

On the Development of an Object-Oriented Geographical Information System

Authors:

Alonso J. Peralta, Languages and Information Systems Department, Universitat Politècnica de Catalunya, Pau Gargallo 5, Barcelona, Spain; e-mail: peralta@lsi.upc.es

Angel Ros i Domingo; Ex-IS Manager, City Hall of Barcelona, Languages and Information Systems Department, Universitat Politècnica de Catalunya, Pau Gargallo 5, Barcelona, Spain

Extended Abstract:

Production GIS, presently, represent territorial information through a proprietary or a relational database model. This has been proven inadequate for three main reasons: management of graphical and alphanumerical requirements of territorial systems, user query needs and software complexity of the GIS construction. We present in this paper an ongoing project developing a prototype of an object-oriented GIS.

Laurini and Thompson value favorably object-oriented technologies in five aspects in relation to GIS: epistemological conception of space, system architecture, limited extension of the layer-based model to the object model, object-orientation of the database and the semantics of the conceptual modelling by objects. We would add a sixth aspect: the power of object-oriented techniques and methodologies in developing software.

Object-oriented databases have a proposed standard (OQL/ODL) defined by Object Data Management Group (ODMG) that does not support querying through methods. The databases defined by ODMG are basically datastores. The definition and manipulation is done exclusively through object attributes.

We have extended ODL/OQL to support access through methods, allowing, therefore, computed attributes and complex graphical operations.

The prototype is being developed under Windows using an object-oriented database system (POET) and C++. Queries are submitted in an extension to OQL and they are translated to C++ which is then compiled using a standard industry compiler. Output may be of two types: graphical or textual. For graphical output the user may choose between screen or plotter.

Georeference is the first application being developed and the main objects are: District, Block, Lot, Building, Address and three subtypes (Street, Plaza and Road Address), Owner, Way with Street, Plaza and Road subtypes, and Way_segments.