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ABSTRACT

Open Source and Open Standards: Tools for Rapid Development of Community-Oriented GIS

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The benefits that can be derived from geospatial information and analysis systems have been widely documented. Unfortunately, many organizations cannot realize these benefits due to the cost and complexity of commercial GIS software. This problem is especially acute for community and local groups who lack funds as well as GIS programming expertise. Available open source tools offer a partial solution.

This paper introduces a stack of three interrelated software tools that implement OGC standards to provide the primary required layers for web-based GIS applications. PostGIS is a sophisticated spatial-relational data base management system which supports a rich set of spatial object types and offers extensive capabilities for manipulating those objects, including queries about spatial relationships, overlays, buffer construction and feature matching. GeoServer is a cross-platform geospatial application server that can manage multiple geographic data sources, both raster and vector, in a wide range of formats. GeoServer abstracts the details of these sources while making their information available to client applications through OGC standard Web Mapping Service (WMS) and Web Feature Service (WFS) requests. OpenLayers is a JavaScript library for creating and controlling dynamic geographic data displays on a web browser. OpenLayers makes it relatively easy to create WMS and WFS requests and to handle the information returned. Together, these three tools simplify the process of building a web-based GIS application, requiring only commonly-available programming skills (HTML, CSS, JavaScript and SQL).

Our paper starts with a mini-tutorial on these tools. Then, as a case study, we describe our own experience using them to implement a web GIS system for community management of water resources in central Thailand. Broader awareness and use of these tools can help organizations with restricted budgets and knowledge benefit from recent dramatic advances in geospatial information technology.

Keywords: Geographic Information Systems, Open Source, Open Standards, Rapid Application Development, Community GIS