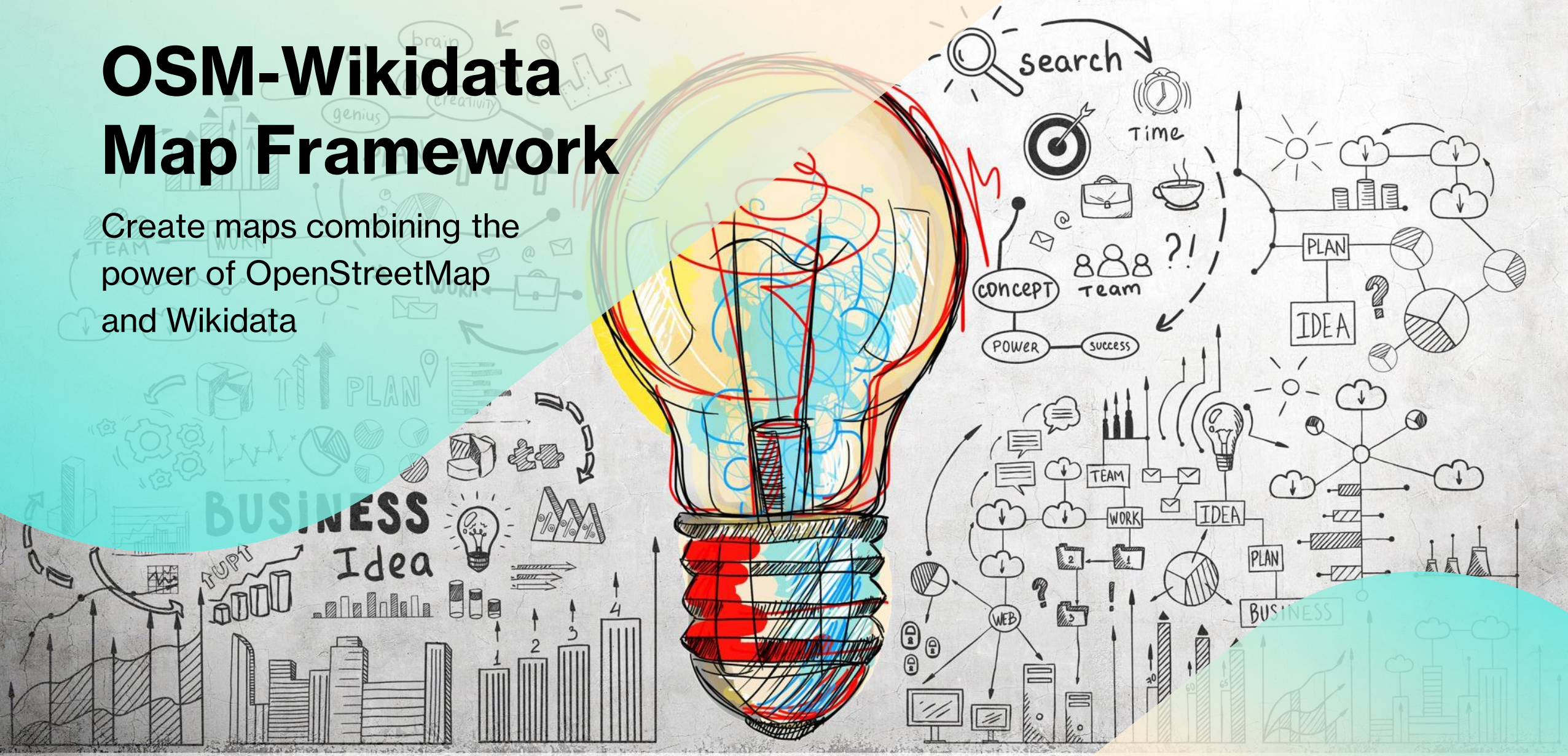


OSM-Wikidata Map Framework

Create maps combining the
power of OpenStreetMap
and Wikidata



\$ whoami

Daniele Santini

Computer engineer

FOSS & Open Knowledge enthusiast

dsantini.it

GitLab: [dsantini](https://gitlab.com/dsantini)

GitHub: [DanySan1](https://github.com/DanySan1)

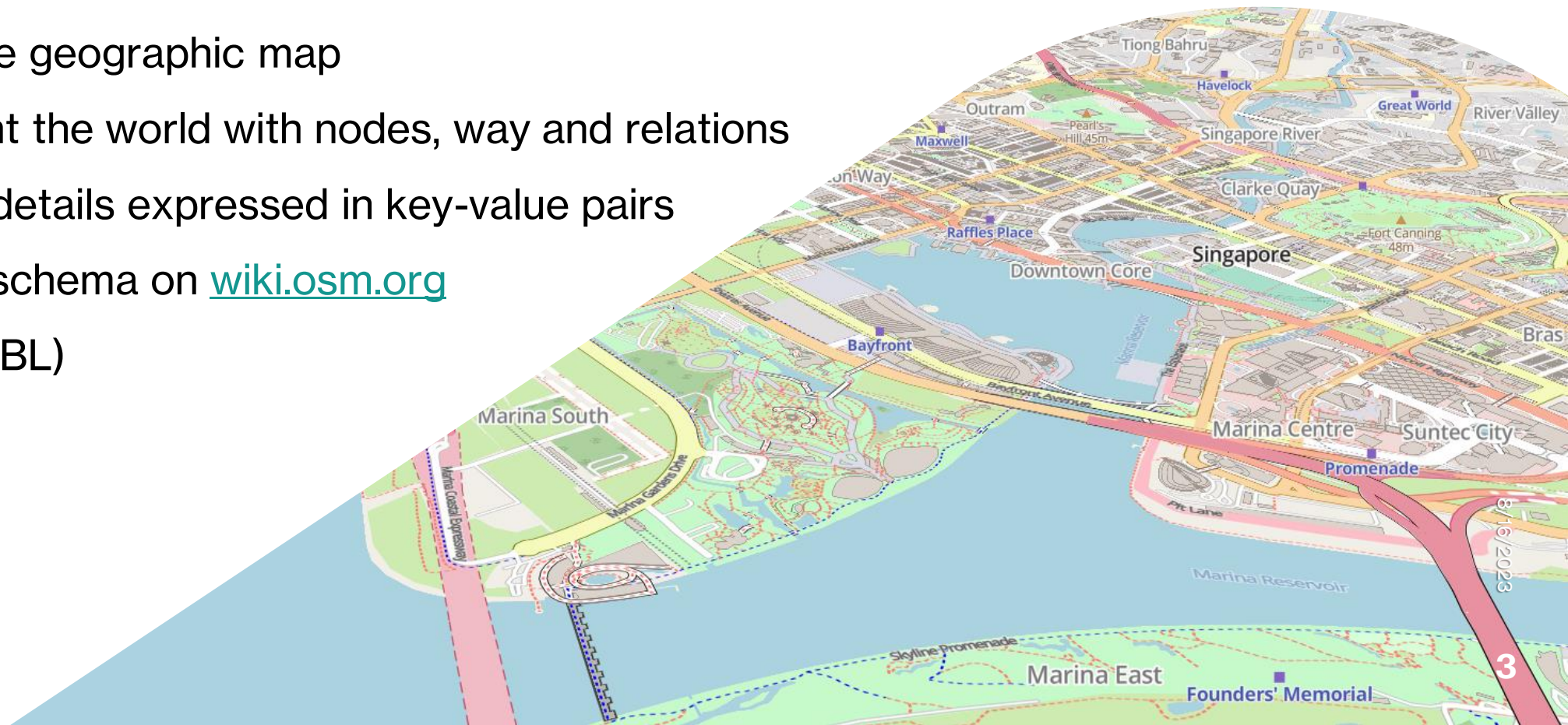


OpenStreetMap

openstreetmap.org

Collaborative geographic map

- Represent the world with nodes, way and relations
- Element details expressed in key-value pairs
- Tagging schema on [wiki.osm.org](https://wiki.openstreetmap.org/wiki/Key:Tagging_schema)
- Free (ODBL)

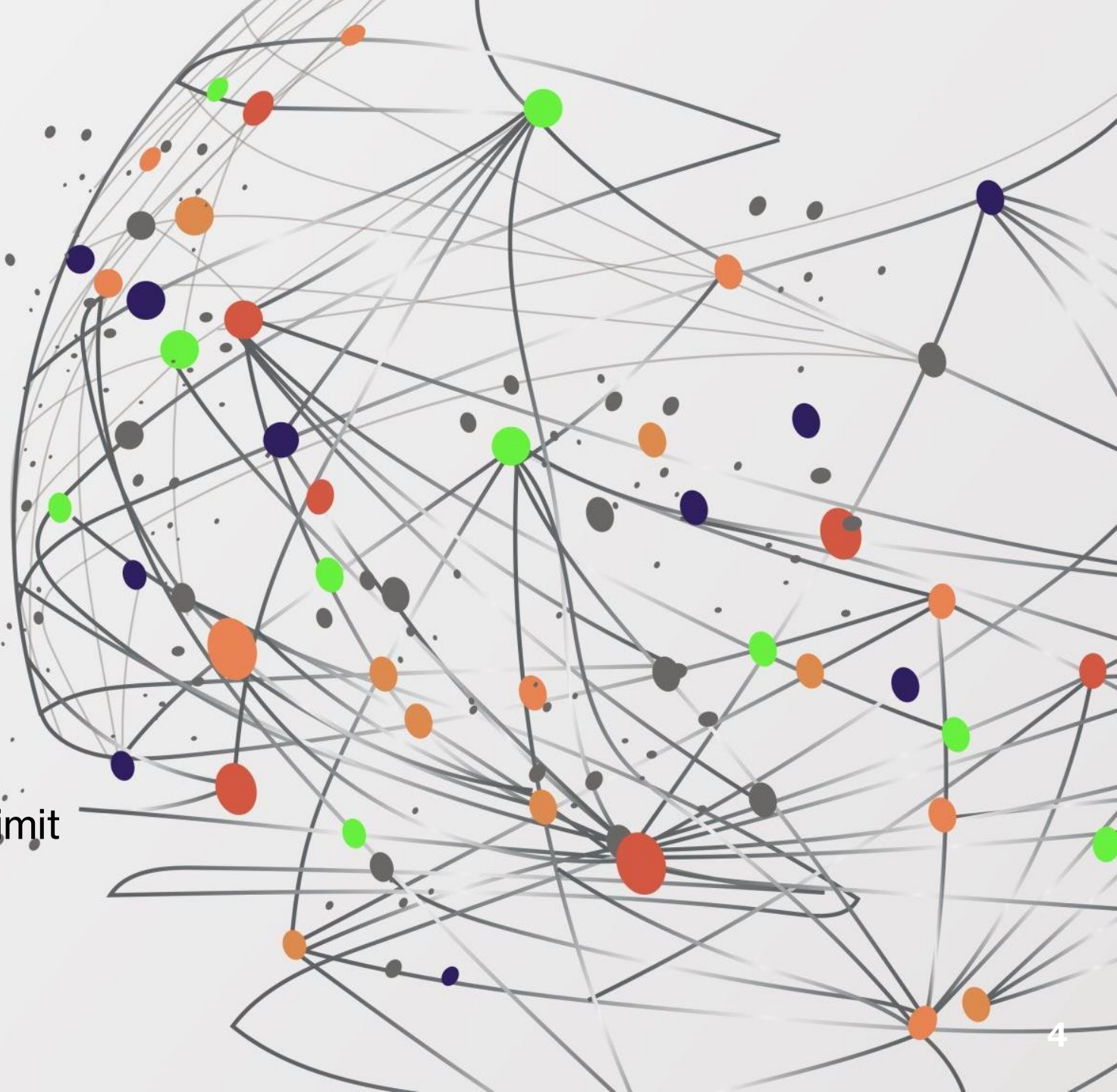


Wikidata

wikidata.org

Knowledge graph

- Free (CC0, Public Domain)
- Collaborative
- Multilingual
- Secondary (sources & links)
- General purpose, notability is the limit



Wikidata data model

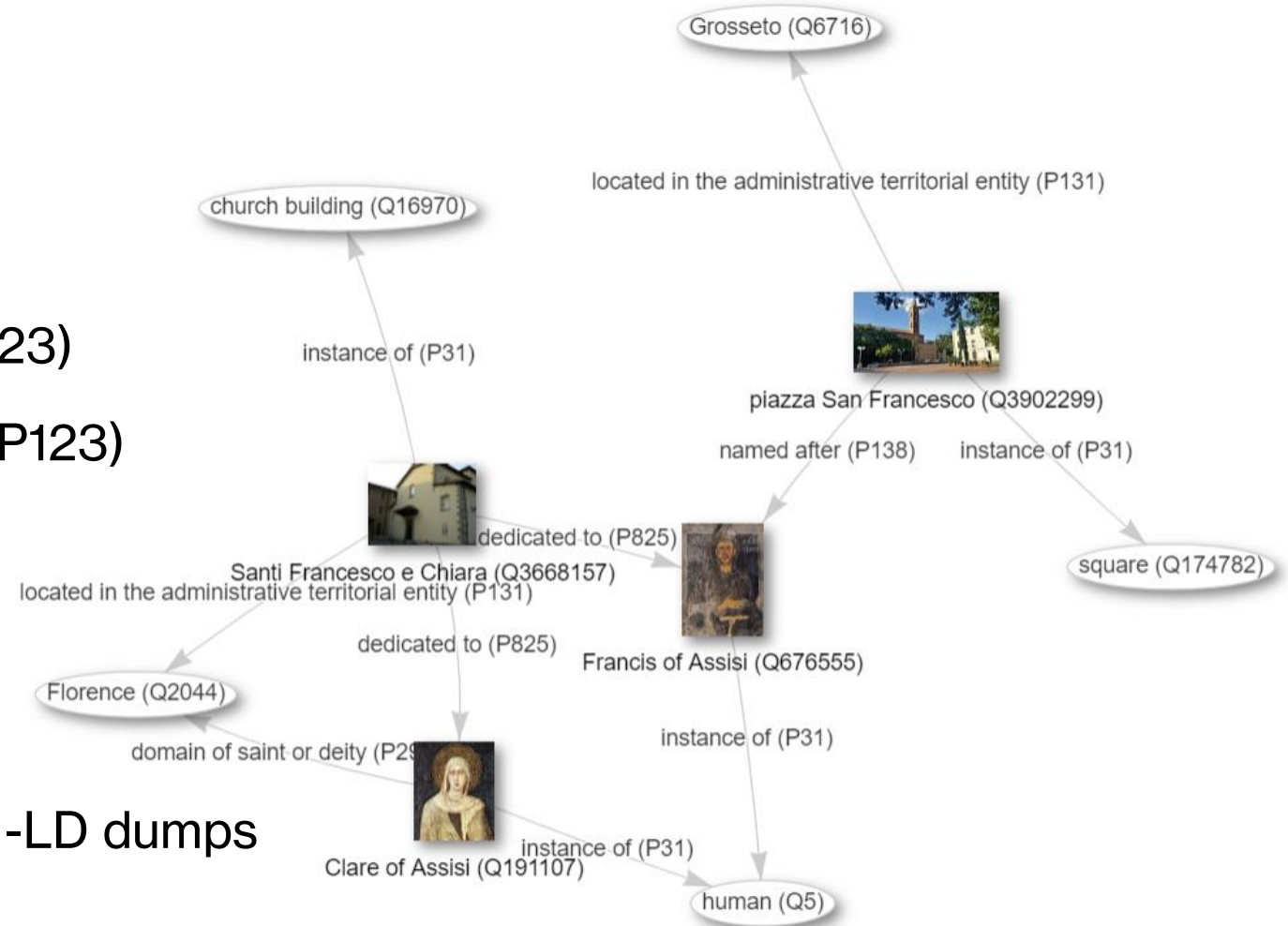
Entities identified by Q-IDs (ex: Q123)

Properties identified by P-IDs (ex: P123)

<subject, predicate, object> triples

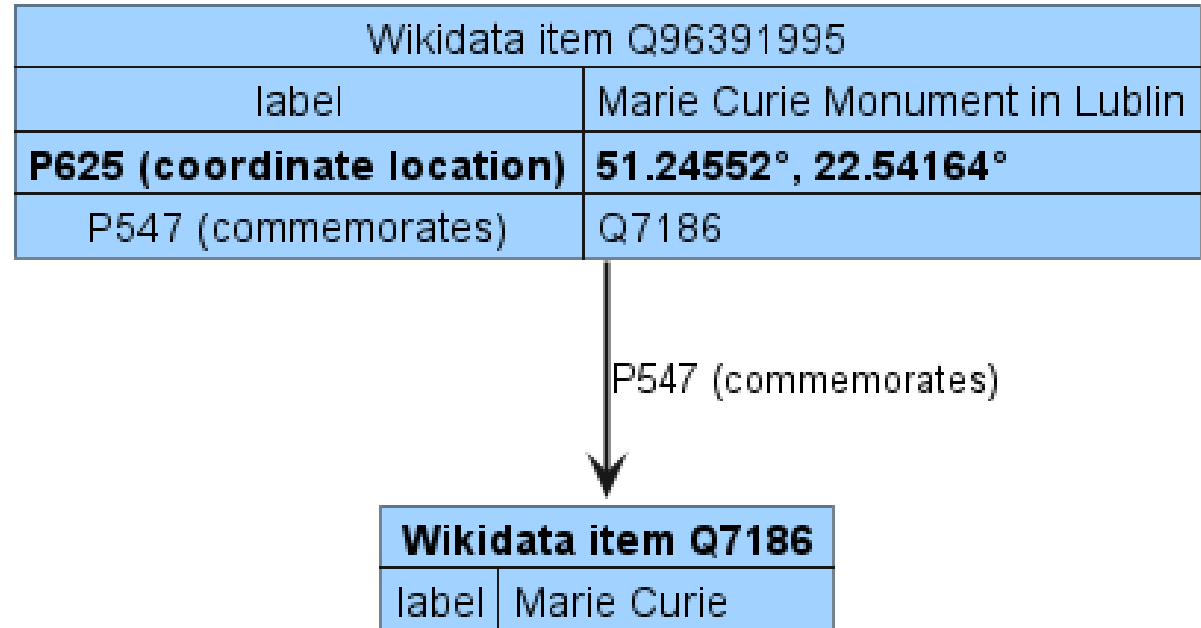
Main usage methods:

- SPARQL endpoint
- JSON / RDF / N-Triples / JSON-LD dumps



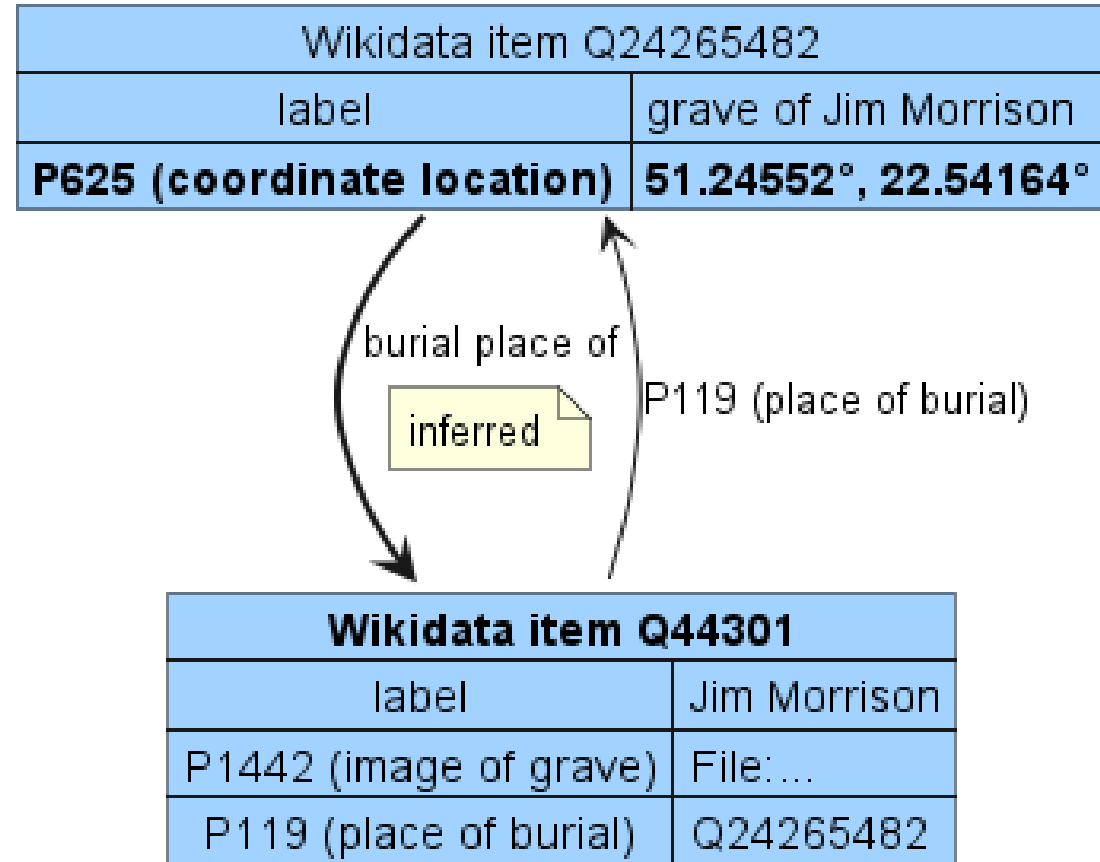
Geographic patterns: P625 + Direct properties

Wikidata item with a **coordinate location** (**P625**) and a **property** linking to another Wikidata item which **describes a certain aspect** of the first one



Geographic patterns: P625 + Inverse properties

Wikidata item with a **coordinate location** (**P625**), **referenced with an «inverse» property** by another Wikidata item which **describes a certain aspect** of the first one



Geographic patterns: P625 qualifier on inverse properties

Wikidata item with
a **coordinate**
location (P625) qualifier on a
statement **of an inverse**
property to another Wikidata
item which **describes a**
certain aspect of the first one

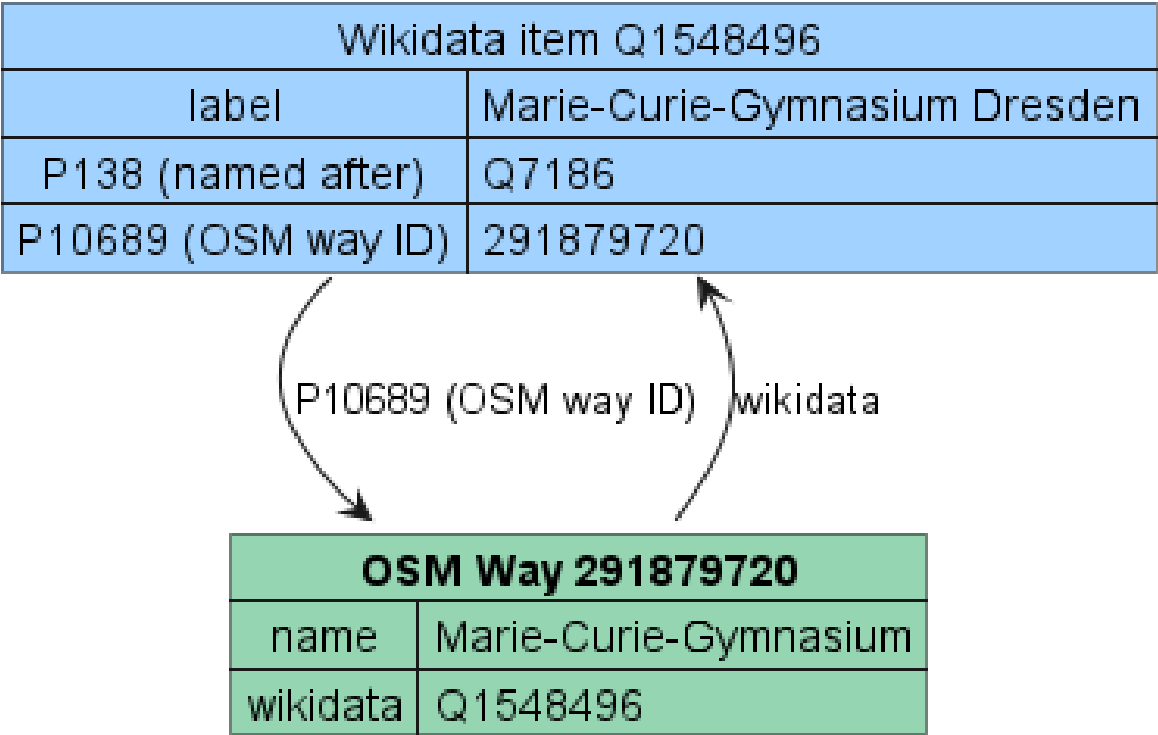
Wikidata item Q8772		
label	Jean Baptiste Joseph Fourier	
P1442 (image of grave)	File:...	
P119 (place of burial)	value	Q311 (Père Lachaise Cemetery)
	P625 (coordinate location)	48.86005°, 2.394004°

OSM Wikidata

Geographic data patterns in OpenStreetMap & Wikidata

OSM wikidata=*

Q-ID of the Wikidata item
**describing the exact same
entity** represented by the OSM
element



Wikidata -> OSM

ID of the OSM element **representing the exact same entity** described in the Wikidata item

- [P11693](#) (OSM **node** id)
- [P10689](#) (OSM **way** ID)
- [P402](#) (OSM **relation** ID)

Discussion under way on the sufficient stability of nodes and ways

Wikidata item Q1548496	
label	Marie-Curie-Gymnasium Dresden
P138 (named after)	Q7186
P10689 (OSM way ID)	291879720



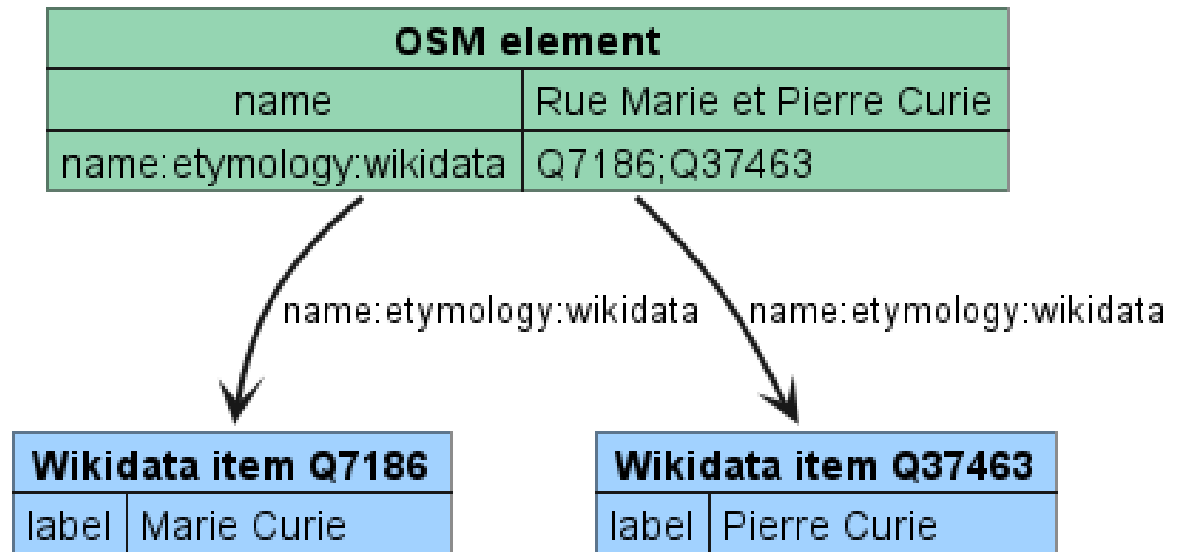
OSM Way 291879720	
name	Marie-Curie-Gymnasium
wikidata	Q1548496

OSM ***:wikidata=*** a.k.a. secondary Wikidata tags

Q-ID of the Wikidata item **describing a certain aspect** of the OSM element

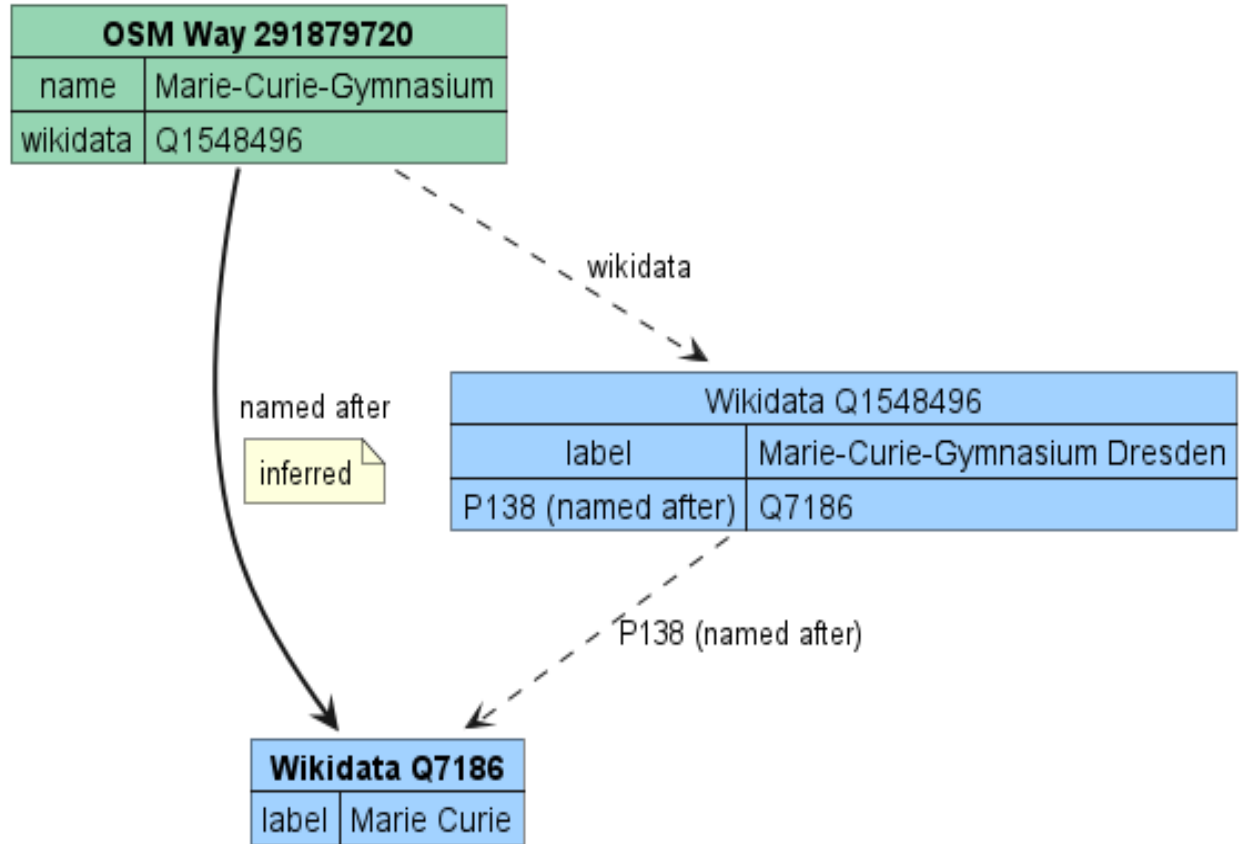
Ex:

- `artist_name=*` => `artist:wikidata=*`
- `brand=*` => `brand:wikidata=*`
- `subject=*` => `subject:wikidata=*`
- `model=*` => `model:wikidata=*`
- `architect=*` => `architect:wikidata=*`
- ...



OSM wikidata=* + Wikidata properties

Combine OSM **wikidata=*** and a Wikidata property to find the Wikidata item **describing a certain aspect** of the OSM element



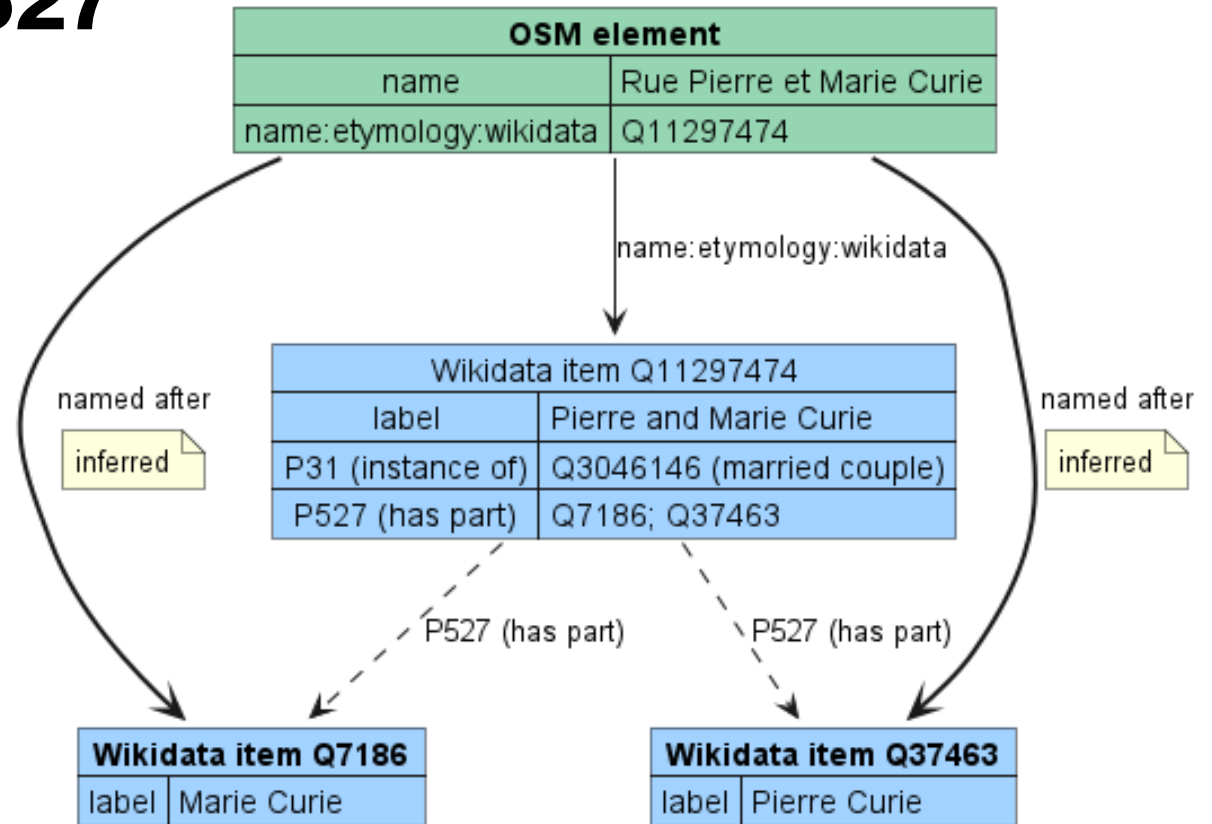
OSM *:wikidata=* + P527

Q-ID of the Wikidata item **describing a certain aspect** of the OSM element.

Use «**has part(s)**» (**P527**) to include **parts of the linked entity**.

Ex:

Williams sisters ([Q1180052](#)) = Serena W. ([Q11459](#)) + Venus W. ([Q11578](#))



Tools, editors and viewers

- [OSM <-> Wikidata matcher](#)
- MapComplete ([etymology](#), ...)
- i18n of labels of vector tiles by [Mapbox](#) and [MapTiler](#)
- I18n of geocoding by [Nominatim](#), [Mapbox](#) and [MapTiler](#)
- JOSM + “Wikipedia” extension
- iD + [Name Suggestion Index](#)
- [Sophox](#)
- [OWL Map](#)
- [OSM-Wikipedia tag validator](#)
- [OSM-Wikidata Map Framework](#) (OWMF)



There's much more!

Explore more about OSM and Wikidata in these talks that will take place in the Plenary Hall during the afternoon:

- "OpenStreetMap and Wikimedia: Awesome Together!"
by Eugene Alvin Villar, Dennis Raylin Chen
- "Giving Contexts to Places We Love - The Power of OpenStreetMap and Wikidata" by James Amattey

What is OSM-Wikidata Map Framework

Tool for creating data-driven maps based on OSM and Wikidata.

Allows you to **use the above patterns** choosing OSM tags and Wikidata properties.

Basic mode: APIs only (Overpass and Wikidata), no DB necessary, simple patterns only.

Advanced mode: with DB (to be initialized), Advanced patterns and propagations.

Uses Docker+ PHP + PostGIS; Apache Airflow + Osmium; Typescript + MapLibre GL JS

Examples in action: [Open Etymology Map](#) , [Open Burial Map](#), [Open Artist Map](#)

Configure OWMF (APIs only, no DB)

1. `$ curl -o .env https://gitlab.com/openetymologymap/osm-wikidata-map-framework/-/raw/main/.env.example`
2. Edit `.env` customizing tags and properties
 - `osm_wikidata_keys`, `osm_text_key` & `osm_description_key`
 - `osm_wikidata_properties`
 - `wikidata_indirect_property` & `wikidata_image_property`
3. `$ docker run --rm --env-file ".env" -p "80:80/tcp" "registry.gitlab.com/openetymologymap/osm-wikidata-map-framework:latest"`

OWMF is now available on [localhost](#)

[Complete guide here](#)

Configure OWMF (with DB)

1. `$ git clone https://gitlab.com/openetymologymap/osm-wikidata-map-framework.git`
 2. Copy **.env.example** in **.env** and customize tags and properties
 3. In **.env** enable the DB (**db_enable=true**) and change its password (**db_password**)
 4. Make sure ports 80, 5432 and 8080 are free
 5. `$ docker-compose --profile airflow --profile airflow-init up -d`
 6. Launch the DB initialization from Apache Airflow (localhost:8080)
 7. `$ docker-compose --profile prod up --d`
- OWMF is now available on localhost

Demo

Creating an application based on OWMF

Find the OSM tags

[Search on OSM Wiki](#)

Ex: architect of a building

- `architect=*`
- `architect:wikidata=*`



[Main Page](#)
[The map](#)
[Map Features](#)
[Contributors](#)
[Help](#)
[Blogs](#)
[Shop](#)
[Donations](#)
[Wiki discussion](#)
[Recent changes](#)

[Tools](#)
[Upload file](#)
[Special pages](#)
[Printable version](#)

Special page

Search results



Search

[Content pages](#) [Multimedia](#) [Everything](#) [Advanced](#)

Create the page "**Architect wikidata**" on this wiki! See also the search results found.

Key:[architect:wikidata](#)

property **architect=***. Its value should be a **Wikidata** item identifier, including the "Q" prefix. **building=gate architect=Carl Gotthard Langhans architect:wikidata=Q313181**
1 KB (77 words) - 10:19, 3 February 2023

Tag:[historic=memorial](#)

g. Wikisource. **wikidata=*** – the ID of the specific **Wikidata** item about the memorial (If any). **subject:wikidata=*** – the ID of the **Wikidata** item about the
8 KB (862 words) - 17:43, 20 May 2023

Key:[architect](#)

office=architect – Office from which the **architect** works **office=engineer** – An office for an engineer or group of engineers **Proposed features/architect**
1 KB (145 words) - 18:26, 1 June 2023

Find the Wikidata properties

[Search on Wikidata](#) limiting to the «Property» namespace

Ex: architect of a building

- «architect» ([P84](#))



Main page
Community portal
Project chat
Create a new item
Recent changes
Random item
Query Service
Nearby
Help
Donate

Lexicographical data
Create a new Lexeme
Recent changes
Random Lexeme

Tools
Special pages
Printable version

Special page

Search results

To search for Wikidata items by their title on a given site, use [Special:ItemByTitle](#).

Q architect



Search

Advanced search: Sort by relevance X

Search in: Property X

View (previous 20 | [next 20](#)) (20 | [50](#) | [100](#) | [250](#) | [500](#))

[architect](#) (P84)

person or architectural firm responsible for designing this building
36 statements, 0 sitelinks - 08:13, 13 June 2023

[Architectuurgids](#) [architect](#) ID (P3058)

identifier for an architect in the Dutch architectuurgids.nl database
24 statements, 0 sitelinks - 02:36, 13 April 2023

[PSS-archi](#) [architect](#) ID (P2194)

identifier for an architect in the PSS-archi database
20 statements, 0 sitelinks - 02:55, 30 January 2023

[Prázdne Domy](#) [architect](#) ID (P6811)

identifier of an architect in the Czech prazdnedomy.cz database

Configure .env (APIs only / no DB)

Download the default configuration ([.env.example](#)) into the file “.env” *.

Then apply the found tags and properties into the .env file.

```
gear .env
1 #####
2 #####
3 ##### Data source #####
4 #####
5 #####
6
7 # osm_filter_tags: Optional (required if you i
8 osm_filter_tags=["amenity=*","building=*"]
9 # osm_text_key: Optional, OSM key whose value
10 osm_text_key=architect
11 # osm_description_key: Optional, OSM key whose
12 osm_description_key=architect:description
13 # osm_wikidata_keys: Optional, OSM keys which
14 osm_wikidata_keys=["architect:wikidata"]
15 # osm_wikidata_properties: Optional, Wikidata
16 osm_wikidata_properties=["P84"]
17 # propagate_data: Optional ("global", "local"
18 propagate_data=false
19 # wikidata_indirect_property: Optional, Wikida
20
21 # wikidata_image_property: Optional, Wikidata
```

* \$ curl -o .env https://gitlab.com/openetymologymap/osm-wikidata-map-framework/-/raw/main/.env.example

Start OWMF (APIs only / no DB)

```
$ docker run --rm --env-file ".env" -p "80:80/tcp" "registry.gitlab.com/openetymologymap/osm-wikidata-map-framework:latest"
```

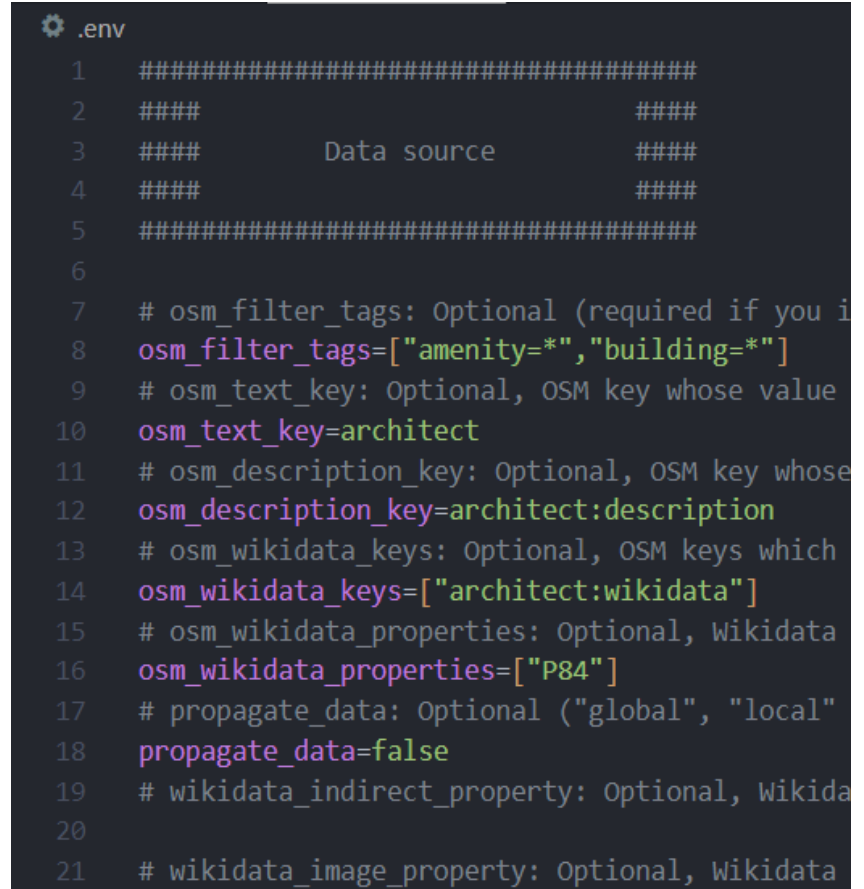
```
PS C:\Users\daniele.santini\Documents\owmf-demo> docker run --rm --env-file ".env" -p "80:80/tcp" "registry.gitlab.com/openetymologymap/osm-wikidata-map-framework:latest"
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message
[Sun Aug 13 18:56:16.371687 2023] [security2:notice] [pid 1] ModSecurity for Apache/2.9.7 (http://www.modsecurity.org/) configured.
[Sun Aug 13 18:56:16.372966 2023] [security2:notice] [pid 1] ModSecurity: APR compiled version="1.7.2"; loaded version="1.7.2"
[Sun Aug 13 18:56:16.372969 2023] [security2:notice] [pid 1] ModSecurity: PCRE2 compiled version="10.42 "; loaded version="10.42 2022-12-11"
[Sun Aug 13 18:56:16.372970 2023] [security2:notice] [pid 1] ModSecurity: LUA compiled version="Lua 5.1"
[Sun Aug 13 18:56:16.372970 2023] [security2:notice] [pid 1] ModSecurity: YAJL compiled version="2.1.0"
[Sun Aug 13 18:56:16.372971 2023] [security2:notice] [pid 1] ModSecurity: LIBXML compiled version="2.9.14"
[Sun Aug 13 18:56:16.372972 2023] [security2:notice] [pid 1] ModSecurity: Status engine is currently disabled, enable it by set SecStatusEngine to On.
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set the 'ServerName' directive globally to suppress this message
[Sun Aug 13 18:56:16.444891 2023] [mpm_prefork:notice] [pid 1] AH00163: Apache/2.4.57 (Debian) PHP/8.2.8 OpenSSL/3.0.9 configured -- resuming normal operations
[Sun Aug 13 18:56:16.444919 2023] [core:notice] [pid 1] AH00094: Command line: 'apache2 -D FOREGROUND'
```

Configure .env (with DB)

Download the OWMF repository and copy the default configuration ([.env.example](#)) into the file “.env” *.

Then apply the found tags and properties into the .env file.

Then set `db_enable=true` .

A screenshot of a code editor showing the contents of a .env file. The file has 21 lines. Lines 1-5 are comment lines with various hash symbols. Line 6 is empty. Lines 7-21 contain configuration for OSM and Wikidata, with some values already set (e.g., osm_filter_tags, osm_text_key, osm_description_key, osm_wikidata_keys, osm_wikidata_properties, propagate_data, wikidata_indirect_property, wikidata_image_property).

```
.env
1 #####
2 #####
3 #####      Data source      #####
4 #####
5 #####
6
7 # osm_filter_tags: Optional (required if you i
8 osm_filter_tags=["amenity=*","building=*"]
9 # osm_text_key: Optional, OSM key whose value
10 osm_text_key=architect
11 # osm_description_key: Optional, OSM key whose
12 osm_description_key=architect:description
13 # osm_wikidata_keys: Optional, OSM keys which
14 osm_wikidata_keys=["architect:wikidata"]
15 # osm_wikidata_properties: Optional, Wikidata
16 osm_wikidata_properties=["P84"]
17 # propagate_data: Optional ("global", "local"
18 propagate_data=false
19 # wikidata_indirect_property: Optional, Wikida
20
21 # wikidata_image_property: Optional, Wikidata
```

```
* $ git clone https://gitlab.com/openetymologymap/osm-wikidata-map-framework.git
$ cp .env.example .env
```

Start Airflow and OWMF (with DB)

```
$ docker-compose --profile airflow --profile airflow-init up -d
```

Run the DB initialization pipeline

```
$ docker-compose --profile prod up --d
```

```
PS C:\Users\daniele.santini> cd .\Documents\personal\osm-wikidata-map-framework\  
PS C:\Users\daniele.santini\Documents\personal\osm-wikidata-map-framework> docker-compose --profile airflow-init --profile airflow up -d  
[+] Running 14/14  
- Network osm-wikidata-map-framework_airflow-torrent-bridge Created  
- Network osm-wikidata-map-framework_airflow-internal Created  
- Network osm-wikidata-map-framework_pgadmin-bridge Created  
- Network osm-wikidata-map-framework_oem-internal Created  
- Network osm-wikidata-map-framework_airflow-postgis-bridge Created  
- Container osm-wikidata-map-framework-postgres-1 Healthy  
- Container osm-wikidata-map-framework-redis-1 Healthy  
- Container osm-wikidata-map-framework-torrent-daemon-1 Started  
- Container osm-wikidata-map-framework-oem-postgis-1 Started  
- Container osm-wikidata-map-framework-airflow-init-1 Exited  
- Container osm-wikidata-map-framework-airflow-scheduler-1 Started  
- Container osm-wikidata-map-framework-airflow-triggerer-1 Started  
- Container osm-wikidata-map-framework-airflow-worker-1 Started  
- Container osm-wikidata-map-framework-airflow-webserver-1 Started  
PS C:\Users\daniele.santini\Documents\personal\osm-wikidata-map-framework> docker-compose --profile prod up -d  
[+] Running 4/4  
- Volume "osm-wikidata-map-framework_apache-sites-available" Created  
- Volume "osm-wikidata-map-framework_apache-sites-enabled" Created  
- Volume "osm-wikidata-map-framework_letsencrypt-certs" Created  
- Container osm-wikidata-map-framework-oem-web-prod-1 Started  
PS C:\Users\daniele.santini\Documents\personal\osm-wikidata-map-framework> |
```

Datasets and DAGs in Airflow (with DB)

← ↻ 🏠 ⓘ localhost:8080/datasets 🔊 ☆ ⚙️

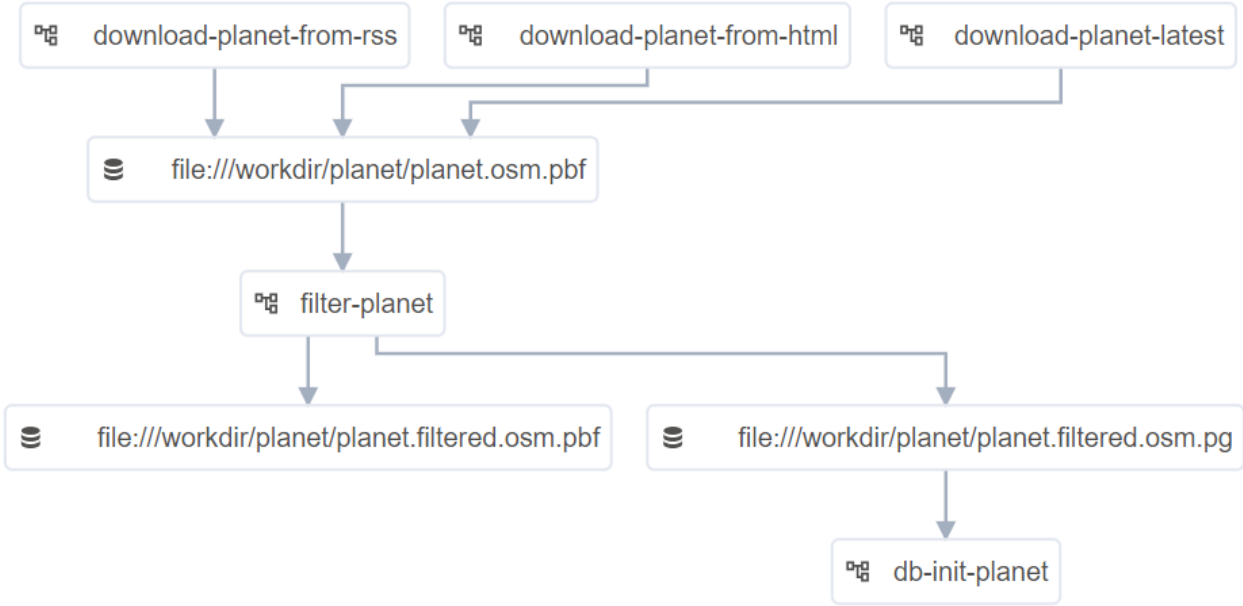
 **Airflow** **DAGs** **Datasets** **Security** ▾ **Browse** ▾ **Admin** ▾ **Docs** ▾

Datasets

Filter datasets with updates in the past: **All Time** 30 days 7 days 24 hours 1 hour

🔍 Search by URI...

URI ↕	LAST UPDATE ▾
file:///workdir/europe/europe.filtered.osm.pbf	Total Updates: 0
file:///workdir/europe/europe.filtered.osm.pg	Total Updates: 0
file:///workdir/europe/europe.osm.pbf	Total Updates: 0
file:///workdir/italy/italy.filtered.osm.pbf	Total Updates: 0
file:///workdir/italy/italy.filtered.osm.pg	



```
graph TD; A[download-planet-from-rss] --> C[file:///workdir/planet/planet.osm.pbf]; B[download-planet-from-html] --> C; D[download-planet-latest] --> C; C --> E[filter-planet]; E --> F[file:///workdir/planet/planet.filtered.osm.pbf]; E --> G[file:///workdir/planet/planet.filtered.osm.pg]; G --> H[db-init-planet];
```

Singapore Flyer



Wikimedia Commons - Public domain - [Waycool27](#) at [English Wikipedia](#)

Kisho Kurokawa

Japanese architect (1934-2007)



Kisho Kurokawa was a leading Japanese architect and one of the founders of the Metabolist Movement.

4/8/1934 (Kanie) - 10/12/2007 (Kawadachō)

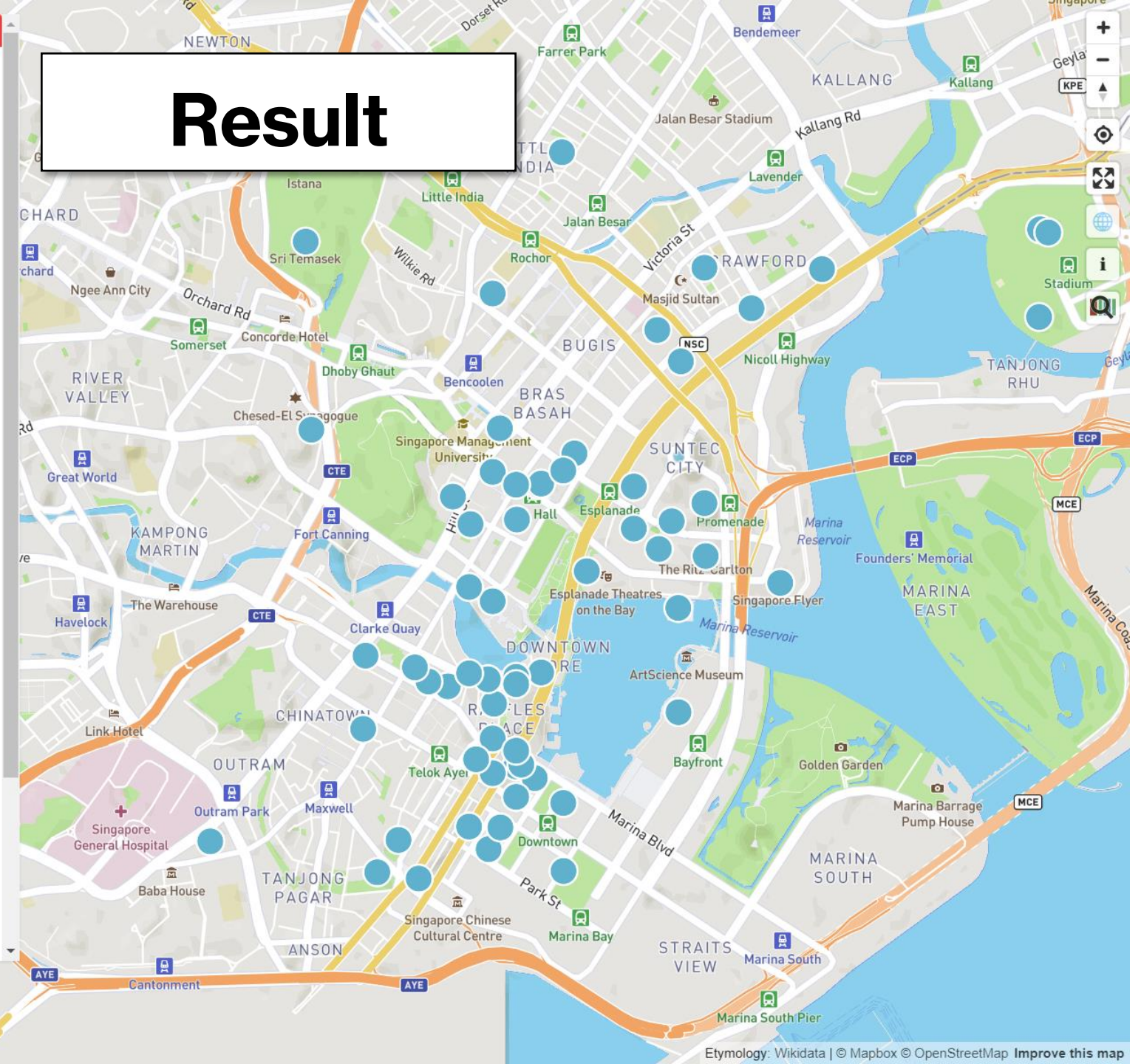
Japan, Empire of Japan

male

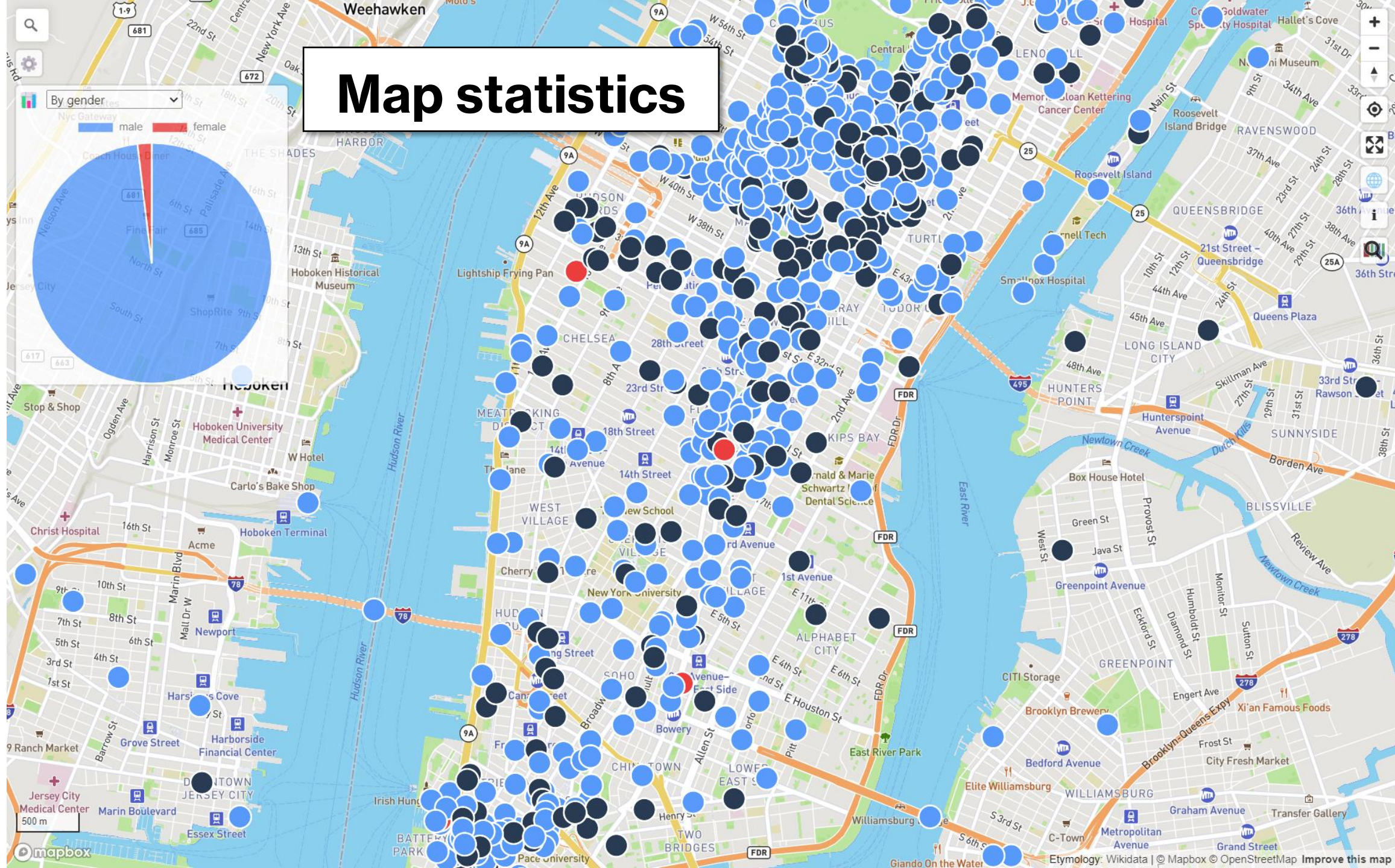
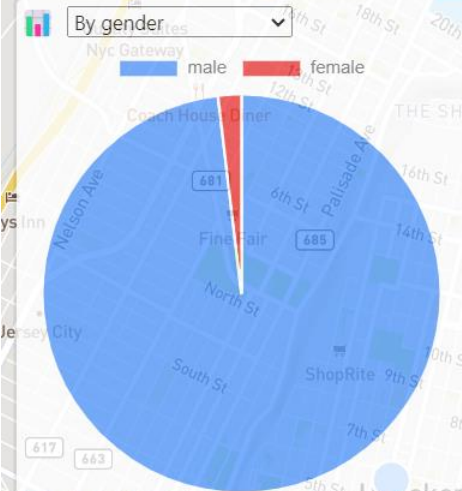
businessman, thinker, architect, political activist



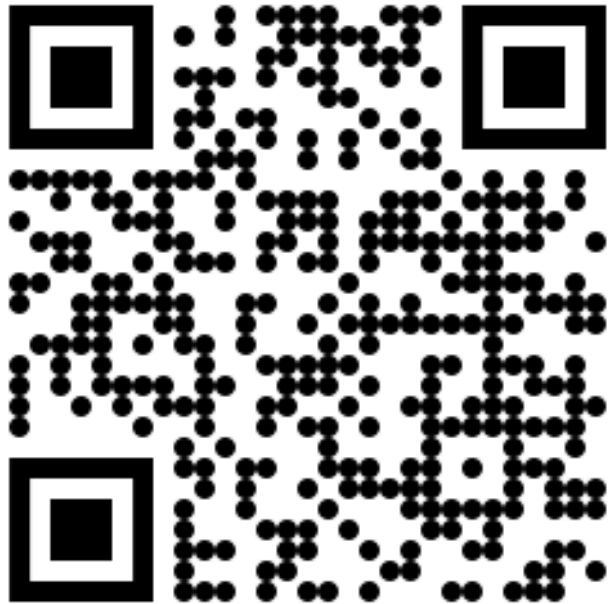
Result



Map statistics



Thank you for your attention!



dsantini.it/owmf.pdf