

Development and adaptation of a web enabled in silico oncology application in grid environment

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This tool was developed following a multi-tier architectural approach in order to provide access to the core grid services through a state of the art web interface. Initially the in silico oncology source code was modified to facilitate the execution of simulations to grid nodes using parameter files that are automatically created from the end users using the tool. Additionally, grid specific wrapper-scripts were developed for setting up the simulation and for gathering useful statistics for the QoS mechanisms. The end users exploiting these mechanisms' functionalities were able to create dynamically simulation specific JDL files based on the user requirements and on the status of the grid infrastructure. Finally a web portal was designed and developed that simplified the access to the grid resources and automated the job submission and monitoring. This portal enabled additional services to the framework, such as user management and job scheduling based on QoS criteria.

3. Impact

Exploitation of the vast resources provided by a grid may lead to a better understanding of the biological and clinical behavior of cancer and especially solid tumours. Furthermore, computer simulation may be employed in order to optimize treatment of cancer, by conducting a number of simulations for different therapeutic schemes based on the individual data of a patient. As the number of possible therapeutic schemes and consequently the number of simulations increases, the time required for evaluating and comparing the effects of the different schemes may become forbiddingly high. Exploiting grid computing is a very attractive solution, as the resources provided in a grid infrastructure may be efficiently used to reduce overall required execution time in a handy, cost-effective and efficient manner. Additionally, this framework guaranteed high level of QoS for the end users utilizing the experience of the past job submissions and the status of the grid infrastructure.

URL for further information:

http://www.gsrt.gr/default.asp?V_ITEM_ID=4318

4. Conclusions / Future plans

This tool provides a web-based, user-friendly interface with added functionality, for performing parameter-sweep simulations on the resources provided by the EGEE infrastructure. The vast resources available in the grid enable the evaluation and comparison of different therapeutic schemes, while the access to these resources was considerably simplified through the web portal. The tool has been utilized in order to perform comparative simulations for a large number of radiotherapy schemes.

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

In silico oncology, grid portal, HellasGrid, EGEE, grid-app, QoS

1. Short overview

A grid-enabled simulation tool for large scale in silico oncology simulations has been developed. In silico oncology aims at mathematically describing and computationally simulating the multiscale biological mechanisms that constitute the phenomenon of cancer and its response to therapeutic techniques. The application has been ported to EGEE infrastructure and a web based interface has been implemented for providing a user-friendly environment and additional QoS and management functionalities.

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