

# FLISSY – AN AREA INFORMATION SYSTEM BASED ON OPEN SOURCE/ FREE GIS SOFTWARE

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## ABSTRACT:

Originally "FIIsSy" (what stands for the German expression "Flächeninformationssystem mit Freier Software") was an information system for laminar geobjects. A version of FIIsSy is in use in the administrative department of Osnabrueck. Target group for the use of the system are mainly instances of public administration. Not only because of that in FIIsSy only Open Source Software is integrated (UMN MapServer, Apache Webserver, PostgreSQL/PostGIS). Within the system user can administrate (insert, change, delete) the attributes of areas in a password-secured content management system (cms) based on PHP. Objects, that have a direct relation to the areas (for example communes, costs, kind of use etc.) can be administrated as well. Through a hyperlink there is a direct relation to a WebGIS, which is mainly responsible for the visualization of the geobjects. Here the user can, for example, navigate, search geobjects and have a look to the basic attributes of the objects. The areas are coloured subjected to the values that are inserted in the cms. Again through a hyperlink user can switch from the WebGIS to the content management system, so there is a close handling of visualization and administration. Meanwhile in the system the client "Mapbender" is used. The structure of that client is based on PHP, Javascript and the database PostgreSQL/PostGIS. Meanwhile not only areas but also points and line objects can be administrated and visualized. Furthermore it is now possible to digitize objects.

## RÉSUMÉ:

Initialement „FIIsSy“ (cet expression c'est-a-dit en allemande „Flächeninformationssystem mit Freier Software“ (système d'informatique pour des surfaces avec Open Source Software)). FIIsSy est basé a Open Source Software (Apache Webserver, UMN MapServer, PostgreSQL/PostGIS). Avec ce système on peut administrer (changer, effacer, insérer) des attributs des géoobjets dans un "content management système" (cms) ce-qui est securité avec un mot de passé. Ce cms base à PHP. En plus on peut administrer des attributs des objets. Par un lien hypertexte il y a une connection entre le cms et un système du webgis, qui est responsable pour la visualisation des géoobjets. L'usager peut, par exemple, naviger et rechercher des objets. En outre il peut regarder des attributs des objets. Les surfaces sont présentés dans des couleurs dépendant à des valeurs d'attribut. Aussi par un lien hypertexte il y a une connection du système webgis au cms. Dans le mis à jour du FIIsSy un client spécial est utilisé au système du webgis, qui s'apelle "Mapbender". Le structure du Mapbender est basé a PHP, Javascript et la base de données PostgreSQL/PostGIS. Dans le mis a jour on peut administrer pas seulement des surfaces mais aussi des points et des lignes. En plus on peut digitaliser des objets.

## KURZFASSUNG:

Ursprünglich stellte das Projekt „FIIsSy“ ein Informationssystem für flächenhafte Geoobjekte dar. Das System ist im Einsatz bei der Osnabrücker Land Entwicklungsgesellschaft (Landkreis Osnabrück). Zielgruppe für die Verwendung dieses Systems sind insbesondere öffentliche Verwaltungsträger. Nicht zuletzt aus diesem Grunde wird in dem Projekt ausschließlich Open Source Software eingesetzt (UMN MapServer, PostgreSQL/PostGIS, Apache Webserver), damit keine Lizenzkosten für einzelne Softwarebausteine anfallen. Das System ermöglicht es, innerhalb eines passwortgeschützten CMS (Content Management System) Attribute von Flächen zu verwalten (einzugeben, zu ändern, zu löschen). Auch können hier Objekte/Personen, welche einen direkten Bezug zu den Flächen haben (z.B. Gemeinden, Art der baulichen Nutzung, Notare etc.) administriert werden. Durch einen Link wird eine Verbindung zum WebGIS erstellt, in welchem die Flächen visualisiert werden. Der Nutzer kann in diesem navigieren, sich bestimmte Attribute anzeigen lassen und diese wiederum in der Datenbank verändern. In der Karte werden die Flächen eigenschaftsabhängig eingefärbt (abhängig von dem Besitzstatus der Areale). In der Erweiterung des Systems wird ein hochleistungsfähiger WebGIS-Client (Mapbender) eingesetzt, welcher unter anderem eine Suche nach Geoobjekten ermöglicht. Zudem ist es in der Ausbaubversion unter anderem möglich, auch punkt- bzw. linienhafte Objekte zu administrieren und Geoobjekte zu digitalisieren.

## 1. INTRODUCTION

Analyzing, administration and storage of geodata can easily be done by using Open Source GIS software. The improvement and development of that software goes fast and a couple of “high-performance-tools” exist and can be used for free by users (Behncke et al., 2007a).

Especially under the topic of WebGIS, what means GIS-solutions in intra/internet, the performance of different tools is getting higher and higher. “Web mapping sites are becoming increasingly popular” (Mitchell, 2005). In former times WebGIS-clients existed that were useful to have a look at geodata. It was more the function of visualization that was used in these tools than anything else.

In these days a lot of functions more are possible. It is even possible to digitize geodata or to use different analyzing functions like measuring lines and spaces.

With a WebGIS-structure user often do not need anymore a typical desktop-GIS. They can use a simple client in their internet browser and with a connection to a internet/intranet server they are able to use the different possibilities of the client.

At least they can visualize geodata, navigate in a map, set requests to special data and organize relevant layers.

The first step to get a WebGIS is building up a server oriented infrastructure, what means that a webserver and a mapserver are used by linking together. A user at a browser puts a request via the url. That request goes from the webserver to the mapserver. The mapserver accesses geodata and produces a map. Via the webserver the map is illustrated in a browser (fig. 1) (CCGIS & terrestris, 2004).

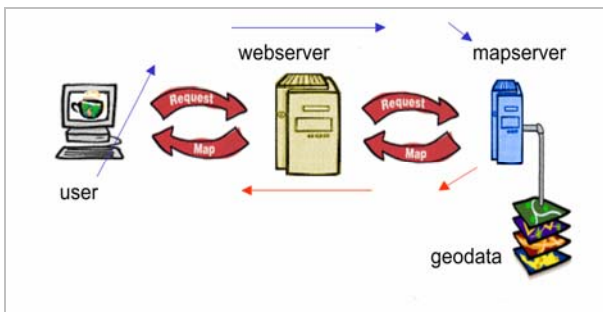


Figure 1. WebGIS-client-server-architecture  
Source: According to CCGIS & terrestris, 2004, p. 41

One of the most used mapserver is the UMN MapServer. The development of that server was started in the middle of the nineties by the University of Minnesota in cooperation with the NASA and the Minnesota Department of Natural Resources. That server can be used for the most Unix/Linux-, Microsoft Windows and MacIntosh operating systems and is used in the FIIsSy-project as well.

The emphasis of this paper is to describe the FIIsSy-project to demonstrate what Open Source GIS systems can be used for.

## 2. FLISSY – THE AREA INFORMATION SYSTEM

FIIsSy, what stands for the German expression “Flächeninformationssystem” (area information system) was originally an information system for laminar geoobjects. It was

developed by Christian Plass and Kai Behncke from the Institute for Geoinformatics and Remote Sensing (IGF) at the University of Osnabrueck.

The system is based on Open Source Software (UMN MapServer, PostgreSQL/PostGIS, Apache) and is used by the administrative department of Osnabrueck to administrate areas. The challenge, the department had, was to set special attributes to their estates.

A surface area can have different attributes. It is owned by someone, it has a purchase price, it has a certain size, a certain extent, a bank maybe gave a credit to buy it, houses are planned to be build on it etc.

To manage all these attributes a content management system (cms) was constructed (fig. 2). The cms is password secured.

The screenshot shows the FIIsSy-cms interface. At the top, there are navigation tabs: 'Übersicht' and 'Administration'. Below that, the title is '20, Osnabrück Fläche 20' and 'Druckversion Karte'. A sub-header reads 'bearbeiten' with a list of options: 'Anschaffungskosten', 'Verkauf', 'Darlehen', 'Baurecht'. The main form contains several input fields and dropdown menus. On the left, there are fields for 'Gemeinde' (Osnabrück), 'Gemarkung', 'Flur', 'Flurstück Zähler', 'Flurstück Nummer', 'Grundbuch' (Testfläche 20), 'Band / Blatt' (2), 'Kaufvertrag Datum' (1999 April 06), 'Nr. Kundenrolle', 'Notar' (Udo Hebrock), 'Fläche m²' (2567.00), and 'Kaufpreis €' (245000.00). On the right, there are fields for 'Weitere Grundstücke', 'Fläche gesamt m²' (0.00), 'Kaufpreis gesamt €' (0.00), 'Aktenzeichen', and 'Bemerkung' (Diese Fläche ist eine Testfläche). At the bottom, there are dropdowns for 'Tausch' (nein), 'Tauschpartner', 'Verkauf' (nein), and 'Verkaufspartner', along with an 'aktualisieren' button.

Figure 2. Screenshot of the FIIsSy-cms

As the FIIsSy-system is based on Open Source Software the content management system of FIIsSy is based on PHP and the Apache WebServer.

The user can easily select areas and change their attributes. It is possible to create new objects or to delete them.

The values and areas are stored together in the geospatial database PostgreSQL/PostGIS.

There is a direct link between the content management system and the visualization of the areas in a WebGIS-client.

For the first version of FIIsSy an own creation of a client was used (fig. 3). By Point-and-click on polygons their attributes are demonstrated. It is possible to switch to the content management system from out of the WebGIS-client.

The user can navigate, activate or deactivate layers and search certain areas. The home-made client is based on HTML, PHP and Javascript.



Figure 3: Original WebGIS-client in the FlisSy-system

As mapserver the UMN MapServer is used. The structure of the system is adapted strictly to the wishes of the administrative department. According to that it was possible to avoid that the system may be too complex or too difficult to use.

The installation of the system is quite easy. One central server is providing the data and the user just needs to write the correct url in his browser (and of course the correct password). There is no need to install other programs or other source code. At the server it is possible to give entry just to special users via the IP-address of their computers.

### 3. FROM FLISSY TO GEOPLP

Step by step FlisSy was expanded. The update of the FlisSy-system has got some very fundamental changes. Now also points and line objects can be administrated. So in the new system it is possible to store geodata of each kind. In the update a high developed WebGIS-client is used (Mapbender (fig.4)). That client is an Open Source tool that has been developed over a couple of years from a broad developer community. Many customers are using that client in different applications. The client is also based on PHP and Javascript. Not only the typical functions like activating layers, zooming or getting informations by mouseclick are possible. In that system many more functions are integrated.

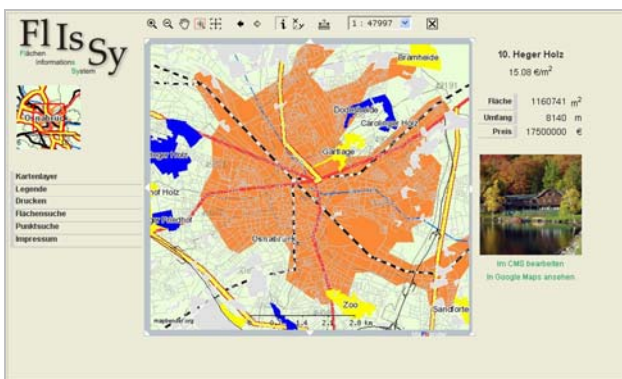


Figure 4: Impression of the WebGIS-client "Mapbender"

For example a high performed WFS-search is integrated within that client. Actually it is not just a WebGIS-client, it is more a complete framework to administrate WebGIS applications and even user permissions.

In the new "FlisSy"-System, that has even got a new name - it is now called GeoPLP (Geo PolygonsLinesPoints) - for example a highlighting-tooltip function is integrated. That makes it very easy for users to look for special areas. By a mouseover-function objects are highlighted in the overview and the general map of the system.

Furthermore a pdf-print is installed. Users are allowed to write their own comments in the print-display.

A special innovation is the digitalization of point objects. Points can be set or deleted by mouse click. In that way it is not programmed via the typical way in Mapbender as WFS-transactional but by writing down the coordinates in the Well Known Text format in the database PostgreSQL/PostGIS (Behncke et al., 2007b).

Again the cms and the WebGIS-application are linked together. In the cms a new developed specification is an integrated area analysis. User now can see, for example, how many point objects are lying within an area.

A very special advantage the system offers is that it can be very easily adapted to the wishes of different clients. It can be used to administrate the attributes of areas but also for hotels, restaurants, trees or other pois. Due to the fact that it is completely Open Source (the Mapbender for example is distributed under the GNU GPL) no license costs are necessary to pay. The system uses all the experiences of the different Open Source Software projects and the source code is changed to special demands, but only parts are integrated that are really used. So it is a typical small system that runs very fast and stable - and can be handled easily without getting much time to get in it - facts that make it useful for many users.

### 4. CONCLUSIONS

By using Open Source Software WebGIS-products can be build up easily on a high performance level. Existing products can be used and adapted to special requirements of different clients. FlisSy (respectively GeoPLP) is just one example for that. The fact that Open Source Software is downloadable for free in the world wide web, gives a great chance for software users and developers. Open Source GIS products (called FreeGIS) could revolutionize the GIS software market more and more.

It goes away from proprietary software solutions to a broad public software(brain)pool in a network that spreads all over the world.

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