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Executive Summary

The JRA2 activity is targeted at the identification of appropriate emerging middleware services from the global Grid initiative that are not already considered by the OMII-Europe. The purpose is the definition of priorities for the placement of such services in the OMII-Europe repository.

The first deliverable of this activity published at month 6 presented an analysis and comparison of different Grid middlewares based on a decomposition of the individual capabilities following the OGSA conceptual architecture. Given this comparison, we have identified a number of capabilities that could be added to the current ones already envisioned by the OMII-Europe project. A prioritization based on cost-risk-value was proposed in order to support the decision for the allocation of an extra-budget to be invested during the second year of the project.

In this deliverable, we present an update of the activity by giving the proposed work-plans for the top three capabilities emerged from the former analysis and by stating the choice made by the project itself. Such a choice implies that the extra-budget will be allocated for the information modeling activity of computing resources to be performed by INFN in the context of JRA2.

This decision is mainly motivated by the fact that OMII-Europe is already porting OGF standards such OGSA-BES and JSDL to a number of implementations that will be part of the repository. Such standards lack a common information model for describing Grid resources that enables resource awareness, discovery and selection. The filling of this gap is an essential and urgent step in order increase the value of the foreseen results by the end of the project.

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1 Introduction

The main purpose of the Open Middleware Infrastructure Institute for Europe (OMII-Europe) is the provision of key software components for building e-Infrastructures within the European Research Area (ERA) [TA]. The activity aims at facilitating the development and porting of a common set of identified application level services to a number of major Grid software distributions, and further to develop tighter interoperability between different Grid distributions. The main strengths of the project are interoperability among a set of relevant Grid middleware platforms via the adoption of emerging standards and usability. If standards are not yet mature or are lacking, the project can contribute via the participation in the appropriate forums and with early implementation across multiple Grid distributions.

In this context, the activity of Joint Research Activity (JRA) 2 aims at identifying appropriate emerging middleware services from the global Grid initiative that are not part of the initial plans [TA]; furthermore it aims at defining priorities for the placement of such services in the OMII-Europe repository. Such a placement activity can be preceded by a re-engineering activity targeted at the adoption of a community-based standard. For this activity, an extra-budget of 100,000 Euros is available and can be allocated for the second year of the project.

The first deliverable of this activity published at month 6 presented an analysis and comparison of different Grid middlewares (gLite, Globus, UNICORE, VEGA-GOS, CROWNGRID, OMII-UK, ARC) based on a decomposition of the individual capabilities following the OGSA conceptual architecture [OGSA]. Given this comparison, we have identified a number of capabilities that could be added to the current ones already envisioned by the OMII-Europe project. A prioritization based on cost-risk-value was proposed in order to support the decision for the allocation of an extra-budget to be invested during the second year of the project.

In this deliverable, we present a summary of the analysis and prioritization activity performed in the first six months activity (Section 3.1), the proposed work-plans for the top three capabilities emerged from the former analysis (Section 3.2) and by stating the choice made by the project itself (Section 3.3).

2 Partners and Effort

In this section, we briefly summarize the partners involved in the JRA2 activity. The actual effort spent in the activity is summarized in Table 1.

Table 1 Actual effort provided by the partners in JRA2 activity (F=Funded, U=Unfunded)

Month	INFN (F)	KTH (F)	UEDIN (F)	BU (U)	ICT (U)	TU (U)
May 2006	0.8	0.125	0.125	0.055	0.055	0.055
Jun 2006	0.8	0.125	0.125	0.055	0.055	0.055
Jul 2006	0.8	0	0.06	0.055	0.055	0.055
Aug 2006	0.8	0	0.125	0.055	0.055	0.055
Sep 2006	0.8	0	0.125	0.055	0.055	0.055
Oct 2006	0.8	0	0.125	0.055	0.055	0.055
Nov 2006	0.8	0.15	0.125	0.055	0.055	0.055
Dec 2006	0.8	0.125	0.125	0.055	0.055	0.055
Jan 2007	0.8	0.125	0.125	0.055	0.055	0.055
Feb 2007	0.8	0.125	0.125	0.055	0.055	0.055
Mar 2007	0.8	0.125	0.125	0.055	0.055	0.055
Apr 2007	0.8	0.125	0.125	0.055	0.055	0.055
Total	9.6	1.025	1.435	0.66	0.66	0.66

3 Progress

In this section, we summarize the activity performed by JRA2. In Section 3.1, we present the process that led us to the identification and prioritization of the top three missing capabilities from the current OMII-Europe software components. In Section 3.2, we describe possible work-plans for the three activities, while in Section 3.3 we report the final decision taken by the project.

3.1 Analysis and Prioritization

In order to identify an ordered list of missing capabilities from the OMII-Europe project, we performed an analysis and comparison of different middlewares. The approach was to decompose the considered software platforms following a hierarchical description of the OGSA [OGSA] architecture. A cost-risk-value prioritization and the identification of the top 3 capabilities was also performed. This work is described in details in the first deliverable of JRA2 [DJRA2.0]. In Figure 1, we show the identification process.

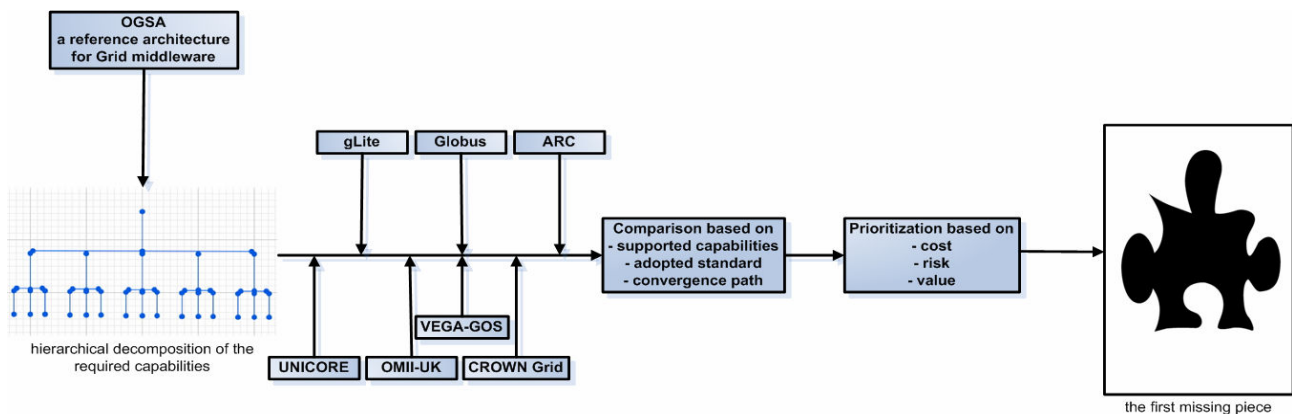


Figure 1 The selection process

In Table 1 Table 2, we summarize the top three capabilities identified in the analysis process. The prioritization is based on a cost-risk-value model. The cost parameter refers to the percentage of an extra-budget (100,000 Euros) that is expected to be invested on a certain capability. The parameters risk and value can assume the following values: low, medium, high. The risk indicates the possibility that the re-engineering process for the inclusion into the OMII-Europe repository can fail; the parameter value indicates the benefit that the inclusion of the considered capability can bring to the global value of the OMII-Europe repository.

Table 2 Cost-Risk-Value comparison

Capability	Activity	Convergence towards	Current Standard Compliance	Cost	Risk	Value
Information.Model	Contribute to OGF GLUE WG for the definition of GLUE Schema 2.0; integration into JSDL and OGSA-BES; implementation of schema and information providers for BES; integration into OGSA-BES implementations part of OMII-Europe	- RRL for JSDL - OGSA-BES - OGF standard	0%* * de-facto standards exist	100%	Low	High
Security.Authorization	Definition of the authorization service interface in the context of OGSA-AuthZ; prototype implementation	XACML, SAML	90%	100%	Low	High
Data.Management.Storage	Select StoRM and integrate into OMII-EU; collaborate with OGF GSM WG	SRM 2.2	90%	100%	Low	High

3.2 Work Plan for the Identified Activities

In this section, we present three possible work plans for the top three activities identified in the analysis process given above. We also report the final decision from the project.

3.2.1 Information Modeling

The OMII-Europe project selected the OGSA-BES specification as the standard specification for computing resource management and job execution. Moreover it adopted the JSDL specification for the description of the computational job to be performed in a Grid environment. These two standards are being introduced in the middleware part of the project by a re-engineering process. Their adoption will enable interoperability and replaceability in Grid systems adopting different implementations. Nevertheless, they lack a common information model for the description of Grid resources in order to enable resource visibility and selection.

In this context, the GLUE Schema is a de-facto standard information model used by several Grid infrastructures. This information model was initially drafted during 2002 and has been evolved through three backward-compatible upgrades. The schema has major components to describe Computing and Storage Elements, and also generic Service and Site information. It has been used extensively in the LCG/EGEE Grid, for job submission, data management, service discovery and monitoring. This schema is one of the base schemas for the definition of a community standard information model in the context of the OGF GLUE WG. The main purpose of the OGF GLUE WG is to provide a recommendation for an abstract information model and reference implementations for entities, attributes and relationships that need to be exchanged among different Grid middleware by using the information service. The focus is to harmonize in a common view existing schemas from different projects (e.g., GLUE Schema 1.3, NorduGrid schema, NAREGI schema, TERAGRID schema).

The aim of this activity is twofold. The first goal is to contribute to the standardization process in the context of OGF in order to consider the OMII-Europe use cases. The second goal is to create the implementations that can be integrated into the OGSA-BES services part of the OMII-Europe repository (mainly from gLite and UNICORE).

This activity has natural relationships with the following OGF WGs: OGF GLUE-WG, OGF JSDL WG, OGF OGSA-BES WG, OGF OGSA Resource Management Design Team and OGF Reference Model WG. The expected benefits of this activity are: (1) the BES-compliant services will be able to advertise the offered resources using a community standard information model; (2) the end users will be able to use a common vocabulary to express their requirements when describing a job activity to be performed in a Grid system; (3) the OMII-Europe use cases will be considered.

Activity Breakdown:

- participation to the OGF GLUE WG for the refactoring of the GLUE Schema and its standardization
 - a. gathering of the use cases in the context of OMII-Europe partners
 - b. contribution to the modeling and schema specification
 - c. contribution to the writing of OGF documents
- implementation of the GLUE Schema in the XML Schema format and inclusion into the OMII-Europe repository
- implementation of a modular information provider for generating XML documents compliant to the GLUE 2.0 specification and with dynamic values generated by means of a plug-in system; the purpose is to enable an easy integration of this information provider with the various OGSA-BES specific implementations

- implementation of plug-ins for measuring the attributes part of the GLUE 2.0 schema in different OGSA-BES implementations part of the OMII-Europe project; these plug-ins should be integrated in the OGSA-BES implementations from gLite and UNICORE; the relevant underlying resource management systems that should be supported are LSF, Torque/MAUI and LoadLeveler.

Milestones/Deliverable:

- PM18 M
 - Use cases for the Information Model in the context of OGSA-BES services and the OMII-Europe project
- PM24 M
 - Implementation of GLUE 2.0 and related information providers for the OGSA-BES implementations of OMII-Europe

3.2.2 Security.Authorization

Within the OGF, the OGSA AuthZ WG is defining a set of specifications for authorization in OGSA services. The Authorization Service is a component that relies on policies in order to answer the authorization requests. The current OMII-Europe work plan does not include such an authorization service, while it includes a service for retrieving the privilege attributes (SAML-based service developed in the context of JRA1/VOM that enables to retrieve privilege attributes managed by VOMS).

This activity could target the definition and prototyping of such an authorization service. This service could be used by VOs to enforce fine grained access control using policies based on VOMS attributes, thus being a perfect complement for VOMS.

Activity Breakdown:

- the collaboration with JRA1/VOM and JRA3/Task1 for the definition of a document describing the integration of the authorization service and attribute authority service
- the contribution of an informational document to the AuthZ WG describing the usage of the latest SAML/XACML specifications for the definition of the Authorization Service; this document should be promoted as an official OGF document;
- prototyping of a Policy Decision Point (PDP) component in order to be compliant with the above mentioned standard interface
- Milestones/Deliverables
 - PM15 M document: “Integration of the Authorization service and Attribute Authority service”
 - PM18 M first document: “SAML/XACML for the Authorization Service” to be submitted to the OGF AuthZ WG
 - PM24 D Prototype implementation of a standard compliant interoperable Authorization Service

3.2.3 Data.Management.Storage

The current OMII-Europe plan covers management of core Grid resources such as computing and data, while the storage is not covered yet. The Storage Resource Manager (SRM) specification is a de-facto standard interface for managing storage systems. This interface is becoming a community standard in the context of the OGF GSM Working Group. The aim of this activity is twofold:

contribute to the standardization process in the OGF and to enrich the OMII-Europe repository with at least one implementation of SRM. The benefits for the OMII-Europe services is the larger coverage of managed resources including the storage ones, that is a strong requirements in many data-oriented Grids

Activity Breakdown:

- Participation in the activity of the OGF GSM WG
- Selection of an SRM implementation and inclusion into the OMII-Europe repository
- Evaluation of integration of the selected SRM implementation with other OMII-Europe services

Milestones/Deliverables:

- PM16 M: Selection of an SRM implementation to be integrated into the OMII-Europe repository and definition of the integration plan
- PM20 M: Integration of an SRM implementation into the OMII-Europe repository
- PM24 M: Integration of the SRM implementation with other OMII-Europe services

3.3 Selection of the New Service

Given the identified top three capabilities and the available budget to be allocated, only one of them can be meaningfully considered. During the February All-Hands meeting held in Bologna, the three work plans were presented. The following common agreement was reached:

“invest the extra-budget of 100,000 Euros in the information model activity to be led by INFN in the context of JRA2 activity”

Such a decision was later ratified by the OMII-Europe Technical Committee and Project Management Committee.

4 Conclusions

In this document, we have summarized the activity of identification of missing capabilities from the OMII-Europe repository. The definition of priorities for the placement of such services was also presented. Given the top three capabilities, we have presented work-plans that could be achieved during the second year of the project based on the availability of an extra-budget of 100,000 Euros. According to the project members, the final decision was to select the information model activity for the budget allocation. Such a budget will be allocated to INFN for performing the defined work-plan in the context of JRA2.

A References

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