Laboratorio di cartografia digitale / 2

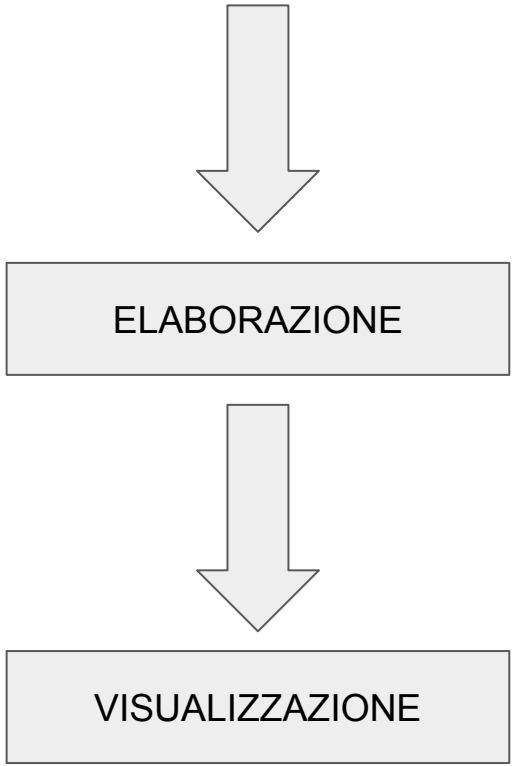
Introduzione a OpenStreetMap: accesso ai dati ed elaborazione

MARCO BARBIERI
marcobarbieri@webmapp.it
Map maker

ALESSIO PICCIOLI
alessiopiccioli@webmapp.it
Geo nerd

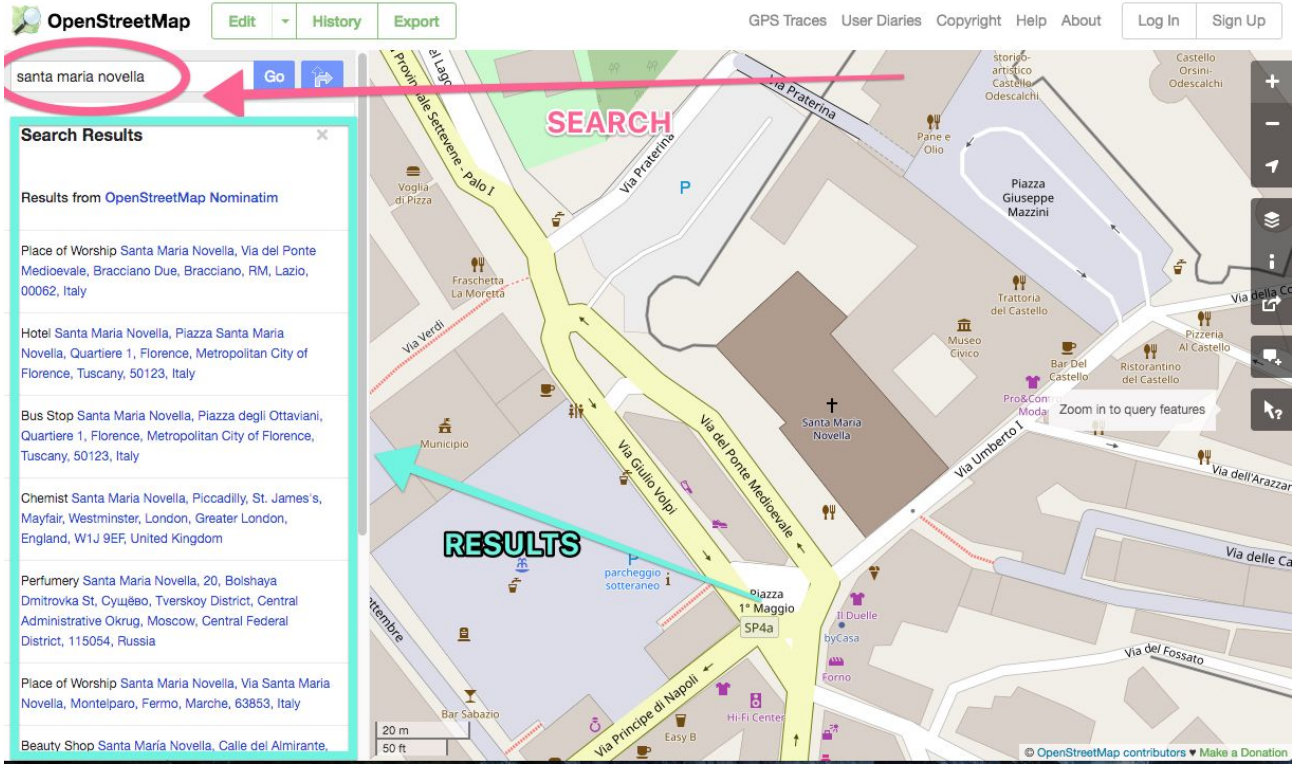
Indice

- Estrazione (OSM, OSM API, OVERPASS)
- Export / Import (geojson.io, QGIS, PostGIS)
- Elaborazione dati



Estrazione dati

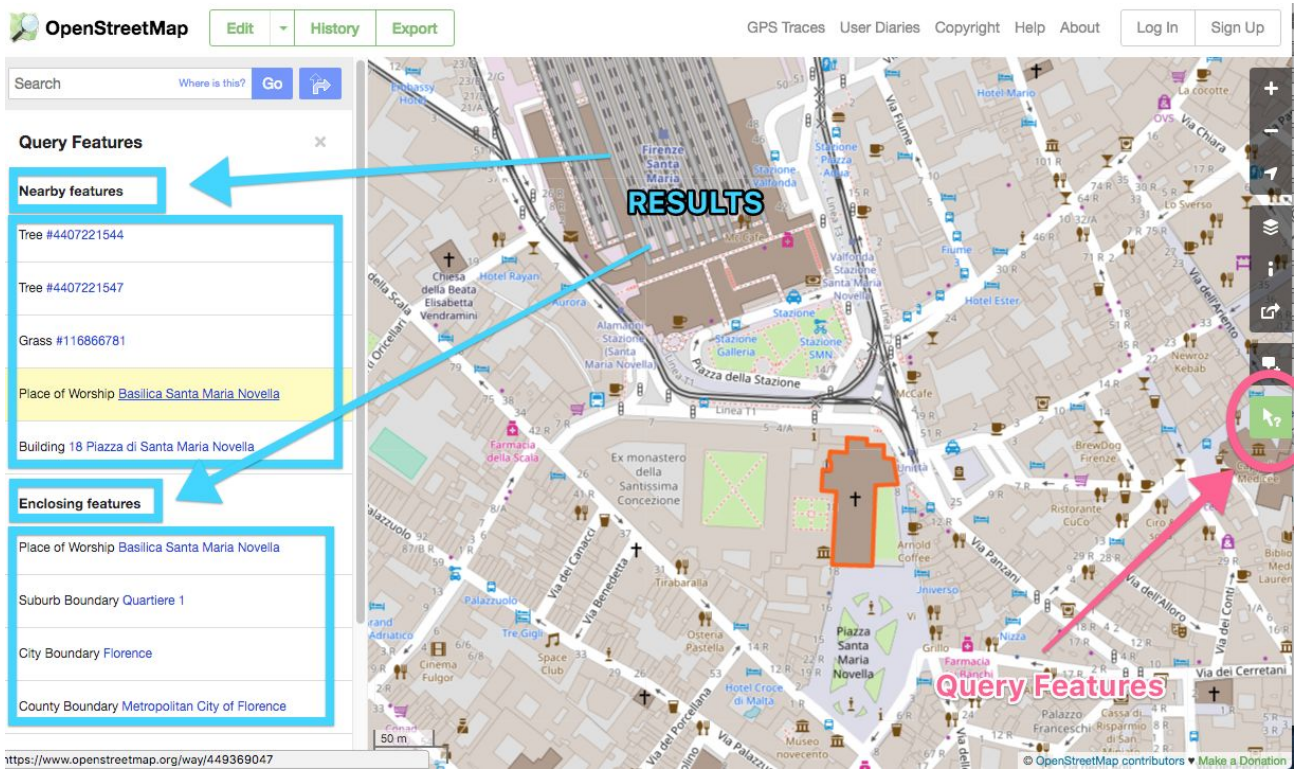
http://www.openstreetmap.org



ESTRAZIONE DATI / 1
L'interfaccia di OpenStreetMap

ESERCIZIO: aprire l'interfaccia di OSM da un browser, utilizzare la funzionalità SEARCH per cercare risultati (per esempio "santa maria novella"). Visualizzare i risultati sulla SX passandoci sopra il mouse e cliccando.

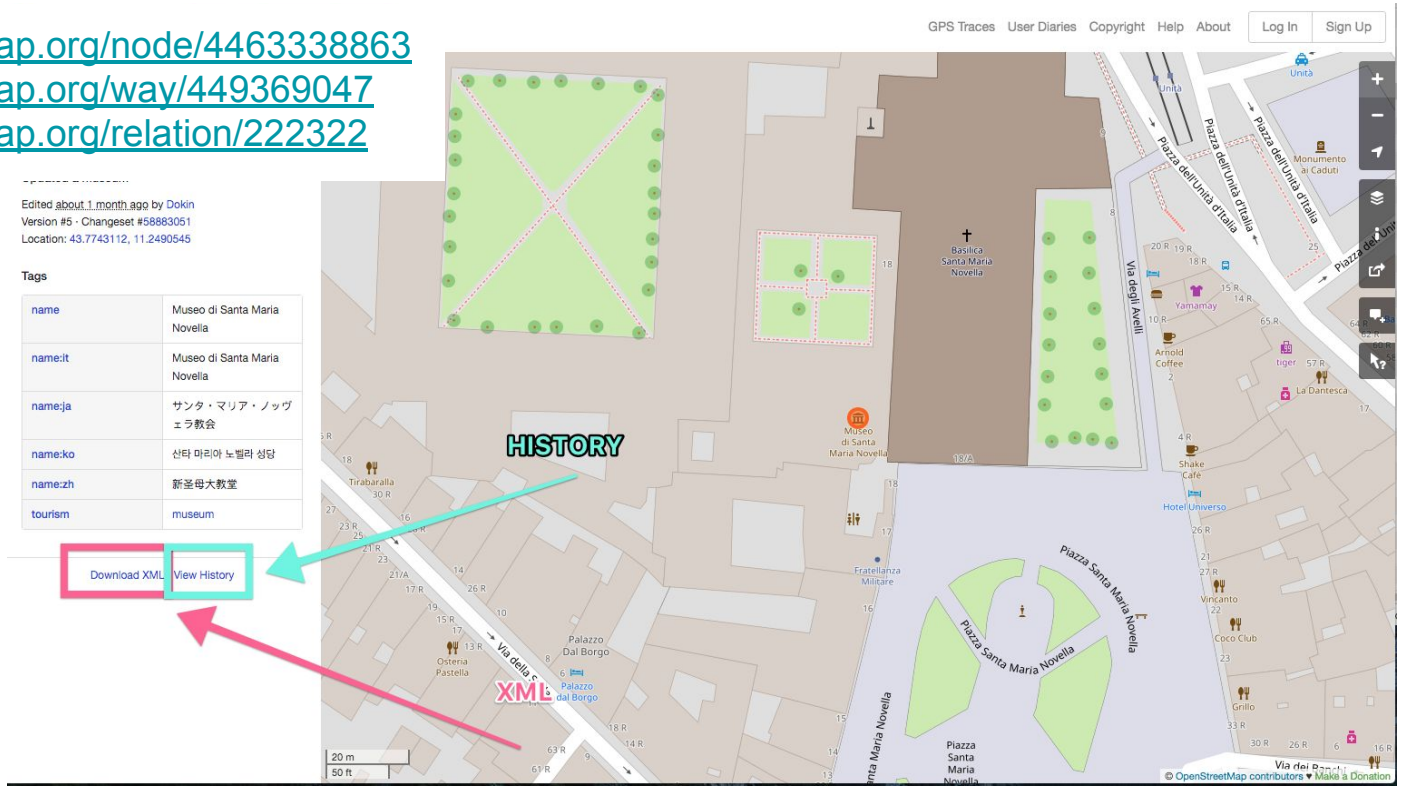
http://www.openstreetmap.org



ESTRAZIONE DATI / 1
L'interfaccia di OpenStreetMap

ESERCIZIO: aprire l'interfaccia di OSM da un browser, centrare la mappa in situazioni differenti (centro città, aperta campagna, cima di un monte noto) e cliccare sul tasto di esplorazione (query features)

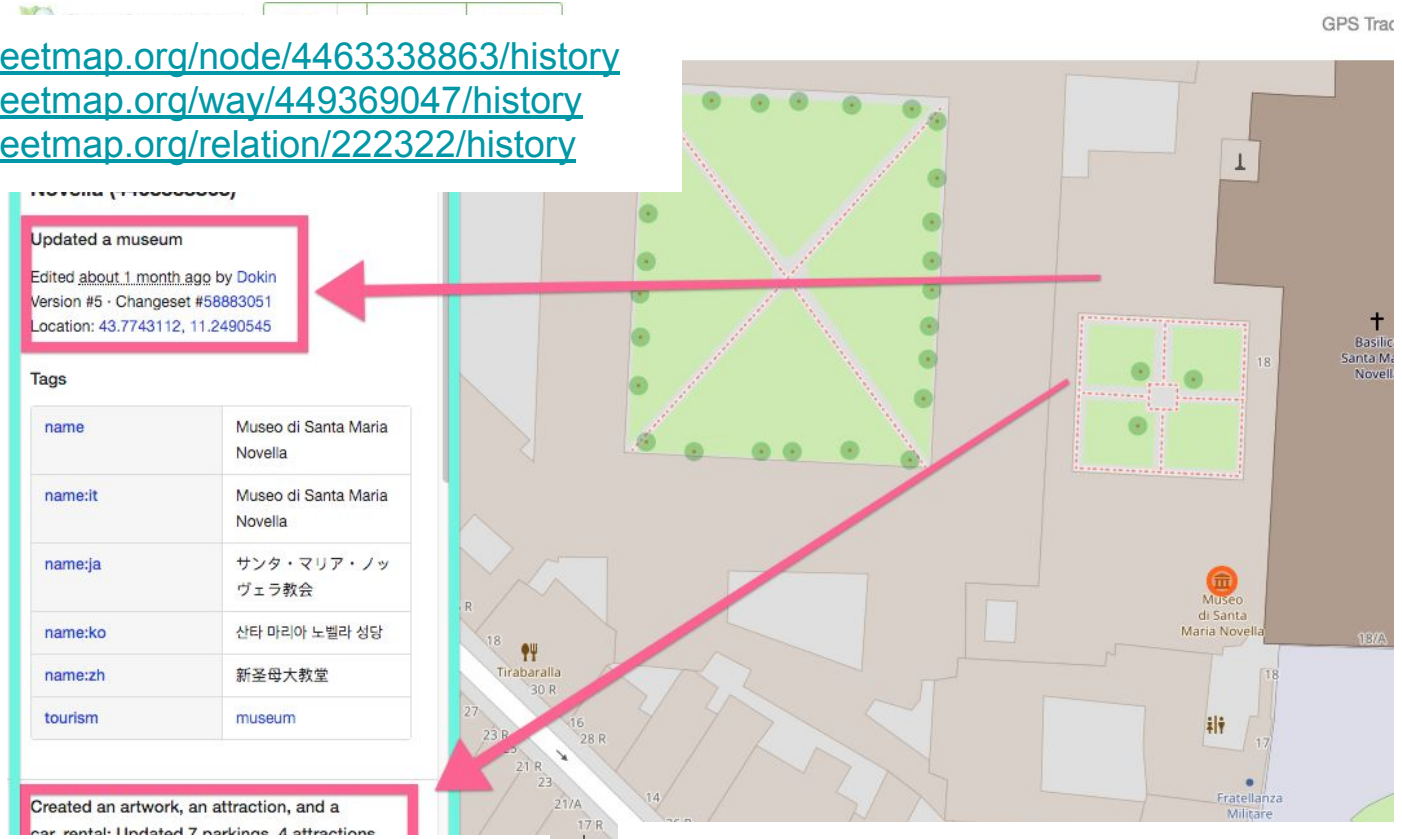
https://www.openstreetmap.org/node/4463338863
https://www.openstreetmap.org/way/449369047
https://www.openstreetmap.org/relation/222322



ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Una volta identificato un elemento nei risultati della ricerca o del query features cliccare sull'elemento e visualizzarlo nella mappa (farlo per un node, per una way e per una relation)

https://www.openstreetmap.org/node/4463338863/history
https://www.openstreetmap.org/way/449369047/history
https://www.openstreetmap.org/relation/222322/history



ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Visualizzare la history (CHANGELOG) degli elementi precedentemente visualizzati su OSM

https://www.openstreetmap.org/api/0.6/node/4463338863
https://www.openstreetmap.org/api/0.6/way/449369047
https://www.openstreetmap.org/api/0.6/relation/222322

```
▼<osm version="0.6" generator="CGImap 0.6.0 (15383 thorn-
 01.openstreetmap.org)" copyright="OpenStreetMap and contributors"
 attribution="http://www.openstreetmap.org/copyright"
 license="http://opendatacommons.org/licenses/odbl/1-0/">
  ▼<node id="4463338863" visible="true" version="5" changeset="58883051"
   timestamp="2018-05-11T16:10:26Z" user="Dokin" uid="8256963"
   lat="43.7743112" lon="11.2490545">
     <tag k="name" v="Museo di Santa Maria Novella"/>
     <tag k="name:it" v="Museo di Santa Maria Novella"/>
     <tag k="name:ja" v="サンタ・マリア・ノッヴェラ教会"/>
     <tag k="name:ko" v="산타 마리아 노벨라 성당"/>
     <tag k="name:zh" v="新圣母大教堂"/>
     <tag k="tourism" v="museum"/>
   </node>
 </osm>
```

ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Visualizzare la API di dettaglio di un singolo elemento in formato XML

https://www.openstreetmap.org/api/0.6/way/449369047/full
https://www.openstreetmap.org/api/0.6/relation/222322/full


```
<osm version="0.6" generator="CGImap 0.6.0 (17958 thorn-02.openstreetmap.org)" copyright="OpenStreetMap and contributors"
attribution="http://www.openstreetmap.org/copyright" license="http://opendatacommons.org/licenses/odbl/1-0/">
  <node id="269997209" visible="true" version="6" changeset="43157399" timestamp="2016-10-25T12:55:50Z" user="Pab09" uid="178610" lat="43.7742095" lon="11.2495537"/>
  <node id="269997212" visible="true" version="5" changeset="43157399" timestamp="2016-10-25T12:55:49Z" user="Pab09" uid="178610" lat="43.7747999" lon="11.2495789"/>
  <node id="269997214" visible="true" version="6" changeset="43157399" timestamp="2016-10-25T12:55:49Z" user="Pab09" uid="178610" lat="43.7748013" lon="11.2498028"/>
  <node id="269997215" visible="true" version="5" changeset="43157399" timestamp="2016-10-25T12:55:49Z" user="Pab09" uid="178610" lat="43.7750924" lon="11.2496663"/>
  <node id="269997216" visible="true" version="5" changeset="43157399" timestamp="2016-10-25T12:55:49Z" user="Pab09" uid="178610" lat="43.7750949" lon="11.2494966"/>
  <node id="269997218" visible="true" version="6" changeset="54602201" timestamp="2017-12-13T17:09:29Z" user="mau59" uid="257767" lat="43.7751387" lon="11.2494956"/>
  <node id="269997219" visible="true" version="6" changeset="54602201" timestamp="2017-12-13T17:09:30Z" user="mau59" uid="257767" lat="43.7751428" lon="11.2492907"/>
  <node id="269997225" visible="true" version="7" changeset="43157399" timestamp="2016-10-25T12:55:50Z" user="Pab09" uid="178610" lat="43.7742174" lon="11.2491407"/>
  <node id="1280019709" visible="true" version="2" changeset="43157399" timestamp="2016-10-25T12:55:49Z" user="Pab09" uid="178610" lat="43.7749968" lon="11.2496637"/>
  <node id="1280019714" visible="true" version="2" changeset="43157399" timestamp="2016-10-25T12:55:49Z" user="Pab09" uid="178610" lat="43.7749924" lon="11.2497650"/>
  <node id="1315184193" visible="true" version="2" changeset="43157399" timestamp="2016-10-25T12:55:50Z" user="Pab09" uid="178610" lat="43.7750962" lon="11.2492891"/>
  <node id="4463338851" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:46Z" user="Pab09" uid="178610" lat="43.7749119" lon="11.2490489"/>
  <node id="4463338853" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:46Z" user="Pab09" uid="178610" lat="43.7747578" lon="11.2490371"/>
  <node id="4463338854" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:46Z" user="Pab09" uid="178610" lat="43.7750359" lon="11.2492874"/>
  <node id="4463338856" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:46Z" user="Pab09" uid="178610" lat="43.7747511" lon="11.2491806"/>
  <node id="4463338857" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:46Z" user="Pab09" uid="178610" lat="43.7750424" lon="11.2491161"/>
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  <node id="4463338884" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:47Z" user="Pab09" uid="178610" lat="43.7749089" lon="11.2491279"/>
  <node id="4463339295" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:47Z" user="Pab09" uid="178610" lat="43.7750382" lon="11.2492062"/>
  <node id="4463339305" visible="true" version="1" changeset="43157399" timestamp="2016-10-25T12:55:47Z" user="Pab09" uid="178610" lat="43.7749714" lon="11.2491094"/>
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    <nd ref="4463338854"/>
    <nd ref="4463339295"/>
    <nd ref="4463338857"/>
    <nd ref="4463339305"/>
    <nd ref="4463338878"/>
    <nd ref="4463338884"/>
    <nd ref="4463338851"/>
    <nd ref="4463338853"/>
    <nd ref="4463338856"/>
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    <nd ref="269997209"/>
    <nd ref="269997212"/>
    <nd ref="269997214"/>
    <nd ref="1280019714"/>
    <nd ref="1280019709"/>
    <nd ref="269997215"/>
    <nd ref="269997216"/>
    <nd ref="269997218"/>
```
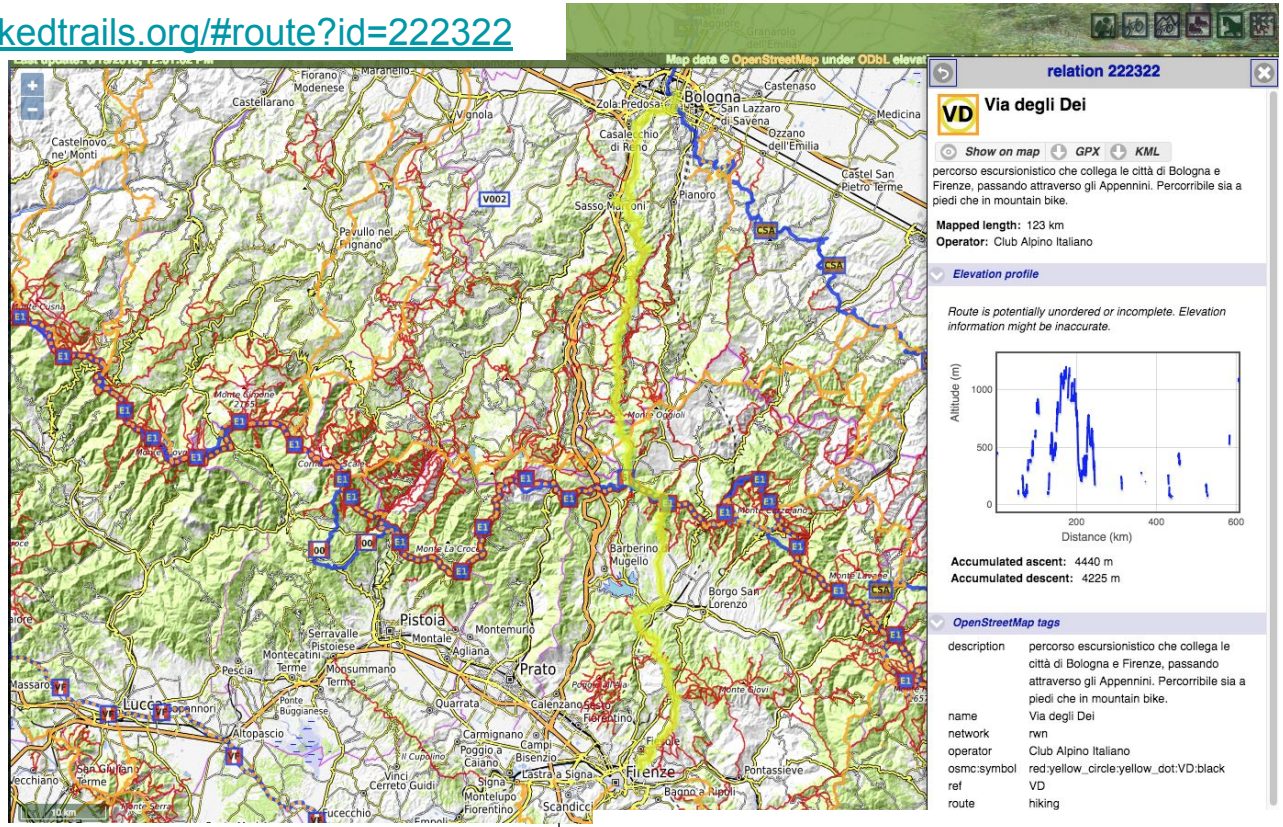


ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Visualizzare la API di dettaglio full di un singolo elemento (di tipo way o relation) in formato XML

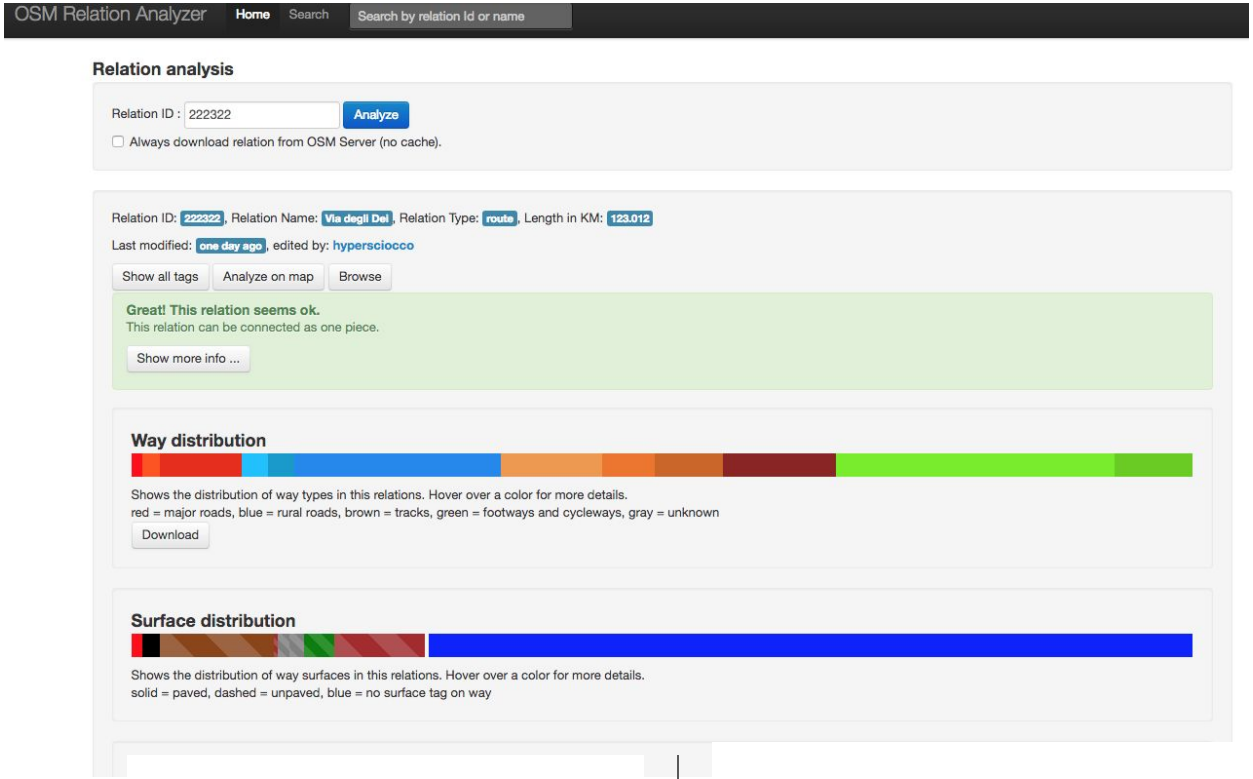
https://hiking.waymarkedtrails.org/#route?id=222322



ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Visualizzare una relation con WAYMARKEDTRAILS

http://ra.osmsurround.org/analyzeRelation?relationId=222322



ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Visualizzare una relation con OSM RELATION ANALYZER

Retrieving map data by bounding box: `GET /api/0.6/map`

The following command returns:

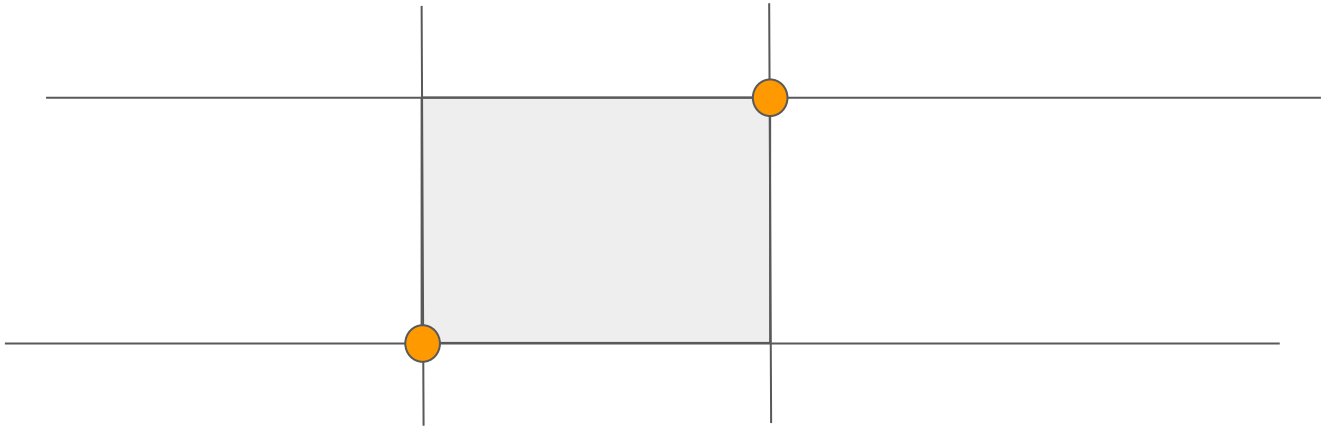
- All nodes that are inside a given bounding box and any relations that reference them.
- All ways that reference at least one node that is inside a given bounding box, any relations that reference them [the ways], and any nodes outside the bounding box that the ways may reference.
- All relations that reference one of the nodes, ways or relations included due to the above rules. (Does **not** apply recursively, see explanation below.)

```
GET /api/0.6/map?bbox=left,bottom,right,top
```

ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Scaricare una porzione di mappa di una zona ristretta attorno alla sede di svolgimento della lezione.

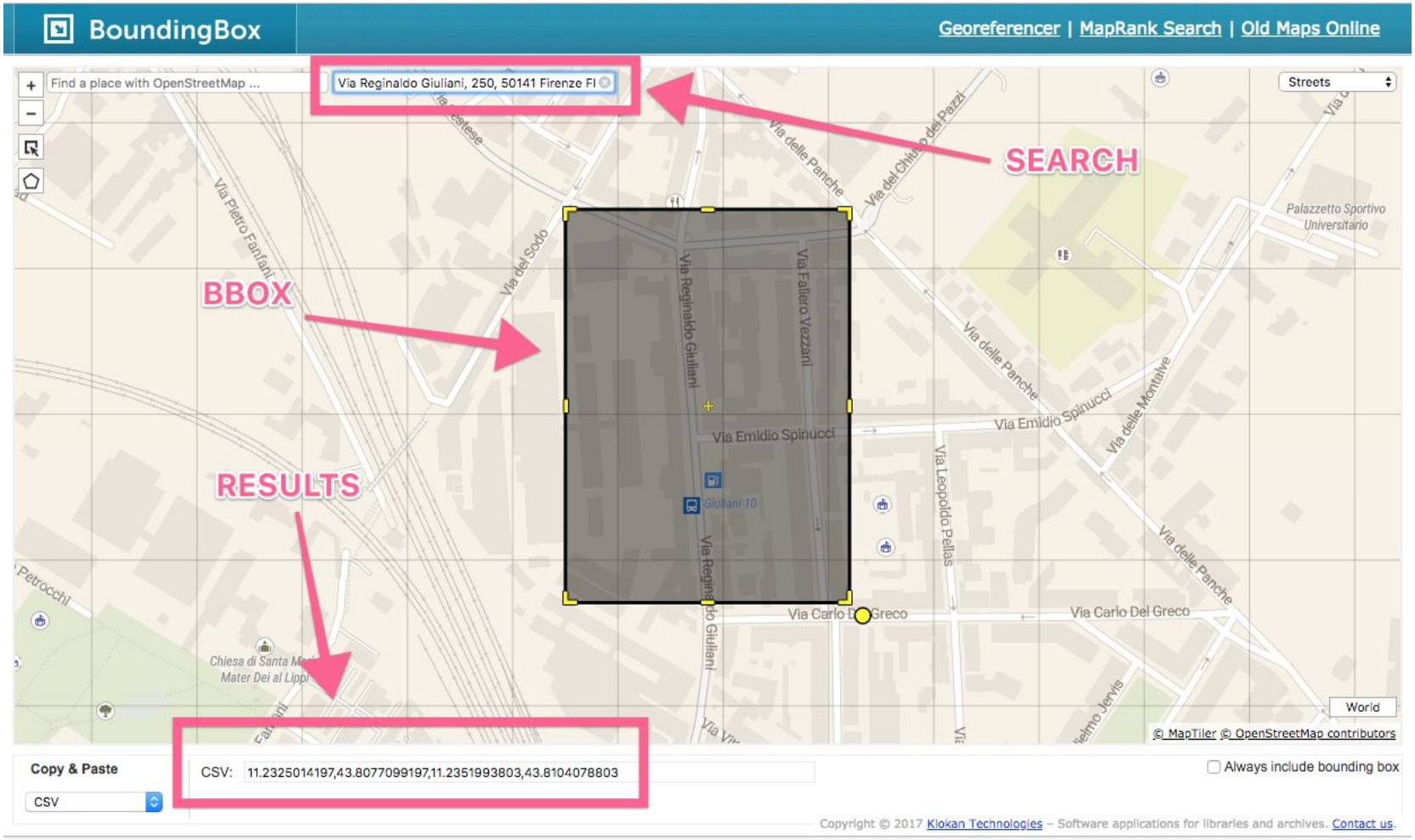
https://www.openstreetmap.org/api/0.6/map?bbox=left,bottom,right,top



ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Scaricare una porzione di mappa di una zona ristretta attorno alla sede di svolgimento della lezione.

https://boundingbox.klokantech.com/



https://www.openstreetmap.org/api/0.6/map?bbox=11.2323068197,43.8077971197,11.2350047803,43.8104950803

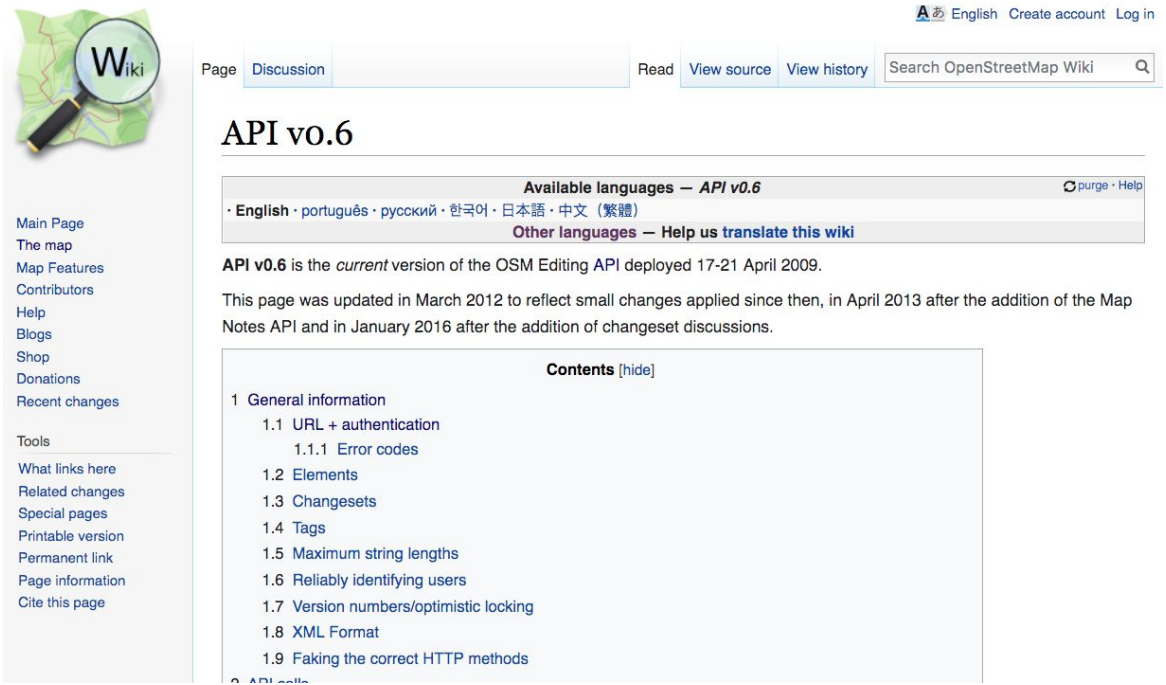
map.osm

```
<?xml version="1.0" encoding="UTF-8"?>
<osm version="0.6" generator="CGImap 0.6.0 (17985 thorn-02.openstreetmap.org)" copyright="OpenStreetMap and contributors" attribution="http://www.openstreetmap.org/copyright" license="http://opendatacommons.org/licenses/odbl/1-0/">
 <bounds minlat="43.8077971" minlon="11.2323068" maxlat="43.8104951" maxlon="11.2350048"/>
 <node id="1533964" visible="true" version="7" changeset="52772175" timestamp="2017-10-09T20:45:35Z" user="hypersciocco" uid="90188" lat="43.8075884" lon="11.2338494"/>
 <node id="1533966" visible="true" version="2" changeset="24746211" timestamp="2014-08-14T13:56:52Z" user="Kurly" uid="967832" lat="43.8095081" lon="11.2336426"/>
 <node id="1533967" visible="true" version="15" changeset="59282046" timestamp="2018-05-25T20:52:07Z" user="mau59" uid="257767" lat="43.8101644" lon="11.2335902"/>
 <node id="1533973" visible="true" version="3" changeset="53427713" timestamp="2017-11-01T15:51:06Z" user="mau59" uid="257767" lat="43.8111661" lon="11.2312831"/>
 <node id="270056613" visible="true" version="3" changeset="25266036" timestamp="2014-09-06T12:38:11Z" user="Pab09" uid="178610" lat="43.8109626" lon="11.2337971"/>
 <node id="270056614" visible="true" version="3" changeset="25266036" timestamp="2014-09-06T12:38:11Z" user="Pab09" uid="178610" lat="43.8111992" lon="11.2337998"/>
 <node id="270056615" visible="true" version="2" changeset="19789339" timestamp="2014-01-03T16:03:41Z" user="Pucciotrex30" uid="1801173" lat="43.8114008" lon="11.2337610"/>
 <node id="270057386" visible="true" version="1" changeset="148897" timestamp="2008-06-13T09:09:16Z" user="grampasso" uid="17383" lat="43.8108736" lon="11.2316301"/>
 <node id="270058549" visible="true" version="5" changeset="24125664" timestamp="2014-07-13T17:47:23Z" user="ppong it" uid="1747341" lat="43.8110339" lon="11.2314252"/>
 <node id="270058633" visible="true" version="5" changeset="33222803" timestamp="2015-08-09T16:42:55Z" user="Pucciotrex30" uid="1801173" lat="43.8116089" lon="11.2335014"/>
 <node id="270058682" visible="true" version="4" changeset="33222803" timestamp="2015-08-09T16:42:55Z" user="Pucciotrex30" uid="1801173" lat="43.8107423" lon="11.2327583"/>
```

ESTRAZIONE DATI / 2
Le API di OSM

ESERCIZIO: Scaricare una porzione di mappa di una zona ristretta attorno alla sede di svolgimento della lezione.

https://wiki.openstreetmap.org/wiki/API_v0.6



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API v0.6

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API v0.6 is the *current* version of the OSM Editing API deployed 17-21 April 2009.

This page was updated in March 2012 to reflect small changes applied since then, in April 2013 after the addition of the Map Notes API and in January 2016 after the addition of changeset discussions.

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  - 1.1.1 Error codes
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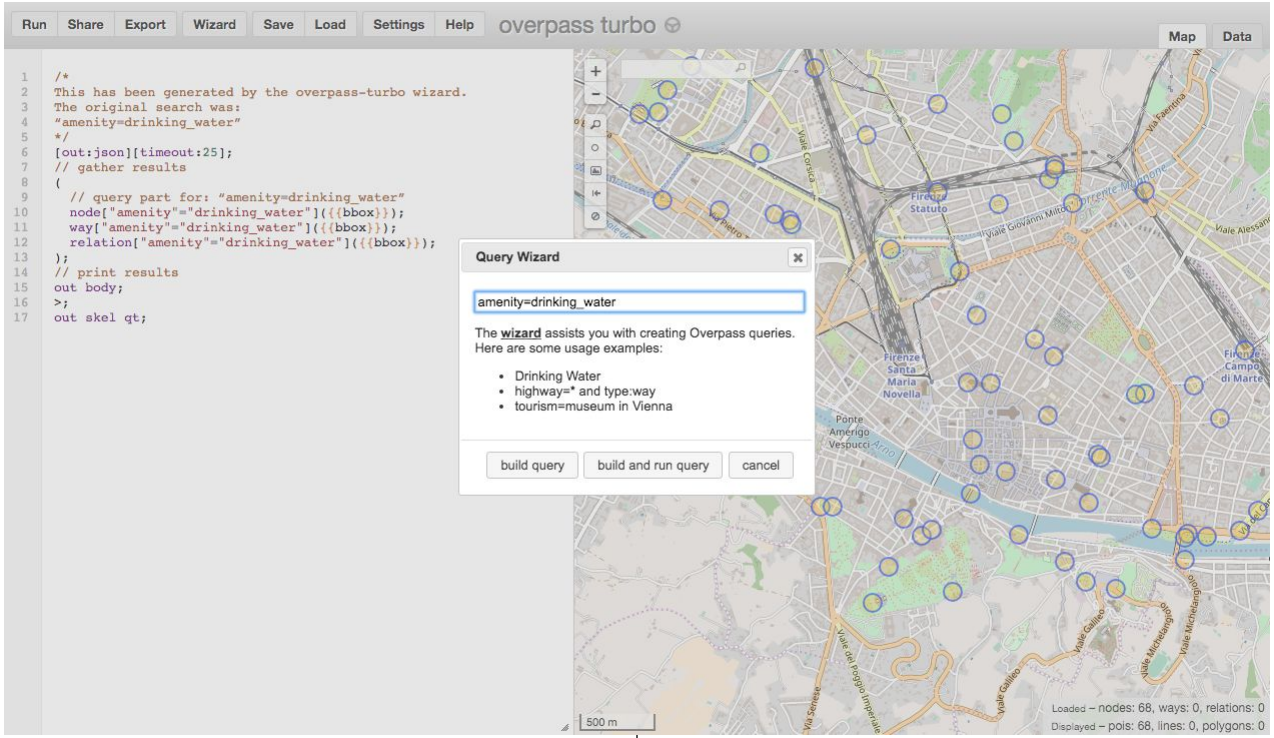
- 1.8 XML Format
- 1.9 Faking the correct HTTP methods

2 API calls

ESTRAZIONE DATI / 2
Le API di OSM

Documentazione sulle API di OSM (v 0.6)

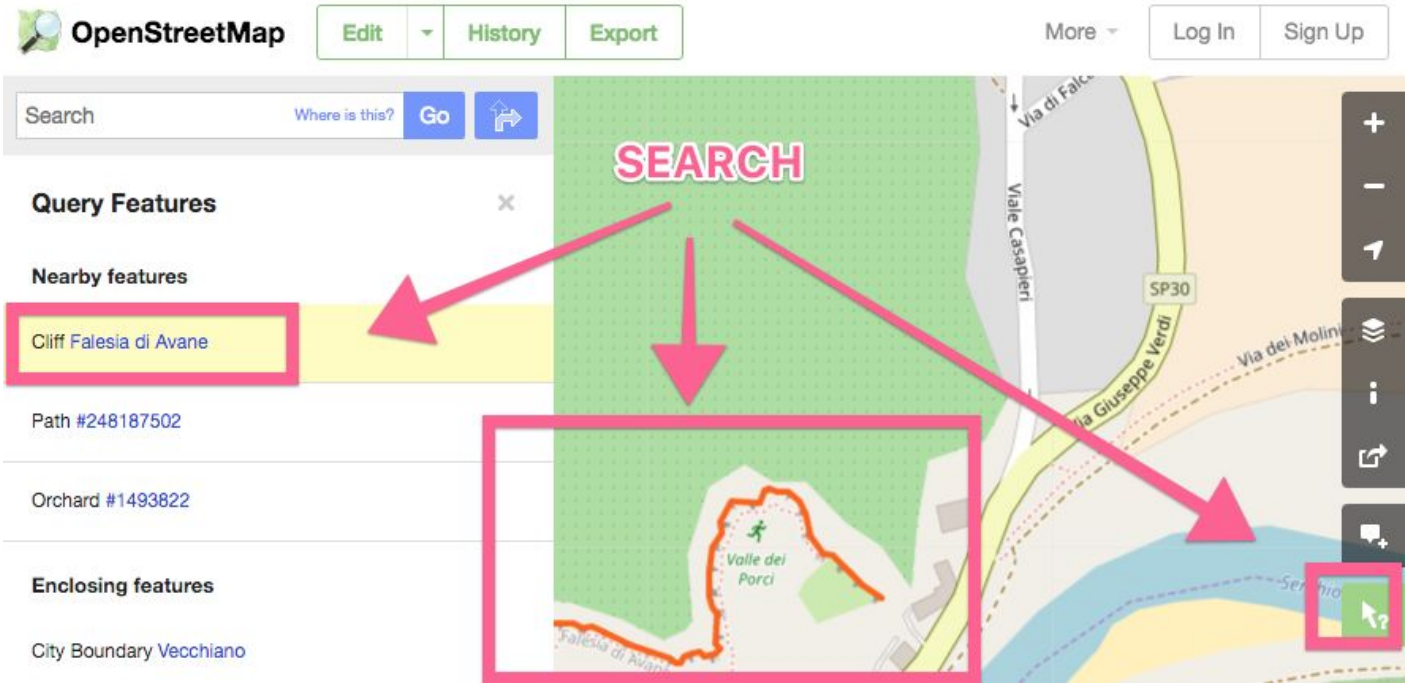
https://overpass-turbo.eu/



ESTRAZIONE DATI / 3
OVERPASS TURBO

ESERCIZIO: Trovare tutte le fontane attorno di una particolare zona usando il WIZARD di OVERPASS TURBO

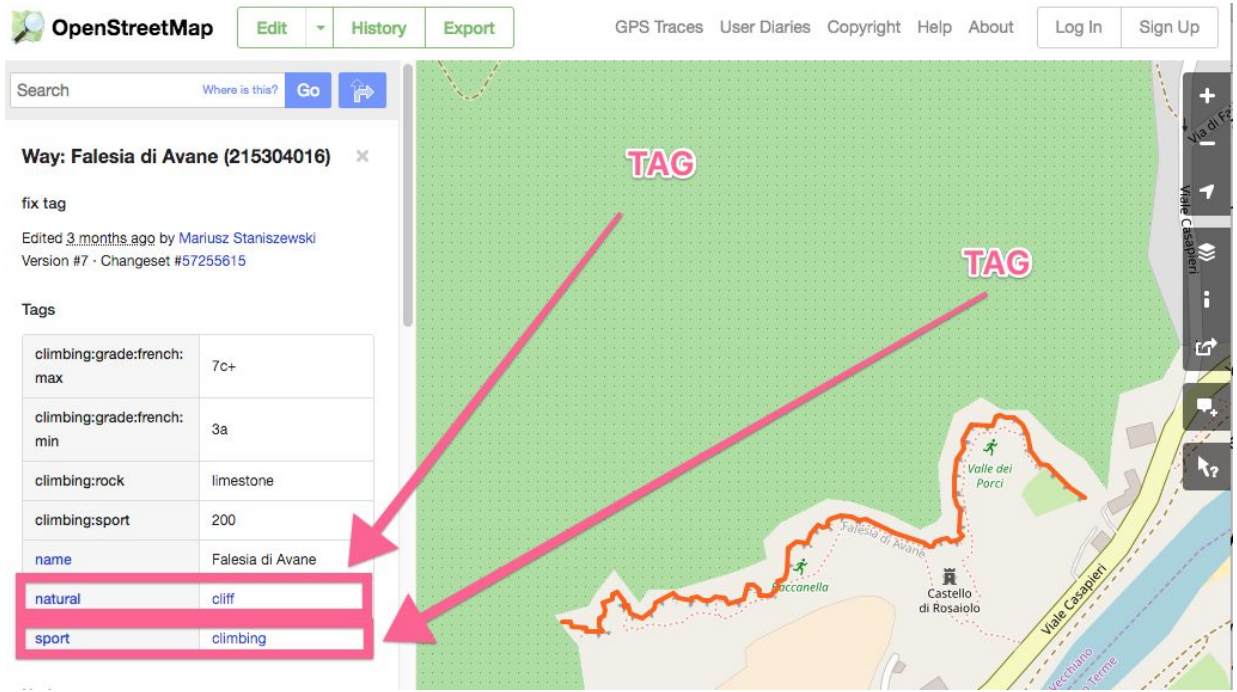
https://overpass-turbo.eu/



ESTRAZIONE DATI / 3
OVERPASS TURBO

ESERCIZIO: Trovare tutte le falesie di arrampicata di una zona. **Da OSM interfaccia trovo una elemento come quello che cerco.** Guardo i TAG. Uso i TAG per effettuare una query su OVERPASS.

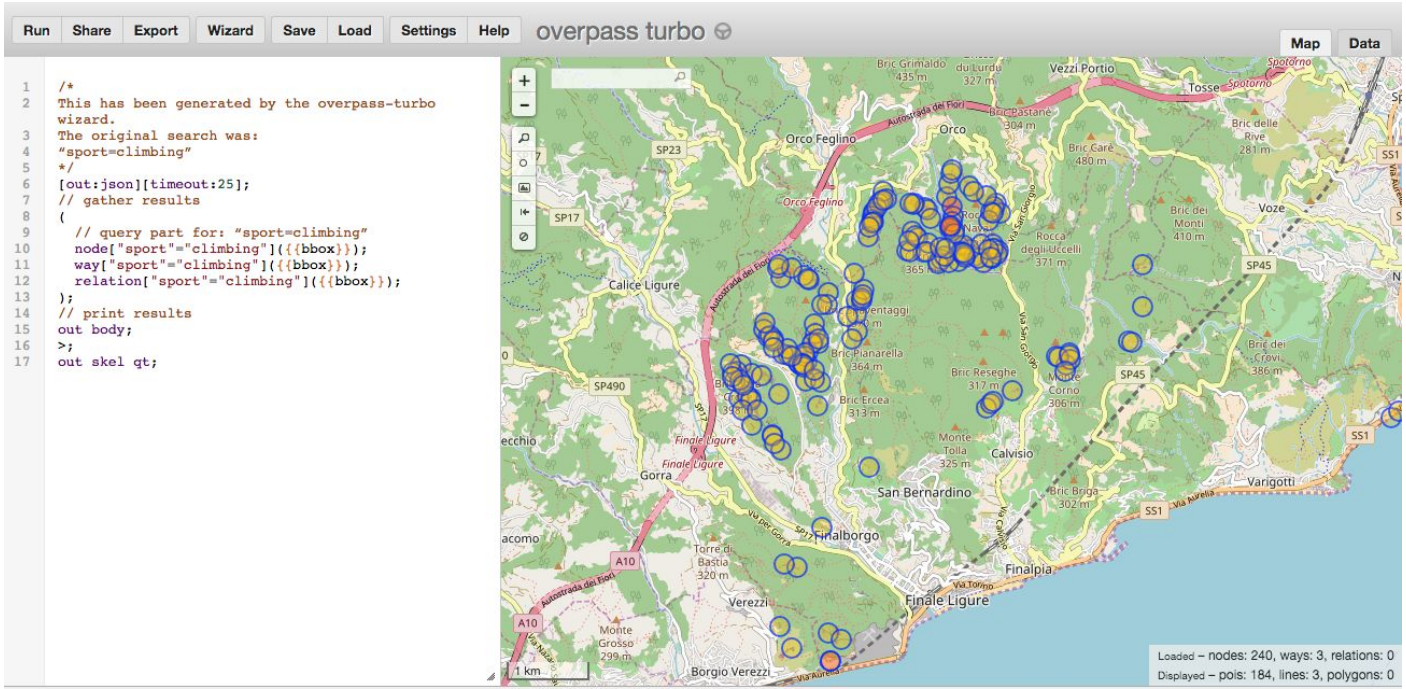
https://overpass-turbo.eu/



ESTRAZIONE DATI / 3
OVERPASS TURBO

ESERCIZIO: Trovare tutte le falesie di arrampicata di una zona. Da OSM interfaccia trovo una elemento come quello che cerco. **Guardo i TAG**. Uso i TAG per effettuare una query su OVERPASS.

https://overpass-turbo.eu/



ESTRAZIONE DATI / 3
OVERPASS TURBO

ESERCIZIO: Trovare tutte le falesie di arrampicata di una zona. Da OSM interfaccia trovo una elemento come quello che cerco. Guardo i TAG. **Uso i TAG per effettuare una query su OVERPASS.**

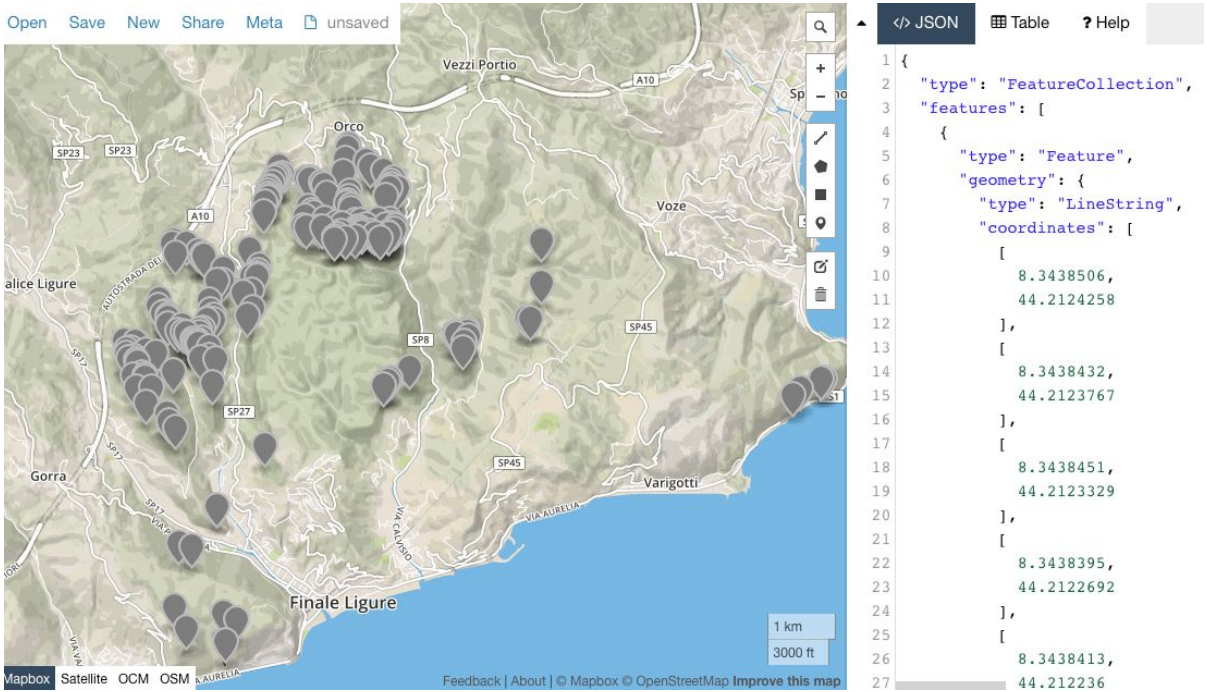
https://wiki.openstreetmap.org/wiki/Overpass_turbo/Wizard

ESTRAZIONE DATI / 3
OVERPASS TURBO

Documentazione di OVERPASS TURBO WIZARD

Import dati

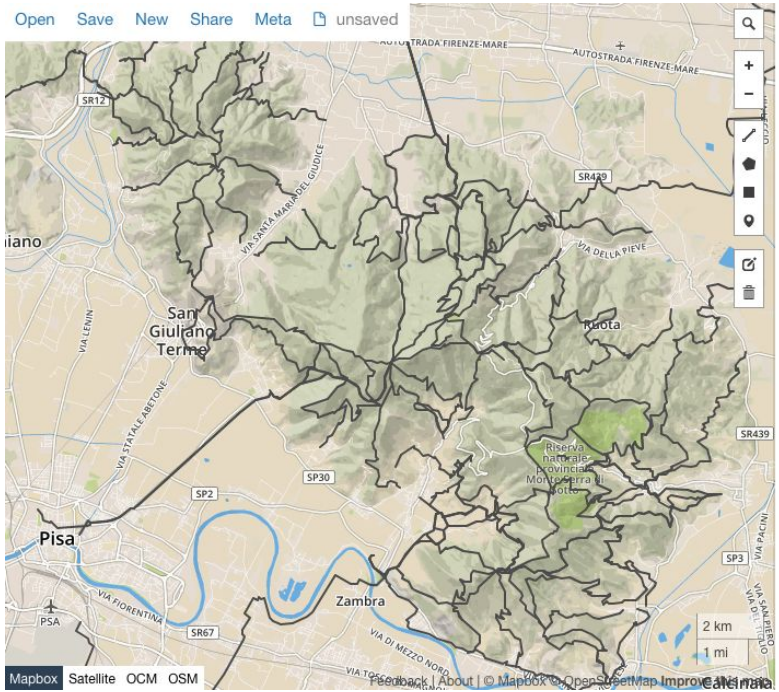
http://geojson.io



IMPORT DATI / 1
http://geojson.io

ESERCIZIO: Importare le falesie di arrampicata. Riprendo la query di Overpass per le falesie. Uso la funzionalità export per scaricare localmente i dati. Trascino il file su geojson.io

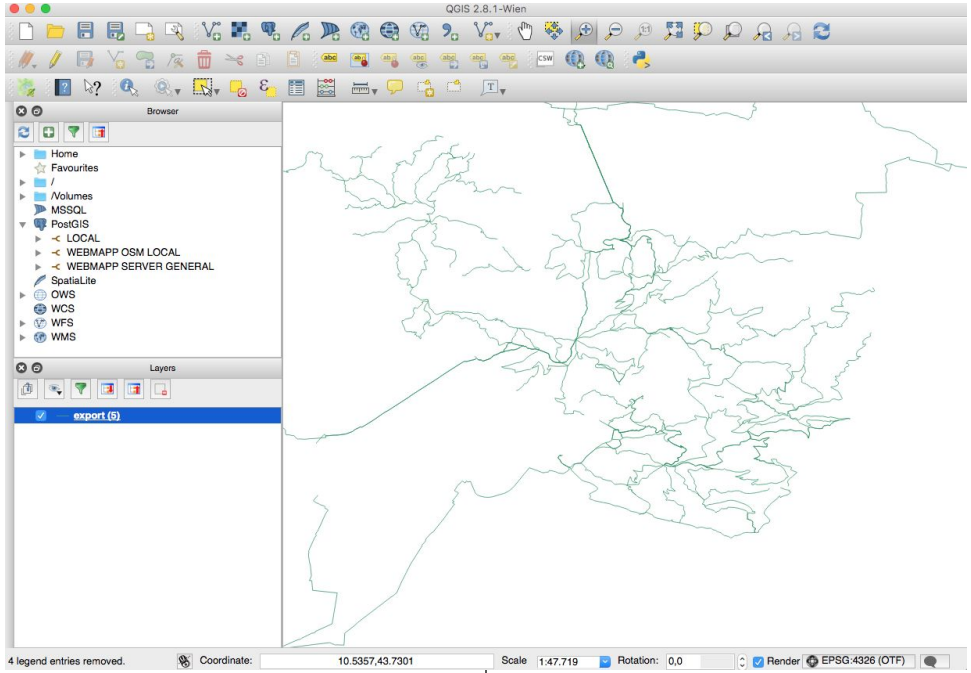
http://geojson.io



IMPORT DATI / 1
http://geojson.io

ESERCIZIO: Importare un gruppo di sentieri su geojson.io

https://www.qgis.org/it/site/



IMPORT DATI / 2
QGIS

ESERCIZIO: Importare un gruppo di sentieri su QGIS

https://postgis.net/
https://www.gnu.org/software/wget/
https://wiki.openstreetmap.org/wiki/Osm2pgsql

> **wget** -O temp.osm
https://www.openstreetmap.org/api/0.6/map?bbox=11.2323068197,43.8077971197,11.2350047803,43.8104950803

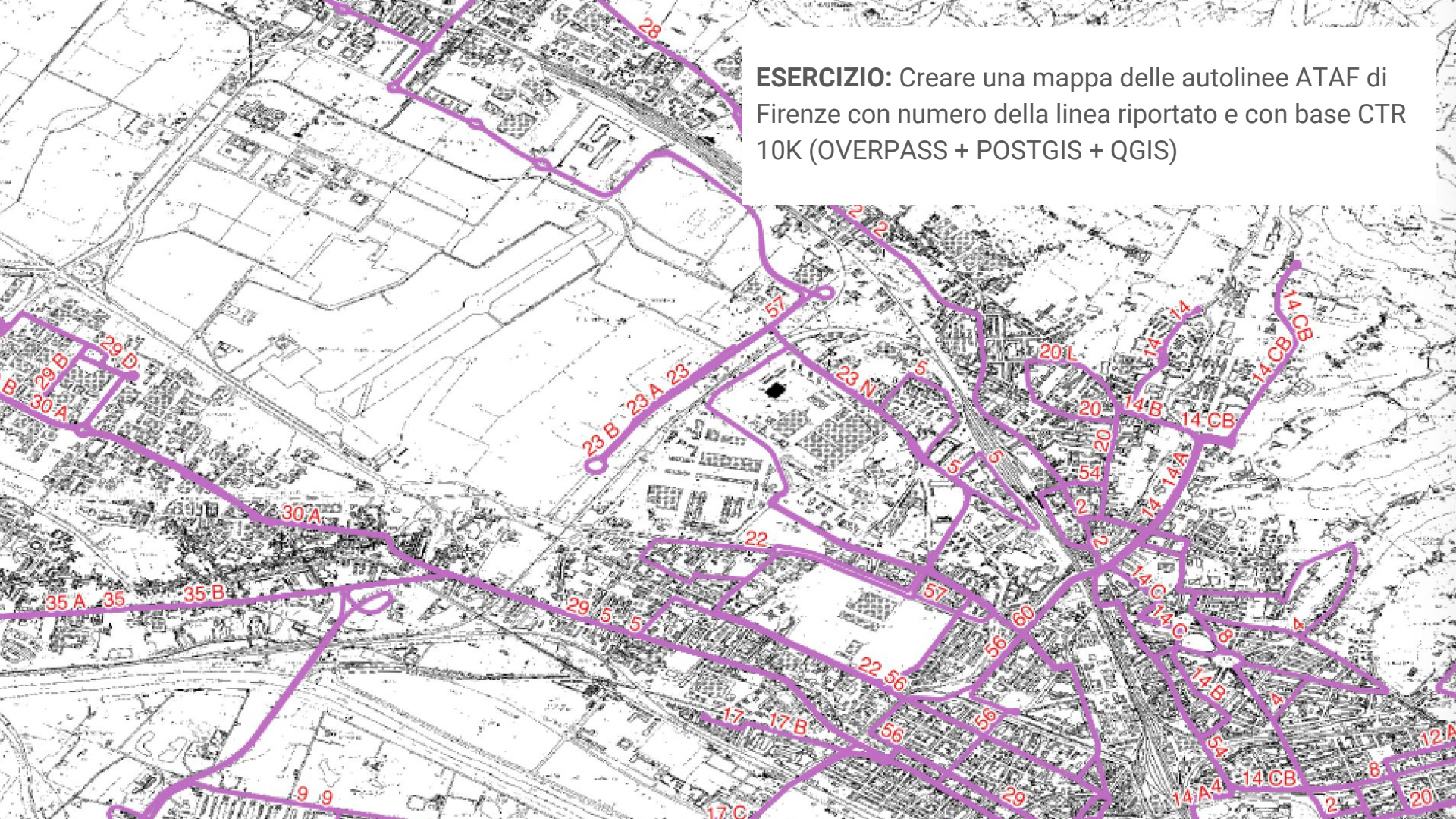
> **osm2pgsql** -c -d osm_lc -U webmapp -H localhost --number-processes 8 --hstore temp.osm
--style /mnt/volume-fra1-01/europaosm/openstreetmap.style

PRIMA DI INIZIARE:
> psql
> create role webmapp superuser login password '*******';
> create database osm_lc owner webmapp ;
> \connect osm_lc
> create extension postgis ;
> create extension hstore ;
> \q

IMPORT DATI / 3 POSTGIS

ESERCIZIO: Importare un file .osm Visualizzare i risultati con QGIS con una connessione a POSTGIS. Esplorare le tabelle create.

Elaborazione dati



ESERCIZIO: Creare una mappa delle autolinee ATAF di Firenze con numero della linea riportato e con base CTR 10K (OVERPASS + POSTGIS + QGIS)

```
[out:xml][timeout:1200];
{{geocodeArea:Firenze}}->.searchArea;
(
  node["operator"="ATAF"](area.searchArea);
  way["operator"="ATAF"](area.searchArea);
  relation["operator"="ATAF"](area.searchArea);
);
// print results
(._;>;);
out meta;
```

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POSTGIS

ESERCIZIO: Creare una mappa delle autolinee ATAF di Firenze con numero della linea riportato e con base CTR 10K

Grazie!

OpenStreetMap

MARCO BARBIERI
marcobarbieri@webmapp.it
Map maker

ALESSIO PICCIOLI
alessiopiccioli@webmapp.it
Geo Nerd