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Re-engineering a Grid Aware Medical Database Based on a Metamodel

A massive increase has been noted in the amount of medical data recorded due to advances in medical and clinical researches. Methods for efficient storage, suitable for data analysis and optimized for utilizing technologies that enhance computing performace such as Grid technologies are a concern of this work.

Databases
Medical Informatics
Metamodels
Grid Computing

Concept

Over the last few decades, the amount of medical data available through the advancements in medical and clinical researches has greatly increased. Therefore, the need for huge storage capacities, effective data retrieval methods and high performance computations has become significantly important.

The aim of this work was to develop a simplified metamodel for SEE++, a software system for the computer-aided simulation of eye motility disorders and their treatments. The poor performance of the current over-engineered metamodel was the driving force behind the necessary enhancements. Thus, the newly developed metamodel allows the integration into a Grid environment to achieve near real-time performance for the numerous simulations and complex calculations performed. This was done using an instantiation of YAMM, a tool for creating web-based database applications based on a metamodel, comprising both the data and model conjointly in a relational back-end.

Our work involved restructuring YAMM to parse its database interactions into a generic form to query any resource. An interoperability layer was created to handle various database connections. The use of a relational back-end was implemented and an interface was designed for using any other system like a Grid-aware database. Moreover, the methodology of instantiating YAMM to represent the SEE++ data model was investigated, resulting in the discovery of a few problems in YAMM's expressiveness, which introduced ambiguity in the SEE++ data model representation.