



JTS and its Application in Environmental Protection Applications

Emanouil Atanassov, Todor Gurov, Dimitar Slavov, Sofiya Ivanovska, and Aneta Karaivanova

Institute for Parallel Processing - Bulgarian Academy of Sciences, Acad. G. Bonchev St., Bl. 25A, 1113 Sofia, Bulgaria
(emanouil@parallel.bas.bg, gurov@parallel.bas.bg, d.slavov@bas.bg, sofia@parallel.bas.bg, anet@parallel.bas.bg)

The environmental protection was identified as a domain of high interest for South East Europe, addressing practical problems related to security and quality of life. The gridification of the Bulgarian applications **MCSAES** (*Monte Carlo Sensitivity Analysis for Environmental Studies*) which aims to develop an efficient Grid implementation of a sensitivity analysis of the Danish Eulerian Model), **MSACM** (*Multi-Scale Atmospheric Composition Modeling*) which aims to produce an integrated, multi-scale Balkan region oriented modelling system, able to interface the scales of the problem from emissions on the urban scale to their transport and transformation on the local and regional scales), **MSERRHSA** (*Modeling System for Emergency Response to the Release of Harmful Substances in the Atmosphere*) which aims to develop and deploy a modeling system for emergency response to the release of harmful substances in the atmosphere, targeted at the SEE and more specifically Balkan region) faces several challenges:

1. These applications are resource intensive, in terms of both CPU utilization and data transfers and storage.
2. The use of applications for operational purposes poses requirements for availability of resources, which are difficult to be met on a dynamically changing Grid environment.
3. The validation of applications is resource intensive and time consuming.

The successful resolution of these problems requires collaborative work and support from part of the infrastructure operators. However, the infrastructure operators are interested to avoid underutilization of resources. That is why we developed the Job Track Service and tested it during the development of the grid implementations of MCSAES, MSACM and MSERRHSA.

The Job Track Service (JTS) is a grid middleware component which facilitates the provision of Quality of Service in grid infrastructures using gLite middleware like EGEE and SEEGRID. The service is based on messaging middleware and uses standart protocols like AMQP (Advanced Message Queuing Protocol) and XMPP (eXtensible Messaging and Presence Protocol) for real-time communication, while its security model is based on GSI authentication. It enables resource owners to provide the most popular types of QoS of execution to some of their users, using a standardized model.

The first version of the service offered services to individual users.

In this work we describe a new version of the Job Track service offering application specific functionality, geared towards the specific needs of the Environmental Modelling and Protection applications and oriented towards collaborative usage by groups and subgroups of users. We used the modular design of the JTS in order to implement plugins enabling smoother interaction of the users with the Grid environment. Our experience shows improved response times and decreased failure rate from the executions of the application. In this work we present such observations from the use of the South East European Grid infrastructure.