OMII Distribution Evaluation Activity

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In February — April 2005, teams from LIT JINR and KIAM evaluated the OMII grid middleware distribution (versions 1.0-1.2). The results were presented at the third EGEE conference in Athens (18 – 22 April 2005).

The aim of the evaluation was to understand better how well the components of the OMII distribution meet the needs of a grid middleware for a grid environment with ten thousands of users, tens of big virtual organizations, hundreds of centers providing resources to the grid, ten thousands of jobs, Peta bytes of data etc.

The evaluation included:

- **Description of the functionality provided by the distribution**
    - General description and architecture
    - Account management
    - User operation
    - Resource Allocation
    - Data Staging
    - Security
    - Authorization
    - Administration

- **Installation and configuration of the distribution on different platforms**
- **Tests of performance, concurrency, reliability, usability and ease of management of services**
    - Job Service
    - Data Service
    - Performance and concurrency of dummy services
    - Security
    - Adding an application
    - Adding a new service

- **Interoperability with EGEE middleware (gLite) Workload Management System**
- **Quality of OMII Support and Documentation**

The evaluation results
The main results are presented below.

- **OMII has several interesting features and abilities**
    - Web services architecture
    - Account management
    - Resource consumption accounting

- Conversation mechanism and authorization module PBAC — Process Based Access Control
- Easy and compact installation (but restricted to the certain OS)

- **OMII is oriented towards web services, rather than Grid architecture**
  - Community services necessary in a large grid are not provided — there is no Workload Management System or Resource Broker, Information System, Logging and Bookkeeping, Replica Catalogs and Replica Management System
  - Does not support Grid Security Infrastructure and proxy credentials that allow a computation (e.g. a service) to delegate securely user rights to another computation — this seriously limits the ability of secure service-to-service interactions
  - No support for Virtual Organizations and VOMS
  - Does not support the execution of user's programs
  - No interoperability with Globus Toolkit and the Workload Management System of EGEE middleware (gLite)

- **Management and administrative techniques are intended to servicing individual servers, not VO and resource infrastructure**
  - The procedure for joining a Grid with OMII Services looks rather complicated and suitable to manage a small project but not a virtual organization (VO) with many users and servers, especially when the staff is not stable
  - The idea of storing the user account information for each OMII Server Site at a user's client does not seem to be a sound decision — both users and budget holders will hardly be able to cope with the management of multiple accounts

- **User's operation needs improvements in the implementation as well as an enhancement of functionality, especially in case of larger grids**
  - more powerful resource selection language
  - account and resource allocation management
- **Performance, concurrency and reliability, usability**
  - Job Service remained stable with up to 20 concurrent clients and showed a maximal job submission rate of about 6 jobs per minute for a 2.4GHz P4 CPU server node
  - Job Service stability: in case of sequential submission of multiple jobs by a user an error occurred near the 180-th job submission
  - Data Service reliability: all 1000 upload + download cycles of 10MB big files were successful
  - Data Service concurrency: all upload + download cycles of 1..100KB big files were successful with up to 5 concurrent clients
  - Performance of Dummy Services: Response time of a non-PBAC dummy service was about 0.1sec and of a dummy service which uses PBAC about 0.7sec
  - Concurrency of a dummy service: 100 parallel clients executed successfully
  - Adding simple applications is easy
  - Adding a new service: a simple example service has been deployed; low level way for service and client creation with no use of e.g. java2WSDL and WSDL2java proposed in OMII User Guide

- **The provided documentation clearly covers the main topics, but at some points (e.g. budget management, service creation) it is unclear and unfinished**