GIS Options

RELU Upland Moorland Scoping Study Project
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1. Introduction

This working paper outlines some Geographical Information System (GIS) options for assimilating data, disseminating information and modelling UK upland moorland. This is part of the Rural Economy and Land Use (RELU) Scoping Study called *Upland Moorland for Multiple Benefits* (RELU, 2005). The Scoping Study is a project that case studies the Peak District National Park, but does not involve the set up development or integration of models or GIS. The Scoping Study is evaluating the feasibility for a UK study that is looking to embrace an open and user friendly internet GIS for identifying UK upland moorland and managing data about these regions with the aim of supporting stakeholders and stakeholder interaction.

This paper argues that the follow on project being proposed (based on the Scoping Study) should be engaged with the integration of other UK studies about different types of regions (e.g. forests, wetlands etc…) in mind, and also with scope to incorporate studies of non-UK regions. Above all it is argued that the follow on project should attempt to address part of the growing demand for a coordinated and integrated regional biogeography in an open and extensible way.

It is easy to underestimate the amount of work that is involved in developing a *state-of-the-art* GIS. At the present time, it is not necessary or reasonable to start from scratch with new software development or with new data collection. In terms of software, there are two types of GIS platform upon which we can build an application. Section 2 outlines closed source options, which may include freeware, but are primarily commercial proprietary systems. It is argued that we should not embrace any closed option unless there is a very clear justification. Section 3 outlines the nature of preferred open source options, and details an option that is almost ready to use.

It is not easy to evaluate all options due to the rapid development of the GIS software. In particular it is difficult to keep track of all the commercial systems capabilities due to the restrictive cost of licences. Many of the commercial systems are excellent and there are numerous online systems that are examples of the sorts of thing we are trying to achieve. The Community Access to Natural Resources Information (CANRI) for New South Wales (NSW) Australia provides a useful summary (CANRI, 2005).[1]

I advocate standards based approaches and declare that the only options worth considering are those that either compliant or are implementing Open Geospatial Consortium (OGC) specifications or interfaces. A list of products is maintained by OGC and is available online (OGC, 2005).

2. Closed source options

Closed source options may publish an Applications Programming Interface (API) such that programmers can use methods in the software. However, the workings of the method are hidden. The documentation that explains the methods that can be used is very important and can be a sufficient and satisfactory means of providing functionality and capability. Open source is generally better, because the code reveals exactly what is going on.

Software that is not open sourced is rarely made available to applications developers, even under strict licence arrangements. The main consequences are that:

- It is not possible to be involved with developing it and fixing problems.
- If a problem is encountered, then the best that can be done to resolve it is, to file a report and encourage the developers to address the problem.

[1] This reference is also worth looking up with respect to biodiversity issues, especially relating to invasive species.

Many closed source options are commercial. An example is the ESRI suite of products (ESRI, 2005). The entire suite seems to offer the functionality that is wanted for the development of a *state-of-the-art* UK upland moorland GIS.

3. Open source options

The argument for open source against closed source software for use by government and public sector organisations have been clear for some time (Plotkin, 2002; OpenSource, 2005). There are various open source software development models that can be embraced. Some models blur the distinction between; user and developer, and producer and consumer more than others. The general view is that all that are involved are valuable resources in a collaborative quest to build something better than any could achieve alone.

The amount of effort that has been contributed in the open source developments outlined in this section has been incredible, although in many ways the projects have only begun to mature.

Most open source software development projects ask that users try to find a way to give something back. This can be something seemingly minor like suggesting a feature or improvement, reporting a problem, or letting others know about the software, but these things that users tend to provide are the (usually commercially expensive mechanisms) of Market Research, Quality Assurance and Advertising that help develop better products (GeoServer, 2005).

3.1 UDIG / GeoServer / GeoTools / Jump

User-friendly Desktop Internet GIS (*uDIG*) is a spatial data viewer/editor, with special emphasis on Open Geospatial Consortium (OGC) standards for internet GIS (OGC, 2005). *uDIG* Version 1.0 is due for release at the end of March 2005 and will then provide a common platform for building spatial applications with open source components (RefractionsResearch 2005, 2003-2005).

uDIG is built from various components, one of which, developed by the GeoServer project is a full transactional implementation of the OGC OWSWeb Feature Server specification, with an integrated Web Map Server (GeoServer, 2005).

uDIG through GeoServer and the other open source components offers a solution to open access to geographic data resources of all kinds.

3.2 MapServer

MapServer is a development environment for constructing spatially enabled Internet-web applications. It is not a full-featured GIS system, but it does provide the core functionality to support a wide variety of web applications. Beyond browsing GIS data, MapServer allows for the creation of "geographic image maps", that is, maps that can direct users to content (Mapserver, 2005).

MapServer is a useful tool, but with the advent of *uDIG*, this option is somewhat eclipsed.

4. Further Considerations

As with all GIS development one of the major things is to get the geographical information loaded into the system. For any project aspiring to develop a GIS, it is clearly beneficial if all involved take on responsible for uploading data and providing documentation.

There should be a clean separation of the data and the software making it possible to upgrade the underlying software and readily rebuild applications.

The more resources made available for GIS development the better the result will be. Although this is broadly true of everything, it is wise to make this explicit to avoid making expectations too high.

It will be necessary to have at least one webserver to implement and develop on. It is advisable to have two servers, one for production and development, the other being live.

5. Summary / Conclusion

Two questions the Scoping Study addresses are:

- What is required to develop a GIS that both assimilates and disseminates information about UK upland moorland in an open, extensible and user friendly way?
- How can people with: an average specification computer; a broadband internet connection; and, a standard modern browser, explore in a virtual way UK upland moorland?

This paper has addressed the former question and proposed we develop the user friendly desktop GIS *uDIG*. The latter question is a challenge to be addressed in applied research.

A further ongoing challenge is to devise ways to study, describe and model how upland moorland is evolving over time. This involves analysing its geographical distribution, and how specific regions of this type of environment are changing. There is a need to gather information about these regions and make it available in ways that facilitate the process of evaluating current and planned land uses and potential and likely threats and problems (especially ecological threats and problems concerning the livelihoods of stakeholders).

High quality information about public spaces is just as much a public good as the public spaces themselves. Quality of life in public places - both built and natural - is largely determined by how well we, as a society, process and interpret the signals that this information sends us. By definition, data about human interaction with the environment has a geographic component; for this reason, we should aim for effectively sharing geographic data (GeoServer, 2005).

In general, public geographic data are currently stored and maintained in such a way that it is available to the public only at a relatively high cost of acquisition and integration. Perhaps even worse, this is also true for inter- and intra-agency data sharing. By embracing the concept of a distributed and consistent stewardship of public geographic data we are showing a way out and aim to provide a mechanism for and resource of public geographic data relevant to modelling upland moorland regions in the UK.

It is clear that good management and the availability of a skilled team will alleviate much risks associated with implementing and developing a GIS. To have this it is probably necessary to implement an ongoing program of skills training to provide and encouragement skills overlap, specialism.

All project members should become GIS users to develop basic GIS skills and be involved in developing documentation.

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