



VIRTUALIZATION AND OPTIMIZATION OF PACS SYSTEMS

M. Šárek, T. Kulhánek

EuroMISE Centre, Institute of Computer Science, Academy of Sciences CR, v.v.i., Prague, CESNET association, Prague, Czech Republic

Background

The DICOM is a widely used standard for the exchange and processing of medical images and PACS systems, to the custody of such data. These systems were originally designed to work on specialized servers and in closed hospital networks.

Objective

Our aim was to implement the PACS system as a normal application, which does not require a dedicated server and is able to reliably work in distributed environment.

Methods

Applying the new virtualization technology Xen to provide virtual data and computing capacity, along with grid tools from Globus MEDICUS on the virtual machines which build up a node of data grid to exchange medical images in DICOM format and provide functionality as a regular PACS system.

Results

There are currently implemented three grid PACS nodes within the Czech academic high-speed network CESNET2. It creates economically and ecologically optimized platform for further research in this area with the possibility of involvement of other participants. On top of this the virtualization and grid technologies allows solution for limitation of current PACS systems such as security, closeness, trustworthy.

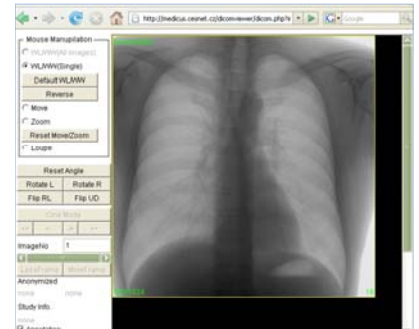
An architecture of Globus Medicus

- independent principal function
- running of each function is HW independent
- all three function could be on the same server or running fully or partially independently

Benefits of Globus Medicus for research and education:

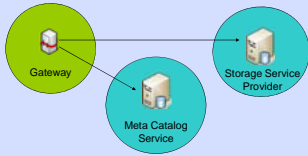
- integrated anonymization modul,
- anonymization „near“ to source

An example of running Globus Medicus system



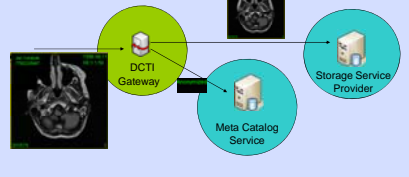
MEDICUS - architecture

- DICOM Grid Interface Service Gateway
- Meta Catalog Service
- Storage Service Provider



MEDICUS – anonymization

- DICOM Clinical trial interface – anonymization

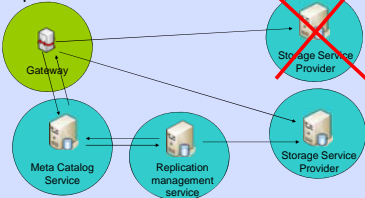


Benefits of Globus Medicus:

- distibuted grid design,
- redundancy and reliability of all system

MEDICUS – replication

- Replication and service resistance



Concept of grid of small inexpensive servers
 • 4 Xeon processors, 8 GB RAM, 1 TB disk

Concept of virtualization:
 • different applications can be run simultaneously on one server
 • on Globus Medicus servers there are running for example independent environment for voice analysis and Modelica editor

Reliable, economical and environmentally friendly solution.

Globus Medicus pilot infrastructure running in Czech academic networks CESNET2 simultaneously with centralized Medimed solution.

