GWD-R, GWD-I or GWD-C
GLUE-WG

Laurence Field, CERN
Jan 18, 2008

Use Cases for Glue 2.0

Status of This Document

This document provides information to the Grid community motivating scenarios for the definition of the GLUE schema version 2.0. It does not define any standards or technical recommendations. Distribution is unlimited.

Abstract

The GLUE-WG is a working group in OGF focusing on the definition of an abstract schema for use within a grid infrastructure. A variety of scenarios used in existing production infrastructures are introduced in this document to illustrate what requirements the schema must meet.

Contents

1. Introduction

This document describes a number of use case from the existing production grid infrastructures. These use cases will be used to focus the definition of Glue 2.0 and validate the resulting specification. This will enable Glue 2.0 to be adopted by those infrastructures.

2. Contributors

Input has been gathered from many infrastructure projects including, EGEE, OSG, TeraGrid, NorduGrid, APAC, Naregi, NGS and DEISA.

3. Template for Use Cases

The use cases should be simple and to the point. Longer use cases have been broken up into smaller use cases where possible. The following template has been used throughout the document to document the use cases.

Description	A short description of the use case
Actors	Roles involved in the use case
Conversation	Sentences that help the understanding of the use case
Acceptance	How to test the use case
Endorsed by	The project supporting the use case

4. Grid Site

4.1 Site Discovery

Description	Find all sites participating in the infrastructure
Actors	End user, operations and monitoring applications
Conversation	Each site needs to have a unique identifier so that conflicts are avoided when two infrastructures interoperate. The site should also have an abbreviated name for displays and the full name.
Acceptance	All sites in the infrastructures can be discovered
Endorsed by	EGEE, OSG, D-Grid, NGS

4.2 Site Location

Description	Find the geographical location for automatically plotting the sites on maps
Actors	Monitoring applications
Conversation	Each site needs geographical coordinates that represent the physical location so that accurate maps can be displayed. In addition a human readable form of the location is also need for annotation.
Acceptance	Site must be automatically and accurately plotted on map based displays
Endorsed by	EGEE, OSG, D-Grid, NGS

4.3 Site Email Contact

Description	Find the email contact for the site
Actors	End user, Operations
Conversation	It should be possible to find an email contact for the site.
Acceptance	Contact the site via email
Endorsed by	EGEE, OSG, D-Grid, NGS

4.4 Site Web URL

Description	Find the sites web page
Actors	End user, Monitoring applications

Conversation	It should be possible to find an web URL for the site.
Acceptance	Find the web page for the site
Endorsed by	EGEE, OSG, D-Grid

4.5 Site Tags

Description	Enable the publishing of additional "tags" for the site
Actors	End user, VO, Operations
Conversation	Infrastructures and VOs need to add various tags to add their own structure. For example, LCG classifies sites as "Tier1", "Tier2" etc. The semantics of these tags is defined by the tag creator.
Acceptance	Add an view additional "tags" for the site
Endorsed by	EGEE, OSG, D-Grid, NGS

5. Generic Service

5.1 Service Discovery

Description	Find all the service endpoints for a specific service type.
Actors	End User, Service Discovery, Operations
Conversation	Show al the services a type x.
Acceptance	A list of all service in the infrastructure should be found. This list show be narrowed to only certain types of service
Endorsed by	EGEE, OSG, NorduGrid, NAREGI, D-Grid, NGS

5.2 Service Authorization

Description	Find all the Services which I am authorized to use.
Actors	End User, Service Discovery
Conversation	Show all the services that support VOx
Acceptance	A list of all the service that VO x can use should be found.
Endorsed by	EGEE, OSG, NorduGrid, NAREGI, APAC, D-Grid

5.3 Service Version

Description	Find all the Services which implement a particular interface version.
Actors	End User, Service Discovery, Operations
Conversation	Show the version of service type x
Acceptance	A list of services of a specific version should be found
Endorsed by	EGEE, OSG, D-Grid

5.4 Service Downtime

Description	A site administrator or grid operator wants to know, if a Grid resource or service is in maintenance or will be in maintenance at a given date and time and when it will recover.
Actors	End User, Service Discovery, Operations
Conversation	Are already used are e.g. the LCG GoC? Database. In the case of distributed GoCs? or dynamic resource providers, this data may be collected dynamically and distributed.

Acceptance	Show the Scheduled down time of the service
Endorsed by	EGEE, OSG, D-Grid, NGS

5.5 Service Associations

Description	Find a service which is associated to another service.
Actors	End User, Service Discovery, Operations
Conversation	There are sometimes associations between services and it is important to find the related service based on this association.
Acceptance	Find the associated service.
Endorsed by	EGEE

6. Compute Service

6.1 Compute Service Properties

Description	Find the generic properties of the Compute Service
Actors	End Users, monitoring applications,
Conversation	This covers information that is not required for a specific purpose but is "interesting" to know. Examples are; batch system implementation, Total Size, etc.
Acceptance	It should be possible to find out generic properties of a computing service
Endorsed by	EGEE, OSG, D-Grid

7. Job Submission

7.1 Resource Usage

Description	Find the total and used amount of the computing resource for a VO.
Actors	Site Administrator, Operations, VO, Resource Selection
Conversation	What is the unit of computing resource that can be free/used/unavailable? From the end-user viewpoint a job slot is different from the physical resource. When a unit of computing resource is free/used/unavailable, what do you count in the total?
Acceptance	Check for double counting and correct handling of accounting multi-core CPUs and virtual machines.
Endorsed by	EGEE, OSG, NorduGrid, D-Grid, NGS

7.2 Share Description

Description	Find the share of compute resources available to a group.
Actors	End User, Site Administrator, Operations, VO, Resource Selection
Conversation	A group-specific share should be modeled in the same way, regardless the possible local allocation strategies implemented via site configuration. What kinds of relationships are possible between groups and shares?
Acceptance	A site admin implements per-group guaranteed share by using a per-group batch queue strategy. A site admin implements per-group guaranteed share by using a batch queue with hierarchical share allocation
Endorsed by	EGEE, OSG, NorduGrid, D-Grid, NGS

7.3 Job Requirements

Description	Find computing resources which meet the requirements of a job.
Actors	End User, Resource Selection Service
Conversation	Common requirement included the OS (name, type and version), SMP size and physical/virtual memory size. This requirement should take into consideration JSDL. Problems with OS naming and processor descriptions need to be taken into account. This will best be done by working closely with the JSDL-WG.
Acceptance	It must be possible to select a computing resource base on JSDL attributes.
Endorsed by	EGEE(Giovanni Bracco), OSG, NorduGrid, NAREGI, D-Grid, D-Grid, NGS

7.4 Execution Host Disk Size

Description	Find computing services where the execution host has free disk space of a certain size.
Actors	End User, Resource Selection Service
Conversation	We are looking at needing 25GB per job and expect this would not be met by a large fraction of the computing services.
Acceptance	It must be possible to select a computing service where the execution hosts have a disk space of at least a specified size.
Endorsed by	EGEE (Stephen Gowdy), OSG, NGS

7.5 Advanced Reservation

Description	Advanced resource reservation
Actors	End User, Resource Selection Service
Conversation	Select only computing resources that support advanced reservation
Acceptance	A user should be able to submit a job with advanced resource reservation. A user should be able to submit jobs with and without advanced reservation at the same time.
Endorsed by	NAREGI, NGS

7.6 Bulk Jobs

Description	Bulk submission
Actors	End User, Resource Selection Service
Conversation	Select only computing resources that support bulk submission.
Acceptance	A Resource Selection Service should be able to submit a bulk job request to compute service.
Endorsed by	NAREGI, D-Grid

7.7 Software Installation

Description	User application Software.
Actors	End User, Resource Selection Service
Conversation	In addition to the software package it is also important to know the software version.
Acceptance	Select only the computing service with the required installed application.
Endorsed by	EGEE, OSG, NAREGI, APAC, NGS

7.8 Software Authorization

Description	Find the computer services where I am authorized to use a specific application.
Actors	End User, Resource Selection Service
Conversation	Select those computing resources where I am authorized to use a specific application.
Acceptance	Only those computing resources where a user is authorized to use a specific application should be selected.
Endorsed by	NAREGI, APAC, NGS

7.9 Input/output

Description	Find the directory for placing input/output files
Actors	End User, Job Submission Service
Conversation	Where are input files a user wants to use for a job execution and where does a user put output files of a job?
Acceptance	A user should be able to execute a job using browsed existing input files, put output files of the job and browse the output files
Endorsed by	NAREGI

8. Parallel Jobs

8.1 Job Instances

Description	Find the instances of the other components for a parallel job
Actors	Running Job
Conversation	When an application program, which consists of multiple components, starts to execute on computer systems belonging to multiple sites, each of the components can get information about the systems where other components run to transfer data among them.
Acceptance	A user should be able to execute a coupled job transferring data among the components
Endorsed by	NAREGI

8.2 Parallel Software Version

Description	Find a compute service where the parallel versions of some application software have been installed.
Actors	End User, Resource Selection Service
Conversation	A user wants to know if software package X contains a parallel or sequential version of software executable Z. Is the software executable Z under the software package X installed on resource R at Site A support parallel/sequential execution?
Acceptance	Only the computing services where the parallel version of the application should be selected.
Endorsed by	APAC, NGS

8.3 Network Technology

Description	Find a compute service where a specific local network technology is used.
Actors	End User, Resource Selection Service
Conversation	A user submitting an MPI job wants to know the technology of the local network (providing clue about the performance, e.g., gigabit Ethernet, myrinet, and infiniband. Local network speed with which WNs are connected in Mbps

Acceptance	The user should be able to find out the technology of the local network
Endorsed by	EU.INT.GRID, EGEE (Antun Balaz) , NGS

8.4 Number of Jobs Slots

Description	Find the maximum number of job slots that can be assigned to a single parallel job.
Actors	End User, Resource Selection Service
Conversation	A user submitting an MPI job wants to know the maximum number of slots that can be assigned to a single MPI job
Acceptance	A user must be able to find computing service which provide enough job slots for their parallel job.
Endorsed by	EU.INT.GRID, NGS

8.5 Supported MPI implementation

Description	Find a compute resource which supports a specific MPI implementation
Actors	End User, Resource Selection Service
Conversation	A user submitting an MPI job wants to know the type of MPI implementation available in an execution environment (e.g., MPICH, OpenMPI, LAMMPI)
Acceptance	A user should be able to find the MPI implementations supported by the computing service.
Endorsed by	EU.INT.GRID, D-Grid, NGS

8.6 Share File System

Description	Find compute resources which have a shared file system.
Actors	End User,
Conversation	A user submitting an MPI job wants to know if there is a shared file system among the execution environments.
Acceptance	Select only those compute services that use a shared file system.
Endorsed by	EU.INT.GRID

9. Job Monitoring

Description	Find the current status of a specific job.
Actors	End User, Monitoring. Operations
Conversation	Ability to query the status of a job and return that the job is either pending, running, failed, or succeeded. Ability to determine the name of the host that is executing as this also helps in debugging problems. The submit time, start time and end time would also need to be found.
Acceptance	Show the current status of a job.
Endorsed by	Nordugrid, SAS, D-Grid

10. Close Storage Service

Description	Find the Storage Service that is close to a Compute Service
Actors	End User, Resource Selection Service
Conversation	If it is known that the data to be processed can be found on a specific storage system, it should be possible to find which Compute Service is “close” to this storage system so that jobs can be directed to this Compute Service. Note: What is the meaning of “close”?
Acceptance	Select a Compute Service that is close to a specific Storage Service.
Endorsed by	EGEE, OSG

11. Storage Service

11.1 Storage Service Properties

Description	Find the generic properties of the Storage Service
Actors	End Users, monitoring applications
Conversation	This covers information that is not required for a specific purpose but is "interesting" to know. Examples are; storage system implementation, Total Size, etc.
Acceptance	
Endorsed by	EGEE, OSG, D-Grid

11.2 Storage Service Accounting

Description	Resource Usage of a Storage Service
Actors	End Users, monitoring applications
Conversation	Find the used and available space for the storage service per VO.
Acceptance	Show the state over time of the storage service.
Endorsed by	EGEE (greig cowan)

12. Data Management

12.1 Transfer Protocols

Description	Supported transfer protocols by a Storage Service
Actors	End User, File Transfer Service
Conversation	Find all Storage Services that support a specific transfer protocol.
Acceptance	Select Storage Services which support a specific transfer protocol.
Endorsed by	EGEE, OSG

12.2 Protocol Capabilities

Description	What are the capabilities of a specific for the Access Protocol?
Actors	End User, File Transfer Service
Conversation	It should be possible to distinguish between protocols that are allowed for read-only operations on WAN like for dcap in certain cases, or protocols that can only be used by a subset of the supported groups
Acceptance	Show the capabilities of a specific access protocol.
Endorsed by	EGEE, OSG

12.3 Resource Usage

Description	Storage Spaces in a Storage Service
Actors	End User, File Transfer Service
Conversation	Find the available storage space provided by a storage service
Acceptance	Select the Storage Space of a Storage Service which the user can access.
Endorsed by	EGEE, OSG, D-Grid, NGS

12.4 Storage Capabilities

Description	What are the capabilities of a specific for the Storage Service?
Actors	End User, File Transfer Service
Conversation	Find the capabilities of the various Storage Components.

Acceptance	Show the capabilities of a specific Storage Service.
Endorsed by	EGEE, OSG

12.5 Authorization

Description	Storage Authorization Groups
Actors	End User, File Transfer Service
Conversation	Find the all storage services that are authorized by a specific group.
Acceptance	Select the Storage Services which can be used by a specific VO.
Endorsed by	EGEE, OSG, GridAustralia

13. MyProxy Service

Description	Find which myproxy service can used in order to retrieve/renew a proxy.
Actors	End User, Resource Selection Service
Conversation	Usually you want to find a service where you are authorized, but in this case you want a service where another service is authorized
Acceptance	Select a myproxy service which is used by a specific service.
Endorsed by	EGEE, OSG, D-Grid, NGS

14. Glossary

TBD

15. Intellectual Property Statement

16. Disclaimer

17. Full Copyright Notice

18. References

TBD