

Open Source GIS Conference 2004  Second Annual
MapServer User Meeting

OSGIS 2004 / MUM 2 Presentation Abstracts

Wednesday, June 9, 2004

10:30am - Intro to Open Source

12:00pm
OSGIS
TB 208

Open Source GIS began with the release of GRASS GIS through an open source license more than a decade ago. This turned out to be ahead of its time, as Internet technologies have facilitated the emergence of a number of new and exciting open source technologies in the GIS industry, a number of which are being showcased at this conference. This presentation will discuss the open source concept, how it works as a software development methodology, and how, with the support of Internet technologies, the open source community is able to develop technology that rivals commercial alternatives. This will be discussed in the context of examples of open source GIS success stories from our industry.

Dave McIlhagga,
DM Solutions
Group

A Brief Survey of Open Source GIS Software

This talk will provide a short overview of the main open source projects in field of GIS. Functionality of each project, maturity, and relationships between the various projects will be covered. This talk should be useful to people with some knowledge of GIS concepts and commercial software, who want to get a feel for the broad state of open source GIS software.

Paul Ramsey,
Refractions
Research

Adopting OS GIS technology in heterogeneous environments-Providing decision makers with arguments beyond cost

Save Money! Currently this catch line is often being (mis)used to primarily legitimate the use of Free Software. This may be one argument, but there are others which have a higher significance, especially because they will have a thorough impact on what we call "Information Society". We are overwhelmed by news but often ill-informed because information is served without flanking knowledge support. This incongruity has to be addressed and to do this all concerned parties have to be integrated into the process. Because Open Source is community-driven & community-serving it offers exactly the mechanisms needed to cultivate the outstanding paradigm shift from an Information- to a Knowledge Society. Open Source does not threaten intellectual property rights but instead preserves access to software (basically coded knowledge) for all people.

The next years will be characterized by proliferating Open Source technology. The constancy of spatial data (it is much less volatile than other data) and the highly specialized processes warranting the actuality and quality of this data ensure that proprietary systems will not just be removed from the process chain quickly. But this constancy of development is also a chance to avoid conflicts between the different parties and reduces the pressure on decision makers. Standardization can conciliate between proprietary and open development models and therefore is an important aspect now and in the future. There is no need to hurry and overthrow grown systems just because Open Source and Free Software have been adopted as . But whenever a complex system has to be extended or old components have to be replaced, it will be a good idea to give Open Source a try.

Arnulf Christl,
CCGIS

Introducing Mapbuilder - A web mapping JavaScript library

Mapbuilder is a JavaScript library that provides a client-side solution for dynamically generating web page content from XML documents. The project was originally conceived to render Web Map Context documents as specified by the Open GIS Consortium (OGC) in web pages; however the modular design allows mapbuilder to be extended to handle almost any XML document type.

Mike Adair,
Canada Centre for
Remote Sensing,
Natural Resources
Canada

The initial release includes support for displaying and zoom/pan of maps from OGC Web Map Services (context documents), selecting maps from a context collection and various other components. Future plans include support for transactional Web Feature Services, gazetteer services, and various other web service document types.

The design goals of mapbuilder are:

Minimal server-side requirements – in most cases, the only requirement is to unpack the mapbuilder library into an HTTP document directory on your server

Easy to code your web page – the target audience for end users is HTML programmers; mapbuilder objects are tied to the page using HTML element ID's

Use JavaScript/XML/XSL – XML data is dynamically rendered into HTML using the browser's built in XSLT processor and added to the page using DHTML and CSS techniques

Modular Design – the library follows a well-defined object modeling design; only the required modules are loaded into the application

Open standards – wherever possible, use of open standards is supported, especially for the specifications of the OGC.

Mapbuilder uses the Model-View-Controller (MVC) design pattern. The model, view and controller objects to be used in a page are specified in an XML configuration file loaded when the page loads. The schema of the configuration file is derived from RDF and is fully described in the mapbuilder configuration documentation.

The presentation will focus on how to configure and link mapbuilder components into a web page. Several different mapbuilder configurations will be demonstrated to show the flexibility provided by the library. A brief overview of the mapbuilder configuration document and programming model will be presented.

Developing Interfaces for Open Source GIS according to Human Computer Interaction Guidelines

A variety of different open source GIS projects for web mapping which exist today make it possible to develop full-functional GIS-applications for the Internet. Most of these projects focus on one specific part of a system (e.g. MapServer, PostGIS, etc). Although certain Open Source GIS projects concentrate on the development of web interfaces, some problems arise (e.g. consistency-problems) when the results of these projects are placed in their context of a whole system. Further the development of a system according to Human-Computer-Interaction guidelines involves the participation of the end-user at almost all stages of the process. This presentation describes the adaptation of Human-Computer-Interaction guidelines during the development of a specific web-mapping system, based on open source-GIS projects: an interactive system for wine-cultivation in the Swiss canton of Vaud. Based on this work, some design-suggestions for developers of Open-Source GIS projects are presented.

Jens Ingensand,
Assistant, GIS
Research
Laboratory, Swiss
Federal Institute of
Technology
(EPFL), Institute
of Urban and
Regional Planning
& Design -
Geomatics

MapCheck production system

The Danish 1: 10.000 vector-map TOP10DK has been in production and updating for 10 years now. All internal production processes are taken care of by internally developed software for which we have the source code. Developments on the software began 10 years ago and today the software represents a considerable accumulated value.

*Peter Højholt,
Ministry of the
Environment,
National Survey &
Cadastre, Denmark*

The two main components in the software are the database (TOPDB) and the map processing and editing tool (MapCheck). Neither the database nor the software claim commercial versatility, but together they constitute a complete production system with many problems solved. The programming is done in C and C++ in MS Visual Studio. The database is an Oracle database.

KMS are at present contemplating to make the source code available under the Open Source conditions.

TOPDB, the database

The database design has 3 main packages:

- The map package controls which objects and object types go on which maps. A map can have its own objects or just “borrow” them from another map.
- The Classification and attribute package determine legal object- and attribute-types and how they can be combined.
- The object package controls how individual objects with attributes are stored.

A few basic features:

- the content is organized as objects with geometries and attributes
- an object or attribute is categorized by an objecttype or attribute type
- the database can include multiple maps (i.e. multiple scales)
- geometries are stored as OGC geometries

MapCheck, the editing tool

MapCheck handles several map-windows simultaneously. Data visualization capabilities are extensive and can be set interactively. Data can be displayed with areal photos or old maps as backdrops. Z-grids can be displayed as grids as well as contour lines. The code includes a large amount of routines to analyze and manipulate geometries, including routines for object generalizations.

1:00pm - Watersheds InfoXchange: Leveraging Open Source GIS Software in a Non-Profit Organization

2:30pm
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There are many purposes for the use of GIS in the non-profit environmental sector, such as the monitoring, analysis, and reporting of environmental conditions. Until recently, a lack of awareness to the potential of Open Source GIS software has led to the slow adoption of this technology by environmental community groups and non-government organizations (NGOs), thereby limiting their GIS capabilities. With limited resources available to purchase and maintain proprietary GIS software systems, non-profit organizations like the Centre for Sustainable Watersheds (CSW) have adopted an Open Source philosophy. Recently, these groups have realized the value of incorporating and leveraging Open Source GIS software in their daily activities, providing a viable solution to their GIS requirements and removing a significant cost barrier.

*Mark Sunohara,
Centre for
Sustainable
Watersheds*

With proper support and guidance, community groups can be effective participants in the shared responsibility of integrated water resource management. To support this initiative, CSW has partnered with GeoConnections and DM Solutions Group to develop an on-line mapping and database application: the Watersheds InfoXchange (WIX). The WIX infrastructure will provide a web-based solution for the access and management of community group environmental monitoring and stewardship information. It leverages Open Source technologies, such as MapServer, Chameleon, GeoServer, and PostGIS. The development of WIX also leverages Canadian Geospatial Data Infrastructure (CGDI) endorsed standards and specifications, and OpenGIS Consortium (OGC) specifications to improve the interoperability of community group geospatial information with other water resource protection stakeholders, such as government and regulatory agencies. WIX will provide community groups with improved access to stakeholder information while ensuring their own information is accurately available to other water resource management stakeholders.

Communicating Antarctic Science Using Open Source Software

The Cybercartographic Atlas of Antarctica project (<http://www.carleton.ca/gcrc/caap>) aims to establish an on-line spatial information system that facilitates discovering, utilizing, presenting and distributing existing information and data about Antarctica to a wide variety of users. Target user groups include scientists, decision makers and the general public. The system architecture under development comprises three separate but interrelated system layers: data infrastructure (data, metadata and policies); mediator (higher level data processing i.e. modeling); interface (visualization and presentation layer accessed by the user). Using open source technologies and standards, efforts to date have focused on development of the data infrastructure layer. As part of an international effort organized through the Scientific Committee on Antarctic Research's

Peter Pulsifer,
Carleton
University

Geographic Information Group of Experts, general technologies and standards are being developed for use in the domain of Antarctic scientific inquiry. The described system is supported by international efforts in developing both framework databases (i.e. topography, place-names, imagery, in-situ sensor data) and a spatial data model that profiles domain specific data semantics, symbolization and interoperability requirements. The continued development of the data infrastructure layer is enabling the development of a range of information products directed at specific user groups. Initial results suggest that the multi-layered development approach based on open source software can provide a framework that can be used for a range of applications. While the data infrastructure remains constant, each information context requires domain specific mediator and interface layers.

CHiRP - An Environmental Partnership for Community Mapping in Whistler, BC

From December to March Whistler village is packed with skiers and snowboarders ready to tear up the slopes in one of the highest ranked ski resorts in North America. From June to September the skiers are replaced by bikers and hikers who are quickly making Whistler one of the top summer outdoor activity destinations in Canada. Whistler is definitely one of Canada's most renowned resort communities but it is also known for stunning scenery, an abundance of wildlife and a socially active local population.

Tracy Howlett,
Whistler Museum

The Community Habitat Resources Project (CHiRP) is a collaboration of eleven of Whistler's community organizations. These 'partners' include local environmental groups, municipal government and private business. The vision of CHiRP is to create a central repository of habitat related data which will be accessible via the internet to local residents and tourists alike.

While the vision for this project has always been clear, the path toward it has not been. This presentation will outline some of the hurdles that our group had to jump in order to get the project up and running. From dealing with communication problems, getting 11 different groups to agree (and participate!) and engaging the community to selecting hardware and software, and resolving the technical issues associated with learning that new software, the project has seen its share of challenges. At the end of phase one, we can now say that despite a somewhat bumpy ride, our project is a success. We have a product we are proud of and now all we have to do is get people to use it!

MapServer Support for Web Coverage Services

In this presentation we describe recent extension of MapServer to support OGC Web Coverage Services (WCS). The WCS specification allows exchange of spatio-temporal data between applications as opposed to generate static maps for visualization over the web. In parallel to the Web Mapping Services, the WCS service also defines three fundamental operations: GetCapabilities, GetCoverage, and DescribeCoverage. We briefly describe these operations and how the MapServer (and the underlying components, e.g., GDAL) has been extended to facilitate data discovery and spatial data product (coverage) generation in web environment. One of the challenging components in new extension is the spatio-temporal query engine, which supports range queries using a new spatio-temporal tile index. We provide a demonstration and hands on tutorial for the interested users. This presentation will benefit all the WGIS application developers and users who are interested in providing/using WCS based services.

*Stephen Lime &
Tom Burk,*
University of
Minnesota

ArcIMS Emulation with IMSEMU

The ArcIMS web map server by ESRI is a popular standard for publishing map data, and a large number of web sites and client software have been written to leverage ArcIMS map services. Both the ArcMap and ArcExplorer product line ship with built-in ArcIMS connection capabilities. IMSEMU is a Perl mapscript application that allows high performance MapServer web mapping to interoperate directly with ArcIMS client software. This talk will cover installation and requirements for IMSEMU, the basics of the ArcXML protocol used by ArcIMS clients and servers, and tips on reverse engineering wire protocols.

Paul Ramsey,
Refractions
Research

MapServer-OGR-OPeNDAP: An Integrated System for Uniform Access to Land and Oceanographic Datasets

In this presentation we describe an extension of MapServer based on new OGR driver for OPeNDAP servers. We describe basic components of the OGR driver and the new capabilities that have been added recently to support the OPeNDAP generated datasets. The main challenge is the miss-match between the MapServer/OGR internal data representation and the OPeNDAP data model. The differences between these data models have been captured through different mapping strategies in OGR driver. We will briefly examine: the OPeNDAP data model and how this data model is mapped into OGR data model, how user requests are translated between MapServer and OPeNDAP, and finally we show how to develop various application configuration files. The main objective is to demonstrate MapServer client interface to the scientific data sources distributed through the OPeNDAP servers. This workshop will benefit the Earth science, and oceanographic and meteorological data providers and users.

Tom Burk,
University of
Minnesota &
Frank
Warmerdam,
Consultant

**3:00pm -
4:30pm**

CIETmap: free GIS and epidemiology software from the CIET group, helping to build the community voice into planning

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CIETmap is an analysis, decision and communication tool to share facts from surveys and services in a way that is easy to understand. A sample or all communities create a continuous raster surface of each indicator. Dark areas on the maps represent populations in need of attention or more investment. The analysis module allows interaction with a range of statistics, from simple or weighted frequencies through to epidemiological models of gains with different investment strategies. Results display seamlessly as raster or vector maps, providing a visual summary of complex data that might otherwise require several large tables. CIETmap was built with Python and OpenEV and can be customised to suit user needs.

Steve Mitchell,
CIET International

Interactive Mapping of Database Queries: Every Map Tells a Story

"Right, so I want some data, and a map. Get me IT. Get me the Database guy. Get me the GIS guy. Gee I'd better write them a memo. Maybe we need a meeting."
What's wrong with this picture? The delay between having an idea, and seeing the idea. The delay between having the first idea, and replacing it with a second idea. We present a collaboration of three applications: MapServer, PostGIS and the LifeLine database query tool to create a different kind of user experience -- one more akin to exploratory data analysis or business intelligence. The idea is to make it easy for a user to express a question to a database and visualize the answer on a map, all using familiar terminology and graphical user interfaces. The user need not worry about the technical details (database, map, GIS) of how to answer the question but can focus on defining and quickly refining a question with maps representing the query contents appearing along the way. This way a person can run through several management scenarios in an hour -- rather than viewing a static report with data table and map a week later. MapServer and PostGIS already work most excellently together. We introduce LifeLine as a user-centric graphical interface which hides the technical details of MapServer and PostGIS from the end user. We want any user to simply think about the real-world objects and real-world constraints that define their question. We want them to ask a question, then another, then another As the user works out "their story" they see it unfold in tables and in maps.

Mishtu Banerjee,
Information
Design, Harmeny
Systems &
Tyler Mitchell,
GIS Coordinator,
Riverside Forest
Products Ltd.

Have You Met MO?

This presentation offers a consultant's perspective on the use of open-source GIS tools in support of consulting services in the municipal, public safety, small-business, and homeland security market places. The services discussed include the ASP model and applications development of software tools for field-use.

Kevin Flanders,
PeopleGIS

JTS Topology Suite

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The JTS Topology Suite is a Java API that implements a core set of spatial data operations using an explicit precision model and robust geometric algorithms. JTS is intended to be used in the development of applications that support the validation, cleaning, integration and querying of spatial datasets. It implements the geometry model specified in the OpenGIS Simple Features Specification. It provides functions for evaluating spatial relationships using the Dimensionally-Extended 9-Intersection Matrix (DE-9IM) model. Spatial analytic functions such as intersection, union and buffer are provided. Metric functions include length, area and distance. JTS is written in 100% pure Java and is cross-platform. The JTS package also provides the TestBuilder, a simple GUI application which allows creating geometry and running all the spatial functions in JTS.

Martin Davis,
Senior Technical
Architect, Vivid
Solutions Inc.

Intro to OpenEV

An overview of the capabilities, strengths and weaknesses of OpenEV is presented, followed by a discussion of the use of OpenEV as a base for customization, ongoing work on OpenEV and the role of OpenEV. OpenEV is a 2D/3D image and vector display and analysis environment based on OpenGL, and Python.

*Frank
Warmerdam,*
Consultant

Proj.4-Handling Coordinate Systems

After a brief introduction to PROJ.4, a detailed tutorial is presented on how to define a variety of coordinate system types with PROJ.4 and a survey of common problems and pitfalls. This presentation should be suitable for users of PROJ.4 based packages (MapServer, GRASS, GDAL/OGR, etc) or those wanting to use the PROJ.4 tools standalone.

*Frank
Warmerdam,*
Consultant

MapServer in the Pacific Islands - South Pacific Applied Geoscience Commission

MUM
TB 340

SOPAC is implementing a project funded by the European Union called "Reducing Vulnerability in Pacific ACP states". The project will use Island System Management as a tool. This tool will be composed mainly of a map server, presenting maps via the web, inside a collaborative environment developed with OpenSource software. Internet is the enabling tool to bring all the stakeholders around the same data and information for better decision making and therefore reduce vulnerability leading towards sustainable development.

Franck Martin,
South Pacific
Applied
Geoscience
Commission
(SOPAC)

Near Real Time Ocean Observations Online

Even though a picture can speak a thousand words, can it meaningfully represent millions of near real-time ocean data observations from a variety of data sources? It is within the SEACOOS online observation portal that SEACOOS partners and affiliates coordinate and integrate disparate datasets into an interactive geographic information system (GIS).

Charlton Purvis,
University of
South Carolina &
SEA-COOS

SEACOOS partners and affiliates contribute to a centralized data repository by providing both in-situ and remotely sensed data in a standard format. These data are aggregated, processed, and normalized to provide a view of information ranging from near real-time in-situ wind and sea surface temperature data to near real-time remotely sensed products, including sea-surface temperature, ocean color, and true color images. The coordination of disparate datasets, namely their respective temporal and spatial resolutions, was made possible by the use of relational databases and other technologies.

Open source software solutions are well suited for the database normalization back-end tasks as well as the core GIS functions at the front-end. In addition to typical GIS mapping functionality, the online observation portal includes animation capabilities, robust point data and raster data querying capabilities, and time-series graphing utilities. Refining the interface to meet both general and specific user needs remains an ongoing process, but the modularity of the existing tools within the portal provides an exceptional foundation on which to build.

Case Study: The Application of Open-Source Web-based GIS and Database Tools in the Development of an Education Information Database in Peru.

This paper focuses on the use of Map Server twinned with additional open source tools including PostgreSQL, PostGIS, PHP and the Rosa Java applet to facilitate development of a Web-based spatial decision support tool. The tool has several aspects of uniqueness that make it especially interesting, paramount among which is the ability to operate at various levels of spatial aggregation for decision support. Each aspect of uniqueness is highlighted in the paper in conjunction with a comprehensive review of technical problems that have been resolved during the tool development process. The tool addresses the issue of indicator-based education quality assessment. This issue is identified as a priority by UNESCO for all developing countries in the world to strive to achieve following two international conferences in 1990 and 2000. It was constructed specifically to address an almost universally ignored, yet centrally important aspect of education quality, namely the multiple levels of spatial aggregation from the individual school level, through to the national level. This approach explicitly addresses the effects of spatial aggregation which often mask extreme local variance in education quality. The tool was constructed to allow registered users to create, save, modify, and experiment with various scenarios of education quality through an intuitive map-based interface. It operates in three languages, namely English, Spanish and Quechua. The latter two language interfaces are essential given the focus on education assessment in Peru. All aspects of code and software implementation subscribe to the principles of the Open Source movement, making the tool not only of great utility to its users in Government and the education sector Peru, but also making the source code available for further customization to users elsewhere in the world. The tool integrates in the PostgreSQL database a variety of source data combined into a large, well designed and highly functional data model. The data include not only all relevant geographic tables and fields that enable spatial and numerical analysis, but also a large education-focused database derived from the Peruvian Ministry of Education and the most recent Peruvian census aggregated at the city block in urban areas and population centres in rural areas. The paper concludes with a review of the technical and applied merits of the tool and reports on developments underway to strengthen its spatial analysis functionality and user friendliness.

*Michael G. Leahy
& G. Brent Hall,
Faculty of
Environmental
Studies, University
of Waterloo*

Thursday, June 10, 2004

8:30am - 10:00am **Best Practices for Web Mapping Design**

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There are several issues in Web Mapping Design one has to look at and take in account:

- Look and feel of the front end and the maps.
- Usability 1: can somebody who never used a GIS handle it?
- Usability 2: does a layer approach really make sense?
- You really want to have to reload the page every time?
- Browsers: do you really want to support the 0.1% and compromise everything?

And some other things you might never have thought of ...

*Flavio Hendry,
CEO TYDAC Inc.,
Bern, Switzerland*

The Atlas of Canada – A User-Centred Approach to Mapping Interface Design

The 6th Edition of The Atlas of Canada is a freely available, completely Internet-based atlas that uses current on-line interactive mapping software and technologies. The main objective of The Atlas of Canada is to disseminate popularized but authoritative scientific information about the geography of Canada from a national perspective. Using interactive and static maps, text, various types of multimedia aids and ancillary documents, users are provided with information about a diverse collection of geographic themes and issues.

*Eric Kramers,
Atlas of Canada,
Natural Resources
Canada*

The Atlas serves a broad general public and educational audience in a large and very diverse country. These user groups responded poorly to earlier GIS-centric mapping environments. User interface tools that are second nature to those in the GIS domain are virtually unknown and less useful to the Atlas of Canada's user groups. Putting a new face on these tools and in some cases developing something entirely new was necessary.

This presentation will look at the approach that the Atlas of Canada has taken in designing its on-line mapping environment. Quantitative and qualitative research and applying a user-centred approach has guided the Atlas' development. The results have allowed the Atlas and its on-line maps to become a more user-friendly and accessible to its user groups.

How MapServer is Enhancing Environmental Management In Brazil: A Brief Description of Successful Applications

MUM
TB 210

Brazil is a country of continental proportions and as so accommodates an enormous diversity of ecosystems and environments that have historically been subject to human exploitation. An aggressive pattern of environmental resources consumption was established during colonial periods, remaining engraved in the peoples' culture as a means of enrichment and profit. Nevertheless, a growing concern over the fate of the environmental resources, as well as environmental quality, is taking place in the political agenda. The results can already be seen in advances in environmental laws, law enforcement, and environmental programs carried on by governmental agencies.

*Rafael Medeiros
Sperb,
Rodrigo Becke
Cabral & Adriana
Gomes Alves*

In order to support this new wave of environmental concern, government agencies became eager for data and information. An uncomfortable situation since Brazilian governmental agencies are not used (or should we say never bothered) to collect and organize environmental data. This situation is aggravated by a growing pressure for data from the public in general. While Federal Government efforts to produce and make available topographic digital charts (1:50.000) are taking place, at States' level, government agencies deal with data assessment and systematization since most of the data and information that has been so far produced is not in a GIS.

Considering this scenario, the Laboratório de Computação Aplicada (G10) of the Universidade do Vale do Itajaí is building an approach to systemize environmental data and information in opposition to traditional GIS construction. The idea is to combine distributed access to information systems, providing means for integration of data that already exists and is spread over several agencies, with data input from ongoing Government Programs that generate more data. The architecture of such information systems is based on open source technologies, where MapServer plays an important role for spatial data visualization. We consider this approach a wise procedure in face of the Brazilian's continental dimension, as well as for the sake of systematization and public access.

The concept permeates several environmental information systems that G10 has developed for government agencies, such as SAGREH, RASTRO and SIPESCA.

Perspectives from the Client Side, Integrating Backbone OS Technology with PG/PostGIS, UMN MapServer and Mapbender

The perspective from the client side opens a practical view to WebGIS or Internet GIS. The backbone technology of a WebGIS system comprise a spatially enabled database, map engine and a client front end. The client must be able to encapsulate access to spatial data for non-experts but still offer full functionality for the expert. The database we use most often in our architectures is PostgreSQL which is object-relational, powerful, transactional and implements SQL99 standard to a high degree. PostGIS by Refractions Research Inc. "spatially enables" PostgreSQL with the "Simple Features Specification for SQL" as specified by the OpenGIS Consortium (OGC). PostGIS implements a lot more spatial operators and functions than most standard Internet GIS front ends will be able to address.

*Arnulf Christl,
CCGIS*

UMN MapServer is the corresponding premium Open Source web mapping engine. It fits in perfectly with PG/PostGIS and allows for OGC WMS compatible access. It is robust, fast and extendable, thus providing a perfect basis for high performance, high quality maps. In our perception the User Community is one of the most important factors why UMN MapServer is so highly successful in the market. The reaction time and competence of the User Community is unsurpassed. Currently most proprietary map service software producers give away their software almost for free in Germany. Nonetheless the tendency is to use UMN MapServer instead. This is a great success for the Open Source idea because software can be compared by its features and not the price, showing that UMN MapServer is recognized as top quality software.

Mapbender is our 2 cent contribution to the OS GIS community and functions as interface to the above software in WMS architectures. It offers service-, user- and GUI-management and has evolved over the past 4 years to satisfy the needs of large installations, especially for hosting and data provider. It can directly access PG/PostGIS functionality with PHP through the CGI interface, can address UMN MapServer as WMS but also through the native interface. Online demos will show some of the functionality and how it has been implemented.

Integrating MapServer with other Online Data Services

Discussion of going beyond using MapServer for map image creation to integrating maps with interactive data services including image and sound servers, financial records, automated email systems, calendars, schedules, project management systems, online stores with credit card processing, public information directories, scientific databases, and other interactive data systems. MapServer's data integration capabilities include its ability to read and interpret a variety of data sources. Examples discussed include configuring MapServer to work with multiple file formats using the OGR and GDAL libraries, PostGIS relational databases, and OGC web mapping services. Spatial data can be integrated across multiple coordinate systems using the PROJ libraries. MapServer used as a CGI supports using maps as a web navigation interface to make spatial queries that interact with other systems linked to map features. Examples will include using a point layer to represent gauging stations linked with real-time environmental monitoring databases from the USGS and the California Data Exchange Center and an interactive directory of environmental organizations that includes images, text, attached files, online map-feature-specific interactive online discussion, and an embedded group email system. MapScript supports using MapServer with systems written in languages such as PHP, Python, and Perl. Used with a spatial database such as PostGIS, customized data models and web applications can perform advanced spatial functions and queries, create maps and embed spatial information in the application workflow. Multi-user relational database applications support collaborative GIS data development. Examples discussed include a spatial-enabled photo archive to assess changes in channel morphology and vegetation for the Trinity River Photo-monitoring Project.

*Doug Renwick &
Matt Perry,*
HostGIS.com

10:30am - 12:00pm **Enabling a Wider Web-Mapping Open Source Community**

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Enabling a Wider Web-Mapping Open Source Community focuses on ideas for adding to and improving on the Community-based aspects of the www.maptools.org website, the home of several Open Source GIS projects. In the past, maptools.org has acted primarily as a developers' collaborative forum, where information flowed mostly from core software developers who hosted their projects on maptools.org to a collection of savvy web-mapping developers. The changes we are proposing are the first step towards making maptools.org more of a vehicle for two-way communication for *all* its users – whether they are extending the software or simply creating applications with it.

By facilitating easy two-way communication, we hope to enable users to effectively share experiences and lessons learned – creating a feedback loop that can only improve the software and increase its audience. We want to put in place the foundation for several new communication channels, including an FAQ, an application gallery, and places to contribute and share documentation and curriculum materials created by our community. As well, input from the community of a more free-form nature will be encouraged and supported. During this presentation, these new directions will be discussed and all ideas are welcome – after all, this is all about Community feedback!

It is likely that the initial improvements made will revolve around the Chameleon portion of maptools.org. However, as the Chameleon area of the website evolves, similar changes may be made to other products delivered through maptools.org.

Darren Redfern,
DM Solutions
Group

Going mainstream: Geodata infrastructures with Open Source

Several parallel developments open up new perspectives on GIS. Evolution in completely different IT branches over the past 10 years present us with new facts which have to be taken into account by the GIS community. Internet technology reduces client-side systems to bear but one software, the browser. Fairly thin layers of web technology (scripting) provide powerful interfaces which can access server side functionality and can operate almost anything imaginable. Databases have developed enormously. With the SQL standard a common language has grown to use throughout IT business. It was only a question of time until databases would also start to understand geometry. Now that they do it gets apparent that traditional GIS Software is having a hard time competing.

Arnulf Christl,
CCGIS

Standards have been developed in the GIS sector and are coming into use more and more. It is only logical that database technology would also adopt these standards, and they do quickly. What before was highly secret knowledge to some proprietary producer is slowly but distinctly becoming common knowledge - which brings us back to the Open Source idea. Open Source technology has become mainstream (Linux, Apache, PostgreSQL, MySQL, PHP). Nobody is questioning the power or reliability of Open Source technology anymore, it has also been adopted for good or ill by the really large companies (IBM, HP, Sun, ...). The basic ingredients of GDI are an operating system, database, map engine, webserver, client layer and browser. For all of these components standardized Open Source software packages are available which just have to be linked together.

Bringing all of these developments together opens the GIS technology to an ever broadening community of non-specialists, the common internet user. As spatial data concerns everybody living in that space this is a very natural thing. The real challenge now is to provide good accessibility to the data and to incorporate the user into the process of using the data in the most effective way.

Public Geodata License: Open source license initiative for geographical data

Unlike in North America, access to geographical information is difficult and expensive in European countries. This is one of the major limitations for the slow development of GIS-related applications in Europe. Some French geomaticians initiate a cooperative writing process to produce a Public Licence dedicated to geographical data, the PUBLIC GEODATA LICENSE. The version 0.1 was released in 2003. This PUBLIC GEODATA LICENSE is derived from GPL (General Public License), one of the most used licenses for open source software. Open source licenses fully succeeded for massive software development. Geomaticians need to re-iterate this success for geodata. This presentation purpose is to show the main aspects of the first known open source license project for geodata, and to get more people involved worldwide.

Daniel Faivre,
Camptocamp

Designing a User Interface for MapServer: The Principles behind MapClient

MUM
TB 210

MapClient is a set of JavaScript functions that can give a web page the functionality of a desktop application. In this presentation I'll go into two main design issues:

1) The coordination between server and browser. Client-Server interaction works different from a standalone PC, where the user interface has direct and continuous access to the processing unit. How can this be simulated in a web environment?

2) The design of the user interface. How can a "classic" user interface with windows and buttons be implemented in pure, W3C standard JavaScript, and what are its limitations. These issues will be compared with alternative solutions offered by other MapServer interfaces: Dbox/Jbox, Chameleon and MapLab.

Jan Hartmann,
Department of
Geography,
University of
Amsterdam

MapServer and SDE

MapServer provides a robust interface to the ESRI SDE server (in some cases it is even more bulletproof than ArcIMS). Recent improvements to the SDE interface for MapServer 4.2 include support for query against user-specified versions. This presentation will cover the hurdles users will need to jump over to get their MapServer setup working with SDE. Compilation, specification of the data connection, querying against versions, and issues to watch out for will be discussed.

Howard Butler,
Department of
Statistics, Iowa
State University

New MapServer Raster Features

An overview of new raster access features in MapServer 4.x including image reprojection, non-eight image scaling and classification, raw data mode, dithering to 8bit, and raster query. Brief map file examples are provided for various configurations.

*Frank
Warmerdam,
Consultant*

**1:00pm -
2:30pm**
OSGIS
TB 208

OGC in Open Source GIS Products

Interoperability is increasingly becoming a focus point for organizations that distribute and share data over the Internet. The OpenGIS Consortium (OGC) focuses on the development of publicly available geospatial web standards. Numerous open source software packages support many OGC specifications, allowing users to publish their data services in an interoperable manner. This presentation will discuss interoperability concepts and benefits, the OGC, as well as a detailed look at what is available in open source software implementing OGC specifications.

*Tom Kralidis,
Environment
Canada
Peter Pulsifer,
Carleton U
Jeff McKenna,
DM Solutions
Bart van den
Eijnden,
Software Engineer,
Geodan*

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Advanced Mapserver Hosting Services

Discussion of advances in MapServer hosting services including web-based utilities to directly manage file-based vector and raster data and PostGIS spatial databases, online automated conversion of shapefiles to PostGIS tables, and integration of maps with other online data services to create complete client solutions.

*Doug Renwick &
Matt Perry,
HostGIS.com*

Upload and convert shapefiles to PostGIS tables via web interface. Edit PostGIS tables, layers, and geometries directly on the server, create new tables, and automatically convert PostGIS tables to shapefiles for download back to your desktop environment.

For your data layers, use the OGR and GDAL libraries to integrate a variety of file-based vector and raster formats with shapefiles, PostGIS tables and Web Mapping Services.

Support for on-the-fly re-projection to integrate data stored in multiple coordinate systems.

Select from libraries of HTML templates to display your data without writing any code or uploading any HTML.

Web-based utilities to import and export files to and from the server, enable users to directly manage their files, create and delete directories, and add new users to their accounts.

Integrate existing libraries of CGI programs with your maps for functions like search and zoom to ZIP codes, landmarks, cities, or street addresses. Integration of PHP, Perl, JavaScript.

Publish your data to the public or to an intranet as GIS files, WebGIS interface or OpenGIS services.

Maps automatically converted to PDF files for user download and print.

Create complete solutions by integrating your maps with other online data applications including geographically linked photo series albums, public information directories, libraries, contact databases, automated group email systems, calendar systems, newsletters, data set sales and other storefronts with credit card processing, website management systems, etc.

Discussion of security risks of shell accounts, uploaded PHP and CGI programs and FTP access.

e-geo.ch, an Internet GIS framework for the Swiss federal administration based on CartoWeb MapServer and PostGIS

The center of competence COGIS is the executive organ of GIS coordination in the federal administration. Their main activities are to coordinate GIS projects in Switzerland and to promote contacts between producers and users of geographical data.

It was found that federal administrations produced a lot of geographical data that were insufficiently used because not shared between all the potential users (private and/or public). Therefore COGIS decided to start a project to build an application framework that should facilitate the use of the geodata produced by the federal administrations.

In Fall 2003, COGIS chose CartoWeb, developed by Camptocamp, for this application framework. It is a web-service based application using MapServer and PostgreSQL/PostGIS as mapping engine. Up to now, six federal administrations have built Internet and Intranet web-gis applications (to be open to public soon) using the solution provided by the e-geo.ch project. Participating to the project gives also the administrations access to the use of all the geographical data produced by Swisstopo (1.7 TB including pixel-map, vector-data, 50cm/pixel orthophotos,...)

This presentation will show that MapServer/PostGIS based applications are perfectly suited for developing nation wide projects to share high amount of data between administrations and population. The main conceptual and technical aspects of the project will be explained.

*Sylvain Pasche,
Camptocamp*

3:00pm - 4:30pm Dutch Ministry of Transport, Public Works and Water Management implements OpenGIS web services with Open Source software

OSGIS
TB 208

The directorate-general (DG) for public Works and Water Management (RWS) resorts under the Ministry of Transport, Public Works and Water Management in The Netherlands. With a headcount of 12.000 and a yearly budget of € 11.000.000.000 it is by far the greatest DG within the ministry. RWS is responsible for maintaining and administering the main roads and waterways. The department of Geo-information and ICT (AGI) services the directorate in the execution of its primary tasks.

In 2003 the AGI conducted a RWS-wide survey in order to investigate the needs for web-GIS support, and the interest in and expected future appeal on a more centrally-organized web-GIS support. The associated financial implications were of particular importance, since RWS, like most governmental institutions, are facing strict budget cuts. The survey results are discussed. They reveal a rise in the expected demands for web-GIS services that could possibly be met in a cost-effective way by a centralized approach offering optimum possibilities for high-quality services. Three scenarios with different degrees of centralization are considered. This will be elaborated and presented in full detail.

AGI received commission by RWS to realize by a proof-of-concept in order to fulfill specified qualifications. The proof-of-concept was realized end of 2003, and was denoted as Geoservices. The main characteristics of Geoservices are that it is based on OpenGIS standards and built with Open Source software. Functionality and technical features of Geoservices will be addressed. Explicit attention will be paid to the choice for Open Source software that was not enforced by the qualifications, but was appealing, and in agreement with the spirit of the age, and the promotion policy of the Dutch government. So far, experiences with OpenGIS web (geo)services and Open Source software are positive and will be specified.

Further development of the proof-of-concept will result in an operational Geodata portal as part of a Geographical Data Infrastructure (GDI), offering employees to search, find and use geodata via this central portal. It will be quite similar to the Canadian and US one-stop portals. The role of AGI will shift from supplier of geodata to broker of geodata.

Expected future developments will be addressed, such as the use of feature services and the planned implementation of a web based transactional web feature service for mobile clients.

*Wim de Haas &
Chiel Stroeven,
Directorate-
General for Public
Works and Water
Management,
Department of
Geo-information
and ICT. The
Netherlands*

Open Source Solutions for a Growing Atlas of Canada

The Atlas of Canada (<http://atlas.gc.ca/>) has had a presence on the Internet since 1994, making it one of the very first web based interactive mapping applications. Since these initial efforts, the Atlas has been through several technological cycles from home-grown solutions to today's managed content approach, using a wide variety of advanced concepts and technologies. This allows the Atlas to bring an ever growing content base to a growing Internet audience.

In particular, in recent years the Atlas of Canada has been through extreme technological change. Three years ago the Atlas was a website comprised of thousands of static HTML pages and images being accessed through a custom built mapping tool built upon commercial software. The current Atlas is based entirely on open source software, and features highly integrated content management and publishing features, be it for text, images or maps.

The system design and technology used for the latest version of the Atlas of Canada (released April 2004) will be shown. The implementation of Zope (<http://www.zope.org/>, <http://www.zope.com/>) as a content management and publishing system will be described, including various expansions. Of interest will be the integration of geospatial content into Zope, as well as its interaction with MapServer (<http://mapserver.gis.umn.edu/>) and the metadata repository, M3Cat (<http://www.intelec.ca/>). In addition, the Atlas provides several web services. A variety of methods for implementing spatial and non-spatial services within the Atlas' infrastructure will be shown.

Doug O'Brien,
Program Manager,
Geomatics for
Connecting
Canadians, Earth
Sciences Sector,
Natural Resources
Canada

Agency scale Geospatial Applications using Open source GIS

TBA

Joel Schlager,
Engineer Research
and Development
Center, U.S. Army
Corps of Engineers

Open Source Software Image Map (OSSIM) Overview

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This presentation will present an overview and demonstration of the Open Source Software Image Map (OSSIM) project. OSSIM is an open source project for advanced remote sensing, photogrammetry, image processing, and GIS capabilities. It consists of cross platform software libraries and example applications written in C++. OSSIM has been supported and implemented by various US Federal Agencies.

Mark Lucas,
ImageLinks

The presentation will provide an overview of OSSIM capabilities and history as well of a demonstration of the Visual Chain Editor application. Some of the capabilities that will be reviewed are:

- Projection/datum coordinate transformations
- Panning and Zooming
- Basic architecture for sensor model development
- Image and map blending
- Standard resampling: nearest neighbor, bilinear, and bicubic
- Keyword batch processing and state generation
- Memory management/caching.
- Universal sensor model support
- Various mosaicking algorithms: Simple NULL pixel fill, Blends, Feathering ... etc.
- Annotation support.
- Support for parallel processing

Dynamic Data Access and Dynamically Generated WMS Layers - Using and Creating Open Source Technologies

Organizations often hold large amounts of attribute data that are maintained in independent databases or outside of traditional GIS systems that tie attributes to their geospatial framework. Access to this 'geolinked' data can be improved using new techniques to dynamically obtain, join, and map data that is contained in spatial data warehouses on distributed computing platforms (DCPs).

*Xiaoyuan Geng,
Peter Schut,
Debbie Pagurek,
Derek Brewin, and
Joan Morishita,
Agriculture and
Agri-Food Canada*

Geolinked attribute data refers to all attribute data that are not directly attached and bundled with geographic coordinates. The data uses a key identifier, or geolinkage field, to indicate the associated geographic unit in a geospatial dataset or framework. Geospatial, or framework data, refers to data explicitly referenced with geographic positioning information. Geospatial data may or may not include attribute data that describe features found in the dataset. A good example of dynamic geolinked attribute data and its associated geospatial data is the daily mean temperature attribute that is associated with the Canadian Ecostratification geospatial framework.

At Agriculture and Agri-food Canada, in order to distribute a large variety of geolinked attribute information from the agricultural census as well as other agri-environmental data, we have applied open source technologies to dynamically distribute the data in several formats such as well-formed XML streams and WMS layers. The core components of the solution are Apache web server, PHP server side programming, MapServer/Mapscript. This work has led to the development of new OpenGIS specifications that have recently been accepted as discussion papers in the OpenGIS Consortium (OGC). These specifications are the Geolinked Data Access Service (GDAS) and Geolinking Service (GLS).

In this presentation, we will discuss the system architecture, data flow, application programming interface (API) methods and implementation. We will also discuss web mapping performance issues by comparing OGR and SDE based data connection approaches. The objectives of this presentation are to share the experiences of using open source technologies; to demonstrate an operational simple data distribution and web mapping system which uses open source technologies; and ultimately to promote existing and future open source technologies.

Federal, State and Local Government applications: Interfacing Multiple Geographic Levels of Decision Support with Map Server to evaluate education quality in Peru

MUM
TB 340

This paper focuses on the use of Map Server twinned with additional open source tools including PostgreSQL, PostGIS, PHP and the Rosa Java applet to facilitate development of a Web-based spatial decision support tool. The tool has several aspects of uniqueness that make it especially interesting, paramount among which is the ability to operate at various levels of spatial aggregation for decision support. Each aspect of uniqueness is highlighted in the paper in conjunction with a comprehensive review of technical problems that have been resolved during the tool development process. The tool addresses the issue of indicator-based education quality assessment. This issue is identified as a priority by UNESCO for all developing countries in the world to strive to achieve following two international conferences in 1990 and 2000. It was constructed specifically to address an almost universally ignored, yet centrally important aspect of education quality, namely the multiple levels of spatial aggregation from the individual school level, through to the national level. This approach explicitly addresses the effects of spatial aggregation which often mask extreme local variance in education quality. The tool was constructed to allow registered users to create, save, modify, and experiment with various scenarios of education quality through an intuitive map-based interface. It operates in three languages, namely English, Spanish and Quechua. The latter two language interfaces are essential given the focus on education assessment in Peru. All aspects of code and software implementation subscribe to the principles of the Open Source movement, making the tool not only of great utility to its users in Government and the education sector Peru, but also making the source code available for further customization to users elsewhere in the world. The tool integrates in the PostgreSQL database a variety of source data combined into a large, well designed and highly functional data model. The data include not only all relevant geographic tables and fields that enable spatial and numerical analysis, but also a large education-focused database derived from the Peruvian Ministry of Education and the most recent Peruvian census aggregated at the city block in urban areas and population centres in rural areas. The paper concludes with a review of the technical and applied merits of the tool and reports on developments underway to strengthen its spatial analysis functionality and user friendliness.

*Michael G. Leahy
& G. Brent Hall,
Faculty of
Environmental
Studies, University
of Waterloo*

MapReport: a Corporate Performance Management tool using GIS Balanced Scorecards

Fragmented information and delay in the generation of management, administrative, and operative reports are causes for late and/or incorrect strategic, administrative or operative decision making. MapReport has the capacity to integrate all the databases of the organization, and based upon this integration it will generate graphic reports in real-time for management, administration, and operative personnel. This will allow timely and unified decision making in the three levels, which facilitates strategic management of the organization and permanent control on operations and its administrative performance. Using Postgres Postgis, MapReport generates reports linked to the administrative information. In some cases it uses company meta data, generated from the administrative database, and in other cases it will have direct access to the administrative data in order to generate information en real-time. MapServer will graph these reports. One of the current problems is that the organizations present a GIS scenario which is not unified. The GIS department is an island with difficult access. Anyone who has to deliver reports requested by the managers must communicate with the administrative area, which is another island, speaking and thinking differently. Having these two islands, without efficient communication among them, generates a manual and slow process; but managers could make their decisions on time using GIS tools, MapReport helps to create a GIS unified scenario where information flows permanently in all directions, because all spatial data are stored in a spatial database which also contains an administrative meta-database. These data are registered in an automatic form by the administrative and engineering areas and by all personnel capable of generating valuable information for the decision making process. Once information is stored and organized, through the use of MapServer and PhpMapscript, MapReport provides the organization an easy-access tool in a web environment, which can be cleaned in any computer with Internet access, and offering a bridge designed with the manager's language and way of thinking. Mapreport has been implemented with great success in several Central American countries, and in Morocco, Wales, and Colombia.

*Wilman Rojas &
Vincente Aragon,
GeoWeb*