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HOPE: HOspital Platform for E-health

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New opportunities offered by the EGEE infrastructure can be exploited to offer radiotherapists and medical physicists new telemedicine services and dosimetric calculations in order to improve their collaboration capabilities. The HOPE portal gives them an easy-to-use telemedicine environment to manage and share patient information between remote locations and the capability to use patient images in the Monte Carlo simulation platform GATE based on GEANT4 to produce precise treatment plans.

Impact

A prototype of the HOPE portal is under test at hospital. It allows physicians to submit, monitor and manage GATE Monte Carlo simulations for which the limiting issue right now is its time consuming on a single CPU. Functionalities of this platform enable :
- A secure authentication to assess grid computing
- The retrieving of medical data from a PACS server using MDM (Medical Data Management tool), this service contains the anonymization of data, encryption and extraction of metadata stored in a base on the grid.
- The secured and parallelized Monte Carlo treatment plans 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.

The HOPE platform should evolve through a partnership with HealthGrid association and MAAT-G enterprise.

URL for further information

http://sourceforge.net/projects/telemed

Conclusions and Future Work

A secured web portal prototype has been installed at a 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 for the Monte Carlo treatment plans is very encouraging. The convivial web portal and the Grid performances could enable, in a near future, the usage of GATE simulations to aid the treatment of patients.

Keywords

Monte Carlo, GATE, medical imaging, web platform

Detailed analysis

Physicians access the platform using a web portal that presents a user friendly interface to access several distributed medical services. 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. Medical information are stored locally in user's hospital using a metadata catalogue. 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 a server at hospital.

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