OpenStreetMap – Overview and Motivational Factors

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User Generated Geographical information

• Appeared because:
  - Increase accuracy of GPS (selective availability)
  - Capture devices - from GPS receivers to mobile phones with integrated camera and A-GPS
  - Decrease in storage costs
  - Increase in bandwidth with decrease in costs
  - Easy to use mapping websites, and wide availability of base mapping

• Results: User Generated Content - Flickr, YouTube
Geograph.org.uk

- 9,399 users
- 1.6m images
- 75.5% coverage

Since last year, increase of 2600 users, 600,000 images and 4% in coverage
Google Map Maker
OpenStreetMap

• Started at UCL by Steve Coast, in the summer of 2004, with the aim to create a crowdsourced street map of the world

• Many people joined in to help with the technical infrastructure and collect data. About 40-50 people form the core of the organisation
Creating Maps for OSM

<table>
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<tr>
<th></th>
<th>Gather Data</th>
<th>Upload Data</th>
<th>Edit Maps</th>
<th>Online Editor</th>
<th>Edit Data</th>
<th>Render Maps</th>
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(Image source: OpenStreetMap)
Mapping parties
OSM technological stack (Geostack)


(cc) OpenStreetMap
Infrastructure for Geographical Information

- Starting from scratch doesn’t get you very far
- Imagery and public domain vector data are critical
Simplified glue – OSM API vs. OGC WMS

- **OpenStreetMap API:**
  http://api.openstreetmap.org/api/0.5/map?bbox=-71.00,42.00,-72.00,43.00

- **OGC WFS API:**
  http://example.com/wfs?service=WFSSIMPLE&version=0.5&REQUEST=GetFeature&BBOX=-71.00,42.00,-72.00,43.00&TIME=2006-09-12/2006-09-22&OUTPUTFORMAT=text/xml

Importantly, the output is also simple from OSM, while coming out as complex GML from the OGC variant.

London after 6 months – 2006/2007
Results
Results
(attributes)
Haiti
Commercial offshoots: CloudMade / GeoFabrik / ITO! World

- Use OSM datasets
- Create information products on a commercial basis, without explicit profit sharing models
- Communal payback exist in all these cases
Business based on open geographical data:

- New applications (CloudMade), VC backed, focus on growth areas - mobile
- Expertise in use of data (GeoFabrik)
- Niche specialism (Transport) leveraged by the use of free data (ITO! World)
- New products (Fluid Form) - Earring
Theoretical framework for VGI motivation

- Unique ethos
- Learning
- Fun
- Instrumentality
- Recreation
- Meeting self need
- Altruism

- Recognition
- Career
- Reciprocity
- Community
- Monetary
- Socio-political

Clary et al. (1998), Clary and Synder (1999); Stebbins (1982), Gould et al. (2008); Wasko and Faraj (2005), Lee et al. (2008), Hertel et al. (2003), Shah (2006), Hippel and Krogh (2003), Nov (2007),
Patterns of engagement

All registered users (131,575)

- Never mapped (90,986) 69%
- Mapped and stopped (26,106) 20%
- Mapping (14,483) 11%

Mapped once (3670) 2.8%

Occasional (9101) 6.9%

Active (1712) 1.3%

Source: CloudMade, July 2009
Registered Users
117,000

Mappers
33452 (29%)

Non-mappers
83548 (71%)

One-timers
14834 (44%)

>100 nodes
(46%)

>1000
(21%)

>10000
(5%)

>100000
(0.6%)

Source: www.openstreetmap.org
http://downloads.cloudmade.com/ (Accessed on April, 2009)
Who collects?

Top 25 contributors

Data for England, March 2008
Contribution by Continent

- One-time contributors
- >100 Node
- >1000 Node
- >10000 Node
- >100000 Node

Mappers (in %)

- Africa
- Asia
- Europe
- North America
- South America
Contribution behaviour (Europe)
<table>
<thead>
<tr>
<th>Number of Users</th>
<th>Area covered (Sq Km)</th>
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<tr>
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<td>269</td>
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<tr>
<td>9</td>
<td>139</td>
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<tr>
<td>10 and above</td>
<td>246</td>
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</table>
Who collects?

(c) Dair Grant

(cc) Shaun McDonald

(cc) Chris Fleming
Gender

- Male (96%)
- Female (3%)
- Prefer not to answer (1%)

N=426
Age

- Below 20 years (4%)
- 20-30 years (32%)
- 31-40 years (32%)
- 41-50 years (22%)
- Above 50 years (10%)
Education

- College/University degree (49%)
- Some College (17%)
- Post-graduate degree (21%)
- Doctoral degree (8%)
- High School or lower (5%)
Occupation

- Employed (63%)
- Freelancer (i.e. self employed) (15%)
- Student (17%)
- Other (3%)
- Retired from Employment (2%)
Motivations

commercial mapping products are constantly failing us up here in rural Quebec. On a number of occasions my husband and I have both wished that we could just upload our own GPS data to fix the existing maps.

It's all frustratingly out of date--showing non-existent logging roads as real streets, and not showing major interurban routes. I suspect that in many rural parts of Canada neither government nor industry has any motivation to verify old data.

Mapper A
How will the involvement of commercial companies affect your contribution to the project?

- It will increase my contribution: 7.3%
- I will decrease my contribution: 12.1%
- It will not affect my contribution: 75.6%
- I will stop contributing: 5%
Conclusions – Users (and impact on quality)

- Participants are mostly men, in their 20-40, with significant education and technology related jobs.

- Participation inequality is a core attribute of all User Generated Content (UGC), and VGI too.

- However, VGI suffers from the ‘tyranny of Geography’ - i.e. you must be at a certain place to record it. This is a unique problem to VGI.
Conclusions – applications

• Applications - few that are new (due to reduction in costs) but most are benefiting from reduced entry costs
• Licensing (commercial vs. egalitarian)
• Update happen and similar to Wikipedia, Apache and other open source projects
Further reading

• Haklay, M., Singleton, A., and Parker, C., 2008, Web mapping 2.0: the Neogeography of the Geoweb, Geography Compass
• To get a copy, write to m.haklay@ucl.ac.uk , or nbudhat2@illinois.edu