

Grid-SAFE Architecture

Grid-SAFE, a software suite developed at EPCC, The University of Edinburgh, is based on the well established SAFE (Service Administration From EPCC) software which is used to help administer and manage a range of HPC resources. SAFE provides project and resource accounting, reporting, and management. Grid-SAFE builds on this functionality to undertake these service administration tasks for a wider range of resources and deployment scenarios, from campus HPC systems to national and international Grids.

The fundamental aim behind Grid-SAFE is to provide a modular and customisable set of software that resource or project administrators/managers can easily deploy to provide the reporting and accounting functionality they require. The components may function as separate applications; or be assembled to provide end-to-end resource monitoring for HPC and Grid systems. The full components and architecture of Grid-SAFE are shown in Figure 1.

Services provided by Grid-SAFE are accessed through the web, utilising well established java technologies to provide the efficient, secure, and user friendly service required. This web-based approach simplifies the access requirements and usability issues associated with running a multi-user resource, especially as often users are from different locations or organizations.

There are currently three separate components provided:

- RUPI¹: A service to allow usage records to be added
- RUQI²: A service which allows usage records to be queried
- Reporting: A service which allows customisable reports to run

All these components build on a common code base which supports reporting and accounting and the required access to a relational database to maintain usage data.

The main data element that is used for reporting and accounting in Grid-SAFE is a usage record. This represents the consumption of some resource for some period of time. Usage records used with Grid-SAFE are generated by processing usage records/data provided from a resource or

¹ RUPI: Resource Usage Publishing Interface

² RUQI: Resource Usage Query Interface

group of resources. This processing extracts relevant information and applies any local policies that have been defined by the administrators of the Grid-SAFE service to generate an appropriate usage record. Both the parsing of the raw usage data and the policies that are applied to the parsed data can be customised to match the HPC resources they are using and their particular policies on resource usage, etc...

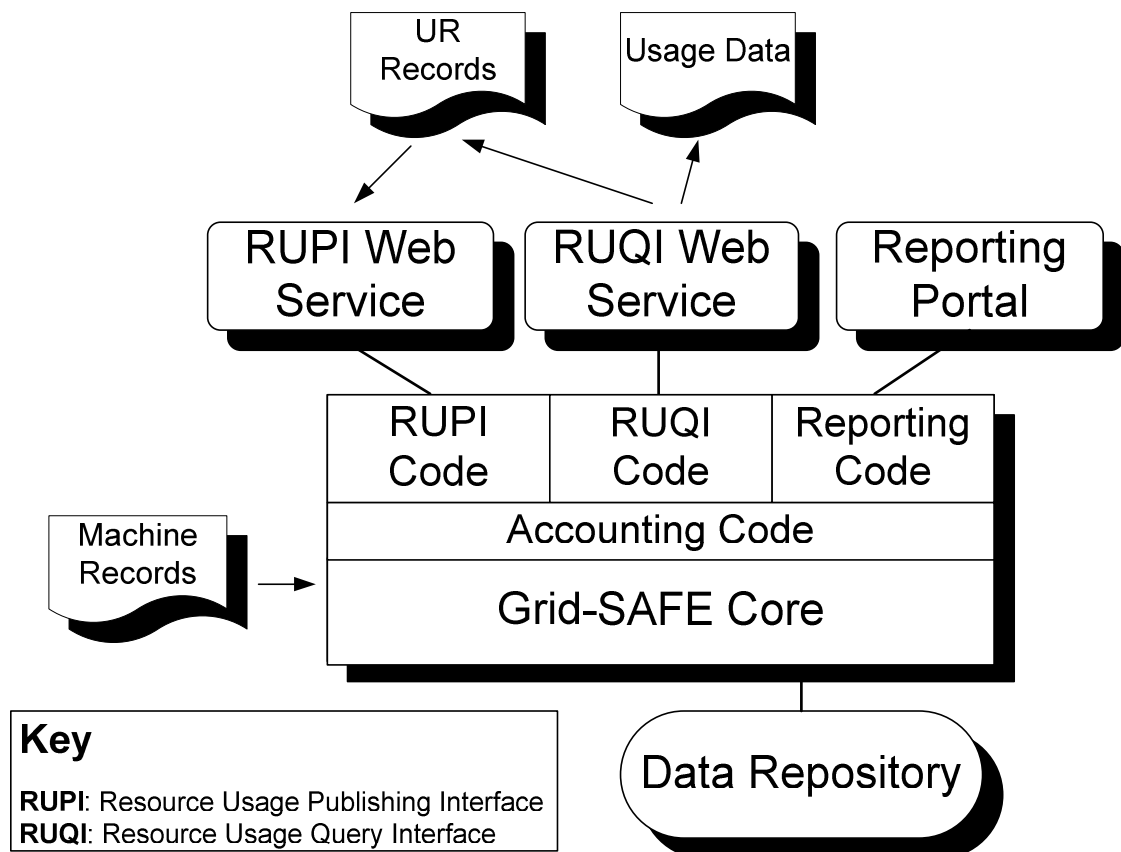


Figure 1: Grid-SAFE Architecture

Grid-SAFE offers two ways which data can be added to the data repository (the relational database). One is through the RUPI service, where data conforming to the OGF-UR standard can be uploaded. The other is to add machine records using a servlet that access the Grid-SAFE core code base. This second mechanism is the one generally used for Grid-SAFE instances that are monitoring local HPC machines such as a campus HPC resource or a national HPC machine.

As previously mentioned, the Grid-SAFE components can be used separately or together for any given deployment of the Grid-SAFE software. There are many different scenarios for the use of the software, from a single HPC system that simply uses the Reporting portal, to an international Grid which uses the RUQI service as an interface for its own

stored data and conversely someone who uses the RUPI service simply as an upload interface to add usage data to service.

Further documentation of each component within Grid-SAFE and deploy details can be found at the [Grid-SAFE website](#).