



Enabling Grids for E-science

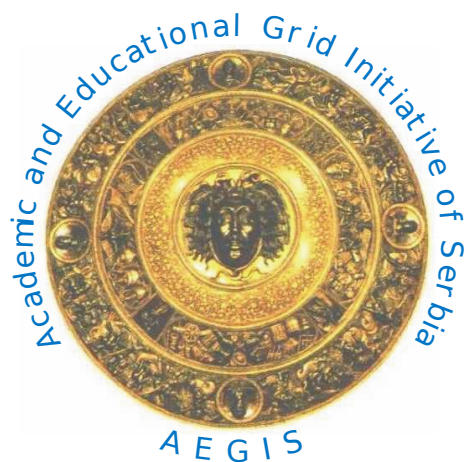
How to use storage resources at Grid

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



Information Society



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www.eu-egee.org

- **Types of storage elements**

- Classic SE
- CASTOR
- dCache
- Disk pool manager

- **Storage Resource Manager**

http://wiki.ipb.ac.rs/index.php/Submitting_jobs

- **Data Channel Protocols**

- GSIFTP
- Remote File Input/Outputprotocol (RFIO)
- gsidcap

FILE NAMES

- **Grid Unique Identifier (GUID)**

`guid:<36_bytes_unique_string>`

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

- **Logical File Name (LFN)**

`lfn:<any_string>`

`lfn:importantResults/Test1240.dat`

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

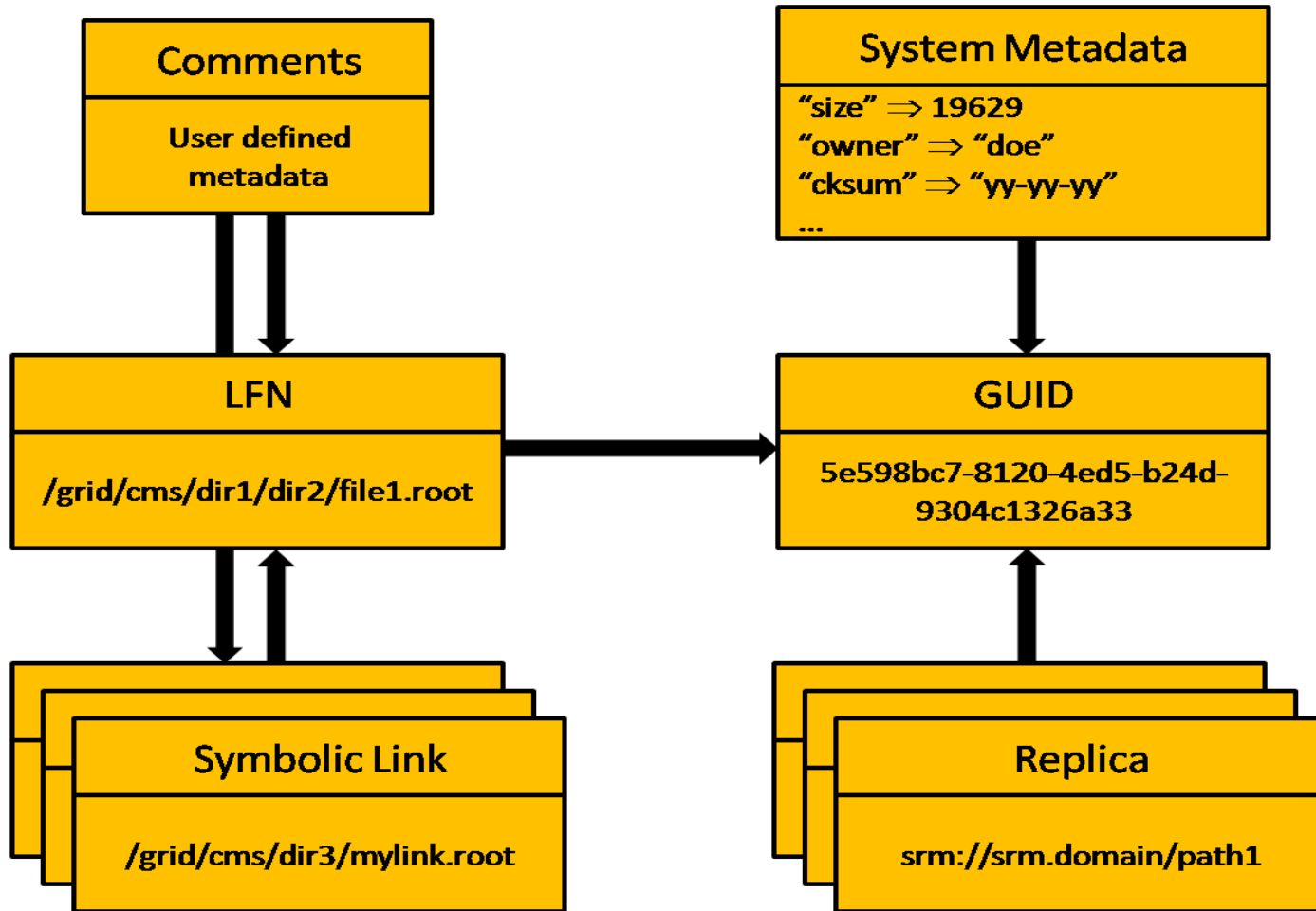
```
<sfn|srm>://<SE_hostname>/<some_string>  
//grid15.rcub.bg.ac.rs/dpm/rcub.bg.ac.rs/  
home/aegis/generated/2009-10-05/  
filebcdd0dc7-9b9b-4f80-8a53-34bcdfcab7a5
```

- **Transport URL (TURL)**

```
<protocol>://<some_string>  
gsiftp://grid15.rcub.bg.ac.rs/data/aegis/
```

- **Logical File Catalogue (LFC)**

- **Maintain mappings between LFN(s), GUID and SURL(s)**



LFC Architecture

- **Directory structure**

```
/grid/<vo>/<you_create_it>  
/grid/aegis/nikola
```

- **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
- ...

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

```
$ lfc-ls /grid/aegis/petnica/nikola/
novidir
```

- **Creating directories in the LFC**

```
$ lfc-mkdi /grid/aegis/petnica/nikola/novidir
```

```
$ lfc-ls -l /grid/aegis/petnica/nikola
drwxrwxr-x  0 210  101          0 Oct  04 23:15 drugidir
drwxrwxr-x  0 210  101          0 Oct  04 23:15 novidir
```

- **Removing LFNs from the LFC**

```
$ lfc-rm -r /grid/aegis/petnica/nikola  
/novidir
```

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

• Replica Management

- `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/ngrkic/mpi.tar.gz
guid:2c7a00e2-89dd-4665-8055-df1ef5a9fa96
```

```
$ lcg-cr -l lfn:/grid/aegis/petnica/nikola/mpi
file:/home/ngrkic/mpi.tar.gz
```

```
guid:aa92553f-55cc-4745-b8b9-765548588d9
```

• Replicate a file (one replica per SE)

```
$ lcg-rep -d grid15.rcub.bg.ac.rs
lfn:/grid/aegis/petnica/nikola/mpi.tar.gz
```

- **List replicas**

```
lcg-lr lfn:/grid/aegis/petnica/nikola/
mpi.tar.gz
```

```
srm://grid15.rcub.bg.ac.rs/dpm/rcub.bg.ac.rs/
home/aegis/generated/2009-10-05/
```

```
filebcdd0dc7-9b9b-4f80-8a53-34bcdcab7a5
```

```
srm://se.ipb.ac.rs/dpm/ipb.ac.rs/home/aegis/
Generated/2009-10-05/
```

```
file2dfdd8cd-6d69-48fd-a823-a80ff08c4d11
```

- **List GUID**

```
lcg-lg lfn:/grid/aegis/petnica/nikola/mpi
guid:aa92553f-55cc-4745-b8b9-765548588d94
```


- **Listing files and directories**

```

lcg-ls -l
lfn:/grid/aegis/petnica/nikola/mpi.tar.gz
-rw-rw-r--  1   210   101   2380
lfn:/grid/aegis/petnica/nikola/mpi
  
```

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

```

lcg-cp lfn:/grid/aegis/petnica/nikola/
mpi.tar.gz
file:/home/ngrkic/mpi.tar.gz
  
```

- **Deleting replicas**

```
$ lcg-del srm://grid15.rcub.bg.ac.rs/dpm/  
rcub.bg.ac.rs/home/aegis/generated/2009-10-05/  
filebcdd0dc7-9b9b-4f80-8a53-34bcdfcab7a5
```

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