

GEO-ROAMING: MODEL-DRIVEN CONTENT MANAGEMENT FOR WEB-BASED 3D GEOINFORMATION SERVICES

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ABSTRACT:

The aim of the Geo-Roaming project is to develop a software framework for managing, updating and accessing distributed 3D geoinformation services. 3D landscape and city models of entire regions and countries are gradually enabling interactive information and entertainment services in the (mobile) Internet. Until recently, these services consisted mostly of isolated solutions which lacked interoperability and were difficult to access, use and maintain. Geo-Roaming, however, will allow a seamless and fully transparent navigation through the virtual information space – analogous to the familiar roaming concept in mobile communications. This paper covers concepts and solutions for integrating, managing and updating location-based content in highly distributed environments, which form the basis for Geo-Roaming.

Location-based content for 3D geoinformation services is very rich, since it includes not only points of interest and 2D vectors but also 3D objects and photo-realistic appearance, viewpoint and animation information. 3D content management solutions also have to address levels of detail and multiple-representations for all types of content, which are inherent to any scalable 3D geoinformation solution.

In order to handle rich content of this kind in different application areas, the content management mechanism GXL (geo-content exchange language) was developed. GXL supports a model-driven architecture (MDA). It is based on GML 3.0 (Geography Markup Language) and on a comprehensive 3D object type developed as part of the related 3D GIS project DILAS (Digital Landscape Server). GXL allows for a relatively simple definition of domain-specific content models (e.g. for tourism or education) by the individual content providers, but at the same time gives them access to the full range of content types.

Components of the Geo-Roaming content management framework are designed and implemented using the MDA approach. Thus, the processes of creating, editing, transforming, validating and storing location-based content can automatically be driven by the GXL-based content models. The Content Editor component, for example, can either be embedded into the web-based high-performance 3D viewer G-VISTA or be used in stand-alone mode. Embedding the content editor into a web-based viewer enables regional content providers to collect and update their information in an intuitive environment. The Content Server component provides a solution for storing and managing the contents of 3D geoinformation services in a distributed, model-driven environment. The current implementation uses a combination of XML and object-relational DBMS technology, ideally combining flexibility and performance.