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# BEgrid
# The Belgian Grid for research

BEgrid

The Belgian Grid for Research

**BELNET - BEgrid**

**UCL - INGI – 18th May 2010**

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# Agenda

- What is BELNET?
- GRID worldwide
- BELNET as NGI
- Who is Begrid?
- How it works?
- Security
- Searching for ressources
- Technologies
- Practical informations
- Conclusion

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# What is BELNET

- BELNET is the Belgian National Research and Education Network (NREN) providing
  - internet connectivity to universities, high-school and research centers in Belgium
  - extra services to our customers including BEgrid as the National Grid Initiative (NGI) and the Computer Emergency Response Team (CERT)

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# Some other services

- Domain Name Servers (DNS)
- FTP Server (ftp.belnet.be)
- Time Server (ntp.belnet.be)
- Registration Authority (RA)
- Video conferencing (http://www.uclouvain.be/130662)
- Instant messaging (jabber.belnet.be)
- ...

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# GRID worldwide

- GRID computing pushed by CERN for LHC experiments
- In Belgium, GRID mainly used by IIHE (ULB/VUB) and UCL (outside of BEgrid) for CMS experiments (LHC related)
- European project to support GRID computing (EGEE previously and now EGI)

# European Grid Iniative EGI

- Wikipedia:
  « *The **European Grid Initiative** is a sustainable computing grid infrastructure in Europe. The EGI will provide a forum to link together computing resources in different European countries to support international research in many scientific disciplines.* »
- Visit: http://web.eu-egi.eu/
- BELNET is member of the EGI and represents Belgium there

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# BELNET as NGI

- Each country member of the European GRID Initiative (EGI) must have a National GRID Initiative responsible for national services.
- For Belgium, BEgrid/BELNET is the NGI.

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# NGI Services

- Virtual Organisation Management (VOMS)
- Work Management Systems (WMS)
- Information Services (BDII)
- Monitoring
- GRID Security
- Support and Training
- Bring computer resources to EGI

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# Who is BEgrid?

- BEgrid is the Belgian Computing Grid for Research;
- BELNET acts as coordinator for BEgrid;
- Participants choose to share resources;
- Participants are universities and research centers (the BELNET customers).

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# Available ressources

- On 29th march 2010 for beapps:
  - IIHE (ULB/VUB): 461 cores
  - KULeuven: 456 cores
  - BELNET: 72 cores (test cluster)
  - ***CISM (UCL): 28 cores***
  - UGent (down for maintenance)
  - Universiteit Antwerpen (down for maintenance)
  - SARA (NL): 1997 cores (external partner)

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# Other participants

- Vlaams Instituut voor de Zee
- Faculté Universitaires Notre-Dame de la Paix (FUNDP)
- Centre of Excellence in Information and Communication Technologies (CETIC)
- Vlaams Insituut voor Technologisch Onderzoek (VITO)

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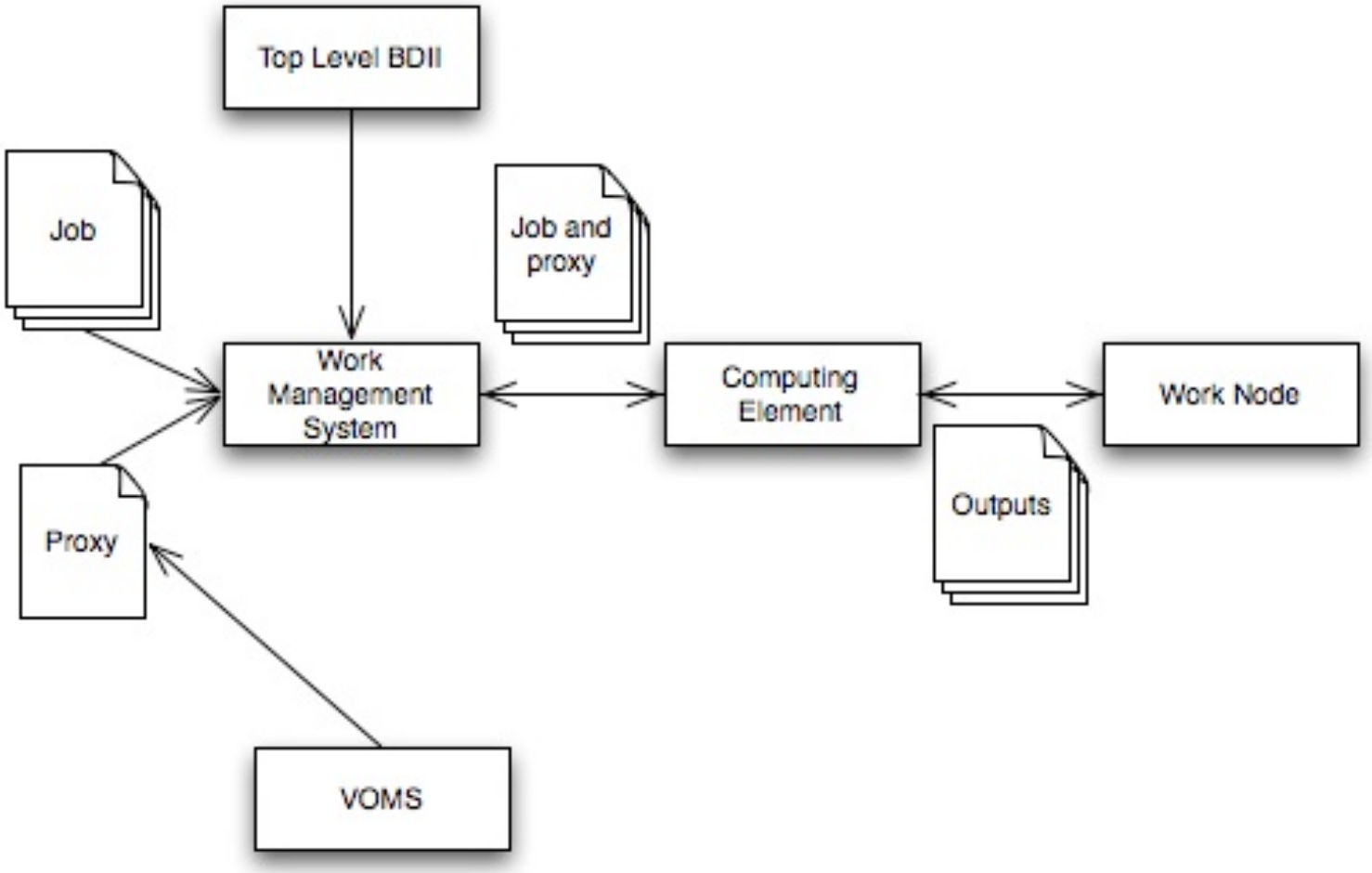
# How it works?



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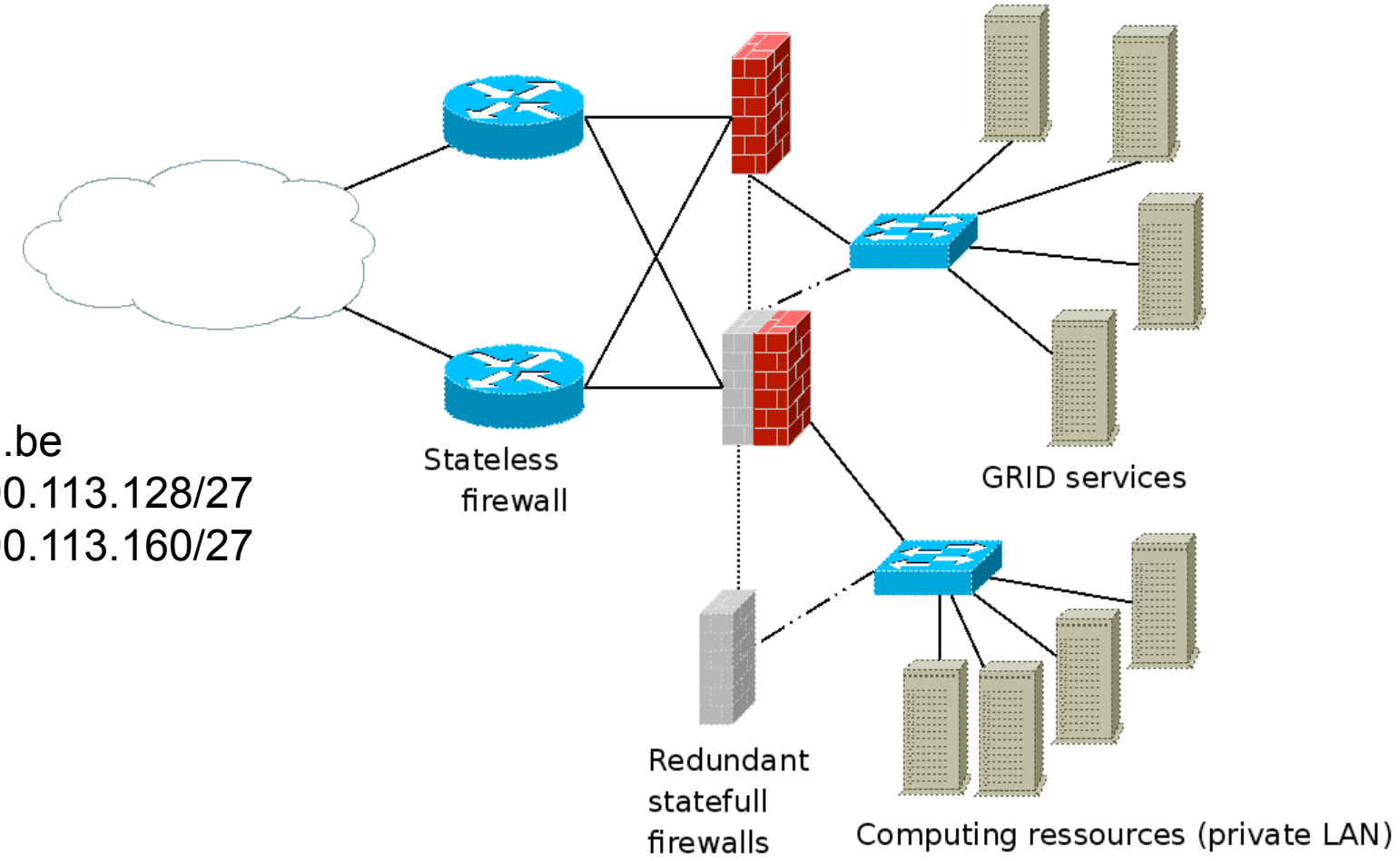
# A job example

- Job description written using the *Job Description Language (JDL)*:

```
Executable = "/bin/echo";
Arguments = "Hello World";
Stdoutput = "message.txt";
StdError = "error.txt";
OutputSandbox = {"message.txt","error.txt"};
```

# Connection to BELNET network

.begrid.be
193.190.113.128/27
193.190.113.160/27



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# Security

- Each server has a certicate valid for 2 years;
- Each user has a certicate valid for 1 year;
- Each job is sent with a certicate valid for maximum 24 hours (8 hours on BELNET VOs);
- BELNET is the Belgian recognized registration authority (self-signed root so the public key is exchanged when required).

# Security: VOMS role

- Each institution is supporting some experiments/applications/user communities;
- Those are organised in virtual organisations (VO);
- VO membership is managed by VOMS servers;
- VOMS servers are declared at international level;
- For BEgrid: *voms.begrid.be* and *voms02.begrid.be*

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# Begrid managed VOs

- **betest –** supported on whole BEgrid and only BEgrid for short life jobs (mainly for test and learning purpose)
- **beapps –** supported on whole Begrid + resources from SARA (NL) for production
- **becms –** for high energy physics computations

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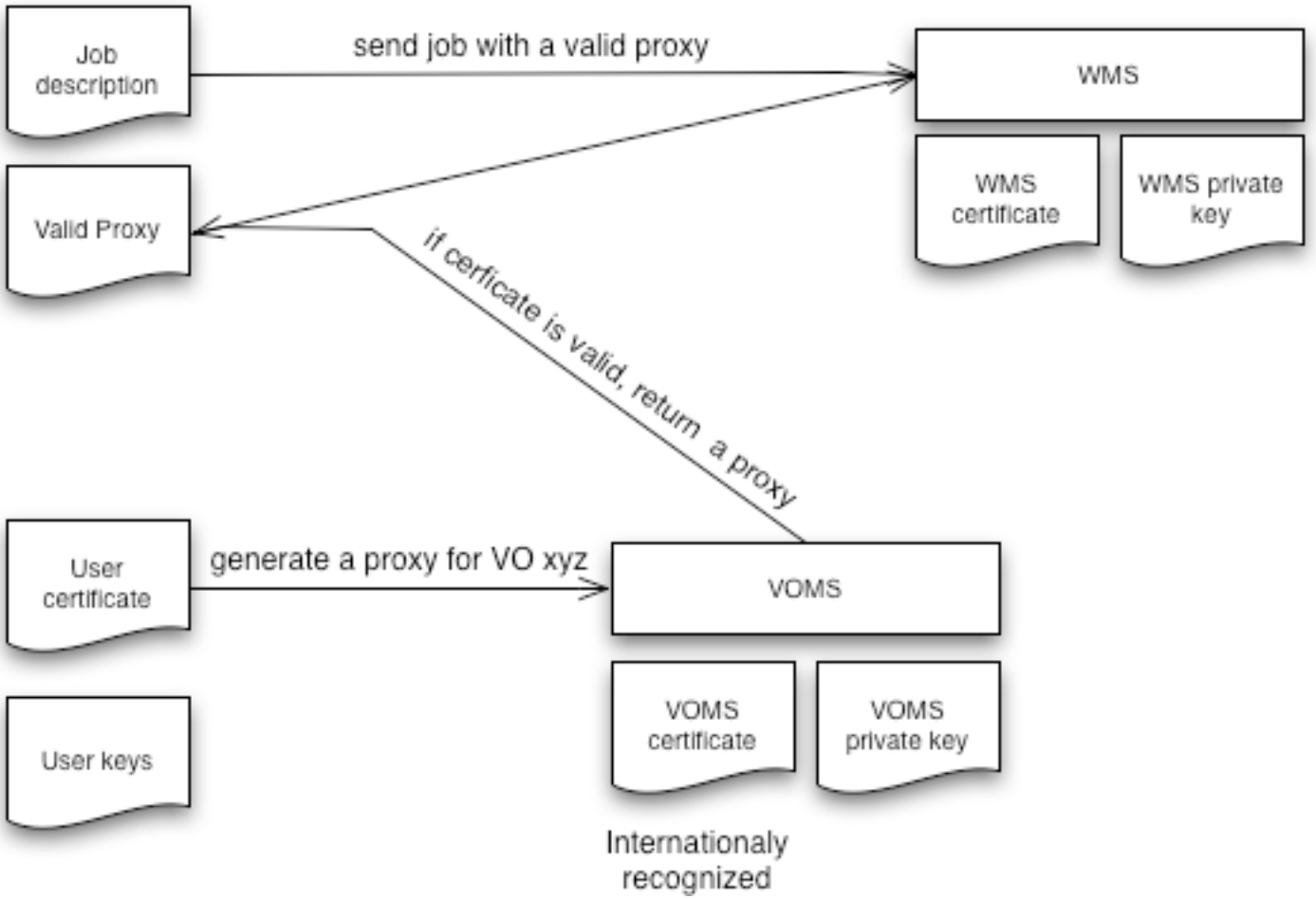
# Security: what happen?




Each server is able to check identity of his pair

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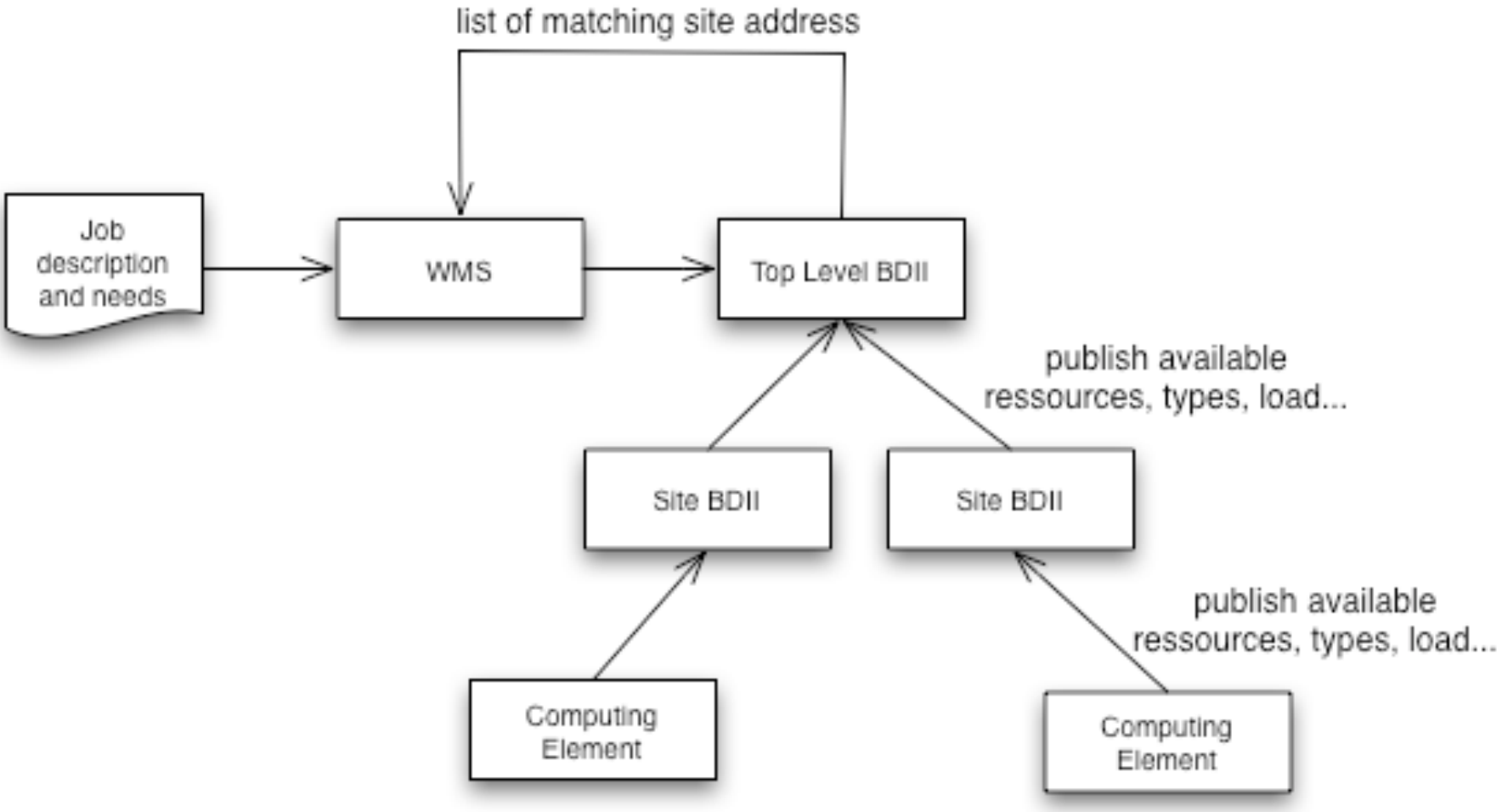
# Searching for ressources



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# Technologies

- Operating System Deploiement and Management
  - Quattor (www.quattor.org)
- Middleware
  - glite 3.1 and gLite 3.2 (www.glite.org)
- Registration Authority
  - OpenTrust (www.opentrust.com)
- Firewall
  - pfSense (www.pfsense.org)

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# Pratical Informations

- From a user point of view
  - Request a certicate on https://gridra.belnet.be
  - Request VO membership (depend on the Vos)
  - (Request a user account on a User Interface)
  - Enjoy the GRID ;-)

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# Practical Informations

- From a institution point of view
  - Each institution is supposed to add to the GRID enough resources to satisfy his need
  - GRID is built on resources sharing principle
  - Each institution supports the VOs wanted. For example, IIHE support CMS which is a CERN VO part of LHC experiments.

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# Available applications

- On betest:
  - Octave
  - R
  - Python
  - Enthought Python Distribution
  - ...
- A few compilers (gcc, python...)
- Any applications with batch support and licenses allowing GRID deployement

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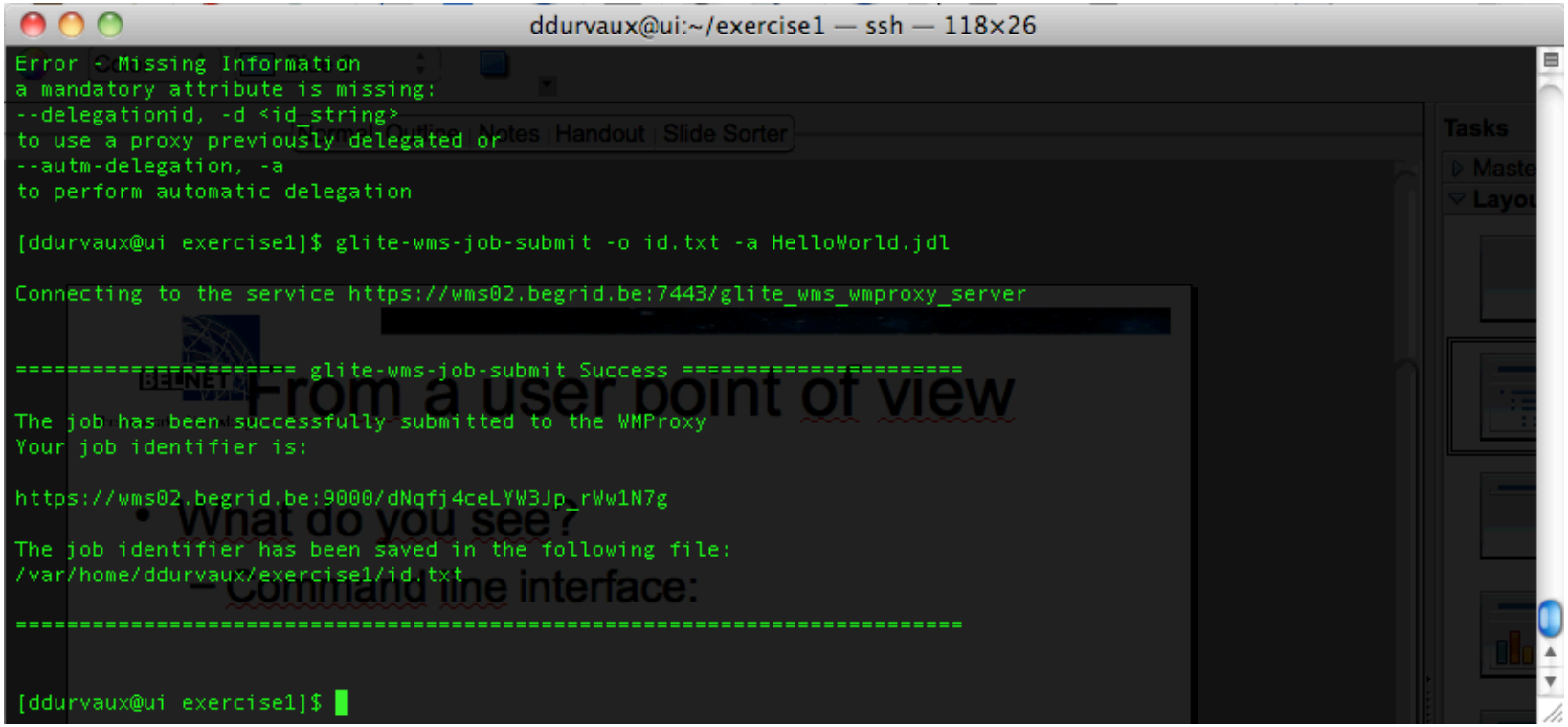
# From a user point of view

- What do you see?
  - Command line interface:



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# From a user point of view

- What do you see?
  - Web interface (for instance P-Grade):

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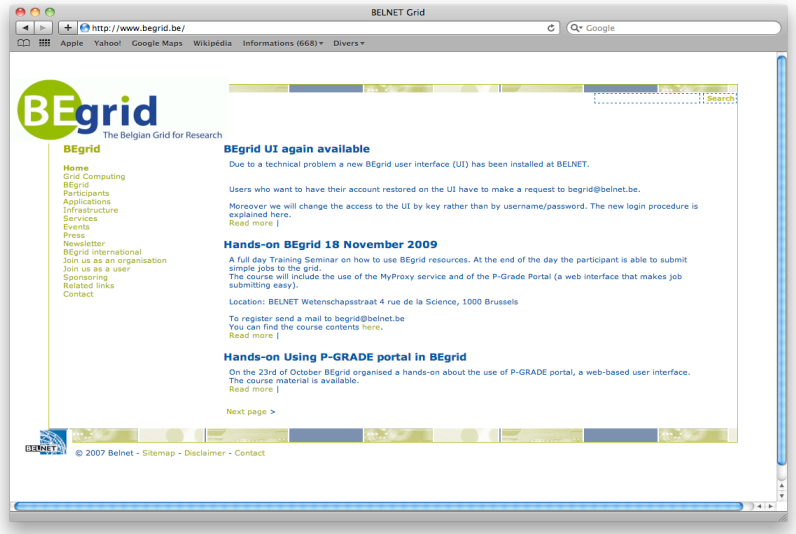
# More info

- BELNET trainings
- Available hands-on
- Begrid website (http://www.begrid.be)
- GridCafé (http://www.gridcafe.org/)



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# Conclusion

- Interested?
  - Feel free to look at it!
- Typically, GRID is good for batch of jobs without too many interactions (MPI available @BELNET) consuming a lot of resources (CPU, memory and storage)
- BELNET is listening to your needs, so ask!

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# Questions

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Feel free to contact us at:

begrid@belnet.be

http://www.begrid.be