Powerful Mapping Web Applications with Open Source Tools

Part Two: OpenStreetMap

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Before we begin, download this:

http://bit.ly/leaf-osm
or
http://pdxmele.com/leaflet-osm-workshop/workshop.zip

Contents:

- slides.pdf
- Files to start with (osmLeaf.html and osmLeaf.js)
- Two example .geojson files, downloaded from OSM (in case you aren't able to download your own)
- Leaflet & jQuery
- Finished web map in "complete" folder (*don't peek!*)

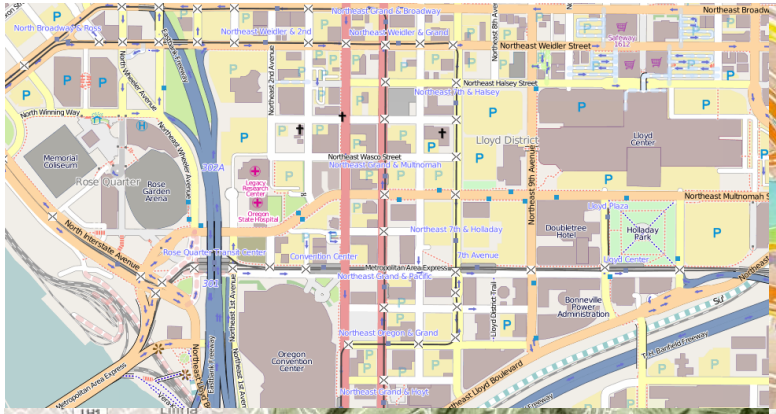
An Introduction to OpenStreetMap

OpenStreetWhat?

- OpenStreetMap or OSM
- ***Not*** "Open Street Maps"
- Founded in 2004
- Worldwide and seamless
- "Wikipedia of Maps"
  - Editable by anyone with an account
  - Data available to anyone, for free
  - … as long as you credit the contributors
- http://www.osm.org

What does it look like?

OSM.org default



Stamen Design

Who uses OpenStreetMap?

- http://switch2osm.org

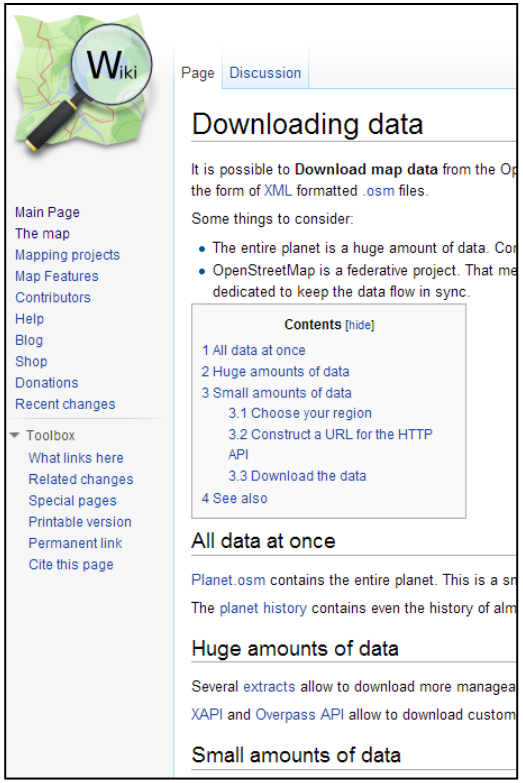
(you)

How do you edit it?

- Create an account
- Various free and open source editors available
- Potlatch and JOSM are very popular
- We will be using iD, a new in-browser editor

How do you get the data?

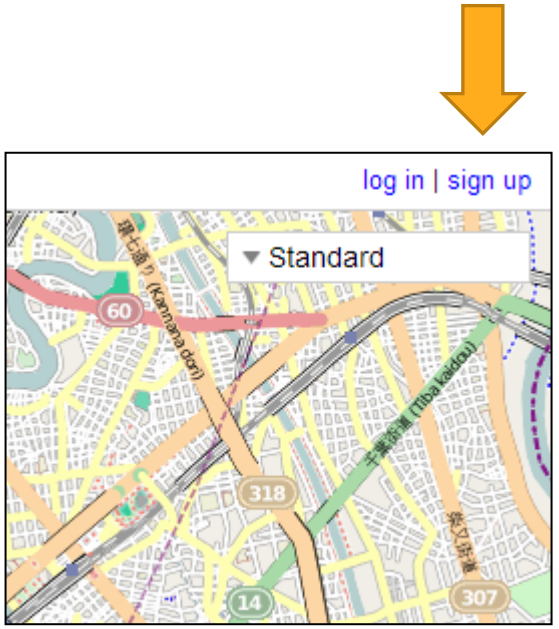
- http://wiki.openstreetmap.org/wiki/Downloading_data
- Download via JOSM
  - Easily download and save small areas
  - "Mirrored Download" plugin for large areas
- Large extracts hosted around the web, updated at differing schedules
- We will be using the OSM plugin for QGIS



Editing basics: Points of interest

Step 1: Sign up for an account

- Go to http://osm.org
- Click the "sign up" link in the top right corner
- Set up your account!



Create a User Account

Fill in the form and we will send you a quick email to activate your account.

Email Address:

Confirm Email Address:

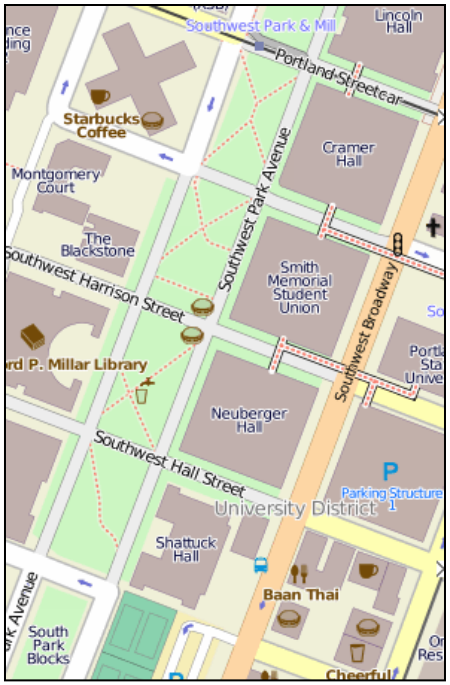
Not displayed publicly (see privacy policy)

Display Name:

Your publicly displayed username. You can change this later in the preferences.

Step 2: Where and what

- Congratulations! You are now the owner of one of > 1 million OSM editing accounts!
- Go to http://osm.org
- Find a neighborhood that you know well
- Think about the places that you know about there - ***local knowledge***
- Notice anything missing?

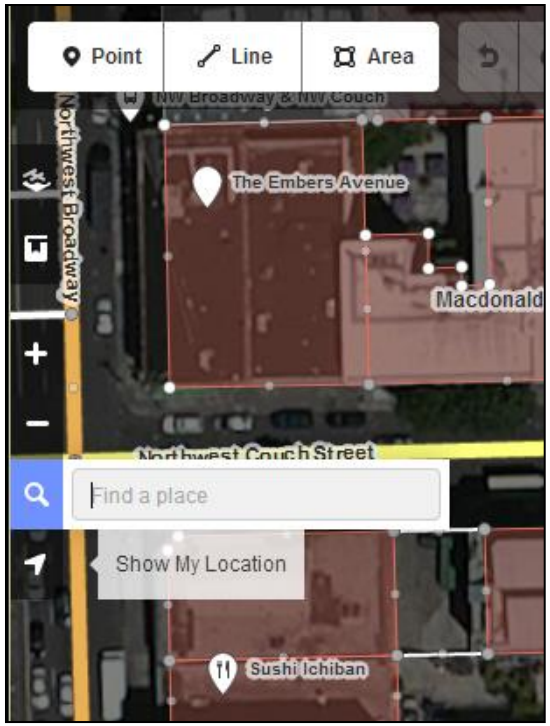


Step 3: Getting started with iD

- Start familiarizing yourself with iD:
  - Go to http://ideditor.com
  - Go through the walkthrough
- Click things to see how they're classified
- Don't worry, you can't break anything ***until you click "Save"***

Step 3: Getting started with iD

- Click the magnifying glass to search for a city or place
- Or, click the arrow to find your current location

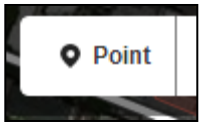


Step 4: Add something

- But first, what's your source?
- **Don't copy from other maps**
- Local knowledge is best, but a dataset with the correct license and permissions can be a source
- You even need permission for aerial imagery (imagery included in OSM editors is OK)
- More info about the OpenStreetMap license (OdBL) can be found at http://www.openstreetmap.org/copyright

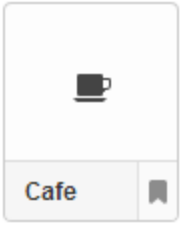
Step 4: Add something

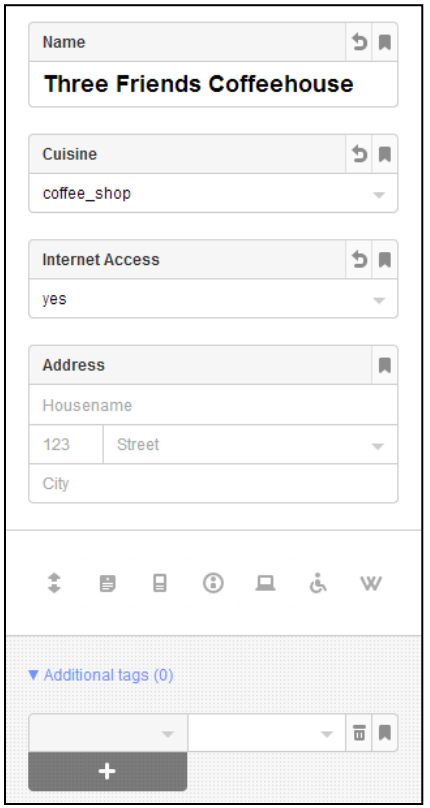
- What do you know about in this area? What are you interested in mapping?
- I picked a café
- Click the "Point" button to add a new point feature
- Click where you want it to be on the map



Step 4: Add something

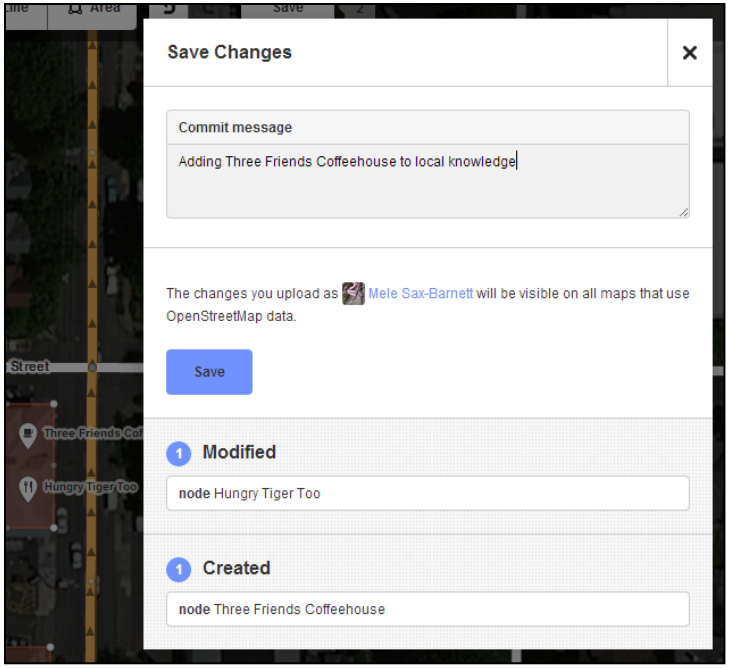
- Click or search the type of feature to set it
- Next, fill in the details that you know





Step 5: Save your edits

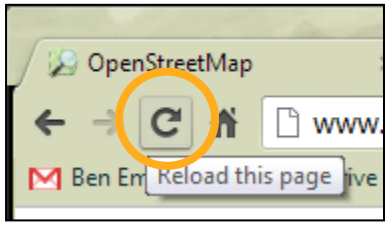
- Save early, save often
- This creates a "changeset" that is sent to the database
- **Give an informative changeset comment** *that includes what you were working on and your sources*
- What imagery are you using? Do you know how to change it?



Step 6: View your edits

- Click "View on OSM" (or go to http://osm.org)
- *Hold down Ctrl while clicking refresh* to clear your browser's cache of map tiles (shift-refresh with Firefox)

Ctrl +



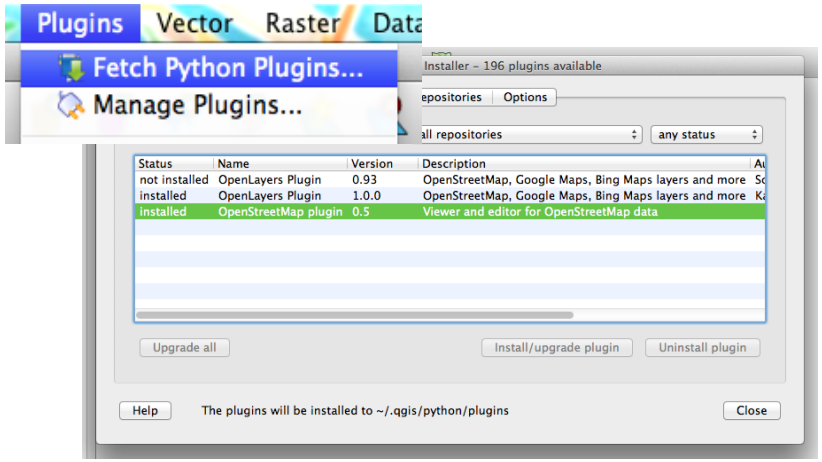
More about editing

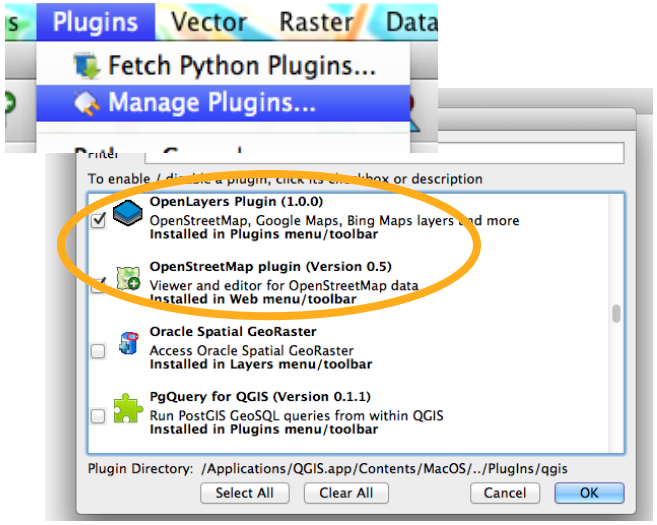
- JOSM (Java OpenStreetMap Editor) is another editor we highly recommend
  - Not too hard to learn, especially if you're familiar with GIS software
  - http://josm.openstreetmap.de/
- Visit http://wiki.osm.org for tagging help, or ask on the newbies listserv http://lists.openstreetmap.org/listinfo/newbies
- Also check out http://learnosm.org

Getting and Preparing your OSM Data

Step 1: Get your plugins running

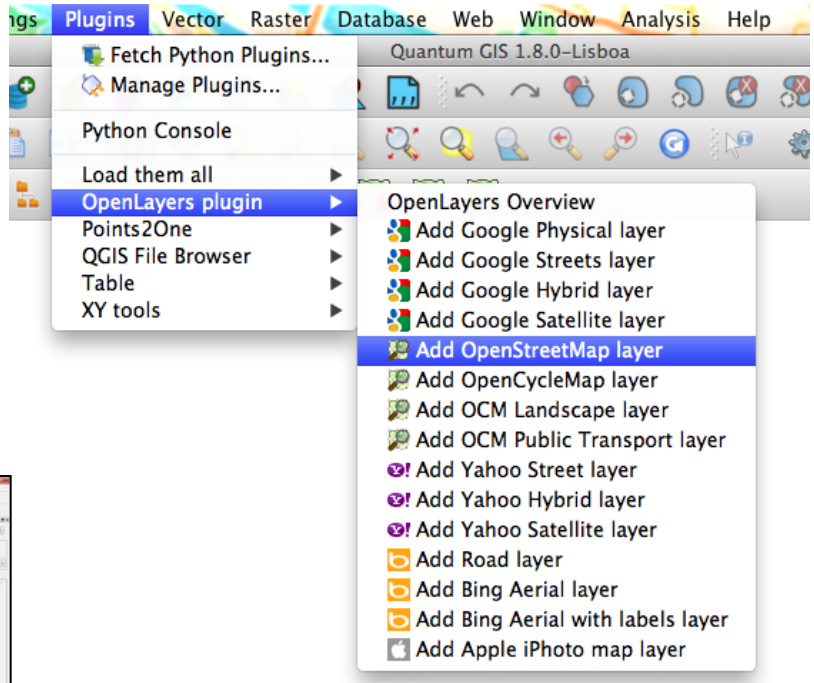
- We will be using just QuantumGIS today to limit the software you needed to install
- Make sure that you've not only downloaded the OSM and OpenLayers plugins, but also turned them on (2 steps)

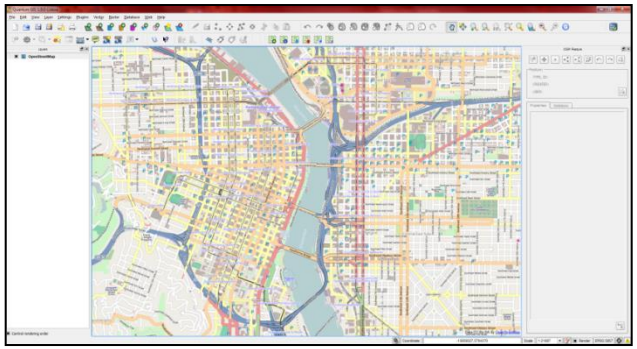




Step 2: Select an area of interest

- Go to Plugins-> OpenLayers plugin -> Add OpenStreetMap Layer
- Zoom and pan to an area of interest (it's a little slow, be patient)

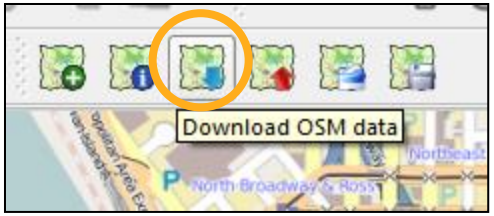




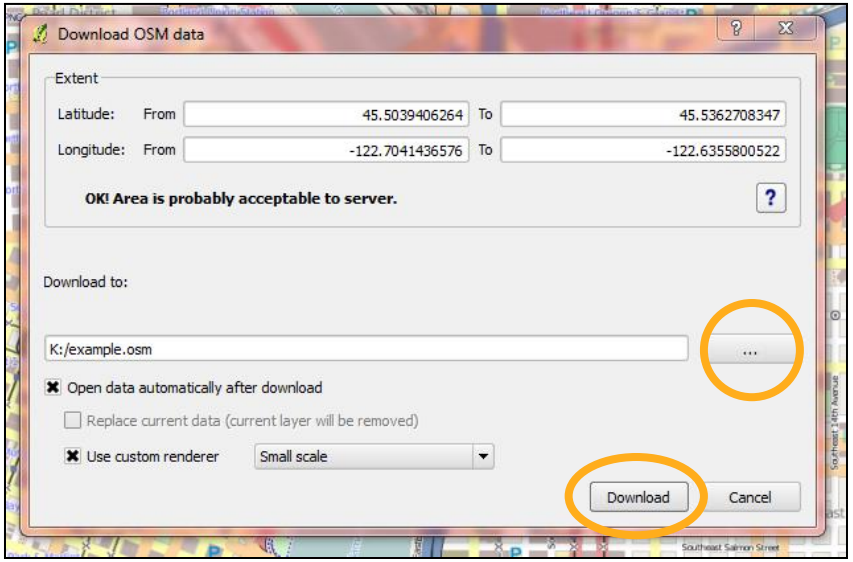
Not too big, now!

Step 3: Download from OSM

- Click the "Download OSM data" button (blue arrow pointing down)
- If you can't see the button, look for and expand the plugin's toolbar

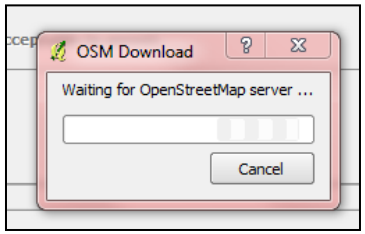


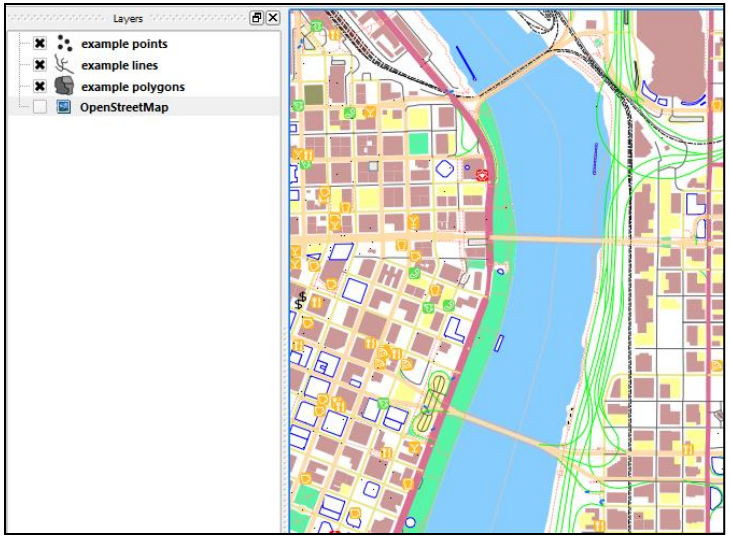
- The extent should be filled automatically
- Click the "…" button to browse for where you want to save the .osm file
- Click "Download"



Step 4: Wait… then view

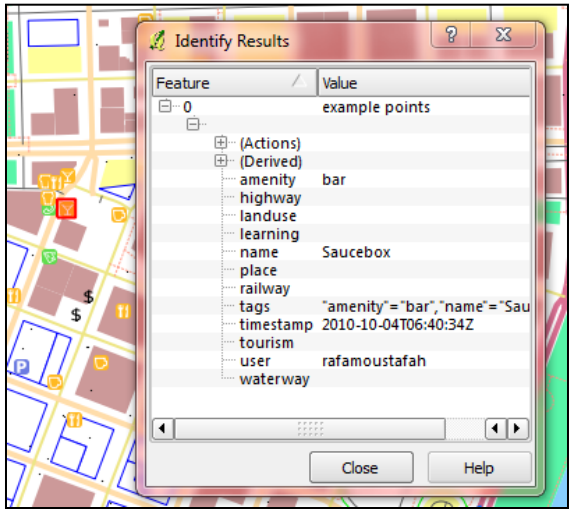
- Again, you can do faster, larger downloads via JOSM's "Mirrored download" plugin, and then open them in QGIS for the next step (though QGIS will still take a while to process large files)
- Turn off the OpenLayers OSM Layer and check it out!

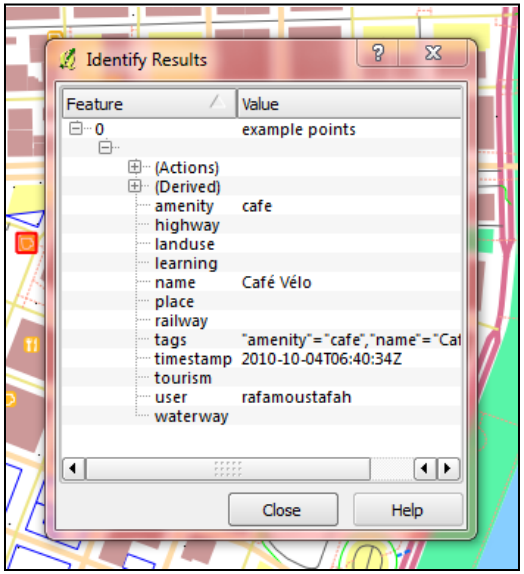




Step 5: Explore

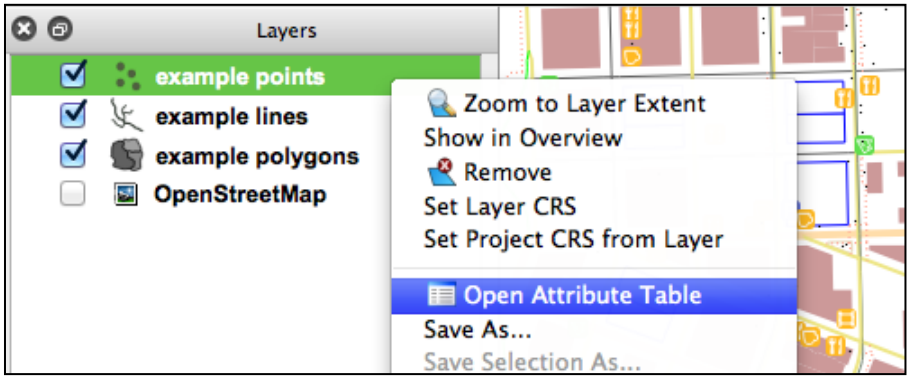
- Click on the points layer to select it and then use the identify tool to check out the attributes of some points





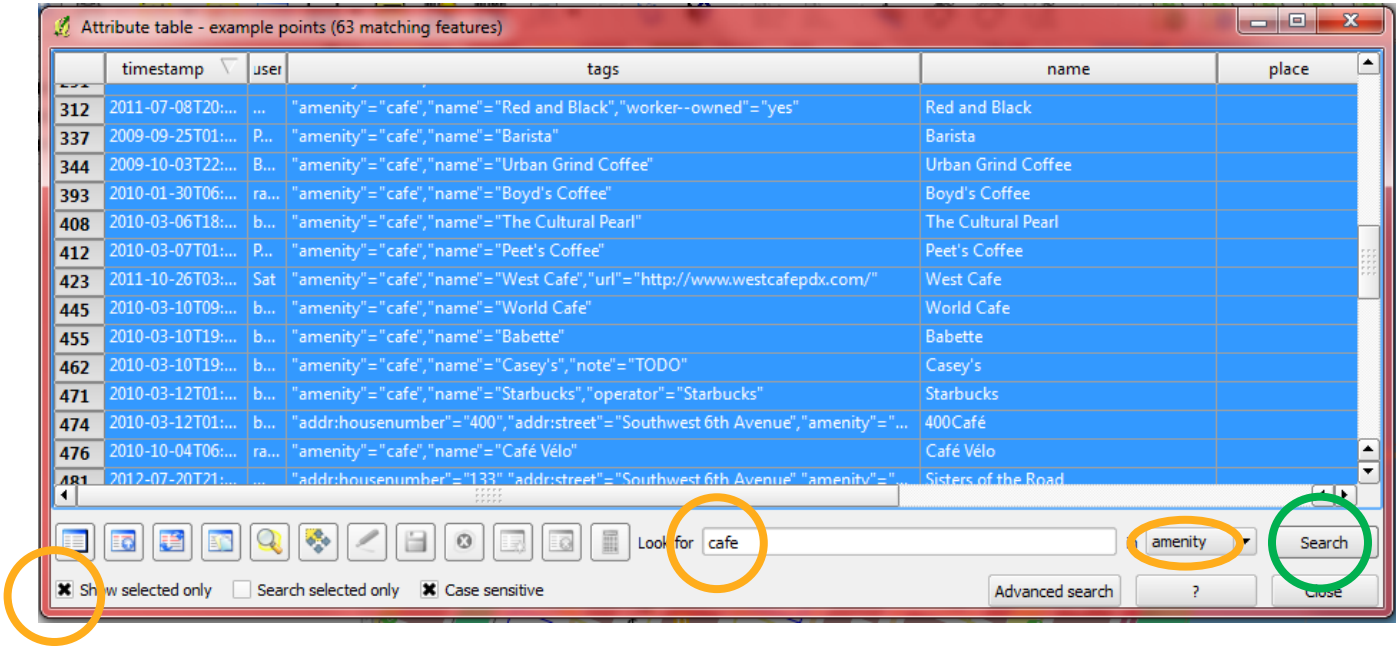
Step 6: Choose what you want

- Right-click on the points layer and select "Open Attribute Table"



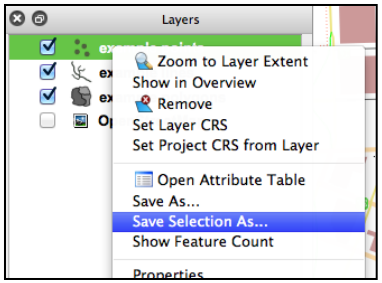
Step 6: Choose what you want

- Search for **cafe**, in **amenity**
- Click the box for **"Show selected only"**

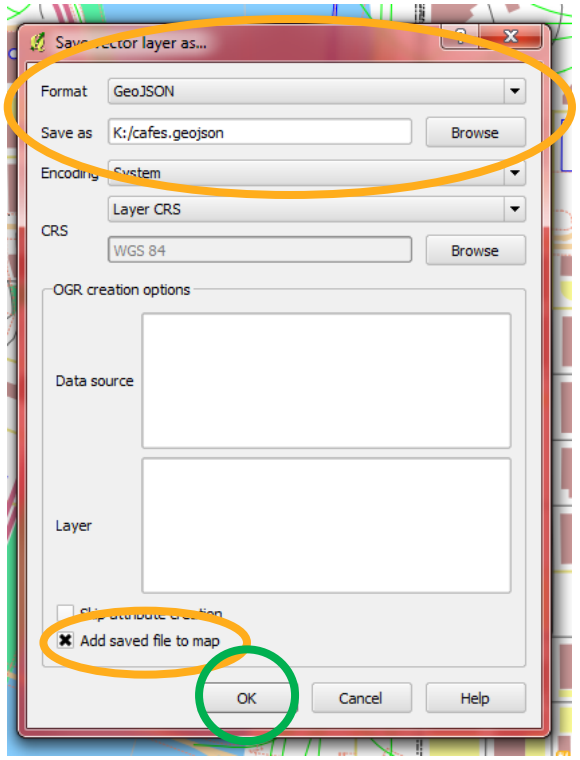


Step 7: Save it as a GeoJSON

- Right-click on the layer and choose "Save Selection As…"

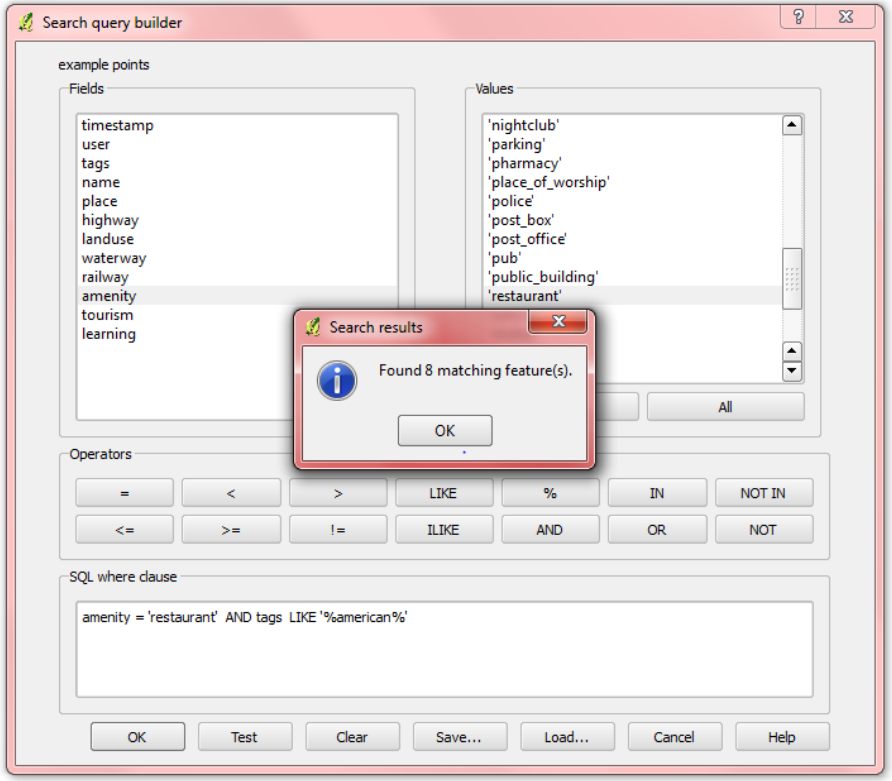


- Choose GeoJSON for the format
- Browse for a file location and choose a name
- Click the box for "Add saved file to map"

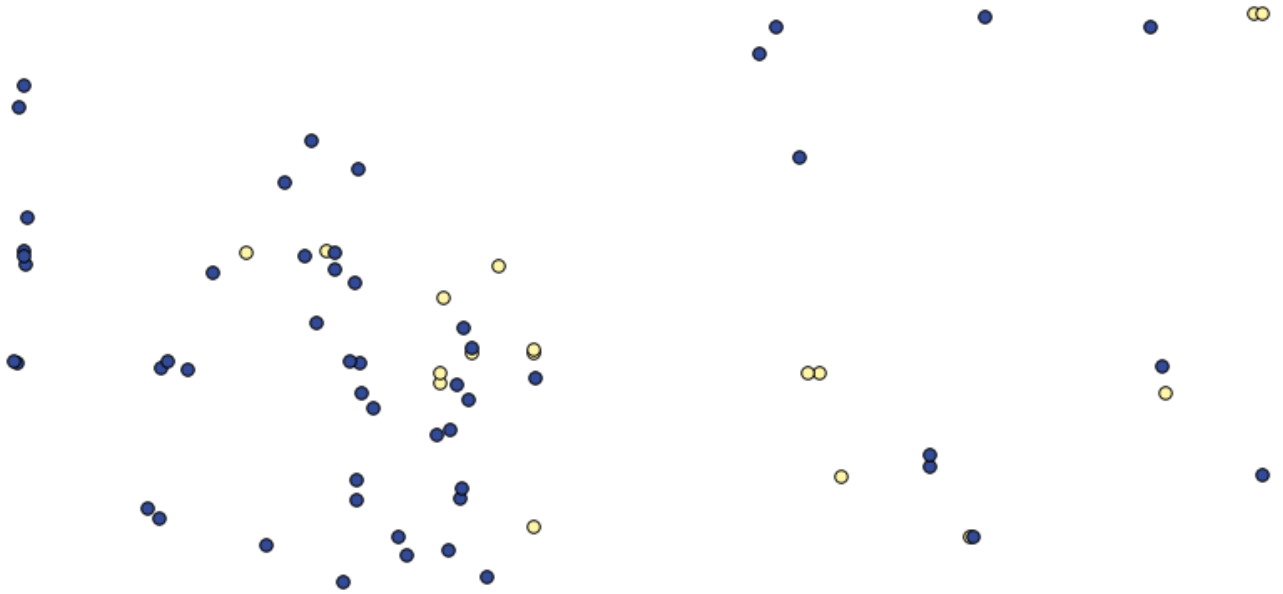


Step 8: Do it again

- Repeat with a different type of POI
- Grant and I are here to help!
- I'm choosing bars
- You can also use the "Advanced search" button to use the Search query builder for more complex queries
- Additional tags should be in the 'tags' field



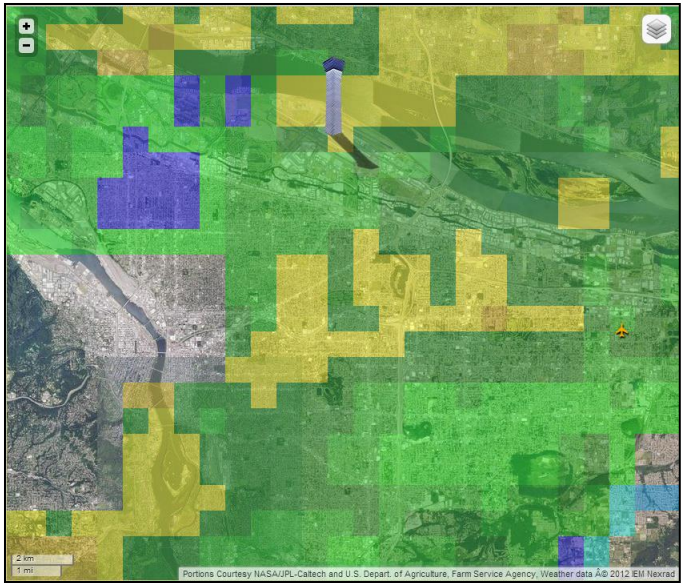
Your OSM-Leaflet Map



Putting GeoJSON OSM POIs into a Leaflet Map

Step 1: Getting started

- Let's build off of one of Wm's examples (Exercise 5)
- Oh no, the rain is coming! Where are some coffee shops or bars that I can hide out in for a while?
- How does the code need to be modified?



Step 2: Adapt what we have

- Let's get rid of the airport, its icon, and the planes
  - Remove this:

```
var airportCode = 'PDX',
        PDXlocation = [45.5891, -122.594], // Portland airport
        appId = 'ebc6552f',
        appKey = '04beae39b6ed9ab36a937dfed0bb484d';
```

  - Scroll down and remove everything after this…

```
map.addControl(layercontrol).addControl(attributioncontrol).addControl(scalecontrol);
```

  - …up until this:

```
    });

}(jQuery));
```

(***DON'T remove this***)

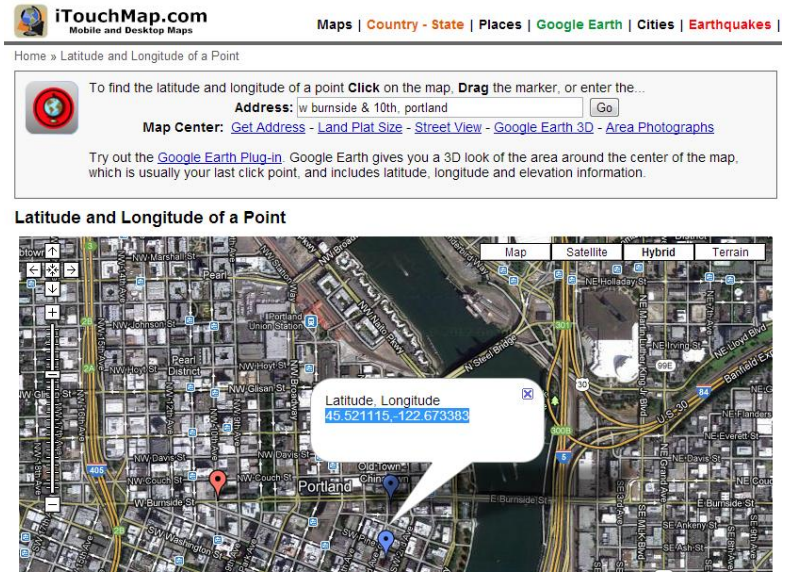
- Do this yourself from ex5.js, or get some tidy files to start with from the workshop zip you downloaded (osmLeaf.html and osmLeaf.js from http://bit.ly/leaf-osm)

Step 3: Change the center & zoom

- http://itouchmap.com/latlong.html and similar tools can help you determine your new map center
- Paste it in []s for the map center

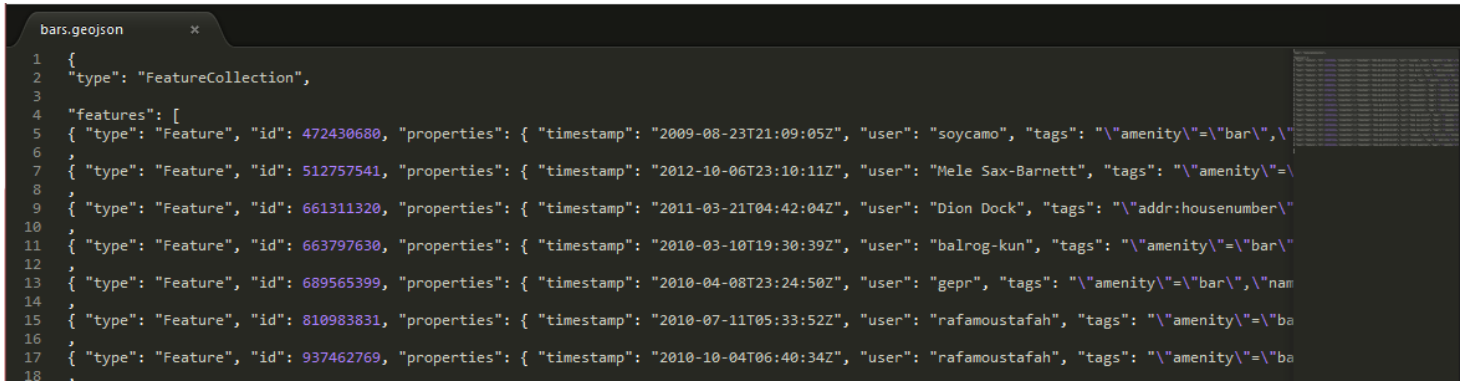
```
var map = L.map('map_div', {
    center: [45.521115,-122.673383],
    zoom: 14,
```

- Increase the zoom



Step 4: Check out your GeoJSON

- So what is GeoJSON anyway? Open up your .geojson files in SublimeText and have a look
- They are just JavaScript files that follow a certain format specification



Step 5: First, set up the styles

- Let's make it so we can tell our layers apart
- Put this code after `map.addControl(layercontrol).` … and mimic it for your second dataset
  - Give the copy a different name and pick a new fillColor (for example, #ff33ff)

```
var cafeStyle = {
    radius: 6,
    fillColor: "#ff7800",
    color: "#000",
    weight: 1,
    opacity: 1,
    fillOpacity: 0.8
};
```

Step 6: Adding the GeoJSON layers to your map

- After both of your style variables, add this:

```
$.getJSON('cafes.geojson', parseCafes);
$.getJSON('bars.geojson', parseBars);
```

  - You will want to change the names to match your datasets
  - These lines take the .geojson files we've created and calls the functions we're about to write

Step 6: Adding the GeoJSON layers to your map

- Next, add this:

```
function parseCafes(data) {
  var cafelayer = L.geoJson(data.features, {
    pointToLayer: function (feature, latlng) {
      return L.circleMarker(latlng, cafeStyle);
    },
    onEachFeature: function(feature, layer) {
      layer.bindPopup(feature.properties.name);
    }
  });
  layercontrol.addOverlay(cafelayer, 'cafes');
  map.addLayer(cafelayer);
}
```

- Then copy it and change the function name, layer name, style name and display name to match your second dataset (parseBars, barStyle, barlayer, ‘bars’)

Step 7: Breaking it down

```
function parseCafes(data) {
```

- We're making a new function that is called by the earlier .getJSON line

```
var cafelayer = L.geoJson(data.features, {
```

- Creates a new layer using L.geoJson with the features in the data we got from the jQuery .getJSON call

Step 7: Breaking it down

```
pointToLayer: function (feature, latlng) {
  return L.circleMarker(latlng, cafeStyle);
},
```

- This styles the data points for the layer

```
onEachFeature: function(feature, layer) {
  layer.bindPopup(feature.properties.name);
}
```

- This adds popups with the features' names

```
  });
  layercontrol.addOverlay(cafelayer, 'cafes');
  map.addLayer(cafelayer);
}
```

- This adds this new layer to the map

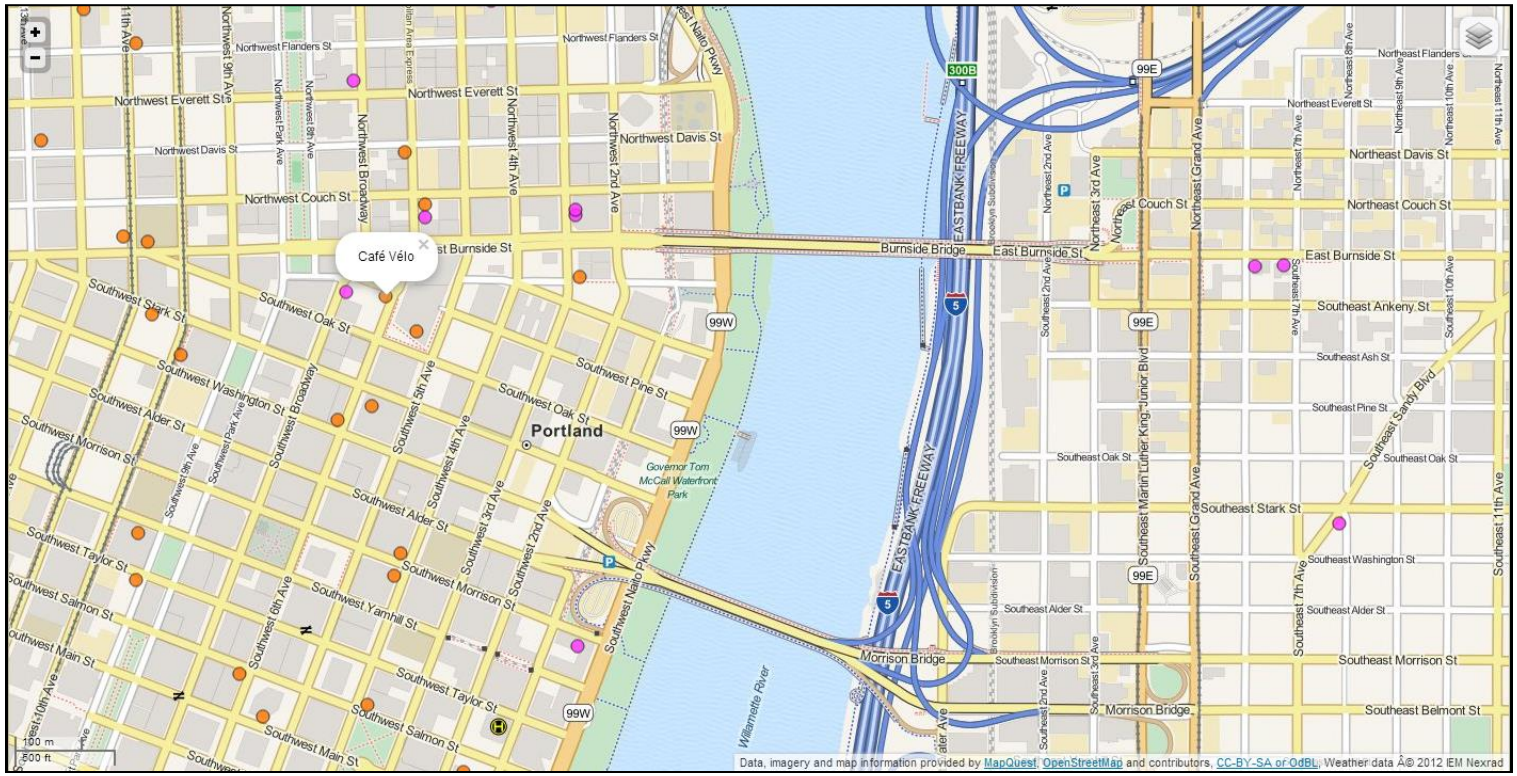
That's it!

- Save and open your fixed-up html file in your web browser. Try Firefox or Safari this time.
- If you're using Chrome to view it locally, it will complain at you about reading from another file. Once it's hosted on a webserver, it will be fine, but in the meantime you can get around it (instructions for Mac):
  - Quit Chrome
  - Open Terminal and type:

    ```
    open –n Google\ Chrome.app/ --args --allow-file-access-from-files
    ```
  - Now reopen your file using Chrome's "Open File"

Your OSM-Leaflet Map

Looking good!



One last word on attribution

- You need to credit OSM properly somewhere in your map or on your webpage
- Since we're already using an OSM tile layer with a © OpenStreetMap contributors in the attribution, we're good to go
  - Part of the MapQuest layer's attribution:

```
&copy; <a href="http://www.openstreetmap.org/copyright" target="_blank">OpenStreetMap</a> contributors'
```

Congratulations!

Great job!
The final version is at:

http://pdxmele.com/leaflet-osm-workshop/complete/osmLeaf.html