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Grid enabled applications for modeling, simulation and optimization

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The candidate applications to be ported on grid were selected based on the following criteria: mature implementation in classic mode, extensive memory and/or computational requirements, grid as innovative approach for the given MOSI domain, expected user community in research and academic area, potential interest from industry. The list of selected applications includes: GridModRed - Model Order Reduction, GridIdent - System Identification, CGALLP and BIBFR - Unconstrained optimization based on conjugate gradient algorithms and Related high performance library (developed by ICI Bucharest), OPT-GT and MFCC - Optimizer based on Grid Technology and Application cluster for CFD-FEM oriented simulation (INCAS Bucharest), DEMO/G - Distributed Evolutionary Multiobjective Optimization on Grid (WUT), CryptoGrid - Cryptographic and Cryptanalitic Algorithms for the Grid (UTCN), DIOGENES - Application oriented task scheduling using genetic algorithms (UPB).

3. Impact

The GridMOSI infrastructure includes 5 sites with counting for about 130 kSI2k computing power and 9 TB of memory. One of them is active in the EGEE infrastructure, while all the other are in preparation to join this infrastructure during EGEE II project. All of them support the GridMOSI VO. Applications are running either in Cluster mode (GridModRed, GridIdent , CGALLP, OPT-GT and MFCC) or in both Cluster and Grid modes (DEMO/G, CryptoGrid), taking advantage of DIOGENES capabilities to optimize job scheduling based on the information coming from information and monitoring services available in the GridMOSI infrastructure. The project portal provides access to the web based user interface (currently under implementation for each application), which facilitates the selection of execution conditions, depending on application specificity: class of algorithms and their execution mode, architectural variant, requested Grid resources.

URL for further information:

www.gridmosi.ro (site under development, first draft of Romanian version available)

4. Conclusions / Future plans

The main challenges of the project are to improve the visibility and accessibility of selected MOSI solutions, to coagulate a user community from both academia and industry, to gradually enlarge the VO offer by attracting new solution providers, to improve the potential for international cooperation. Current applications are in the final stage of their porting to grid. Main difficulties have been related with the limited experience, low network speed that limits the performance level.

Provide a set of generic keywords that define your contribution (e.g. Data Management, Workflows, High Energy Physics)

VO, advanced system modeling and optimization, CFD, application scheduling, cryptography,

1. Short overview

The applications have been ported to grid infrastructure within the project “GridMOSI-Grid technology based virtual organization for high performance modeling, simulation and optimization” funded by the Romanian Research of Excellence Programme. The project aims at setting up the first national VO providing the research and academic community with access to advanced MOSI solutions in different domains according to the scientific expertise of partner organizations.

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