Infrastructure for Grid-based Virtual Organizations

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Abstract. This paper presents architecture of a collaborative computation environment based on a Grid infrastructure, used as a support for large scientific virtual organizations. The environment consists primarily of a collaboration-supporting user interface, workflow system capable of submission of jobs to the Grid and a Grid-based data management suite. A prototype of such an environment is deployed and tested for a flood forecasting system. The system consists of workflow system for executing simulation cascade of meteorological, hydrological and hydraulic models, data management system for storing and accessing different computed and measured data, and a set of web portals.

1 Introduction

In recent years a number of scientific projects with international (even global) participation emerged as an answer to increasingly complicated problems of modern science – a well-organized business, with dense network of cooperation between people, organizations and countries. Such cooperation also requires an effective toolset for communication, experiment management and results sharing. The natural way to produce such a toolset is to develop a network-enabled software suite. Such software suites exist – although mainly incomplete and not mature – and in recent years are becoming more oriented toward the paradigm of virtual world-wide resource sharing – Grid computing.

2 The Architecture of a Grid Infrastructure for Virtual Organization

The basic perpetual cycle of work in a scientific virtual organization is simple – data is processed, another data is created. Of course, new data also enters the virtual organization and produced data is used, viewed, analyzed and interpreted to obtain results as the main purpose of the actual existence of the organization.

So we begin the analysis of the software infrastructure with the word data, and this tells us that the support of work with this data is one important part of the