IMPLEMENTING A SPATIAL DATA INFRASTRUCTURE SUCCESSFULLY WITH FREE AND OPEN SOURCE SOFTWARE?

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Canada's Success with Spatial Data Infrastructure

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ABSTRACT:

The implementation of a Spatial Data Infrastructure (SDI) for local government, or as part of a company's information infrastructure is a task that has gained ample attention in recent years. Different categories of geospatial software such as desktop GIS, server GIS, web map servers, spatial database management systems, web map development frameworks, etc., are essential – in addition to hardware – for the realization of an SDI. In parallel to recent effort implementing SDIs, there has also been considerable effort developing the capability and usability of free and open source geospatial software. For instance, the website FreeGIS.org lists some 350 GIS related projects and opensourcegis.org list nearly 250. Besides the advent of new software projects, of free data initiatives, and the growth of established projects, a new organization known as the OSGeo Foundation (www.osgeo.org) has been established to offer a point of contact for current and future GIS software users and developers. This presentation aims to give an overview of existing free and open source projects that develop and maintain geospatial software necessary to implement a spatial data infrastructure.

The large number of software projects working on geospatial software indicates the variety of interests that exist within the geospatial industry and includes well-known and commercially successful projects as well as projects that are still in their infancy. Many of the projects that are well known include:

- web map server projects such as GeoServer, MapServer, MapGuide OpenSource and Deegree;
- spatial database management systems such as PostGIS (for PostgreSQL) and SpatialLite (for SQLite);
- frameworks that allow users to develop web mapping and portal components such as Deegree, MapBender, GeoMoose and MapFish;
- catalog and metadata software, such as GeoNetwork; and
- desktop GIS projects, such as Quantum GIS, gvSIG, OpenJUMP, etc.

It is interesting to note that in the development and maintenance of these free and open source projects there is more than just a "bunch of enthusiastic" volunteers involved. Rather, projects have been founded and supported by companies with a business interest, or by government or NGO/not-for-profit institutions that required software to fulfil specific tasks that may have been difficult to achieve with proprietary software. Some projects have also arisen from university and research activities – often software that presents novel concepts that solve special tasks.

If an organization chooses to implement an SDI using free and open source software (FOSS), FOSS projects should be assessed for their application to spatial data infrastructures based on several key criteria: (i) functionality, (ii) support of common data distribution standards (e.g. standards by the Open Geospatial Consortium, OGC), (iii) supported platforms (Windows vs. Linux etc.), (iv) software reliability, (v) options for customization, (vi) distribution costs, (vii) installation and maintenance efforts (incl. costs), (viii) training and support options and prices. Furthermore free and open source software should be able to compete with proprietary software in terms of functionality and options for customization and adaptation.

Our overview firstly reveals that for (almost) all categories of software, used in SDIs, a free software product is available. Also several products are able to compete with proprietary software (in particular the

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web map server projects, but also the database PostGIS, or the data viewer OpenLayers) as is shown by the number of “real-world installations”, often in high-demand environments. The license used by free and open source products ensures a low price (typically no cost) for the software itself and ensures that the software is customizable and adaptable to the SDI context. Hence, and with respect to the latter point, free and open source software typically implement a wide set of (OGC) standards, and if not, at least permit the implementation/addition of components to be OGC/ISO standard compliant. Another benefit of the open source license model is that it allows the simple deployment of SDI components to other locations (so-called up-scaling) at no additional cost. We also note that helpful user and developer communities exist, and support and maintenance service options are offered by various companies which are similar to that currently offered by proprietary software vendors. However, if free software is used for an SDI it requires that adopters first understand the benefits and limitations of a FOSS approach as opposed to a proprietary approach. We plan to address those in the presentation.