

# OpenStreetMap

## a resource for the data science

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[<napo@fbk.eu>](mailto:<napo@fbk.eu>)

# Outline



What's OpenStreetMap



How it Works



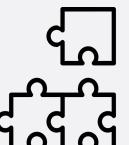
Success Stories



OSM in Research



Copyright



Data Model



# What's OpenStreetMap



# What is OpenStreetMap?



Local Knowledge



Community Driven



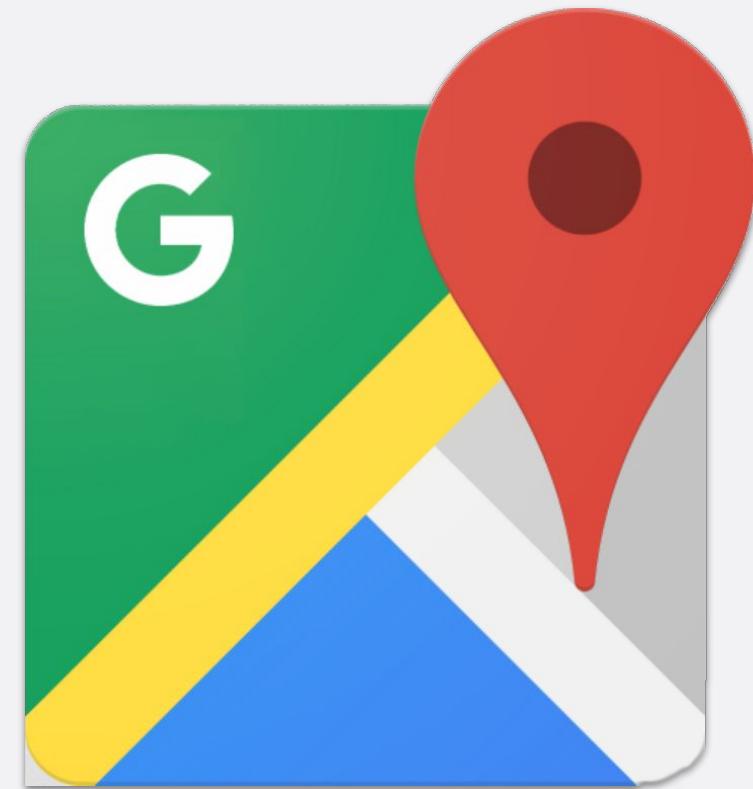
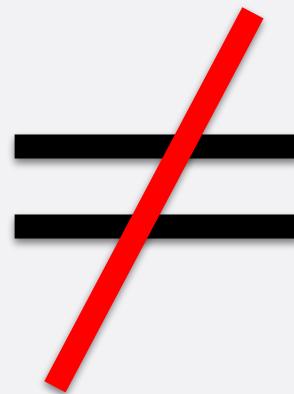
Open Data

**OpenStreetMap is built by a community of mappers that contribute and maintain data about roads, trails, cafés, railway stations, and much more, all over the world.**

<http://www.openstreetmap.org/about>



# OpenStreetMap is NOT an alternative to Google Maps





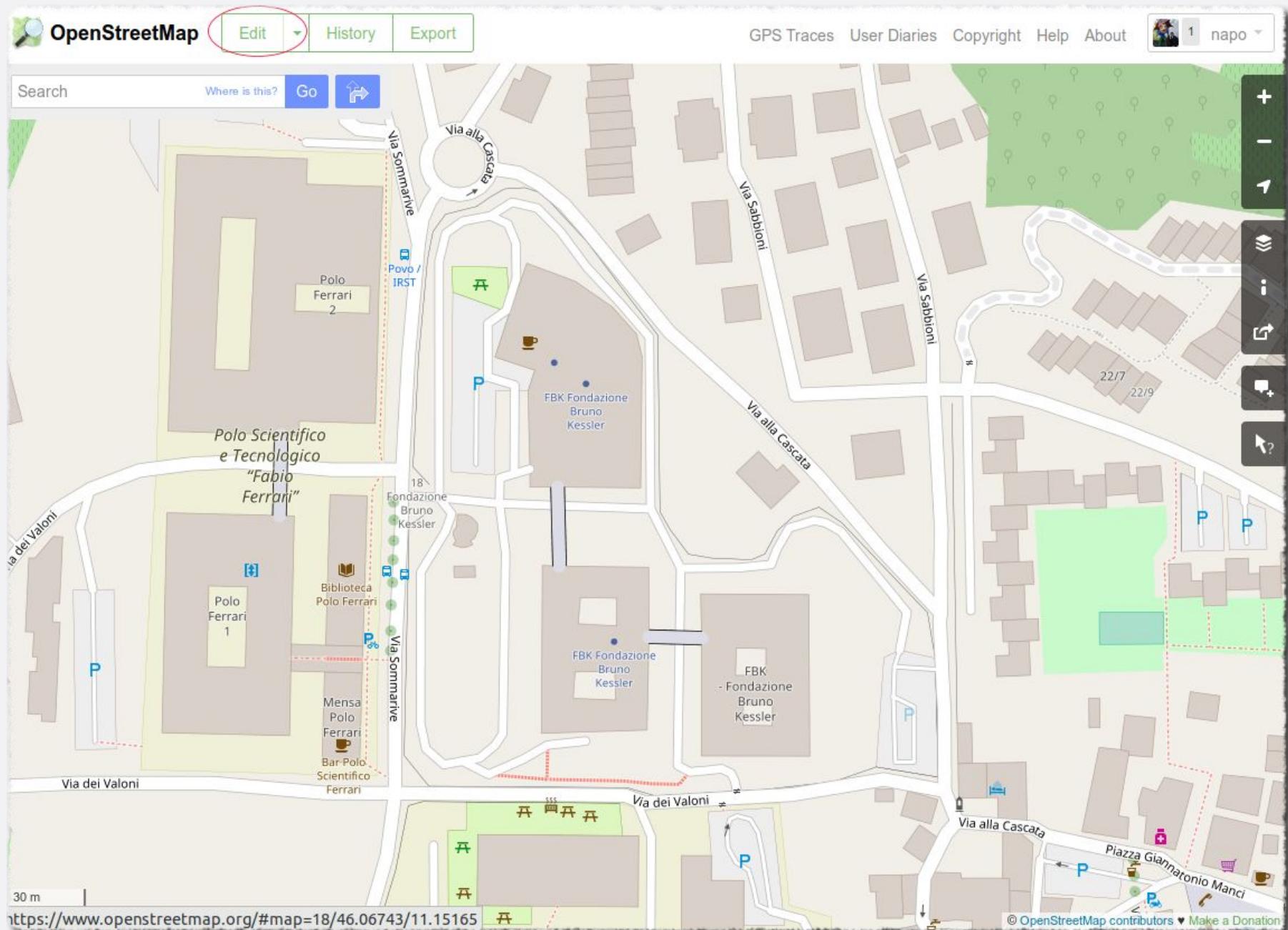
OPEN DATA

IS A COMMONS



# How it works





The map shows the University of Trento campus area, specifically the Polo Scientifico e Tecnologico "Fabio Ferrari". Key locations labeled include:

- Polo Ferrari 2
- Polo Scientifico e Tecnologico "Fabio Ferrari"
- Polo Ferrari 1
- Biblioteca Polo Ferrari
- Mensa Polo Ferrari
- Bar Polo Scientifico Ferrari
- Fondazione Bruno Kessler
- FBK Fondazione Bruno Kessler
- FBK Fondazione Bruno Kessler
- Via Sommarive
- Via alla Cascata
- Via dei Valoni
- Via Sabbioni
- Via alla Cascata
- Piazza Giannantonio Manci

The map also features several parking areas (P) and green spaces. A red circle highlights the "Edit" button in the top left corner of the OpenStreetMap interface.

<https://www.openstreetmap.org/#map=18/46.06743/11.15165>

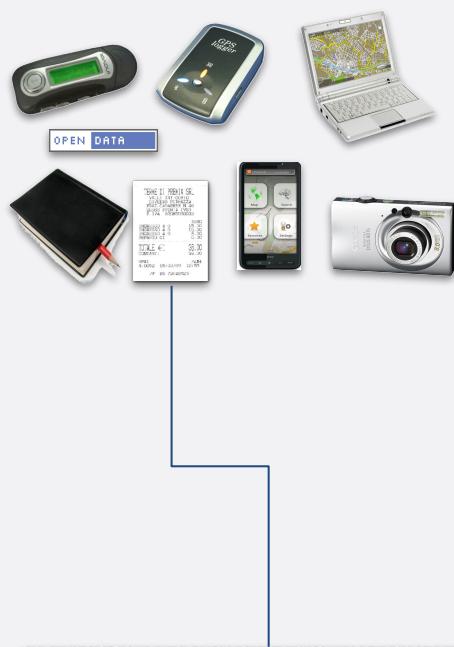
# What's happening now



<http://osmlab.github.io/show-me-the-way/>

# Geospatial analysis and representation for data science

## Master in Data Science - University of Trento



**OpenStreetMap**

Edit History Export

Edit feature

Research Office

All fields

Name: FBK Fondazione Bruno Kessler

Address: Street: 123, Postcode: City:

Building: yes

Hours: 24/7 Mo-Sa 08:00-20:00, sunrise-sunset.

Add field: Description, Elevation, Email...

All tags (5)

- alt\_name: FBK Edificio nord
- building: yes
- layer: 1
- name: FBK Fondazione B...
- office: research

All relations (1)

See FBK Fondazione Bruno Kessler

Save

A screenshot of the OpenStreetMap website's edit interface, showing a building footprint highlighted in red. The interface includes a sidebar for editing fields like name, address, and building type, and a detailed view of the building's location with surrounding streets and landmarks.

Map Compare

OSM Mapnik OSM Watercolor Overlay: None

OSM OpenTopMap OSM FR hot

Ing.lat: 11.1598146.07063 zoom:19 number of maps: 1 2 3 4 6 8+ share

A screenshot of the Map Compare tool showing four different map styles side-by-side: OSM Mapnik, OSM Watercolor, OSM OpenTopMap, and OSM FR hot. The tool allows users to compare different map layers and styles simultaneously.

HOT EXPORT TOOL About Learn Create Exports Configs English Log Out

Download OpenStreetMap Data

The Export Tool is an open service that creates customized extracts of up-to-date OSM data in various file formats.

Download and use the data simply by crediting the OpenStreetMap contributors.

Start Exporting

File Formats See Learn (1)

- Shapefile (.shp)
- GeoPackage (.gpkg)
- Garmin (.img)
- Google Earth (.kmz)
- OSM (.pbz)
- MAPS.ME (.mmz)
- OsmAnd (.obb)
- MBTiles (.mbtiles)

Tag Tree

Search for a feature type...

> Buildings

> Commercial

> Communication

> Education

> Emergency

> Financial

> Government

> Healthcare

> Humanitarian

> Land Use

> Localities

> Natural

> Power

> Public

> Sport

> Transportation

> Water

> Language

A screenshot of the HOT Export Tool website. It features a map of a city area with a red outline, a sidebar with file format options, and a large central area for selecting a feature type from a tree structure.



The image displays two screenshots of mobile map applications side-by-side.

**Orux Maps (Left):**

- Header:** "Orux Maps" in large white font, "online/offline map viewer for Android. and more..." below it.
- Navigation Bar:** Home, Maps!!!, Manual, Downloads, Links, FORUM.
- Language Options:** English, Español, Français.
- Content:** A map view with a red balloon icon, a sidebar with "MAIN MENU" (OsmAnd, Download / First Steps, Plugins, Screenshots, How To + FAQs, Blog), and a sidebar with "RESOURCES" (Project Site, Forum, Source Code, OsmAnd release builds, OsmAnd nightly build, OsmAnd CZ, OSM Homepage, Administrator).

**Locus Map (Right):**

- Header:** "Locus" logo with "63".
- Navigation Bar:** HOME, NEWS, FEATURES, DOWNLOAD, SUPPORT, CONTACT.
- Content:** Three devices (Tablet, Smartphone, Smartphone) displaying the Locus Map application interface, which shows a detailed map with various trails and locations labeled (e.g., Althütte, C42, C41, C40).
  - A text block on the right says: "Locus Map – GPS navigation app for Android that can do everything you want".
  - A bulleted list of features: View maps offline, Track your route, Find caches, Use a voice guide, And much more....
  - A call-to-action: "So download it for free today."
  - A "GET IT ON Google play" button with the Google Play logo.
- Bottom Section:** "Locus Map – Android online/offline maps application". It lists features: Offline maps, Geocaching, Online maps, Track record, Hiking & Cycling, Points & Tracks, Navigation & More. It also shows links to Google Play and Google+.

# BATTLEFIELD 4 (BF4) IMAGES

The image shows a screenshot of the Battlefield 4 Battlelog leaderboards. The main focus is a map of a city street with player icons and a large blue circle highlighting a specific area. To the right is a detailed leaderboards table for the M416 assault rifle.

**LEADERBOARDS > ASSAULT RIFLES > M416**

**FRIENDS #6**

**UPPSALA Top 5%**

**UPPLAND Top 70%**

**SWEDEN Top 25%**

**WORLD Top 5%**

**ALL TIME**

**M416 Most kills**

Rank	User	Kills
1	ogabretts	16,654
2	ogbystrom	15,558
3	JBRipley	15,330
4	Sodatrukt	15,135
5	tsa	14,657
6	TheBikingViking	14,301
7	Indigownd	13,719
8	DarkLord7854	11,503
9	drohr31337	11,334
10	Flag-E	10,964
892	MHESLOW	7,643

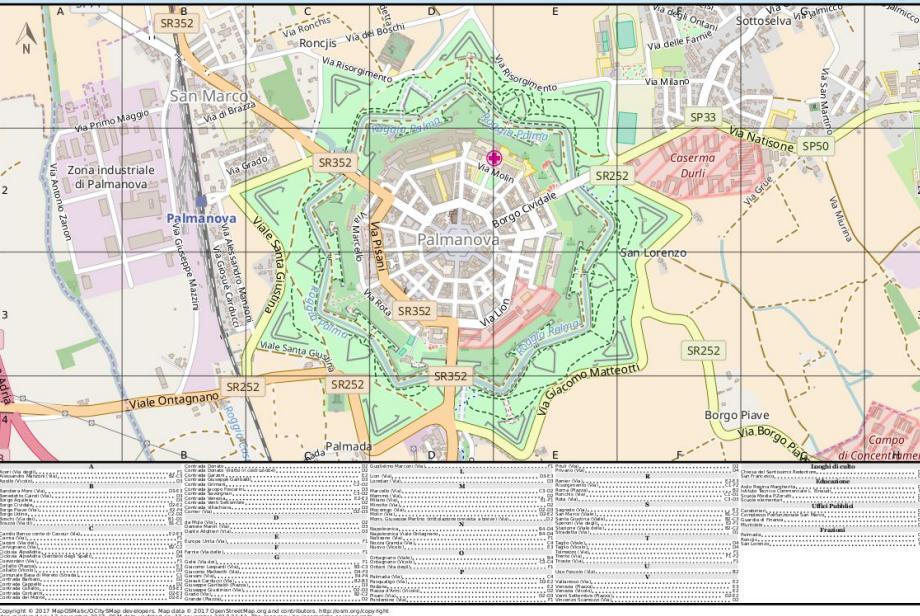
962 players

**VIEW SPECIFIC ASSAULT RIFLE**

**BF4 SCREENSHOTS - BATTLELOG LEADERBOARD**

M416 Top 25%   AN92 Top 38%   SAR-11 Top 5%   SAR-21 Top 42%   AEK-971 Top 68%   FAMAS Top 71%

## Palmanova - centro storico



## MapOSMatic

<http://maposmatic.org>

<https://maposmatic.osm-baustelle.de/>

# Orienteering

<http://oobrien.com/oom/>

Control Point	Description
1	Post box number
2	Post box number
3	Colour of do...
4	Colour of do...
5	Fire hydrant...
20	Number of tr...
21	Name of road
22	Gate closes at:
23	No _____ el...
30	Name of chemist



<https://touch-mapper.org/>



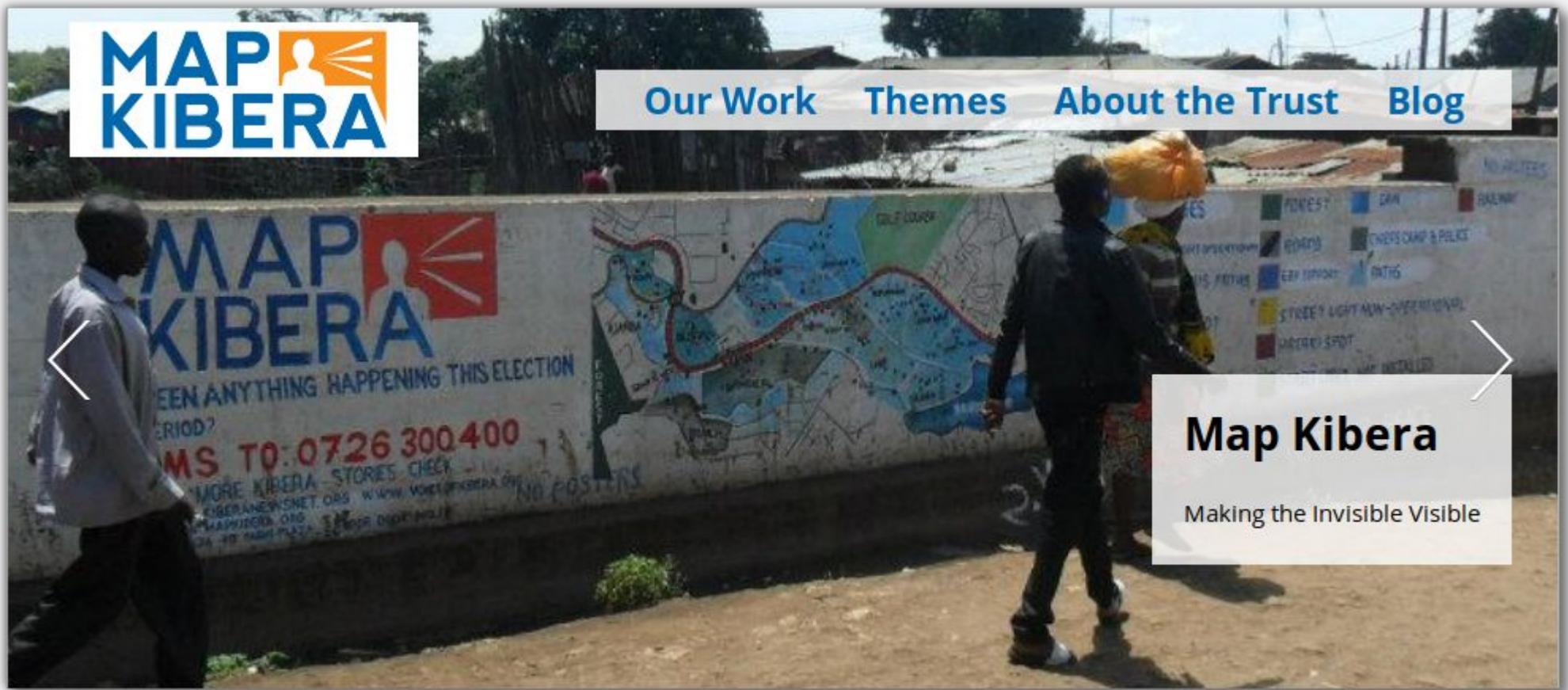
@napo



# Success Stories



# Making the Invisible Visible



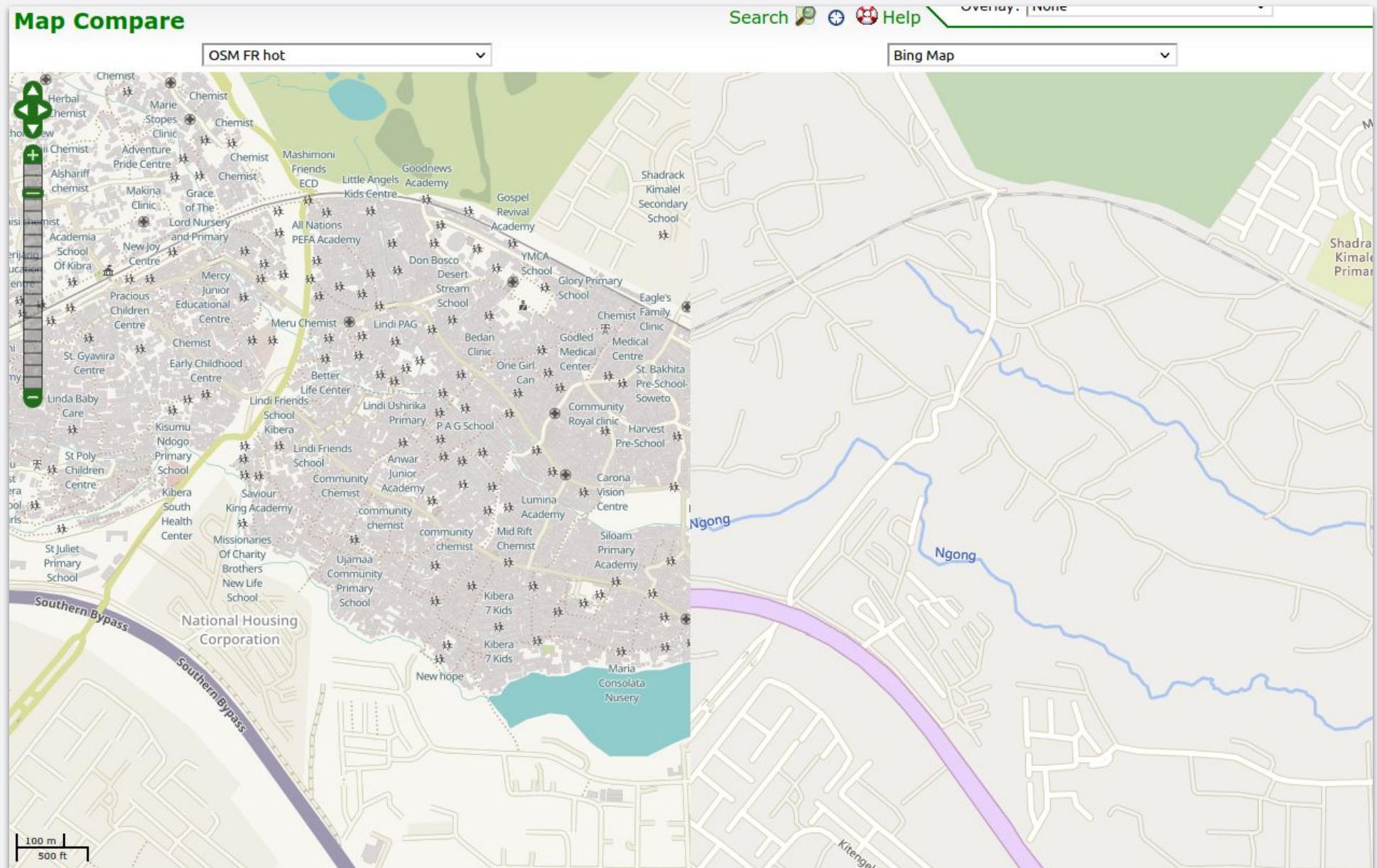
[mapkibera.org](http://mapkibera.org)

<http://tiny.cc/kiberacompare>



@napo



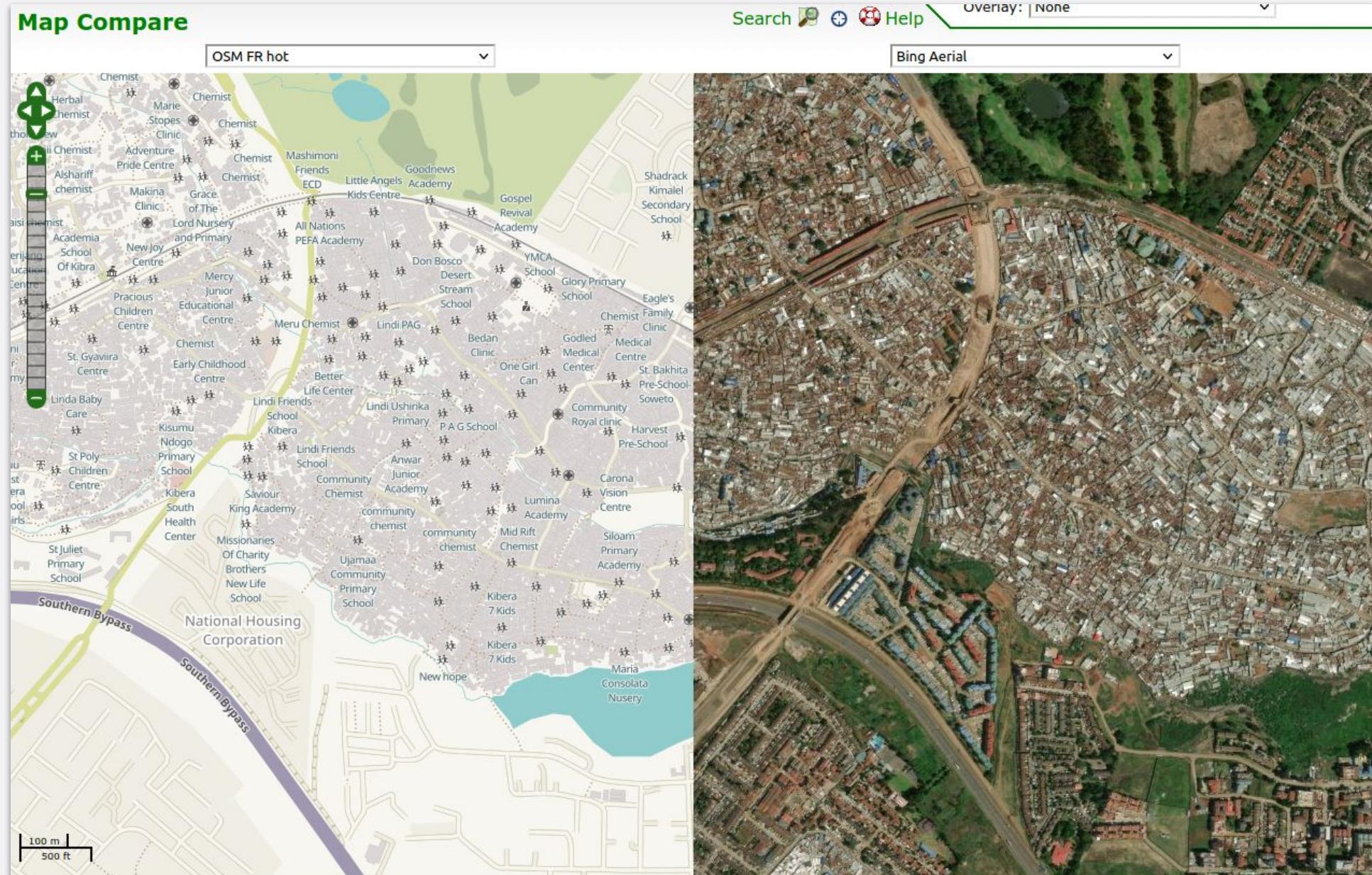


### Map Compare

Search  +  Overlay: None

OSM FR hot

Bing Aerial



 Humanitarian  
OpenStreetMap  
Team

WHAT WE DO OUR WORK TOOLS & DATA NEWS

COMMUNITY & ORGANIZATION PARTNER WITH US GET INVOLVED

SEARCH

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

Learn about what we do > START MAPPING >

← →



Mwanza Urban Risks Mapping: Ramani Mwanza  
Tanzania



Integrating OpenStreetMap data into Caribbean disaster risk reduction  
19 Countries

**359,817**  
Community Mappers<sup>①</sup>

**151,726,808**  
Total Map Edits<sup>①</sup>

**115,559,206**  
Buildings Mapped<sup>①</sup>

**2,602,131**  
Roads Mapped (KM)<sup>①</sup>

<https://www.hotosm.org/>

@napo





**Putting the World's Vulnerable People on the Map**

Each year, disasters around the world kill nearly 100,000 and affect or displace 200 million people. Many of the places where these disasters occur are literally 'missing' from any map and first responders lack the information to make valuable decisions regarding relief efforts. Missing Maps is an open, collaborative project in which you can help to map areas where humanitarian organisations are trying to meet the needs of vulnerable people.

**Step 1.**  
Remote volunteers trace satellite imagery into OpenStreetMap



**Step 2.**  
Community volunteers add local detail such as neighborhoods, street names, and evacuation centers



**Step 3.**  
Humanitarian organizations use mapped information to plan risk reduction and disaster response activities that save lives





Fondazione Bruno Kessler

WELCOME TO FBK  
[bit.ly/FBKvirtualtour](http://bit.ly/FBKvirtualtour)

Fondazione Bruno Kessler (Scientific Center)

Home Recensioni Foto Negozi Informazioni Community Crea una Pagina

Mi piace Segui Condividi ... Chiama ora

Ancora nessuna valutazione

Community Mostra tutti

Invita i tuoi amici a mettere "Mi piace" a questa Pagina

Post 12 h • Fondazione Bruno Kessler

Prosegue il nostro viaggio attraverso le 9 storie favolose di #RACCONTASCIENTZA

Il racconto "La lezione dell'acqua", di Albania Calepija, dai 6 anni in su, è la seconda tappa

Leggilo tutto!  <https://buff.ly/38O9whR...> Altro...

Visualizza tutte le statistiche



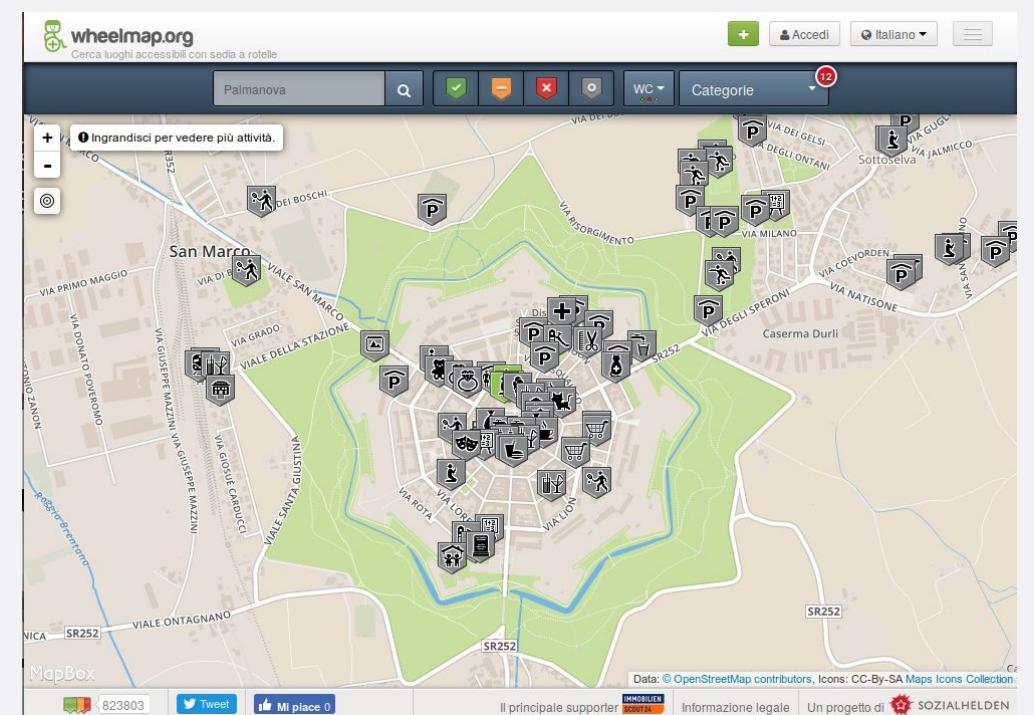
@napo





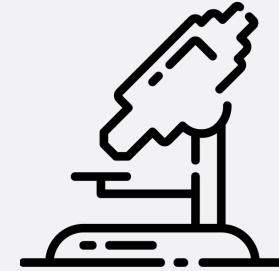
The screenshot shows the homepage of MapMyDay. At the top, there's a logo with the text "MAP M+ DAY". Below it, a large banner features the text "Be the movement!". Underneath, a call-to-action text reads: "Join "MapMyDay" – a global social event for more accessibility! We need your support! Because steps are a daily barrier for millions of people worldwide who are traveling – whether they use a wheelchair, a walking aid or a stroller. The event will kick off on World Tourism Day. Help out with a few clicks and mark places in your neighborhood on the online map [Wheelmap.org](https://wheelmap.org) as to whether they are wheelchair accessible or not. Let's do this together and gather as many places as possible!"

<http://mapmyday.org/en>

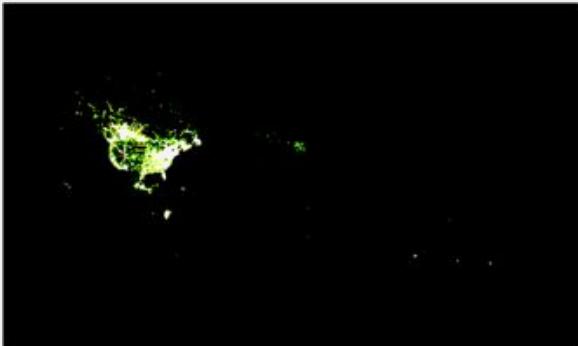


<https://wheelmap.org/it/>

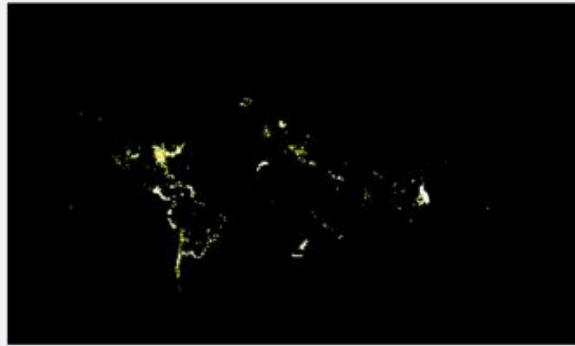
# OSM in Research



# Corporate Editors in the Evolving Landscape of OpenStreetMap



Telenav



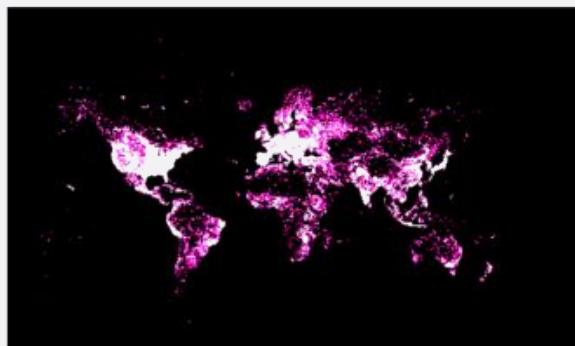
Kaart



Apple



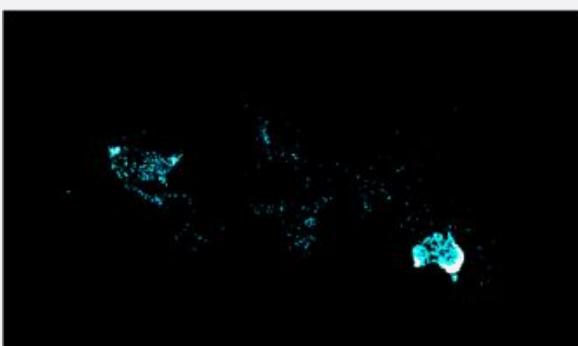
Facebook



Mapbox & Development Seed



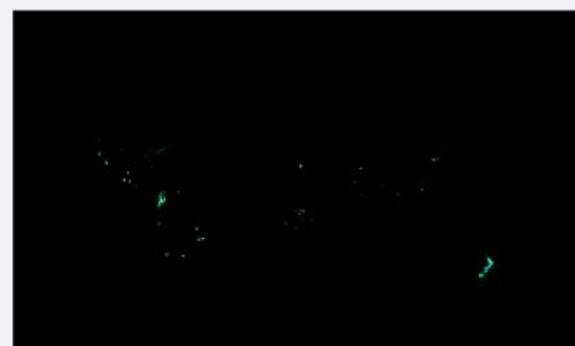
Amazon



Microsoft



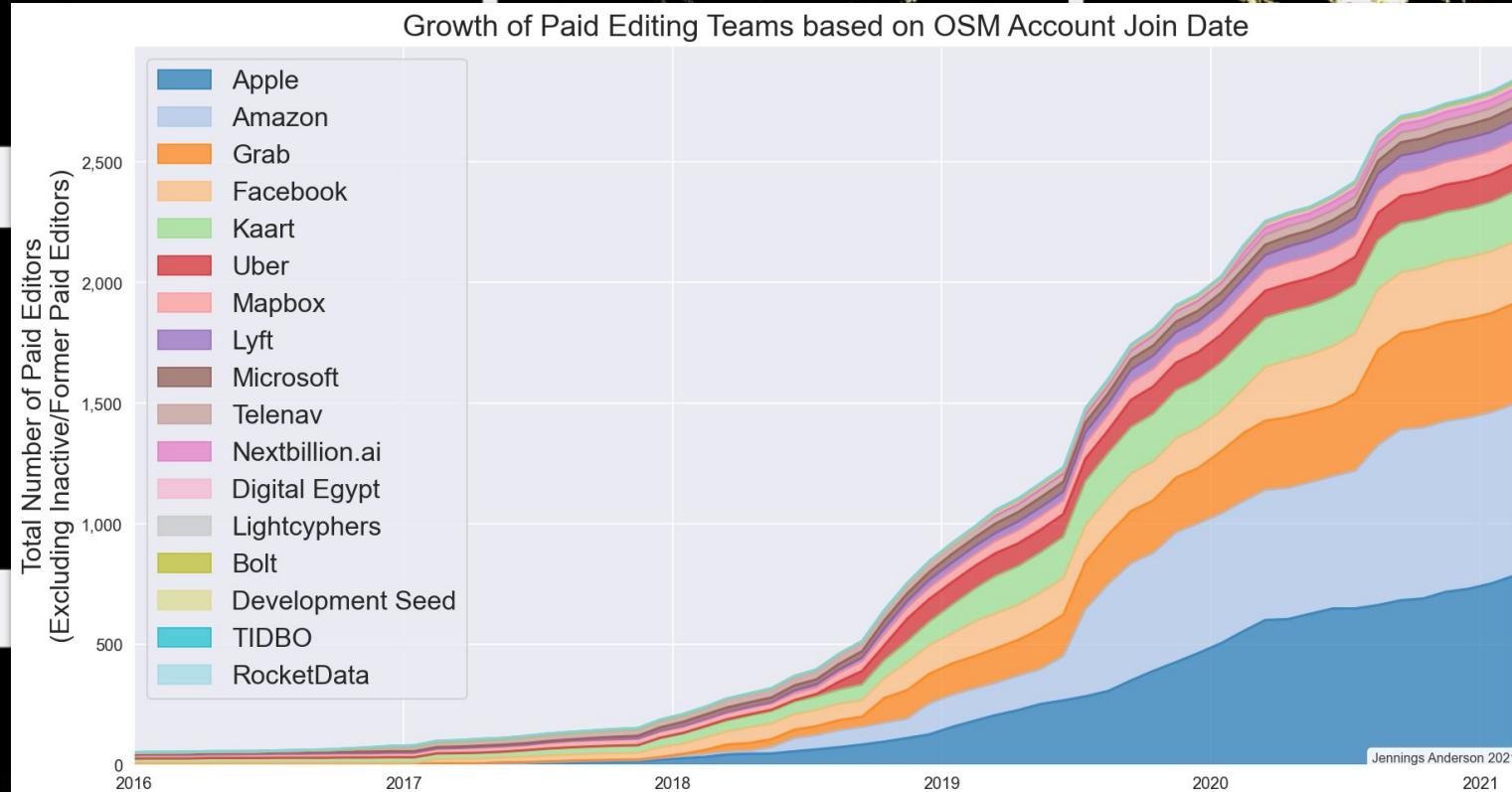
Grab



Uber

<https://www.mdpi.com/2220-9964/8/5/232>

# Corporate Editors in the Evolving Landscape of OpenStreetMap



Microsoft

Grab

Uber

[@napo](https://www.openstreetmap.org/user/Jennings%20Anderson/diary/396271)



## Atlas

build passing

The [Atlas](#) is a way to efficiently represent OpenStreetMap data in memory. A subset of the data is in a "navigable network" form, meaning anything that is assumed to be navigable will be in a form of `Node`s and `Edge`s in a way a routing algorithm could traverse it. It also provides easy to use APIs to access geographical data. On top of it all, it is easy to shard and re-stitch, making it perfect for distributed processing!

Projects using Atlas:

- [atlas-generator](#): A Spark job to distribute Atlas shards generation
- [atlas-checks](#): A suite of tools to check OSM data integrity using Atlas, and Spark.
- [josm-atlas](#): A JOSM plugin to visualize Atlas data.

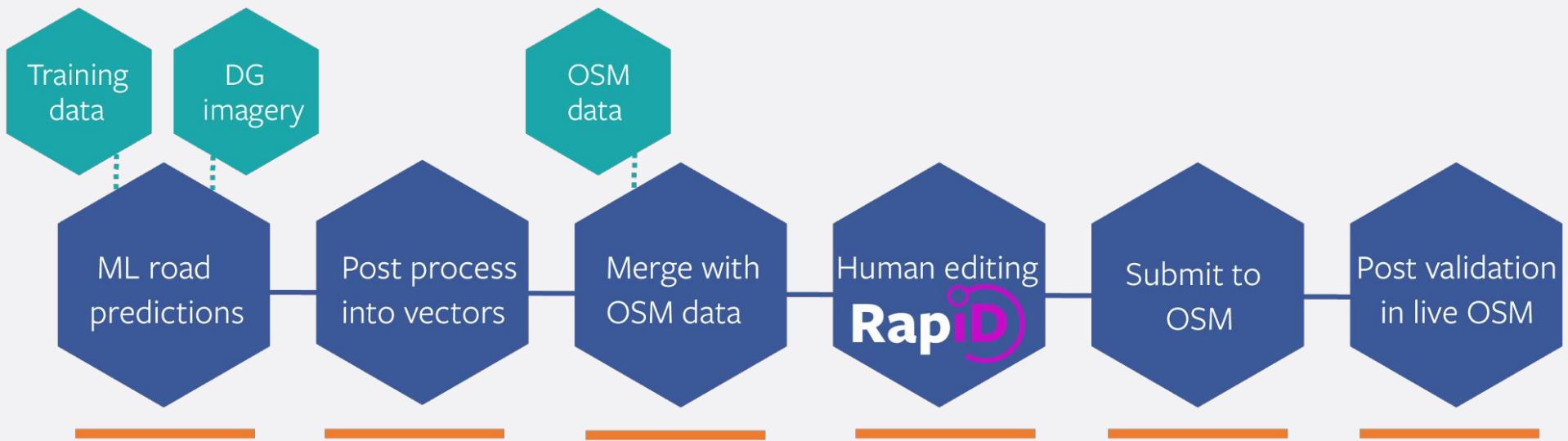
<https://github.com/osmlab/atlas>

27 lines (21 sloc) | 1.52 KB

```
1 Copyright (c) 2015-2018, Apple Inc. All rights reserved.  
2  
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4 are permitted provided that the following conditions are met:  
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6 1. Redistributions of source code must retain the above copyright notice,  
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25 ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE  
26 POSSIBILITY OF SUCH DAMAGE.
```



# facebook



[https://wiki.openstreetmap.org/wiki/AI-Assisted\\_Road\\_Tracing](https://wiki.openstreetmap.org/wiki/AI-Assisted_Road_Tracing)

## MaRS - la raccolta dei dati



machine-augmented automatic review system (MaRS).

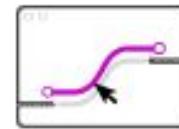


## Using AI to Map the World

In conjunction with OpenStreetMap, we are creating tools that we hope will enable the mapping community to enjoy a faster & more accurate mapping experience. To this end, we used artificial intelligence to predict features on high-resolution satellite imagery; these features are then populated in our RapiD map editing tool. When combined with global-scale humanitarian efforts, we hope RapiD can help realize our vision of a more connected world.



Artificial Intelligence Detected  
Roads



Mapping the World w/ RapiD  
Editor



Humanitarian Prioritized  
Community Task Mapping

ML Roads





≡ **Google Scholar** OpenStreetMap 

Articles About 63,400 results (0.04 sec)

Any time Since 2021 Since 2020 Since 2017 Custom range... Sort by relevance Sort by date Any type  include patents  include citations Review articles Create alert

**[BOOK] OpenStreetMap**  
J Bennett - 2010 - books.google.com  
This book introduces the OSM project, its aims and objectives, and its history, then guides you through the process of gathering, editing, and using OpenStreetMap data using a series of real-world examples. This book is the perfect aid for geographic-information professionals ...  
  Cited by 166 Related articles

**Openstreetmap: User-generated street maps**  
M Haklay, P Weber - IEEE Pervasive computing, 2008 - ieexplore.ieee.org  
The **OpenStreetMap** project is a knowledge collective that provides user-generated street maps. OSM follows the peer production model that created Wikipedia; its aim is to create a set of map data that's free to use, editable, and licensed under new copyright schemes. A ...  
  Cited by 2682 Related articles All 13 versions

**Quality assessment of the French OpenStreetMap dataset**  
JF Girres, G Touya - Transactions in GIS, 2010 - Wiley Online Library  
Abstract The concept of Volunteered Geographic Information (VGI) has recently emerged from the new Web 2.0 technologies. The **OpenStreetMap** project is currently the most significant example of a system based on VGI. It aims at producing free vector geographic ...  
  Cited by 711 Related articles All 5 versions

**[PDF] A review of OpenStreetMap data**  
P Mooney, M Minghini - 2017 - library.oapen.org  
While there is now a considerable variety of sources of Volunteered Geographic Information (VGI) available, discussion of this domain is often exemplified by and focused around **OpenStreetMap** (OSM). In a little over a decade OSM has become the leading example of ...  
  Cited by 91 Related articles All 21 versions 

Related searches

<a href="#">openstreetmap street maps</a>	<a href="#">openstreetmap data quality</a>
<a href="#">openstreetmap road network</a>	<a href="#">humanitarian openstreetmap</a>
<a href="#">openstreetmap accuracy</a>	<a href="#">openstreetmap gps</a>



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openstreetmap Advanced Search

363 results for openstreetmap Sort By: Relevance

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**Journal**

PLOS ONE

PLOS Neglected Tropical Diseases (68)

PLOS Biology (5)

PLOS Medicine (5)

PLOS Genetics (3)

PLOS Pathogens (3)

[show more](#)

**Subject Area**

Biology and life sciences (276)

Earth sciences (248)

Social sciences (203)

People and places (172)

Medicine and health sciences (160)

Geography (159)

Ecology and environmental sciences (150)

**Modelling urban vibrancy with mobile phone and OpenStreetMap data**  
Federico Botta, Mario Gutiérrez-Roig  
Research Article | published 02 Jun 2021 PLOS ONE  
<https://doi.org/10.1371/journal.pone.0252015>  
Views: 409 • Citations: 1 • Saves: 0 • Shares: 8

**The world's user-generated road map is more than 80% complete**  
Christopher Barrington-Leigh, Adam Millard-Ball  
Research Article | published 10 Aug 2017 PLOS ONE  
<https://doi.org/10.1371/journal.pone.0180698>  
Views: 13574 • Citations: 131 • Saves: 167 • Shares: 247

**ISED: Constructing a high-resolution elevation road dataset from massive, low-quality in-situ observations derived from geosocial fitness tracking data**  
Grant McKenzie, Krzysztof Janowicz  
Research Article | published 13 Oct 2017 PLOS ONE  
<https://doi.org/10.1371/journal.pone.0186474>  
Views: 3533 • Citations: 2 • Saves: 18 • Shares: 1

**Using OpenStreetMap point-of-interest data to model urban change—A feasibility study**  
Liming Zhang, Dieter Pfoser

# Copyright





OpenStreetMap Edit History Export

GPS Traces User Diaries Copyright Help About Log In Sign Up

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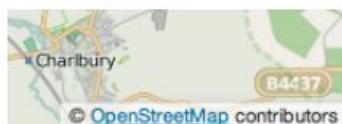
## How to credit OpenStreetMap

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You must also make it clear that the data is available under the Open Database License. You may do this by linking to [this copyright page](#). Alternatively, and as a requirement if you are distributing OSM in a data form, you can name and link directly to the license(s). In media where links are not possible (e.g. printed works), we suggest you direct your readers to [openstreetmap.org](http://openstreetmap.org) (perhaps by expanding 'OpenStreetMap' to this full address) and to [opendatacommons.org](http://opendatacommons.org).

The map tiles in the “standard style” at [www.openstreetmap.org](http://www.openstreetmap.org) are a Produced Work by the OpenStreetMap Foundation using OpenStreetMap data under the Open Database License. When using this map style, the same attribution is required as for the map data.

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You are free to copy, distribute, or build upon our data, you may distribute

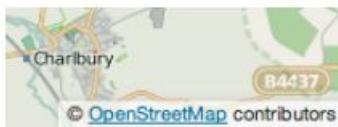
Our documentation is

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For a browsable electronic map, the credit should appear in the corner of the map. For example:



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This is a human-readable summary of the ODbL 1.0 license. Please see the disclaimer below.

## You are free:



*To Share:* To copy, distribute and use the database.



*To Create:* To produce works from the database.



*To Adapt:* To modify, transform and build upon the database.

## As long as you:



*Attribute:* You must attribute any public use of the database, or works produced from the database, in the manner specified in the ODbL. For any use or redistribution of the database, or works produced from it, you must make clear to others the license of the database and keep intact any notices on the original database.



*Share-Alike:* If you publicly use any adapted version of this database, or works produced from an adapted database, you must also offer that adapted database under the ODbL.



*Keep open:* If you redistribute the database, or an adapted version of it, then you may use technological measures that restrict the work (such as DRM) as long as you also redistribute a version without such measures.

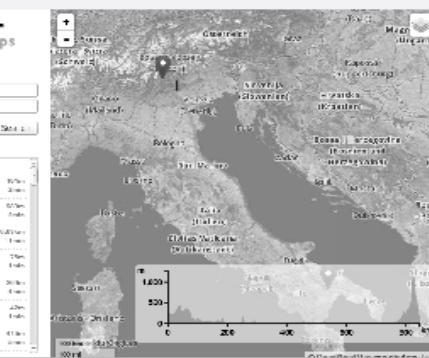


# The ODbL license by examples

```
<?xml version='1.0' encoding='UTF-8'?>
<osm version="0.6" generator="osmconvert 0.7m" timestamp="2014-09-29T20:21:02Z">
  <bounds minlat="45.9775306" minlon="11.0224735" maxlat="46.1530112" maxlon="11.1948226"/>
  <node id="9191867" lat="46.104119" lon="11.0899633" version="4" timestamp="2010-09-01T22:36:26Z" changeset="5658159" uid="330007" user="pikappa79"/>
  <node id="9191982" lat="46.0499659" lon="11.1169915" version="6" timestamp="2011-08-06T16:15:07Z" changeset="8939495" uid="330007" user="pikappa79"/>
  <node id="9192136" lat="46.054435" lon="11.1180986" version="6" timestamp="2012-12-14T22:11:48Z" changeset="14276412" uid="330007" user="pikappa79"/>
  <node id="9192343" lat="46.1140579" lon="11.0871511" version="6" timestamp="2010-09-01T22:36:35Z" changeset="5658159" uid="330007" user="pikappa79"/>
  <node id="9192428" lat="46.076984" lon="11.112499" version="2" timestamp="2011-01-19T18:32:46Z" changeset="7023211" uid="76312" user="scratara"/>
  <node id="9192494" lat="45.977028" lon="11.114043" version="1" timestamp="2006-06-30T11:53:08Z" changeset="48807" uid="573" user="Jörg Ostertag">
    <tag k="created_by" v="JOSM"/>
  </node>
  <node id="9192593" lat="46.0521296" lon="11.1170876" version="9" timestamp="2011-08-06T16:15:07Z" changeset="8939495" uid="330007" user="pikappa79"/>
  <node id="9192771" lat="46.0181248" lon="11.1274916" version="4" timestamp="2011-02-16T13:31:43Z" changeset="7303863" uid="330007" user="pikappa79"/>
  <node id="9193403" lat="45.9945344" lon="11.1215165" version="2" timestamp="2009-07-06T23:57:51Z" changeset="1757920" uid="136835" user="user_136835">
    <tag k="created_by" v="JOSM"/>
  </node>
  <node id="9193405" lat="46.0313027" lon="11.1277415" version="5" timestamp="2011-02-16T13:31:31Z" changeset="7303863" uid="330007" user="pikappa79"/>
  <node id="9193447" lat="45.9697045" lon="11.1130485" version="4" timestamp="2008-08-04T17:14:50Z" changeset="57846" uid="20610" user="napo">
    <tag k="created_by" v="JOSM"/>
  </node>
  <node id="9193468" lat="46.0763371" lon="11.1130076" version="10" timestamp="2013-04-21T11:37:25Z" changeset="15809662" uid="330007" user="pikappa79"/>
  <node id="9193580" lat="46.0989526" lon="11.1251955" version="3" timestamp="2013-07-07T06:28:42Z" changeset="16856691" uid="530691" user="Peterfritz"/>
  <node id="9193607" lat="46.054411" lon="11.1295695" version="6" timestamp="2011-11-28T21:45:33Z" changeset="9982706" uid="330007" user="pikappa79"/>
  <node id="9193619" lat="46.0744894" lon="11.1124451" version="9" timestamp="2013-04-21T11:37:25Z" changeset="15809662" uid="330007" user="pikappa79"/>
  <node id="9193812" lat="46.0514793" lon="11.1157438" version="15" timestamp="2010-08-09T13:10:36Z" changeset="5443649" uid="24966" user="alesstoz"/>
  <node id="9193846" lat="46.1201572" lon="11.0860899" version="6" timestamp="2011-02-02T16:18:24Z" changeset="7217702" uid="330007" user="pikappa79"/>
  <node id="9193873" lat="46.0869729" lon="11.104303" version="5" timestamp="2010-09-01T22:35:55Z" changeset="5658159" uid="330007" user="pikappa79"/>
  <node id="9193877" lat="46.0521785" lon="11.1175845" version="11" timestamp="2011-08-06T16:15:07Z" changeset="8939495" uid="330007" user="pikappa79"/>
  <node id="9193996" lat="46.0534124" lon="11.1185143" version="9" timestamp="2013-05-21T19:07:54Z" changeset="16228624" uid="330007" user="pikappa79"/>
  <node id="9194295" lat="46.0533991" lon="11.1278855" version="8" timestamp="2011-05-07T00:08:51Z" changeset="5452578" uid="nfranz" user="nfranz"/>
  <node id="9194326" lat="46.0533991" lon="11.1278855" version="8" timestamp="2011-05-07T00:08:51Z" changeset="5452578" uid="nfranz" user="nfranz"/>
</osm>
```



Graphhopper maps



**OpenStreetMap**

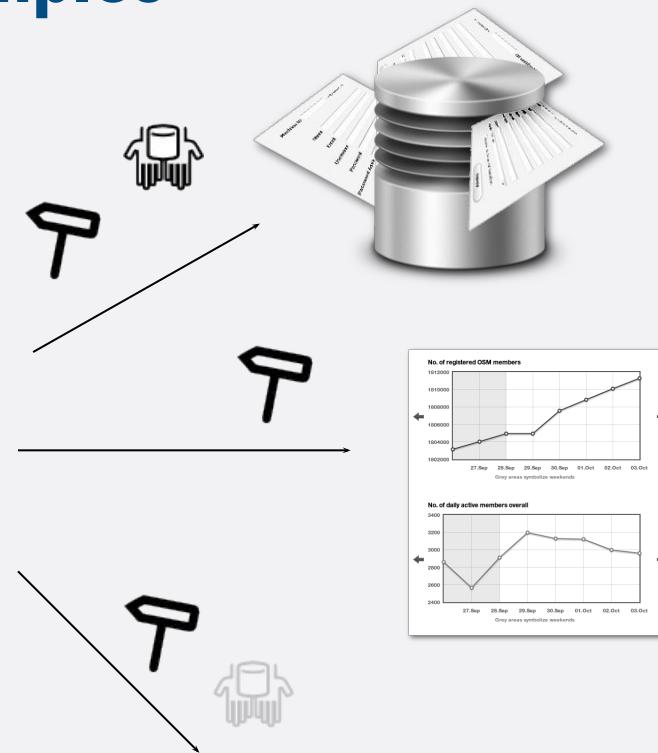
Matera

Search Results

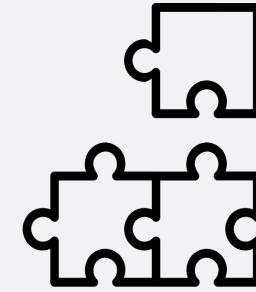
Results from OpenStreetMap Nominatim

- City Boundary Matera, MT, BAS, Italy
- Hamlet Matera, AP, MAR, Italy
- Locality La Matera, San Esteban de Gormaz, Provincia de Soria, Castile and León, Spain
- County Boundary MT, BAS, Italy
- Archaeological Site Matera, P-3, Senere, Southern Zone, Enries
- Residential Matera, Vista Flores, Northwood, Irvine, Orange, California, 92620, United States of America

More results



# Data Model



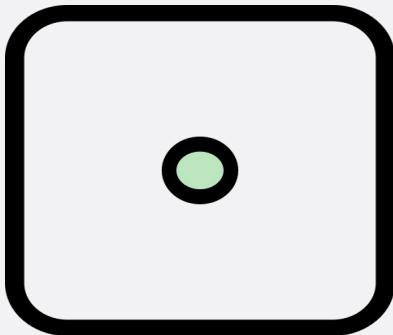
# tag

## key=value

### Public Transport

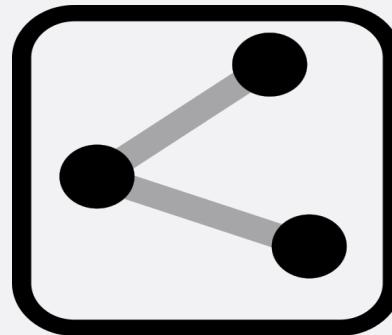
This is used for features related to public transport. For example: railway stations, bus stops and services. See the page titled [Public transport](#) for an introduction on its usage.

Key	Value	Element	Description	Map rendering	Image	Count
public_transport	stop_position	○	The position on the street or rails where a public transport vehicle stops.			631 228  392  199 
public_transport	platform	○ □ □□	The place where passengers are waiting for the public transport vehicles.			844 953  203 891  3 646 
public_transport	station	○ □	A station is an area designed to access public transport.			22 639  9 897  355 
public_transport	stop_area	□□	A relation that contains all elements of a train, subway, monorail, tram, bus, trolleybus, aerialway, or ferry stop.			528  198  180 878 



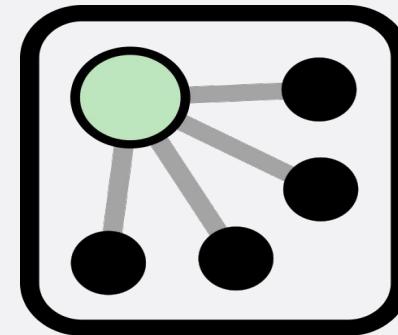
## NODE

A **node** is one of the core elements in the OpenStreetMap data model. It consists of a single point in space defined by its **latitude**, **longitude** and **node id**.



## WAY

A **way** is an ordered list of nodes which normally also has at least one tag or is included within a Relation. A way can have between 2 and 2,000 nodes, although it's possible that faulty ways with zero or a single node exist. A way can be *open* or *closed*. A *closed way* is one whose last node on the way is also the first on that way. A closed way may be interpreted either as a closed polyline, or an area, or both.



## RELATION

A **relation** is one of the core data elements that consists of one or more tags and also an **ordered list** of one or more nodes, ways and/or relations as **members** which is used to define logical or geographic relationships between other elements. A member of a relation can optionally have a **role** which describes the part that a particular feature plays within a relation.

## Example of relation: line path of the bus number 5

OpenStreetMap Edit History Export

Piazza Fiera - Povo - Oltrecastello (variante z) (1396109)

(no comment)

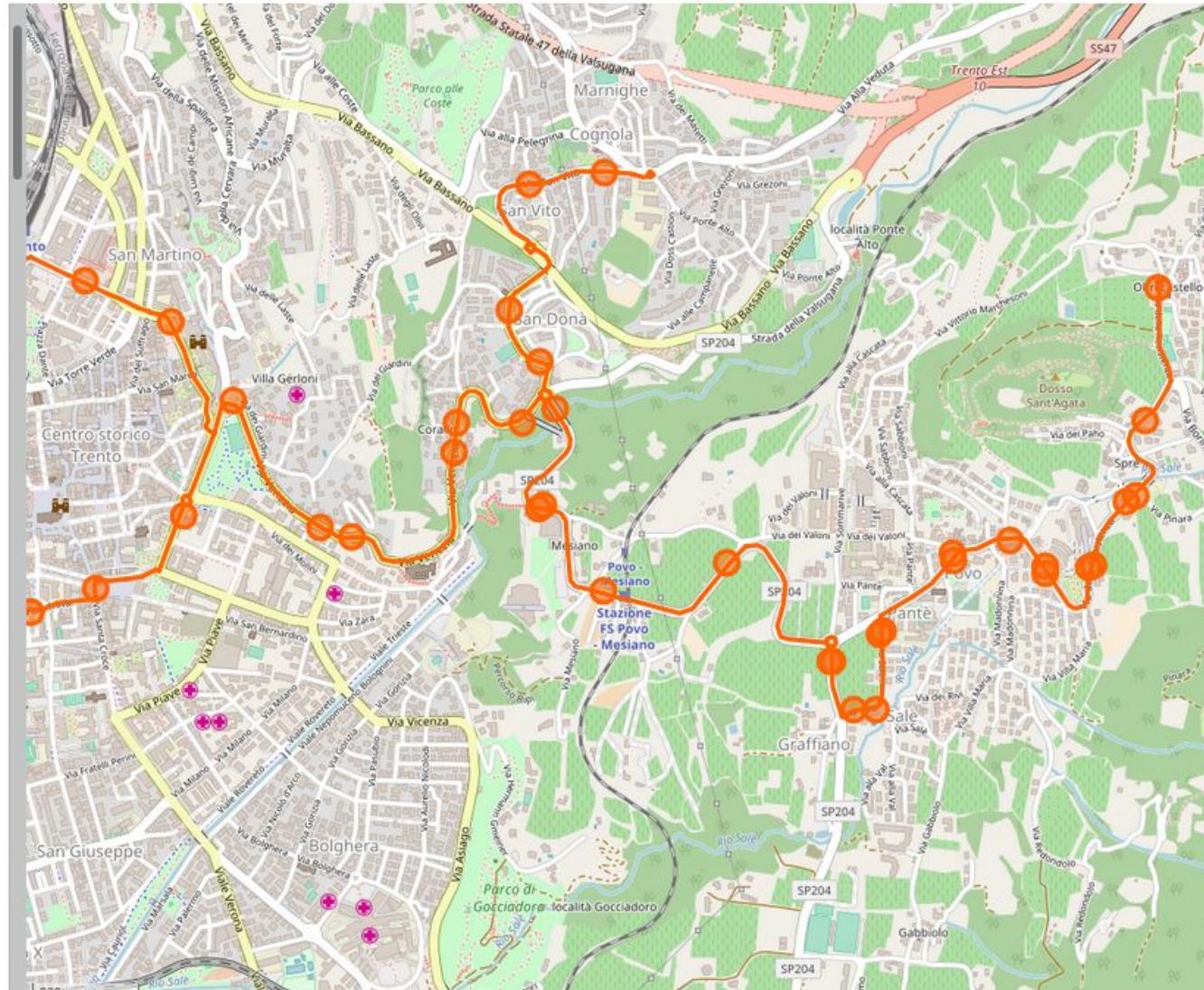
Edited 3 months ago by gumul  
Version #44 · Changeset #57637620

Tags

colour	#f5c500
from	Piazza Dante
importance	urban
name	Linea 5 - Piazza Dante - Piazza Fiera - Povo - Oltrecastello (variante z)
network	Servizio Urbano Trento
operator	Trentino Trasporti
ref	5
route	bus
state	alternate
to	Oltrecastello
type	route

Members

- Way Piazza Dante (96965212) as forward
- Way Piazza Dante (23066740) as forward
- Way Via Andrea Pozzo (177180084) as forward
- Way Via Torre Vanga (23058904) as forward
- Way Via Torre Vanga (283010968) as forward
- Way Via Torre Vanga (141265570) as forward
- Way Via Torre Vanga (177180085) as forward
- Way Via Prepositura (23794856) as forward
- Way Via Prepositura (141265569) as forward



<https://www.openstreetmap.org/relation/1396109#map=15/46.0670/11.1508>

@napo



# Import are hard to do

## Contents [hide]

### 1 Process

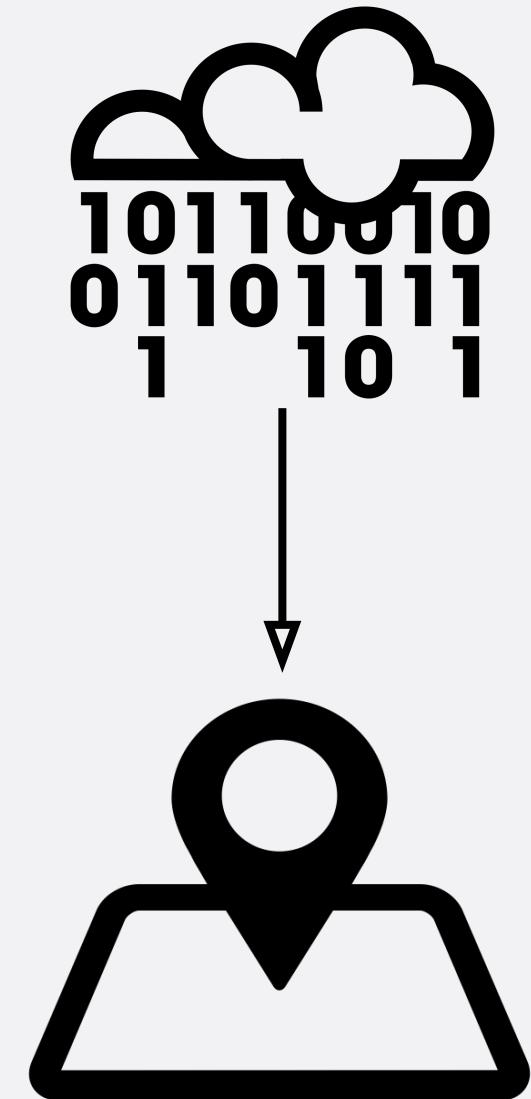
- 1.1 Step 1 - Prerequisites
- 1.2 Step 2 - Community Buy-in
- 1.3 Step 3 - License approval
- 1.4 Step 4 - Documentation
- 1.5 Step 5 - Import Review
- 1.6 Step 6 - Uploading

### 2 Key considerations

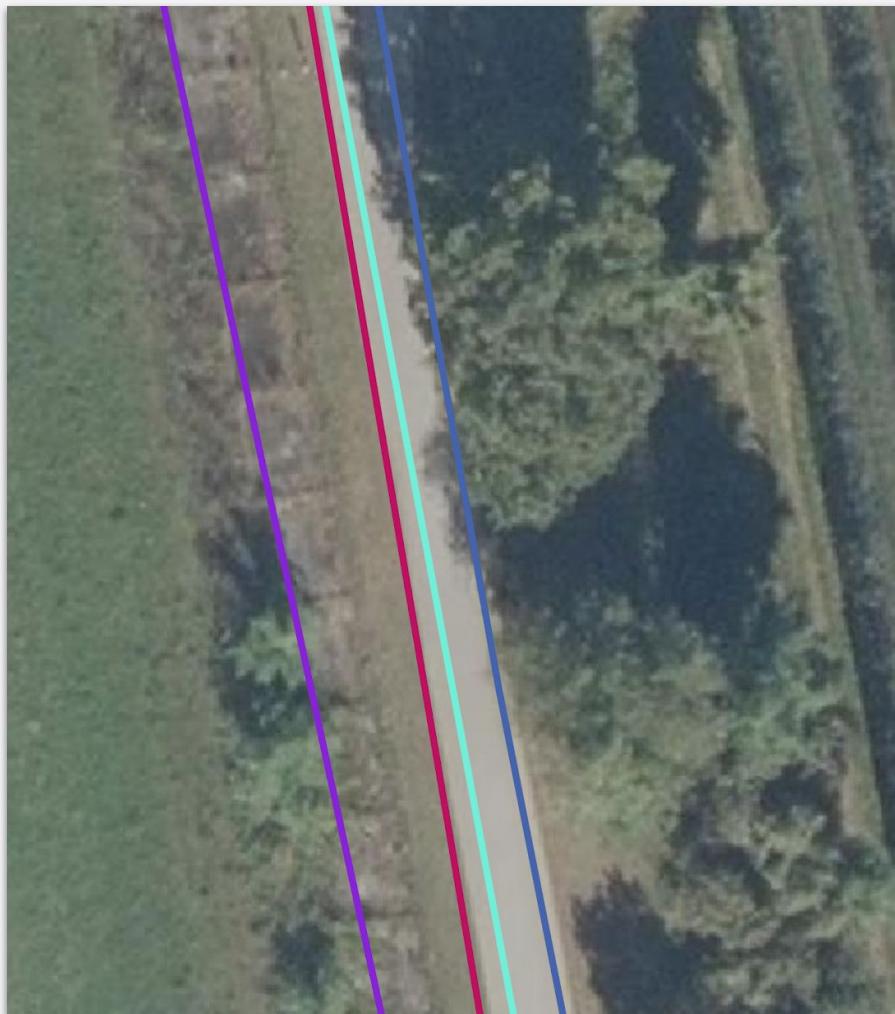
- 2.1 Discuss your proposed import
- 2.2 Document your import
- 2.3 Ensure that the data license is OK
- 2.4 Use a dedicated user account
- 2.5 Use the right tags
- 2.6 Don't put data on top of data
- 2.7 Consider simplifying
- 2.8 Keep server resources in mind
- 2.9 Take great care to avoid damaging the database

### 3 See also

<https://wiki.openstreetmap.org/wiki/Import/Guidelines>



# THE CYCLE PATHS OF TRENTO



- OpenStreetMap
- Azienda Promozione Turistica
- Provincia Autonoma di Trento
- Comune di Trento

# THE CYCLE PATHS OF TRENTO



OpenStreetMap

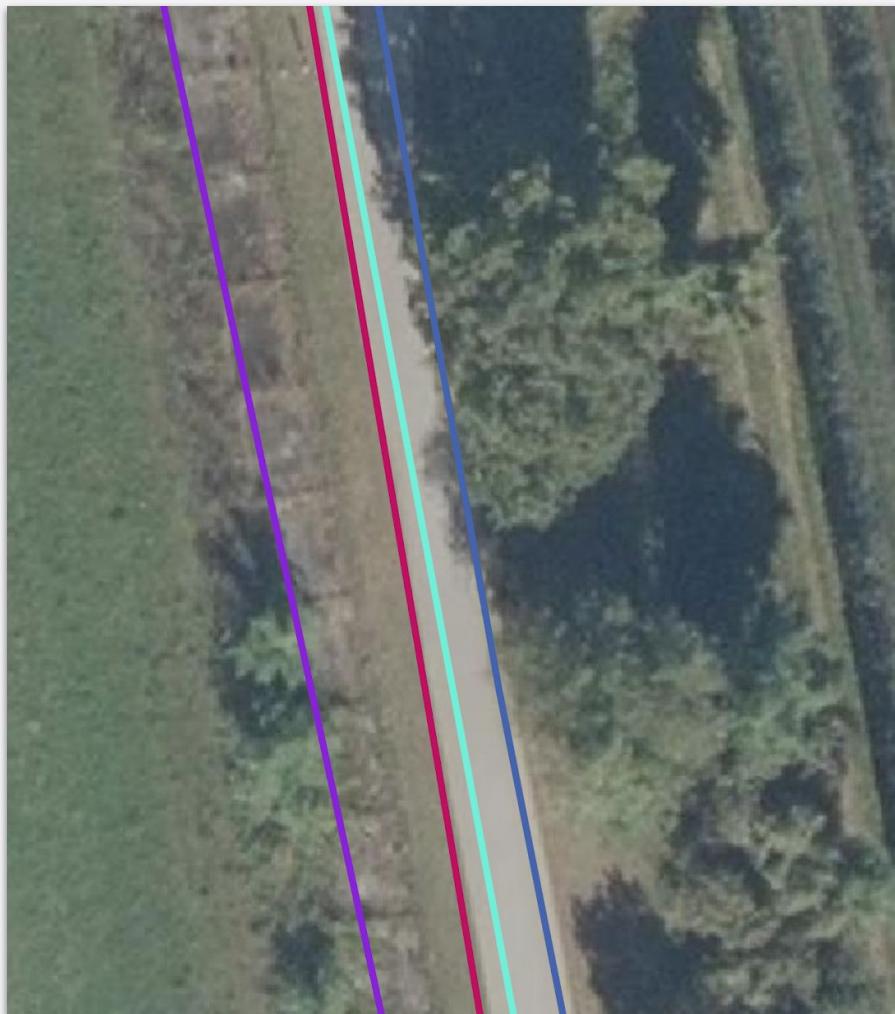
Campi	Valori
cycleway	a Promozione Turistica
foot	lia Autonoma di Trento
footway	e di Trento
highway	
segregated	
source	
surface	
name	
name:de	
name:it	

# THE CYCLE PATHS OF TRENTO



OpenStreetMap	
Azienda Promozione Turistica	
<b>Campi</b>	<b>Autonoma di Trento</b>
name	di Trento
cmt	
desc	
src	
link1_href	
link1_text	
link1_type	
link2_href	
link2_text	
link2_type	

# THE CYCLE PATHS OF TRENTO

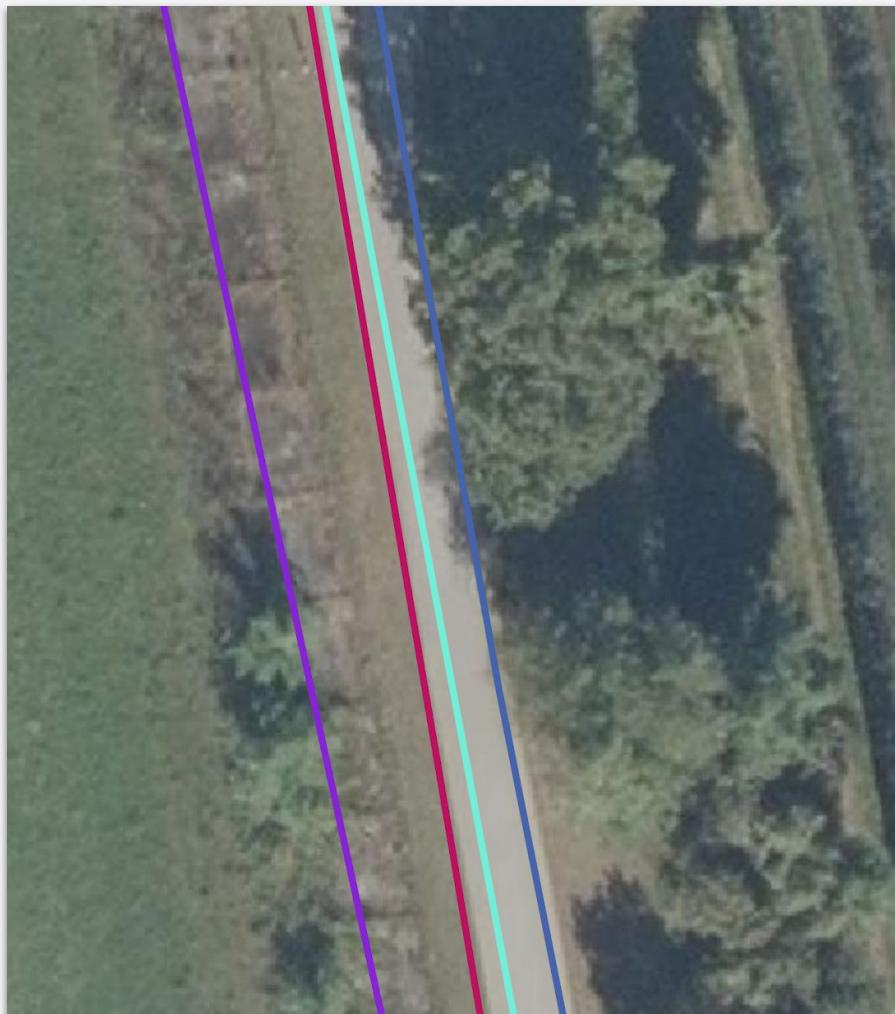


- OpenStreetMap
- Azienda Promozione Turistica
- Provincia Autonoma di Trento

## Campi

LENGTH  
PISTE\_  
PISTE\_ID  
TIPO  
SIM  
DXF\_LAYER  
AREA  
PERIMETER  
AMMCOM2001  
COMU  
COMP

# THE CYCLE PATHS OF TRENTO



- OpenStreetMap
- Azienda Promozione Turistica
- Provincia Autonoma di Trento
- Comune di Trento

## Campi

tipo
fumetto
scala_1000
scala_2000
descrizion

# EVOLUTION OF THE OBJECTS DURING THE TIME

**amenity = school** v · d · e



**Description**

A primary or secondary school (pupils typically aged 6 to 18)

**Group:** Education features

**Used on these elements**

- 
- 
- 
- 

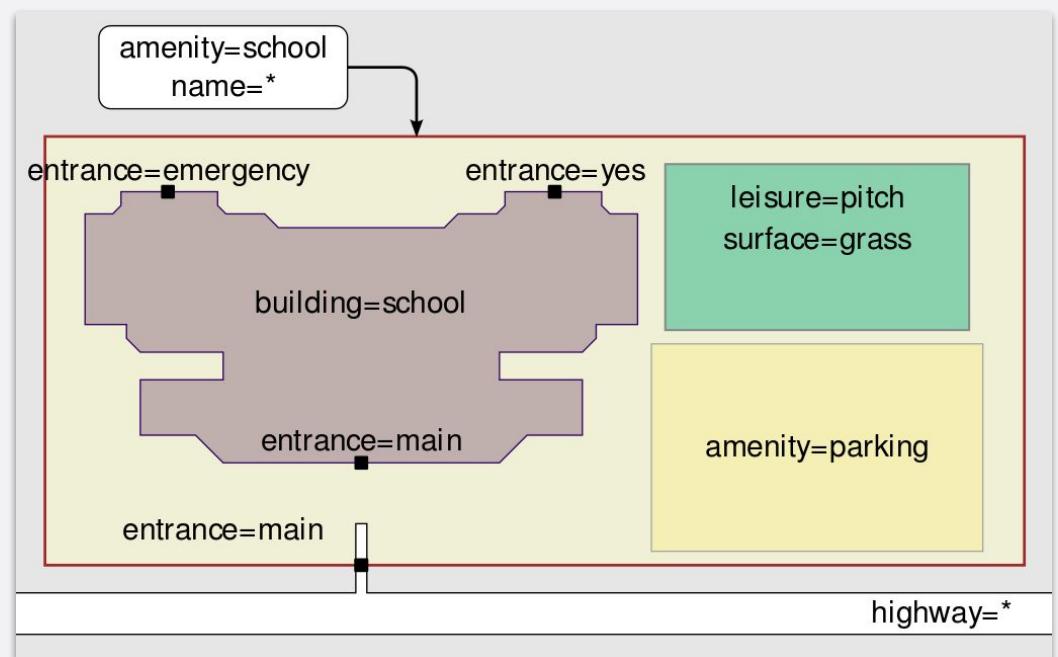
**amenity=school**

A primary or secondary school (pupils typically aged 6 to 18)

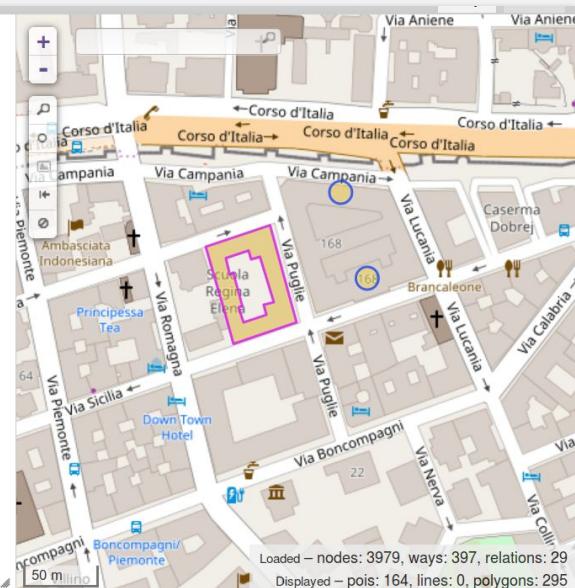
Overview Combinations Map Wiki Projects

**Overview**

Type	Number of objects	
All	898 117	0.02%
Node	415 180	0.33%
Way	468 152	0.10%
Relation	14 785	0.26%



```
/*
This has been generated by the
overpass-turbo wizard.
The original search was:
"amenity=school in Rome"
*/
[out:json][timeout:25];
// fetch area "Rome" to search
in
{{geocodeArea:Rome}}->.searchArea;
// gather results
(
    // query part for:
    "amenity=school"
    node["amenity"="school"];
    area.searchArea;
    way["amenity"="school"];
    area.searchArea;
    relation["amenity"="school"];
    area.searchArea;
);
// print results
out body;
>;
out skel qt;
```



## Overview of the ResultMaps @ [neis-one.org](http://neis-one.org)

Copyright © Pascal Neis ([neis-one.org](http://neis-one.org)) - Map data © [OpenStreetMap](#) contributors

### Updated Maps/Websites



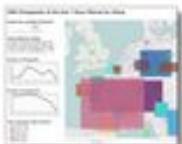
**Detect suspicious OSM Changesets**  
(Since January 20th, 2016)  
[Website](#) - [Blog Post](#)



**Latest OSM Changeset Discussions/Comments**  
(Since March 20th, 2015)  
[Website](#) - [Blog Post](#) - [Twitter](#)



**OSMstats**  
**Statistics of the free wiki world map**  
(Since September 7th, 2014)  
[Website](#) - [Blog Post](#)



**Filtering OpenStreetMap Changesets by a Specific Comment**  
(Since February 2nd, 2014)  
[Website](#) - [Blog Post](#)



**Stats about added OpenStreetMap Notes**  
(Since May 5th, 2013)  
[Website](#) - [Blog Post](#)

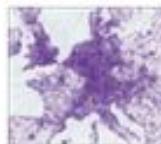


**Overview of OpenStreetMap Contributors aka Who's around me?**  
(Since January 6th, 2013)  
[Map](#) - [Blog Post](#)

### Static Maps/Websites



**Unmapped Places of OpenStreetMap**  
(June 19th, 2016)  
[Map](#) - [Blog Post](#)



**OpenStreetMap-GPS-Grid-Map**  
(May 27th, 2012)  
[Map](#) - [Blog Post](#)



**Unmapped Places in OSM Europe**  
(Since August 1st, 2010)  
[Map](#) - [Blog Post](#)

<http://resultmaps.neis-one.org/>



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# Emacsen's Blog

Education | Esperanto | Free culture | Misc | Openstreetmap | Python | React | Reviews | Videos

Atom

FRI 16 FEBRUARY 2018

## Why OpenStreetMap is in Serious Trouble

I was a contributor for OpenStreetMap for a long time, and I advocated for OpenStreetMap for a long time, but the project has stalled while the proprietary mapping world has continued to improve in data quality. For those of us who care about Free and Open data, this is a problem. In this article, I explore the reasons why I think OSM has stalled, as well as solutions to get the project back on track.

I was a contributor to the OpenStreetMap project from 2009 until roughly 2016. I was heavily involved in the development of the Java API and contributed many features to the project. I also worked on the OSM API and contributed many features to that as well. I have since moved on to other projects and no longer contribute to OSM.

<https://blog.emacsen.net/blog/2018/02/16/osm-is-in-trouble/>

### Recent Posts

[Why OpenStreetMap is in Serious Trouble](#)

[Free Software Call To Action](#)

[Why is SFLC siding with Oracle over Linux developers?](#)

[The Rule of One](#)

[Modern Web Development with React \(Part 4\)](#)

### Categories

Education



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## Tech Corner: how obtain the data

### Talk with OSM

API I/O

<http://wiki.openstreetmap.org/wiki/Xapi>

API for special queries

<http://overpass-api.de>

### Extract the data

Raw/Historic/Log data:

<http://planet.openstreetmap.org>

### Country data:

<http://download.geofabrik.org>

### Areas in different formats

<http://https://osmaxx.hsr.ch>

<http://export.hostosm.org>



# Contacts



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@napo