Open Street Map Let's Peel Back the OSM Layers

Monday 4/8/2019 Workshop – 1:00 – 5:00 pm

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Associate Fehr & Peers

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Workshop Outline

- What is Open Street Map
  - State of the Map
- Open means what?
  - Stretch
- Your account and OSM Wiki
- Geometries OSM style
- Tags
  - Stretch
- Editing
- Common Uses
  - Basemap and More Extracting Data
- Applied Uses
  - Let's go for a walk

Special Thanks

- Christina Boggs – NorCal GIS URISA All-Star
- Randal Hale – Georgia URISA All-Star
- They previously taught an OSM workshop at the 2014 CalGIS Conference
- Slides with an * are recycled from their presentation – Give Credit when due

Open Street Map

- History
- Contemporary
- Conferences
- Humanitarian
- Help

www.openstreetmap.com

OpenStreetMap

FREE & OPEN MAP

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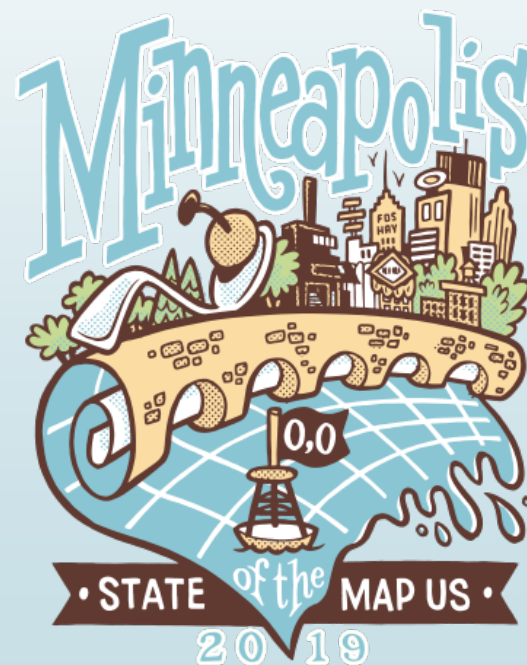
#CalGIS2019   April 8th-10th, 2019; Fresno California

Grassroots Community approach *

- Fight the power of the Royal authority of British national mapping

- Donated GPS tracks around London from Ecourier bicycle track data

- Mapping parties began in 2005 Limehouse Town Hall
  - Who has attended or hosted a mapping party?
  - Who has never attended a mapping party?

- Volunteers map disaster zones, Haiti's 7.0 magnitude Earthquake in 2010

- Share your knowledge and Geographic passion with others

State of The Map – World and US

- Worldwide conference to present and advocate Open Street Map

- General and Technical resources

- Latest applications and newest technologies leveraging OSM

- 2019 – Hedelburg, Germany

    - https://2019.stateofthemap.org/

- SOTMUS – Minneapolis

    - https://2019.stateofthemap.us/

Humanitarian Open Street Map

- https://www.hotosm.org/
- Tasking Manger

Humanitarian OpenStreetMap Team

WHAT WE DO   OUR WORK   TOOLS & DATA   NEWS

HOT is an international team dedicated to humanitarian action and community development through open mapping.

Current Activation

CYCLONE IDAI IN MOZAMBIQUE | VENEZUELA SITUATION IN COLOMBIA   HELP US MAP AFFECTED LOCATIONS

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Open means What?

- Open Data
- Open Source
- Open Use
- Contributions
- API

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ODBL after September 2012 to Present *

- OpenStreetMap is open data, licensed under the Open Data Commons Open Database License (ODBL).

- You are free to copy, distribute, transmit and adapt our data, as long as you credit OpenStreetMap and its contributors. If you alter or build upon our data, you may distribute the result only under the same license. The full legal code explains your rights and responsibilities.

  http://opendatacommons.org/licenses/odbl/

So what does this licensing mean to you? *

- If you download it and use it - your contributions/alterations must be contributed back to the author.

- Any edits made to downloaded OSM data and made publically available need to be either added to OSM or made available to all.

- https://wiki.osmfoundation.org/wiki/Licence

Help - https://www.openstreetmap.org/help

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- OpenStreetMap has several resources for learning about the project, asking and answering questions, and collaboratively discussing and documenting mapping topics.

- **Welcome to OSM – Let's review together**

- Start with this quick guide covering the OpenStreetMap basics.

- **Beginners' Guide – Who needs to create an account?**

- Community maintained guide for beginners.

- **help.openstreetmap.org**

- Ask a question or look up answers on OSM's question-and-answer site.

- **Mailing Lists**

- Ask a question or discuss interesting matters on a wide range of topical or regional mailing lists.

- **Forums**

- Questions and discussions for those that prefer a bulletin board style interface.

- **IRC**

- Interactive chat in many different languages and on many topics.

- **switch2osm**

- Help for companies and organisations switching to OpenStreetMap based maps and other services.

- **For Organizations**

- With an organization making plans for OpenStreetMap? Find what you need to know in the Welcome Mat.

- **wiki.openstreetmap.org**

- Browse the wiki for in-depth OSM documentation

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Open an Account

http://www.openstreetmap.com

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- Create your account – Share your username with your new friends with your nametag

- Read and accept the Contributor terms

- Explore the Wiki - https://wiki.openstreetmap.org/wiki/Main_Page and tell us something about how your profession could contribute to OSM.

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https://www.igismap.com/gis-tutorial-basic-spatial-elements-points-lines-and-polygons/

Geometries *
Special Thanks To Randal and Christina

Points, Lines and Polygons – OSM Style
a.k.a. Elements *

Nodes = Points; Ways = Lines and Polygons

- Closed Ways can also be Areas
- Relations describe logical or geographic relationships (think of multipoints or multipolygons or mmmmmm donuts)

Nodes *

Single X and Y Coordinate

Things that would be a node:

- Fire hydrant

- Water fountain

- Door/entrance

- Pole

- Sign

- Tree

Way(s) *

Open Polyline(s)

Things that would be a way(s):

- Stream(s)
- Trail(s)
- Road(s)
- Railroad(s)
- Subway(s)
- Trolley route(s)
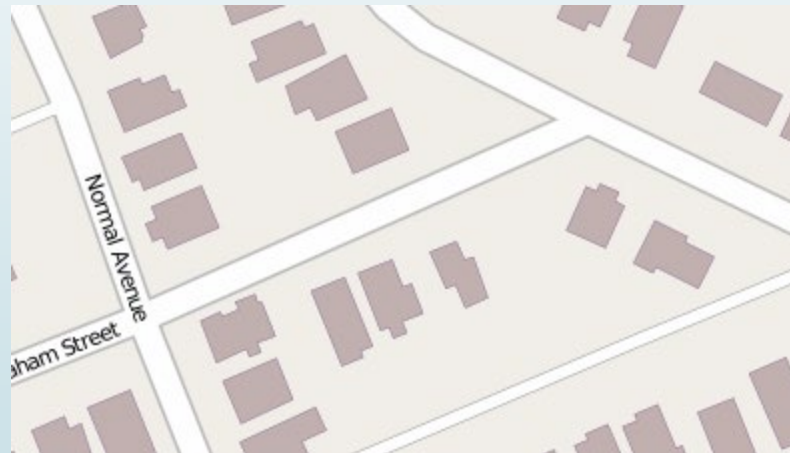
Way(s) *

Closed Way – 1ˢᵗ and last node are shared

- Things that would be a closed way:
- Some highways (bypass or loop)
- Fence
- Hedge

Typically these would have an area=yes tag

I know – "What's a tag?" We're getting there…

Way(s) Area *

Closed Way Tagged as Area

Things that would be an area:

- Lake

- Building

- Park

- Parking lot

- Forested area

Geometry Recap *

- Two or more nodes that are connected form a way

- A way that closes in on itself forms a closed way

- A closed way can be an area (linear) or a building (polygon)

And all of that brings you to…

File Format *

XML File Format

```
<node id="25496583" lat="51.5173639" lon="-0.140043" version="1" changeset="203496" user="80n"
    uid="1238" visible="true" timestamp="2007-01-28T11:40:26Z">
  <tag k="highway" v="traffic_signals"/>
</node>
```

Readable by:

- ArcGIS http://www.esri.com

- GDAL/OGR (Geospatial Data Abstraction Library) http://www.gdal.org

- QGIS* http://www.qgis.org

- PostGIS* http://www.postgis.org

XML Data *

```xml
<?xml version="1.0" encoding="UTF-8"?>
<osm version="0.6" generator="CGImap 0.3.1 (12589 thorn-03.openstreetmap.org)" copyright="OpenStreetMap and contributo
rs" attribution="http://www.openstreetmap.org/copyright" license="http://opendatacommons.org/licenses/odbl/1-0/">
 <bounds minlat="33.7763000" minlon="-84.3755000" maxlat="33.7826000" maxlon="-84.3700000"/>
 <node id="69146790" visible="true" version="3" changeset="2760040" timestamp="2009-10-06T13:06:24Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7736660" lon="-84.3709040">
  <tag k="highway" v="traffic_signals"/>
 </node>
 <node id="69207007" visible="true" version="2" changeset="3353549" timestamp="2009-12-12T03:39:32Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7781240" lon="-84.3698620"/>
 <node id="69262567" visible="true" version="2" changeset="3021897" timestamp="2009-11-03T03:07:16Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7768670" lon="-84.3701950"/>
 <node id="69262596" visible="true" version="2" changeset="3021897" timestamp="2009-11-03T03:07:16Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7770150" lon="-84.3724120"/>
 <node id="69262565" visible="true" version="2" changeset="3110547" timestamp="2009-11-14T04:47:28Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7768890" lon="-84.3702880"/>
 <node id="69262604" visible="true" version="2" changeset="3110547" timestamp="2009-11-14T04:47:28Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7770470" lon="-84.3712830"/>
 <node id="69262572" visible="true" version="2" changeset="3353549" timestamp="2009-12-12T03:48:29Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7768710" lon="-84.3683620"/>
 <node id="69262574" visible="true" version="3" changeset="3353549" timestamp="2009-12-12T03:48:29Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7768712" lon="-84.3675646"/>
 <node id="69262593" visible="true" version="3" changeset="13214719" timestamp="2012-09-23T01:22:26Z" user="Ryan Lash"
 uid="127401" lat="33.7771300" lon="-84.3727846"/>
 <node id="69279745" visible="true" version="2" changeset="3110547" timestamp="2009-11-14T04:48:05Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7805660" lon="-84.3776520"/>
 <node id="69279730" visible="true" version="2" changeset="3353549" timestamp="2009-12-12T03:50:58Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7778480" lon="-84.3776640"/>
 <node id="69279742" visible="true" version="2" changeset="3353549" timestamp="2009-12-12T03:50:58Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7795120" lon="-84.3776560"/>
 <node id="69281042" visible="true" version="2" changeset="3353549" timestamp="2009-12-12T03:51:08Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7790430" lon="-84.3695570"/>
 <node id="69282165" visible="true" version="2" changeset="2760040" timestamp="2009-10-06T13:19:26Z" user="woodpeck_fi
xbot" uid="147510" lat="33.7794980" lon="-84.3711310"/>
```

A Website*

History of Edits*

Exercise*

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➡ Who is editing in your neighborhood

1. Click History

2. What are the people editing?

3. Click on each Changeset number.

4. What was changed?

Tagging

- Map Features - most popular tags in OSM
- Category:Tagging guidelines by country - for tagging rules specific to some country / territory
- Category:Features - for tags grouped by their purpose or function
- Category:Proposed features - to find *new tags* and *not-popular-yet* tags
- To find new tags search wiki or use Taginfo
- Editing standards and conventions
- If you miss a proper tag, you can start a proposal process
- There are already proposed features

**Tags
What does it all mean?**

Tags*

- *Tags* are attributes
- OpenStreetMap is feature rich
  - Also known as *keys* and *values*
  - As of 05/01/2013 there are:
    - └41,221 different keys
    - └59,593,881 different values or tags

New Tag Creation*

- Tags are vetted by the community
- If you have something you want to add
  - Send email to tagging@openstreetmap.org
  - **Subject line**: "Feature Proposal – RFC – (*Feature Name*)"
  - **Subject line**: "Feature Proposal – Voting – (*Feature Name*)"
  - A rule of thumb for "enough support" is 8 unanimous approval votes or 15 total votes with a majority approval, but other factors may also be considered.

How do you know what to do? *

Preplan your edits if possible, then look up through the resources

Go here: http://wiki.openstreetmap.org

Example parking lots:

- Geometry is a closed way
- *amenity = parking*
- Parking lanes can be *highway = service*

Values are very British*

Highway: http://wiki.openstreetmap.org/wiki/Highway

*highway = **primary***

Administrative classification in the UK, generally linking larger towns.

*highway = **secondary***

Administrative classification in the UK, generally linking smaller towns and villages

*highway = **tertiary***

A "C" road in the UK. Generally for use on roads wider than 4 metres (13') in width, and for faster/wider minor roads that aren't A or B roads. In the UK, they tend to have dashed lines down the middle, whereas unclassified roads don't.

*highway = **residential***

Roads which are primarily lined with housing, but which are of a lowest classification than tertiary and which are not living streets. Using *abutters=residential* together with tertiary, secondary etc for more major roads which are lined with housing.

*highway = **path***

A non-specific or shared-use path. Probably better to use *highway=footway* for paths mainly for walkers, *highway=cycleway* for one also usable by cyclists, *highway=bridleway* for ones available to horses as well as walkers and *highway=track* for ones which is passable by agriculture or similar vehicles.

The Wiki

https://wiki.openstreetmap.org/wiki/Main_Page

Welcome to OpenStreetMap, the project that creates and distributes *free* geographic data for the world. We started it because most maps you think of as free actually have legal or technical restrictions on their use, holding back people from using them in creative, productive, or unexpected ways.

More about OpenStreetMap | How to contribute | Where to get help

Use OpenStreetMap	Contribute free map data	Software Development
Using OpenStreetMap	Beginners' Guide	Develop and use the Platform
• Browse our world map ⧉ • Check the ready-to-use products for your mobile device, your desktop computer or the web services • ...more on using OpenStreetMap	• Browse the map feature documentation • Browse the Mapping projects • ...more on contributing map data	• Use OpenStreetMap for your software • Contribute to the OpenStreetMap software
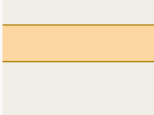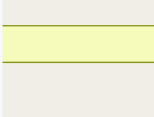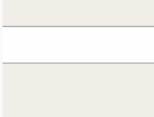
➨ https://wiki.openstreetmap.org/wiki/Map_Features#Transportation

Wiki – Detailed Explanations*

https://wiki.openstreetmap.org/wiki/Key:highway
https://taginfo.openstreetmap.org/keys/highway#overview

Roads

These are the principal tags for the road network. They range from the most to least important.

highway	motorway	⚃	A restricted access major divided highway, normally with 2 or more running lanes plus emergency hard shoulder. Equivalent to the Freeway, Autobahn, etc..		
highway	trunk	⚃	The most important roads in a country's system that aren't motorways. (Need not necessarily be a divided highway.)		
highway	primary	⚃	The next most important roads in a country's system. (Often link larger towns.)		
highway	secondary	⚃	The next most important roads in a country's system. (Often link towns.)		
highway	tertiary	⚃	The next most important roads in a country's system. (Often link smaller towns and villages)		
highway	unclassified	⚃	The least important through roads in a country's system – i.e. minor roads of a lower classification than tertiary, but which serve a purpose other than access to properties. (Often link villages and hamlets.) The word 'unclassified' is a historical artefact of the UK road system and does **not** mean that the classification is unknown; you can use highway=road for that.		

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How you tag is up to you...

...mostly

- You can be as detailed as you want

- You can be as generic as you want

- Something is better than nothing

Example:

- amenity=cafe

- amenity=fast_food

- cuisine=* - for describing the ethnicity or type of the food served.

- diet=* - for describing dietary choices on offer such as vegetarian.

- brewery=* - Brewery, which beer is sold.

- opening_hours=* - for describing the opening hours.

- payment=* - for describing the payment methods accepted

- website=* - for providing a link to a restaurant's website

- contact:website=* - another (less frequently used) way for providing a link to a restaurant's website.

- wheelchair=yes/no/limited - To indicate if the location is accessible with a wheelchair.

- drive_in=yes/no - To indicate if a restaurant offers drive-in service. See Drive-in for more information.

- takeaway=* - yes/no/only/seasonal. Does the amenity offer anything to take away.

Tags

- Research tags for an interesting idea
- Investigate tags for items
- https://taginfo.openstreetmap.org/tags

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Editing
Putting your hard earned GIS skills to practice

Top three editors

iD is the easy to

Potlatch 2 is

JOSM is a highl

https://wiki.openstreetmap.org/wiki/Editors

Editors

- iD – in-browser editor – my preferred
- Potlach 2 (in-browser editor)
- Remote – JOSM or Merkaartor

Remember These

Basic Terms For Mapping

OpenStreetMap has some of its own lingo. Here are a few key words that'll come in handy.

An **editor** is a program or website you can use to edit the map.

A **node** is a point on the map, like a single restaurant or a tree.

A **way** is a line or area, like a road, stream, lake or building.

A **tag** is a bit of data about a node or way, like a restaurant's name or a road's speed limit.

Editing with iD
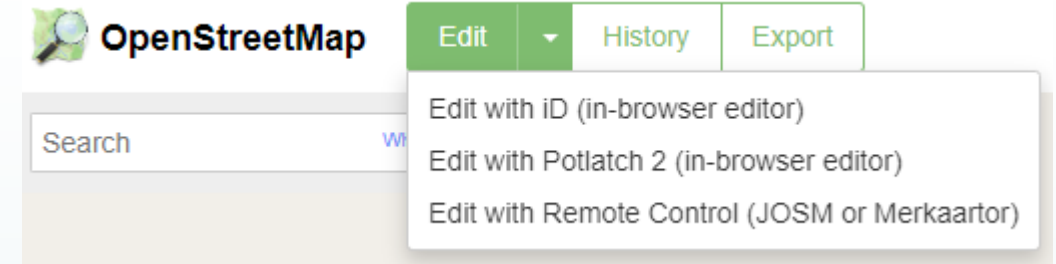
- Works best in Chrome and Firefox
- Login – then select from dropdown menu
- You can search on content, locations,
- You can select items to edit
- You can create new from scratch
- Don't forget to include tags

Adding Tag to Existing Highway at a Node

9; Fresno California

Editing with iD

- ➥ Select a location
- ➥ Make edits
- ➥ Add tags
- ➥ https://learnosm.org/en/beginner/id-editor/

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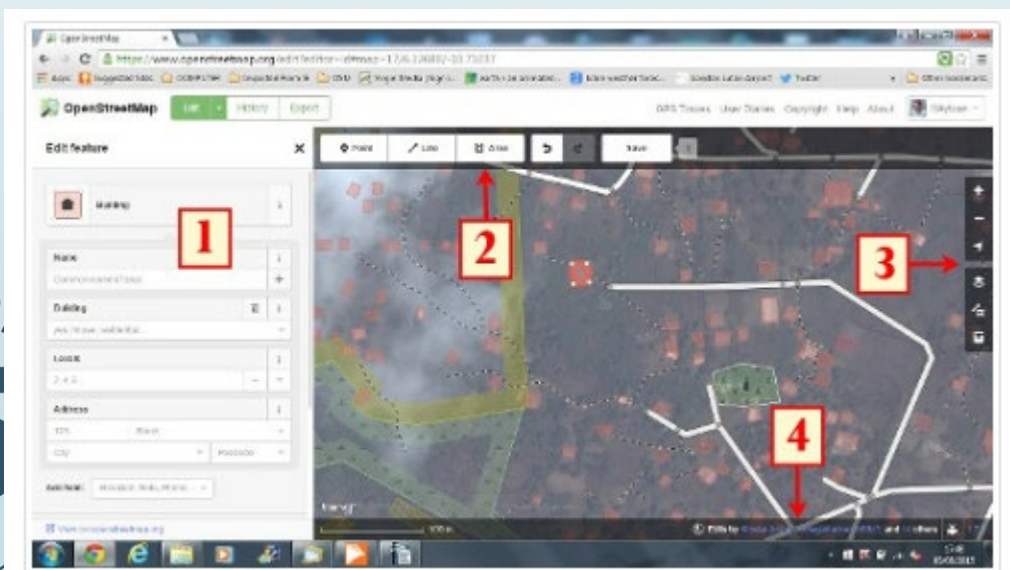
Background

⌄ Backgrounds

- ⦿ Bing aerial imagery
- ◯ DigitalGlobe Premium Imagery
- ◯ DigitalGlobe Standard Imagery
- ◯ Esri World Imagery
- ◯ Esri World Imagery (Clarity) Beta
- ◯ Mapbox Satellite
- ◯ OpenStreetMap (Standard)
- ◯ OpenTopoMap
- ◯ Stamen Terrain
- ◯ USGS Imagery
- ◯ U.S. Forest Service roads
- ◯ USGS Topographic Maps
- ◯ None
- ◯ Custom   ...

☐ Show Minimap

⌞ Imagery Info / Report a Problem

⌄ Overlays

- ☑ Locator Overlay
- ☐ OpenStreetMap GPS traces
- ☐ U.S. Forest Roads Overlay
- ☐ TIGER Roads 2017

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JOSM editor

➥ https://josm.openstreetmap.de/

➥ Awesome for bulk editing, locally stored and uploaded in a batch

➥ Offline editing

➥ Requires Java Runtime 8 update 201 – 4/7/2019

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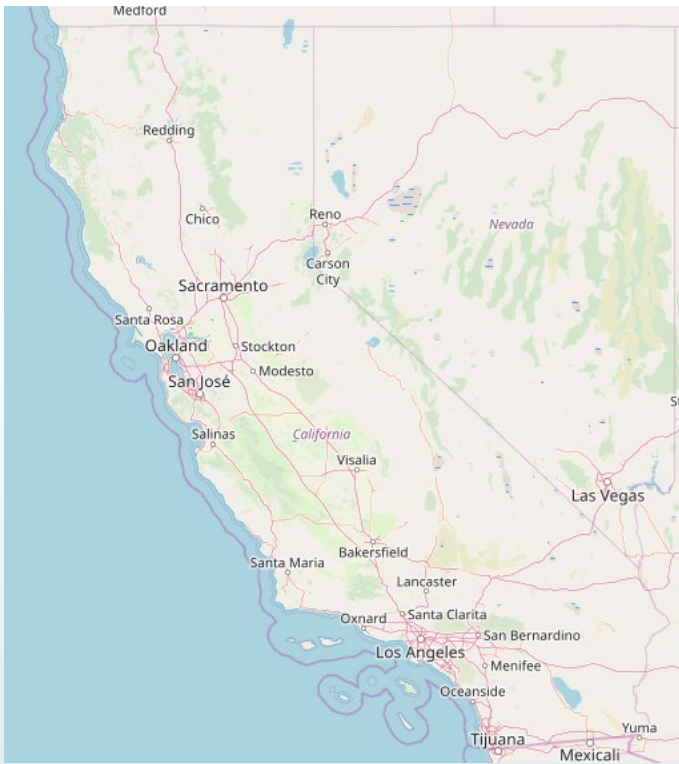moving California GIS forward, together

#Ca
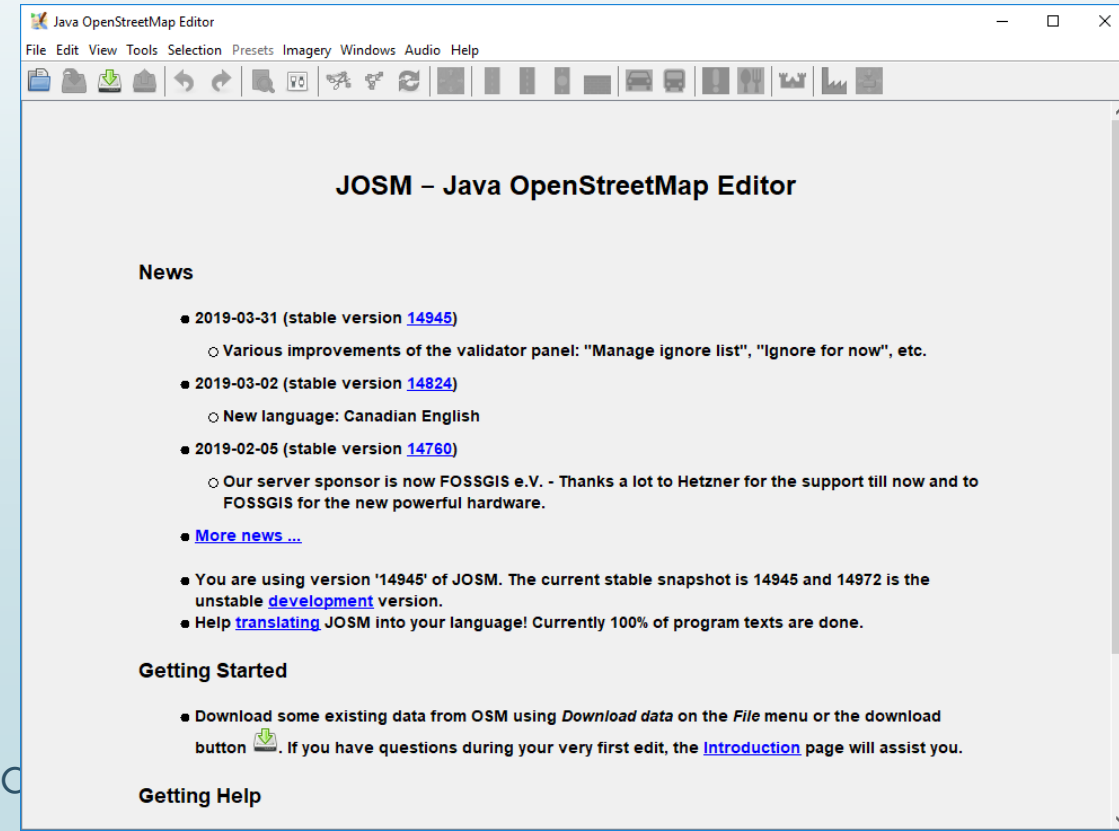
Editing with Software*

Java OpenStreetMap Editor (JOSM)

- More or less the standard for editing in OSM

- Edits offline

- Edits are reconciled against the database

  – Versioning control

- Can be run from web or installed

- Style editor for the map display, including multiple styles
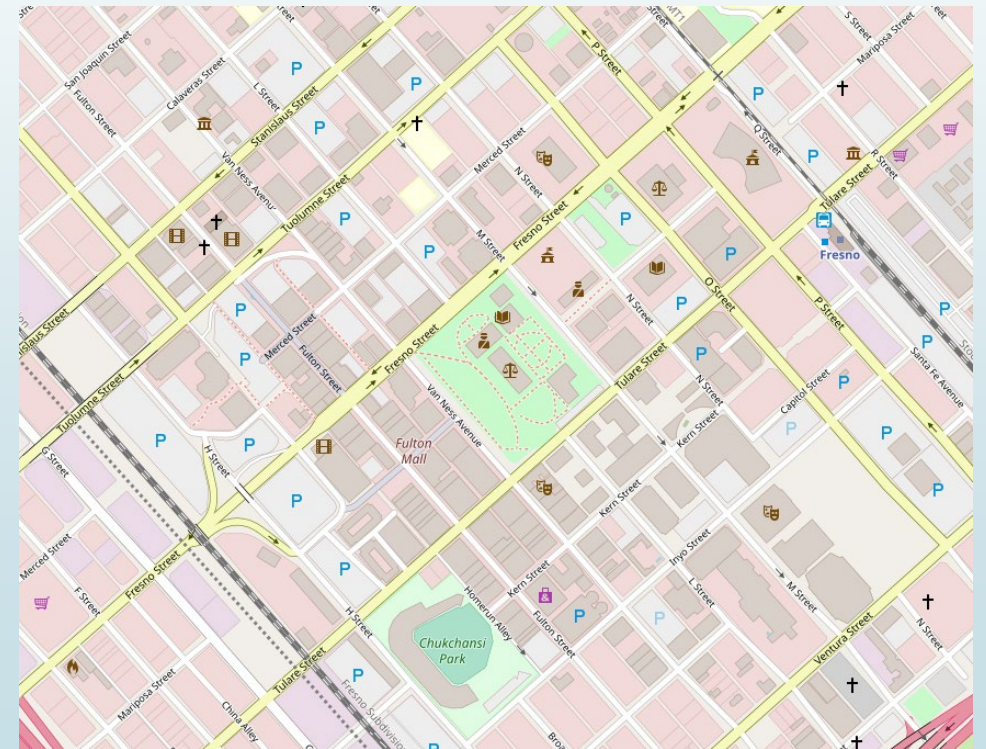
- Connects to GPS

Common Uses

Basemaps, API, Routing, Data Sources, Geocoding

Basemaps

- ArcGIS - https://www.arcgis.com/home/item.html?id=b834a68d7a484c5fb473d4ba90d35e71

- QGIS – various plugins

- Leaflet

Routing and Routing uses

- Open Trip Planner - https://www.opentripplanner.org/
  - https://Trips.vta.org
  - https://modbeta.trimet.org/map/#/
- Graphhopper
  - https://www.graphhopper.com/
- Valhalla
  - http://valhalla.github.io/demos/routing/#loc=13,40.751000,-73.978300
- Open Source Routing Machine - OSRM
  - http://project-osrm.org/
- Open Route Service
  - https://openrouteservice.org/
- And more

Geocoding

- Nominatim – original geocoder from OSM
  - http://nominatim.org/
- Pelias
  - https://pelias.io/
- Limitations of geocoders
  - Address ranges
 - Point Addresses
  - Data Quality

API's, editing, downloads

- ➤ Editing API – enable the editing tools

- ➤ Downloading API - .pbf file

  - ➤ Small batches from main API primarily used by editing applications

- ➤ Metro Extracts of OSM

  - ➤ https://metro-extracts.nextzen.org/

- ➤ Overpass API

  - ➤ https://lz4.overpass-api.de/

- ➤ Overpass Turbo

  - ➤ https://overpass-turbo.eu/

Data Source

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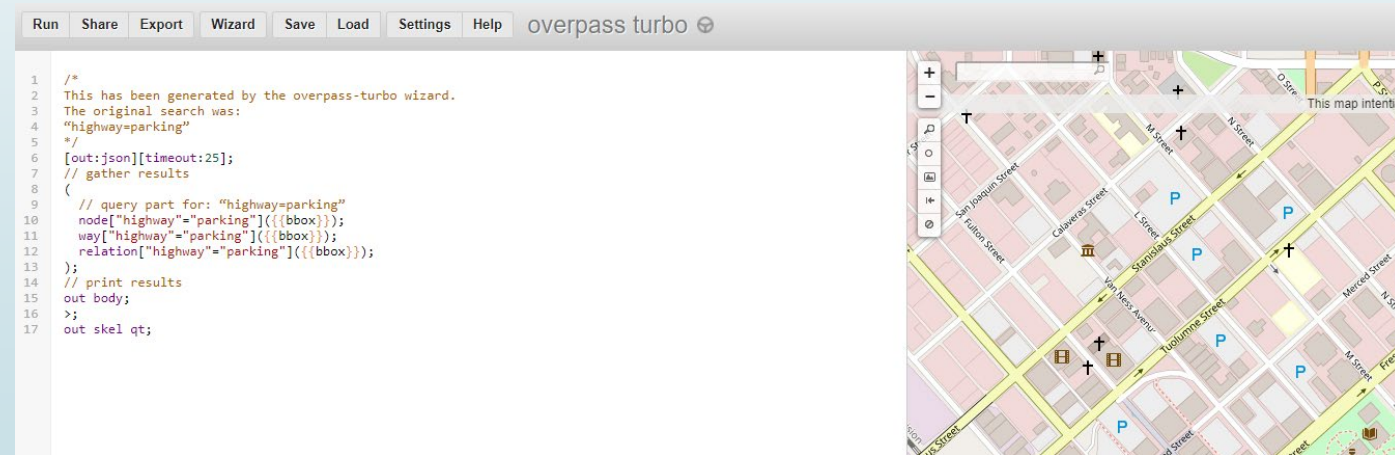
- The Export
  - Overpass Turbo
- How do you want your data?
- Do you have a database for it?
- Use tags to optimize your query
- Try the wizard
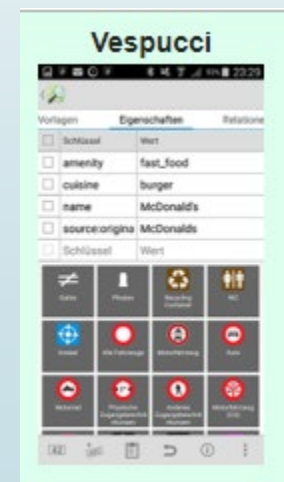 - parking=surface or parking=multi-storey
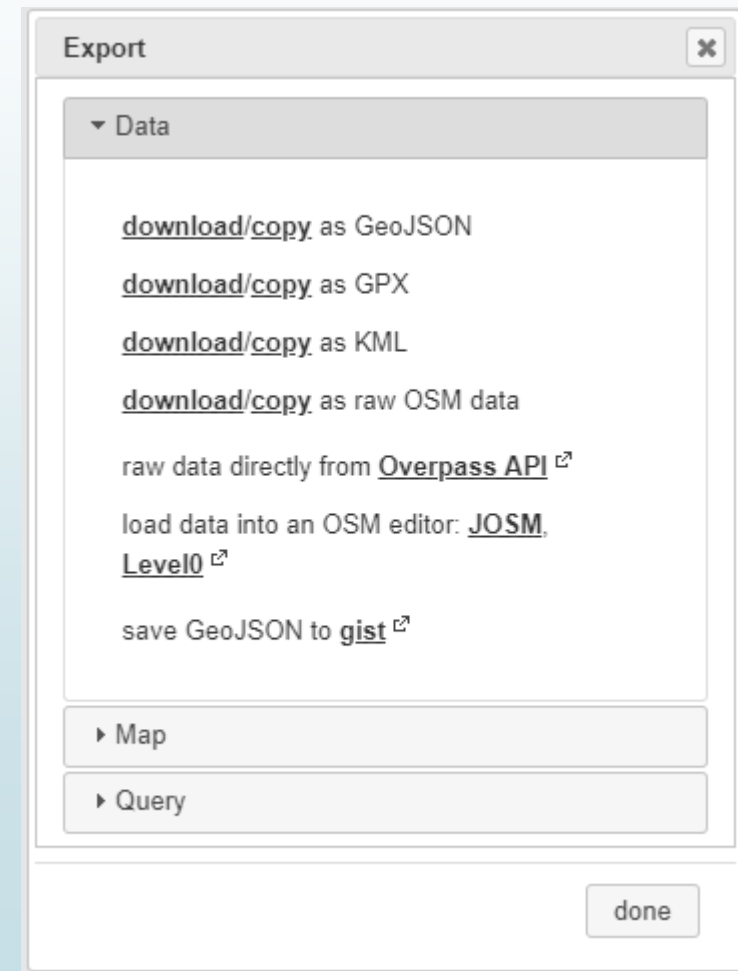
Apply to your preferred software and analysis

- What do you want to do with your downloaded data

- Inventories

- Advanced Spatial Analysis

- Level of Traffic Stress

- What is the quality of the data?

- Do you need at add data into OSM?

Walking and Mapping Time

A C T I V I T Y

- Let's team up or download an app
- Vespucci - http://vespucci.io/
  - Android
- Go Map!! - https://wiki.openstreetmap.org/wiki/Go_Map!!
  - iOS only

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Questions? / Preguntas?