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IMAGIN is a non-profit 501(c)3 organization comprised of individuals and organizations interested in the use and application of geographic information system (GIS) technology in Michigan. Our members are committed to improving the quality and availability of digital data necessary to make good use of GIS. We believe that cooperation and open communication are necessary to achieve these objectives.

imagiNEWS
is published bi-monthly
You may contact the editor at:

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East Lansing MI 48823

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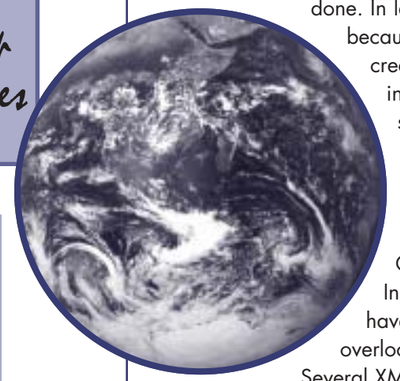
imagi NEWS

what's inside



Markup Languages Can Make One's Geographic Web-Life Easier

By Jason M. Wagester

The Internet is slowly but steadily revolutionizing the way business gets done. In large part this is because of efforts to create platform independent open standards that allow for unprecedented levels of data sharing and interoperability. Geographic Information Systems have not been overlooked by this trend. Several XML based languages, namely GML & SVG, have the potential to redefine how geographic data is transferred and visualized on the World Wide Web.

XML (eXtensible Markup Language) is becoming an increasingly popular language to facilitate data publishing and data exchange, especially on the World Wide Web. This popularity can be attributed to three primary design features of the XML standard: (1) There are no predefined tags in the XML language, meaning that all of the tags are user defined, making XML suitable for describing any type of data; (2) XML documents enforce a strict structure. Since there are no predefined tags, the only way for an XML parser to understand and process the contents of an XML file is for that file to be "well formed" i.e. adhere to the formatting and structural rules laid out by the XML standard. A "well formed" XML document is readable by all conforming XML parsers regardless of the "brand" of parsing software or the operating system it is running on; (3) an XML document is "human readable" text, meaning that with a few exceptions, anyone should be able to open, read, and edit an XML document using nothing more than a simple text editor, such as Notepad or vi.

So one hears a lot of buzz about XML, and as described in the first paragraph it's an attractive technology, but what is it really used for? This brings up the topic of XML "encodings", or in other words, languages based on XML. XML is what is known as a "meta-language", or a language used to create other markup languages. XML essentially provides the structure, rules and syntax to allow people and/or organizations to create their own unique markup languages to model the particular types of information in which they are interested. In some cases, these

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Who's Doing What in GIS and Spatial Technology

OAKLAND LAND CONSERVANCY

Population: *1,198,593*
Geographic Coverage: *Oakland County*
Number of Staff: *Four*
Executive Director (Full-time)
Stewardship Coordinator and GIS Specialist (Part-time)
Administrative Assistant (Part-time)
Development Coordinator (Part-time)

PROGRAM STATUS

The Oakland Land Conservancy is a private 501(c)(3) nonprofit organization whose mission is "to preserve, protect and connect the natural areas and open spaces of Oakland County to enhance the quality of life." The Oakland Land Conservancy operates with an annual budget of $150,000 supported by foundation grants, corporate and individual donations, and membership dues from approximately 400 members. Currently, the Conservancy employs four staff members: one full-time Executive Director; one part-time Stewardship Coordinator/GIS Specialist; one part-time Administrative Assistant; one part-time Development Coordinator. The Conservancy's service area covers all of Oakland County.

The growth of the Oakland Land Conservancy's GIS capabilities took off in the spring of 2001, stimulated by a capacity-building challenge grant from the Carl's Foundation.

The Carl's Foundation is a private foundation in Michigan whose charitable focus is children's welfare and preservation of natural areas, open space, and historic buildings through assistance to land trusts. The resulting increased capacity allowed the Conservancy to hire a Land Protection Assistant and purchase both a better computer and large format printer. Using Arcview 3.1 software and licenses provided from Oakland County via Oakland Township, the Conservancy's GIS Program was established. In 2002, the Land Protection Assistant was moved to the Stewardship Coordinator position to reflect the growth of the Conservancy's stewardship program. The Stewardship Coordinator is currently responsible for all GIS services and will continue to supervise the GIS program into the foreseeable future. Plans to obtain a GPS unit, hire a new Land Protection Specialist and acquire a volunteer proficient in GIS applications are in the works.

The majority of the GIS data used in the Conservancy's projects are obtained from Oakland County Planning and Economic Development Services. Other data sources include Lapeer County Equalization and the State of Michigan. At this time the Conservancy only uses orthophotos and ArcView shapefiles (hydrology, roads, parcels, etc.). Using this data, the Conservancy's GIS program has established four main focal areas: Individual Parcels, Conservation Clusters/Cells, Conservation Corridors, and Countywide Planning. Each area uses GIS data layers to help locate linkages between protected and potential protection sites.

INDIVIDUAL PARCELS

Individual parcel maps are most commonly used for site evaluations and to communicate with partners, landowners, Board members, staff, and volunteers.

CONSERVATION CLUSTERS/CELLS

Conservation Clusters/Cells maps are produced to help delineate adjacent groups of parcels being considered for conservation or that are already preserved. Oakland County Planning and Economic Development Services is developing a cell analysis data set (an experimental technique to group parcels within the County using the major roads surrounding them as natural breaks/boundaries) that the Conservancy will use as a reference when dealing with conservation clusters.

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From the Events Committee . . .

2004 IMAGIN Conference

May 3-5, 2004
Holiday Inn - South / Convention Center
Lansing, Michigan

Preparations for the 2004 Conference are well underway. Abstracts have been received and are being reviewed by the committee. Thanks to those of you who submitted an abstract. We will be contacting you in the near future! If you didn't submit an abstract this year, please consider submitting next year! The success of our conferences depends on the range and quality of abstracts that we receive.

We have lined up some focused sessions on a wide range of topics including:

Land Use — **Web GIS**

Aerial Imagery — **Homeland Security**

Utility GIS — **Mobile Mapping**

Monday morning is sure to provide some lively conversation at the Pre-Conference Panel Discussions. These are always a crowd favorite, and this year we have a mixture of new and renewed topics! Join us as we discuss **GIS Outside the Box, Basic IT/GIS Security**, and even old favorites such as **Careers in GIS.**

If you need to brush up on those **cartography skills**, or if you want to learn more about **Census data, geodatabases,** or **CAD conversion**, you will want to be sure to attend one of the Post Conference Workshops!

Finish your conference experience by participating in the **Map Crawl** where you will have the opportunity to visit some of Lansing's GIS hotspots. Participants will pay a quick visit to the **United States Geological Survey**, the **Surveyor's Museum**, the **Center for Geographic Information**, and the **Remote Sensing** and **GIS facilities at Michigan State University.**

Once you have 'crawled' around the State Capital, join your fellow GIS professionals for some quality networking and a round of golf in the **First Annual IMAGIN Four Person Scramble** at Forest Akers West Golf Course. We can't wait to see you in Lansing!

MARKUP LANGUAGES continued from page 1

specific markup languages may describe fairly simple information involving only a few individuals. In other cases, these new XML encodings are designed to standardize the way information is modeled and stored across entire industry segments. There are two particular XML encodings that are of growing importance for users and developers of GIS technology, and they are GML (Geography Markup Language) and SVG (Scalable Vector Graphics).

GML (Geography Markup Language), developed by the OpenGIS Consortium, is an open standard XML encoding for storing and transporting both the spatial and non-spatial properties of geographic data. GML encodes these properties of geographic data as "features", based on the abstract model of geography developed by the OpenGIS Consortium. A feature is simply a list of properties (AKA"attributes") and related geometries. GML's basic geometries consist of the point, line string, linear ring, and polygon. Of course, all of these geometries are made up of coordinates, which can be one (x), two (x, y) or three (x, y, z) dimensional. An interesting aspect of the GML geometry model is that every feature must specify a Spatial Reference System, which of course allows that feature to be referenced back to some location on the surface of the Earth. For example, to encode a simple fire station feature the following snippet of GML code could be used:

```
<FireStation>
  <gml:name>Station 34</gml:name>
  <address>1234 N. Main Street</address>
  <description>Cities oldest fire
station</description>
  <numberofengines>5</numberofengines>
  <gml:location>
   <gml:Point
srsName="http://www.opengis.net/gml/srs/epsg.
xml#4326
<gml:coord><gml:X>40.0</gml:X><gml:Y>5.0</gml
:Y></gml:coord>
   </gml:Point>
  </gml:location>
</FireStation>
```

The feature is declared as a fire station, assigned a name, a few attributes are declared, and the geometry is specified. While this example is very simple, this does not imply that GML cannot model complex geometry or feature relationships. The current GML geometry model is very robust and flexible. For example, aggregate geometries can be composed of multiple simple geometries of the same type, such as MultiPoint, MultiLineString, etc. Furthermore, even more complex geometries, known in GML as MultiGeometry features, can be created by combining multiple simple geometries of differing types. Additionally, features can be composed of other features, for example a Wastewater System feature could be composed of pipe, manhole, and pumping station features. While it is difficult to convey all of GML's capabilities in a few brief paragraphs, GML is a capable mechanism for storing geographic features and for representing the relationships between those features. Currently, the most glaring omission from the GML data model is the lack of a mechanism for storing topological relationships between features. However, that mechanism should be available in a future version of the GML specification.

In the context of this article, what GML does not do is equally important as what it does do. As previously described, GML is designed for storing and transporting the spatial and non-spatial properties of geographic data. GML does not concern itself with how that data is represented as cartographic output on a map. This is not a shortcoming of GML, it is in fact a design goal of GML, and XML in general, to separate the informational content from the presentation of that content. However, this doesn't mean that GML is only good for data storage and transport; it can be viewed cartographically when combined with another popular XML language, SVG.

SVG (Scalable Vector Graphics) is an open standard XML encoding developed for describing 2D graphics. Like GML, SVG can store simple discrete geometries like lines and polygons, but can also store true circles and ellipses, vector text, and mathematically generated path elements. In addition to the ability to store these graphical objects, SVG also has the ability to describe how these objects should be rendered in a graphical environment. From simple attributes like color, line width, and symbols to complex features like gradients, masking and compositing, SVG can encode most conceivable graphical presentation attributes. This powerful format for describing 2D vector graphics is exploited using an SVG viewer, which accurately renders the graphical information encoded in the SVG document on the user's display device. SVG viewers are available as stand-alone

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IMAGIN AWARDS

Every year, several individuals are recognized for their contributions to the field of GIS at the IMAGIN conference. Nominations are requested for the following awards to be presented at the 2004 Conference:

The Jim Living Lifetime Achievement Award is presented to an IMAGIN member in recognition of an exceptional career-long dedication and commitment in the field of GIS/Geospatial Sciences and serving as an IMAGIN member.

The Jim Living Scholarship Award presents an outstanding student with a scholarship for their participation and involvement in Geographic Information/Geospatial Sciences.

The GIS for Everyone Award recognizes an organization that does an outstanding job of making GIS data or analysis available to either organizations or to the public.

The GIS Education and Outreach Award is presented to an individual or group that promotes an innovative GIS activity or educational project using GIS/Geospatial Sciences.

Recipients will be recognized at the 2004 IMAGIN Conference Luncheon. Criteria and submittal information is located on the IMAGIN website (http://www.imagin.org). All nominations must be submitted to the IMAGIN office by March 19, 2004.

IMAGIN MAP GALLERY

Show off your best maps at the 2004 Map Gallery! Display your GIS accomplishments and demonstrate how GIS and mapping aids in understanding, managing, and improving our world. Maps will be recognized for best cartographic design, analytical presentation, data integration, and cooperative presentation. All maps will be showcased at the 2004 IMAGIN Conference (May 3-5) and winners will be announced at the banquet. Applications must be submitted by April 09, 2004. Category descriptions, submittal applications and more can be found on the IMAGIN website (http://www.imagin.org).

IMAGIN STUDENT PAPER COMPETITION

Professionals and Educators - Get the word out to your students and interns!!!

IMAGIN is now accepting abstracts for its Student Paper Competition for the 2004 Conference. Take part in Michigan's premier GIS conference! Gain professional experience, industry recognition and monetary rewards! IMAGIN's Annual Conference provides opportunities for students to network with GIS professionals and employers throughout Michigan.

Full papers are due April 15, 2004 and will be reviewed by the IMAGIN Panel. Finalists will receive free lodging, paid conference registration, a one year free membership to IMAGIN and will be asked to present at this year's conference in Lansing, MI, May 3-5, 2004. All papers must have a GIS application theme to be considered for competition. Submittal of class projects or portions of theses/dissertations is encouraged. More information can be found on the IMAGIN website at http://www.imagin.org.

Member News

Bloomfield Hills, Michigan - Hubbell, Roth & Clark, Inc. (HRC), a consulting engineering firm servicing southeastern Michigan, announces that **Brian Buckley** joins the firm's GIS Department as Senior GIS Specialist. Buckley brings 17 years of experience from the MSU Center for Remote Sensing & GIS.

Meceola Central Dispatch, an agency serving the emergency response needs of Osceola and Mecosta Counties, has selected Digital Data Technologies, Inc. (DDTI) to provide an intelligent base map and software in support of E9-1-1.

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applications, or as plug-ins (e.g. Adobe SVG Viewer) to many popular web browsers, including Internet Explorer and Netscape. What makes SVG so attractive to GIS professionals is that by using an SVG plug-in for a web browser, there is finally an inexpensive way to provide high quality, interactive, vector format cartographic content over the World Wide Web.

Again, in the context of this article, what SVG does not do is equally important as what SVG does do. SVG models 2D graphics. It does not model geographic information. Applications developed using SVG technology can simulate some aspects of the GML feature model, however, it is important to note that the application provides this functionality, and it is not implicit in the SVG language.

So there are these two great XML-based technologies, GML and SVG. Each is designed for a different purpose, and both are directly applicable to GIS. Wouldn't it be great if these two technologies could be used together? They can, using an evolving new XML based (of course) technology known as XSLT (eXtensible Stylesheet Language Transformations) Style Sheets, which has the ability to "transform" XML data. While this technology could warrant an article of its own, here's a brief description. The transformation is facilitated by an XSLT engine, typically built right into your web browser. The engine takes an XML document as input, applies the transformations as detailed in the XSLT Style Sheet, and outputs the transformed XML. So in this case, one takes a GML document, and "transforms" it to an SVG document, complete with thematic coloring schemes based on attributes contained in the GML data. XSLT needn't be limited to converting from one form of XML to another, however. For example, because all GML features specify a Spatial Reference System, one could have another XSLT Style Sheet to transform all of the GML documents it processes to a standard SRS before going to SVG. We could have yet another XSLT Style Sheet generalize the feature geometry to reduce transport and rendering times. Even more promising is that all of this could be performed in real time via distributed providers over the web.

XML and related technologies are offering GIS users new and exciting ways to share, publish, and present their geospatial information resources. Open standards such as GML and SVG offer powerful features at relatively low cost. As these technologies mature and their user base expands, it will be important and beneficial for GIS professionals to be able to recognize where GML and SVG can be fit into their workflow to increase the efficiency and lower the cost of their GIS operations.

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CONSERVATION CORRIDORS

Conservation Corridor maps delineate either a riparian area or another specified corridor that is targeted for conservation. Within the corridor, individual parcels may be identified as: 1) parcels that are a priority for conservation, 2) parcels with landowner communication underway but no conservation, 3) parcels with conservation in progress, or 4) stewardship parcels.

COUNTYWIDE CONSERVATION MAPPING

The Conservancy plans to use Oakland County's new cell analysis data to help in the identification of links between existing conservation corridors as well as to guide future protection actions.

LESSONS LEARNED/RECOMMENDATIONS

Through the process of trial and error the Oakland Land Conservancy's GIS program has evolved into an effective communication tool. Data can be displayed in many interesting and descriptive ways. This gives flexibility to the Conservancy when talking with municipalities, developers and landowners. A visual-aid is very helpful when trying to explain reasons for conserving or preserving specific areas.

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