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VisIVO Software and gLite: A Set of Tools for Large Scale Dataset Exploration

Description of the work

VisIVO tools are developed by INAF and by the University of Portsmouth (UK).
VisIVO consists of several tools: a) VisIVO Desktop - a stand-alone application for interactive visualization on standard PCs; b) VisIVO Server –a command line set of programs for high performance visualization; c) VisIVO Science Gateway –a WS-PGRADE gateway supporting services based on the VisIVO Server functionality, developed in SCI-BUS project; d) VisIVO Mobile, an iOS application that allows the user to execute VisIVO on mobile devices; e) VisIVO Library to produce a set of images or movies directly using VisIVO with its internal data arrays without the need to produce intermediate files.
All these tools are based on three main components: Importer, Filter and Viewer. VisIVO Importer converts user-supplied datasets into VBTs (VisIVO Binary Table), the internal data format of VisIVO. VBTs are employed by VisIVO Filter modules for data exploration and by VisIVO Viewer for the final data rendering.
Through VisIVO, users can explore and display large datasets and generate movies; they can rapidly obtain meaningful visualizations while preserving full and intuitive control of the relevant visualization parameters.
The development of VisIVO is included in several EU funded international projects: a) EGI-InSPIRE, to complete the VisIVO porting on gLite middleware; b) EDGI where the VisIVO porting on Desktop Grids is completed and the validation phase is in progress; c) SCI-BUS to develop the new VisIVO Science Gateway and the VisIVO Mobile application; d) Muon Portal: a national project funded by the Italian Ministry of Research using EU funds, for the inspection of standard containers using the research conducted in Astrophysical and in Nuclear Physics (http://muoni.oact.inaf.it:8080).
Moreover a new project to conduct a pilot experiment for the usage of VisIVO in the visitors' centres using the VisIVO Mobile application is going to start.

Link for further information

http://visivo-server.oact.inaf.it:8080

Wider impact of this work

VisIVO was initially developed to simulate the Large Scale Structure of the Universe and the exploration of related data. It is particularly suitable in exploring N-Body simulations and many physical problems can be described using particles.
The simplified usage of VisIVO combined with its different components allow user to explore complex datasets and make it attractive for all users working with particles and volumes to describe the physical phenomena.
The development of the VisIVO Library moreover offers new opportunities to the user, especially for the investigation of possible problems at run time, by checking the current status of the simulation trying to understand if everything is correct.
All this explains the wide potential impact of VisIVO as it is a tool suitable for many disciplines and also for common citizens.
The future work aims at fully porting VisIVO Server on Grid environments enhancing significantly is this way the performances of the tool.

Printable Summary

Modern scientific research needs to exploit computer graphics and scientific visualization tools to appropriately display datasets and thus allow scientists to perform efficient visual discovery.
VisIVO is a suite of software tools aimed at creating 3D customized views of many types of data with no limits imposed on the data size. The software allows datasets to be explored and the creation of images and movies

starting from files provided by users. VisIVO was originally written to visualize astronomical data but can now be used in many other scientific fields including chemistry, nuclear physics and biomedical.
In this demonstration VisIVO will be used to explore a complex dataset and in particular, VisIVO Server as a set of programs will produce images and movies directly from complex datasets. We will also demonstrate the features offered by the VisIVO Science Gateway and by the Mobile application. Finally, a simple use of the VisIVO Library will be presented.

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