gLite on Grid'5000 :
towards a real-size testbed for production grids

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Goal

- **Use Grid'5000 as a testbed for gLite**

- Use cases : developers of gLite components, and of applications interacting with the gLite middleware

    - Be able to **run experiments in a stable environment** (no variation between experiments) $\rightsquigarrow$ compare results

    - Be able to **create experimental conditions required by an experiment**, possibly hard to meet in a production environment (e.g service crash)

    - Be able to **replace components of the infrastructure** $\rightsquigarrow$ test new versions, test interoperability

   - **Avoid overloading or influencing the production infrastructure** with test jobs

Grid'5000

- **Experimental platform for research on distributed systems** and high performance parallel computing

- 1700 nodes (7000 cores), 10 sites in France

- **Reconfigurable by users** : operating system on nodes can be replaced using Kadeploy, network isolation with KaVLAN
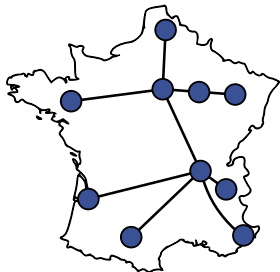
Deployed gLite infrastructure

- ▶ One **VO** and its **VOMS (*Virtual Organization Membership Service*)**, users directory

- ▶ Several sites, composed of :

  1 One **BDII (*Berkeley Database Information Index*)**, directory of resources available on each site

  2 One **CE (*Computing Element*)**, task submission service for a given computing site

  3 **Worker nodes** and a **batch scheduler** to access them. **Torque/Maui** was used

  4 One **UI (*User Interface*)**, used by users to access the resources

Tools developed
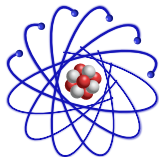
- ▶ **Scientific Linux 5.5** image, minimal and generic (working on all Grid'5000 clusters) for the Kadeploy deployment tool

- ▶ **Ruby scripts** enabling an automated installation of gLite from RPM repositories

  - ▶ Description of the platform to deploy (VO, sites, clusters) in a configuration file

  - ▶ Creation of a certification authority to generate and automatically sign users and machines certificates

  - ▶ Pre-filling of the RPM cache on nodes using Kadeploy to accelerate deployment

    ```
    https://github.com/sbadia/gdeploy/
    ```

Deployment process
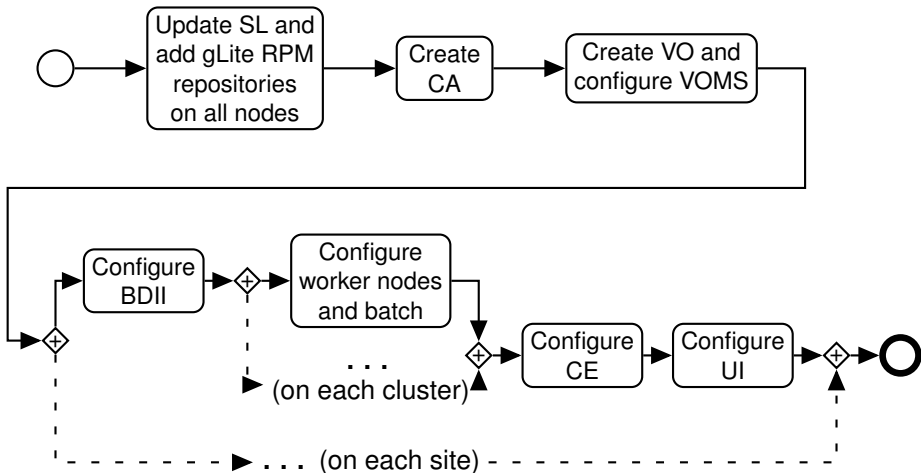
Results

Use of Grid'5000 to deploy the gLite middleware

- ▶ Deployment up to **926 nodes (17 clusters, 9 sites)**

- ▶ Installation of machines with Scientific Linux 5.5 using Kadeploy : 10 minutes

- ▶ Configuration of gLite with one VO on 597 nodes (6 sites, 10 clusters) : **170 minutes**

Future work

- ▶ **Improvements to the deployment script**
  - ▶ Deployment of several VO
  - ▶ Deployment of other gLite services : storage, monitoring

- ▶ **Collaborations**
  - ▶ **Experiments on evolution of gLite components**
  - ▶ **Experiments on tools interacting with the gLite middleware : workflow engines, pilot jobs managers, etc.**
    - ▶ Simulation of services crash
    - ▶ Load injection
    - ▶ Submission of a large number of fake tasks