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Emergency Mapping Symbology and Next Steps

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Police, fire fighters and EMTs are just beginning to use internet-connected cell phones, PDAs, handheld computers and laptops that provide views into spatial data held in Web servers. But as applications have begun to be deployed, it has become apparent that map symbology is a major issue. Maps are collections of symbols whose value depends on whether the symbols are understood by the map user. The difficulty faced by solution providers is that in the new world of Web mapping for first responders, spatial data -- and instructions for presentation -- may come from various servers.

Because there is a need for multiple Web application clients to get data from multiple servers and present that data to first responders in familiar map styles, there is a need for interoperability standards that support map styling. To meet this need, the US Federal Emergency Management Agency (FEMA), GeoConnections (Canada) and others are sponsoring an OGC™ Emergency Mapping Symbology (EMS) Initiative. Technology provider participants will build on other OpenGIS® Specifications to develop draft specifications for open interfaces that enable solution providers to build systems that automatically present data from diverse sources in symbologies appropriate for different sets of users. The Federal Geographic Data Committee (FGDC) will provide symbol sets.

Building on the Interoperability Framework

The EMS Initiative builds on OGC's open interoperability framework, which is a set of OpenGIS Specifications that enable one GIS (or other software application, not necessarily a GIS) to reach across the net to invoke processing services and get data back from another GIS (or other geoprocessing application). OGC makes Sun's maxim, "The network is the computer," apply to spatial processing. The goal is multi-vendor interoperability on an open network and easy integration of spatial information into other kinds of applications. Just as you can use any vendor's Web browser to get simple text and image data from Web sites that use any other vendor's Web server, you can now, through standard interfaces implemented by software vendors, use any vendor's Web mapping client (often executed through an ordinary Web browser) to get simple or complex spatial data (and geoprocessing services) from any vendor's Web map server.

The "map" your application displays may be 1) a simple map image (e.g. PNG or TIFF), or 2) a set of SVG (Scalable Vector Graphics) "dumb" (no attributes) display primitives, or 3) a set of OGC Simple Features (with attributes) encoded in the Geography Markup Language (GML). In cases 2 and 3, your client software determines the style of map symbols. Options 2 and 3 also allow capabilities such as zooming to greater detail that are not available with a simple map image. Option 3 gives you the actual data, not just a representation of it. (Data providers often choose to give users only a view, not the actual data.)

Without the family of specifications that make up OGC Web Services (OWS), such data access and display options have been possible, but users have been limited to Web sites running a

specific vendor's map server software. With OWS, the spatial resources network is opening up. (See "The Importance of Going Open" (http://www.opengis.org/press/?page=papers .) Similarly, with the new standards that come out of the EMS initiative, symbol management will be something any solution provider can provide, and the solution will work with any spatial data server that is compliant with the OGC symbology standard. Agencies and businesses with diverse data collections will be able to provide first responders with access to data that will be presented to them in a style that best suits their needs and training.

What's Next?

Translating between symbol sets builds on OGC members' successful efforts to translate between data models, mapping one GML-encoded data model to another "on the fly." As this interoperability technology matures (and as more organizations move their data into GML), it will be an extraordinary boon to data sharing and data coordination. Other completed and in-process OWS standards provide a standards foundation for powerful "spatial search engines," Web connected sensor networks, terrain modeling, geodata commerce, decision support and more.

Clearly, not all the data sharing challenges are technical. Data sharing forums in our industry discuss topics such as data security, licensing, data lineage, data certification, for-fee vs. free data distribution, and ways in which frictionless production and dissemination of spatial data create the potential to abuse personal privacy rights and civil liberties. We believe these debates need facts and we maintain that open, hands-on, collaborative experiments offer the best path to solutions, many of which will require agreements about technology standards. What's next is the planning of such initiatives by stakeholder organizations.

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