa --vo gilda guid:6f67888c-4628-48c4-b91c-1e6b0564bfd8 lfn:/grid/gilda/prova/release.txt**
- To check if the previous command was successful, you can use **lcg-la** command to **list the aliases for a given LFN, GUID or SURL**
 - > **lcg-la --vo gilda lfn:/grid/gilda/prova/release.txt**

Exercise:

- verify that your **LCG_GFAL_INFOSYS** is correctly set up
- create a dummy file
- check the available storage elements
- copy and register the previous created file into your previous created dir
- add an alias to the just uploaded file
- check if the alias was assigned correctly

Copying a file from one SE to another one and register it in the Catalog

```
lcg-rep -d dest_file | dest_host [-v | --verbose] --vo vo src_file
```

where

- **dest_host** is the fully qualified hostname of the destination SE
- **dest_file** is a valid SURL (both sfn:// or srm:// are valid)
- **vo** specifies the Virtual Organization the user belongs to
- **src_file** specifies the source file name: the protocol can be LFN, GUID or SURL. An SURL scheme can be sfn: for a classical SE or srm:
- *Example:*
 - > **lcg-rep -d gildase.ct.astro.it --vo gilda lfn:/grid/gilda/prova/myprova6.txt**

Listing of replicas for a given LFN, GUID or SURL

lcg-lr --vo vo file

where

- **vo** specifies the Virtual Organization the user belongs to
- **file** specifies the Logical File Name, the Grid Unique IDentifier or the Site URL. An SURL scheme can be sfn: for a classical SE or srm:

Example:

- > `lcg-lr --vo gilda lfn:/grid/gilda/prova/myprova6.txt`
- > `lcg-lr --vo gilda guid:00ec1459-6154-4d89-b016-503a23c445c7`

Deleting replicas

- `lcg-del [-a] [-s se] [-v | --verbose] --vo vo file`

where

- **a** is used to delete all replicas of the given file
- **se** specifies the SE from which you want to remove the replica
- **vo** specifies the Virtual Organization the user belongs to
- **file** specifies the Logical File Name, the Grid Unique Identifier or the Site URL. An SURL scheme can be sfn: for a classical SE or srm:.

Example:

- delete one replica
 - > `lcg-del --vo gilda -s gildase.ct.astro.it lfn:/grid/gilda/prova/myprova6.txt`
- delete all the replicas
 - > `lcg-del -a --vo gilda lfn:/grid/gilda/prova/myprova6.txt`

Downloading a Grid file in a SE to a local destination

```
lcg-cp [ -v | --verbose ] --vo vo src_file dest_file
```

where

- **vo** specifies the Virtual Organization the user belongs to
- **src_file** specifies the source file name: the protocol can be LFN, GUID, SURL or local file. An SURL scheme can be sfn: for a classical SE or srm:
- **dest_file** specifies the destination. The protocol can be file:/// or gsiftp://

Example:

```
> lcg-cp --vo gilda lfn:/grid/gilda/prova/tony
file:/home/tcaland/mppi.jdl
```

Exercise:

- Create two replicas of the file you previously uploaded (you could also use the alias to point to it)
- Check if the operation was successful
- Download the file back in your UI
- Delete just one replica and verify that
- Delete all the replicas and verify that
- Verify if the entry is still into the catalog

Replica Management

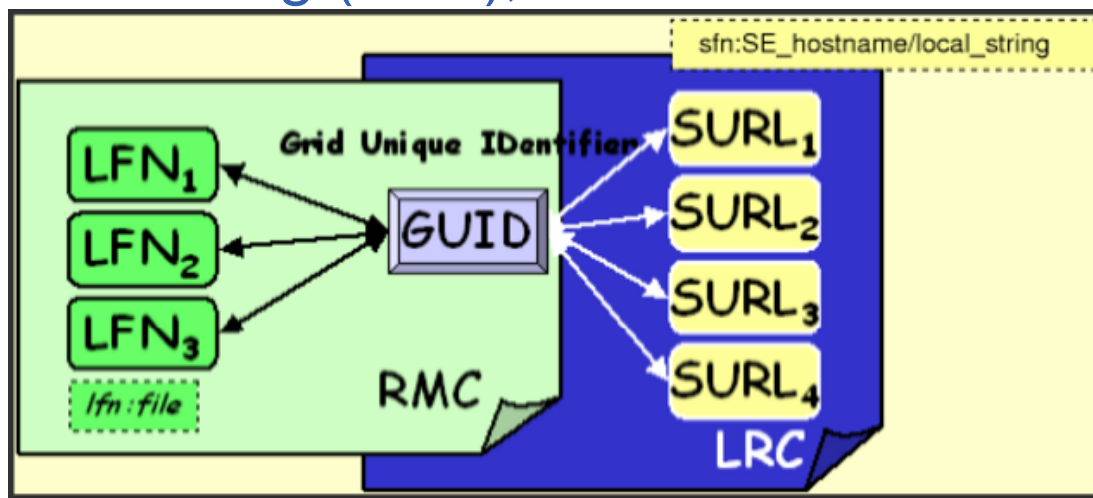
lcg-cp	Copies a grid file to a local destination
lcg-cr	Copies a file to a SE and registers the file in the catalog
lcg-del	Delete one file
lcg-rep	Replication between SEs and registration of the replica
lcg-gt	Gets the TURL for a given SURL and transfer protocol
lcg-sd	Sets file status to “Done” for a given SURL in a SRM request

File Catalog Interaction

lcg-aa	Add an alias in LFC for a given GUID
lcg-ra	Remove an alias in LFC for a given GUID
lcg-rf	Registers in LFC a file placed in a SE
lcg-uf	Unregisters in LFC a file placed in a SE
lcg-la	Lists the alias for a given SURL, GUID or LFN
lcg-lg	Get the GUID for a given LFN or SURL
lcg-lr	Lists the replicas for a given GUID, SURL or LFN

- The `edg-local-replica-catalog` (`edg-lrc`) and `edg-replica-metadata-catalog` (`edg-rmc`) commands are low level tools that allow users to browse and directly manipulate the LRC and the RMC catalogs.
- In normal operation, a user should **preferably** use the high level LCG Data Management tools previously described.
- However, `lcg-utils` do not offer a way to browse and search in RLS Catalog. To do this you still need to use `edg-rmc` command.

The Replica Metadata Catalog keeps the mappings between LFNs and GUID, while, Guid – SURLs are stored into the Local Replica Catalog (LRC), as shown below:



To find out if a particular LFN or LFNs satisfying a pattern are into the Catalog, we need to use `edg-rmc` command. For example, if we want to find all the entries containing the word “my” we should issue the following command:

```
> edg-rmc mappingsByAlias *my* --endpoint $RMC_ENDPOINT
```

where `$RMC_ENDPOINT` contains the endpoint of the RMC Catalog. You can discover it by `lcg-infosites --vo gilda rmc`.

- **Actually there is no particular command to list the whole contents of the RMC Catalog. A way to reach this goal is to make a search on GUID with the wildcard *.**
- **Example:**
 - > `edg-rmc -i mappingsByGuid * -l 100000 --endpoint $RMC_ENDPOINT`

-l flag is used to limit the number of results.

Exercise:

- Set your env variables to point to the RLS catalog
- Copy and register a file into the catalog
- Ask your neighbour the name of the LFN he/she put in
- Search that file, download locally and delete it

- **Basic commands**

`glite-put`

`glite-get`

`glite-rm`

`glite-catalog-ls`

`glite-catalog-mkdir`

`glite-catalog-chmod`

`glite-catalog-stat`

`glite-catalog-symlink`


```
[giorgio@glite-tutor:~]$ glite-put tt1406 lfn:///tt1406
[glite_put] Total 0.00 MB          |=====| 100.00
% [0.0 Mb/s]
```

Transfer Completed:

```
LFN                : /tt1406
GUID               : 00341804-fb70-12ae-95a4-
c1ced08dbeef
SURL               : srm://glite-
se.ct.infn.it:8443/srm/managerv1?SFN=/pnfs/ct.infn.it/data/
gilda/tt1406
Data Written [bytes] : 30
Eff.Transfer Rate [Mb/s] : 0.000008
```

- **Optional parameters:**

- m <mode>: the permission to use for the new file (default is 0640).
- c <name> : configuration name to be used (Override glite-io-client configuration)

```
[giorgio@glite-tutor:~]$ glite-get lfn:///tt1406 testGet
[glite_get] Total 0.00 MB          |=====| 100.00 % [0.0
      Mb/s]
```

Transfer Completed:

```
LFN                : /tt1406
GUID                : 00341804-fb70-12ae-95a4-c1ced08dbeef
SURL                : srm://glite-
      se.ct.infn.it:8443/srm/managerv1?SFN=/pnfs/ct.infn.it/data/gilda/
      tt1406
Data Written [bytes] : 30
Eff.Transfer Rate [Mb/s] : 0.000006
```

```
[giorgio@glite-tutor:~]$ ll testGet
-rw-r----- 1 giorgio users          30 Jun 14 2005 testGet
```

Optional parameters:

-c <name> : configuration name to be used (Override glite-io-client configuration)

```
[giorgio@glite-tutor:~]$ glite-rm lfn:///tt1406
```

```
Unlink Completed:
```

```
File           : lfn:///tt1406
```

```
Time [s]       : 3.595000
```

```
[giorgio@glite-tutor:~]$ glite-catalog-ls -l /
-pdrwl-gs--r-l-g----- 229282k 2005-06-13 08:13:53 /EDGhistory.mpg
-pdrwl-gs--r-l-g----- 1371 2005-06-06 11:14:26 /alroot.jdl
-pdrwl-gs--r-l-g----- 9234k 2005-06-13 08:13:20 /pete2.mpg
-pdrwl-gs--r-l-g----- 30 2005-06-07 20:00:10 /pippo01
dpdrwlx--p-rwl---p-r-l--- 0 2005-05-24 19:22:06 /prova
dpdrwlx----rwlx----r-lx-- 0 2005-05-25 17:36:46 /prova2
```

Main options :

- l long output (with permissions)
- s specify the service endpoint (i.e. the catalog to use)

ACL : - for regular files, **d** for directory, **l** for symbolic links and **v** for virtual directories (when supported...). **p** indicates the permission to change attribute, while **d** rights to delete the entry. Successive 12 bits indicates, for user (u), group (g), other (o), permission to **r**ead, **w**rite, **l**ist contents or **e**xecute the content. Last two are reserved for metadata use, and so are currently unused. They will show the right to **g**et or **s**et the metadata.

- **NOT stable yet ! (#8730)**

```
[giorgio@glite-tutor:~]$ glite-catalog-ls -l
/test1406_3
-pdrwl-gs-drwl-g--d-w--g-      30  2005-06-14 19:29:16
/test1406_3
[giorgio@glite-tutor:~]$ glite-catalog-chmod a-g
/test1406_3
[giorgio@glite-tutor:~]$ glite-catalog-ls -l
/test1406_3
-pdrwl--s-drwl----d-w----      30  2005-06-14 19:29:16
/test1406_3
```

```
[giorgio@glite-tutor:~]$ glite-catalog-symlink /test01
/test001
[giorgio@glite-tutor:~]$ glite-catalog-ls -l /test001
lpdrwx----rwx-----r-l---      0  2005-06-14 19:38:48
/test001 -> /test01
```

Available options:

`-s URL`
 specified URL.

Use the catalog service at the

`-c`
 parent directory.

Copy permissions from the

- List all information about a file or directory

```
[giorgio@glite-tutor:~]$ glite-catalog-stat /test1406_3
```

```
LFN:      /test1406_3
Created:   2005-06-14 19:29:16.000
Modified:  2005-06-14 19:29:16.000
Size:      30
Type:      File
Expires:   Never
GUID:      0076bc4a-140e-12af-b93c-c1ced08dbeef
Created:   2005-06-14 19:29:20.000
Modified:  2005-06-14 19:29:20.000
Size:      30
Checksum:  00000000
Status:    0
User:      egee
Group:     egee-group
User rights: pdrwl--s
Group rights: -drwl---
Other rights: -d-w----
Replicas:
  srm://glite-se.ct.infn.it:8443/srm/managerv1?SFN=/pnfs/ct.infn.it/data/gilda/test1406_3
    Master replica
      Created:   2005-06-14 19:29:16.000
      Modified:  2005-06-14 19:29:16.000
```