

# DaMaViS – Data Management and Visualization System

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## ABSTRACT

We describe a component based data management and visualization system called **DaMaViS**. Important aspects of our system are the component based client-server-architecture and its flexibility and reusability that are guaranteed by applying generic data structures for storing and representing data as well as using CORBA (Common Object Request Broker Architecture) for the communication between server and clients. With **DaMaViS** it is possible to handle almost every kind of data.

## Keywords

Data management, visualization, virtual environments

## 1. INTRODUCTION

Nowadays almost every application area has to deal with a large amount of data. These masses of data need to be managed by a data management system in order to cope with complexity.

## 2. STATE OF THE ART

Today's data management systems are specialized to handle data of a certain application area. In the application area of environmental planning and urban development several specialized geographic information systems like land information systems, spatial information systems, environment

information systems, network information systems or branch information systems do exist. Due to the large variety of systems and the huge amount of data these systems have to handle, it is necessary to use data management systems. Nevertheless, a data management system, which is able to cope with almost all application areas, is still missing.

## 3. DAMAVIS

As shown in Figure 1 the structure of **DaMaViS** is based on a client-server-architecture. We use the middleware CORBA for location and language independent communication of all components.

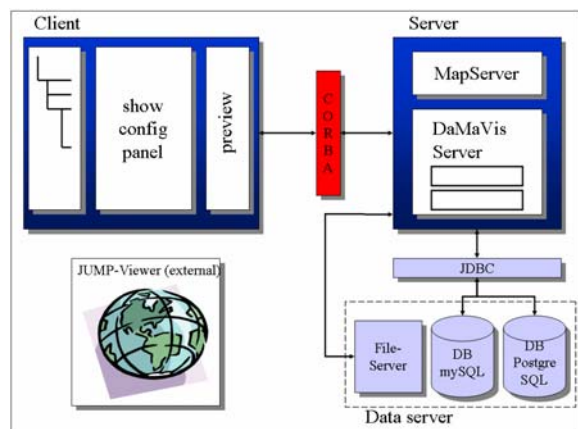
The client represents the user interface for communication with the server. On the left side the structure of the current project is presented as a tree to the user. The right side of the client consists of a tabbed pane, which contains the configuration and preview panel for the currently selected object.

The server can be seen as the central part of the data management system **DaMaViS**. To create maps out of GIS data an external program MapServer is integrated. The creation of a three dimensional

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walkthrough is realized with a newly developed viewer. The flexibility and reusability of **DaMaViS** is increased by using JDBC for accessing the databases.



**Figure 1. System structure of DaMaViS**

To store GIS data and other data the database software PostgreSQL was chosen. The additional package PostGIS enables PostgreSQL to store GIS data with regard to the OpenGIS standards [Ogc04a].

## 4. APPLICATIONS

### 4.1 2D: GIS Report

Based on GIS data stored in the database a report ought to be created. Within that report a map based on GIS data shall be included. Besides maps it is also possible to add other elements like headings and text modules. **DaMaViS** provides several templates for headings and text modules.

In the end the user is able to save his constructed GIS report in several output formats. One important format for saving the created report is Microsoft Word XML format, which offers the possibility for further processing (printing, formatting ...).

### 4.2 3D: Walkthrough

One is able to build a 3D walkthrough of interesting city quarters based on a digital terrain model and building outlines given in Gauß-Krüger coordinates. After adding a walkthrough the user has to select an appropriate digital terrain model. Then the user is able to select buildings for the walkthrough out of a city map. If a building has been added to the walkthrough, auxiliary information like height, address and textures can be chosen. The user is also able to mark the current building as a point of interest (POI). Later these points of interest are labeled with arrows in the walkthrough. For example a train station or a post office can be marked as POI.

All data of the 3D model is saved as Open Scene Graph files (OSG).

To visualize the walkthrough **DaMaViS** includes a viewer application based on the Open Scene Graph graphics toolkit. The original OSG viewer has been augmented with the ability to display all given points of interest (Figure 2). Therefore easy navigation to all interesting points of the walkthrough is provided.



**Figure 2. Walkthrough with POI**

The virtual walkthrough generated by **DaMaViS** could also be used for exploring world cultural heritages. One possibility would be a virtual and interactive walkthrough of Völklingen's old ironworks [Mue01a], [Mue02a].

## 5. FUTURE WORK

Almost every kind of data type can be integrated into **DaMaViS**. Multimedia data like videos or sounds could be associated in the GIS report and the walkthrough. For example one should be able to select a restaurant (POI) in the walkthrough and watch a short video about it.

To facilitate the creation of textures for buildings of a virtual walkthrough a tool is currently developed. This tool will interactively extract textures and create 3D models out of perspective photos taken from buildings.

## 6. REFERENCES

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