

Web Mapping Initiatives

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Building the spatial Web offers unprecedented market opportunity for the geotechnology industry, and, once in operation, the spatial Web will offer unprecedented benefits for society. But success depends on standards that support interoperability. Below we profile initiatives whose purpose is to facilitate consensus on technical easy discovery and widespread access to the world's geoprocessing resources and spatial information.

First, it is important to understand what kinds of standards are important, because this picture has changed dramatically. Six years ago, cities, states, federal agencies, and major corporations were still debating internally and with their data sharing partners about standardizing on particular vendors' GIS software platforms, particular data formats, and particular operating systems. Now, those issues are much less important. Today's task is much easier. Today, it is important, within and between organizations, to agree on two things: OpenGIS Interface Specifications and FGDC Metadata Standards. The OpenGIS software interface specifications enable access to heterogeneous spatial data and spatial processing resources. Discovery of these resources (in the way that search engines and Web site keywords provide discovery of Web sites) depends on the OpenGIS Catalog Interface spec and on the resource owners' publishing of standard metadata for their data and processing resources.

Understanding interoperability requires understanding two terms: open interfaces and standard metadata schemas.

Open interfaces and OGC's Web Mapping Initiative: An interface, in software terms, is software that enables independent systems to act on each other or communicate with each other. Historically, software vendors usually hid the interfaces that enabled communication between the independent systems of their product lines. But the general trend in the last decade has been to get away from closed interfaces, to publish the interface specifications so that software from diverse vendors can be made to work together. Good management of open interfaces is one key to the success of most major software vendors.

OGC (the Open GIS Consortium, Inc.), a not-for-profit, began in 1994 to enlist vendors of GIS software (and other organizations) in a technical committee process to reach consensus on open interfaces that would enable their systems to communicate over networks. OGC's highly successful 1999 Web Mapping Testbed led OGC to make testbeds the consortium's main method for developing specifications. This method is fast and it creates well-tested working prototypes of interfaces. The agenda of OGC's Interoperability Program has expanded to include testbeds in related areas such as geospatial fusion, location services, image exploitation, coordinate transformation, XML encoding of spatial data, etc.

Standard metadata schemas and FGDC's NSDI initiative: Metadata is “data about data.” Finding and sharing spatial data repositories and their individual spatial data files require that those repositories and files be accompanied by a considerable amount of information: When and how was the data collected? What geographic area is covered? What kind of data is it? (Raster, vector, TIN, etc.) What is the scale? What is the coordinate reference system? What geographic features are included? How are those features defined? Metadata files are typically hundreds of lines long. A metadata schema (or profile) establishes a specific sequencing, vocabulary, and format for such data. If multiple data repositories use the same metadata schema, it is possible to automate searches of the repositories. Such automation offers important social and economic benefits, just as search engines on the Web offer important social and economic benefits. Unfortunately but understandably, because so many people have collected spatial data for so many different purposes over so many years, there are many different and incompatible metadata schemas.

The Federal Geographic Data Committee (FGDC) was created ten years ago to coordinate the development of the National Spatial Data Infrastructure (NSDI). One of its main tasks has been to coordinate the federal agencies' development of standard metadata schemas. This effort has proceeded in coordination with the relevant committees in the International Organization for Standardization (ISO). FGDC has overcome complex technical and organizational problems to achieve this goal. It is a success, but there is still much to do.

A major report on financing options the NSDI was prepared for the FGDC by Urban Logic, a New York City not-for-profit organization. That report identified ways to invest in sharable spatial information by 1) organizing spatial data consortia, 2) making OpenGIS and FGDC standards a key investment criteria, and 3) by examining the potential data redundancy being created by the many data mandates required for government programs.. The Report is available online at <http://www.fgdc.gov/whatsnew/whatsnew.html#financing>.

What the public – and “spatially aware” public servants – can do
Adoption of OpenGIS conformant products and FGDC Framework Metadata Standards is now proceeding rapidly in the US Federal government, and it is likely that thousands of local governments will follow this trend in 2001 as they begin to use the Web to organize better access to local data. Producers and users of spatial data have much to gain and should “vote with their pocketbooks” to encourage vendors to implement the interoperability-enabling specifications. Local governments have much to gain if they educate themselves and their political representatives about the issues in the Urban Logic report, i.e, issues pertaining to intelligently conceived “data mandates”.

Without interoperability, the Spatial Web is not a web at all, but a bunch of short strings. As OGC's chief scientist, Cliff Kottman, is fond of saying, “Interoperability does not happen by accident.” Without awareness and concerted action, there will be no interoperability.