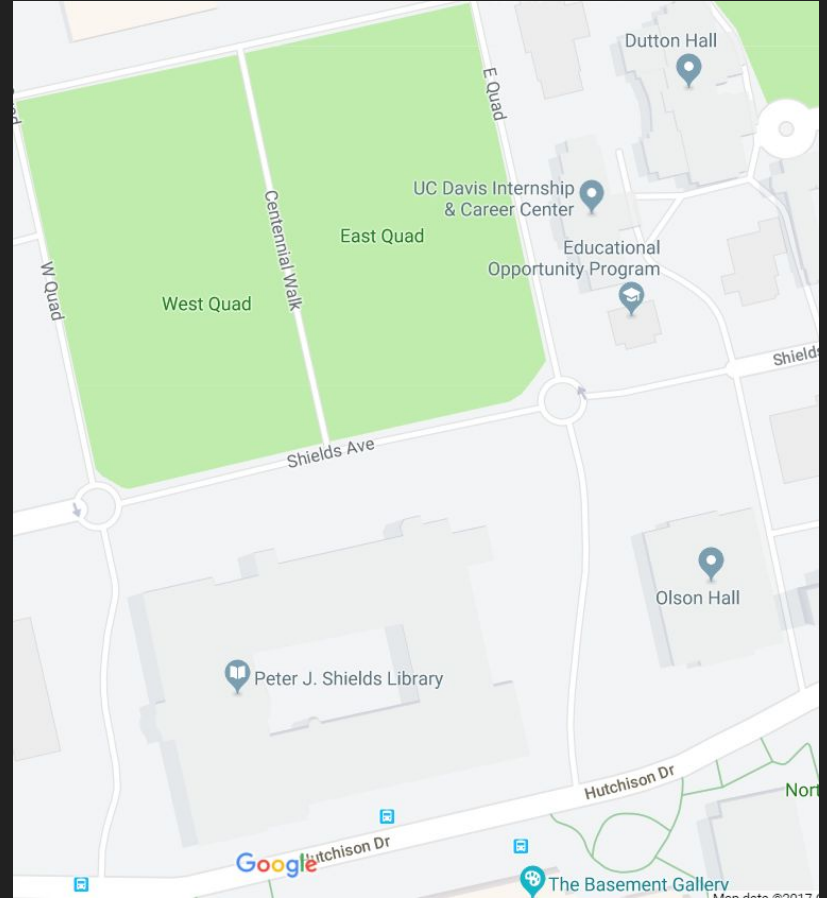
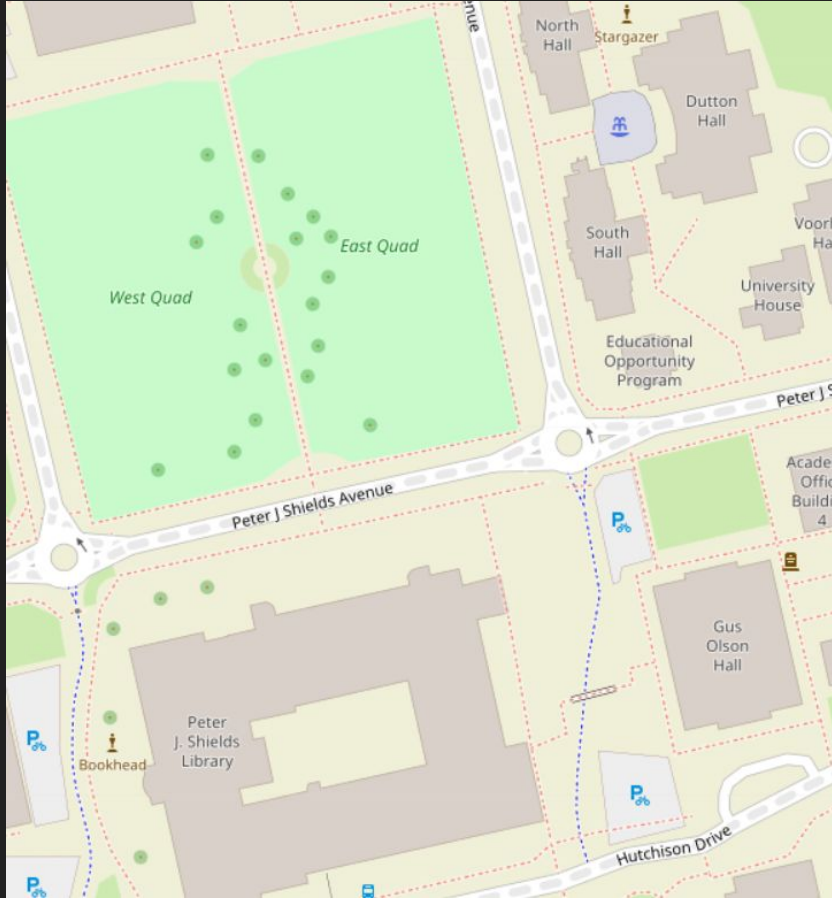


Using OpenStreetMap Data

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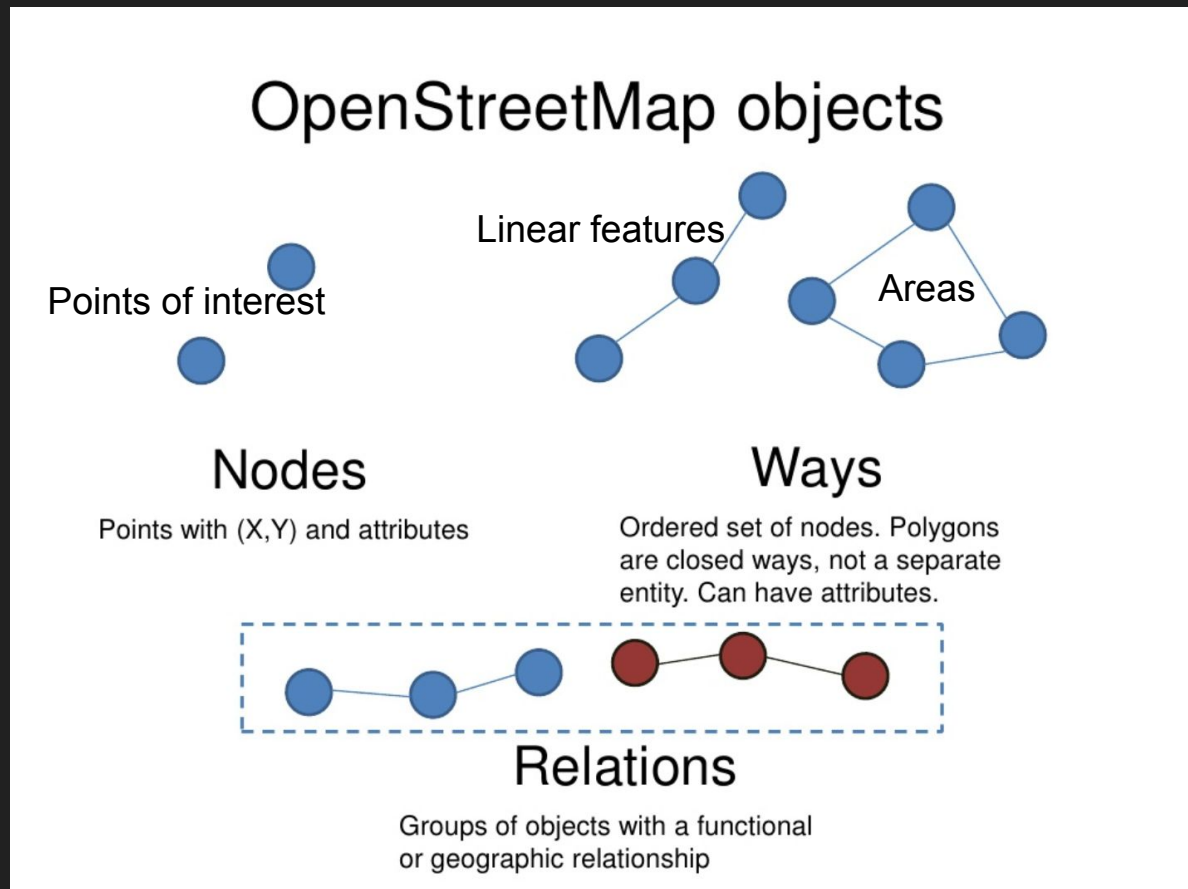
OSM vs Google Map



Understanding OSM data

OSM data model

Nodes, ways and relations are tagged with a key/value pair



OSM object and GIS objects



Nodes

Points



Ways

Lines

Polygons



Relations

role = unique

Multilines





role = outer / inner

Multipolygons

OSM tags

Links features on the ground to OSM basic structures: attributes

Multiple tagging allowed with key=value pair

Key	Value	Element	Comment	Photo
Accommodation				
building	apartments		A building arranged into individual dwellings, often on separate floors. May also have retail outlets on the ground floor.	
building	farm		A residential building on a farm (farmhouse). For other buildings see below building=farm_auxiliary , building=barn , ... If in your country farmhouse looks same as general residential house then you can tag as building=house as well. See also landuse=farmyard	

Key = “building”, value = “library”; case insensitive?

Go to http://wiki.openstreetmap.org/wiki/Map_Features

OSM file formats

- OSM XML – xml-format provided by the API
- PBF Format – highly compressed, optimized binary format similar to the API
- o5m – for high-speed processing, uses PBF coding, has same structure as XML format
- Overpass JSON – JSON variant of OSM XML
- Level0L - more human readable OSM XML without <> and lowered redundancy

Source: http://wiki.openstreetmap.org/wiki/OSM_file_formats

OSM file formats

```
<osm version="0.6" generator="CGImap 0.6.0 (31756 thorn-03.openstreetmap.org)" copyright="OpenStreetMap and contributors" attribution="http://www.openstreetmap.org/copyright"
license="http://opendatacommons.org/licenses/odbl/1-0/">
  <relation id="18189" visible="true" version="9" changeset="29524501" timestamp="2015-03-16T18:42:58Z" user="MattSidor" uid="1490939">
    <member type="way" ref="25055432" role="outer"/>
    <member type="way" ref="25055441" role="inner"/>
    <tag k="addr:city" v="Davis"/>
    <tag k="addr:housenumber" v="100"/>
    <tag k="addr:postcode" v="95616"/>
    <tag k="addr:state" v="CA"/>
    <tag k="addr:street" v="West Quad Avenue"/>
    <tag k="building" v="university"/>
    <tag k="name" v="Peter J. Shields Library"/>
    <tag k="type" v="multipolygon"/>
  </relation>
</osm>
```

Shields Library

```
<node id="568127838" visible="true" version="3" changeset="19203936" timestamp="2013-12-01T02:55:30Z" user="jraller" uid="46789" lat="38.5397258" lon="-121.7499180">
  <tag k="artwork_type" v="sculpture"/>
  <tag k="name" v="Bookhead"/>
  <tag k="start_date" v="1989"/>
  <tag k="tourism" v="artwork"/>
</node>
</osm>
```

Bookhead in front of Shields Library

```
<way id="10746426" visible="true" version="12" changeset="36541198" timestamp="2016-01-13T00:18:32Z" user="jraller" uid="46789">
  <nd ref="95716931"/>
  <nd ref="559373141"/>
  <nd ref="3942688440"/>
  <tag k="access" v="private"/>
  <tag k="highway" v="residential"/>
  <tag k="name" v="Peter J Shields Avenue"/>
  <tag k="tiger:cfcc" v="A41"/>
  <tag k="tiger:county" v="Yolo, CA"/>
  <tag k="tiger:name_base" v="Peter J Shields"/>
  <tag k="tiger:name_type" v="Ave"/>
</way>
</osm>
```

Shields Avenue

Export OSM data: osm website

Go to <http://www.openstreetmap.org> and use Export tab

The screenshot shows the OpenStreetMap website interface. At the top, the 'OpenStreetMap' logo is on the left, and navigation links 'Edit', 'History', and 'Export' are in the center. The 'Export' tab is highlighted with a red box. To the right of these links are links for 'GPS Traces', 'User Diaries', 'Copyright', 'Help', 'About', 'Log In', and 'Sign Up'. Below the navigation bar is a search bar with the text 'Where am I?' and a 'Go' button. On the left side, there is an 'Export' panel. It contains a bounding box input area with coordinates: 38.5529, -121.7495, 38.5415, and -121.7240. Below these coordinates is a red box containing the text 'Manually select a different area'. Underneath the bounding box is a 'License' section with the text 'OpenStreetMap data is licenced under the Open Data Commons Open Database Licence (ODbL)' and a blue 'Export' button. At the bottom of the panel, there is a note: 'If the above export fails, please consider using one of the sources listed below:' followed by links to 'Overpass API', 'Planet OSM', 'Geofabrik Downloads', and 'Metro Extracts'. The main part of the page is a map of a city street grid, showing streets like 1st Street through 9th Street, and landmarks like 'Civic Center Park' and 'Davis Food Cooperative'. A red bounding box is drawn on the map, corresponding to the coordinates in the export panel. The bottom right corner of the map shows the 'OpenStreetMap contributors' logo and a 'Make a Donation' link.

OpenStreetMap

Edit History **Export**

GPS Traces User Diaries Copyright Help About Log In Sign Up

Search Where am I? Go

Export

38.5529
-121.7495
38.5415
-121.7240

Manually select a different area

License

OpenStreetMap data is licenced under the Open Data Commons Open Database Licence (ODbL).

Export

If the above export fails, please consider using one of the sources listed below:

- Overpass API
Download this bounding box from a mirror of the OpenStreetMap database
- Planet OSM
Regularly updated copies of the complete OpenStreetMap database
- Geofabrik Downloads
Regularly-updated extracts of continents, countries, and selected cities
- Metro Extracts

100 m
500 ft

OpenStreetMap contributors Make a Donation

Export OSM data: osm website

OpenStreetMap Edit History Export

GPS Traces User Diaries Copyright Help About Log In Sign Up

Search Where am I? Go

Export

38.5529
-121.7570 38.5415 -121.7315

Licence
OpenStreetMap data is licenced under the [Open Data Commons Open Database Licence \(ODBL\)](#).

Export

If the above export fails, please consider using one of the sources listed below:

- [Overpass API](#)
Download this bounding box from a mirror of the OpenStreetMap database
- [Planet OSM](#)
Regularly updated copies of the complete OpenStreetMap database
- [Geofabrik Downloads](#)
Regularly-updated extracts of continents, countries, and selected cities
- [Metro Extracts](#)
Extracts for major world cities and their

100 m 500 ft

OpenStreetMap contributors Make a Donation

This will download an '.osm' file with 'everything' in it

Export OSM data: APIs and services

If you need large (world) areas, use [Planet OSM](#)



Planet OSM

The files found here are regularly-updated, complete copies of the OpenStreetMap.org database, and those published before the 12 September 2012 are distributed under a Creative Commons Attribution-ShareAlike 2.0 license, those published after are Open Data Commons Open Database License 1.0 licensed. For more information,

[see the project wiki.](#)

Complete OSM Data

[Latest Weekly Planet XML File](#)

62 GB, created 4 days ago.

md5: 70d54f52100932325c953e77bcbf41.

[Latest Weekly Changesets](#)

2.0 GB, created 4 days ago.

md5: 7470fb0977c48347ac54d7178bbcf7c1.

[Latest Weekly Planet PBF File](#)

38 GB, created 4 days ago.

md5: eb62463b69eb92ba6d66c7d0d77dcdc7.

Using The Data

You are granted permission to use OpenStreetMap data by [the OpenStreetMap License](#), which also describes your obligations.

You can [process the file](#) or extracts with a variety of tools. [Osmosis](#) is a general-purpose command-line tool for converting the data among different formats and databases, and [Osm2pgsql](#) is a tool for importing the data into a PostGIS database.

Extracts & Mirrors

The complete planet is very large, so you may prefer to use one of [several periodic extracts](#) (individual countries or states) from third parties. [GeoFabrik.de](#) and [BBBike.org](#) are two providers of extracts with up-to-date worldwide coverage.

Export OSM data: APIs and services

If you need large (regions/countries) areas, use [Geofabrics](#)

OpenStreetMap Data Extracts

Welcome to Geofabrik's free download server. This server has data extracts from the [OpenStreetMap project](#) which are normally updated every day. Select your continent and then your country of interest from the list below. (If you have been directed to this page from elsewhere and are not familiar with OpenStreetMap, we highly recommend that you read up on OSM before you use the data.) This download service is offered for free by Geofabrik GmbH.

Willkommen auf dem Geofabrik-Downloadserver. Hier gibt es Daten-Auszüge aus dem [OpenStreetMap-Projekt](#), die normalerweise täglich aktualisiert werden. Wählen Sie aus dem Verzeichnis unten den Kontinent und ggf. das Land, für die Sie Daten benötigen. (Wenn Sie von anderswo auf dieser Seite gelandet sind und von OpenStreetMap nichts wissen, dann ist es empfehlenswert, sich mit dem Projekt vertraut zu machen, bevor Sie mit den Daten arbeiten.) Diese Downloads werden von der Geofabrik GmbH kostenlos angeboten.


Click on the region name to see the overview page for that region, or select one of the file extension links for quick access.

Sub-Region	Quick Links		
	.osm.pbf	.shp.zip	.osm.bz2
Africa	[.osm.pbf]	✕	[.osm.bz2]
Antarctica	[.osm.pbf]	[.shp.zip]	[.osm.bz2]
Asia	[.osm.pbf]	✕	[.osm.bz2]
Australia and Oceania	[.osm.pbf]	✕	[.osm.bz2]
Central America	[.osm.pbf]	✕	[.osm.bz2]
Europe	[.osm.pbf]	✕	[.osm.bz2]
North America	[.osm.pbf]	✕	[.osm.bz2]
South America	[.osm.pbf]	✕	[.osm.bz2]

[Technical details](#) about this download service.

Export OSM data: APIs and services

If you need cities, use [Metro Extracts](#)

[PRODUCTS](#) [DOCUMENTATION](#) [PRICING](#) [BLOG](#) [SIGN IN](#) [SIGN UP](#)

metro extracts

Every week, Metro Extracts automatically creates snapshots of **OpenStreetMap** data into manageable, metro-area files in a variety of formats for you to use. Download an extract from the list of **200 most popular extracts** below to get started right away.

Can't find what you are looking for? You can get **custom extracts** of anywhere in the world! To get started, search for the place you are looking for.

[Your Custom Extracts](#) | [Documentation](#) | [Tutorial](#) | [File Format Guide](#)

SEARCH FOR A CITY OR REGION

SEARCH

POPULAR EXTRACTS:

ABU DHABI

Dubai

ALGERIA

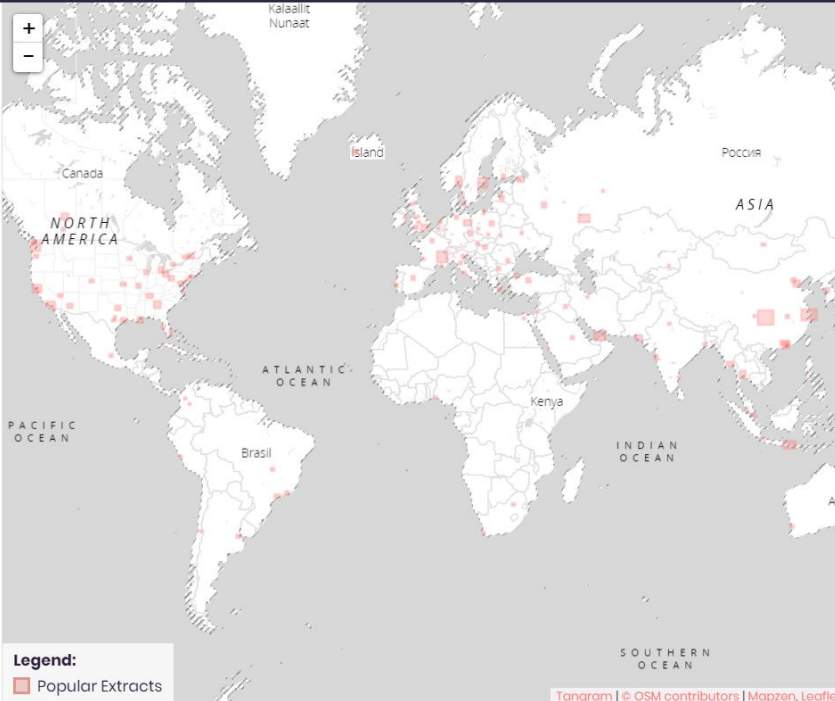
Algiers

ANGOLA

Luanda

ARGENTINA

Buenos Aires



Legend:

Popular Extracts

Tangram | © OSM contributors | Mapzen, Leaflet

Export OSM data: APIs and services

For more custom controls, use [Overpass turbo](#)

Run Share Export Wizard Save Load Settings Help overpass turbo

Map Data

```
1 /*
2 This has been generated by the overpass-
3 turbo wizard.
4 The original search was:
5 "Post Office"
6 */
7 [out:json][timeout:25];
8 // gather results
9 (
10 // query part for: "Post Office"
11 node["amenity"="post_office"]
12 {{bbox}};
13 way["amenity"="post_office"]
14 {{bbox}};
15 relation["amenity"="post_office"]
16 {{bbox}};
17 );
18 // print results
19 out body;
20 >;
21 out skel qt;
```

Loaded – nodes: 1, ways: 0, relations: 0
Displayed – pois: 1, lines: 0, polygons: 0

More freedom? Query OSM data using R

Few packages available: [osmdata](#), [osmplotr](#), [osmar](#)

gdal can be used to read the [xml & pbf files](#)

[osmdata](#) is the most complete package available now

Allows downloading (using overpass API) and exporting to other spatial formats

OSM data in R: get OSM data

Getting started:

```
> install.packages(c('osmdata', 'sf'),  
+ dependencies = TRUE)  
# will install lot of packages  
> library(osmdata)  
  
# supply the bounding box or specify the names  
> bb <- getbb('Davis')  
> q0 <- opq(bb)
```

Bicycle parkings in Davis from OSM

```
# Construct an Overapss query object
> q1 <- add_osm_feature(q0, key = 'amenity', value =
+ 'bicycle_parking')
# Return the result of the query as sf object
> osmd <- osmdata_sf(q1)

# or combine by pipe
> osmd <- opq(bbox = 'Davis') %>%
  add_osm_feature(key = 'amenity', value = 'bicycle_parking') %>%
  osmdata_sf()
```

Inspect osmdata object for parkings

> osmd

```
Object of class 'osmdata' with:
  $bbox : 38.5348626,-121.7940664,38.5755912,-121.6754999
  $overpass_call : The call submitted to the overpass API
  $timestamp : [ Mon 2 Dec 2017 01:58:28 ]
  $osm_points : 'sf' Simple Features Collection with 314 points
  $osm_lines : 'sf' Simple Features Collection with 0 linestrings
  $osm_polygons : 'sf' Simple Features Collection with 54 polygons
  $osm_multilines : 'sf' Simple Features Collection with 0 multilinestrings
  $osm_multipolygons : 'sf' Simple Features Collection with 0 multipolygons
```

Plot the parkings

```
# plot the polygons; we will use the mapview  
# package, should be installed now with osmdata  
> library(mapview)  
> mapview(bikepark)  
  
# this will create an interactive map window  
# browse the map to check the accuracy of the  
# osm tagging
```

Now let's find the dog parks

Use the key/value pairs from [OSM map features](#)
to download and plot the dog parks in Davis

Are all the dog parks
in Davis mapped?



Read ``.osm`` files

```
# You have exported the `.osm` file from the OSM  
# website. We can read that file in R with  
# sf/gdal routines
```

```
> testdata <- sf::st_read('map.osm', layer =  
+ 'multipolygons', quiet = TRUE)  
> mapview(testdata)
```