The World Bank and the Open Geospatial Web

–Chris Holmes
Geospatial is Everywhere
Spatial Data Infrastructure (SDI)

“...the sources, systems, network linkages, standards, and institutional issues involved in delivering spatially-related data from many different sources to the widest possible group of potential users at affordable costs.”

– Groot & McLaughlin 2000
The Success of SDIs?
“Architectures of Participation”

– Coined by Tim O’Reilly
An “Architecture of Participation” is both social and technical, leveraging the skills and energy of users as much as possible to cooperate in building something bigger than any single person or organization could alone.
Architectures of Participation

Software: The first domain to see benefits

The process can be applied to other fields
Geospatial Data

Creation

Sharing
Factors for Success

- Compelling Initiative
- User at the Center
- User Responsibility
- No Barriers or Difficulty
Compelling Initiative: ‘give a win’

- No benefit to registering
- Few real users
- No recognition
- No reward for the effort
- Uses stick, not carrot

vs.

[Image of a chicken and an egg]
Compelling Initiative: ‘give a win’

- Quickly add data to quality map
- Ease of customization
- Recognition: Shared, emailed, blogged about…
- Indexed & Searchable
Users as Contributors

- Consumers ≠ Producers
- Data from “official” sources
- Metadata takes training
- GIS Professionals Only
Users as Contributors

- Consumers = Producers
- Everyone encouraged to contribute
- Community members grow into experts
- Even used for ‘real GIS’
  …it’s easier than getting on an SDI
SDI Contributing: Data
Hardware
Software

- GeoServer
- Apache
- Windows
- ionic
- ESRI
- CubeWerx
- OpenGeo

www.opengeo.org
Metadata
Metadata Training
A Catalog to Register On
Contributing Data to Google...
## Barriers to Entry…

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Browser</td>
<td>✔️</td>
</tr>
<tr>
<td>Metadata</td>
<td>✔️</td>
</tr>
<tr>
<td>Training</td>
<td>✔️</td>
</tr>
<tr>
<td>Server Hardware</td>
<td>✔️</td>
</tr>
<tr>
<td>WMS Software</td>
<td>✔️</td>
</tr>
<tr>
<td>Sharing Agreements</td>
<td>✔️</td>
</tr>
<tr>
<td>Catalog Registration</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Does user contribution alone make an SDI?
Let commercial players run SDI?

- SDI’s are a public good
- Commercial players have profit motive
- Commercial players seek monopoly

**DANGER:** Governments are handing over data without opening it to anyone else!
Towards the Open Geo Web

- Inclusive Infrastructure
- Single “Geo Web” Project
- True data accessibility
- Build on existing Architectures of Participation
Principles: Towards the Open Geo Web

Not just policies, requirements & mandates

Align incentives to create a single Geospatial Web
Geospatial Data

Creation                      Sharing
Geo Data Creation:

- OpenStreetMap
- TomTom
- Google Map Maker
- MapShare™

- Is already here…
OSM Maps

Port Moresby

Google Maps

OpenGeo
www.opengeo.org
...Though far from mature

- Licensing is a big problem
- Tools are unsophisticated
- Few different workflow options
- But huge potential has been proven
Towards Maturity: Workflow vs open source
Towards Maturity: Scope vs

[Map of Lusaka]

[Stacked layers diagram with categories: Topographic base, Parcels, Zoning, Floodplains, Wetlands, Land cover, Soils, Survey control, Composite overlay]
Towards Maturity: Tools

• Compatibility with GIS tools
• Advanced workflow management
  Sandboxes, approval before acceptance
  Automatic validation (topology, required fields)
  Branches and merging with Conflict Resolution
  Automatic change notification email / rss
• Automatic feature extraction: GPS tracks and Satellite images
Towards Maturity: Licensing

For Geodata?
Towards Maturity: Cooperation

- Align efforts so that amateur, commercial, NGO and governmental creators all naturally collaborate
- Figure out workflows, tools and licenses that work for everyone
- Towards living data, constantly evolving - authoritative and always up to date
Building the Open Geo Web

• ‘Architectures of Participation’ - social and technical, build iteratively

• Build infrastructure to align incentives in support of data availability in open formats

• ‘Scratch your own itch’ - no one has solved spatial data sharing, figure out for yourself first

• Think in terms of nodes, each solving the problem locally, network spreads good solutions
Beyond Portals

- Web Portals went out of fashion in 2001
- ‘GeoWeb Node’ = GeoPortal + Web 2.0
- GeoPortal goal: find existing data
- GeoWeb Node goal: increase creation and sharing of data
- End goal of both is easier to find and use data
No more Aquariums!
Join the Web!
A Geo Web Node

Building SDI’s from the bottom up
GeoWeb Node:
Rooted in Data Access

- PostGIS
- Oracle Spatial
- ArcSDE
- MySQL
- DB2
GeoWeb Node:
Spreading to the Geo Web

- Google Earth
- NASA WorldWind
- Google Maps
- Yahoo! Maps
- Virtual Earth
GeoWeb Node: Online Styling
GeoWeb Node: Easy upload

Choose File

Upload

Geofile.shp
GeoWeb Node:
Searchable by Google
GeoWeb Node: Editing
GeoWeb Node: Versioning and advanced workflow

- **buildings.3961**
  - Height (ft): 25
  - **Edit**
  - **History**

**History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09-18</td>
<td>Update</td>
</tr>
<tr>
<td>2008-09-18</td>
<td>Changed the height, to reflect more accurate measurements</td>
</tr>
<tr>
<td>2008-09-18</td>
<td>Reverted previous bad edit</td>
</tr>
<tr>
<td>2008-09-18</td>
<td>New addition to the building planned</td>
</tr>
</tbody>
</table>

[Rollback]
GeoWeb Node: User accounts

• User statistics
• Comments, ratings, tags
• Collaborative Filtering
• Rankings of best ‘views’ and data sets contributed
• Highest rated, most viewed, most shared
GeoWeb Node: Metadata

- Derive from data and user actions
- Don’t require metadata to put out data
- Wiki type editing of metadata
- Automatically available with the Catalog standards
GeoWeb Node:
The bottom up SDI

- Traditional SDI start with metadata
  - Metadata -> Users -> Data
- GeoWebNodes start with data
  - Data -> Users -> Metadata
- Align incentives so everyone gets some benefit from contributing
- Make it easy and open for anyone to use, not just specialists
- Build iteratively
Where to put these nodes?

- Everywhere!
- Anywhere you might put a portal
- Anywhere you have an ‘Enterprise GIS System’
- Anywhere people share data with each other
- Handling all these use cases will evolve GeoWeb nodes to be truly useful
A Spatial Data Clearinghouse

- Focus on one region and one domain
- Easy for anyone to create, edit and share maps
- Compelling styling, export options on webpages, Google Earth, WorldWind
- Tagging/rating/commenting and traditional metadata combining for ease of use
- Resulting maps available as all open standards and real data downloads
- Users just viewing add value with rating, making maps, statistics
Spreading the GeoWeb Nodes

- Build the first Spatial Data Clearinghouse on Open Source Software
- Allow anyone to use the same package
- Other domains and regions will improve software in other ways that all nodes can use
- Encourage internal use, make it the easiest way to create and share data
- Sync nodes up and down for increased performance
- Result is a true information infrastructure
Building the GeoWeb Node

The OpenGeo Suite

- GeoExt
- GeoWebCache
- GeoServer
- PostGIS

OpenGeo
www.opengeo.org
Don’t have to go it alone

OpenGe

Enterprise

www.opengeo.org
The Future: Beyond Portals

• The future is users

• Geo Participation
  • GIS Professionals
  • Amateur Neo Geographers
  • Anyone with a locative device

• Technology & Community
My GeoWeb Goal

Let’s build a Geo Web that’s so compelling and easy-to-use that everyone: Citizens, Governments, NGO’s and Companies all naturally collaborate towards the same infrastructure for public good.
Learn more…

www.geoserver.org
www.opengeo.org
www.cholmes.wordpress.com
In the beginning

(The Open Planning Project)
The first project

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.
Towards OpenGeo

Grow!
Building a stack

User Interface

Application Server

GeoExt

GeoWebCache

GeoServer

PostGIS

Database
GeoServer
The OpenGeo Suite
Introducing OpenGeo, the geospatial division of The Open Planning Project.

If 'off the shelf' software packages just aren't living up to their promises after opening the box, talk with us about how a partnership with OpenGeo can take you exactly where you want to go.

Your partner in the Open Geospatial Web

OpenGeo is a social enterprise that offers consulting and support services around best of breed, open source, geospatial software.

We combine flexible functionality with seamless user experience, tailored to meet the needs of your organization.

OpenGeo Introduces

**GeoServer**

ENTERPRISE EDITION

Two new ways to get the finest in services and...
Building the Open Geospatial Web

Making Geospatial Information Open and Accessible

By bringing Open Source Principles to Geo

Working by building OS software that gets used by all

In the context of a hybrid organization
The full solution

OpenGe  

Enterprise