

Collaborative Grid Environment for Scientific Virtual Organizations

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Abstract

In this paper the authors present the architecture and current status of implementation of a Grid-based environment for large scientific virtual organizations, with primary focus on the hydrometeorological community. The whole system consists of a collaborative user interface, a workflow system capable of submission of jobs to the Grid and a set of data management tools, including a metadata catalogue. A prototype of the system is deployed and tested on a flood prediction scenario. The scenario contains a simulation cascade of meteorological, hydrological and hydraulic models and appropriate hydrometeorological data.

1 INTRODUCTION

The catastrophic floods that (not only) Europe has seen in recent years have had great impact on the level of importance of successful and accurate hydrometeorological predictions. These are not only highly sophisticated, but also demanding in terms of computational power and input data volume. It is therefore necessary to devise efficient tools providing simple and manageable user interface and efficient computational core for these activities.

The path leading to a Grid-enabled collaboration environment began in the 1960's with the development of first Problem Solving Environments (PSE). First PSEs were simple single-user control layers based on top of complex libraries, but they delivered an important simplification – they enabled to express the problem in its natural language. Thus even unskilled computer users were able to use the full potential of complex software libraries and fast computers [1]. Later PSEs became fully network-oriented and from this point it was only logical to make one step further, as soon as the Grid computing paradigm emerged and was widely accepted by the scientific community as the ultimate tool for effective global resource sharing. We describe below the general properties of the flood prediction PSE, followed in each section by a more thorough description of our use case, the flood-forecasting scenario. The efforts are applied and tested in an international IST project CROSSGRID [6].

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