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**Grid Computing School  
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**Hands-on with the P-GRADE Portal**

**Preparation:**

You have received a two digit number between 30-60. (**XY**). Use this number to login to one of the machines:

Account: budapest**XY**  
Password: GridBUD**XY**

Open a terminal window and login to the GILDA UI machine:

```
ssh budapestXY@glite-tutor.ct.infn.it  
Password: GridBUDXY
```

Upload a proxy into the GILDA MyProxy server:

```
myproxy-init --voms gilda -s grid001.ct.infn.it -p 7512 -l budapestXY  
Set GridBUDXY as MyProxy password!
```

Create a Grid catalog:

```
voms-proxy-init --voms gilda  
lfc-mkdir /grid/gilda/budapestXY
```

**1. Login to the GILDA Portal:**

- 1.1. Go to the URL:  
`http://portal.p-grade.hu/gilda`
- 1.2. Use user**XY** account and user**XY** password for the login

**2. Import an example workflow (traffic simulation) into your portal account:**

- 2.1. Download the following file onto your desktop computer using another browser window:  
`http://jfe.lpds.sztaki.hu/~sipos/p-grade/traffic/traffic-gilda.tar`
- 2.2. Go back to the portal and click on the "Upload" submenu of the "Workflow" tab
- 2.3. Select the previously downloaded archive file with the "browse" button and click OK
- 2.4. Click on the "Workflow manager" submenu of the "Workflow" tab
- 2.5. Click on the "Workflow editor" button and open the previously uploaded workflow in it ("Open item in the Workflow menu")

- 2.6. Map the jobs of the workflow onto the "gilda\_GLITE\_BROKER" grid (Workflow properties in the Workflow menu)
- 2.7. Save the workflow (Save or Save as in the Workflow menu)

### 3. Download a short-term proxy credential into the Portal:

- 3.1. Click on the "Certificates" tab
- 3.2. Click on the "Download" button
- 3.3. Submit the download form with the following data:

```
Hostname:    grid001.ct.infn.it
Port:        7512
Login:       budapestXY
Password:    GridBUDXY
Lifetime:    10
Description: <optional>
```
- 3.4. If download is successful then set your proxy for the "gilda\_GLITE\_BROKER" Grid

### 4. Submit the Traffic simulation workflow into the Grid and monitor its execution:

- 4.1. Go back to the Web interface of the portal and click on the "Refresh" button on the "Workflow" tab
- 4.2. Click on the submit button of the workflow
- 4.3. Monitor the progress of the workflow by the Workflow Editor and by the Web interface (Click on "Details" then on "Visualize")

### 5. Define a new workflow: Matrix multiplication

**Note: The "Matrix operations" program will be used as the core of the workflow. Please read the description of this program now. (See attached sheet for description!)**

- 5.1. Open a new workflow (Workflow menu) and define a new job with the following parameters:

```
Name:          <any>
Job type:      SEQ
Job executable: <path of the matrix_operations file>
Attributes:    M V
Grid:          gilda_GLITE_BROKER
```
- 5.2. Define a port for the job with the following parameters:

```
Port Name:     0
Type:          In
File type:     Local
File:          <path of INPUT1 file>
Internal File Name (case sensitive): INPUT1
```
- 5.3. Define another port to the job with the following parameters:

```
Port Name:     1
Type:          In
File type:     Local
File:          <path of INPUT2 file>
Internal File Name (case sensitive): INPUT2
```
- 5.4. Define a third port to the job with the following parameters:

```
Port Name:     2
Type:          Out
File type:     Local
Internal File Name (case sensitive): OUTPUT
File storage type: Permanent
```

- 5.5. Save your workflow as **Multiply**, go back to the browser, click "Refresh" then "Submit" on the "Workflow manager" panel.
- 5.6. Monitor the execution from the workflow editor and from the browser
- 5.7. Download and unzip the result file

## 6. Save the result of matrix multiplication into a Grid file

- 6.1. Save the Multiply workflow as **Multiply\_remoteout** ("Save as" in the "Workflow" menu)
- 6.2. Modify **port 2** to a remote file:
  - Double click on port 2
  - Set the "File type" parameter to **Remote**
  - Set the "File" field to  
**lfn:/grid/gilda/budapestXY/result\_matrix**  
**(substitute XY with your user number!)**
- 6.3. Open the Property window of the job and click on the "JLD Editor" button.
- 6.4. On the "Environment" tab set the following environment variables:
  - **LCG\_CATALOG\_TYPE = lfc**
  - **LFC\_HOST = lfc-gilda.ct.infn.it**
  - **LCG\_GFAL\_INFOSYS= grid004.ct.infn.it:2170**
 (See the data management hands-on from Day2 for details!)
- 6.5. Save your workflow
- 6.6. Submit your workflow and monitor its execution
- 6.7. Please note that after the execution there is no result file to download!
- 6.8. Check the existence of the result Grid file with the lfc-ls command!

## 7. Define a workflow which computes the following expression:

$$AB[* , 0]^T * AB[* , 1]$$

(A and B represents the INPUT1 and INPUT2 input matrixes)

**Hint:** The "Matrix operations" program reads and produces files in the same format. Add the matrix\_operation program 4 times to the Multiply workflow. The new workflow is shown in the Figure below.

Set the jobs to compute the following operations:

- Multip -  $A \cdot B \rightarrow$  parameter: M
- Column0 -  $A \cdot B[* , 0] \rightarrow$  parameter: C 0
- Column1 -  $A \cdot B[* , 1] \rightarrow$  parameter: C 1
- Transpose -  $A \cdot B[* , 0]^T \rightarrow$  parameter: C 1
- Multip.2 -  $A \cdot B[* , 0]^T * A \cdot B[* , 1] \rightarrow$  parameter: M

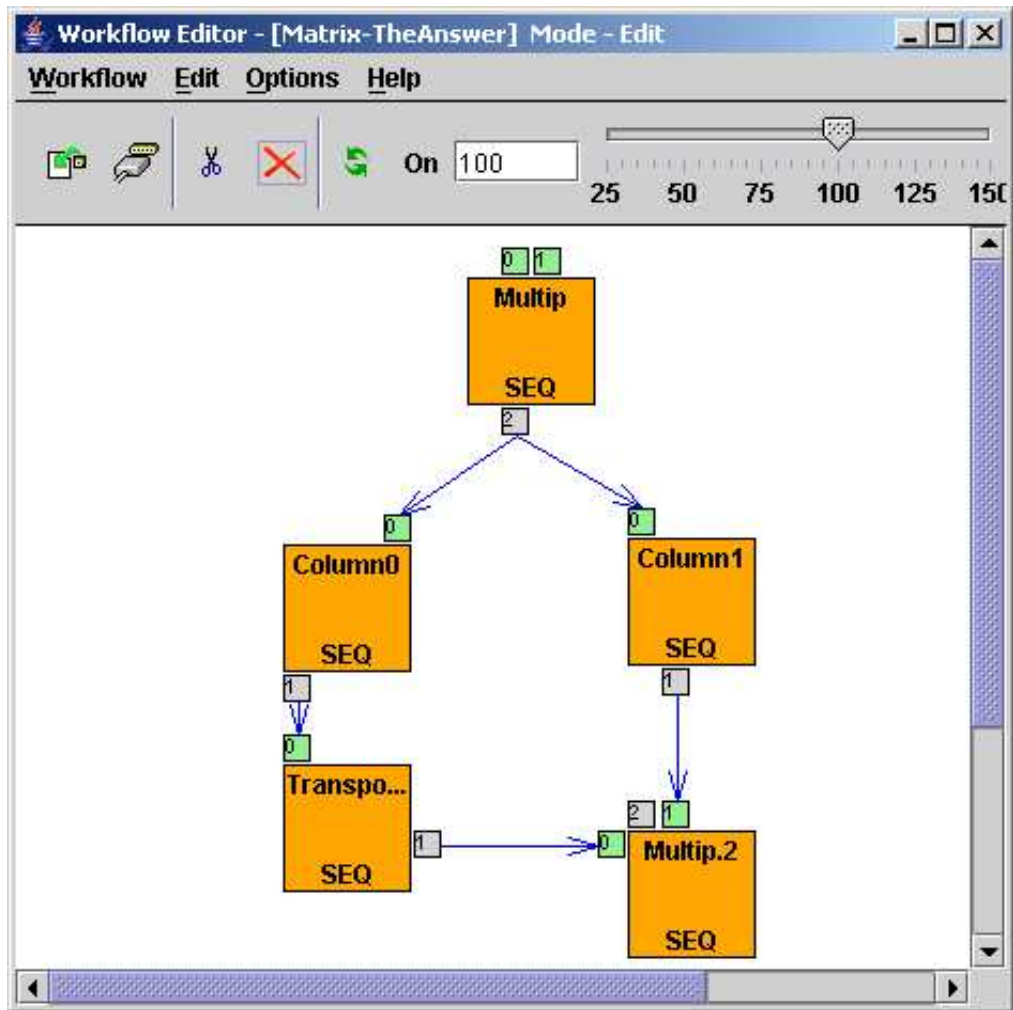


Figure 1. Matrix workflow to compute  $AB[*,0]^T * AB[*,1]$

The full workflow can be downloaded from:

<http://jfe.lpds.sztaki.hu/~sipos/p-grade/matrix-full/Matrix-full.tar>

Do not forget to reallocate the jobs to the gilda\_GLITE\_broker Grid!