Interoperability and Usability of Grid Infrastructures

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What is OMII-Europe?

- **EU funded FP6 project (RI)**
  - Starting May 2006, initial 2 year duration
  - 16 partners (8 European, 4 USA, 4 Chinese)
- **Open Middleware Infrastructure Institute for Europe**
  - Complimentary to existing national programmes (OMII-UK, NMI, C-OMEKA, OMII-China…)
- **Goal is to provide key software components for building e-infrastructures**
- **Project will demonstrate “proof of concept” with expectation for a follow-on project in FP7**
### OMII-Europe Project Partners

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<tr>
<th>University of Southampton, <strong>UK (coordinator)</strong></th>
<th>University of Chicago, <strong>USA</strong></th>
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<td>Fujitsu Laboratories Europe, <strong>UK</strong></td>
<td>NCSA, University of Illinois, <strong>USA</strong></td>
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<td>Forschungszentrum Jülich, <strong>Germany</strong></td>
<td>University of Southern California, Los Angeles, <strong>USA</strong></td>
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<td>Kungl Tekniska Högskolan, <strong>Sweden</strong></td>
<td>University of Wisconsin-Madison, <strong>USA</strong></td>
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<td>Istituto Nazionale di Fisica Nucleare, <strong>Italy</strong></td>
<td>Beihang University, <strong>China</strong></td>
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<td>Poznan Supercomputing &amp; Networking Center, <strong>Poland</strong></td>
<td>China Institute of Computing Technology, Beijing, <strong>China</strong></td>
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<td>University of Edinburgh, <strong>UK</strong></td>
<td>Computer Network Information Centre, Beijing, <strong>China</strong></td>
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<td>CERN, European Organisation for Nuclear Research, <strong>Switzerland</strong></td>
<td>Tsinghua University, <strong>China</strong></td>
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What will OMII-Europe do?

• Initial focus on providing common interfaces and integration of major Grid software infrastructures

• Common services:
  – Database Access, Virtual Organisation Management, Portal, Accounting, Job Submission and Job Monitoring
    • These represent many of the outputs from the standards function groups
  – Capability to add additional services
  – Emphasis on porting and re-engineering work, not developing from scratch

• Infrastructure integration
  – Initial gLite/UNICORE/Globus/CROWNgrid interoperability
  – Interoperable security framework
OMII-Europe guiding principles

• Committed to standards process
  – Implementing agreed open standards and working with standards process (OGF/Oasis)

• Quality Assurance
  – Published methodology and compliance test
  – All software components have public QA process and audit trail
  – Working with similar projects and organisations to agree policies

• Impartiality
  – OMII-Europe is “honest broker” providing impartial advice/information on e-infrastructures
What will OMII-Europe deliver?

• Repository of open-source, quality assured software services for gLite, Globus, UNICORE and CROWNgrid
  – Some services bundled with major grid distributions
  – Initial integration work with gLite, UNICORE and Globus

• Public reports on grid infrastructures
  – Initial benchmark results
  – Impartial advice and information

• Evaluation infrastructure to “test” services
  – User support and training for services
Why Globus, UNICORE, gLite and CROWNgrid?

- **Minimal significant set:**
  - gLite is a complete set of middleware developed within EGEE and is deployed to create a Grid containing more than 150 sites and 30 countries
  - UNICORE is a major EU and national middleware initiative and is deployed at many supercomputer sites, in particular those available through DEISA
  - Globus is the world-leading open-source platform for Grid computing developed within the USA and is used for many research projects world-wide
  - All three Grid platforms have significant user bodies within Europe
  - CROWNgrid is the middleware used on the major Chinese grid infrastructure
## OMII-Europe re-engineering activities

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<th>OGSA DAI</th>
<th>BES</th>
<th>VOMS</th>
<th>RUS</th>
<th>Grid Sphere</th>
<th>Etc. Identified Components</th>
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<td>gLite</td>
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<td>Globus</td>
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<td>Etc. OMII-UK, USA, China</td>
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Database Service

- Implementation of the OGSA-DAI specification from the DAIS-WG within the Data function group of OGF
  - OGSA-DAI service federates data resources with different support mechanisms (Relational/XML Databases/flat files) allowing uniform access across these resources
- Number of other data specifications emerging that may be considered later.
  - transaction management; byte IO; Grid file systems etc
- DAIS implementation already available for Globus 4 –
- Work is to port to UNICORE and gLite – Alpha releases scheduled for May 2007.
  - Evaluating OGSADai4UnicoreGS
Job Submit and Job Monitoring Service

- Implementation of the JSDL (job submission description language) and BES (Basic execution service) specifications from the Compute working group at OGF
  - Common way to specify and control jobs (abstraction of OS and cluster controller)
- Other specifications such as scheduling, but above are essential and well developed with implementations
- Work is to make BES and JSDL available on Globus, UNICORE and gLite
  - Initial version for UNICORE available in May 2007
  - JSDL translator (using XSLT) for gLite in testing
Virtual Organisation Management Service

• **Authorisation service available for Globus and gLite.**
  - Provides information on the user's relationship with Virtual Organization: groups, roles and capabilities

• **Work to make VOMS available under UNICORE and to extend VOMS with SAML support**
  - SAML (Security Authorisation Markup Language) from OASIS Technical Committee. (standard for XML exchanging authentication and authorisation data between security domains)
  - Alpha version for UNICORE with SAML support scheduled for May 2007
Accounting Service

- Implementation of the Resource Usage Service (RUS) from the Management working group within OGF
  - Tracks use of resources (accounting in traditional UNIX sense), but not concerned with payment
  - Closely related to Usage Record (UG-WG) within OGF
- Specification available for public comment
- Alpha version of RUS (or equivalent) available in May 2007 for Globus, gLite and UNICORE
Portal Service

• Integration of the Gridsphere portal framework with Globus, UNICORE and gLite and provide portlets for job submit, accounting, etc…
  – Provide application level portability at a portlet level
  – Portlets available for main OMII-Europe services
Additional Services

• Current solution:

• Chinese partners will make all services available on Chinese CROWNgrid infrastructure

• In May 2007, launch of the second round of service integration
OMII-Europe Infrastructure Integration

- This activity goes beyond the adoption of common services and focuses on full grid infrastructure integration through employing:
  - A common security infrastructure
    - Much similarity (X.509) and differences (handling of proxies, authorisation, anonymity and auditing)
    - Intention to define a common security base
    - Provide a strengthened form of X.509 credential management through using myProxy
  - Job exchange between Globus/gLite/UNICORE
    - Builds on Globus/UNICORE Grip project
- Close collaboration with OGF GIN WG
Summary

• **OMII-Europe has support from the major Grid Infrastructure providers to deliver interoperability**
  – No point to be trying to solve the problem without vendor support

• **OMII-Europe’s emphasis on standards provides a non-biased approach towards interoperability**
  – An open independent process needs to be used to arrive at technical decisions

• **Achieving interoperability is a long term goal, don’t try and eat an elephant in one go!**
  – OMII-Europe will improve overall USABILITY of grid Infrastructures and improve INTEROPERABILITY of grid infrastructures over the next two years
OMII-Europe Vision

Will demonstrate that interoperable Grids can be built from standards-compliant Web Services and to deliver a set of quality-assured services, sourced from open source repositories, able to be used on the principal Grid infrastructures in use in Europe today.