Concept of a Problem Solving Environment for Flood Forecasting*

L. Hluchy, V. D. Tran, O. Habala, J. Astalos, B. Simo, D. Froehlich†

Institute of Informatics, SAS, Dubravska cesta 9, 842 37 Bratislava, Slovakia
hluchy.ui@savba.sk

Abstract. Flood forecasting is a complex problem that requires cooperation of many scientists in different areas. In this paper, the concept of a Collaborative Problem Solving Environment for Flood Forecasting – a part of the CrossGrid project - is presented. This paper also focuses on the parallel numerical solution of hydraulic simulation module that is one the most computational-intensive parts of the whole system.

Keywords: Virtual Organization, Flood Forecasting, Collaborative Problem Solving Environment, Parallelization, MPI Programming.

1 Introduction

Over the past few years, floods have caused widespread damages throughout the world. Most of the continents were heavily threatened. Therefore, modeling and simulation of flood forecasting in order to predict and to make necessary prevention is very important. In this paper we propose to develop problem solving environment [1] meant as a support system for establishment and operation of Virtual Organization for Flood Forecasting (Chapter 2) associating a set of individuals and institutions involved in flood prevention and protection. The system will employ the Grid technology to seamlessly connect together the experts, data and computing resources needed for quick and correct flood management decisions. The main component of the system will be a highly automated early warning system based on hydro-meteorological (snowmelt) rainfall-runoff simulations. Moreover, the system will integrate some advanced communication techniques allowing the crisis management teams to consult the decisions with various experts. The experts will be able to run the simulations with changed parameters and analyze the impact (what-if analysis). The use of Grid resources is vital especially in the case of flood crisis when the simulations have to be performed as fast as possible.

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† Parsons Brinckerhoff Quade and Douglas, Inc., 909 Aviation Parkway, Suite 1500, Morrisville, North Carolina 27560 USA, Froehlich@pbworld.com