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Medical Data Manager use case: 3D medical images analysis workflow.

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Complex medical workflows can run on the grid to process 2D and 3D medical images from a DICOM compliant systems such as a PACS(Picture Archiving and Communication Systems) through the Medical Data Manager(MDM).The MDM, developed in the context of the EGEE project, provides a grid storage interface and ensures medical data protection through strict data access control, anonymization and encryption.It's an important milestone towards the adoption of grid technologies in the medical imaging community.

Impact

The Medical Data Manager is a high level middleware that provides many services for medical applications. It stores both images and associated patient data in the local hospital network near the user who registered the image and defined the access rights. The information are securely stored in AMGA databases and the DICOM image is protected by multiple levels of security. All images sent to the grid is encrypted and private patient information are removed.
The MDM provides an easy way to search for medical images. The user uses a single sign-on authentication mechanism to access a view of all the distributed medical databases and can execute SQL-like commands on this virtual database.
The MDM services enables medical workflows on the EGEE grid. Medical Image Analysists (MIA) can submit jobs that retrieve a large number of 2D DICOM pictures or 3D medical images from the MDM. Image analysis jobs directly fetch input images on behalf of the users.

URL for further information

http://modalis.polytech.unice.fr/softwares/mdm/start

Conclusions and Future Work

The Medical Data Manager enables many complex use-cases. Physicians and scientists can access medical images and metadata from multiple hospitals, radiological centers and local servers. The MDM uses virtualization mechanisms to provide an easy way to manage the images. It also provides the strong security needs by the biomedical community.
A graphical interface will be developed to search into the metadata and retrieve medical images. A prototype will be demonstrated at the conference.

Keywords

Medical Data Management, Secured Files Storage, DICOM, Workflow, 3D

Justification for delivering demo and technical requirements (ONLY for demonstrations)

The spectators will be invited to manipulate the graphical interface of the service. This interface will display the medical images and data from patients. We will demonstrate the transparent access to multiple sites and

the fine grain security. The emphasis will be put on the handling of 3D images and the running workflows. A video explaining the mains feature of the MDM will be running as well. A poster of several projects using the MDM will be shown.

Detailed analysis

Hospitals continuously produce tremendous amounts of image data that is managed by local PACS, which offers a limited access, whereas the biomed community experiences a growing interest for data sharing and remote processing. The gLite middleware provides the distribution, user identification, data access control needed to envisage wide scale deployment of medical imaging applications. The MDM provides an upper layer to interface to PACS with the required level of security.
The MDM stores both the image and the related information. Related metadata does contain some sensitive and identifying information such as patient and physicians names. The MDM defines various categories of users (physicians, researcher, VO user...) and individual identification to control access to data. MDM users can share their information with other users and categories of user. The MDM allows to give separate permissions to the sensitive and anonymous part of the image information.

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Track Classification: Grid Services exploiting and extending gLite middleware