

Overview of Geospatial Open Source Software which is Robust, Feature Rich and Standards Compliant

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SUMMARY

Standards from the Open Geospatial Consortium enable the sharing of data across agencies and applications, leading to large scale cost savings through data and software interoperability. Developing in parallel has been the widespread standards support from Open Source Software. Open Source offers many advantages, including robust applications, strong standards compliance, commercial support, permissive licensing, and an international pool of developers.

The suite of Open Source Software includes databases, web services, data processing, analysis and transformation tools, desktop clients, browser based clients, geospatial business intelligence tools and a catalogue.

This presentation provides an overview of the Open Standards provided by the Open Geospatial Consortium (OGC) and the key Open Source applications available in the Geospatial Open Source Stack. Participants will be provided an overview of packages features, supported standards, how they integrate with each other and proprietary systems.

This talk will be presented by Cameron Shorter, the chair of the 2009 international conference for Free and Open Source Software for Geospatial. <http://2009.foss4g.org>

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1. INTRODUCTION

Standards from the Open Geospatial Consortium (OGC)ⁱ enable the sharing of data across agencies and applications, leading to large scale cost savings through data and software interoperability. Developing in parallel has been the widespread standards support from Open Source Software. Open Source offers many advantages, including robust applications, strong standards compliance, commercial support, permissive licensing, and an international pool of developers.

2. GEOSPATIAL STANDARDS

Over the last ten years, the Open Geospatial Consortium has developed a comprehensive set of standards for storing and sharing Spatial Information. The Web Service Standards (WMS, WFS, WCS, CSW etc) significantly improve integration of map layers using different applications and agencies. In following years, standards development included semantic interoperability, defining application profiles which define attributes for specific domain sets and further improves interoperability.

These standards provide a number of key benefits.

- The cost of data sharing, processing and maintenance is reduced as data is available in known formats.
- The risk of forced software upgrades, or unsupported end of life of products is reduced, as standards based components can be replaced by another vendor's products.
- There is strong international sponsor and industry support for the Open Standards, which ensures that long term development costs will be shared and supported by a large developer base.
- Major geospatial vendors have all been embracing Open Standards, in response to many major programs mandating the use of standards.

Consequently, it makes good business sense for designers and systems integrators to build solutions based upon Open Standards.

3. GEOSPATIAL OPEN SOURCE

In line with the development of Geospatial Standards has been the growth of robust Open Source Software which supports these standards. Standards and Open Source complement each other as business drivers for both are advanced by cross project and cross agency collaboration. Open Source provides excellent standards support, and the reference implementation for most of the OGC standards is provided by Open Source packages.

To support the development, integration and promotion of Robust Open Source Software, the community has built an Open Source Geospatial Foundation, (OSGeo)¹. OSGeo is a not-for-profit organization whose mission is to support and promote the collaborative development of robust open geospatial technologies and data. The foundation provides financial, organizational and legal support to the broader open source geospatial community. It also serves as an independent legal entity to which community members can contribute code, funding and other resources, secure in the knowledge that their contributions will be maintained for public benefit. OSGeo also serves as an outreach and advocacy organization for the open source geospatial community, and provides a common forum and shared infrastructure for improving cross-project collaboration.

Projects supported by the OSGeo Foundation need to pass an incubation process which addresses project stability, community strength, software quality, and license purity. Some of these key projects are covered below.

So when designing GeoSpatial systems, architects should seriously consider integrating Open Source as it often provides significant advantages.

4. THE ROBUST GEOSPATIAL OPEN SOURCE STACK



The following applications represent a number of the widely deployed, robust applications in the GeoSpatial Open Source Stack.

¹ <http://osgeo.org>

4.1 Browser: OpenLayers

Openlayers is a browser based javascript toolkit for building map based web sites.

4.2 Browser: Mapfish

A complete and flexible framework for building rich web-mapping applications.

4.3 Mobile: gvSIG mobile

gvSIG mobile provides a port a subset of the features of gvSIG on mobile devices.

4.4 Desktop: gvSIG

gvSIG is a Geographic Information System (GIS), an easy to use desktop application designed for capturing, storing, handling, analyzing and deploying any kind of referenced geographic information in order to solve complex management and planning problems.

4.5 Desktop: uDig

User-friendly Desktop Internet GIS (uDig) uDig is a desktop application framework, built with Eclipse Rich Client (RCP) technology.

4.6 Desktop: Kosmo

Kosmo - Desktop is a Geographic Information System (GIS), designed for a full management of spatial information, with advanced tools to explore, edit and analyze it.

4.7 Desktop: Quantum GIS

Quantum GIS (QGIS) is a user friendly desktop Open Source Geographic Information System (GIS) licensed under the GNU General Public License. QGIS is an official project of the Open Source Geospatial Foundation (OSGeo). It runs on Linux, Unix, Mac OSX, and Windows and supports numerous vector, raster, and database formats and functionalities.

4.8 Desktop: GpsDrive

A powerful Geographic Information System (GIS) used for geospatial data management and analysis, image processing, graphics/maps production, spatial modeling, and visualization.

4.9 Desktop: R

R is 'GNU S', a freely available language and environment for statistical computing and graphics which provides a wide variety of statistical and graphical techniques: linear and nonlinear modelling, statistical tests, time series analysis, classification, clustering, etc.

4.10 Business Intelligence: GeoKettle

GeoKettle is a "spatially-enabled" version of Pentaho Data Integration (Kettle), an open source Extract, Transform and Load (ETL) tool. This special distribution of Kettle includes extensions which enable the use of geospatial (GIS) data in ETL processes.

4.11 Map Server: GeoServer

GeoServer publishes data from major spatial data sources using open standards. GeoServer is the reference implementation of the Open Geospatial Consortium (OGC) Web Feature

Service (WFS) and Web Coverage Service (WCS 1.1) standards, as well as a high performance compliant Web Map Service (WMS) and KML publisher.

4.12 Map Server: MapServer

UMN MapServer is a development environment for building spatially-enabled Internet applications, including WFS/WMS based services.

4.13 Map Server: Deegree

deegree is an open source software solution for spatial data infrastructures. deegree provides a uniform solution for accessing, analysing, processing and publishing various data sources (e.g. from database backends, file systems and remote services) in an Open Geospatial Consortium (OGC) compliant fashion. deegree is reference implementation of the Web Map Service (WMS 1.1.1, WMS 1.3.0) and the Web Coverage Service (WCS 1.0.0) standards. deegree not only focuses on OGC compliant interfaces and encodings, it is a one-stop-solution for setting up and maintaining your whole spatial data infrastructure, client- and server-side.

4.14 Map Server: MapTiler

MapTiler is a powerful tool for online map publishing and generation of map overlay mashups. Your geodata are transformed to the tiles compatible with Google Maps and Earth - ready for uploading to your webserver.

4.15 Catalog: GeoNetwork

GeoNetwork allows users to catalog datasets and resources using XML metadata standards such as ISO19115 and dublin core. It includes a map viewer for displaying styled layers from OGC Web Map Services (WMS) and includes GeoServer for publishing data.

GeoNetwork uses open standards interfaces and protocols for searching and harvesting. It is the reference implementation of the Open Geospatial Consortium (OGC) Catalog Service Web (CSW) version 2.0.2.

4.16 Client: GpsDrive

GpsDrive is a car (bike, ship, plane, foot) navigation system. GpsDrive displays your position provided from a GPS on a zoomable map, the map file is autoselected depending on your position and preferred map scale. All GPS receivers which support the NMEA protocol should be usable, as well as many USB GPSs using a binary protocol known to the Gpsd daemon.

4.17 Database: pgRouting

pgRouting adds routing functionality to the PostGIS database.

4.18 Database: PostGIS

PostGIS is an extension library to the PostgreSQL object-relational database that adds support for geographic objects and functions.

4.19 Database: SpatialLite

Spatial extensions to the SQLite embedded database.

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ⁱ <http://www.opengeospatial.org/>