

Decentralised Mapping

A guide through the world of decentralized mapping projects

Bèr berkes Kessels

Decentralised Mapping

About: This pres

- ▶ Is online: berk.es/mapping-fission
- ▶ Uses the word Blockchain only once
- ▶ Is on git: git.webschuur.com/placebazaar/mapping-fission

About: Me

- ▶ Bèr berkes Kessels
- ▶ Everywhere: berkes (berkes.eth, mastodon, keybase, github and that birdsite)
- ▶ Founder of placebazaar
- ▶ Blog on berk.es
- ▶ Mail on ber@berk.es

Contents

- ▶ Problem
- ▶ Solution
- ▶ Current options
- ▶ Obstacles

Problem

Maps are expensive to make.

They require local knowledge. Feet on the ground.

Maps are always outdated.

The moment you publish a worldwide map, thousands of things have been moved, renamed, replaced, closed, opened and so on.

Maps are political and strategical.

Lots of pieces on a map are undebatable facts.

There is a park bench at X,Y.

Maps are also debatable.

This city is part of China/Israel/Thailand/Belgium

Maps are often strategic

- ▶ Here's a military base with N parking spots.
- ▶ This is where all the speed camera's are.
- ▶ Here you can cross the border easily.

Maps:

- ▶ are hard and expensive to make and maintain.
- ▶ require local knowledge.
- ▶ are politically motivated and censored.

Centralisation

Centralisation enables censorship

Hampered by commercial interest

Enables privacy infringements

Google knows: * Where you work, live, sport, spend free time. *
Where your boyfriend lives. * That you no longer visit your
boyfriend. * When you quit your job. * Visit the liquor store more
often. * Sleep on a bench.

Google Location services, and the “free” google maps app, are the sneakiest *trojan horse* to get the most valuable metadata about you. Ever.

Centralisation

- ▶ Easy to censor.
- ▶ Dependent on interest of central publisher.
- ▶ Runs on users' data (privacy)
- ▶ Monopoly.
- ▶ etc. The usual.

Current mapping

- ▶ Google Maps
- ▶ Open Street Maps
- ▶ A bazillion GIS providers

example

Solution

- ▶ Decentralised collection of mapping data
- ▶ Decentralised publication of mapping data
- ▶ Glueing all that data together

Current Options

- ▶ Google Business/maps
- ▶ Apple Maps
- ▶ Bing Maps
- ▶ Open Street Map

Future options: Collection

- ▶ FOAM
- ▶ OSMand Live (Bitcoin Payments)
- ▶ Scamcoins galore
- ▶ Vaporware (including PlaceBazaar)

Future options: Distribution

- ▶ Peermaps
- ▶ Bittorrent
- ▶ IPFS
- ▶ Streaming

GTFS example.

Obstacles

- ▶ Collection of data is complex.
- ▶ Data is continuously updating.
- ▶ Data is HUGE.

Report run at Nov, 27th 2019 1:03 am CET

Statistics of the free wiki world map (OpenStreetMap.org)
created in Central European Time (CET)

Number of OSM Nodes in the database 5614799731

Number of members who are the last
modifier of at least one node 957487

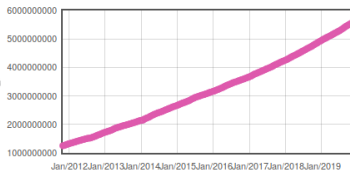
Max. OSM Node ID 7009739176

Yesterday's number of created nodes 2475018

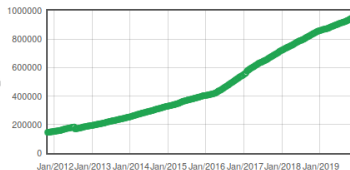
Yesterday's number of modified nodes 603657

Yesterday's number of deleted nodes 187859

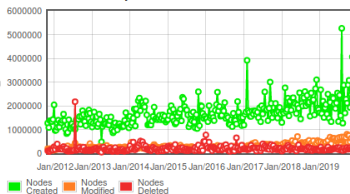
No. of OSM Nodes in the database



No. of members who are the last modifier of at least one node



No. of nodes that are daily created/modified/deleted



Data is never “finished”. Or 100% dependable.

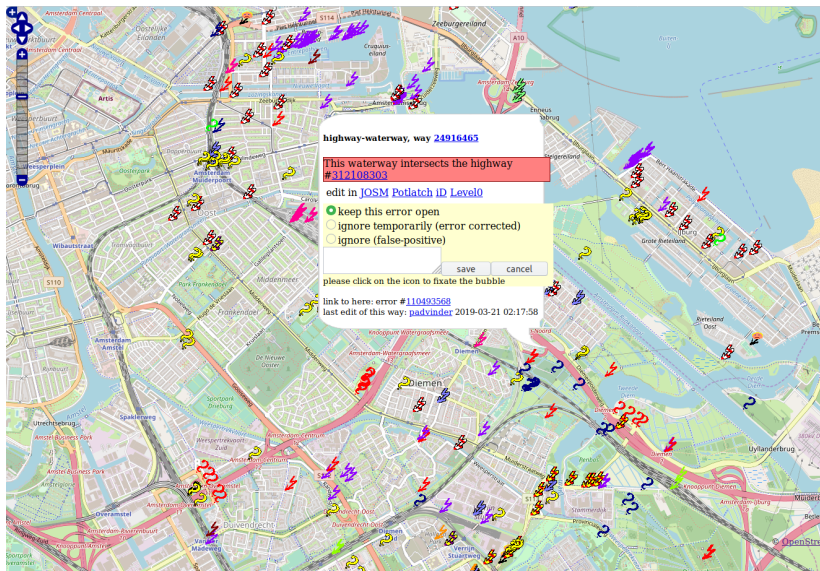
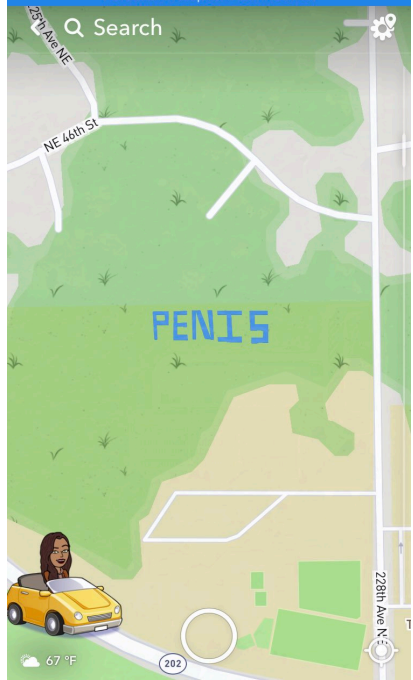


Figure 2: Errors



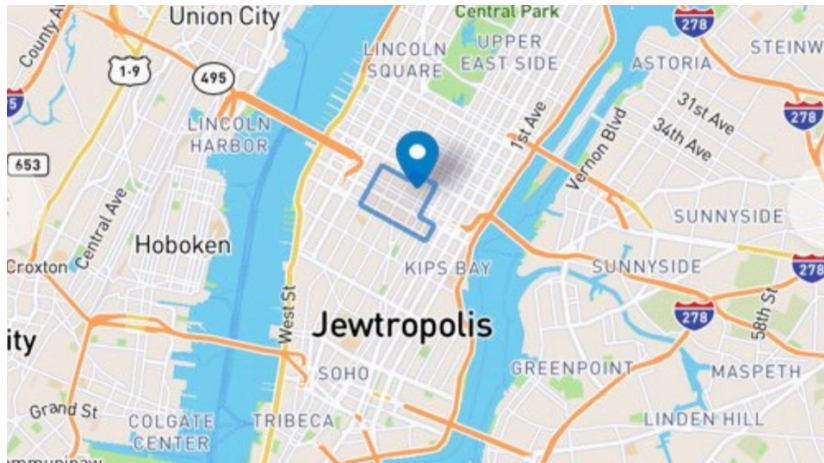


Figure 4: Vandalism

Data is everywhere (but unfindable).

example

Standards

HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)



Figure 5: XKCD 927 Standards

Standards: just one example

- ▶ Netherlands requires Rijksdriehoekstelsel

Standards: just one example

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- ▶ How many **official** Spatial reference systems are there?
Guess?

Standards: just one example

- ▶ Netherlands requires Rijksdriehoekstelsel
- ▶ How many **official** Spatial reference systems are there?
Guess?
- ▶ Nope: 4362 (in EPSG)

Distribution

Just because it is possible to build distributed systems does not necessarily mean that it is a good idea. — Andrew S. Tanenbaum in Distributed Systems: Principles and Paradigms

Solutions by centralising

- ▶ Weekly/Nightly imports: just rebuild the database.
- ▶ Event stream, handle changesets.

Solutions by centralising

- ▶ Central Quality Assurance (tools)
- ▶ Validation by crowd
- ▶ Effort orchestration
- ▶ Standards enforcement and -emergence.

Solutions through decentralisation

Breaking Monopolies?

- ▶ There's enough data. Open and Free.
- ▶ Data gathering of map-data is decentralised by nature.
- ▶ (Well there's satellite and AI).
- ▶ We need more interfaces around existing datasets. The read-side is not distributed.

Breaking Censorship?

- ▶ On the read-side.
- ▶ Developers need more options (than Google maps).
- ▶ Developers need easier access to datasets.

Taking back ownership?

- ▶ Any personal location data must be owned by users.
- ▶ Any other data is already very much open data.

What can the decentralisation-movement do?

Make apps.

(and make them privacy-first)

Use apps.

OSMand, Maps.me, Or one of the 160+ android or 126 iOS apps using open data maps.

Use free mapping tools

- ▶ Display maps: Leaflet, OpenLayers
- ▶ In apps: Mapbox SDK, Skobbler, Nutitek, and many more
- ▶ Run your own tileserver: Mapnik and many more.
- ▶ Tune your own routing: GraphHopper, OpenTripPlanner, Brouter, Openrouteservice
- ▶ And more usages

Release open data (yay! even more data)

Peermaps

example: luxembourg

Storage

Exporteren | OpenStreetMap - Mozilla Firefox

https://www.openstreetmap.org/export?map=9/49.5314/6.6083

OpenStreetMap Bewerken Geschiedenis Exporteren

Meer Aanmelden Registreren

Zoeken Waar is dit? OK

Exporteren

49.6160 6.3281 6.6800 49.4440

Licentie

OpenStreetMapgegevens zijn gelicentieerd onder de licentie Open Data Commons Open Database (ODbL).

Exporteren

Als het exporteren mislukt, overweeg dan een van de onderstaande bronnen te gebruiken:

Overpass API
Dit selectiekader downloaden van een kopie van de database van OpenStreetMap

Planet OSM
Regelmatig bijgewerkte kopieën van de volledige OpenStreetMap database

Geofabrik downloads
Regelmatig bijgewerkte extracten van continenten, landen en een selectie van steden

Andere bronnen
Extra bronnen die worden vermeld op de OpenStreetMapwiki

JSON Onbewerkte gegevens

Opslaan Kopieren Alles samenvoegen

0: 5.9765625
1: 49.44354826172047
2: 6.328125
3: 49.61595427526525

6: 5.9765625
1: 49.61595427526525
2: 6.328125
3: 49.788988424167995

7: 5.9765625
1: 49.788988424167995
2: 6.328125
3: 49.96262687801544

8: 6.328125
1: 49.27173838736439
2: 6.6796875
3: 49.44354826172047

9: 6.328125
1: 49.44354826172047
2: 6.6796875
3: 49.61595427526525

10: 6.328125
1: 49.61595427526525
2: 6.6796875
3: 49.788988424167995

11: 6.328125
1: 49.788988424167995
2: 6.6796875
3: 49.96262687801544

12: 6.6796875
1: 49.27173838736439
2: 7.03125
3: 49.44354826172047

13: 6.6796875
1: 49.44354826172047

10 km 10 mi

© bijdragers OpenStreetMap Dit is een website en API-voorziening

Figure 6: Example of the file structure

R-tree

