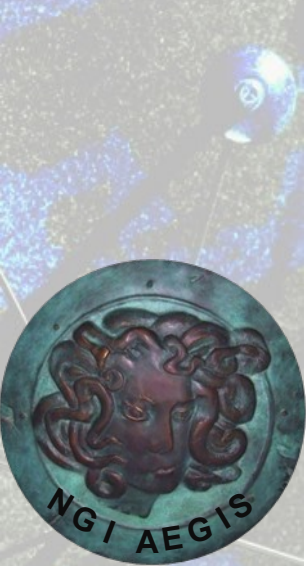


GRID Data Management



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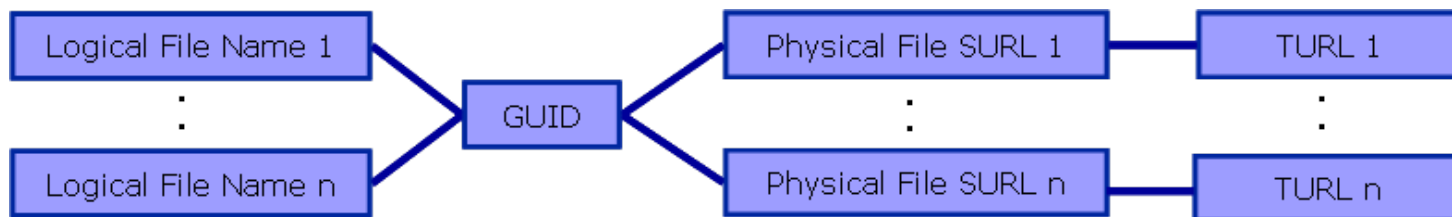
Nov. 15, 2010

- Storage elements types
- Grid file names
- LFC Concept
- Data management client tools
 - File catalogue interaction
 - Replica tools

- Classic SE (obsolete)
- LCG Disk pool manager (DPM)
- CASTOR
- dCache

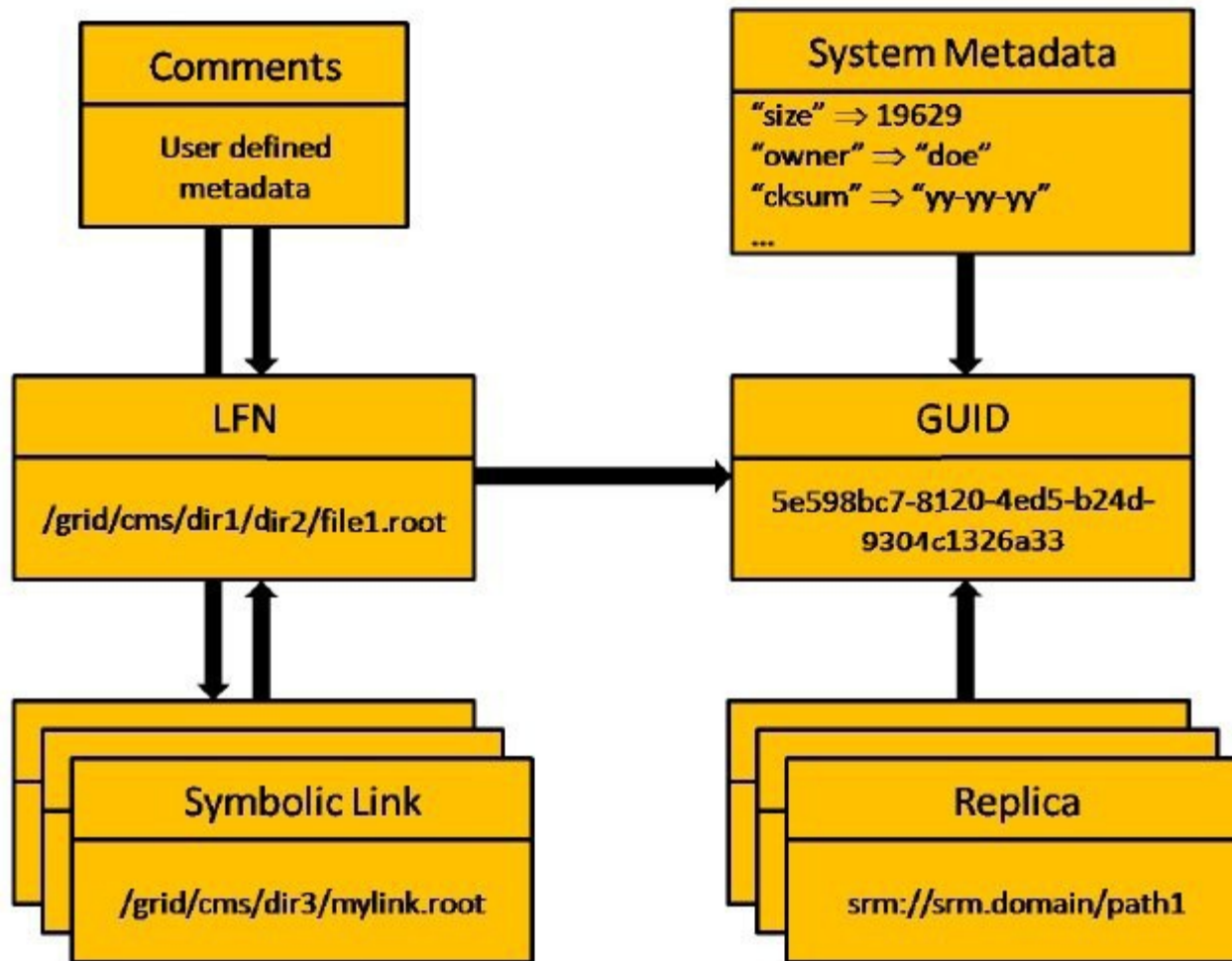
- Resource management is done through Storage Resource Manager (SRM) interface
 - Hides the complexity of the resources

- LCG File Catalogue (LFC)
 - Maintains mappings between LFN(s), GUID and SURL(s)
 - Provides System metadata
 - Provides single string user metadata
- GRID file
 - Both physically present in a SE and registered in the file catalogue
 - Files are write-once, read-many
 - Files cannot be changed unless remove or replaced

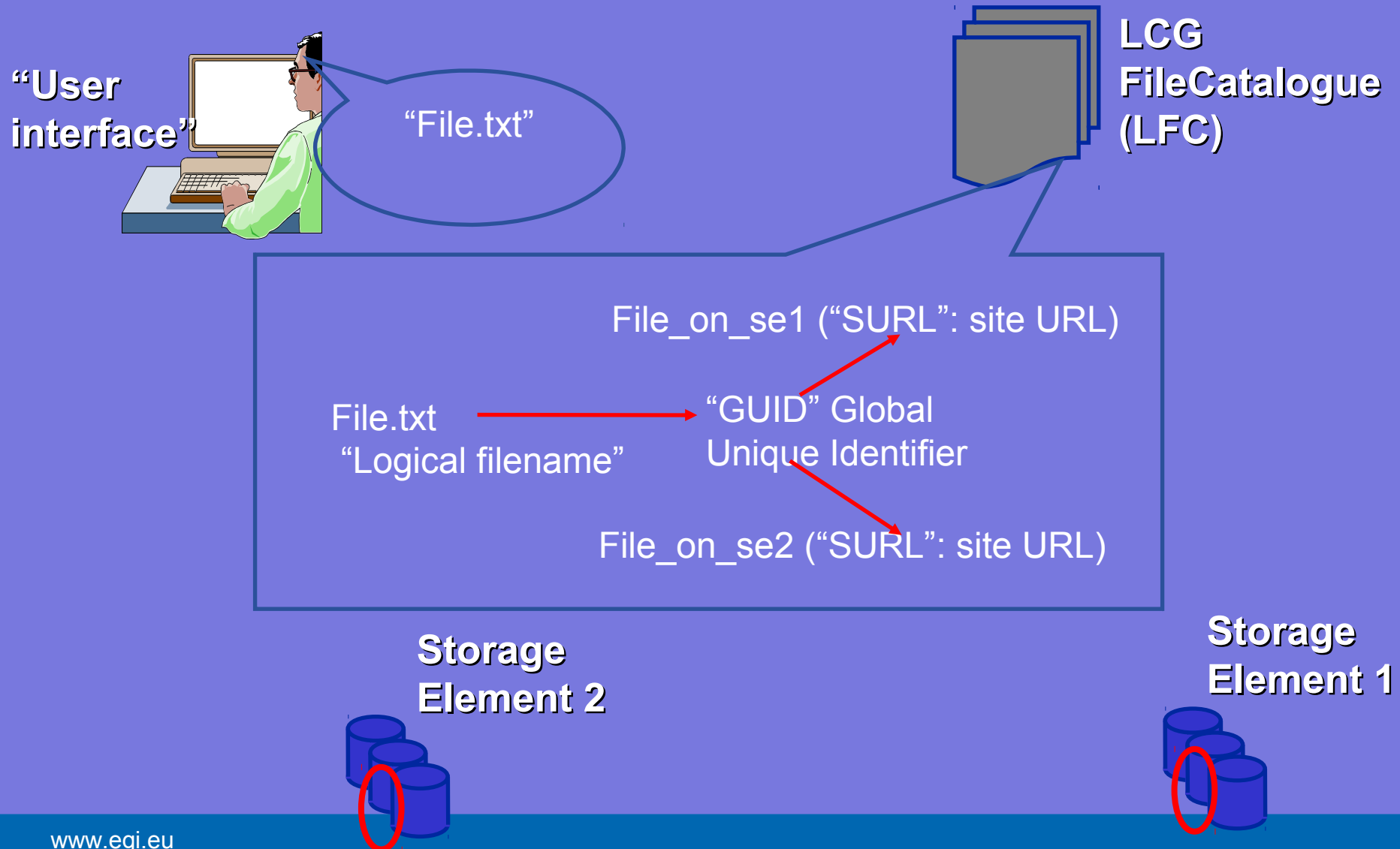


- Grid Unique Identifier (GUID)
 - Identifies a file uniquely, is of the form:
 - guid:<36_bytes_unique_string>
 - guid:38ed3f60-c402-11d7-a6b0-f53ee5a37e1d
- Logical File Name (LFN) or User Alias
 - Used to refer to a file in human readable form
 - lfn:/grid/<MyVO>/<MyDirs>/<MyFile>
 - lfn:/grid/aegis/vlada/outputs/output1.txt

- Storage URL (SURL)
 - Identifies a replica in a SE
 - `<sfn|srm>://<SE_hostname>/<some_string>`
 - `srm://se.ipb.ac.rs/dpm/ipb.ac.rs/home/aegis/generated/2010-10-10/fileb3469b96-d956-4062-9662-4da7e203557d`
- Transport URL (TURL)
 - Valid URI with the necessary information to access a file in a SE
 - `<protocol>://<some_string>`
 - `gsiftp://se2.ipb.ac.rs/se2.ipb.ac.rs:/storage8/aegis/2010-10-10/fileb3469b96-d956-4062-9662-4da7e203557d.2015029.0`



- Directory structure
 - /grid/<vo>/<you_create_it>
 - /grid/aegis/vlada
- All members of given VO have rw permissions in their directory



- Unix-like LFC 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
- User needs a valid proxy for using these commands

- Listing the entries of a LFC directory

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

- result1

- result2

- Creating directories in the LFC

- `$ lfc-mkdir /grid/aegis/vlada/misanu/new_dir`

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

- `drwxrwxr-x 0 165 101`

- `0 Oct 10 15:53 new_dir`

- `-rw-rw-r-- 1 165 101`

- `12 Oct 10 15:51 result1`

- `-rw-rw-r-- 1 165 101`

- `18 Oct 10 15:52 result2`

- Creation of symbolic links
 - `$ lfc-ln -s /grid/aegis/vlada/misanu/result1 \ /grid/aegis/vlada/misanu/result1_link`
 - `$ lfc-ls -l /grid/aegis/vlada/misanu/result1_link`
rwxrwxrwx 1 165 101 0 Oct 10 16:05
grid/aegis/vlada/misanu/result1_link ->
/grid/aegis/vlada/misanu/result1
- Adding metadata information to LFC entries
 - `$ lfc-setcomment /grid/aegis/vlada/misanu/result2 "best result"`
 - `$ lfc-ls --comment /grid/aegis/vlada/misanu/result2 /grid/aegis/vlada/misanu/result2 best result`

- Removing LFNs from the LFC
 - `$ lfc-rm -r /grid/aegis/vlada/misanu/novi_dir`
- Print the ACL of a directory
 - `$ lfc-getacl /grid/aegis/vlada/misanu`
 - `# file: /grid/aegis/vlada/misanu`
 - `# 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 (lcg_utils)
- High level tools
- Hide the complexities of catalogue and SEs interaction
- CLI, API

- Check environment
 - echo \$LCG_GFAL_INFOSYS
 - echo VO_<VO>_DEFAULT_SE
- 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

- 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 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/misanu/mpi.jdl`
guid:830e7a82-f9fb-4c04-aafd-e24a5f25acdb
- Specify lfn:
 - `$ lcg-cr -l lfn:/grid/aegis/vlada/misanu/mpi`
file:/home/vlada/misanu/mpi.jdl
guid:25fdcd16-bc76-4458-9c1a-8c597fb33194
- Replicate a file (one replica per SE)
 - `$ lcg-rep -d grid15.rcub.bg.ac.rs`
lfn:/grid/aegis/vlada/misanu/mpi

- List replicas

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

- `srm://grid15.rcub.bg.ac.rs/dpm/rcub.bg.ac.rs/home/aegis/generated/2010-10-10/file531a6e7f-ab4a-4a9b-bb9f-a2d9a693e615`

- `srm://se.ipb.ac.rs/dpm/ipb.ac.rs/home/aegis/generated/2010-10-10/fileb3469b96-d956-4062-9662-4da7e203557d`

- Copying files out of the Grid (download)

- `$ lcg-cp lfn:/grid/aegis/vlada/misanu/mpi file:/home/vlada/misanu/mpi`

- Deleting replicas

- `lcg-del`

- `srm://grid15.rcub.bg.ac.rs/dpm/rcub.bg.ac.rs/home/aegis/generated/2010-10-10/file531a6e7f-ab4a-4a9b-bb9f-a2d9a693e615`

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

- List guid
 - `$ lcg-lg lfn:/grid/aegis/vlada/misanu/mpi`
`guid:25fdcd16-bc76-4458-9c1a-8c597fb33194`
- Listing files and directories
 - `$ lcg-ls -l lfn:/grid/aegis/vlada/misanu/`

<code>-rw-rw-r--</code>	<code>1</code>	<code>165</code>	<code>101</code>	<code>606</code>	<code>mpi</code>
<code>-rw-rw-r--</code>	<code>1</code>	<code>165</code>	<code>101</code>	<code>12</code>	<code>result1</code>
<code>-rw-rw-r--</code>	<code>1</code>	<code>165</code>	<code>101</code>	<code>12</code>	<code>result1_link</code>
<code>-rw-rw-r--</code>	<code>1</code>	<code>165</code>	<code>101</code>	<code>18</code>	<code>result2</code>

- <https://edms.cern.ch/file/722398/1.3/gLite-3-UserGuide.pdf>
- http://wiki.egee-see.org/index.php/SEE-GRID_Wiki
- http://wiki.egee-see.org/index.php/SG_Data_Management_High_Level_Tools