

Università degli studi di Napoli "Federico II"

Bachelor Degree

Software Virtualization of the Computing Infrastructure to Interface DAMEGRID web application on the S.Co.P.E. Grid

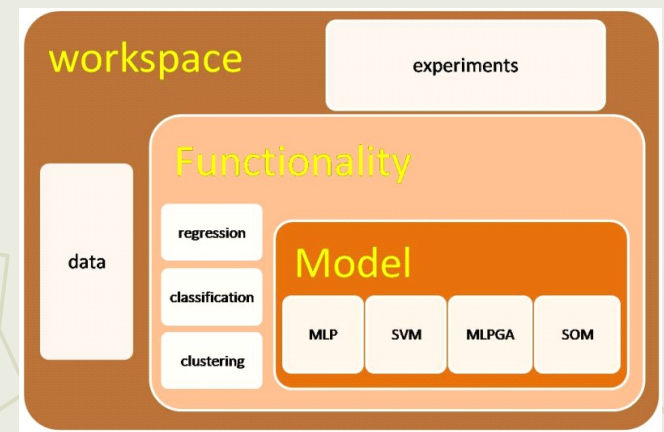
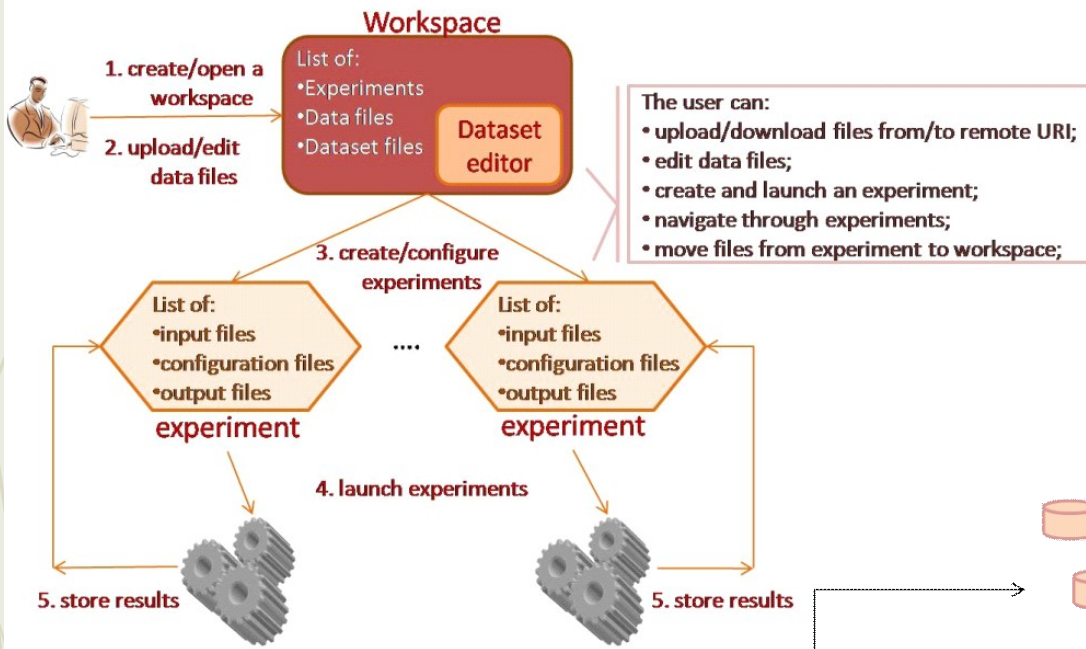
Academic Tutor:
Prof. Adriano Peron

Company Tutor:
Dr. Massimo Brescia

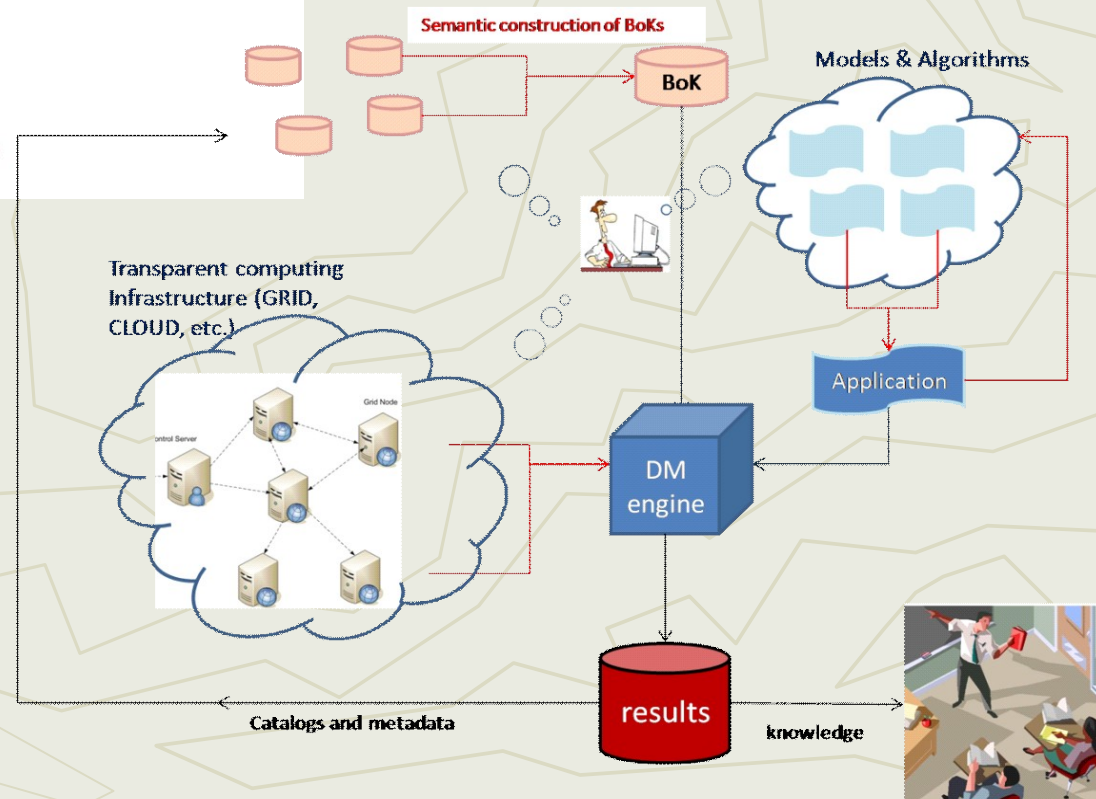
Candidate:
Giovanni Vebber
Matricola: 566/346

Academic Year 2010/2011

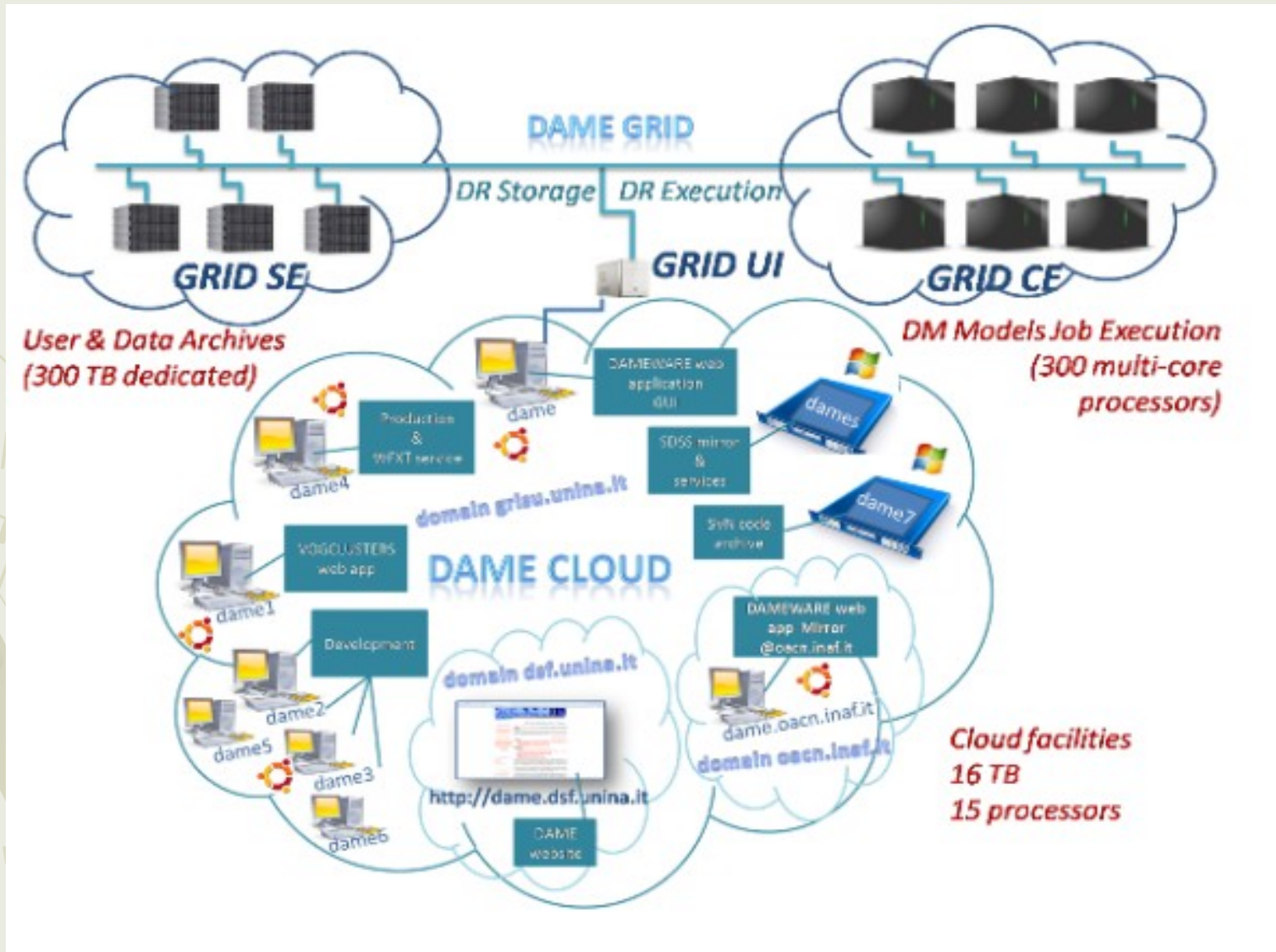
DAME (Data Mining & Exploration)



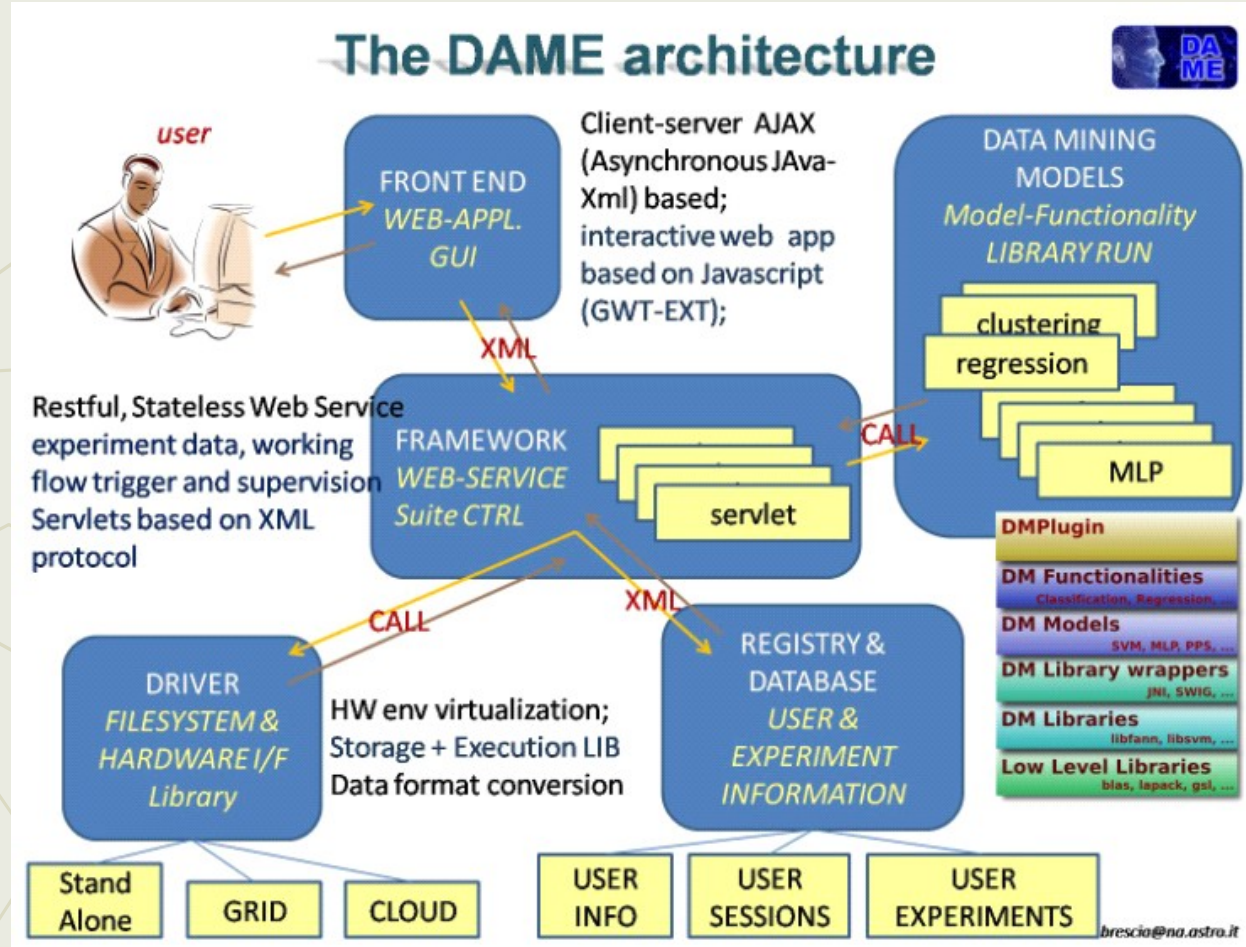
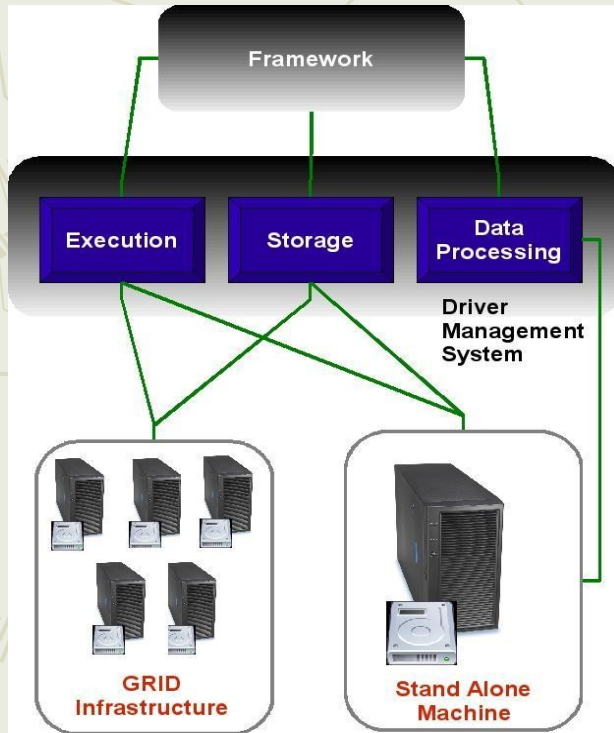
It is a program for the development of Web 2.0 services, dedicated to data mining on massive data sets, based on distributed computing infrastructure and machine learning methods



HW Hybrid DAME Infrastructure



Driver Component Grid Extension



Bachelor Activities

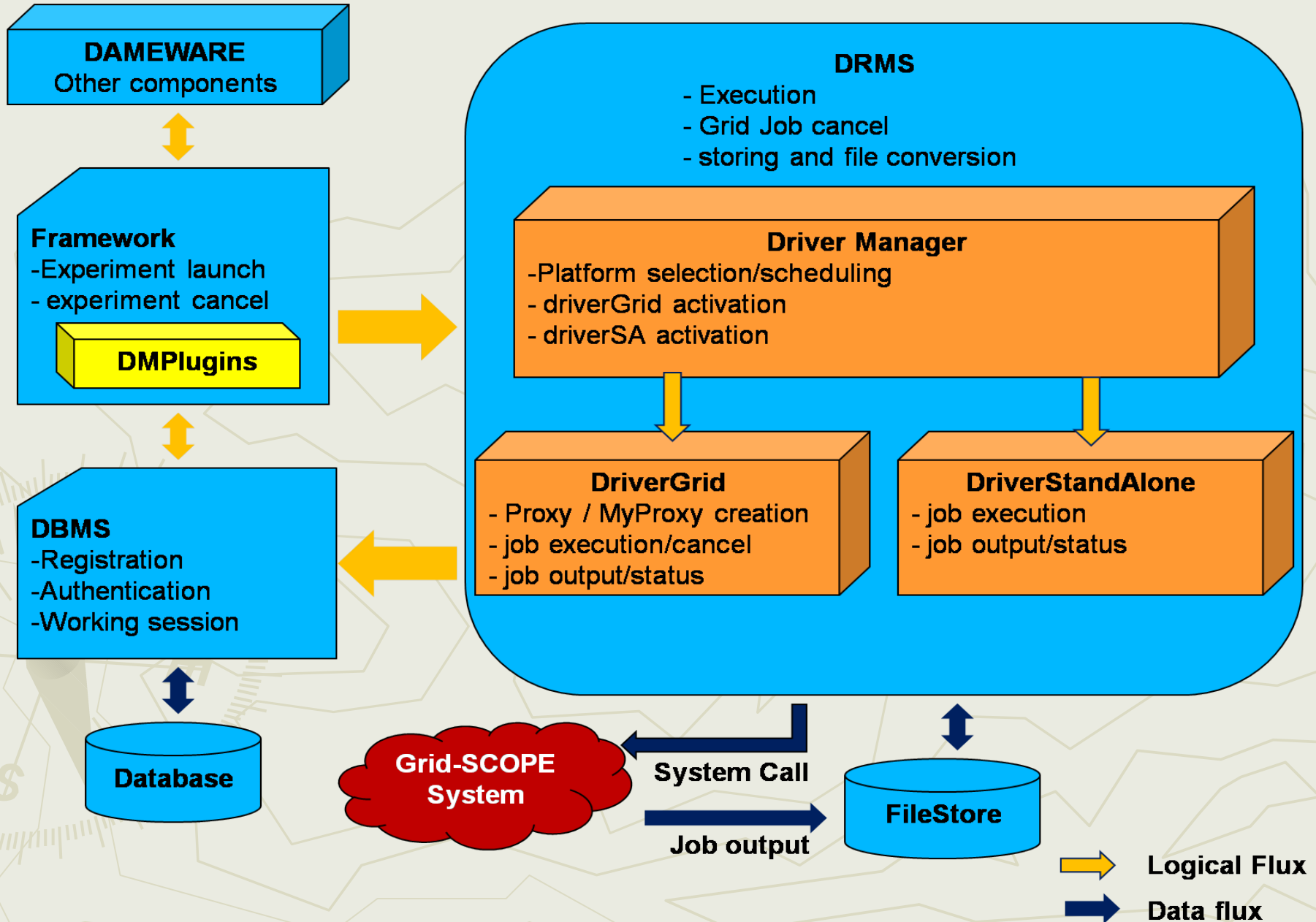


- ▶ SCOPE Grid User Interface (UI) installation and configuration on DAME Cloud machine

- ▶ DriverGRID Module design and development
 - Grid job execution functionalities (Java environment)
 - ▶ Glite commands handled via system call

- ▶ DRMS integration with DriverGRID
 - Hierarchical structure of DRMS in two layers:
 - ▶ First layer: platform selection/scheduling GRID / Stand Alone (SA)
 - ▶ Second layer: platform job handling (DriverGRID / DriverSA)

The new DRMS



UI Installation

- ▶ UI installation through gLite 3.2 INFN GRID
 - gLite 3.2 x86_64
 - Scientific Linux 5.5
- ▶ The UI is installed with the packet handler
YUM

Command:

```
yum groupinstall ig_UI_noafs
```

File Repository

- **glite-ui.repo**: UI node info retrieval
- **lcg-ca.repo**: get Certification Authority list
- **dag.repo**: get added packets of SL5.5
- **ig.repo**: get sw packets of gLite

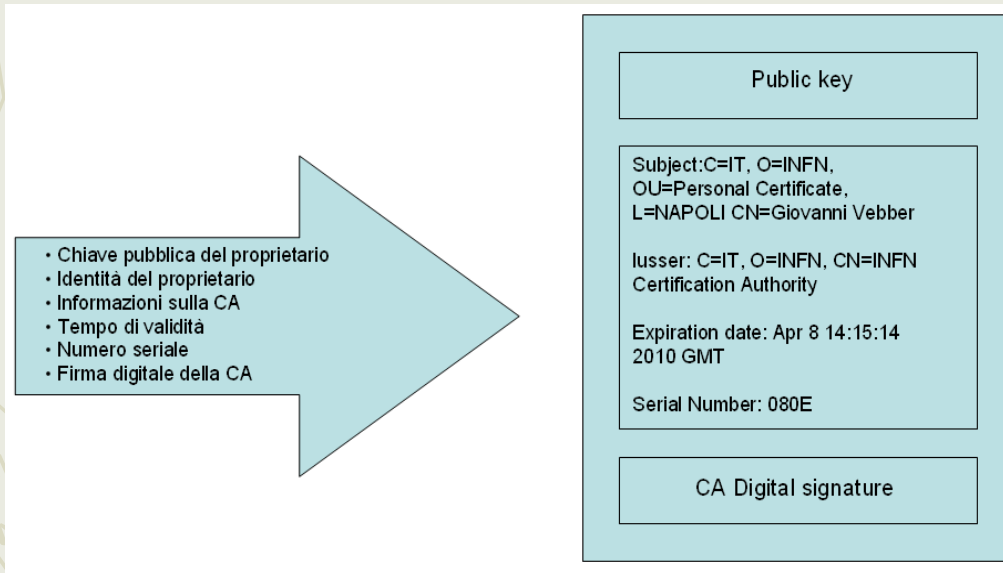
UI configuration

- ▶ UI Node configuration through YAIM_INFNGRID
- ▶ YAIM is a simple way to configure a Grid node
- ▶ It is distributed through rpm packets

Command:

```
/opt/glite/yaim/bin/ig_yaim -c -s <your-site-info.def> -n <nodetype>
```


Grid Access



- ▶ Access to the Grid is done by a digital certificate X.509
 - Next, people authentication is required
- ▶ Proxy certificate generation
 - Avoids iterated periodical authentication (limited to 12/24 hours)
- ▶ Myproxy certificate generation
 - Extends account connection (typically 7 days)
- ▶ Subscribe to a virtual organization (unina.it)

Proxy Creation:

```
[gvebber@notredame ~]$ voms-proxy-init --voms unina.it
Enter GRID pass phrase:
Your identity: /C=IT/O=INFN/OU=Personal Certificate/L=Federico II/CN=Giovanni Vebber
Creating temporary proxy ..... Done
Contacting voms01.scope.unina.it:15003 [/C=IT/O=INFN/OU=Host/L=Federico
II/CN=voms01.scope.unina.it] "unina.it" Done
Creating proxy ..... Done
Your proxy is valid until Thu Jan 13 00:23:57 2011
```

GRID Activities

► Main Grid job activities...

- launch (file jdl)
- status
- Output
- Cancel

► ...respective gLite commands:

- *glite-wms-job-submit -a jdl*
- *glite-wms-job-status Id_job*
- *glite-wms-job-output Id_job*
- *glite-wms-job-cancel -a Id_job*

User Interface



Computing Element



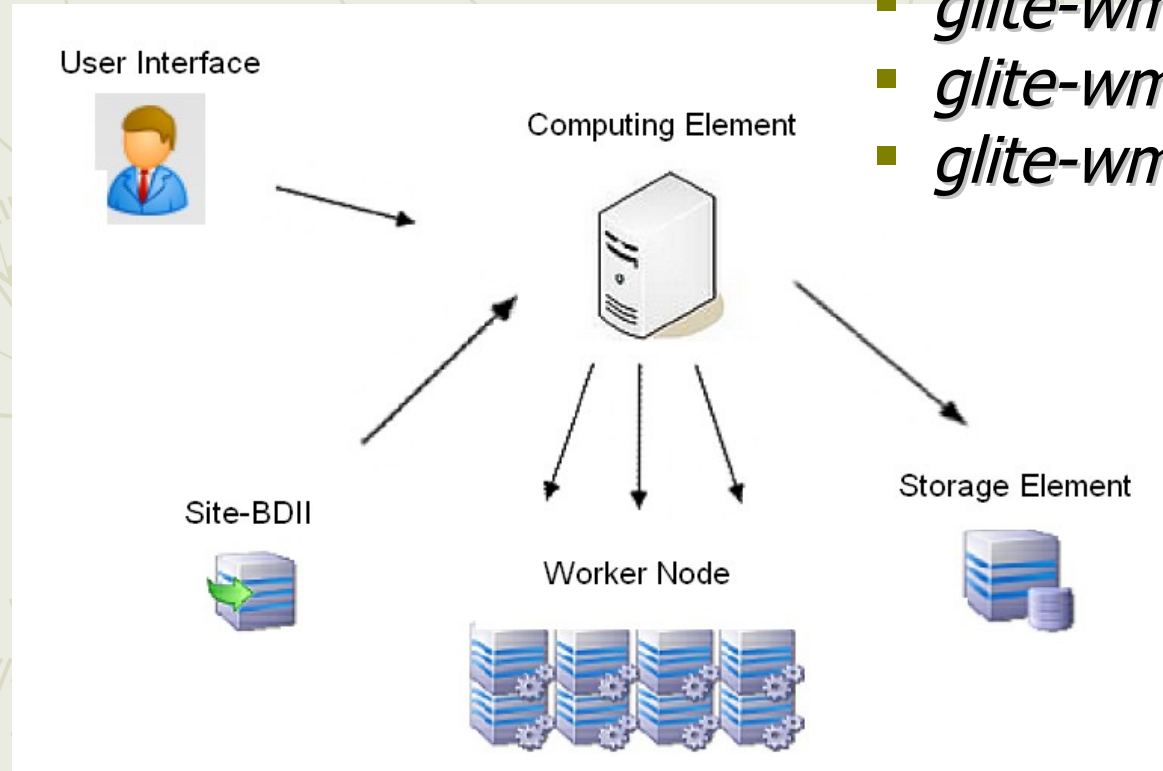
Site-BDII



Storage Element

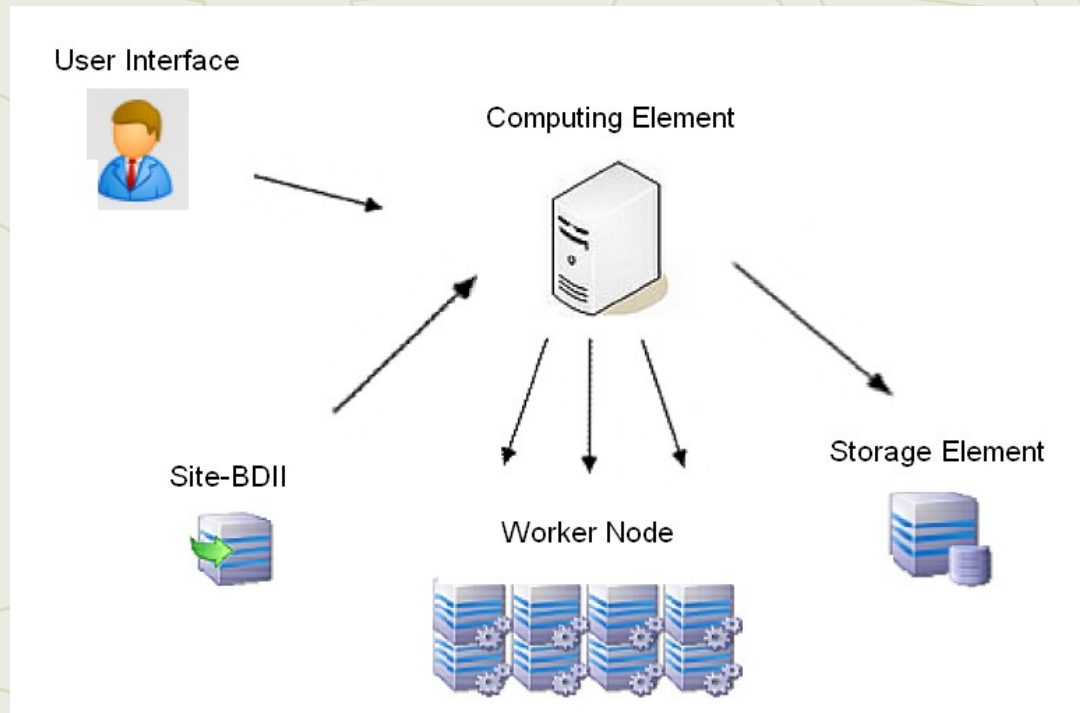


Worker Node



Job status analysis

- One thread for each launched job on the Grid
- Periodical polling on job status (1min)
- The monitoring thread stops when:
 - ▶ Done (Success)
 - ▶ Done (Failed)
 - ▶ Aborted
 - ▶ Cancelled
 - ▶ Cleared



gLite Java System Call vs API

▶ Why system calls?

- Can use all gLite commands available
- Fast modification of any command
- More portability between gLite versions

▶ Why not APIs?

- Limited handling of gLite commands number
- gLite 3.2 integration not easy

COMING NEXT...



- ▶ Complete integration into DAMEWARE webapp
- ▶ Intelligent (self-adaptive) job scheduling system improvement
- ▶ Deeper testing sessions

<http://dame.dsf.unina.it/>

Technical and management info
Documents
Science cases
Newsletters

The screenshot shows the DAME website homepage. At the top is a navigation bar with links: Home, Cloud Services, Science, Technology, Machine Learning, Publications, Education & Lectures, The Team, and Contact. Below the navigation bar is a search bar and a 'What is DAME' section. The 'What is DAME' section contains text about the platform's purpose and evolution. To the right of the 'What is DAME' section is a sidebar with a '1861 > 2011 >>' anniversary banner and a 'Subscribe to DAME Project News by Email' button.

The screenshot shows the DAME web application interface. It features a top navigation bar with links: Model Manuals, Cloud Services, Science Cases, Documents, and Info. Below the navigation bar is a 'Workspace' section with a 'File Manager' and a 'My Experiments' table. The 'File Manager' shows a file named 'provovs.dat' with a last access date of 2010-12-17. The 'My Experiments' table has the following data:

| Experiment | Status | Last Access | Delete |
|------------|--------|-------------|--------|
| dsadadas | failed | 2011-03-07 | X |
| dsadad | failed | 2011-03-07 | X |
| asdasdasd | ended | 2011-03-07 | X |
| asdasdad | ended | 2011-03-07 | X |
| rlsrl | ended | 2011-03-07 | X |

http://dame.dsf.unina.it/beta_info.html
DAMEWARE Web application Beta Version