# Towards GLUE 2: Evolution of the Computing Element Information Model


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## The Need for a Common Description of Grid Resources

Grid systems enable the sharing of distributed resources across multiple heterogeneous platforms, locations, and organizations. A precise and shared description of these resources should be defined in order to enable awareness and discoverability of their characteristics and status. This description should also be common to different Grid middlewares and infrastructures in order to contribute to the interoperability aspects.

## The OGF GLUE Working Group

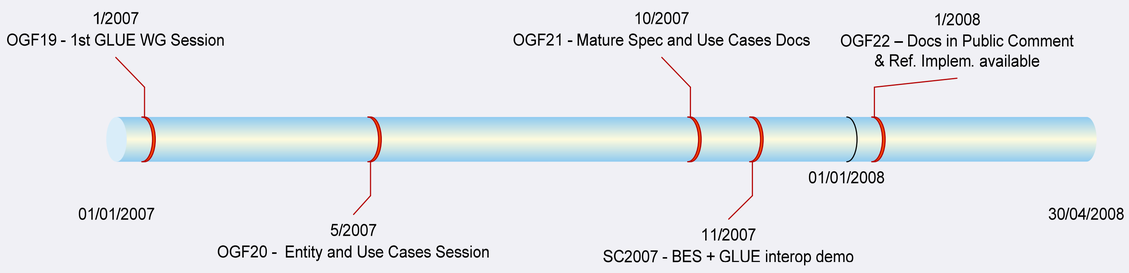
In the context of the Open Grid Forum, the GLUE Working Group was created in January 2007 in order to provide a recommendation for an abstract information model that leverages the existing proposals into a community-agreed standard.

The group will also provide reference implementations for the relevant concrete data models required by the community (e.g., XML Schema, relational, LDAP, RDF). Such implementations will consider simplifications specific to the target data model in order to improve query performance or other aspects.

The activity benefits from several years of experience by contributing Grid projects such as EGEE, NorduGrid and OSG. Other projects support and contribute to this activity, mainly OMII-Europe, TERAGRID, NGS, NAREGI, D-GRID, UNICORE, KnowArc and APACGrid.

Two main documents will be produced [2]: a *use case document* describing all the production scenarios that motivate the need for modeling aspects of Grid systems and a *specification document* with the precise definition of classes, attributes and relationships in response to the given use cases.

In the first year, the group is focusing on the redesign of models for the following main concepts: administrative domains, service, computing resources and storage resources. The timeline shows the tentative schedule for schema definition.



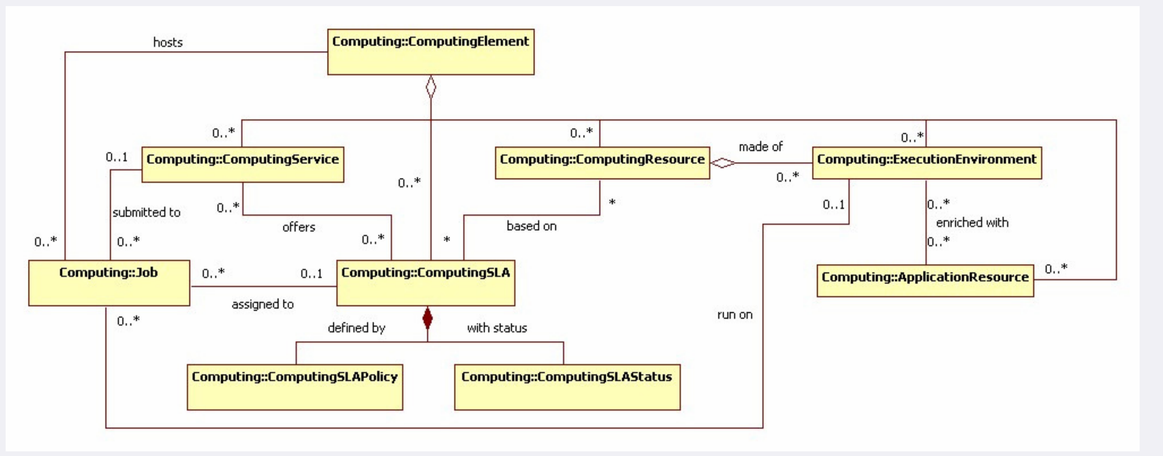

## Relationship to CIM

CIM (Common Information Model) is a standard defined by the DMTF (Distributed Management Task Force) whit the goal of providing a common definition of management information for systems, networks, applications and services, and allows for vendor extensions. Such definitions should enable vendors to exchange semantically rich management information between systems throughout the network.

Based on the OGF Liaison with DMTF, the GLUE WG is working on engaging the DMTF in order to leverage CIM and other DMTF standards for the modeling of GLUE 2. The goal is to render the GLUE 2 specification in terms of the CIM meta-model in order to exploit the WBEM technologies for a possible implementation.

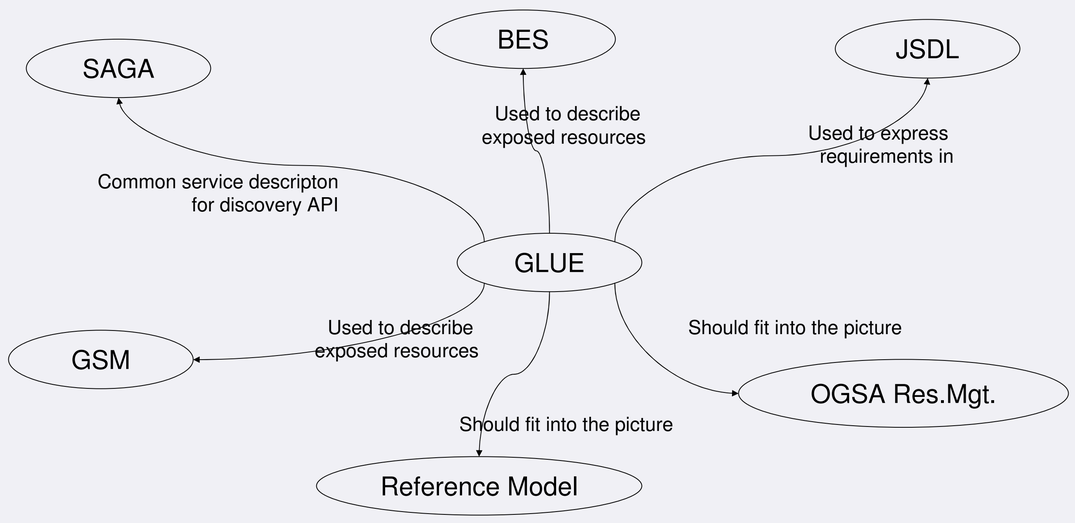
## The Computing Information Model (draft)

In the class diagram reported in this section, we propose the current draft of the entities and relationships involved when modeling computing resources. The Computing Element is a container concept for all sub-entities to which a job relates to when submitted for execution to a Grid interface. The computing service describes a Grid interface that an external client can use in order to submit and control jobs. The computing SLA is composed of policies and status information; it can be used to describe several utilization targets and their usage/free share. The computing resource is associated to a set of execution environment types for Grid jobs and it is defined by a management domain (e.g., a batch system installation maps to a computing resource).




## Relationships to other OGF Working Groups

The description of Grid resources is a key piece of information that is relevant to other OGF activities: the BES (Basic Execution Service) implementations can expose a richer description of the computing resources by means of the GLUE computing model; a JSDL document can exploit the GLUE terms to enable users to express requirements on resources; the SAGA service discovery API can enable to search services based on the GLUE Service specification; the GSM can expose a richer description of storage resources managed by an SRM using the GLUE Storage model; GLUE contributes to the information model architecture being defined by the OGSA Resource Management Design Team; GLUE should also be coherent with the Reference Model for Grid systems.




SAGA:Simple Access Grid API — JSDL: Job Submission Description Language

GSM:Grid Storage Management — BES: Basic Execution Service

## Implementations

The OMII-Europe project is providing man-power to implement the GLUE 2 computing model for the OGSA-BES implementations of gLite, UNICORE and Globus [3]. An alpha integration will be showed during SuperComputing 2007, while the final implementation will be available by the end of the project (April 2008).

Other implementations will be available from other parties. Moreover, the next generation Advanced Resource Connector (ARC) middleware being developed by the KnowARC project will also rely on the GLUE 2 model.

## Acknowledgements


We thank all the persons that are contributing to the OGF GLUE WG as their contribution is essential to the success of this work. We also thank Ellen Stokes, Hiro Kishimoto and Tom Roney for their guidance in the OGF community and for the support with external relationships with DMTF. The final thank is for Paul Strong from the Reference Model WG for the fruitful discussion about integrating GLUE and the Reference Model.


## References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