

OGC Status: Building Stronger Information Communities With Feature Type Schemas; Is it Rules or Hierarchies?

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Abstract: Dr. Kottman will provide a summary of the accomplishments of OGC since the last EC-GIS Workshop. Each of OGC's two channels for such Specifications will be discussed: the Specification Program and the Interoperability Program. Emphasis will be placed on the roles these Specifications are playing in the Standards community, and in the marketplace.

In addition current activities and future plans within the Open GIS Consortium for the achievement of consensus Interoperability Interface Specifications will be presented. Dr. Kottman will focus his remarks on the emerging role of registries of feature schema (that is, feature content models) for interoperability within specific Information Communities. When you look inside the registry, what do you see? Is it Rules, or Hierarchies?

The future of GIS holds a lot of registries. This paper examines registries of feature schema (that is, feature content models) for specific (but abstract) Information Communities.

Background: The Open GIS Consortium is a not-for-profit membership organization with more than 210 Members. Now about seven years old, the OGC runs two programs aimed at the advancement in the access and use of spatial data and processing tools. The first is the Specification Program that is modeled in part after the Object Management Group. Specifications in this program begin as abstract (or “essential”) descriptions of desirable environments. Especially attractive are descriptions that cope with “pain” in the marketplace. When finished, the abstract specifications are issued with a Request for Proposal, where the requested proposal is to be centered on crafting and submitting Implementation-level Specifications that define solutions at the software engineering level.

The second Program is the Interoperability Program in which participating companies and sponsors identify needs, jointly craft solutions, write up the specification documents, and obtain OAC approval through one of its mechanisms for generating and capturing consensus.

The Open GIS Consortium (OGC) is ultimately about the communication of geographic information. Basically, today’s computer environments are unable to communicate in the spatial domains. The goal of the OGC is the ubiquitous access to and use of spatial data and spatial processing in an open marketplace. By that we mean that OGC’s goal is to make geospatial data and processing just as fluid as text access and text processing is

today. Text flows freely between all computer environments without regard to manufacturer, intended use, or distributed and heterogeneous environment.

This paper highlights the recently achieved standards in the OGC, and others technical areas about to be targeted for standardization.

Feature Access: The most fundamental tools for dealing with spatial information are tools that reveal the existence (discovery!) of spatial data, and tools that access it. The first family of specifications approved by OGC do exactly this: They discover spatial information, examine its metadata, query it by its footprint, by its geometry, by its topology, by its attributes, by relationships between features, by its themes, by its metadata, alone or in any combination. The specifications that provide this functionality are:

1. **OpenGIS® Simple Features Spec for OLE/COM Rev 1.1**
2. **OpenGIS® Simple Features Spec for CORBA Rev 1.0**
3. **OpenGIS® Simple Features Spec for SQL Rev 1.**

Catalogs and Coverages: The next two Implementation Specifications published by OGC are

4. **OpenGIS® Catalog Interface Implementation Spec Rev 1.0**
5. **OpenGIS® Grid Coverages Implementation Spec Rev 1.0.**

The first of these enables a collection of interfaces to catalog services and cataloged data using Metadata as the primary key. Additionally, the specifications provide for the use of librarian functions and additional functions that expand the power of a spatial information library. Catalogs are additionally useful for the sharing of processes and services, not just data. Catalogs makes it possible to relate many sources of information, even when their native formats are incompatible.

Coverages are mappings from a spatial domain (usually a geometry such as a collection of points, say, sensor sites) to some value set (for example: those sensed by the sensors.) Most popular among coverages are those whose domain is (or may be assumed to be) a rectangular array. Examples include elevation grids (where the value is elevation) and digital images (where the value might be a color vector). These are called Grid Coverages. The Grid Coverage Implementation Specification provides for access, evaluation, and simple operations with Grid Coverages.

Coordinates and Transformations. The sixth in the sequence of OGC Implementation Specifications is the Coordinate Transformation Services Implementation Specification. Without a rigorously defined Coordinate Reference System (CRS) feature geometries (e.g., points) have no semantic values. The Coordinate Transform Services enable clients to understand and control the meaning and accuracy of spatial coordinates. The specification enables users to request that data be transformed and referenced to a different CRS. As with all specifications discussed in this paper, a digital copy of it may be downloaded from <http://www.opengis.org/techno/specs.htm>. The formal name of this specification is:

6. OpenGIS® Coordinate Transformation Services Implementation Specification, Rev 1.0

This specification is actually like a graduate course in geodesy; it leads the reader to a sophisticated understanding of the fundamental concepts, such as origin, axis, unit, scale, coordinate, coordinate system, prime meridian, and so on.

Web Mapping: The seventh specification approved by OGC, and the first of the OGC Specifications to be produced in the Interoperability Program was the:

7. OpenGIS® Web Map Server Interfaces Implementation Specification, Revision 1.1.0

This specification provides for the serving up of “pictures” of geospatial information. Three interfaces are present in this specification. The first, “GetCapability” queries a data store to discover the thematic layers it contains, and how these layers may be rendered for display. The second interface, “GetMap” strings together many simultaneous requests to different data stores, asking them to return map images with identical scale and projection parameters. These are displayed in the requested order with transparent pixel technology. Thus, information from one data store may be simultaneously integrated with that from many others. The third interface allows clients to query the source data and metadata pixel by pixel.

Geographic Markup Language (GML): The eighth and most recent achievement of OGC is the Geographic Markup Language, now in Version 2, and soon to be Version 3. This specification, along with the others already mentioned, is available at: <http://www.opengis.org/techno/specs.htm>

8. OpenGIS® Geography Markup Language (GML) Implementation Specification Version 2.0

GML provides a “lingua franca” for the expression of features and feature collections in the course of service requests and service responses. GML provides many advantages over earlier technologies such as: character-based, support for links and references, and CASE tools.

The Future: The immediate goals of the OGC are summarized in the 13 papers now included in the list of OGC Discussion Papers. These papers present a discussion of technology issues considered in the Working and Special Interest Groups of the Open GIS Consortium Technical Committee. The content of these papers are presented to create discussion in the geospatial information industry on a specific topic; the content of these papers is not to be considered an adopted standard of any kind. These papers do not represent the official position of the Open GIS Consortium nor of the OGC Technical Committee. The following thirteen documents have been released by their authors (and the OGC Working Group or SIG indicated) as OGC Discussion Papers. Your comments are welcome:

- ?? OpenGIS Project Document **01-044r2**: Units of Measure and Quantity Datatypes
- ?? OpenGIS Project Document **01-037**: Location Organizer Folder Specification
- ?? OpenGIS Project Document **01-036**: Gazetteer Service Specification
- ?? OpenGIS Project Document **01-035**: Geoparser Service Specification
- ?? OpenGIS Project Document **01-026r1**: Geocoder Service Draft Candidate Implementation Specification Version 0.7.6
- ?? OpenGIS Project Document **01-022r1**: Basic Services Model
- ?? OpenGIS Project Document **01-018**: Web Coverage Server
- ?? OpenGIS Project Document **01-023**: Web Feature Server
- ?? OpenGIS Project Document **01-021r1**: Web Map Server
- ?? OpenGIS Project Document **01-028**: Styled Layer Descriptor
- ?? OpenGIS Project Document **01-019**: XML for Imagery and Map Annotations
- ?? OpenGIS Project Document **01-013r1**: High-Level Ground Coordinate Transformation Interface
- ?? OpenGIS Project Document **01-024r1**: Web Registry Server

These papers may be downloaded from <http://www.opengis.org/techno/discussions.htm>

The Longer Range Vision: Increasingly, the Consortium is moving its attention to deeper issues surrounding the sharing of information and processes. Enormous activity is centered on the 13th Discussion Paper in the list above: the Web Registry Server. A few years ago, the Registry was seen as a special type of data catalog. The emerging role of the Registry is now centered on the concept of feature schema (that is, feature content models) and Service Registries, and the reserved vocabularies used by both..

Consensus within Information Communities on their feature schema (that is, their world view; the collection of objects, relations, and behaviors they model) and the reserved vocabulary used to name these objects/relations/behaviors is essential for information sharing. Likewise, sharing of processes requires consensus on the names, types, and semantics of each process input and output.

When you look inside a registry, what do you see? Is it a collection of Rules, such as a collection of Rules for Data Capture? Here is an example:

Rule for capture of cul-de-sacs:

“Cul-de-sacs longer than 100 meters shall be represented with a linear geometry”

Or do you see Feature and Process Hierarchies? Here are two examples:

“Cul-de-sacs are a subtype of ‘Street’”

“ A LOF server is a subtype of a Web Feature Server”

Of course, registries need to be perceived from both directions, and sometimes from both directions simultaneously. Within an information community, we need all of this, and common reserved vocabularies and common semantics, too. Only when this foundation is secure can we attack the problems latent in information and process sharing between different information communities.