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Markup Languages and Google Earth Enable the GeoWeb

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GML DEVELOPMENT

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Markup Languages and Google Earth Enable the GeoWeb

In 2005, Google Earth was introduced to the desktop. The new service offered high-performance access to a global information base of geographic imagery and maps integrated with a "slick," easy-to-use interface. Suddenly the game had changed.

All at once, consumers and the general press discovered the world of geography and geographic imagery. Articles have appeared in The New York Times, The Wall Street Journal and many other mass-market media.

Introducing KML

An interesting aspect of the Google Earth application is its use of Keyhole Markup Language (KML), which is named after the company that Google acquired to constitute Google Earth. This markup language is written in Extensible Markup Language (XML) and marks widespread exposure for using markup for geographic information.

The history of applying XML to geographic information is much older, and GeoWorld readers probably are aware that Geography Markup Language (GML) became an OGC recommendation paper (GML 1.0) in 2000. GML has gone on to version 3.1, and version 3.2 will soon be a draft international standard (ISO 19136) of ISO/TC 211. It's therefore interesting to see how GML and KML compare as well as speculate on the impact of markup languages on the evolving global "GeoWeb."

KML is based on GML, although it doesn't formally import GML schemas. Comparing geometry models, KML is syntactically identical to a subset of the GML geometry model (for further details, see geoweb.blog.com). KML also uses GML 3.0 grammar for temporal entities, using a subset of GML temporal.xsd for TimeInstant and TimePeriod.

In addition, GML and KML endorse schemas for defining objects not natively defined in GML or KML languages. In GML, this is accomplished using W3C XML Schema language, while KML introduces its own schema definition capabilities via the KML <Schema> element.

Despite these similarities, the objectives of GML and KML, as presently written, are quite different.

GML and KML

GML is focused on describing geographic content. It relies on other technologies and standards to specify styling for visualization and graphical or textual visualization (SVG, VML, HTML, etc.) of GML content. KML, however, is used for styling geographic "PlaceMarks" to appear on the Google Earth application. In some ways, KML could be compared to SVG as much as GML.

KML describes itself as "an XML grammar and file format for modeling and storing geographic features such as points, lines, images and polygons for display in the Google Earth Client." This is quite different from GML.

GML describes geographic features that can have associated geometric characteristics (expressed as points, lines and polygons) as well as many other types of characteristics. GML is intended to allow users to create vocabularies of geographic objects that can be used to exchange data, describe messages used by Geospatial Web Services and express geospatial requests and transactions.

GML isn't intended for any specific visualization application, but GML data can be readily styled for presentation on Google Earth. Various style engines likely will be created to enable the direct styling of GML output from OGC WFSs to Google Earth.

As a language for describing geographic entities apart from Google Earth visualization, KML is quite limited. The KML <schema> construct can be used to a limited degree, but it would be more or less impossible to describe most geographic datasets using this approach, and it's unlikely that this is the intention of KML.

The Global GeoWeb

GML and Google Earth mark important milestones in creating the global GeoWeb. Despite the long history of computers in GIS, the flow of geographic information still is mostly a matter of manual file transfer, "cut and paste," and manual file conversion processes. This is true across virtually all domains.

The objective of GML and associated OGC Web services is to move toward the GeoWeb, a world in which we have instant and global access to geographic information that flows in near real time from widely distributed data providers to a larger audience of data consumers.

Critical to this vision is the broad utilization of open standards such as OGC GML and WFS. This long-awaited goal moved a step closer with the release of Google Earth.