OpenStreetMap on PostgreSQL pgcon 2009

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May 2009

Map of the hour

- What is a free map
- How OpenStreetMap works
- How to use the data with PostgreSQL

What is OpenStreetMap

- A project to collect & distribute free geographic data
- A wiki-editable map of the world
- CC-by-SA licensed

Is Your Map Free?
Flicker: izarbeltza

Free to See

flicker:iyllish

Free to give

- Publishing
- Distribution (embedded devices)
- Sell

TopOSM - Massachusetts - Iceweasel

File Edit View History Bookmarks Tools Help

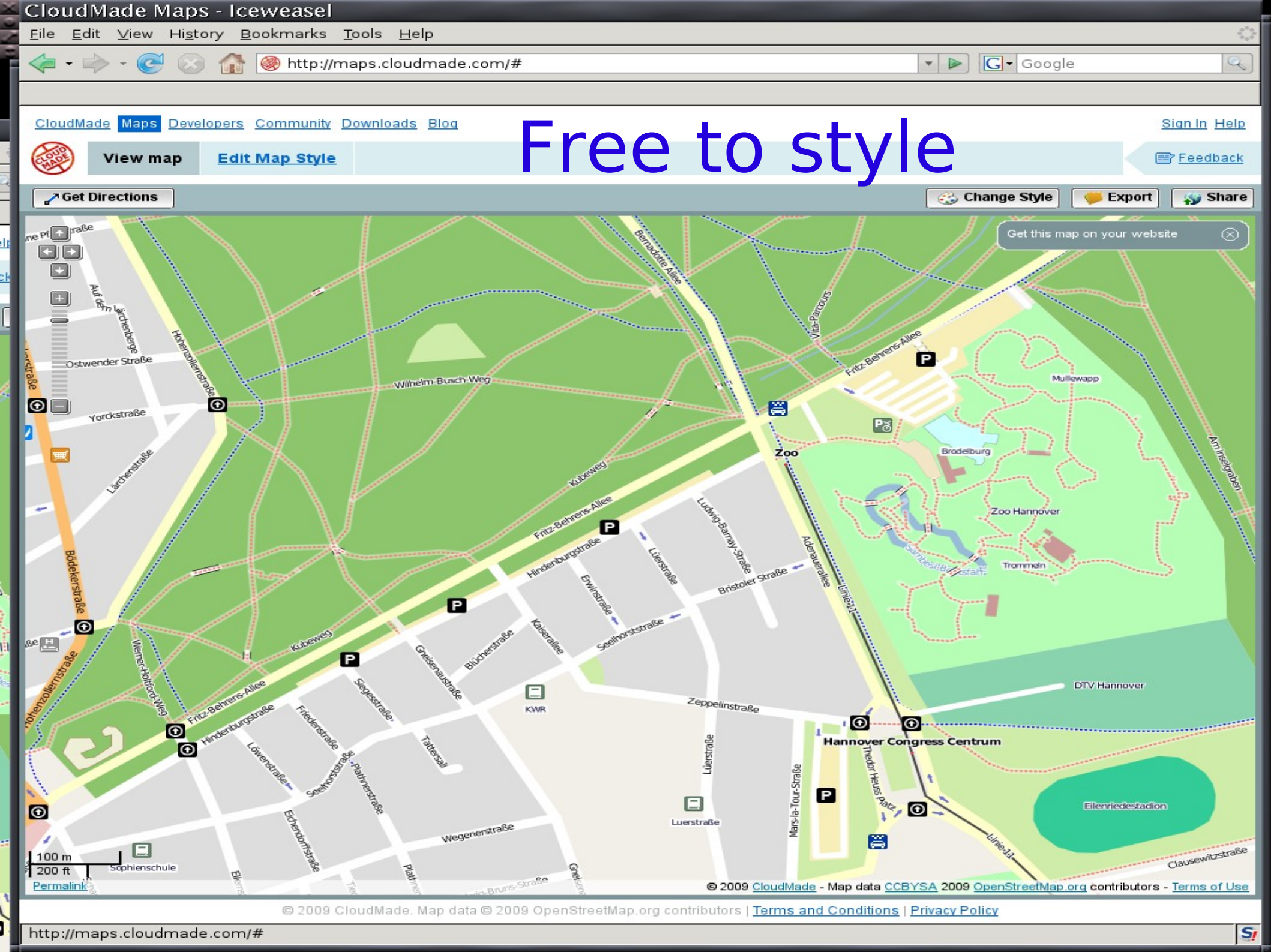
http://toposm.com/ma/?zoom=15&lat=42.45413&lon=-70.95722&layers=B000

Most Visited Getting Started Latest Headlines

OpenStreetMap | TopOSM - Massachusetts

Map by Lars Ahlzen. CC-BY-SA. Data from OpenStreetMap and Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs. More info.

Done


CloudMade Maps - Iceweasel
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Free to style
View map
Edit Map Style
Feedback
Get Directions
Change Style
Export
Share
Get this map on your website
Ostwender Straße
Yorckstraße
Lärchenstraße
Bödekerstraße
Hohenzollernstraße
Wilhelm-Busch-Weg
Kubeweg
Fritz-Behrens-Allee
Hindenburgstraße
Bernadotte Allee
Vita-Parcours
Mullewapp
Brodelburg
Zoo
Zoo Hannover
Trommeln
Ludwig-Barnay-Straße
Bristoler Straße
Adenauerallee
Linie 11
Erwinstraße
Lüerstraße
Seelhorststraße
Kaiserallee
Blücherstraße
Gneisenaustraße
Siegesstraße
Friedenstraße
Löwenstraße
Plathnerstraße
Eichendorffstraße
Wegenerstraße
Tattersall
KWR
Luerstraße
Zeppelinstraße
Hannover Congress Centrum
Theodor Heuss Platz
Mars-la-Tour-Straße
DTV Hannover
Eilenriedestadion
Clausewitzstraße
Sophienschule
100 m
200 ft
Permalink
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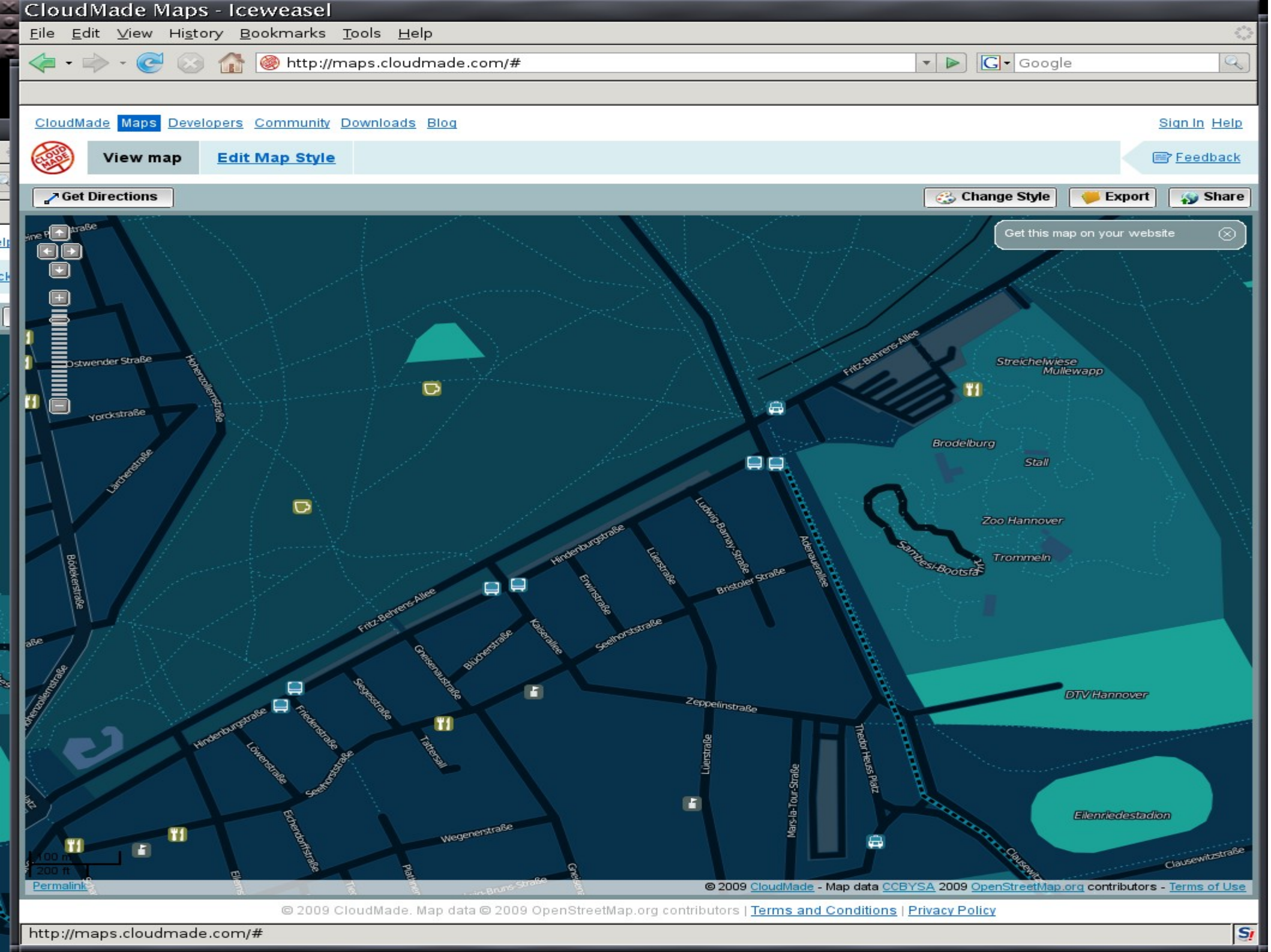
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View map
Edit Map Style
Feedback
Get Directions
Change Style
Export
Share
Get this map on your website
Ostwender Straße
Yorckstraße
Hohenzollernstraße
Lärchenstraße
Bödekerstraße
Fritz-Behrens-Allee
Hindenburgstraße
Lüerstraße
Ludwig-Barnay-Straße
Bristoler Straße
Adenauerallee
Erwinstraße
Blücherstraße
Kaiserallee
Seelhorststraße
Gneisenaustraße
Siegesstraße
Friedenstraße
Lowerstraße
Tattersall
Zeppelinstraße
Wiegenerstraße
Eichendorffstraße
Mars-la-Tour-Straße
Theodor Heuss Platz
Clausewitzstraße
Streichelwiese
Mullewapp
Brodelburg
Stall
Zoo Hannover
Sambesi-Bootsfahrt
Trommeln
DTV Hannover
Eilenriedestadion
100 m
200 ft
Permalink
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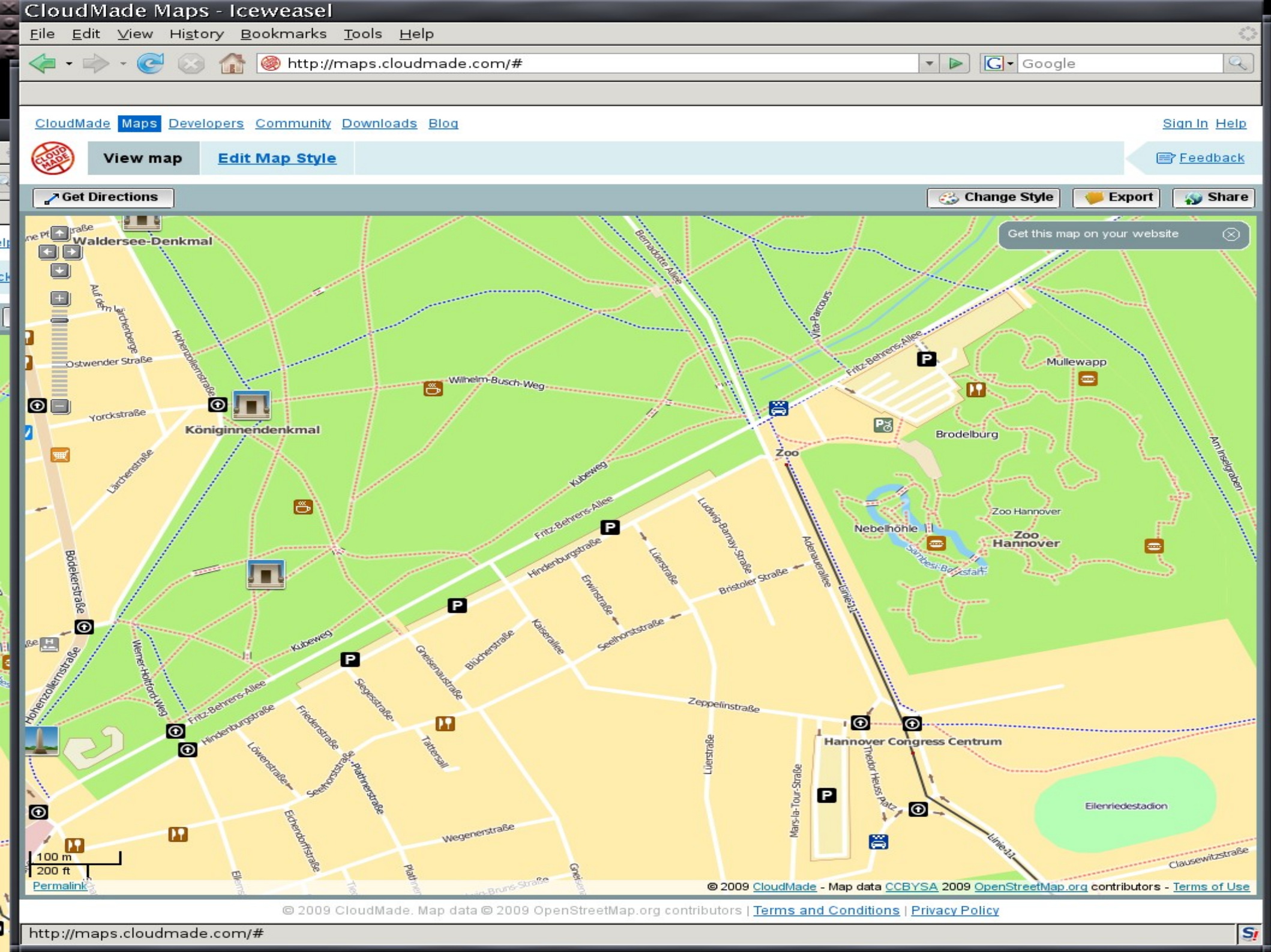
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Feedback
Get Directions
Change Style
Export
Share
Get this map on your website
Waldersee-Denkmal
Königinnendenkmal
Wilhelm-Busch-Weg
Ostwender Straße
Yorckstraße
Lärchenstraße
Bödekerstraße
Hohenzollernstraße
Kubeweg
Fritz-Behrens-Allee
Hindenburgstraße
Werner-Holtfort-Weg
Friedenstraße
Siegesstraße
Gneisenaustraße
Blücherstraße
Kaiserallee
Seelhorststraße
Erwinstraße
Lüerstraße
Ludwig-Barnay-Straße
Bristoler Straße
Adenauerallee
Linie 11
Zeppelinstraße
Tattersall
Löwenstraße
Platanenstraße
Eichenhorststraße
Wegenerstraße
Mars-la-Tour-Straße
Theodor Heuss Platz
Hannover Congress Centrum
Eilenriedestadion
Clausewitzstraße
Zoo
Müllewapp
Brodelburg
Zoo Hannover
Nebelhöhle
Am Inselgraben
Bernadotte Allee
Via Parcours
100 m
200 ft
Permalink
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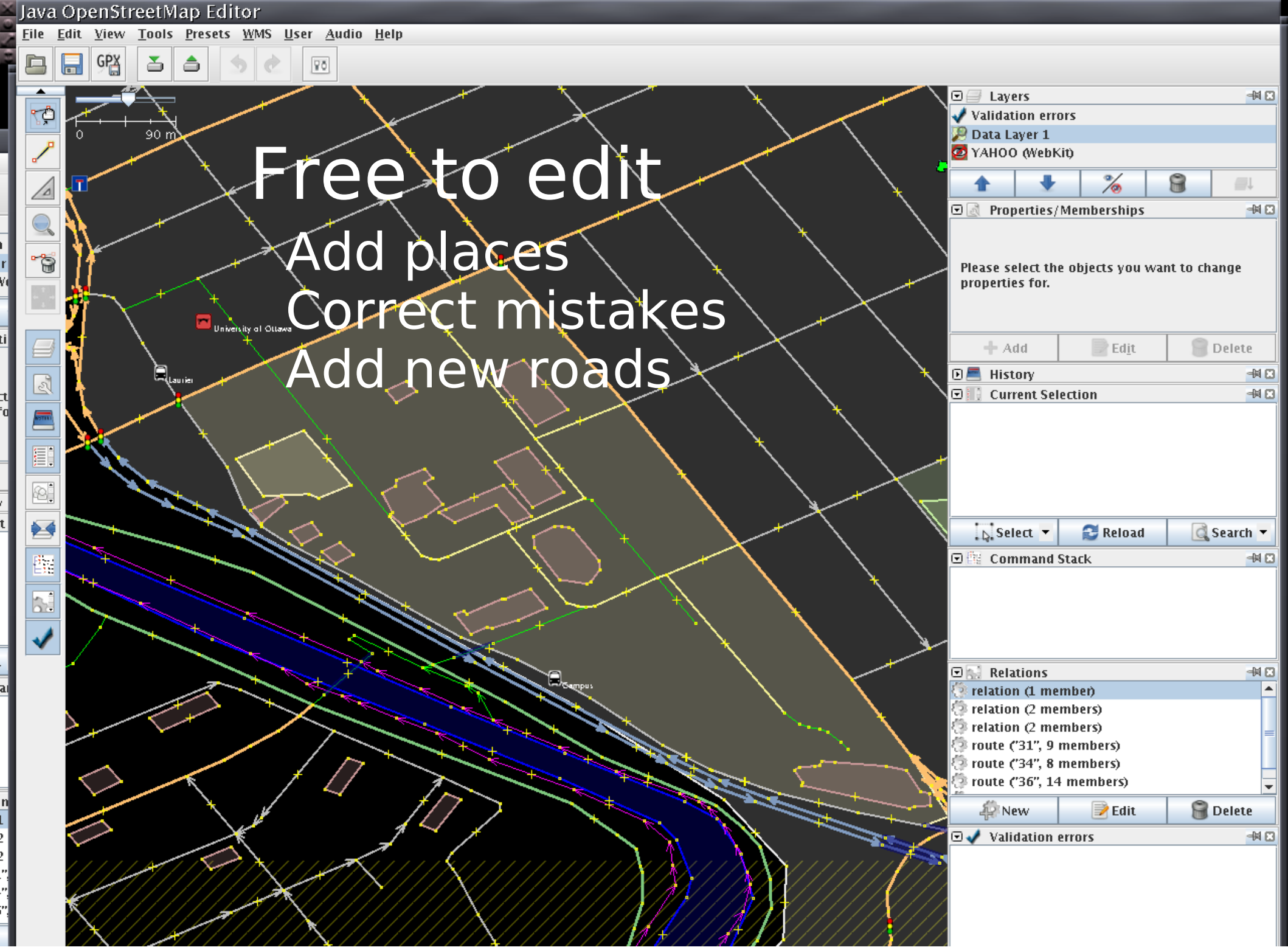
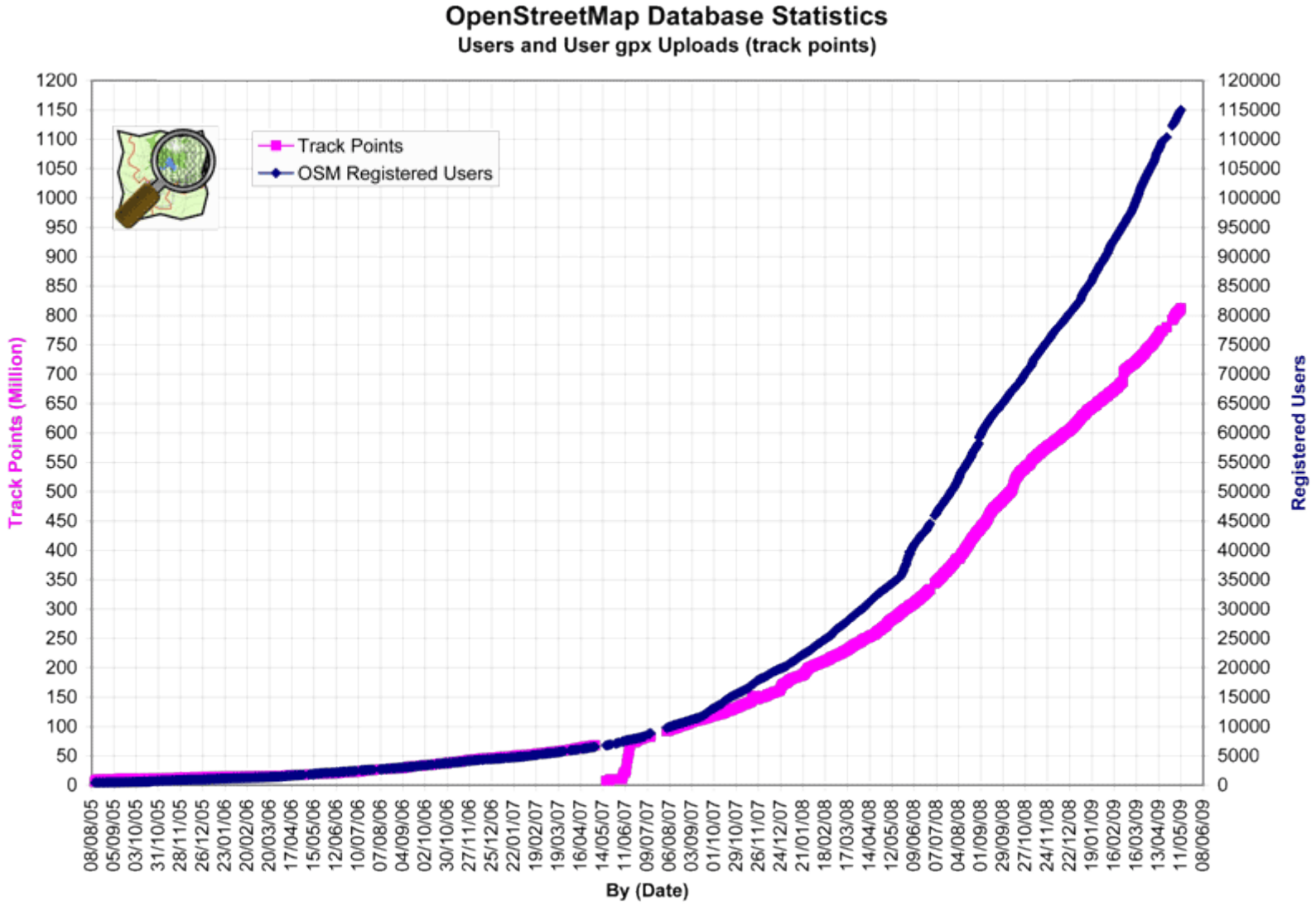
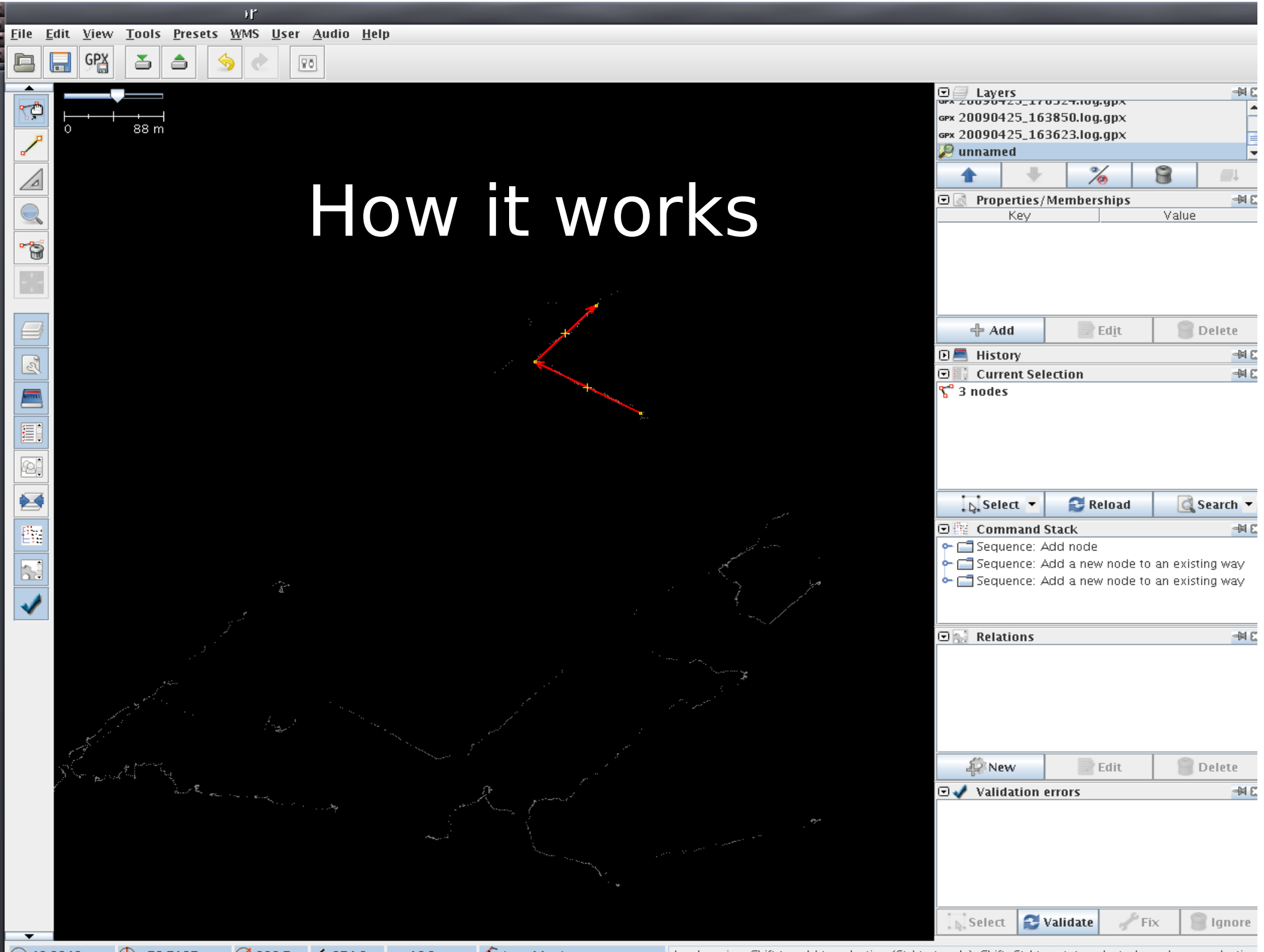

Java OpenStreetMap Editor
File Edit View Tools Presets WMS User Audio Help
Free to edit
Add places
Correct mistakes
Add new roads
Layers
Validation errors
Data Layer 1
YAHOO (WebKit)
Properties/Memberships
Please select the objects you want to change properties for.
Add
Edit
Delete
History
Current Selection
Select
Reload
Search
Command Stack
Relations
relation (1 member)
relation (2 members)
relation (2 members)
route ("31", 9 members)
route ("34", 8 members)
route ("36", 14 members)
New
Edit
Delete
Validation errors

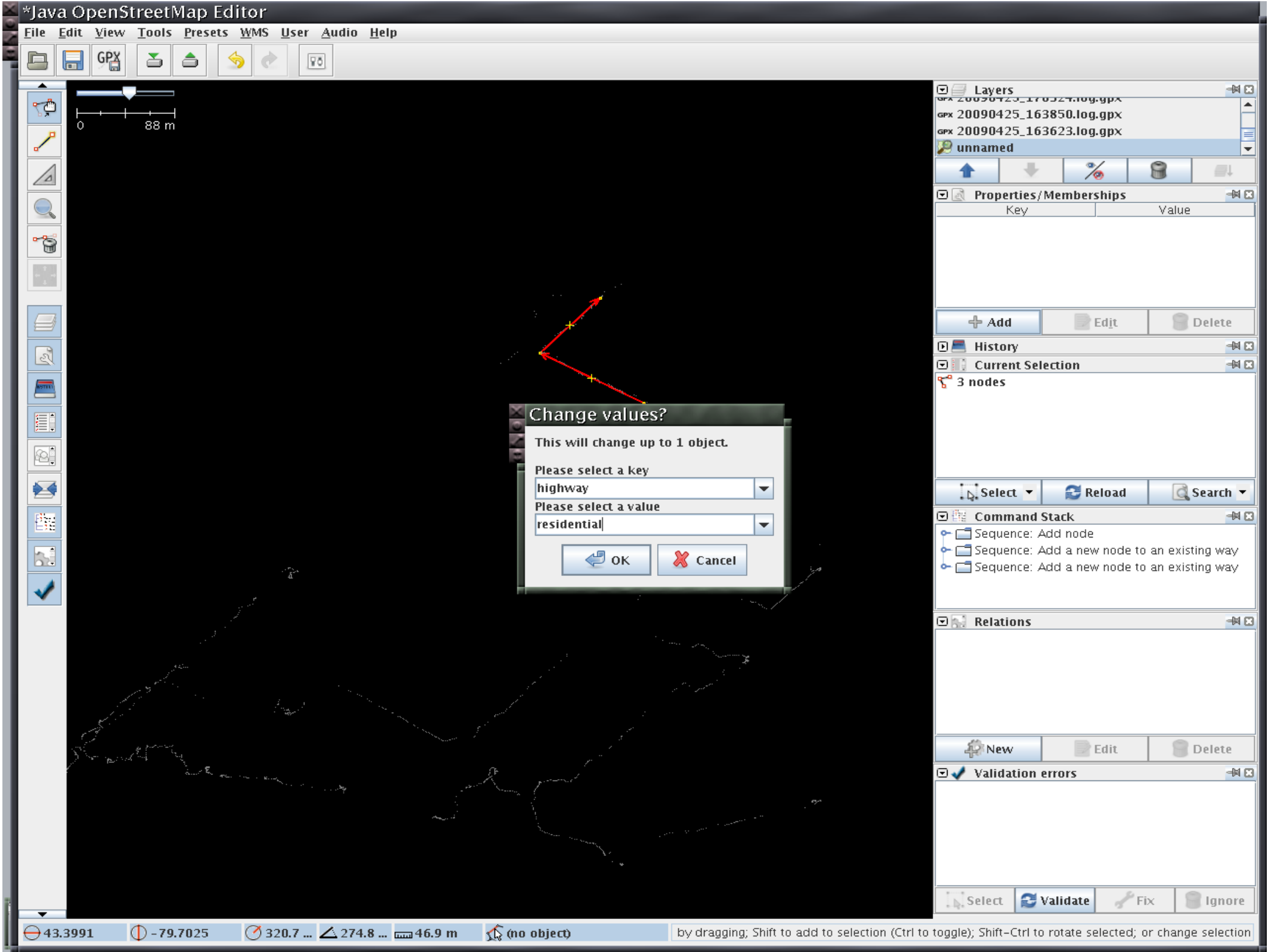
How it got started

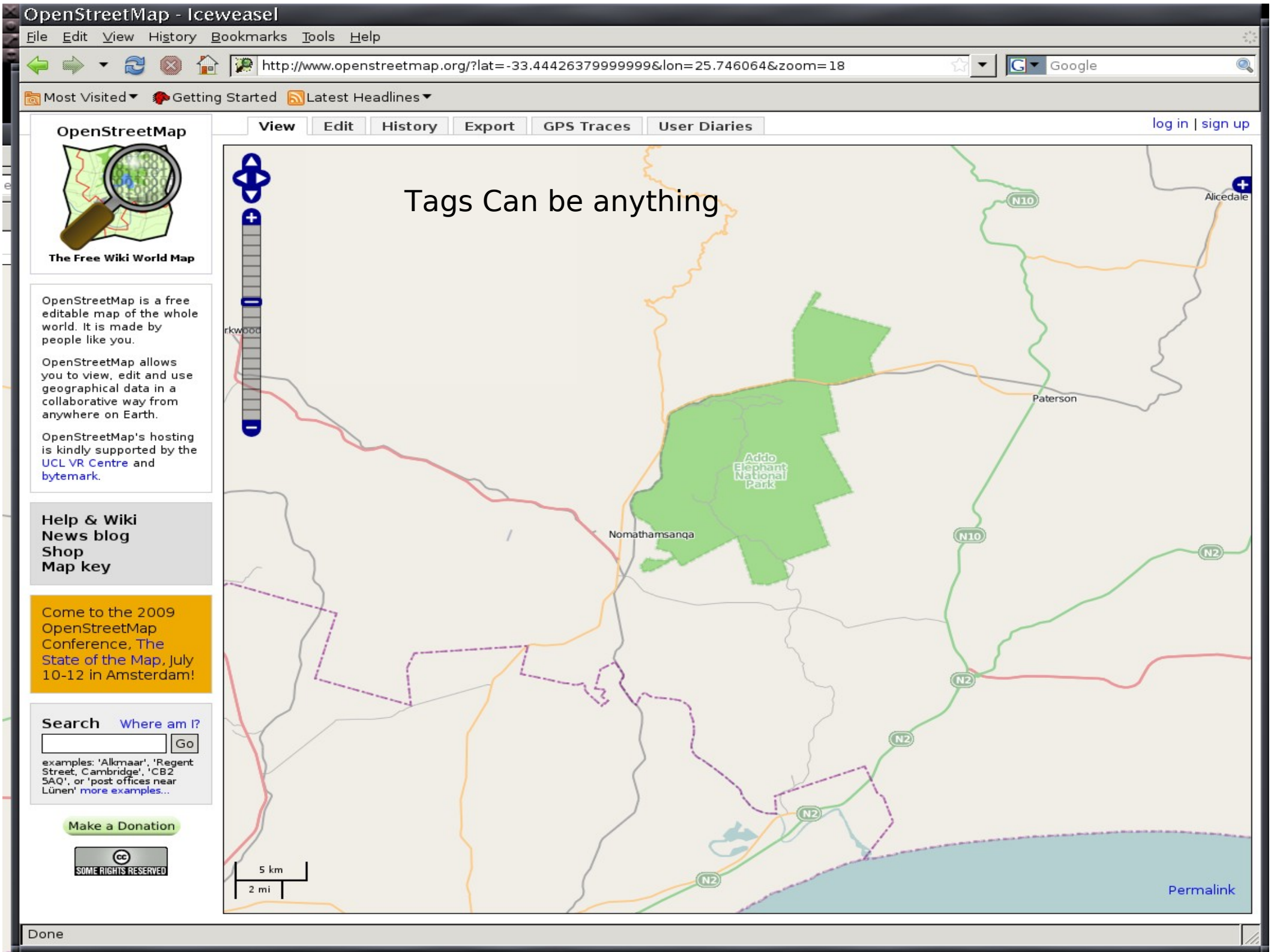
Founded by Steve Coast, Summer of 2004

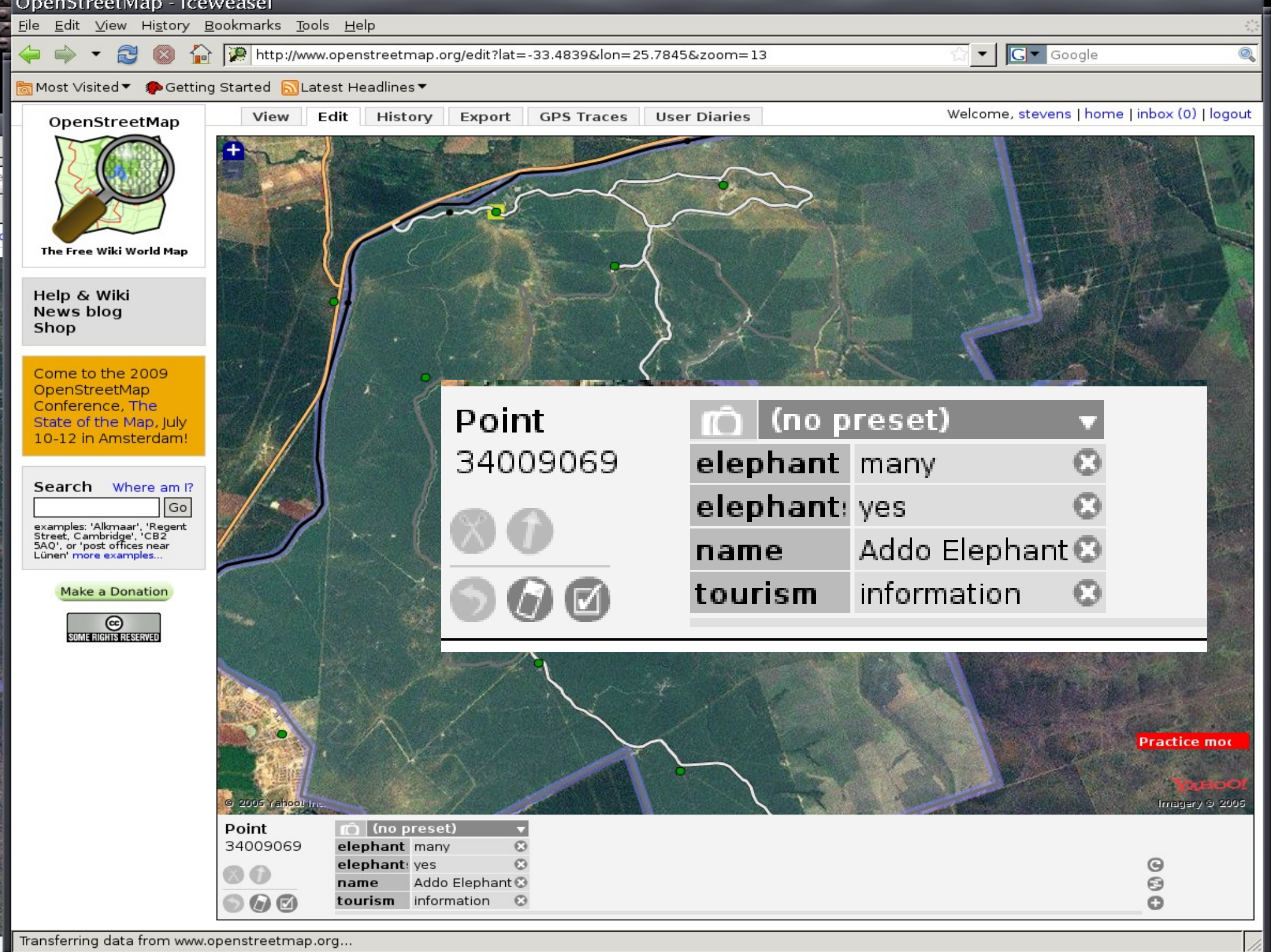
Crowd Sourcing




File Edit View Tools Presets WMS User Audio Help
0
88 m
How it works
Layers
20090425_163850.log.gpx
20090425_163623.log.gpx
unnamed
Properties/Memberships
Key
Value
Add
Edit
Delete
History
Current Selection
3 nodes
Select
Reload
Search
Command Stack
Sequence: Add node
Sequence: Add a new node to an existing way
Sequence: Add a new node to an existing way
Relations
New
Edit
Delete
Validation errors
Select
Validate
Fix
Ignore


*Java OpenStreetMap Editor
File Edit View Tools Presets WMS User Audio Help
0
88 m
Change values?
This will change up to 1 object.
Please select a key
highway
Please select a value
residential
OK
Cancel
Layers
20090425_163850.log.gpx
20090425_163623.log.gpx
unnamed
Properties/Memberships
Key
Value
Add
Edit
Delete
History
Current Selection
3 nodes
Select
Reload
Search
Command Stack
Sequence: Add node
Sequence: Add a new node to an existing way
Sequence: Add a new node to an existing way
Relations
New
Edit
Delete
Validation errors
Select
Validate
Fix
Ignore
43.3991
-79.7025
320.7 ...
274.8 ...
46.9 m
(no object)
by dragging; Shift to add to selection (Ctrl to toggle); Shift-Ctrl to rotate selected; or change selection


OpenStreetMap - Iceweasel
File Edit View History Bookmarks Tools Help
http://www.openstreetmap.org/?lat=-33.44426379999999&lon=25.746064&zoom=18
Google
Most Visited
Getting Started
Latest Headlines
OpenStreetMap
The Free Wiki World Map
OpenStreetMap is a free editable map of the whole world. It is made by people like you.
OpenStreetMap allows you to view, edit and use geographical data in a collaborative way from anywhere on Earth.
OpenStreetMap's hosting is kindly supported by the UCL VR Centre and bytemark.
Help & Wiki
News blog
Shop
Map key
Come to the 2009 OpenStreetMap Conference, The State of the Map, July 10-12 in Amsterdam!
Search
Where am I?
Go
examples: 'Alkmaar', 'Regent Street, Cambridge', 'CB2 5AQ', or 'post offices near Lünen' more examples...
Make a Donation
SOME RIGHTS RESERVED
View
Edit
History
Export
GPS Traces
User Diaries
log in | sign up
Tags Can be anything
Alicedale
N10
Paterson
Addo Elephant National Park
Nomathamsanqa
N10
N2
N2
N2
N2
N2
5 km
2 mi
Permalink
Done

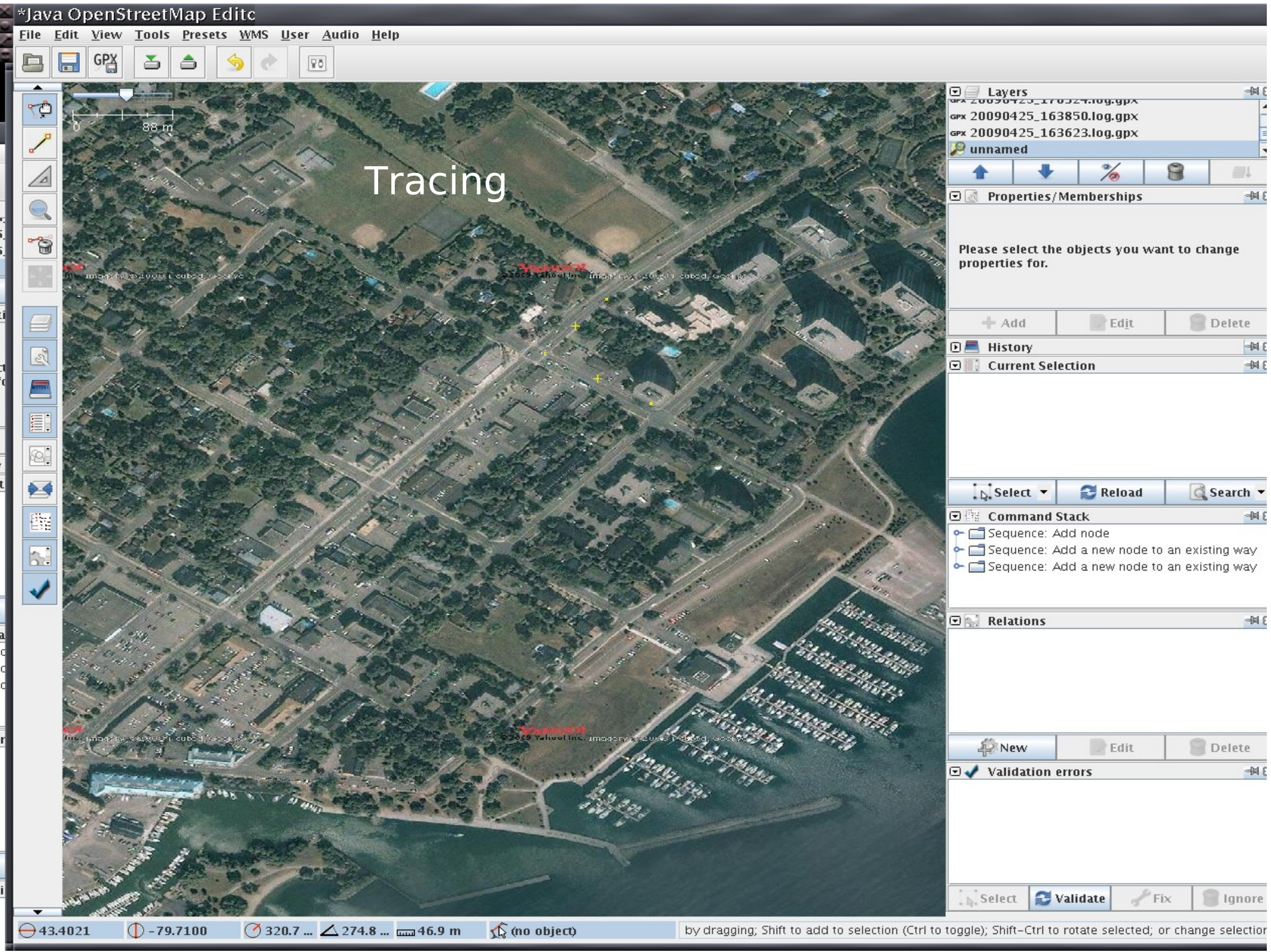

OpenStreetMap - Iceweasel
File Edit View History Bookmarks Tools Help
http://www.openstreetmap.org/edit?lat=-33.4839&lon=25.7845&zoom=13
Google
Most Visited
Getting Started
Latest Headlines
OpenStreetMap
The Free Wiki World Map
View
Edit
History
Export
GPS Traces
User Diaries
Welcome, stevens | home | inbox (0) | logout
Help & Wiki
News blog
Shop
Come to the 2009 OpenStreetMap Conference, The State of the Map, July 10-12 in Amsterdam!
Search
Where am I?
Go
examples: 'Alkmaar', 'Regent Street, Cambridge', 'CB2 5AQ', or 'post offices near Lünen' more examples...
Make a Donation
SOME RIGHTS RESERVED
Point
34009069
(no preset)
elephant
many
elephant
yes
name
Addo Elephant
tourism
information
Practice mo
© 2006 Yahoo! Inc.
Imagery © 2006
Transferring data from www.openstreetmap.org...

```
<node id='34009069' lat='-33.4442638' lon='25.746064
  ' user='Firefishy' xapi:users='CoreyBurger,
      Firefishy' timestamp='2009-03-23T00:09:07Z'
      version='2'>
  <tag k='elephant' v='many'/>
  <tag k='elephants' v='yes'/>
  <tag k='name' v='Addo Elephant National Park'/>
  <tag k='tourism' v='information'/>
 </node>
```

Where does the data come from

- 100,000+ contributors
- GPS traces
- local knowledge
- Bulk imports
- Imagery traces

GPS


*Java OpenStreetMap Editc
File Edit View Tools Presets WMS User Audio Help
Tracing
0 88 m
Layers
20090425_163850.log.gpx
20090425_163623.log.gpx
unnamed
Properties/Memberships
Please select the objects you want to change properties for.
Add Edit Delete
History
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Select Reload Search
Command Stack
Sequence: Add node
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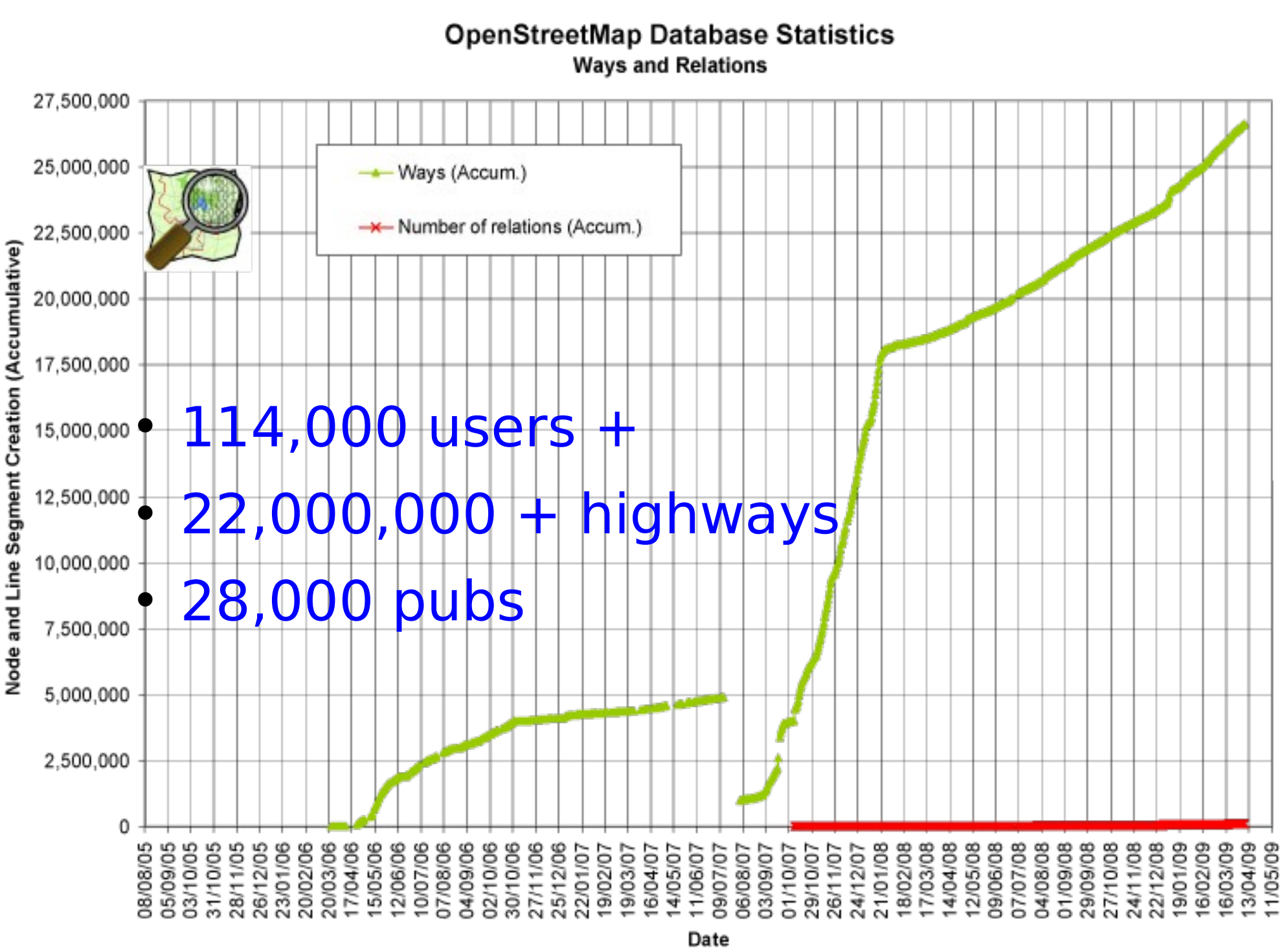
Sequence: Add a new node to an existing way
Relations
New Edit Delete
Validation errors
Select Validate Fix Ignore
43.4021 -79.7100 320.7 ... 274.8 ... 46.9 m (no object)
by dragging; Shift to add to selection (Ctrl to toggle); Shift-Ctrl to rotate selected; or change selection

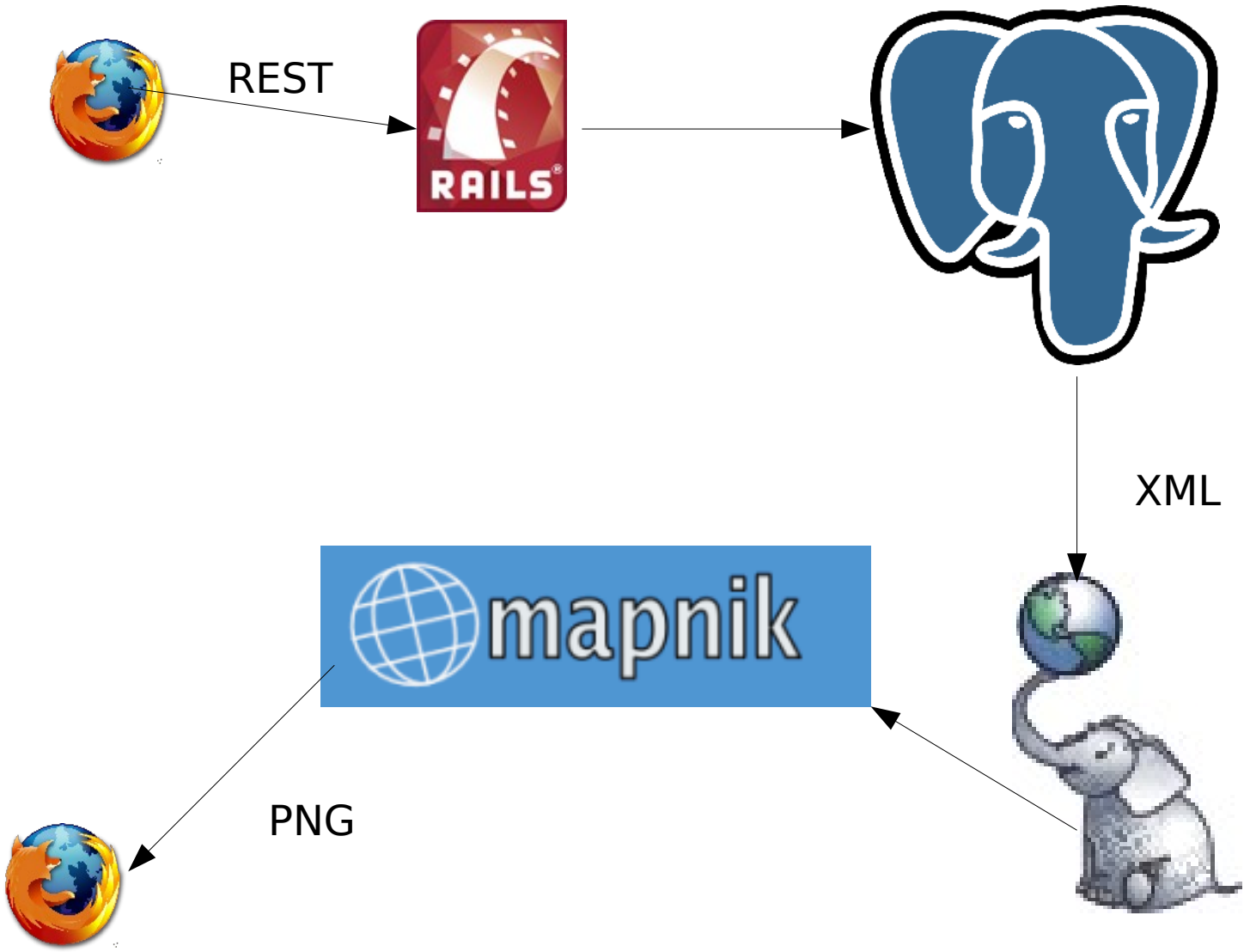
Data Imports

- Copyright compatible datasets
- TIGER, vmap0 (US),
- GeoBase(Canada)
- NAND (Netherlands)

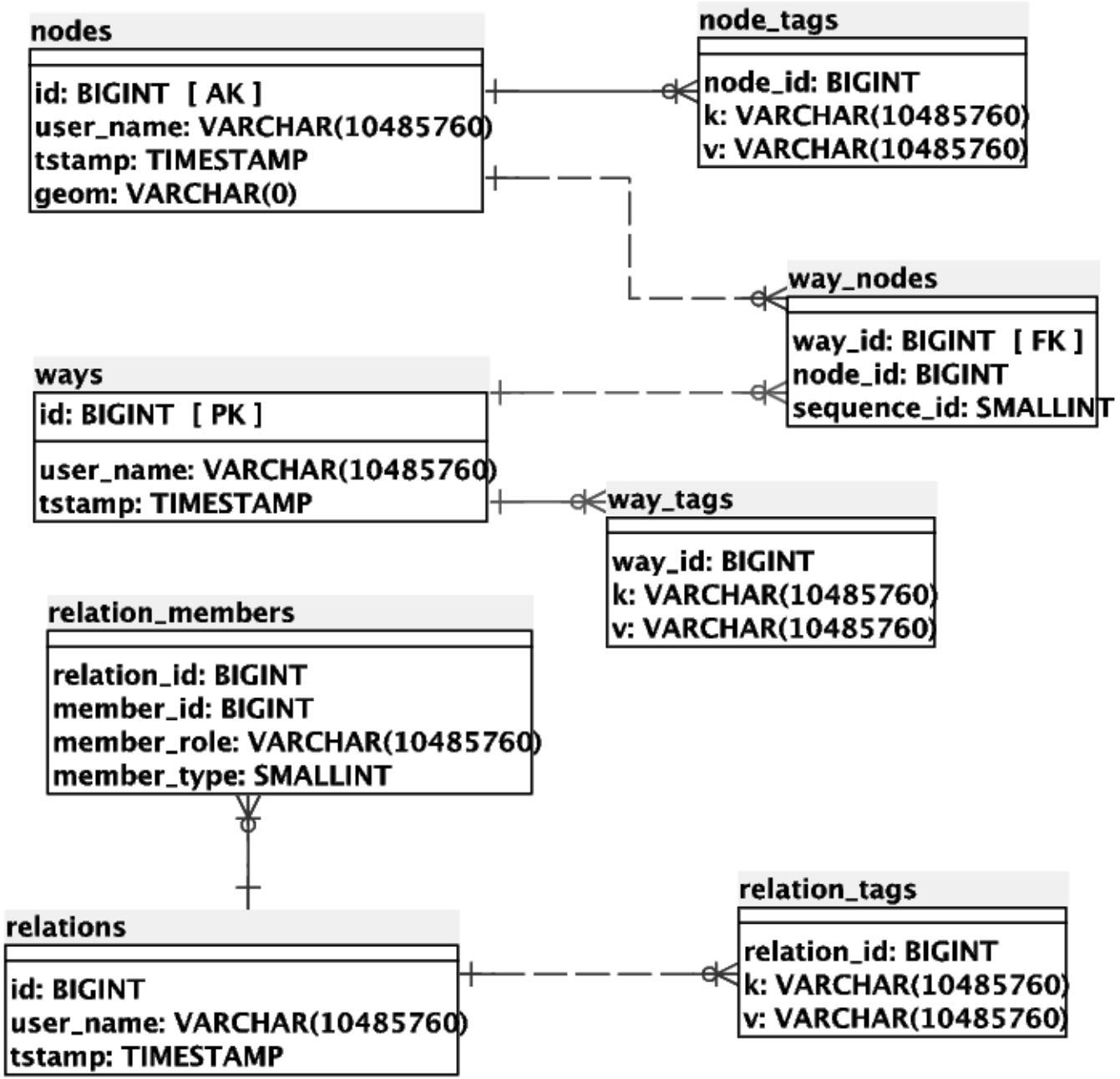


- 114,000 users +
- 22,000,000 + highways
- 28,000 pubs

Where does the data go?



The simple schema



Why PostgreSQL

- Pre 0.6 Mysql + MYISAM
- Errors could mean only half an edit
- Solution: Transactions
- InnoDB has no text search

PostgreSQL 8.3
2x Intel Xeon Processor E5420 Quad Core 2.5Ghz
2x 73GB (3.5) SAS 15K
10x 450GB (3.5) SAS 15K
30GB of RAM

(pg)-stat

- AVG 7.42M tuples fetched per second
- AVG 1.04k tuples inserted per second
- 800GB

Table	Size(GB)
current_node_tags	99
current_nodes	58
current_way_nodes	44
current_way_tags	20
Historical	
nodes	211
node_tags	119
way_nodes	113
gps_points	94
way_tags	32
ways	14

Planet Dumps
http://planet.openstreetmap.org

Osmosis, your own API

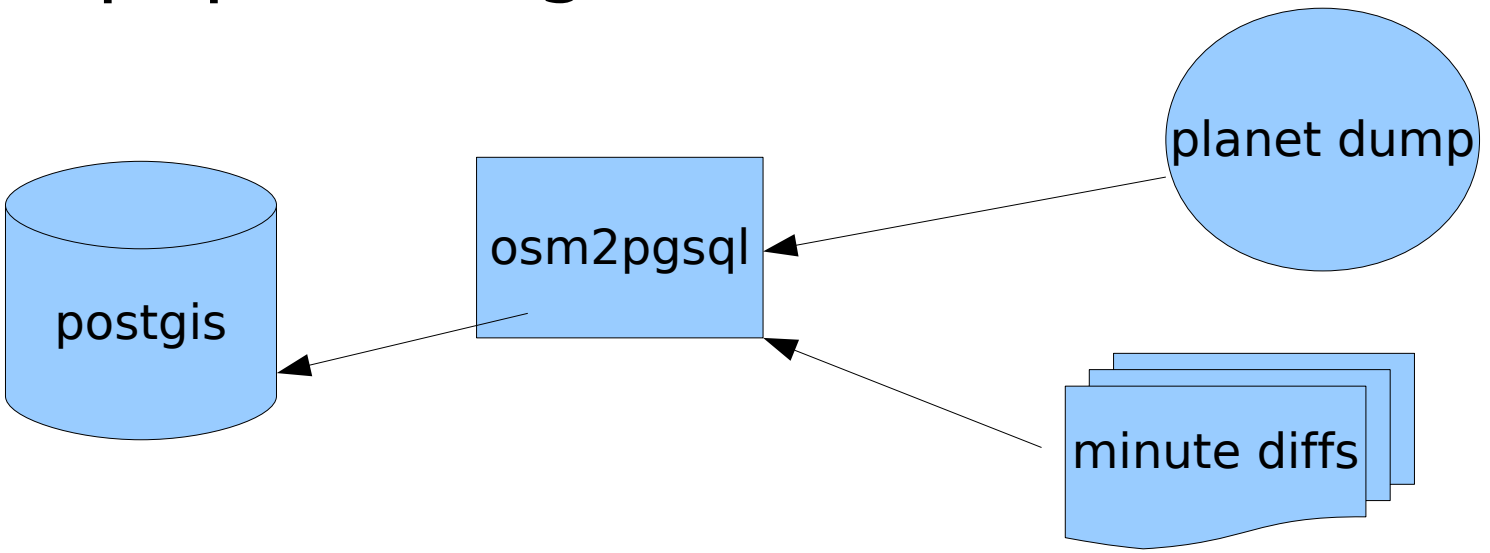
- Populates DB from planet dumps

But I really want to use PostGIS

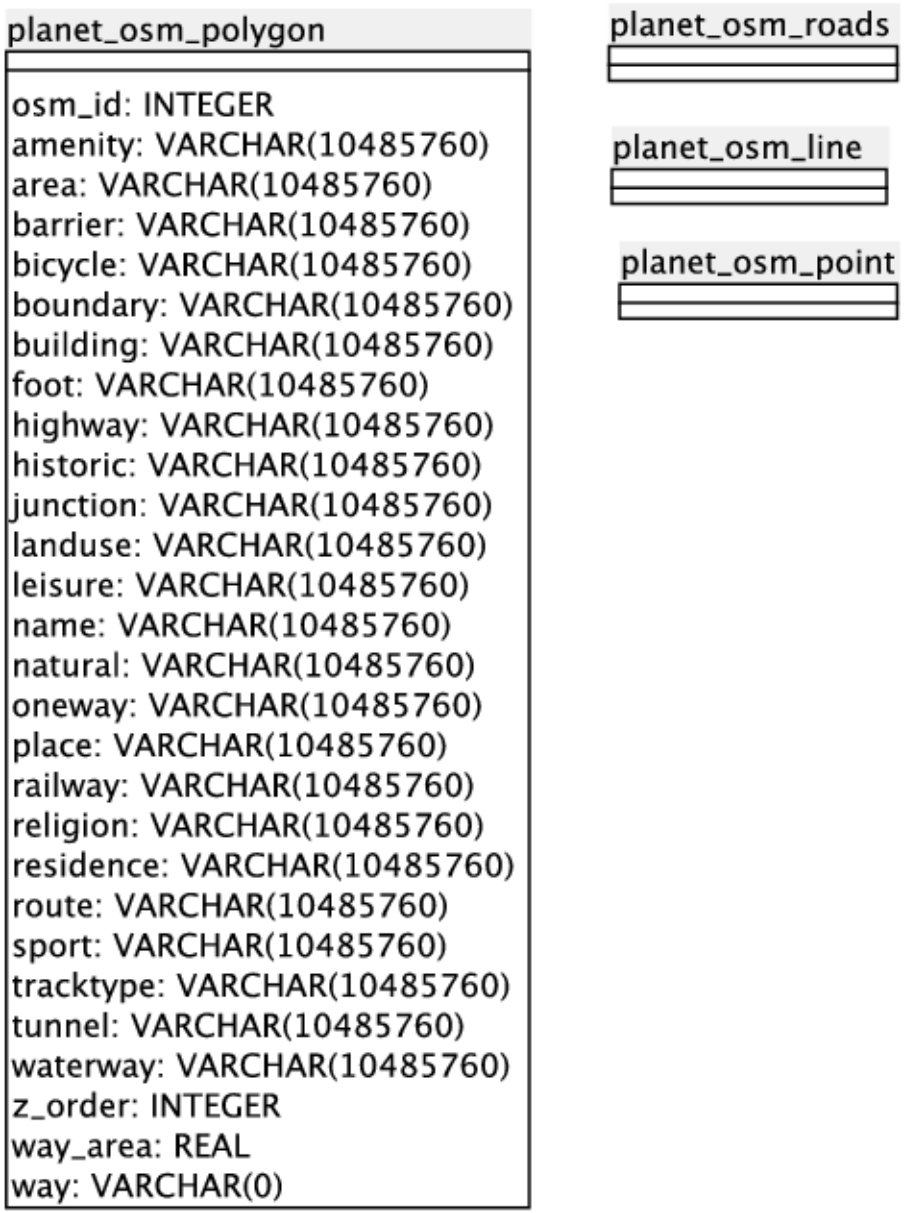
- Complex Geometries
- Spatial queries

osm2pgsql

- Populates postgis from planet dumps
- Creates spatial objects (lines)
- Populates attribute columns for popular tags



schema


planet_osm_polygon
osm_id: INTEGER
amenity: VARCHAR(10485760)
area: VARCHAR(10485760)
barrier: VARCHAR(10485760)
bicycle: VARCHAR(10485760)
boundary: VARCHAR(10485760)
building: VARCHAR(10485760)
foot: VARCHAR(10485760)
highway: VARCHAR(10485760)
historic: VARCHAR(10485760)
junction: VARCHAR(10485760)
landuse: VARCHAR(10485760)
leisure: VARCHAR(10485760)
name: VARCHAR(10485760)
natural: VARCHAR(10485760)
oneway: VARCHAR(10485760)
place: VARCHAR(10485760)
railway: VARCHAR(10485760)
religion: VARCHAR(10485760)
residence: VARCHAR(10485760)
route: VARCHAR(10485760)
sport: VARCHAR(10485760)
tracktype: VARCHAR(10485760)
tunnel: VARCHAR(10485760)
waterway: VARCHAR(10485760)
z_order: INTEGER
way_area: REAL
way: VARCHAR(0)
planet_osm_roads
planet_osm_line
planet_osm_point

planet_osm_lines

- Roads
- Rivers
- Trails

planet_osm_points

- POI's
- amenity
- place_of_worship
- name

planet_osm_polygons

- Areas
- Land use
- building outlines
- lakes

Is my school a polygon or a point?

- Tags can be anything
- You can map a school as a area, buildings, or a single POI
- Must query all tables (UNION?)

mapnik

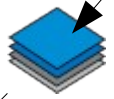
postgis

Map Style
<XML>

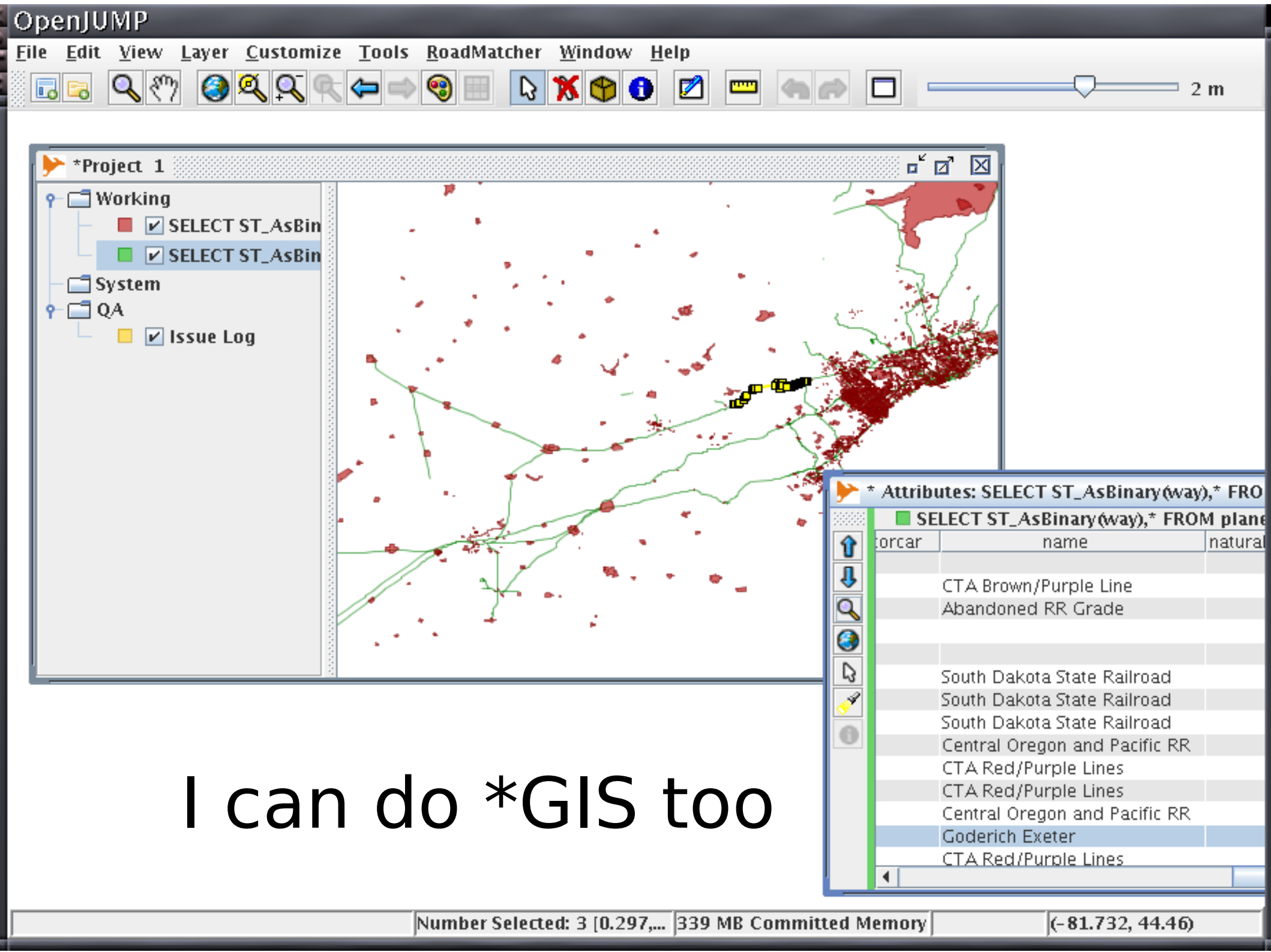
PDF(for printing)

SVG

Tiles(PNG)



OpenLayers (Slippery Map)


OpenJUMP
File Edit View Layer Customize Tools RoadMatcher Window Help
2 m
*Project 1
Working
SELECT ST_AsBin
SELECT ST_AsBin
System
QA
Issue Log
* Attributes: SELECT ST_AsBinary(way),* FRO
SELECT ST_AsBinary(way),* FROM plane
name
natural
CTA Brown/Purple Line
Abandoned RR Grade
South Dakota State Railroad
South Dakota State Railroad
South Dakota State Railroad
Central Oregon and Pacific RR
CTA Red/Purple Lines
CTA Red/Purple Lines
Central Oregon and Pacific RR
Goderich Exeter
CTA Red/Purple Lines
I can do *GIS too
Number Selected: 3 [0.297,...
339 MB Committed Memory
(-81.732, 44.46)

Nearby Pubs

```
SELECT
    p.name,
    ST_Distance(ST_Transform(p.way,3348),
    ST_Transform(u.way,3348) )

    FROM planet_osm_point p, planet_osm_point u
    where p.amenity='pub'
    AND u.name='University of Ottawa' AND
    ST_Distance(p.way,u.way)<1;
~
```

```
name          |    distancem
----------------------+-----------------
Elephant & Castle     | 541
D'Arcy McGees         |  764
Drumlins              | 937
Meadowlands Pub       | 7259
Montana's Steakhouse  | 9565
Rockwell's Sports Bar | 9622
Tanglewood Pub        | 10339
Greenfields Pub       | 16710
Barley Mow Pub        | 17698
Cheshire Cat Pub      | 27110
The Thirsty Moose     | 48771
Queen's Hotel         | 48771
(12 rows)
```

Spatial queries

- ST_Intersects
- ST_UNION
- ST_Distance

- How free is your map?
- About OpenStreetMap
- How to use with PostGIS

Questions?

http://www.openstreetmap.org

http://www.mapnik.org

http://postgis.refractions.net

https://www.openjump.org

http://www.qgis.org

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IRC: StevenSn

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NASA

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