Comparison of European Grid Projects

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Project:

GEMSS

Area:

Project Overview

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1. Introduction

1.1. Objective and Structure

This document is one of thirteen templates that have common goal to gather information related to main European Grid Projects in order to make their accurate comparison in the framework of GRIDSTART initiative. We believe that the participation of particular projects members in preparation of this document will allow comparing all activities in a credible and exhaustive way.

The proposed structure of the description consists of two parts. The former is concerned with the general overview and architecture together with the contents of layers (the first template). The latter includes the main components of the Grid infrastructure (remaining 12 templates). Since information regarding the project architecture is to be quite general, more detailed description should be provided in the review of the main aspects of the Grid infrastructure. In order to prepare uniform description for each project, we identify the important issues that have to, should or can be included into particular components. Common issues for all components and these specific for this component are briefly described in the next section.

We ask you to proceed according to this schema. However, a feedback is obviously welcome. For some projects the document has been partially completed on the basis of descriptions found at the official web pages. In this case, we ask you to revise already filled in sections, correct and complete them if necessary.

You should take into consideration future plans while you fill in particular sections. Actually they are even more important then the current state of the project components. If you are not going to design some elements in the scope of the project at all, please, note it in the proper section.

1.2. Uniform description

Issues regarding general description of the project are presented in the sequel. Some of them, which we consider to be clear, have been skipped, however, if they turn out to be vague, please, contact the authors of this document (ariel@man.poznan.pl).

The **Objective** section contains **Main goals** and **Priorities** which determine whether project is application, middleware or infrastructure oriented.

The **Architecture** section should provide a general view of the project and its structure. A short description of contents for each layer should be included in **Layers** paragraph. A diagram describing the architecture is recommended with a short (about half up to one page) comment. Similarly, the description of layers can be short, for example, it can include a list of components or modules.

2. Project overview

GEMSS will develop an interoperable, innovative Grid middleware for medical service applications building on common Grid standards. The focus is on innovative extensions that support medical applications including security models compliant with European legal issues, fail-over and recovery from errors as well as workflow and service orchestration techniques for time-critical processes.

GEMSS is a 2,5 year project which started in September 2002. The GEMSS design is still being discussed by the project and not all issues have been finalized yet.

2.1.Objective

The central objective of the GEMSS project is to:

- demonstrate that the Grid can improve pre-operative planning and near real-time surgical support by providing access to advanced simulation and image-processing services,
- build middleware on existing/developing Grid technology standards to provide support for authorisation, workflow, security and Quality of Service aspects,
- develop, evaluate and validate a test-bed for the GEMSS system, including its deployment in the end-user's working environment,
- anticipate privacy, security and other legal concerns by examining and incorporating into its Grid services the latest laws and EU regulations related to providing medical services over the Internet.

2.1.1. Main goals

The main goal of GEMSS is to provide end-users from the medical community with advanced tools at their workplace through easy-to-use interfaces. In particular GEMSS will:

- install an extendible, interoperable and collaborative test bed for GRID-enabled medical application services,
- demonstrate the medical significance of the GEMSS models,
- demonstrate the functionality of the GRID-infrastructure,
- open new business models for future commercial exploitation.

2.1.2. Priorities

Through the central objective outlined in section 2.1 GEMSS is an infrastructure project driven by its 6 prototype medical service applications.

2.2.Architecture

The GEMSS architecture is based on a client-server topology. Figure 1 shows the basic design.

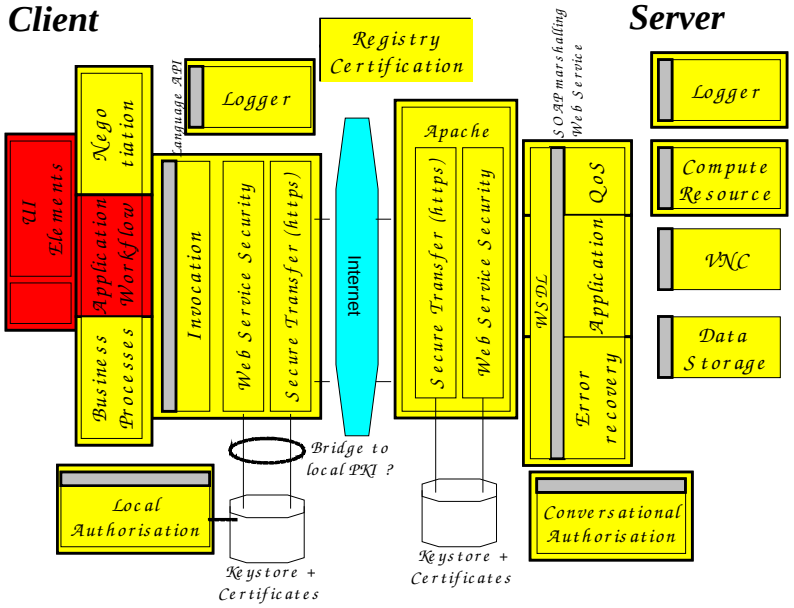

Figure 1: Global GEMSS Architecture

2.3.Layers

Building blocks of the GEMSS architecture will be:

- Web Services based on OGSA/OGSI
- Apache Axis
- SOAP Requests over HTTPS
- NEC-COSY scheduler for Resource Management

2.3.1. Applications and portals

The ***GEMSS*** test-bed will include medical service applications, with varying performance and Quality of Service requirements targeting different medical sectors:

- Maxillo-facial surgery simulation: a virtual pre-operative planning space.
- Neuro-surgery support: prediction of the brain-shift during neuro-surgery.
- Radio-surgery simulation: improved treatment planning for cancer destruction.
- Inhaled drug delivery simulation: virtual drug delivery to the lung.
- Cardio-vascular system simulation: simulation of the entire cardio-vascular system for improved treatment plans and surgical procedures.
- Advanced Medical Image Reconstruction.

2.3.2. Application development environment and tools

GEMSS will not develop its prototype applications from scratch. There is a need to include existing software to which we do not have source access in all cases.

2.3.3. Middleware

Currently GEMSS plans to develop its own system based on web-services (OGSA) and use UNICORE and GT3/OGSA as alternative.

2.3.4. Fabric

GEMSS does not seek to manage local resources directly. GEMSS is designed to work with the COSY scheduler developed for the project and coexist with existing schedulers.