

GRID BASED TELEMEDICINE APPLICATION FOR GATE MONTE CARLO DOSIMETRIC STUDIES

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The secured web portal has been designed to be used by physicians and medical physicists to perform Monte Carlo calculations :

to optimize the acquisition and data processing protocols of medical scans,
to ensure accurate treatment plannings for some specific radiotherapy applications.

In that way, developments focus on the creation of a secured web platform to access grid computing to split the GATE simulations.

Functionalities of this platform enable :

A secure authentication to assess grid computing

The retrieving of medical data from a PACS server, this service contains the anonymization of data, encryption and extraction of metadata stored in a base on the grid.

The secured and parallelized computing using medical images on the grid.

The monitoring and resubmission of calculations in case of failure.

The visualization of results (dosimetry map, sinograms...) as images, directly from the client machine of the use.

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

Medical Data Management, Monte Carlo, PACS, Web Services, GridSphere

1. Short overview

GATE is a pilot application dedicated to medical physics in the biomedical area of the EGEEII project. It has benefited of fundings from the french regional LifeGrid project and is tested on the regional grid infrastructure in Auvergne Auvergrid.

For a usage of GATE in clinic, the goal is to share and store medical images with their metadata from hospital (PACS systems) to use them in GATE calculations on the grid infrastructure. Those functionalities are developed under a secured web portal.

3. Impact

The architecture of the platform is made of a secured web server, a plug machine at hospital and an efficient and reliable network for the transfer of confidential medical data.

The platform uses web services technology and grid services provided by the EGEE grid infrastructure. Physicians access the platform using a web portal developed on GridSphere portlet container that present a user friendly interface to access several distributed medical services to manage medical images and information. Medical information are stored locally in user's hospital using AMGA metadata catalogue and information between services are exchanged using SOAP messaging protocol. Medical images are stored, anonymized and encrypted on the grid while their corresponding metadata are stored in the AMGA server. The platform allows physicians to submit monitor, and manage GATE simulations for which the limiting issue right now is its time consuming on a single CPU.

URL for further information:

www.lifegrid.fr

clrwww.in2p3.fr/PCSV

4. Conclusions / Future plans

A secured web portal prototype has been installed at hospital in order to be used by medical staff. The web portal offers the user a transparent and secured way to create, submit and manage GATE simulations using realistic scans in a Grid environment. The gain in computing time obtained by splitting the simulations is very encouraging. The convivial web portal and the Grid performances could enable, in a near future, the usage of GATE simulations to treat patients for specific treatments.

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