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Open GIS Consortium

Toward Consensus-Driven Geoprocessing Interoperability

An Open GIS Consortium (OGC) White Paper

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The Open GIS Consortium, Inc. (OGC) thanks the editor of GIM for offering a column in which we can discuss the work and viewpoints of OGC.

OGC is a non-profit trade association dedicated to interoperable geoprocessing. Founded in the U.S. but encouraging global participation, OGC now has a member list that includes more than fifty software vendors, computer equipment vendors, integrators, telecommunications companies, universities, data suppliers, and government agencies in Norway, England, Germany, Switzerland, Italy, Greece, Japan, Australia, Canada, and the U.S. By means of a consensus-based technical committee process, these members are creating OpenGIS™ software specifications.

OGC is also a seedbed for new commercial partnerships. Vendors and integrators participate in the OGIS Project because they see that a common framework for interoperable geoprocessing will help them solve some of their users' most frustrating problems. But they also see that OGC's OpenGIS™ technologies bring geoprocessing into the exciting new world of distributed computing. With OGIS, the market for geoprocessing expands as National Spatial Data Infrastructures become part of National Information Infrastructures, and as the Global Spatial Data Infrastructure becomes part of the Global Information Infrastructure. New distributed computing technologies are clearing away the boundaries between MIS, GIS, and LIS. Monolithic software systems yield to multivendor solutions; database vendors and telecommunications companies become Geographic Information (GI) industry participants; general purpose corporate databases store geodata; geomatics functions appear in word processing and spreadsheet applications; and high-resolution Earth imaging and GPS have a clear path into commodity applications.

OGC's principal OpenGIS product, the Open Geodata Interoperability Specification (OGIS), includes three parts:

1) The Open Geodata Model is the core of OGIS. Every geoprocessing system has a geodata model, a scheme for representing geographic features in software. Most systems' geodata models are proprietary, and few, if any, are identical. The Open Geodata Model is a comprehensive "universal" geodata model, an open programming interface that provides a basis for building interoperable interfaces between geomatics systems with different geodata models. Imagine, for example, a store of geodata created with a particular vendor's software product, residing on a server running that software. An OGIS interface provided by the vendor (probably developed in a multivendor OGIS Project Testbed project) will enable data-seekers on the network who are using other OGIS-compatible applications to query the store of geodata held in that proprietary system and extract data which will immediately be ready for use in those different systems, some of which may not be geoprocessing systems. There are many other possible scenarios, including compound documents with "live" maps that can be manipulated as GIS or digital cartography objects. The Open Geodata Model is not a data transfer standard or a data translation program that translates one data format to another. It is a software interface

specification by which software engineers can bring geoprocessing into the emerging world of network-based distributed object processing, componentware, and middleware.

2) The OGIS Information Communities Model uses the Open Geodata Model to automate, as completely as possible, the task of integrating geodata that was created for different purposes. Different sets of data users and producers define geographic features differently: To an ecologist, a road is a barrier to the movement of plants and animals. To a civil engineer, a road is a certain class of property with precise cadastral definition, load certification, physical substructure, drainage requirements, etc. The geodata created by the ecologist and the engineer will be different, even if they use the same software, because they must define roads and other geographic features differently. An information community is a group of geodata producers and users who share a set of geographic feature definitions. By definition, their "semantic schema" -- including metadata, spatial reference system, and geomatics functions -- is the same. The OGIS Information Communities Model specifies 1) a standard way to represent an Information Community's semantics, for the benefit of both members and non-members of the Information Community, and 2) a standard way to construct "semantic translators," rather like bilingual dictionaries implemented in software, which provide a mapping between two Information Communities' semantic schemas. Configuring and maintaining a semantic translator will be a manual task performed by representatives of two information communities. But once configured, it will automate data integration to the degree that these representatives can agree on rules for integration.

3) The OGIS Services Architecture, the third OGIS component, specifies processing services that support the OGIS Information Communities Model and also support remote access to heterogeneous geoprocessing resources.

Clearly, OGC's collective R&D efforts will bring many benefits for users, including: lower prices, better ability to choose specific functionality, better integration of geodata into analyses and reports, better advantage from other's investments in data development, more efficient and profitable sale and distribution of geodata, less time spent manipulating data prior to use, highly leveraged metadata efforts, and a means of utilizing the huge volumes of data that will soon be available from new high resolution commercial Earth observation satellites and widespread use of small, inexpensive GPS units.

Bringing new distributed computing technologies to geoprocessing will cause significant changes in the business of geotechnology vendors and geographic information professionals. But overall, the change promises to be good, because it raises the visibility and value of geographic information. Those who really understand how geodata is collected and used will have many opportunities to help rapidly growing communities of users take advantage of newly available on-line geodata and geoprocessing resources.