

# Getting what you want out of OpenStreetMap

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Urban Airship  
Practical Cartography Day  
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# OpenStreetWhat?

- <http://www.osm.org>
- OpenStreetMap or OSM
- **Not** “Open Street Maps”
- Founded in 2004
- Worldwide and seamless
- “Wikipedia of Maps”
- Editable by anyone with an account



**OpenStreetMap**  
The Free Wiki World Map

# So, what is it really?

- It's a very large database of XML data
- Each feature is of a certain basic type, and is defined by tags (key value pairs)
- Basic types:
  - Nodes (points)
  - Ways (lines)
  - Areas (polygons)
  - Relations (groups)
- Example tags:
  - highway = primary, bridge = yes

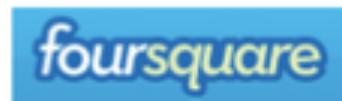


# What is it *not*?

- A rendered map that uses particular cartography, whether for web or paper.
- Proprietary—anyone can use it for free as long as they provide proper credit
- Something static—it changes and grows all the time
- Controlled by an authority—it is driven and maintained by a large community of contributors and data consumers

# Who uses OpenStreetMap?

- <http://switch2osm.org>



WIKIPEDIA  
The Free Encyclopedia



# What kind of things can you find in OpenStreetMap?

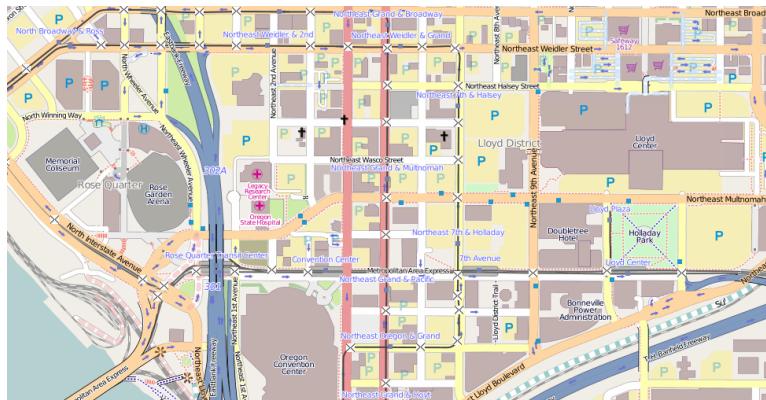
- Roads, highways, bridges, and tunnels
- Bus stops, bus routes, bike routes, and railways
- Businesses: shops, restaurants, bars
- Buildings: schools, churches, houses
- Parks, lakes, mountains, and even trees
- Airports, power networks, and mailboxes
- Administrative boundaries
- Almost anything that stays the same for a while,  
see <http://wiki.osm.org> for more

# How did all this data get there?

- United States: 2007 TIGER data import  
<http://wiki.openstreetmap.org/wiki/TIGER>
- Other imports of open data
- Around the world: lots of people uploading and tidying up GPS tracks
- More recently, tracing aerial imagery (Bing gave special permission for editors to use its aerials)
- Local knowledge
- *A real person put it there, and other people have looked at it and confirmed that it is correct*
- **Challenge: data maintenance**

# What does it look like?

## OSM.org default



# Stamen Design



The map displays the urban area of Honolulu, featuring a grid of streets and several major thoroughfares. Key landmarks include The Arts District, Booth/Punchbowl, Makiki, Manoa, St. Louis Heights, University of Hawai'i at Mānoa, and the Palolo Triangle. The Waikiki Beach area is shown along the coast. The map also highlights the Waikiki-Honolulu Waterfront, Ward Ave., Pinole St., King St., Beretania St., Ala Moana, McCully, Kapiolani Blvd., Ala Wai Blvd., and Waialae Ave. A river, Nānākuli Hwy., and the Iwilei River are also visible. The background shows the rugged terrain of the surrounding mountains.

A detailed map of Reykjavík, Iceland, centered around the city's name. The map shows various neighborhoods, including Gaml Vesturbærinn, Grjótadóp, Midtbærinn, and Tjarnarbrekka. Key landmarks like Hallgrímskirkja, Harpa Concert Hall, and the National Museum are marked. Major roads like Laugavegur, Hverfjallavegur, and Landakotsvegur are visible. The map also includes a green area representing a park or nature reserve.

# OpenStreetMap is the data itself

Data [Close](#)

[Manually select a different area](#)

[Hide areas](#)

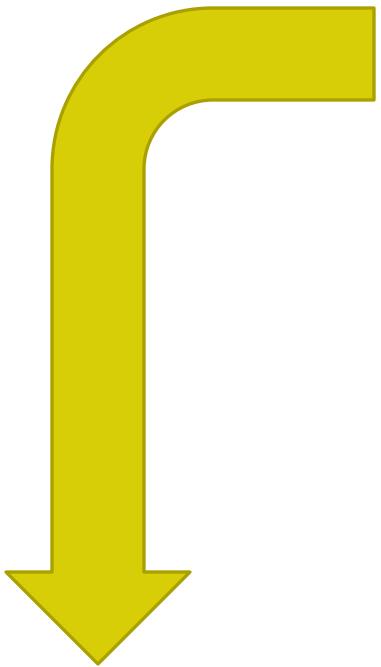
Object list

- Node Greenville
- Node 112808081
- Node 112863024
- Node 112886419
- Node 112886426
- Node 112886435
- Node 112939745
- Node 112946183
- Node 112946196
- Node 113059925
- Node 113059929
- Node 113079633
- Node 113145304
- Node Buncombe Street United Methodist Church
- Node Hyatt Regency Greenville
- Node Ayers Leather Shop
- Node City Tavern
- Node Bertolo's Pizza
- Node Charleston Cooks

30 m  
100 ft

© OpenStreetMap

# Nodes



### Node: Hyatt Regency Greenville (510781128)

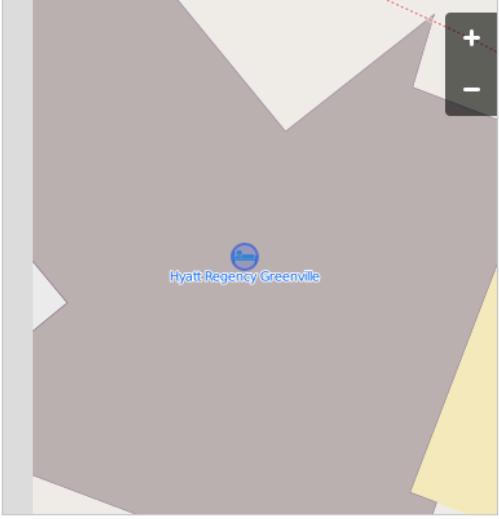
[Download XML](#) | [View history](#) | [Edit node](#)

« 510781127 | 510781129 »

**Edited at:** Sun, 27 Sep 2009 16:57:15 +0000  
**Edited by:** MikeN  
**Version:** 1  
**In changeset:** 2654464  
**Comment:** McPherson Park, Springview Cemetery,  
North end of Greenville Downtown

**Tags:** name = Hyatt Regency Greenville  
tourism = hotel

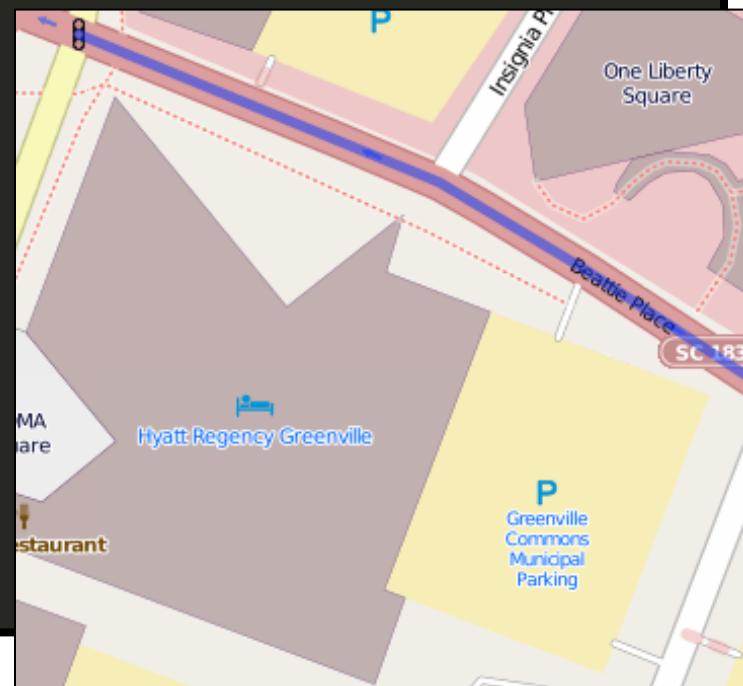
**Coordinates:** 34.8531865, -82.3970216



```
<node id="510781128" version="1" changeset="2654464" lat="34.8531865" lon="-82.3970216" user="MikeN"  
uid="135163" visible="true" timestamp="2009-09-27T16:57:15Z">  
<tag k="name" v="Hyatt Regency Greenville"/>  
<tag k="tourism" v="hotel"/>  
</node>
```

# Ways: groups of nodes

```
<way id="191148935" visible="true" timestamp="2013-09-05T07:05:36Z" version="3" changeset="17682401" user="mjbyars" uid="1374718">
<nd ref="113059929"/>
<nd ref="113064594"/>
<nd ref="113064592"/>
<nd ref="113064589"/>
<nd ref="113064586"/>
<nd ref="113064583"/>
<nd ref="113064580"/>
<nd ref="113064577"/>
<nd ref="2230341288"/>
<nd ref="112939745"/>
<tag k="highway" v="primary"/>
<tag k="name" v="Beattie Place"/>
<tag k="oneway" v="yes"/>
<tag k="ref" v="SC 183"/>
<tag k="tiger:cfcc" v="A31"/>
<tag k="tiger:county" v="Greenville, SC"/>
<tag k="tiger:name_base" v="Beattie"/>
<tag k="tiger:name_base_1" v="State Highway 183"/>
<tag k="tiger:name_type" v="P1"/>
<tag k="tiger:zip_left" v="29601"/>
<tag k="tiger:zip_right" v="29601"/>
</way>
```



# Areas: closed ways

- They contain the same node twice, once at the start and once at the end

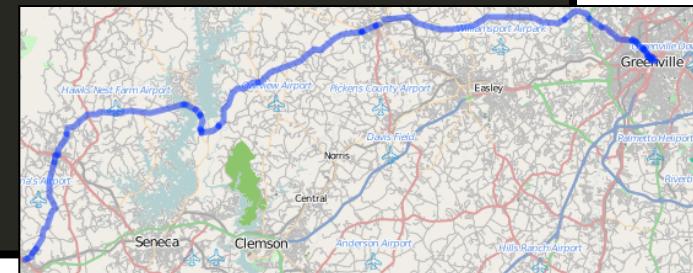
```
<way id="45332581" visible="true" timestamp="2013-01-25T18:01:37Z" version="3" changeset="14783844" user="MikeN" uid="135163">
<nd ref="506555968"/>
<nd ref="576141047"/>
<nd ref="576141042"/>
<nd ref="506555972"/>
<nd ref="506555971"/>
<nd ref="506555970"/>
<nd ref="506555969"/>
<nd ref="506555968"/>
<tag k="area" v="yes"/>
<tag k="highway" v="pedestrian"/>
<tag k="name" v="NOMA Square"/>
</way>
```



# Relations: groups of nodes and ways

- Come in various types, for example, a route:

```
<relation id="2578793" visible="true" version="3" changeset="14099703" timestamp="2012-11-30T14:46:26Z" user="van Rees" uid="618879">
  <member type="way" ref="12521903" role="" />
  <member type="way" ref="12507058" role="" />
  <member type="way" ref="12521898" role="" />
  <member type="way" ref="12514439" role="" />
  <member type="way" ref="12493746" role="" />
  <member type="way" ref="12524944" role="" />
  ...
  <member type="way" ref="12406361" role="" />
  <member type="way" ref="12503057" role="" />
  <member type="way" ref="12511287" role="" />
  <tag k="name" v="SC Highway 183" />
  <tag k="network" v="US:SC" />
  <tag k="ref" v="183" />
  <tag k="route" v="road" />
  <tag k="type" v="route" />
</relation>
```

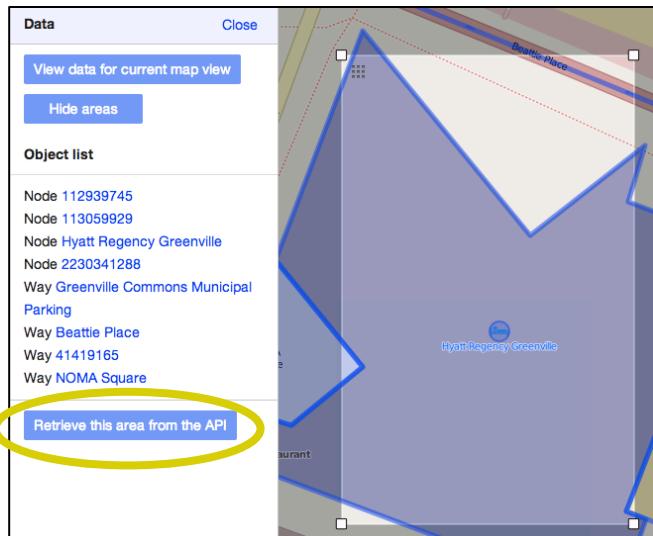


# Before you begin: Think about what you want to do

- Let's assume we want to use OSM data for cartography
- What are you making? A web map? A print map?
- What software do you want to use to make it?
- What formats can that software use? Do you prefer to work with certain data formats?
- What is your geographic extent?
- Which features do you want to show? Everything? Only the highways? Only the coffee shops? Only a few select features?
- How often do you want to update your map?

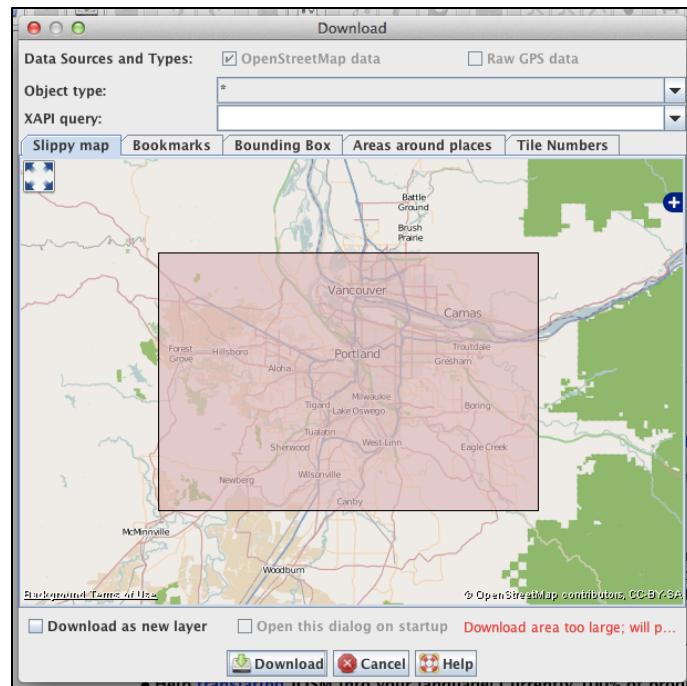
# Step 1: Get the data

- [http://wiki.osm.org/wiki/Downloading\\_data](http://wiki.osm.org/wiki/Downloading_data)
- Small areas and individual features from the OSM website
  - <http://www.osm.org>
  - Layers -> Map Data



# Step 1: Get the data

- From a standalone OSM editor:
  - JOSM
    - Just download and save, or use the “Mirrored download” plugin for large areas
  - QGIS 2.0
    - Plugin for earlier versions

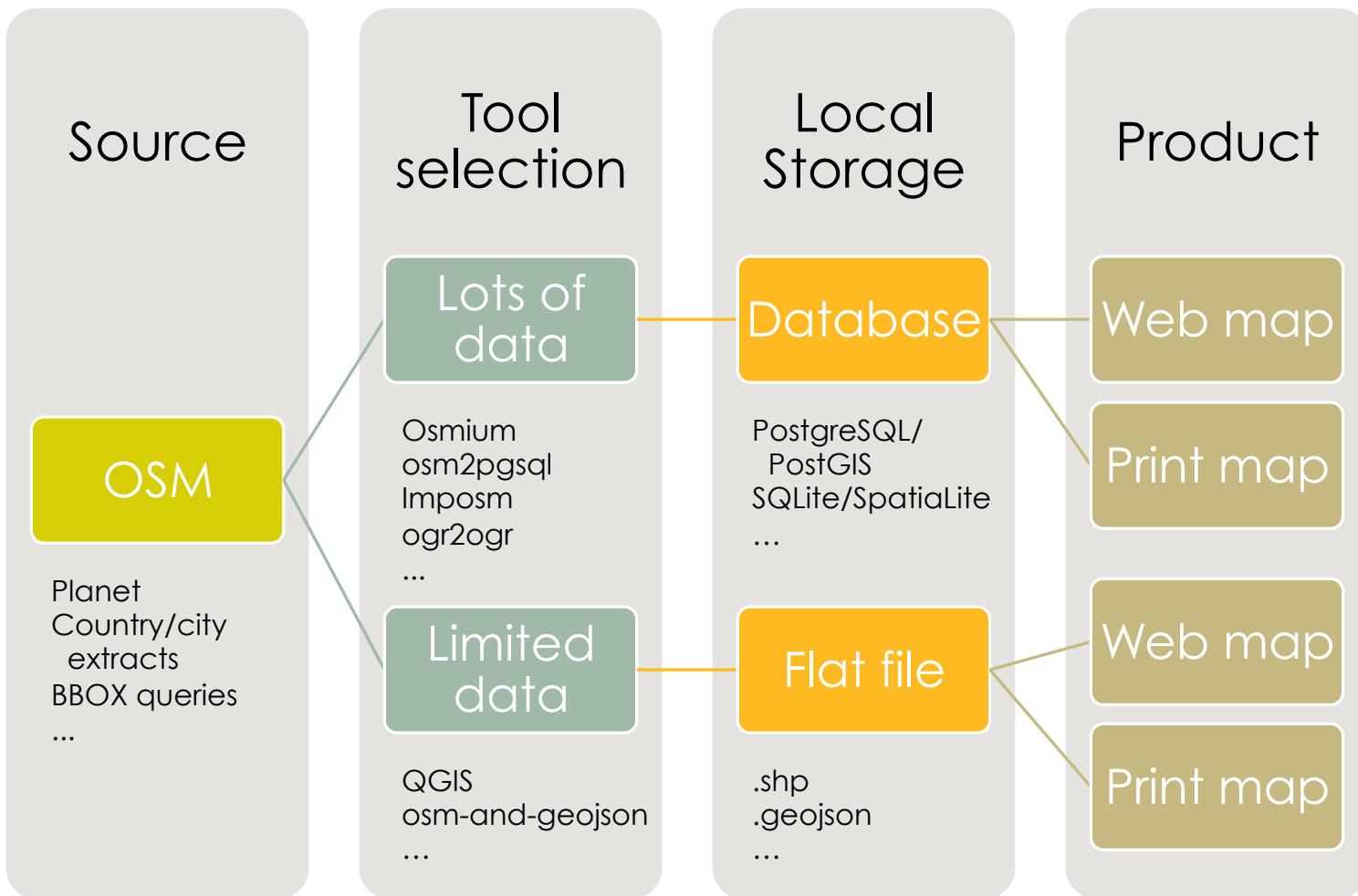


# Step 1: Get the data

- Download large areas from various places, free or at cost:
  - “The planet”, countries, cities, etc.
  - APIs: <http://wiki.openstreetmap.org/wiki/Xapi> ,  
[http://wiki.openstreetmap.org/wiki/Overpass\\_API](http://wiki.openstreetmap.org/wiki/Overpass_API)
  - <http://download.geofabrik.de/>
  - <http://osmdata.thinkgeo.com/>
  - <http://metro.teczno.com/>
  - <http://download.bbbike.org/osm/>
  - <http://market.weogeo.com/>
  - Some of it is already in shapefile format, but it might not have exactly what you're looking for
  - Remember to check the date

## Step 2: Process the data

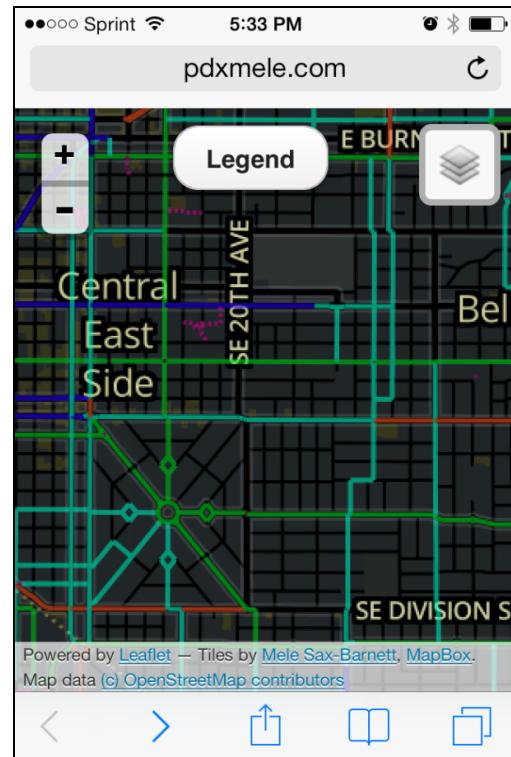
- There are an ever-increasing number of tools and scripts that you can use
- Many of them involve using the command line
- I will go over some popular options, and two use cases in detail
- Full list at <https://github.com/pdxmele/gwyw-osm>



More at <https://github.com/pdxmele/gwyw-osm>

# Use case 1: Web map with TileMill

- Can use both flat files and databases
  - Shapefile, GeoJSON
  - PostGIS, SQLite
- This means it can work for both creating a complete basemap from scratch, or for layering a number of features on another basemap
- This use case: make a custom bike map of a city

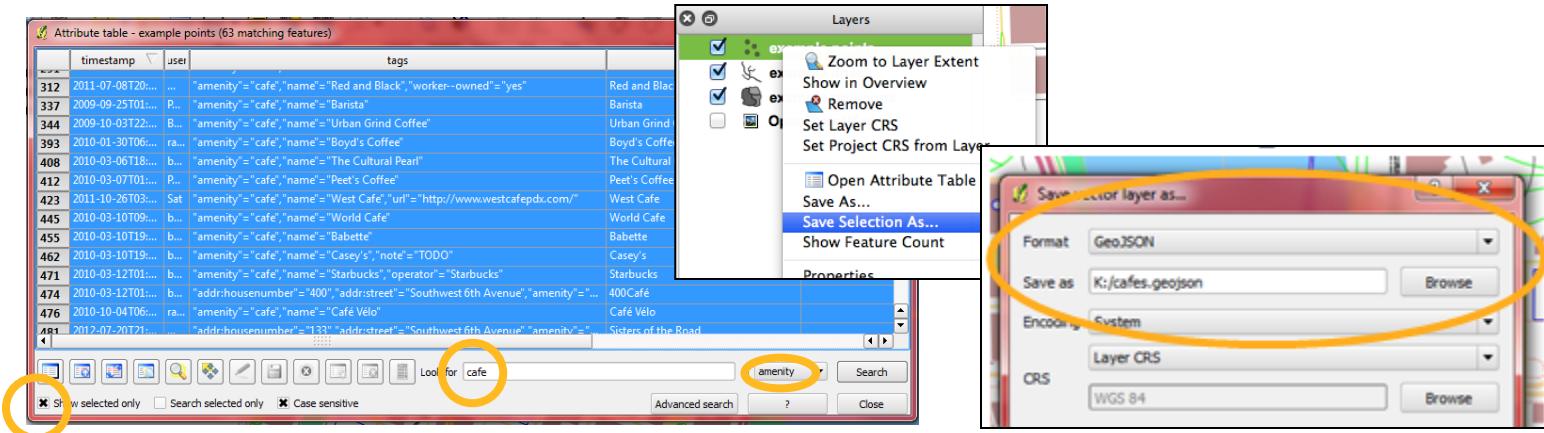


# Use case 1: Web map with TileMill

1. Download the metro area with **JOSM**'s mirrored download plugin and save as a .osm file
2. Use **osm2pgsql** to import the data into a **PostGIS** database, customizing the style file to include specialized tags
3. In **TileMill**, add the layer by connecting to the “planet\_osm\_line” table
4. Style with CartoCSS
5. Upload to MapBox or host on your own
6. Update easily by downloading the same bounding box, running the same osm2pgsql command, and dropping it into TileMill with the same styling

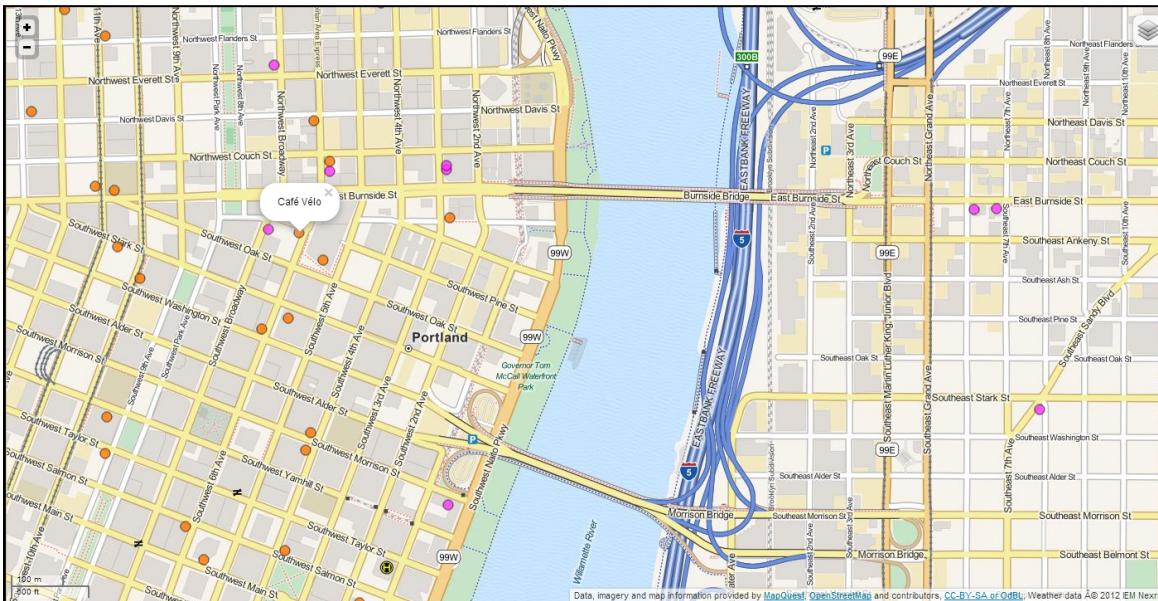
# Use case 2: Leaflet POI web map

- Leaflet works nicely with **GeoJSON**
- Let's say we want to show all of the coffee shops and bars in an area
- Download the data with your preferred method
- Open it in **QGIS** and select only the features you want



## Use case 2: Leaflet POI web map

- Save the selected features out as a .geojson file
- Include the GeoJSON in your Leaflet map by your preferred method



# So, you say you want to process the planet

- Pack your patience – it can easily take months to find the method that works for you, fiddle with settings, and get all of the resources you will need ready
- Ask for help from the mailing lists and OSM/GIS help sites when you need it
  - <http://help.osm.org>
  - <https://lists.openstreetmap.org/listinfo>
  - <https://lists.openstreetmap.org/listinfo/newbies>
  - <https://lists.openstreetmap.org/listinfo/dev>
  - <http://gis.stackexchange.com/>

# Go for it—the data is yours!

- Your main resource for OSM tags (how to filter the data) is <http://wiki.osm.org>
- I've also made a list of common tag keys for you at <https://github.com/pdxmele/gwyw-osm>
- Please remember to credit the OSM contributors: <http://www.openstreetmap.org/copyright>

# The Future: Vector tiles

- TileMill 2
  - “Slim enough to fit the entire world on a single USB stick”
  - <http://www.mapbox.com/blog/vector-tiles/>
  - <https://github.com/mapbox/tm2>
- OSM vector tiles
  - Mapnik vector tiles:  
<http://openstreetmap.us/~migurski/vector-datasource/>
  - NACIS presentation by Michal Migurski (Thursday morning):  
“Speedy Delivery: Vector Tiles from Open Data”