egee

Laboratory: Hands-on using EGEE Grid and gLite middleware

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Information Society
and Media

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WMS

- Choose an available site for the job execution

HG-01-GRNET

Resource Broker

The user connects to User Interface using a SSH-client
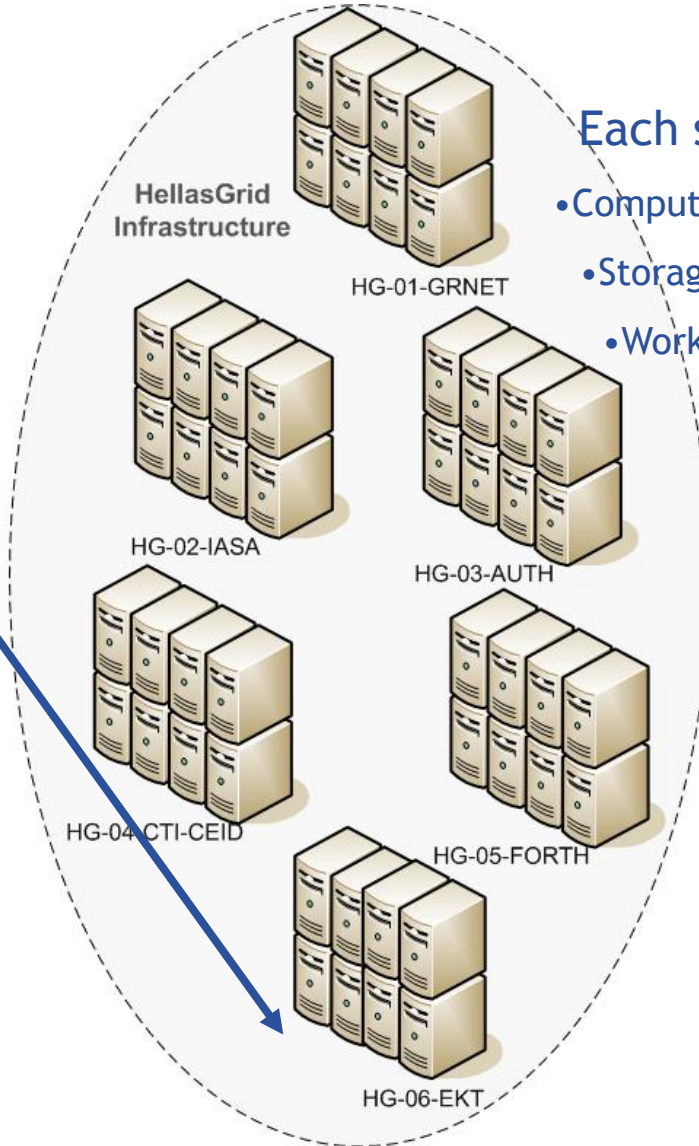
User

User Interface

ui01.isabella.grnet.gr

- User's personal account and its certificate

- Command Line Interface for job submission

HG-06-EKT

Resource Broker

Each site has:

- Computing Element

- Storage Element

- Worker Nodes

HellasGrid Infrastructure

HG-01-GRNET

HG-02-IASA

HG-03-AUTH

HG-04-CTI-CEID

HG-05-FORTH

HG-06-EKT

- **Creating a proxy certificate**
  - **voms-proxy-init --voms=hgdemo**

- **Listing Computing Elements that match a job description**
  - **glite-wms-job-list-match -a testJob1.jdl**
- **Submitting a job**
  - **glite-wms-job-submit -o jobId -a testJob1.jdl**
- **Retrieving the status of a job**
  - **glite-job-status -i jobId**
- **Retrieving the output of a job**
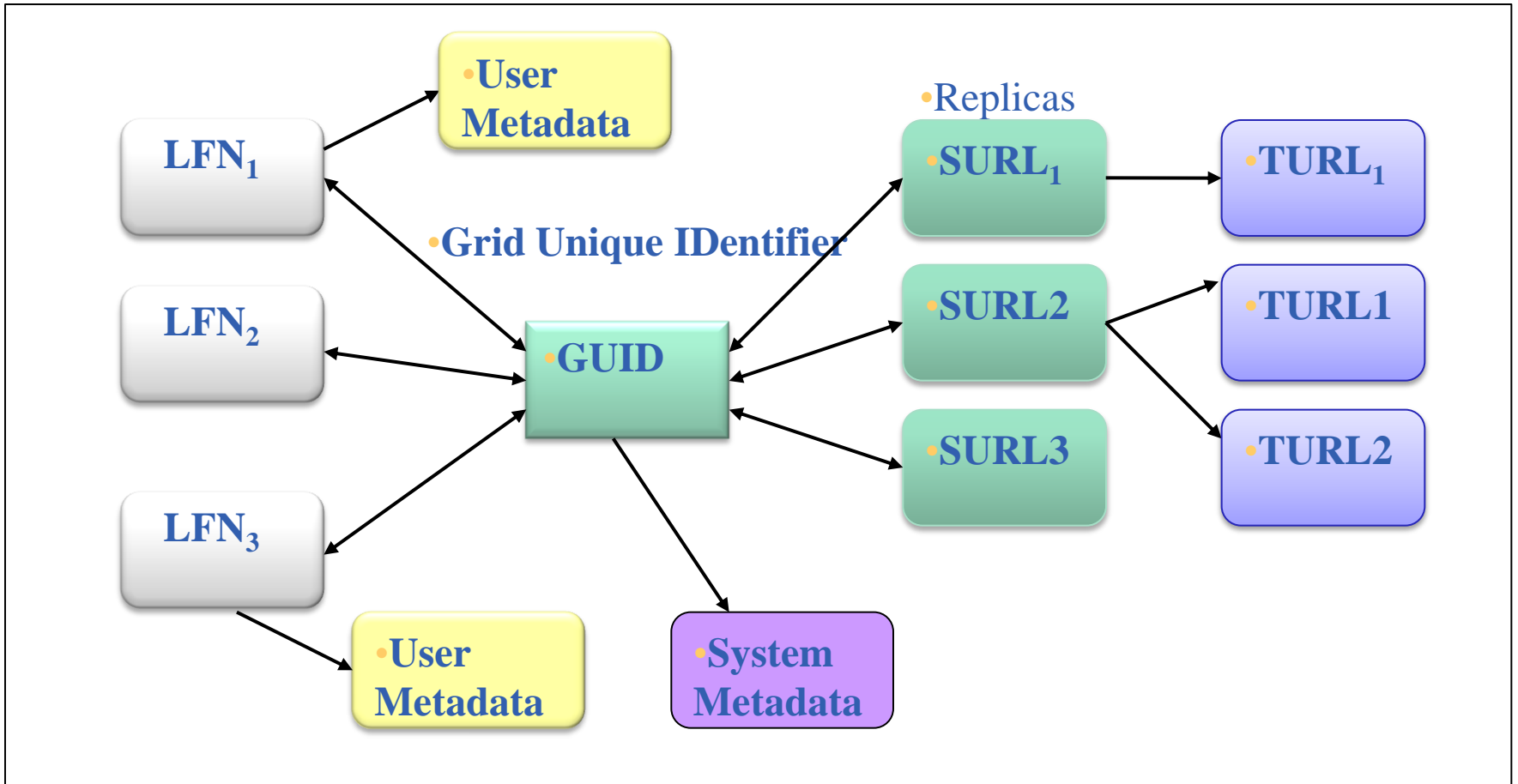 - **glite-wms-job-output -i jobId**

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- **Grid Unique Identifier (GUID)**
  – Identifies a file uniquely
  – Example: guid:ab993b98-8bc9-4984-901e-91290276090c

- **Logical File Name (LFN) (User Alias)**
  – Refers to a file instead of a GUID
  – lfn:<any_string>
  – LFC catalogue: lfn:/grid/<MyVO>/<MyDirs>/<MyFile>
  – Example: lfn:/grid/hgdemo/test_hgdemodemo/test_file

- **Storage URL (SURL) (Physical File Name-PFN)**
  – Identifies a replica in a SE
  – <sfn|srm>://<SE_hostname>/<some_string>
  – Example: sfn://se01.isabella.grnet.gr/storage/hgdemo/generated/2007-04-20/filec4087974-dbaa-4890-91e2-3c105fa0a3df

- **Transport URL (TURL)**
  – A valid URI with the necessary information to access a file in a SE
  – <protocol>://<some_string>
  – Example:gsiftp://se01.isabella.grnet.gr/storage/hgdemo/generated/2007-04-20/file1a08d327-d7dc-4d89-bb01-2c86f59eae37

Enabling Grids for E-sciencE

- **Stores names of a file on the Grid**
  - Includes correlation among GUID, LFN, SURL, TURL
  - Enables locating a file

- **LCG File Catalogue (LFC)**
  - File Catalogue adopted by the gLite.
  - Maintains mappings among the LFNs, GUID and SURL(s) are maintained in the, which is the main type

- **CLI provides various functionalities and enables the interaction with the LFC**

- **Grid file**
  - Physically present in a SE
  - Registered in the file catalogue

- **LFC catalogue**
  - lfc tool

- **File operations**
  - LCG Data Management tools (**lcg_util**)
  - Operations such as:
    - Upload a file on the Grid
    - Download a file from the Grid
    - Replicate a file among different SEs

- **lfc-ls: List file / directory entries in a directory**

- **lfc-mkdir: Create directory**

- **lfc-chmod: Change access mode of a LFC file / directory**

- **lfc-chown: Change owner and group of a LFC file / directory**

- **lfc-ln: Make a symbolic link to a file / directory**

- **lfc-rename: Rename a file / directory**

- **lfc-rm: Remove a file / directory**

- **lfc-setcomment: Add / replace a comment**

- **lfc-delcomment: Delete the comment associated with a file / directory**

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- **lfc-getacl: Get file / directory access control lists**

- **lfc-setacl: Set file / directory access control lists**

- **lfc-entergrpmap: Defines a new group entry in the Virtual ID table**

- **lfc-enterusrmap: Defines a new user entry in Virtual ID table**

- **lfc-modifygrpmap: Modifies a group entry corresponding to a given virtual gid**

- **lfc-modifyusrmap: Modifies a user entry corresponding to a given virtual uid**

- **lfc-rmgrpmap: Suppresses group entry corresponding to a given virtual gid or group name**

- **lfc-rmusrmap: Suppresses user entry corresponding to a given virtual uid or user name.**

- *lcg_util* **tools**
  - Allow users to copy files between UI, CE, WN and a SE
  - Allow users to register entries in the file catalogue and replicate files between SEs

- **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
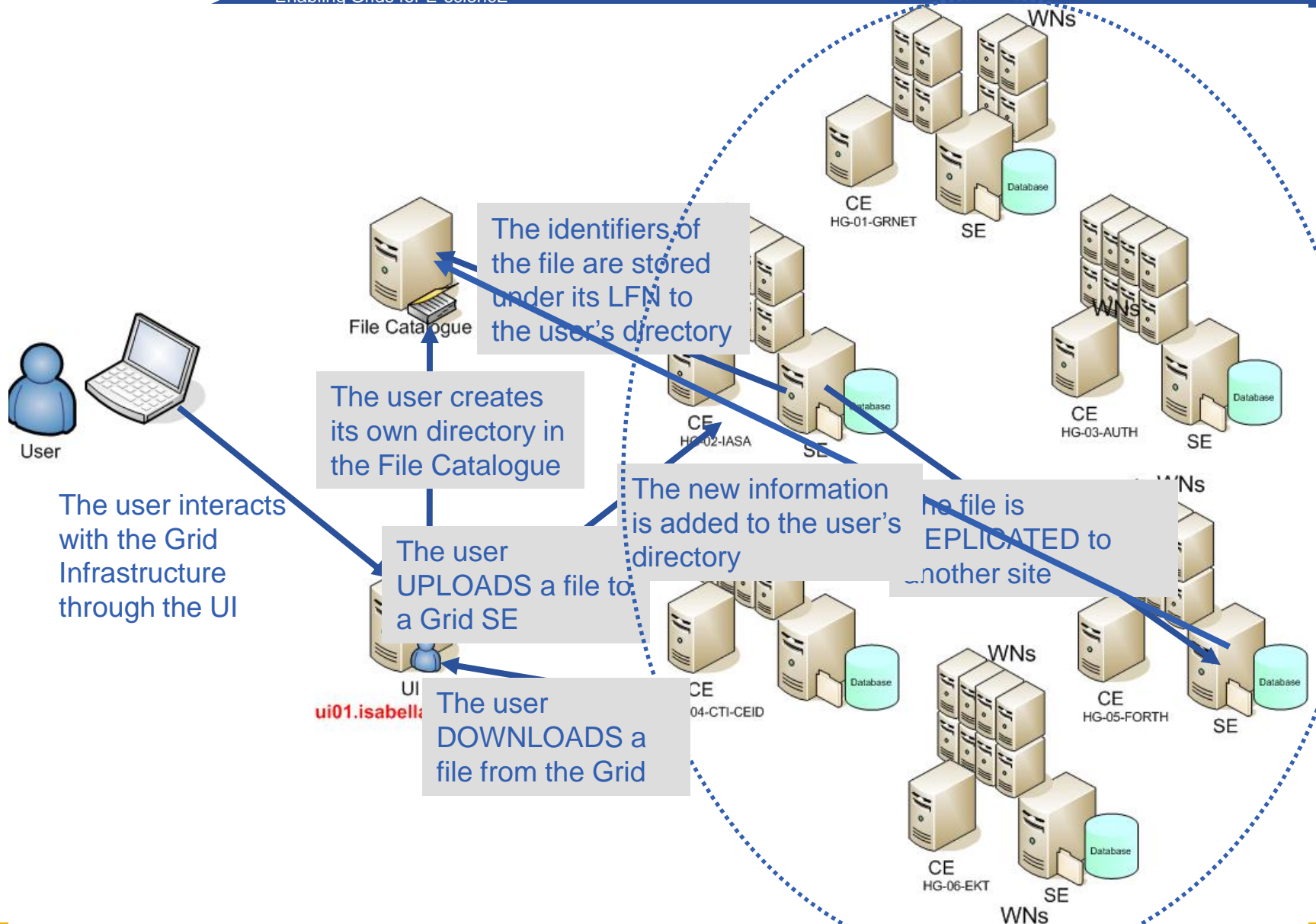
  lcg-rf: Registers in the catalogue a file residing on an SE

  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-lg: Gets the GUID for a given LFN or SURL

  lcg-lr: Lists the replicas for a given LFN, GUID or SURL

Enabling Grids for E-sciencE

The identifiers of the file are stored under its LFN to the user's directory

The user creates its own directory in the File Catalogue

The user interacts with the Grid Infrastructure through the UI

The new information is added to the user's directory

The file is REPLICATED to another site

The user UPLOADS a file to a Grid SE

The user DOWNLOADS a file from the Grid

User

File Catalogue

ui01.isabella

CE HG-01-GRNET
CE HG-02-IASA
CE HG-03-AUTH
CE HG-04-CTI-CEID
CE HG-05-FORTH
CE HG-06-EKT

- **The LFC_HOST variable must contain the hostname of the machine providing the LFC service**

  ✓ **[ege̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶ites --vo hgd̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶**

  ✓ **[ege̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶YPE=lfc**

  [egee@ui01.isabella.grnet.gr]$ **cd ~/training/dataJob**

  [egee@ui01.isabella.grnet.gr]$ **source export.sh**

- **The ̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶tain the name of the user's VO**

  ✓ **[egee@ui01.isabella.grnet.gr]$ export LCG_GFAL_VO=hgdemo**

- **Creating a directory in the LFN namespace**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lfc-mkdir /grid/hgdemo/test_($USER)**

  where $USER -> the username of each participant

- **Listing the entries of a LFC directory**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lfc-ls -l /grid/hgdemo/**
    drwxrwxr-x   0 26158   32000   0 Apr 20 12:45 test_hgdemodemo

- **Defining LFC_HOME variable to point to the created directory**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ export LFC_HOME=/grid/hgdemo/test_($USER)**

- **Removing LFNs from the LFC**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lfc-rm -r lfc:/grid/hgdemo/test_($USER)**

- **Uploading a file to the grid with specific LFN and in a specific storage element**

✓ **[egee@ui01.isabella.grnet.gr]$ lcg-cr file:$PWD/satimg.ppm -l lfn:satimg**

guid:e20d1fa9-e35f-426d-aa72-cb99b18c2791

✓ **[egee@ui01.isabella.grnet.gr]$ lfc-ls /grid/hgdemo/test_($USER)/**
satimg

- **Replicating a file**

✓ **[egee@ui01.isabella.grnet.gr]$ lcg-rep -v lfn:satimg -d se01.athena.hellasgrid.gr**

- **Copying a file out of the Grid**

✓ **[egee@ui01.isabella.grnet.gr]$ lcg-cp lfn:satimg file:$PWD/copy_satimg**

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- **Listing replicas**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lcg-lr --vo hgdemo lfn:satimg**
  - ✓ **srm://se01.grid.hgdemo.gr/dpm/grid.hgdemo.gr/home/hgdemo/generated/2009-05-06/fileaaa2af18-8b10-4566-8b96-1f55f3eb2610**

- **Listing guids given the lfn**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lcg-lg lfn:satimg**
    guid:e20d1fa9-e35f-426d-aa72-cb99b18c2791

- **Adding metadata information to LFC entries**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lfc-setcomment /grid/hgdemo/test_($USER) /satimg "Created for the training"**
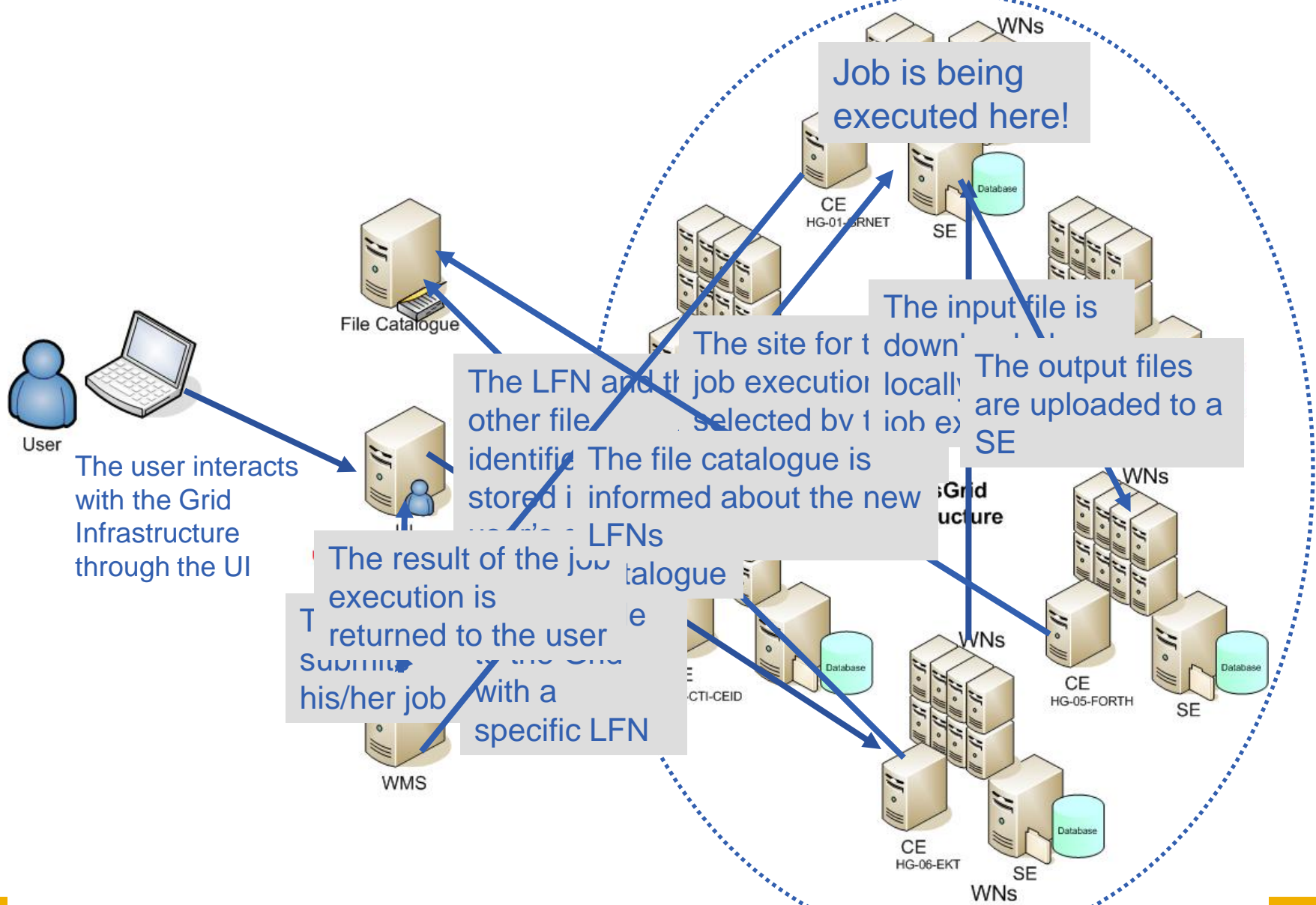
- **View metadata of a specific file**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lfc-ls --comment /grid/hgdemo/test_($USER)/satimg**
    satimg Created for the training

- **Removing metadata information to LFC entries**
  - ✓ **[egee@ui01.isabella.grnet.gr]$ lfc-delcomment /grid/hgdemo/test_$USER/satimg**

Job is being executed here!

The input file is downloaded locally

The output files are uploaded to a SE

The site for the job execution is selected by the job e...

The LFN and the other file... identifie... stored i...

The file catalogue is informed about the new LFNs

The user interacts with the Grid Infrastructure through the UI

The result of the job execution is returned to the user

Submit... his/her job ...with a specific LFN

✓ **[egee@ui01.isabella.grnet.gr]$** **less testJob2.sh**

- **#!/bin/sh**

  echo Information about the Worker Node

  echo Running at `hostname`

  echo Date `date`

  echo Enabling the executable flag for the application

  chmod 755 $PWD/comprjesspeg

  echo Fetching data from a Storage Element

  lcg-cp --vo hgdemo $1 file:$PWD/local_copy

  echo Runnning executable of the user taking as input the transfered file

  $PWD/compressjpeg local_copy > local_compressed_copy

  ls -al

  echo Registering output to the Storage Elements

  lcg-cr --vo hgdemo -l $2 file:$PWD/local_compressed_copy

  echo Job is done!

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✓ **[egee@ui01.isabella.grnet.gr]$ less testJob2.jdl**

```
[
    Type = "job";
    JobType = "normal";
    RetryCount = 0;
    ShallowRetryCount = 3;
    Executable = "testJob2.sh";
    Arguments = "lfn:/grid/hgdemo/test_($USER)/satimg lfn:/grid/hgdemo/te
st_($USER)/satimgjpg ";
    InputSandbox =  {"testJob2.sh", "compressjpeg"};
    StdOutput = "std.out";
    StdError = "std.err";
    OutputSandbox = {"std.out", "std.err"}
    DataRequirements = {
        [InputData = {"lfn:/grid/hgdemo/test_($USER)/satimg"};
         DataCatalogType = "DLI";]
    };
     DataAccessProtocol = {"gridftp","rfio","gsiftp", "https"}
  ]
```

Enabling Grids for E-sciencE

- **Uploading a file to the grid with specific LFN (if not already)**

✓ **[egee@ui01.isabella.grnet.gr]$ lcg-cr file:$PWD/satimg.ppm -l lfn:satimg guid:594cf6b5-e3b7-49b5-a916-0d5e3054af17**

✓ **[egee@ui01.isabella.grnet.gr]$ lfc-ls /grid/hgdemo/test_($USER)/** satimg

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Enabling Grids for E-sciencE

- ## Submit job
  glite-wms-job-submit -o jobId2 -a testJob2.jdl

- ## Watch the job status
  watch "glite-wms-job-status -i jobId2"

- ## Retrieve the job output
  glite-wms-job-output -i jobId2

- ## Listing the entries of a LFC directory
  [egee@ui01.isabella.grnet.gr]$ lfc-ls -l /grid/hgdemo/test_($USER)
  -rw-rw-r--   1 26259   32000   14110553 Nov 04 22:32 satimg
  -rw-rw-r--   1 26259   32000   1521142 Nov 04 22:36 satimgjpg

Enabling Grids for E-sciencE

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

  [egee@ui01.isabella.grnet.gr]$ lcg-lr --vo hgdemo lfn:satimgjpg

  [egee@ui01.isabella.grnet.gr]$ lcg-lr --vo hgdemo lfn:greysatimg

- Download output files

  [egee@ui01.isabella.grnet.gr]$ lcg-cp –v lfn:satimgjpg file:$PWD/local_satimgjpg

  [egee@ui01.isabella.grnet.gr]$ lcg-cp -t 100 lfn:greysatimg file:$PWD/local_greysatimg

- ## Deleting all replicas with the specific lfn

  - ✓ **[egee@ui01.isabella.grnet.gr]$** **lcg-del -a lfn:satimg**

  - ✓ **[egee@ui01.isabella.grnet.gr]$** **lcg-lr --vo hgdemo lfn:satimg**
    lcg_lr: No such file or directory

- ## Delete LFC directory

  - ✓ **[egee@ui01.isabella.grnet.gr]$** **lfc-ls /grid/hgdemo/test_($USER)**

  - ✓ **[egee@ui01.isabella.grnet.gr]$** **lfc-rm -r /grid/hgdemo/test_($USER)**

  - ✓ **[egee@ui01.isabella.grnet.gr]$** **lfc-ls /grid/hgdemo/**

Enabling Grids for E-sciencE

- **Commandline Tutorial**
  - *http://wiki.egee-see.org/index.php/Programming_from_the_Command_Line*

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Enabling Grids for E-sciencE

Ευχαριστώ πολύ!!!