HAL open science

Introduction aux données OpenStreetMap (Structuration, interrogation, extraction et édition)

Boris Mericskay

▶ To cite this version:

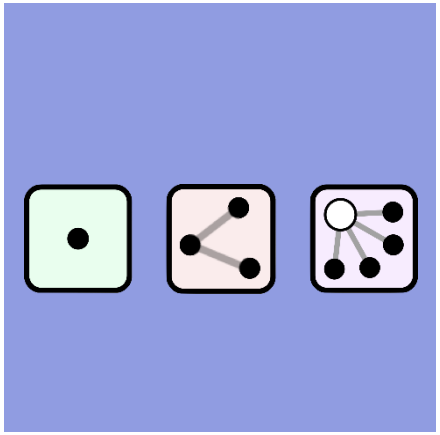
Boris Mericskay. Introduction aux données OpenStreetMap (Structuration, interrogation, extraction et édition). Master. France. 2017. cel-01660629

HAL Id: cel-01660629
https://hal.science/cel-01660629

Submitted on 11 Dec 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Introduction aux données OpenStreetMap (Structuration, interrogation, extraction et édition)

 # M2 SIGAT / TELENVI
Automne 2017

@Boris Mericskay

CC BY SA

Manipulation de données avec OSM

Données OSM

Quelles sont les données disponibles sur OSM ?

Comment récupérer des données issues de OSM ?

- Selon une emprise
- Selon des critères qualitatifs

Comprendre comment sont structurées ces données

Savoir comment les réutiliser…

…et les faire évoluer

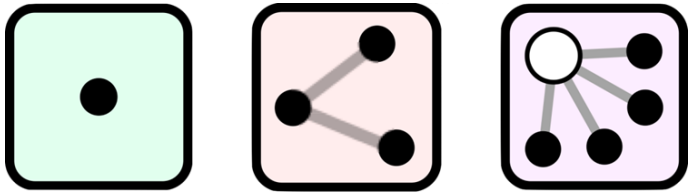
Les données OSM

Dans un SIG, les données cartographiques sont représentées de trois façons différentes

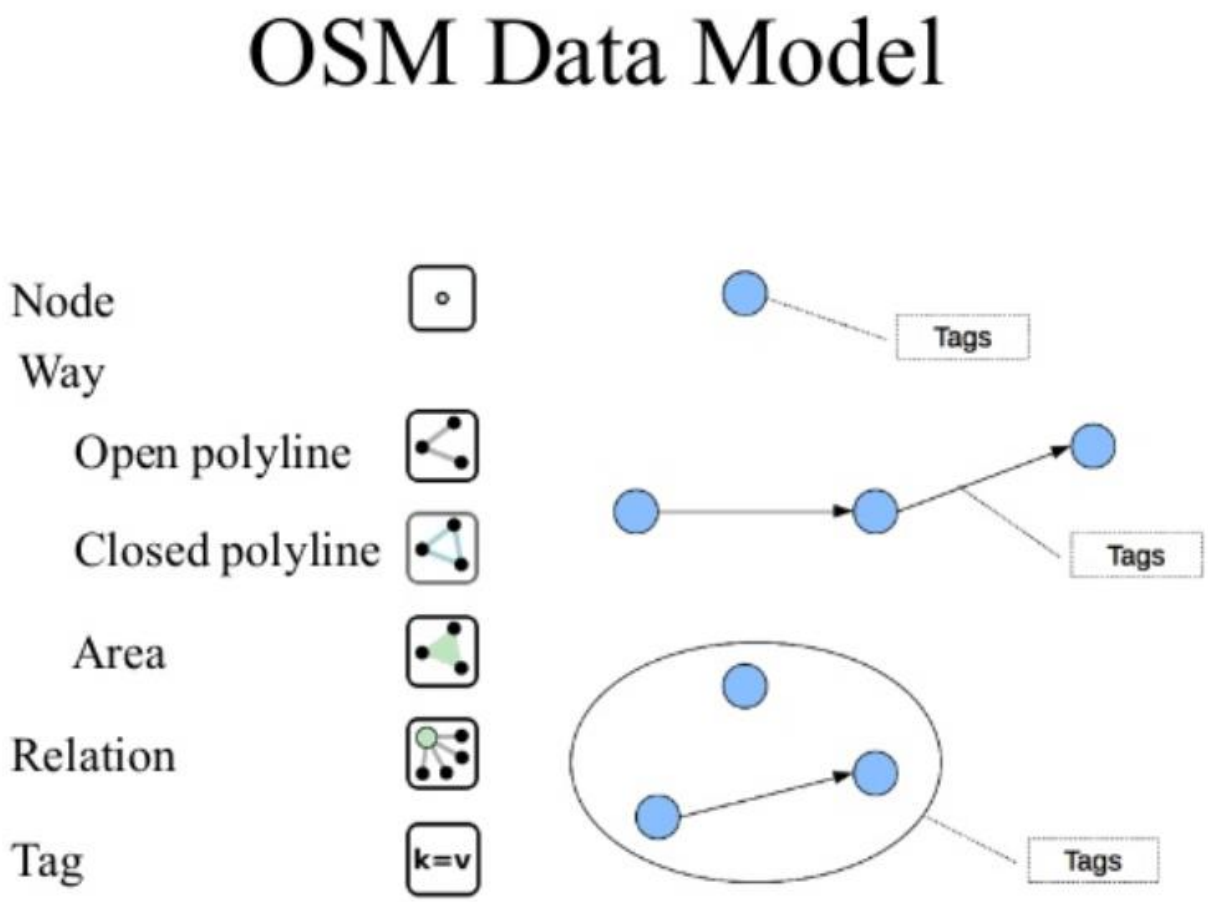
- Points, lignes et polygones
- Les données attachées à ces objets sont généralement stockées dans une base de données liée à la base géographique.

Dans OpenStreetMap, ces trois concepts sont modélisés différemment :

- **Nœuds** (*nodes*)
- **Lignes** (*ways*)
- **Relations**
- complétés par des **attributs** (*tags*) décrivant chaque objet



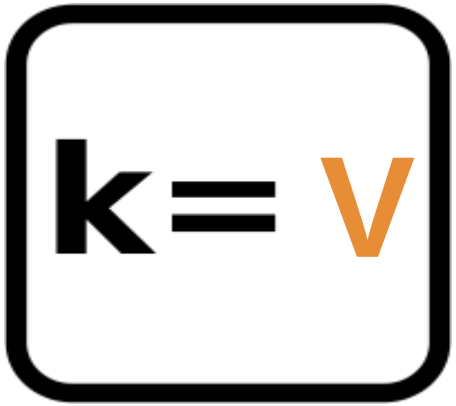
Les données OSM



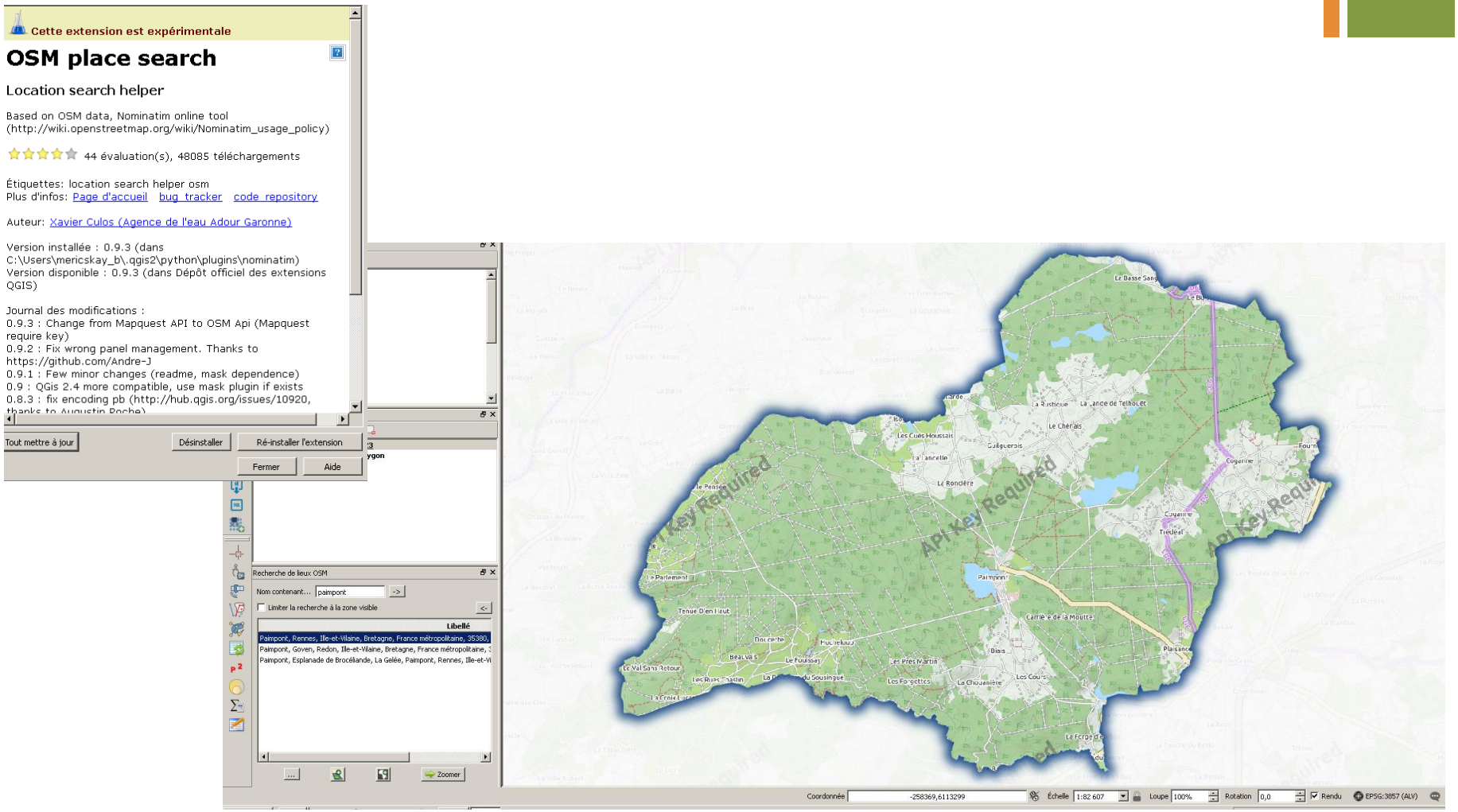
Les données OSM

Par exemple pour indiquer qu'un trait correspond à une route secondaire, en sens unique, de vitesse maximale 90 km/h et munie d'une bande cyclable, on utilisera :

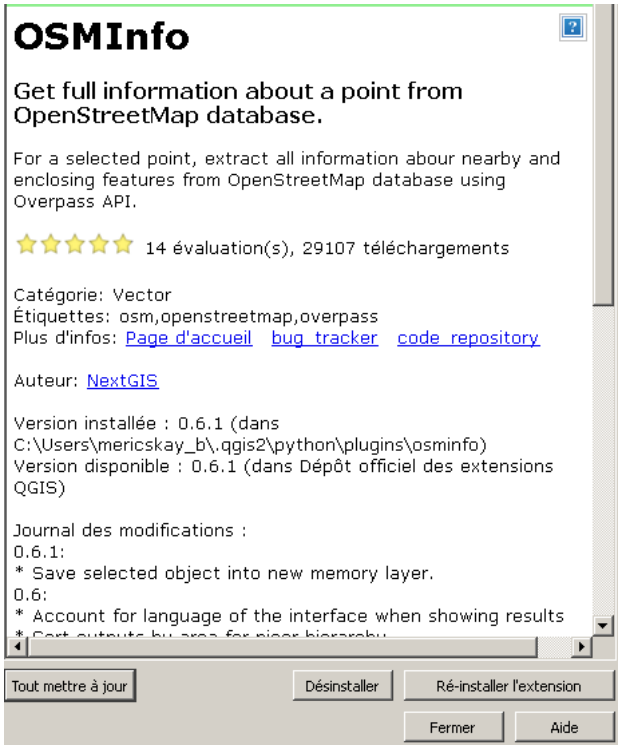
- highway=secondary
- oneway=yes
- maxspeed=90
- cycleway=lane

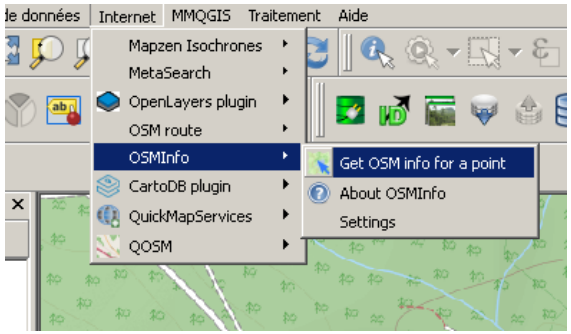


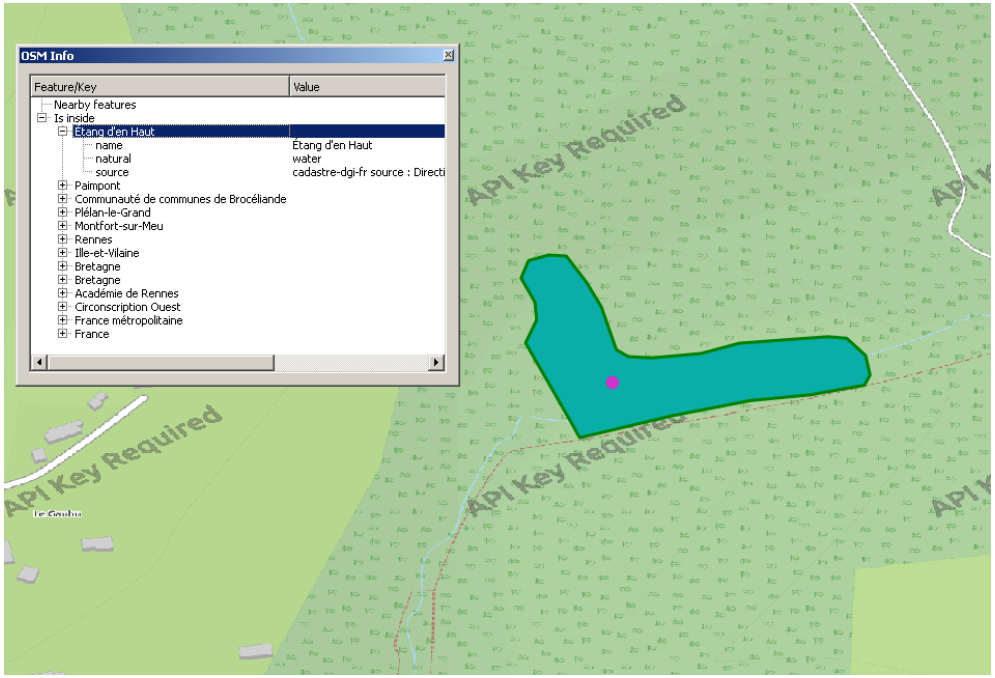
OSM place search



OSM Info

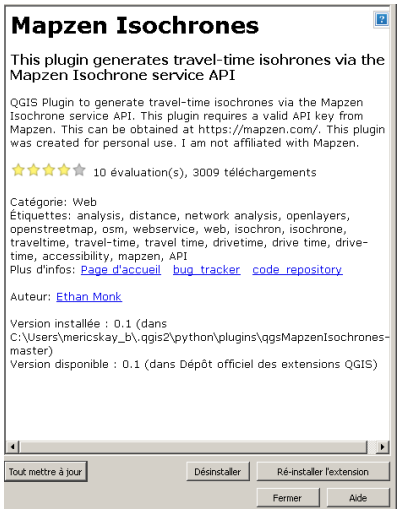

OSMInfo
Get full information about a point from OpenStreetMap database.
For a selected point, extract all information abour nearby and enclosing features from OpenStreetMap database using Overpass API.
14 évaluation(s), 29107 téléchargements
Catégorie: Vector
Étiquettes: osm,openstreetmap,overpass
Plus d'infos: Page d'accueil bug tracker code repository
Auteur: NextGIS
Version installée : 0.6.1 (dans C:\Users\mericskay_b\.qgis2\python\plugins\osminfo)
Version disponible : 0.6.1 (dans Dépôt officiel des extensions QGIS)
Journal des modifications :
0.6.1:
* Save selected object into new memory layer.
0.6:
* Account for language of the interface when showing results
Tout mettre à jour
Désinstaller
Ré-installer l'extension
Fermer
Aide

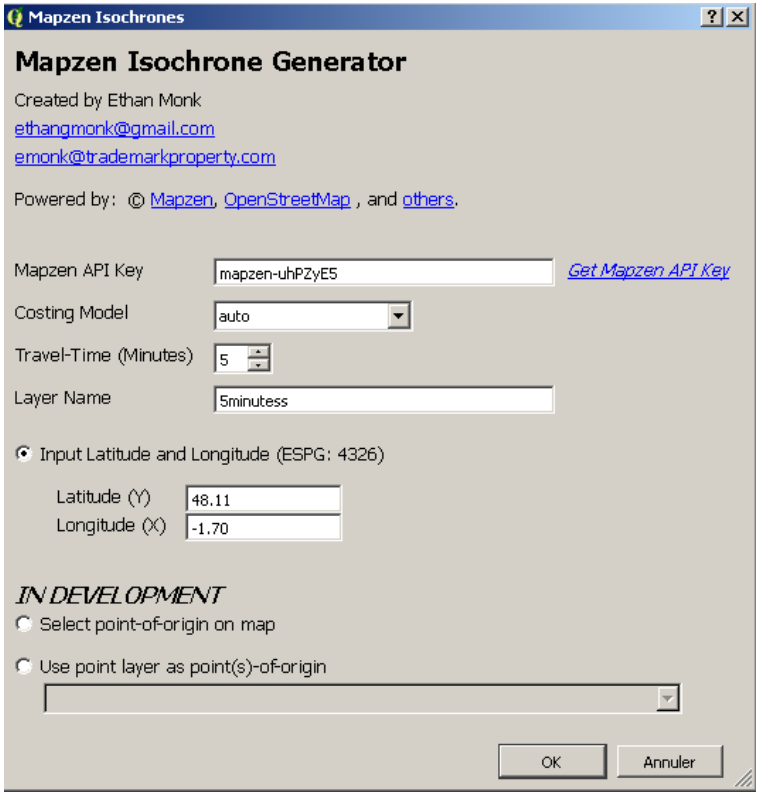

Internet
MMQGIS
Traitement
Aide
Mapzen Isochrones
MetaSearch
OpenLayers plugin
OSM route
OSMInfo
CartoDB plugin
QuickMapServices
QOSM
Get OSM info for a point
About OSMInfo
Settings

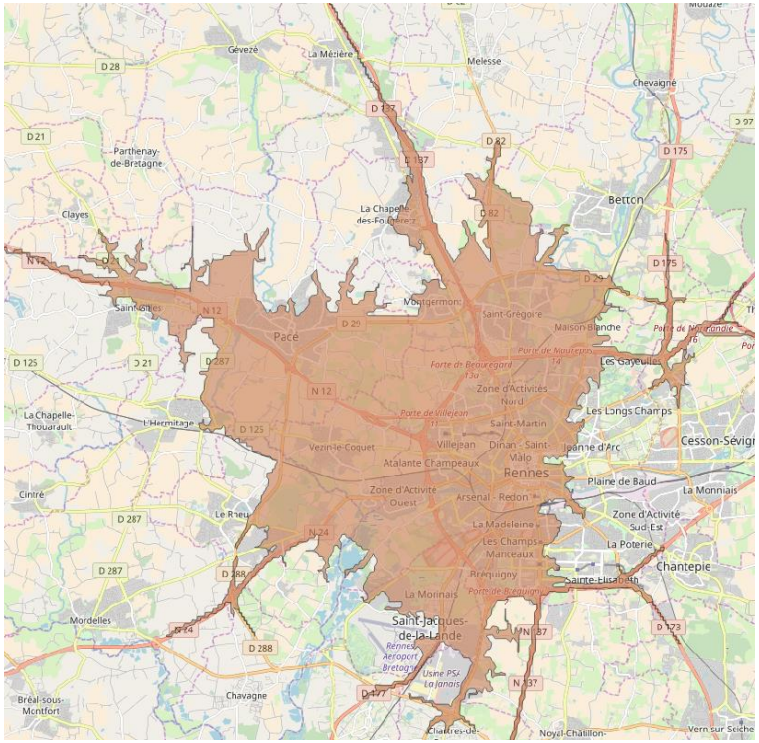

OSM Info
Feature/Key
Value
Nearby features
Is inside
Étang d'en Haut
name
Étang d'en Haut
natural
water
source
cadastre-dgi-fr source : Directi
Paimpont
Communauté de communes de Brocéliande
Plélan-le-Grand
Montfort-sur-Meu
Rennes
Ille-et-Vilaine
Bretagne
Bretagne
Académie de Rennes
Circonscription Ouest
France métropolitaine
France
API Key Required

Isochrones

Mapzen Isochrone Generator

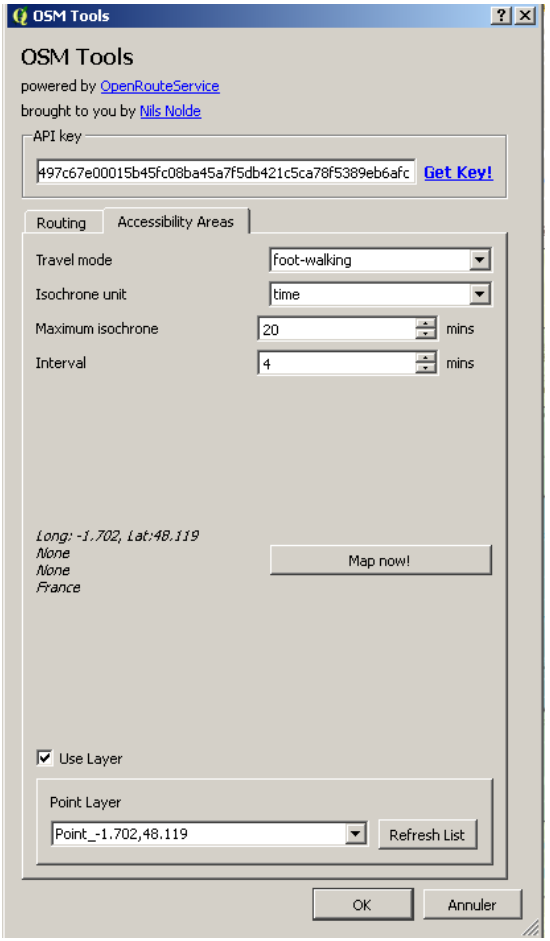


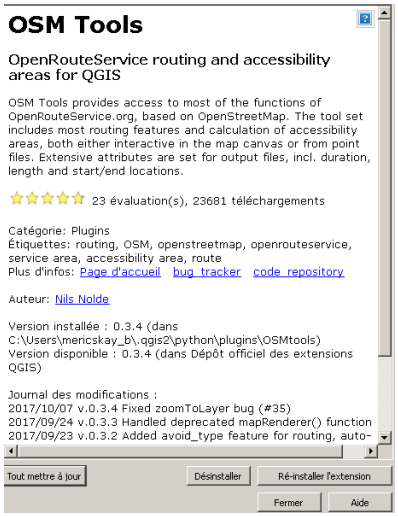


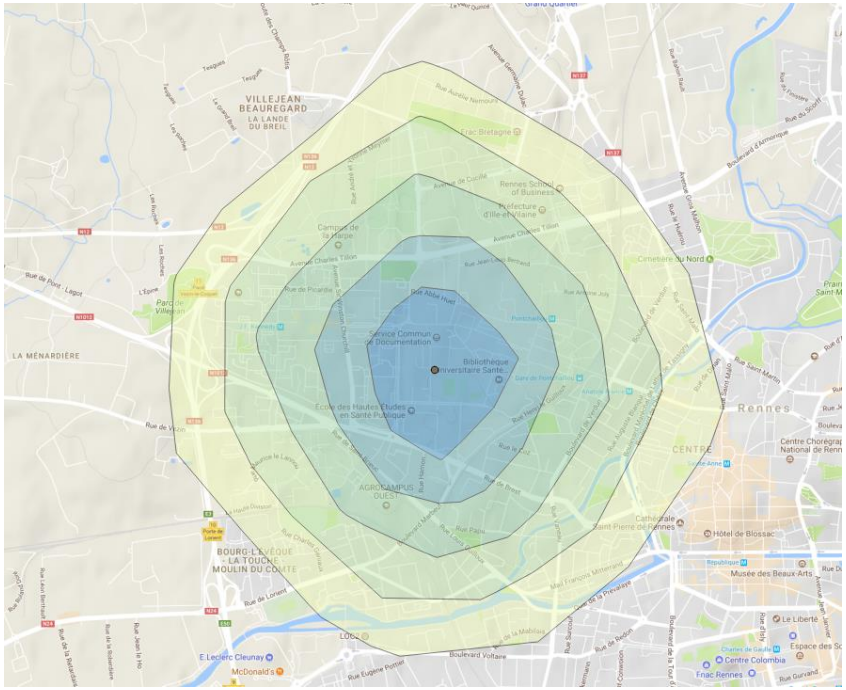


Isochrones

OSM Tools





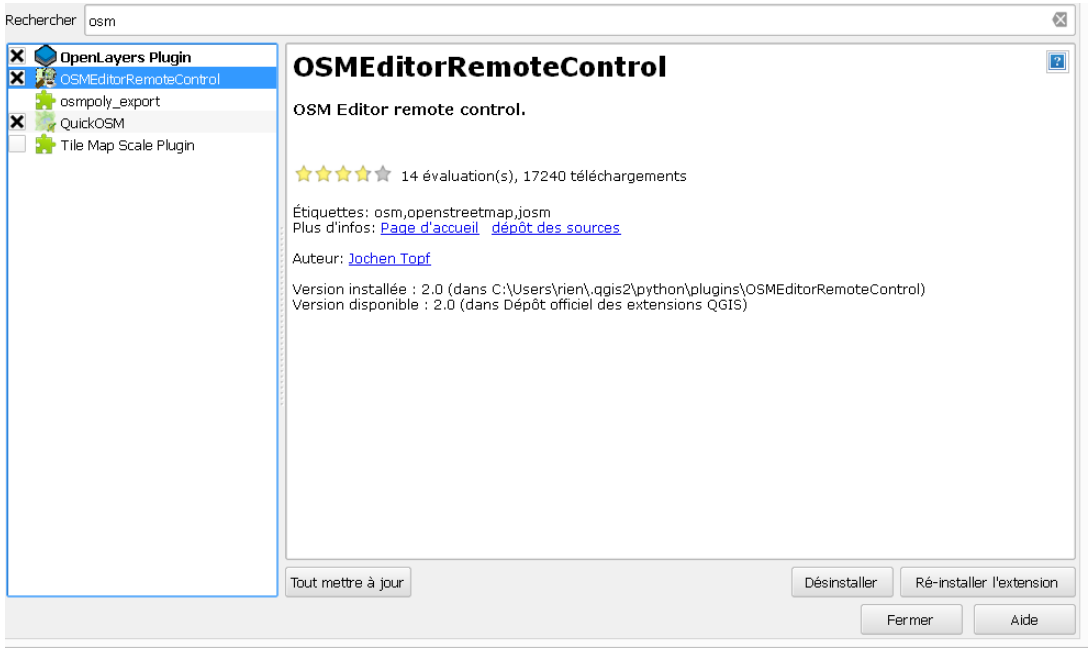


OSMEditorRemoteControl

Extension de QGIS

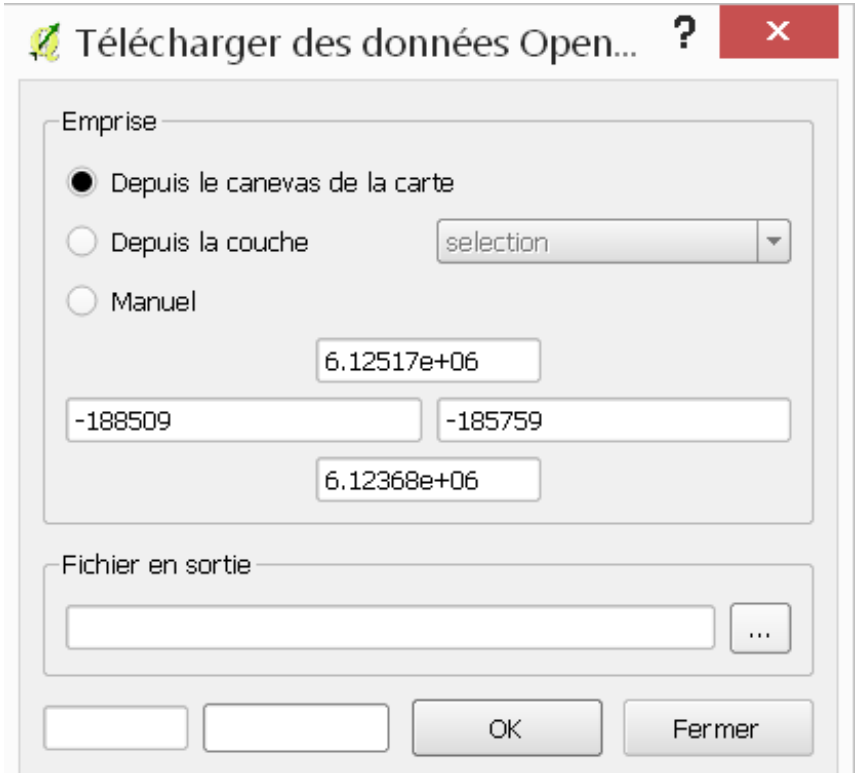
→ Récupérer des données issue de l'emprise de la carte

→ Récupérer des données issue de l'emprise d'une couche



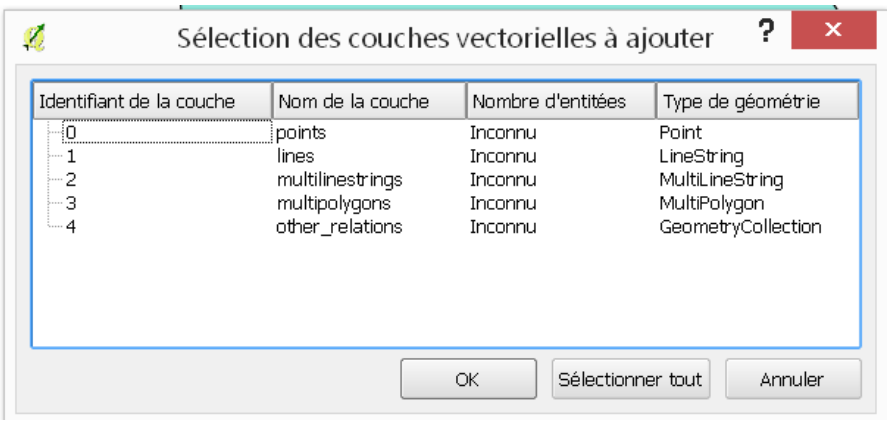
OSMEditorRemoteControl

Menu Vecteur → OpenstreetMap → Télécharger données



OSMEditorRemoteControl

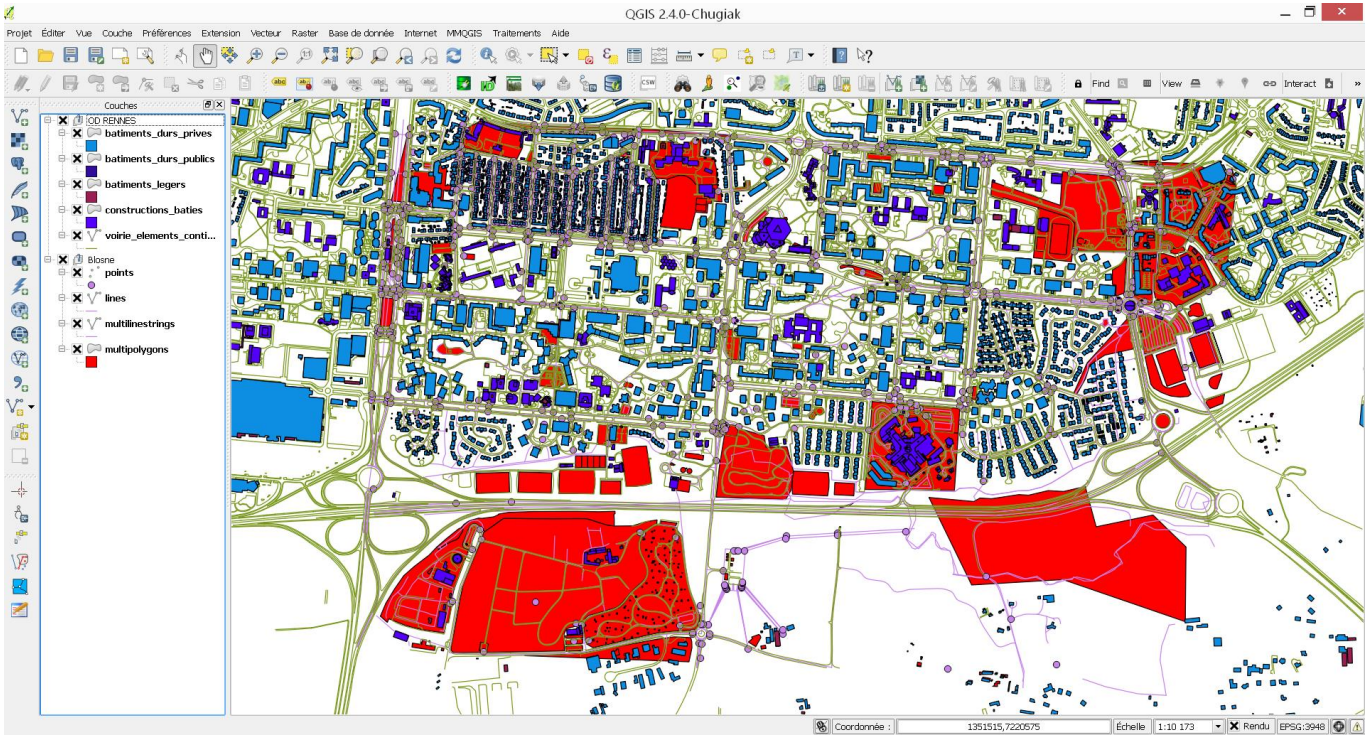
- Importer la base de données .osm
- La base de données contient 5 tables
  - Points
  - Lines
  - Multilinestrings
  - Multipolygons
  - Other_relations



- Les tables attributaires contiennent plusieurs champs correspondant à certains des tags présents dans la base OSM (qualification des données ex. type de route, type de commerce, type de sol, etc.)

Exercice 1

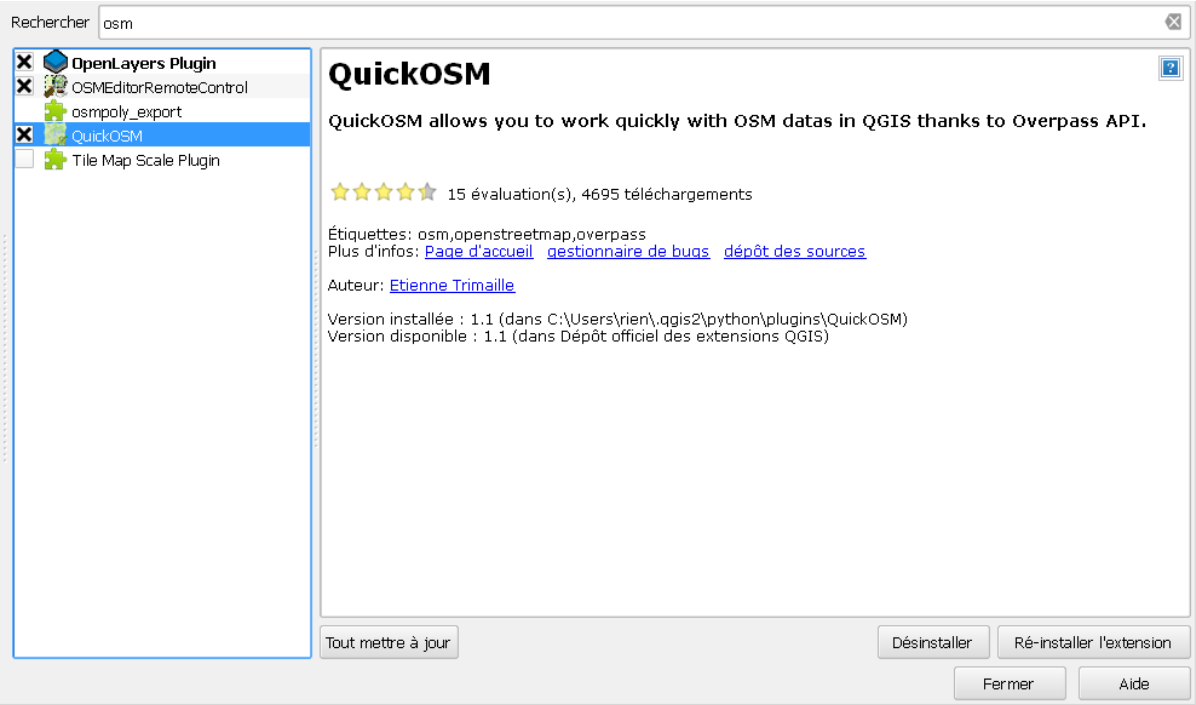
- Comparer les données d'OSM avec celle issues de l'IGN sur le **quartier du Blosne (Rennes)**



Quick OSM

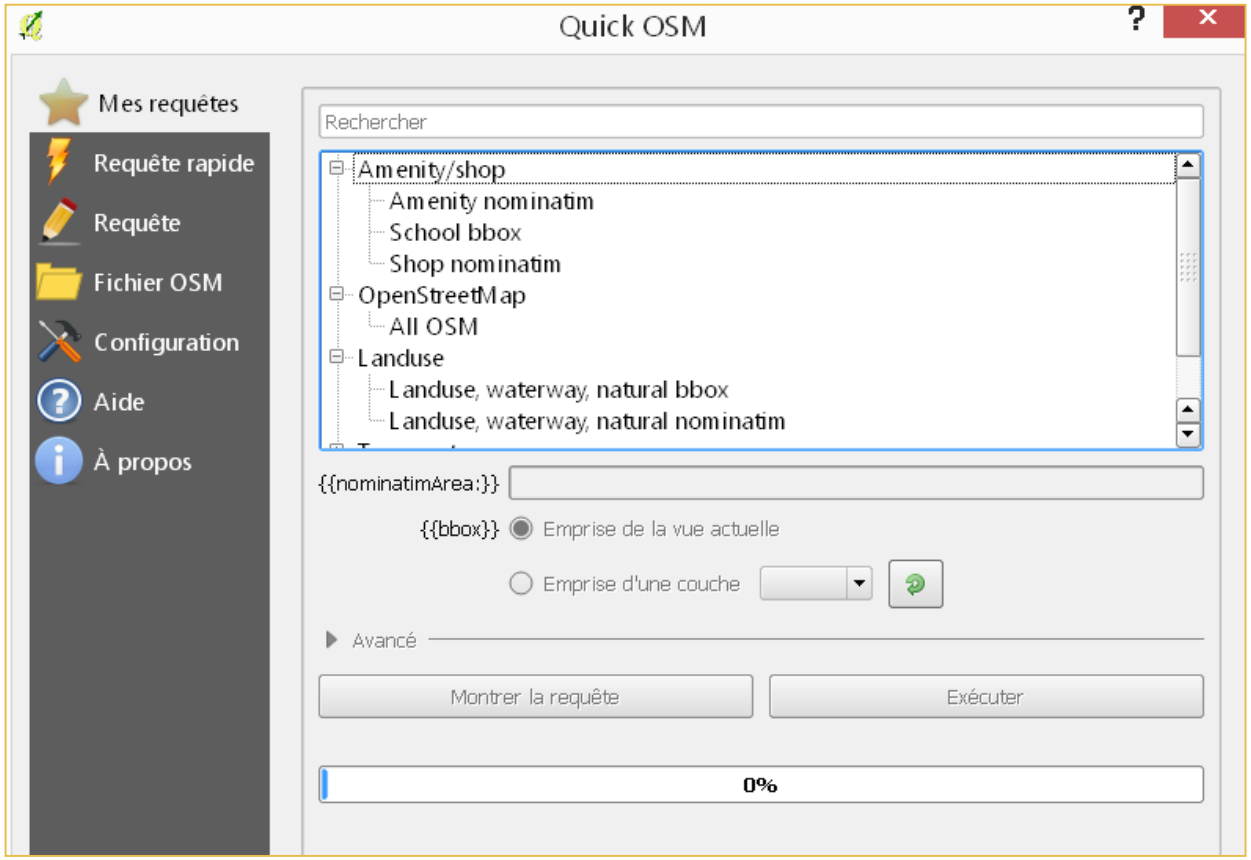
Quick OSM

- Extension QGIS qui permet de récupérer des données selon des requêtes (avec des critères) et selon une entrée géographique comme une ville par exemple
- Basée sur l'API Overpass



Quick OSM

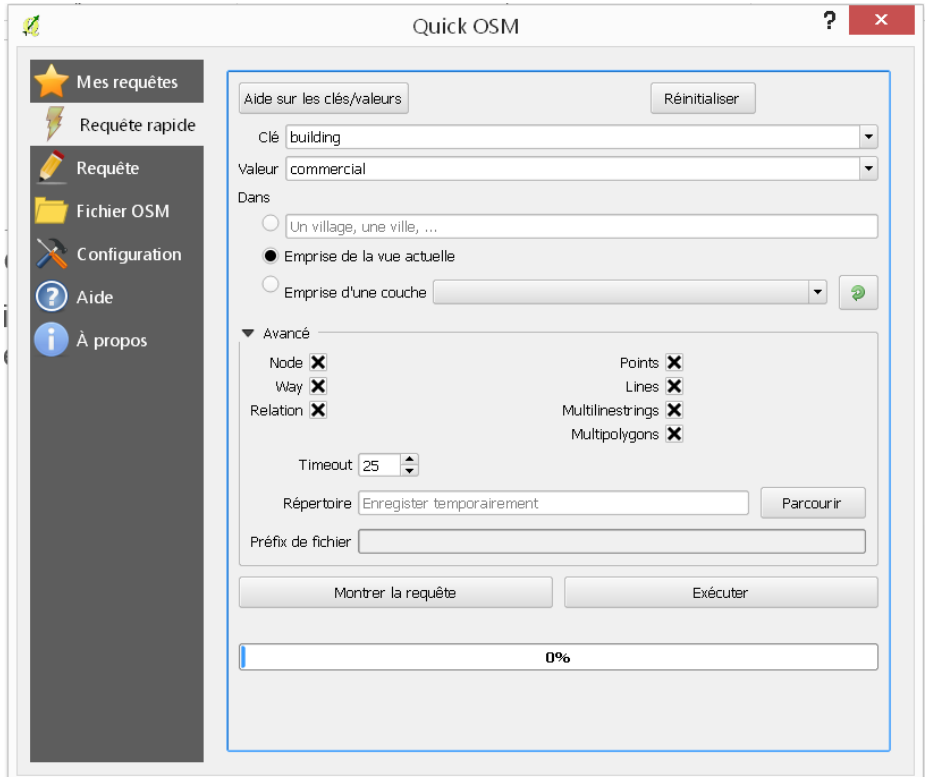
"Mes requêtes" = requêtes pré-enregistrées



Quick OSM

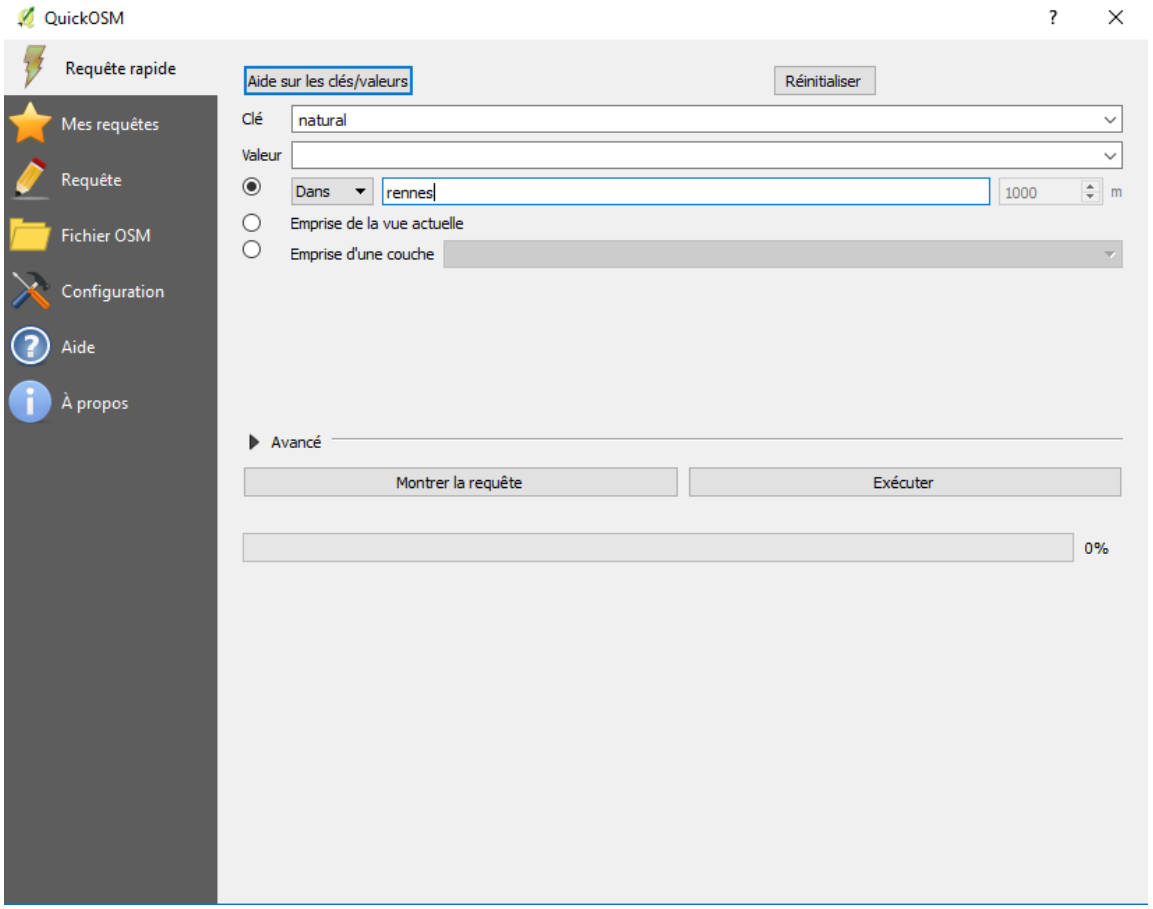
Requête rapide permet de requêter une clé et une valeur

- Possibilité de filtrer les informations selon une entrée thématique (type de route, type de bâtiment, type de magasin, etc.)



QuickOSM

Télécharger les données avec la clef « natural » à Rennes



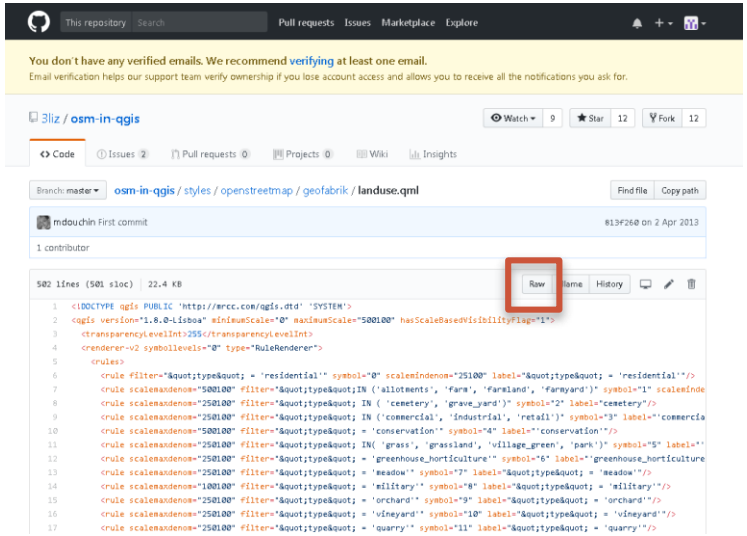
Exercice 2

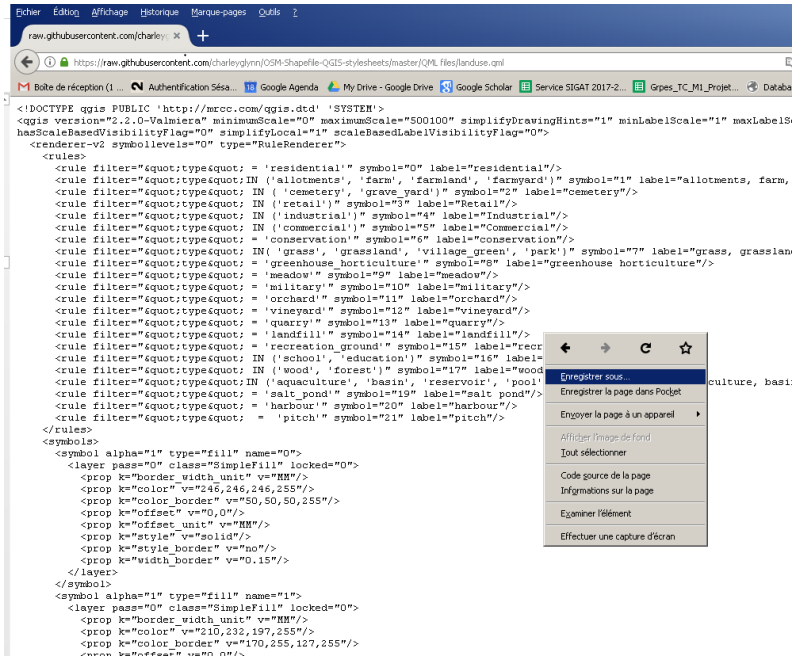
Appliquer un fichier de style pour mettre en forme la couche *landuse* issue d'OSM

- Télécharger un modèle .qml

https://github.com/3liz/osm-in-qgis/blob/master/styles/openstreetmap/geofabrik/landuse.qml

- Ouvrir la version brute (cliquer sur *Raw*)
- Clic droit → Enregistrer sous

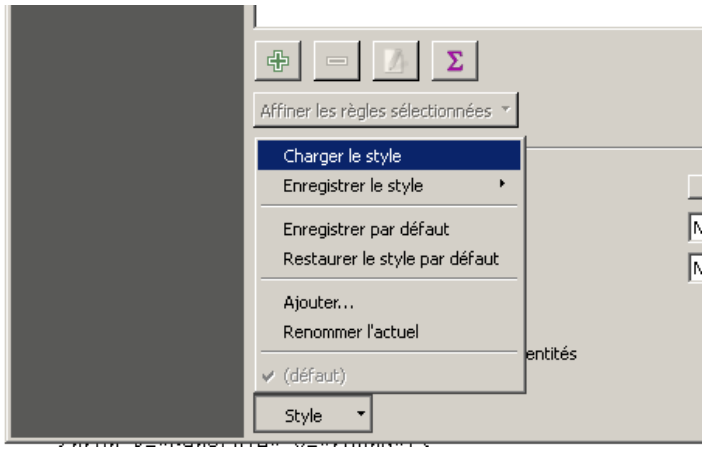


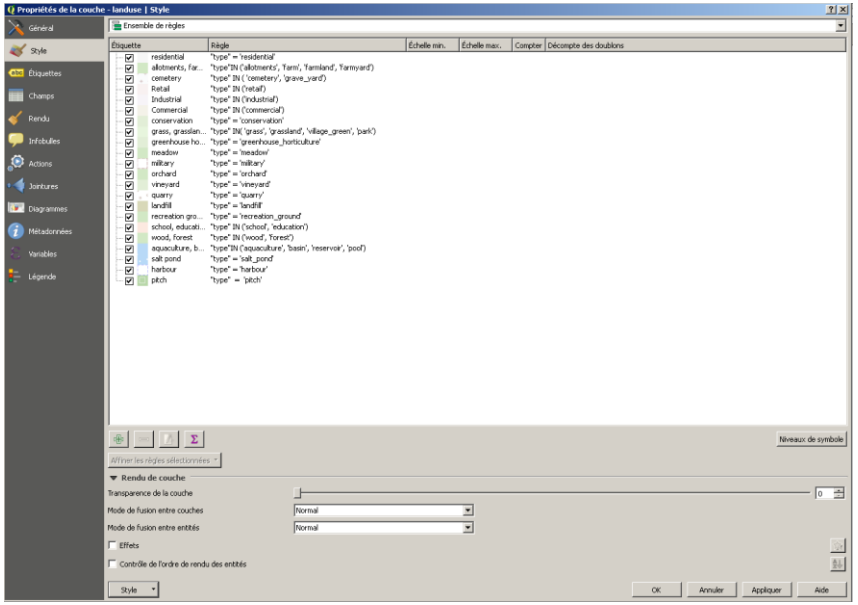


Exercice 2

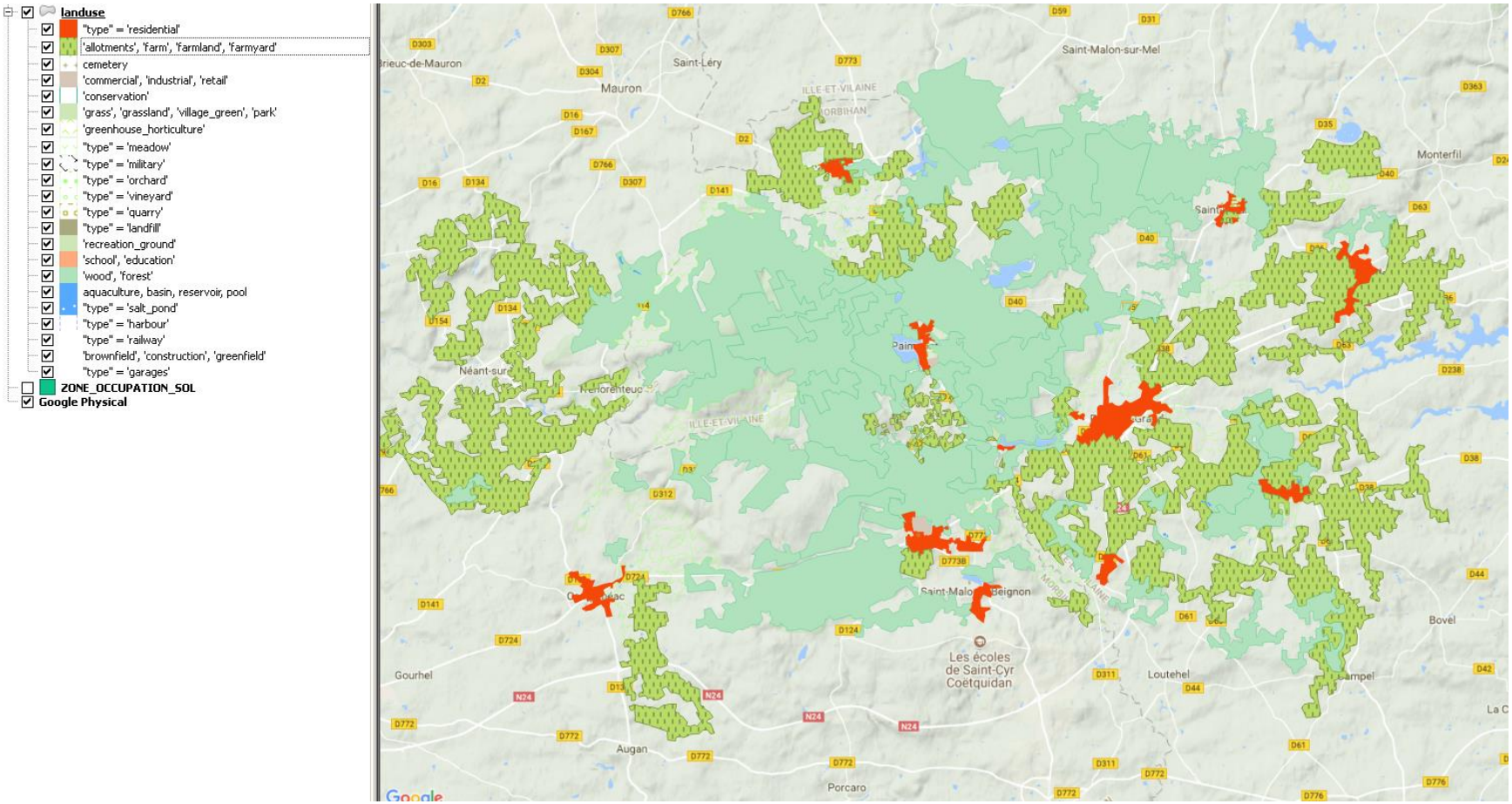
Appliquer un fichier de style pour mettre en forme la couche *landuse* issue d'OSM

- Dans les propriétés de style de la couche, charger le modèle .qml





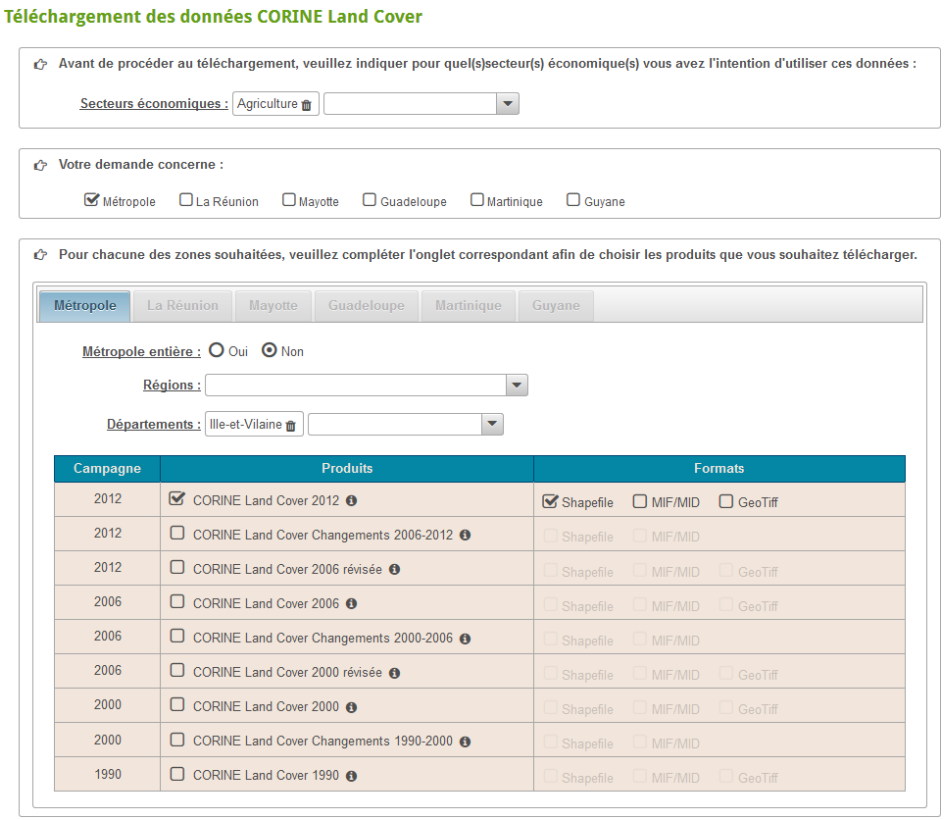
Exercice 2


landuse
"type" = 'residential'
'allotments', 'farm', 'farmland', 'farmyard'
cemetery
'commercial', 'industrial', 'retail'
'conservation'
'grass', 'grassland', 'village_green', 'park'
'greenhouse_horticulture'
"type" = 'meadow'
"type" = 'military'
"type" = 'orchard'
"type" = 'vineyard'
"type" = 'quarry'
"type" = 'landfill'
'recreation_ground'
'school', 'education'
'wood', 'forest'
aquaculture, basin, reservoir, pool
"type" = 'salt_pond'
"type" = 'harbour'
"type" = 'railway'
'brownfield', 'construction', 'greenfield'
"type" = 'garages'
ZONE_OCCUPATION_SOL
Google Physical
Saint-Léry
Mauron
Saint-Malon-sur-Mel
Monterfil
Néant-sur
Les écoles
de Saint-Cyr
Coëtquidan
Gourhel
Augan
Porcaro
Loutehel
Bovel
Lampel
Google

Exercice 2

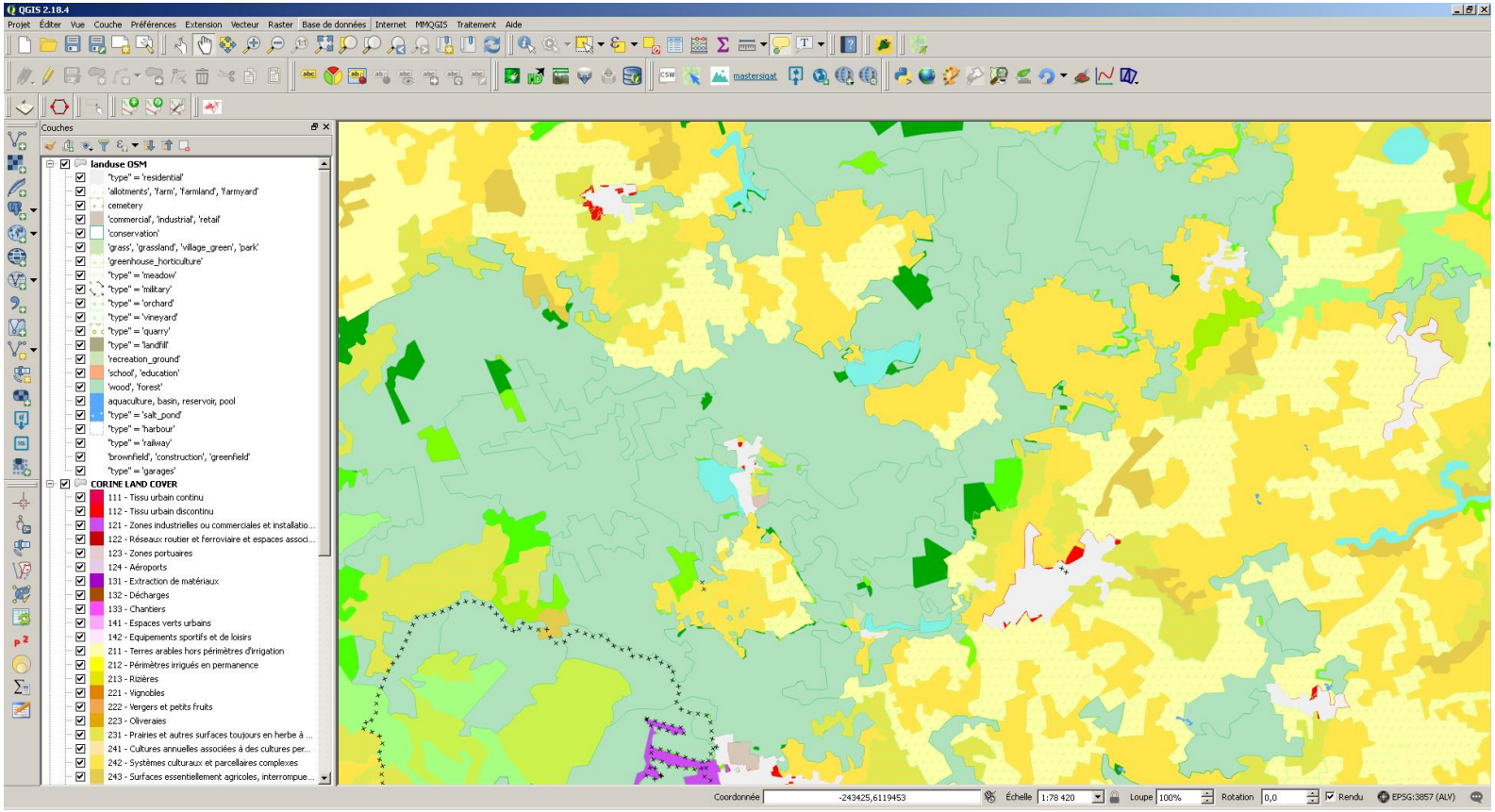
Comparer avec les données issues de CORINE LAND COVER

http://www.statistiques.developpement-durable.gouv.fr/clc/fichiers/



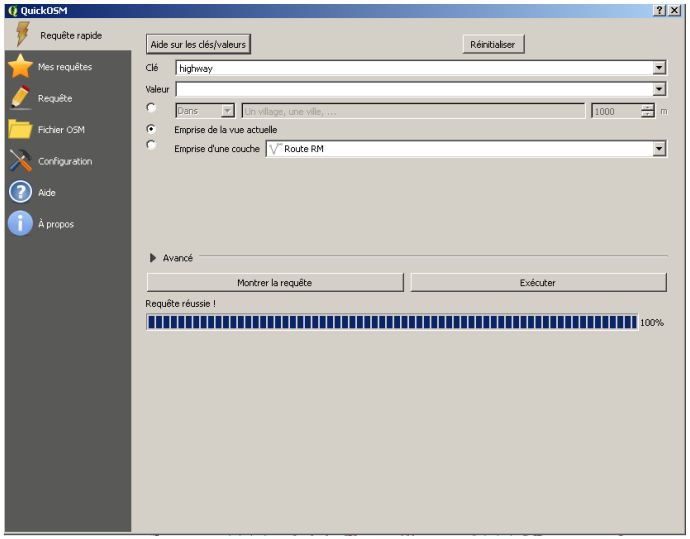
Exercice 2

Appliquer le ficher de style SLD fourni et comparer les 3 jeux de données



Exercice 3

Comparer le réseau routier de la BDTOPO et les données routières issues d'OSM (key=highway) à Villejean



Exercice 3

Comparer également avec la base de données de Renne Métropole

https://data.rennesmetropole.fr/explore/dataset/troncons-de-voies-du-referentiel-voies-et-adresses-de-rennes-metropole/

Tronçons de voies du référentiel voies et adresses de Rennes Métropole

Informations | Tableau | Carte | Analyse | Export | API | Commentaires (0)

Rennes Métropole dispose depuis 2013 d'un Référentiel Voies et Adresses (RVA) sur les communes de l'agglomération.

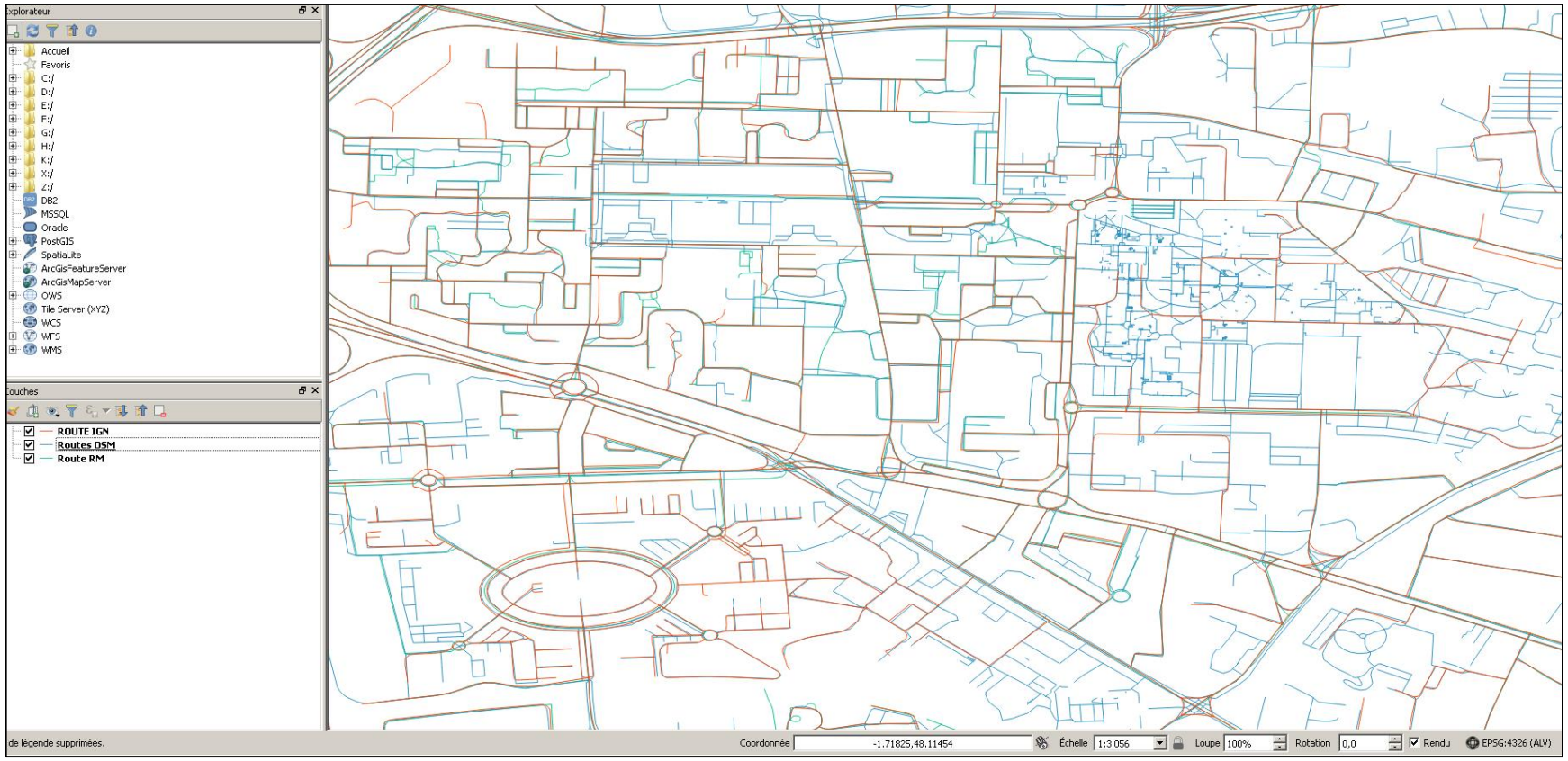
Lignes représentant chaque tronçon des voies.

Un tronçon appartient à au moins une voie.
Un tronçon appartient à une ou deux communes.

Un tronçon représente, le plus souvent, le centre de la chaussée.
Les tronçons de voies sont topologiques : les extrémités d'un tronçon correspondent à des intersections ou des jonctions, sauf dans le cas d'un chevauchement (cf paragraphe suivant).

Les tronçons gèrent les cas de chevauchement grâce à l'attribut « Niveau ». Cet attribut permet donc de différencier le tronçon passant dessus et le tronçon passant dessous.

Exercice 3


Explorateur
Accueil
Favoris
C:/
D:/
E:/
F:/
G:/
H:/
K:/
X:/
Z:/
DB2
MSSQL
Oracle
PostGIS
SpatiaLite
ArcGisFeatureServer
ArcGisMapServer
OWS
Tile Server (XYZ)
WCS
WFS
WMS
Couches
ROUTE IGN
Routes OSM
Route RM
de légende supprimées.
Coordonnée
-1.71825,48.11454
Échelle
1:3 056
Loupe
100%
Rotation
0,0
Rendu
EPSG:4326 (ALV)

API Overpass

API Overpass

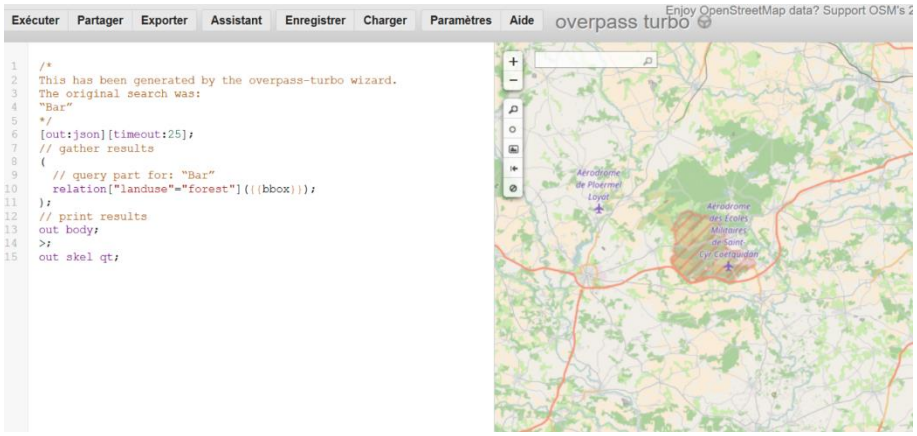
API Overpass permet d'interroger la base de données OSM

- Possibilité d'interrogation nombreuses
- Extraction des données massives et personnalisées

Overpass turbo est un outil internet d'exploration de données pour OpenStreetMap

- Ce site permet d'exécuter toutes sortes de requêtes de l' API Overpass et présente le résultat sur une carte interactive.

https://overpass-turbo.eu/



API Overpass

Routes

- Documentation

http://wiki.openstreetmap.org/wiki/Key:highway

Key = **highway**

Value =

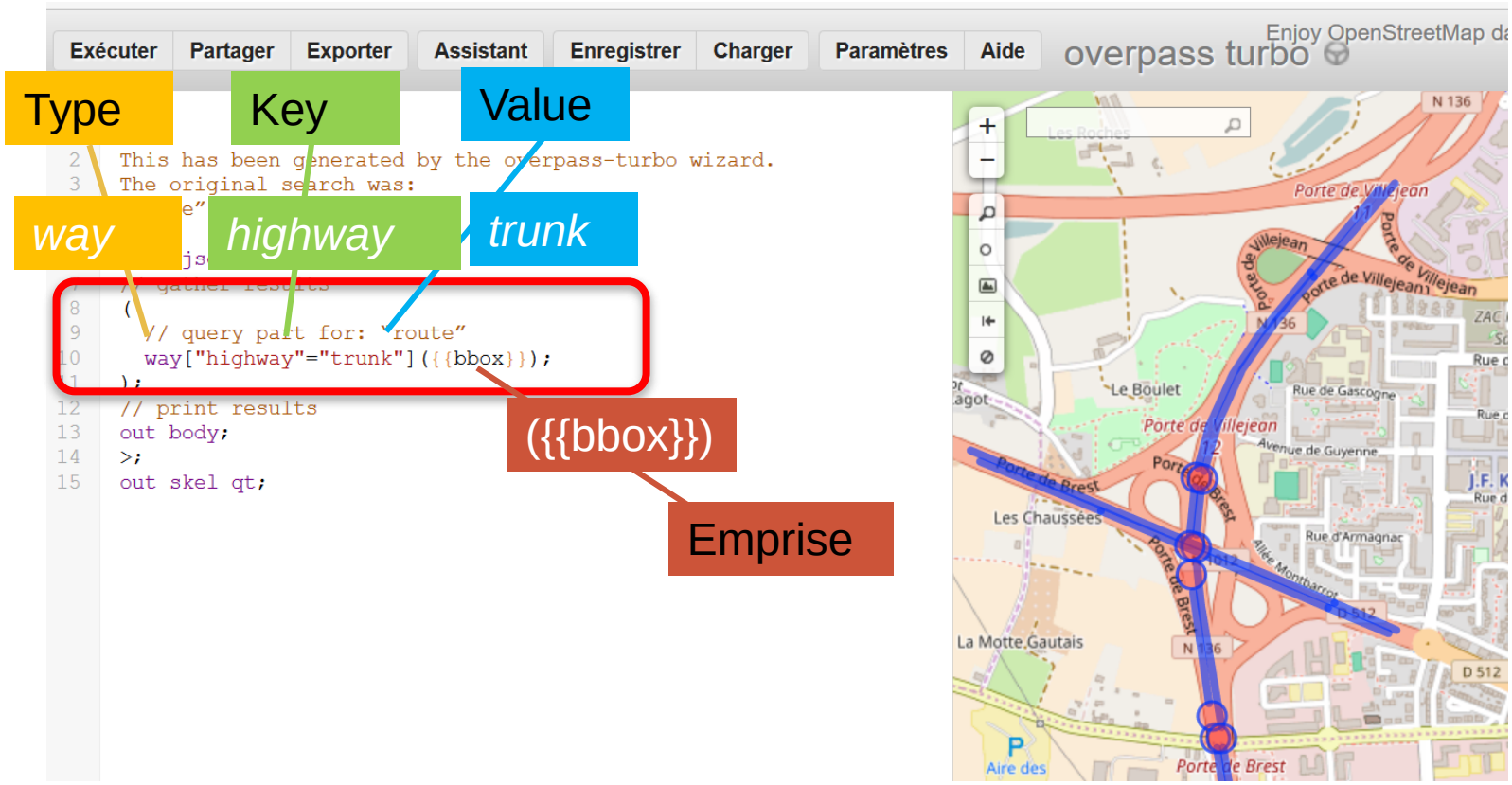
- motorway
- Trunk
- Primary
- Secondary
- …

Key	Value	Element	Comment	Rendering	Photo
Roads					
These are the principal tags for the road network. They range from the most to least important.					
highway	motorway		A restricted access major divided highway, normally with 2 or more running lanes plus emergency hard shoulder. Equivalent to the Freeway, Autobahn, etc..		
highway	trunk		The most important roads in a country's system that aren't motorways. (Need not necessarily be a divided highway.)		
highway	primary		The next most important roads in a country's system. (Often link larger towns.)		
highway	secondary		The next most important roads in a country's system. (Often link towns.)		
highway	tertiary		The next most important roads in a country's system. (Often link smaller towns and villages)		
			The least most important through roads in a country's		

API Overpass

Extraire les routes selon une valeur (hierarchie)

- Les routes principales (trunk)

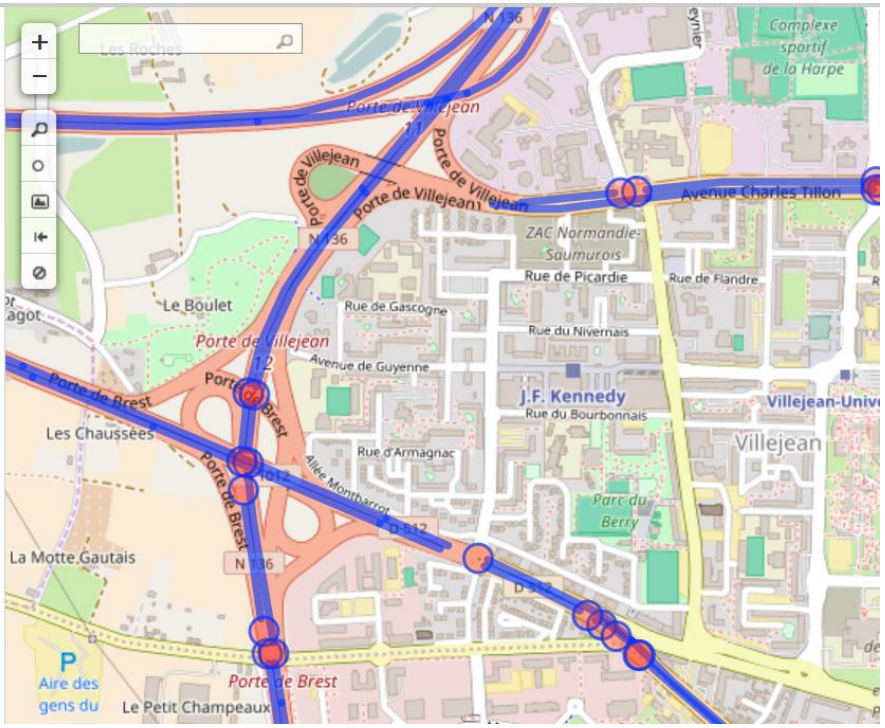


API Overpass

Combiner 2 critères

- Les grandes routes principales (*trunk*) et les routes principales (*primary*)

```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"route"
*/
[out:json][timeout:25];
// gather results
(
  // query part for: "route"
  way["highway"="trunk"]({{bbox}});
  way["highway"="primary"]({{bbox}});

);
// print results
out body;
>;
out skel qt;
```



API Overpass

Ajouter un critère de vitesse

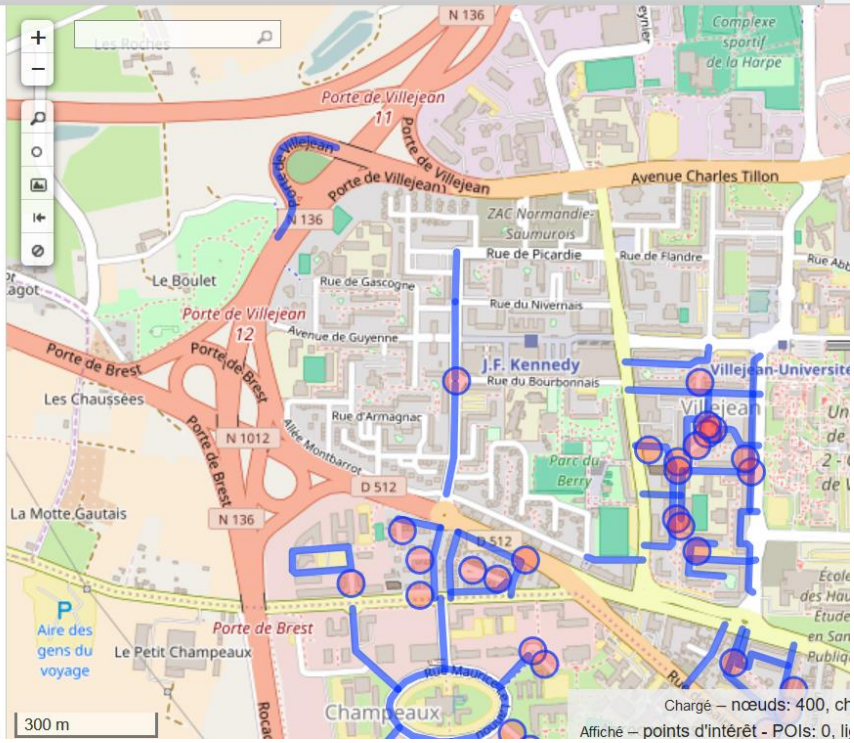
- Les routes limitées à 30kmh (*maxspeed*)
- http://wiki.openstreetmap.org/wiki/Key:maxspeed

Exécuter | Partager | Exporter | Assistant | Enregistrer | Charger | Paramètres | Aide

overpass turbo

Enjoy OpenStreetMap data? Support OSM's 2016 donation d

```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"route"
*/
[out:json][timeout:25];
// gather results
(
  // query part for: "route"
  way["highway"]["maxspeed"="30"]({{bbox}});

);
// print results
out body;
>;
out skel qt;
```

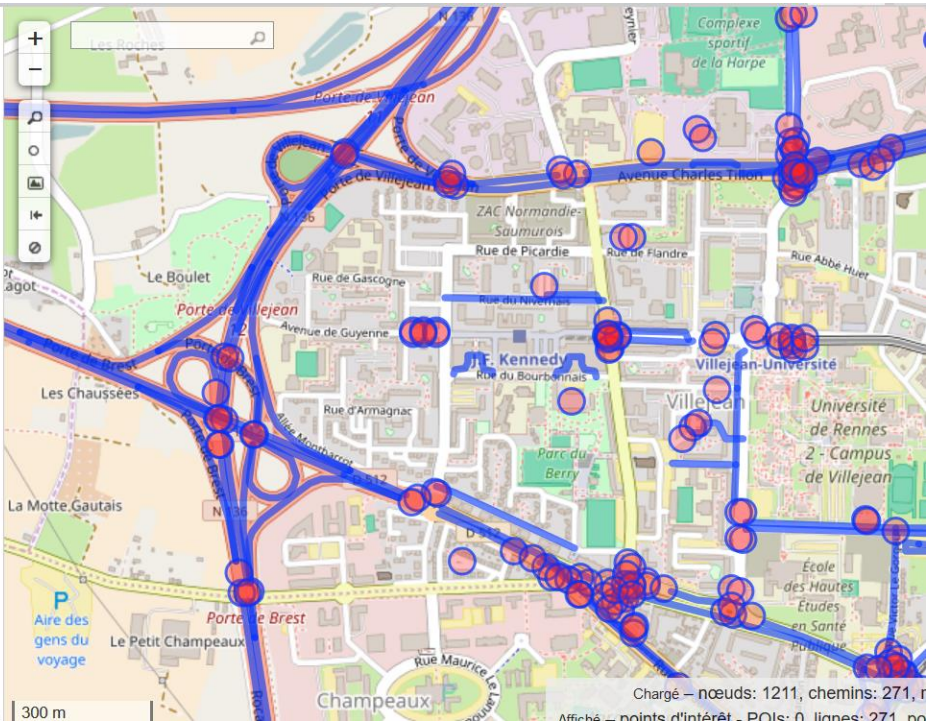


API Overpass

Ajouter un critère de direction

- Les routes en sens unique (*oneway*)
- http://wiki.openstreetmap.org/wiki/Key:oneway

```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"route"
*/
[out:json][timeout:25];
// gather results
(
  // query part for: "route"
  way["highway"]["oneway"="yes"]({{bbox}});

);
// print results
out body;
>;
out skel qt;
```

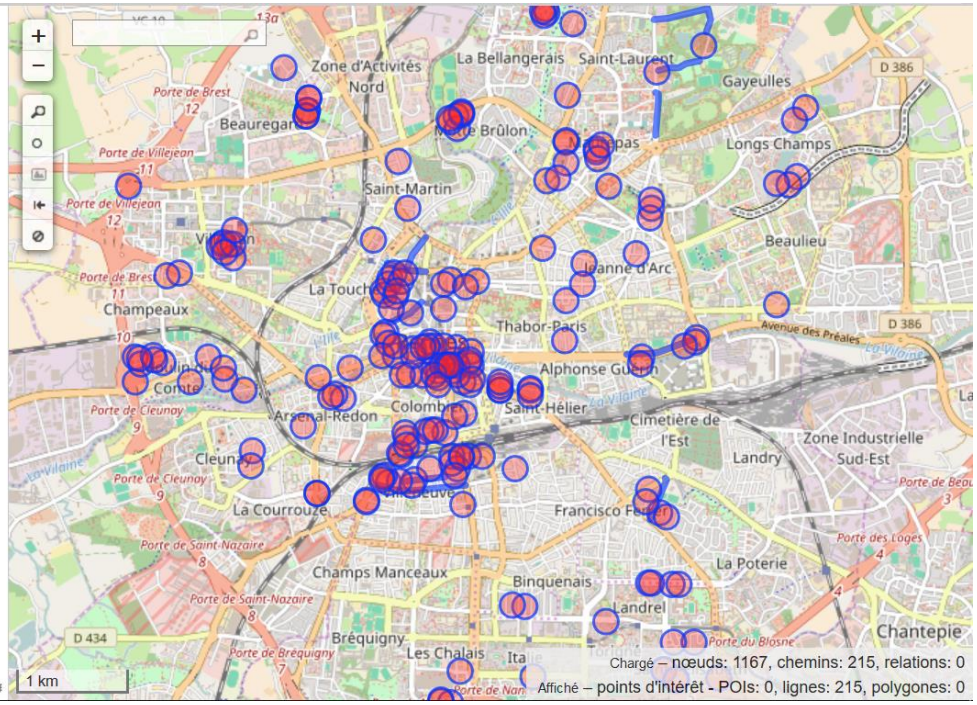


API Overpass

Choisir la zone d'interrogation (emprise de la requête)

- Récupérer les routes à sens uniques et limitées à 30km/h à Rennes

```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"highway=trunk in Rennes"
*/
[out:json][timeout:25];
// fetch area "Rennes" to search in
{{geocodeArea:Rennes}}->.searchArea;
// gather results
(
  // query part for: "highway=trunk"
  way["highway"]["maxspeed"="30"]["oneway"="yes"]
(area.searchArea);

);
// print results
out body;
>;
out skel qt;
```



API Overpass

Amenity

- Documentation

http://wiki.openstreetmap.org/wiki/Key:amenity

Key = **highway**

Value =

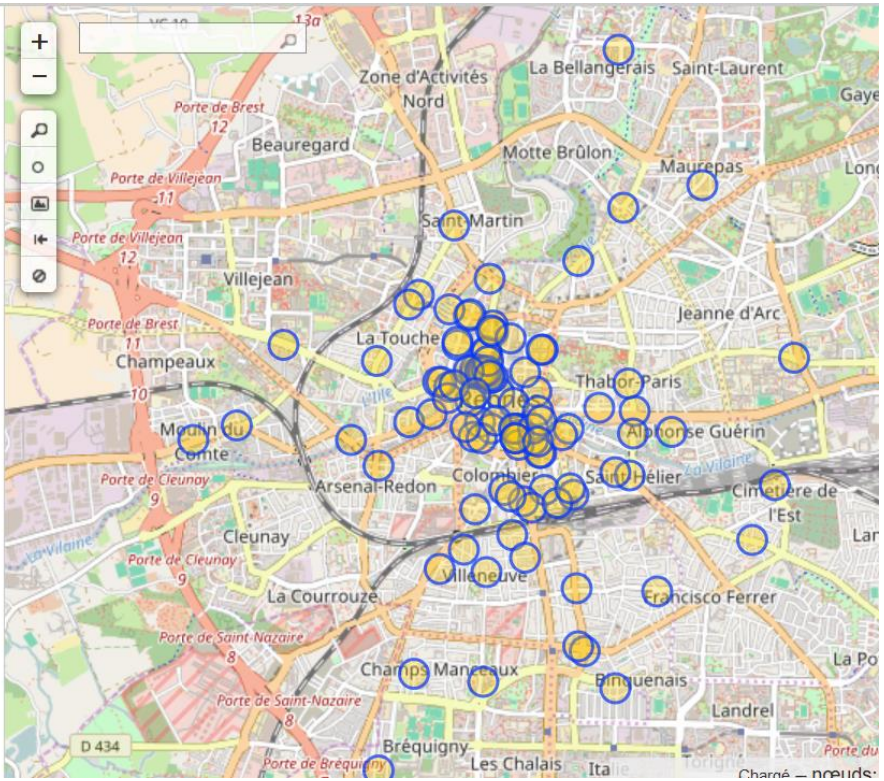
- bar
- recycling
- bench
- school
- …

Key	Value	Element	Comment	Rendering	Photo
			Sustenance		
amenity	bar		**Bar** is a purpose-built commercial establishment that sells alcoholic drinks to be consumed on the premises. They are characterised by a noisy and vibrant atmosphere, similar to a party and usually don't sell food. See also the description of the tags `amenity=pub;bar;restaurant` for a distinction between these.		
amenity	bbq		**BBQ** or **Barbecue** is a permanently built grill for cooking food, which is most typically used outdoors by the public. For example these may be found in city parks or at beaches. Use the tag `fuel=*` to specify the source of heating, such as `fuel=wood;electric;charcoal`. For mapping nearby table and chairs, see also the tag `tourism=picnic_site`. For mapping **campfires** and **firepits**, instead use the tag `leisure=firepit`.		
amenity	biergarten		**Biergarten** or **beer garden** is an open-air area where alcoholic beverages along with food is prepared and served. See also the description of the tags `amenity=pub;bar;restaurant`. A biergarten can commonly be found attached to a beer hall, pub, bar, or restaurant. In this case, you can use `biergarten=yes` additional to `amenity=pub;bar;restaurant`.		
amenity	cafe		**Cafe** is generally an informal place that offers casual meals and beverages; typically, the focus is on coffee or tea. Also known as a **coffeehouse/shop**, **bistro** or **sidewalk cafe**. The kind of food served may be mapped with the tags `cuisine=*` and `diet=*`. See also the tags `amenity=restaurant;bar;fast_food`.		
amenity	drinking_water		**Drinking water** is a place where humans can obtain potable water for consumption. Typically, the water is used for only drinking. Also known as a **drinking fountain** or **bubbler**.		

API Overpass

→ Extraire les bars

```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"Bar"
*/
[out:json][timeout:25];
// gather results
(
  // query part for: "Bar"
  node["amenity"="bar"]({{bbox}});
);
// print results
out body;
>;
out skel qt;
```



API Overpass

Boundary

- Documentation

http://wiki.openstreetmap.org/wiki/Boundaries

Feature : Boundaries

Description

Boundaries mark the borders of areas, mostly political, but also of other administrative areas.

Tags

`boundary=*`

Other

boundary=maritime

for marking maritime borders (rather than land areas normally assumed by bounda

boundary=political

is approved, should be documented in each country where they are used. Can be use

boundary=vice_county

for marking vice counties in Britain and Ireland.

boundary=national_park

marks the borders of a national park.

boundary=protected_area

a more recently introduced tag with a more verbose tagging scheme which can deal v

boundary=religious_administration

trial for dioceses, parishes... see FrViPofm/Tag:boundary=religious_administration

boundary=national

is approved, but not documented, can somebody check tagwatch for usage?

boundary=civil

is approved, but not documented, can somebody check tagwatch for usage?

boundary=metropole

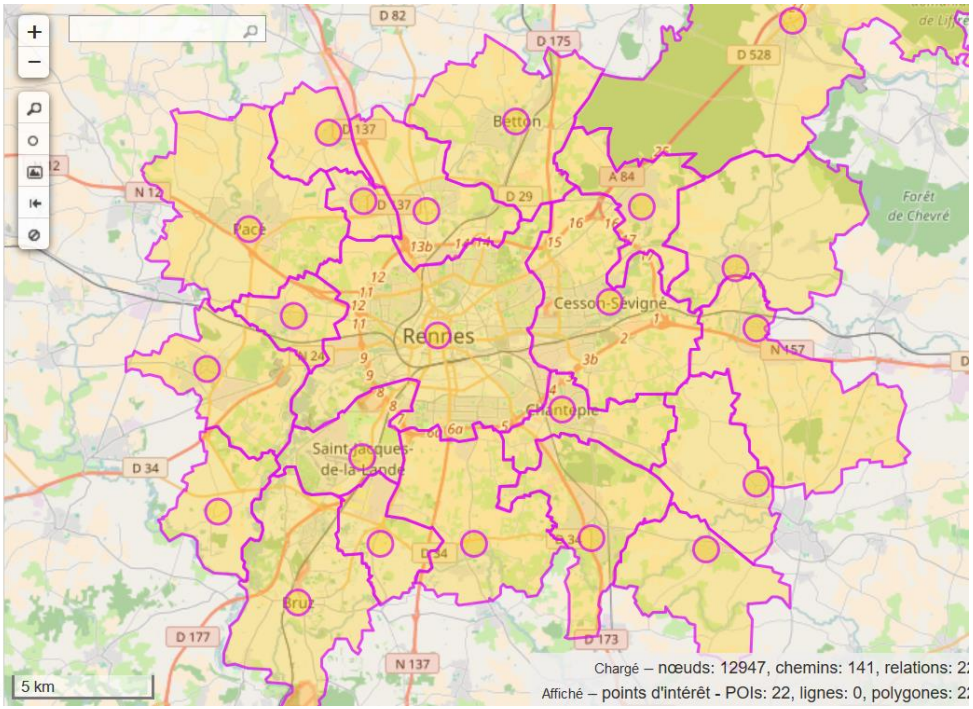
trial: When metropolitan areas don't match with an administrative subdivision (someti

API Overpass

Extraire les communes adjacentes à Rennes

- Niveau communal en France ("8 ")
- http://wiki.openstreetmap.org/wiki/Tag:boundary%3Dadministrative

```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"Bar"
*/
[out:json][timeout:25];
// gather results
(
  // query part for: "Bar"
  relation["boundary"="administrative"] ["admin_level" ="8"]
({{bbox}});
);
// print results
out body;
>;
out skel qt;
```



API Overpass

Landuse

- Documentation

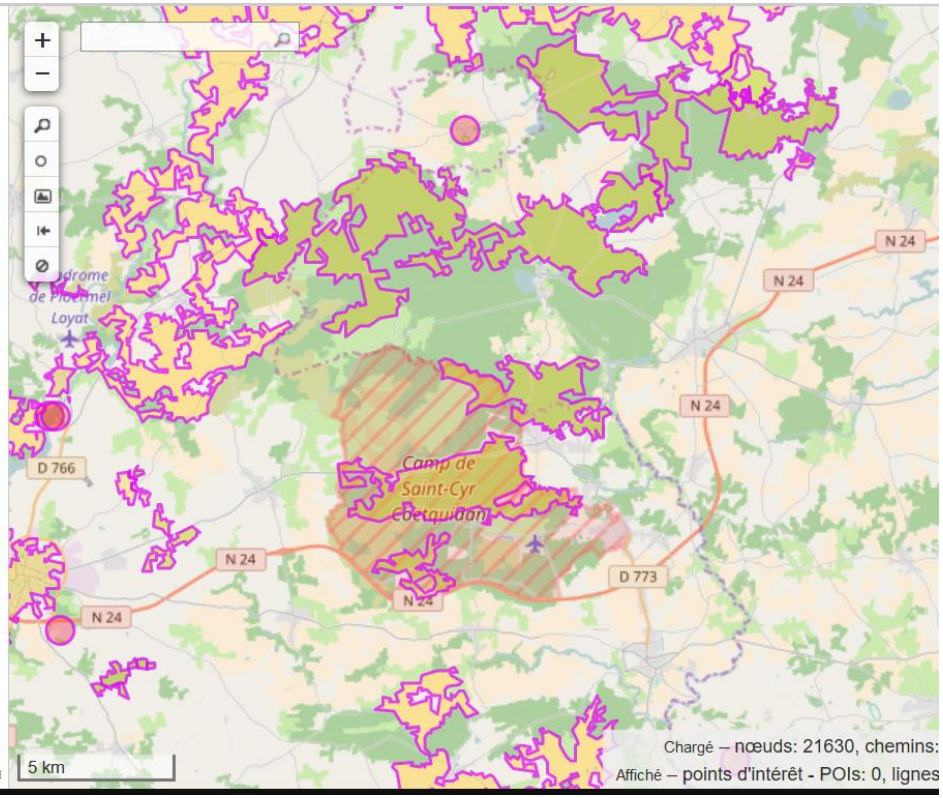
http://wiki.openstreetmap.org/wiki/FR:Key:landuse

landuse	basin		Zone d'eau artificielle de plusieurs types (infiltration, détention, rétention) qui finit par s'écouler dans une rivière. Utiliser avec `basin=*` pour les différents types.		
landuse	brownfield		Zone où des anciens bâtiments ont été rasés. La construction de nouveaux bâtiments est planifiée, mais pas encore en cours.		
landuse	cemetery		Cimetière. ajoutez `religion=*` s'il y a lieu (voir liste dans `amenity=place of worship`). Utiliser `amenity=grave_yard` pour les petites surfaces (à proximité d'une église par exemple)		

API Overpass

Extraire les zones renseignées sur l'occupation des sols

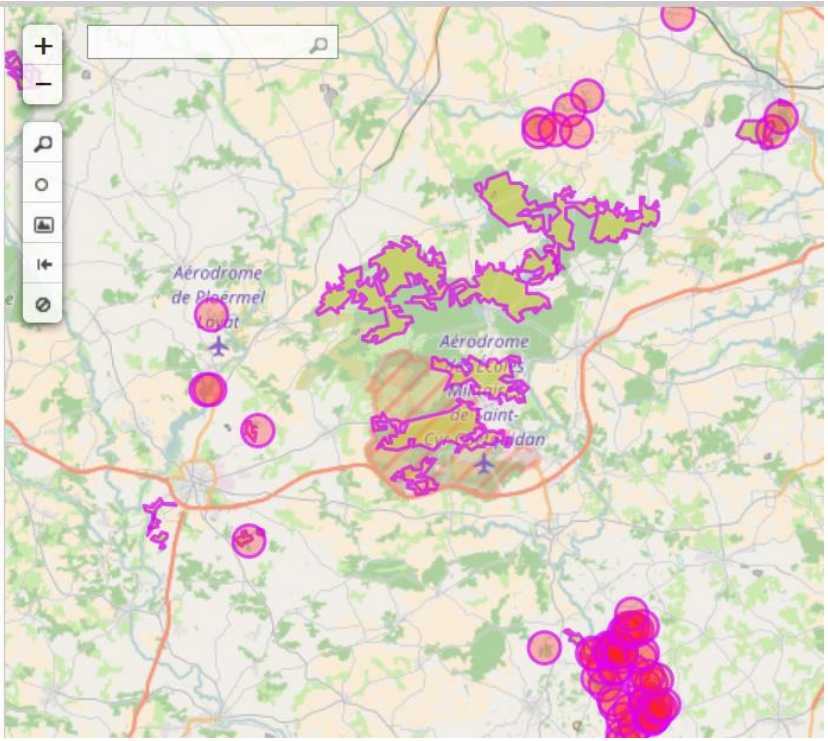
```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"Bar"
*/
[out:json][timeout:25];
// gather results
(
  // query part for: "Bar"
  relation["landuse"]({{bbox}});
);
// print results
out body;
>;
out skel qt;
```



API Overpass

Extraire les zones renseignées comme forêt

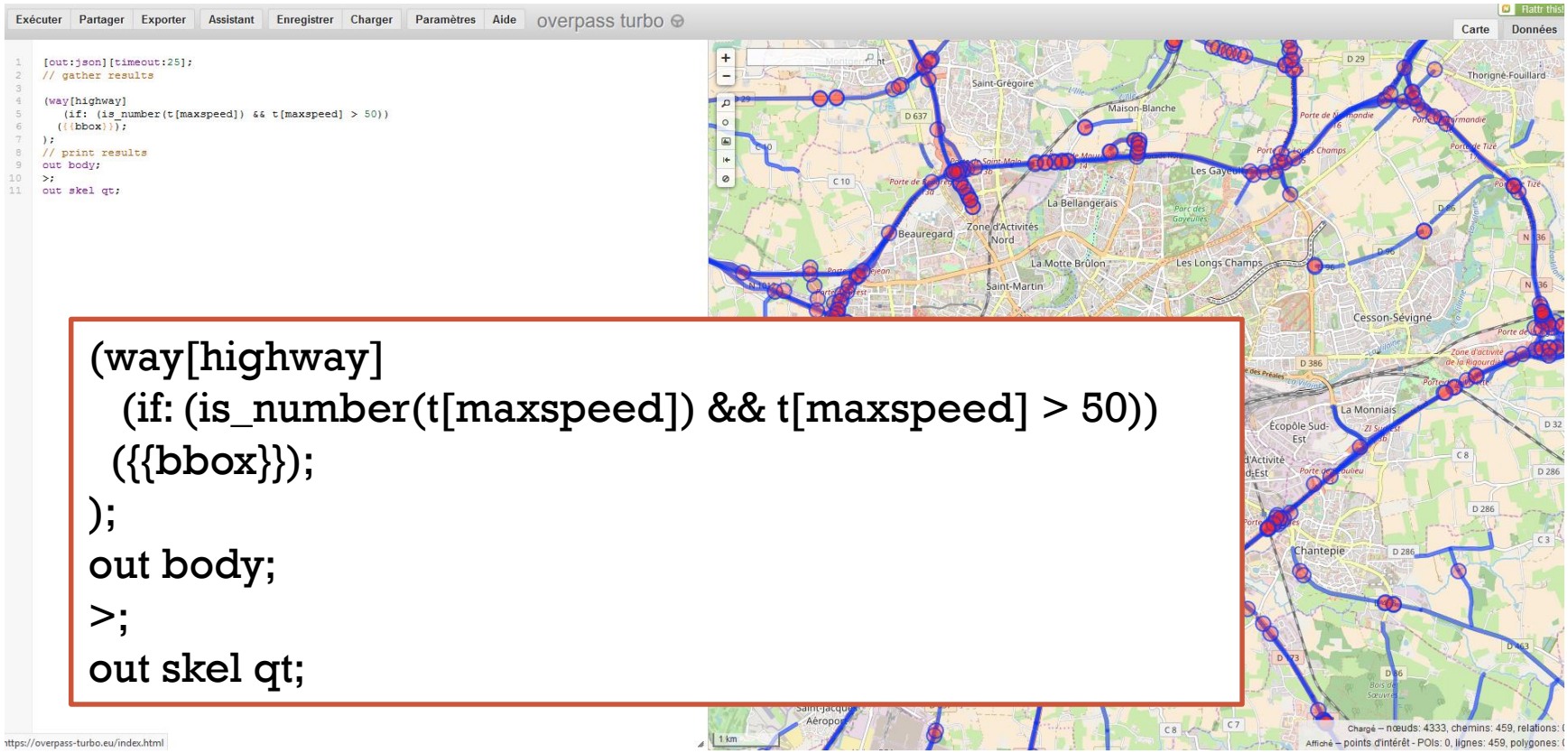
```
/*
This has been generated by the overpass-turbo wizard.
The original search was:
"Bar"
*/
[out:json][timeout:25];
// gather results
(
  // query part for: "Bar"
  relation["landuse"="forest"]({{bbox}});
);
// print results
out body;
>;
out skel qt;
```



API Overpass

Ajouter un critère de vitesse

- Toutes les routes avec une vitesse limite de plus de 50km/h



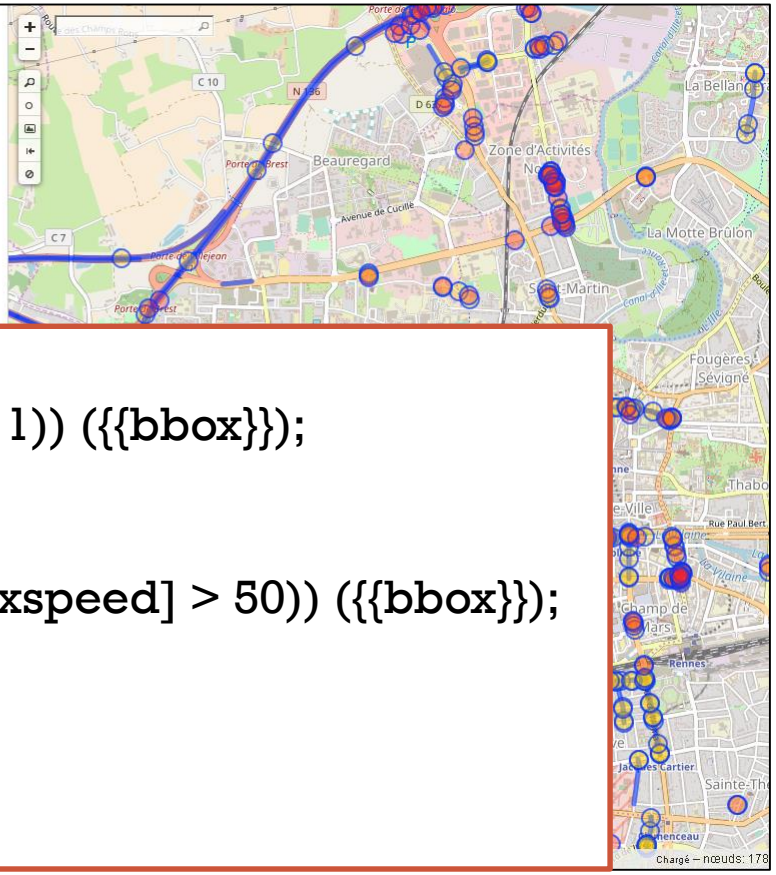

```
(way[highway]
   (if: (is_number(t[maxspeed]) && t[maxspeed] > 50))
  ({{bbox}});
);
out body;
>;
out skel qt;
```

API Overpass

Ajouter un critère de nombre de voies

- Toutes les routes avec au moins deux voies (*lanes*)

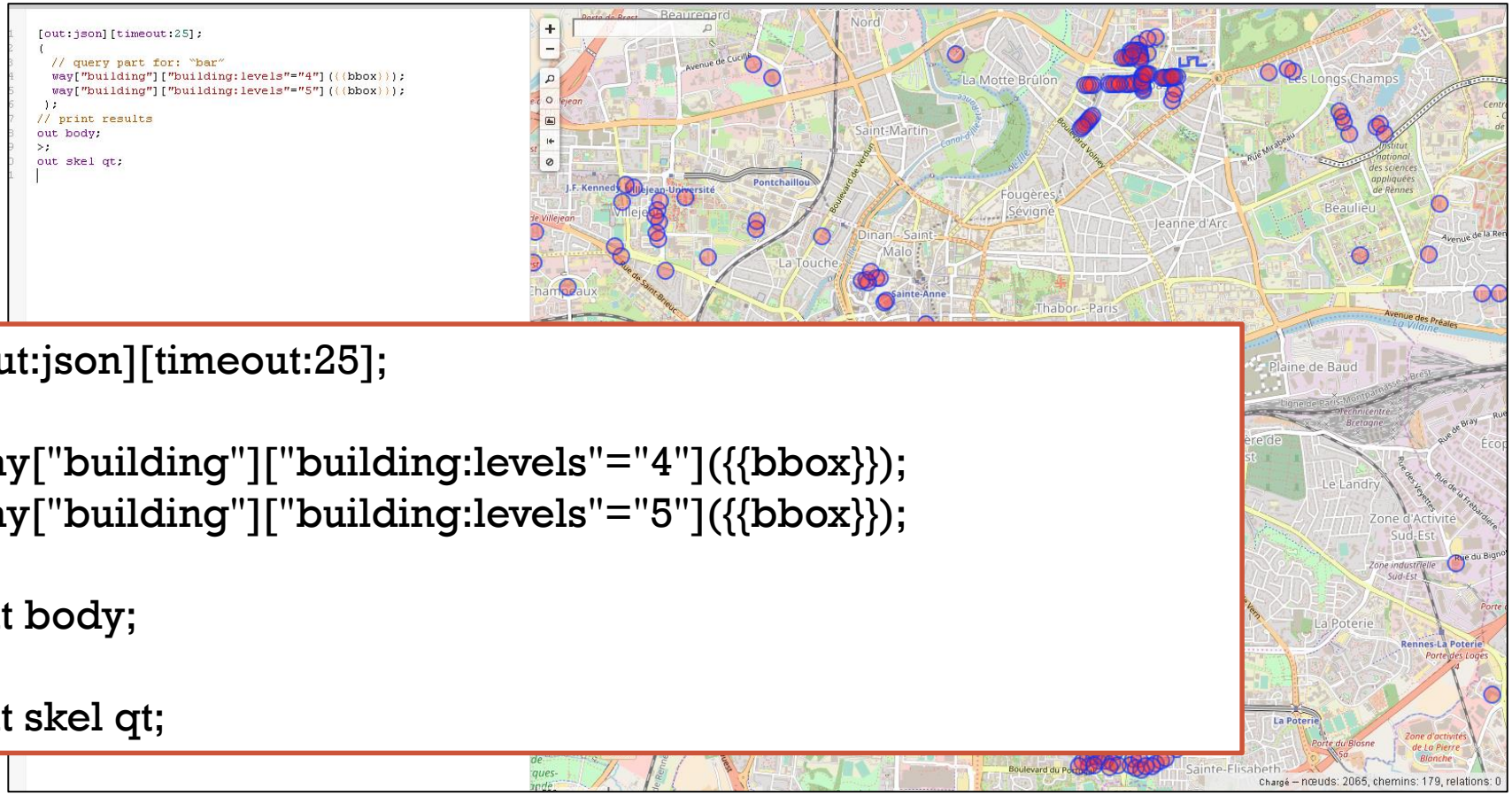
```
/*
This is an example Overpass query.
Try it out by pressing the Run button above!
You can find more examples with the Load tool.
*/

(way[highway]
   (if: (is_number(t[lanes]) && t[lanes] > 1))
  ({{bbox}});
);


out meta;
>;
out meta qt;
```




```
(way[highway]
   (if: (is_number(t[lanes]) && t[lanes] > 1)) ({{bbox}});
);
(way[highway]
   (if: (is_number(t[maxspeed]) && t[maxspeed] > 50)) ({{bbox}});
);
out body;
>;
out skel qt;
```

Sélection de hauteur

Sélectionner les bâtiments de 4 et 5 étages




```
[out:json][timeout:25];
(
way["building"]["building:levels"="4"]({{bbox}});
way["building"]["building:levels"="5"]({{bbox}});
 );
out body;
>;
out skel qt;
```

Comptage d'entités

Afficher des statistiques sur les bâtiments de Rennes

```
[out:csv(::count, ::"count:nodes", ::"count:ways",
::"count:relations")][timeout:25];
{{geocodeArea:Rennes}}->.searchArea;
(
  node["building"="yes"](area.searchArea);
  way["building"="yes"](area.searchArea);
  relation["building"="yes"](area.searchArea);
);
out count;
```

```
@count  @count:nodes    @count:ways @count:relations
37821   6   37626   189
```

Comptage d'entités

Afficher des statistiques sur les routes de Rennes

Exécuter | Partager | Exporter | Assistant | Enregistrer | Charger | Paramètres | Aide | overpass turbo

```
[out:csv(::count, ::"count:nodes", ::"count:ways", ::"count:relations")][timeout:25];
{{geocodeArea:Rennes}}->.searchArea;
(
  node["highway"](area.searchArea);
  way["highway"](area.searchArea);
  relation["highway"](area.searchArea);
);
out count;
```

```
@count  @count:nodes    @count:ways @count:relations
23862   6792    17049   21
```

Afficher des statistiques sur les bars de Rennes

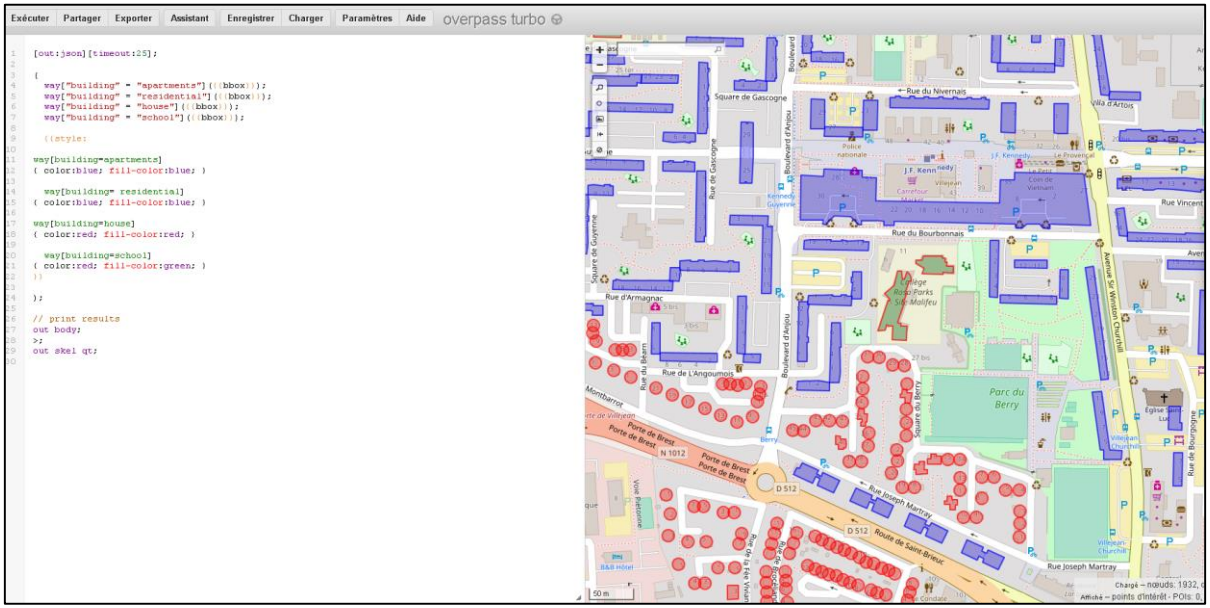
```
[out:csv(::count, ::"count:nodes")][timeout:25];
{{geocodeArea:Rennes}}->.searchArea;
(
  node["amenity"="bar"](area.searchArea);
);
out count;
```

```
@count  @count:nodes
112 112
```

Requête et style

Sélectionner et représenter les types de bâtiments

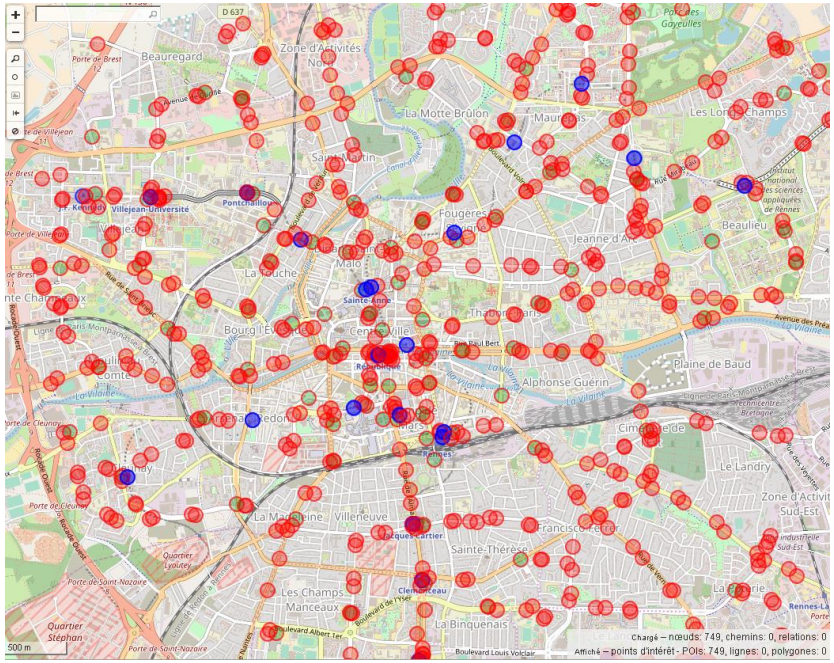
```
[out:json][timeout:25];

(  way["building" = "apartments"]({{bbox}});
  way["building" = "residential"]({{bbox}});
  way["building" = "house"]({{bbox}});
  way["building" = "school"]({{bbox}});

  {{style:

way[building=apartments]
{ color:blue; fill-color:blue; }

 way[building= residential]
{ color:blue; fill-color:blue; }

way[building=house]
{ color:red; fill-color:red; }

 way[building=school]
{ color:red; fill-color:green; }
}}

);

// print results
out body;
>;
out skel qt;
```



Requête et style

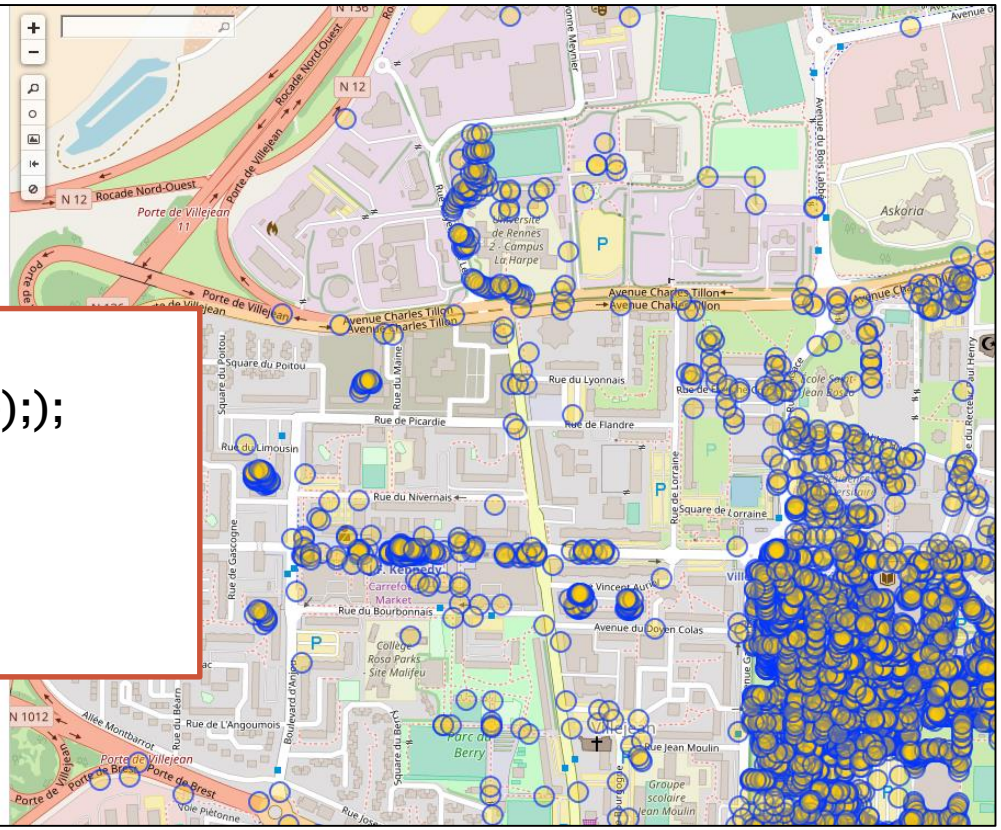
Sélectionner et représenter les arrêts de bus, stations de métros et stations de vélos en libre service

```
[out:json][timeout:25];

{{geocodeArea:rennes}}->.searchArea;

(   node["public_transport"="stop_position"] ["subway"="yes"]
(area.searchArea);
   node["highway"="bus_stop"](area.searchArea);
   node["amenity"="bicycle_rental"](area.searchArea);

{{style:

node[public_transport=stop_position]
{ color:blue; fill-color:blue; }

node[highway=bus_stop]
{ color:red; fill-color:red; }

node[amenity=bicycle_rental]
{ color:red; fill-color:green; }
}}

);
out body;
>;
out skel qt;
```



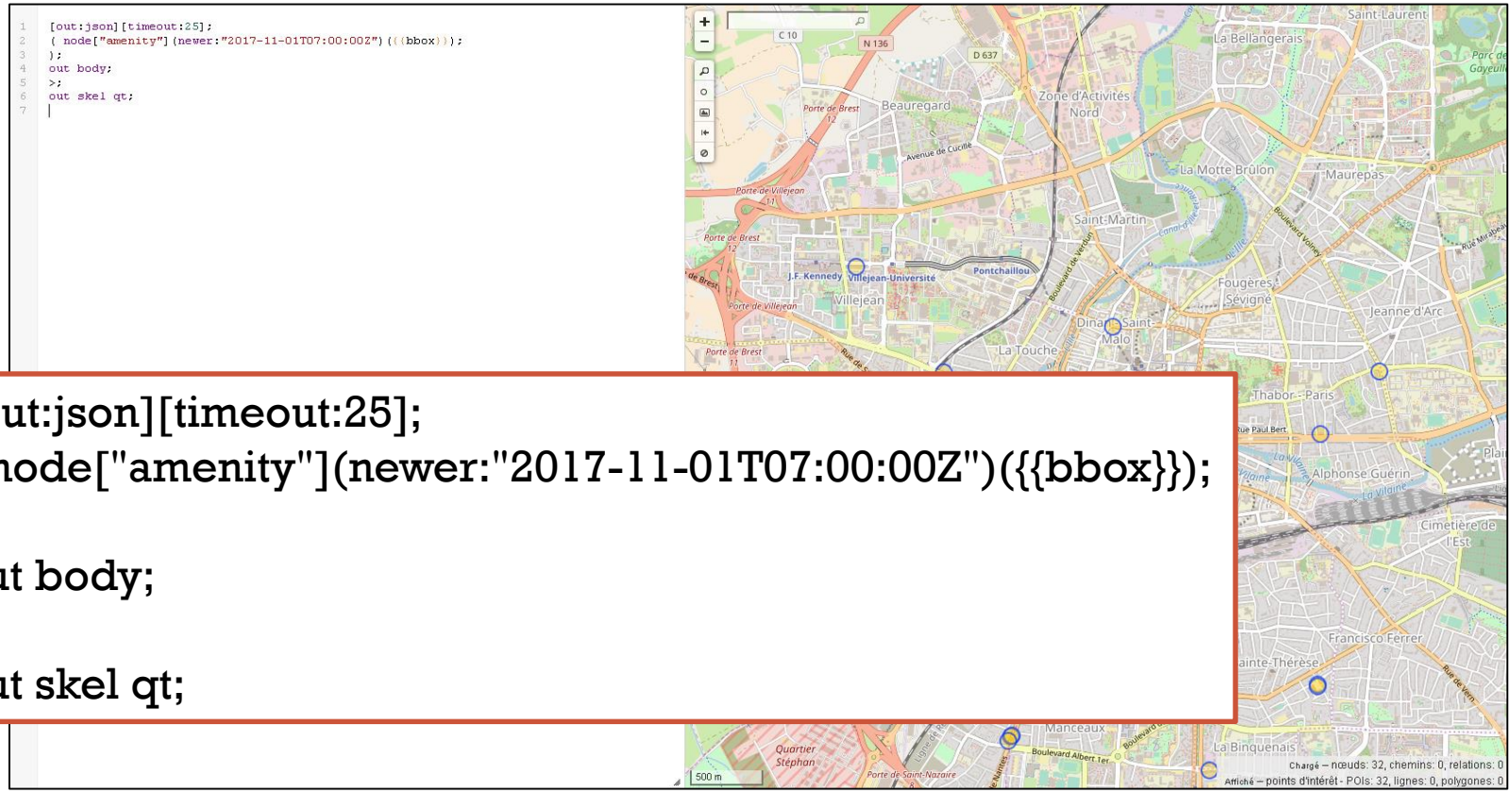
Extraction par utilisateur

```
[out:json][timeout:25];
(node(user:PanierAvide)({{bbox}}););

out body;
>;
out skel qt;
```



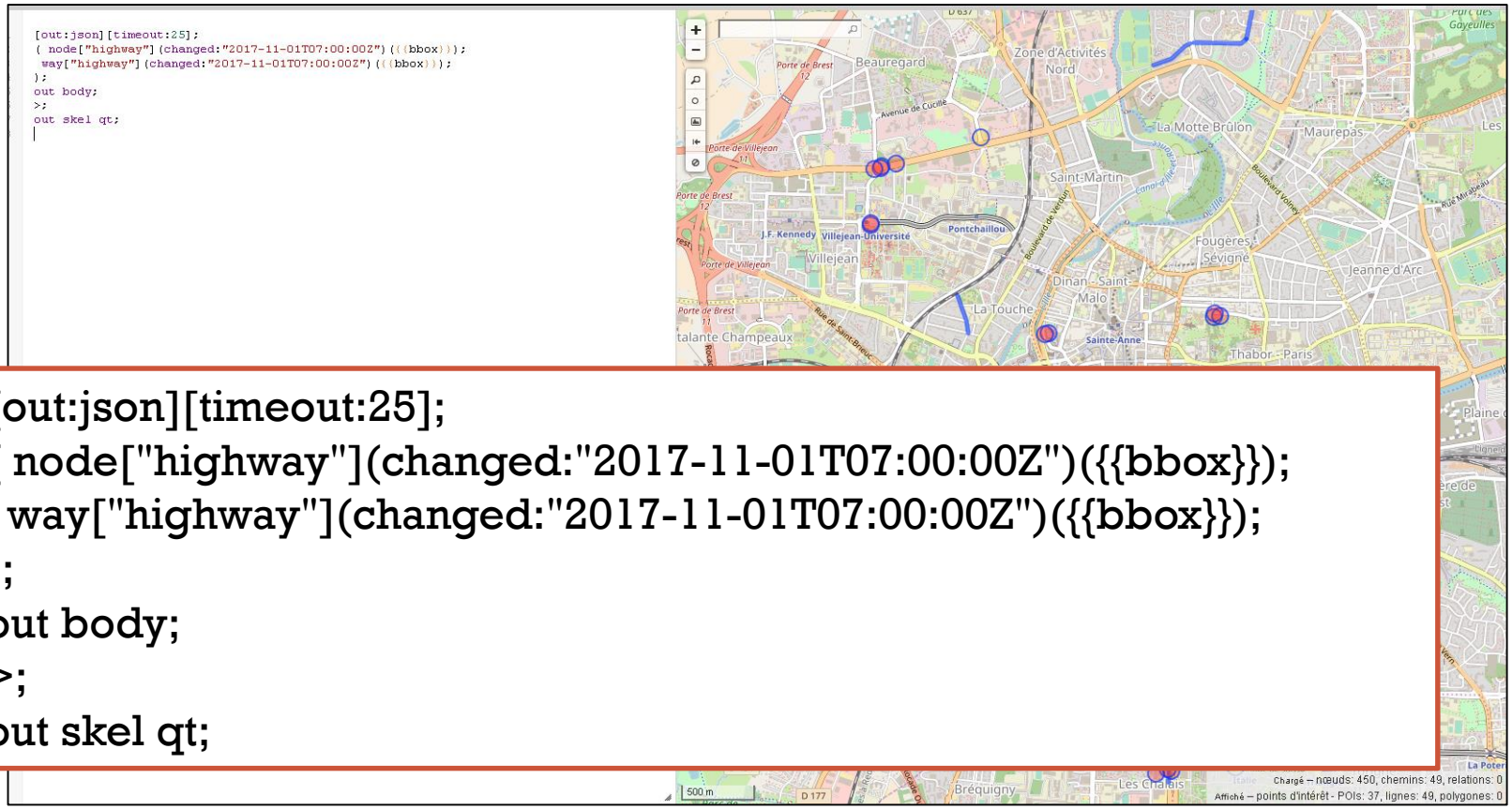
Extraction par date

Sélectionner les nouvelles aménités depuis le 1er novembre



Extraction par date

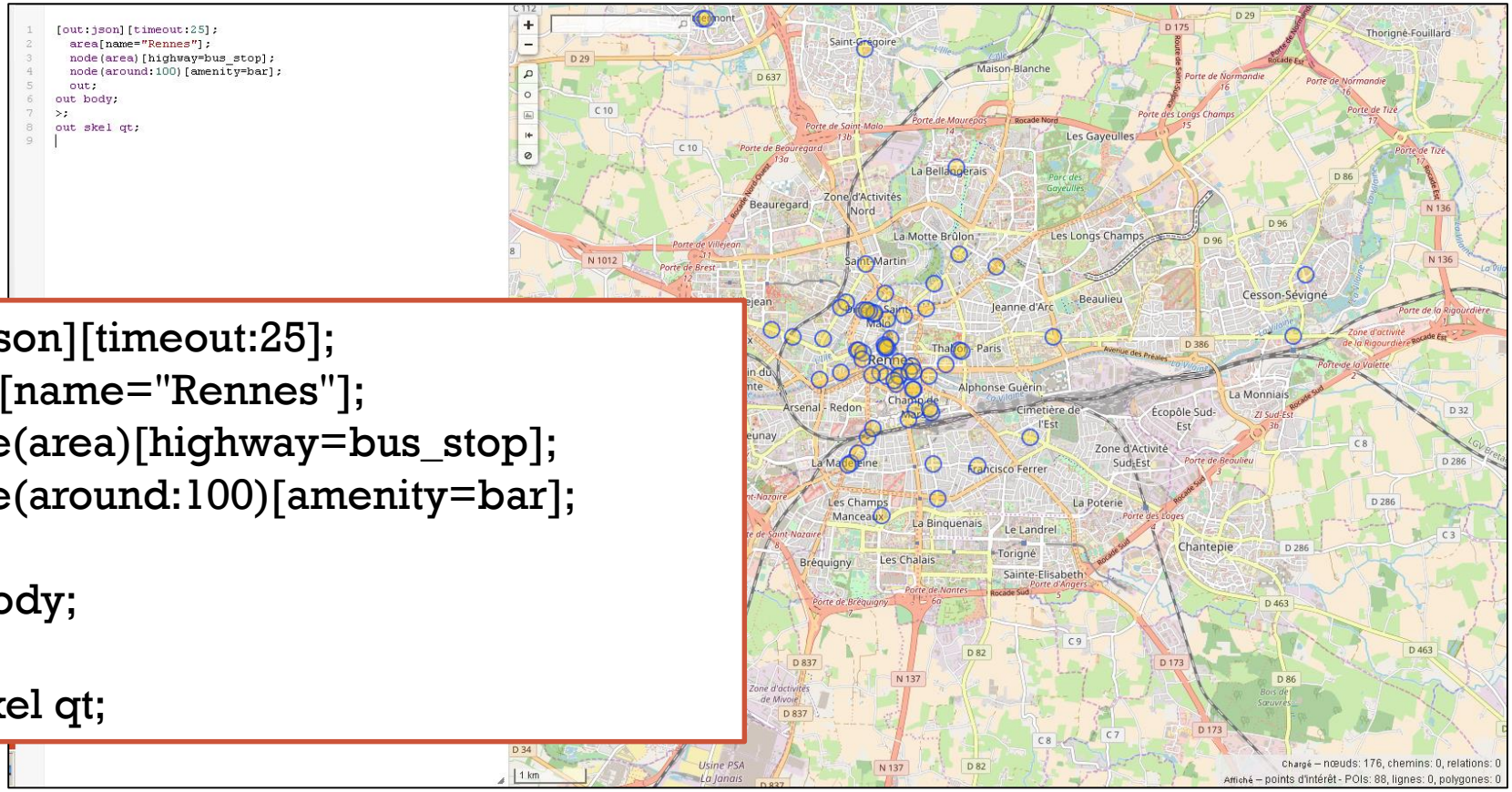
Sélectionner les routes mises à jour depuis le 1er novembre




```
[out:json][timeout:25];
( node["highway"](changed:"2017-11-01T07:00:00Z")({{bbox}});
  way["highway"](changed:"2017-11-01T07:00:00Z")({{bbox}});
);
out body;
>;
out skel qt;
```

Sélection spatiale

Sélectionner tous les bars à moins de 100m d'un arrêt de bus




```
[out:json][timeout:25];
  area[name="Rennes"];
  node(area)[highway=bus_stop];
  node(around:100)[amenity=bar];
  out;
out body;
>;
out skel qt;
```

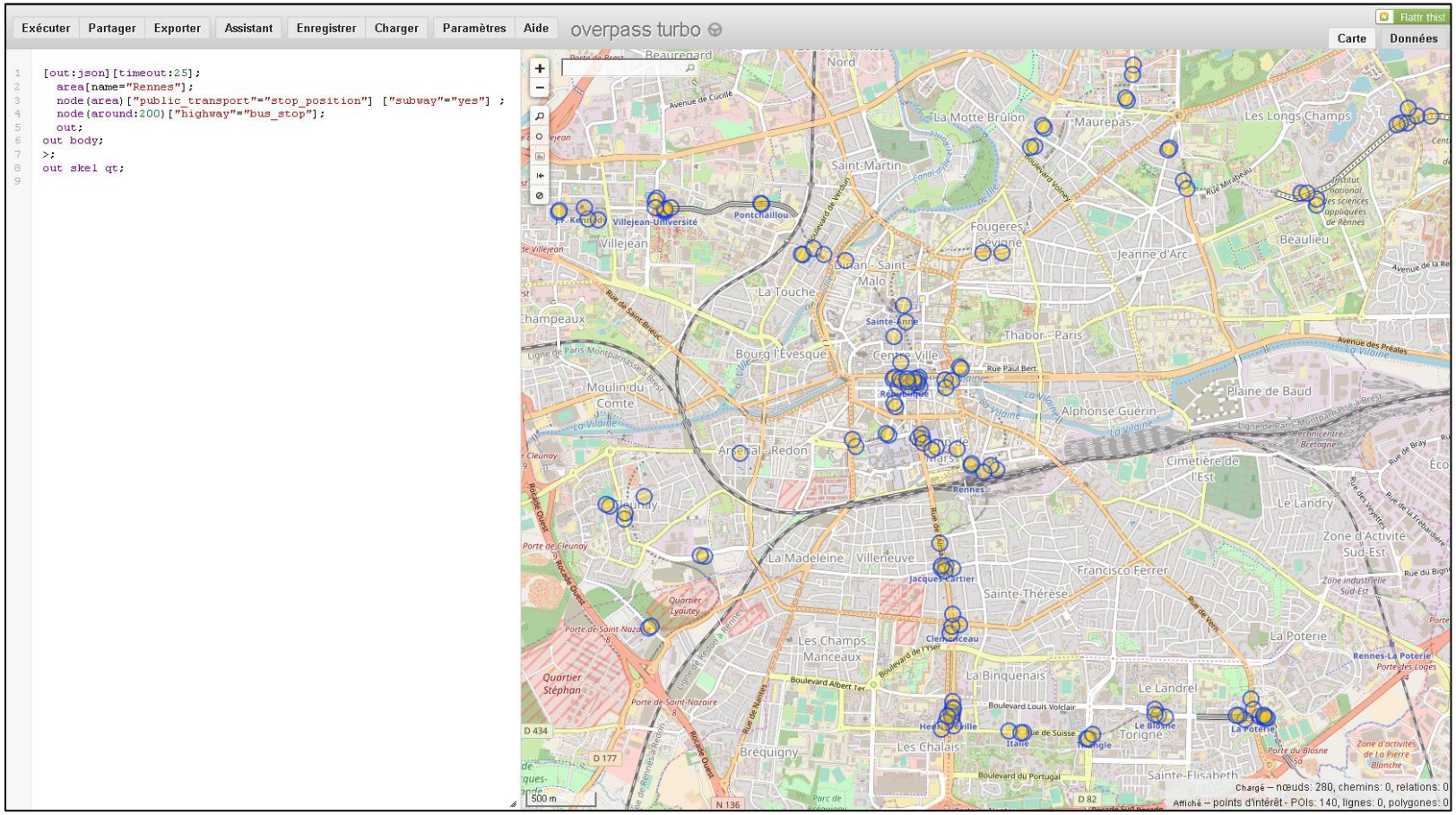
Sélection spatiale

Sélectionner tous les bars à moins de 200m d'une station de métro

```
[out:json][timeout:25];
  area[name="Rennes"];
  node(area)["public_transport"="stop_position"] ["subway"="yes"] ;
  node(around:200)[amenity=bar];
  out;
out body;
>;
out skel qt;
```

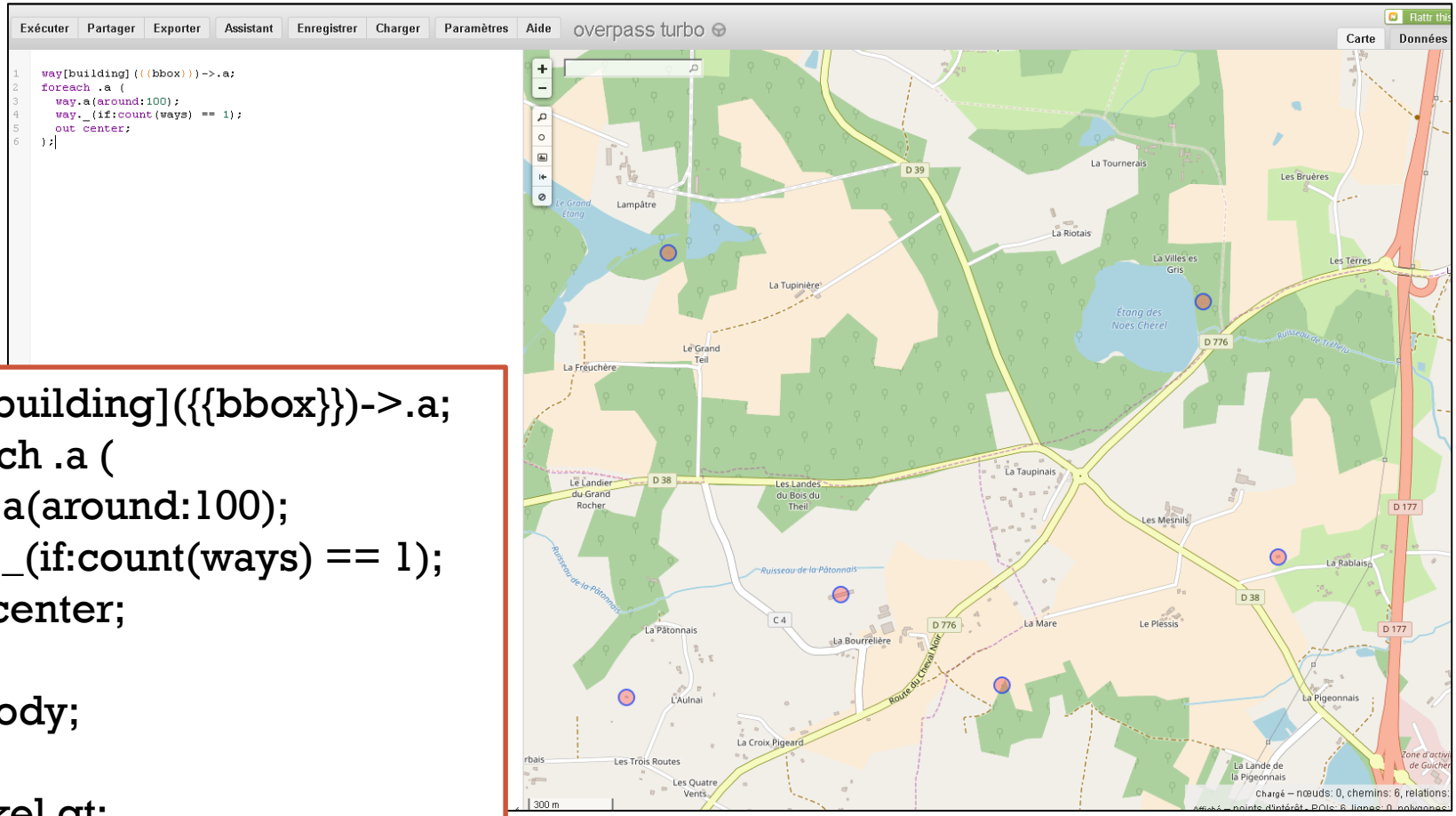
Sélection spatiale

Sélectionner les arrêts de bus à moins de 200m d'une station de métro



Sélection spatiale

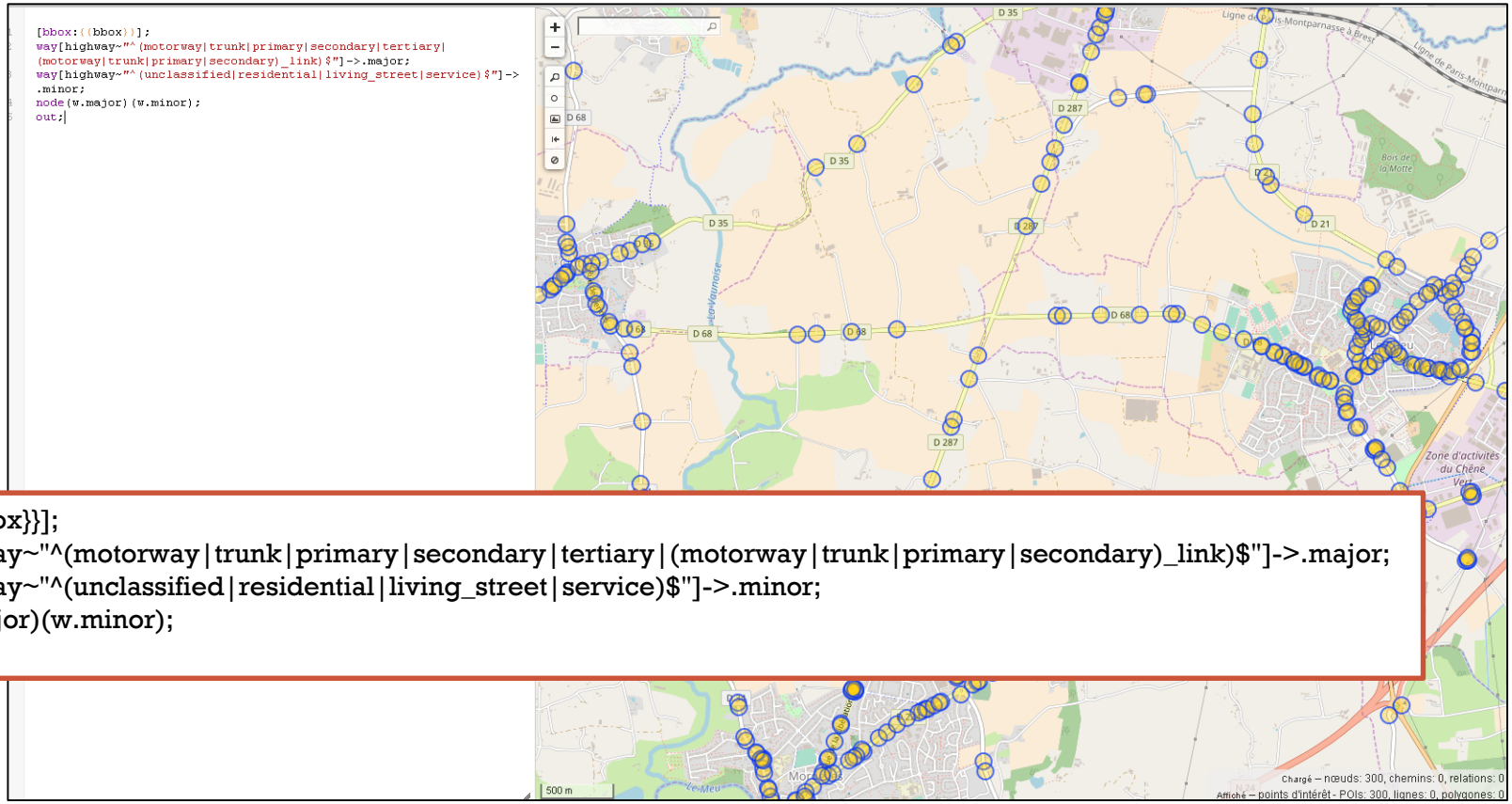
Sélectionner les bâtiments isolés (100m)




```
way[building]({{bbox}})->.a;
foreach .a (
  way.a(around:100);
  way._(if:count(ways) == 1);
  out center;
);
out body;
>;
out skel qt;
```

Sélection spatiale

Sélectionner les intersections entre routes principales et petites routes

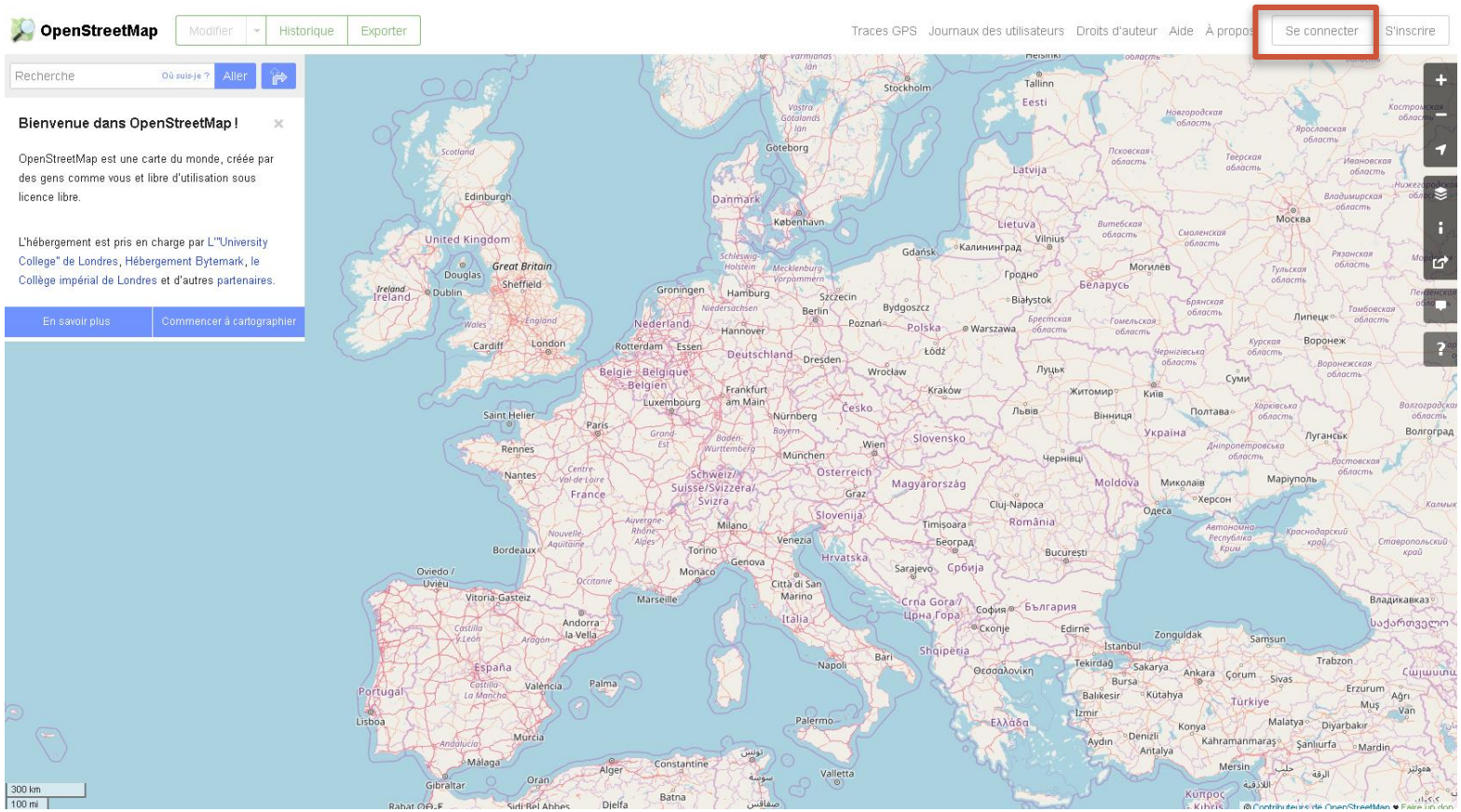



```
[bbox:{{bbox}}];
way[highway~"^(motorway|trunk|primary|secondary|tertiary|(motorway|trunk|primary|secondary)_link)$"]->.major;
way[highway~"^(unclassified|residential|living_street|service)$"]->.minor;
node(w.major)(w.minor);
out;
```

Edition de données avec l'éditeur OSM ID

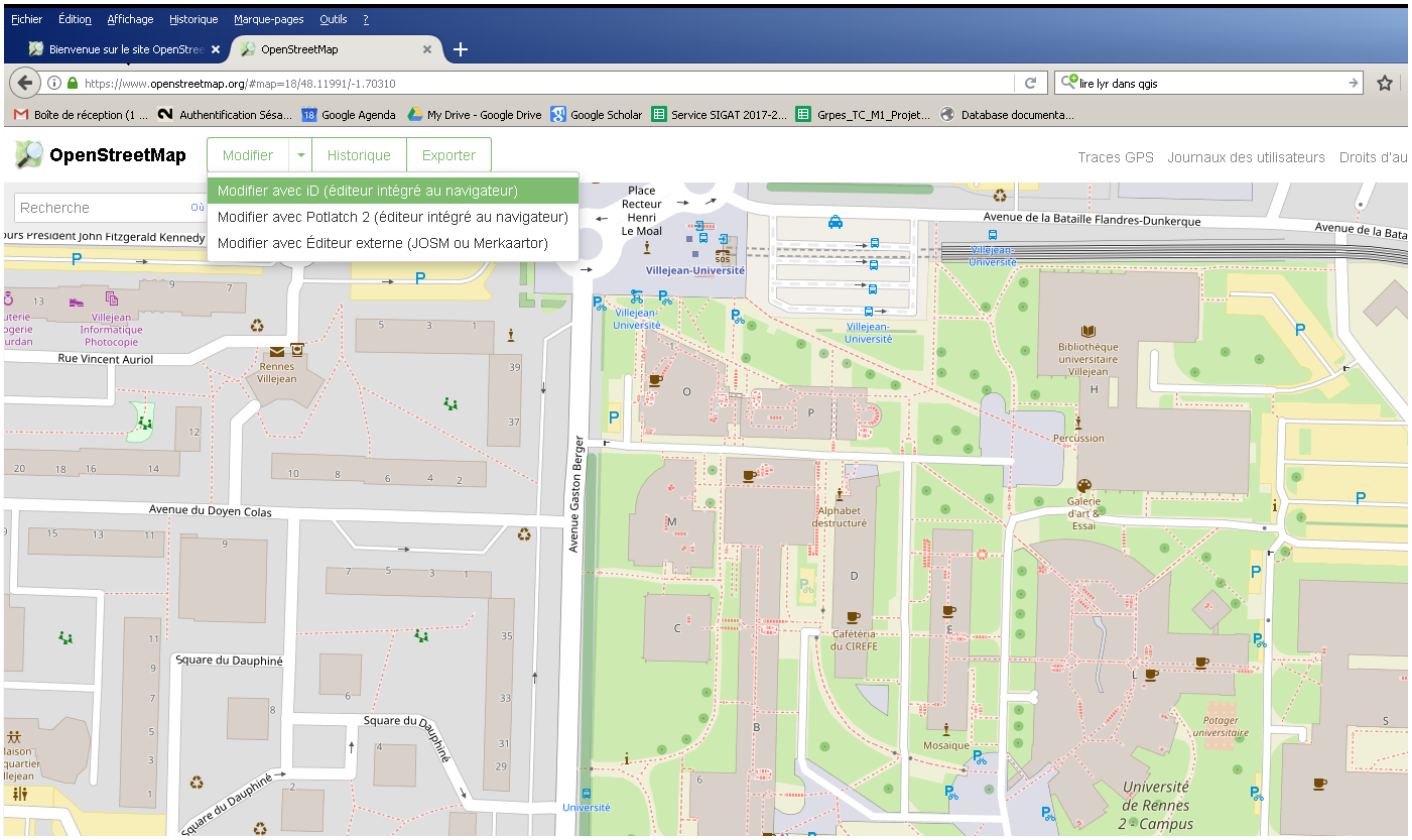
L'éditeur du site OSM ID

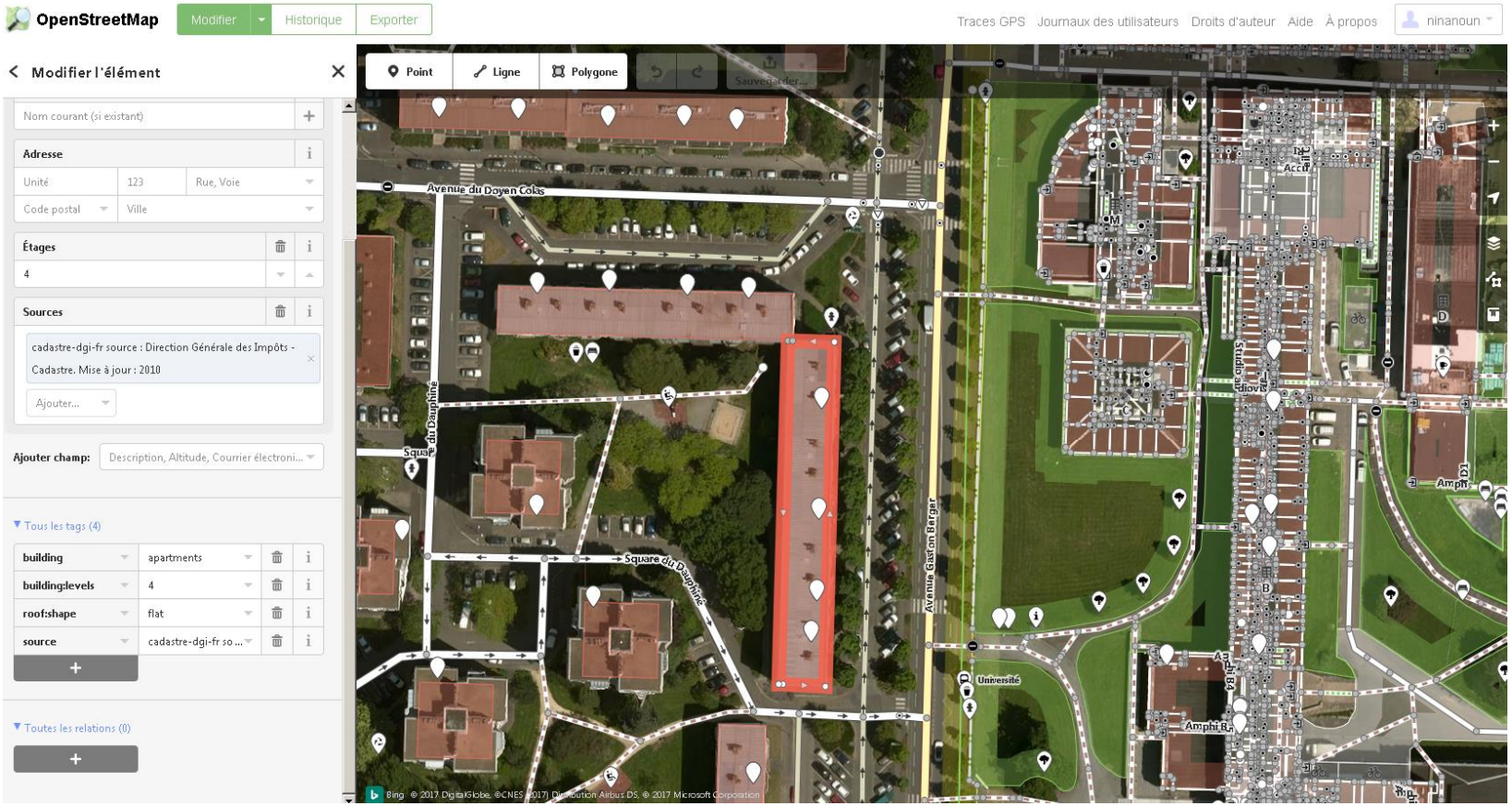
http://www.openstreetmap.org/#map=5/48.821/9.053



L'éditeur du site OSM ID

Modifier avec ID (éditeur intégré au navigateur)



L'éditeur du site OSM ID

Modifier avec ID (éditeur intégré au navigateur)