

La cartographie avec OpenStreetMap

Institut Galilée - Master 2 P2S

Jones Magloire

11 Octobre 2024



Qui suis-je ?

CTO / DevOPS / Carto & Geocoding Expert

- Diplômé Master PLS 2015 (Mention Très Bien)
- Stage de 6 Mois chez takima
- Création du projet Jawg Maps 2015 (juillet)
- Création de la start-up Jawg Maps 2017
- Developpeur backend (Kotlin, NodeJS, Rust, Java)



Qui suis-je ?

Passionné de Développement et Photographie

- Site web: <https://joxit.dev>
- Contributions journalières sur Github @Joxit
 - Pelias Geocoder (github.com/pelias)
 - Docker Registry UI (github.com/Joxit/docker-registry-ui)
 - Vert.x (github.com/eclipse-vertx)
- Partage photos sur instagram @jox.it



① OSM

② Qu'est-ce qu'une carte ?

③ Travaux Pratiques: Spring Boot et Kotlin

OSM



No one knows everything, everyone knows something, all knowledge resides in humanity. . . - Pierre Levy

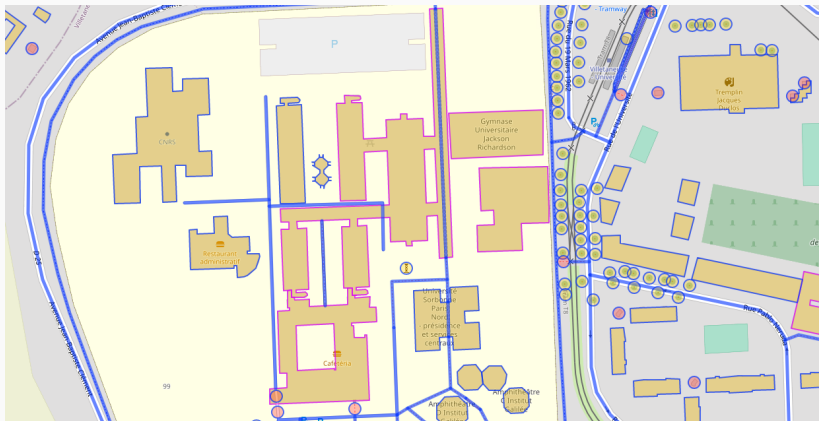
Le projet OpenStreetMap

- Projet de cartographie mondial
- Fondé en 2004 en Angleterre
- Projet collaboratif
- Fondation à but non lucratif
- Chaque pays a sa communauté
- Organisation de State Of The Map (conférences modiales)

Projet de cartographie mondiale



Types de données différents: Nodes, Way, Relations



Tags clé/valeur

OpenStreetMap [Modifier](#) [Historique](#) [Exporter](#) Plus ▾ [Se connecter](#) [S'inscrire](#)

Relation : Gymnase Universitaire Jackson Richardson (9657316) ×

Version #1

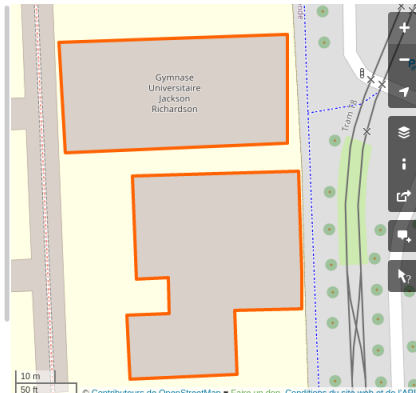
Attributs

building	yes
building:levels	2
leisure	sports_centre
name	Gymnase Universitaire Jackson Richardson
ref	3
source	extraction vectorielle v1 cadastre-dgi-fr
sport	gymnastics
type	multipolygon

Membres

▼ 2 membres

- Chemin 81144908 avec le rôle outer
- Chemin 290568907 avec le rôle outer



© Contributeurs de OpenStreetMap [Faire un don](#). [Conditions du site web](#) et de l'API

Parution hebdomadaire au format BZ2/PBF (100Go/60Go) avec mise à jour par minutes/heures/jours



Planet OSM

The files found here are regularly-updated, complete copies of the OpenStreetMap.org database, and those published before the 12 September 2012 are distributed under a Creative Commons Attribution-ShareAlike 2.0 license, those published after are Open Data Commons Open Database License 1.0 licensed. For more

information, [see the project wiki](#).

Complete OSM Data

[Latest Weekly Planet XML File](#)
([torrent](#)) ([RSS](#))

108 GB, created 8 days ago.

md5: bfa6b1ff097a5bd064c1bc5dd5faec4c.

[Latest Weekly Planet PBF File](#)
([torrent](#)) ([RSS](#))

60 GB, created 8 days ago.

md5: 1d71f0555f806527e18f07efa150900e.

Each week, a new and complete copy of all data in OpenStreetMap is made available as both a compressed XML file and a custom PBF format file. Also

Using The Data

You are granted permission to use OpenStreetMap data by [the OpenStreetMap License](#), which also describes your obligations.

You can [process the file](#) or extracts with a variety of tools. [Osmosis](#) is a general-purpose command-line tool for converting the data among different formats and databases, and [Osm2pgsql](#) is a tool for importing the data into a Postgis database for rendering maps.

Extracts & Mirrors

The complete planet is very large, so you may prefer to use one of [several periodic extracts](#) (individual countries or states) from third parties. [GeoFabrik.de](#) and [BBBike.org](#) are two providers of extracts with up-to-date worldwide coverage.

Open Database License (ODbL)

- Possibilité d'utiliser la donnée publiquement et commercialement
- Obligation de maintenir la license sur la donnée après ajout/modification
- Obligation de mentionner à chaque usage © les contributeurs d'OpenStreetMap

La carte OSM

Fond de carte par défaut: <https://osm.org>

The screenshot displays the OpenStreetMap (OSM) website interface. At the top left, the OSM logo is followed by the text "OpenStreetMap". To the right of the logo are three buttons: "Modifier" (with a dropdown arrow), "Historique", and "Exporter". Further right is a "Plus" dropdown menu, followed by "Se connecter" and "S'inscrire" buttons.

Below the navigation bar is a search bar with the text "Recherche" and a "Où est-ce ?" link. To the right of the search bar are two buttons: "Aller" (in blue) and a magnifying glass icon. The main area of the page is a map of Europe and the Mediterranean region, showing various countries and cities. The map is rendered in a light beige color with blue water. Labels for countries and cities are in multiple languages, including French, German, Polish, Czech, Slovak, Hungarian, Romanian, Bulgarian, Turkish, Arabic, and Hebrew. For example, "France" is labeled in French, "Deutschland" in German, "Polska" in Polish, "Česko" in Czech, "Slovensko" in Slovak, "Magyarország" in Hungarian, "România" in Romanian, "България" in Bulgarian, "Türkiye" in Turkish, "المغرب" in Arabic, "إسرائيل" in Hebrew, "البحرين" in Arabic, "عمان" in Arabic, "قطر" in Arabic, "السعودية" in Arabic, "الأردن" in Arabic, "مصر" in Arabic, "لبنان" in Arabic, "سوريا" in Arabic, "العراق" in Arabic, "البحرين" in Arabic, "عمان" in Arabic, "قطر" in Arabic, "السعودية" in Arabic, "الأردن" in Arabic, "مصر" in Arabic, "لبنان" in Arabic, "سوريا" in Arabic, "العراق" in Arabic.

On the right side of the map, there is a vertical toolbar with several icons: a plus sign for zoom in, a minus sign for zoom out, a compass for orientation, a location pin for current location, a magnifying glass for search, a speech bubble for sharing, and a person icon for user profile. At the bottom left of the map, there is a scale bar showing "500 km" and "300 mi". At the bottom right of the map, there is a copyright notice: "© Contributeurs de OpenStreetMap" followed by a dropdown arrow, "Faire un don", and "Conditions du site web et de l'API".

La carte OSM

Éditable via iD (osm.org), JOSM (desktop), OSM Contributors (Android), StreetComplete (Android)...

The screenshot displays the OpenStreetMap mobile editor interface. At the top, the 'OpenStreetMap' logo is on the left, and navigation options 'Modifier', 'Historique', and 'Exporter' are in the center. On the right, there's a 'Plus' menu and a user profile for 'Joxit'. Below this is a 'Modifier l'élément' screen with a close button (X). The left sidebar shows the 'Type d'élément' as 'Hotspot Wi-Fi' and 'Champs' (fields) for 'Nom du réseau WiFi' (Inconnu), 'Accès Internet payant' (Gratuit, Payant...), and 'Nom' (Laboratoire d'Informatique de Paris Nord). The main map area shows an aerial view of a building complex with a red Wi-Fi hotspot icon being edited. A toolbar at the top of the map offers 'Point', 'Ligne', and 'Surface' tools. At the bottom, a scale bar indicates 50 meters, and a credit line mentions 'Modifications de glostis, Laurent93, Philippe9517, et de 28 autres'.

Un wiki dédié: <https://wiki.osm.org/>



Accueil

The map

Map Features

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Pages liées

Suivi des pages liées

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Version imprimable

Lien permanent

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Accueil

Discussion

Lire

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Voir l'historique

Rechercher dans OpenStreetMap

français Créer un compte Se connecter

Main Page - Autres langues

purger Aide

Afrikaans · asturianu · azərbaycanca · Bahasa Indonesia · Bahasa Melayu · bosanski · brezhoneg · català · čeština · dansk · Deutsch · eesti · **English** · español · Esperanto · euskara · français · Frysk · galego · hrvatski · interlingua · isenska · italiano · kréyòl gwadeloupèyen · kurdî · latviešu · Lëtzebuergesch · lietuvų · magyar · Nederlands · norsk · occitan · polski · portuguis · română · shqip · slovenčina · slovenščina · srpski (latinica) · suomi · svenska · Tiếng Việt · Türkçe · Zazaki · Ελληνικά · български · македонски · русский · српски / srpski · українська · עברית · العربية · فارسی · ދިވެހިބަސް · नेपाली · বাংলা · ភាសាខ្មែរ · ភាសាខ្មែរ · 한국어 · 中文 (简体) · 中文 (繁體) · 日本語

Autres langues · Traduire

Welcome to OpenStreetMap, the project that creates and distributes *free* geographic data for the world. We started it because most maps you think of as free actually have legal or technical restrictions on their use, holding back people from using them in creative, productive, or unexpected ways.

More about OpenStreetMap | **How to contribute** | **Where to get help**



Use OpenStreetMap



Contribute free map data



Software Development



Les providers OSM

- **JawgMaps** (France)
- **Mapbox** (USA)
- **Carto** (USA)
- **Geofabrik** (Allemagne)
- **Stamen** (USA)
- **Thunderforest** (USA)
- **maptiler/OpenMapTiles** (Suisse)

Qui utilise des cartes OSM ?

Qui utilise des cartes OSM ?

- Facebook et Instagram
- Snapchat (utilise Mapbox)
- Wikipedia (via Wikimedia)
- Microsoft (via Bing)

Qu'est-ce qu'une carte ?

Qu'est-ce qu'une carte ?

Composition

- De la géométrie géocontextualisée
- Points => Noms Villes/Pays, POIs (Point Of Interest), Numéros de rues, Arbres. . .
- Lignes => Routes, Rivières, Frontières. . .
- Polygones => Bâtiments, Fleuves/Lacs, Forêts, Frontières

Affichage

- Rendu différent pour chaque type d'éléments
- Utilisation de "tuiles" raster ou vectorielle

Qu'est-ce qu'une carte ?



Les services cartographiques

Fond de carte (personnalisé ou non, flux WMTS ou WMS)

The image shows a screenshot of a web mapping application interface. The central part of the screen displays a map of Paris, France, with major roads and landmarks visible. The map is overlaid with several control panels:

- Top Left:** A circular logo and two blue buttons (Save and Close).
- Top Right:** A black box displaying coordinates: Lat: 48.844056, Lng: 2.446679, and Zoom: 8.7.
- Left Panel:** A vertical sidebar with icons for Home, Layers, Terrain, and Settings. Below these are controls for Labels, Routes, and Territoires, each with minus, Forte, and plus buttons. An "Assistant" button is also present.
- Bottom Left Panel:** A "Détails" panel with a dropdown menu for "Icônes bulles". It contains several checked options: Frontières, Bâtiments, Relief, Terrain, Icônes de transport, and Étiquette de route. There are also checkboxes for "3D" and "HD".
- Bottom Right Panel:** A "Palette" panel with tabs for "Automatique", "Simple", and "Avancée". It lists several layers: Routes, Territoires, Arrière-plan, Bâtiments, Eau, and Frontières. Below the list is a color gradient bar and a legend.

At the bottom of the map, there are several buttons labeled "E2C360", "226", "195", and "96". The footer text reads "© JavwMaps | © OSM contributors".

Geocoding (Nom de ville \Leftrightarrow coordonnées)

The screenshot shows the 'Jawg | Doc' website. The left sidebar contains a navigation menu with categories: Overview, Maps, Geocoding, Routing, Elevation, SDKs & Softwares, and a partially visible 'P' category. The 'Geocoding' item is selected. The main content area has a header with 'API doc & reference', 'SDKs & Softwares', and 'Useful links'. Below the header, there is a text prompt: 'your own access token from the [Jawg Lab](#).' A 'View on GitHub' button is present. A search input field contains the text 'Institut Galilée'. Below the search field, a list of results is displayed: 'Amphithéâtre A Institut Galilée, Villetaneuse, France', 'Amphithéâtre C Institut Galilée, Villetaneuse, France', 'Amphithéâtre B Institut Galilée, Villetaneuse, France', 'Amphithéâtre D Institut Galilée, Villetaneuse, France', and 'Institut Galilée - Université Sorbonne Paris Nord, Villetaneuse, France'. At the bottom of the results, it says 'Powered by [JawgMaps](#)'. A code editor shows a snippet of JavaScript code:

```
11     size: 10,  
12   })  
13 </script>  
14 </body>  
15 </html>
```

Routing (Route de A à B)

The screenshot displays the JawgMaps website's routing interface. At the top left is the JawgMaps logo. To its right are navigation links: 'Produits', 'Témoignages', 'Tarifs', 'Développeur', and a user profile icon. A red button labeled 'Demander un devis' is positioned on the far right. The main heading 'Routing' is centered in a large white font on a blue background. Below this, there are two input fields for the start and end points, a 'GO' button, and icons for car and pedestrian modes. The start point is 'Institut Galilée - Université Sorbonne I' and the end point is 'Jawg Corp, Bagneux, France'. The route summary shows a travel time of 34 minutes and a distance of 26.2 km. A map of Paris and its suburbs shows the highlighted route in blue. A 'Voir le détail' button is located at the bottom left of the map area.

JawgMaps Produits Témoignages Tarifs Développeur Demander un devis

Routing

Institut Galilée - Université Sorbonne I

Jawg Corp, Bagneux, France

GO

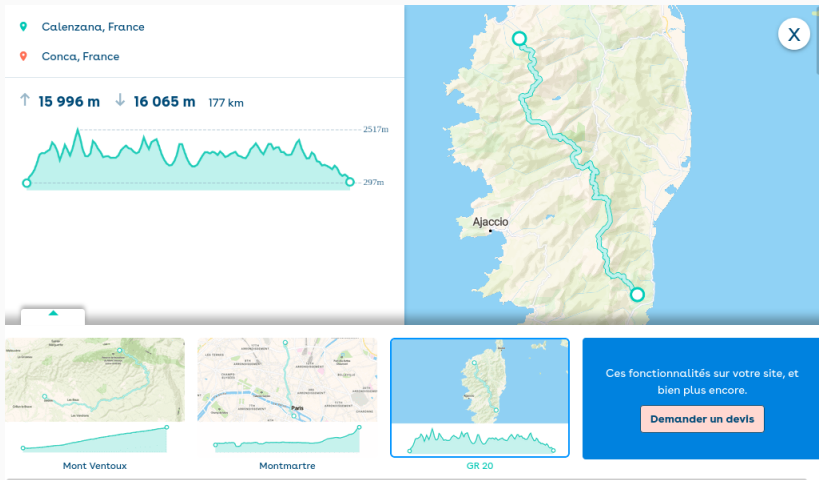
34 min 26.2 km

[Voir le détail](#)

Map labels: Institut Galilée - Université Sorbonne Paris N, Honorine, Franconville-la-Garenne, Sartrouville, Argenteuil, Saint-Denis, Asnières-sur-Seine, Aubervilliers, Drancy, Aulnay-sous-Bois, Bondy, Paris, Montreuil, Boulogne-Billancourt, Nanterre, Poissy, Saint-Germain-en-Laye, Versailles, Clamart, Vitry-sur-Seine, Champigny-sur-Marne, Noisy-le-Gr, Trembl-en-Frar, A1, 5 km, 10m

Les services cartographiques

Élevation (Altitude d'un point ou d'une série de points)



Système d'Information Géographique (SIG)

PARIS | Data

Connexion

Accueil Les données L'API La licence La démarche Cartographie

Vélib - Vélos et bornes

1 428 enregistrements

Aucun filtre actif

Filtres

Rechercher...

Nom station

11 Novembre 1918 - 8 Mai 1945	1
18 juin 1940 - Buzenval	1
8 Mai 1945 - 10 Juillet 1940	1
Abbé Carton - Plantes	1
Abbé Groult - Convention	1
Abbeville - Faubourg Poissonnière	1
> Plus	

Station en fonctionnement

NON	24
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Leaflet | Propulsé par OpenDataSoft - Tiles Courtesy of jawg - Map data © OpenStreetMap contributors

Travaux Pratiques: Spring Boot et Kotlin

Création d'un serveur de tuiles

Démo

Consignes

- Format de l'API: `/z/x/y.png`
- Mode simplifié: SVG du monde => png
- Base de code disponible =>
<https://github.com/Joxit/IG-Master2/tree/master/osm>
- Zoom 0: $2^0 = 1$ tuile 256x256
- Zoom 1: $2^2 = 4$ tuiles
- Zoom 2: $2^4 = 16$ tuiles
- Zoom n: 2^{2n} tuiles

Consignes

- Doit renvoyer un GeoJSON correctement formé:
<https://geojson.org/>
- Éléments simples (FeatureCollection de Points)
- Exemple de donnée disponible =>
<https://github.com/Joxit/IG-Master2/tree/master/osm/osm-core/src/main/resources/>
- Renvoyer les données via votre API
- Ajout des éléments sur la carte

Place au TP

Pour 6 mois de stages

- 3 mois et demi de formation
- 2 mois et demi sur un projet interne
- Back: Java, Kotlin, Spring, Hibernate, JEE...
- Front: React et Angular
- Ops: Docker, Gitlab CI...



Les vie d'entreprise

- Invité aux séminaires (vendredi, samedi, dimanche)
- Soirés jeux de sociétés
- Meetups et BBL en interne
- Billard + Nintendo Switch...

