

# Distributed Optimal Genetic algorithm for grid applications Scheduling

Wednesday 9 May 2007 17:30 (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).**

The work is developed as a Grid application/service in the See-Grid project, by a team in the National Center for Information Technology (NCIT) of the University "Politehnica" of Bucharest. NCIT is member of the RoGrid consortium, which participates in See-Grid and in EGEE-2. NCIT is involved in projects that are developed in cooperation with CERN and Caltech (RoDiCA), develops national Grid research projects GridMOSI, MedioGRID, and contributes to See-Grid and EGEE projects.

**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.**

DIOGENES doesn't control the clusters / resources directly. It is more natural to consider it closer to Grid applications. It is responsible for the management of jobs, such as allocating resources needed for any specific job, managing the tasks for parallel execution, managing of data, and correlation of events. To fulfill its functions, DIOGENES needs information coming from information and monitoring services available in the platform, in this case in EGEE. The results of testing DIOGENES strategies in a Romanian cluster of SEE-GRID demonstrate very good behaviour in comparison with other scheduling approaches.

**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)**

EGEE includes the services requested by DIOGENES. For the moment we don't foresee difficulties in using it on this infrastructure. We'll use DIOGENES in

projects like GridMOSI –VO in Grid technology for high performance MOdeling, Simulation, and optimization, and MedioGRID –Parallel and distributed processing of geographic and environmental data. We will pre-test new strategies developed in DIOGENES for applications built in these and other projects and eventually run on EGEE.

**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**

DIOGENES (Distributed Optimal GENetic algorithm for grid application Scheduling) provides a solution for Grid meta-scheduling, aiming to achieve a distributed, fault-tolerant, scalable and efficient method for optimizing task assignment in Grid. The DIOGENES scheduler uses a combination of genetic algorithms and lookup services for obtaining a scalable and highly reliable optimization tool. Gridification topics that are covered are: application monitoring, running job, data management and access, workflows. The social impact is more efficient use of SEE-GRID VO's resources and the scientific impact represent new optimization method for Grid scheduling using Genetic Algorithms The current research is focused on multi-criteria optimization of Grid scheduling, complex task dependencies, backup and recovery from service failures (re-scheduling). We also provide a method for efficient integration with the Globus Toolkit, based on Open Grid Service Architecture.

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