Free and Open Source Software for Geospatial Applications (FOSS4G) at the University of Colorado Denver

NCAR Geospatial Talks Series

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Denver | Anschutz Medical Campus

Several of the resources used in this presentation can be found in:

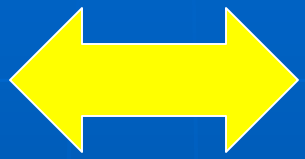
- **Moreno-Sanchez**, R. 2012. Free and Open Source Software for Geospatial applications (FOSS4G): A mature alternative in the geospatial technologies arena. *Transactions in GIS* 16(2): 81-88

- Article references at the end of these slides.

Main Messages

1. Today the question is no longer if FOSS/FOSS4G are mature or capable, but how to take advantage of their features and development philosophy to deliver the systems and geospatial information demanded by citizens, businesses, governments, educators and researchers around the world.

2. For almost every geospatial software need and niche (e.g. desktop GIS, spatial extensions to Database Management Systems, WebGIS, code libraries, etc…) there is at least one mature FOSS4G project with a well-documented record of successful application in diverse contexts.



3. Though findings are varied as to the strengths and weaknesses of FOSS/FOSS4G for specific contexts and purposes (Erlich and Aviv 2007, Ven et al. 2008), today it is clear that FOSS/FOSS4G not only provide healthy competition for private/close solutions but also opportunities for mutual benefit and complementarity.

4. Several myths and misunderstanding about FOSS/FOSS4G are not true such as:

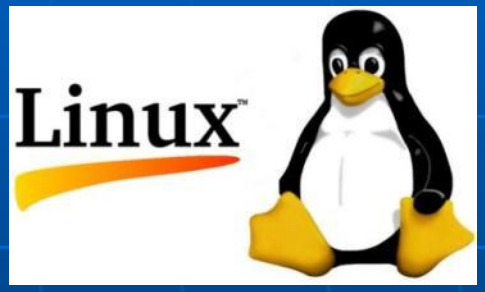
- "FOSS4G is not ready for the desktop/end user, it is only good for backend/developer applications"
- "There is no support" "It is difficult to learn and there are no education resources".
- "It is not good for mission-critical applications"
- "It can't be that good if it is free (no cost)"

Free and Open Source Software

- Free Software refers to liberty, not price.
- It means that the program's users have the freedom to run the program for any purpose, access the code to study how it works and change it, redistribute copies, and redistribute copies of modified versions of the software.
- Software must offer more than just access to the source code, it must comply with 10 criteria listed in the Open Source Initiative.

GNU Project (http://www.gnu.org/philosophy/free-sw.html)
Open Source Initiative (http://www.opensource.org/docs/osd)

- FOSS/FOSS4G is **not new nor rare…**
- FOSS movement has a history of 20-40 years.



1991

1995

GRASS GIS

http://grass.osgeo.org/

Early 1980's

They are not rare …

- Up to December of 2011 the following FOSS websites contained …

  Freecode: 45,000 projects (http://freecode.com)

  Sourceforge: 326,613 projects (http://sourceforge.net)

- Sourceforge reported **4 million downloads** in one day.

- According to Sourceforge the most popular project (eMule http://sourceforge.net/projects/emule/) has been downloaded **600 million** times.

FreeGIS.org
(http://freegis.org)

Open Source GIS
(http://opensourcegis.org)

contain **355 FOSS4G projects.**

- There is a mature FOSS4G project for almost every geospatial need and niche.

- FOSS/FOSS4G has been declared as crucial for the developing world.
- (Naronha 2002 and 2003, Rajani 2003, Schenker 2003, Wambui 2004, Holmes et al. 2005, Camara and Fonseca 2007).

- Also, developed countries are making use of FOSS/FOSS4G:

  France (Marson 2005, Kaneshige 2008)
  Germany (Gillespie 2000)
  England (Lettice 2004)
  Australia (Coonan 2004)
  Italy

  among others.

Concerns and Myths about FOSS/FOSS4G

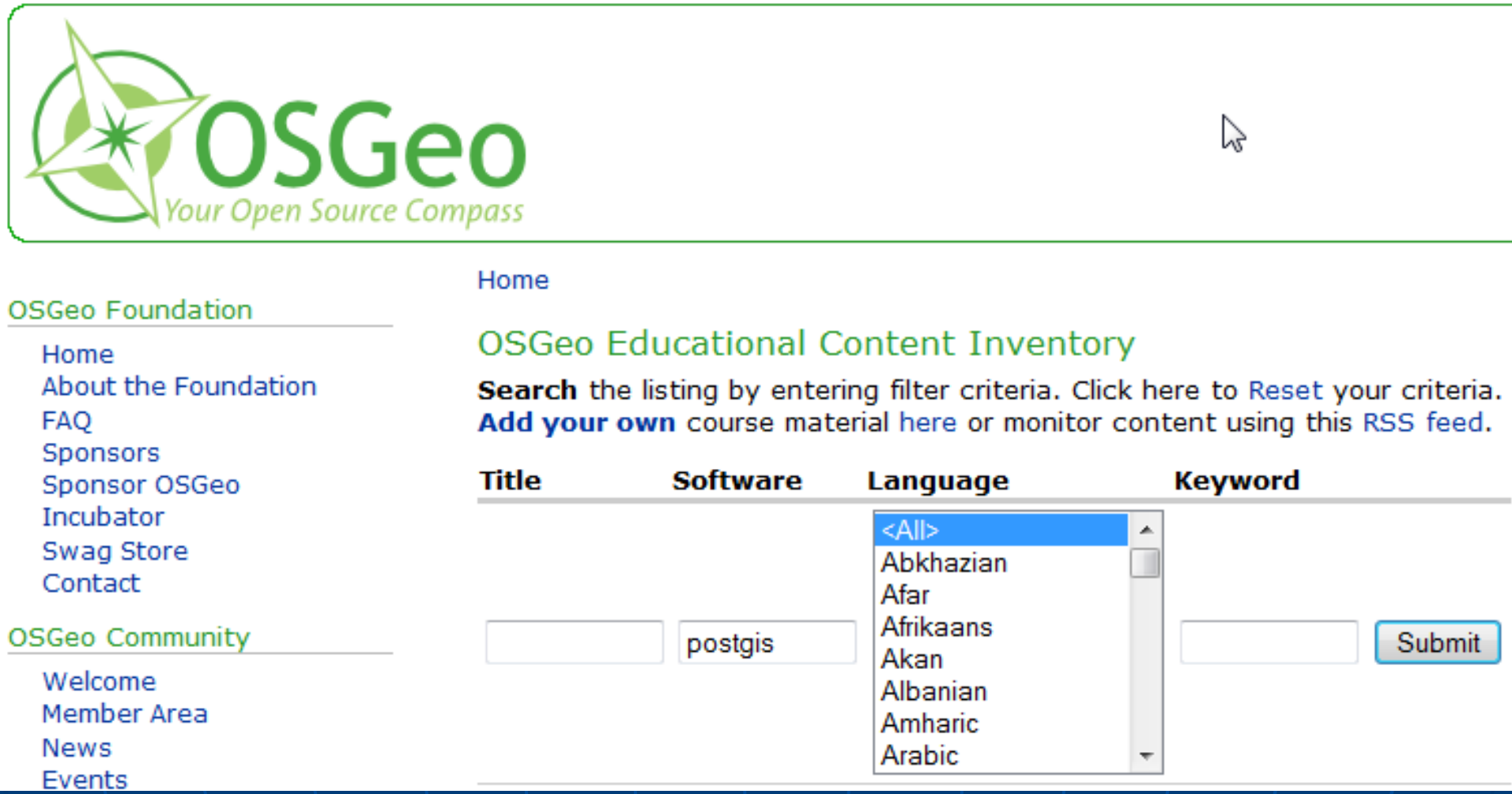
Wheatley (2004) provides examples that help dispel the following myths:

- "The principal attraction is its no-cost"
- "The savings are not real"
- "There is no tech support"
- "It is not for mission-critical applications"
- "FOSS is not ready for the desktop"
- "It can't be that good if it is free"
- "It is difficult to learn"
- "It is only for programmer/developers"
- " There are no learning materials or books about them".

FOSS4G Resources and Education

- There is an increasing number of commercial support services, on-line tutorials, books, and education resources to help FOSS/FOSS4G users to choose the right software and use it.

(Holck et al. 2005, Woods and Guliani 2005, Ven et al. 2008,
The FOSS Evaluation Center
http://foss.technologyevaluation.com/, OpenGeo
http://opengeo.org/products/suite/
OSGeo Education and Curriculum
http://www.osgeo.org/education
http://www.osgeo.org/educational_content
OSGeo Live http://live.osgeo.org/es/index.html
ELOGeo platform http://elogeo.nottingham.ac.uk/).



http://www.osgeo.org/education

http://www.osgeo.org/educational_content

Home | Contents | Standards | Download | Contact Us | Sponsors

English | Español | Català | Français | Deutsch | Italiano | Polski | Ελληνικά | 中文 | 한국어 | 日本語

Self-contained bootable DVD that allows you to try a wide variety of open source geospatial software without installing anything.

http://live.osgeo.org/es/index.html

Open Source

Open Source GIS Bootcamp

Commercial Education Services

PostGIS
Attendees will learn about and create spatial databases, load data from a variety of sources into a spatial database, and perform queries against the data. Basic SQL syntax will be covered.

View the syllabus.

www.geospatialtraining.com/index.php

Course Modules

Module 1: General Open Source GIS Architecture
Module 2: OGC & Open Source
Module 3: The Database - Postgre SQL Implementation
Module 4: PostGRE Administration
Module 5: The Spatial Data Add On - Post GIS Implementation
Module 6: PostGIS Use & Administration
Module 7: The GIS Server - GeoServer Implementation
Module 8: Geoserver Administration
Module 9: The Mapping API - OpenLayers
Module 10: The Complete Solution - PostGIS + GeoServer + OpenLayers
Module 11: Common Errors and Recommendations
Module 12: Final Project

GISCI Education Credit: Pending

Next Session
October 8th - November 9th

Online Registration
October 8th - November 9th
$715

Open Source GIS Bootcamp
OpenLayers + GeoServer + PostGIS
January 2013

FOSS4G International Labs Network

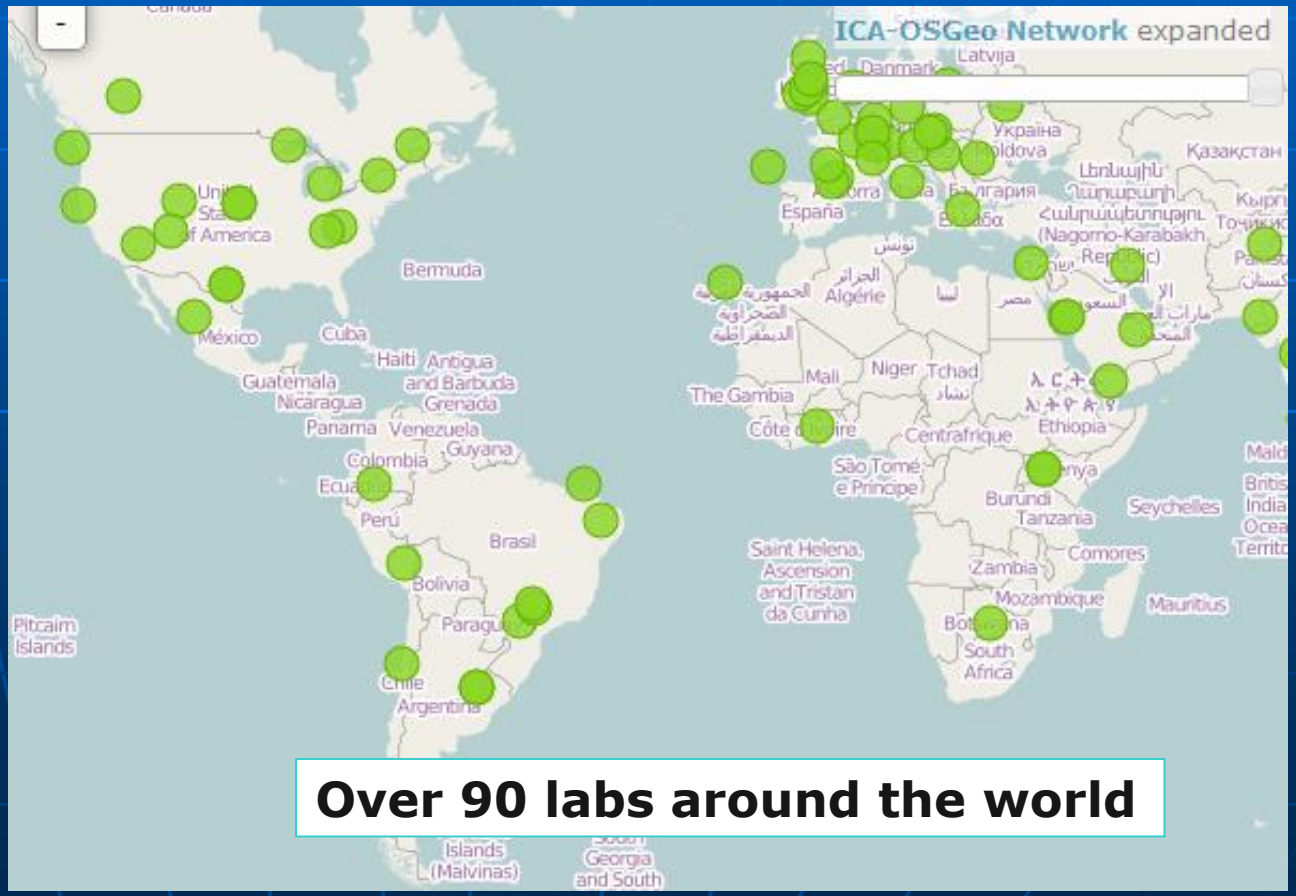
www.geoforall.org
http://wiki.osgeo.org/wiki/Edu_current_initiatives

OSGeo

ICA ACI

ICA-OSGeo MoU

isprs
Information from Imagery



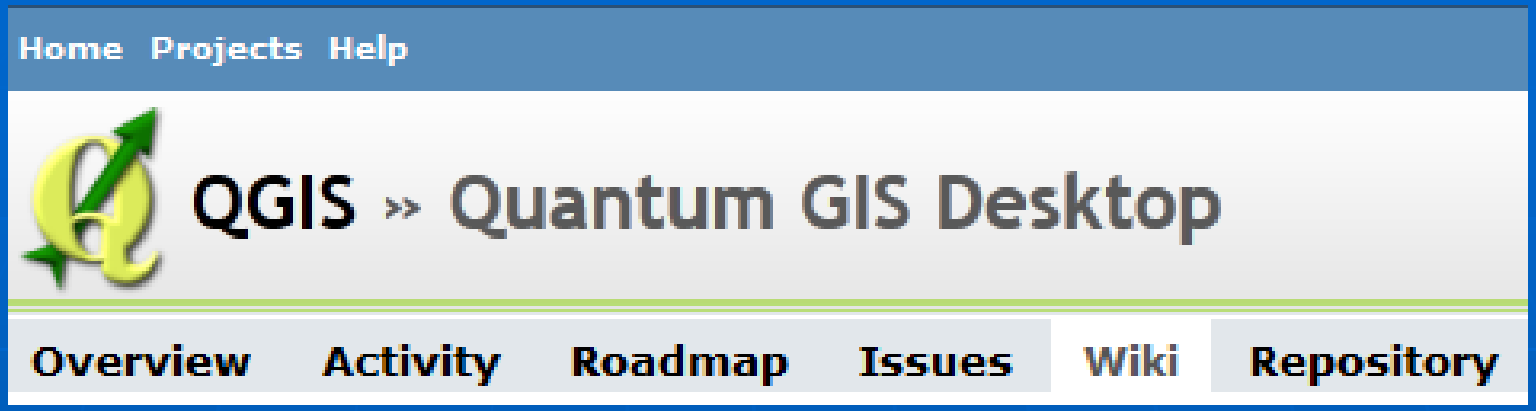
UCD FOSS4G Lab

http://geospatial.ucdenver.edu/foss4g

User

Forums

(“Your Tech Support”)



Forums

- Official QGIS forum in English
- QGIS forum in Polish
- QGIS forum in Russian
- QGIS forum in Japanese

Special interest groups

- Ecology Tools
- Transportation Tools
- Hydrology and Hydraulic modelling
- UK Ordnance Survey Users

http://hub.qgis.org/wiki/quantum-gis/Users_Corner

postgis-users -- PostGIS Users Discussion

GRASS: Community

Intro	Docs	Download	Community	

National & Regional user groups

- Canada: Ottawa GRASS User's Group (merged with MapServer grou
- China: Forum
- Czech Republic: Českésdružení uživatelů GISu GRASS
- Germany: GRASS Anwender-Vereinigung e.V.
- India: India Chapter of OSGeo
- Italy: Sito degli utenti italiani di GRASS
- Korea: User group at Chinju National University
- Poland: GRASS Poland
- Poland: Wrocławska Grupa Użytkowników GRASS
- Russia: GRASS Forum
- Spain: Spanish web forum about GRASS
- USA: Los Angeles Area GRASS Users Group (spatial data/GIS)
- USA: GRASS Users Group of Davis, CA
- WORLD: Open Source Geospatial Foundation (OSGeo Foundation)

FOSS4G local user groups

Google

Search for topics

Welcome to the new Google Groups! Learn about the new features you'll find.

Groups

NEW TOPIC

Filters

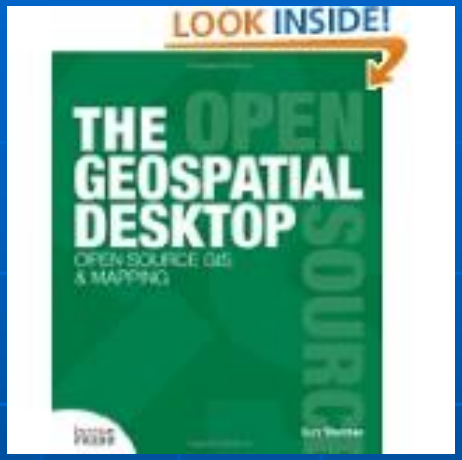
Front Range Users of Geospatial Open Source

+1 0

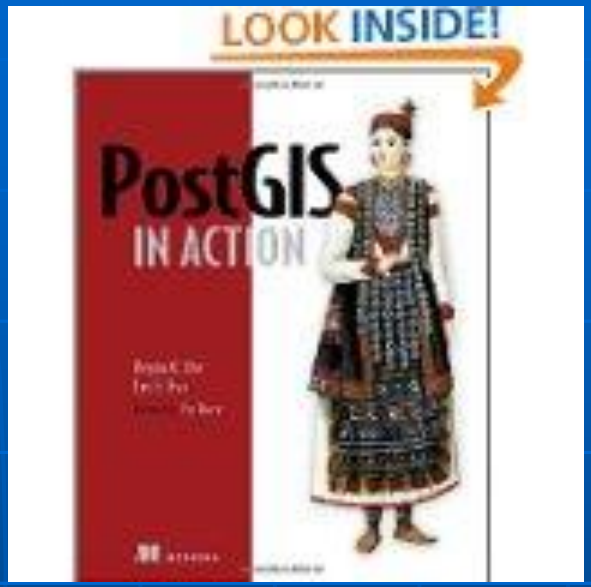
Reminder: Tomorrow GeoGeek Meetup/Rogues/Frugos/WhereCamp Planning
By Eric Wolf - 2 posts - 0 views - updated 11/13/12

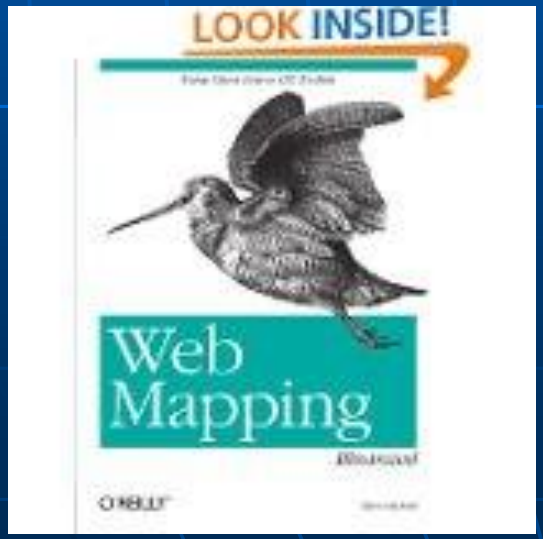
6/9/13/12: GeoGeek Meetup/Rogues/Frugos/WhereCamp Planning
By Eric Wolf - 1 post - 2 views - updated 9/1/12

Books

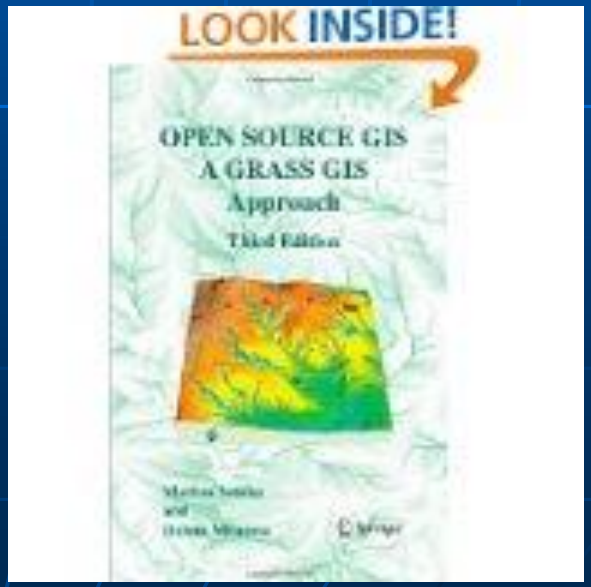

LOOK INSIDE!
THE OPEN SOURCE GEOSPATIAL DESKTOP
OPEN SOURCE GIS & MAPPING


LOOK INSIDE!
Open Source Approaches in Spatial Data Handling


LOOK INSIDE!
PostGIS IN ACTION


LOOK INSIDE!
Web Mapping


LOOK INSIDE!
OpenStreetMap


LOOK INSIDE!
OPEN SOURCE GIS
A GRASS GIS Approach
Third Edition

The reasons for FOSS/FOSS4G adoption vary from pragmatic to ideological, but they should be based not only on their technical merit, their no-cost feature, or their access to the source code.

FOSS/FOSS4G should be evaluated at par with commercial private/closed software in terms of:

- Their technical features;
- Reliability;
- Ease of use;
- Documentation;
- Technical support;
- Customizability and extensibility;
- Costs of training;
- Support and maintenance; and
- Management requirements (e.g. budget, in-house development team expertise, long-term maintainability).

(Wang and Wang 2001, Woods and Guliani 2005, Ven et al. 2008).

The evaluation of FOSS4G also should include the following questions (Ramsey 2005):

- Is the software well documented?
- Is it clear who the core development team is?
- Is the software modular?
- How wide is development community?
- How wide is the user community?

Positive answers to these questions indicate a healthy and mature FOSS4G project which provides a greater degree of confidence in its use.

Mature popular FOSS4G

Holmes et al. 2005, Bruce 2007, Saenz-Salinas and Montesinos-Lajara 2009, Steininger and Bocher 2009, Garbin and Fisher 2010, Tsou and Smith 2011, Steinger and Hunter 2011, OSGeo-Live DVD http://live.osgeo.org/en/index.html

1.Desktop GIS:

- KOSMO (http://www.opengis.es/)
- gvSIG (http://www.gvsig.com)
- uDig (http://udig.refractions.net/)
- Quantum GIS (QGIS) (http://www.qgis.org/)
- GRASS (http://grass.osgeo.org/)

2. Remote Sensing:

- ImageJ (http://rsbweb.nih.gov/ij/)
- OSSIM (www.ossim.org)
- OpenEV (http://openev.sourceforge.net/)
- ILWIS Open (http://52north.org/)
- Opticks (http://opticks.org/confluence/display/opticks/Welcome+To+Opticks)

3. Web GIS servers and clients:

SERVERS:

- MapServer (http://mapserver.org/)
- GeoServer
  (http://geoserver.org/display/GEOS/Welcome)
- MapGuide Open Source
  (http://mapguide.osgeo.org/)

CLIENTS:

- OpenLayers (http://openlayers.org/)
- Mapfish (http://mapfish.org/)

4. Database Management Systems with Spatial Extensions

- PostGIS (http://postgis.refractions.net/) extension for PostgreSQL.
- MySQL Spatial Extensions (http://dev.mysql.com/doc/refman/4.1/en/spatial-extensions.html)
- GearScape (http://www.fergonco.es/gearscape/)

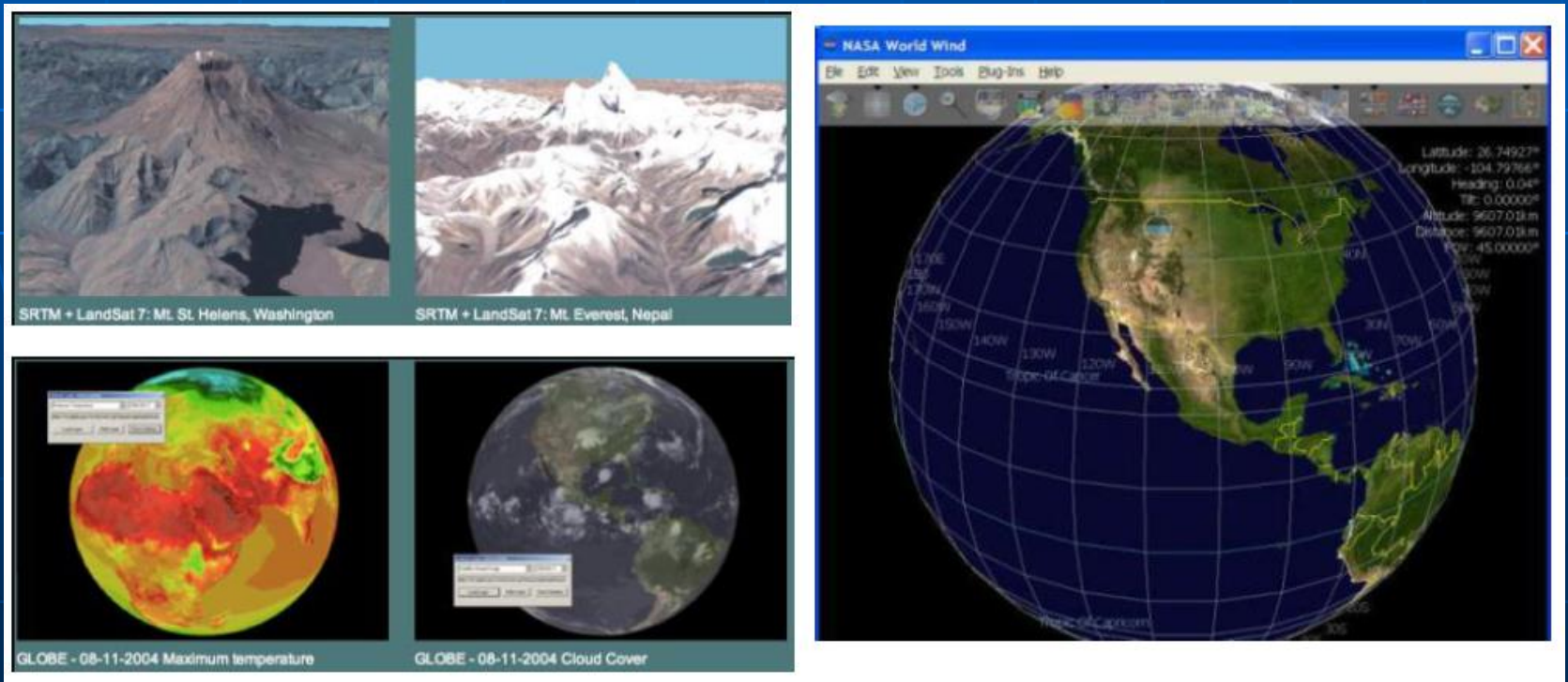
5. Code Libraries

- STARS (Space-Time Analysis of Regional Systems) (http://regionalanalysislab.org/index.php/Main/STARS)
- PySAL (http://geodacenter.asu.edu/projects/pysal)

6. Virtual Globes

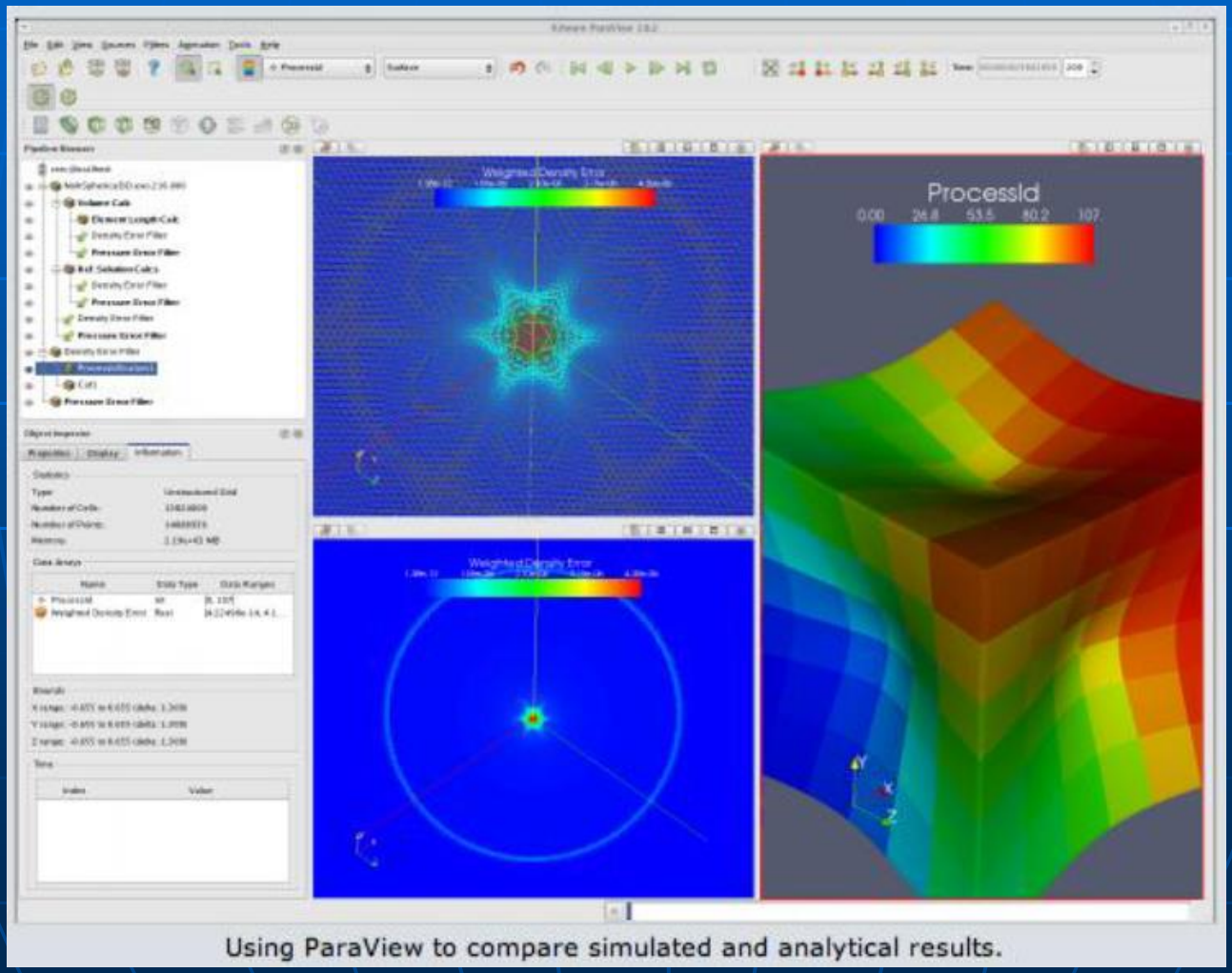
- NASA World Wind: (http://worldwind.arc.nasa.gov/download.html)

- ossimPlanet: (http://www.ossim.org/OSSIM/ossimPlanet.html)



7. Tools for visualization and analysis.

- ParaView (http://www.paraview.org/)



Using ParaView to compare simulated and analytical results.

Use of FOSS4G

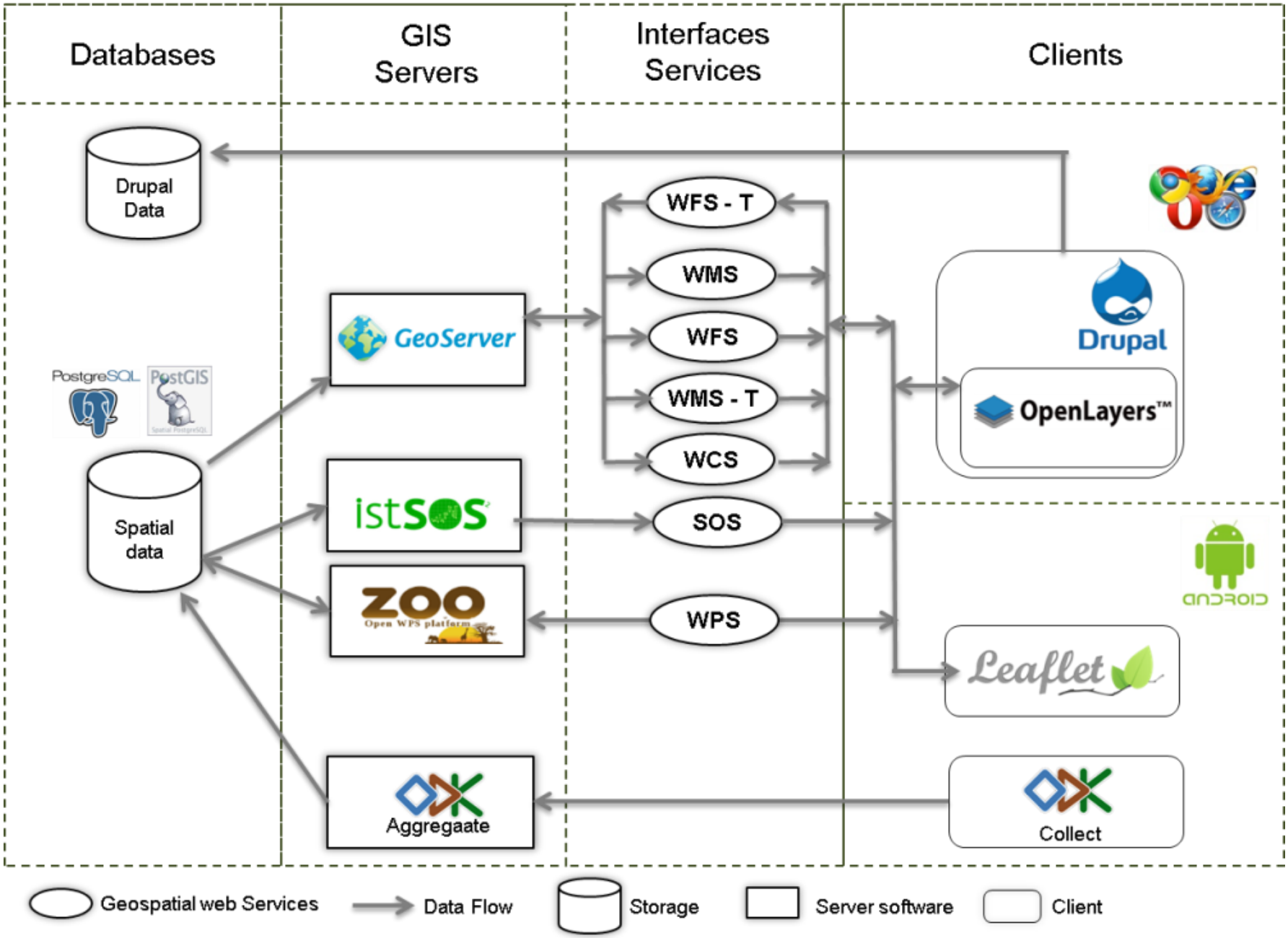
for creation of

SDI

Table 15.1 Selected OGC standards supported by some of the GIS software mentioned

Software category	Software	Selected supported OGC ISO standards
Web Map Server	MapServer	WMS, WFS, WCS, SLD, WMC, GML
	GeoServer	WMS, WFS, WFS-T, WCS, SLD, GML, KML
	Deegree 3	WMS, WFS, WFS-T, WFS-G, WCS, WMC, SLD, GML, WPS, CS-W
	Map Guide Open Source	WMS, WFS
	GIS Mapserver	WMS, SLD
Registry/ MetaData	GeoNetwork	CS-W, ISO 19115:2003, Geographic Information - Metadata
	Deegree 3	see above, ISO 19115, ISO/TS 19139:2007, Geographic Information – Metadata – XML Schema Implementation, ISO 19107: 2003,
	CADMEdit, MDweb	Geographic Information – Spatial Schema ISO 19115
		ISO 19115, ISO 15836: 2003, Information and Documentation – The Dublin Core Metadata element set)
Desktop GIS[a]	uantum GIS	WMS, WFS, SFS, GML, KML
	OpenJUMP	WMS, WFS[b], SFS, GML, KML[b], SLD, WFS-T[b], WPS[b]
	gvSIG	WMS, WFS, WFS-G, WCS, GML, KML, CS-W
	uDig	WMS, WFS, WFS-T, SFS, GML, SLD, WPS[b]
	MapWindow	WMS[b], WFS[b]
	GRASS	WMS, WFS, GML, WPS[b]

[a]After writing this article ILWIS Open 3.7 received WMS support [b]Supported via plug-in.


Databases
GIS Servers
Interfaces Services
Clients
Drupal Data
Spatial data
PostgreSQL
PostGIS
GeoServer
istSOS
ZOO
Open WPS platform
Aggregaate
WFS - T
WMS
WFS
WMS - T
WCS
SOS
WPS
Drupal
OpenLayers™
ANDROID
Leaflet
Collect
Geospatial web Services
Data Flow
Storage
Server software
Client

FOSS4G

at the

University of Colorado Denver

Web-GIS, enterprise wide and distributed spatial information systems

GIS on Web

Enterprise and Distributed Spatial Information systems Design and Implementation

GIS customization and Spatial Info Systems development level

Object Oriented Programming

Customizing a GIS

Spatial database design and management level

Relational and OO Database Design and Implementation

GIS Databases Design and Implementation

Spatial extensions to DBMS

Analysis level

GIS Applications

Env. Modeling GIS

OTHER

Basic level

Intro to GIS

Computer Cartography

UCD FOSS4G Lab

http://geospatial.ucdenver.edu/foss4g

2015 Spring Speaker Series

Learn the “way of the hacker”

- Don’t reinvent the wheel.
- “Hack”: Find, copy, paste, test, modify/improve, redistribute to the community.
- Quick on your feet. Creative.
- Self motivated.
- Curious.

Fall 2015 new FOSS4G course

Since 2003 Web-GIS course 2/3 based on FOSS4G
- MapServer
- PostgreSQL-PostGIS

GIS Relational Databases
- PostgreSQL-PostGIS

New course Spring 2016 GIS programming and automation

Summer 2015 brain storming sessions to move forward

- Possible FOSS4G certificate

We are

looking for

internship opportunities

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