Grid computing and EGEE project

L.Hluchý, V.Tran, M.Dobrucký
Institute of Informatics,
Slovak Academy of Sciences
E-mail:{hluchy, viet, dobrucky}.ui@savba.sk

Abstract

Our presentation will consist of short introduction into the Grid and EGEE project, then we will show a demo how to use GILDA testbed through Genius portal and our last demo will show our grid application developed in the CrossGrid project .

1. Introduction

In the recent years, Grid computing has been rapidly growing and many scientists from different areas start using the huge computational power provided by Grid computing. According to Ian Foster's original definition, "a computational grid is a hardware and software infrastructure that provides dependable, consistent, pervasive, and inexpensive access to high-end computational capabilities". The idea was that people could access computational power, content, and other computer services in an easy way, just like using electricity by plugging a device into a wall socket.

Realizing the idea is a challenging work. Grid consists of many computational resources from different organizations, geographically distributed and dynamically linked via the Internet. Problems like security, reliability, performance need to be thoroughly solved in order to make grid computing usable. Today, grid computing is "coordinated resource sharing and problem solving in dynamic, multi-institutional virtual organizations" where multiple organizations collaborate with each other, sharing their resources to solve common problems.

There have been many international projects in Grid computing like DataGrid, GridLab, CrossGrid [1]. Grid computing is also funded on national level like HellasGrid, UK National e-science etc.

2. EGEE project

EGEE [2] is a project that aims to integrate current national, regional and thematic Grid efforts, in order to create a seamless Grid infrastructure for the support of scientific research. EGEE provides researchers in academia and industry with round-the-clock access to major computing resources, independent of geographic location. The infrastructure supports distributed research communities, which share common Grid computing needs and are prepared to integrate their own computing infrastructures and agree on common access policies.

In order to achieve the aim, the work in EGEE project has been divided into three main activities:

- To deliver production level of Grid services, the essential elements of which are manageability, robustness, resilience of failure, and a consistent security model, as well as scalability needed to rapidly absorb new resources when they become available.
- To carry out a professional Grid middleware re-engineering activity in support of the production services.
- To ensure an outreach and training effort which can proactively market Grid services to new research communities.

3. GILDA testbed

A part of EGEE project is the GILDA Grid testbed [3] which is used for demonstration and

training purposes. It provides a demo part suitable for newcomers, that can be immediately used without prior registration. User can submit a job even from Internet cafe, but only predefined demo-jobs are available. More serious user can register through a web portal [3] and then create his/her own job for submission into the GILDA testbed. Job status can be monitored and canceled anytime through web portal, as well as job's result can be seen.

4. Flood application

The flood forecasting application developed within the scope of the CrossGrid project [1] consists of several simulation models (meteorological, hydrological and hydraulic) and appropriate post-processing tools connected together, thus constituting a workflow [4, 5, 6].

The meteorological model is used to forecast precipitation, to be used by the hydrological model for computation of discharge of the river. That is used in the final step for actual computation of possible flood by the hydraulics model. All the models generate binary output data, which are then used by post-processing tools to generate pictures visualizing the situation. These pictures are then used by respective experts for situation evaluation.

The flood forecasting application has two user interfaces to enable users to interact with the application in a more user-friendly way. One interface is implemented as a web portal accessible by standard web browser. It consists of a set of portlets – reusable web components – that are placed in the portlet portal framework. Another user interface is implemented as plug-in for Migrating Desktop (MD) – a desktop user environment for working with grids developed in [1]. While the portal interface focuses mainly on the flood application, MD is a general tool that enables a user to work with grid in a flexible way.

The flood forecasting application framework with appropriate simulation models enable users to easily run the desired sequence of simulations and respective post-processing tools, browse the results of simulations, register results into the replica management service and applicable metadata into the metadata catalog for later search and retrieval.

Acknowledgements

This work is supported by EU 5FP CROSSGRID IST-2001-32243 RTD project, EU 6FP EGEE INFSO-RI-508833 project and the Slovak Scientific Grant Agency within Research Project No. 2/7186/20.

References

[1] CrossGrid project *http://www.eu-crossgrid.org*

[2] EGEE project *http://public.eu-egee.org/*

[3] GILDA testbed and Genius portal *https://gilda.ct.infn.it/*

[4] L. Hluchý, O. Habala, V.D. Tran, B. Šimo, J Astaloš, M. Dobrucký, "Infrastructure for Grid-based Virtual Organizations", *Proc.of International Conference on Computational Science, Part III, LNCS 3038,* Springer-Verlag, 2004, pp. 124-131.

[5] L. Hluchý, V.D. Tran, O. Habala, B. Šimo, E. Gatial, J Astaloš, M. Dobrucký, "Flood Forecasting in CrossGrid project", *Grid Computing, 2nd European Across Grids Conference, LNCS 3165,* Springer-Verlag, 2004, pp. 51-60.

[6] L. Hluchý, J Astaloš, M. Dobrucký. O. Habala,, B. Šimo, V.D. Tran, "Flood Forecasting in a Grid Environment", *Proc. of 5-th Intl. Conf. on Parallel Processing and Applied Mathematics PPAM'2003,* R.Wyrzykowski et.al. eds., 2004, *LNCS 3019*, Springer-Verlag, pp. 831-839