



# M2B – Mapas y OpenData: herramientas de localización, visualización y análisis de geodatos

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TECNOLOGÍAS SIG





# Vector-Tiles & MapBox Styles

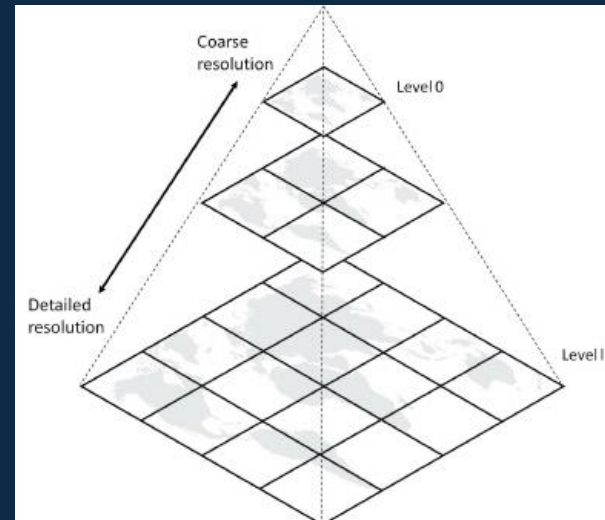


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# Vector Tiles

- Vector Tiles es un formato para almacenar datos geográficos en formato binario (Google Protobuf) y pensados para la visualización en navegadores web modernos que soporten WebGL. Creado por MapBox
- Una tesela vectorial (vector tiles) contiene datos vectoriales georreferenciados (puede contener múltiples capas), recortados en teselas para facilitar su recuperación. Son equivalentes a las teselas raster tradicionales (XYZ, WMTS, TMS) pero retornan datos vectoriales en lugar de una imagen.



# Vector Tiles

- Mapbox ha publicado de forma abierta como una especificación la forma de crear vector tiles
- <https://docs.mapbox.com/vector-tiles/specification/>

Version	Date of release	Updates
2.1	January 19th, 2016	Correction to the wording in a few locations of the 2.0 specification.
2.0	December 4th, 2015	The focus of version 2.0 of the Mapbox Vector Tile specification is the clarification of the intent of the initial version of the specification and the definition of interior and exterior rings within polygons. The fields within the protobuf are more clearly defined in this version of the specification and the steps for decoders and encoders are more explicitly declared.
1.0.1	July 28, 2014	Update .proto file to match <a href="#">Protocol Buffer style guide</a> , changed namespace
1.0.0	April 13, 2014	First release

# Vector Tiles – Características

- Cada tile es un contenedor de datos vectores y atributos
- Los Tiles **no tienen estilo**
- Soporta rotación y orientación
- Soporta extrusión y 3D



# Vector Tiles

- Cada conjunto de teselas vectoriales tiene su propio esquema. Un esquema consiste en nombres de capas, atributos, selección de elementos.
- Actualmente hay tres esquemas muy utilizados
  - MapBox
  - OpenMapTiles
  - ESRI vector tiles



# MapBox Styles

- Es una especificación, también publicada por MapBox, para estilizar los vector tiles
- Se codifica en un archivo JSON

```
{
  "version": 8,
  "name": "ICGC",
  "metadata": {},
  "center": [
    1.537786,
    41.837539
  ],
  "zoom": 12,
  "bearing": 0,
  "pitch": 0,
  "sources": {
    "openmaptiles": {
      "type": "vector",
      "url": "https://geoserve.is.icgc.cat/contextmaps/basemap.json"
    }
  },
  "sprite": "https://geoserve.is.icgc.cat/contextmaps/sprites/sprite@1",
  "glyphs": "https://geoserve.is.icgc.cat/contextmaps/glyphs/{fontstack}/{range}.pbf",
  "layers": [
    {
      "id": "background",
      "type": "background",
      "paint": {
        "background-color": "#f8f4f0"
      }
    },
    {
      "id": "landcover-glacier",
      "type": "fill",
      "metadata": {
        "mapbox:group": "1444849388993.3071"
      },
      "source": "openmaptiles",
      "source-layer": "landcover",
      "filter": [
        "==",
        "subclass"
      ]
    }
  ]
}
```

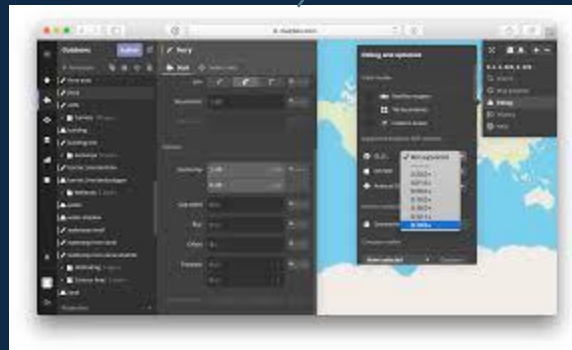
<https://docs.mapbox.com/mapbox-gl-js/style-spec/>

# MapBox Styles - ¿Cómo funciona?



Visor con libreria  
Mapbox GL JS

MapBox Studio





# MapBox Styles - ¿Componentes?

Sources: Url a los datos

## Sources

vector

raster

raster-dem

geojson

image

video

```
"mapbox-streets": {  
  "type": "vector",  
  "tiles": [  
    "http://a.example.com/tiles/{z}/{x}/{y}.pbf",  
    "http://b.example.com/tiles/{z}/{x}/{y}.pbf"  
  ],  
  "maxzoom": 14  
}
```

# MapBox Styles - ¿Componentes?

Layers: Capas que del source

## Layers

background

fill

line

symbol

raster

circle

fill-extrusion

heatmap

hillshade

```
"layers": [  
  {  
    "id": "water",  
    "source": "mapbox-streets",  
    "source-layer": "water",  
    "type": "fill",  
    "paint": {  
      "fill-color": "#00ffff"  
    }  
  }  
]
```

# MapBox Styles - Layers

- Partes principales de la estilización de los layers:
- **Id:** único del layer
- **Type:** "fill", "line", "symbol", "circle", "heatmap", "fill-extrusion", "raster", "hillshade", "background"
- **Source:** id del source a que pertenece la capa
- **Source-layer:** nombre del layer
- **Paint:** Opciones estilos y tematicas "expressions"
- **Layout:** Opciones visualización
- **Filter:** Opciones de filtro con "expressions"

# MapBox Styles – Editar estilos

Los estilos se pueden generar mediante código en el visor o utilizar un editor gráfico como

- **Mapbox Studio**

En Mapbox Studio poder cargar nuestros datos y convertirlos a Vector-Tiles (Tilesets)

Los tilesets pueden ser integrados como capas dentro de los estilos (styles)

- **Maputnik**

# Recursos y herramientas

## Clients

- [Mapbox GL Native](#) - C++/OpenGL vector maps library with native SDKs for Android, iOS, Node.js, macOS, and Qt
- [Mapbox GL JS](#) - JavaScript/WebGL vector maps library.
- [OpenLayers 3](#) - JavaScript vector & raster library.
- [WhirlyGlobe/Maply](#) - Objective C code that is able to read and render vector tiles(and style with mapnik xml) on iOS devices.
- [Leaflet.MapboxVectorTile](#) is able to read PBF MapboxVectorTiles from a REST endpoint and render them as a TileLayer on a Leaflet Map. Use this option if you want to utilize vector tiles on a standard Leaflet web map without needing WebGL.
- [CARTO Mobile SDK](#) - C++ maps library focused on offline features, for iOS, Android, Windows Phone and Xamarin with bindings for Java, Objective-C and C#. Based on [Nutiteq Maps SDK](#), but open source and uses CartoCSS.
- [Mapzen Tangram](#) - JavaScript library for rendering 2D & 3D maps live in a web browser with WebGL, supports MVT, GeoJSON, TopoJSON
- [Mapzen Tangram-es](#) - C++ library for rendering 2D and 3D maps using OpenGL ES 2 with custom styling and interactions
- [mapbox-gl-leaflet](#) - Create Mapbox GL layers in Leaflet
- [react-native-mapbox-gl](#) - Render Mapbox GL maps from React applications
- [hoverboard](#) - Render vector tiles on canvas with Leaflet 0.7.x (supports GeoJSON, TopoJSON, and protobuf) ⚠ no longer maintained
- [Leaflet.VectorGrid](#) - Display gridded vector data (sliced GeoJSON, TopoJSON or Mapbox Vector Tiles) in Leaflet 1.0.0
- [ArcGIS API for JavaScript](#) - Draw vector tile layers as part of your web map. Rendering done via `mapbox-gl-js` integration.
- [mapscii](#) - A Vector Tile to Braille and ASCII renderer for xterm-compatible terminals
- [Unofficial Mapbox GL Native bindings for Qt QML](#) - Qt QML bindings for Qt 5.6 and higher.
- [Mapbox-vector-tiles-basic-js-renderer](#) - A fork of mapbox-gl-js giving you full control over rendering of specific tiles, also provides vector tile overlay for google maps.
- [QtPBFImagePlugin](#) - Qt image plugin for displaying Mapbox vector tiles.
- [AliFlux VectorTileRenderer](#) - A highly customizable vector tile renderer built using C# for .Net platform. Comes with bindings for Mapsui and Gmap.Net components.
- [Azure Maps Web SDK](#) - Render vector tile layers on an interactive web map control using JavaScript or TypeScript.


<https://github.com/mapbox/awesome-vector-tiles>



Mapbox GL JS is a JavaScript library that uses WebGL to render interactive maps from [vector tiles](#) and [Mapbox styles](#).



# Nuestra página de referencia



MapsNavigationSearchAll docsHelp

Mapbox GL JSOverviewAPI Reference**Examples**PluginsStyle Specification

### Examples

#### Styles (10)


- Add an animated icon to the map
- Add a generated icon to the map
- Generate and add a missing icon to the map
- Add a stretchable image to the map
- Add an icon to the map
- Display a map with a custom style
- Render world copies
- Display a satellite map
- Change a map's style
- Display a map

#### Layers (32)

- Display buildings in 3D
- Extrude polygons for 3D indoor mapping
- Add a 3D model
- Adjust a layer's opacity
- Animate a line
- Animate a series of images

## Examples


### Getting started




Display a map

Initialize a map in an HTML element with Mapbox GL JS.

### Styles (10)



Add an animated icon to the map



Add a generated icon to the map

<https://docs.mapbox.com/mapbox-gl-js/examples/>