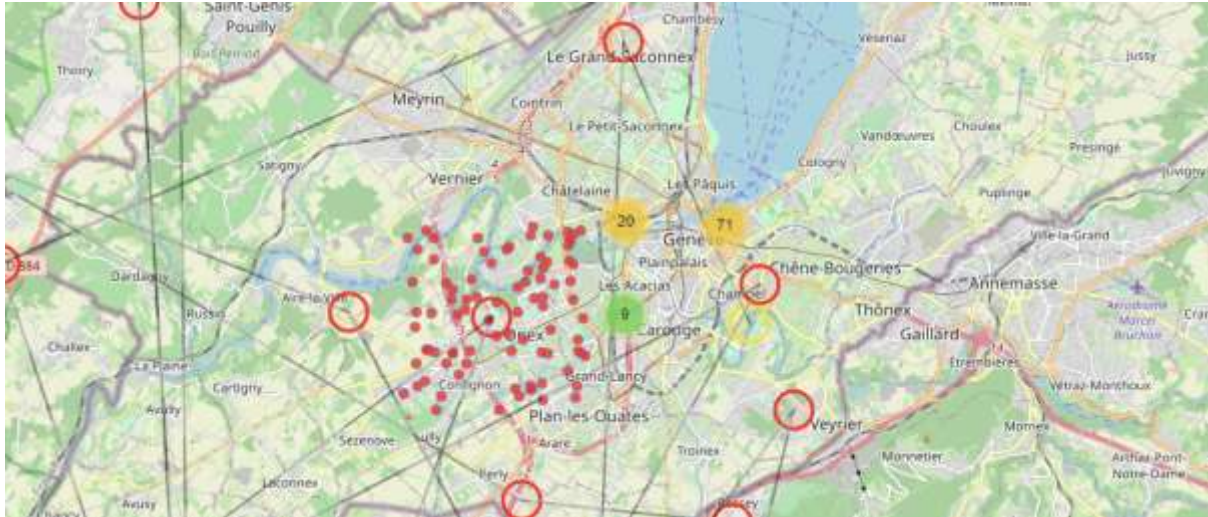


Monitoring Prototype



Monitoring locations

One of the challenges at this moment is how to monitor human concentrations, understanding the existence of a greater risks if the concentration higher. Monitoring locations could be an option with the available technology that we have at the moment.

To monitor locations, could be useful to have more information about the locations to be monitored, a classification and the maximum expected occupancy. Most advanced countries have this information, type of building, type of service that the building provides and the maximum occupancy allowed in that place. This is considered “static” information. ([International Building Codes](#))

Note: This exercise is based on “fake” data; the proximity of the “devices” should be closer in reality, if we consider as an example people travelling on a train, bus or tram.

Static

- **Critic or Strategic installations:** It is possible to create or confirm which installations are critic to be monitored.
- **Critic or Strategic locations:** It is possible to create or confirm which locations are critic to be monitored.
- **Nesting locations:** Locations where the population rest, fix address or location, residence place. *By definition it is possible to assume in most cases the **night-time location** is the “nesting location” from 10 pm – 5 am.*
- **Schooling locations:** Locations where part of the population spends “**part of the day**”. These locations could provide more information, like age range, when the “education” pattern follows some specific rules or conditions.
 - Pre-School. **305.2 Group E**
 - Primary.
 - Secondary
 - High School
 - College
- **Public Services:** Locations where Government or Companies offer services to the public. Multiple classifications could be associated. Most of these services have a specific “**opening hours**”, so it is possible to estimate traffic volumes.
- **Public Institutions:** In specific, **308.3 Institutional Group I-2**
 - Foster care facilities
 - Hospitals
 - Nursing Homes
 - Psychiatric hospitals
 - Detoxification facilities

Dynamic

- **Timeline:** We can assume a timeline human concentrations based on a week days and day time.
- **Concentration:** Based on a location, it is possible to find out the concentration gathering device information, in specific, the location and timestamp. Multiple options are available to obtain this information:
 - **Public application:** This application is downloaded on demand and at the user will and consent.
 - **Private information:** Most of the communication service providers have tools to monitor and deliver messages from a “device” to another “device” in which it is necessary to know the **location** of the devices.
 - **IP Geocoding:** It is possible to obtain approximate location information from the “device” using the **IP** used by the device to send or receive a message. Most of the web services, social networks, email, video conferencing, etc. These services require and sometimes store this information, using this IP address it is possible to calculate a physical address.

With this information, it is possible to estimate certain numeric human risk index in case of an incident, fire, earthquake or other event, if it is compared with “**dynamic**” information on a timeline.

Basic functionalities

- Know device concentration at some selected location.
- Know displacement of a specific device on a period of time
- Know device concentration around the selected device at the selected location.

All the data used in this prototype is not real, was created using “PHP Faker” library, creating a simple table with locations close to “Genève Switzerland”:

device_id	lat	lng	registered_at
4	46.175832	5.978158	1/14/2020 22:41
11	46.284252	5.948681	1/14/2020 10:08
14	46.24706	6.009348	2/22/2020 21:19
2	46.216619	5.952757	3/9/2020 17:20
2	46.25868	6.072518	2/27/2020 12:03
17	46.218152	6.082518	1/27/2020 20:49
7	46.295119	6.180628	2/29/2020 1:27
2	46.193364	5.941565	2/18/2020 11:50
5	46.246681	6.152654	3/14/2020 9:32
22	46.201187	6.182332	2/19/2020 2:28

Device Concentration at some location

Exploring concentrations at a specific location.

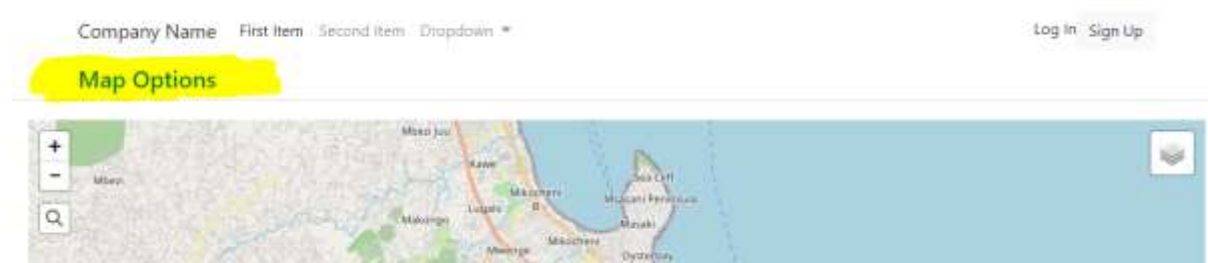
Note: Most of the controls are not activated to restrict the functionality to the data created and avoid confusions in the operation. **Date ranges** are not activated.

Instructions:

Open the link: <http://www.adsmexico.com/covid19/>

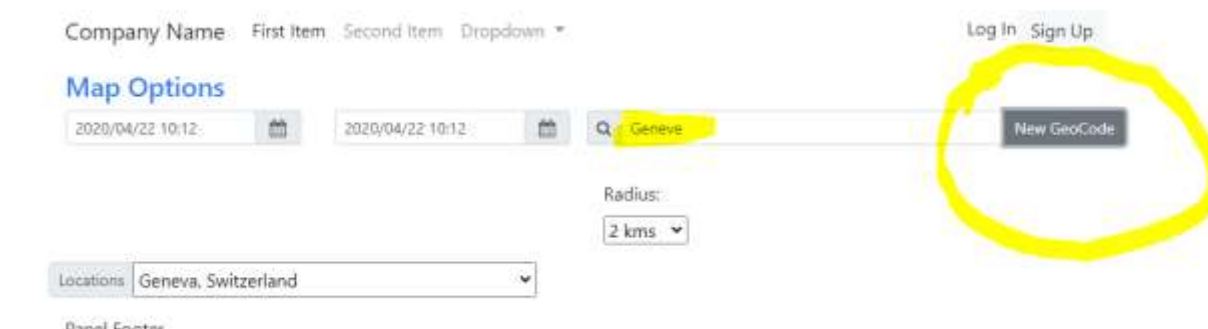
Creating Geo Code Query

Click on the “Map Options”, will open the user interaction section. This option will open or close the options section. This will allow to have more Map workable space.



Will open the operational parameters, Type any address, It will be “Geo-Coded” and then select the button “**New GeoCode**”, in this example “Geneve” and the query will find multiple locations.

Every “Geo-Code” operation will create a layer on the map. These layers will have two states, show or no-show on the map. (toggle option)



Panning

The Geo-Code query could return multiple locations; this option allows the user to “review” multiple possibilities.

The Locations “Select” will pan the Map to the selected location. This option could help to compare multiple geographic options.

Radius

Select the **Radius** to consider in the Server API call.



Device concentration

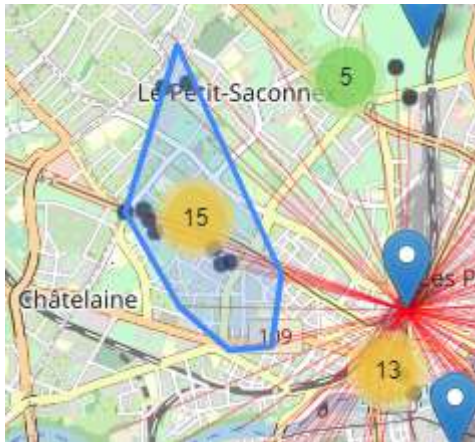
To obtain the device concentration at some point, “**double click**” on the marker and will make an API call, to retrieve the points.



The response maybe will take some time to display the results, and will create two layers. These layers provide the same information in different formats, direct and clustered. Depending on the device concentration the analyst could select the easiest one to work with.

Zooming in and out will change the cluster information.

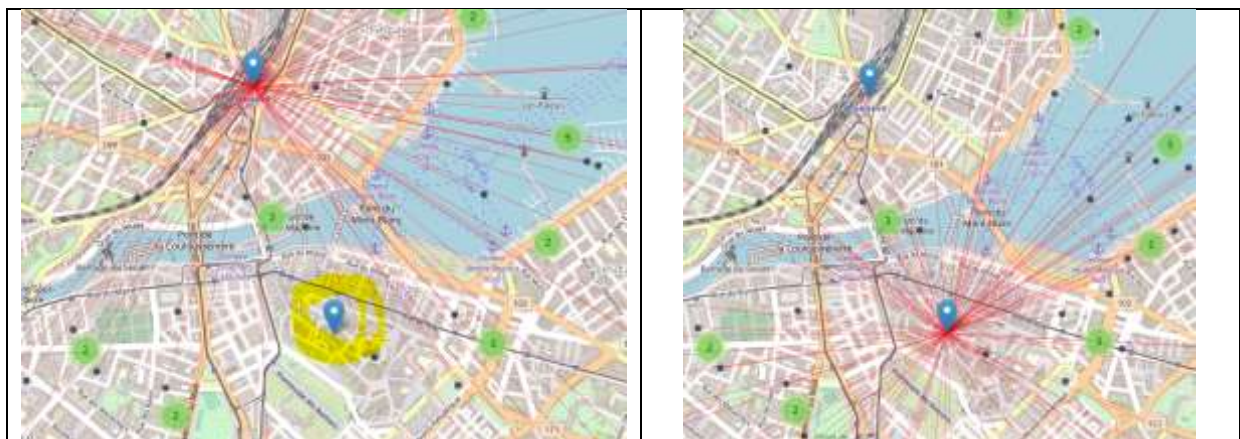
Placing the mouse on top of the cluster, will draw the area where the points of the cluster are located.

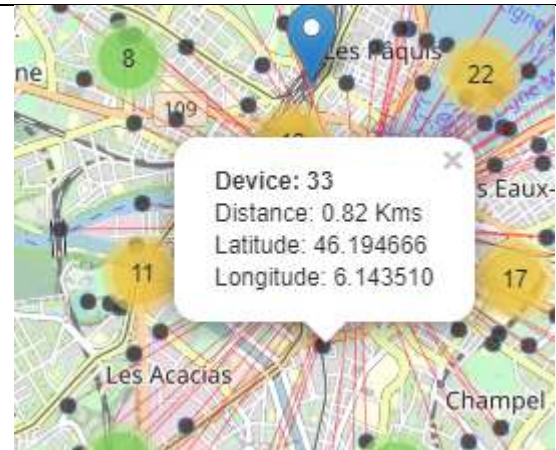


Recalculating the concentration

In this example, let's suppose the analyst want to recalculate the clustering with the secondary location.

Note: this operation will erase the results of the previous call.





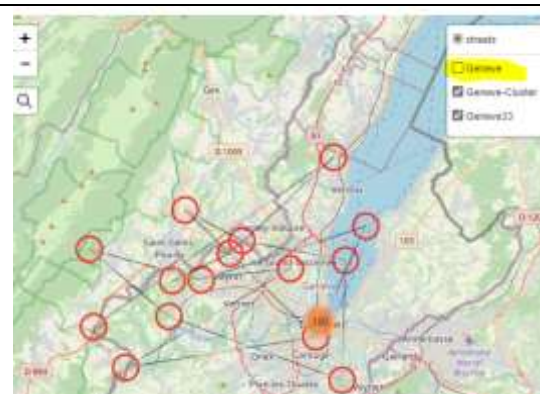
Displacement of a specific device

Selecting one of the points on the map, the analyst could find out the multiple locations where the device was recorded.

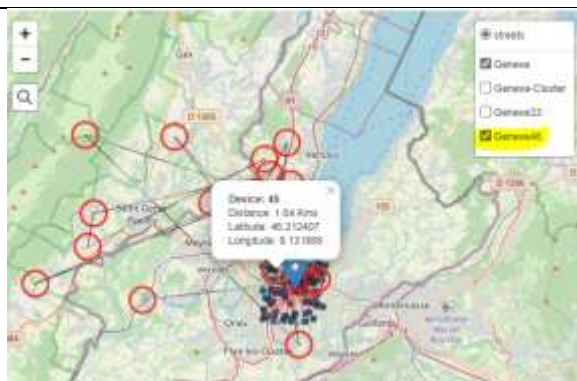
Pressing “double click” will call the server API to retrieve all the locations of that device in a **period of time**.



Result of the Server API Call



Removing the main Markers



Multiple tracks or paths



Device concentration around a specific device

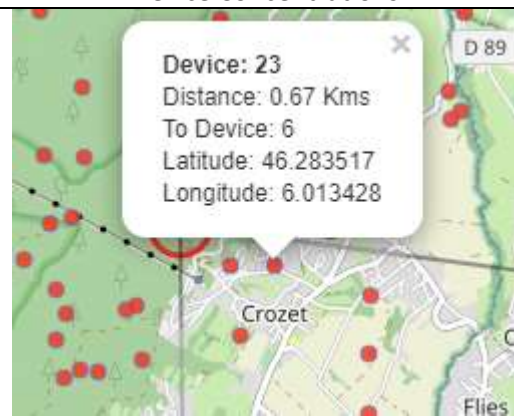
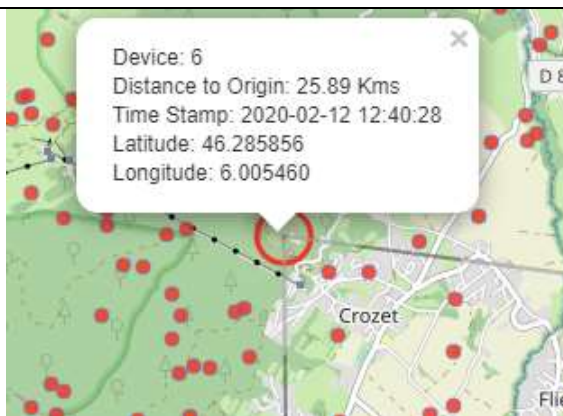
Displaying the concentration around the “device” at specific “location” at specific “time”, could help to monitor and maybe **notify** to other devices.



Double click on the Circle



Device Concentrations



Applications

Defining the initial position, will define the meaning of the analysis, School, Hospital, Shopping Mall, Sport Center, Market, etc.