# gLite Administration Workshop

## GridKa Summer School 2010

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# Contents

# Overview



## Monday

Grid Computing and Cloud Computing, an Overview (T. Cass)

## Tuesday

gLite Introduction Course (M. Sober)

## Today

gLite Administration Course (S. Freitag, F. Feldhaus)

# Time table



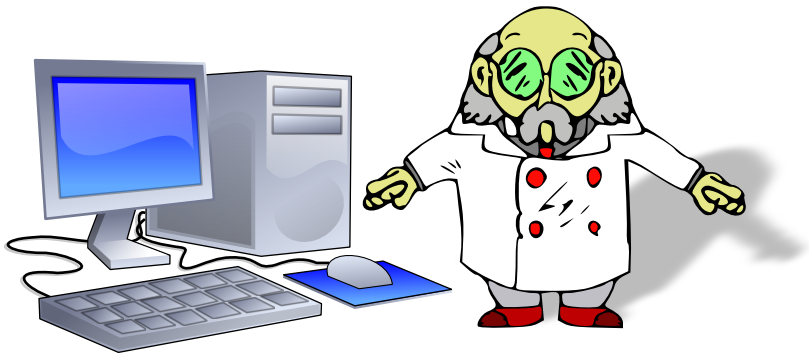
| | |
|---|---|
| 11:00 | Brief introduction |
| 11:30 | site BDII |
| 12:30 | Lunch (northern canteen) |
| 13:45 | Batch system |
| 14:45 | CREAM Compute Element |
| 15:30 | Coffee break |
| 16:00 | User Interface |
| 17:00 | Advanced exercises and site testing |
| 18:30 | End of the workshop |

# Why Grid middlewares?



## Resource sharing in early days of computing

1. only few scientists had access to compute and storage resources
2. resources only available at a very limited number of sites



If you were not working at such a site → What a pity!

# Why Grid middlewares?

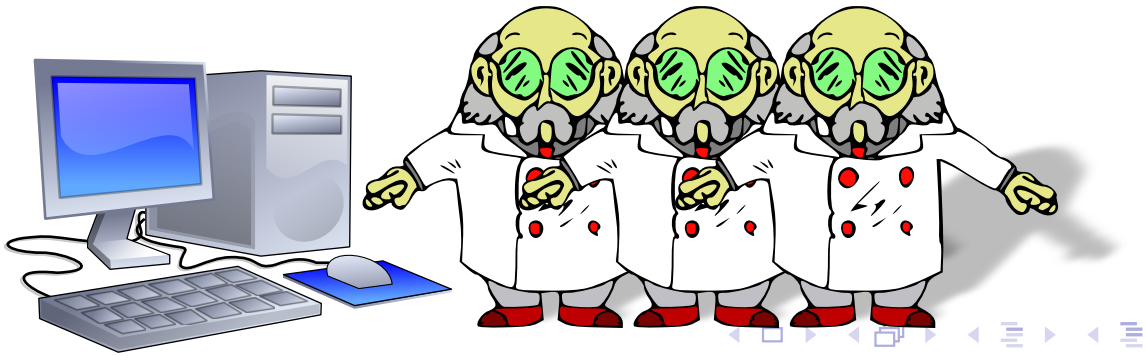


## Maybe you have heard...

If the mountain won't come to Mohammed, Mohammed must go to the mountain.

## Consequences

- Scientists moved to the places where the required resources were available.
- Resource sharing allowed multiple scientists to access the resources at the same time



# Why Grid middlewares? - Intervention



You could ask: "Why did those scientists move? If I was a one of those scientists I would have simply used something like `ssh`?"

## Brief historical overview

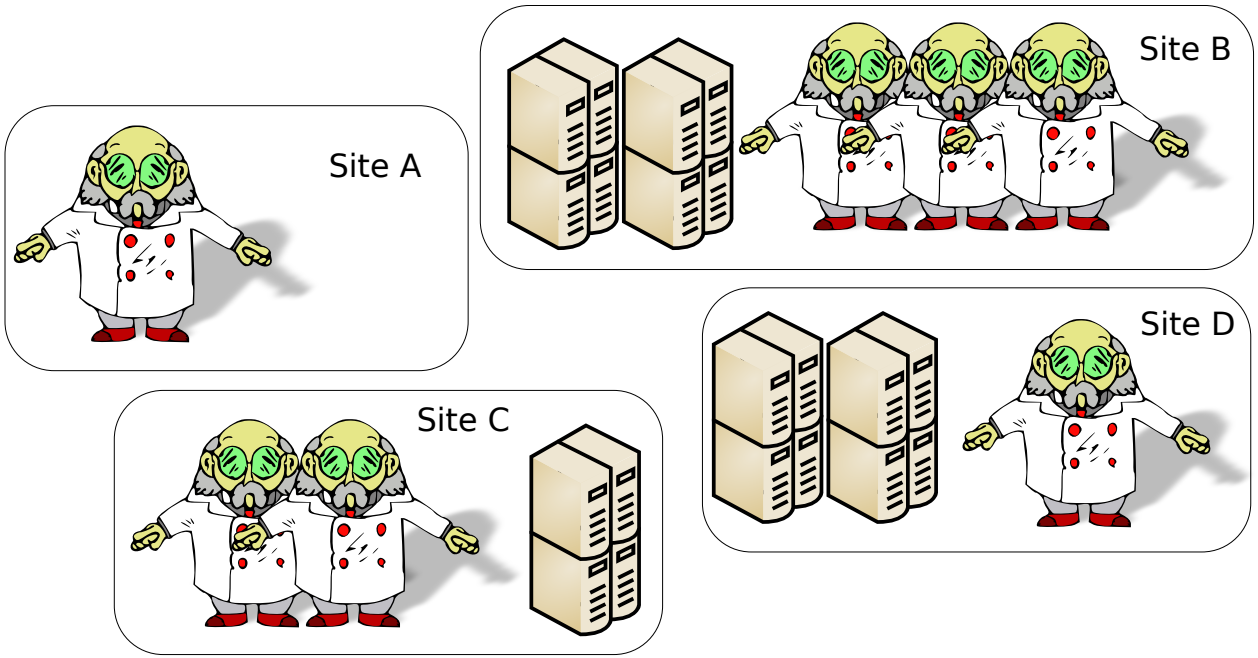
- `rsh` originated as part of the BSD Unix operating system in 1983
- Version 1 of the `ssh` protocol was designed in 1995

- Until protocols for remote shells were developed, there was no other choice

# Why Grid middlewares?



- Over time resources became affordable for research facilities → more resources and more locations




As some scientists had/ still have no access to local resources a way for sharing resources in the research community was required.

# Why Grid middlewares?



Fosters checklist:

## A Grid

- coordinates resources that are not subject to centralized control
- It integrates/ coordinates resources and users that exist within different control domains.

# Why Grid middlewares?



Fosters checklist:

## A Grid

- uses standard, open, general-purpose protocols and interfaces
- delivers nontrivial qualities of service. $\rightarrow$ allows its constituent resources to be used in a coordinated fashion to deliver various qualities of service.

# Grid middleware implementations



- gLite


- NAREGI (National Research Grid Initiative), Japan

# Grid middleware implementations



- ARC (Advanced Resource Connector)


- Globus Toolkit


- UNICORE (Uniform Interface to Compute Resources)

# Grid middleware



Most services implemented by Grid middlewares can be assigned to one or more of the following categories:

## Service categories

- Execution management,
- Data management,
- Information services and
- Security

# Globus Toolkit 5



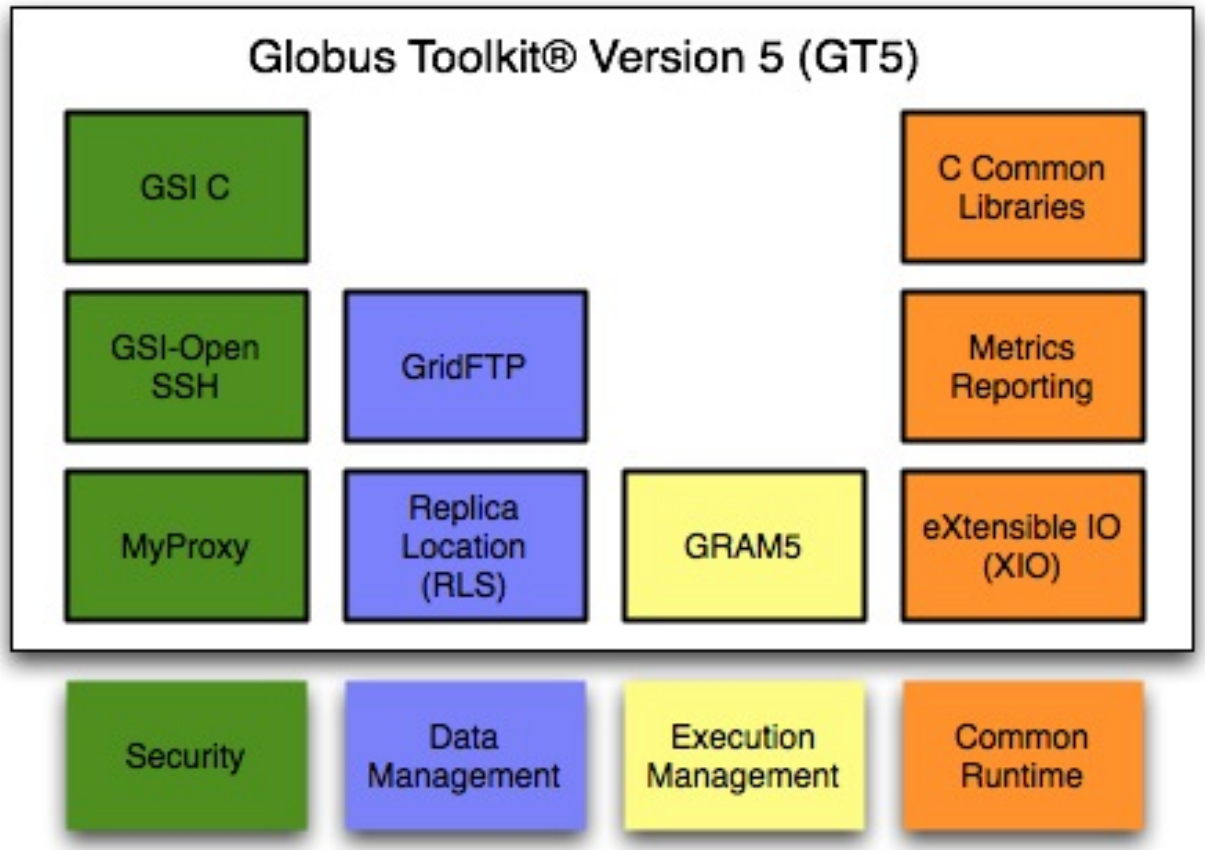



Figure: Globus Toolkit 5 Architecture

# gLite

## Execution Management

- Workload Management System
- CREAM Compute Element
- Batch system

## Information services

- siteBDII
- TopLevelBDII

# gLite

## Data management

- LFC (File Catalog)
- dCache Storage Element
- CASTOR (CERN Advanced Storage manager)
- DPM (Disk Pool Manager)

## Security

- GSI (Grid Security Infrastructure)

# gLite Interaction



is more complex than you can imagine.

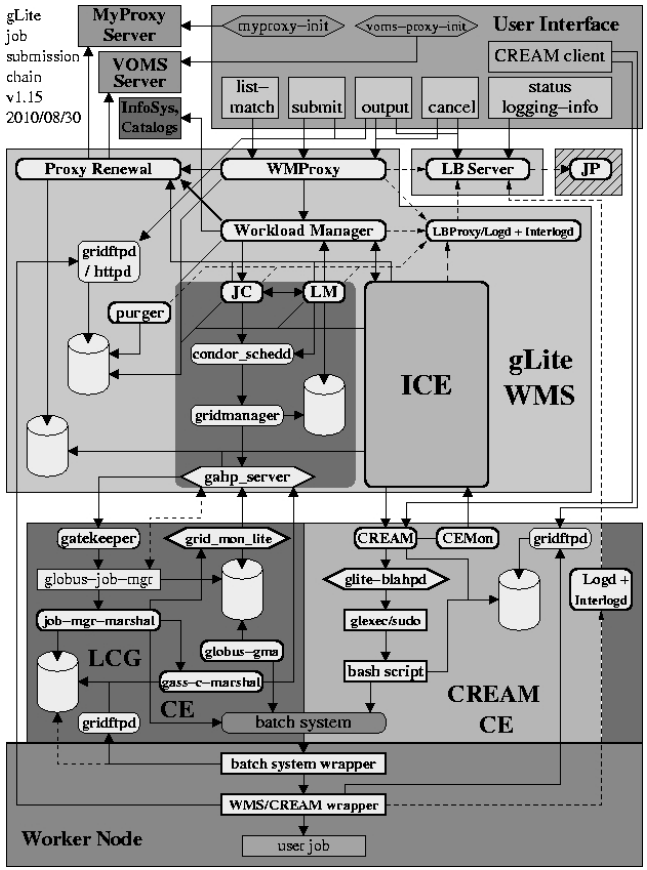



Figure: EGEEgLiteJobSubmissionSchema

Thanks to Maarten Litmaath

# Plan for today



## Focus: Installation & Configuration

of gLite services required for a site offering access to compute resources

- Execution Management
  - CREAM Compute Element
  - Batchsytem (Torque server and one worker node)
- Information Services
  - siteBDII
- Additional services
  - User Interface
  - VO Box
  - Accounting service (APEL node)
  - LFC (File catalog)

# Worker Node

- eager beaver of the Grid site
- all jobs submitted to the site are executed on worker nodes
- the worker nodes are linked to a batch system server

## Installed software

- Batch system software (Torque mom)
- CLI/ libraries for e.g. file catalog and storage element operations
- (MPI)

# Batch System Server



- consists of different queues
  may vary in wallclocktime, max. resource allocation,...
- job management
  assigning jobs to worker nodes, start/ stop jobs
- workernode management

## Installed software

- Torque Batchsystem server
- Maui Scheduler

# Compute Element



- Contact point for WMS and end users to submit jobs to the Grid site
- Authorizes remote users for job submission
- Acts on behalf of the users and submits jobs via the batch system client.

## Installed software

- Tomcat (CREAM CE is using this)
- Accounting service (APEL)
- Information provider (GIP)
- Batchsystem client

# siteBDII

- Contact point for TopLevelBDIIs
  yep, there is not only one!
- Queries local gLite services for information
- In both cases LDAP is used

## Installed software

- openLDAP

GridMap: `http://gridmap.cern.ch`
GStat 2.0:
`http://gstat-prod.cern.ch/gstat/geo/openlayers`

# VO Box



- allows virtual organizations to run their own specific services and directly access their local software area at a Grid site.
- (usually) software managers are able to connect to the VoBox via gsissh

## Installed software

- gsissh client (Port 1975 is default)
- gLite CLI/ libraries

# APEL node

- Publishes accounting information to the Grid via ActiveMQ
- Information is taken from a local database
- Compute Elements fill the database by
  - parsing the batch system accounting logs
  - MySQL inserts

## Installed software

- MySQL
- Java

APEL RSS: Link

Accounting Portal: `http://www3.egee.cesga.es/`

# Plan for today

- Group to small teams of 4 - 6 people
- Each team will act as a SysAdmin team of a grid site.
- Open `http://gkswiki.fzk.de/index.php5` in your browser
- Select gLite administration workshop with hands-on
- Now it is your turn!

## Support

If you experience problems while setting up the services, Florian and I will join your team and assist.

# Hints

## Hint 1

Make an initial sketch of your site setup containing an assignment of grid services to hosts (and administrators)

## Hint 2

We suggest to install the basic services in the following order

- siteBDII
- Batchsytem
- Compute Element

## To anyone interested

How to establish a storage resource at your grid site is shown tomorrow in the dCache administrations workshop.

## Our experience

- Do not expect that everything works ouf-of-the-box.

## For now

# Thanks for your attention! Questions !?

Access to your machines: `ssh -p24 root@gks-X-XYZ.fzk.de`