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On-line Visualization for Grid-based Astronomical Parametric Studies

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The presented work is aimed at the creation and testing of on-line visualization for Grid-based Parametric Studies as a sequence application in Grid environment. The design is tested on Astronomical simulations. The simulation of the Oort-cloud formation was performed. The dynamical evolution of the test particles was followed via numerical integration, in the GRID, for the period of 2 G-year. The main reason for using the grid was the need for visual verification during long computations.

Conclusions and Future Work

The presented effort is still in-progress. Computationally intensive tasks in the development version were tested with astronomical data. We used EGEE and its virtual organization TRIGRID. We have built practical tools to allow grid users to put their application code and input data into the grid, configure and start the process, and after the processing to download the output data. We plan to use the tools for porting applications with similar characteristics to EGEE.

Keywords

on-line visualization tool, parametric study, astronomical simulation, grid application

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

in common use data-projector for visualization demo

Impact

For the submission of parametric simulation the Easy-to-use framework based on technologies available in EGEE was already designed. The input datasets are stored in a Storage Element (SE). Pilot jobs (workers) are running the application code in cycle with the input datasets downloaded from the SE. After processing, workers store the output datasets to output folder in SE; the user only needs to list the contents of the folder to check the progress. The newly designed on-line vis-framework (vis-visualization) continues as a sequence Grid application. Output datasets in the output folder in SE are input datasets for the following vis-application. Pilot vis-jobs (vis-workers) are running the vis-application code and the output datasets in required formats are stored to the output folder in SE. The management of vis-workers is done using an automatic job management script running in the background on the User Interface. User can visualise data on the installed browser, and this make visual control.

URL for further information

<http://ups.savba.sk/~eva/Videos/Astrofyz/3DProtopl.avi>

Detailed analysis

The design is tested on astronomical simulations in the scope of collaboration between Astronomical Institute of SAS, Catania Observatory and Adam Mickiewicz University in Poznan. The simulations were ported to EGEE by Institute of Informatics SAS. For a long time in the Computing of Intensive Parametric Studies a main problem has been to control if executions converge to the correct way. The client naturally wants to see the intermediate results. The described tool is able to visualize the partial results of the application. The user can completely control the job during execution, and can change the input parameters while execution is still running. The two tools - the tool for submission, and the continued sequence visualization tool, provided a complete solution for an important problem in the Grid environment.

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