

The Porting of a Grid Software for Virtual Eye Surgery from Globus 4 to gLite

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In Globus Toolkit 4, we developed a parallel version of the simulation of the Hess-Lancaster test (typical medical examination). By this, we speeded up this simulation by a factor of 14-17.

Furthermore, we reported the prototype implementation of a medical database component for “Grid-Enabled SEE++”. Our next steps concentrate on developing a distributed grid-enabled database system.

Finally, we designed a so called grid-based Pathology Fitting algorithm, which would be able to determinate (or at least estimate) automatically the pathological reason of a patient’s strabismus. Since the outcome of this algorithm strongly depends on the initial estimation for the pathological case, we propose to exploit the grid in the following way:

- by searching in the grid-based SEE++ medical databases for similar pathological cases and
- by starting concurrent pathology fitting processes with these cases as the starting points of the optimizations (parameter study).

3. Impact

Since we met with some limitations of Globus 4, we also designed and developed a version of “Grid-Enabled SEE++” compatible with gLite.

We use some kind of server jobs (as executers for parallel Hess calculations) started via the WMProxy. To return the allocated port numbers, we investigated the interactive job submission feature of gLite.

We may exchange the access layer developed earlier for the SEE++ medical databases to an AMGA-based solution.

Pathology Fitting is proposed to execute on gLite as parametric jobs. Each job will be started with different initial parameters founded in the SEE++ medical databases.

We plan to apply the R-GMA information system as well, such that our system will be able to discover automatically the available databases and the executer jobs on the grid.

An important security concept is the managing of the Virtual Organizations, because we have to be sure that the published medical data will be hosted only by certain trusted grid nodes.

4. Conclusions / Future plans

The fact that “Grid-Enabled SEE++” is an interactive application with many fine-grained jobs (the users change the eye parameters by a manual trial and error before each simulation) may make the software an interesting testcase for gLite. In this updated poster demonstration, we intend to focus on the differences between initial (but in some senses already more sophisticated) gLite version and the Globus version of our software system and to report on some comparative benchmark results.

Provide a set of generic keywords that define your contribution (e.g. Data Management, Workflows, High Energy Physics)

Medical Imaging, “Grid-Enabled SEE++”,

1. Short overview

“Grid-Enabled SEE++” is a grid-based simulation software that supports the diagnosis and treatment of certain eye motility disorders (strabismus). The overall goal is to develop an efficient grid-based tool for “Evidence Based Medicine”, which supports the surgeons in choosing optimal surgery techniques for the treatments of

different syndromes of strabismus. In the current poster demonstration, we propose to report our experiences regarding the porting of this application to gLite.

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