# Summary of the session *Interoperability and Resource Utilisation*

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# Introduction

- **Many infrastructures are providing resources for e-science**
  - Local resources, regional and disciplinary grids
- **Resource integration at the European scale is required**
  - A fully integrated (“monolithic”) grid is not a realistic perspective
- **Interoperability & interoperation**
  - Standardization
  - Access to heterogeneous infrastructures
  - Application-level abstractions

# Standards

## EGEE strategy towards interoperability:

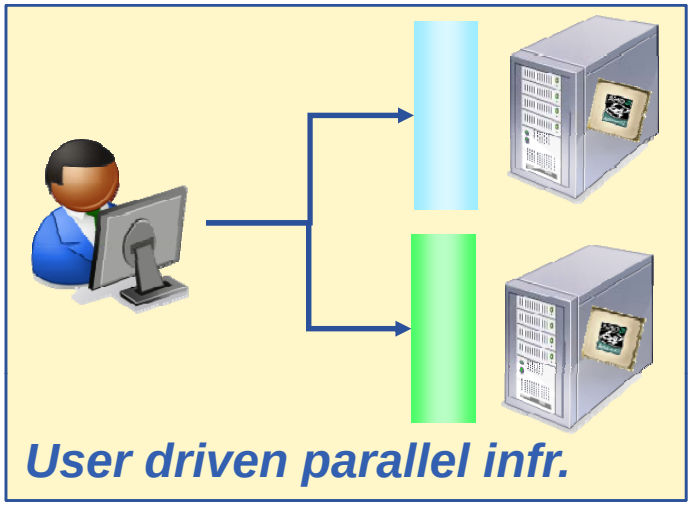
- **The best solution is to have *common interfaces* through the development and adoption of *standards*.**
- **The gLite reference forum for standardization activities is the Open Grid Forum**
  - Many contributions (e.g. OGSA-AUTH, BES, JSDL, new GLUE-WG, UR, RUS, SAGA, INFOD, NM, …)
- **Problems:**
  - Infrastructures are already in production
  - Standards are still in evolution and often underspecified
- **OGF-GIN follows a pragmatic approach**
  - balance between application needs vs. technology push

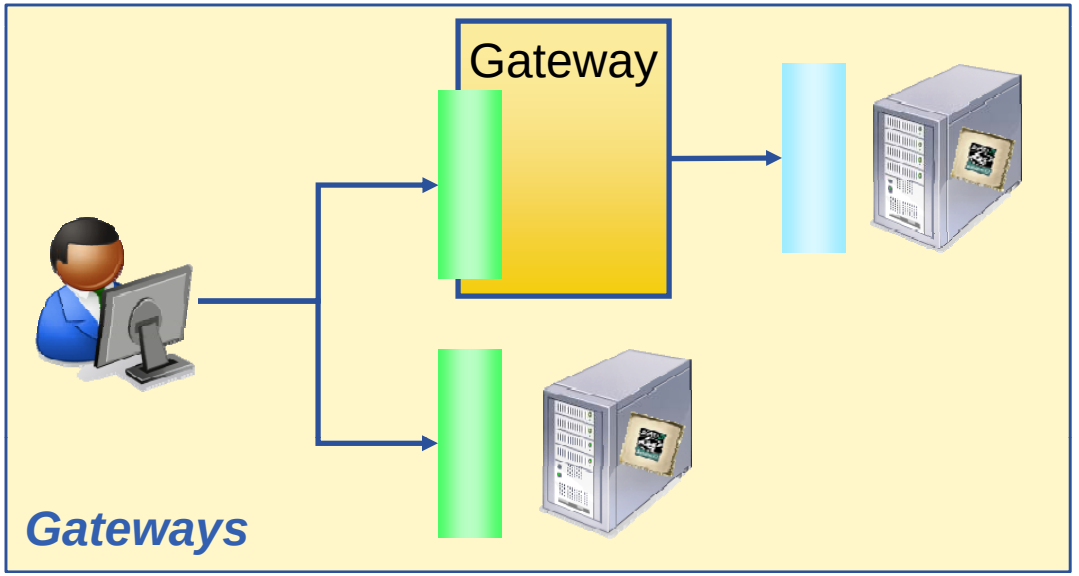
# Interoperability

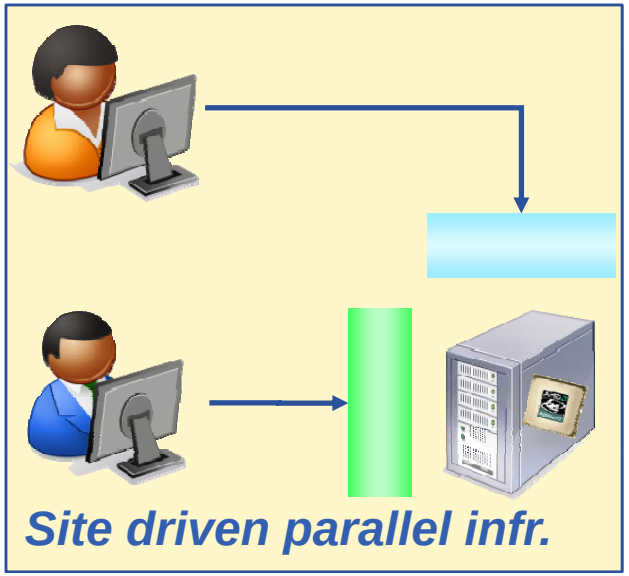
- **How to achieve interoperability in absence of adequate standards:**
  - Parallel Infrastructures
    - User driven: the user joins different grids (uses different tools)
    - Site driven: the site offers different access methods to resources
  - Gateways
    - Bridges between infrastructures
  - Adaptors and translators
    - Single API for users. Plug-ins provide translation

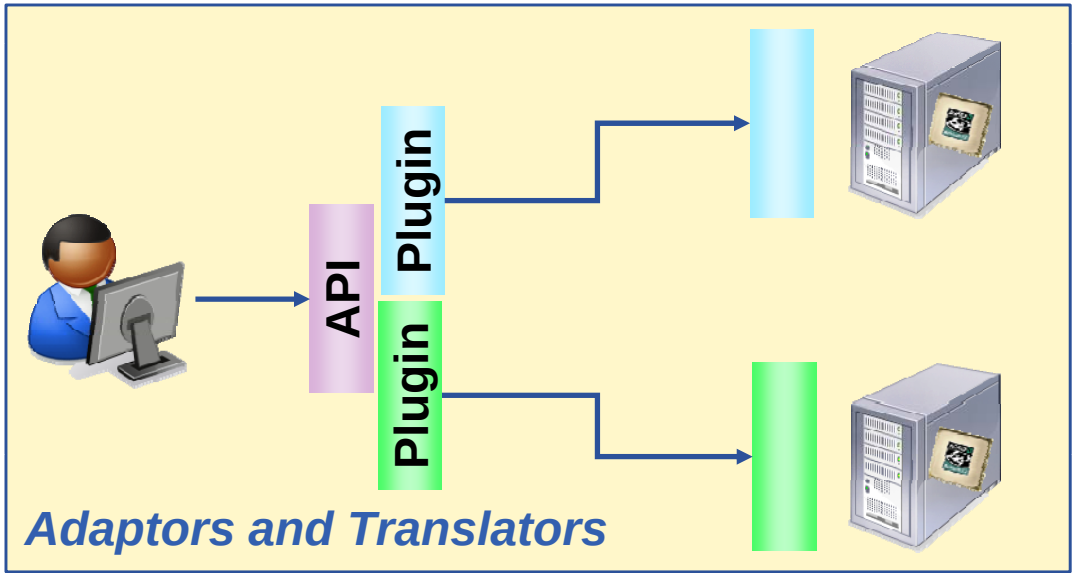
# Interoperability models

By L.Field



# SAGA API for gLite Service Discovery

- **Steve Fisher presented the work done within EGEE-II to support the OGF-SAGA APIs in the gLite service discovery**
- **Motivation for Service Discovery**
  - Middleware has to dynamically find other services
  - Users need to be able to “bootstrap” the environment when travelling (i.e. at different locations)
- **Use SQL-like filters to search resources**
  - GLUE 2 compatible

- **SAGA specific code will go to the OGF repository**
- **BDII and RGMA code will go to the gLite repository**

# Filters

- **The service filter selects on the basis of some GLUE attributes such as the “type” of service**
  - string svc_filter = "type = 'Broker' AND
    name = 'CERN-PROD-rb‘";
- **The VO filter allows the user to select from those services available to specific VOs**
  - string vo_filter = "VO IN ('atlas', 'dteam')";
- **The data filter makes use of a GLUE feature of key/value pairs associated with each service - this makes it extensible**
  - string data_filter = "RunningJobs > 10";

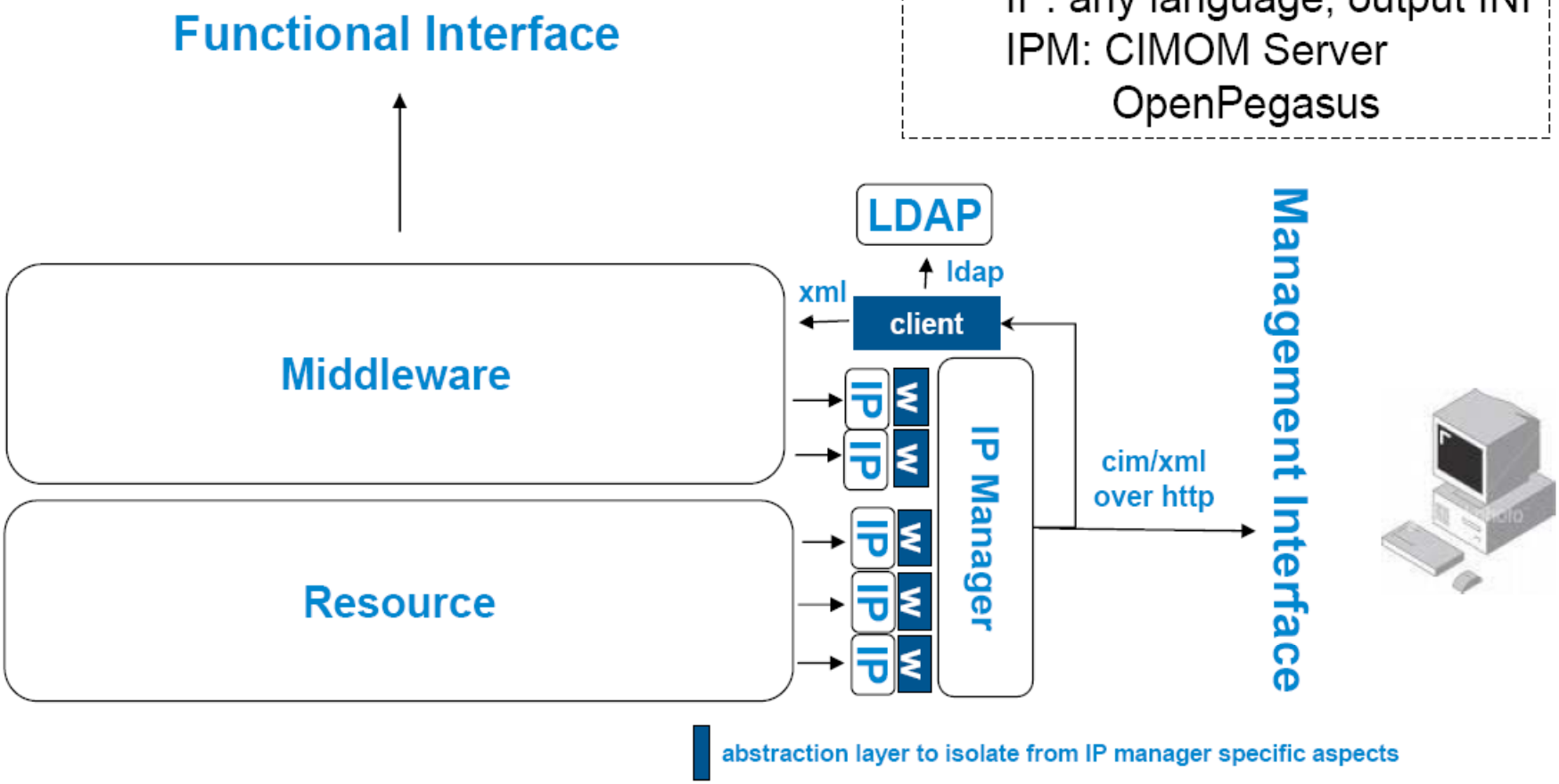
# Towards a WBEM-based Implementation of the OGF GLUE Information Model

- **Sergio Andreozzi presented the work done in OMII-EU to design GLUE 2.0 and information providers based on WEBEM standard by DMTF**
- **How do we describe resources shared in Grid systems in order to enable:**
  - Resource awareness
  - Resource discoverability
  - Resource requirements expression
  - Resource monitoring
- **Currently in gLite 3:**
  - Information Model (IM): GLUE 1.3
  - Concrete Data Model (CM): LDAP
  - Information Providers (IP): Any language that write ldif files
  - Information Provider Manager (IPM): OpenLDAP

# Possible Deployment Scenario in gLite

**Situation:**

IM: GLUE 2.0
CM: various,
rendering at the client side
IP: any language, output INI
IPM: CIMOM Server
OpenPegasus



- **Carlos Sanchez presented the work done in ETICS to produce an automated facility to reproduce real scenarios under fully controlled environment**
  - General purpose: to run functional and conformance tests on production-like scenarios
- **Prototype produced that verifies BES compliance of the CREAM Compute Element (in collaboration with OMII-EU)**
  - Develop the test suite that interprets and parses the recommendation into specific service calls
  - Use or develop the independent client which will perform the test
- **Will repeat the exercise with the OGSABES extensions for UNICORE**

Enabling Grids for E-sc

# Final integration I

omii europe

Powered by ETICS and NMI

Home

## Module Summary

testbed
omii.compliance
SA-BES compliance
ting for gLite
0

II-Europe

## Execution Summary

| | |
|---|---|
| **Result:** | **Success** |
| **Success rate:** | 100% (1/1) |
| **Start time:** | 24/09/2007 17:36:21 |
| **End time:** | 24/09/2007 18:07:50 |
| **Duration:** | 00:31:29 |
| **Configuration:** | eu.omii.compliance.glite |
| **Tag:** | HEAD |
| **VCS Root:** | :pserver:anonymous@isscvs.cern.ch:/local/reps/gridtestbed |
| **Platform:** | slc4_ia32_gcc346 |

# Final integration II

## Build System

| | |
|---|---|
| **Project name:** | gridtestbed |
| **Module name:** | eu.omii.compliance.ce |
| **Module config:** | eu.omii.compliance.ce.glite |
| **Build status:** | **Success** |
| **Description:** | OGSA-BES CE |
| **Dependencies** | |

**Artefacts**

**Checkout / download log**

```
09/24/07 17:41:06.170 INFO main [write] - Checking out configuration 'eu.omii.compliance.ce.glite'
09/24/07 17:41:06.171 INFO main [write] -
09/24/07 17:41:06.173 INFO main [write] - [checkout]: cvs -d :pserver:anonymous@isscvs.cern.ch:/local/
09/24/07 17:41:06.175 INFO main [write] -
09/24/07 17:41:06.176 INFO main [_systemCall] - Calling system command: cvs -d :pserver:anonymous(
eu.omii.compliance.ce
09/24/07 17:41:06.780 ERROR main [write] - cvs checkout: Updating eu.omii.compliance.ce
09/24/07 17:41:07.013 INFO main [write] - U eu.omii.compliance.ce/deployCE.sh
```

**Build log**

No log available

**Test report**

```
09/24/07 17:43:15.896 INFO main [write] - Executing test: eu.omii.compliance.ce.glite
09/24/07 17:43:15.898 INFO main [write] -
09/24/07 17:43:15.932 INFO main [write] - Cannot found sloccount. Plugin is disabled
09/24/07 17:43:15.951 INFO main [write] -
09/24/07 17:43:15.959 INFO main [write] - [init]: echo "Launching deployment of gLite CE"
09/24/07 17:43:15.962 INFO main [write] -
09/24/07 17:43:15.964 INFO main [_systemCall] - Calling system command: echo "Launching deployment
09/24/07 17:43:16.014 INFO main [write] - Launching deployment of gLite CE
09/24/07 17:43:16.106 INFO main [write] - [test]: sh deployCE.sh -l "/root/wsetics/eu.omii.compliance.glit
09/24/07 17:43:16.107 INFO main [write] -
09/24/07 17:43:16.109 INFO main [_systemCall] - Calling system command: sh deployCE.sh -l "/root/wse
09/24/07 17:45:15.980 INFO main [write] - Waiting for the repository...
09/24/07 17:45:15.980 INFO main [write] - found at lxb1107v2.cern.ch:8090
09/24/07 17:45:16.073 INFO main [write] - Publishing CE proposal for the WN (lxb1107v1.cern.ch)...
09/24/07 17:45:19.680 INFO main [write] - Done!
09/24/07 17:45:19.780 INFO main [write] - Waiting for the Worker Node...
09/24/07 17:45:33.687 INFO main [write] - found at lxb1303v2.cern.ch
Deploying CE (using lxb1107v2.cern.ch:8090 as repo and lxb1303v2.cern.ch as wn)...
09/24/07 17:45:33.778 INFO main [write] - Downloading certificates...
```



# Final integration III

## Unit Test Results

Designed for use with JUnit and Ant.

**Class eu.omii.bes.compliance.BESComplianceTestSuite**

| Name | Tests | Errors | Failures | Time(s) | Time Stamp | Host |
|---|---|---|---|---|---|---|
| BESComplianceTestSuite | 27 | 27 | 0 | 77.162 | 2007-09-24T16:04:51 | lxb1303v1.cern.ch |

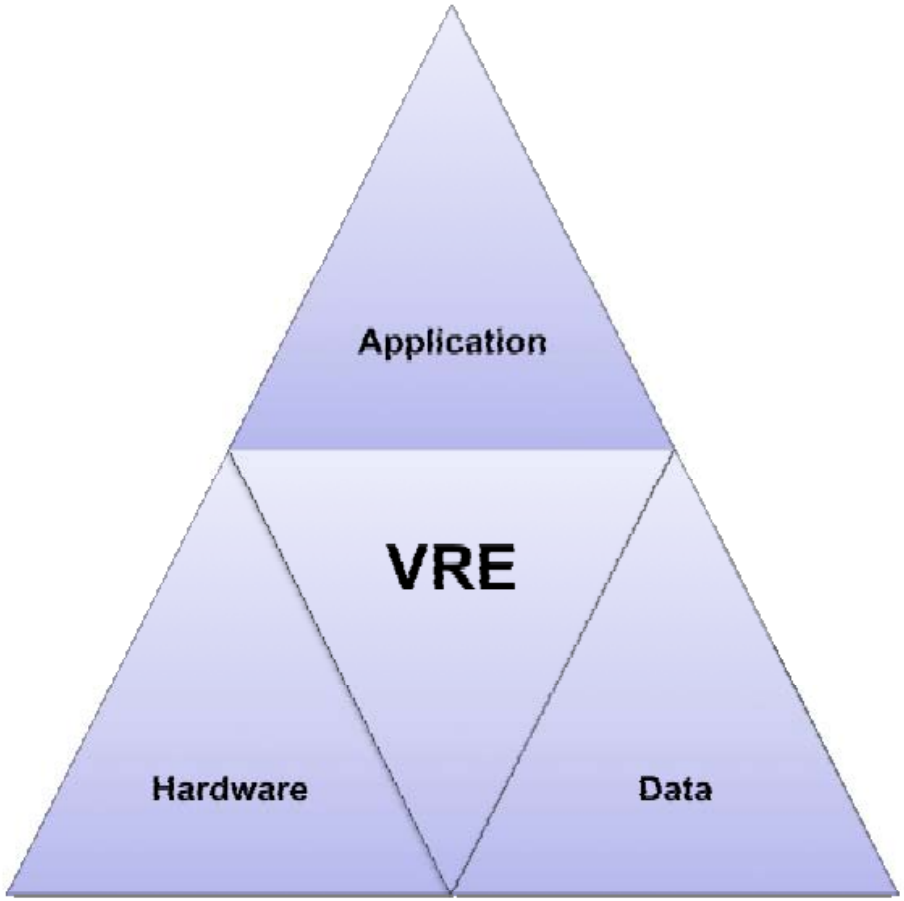
**Tests**

| Name | Status | Type | Time(s) |
|---|---|---|---|
| BadFormattedJSDLActivityDocument | Error | Unexpected exception, expected<org.ogf.bes.factory.UnsupportedFeatureFaultType> but was<eu.omii.bes.exception.ServiceInvocationException><br>java.lang.Exception: Unexpected exception, expected but was<br>Caused by: eu.omii.bes.exception.ServiceInvocationException: ; nested exception is:<br>java.io.IOException: java.io.IOException: java.io.IOException: Non nillable element 'jobDefinition' is null.<br>at eu.omii.bes.clients.FactoryClient.CreateActivity(Unknown Source)<br>at eu.omii.bes.compliance.factory.CreateActivityTest.BadFormattedJSDLActivityDocument(Unknown Source) | 0.506 |
| UnsupportedJSDLActivityDocument | Error | Unexpected exception, expected<org.ogf.bes.factory.UnsupportedFeatureFaultType> but was<java.lang.NullPointerException><br>java.lang.Exception: Unexpected exception, expected but was<br>Caused by: java.lang.NullPointerException<br>at org.ogf.jsdl.posix.POSIXApplication_Type.setArgument(Unknown Source)<br>at eu.omii.bes.compliance.factory.CreateActivityTest.UnsupportedJSDLActivityDocument(Unknown Source) | 0.107 |
| UnsupportedFeatureActivityDocument | Error | Unexpected exception, expected<org.ogf.bes.factory.UnsupportedFeatureFaultType> but was<java.lang.NullPointerException><br>java.lang.Exception: Unexpected exception, expected but was<br>Caused by: java.lang.NullPointerException<br>at eu.omii.bes.utils.FormatConverter.getMessageElement(Unknown Source)<br>at eu.omii.bes.compliance.factory.CreateActivityTest.UnsupportedFeatureActivityDocument(Unknown Source) | 0.112 |
| PrivilegedActivity | Error | Unexpected exception, expected<org.ogf.bes.factory.NotAuthorizedFaultType> but was<eu.omii.bes.exception.ServiceInvocationException><br>java.lang.Exception: Unexpected exception, expected but was<br>Caused by: eu.omii.bes.exception.ServiceInvocationException<br>at eu.omii.bes.clients.FactoryClient.CreateActivity(Unknown Source)<br>at eu.omii.bes.compliance.factory.CreateActivityTest.PrivilegedActivity(Unknown Source) | 48.333 |
| StoppedService | Error | Unexpected exception, expected<org.ogf.bes.factory.NotAcceptingNewActivitiesFaultType> but was<eu.omii.bes.exception.ServiceInvocationException><br>java.lang.Exception: Unexpected exception, expected but was<br>Caused by: eu.omii.bes.exception.ServiceInvocationException: No such operation 'StopAcceptingNewActivities'<br>at eu.omii.bes.clients.ManagementClient.StopAcceptingNewActivities(Unknown Source)<br>at eu.omii.bes.compliance.factory.CreateActivityTest.StoppedService(Unknown Source) | 0.855 |
| InvalidRequest | Error | Unexpected exception, expected<org.ogf.bes.factory.InvalidRequestMessageFaultType> but was<eu.omii.bes.exception.ServiceInvocationException><br>java.lang.Exception: Unexpected exception, expected but was<br>Caused by: eu.omii.bes.exception.ServiceInvocationException<br>at eu.omii.bes.clients.FactoryClient.CreateActivity(Unknown Source)<br>at eu.omii.bes.compliance.factory.CreateActivityTest.InvalidRequest(Unknown Source) | 0.605 |

# gCube Grid Services

- **Pedro Andrade presented gCube**
  - Collaborative framework built on DILIGENT software
  - Not only resources and data but also applications to access the data are managed
- **Virtual Research Environments (VREs) are collaborative environments created on-demand through remote sharing of resources to support the research activities of distributed communities**
- **gCube provides a vast number of VRE services for Content Management, Workflow Management, Information Retrieval, VREs Management, etc.**
- **The creation, management and exploitation of VREs using gCube has been successfully tested in DILIGENT**
  - A new VO can join the infrastructure in less then 1 day
  - A new VRE can be deployed in less then 2 hours

# What is gCube

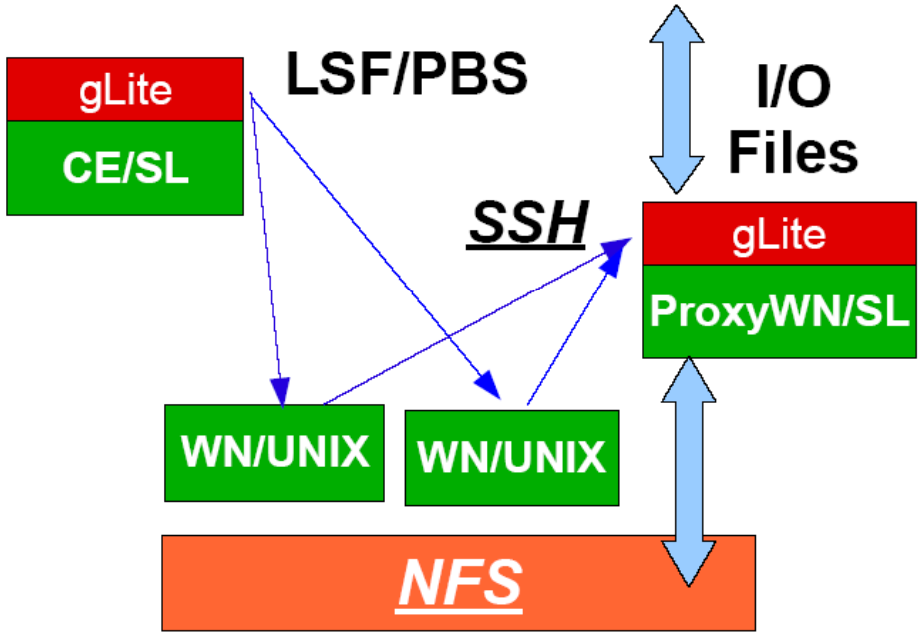



- gCube is a distributed system of middleware and domain services to host, define and manage VREs
- Workspaces in which users collaborate through controlled sharing of hardware, data, and application resources
  - 3rd generation of the Grid vision of resource sharing

# A simple SPAGO implementation enabling the connection of heterogeneous computational resources to a gLite based GRID

- **Andrea Santoro presented SPAGO (Shared Proxy Approach for GRID Objects)**
- **Motivations:**
  - Grant access via grid to resources not on the standard SL/IA32/x86-64 platforms
- **Implemented on the ENEA AIX cluster using LSF and AFS**
- **New simpler solution based on ssh and NF**
  - Deal with limiting firewall settings
  - Doesn't require specific WN installations
- **Requirements to gLite**
  - Provide a mechanism to inform users that the site is somehow 'special' and may not provide all the features of a normal site
  - Pay attention to architecture-dependent gLite modules on WNs
    - Define if they can run on a proxy

# SPAGO Approach for a typical UNIX system




## *Real Case Implementation*

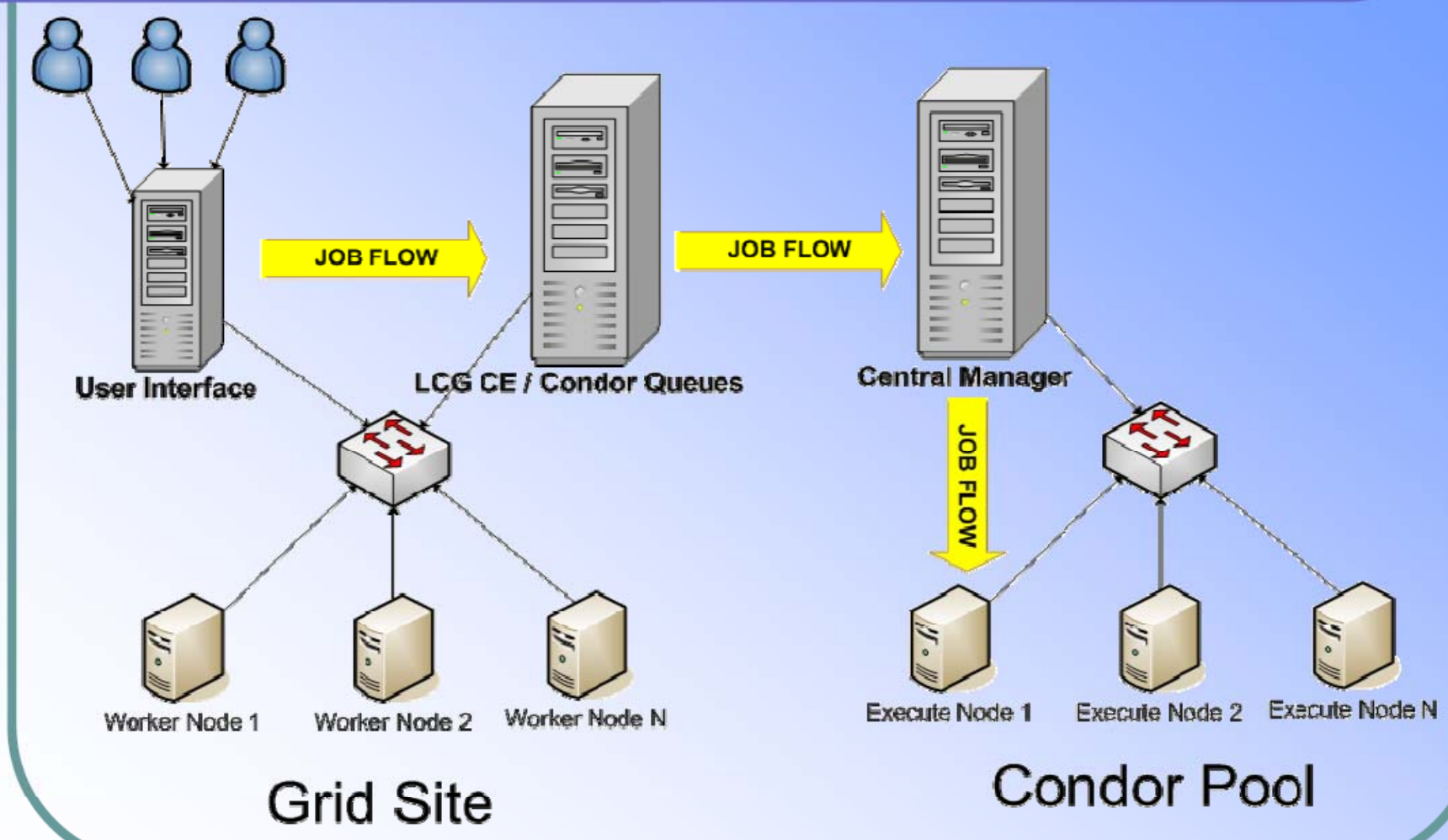
- **ENEA Fusion department**
  - 10 CPUs with SPAGO
  - Employ SSH/NFS
  - Support VO “fusion”

**Any typical Shared Filesystem (e.g. GPFS, LUSTRE) and remote execution mechanism (e.g. RSH) can be employed**

# INTERCONNECTING GRID, DESKTOP GRID AND NETWORK

- **Kostas Georgakopoulos presented a project pf the University of Macedonia to connect Condor pools and BOINC infrastructures to EGEE using a gateway-like approach**
- **Main issues to be solved are related to the security**
  - No control over “malicious” PC owners
- **Still not able to exploit the Condor “Standard Universe”**
- **Next steps**
  - Exploit desktop in schools of north Greece (~65000)
  - Integrate with the Berkeley Open Infrastructure for Network Computing (BOINC)
    - Open source platform for creating scientific distributed projects modeled after the SETI@Home project

# Condor & Grid – The bridge



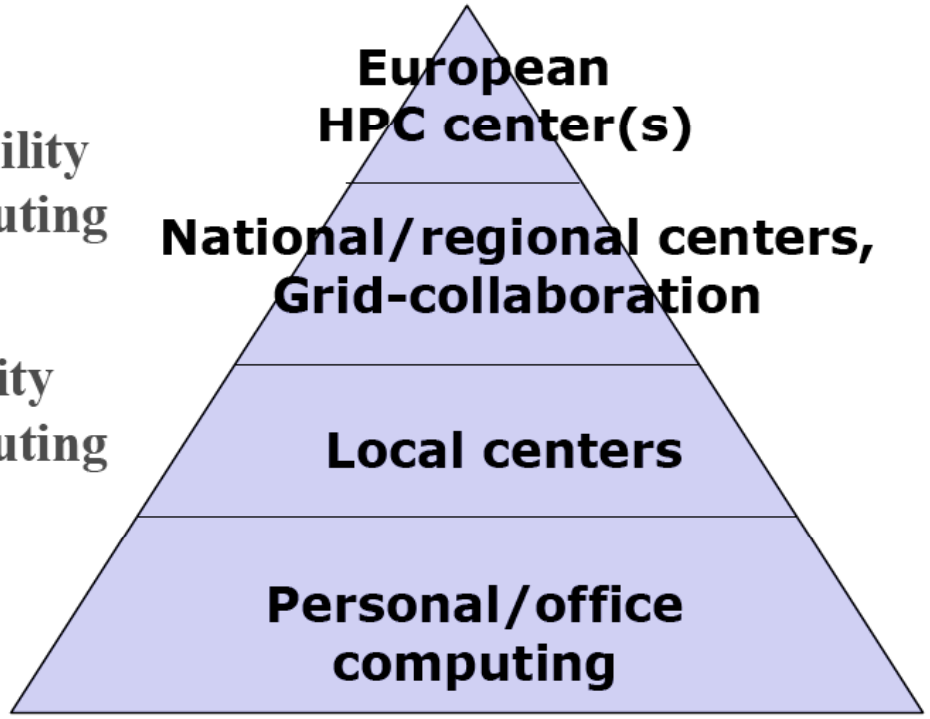



Georgakopoulos K., Stefanidis V., Margaritis K.
University Of Macedonia

# Partnership for Advanced Computing in Europe (PRACE)

- **Per Öster presented the PRACE project**
- **PRACE started on 1/1/08 and has members from 14 European countries**
- **Prepare creation of a persistent pan-European High Performance Computing (HPC) service**
  - Provide European researchers with world-class computing resources
  - Establish the top-level of the European HPC ecosystem involving national, regional and topical HPC centres
  - Deploy several leadership systems at selected tier-0 centres
- **Contribute and use standards, in particular following the work done for gLite-UNICORE interoperability**

# Performance Pyramid




Capability Computing

Capacity Computing

TIER 1

TIER 2

TIER 3

TIER 4