

Free and Open Source Software for Cadastre and Land Registration : A Hidden Treasure?

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Overview

- FLOSS concepts
- Digital Land Administration systems
- FLOSS Database alternatives
- FLOSS GIS alternatives
- FLOSS as base for Land Administration Systems

FLOSS concepts

FLOSS stands for Free / Libre and Open Source Software.
FLOSS is a combination of two movements:

Free Software Foundation

Software that can be used, copied, studied, modified and redistributed without restriction

Open Source Initiative

Software in which the source code is available for modification and redistribution by the general public



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FLOSS concepts

```
//grouping by key
Iterator it2 = codeList.entrySet().iterator();
count = 0;
while(it2.hasNext()){
    Map.Entry entry = (Map.Entry) it2.next();
    key = (String) entry.getKey();
    okFeatures = new ArrayList();
    it = features.iterator();
    while(it.hasNext()){
        BasicFeature f = (BasicFeature)it.next();
        s = f.getAttribute(zIndex);
        if(s.toString().trim().equals(key.trim())==true){
            okFeatures.add(f);
            count++;
            if(count == entry.getValue())
                break;
        }
    }
}
//do dissolve
```

Source code

COMPILE
→

```
10011001 00011101 01001100
11000101 01001101 11100101
11010111 01100011 00011000
10010010 01110100 11011100
11101100 01110100 11011001
00010100 11011011 00101000
11011011 00100010 01000110
10101000 11011100 11011001
10011010 10001000 10001111
10101110 10001110 10111011
10011101 10000111 10100111
```

Binaries (machine code)

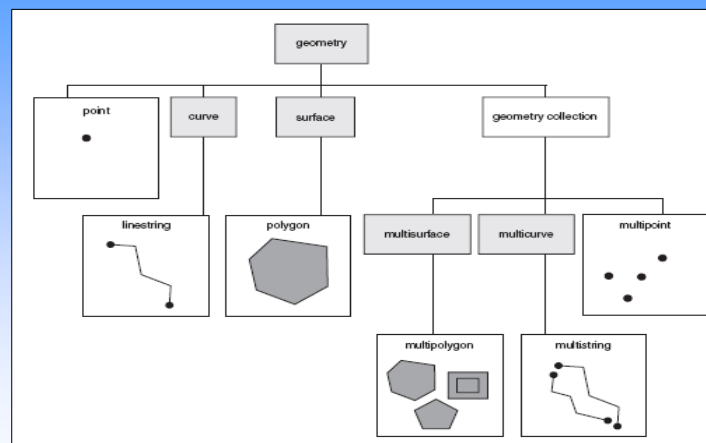


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The FLOSS world

- OSS repositories: Sourceforge.net, Freshmeat, Savannah and many others
- 52° North Initiative hosts geospatial open source projects
- OSGEO supports and promotes the development of open source geospatial technology and organizes FOSS4G conferences
- OGC is setting standards for interoperability of geospatial information

OGC Simple Feature Specification



OGC interoperability standards

- Web Map Service (WMS)
- Web Feature Service (WFS)
- Transactional Web Feature Service (WFS-T)

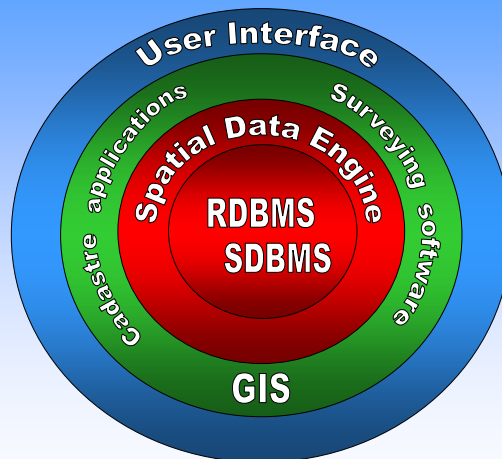
Digital Land Administration Systems

There are many variations resulting from different laws and practices in land administration

Most land administration systems use relational database software with spatial data engines to store the data; GIS software; and cadastral and surveying applications

All software components must be customized and adapted to fit legal requirements, there are no out of the box solutions

Software components



FLOSS database alternatives

- Database technology is used to store, maintain and control access to large amounts of data
- Large differences in table design, queries, reporting functions and system architecture, but the underlying technology is the same
- Oracle with Oracle Spatial is the most common repository for digital cadastral systems
- FLOSS alternatives exist: PostgreSQL / PostGIS and MySQL

FLOSS database alternatives

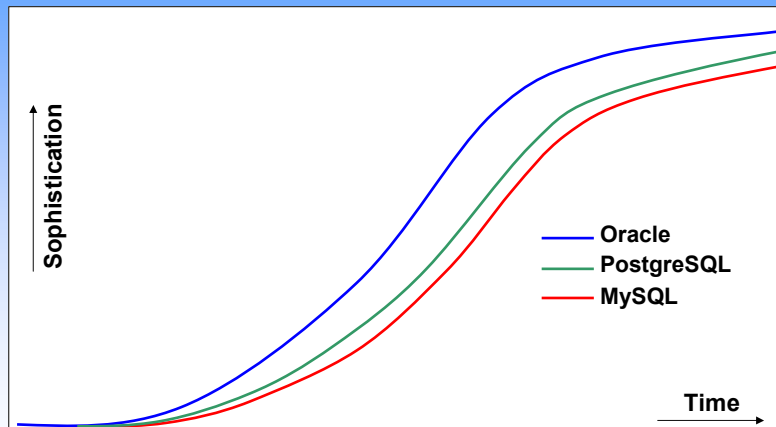
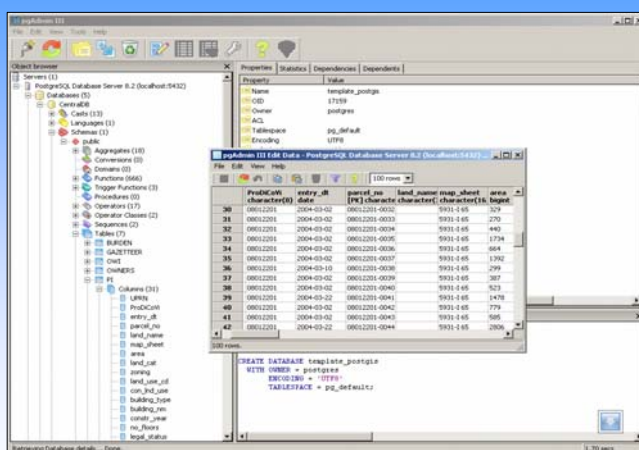


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PostgreSQL with PostGIS



PostgreSQL has evolved into sophisticated database software with user-friendly interface

With PostGIS extension, also spatial data can be stored in PostgreSQL

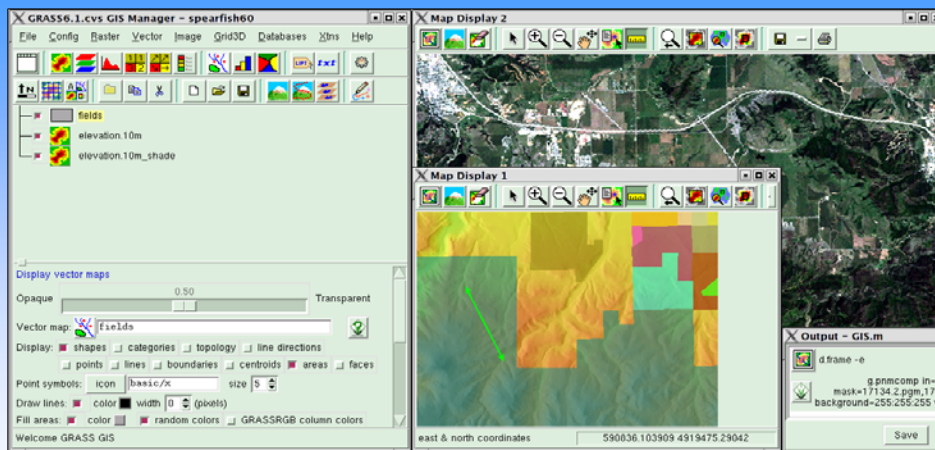


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FLOSS GIS alternatives

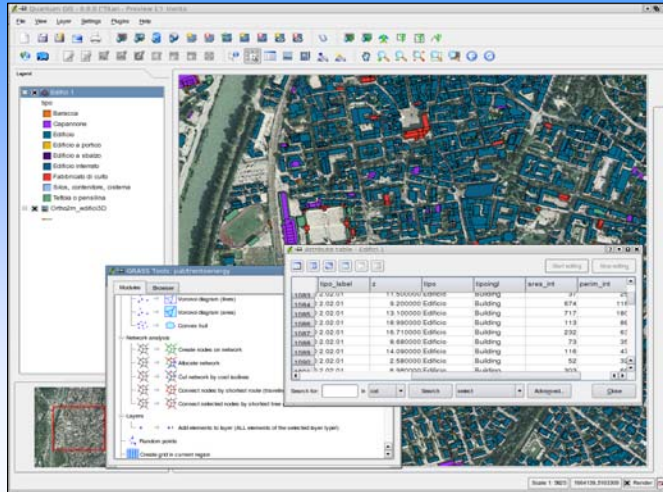
- GRASS
- Quantum GIS
- uDIG
- GvSIG
- Kosmo
- OpenJUMP

GRASS




Developed since the 1980s as a raster GIS

Quantum GIS

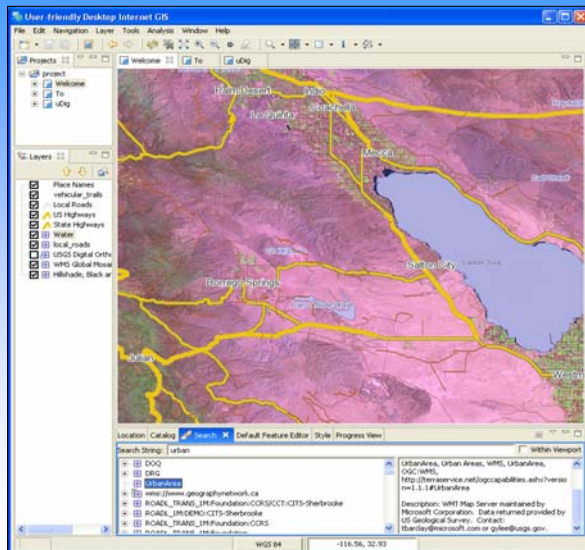


- Developed since 2002
- Works with PostGIS
- Can edit GRASS layers
- Very user-friendly




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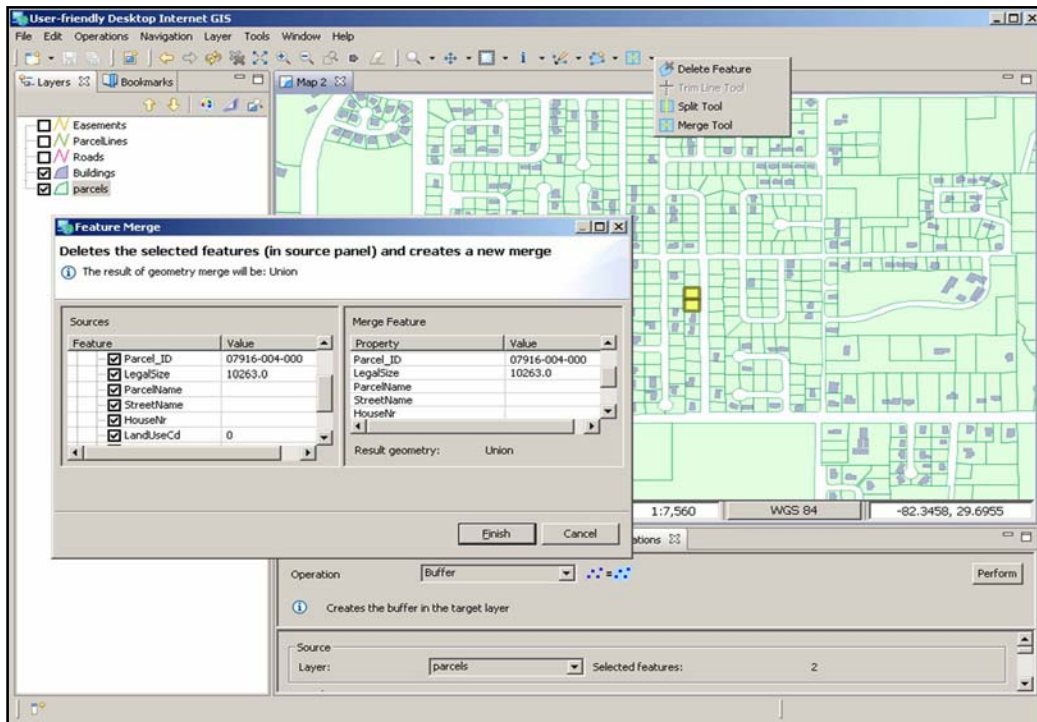
uDIG



- Developed since 2004 under the lead of Canadian based Refractions Research Inc.
- Works with PostGIS, Oracle, MySQL and ArcSDE
- Client tool for GIS data from map servers through WMS, WFS, WFS-T
- Basic editing options



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gvSIG

- Developed in Spain since 2003
- Implements OGC standards
- Translated in 11 languages

The screenshot shows the 'Cambios de estilo' dialog box with the following settings:

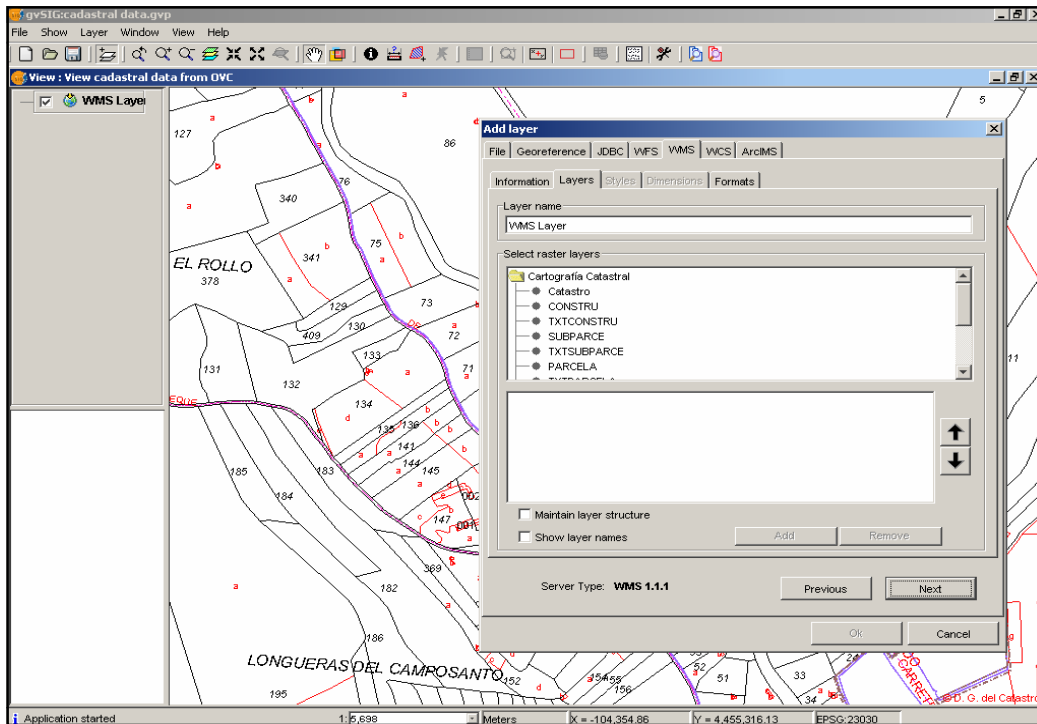
- Color: Red
- Tamaño: 2
- Tamaño en metros

The screenshot shows the 'Control de procesos' dialog box with a list of processes:

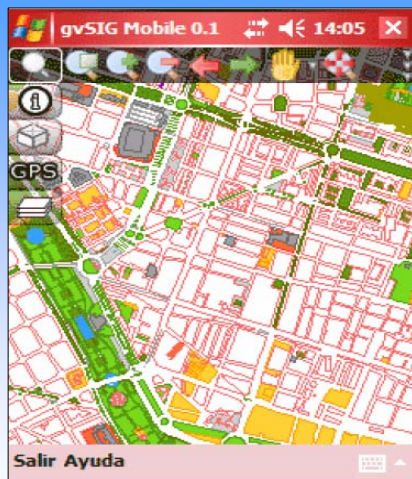
- sgn #72330.dgn
- sgn #72331.dgn
- sgn #72332.dgn
- sgn #72333.dgn
- monitoreo.shp
- tabla #6-72334.acv
- tabla #6-72335.acv
- tabla #6-72336.acv
- tabla #6-72337.acv
- tabla #6-72338.acv
- tabla #6-72339.acv
- tabla #6-72340.acv

- CAD-like precision
- Works with PostGIS and MySQL

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gvSIG



The first version of gvSIG mobile was released in March 2008.

gvSIG mobile can be integrated with GPS and used for generation of tracklogs and waypoints



JUMP

- Developed since 2002, continued as OpenJUMP
- Advanced editing options, including split and merge polygons
- Good topology tools
- Implements OGC Simple Feature Specification
- Limited scalability

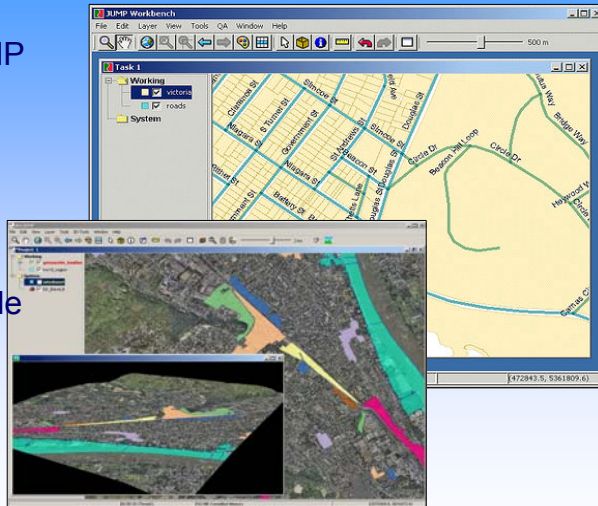



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Kosmo

- Derived from JUMP
- Developed since 2006 by Spanish company (SAIG)
- Editing and topology functions similar to JUMP



- Improved performance and stability
- Documentation only in Spanish



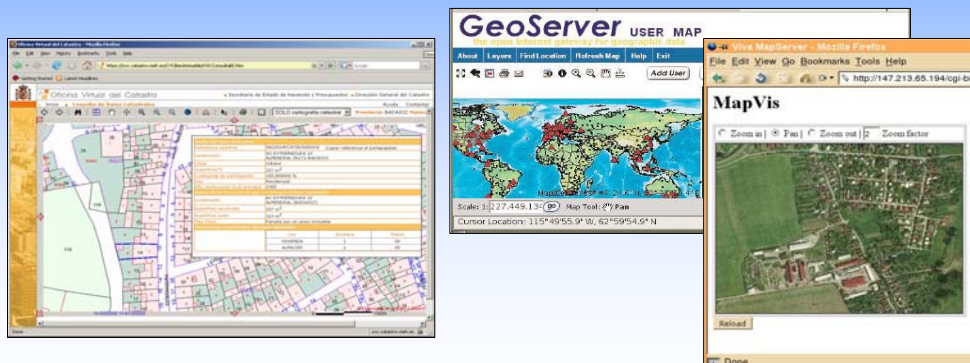
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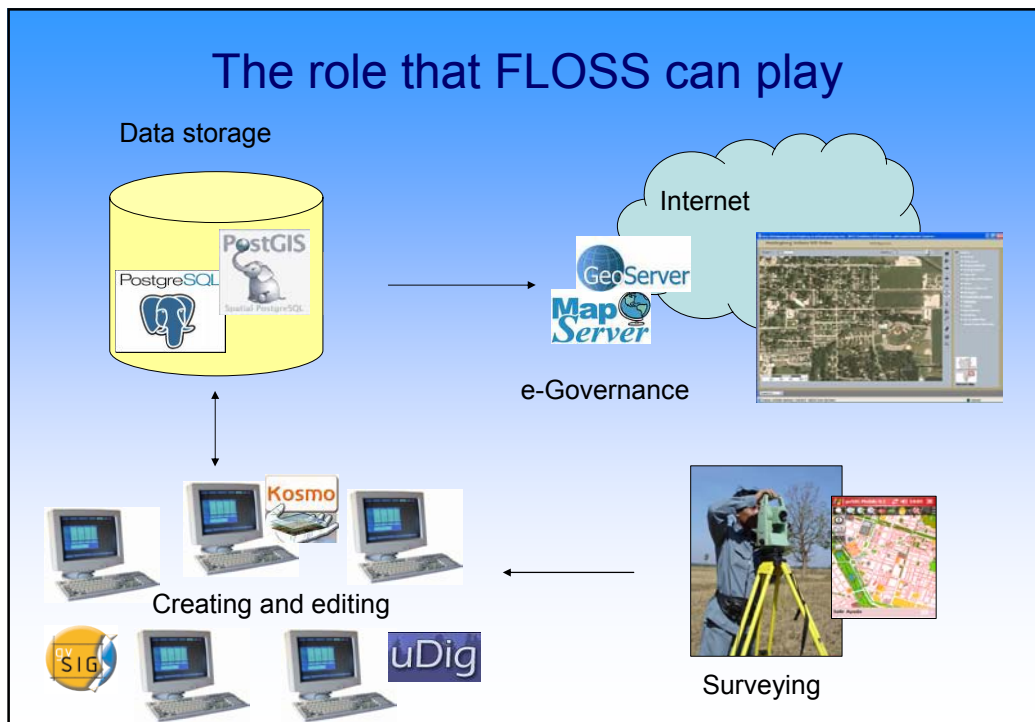
FLOSS desktop GIS compared to proprietary GIS

- Less editing functionality
- More flexibility in the choice of database software and platform
- Good topology validation tools
- More interface languages
- No license fees
- More development is needed to use any of these desktop FLOSS GIS in cadastre systems

Server-based GIS tools

GeoServer, MapServer and Deegree are open source map server products focusing on internet mapping applications using OGC webGIS standards.





The use of FLOSS can be successful in countries where:

- The government adopts a pro-FLOSS policy and include FLOSS as part of the national IT strategy
- The use of FLOSS in schools and universities is supported by the government
- Research initiatives and innovative projects that use FLOSS are stimulated