OGSA Resource Usage Service Charter

Open Grid Forum, Management Area

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1. Administrative Information

Name and Acronym:

OGSA Resource Usage Service (RUS-WG)

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2. Charter

2.1 Purpose

Many production Grid projects have begun to offer a wide variety of services to end-users which typically include access to the underlying infrastructure of resources such as supercomputers, clusters, server farms or large storage facilities. In the last few years, these Grid projects have identified an increasing number of applications that require access to these resources via Grid middleware. The usage of the resources per user or per Virtual Organization (VO) is typically logged at the corresponding Grid site and in an ideal case stored using a well-defined usage record format, e.g. the Usage Record Format (URF) [1] as defined by the OGF Usage Record (UR) [2] working group.

The aim of Resource Usage Service (RUS) working group (WG) [3] is to provide a standard for a Web service interface that exposes a collection of information stored in a specific format (e.g. URF) to service consumers. This standardized interface to Grid middleware systems will provide service consumers with the functionality to securely upload, edit and retrieve any kind of resource usage documents contained in the collection.

Examples of service consumers are resource monitoring tools or accounting and billing systems. In addition, such a standardized interface lays the foundation for cross-Grid monitoring, accounting, and billing. This implies the provisioning of VO–wide usage records that are distributed among different Grid resources and exposed by the Resource Usage Service of this working group.

2.2 Scope

The scope of the WG is to pursue the development and definition of a standardized Web service-based RUS interface that provides access to information stored in standardized usage record formats. While other usage record formats may be of interest, the WG primarily focuses on an interface that provides access to information stored in the URF, which is defined by the UR–WG. Note that the RUS specification does explicitly not concern itself with any form of content for the used usage record formats.

It is out of scope that this WG will provide an own security model, since such work is done in other OGF groups (e.g. [11]). However, since RUS provides a storage for data that may be used as a basis for Grid accounting or even financial transactions, it is important that clear evidence of the origin of the data stored in a RUS exists. Therefore the RUS-WG has to address what information about operations on the UR collection has to be stored along the usage record and how it is possible for clients to retrieve that audit information from the service. The audit model developed by the RUS-WG should also aid conflict resolution in case resource owners and consumers have different opinions about the contents of a usage record. This is especially important since RUS cannot and should not make any guarantees about the correctness of the information stored in a usage record beyond schema validation.

Furthermore, the RUS specification does explicitly not concern itself with any form of payment transactions for the used resources.

2.3 Goals

The goal of the RUS-WG is to define a standard way of exposing a collection of UR documents using as a Web Service to allow service consumers to store and access usage information. Since such consumers can have very different requirements, the Resource Usage Service specification is split into core functionality that every RUS needs to implement and advanced functionality that implementations can elect to implement in addition to the core functionality.

Furthermore the two specifications are presented in an abstract, technology independent specification document and in renderings for different transportation technologies.

~~The RUS–WG has two primary goals that are listed in the following as the "RUS core specification" and the "RUS extended specification", which is an optional specification on top of the core specification~~

2.3.1 Resource Usage Service - Core Specification

The core specification consist of a technology independent functional specification and two renderings for different transfer technologies. It provide basic functionality only. The following three documents should be produced for this specification.

Title: Resource Usage Service – Core Specification

Abstract:

The core RUS specification will provide a minimum set of abstract operations to store and extract usage records that are URF compliant. The emphasis should be on providing a simple but extensible interface that covers the basic use-cases. In more detail, the core specification defines a Web service interface to securely store, retrieve and edit collections of information that are URF compliant. Since an initial draft of the RUS specification [5] was given to public comment, ongoing work of the WG focuses on this draft. The current working draft is defined in the context of the WS-I Basic Profile[12], however to decouple the functionality from the transport technology, the operations will be reformulated using the abstract Interface Description Language (IDL).~~:~~ ~~Given the existence of multiple accepted transport standards, the recommendation will be reformulated to state the operations in terms of abstract names with defined semantics independent of the underlying transportation technology.~~ Efforts will also be undertaken to isolate the Resource Usage Service specification against the Usage Record Format specification. Accompanying recommendations will define normative renderings for given technologies. An alignment with the community requests should be carried out to make sure that the current standard meets actual user requirements.

Type: OGF Recommendation

Milestone	Target Date	Completed	Completion Date
First Draft for Review		Yes	during 2005
Submission for Comment			19th Aug. 2005
Resubmission for Comment	Jun. 2007		
Published	Oct~~Aug~~. 2007		

Title: Resource Usage Service – Core Specification WS-I Basic Profile Rendering

Abstract:

This recommendation defines the rendering of the Resource Usage Service Core Specification in the framework of the WS-I Basic Profile transport layer. It specifies the mapping of abstract operations to actual implementation in compliance with the requirements of the WS-I Basic Profile. If not explicitly prohibited by~~ut~~ the Profile, interoperability with the WS-RF rendering is maintained.

Type: OGF Recommendation

Milestone	Target Date	Completed	Completion Date
First Draft for Review	May 2007~~May 2007~~		
Submission for Comment	Aug. 2007		
Published	Dec. 2007		

Title: Resource Usage Service – Core Specification WS-RF Rendering

Abstract:

This recommendation specifies the rendering of the abstract operations of the Resource Usage Service Core Specification using the WS Resource Framework as ~~—at~~ transport technology. It allows implementations to use the WS-RF standard operations to communicate with the Resource Usage Service while trying to maintain compatibility with the WS-I rendering wherever possible.

Type: OGF Recommendation

Milestone	Target Date	Completed	Completion Date
First Draft for Review	May 2007		
Submission for Comment	Aug. 2007		
Published	Dec. 2007		

2.3.2 Resource Usage Service - Advanced Specification

This specification will provide more advanced functionality like aggregation and VO-level access that is not covered by the core specification. The following three documents should be produced for this specification.

Title: Resource Usage Service – Advanced~~Extended~~ Specification

Abstract:

Since the core RUS specification only tries to provide the bare minimum, more advanced features should be specified in a fully backwards compatible way in the advanced~~extended~~ RUS specification. Features of interest include server-side aggregation, data replication, fine-grained security aspects, and VO-level access to usage records. All these topics are currently not addressed by the RUS core specification since not every service consumer/provider needs this functionality. Hence, implementations of both the core and extended specification should be able to co-exist to allow developers/deployers to choose between a simple RUS interface (only core) or a version of a RUS interface with much more features (core and extended specification on top of core). Furthermore, advanced features that are requested by the Grid community will be gathered and integrated into a seed for discussing possible extensions of the core RUS specification. Also, contents of the advanced~~extended~~ RUS specification include the exposure of other usage record formats different from the URF standard defined by the UR–WG, for instance usage records of large storage facilities or network connections when they become available in a standardized format. The advanced specification will also be formulated using IDL~~in terms of abstract operations independent of the underlying transportation technology~~. Renderings for transportation technologies will be provided in separate documents. In addition advanced features will be added by extending the semantics of the existing core operations when possible.

Type: OGF Recommendation

Milestone	Target Date	Completed	Completion Date
First Draft for Review	Feb. 2008		

Submission for Comment	Mar. 2008		
Published	Jul. 2008		

Title: Resource Usage Service – AdvancedExtended Specification WS-I Basic Profile Rendering

Abstract:

This recommendation defines the rendering of the Resource Usage Service AdvancedExtended Specification in the framework of the WS-I Basic Profile transport layer. It specifies the mapping of abstract operations to actual implementation in compliance with the requirements of the WS-I Basic Profile. If not explicitly prohibited bybut the Profile, interoperability with the WS-RF rendering is maintained.

Type: OGF Recommendation

Milestone	Target Date	Completed	Completion Date
First Draft for Review	Feb. 2008		
Submission for Comment	Mar. 2008		
Published	Jul. 2008		

Title: Resource Usage Service – AdvancedExtended Specification WS-RF Rendering

Abstract:

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Type: OGF Recommendation

Milestone	Target Date	Completed	Completion Date
First Draft for Review	Feb. 2008		
Submission for Comment	Mar. 2008		
Published	Jul. 2008		

2.4 Management Issues

Webmaster and secretary duties will be carried out by the WG chairs.

2.5 Evidence of commitments to carry out WG tasks

During recent telephone conferences of the RUS–WG the following individuals made commitments to carry out WG tasks:

- Morris Riedel, Forschungszentrum Juelich GmbH (FZJ), Germany (UNICORE)
- Gilbert Netzer, Royal Institute of Technology (KTH), Sweden
- Rosario M. Piro, National Institute of Nuclear Physics (INFN), Italy (EGEE)
- Xiaoyu Chen, Brunel University, UK (OSG, EGEE, GridPP)
- Sven van de Berghe, Fujitsu Laboratories Europe (FLE), UK (UNICORE)

Since these individuals participating in different production Grids and Grid projects it is ensured that a wide area of different resource usage use cases will be considered.

2.6 Pre-existing Documents

A first version of the RUS specification was developed for the Open Grid Services Infrastructure (OGSI) and has not achieved the proposed recommendation status.

Another version of the RUS specification named as RUS based on WS – I Basic Profile 1.0 [5] was given to public comment and has not achieved the proposed recommendation status so far.

2.7 Exit Strategy

After the primary goals of the WG have been completed, the WG will assess if continued interest and commitment from the Grid community exist. In that case the WG will continue working on other specifications on top of the ~~core~~ RUS specifications, otherwise the WG will dissolve itself.

2.8 Any other relevant information

There are several projects and Grid technologies that already have started to implement the interfaces as defined in the early draft RUS core specification:

- The OMII – UK project developed GridSAM which implements the RUS interface – GridSAM is used within the UK e-Science infrastructure.
- The UNICORE Grid middleware [8] is currently augmented with a RUS interface – UNICORE is used within the DEISA [9] infrastructure.
- The SweGrid Accounting System (SGAS) [6] started to support a RUS interface – This system is one optional technology within the Globus Toolkit.
- The Distributed Grid Accounting System (DGAS) [7] integrated the RUS interface – This system is used in the context of gLite within the EGEE Grid [10].

In addition, the following project has announced its interest in implement the RUS interface:

- The currently proprietary LCG–RUS implementation is interested in the integration of a standardized RUS interface – LCG–RUS is used within the OSG Grid.

These efforts to provide three independent implementations lay the foundation to achieve a FULL RECOMMENDATION status of the proposed RUS specifications.

Furthermore, the experiences gained by the integration of the RUS interfaces will lead to continuous feedback to the standardization process.

Finally, the OMII – Europe project has started funded interoperability efforts with respect to RUS interfaces among the UNICORE Grid middleware, SGAS, and DGAS. This in turn provides feedback for the evolution of the RUS specifications.

3. Appendix: Seven questions: Evaluation Criteria (from GFD.3)

When considering the formation of this group, the Steering Group will wish to ensure that every WG has clear and focused objectives, and has demonstrated support from the community. The Steering Group will consider the following seven issues (taken from GGF document GFD.3).

1. Is the scope of the proposed group sufficiently focused?

The WG aims at standardising a single Web service interface for update and storage of XML document types (usage records). The primary focus lies on the upcoming OGF URF standard of the UR – WG which is already ~~within public comment~~a proposed recommendation.

2. Are the topics that the group plans to address clear and relevant for the Grid research, development, industrial, implementation, and/or application user community?

The working group addresses the storage and exchange of usage record information between resource providers and service consumers (end-users or other services). This is central for allowing grids to provide provisioning of resources and charging of users for consumed services/resources

3. Will the formation of the group foster (consensus–based) work that would not be done otherwise?

Interoperation between different Grids will create the need for exchange of resource usage information between different Grid systems. However without a consensus-based standardization effort, proprietary solutions will most likely be used to archive interoperation without respect to the larger picture.

4. Do the group's activities overlap inappropriately with those of another GGF group or to a group active in another organization such as IETF or W3C? Has the relationship, if any, to the Open Grid Services Architecture (OGSA) been determined?

There are no major inappropriate~~ly~~ overlaps with other standardization activities.

Minimal overlap with DAIS-WG exists, since DAIS-WG also provides access to remote databases, however RUS-WG is focused on UR storage, whereas DAIS-WG is concerned with remote database access.

5. Are there sufficient interest and expertise in the group's topic, with at least several people willing to expend the effort that is likely to produce significant results over time?

The interest of a standardized RUS interface comes out of different projects and technologies that deal with accounting, billing and monitoring and thus with resource usage in general. The active group members of the WG work in the context of different Grid technologies such as UNICORE, SGAS, DGAS, gLite and Globus Toolkits, while these technologies are used within production Grid projects such as DEISA, D-Grid, EGEE, or TeraGrid. The effort in standardization for resource usage within these technologies ~~y~~by the members of WG will produce significant results over time, bringing in their expertise in the context of resource usage from deployments in real case scenarios.

6. Does a base of interested consumers (e.g., application developers, Grid system implementers, industry partners, end-users) appear to exist for the planned work?

Currently the UNICORE, gLite (via DGAS) and Globus Toolkit (via SGAS) are augmented with a RUS interface. Furthermore a RUS implementation for the OMII-UK middleware stack already exists, while the LCG – RUS developers have already announced their interest for the integration of the RUS interface. Finally, the OMII – Europe project works in the context of interoperability among the RUS interfaces of UNICORE, DGAS and SGAS.

7. Does the OGGF have a reasonable role to play in the determination of the technology?

Currently no standards for accessing accounting information from Grid middleware exist. This means that the upcoming RUS standard is defining one possible technology for exchanging accounting and monitoring information between different Grids. At least four middleware stacks will be augmented in future with the RUS interface.

4. References

[1] R. Mach, et. al., *"Usage Record - Format Recommendation"*, Usage Record WG, September ~~August~~ 2006, http://www.ogf.org/documents/GFD.98.pdf~~http://forge.gridforum.org/sf/go/doc13864?nav=1~~

[2] OGF Usage Record Working Group
http://forge.gridforum.org/sf/projects/ur-wg

[3] OGF Resource Usage Service Working Group
http://forge.gridforum.org/sf/projects/rus-wg

[4] I. Foster, et. al., *"OGSA WSRF Basic Profile 1.0"*, Open Grid Services Architecture Working Group, May 1, 2006, http://www.ggf.org/documents/GFD.72.pdf

[5] J. Ainsworth, et. al., *"Resource Usage Service (RUS) based on WS-I Basic Profile 1.0"*, RUS-WG, August, 2006, http://forge.gridforum.org/sf/go/doc7965?nav=1

[6] SweGrid Accounting System (SGAS)
http://www.sgas.se/

[7] Distributed Grid Accounting System (DGAS)
http://www.to.infn.it/grid/accounting/main.html~~http://www.to.infn.it/grid/accounting/main.htmlhttp://www.to.infn.it/grid/accounting/main.html~~

[8] Uniform Interface to Computing Resources (UNICORE) Grid Middleware
http://www.unicore.eu

[9] Distributed European Infrastructure for Supercomputing Applications (DEISA)
http://www.deisa.org

[10] Enabling Grids for e-Science (EGEE)
http://public.eu-egee.org/

[11] OGSA Authorization WG
http://forge.gridforum.org/sf/projects/ogsa-authz

[12] Keith Ballinger, et al., *"WS-I Basic Profile 1.0"*, The Web Services-Interoperability Organization
http://www.ws-i.org/Profiles/BasicProfile-1.0-2004-04-16.html