

Flood modeling system and its parallelization

L. Hluchy, V. D. Tran,

J. Aсталos, M. Dobrucky, G. T. Nguyen

Institute of Informatics

Slovak Academy of Sciences

Dubravská cesta 9, 842 37 Bratislava, Slovakia

viet.ui@savba.sk

D. Froehlich

Parsons Brinckerhoff Quade and Douglas, Inc

909 Aviation Parkway, Suite 1500

Morrisville, North Carolina 27560 USA

Froehlich@pbworld.com

Abstract

Flood modeling is a complex problem that requires cooperation of many scientists in different areas. In this paper, the architecture and results of ANFAS¹ (Data Fusion for Flood Analysis and Decision Support) project is presented. This paper also focuses on the parallel numerical solutions of flood modeling module that are the most computational-intensive part of whole ANFAS architectures.

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 floods in order to forecast and to make necessary prevention is very important. There are several flood modeling software like MIKE [1], FLOWAV [2], however, they are suitable only for small problems. It is the motivation of ANFAS [13] (Data Fusion for Flood Analysis and Decision Support) project that is supported by European Commission within IST Fifth Framework Programme.

The ANFAS system is based on a 3-tier architecture (Figure 1):

- the ANFAS client,
- the ANFAS core server,
- the servers or wrappers allowing to "connect" possibly in remote access external features as the database, the models and possibly additional processes (e.g. computer vision ones).

1.1. ANFAS architecture description

Hereafter, there is a short description of each component:

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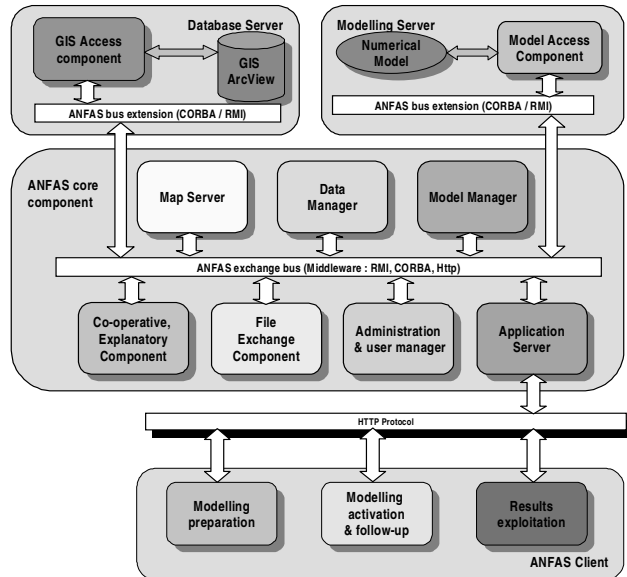


Figure 1. ANFAS architecture

Database Server:

GIS ArcView (where are stored all data that represent the sites) and

GIS access component (responsible for the management of the GIS)

Modeling server:

Numerical models (such as FESWMS Flo2DH) and

Model access component (pilots the numerical models)

ANFAS Core server:

Application server (the bridge between the client and the ANFAS Core server),

Data manager (handles the user sessions i.e. set of data, especially for what concern scenarios such as recording, loading and collections),

File exchange component (responsible for the transfer of files between servers),