

Unil

UNIL | Université de Lausanne



SWITCH/AAA Info-Day 2009

# GridUNIL

*a campus grid for the UNIL  
community and beyond...*

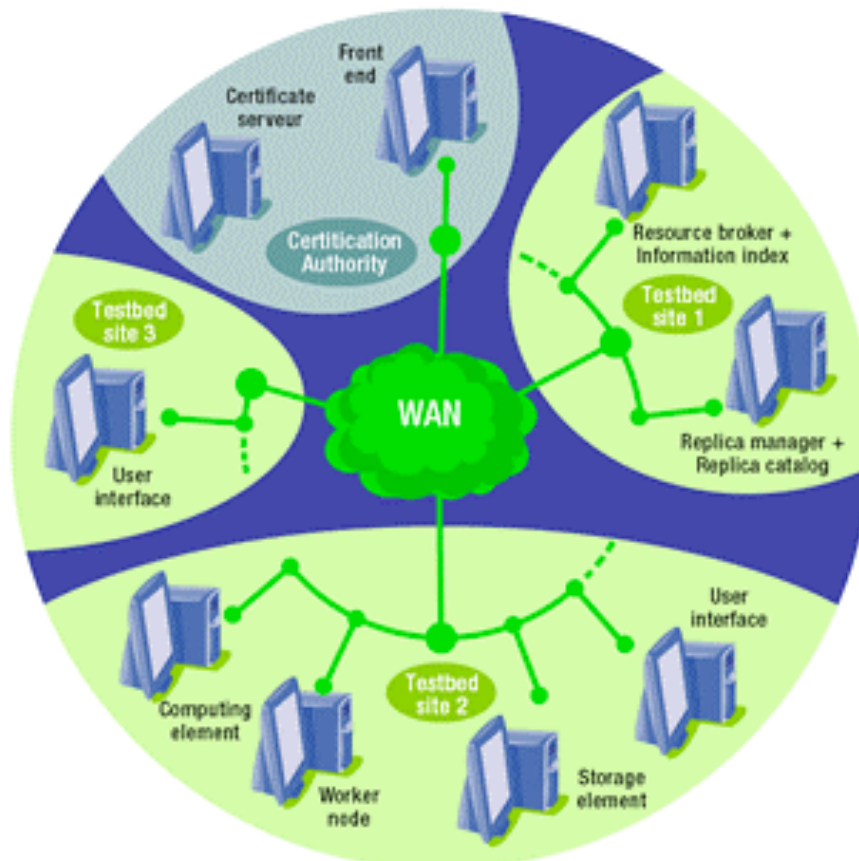
| le savoir vivant |

Friday, January 16, 2009

# Overview

- A grid at the scale of the UNIL campus?
- A three phase deployment plan
- Main components
- Architecture
- Future prospects
- Discussion & Questions?

# A GRID at the scale of UNIL campus?



Source: Grid Café CERN

- UNIL owns an heterogenic pool of about 4000 CPUs and associated storage interconnected on a fast Ethernet network.
- With relatively few additional resources, part of this pool of machines could be **progressively** integrated in a local GRID at UNIL. Later it could be opened / interconnected with other resources in Switzerland and in the rest of the world.
- UNIL would then benefit, starting today, of a know-how which will be indispensable tomorrow.

# A three phase deployment plan

## Three levels of resources aggregation

- Local scale resources deployment on the campus of the University of Lausanne (UNIL)
  - *High Performance Computing (HPC)* on central servers
  - *High Throughput Computing (HTC)* on central servers
  - *High Throughput Computing (HTC)* on distributed platforms
- Campus wide resources
  - Aggregation of local resources in a campus wide grid named “**GridUNIL**”
  - Independence at the level of the different Faculties and Institutes of the University
  - Central governance local management model
  - Middleware stack is chosen for its compatibility with the two main worldwide scale Grid projects
    - EGEE actually 120 institutional partners mainly allover Europe (72'000 CPUs 7/24)
    - OSG actually 90 institutional partners mainly allover US
- Regional and World Wide resources aggregation
  - Based on a community computing model ???
  - Commercial model ???
  - Other sharing model ???

# Main problems

## Distributed ownership of the IT resources

- IT services
  - Mainframes
    - HPC
    - HTC
- Faculty / Academic departments
  - Large clusters
  - Computer lab room desktop
- Institutes & Research groups
  - Desktops
  - Small clusters
- Individuals
  - Desktops
  - Multiplatform environment
    - Windows
    - Mac OSX Intel/PPC
    - Linux

## All participants have similar interests but no one shares common interests

- All agree that it is a cool thing to tap in others extra CPU cycles but mostly no one agrees on concessions to obtain it!
- Local IT support staffs are reluctant to the extra work due to the grid middleware installation and maintenance
- Do not want to share root access with the grid staff
- Want to keep full privileges and priority with 100% availability 24/7 on their own resources
- Scientists are funded to produce science and are reluctant to change the way they interact with their IT resources

# GridUNIL main features requirements

- Almost no change on local IT resources
- Fine grained control over grid users authorization
- Strong authentication
- Mapping IT resources owner hierarchy on a VO/group/role-attributes hierarchy
- Profiling user based on:
  - information in his Shibboleth attributes
  - any other data sources
  - his relation to the resources ownership hierarchy
- CLI tools
- Web based GUI tools
- Monitoring tools

# Projected GridUNIL components

## **Components of the central middleware**

AAI	<a href="http://www.switch.ch/aai/">http://www.switch.ch/aai/</a>
Ant	<a href="http://ant.apache.org/">http://ant.apache.org/</a>
Apache http Server	<a href="http://httpd.apache.org/">http://httpd.apache.org/</a>
Axis	<a href="http://ws.apache.org/axis/">http://ws.apache.org/axis/</a>
BerkleyDB	<a href="http://www.oracle.com/">http://www.oracle.com/</a>
Generic Information Provider	<a href="https://twiki.cern.ch/twiki/bin/view/EGEE/GIP">https://twiki.cern.ch/twiki/bin/view/EGEE/GIP</a>
Globus Toolkit	<a href="http://www.globus.org/toolkit/">http://www.globus.org/toolkit/</a>
GLUE Schema	<a href="http://forge.ogf.org/sf/projects/glue-wg">http://forge.ogf.org/sf/projects/glue-wg</a>
GridSphere	<a href="http://www.gridisphere.org/gridsphere/gridsphere">http://www.gridisphere.org/gridsphere/gridsphere</a>
GridWay Metascheduler	<a href="http://www.gridway.org/">http://www.gridway.org/</a>
GUMS	<a href="https://www.racf.bnl.gov/Facility/GUMS/1.2/index.html">https://www.racf.bnl.gov/Facility/GUMS/1.2/index.html</a>
MyProxy	<a href="http://grid.ncsa.uiuc.edu/myproxy/">http://grid.ncsa.uiuc.edu/myproxy/</a>
MySQL	<a href="http://www.mysql.com/">http://www.mysql.com/</a>
PostgreSQL	<a href="http://www.postgresql.org/">http://www.postgresql.org/</a>
PRIMA	<a href="http://computing.fnal.gov/docs/products/voprivilege/prima/prima.html">http://computing.fnal.gov/docs/products/voprivilege/prima/prima.html</a>
Site Authorization Service	<a href="http://www.fnal.gov/docs/products/saz/v_vo1/SAZ.htm">http://www.fnal.gov/docs/products/saz/v_vo1/SAZ.htm</a>
Shibboleth	<a href="http://shibboleth.internet2.edu/">http://shibboleth.internet2.edu/</a>
Simple CA	<a href="http://www.globus.org/grid_software/security/simple-ca.php">http://www.globus.org/grid_software/security/simple-ca.php</a>
Tomcat	<a href="http://tomcat.apache.org/">http://tomcat.apache.org/</a>
VASH	<a href="http://www.switch.ch/grid/vash/">http://www.switch.ch/grid/vash/</a>
Vine Toolkit	<a href="http://www.vinetoolkit.org/">http://www.vinetoolkit.org/</a>
VOMRS	<a href="http://www.fnal.gov/docs/products/vomrs/">www.fnal.gov/docs/products/vomrs/</a>
VOMS	<a href="http://hep-project-grid-scg.web.cern.ch/hep-project-grid-scg/voms.html">http://hep-project-grid-scg.web.cern.ch/hep-project-grid-scg/voms.html</a>

# Projected GridUNIL components

## **Components of the peripheral middleware**

Condor	<a href="http://www.cs.wisc.edu/condor/">http://www.cs.wisc.edu/condor/</a>
LSF	<a href="http://www.platform.com/">http://www.platform.com/</a>
PBS/OpenPBS	<a href="http://www.pbsgridworks.com/">http://www.pbsgridworks.com/</a>
SunGridEngin	<a href="http://gridengine.sunsource.net/">http://gridengine.sunsource.net/</a>
Torque	<a href="http://www.clusterresources.com/">http://www.clusterresources.com/</a>

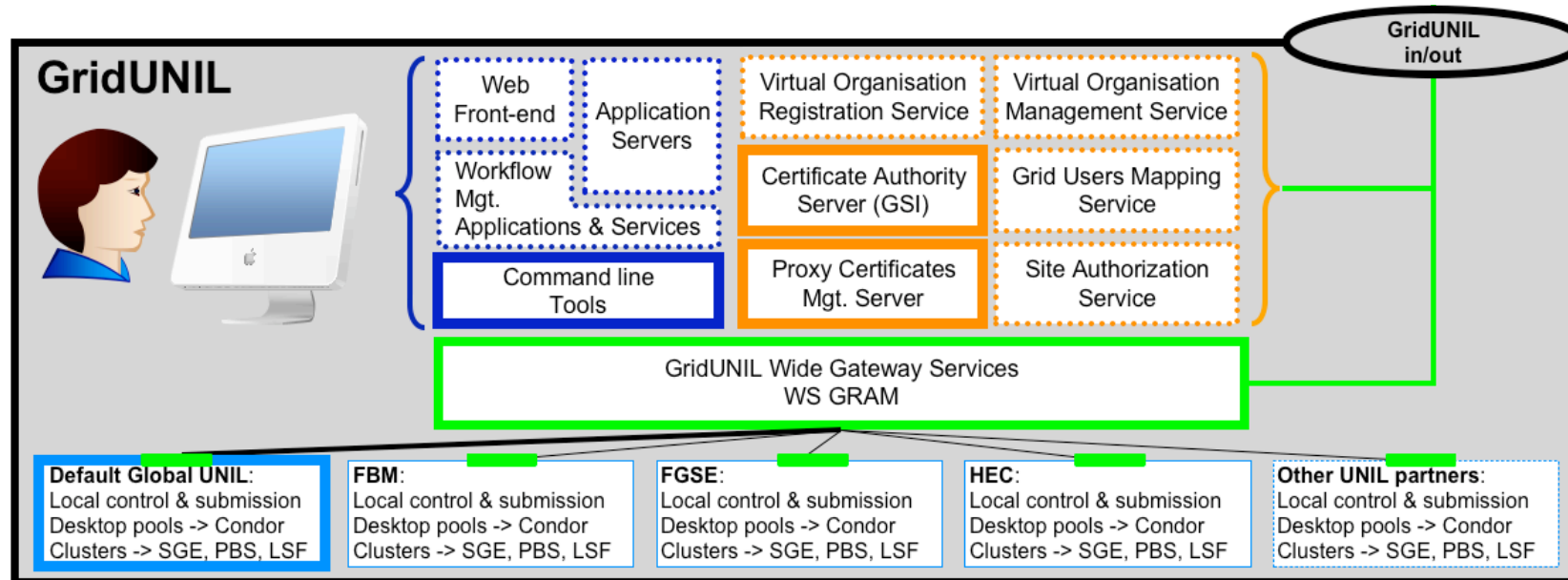
## **Virtualization/OS Platforms**

RedHat	<a href="http://www.redhat.com/">http://www.redhat.com/</a>
VMWare	<a href="http://www.vmware.com/">http://www.vmware.com/</a>
Xen	<a href="http://www.citrixserver.com/">http://www.citrixserver.com/</a>
Oracle VM	<a href="http://www.oracle.com/technologies/virtualization/index.html">http://www.oracle.com/technologies/virtualization/index.html</a>

## **Monitoring Infrastructure (candidates)**

CEmon	<a href="http://grid.pd.infn.it/cemon/">http://grid.pd.infn.it/cemon/</a>
Ganglia	<a href="http://www.ganglia.info/">http://www.ganglia.info/</a>
GIP	<a href="https://twiki.cern.ch/twiki/bin/view/EGEE/GIP">https://twiki.cern.ch/twiki/bin/view/EGEE/GIP</a>
Gridcat	<a href="http://www.ivdgl.org/gridcat/">http://www.ivdgl.org/gridcat/</a>
Hyperic	<a href="http://www.hyperic.com/">http://www.hyperic.com/</a>
Monalisa	<a href="http://monalisa.cacr.caltech.edu/">http://monalisa.cacr.caltech.edu/</a>
Nagios	<a href="http://www.nagios.org/">http://www.nagios.org/</a>
RealTime	<a href="http://gridportal.hep.ph.ic.ac.uk/rtm/">http://gridportal.hep.ph.ic.ac.uk/rtm/</a>
R-GMA	<a href="http://www.r-gma.org/">http://www.r-gma.org/</a>
SiteVerify	<a href="https://twiki.grid.iu.edu/twiki/bin/view/Integration/SiteVerify">https://twiki.grid.iu.edu/twiki/bin/view/Integration/SiteVerify</a>

# GridUNIL Architecture



Dark Blue => User Interfaces & Associated Application Servers

Orange => Security Infrastructures

Green => Distributed Gateways to Local Resources

Light Blue => Pool of Distributed Local Resources Owned by Faculties & Institutes

Not presented on Map: Monitoring Resources

# GridUNIL present & future prospects

- **Short term**     <= AAA funded until end 2009
  - Basic (CLI) production environment deployment
  - Shibboleth/AAI integration
  - Web based Front-end
  - Monitoring Infrastructure
  - Administrative & support staff training
  - Out of campus deployment / interconnection
  
- **Long term**
  - Adding new services and technologies to the GridUNIL infrastructure
    - Meta-schedulers
    - Virtualization
    - Accounting & Auditing services
    - Remote grid middleware installation and management services
    - Distributed storage
    - Workflow management
    - Collaborative workspaces

# Credits

- Centre informatique / University of Lausanne

- Etienne Dysli [etienne.dysli@unil.ch](mailto:etienne.dysli@unil.ch)
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# Questions & Discussion

