

OpenStreetMap

OpenStreetMap is comparable to the well-known Google Maps regarding the functionality but with the main difference that it is openly licensed and therefore editable for everyone. Main features are different layers or a routing service for different types of vehicles.

Whenever someone contributes to the map by modifying the underlying data, like nodes, ways or relations, a new changeset gets created. A changeset gives a little overview about what and where data has been altered.

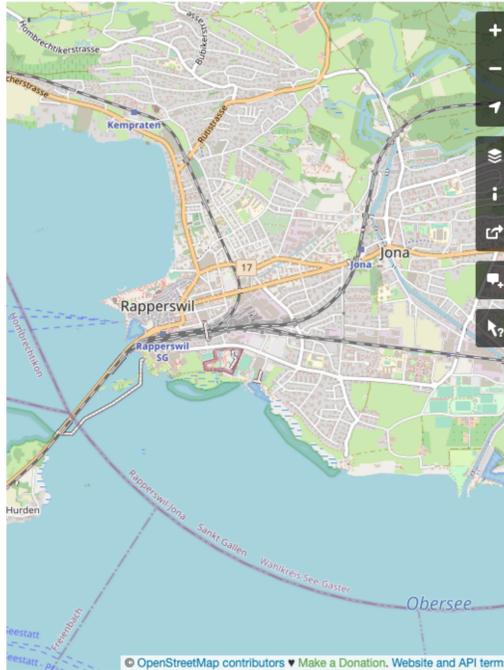
A changeset contains different attributes:

- id
- username
- date
- a comment which gives a short explanation about the modifications
- tags

On the other hand there is the underlying data like nodes, ways and relations. OpenStreetMap is built on these data objects.

These data objects can also have attributes like:

- coordinates
- tags e.g. building = hospital or amenity = parking



OpenStreetMap section of Rapperswil-Jona, Canton of St. Gallen.
<https://www.openstreetmap.org/#map=14/47.2248/8.7695>

Schutz & Rettung Zurich

Schutz & Rettung Zurich is our project partner.

Whenever they prepare an operation they are taking different resources into account. One of these resources is OpenStreetMap. They have to rely on the underlying data of OpenStreetMap. To ensure to correctness of the data (with certain attributes in specific regions) they have to check the data literally. To support this work a tool to list, filter and sort changesets is requested.



Control room of Schutz & Rettung Zurich, from where all emergency operations are planned, monitored and supported.
Source: https://www.gvz.ch/_file/426/_r1140x600cc/alarmerung-3.jpg

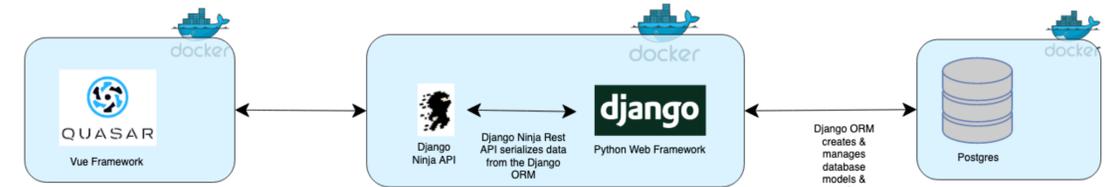
OSM Monitoring Tool

Architecture

Our project "OSM Monitoring Tool" consists of a full stack web application and is split into three parts:

- Front-end (Quasar) allows the users to interact with the application.
- Back-end (Django) is the business layer of the application.
- Database (PostgreSQL) is the database layer of the application.

Each layer runs in a separate Docker container. The database contains all OpenStreetMap data of Switzerland, all changesets and gets updated on a regular basis.



An overview of the application architecture, consisting of a front- and back-end as well as a database, all in Docker.
Source: own image

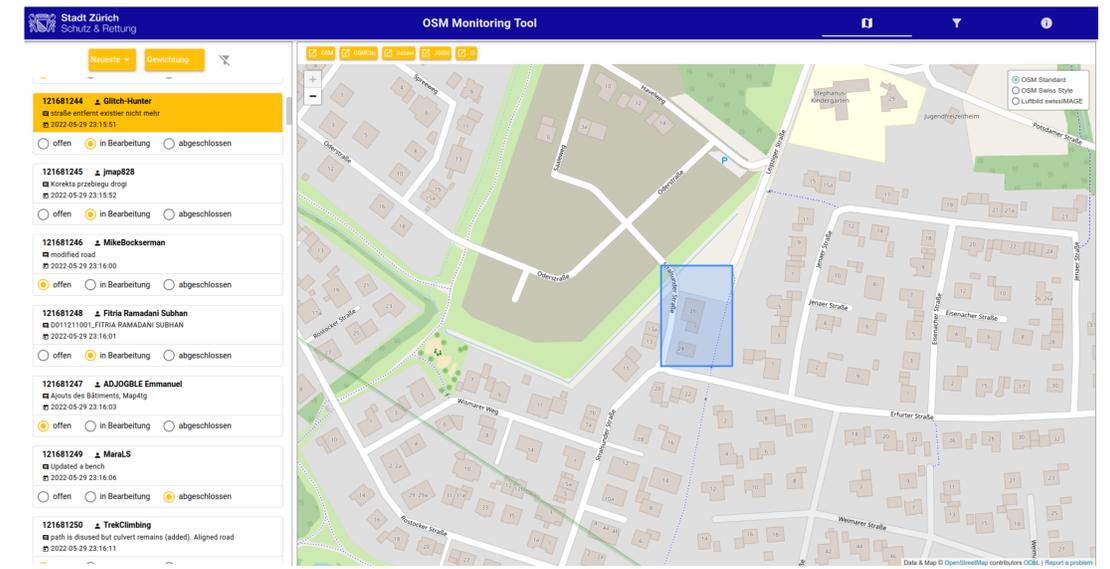
Watching a specific changeset

OSM Monitoring Tool can list, sort and filter changesets. Sorting is possible after date or QRank.

By clicking on a changeset, the zoomed area including the bounding box of a changeset is displayed on the map. All modified data of OpenStreetMap related to a specific changeset is inside this geographical region.

The working status of each changeset can be set specifically.

In order to get more information about the changeset and to see its history you can open it in one of the following external pages: OSM, OSMCha, Achavi, JSOM, ID



An example of our application in use, which shows some of the different components and functions it supports. Here a bounding box of a specific changeset is shown.
Source: own image

Filter changesets

Since there are many changesets created on a daily basis, it can be useful to filter the results in order to only see a relevant selection.

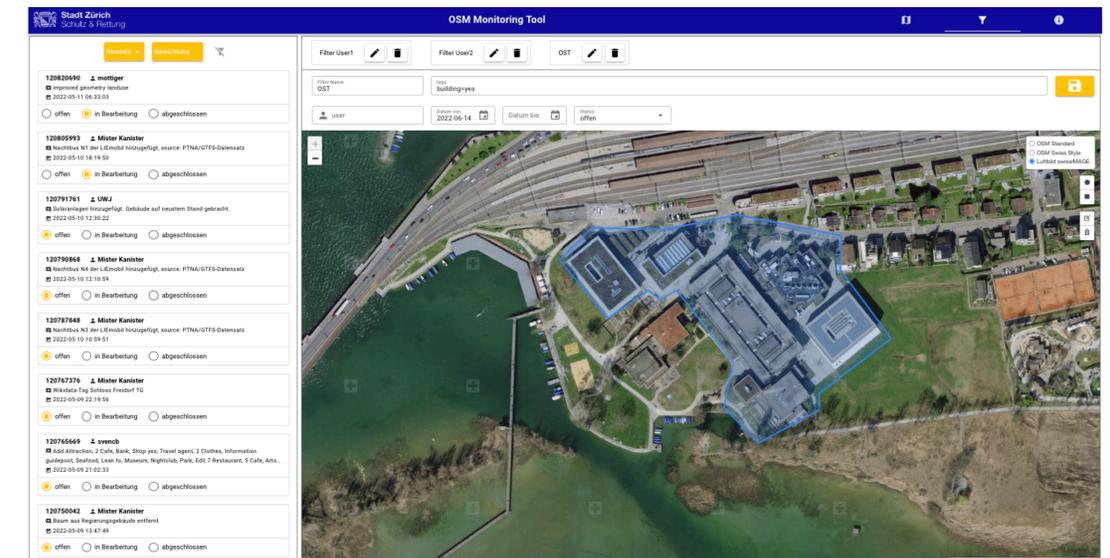
On the filter page the user can create, edit, delete and apply a filter.

It is possible to filter for changesets which

- are created by a certain user
- are inside a specific date range
- referencing nodes, ways or relations with certain attributes
- lie in a geographical search area
- have an open or in progress status

Bachelor Thesis, Spring Semester 2022 at OST

- Team members: Tim Wisotzki & Samuel Lemmenmeier
- Tutor: Nicola Jordan
- Advisor: Prof. Stefan Keller, Institut für Software OST
- External partner: Christian Nüssli, Schutz & Rettung Zurich



An example of our application in use, which shows the filter page. The settings of filter "OST" are displayed as an example, if the filter gets applied only changesets intersecting with the blue polygon will be listed.
Source: own image