

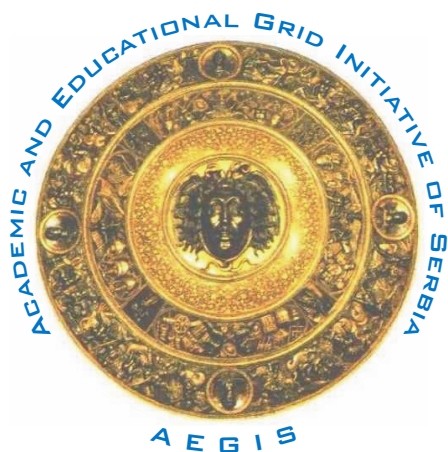


Enabling Grids for E-science

Data Management

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SEE-GRID-SCI
SEE-GRID infrastructure for regional eScience



Information Society



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- **Storage element**
- **LFC Concept**
- **lfc and lcg commands**
- **Globus data management**

- **Types**
 - Classic SE**
 - LCG Disk pool manager**
 - CASTOR**
- **Storage Resource Manager (SRM)**

- **LCG File Catalogue (LFC)**
- **Maintain mappings between LFN(s), GUID and SURL(s)**
- **GRID file**

- **Grid Unique Identifier (GUID)**

guid:<40_bytes_unique_string>

guid:38ed3f60-c402-11d7-a6b0-f53ee5a37e1d

- **Logical File Name (LFN)**

lfn:<anything_you_want>

lfn:importantResults/Test1240.dat

- **Storage URL (SURL) or Physical File Name (PFN)**

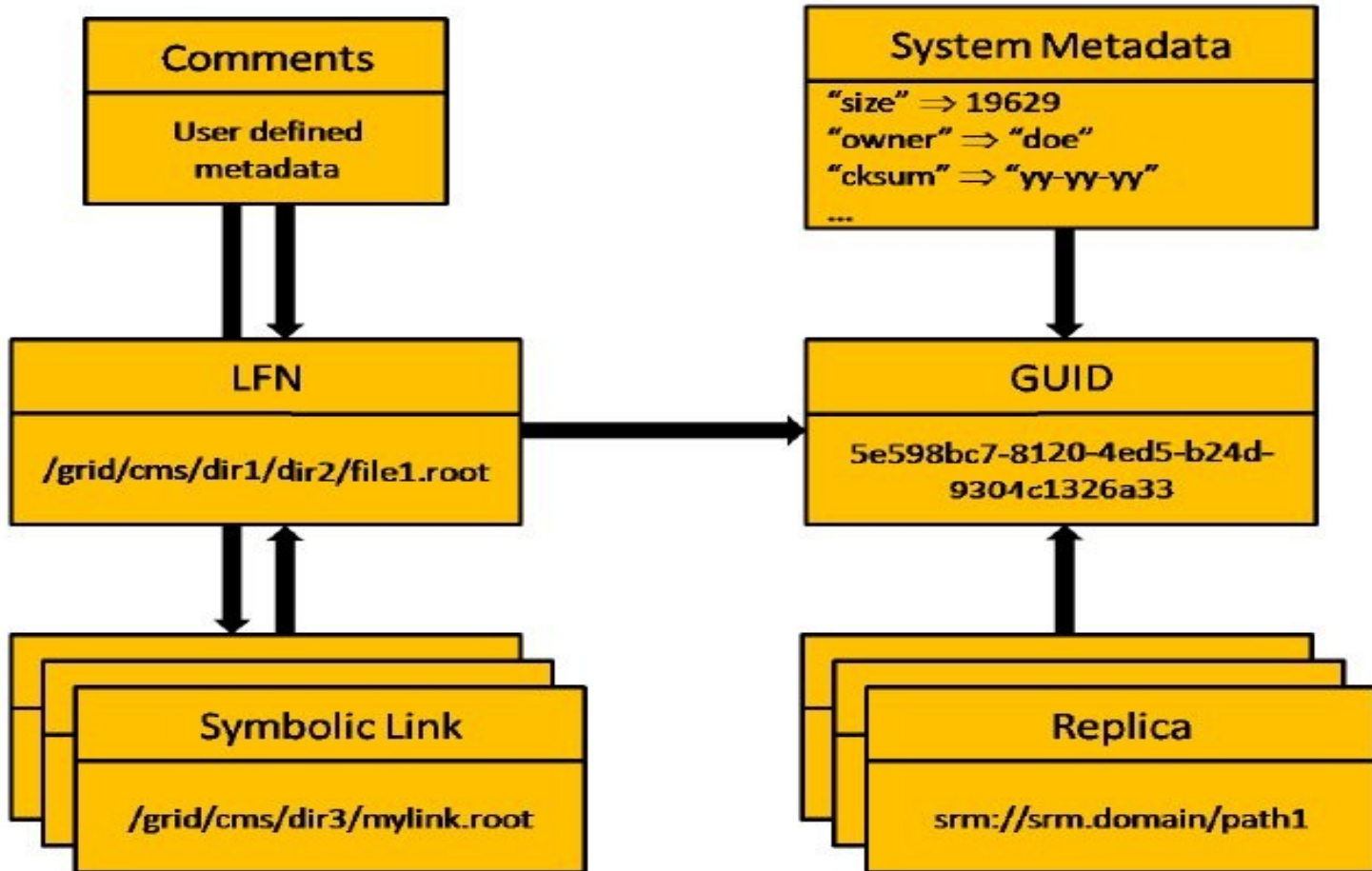
<sfn|srm>://<SE_hostname>/<some_string>

srm://srm.cern.ch/castor/cern.ch/grid/dteam/doe/file1

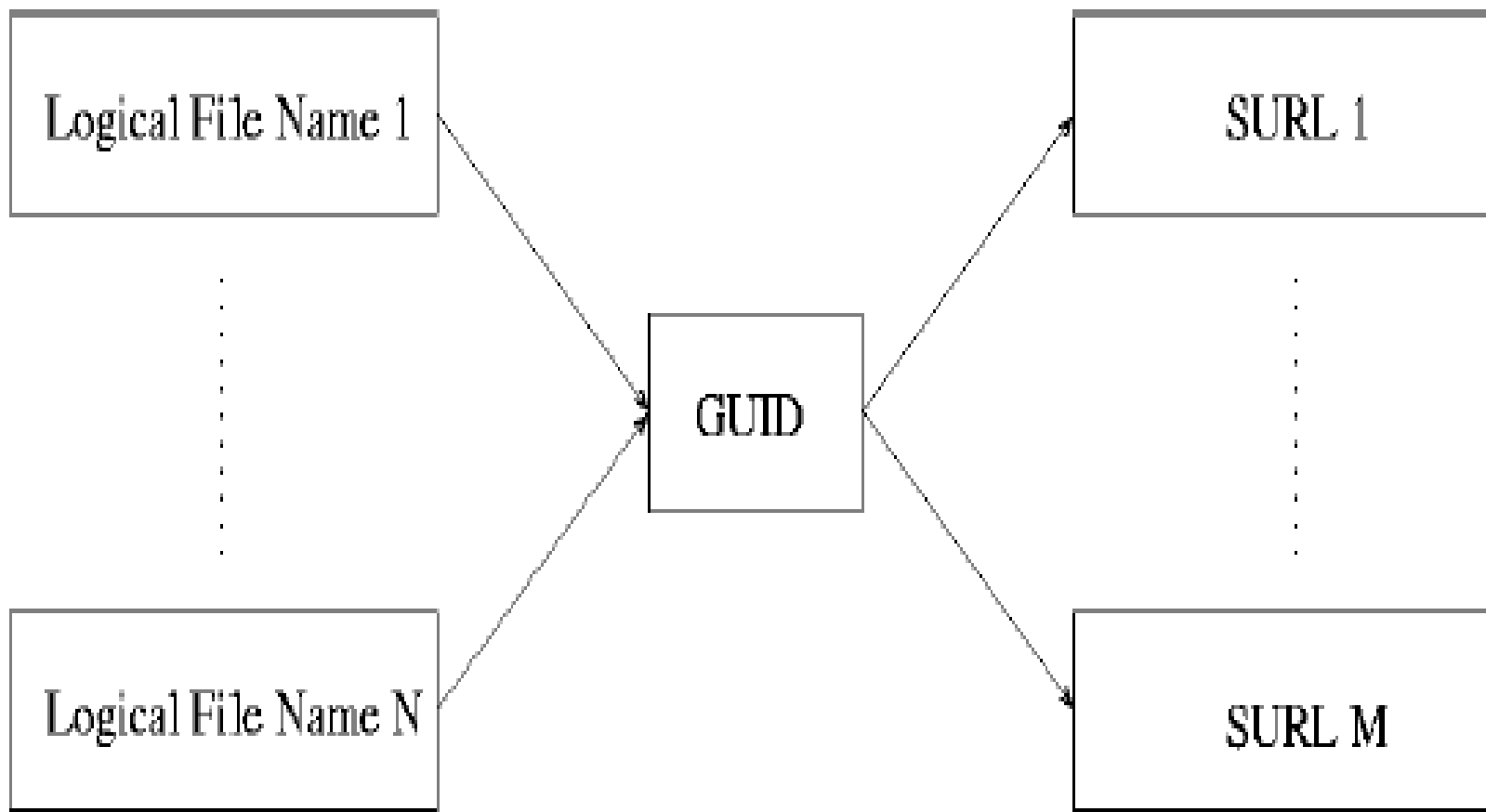
- **Transport URL (TURL)**

<protocol>://<some_string>

gsiftp://tbed0101.cern.ch/data/dteam/doe/file1



LFC architecture



- **Directory structure**

`/grid/<vo>/<you_create_it>`

`/grid/aegis/vlada`

- **VO members have rw permissions in their directory**

- **Unix-like commands**

- **echo \$LFC_HOST**
- **lfc-ls** List file/directory entries in a directory
- **lfc-mkdir** Create directory
- **lfc-ln** Make a symbolic link to a file/directory
- **lfc-ls** List file/directory entries in a directory
- **lfc-chmod** Change access mode of a LFC file/directory
- **lfc-chown** Change owner and group of a LFC file/directory
- **lfc-getacl** Get file/directory access control lists
- **lfc-setacl** Set file/directory access control lists

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- **Listing the entries of a LFC directory**

```
$ lfc-ls /grid/aegis/vlada
```

```
novi_fajl
```

```
rezult
```

- **Creating directories in the LFC**

```
$ lfc-mkdir /grid/aegis/vlada/novi_dir
```

```
$ lfc-ls -l /grid/aegis/vlada
```

```
drwxrwxr-x  0 165    101    0 Feb 19 00:30 novi_dir
-rw-rw-r--  1 165    101   27 Feb 18 01:08 novi_fajl
-rw-rw-r--  1 165    101   83 Feb 15 00:30 rezult
```

- **Creation of symbolic links**

```
$ lfc-ln -s /grid/aegis/vlada/rezult \  
/grid/aegis/vlada/rezult_link
```

```
$ lfc-ls -l /grid/aegis/vlada/rezult_link
```

```
lrwxrwxrwx 1 165 101 0 Feb 19 00:42  
/grid/aegis/vlada/rezult_link -> /grid/aegis/vlada/rezult
```

- **Adding metadata information to LFC entries**

```
$ lfc-setcomment /grid/aegis/vlada/rezult "best result"
```

```
$ lfc-ls --comment /grid/aegis/vlada/rezult  
/grid/aegis/vlada/rezult best result
```

- **Removing LFNs from the LFC**
\$ lfc-rm -r /grid/aegis/vlada/novi_dir

- **Print the ACL of a directory**

```
$ lfc-getacl /grid/aegis/vlada/
```

```
# file: /grid/aegis/vlada/
```

```
# owner: /C=RS/O=AEGIS/OU=Institute of Physics  
Belgrade/CN=Vladimir Slavnic
```

```
# group: aegis
```

```
user::rwx
```

```
group::rwx      #effective:rwx
```

```
other::r-x
```

```
default:user::rwx default:group::rwx default:other::r-x
```

- **LCG Data Management Tools**
- **High level tools**
- **CLI, API**
- **Hides interaction between LFC and SE**

Replica Management

- **echo \$LCG_GFAL_INFOSYS**
- **lcg-cp** Copies a Grid file to a local destination (download)
- **lcg-cr** Copies a file to a SE and registers the file in the catalogue (upload)
- **lcg-del** Deletes one file (either one replica or all replicas)
- **lcg-rep** Copies a file from one SE to another SE and registers it in the catalogue (replicate)
- **lcg-gt** Gets the TURL for a given SURL and transfer protocol

File Catalogue Interaction

- **lcg-aa** Adds an alias in the catalogue for a given GUID
- **lcg-ra** Removes an alias in the catalogue for a given GUID
- **lcg-rf** Registers in the catalogue a file residing on an SE
- **lcg-uf** Unregisters in the the catalogue a file residing on an SE
- **lcg-la** Lists the aliases for a given LFN, GUID or SURL
- **lcg-lr** Lists the replicas for a given LFN, GUID or SURL
- **lcg-ls** Lists file information for given SURLs or LFNs

- **Upload a file**

```
$ lcg-cr file:/home/vlada/raf/mpi.jdl
```

```
guid:830e7a82-f9fb-4c04-aafd-e24a5f25acdb
```

```
specify lfn:
```

```
$ lcg-cr -l lfn:/grid/aegis/vlada/mpi \
```

```
file:/home/vlada/raf/mpi.jdl
```

```
guid:25fdcd16-bc76-4458-9c1a-8c597fb33194
```

- **Replicate a file (one replica per SE)**

```
$ lcg-rep -d grid15.rcub.bg.ac.yu \
```

```
lfn:/grid/aegis/vlada/mpi
```

- **List replicas**

```
$ lcg-lr lfn:/grid/aegis/vlada/mpi
```

```
srm://grid15.rcub.bg.ac.yu/dpm/rcub.bg.ac.yu/home/aegis/generated/2009-02-18/file8f99889c-c00a-4b7b-89d3-d9abf66ba103
```

```
srm://se.phy.bg.ac.yu/dpm/phy.bg.ac.yu/home/aegis/generated/2009-02-18/file576fbae0-ba6a-4b21-a205-3d115b2cf7fb
```

- **List guid**

```
$ lcg-lg lfn:/grid/aegis/vlada/mpi
```

```
guid:25fdcd16-bc76-4458-9c1a-8c597fb33194
```

- **Listing files and directories**

```
$ lcg-ls -l lfn:/grid/aegis/vlada/mpi
```

```
-rw-rw-r--  1  165  101   349 lfn:/grid/aegis/vlada/mpi
```

- **Copying files out of the Grid (download)**

```
$ lcg-cp lfn:/grid/aegis/vlada/mpi \
```

```
file:/home/vlada/raf/down/mpi
```

- **Deleting replicas**

```
lcg-del
```

```
srm://grid15.rcub.bg.ac.yu/dpm/rcub.bg.ac.yu/home/aegis/generated/2009-02-19/file36d25d0d-ee61-477e-b667-40b3791786a4
```

```
$ lcg-del -a lfn:/grid/aegis/vlada/mpi
```

- **Globus data management**
 - **edg-gridftp**
 - **globus-url-copy**
- **Careful!**

- <https://edms.cern.ch/file/722398//gLite-3-UserC>
- http://wiki.egee-see.org/index.php/SG_Data_Ma
- <http://wiki.egee-see.org/index.php?title=Introd>

Thank you!