

PSNC Virtual Laboratory system as implementation of remote instrumentation idea

Friday 11 May 2007 10:00 (20 minutes)

Describe the scientific/technical community and the scientific/technical activity using (planning to use) the EGEE infrastructure. A high-level description is needed (neither a detailed specialist report nor a list of references).

A number of problems in science, industry and commerce may be addressed by using sophisticated equipment and top-level expertise, which is often locally unavailable. The answer for some of these problems is conception of Remote Instrumentation Services (RIS). RIS supports activities related with using rare equipment remotely e.g. workflows, post-processing, visualization, data management. This idea is especially attractive for: radio astronomy, chemistry, physics and medicine.

Report on the experience (or the proposed activity). It would be very important to mention key services which are essential for the success of your activity on the EGEE infrastructure.

We are going to demonstrate two implementations of the VLab. First demo –the Virtual Laboratory of Nuclear Magnetic Resonance Spectroscopy (VLab-NMR), includes two parts: measurement scenario presentation and demonstration of the Digital Science Library functionality. The aforementioned measurement scenario contains: real experiment performed on the NMR, post processing and visualization. The experiment will be executed on Varian Unity 300 spectrometer placed in the Institute of Bioorganic Chemistry in Poznan (Poland). The output data of real experiment are automatically sent to the Data Management System (DMS). The next step covers the post processing analysis, which is performed on the application server using TopSpin application – third party software. The second implementation of the VLab is Virtual Laboratory of Radio Astronomy. It is possible to demonstrate how very large (32 m diameter) radio telescope, situated in Piwnice in Poland, can be remotely accessed and controlled.

With a forward look to future evolution, discuss the issues you have encountered (or that you expect) in using the EGEE infrastructure. Wherever possible, point out the experience limitations (both in terms of existing services or missing functionality)

PSNC Virtual Laboratory is still under development and much new functionality is anticipated to implement. Due to consuming a lot of resources by virtual laboratory applications beginning from network bandwidth and finishing on storage for experiment results, integration with e-Infrastructure (like EGEE infrastructure) is essential. Development of virtual laboratory claims also functionality which is neither available yet nor well defined e.g. real bandwidth on demand.

Describe the added value of the Grid for the scientific/technical activity you (plan to) do on the Grid. This should include the scale of the activity and of the potential user community and the relevance for other scientific or business applications

The PSNC Virtual Laboratory (VLab) is an exemplary implementation of the remote instrumentation system. The main goal of VLab is definition of a framework for building many different types of laboratory. It will facilitate and automate building new laboratories using existing modules with their functionality. Definition of all accessible remote facilities as simple resources in the Grid infrastructure allows treating jobs submitted to the real laboratory devices as any other Grid task. Dynamic measurement scenarios allow flexible defining the process of experiment, from pre-processing, through executing the experiment, to the post-processing and visualization tasks. Users are also allowed to add their own module as a part of the scenario. The PSNC Virtual Laboratory system should not be solely comprehended as a set of mechanisms to submit, monitor and execute jobs. It is also a possibility to give access to the resources of the digital library, communication, and e-Learning systems.

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Track Classification: On-line Demonstrations