Conteúdo

Tema

Exploração de visualizadores de informação georreferenciada usando Open Layers e Leaflet

1. Open Layers

1.1 Estrutura Base

index.html

```html
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>OpenLayers</title>
    <style>
      html, body, #map-container {
        margin: 0;
        height: 100%;
        width: 100%;
        font-family: sans-serif;
      }
    </style>
  </head>
  <body>
    <div id="map-container"></div>
  </body>
</html>
```

+

main.js

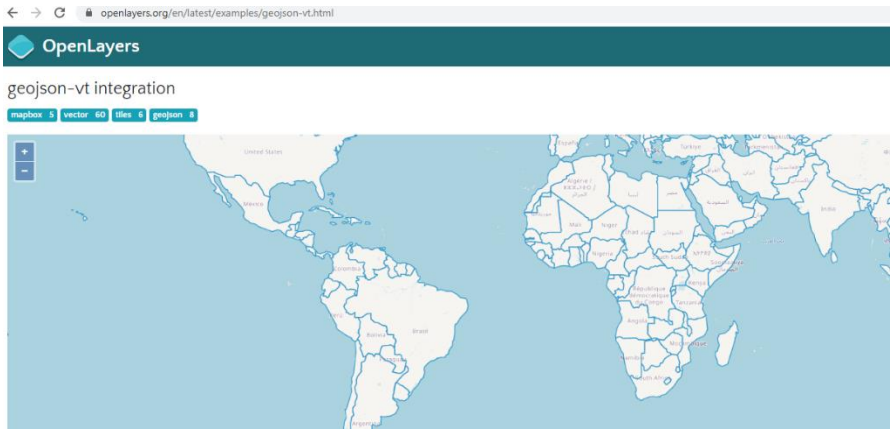
```js
import 'ol/ol.css';
import {Map, View} from 'ol';
import TileLayer from 'ol/layer/Tile';
import XYZSource from 'ol/source/XYZ';
import {fromLonLat} from 'ol/proj';

new Map({
  target: 'map-container',
  layers: [
    new TileLayer({
      source: new XYZSource({
        url: 'http://tile.stamen.com/terrain/{z}/{x}/{y}.jpg'
      })
    })
  ],
  view: new View({
    center: fromLonLat([0, 0]),
    zoom: 2
  })
});
```

Resultado:

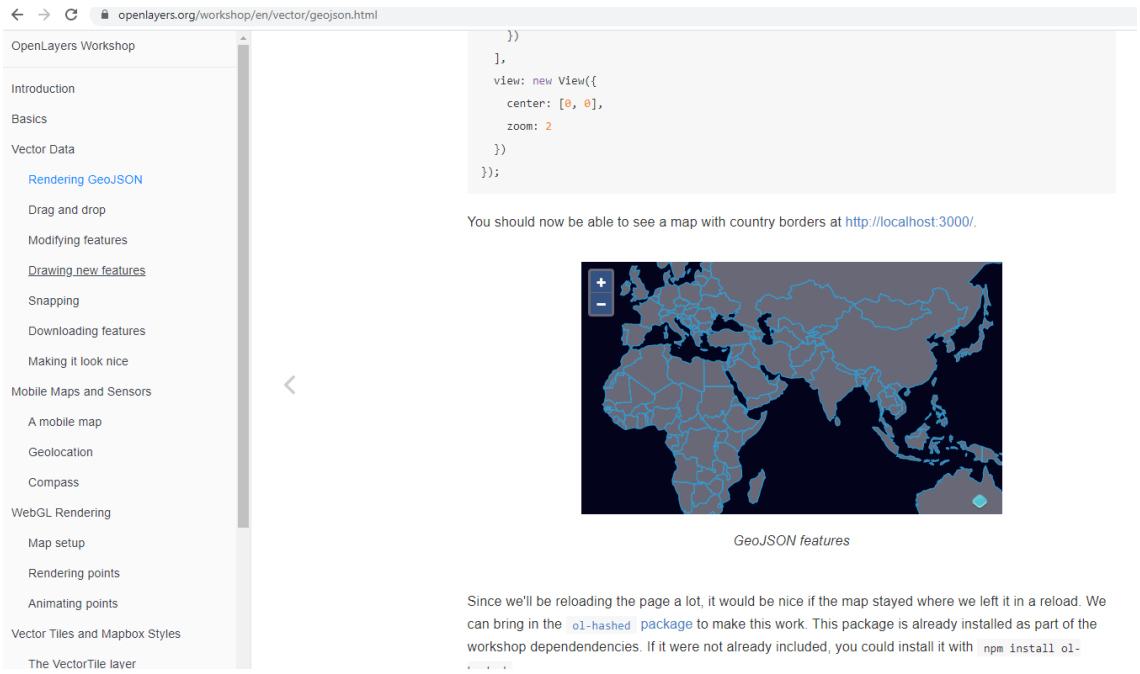
1.2 OpenLayers e GeoJSON

Considere o exemplo do tutorial disponível em:

- Países: https://openlayers.org/en/latest/examples/geojson-vt.html

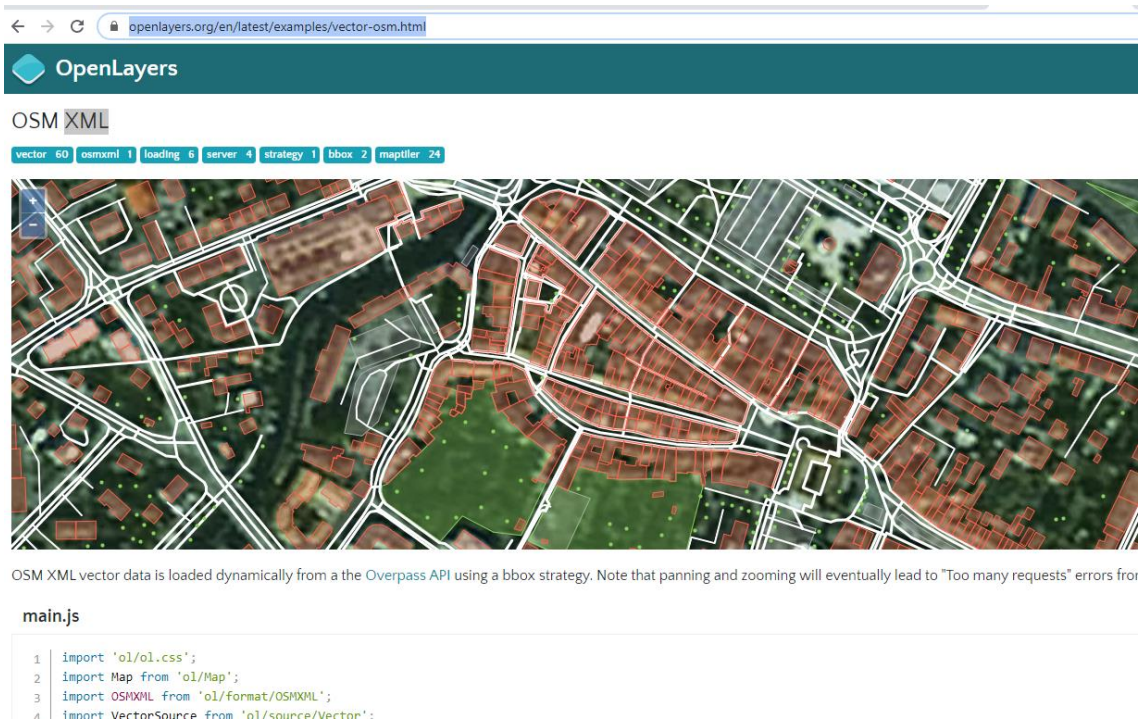


- Workshop: https://openlayers.org/workshop/en/vector/geojson.html



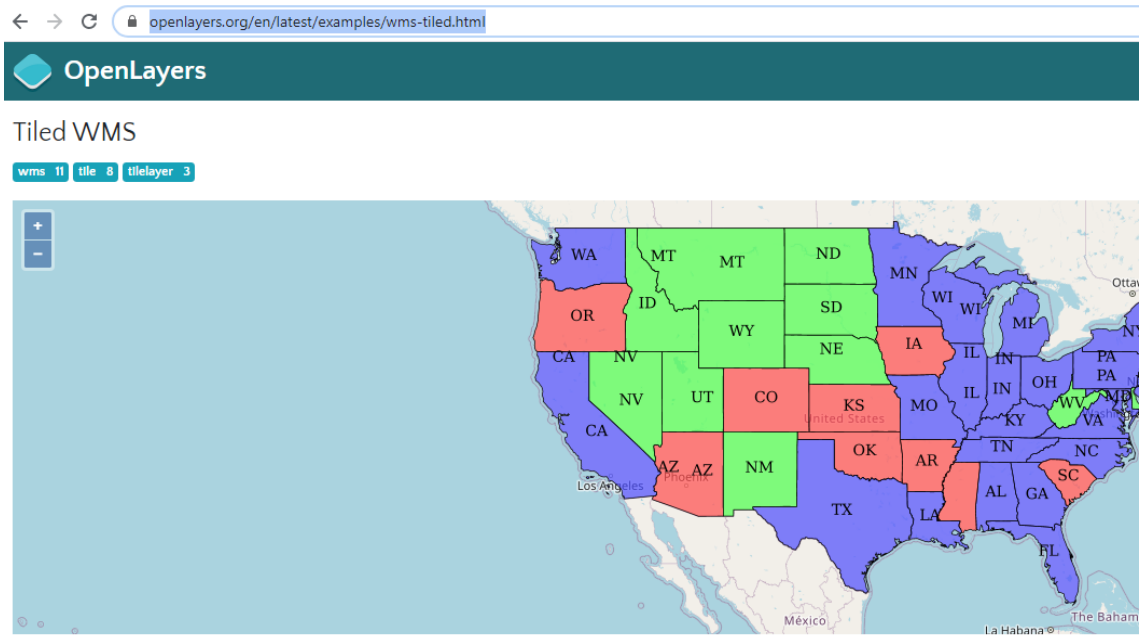
1.3 OpenLayers e XML

Considere o exemplo em: https://openlayers.org/en/latest/examples/vector-osm.html



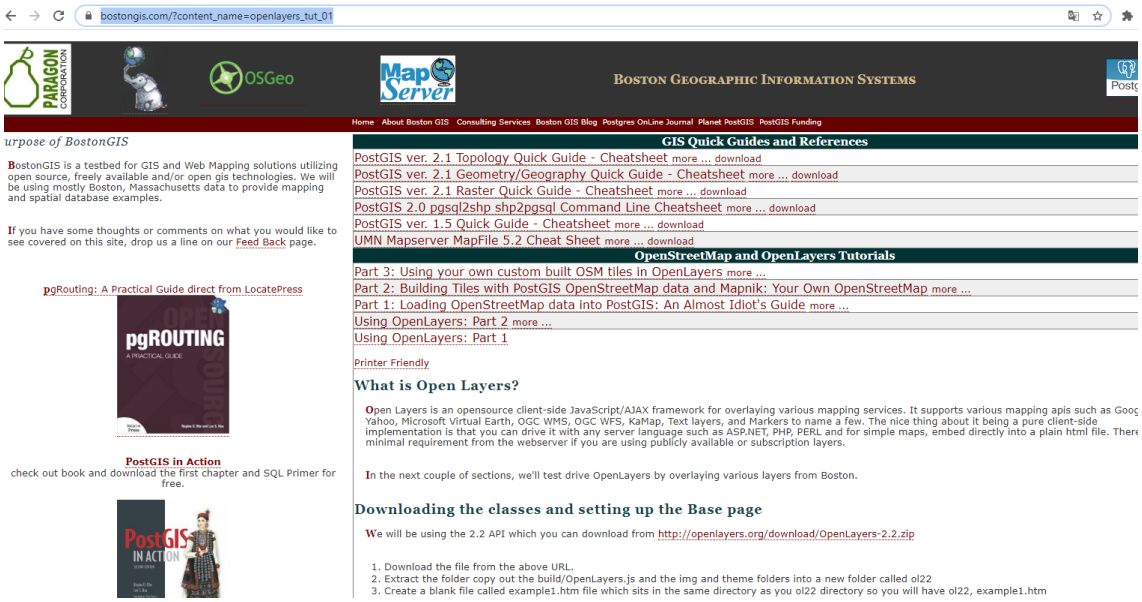
1.4 OpenLayers e WMS as a Service

Considere o exemplo em: https://openlayers.org/en/latest/examples/wms-tiled.html



1.5 OpenLayers + PosGreSQL + Geoserver

Considere os exemplos disponíveis em:
https://www.bostongis.com/?content_name=openlayers_tut_01



2. Leaflet

2.1 Estrutura Base

Considere a informação disponível no link: https://leafletjs.com/examples.html Seguindo estas bases, de seguida apresentam-se um conjunto de exemplos de exploração das funcionalidades do Leaflet.

Scripts para aplicar a biblioteca Leaflet num ficheiro JavaScript:

```
<link rel="stylesheet" href="https://unpkg.com/leaflet@1.3.4/dist/leaflet.css"
integrity="sha512-puBpdR0798OZvTTbP4A8Ix/l+A4dHDD0DGqYW6RQ+9jxkRFclaxxQb/SJAWZfWAkuyeQUytO7+7N4QKrDh+drA=="
crossorigin=""/>

<script src="https://unpkg.com/leaflet@1.3.4/dist/leaflet.js"
integrity="sha512-nMMmRyTVoLYqjP9hrbed9S+FzjZHW5gY1TWCHA5ckwXZBadntCNs8kEqAWdrb9O7rxbCaA4lKTIWjDXZxflOcA=="
crossorigin=""></script>
```

Estilização do mapa para ser apresentado no browser:

```
<style>

    #mapid {
        height: 480px;
    }

</style>
```

Declaração do mapa e criação do layer (camada que apresenta o mapa):

```
var mymap = L.map('mapid').setView([51.505, -0.09], 13);

var token = "pk.eyJ1Ijoiam51bm9mZXJyZWlyYSIsImEiOiJjam5zMGdsb3owYjFqM2txcTA2bmN0OHZwIn0.UlhgHg316EPrNvALad0oqQ";

L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {
    attribution: 'Map data &copy; <a href="https://www.openstreetmap.org/">OpenStreetMap</a> contributors, <a href="https://c
    maxZoom: 18,
    id: 'mapbox.streets',
    accessToken: token
}).addTo(mymap);
```

Criação de um ponto, circulo e polígono no mapa:

```
var marker = L.marker([51.5, -0.09]).addTo(mymap);

var circle = L.circle([51.508, -0.11], {
    color: 'red',
    fillColor: '#f03',
    fillOpacity: 0.5,
    radius: 500
}).addTo(mymap);

var polygon = L.polygon([
    [51.509, -0.08],
    [51.503, -0.06],
    [51.51, -0.047]
]).addTo(mymap);
```

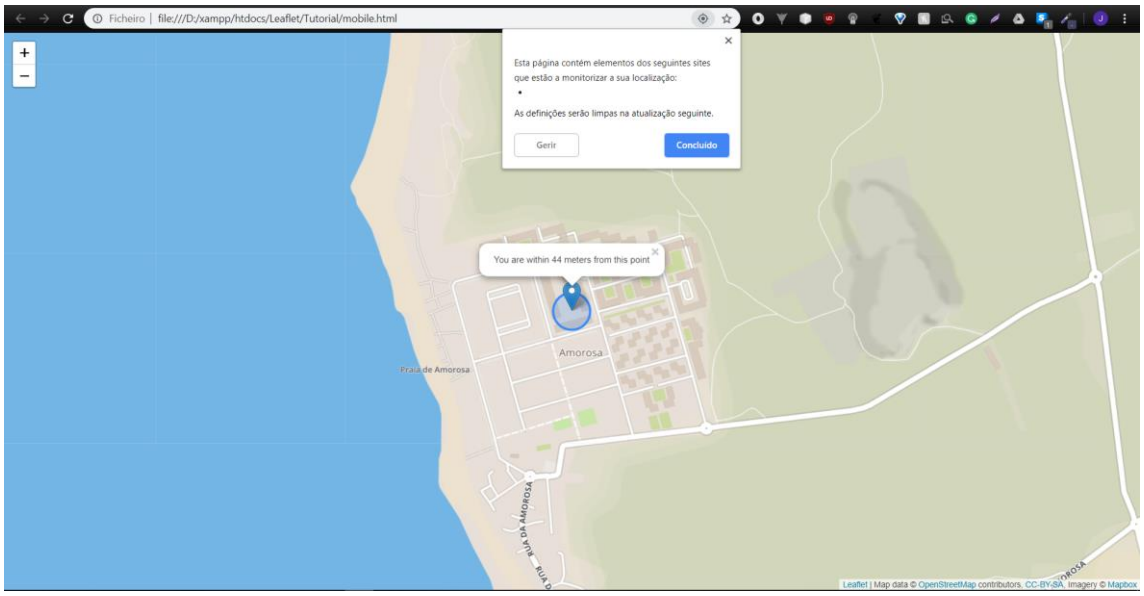
Atribuição de popups aos elementos criados:

```
marker.bindPopup("<b>Hello world!</b><br> I am a popup.");
circle.bindPopup("I am a circle");
polygon.bindPopup("I am a polygon");
```

Função de clique que permite apresentar a latitude e longitude do ponto:

```
function onMapClick(e){
    popup
        .setLatLng(e.latlng)
        .setContent("You clicked the map at " + e.latlng.toString())
        .openOn(mymap);
}
```

Resultado:



Criação dos layers (light, streets and satellite):

```
//Definimos 3 Layers default (GrayScale, Streets e Satellite)
var grayscale = L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {id: 'mapbox.light', accessToken: 'pk.eyJ1IjoidmFh
    streets   = L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {id: 'mapbox.streets', accessToken: 'pk.eyJ1IjoidmF
    satellite   = L.tileLayer('https://api.tiles.mapbox.com/v4/{id}/{z}/{x}/{y}.png?access_token={accessToken}', {id: 'mapbox.satellite', accessToken: 'pk.eyJ1Ij
```

Adicionamos a atributos pré-definidos do Leaflet as 3 layers criadas:

```
//Dizemos que as 3 Layers default estão dentro da variavel "baseMaps"
var baseMaps = {
    "Grayscale": grayscale,
    "Streets": streets,
    "Satellite": satellite
};
```

Criação do mapa e atribuímos as layers que serão apresentadas na primeira instância:

```
//Pomos o Mapa (já preparado com as layers acima definidas) associado ao div com o id "mapid"
var mymap = L.map('mapid', {
    center: [41.50, -7.73],
    zoom: 9,
    layers: [streets, carros] //aqui definimos as layers que queremos que estejam visiveis numa primeira instancia
});
```

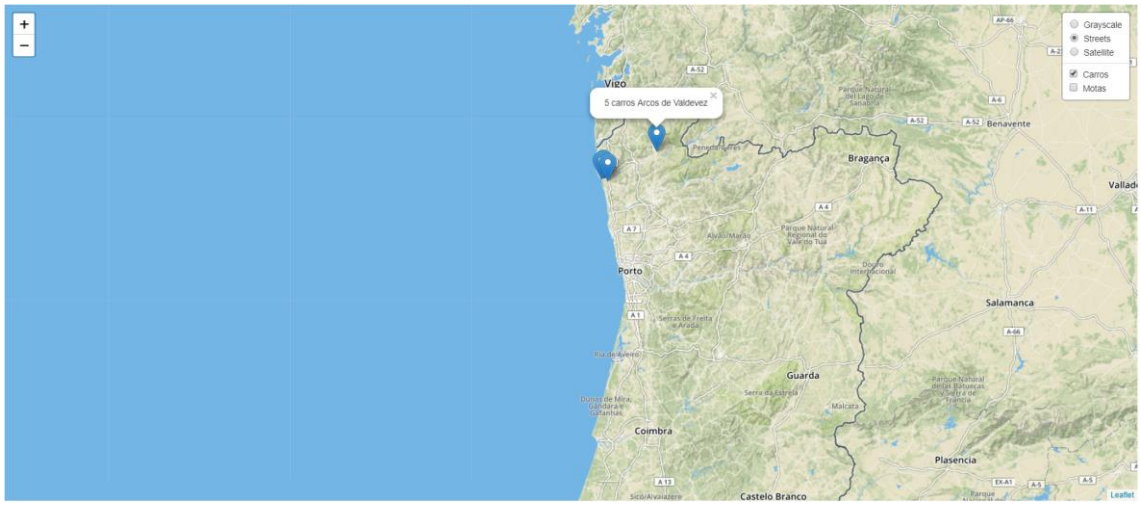
Criação das layers que podem ser apresentadas em simultâneo (overlay):

```
//Aqui definimos as restantes layers (para além das default). Podemos mostrar várias ao memos tempo
var overlayMaps = {
    "Carros": carros,
    "Motas": motas
};
```

Adição de um controlador na página para se visualizar as layers criadas:

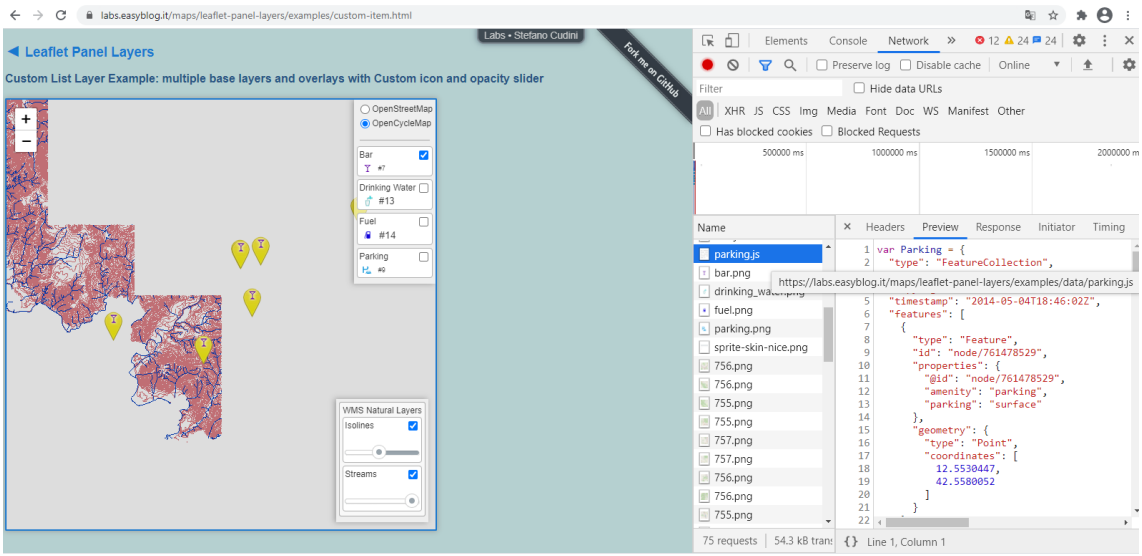
```
//No canto superior direito aparece um ocntrolador para por as layers visiveis ou invisiveis
L.control.layers(baseMaps, overlayMaps).addTo(mymap);
```

Resultado:



Considere os seguintes exemplos, seguindo os tutoriais disponibilizados nos seguintes links:

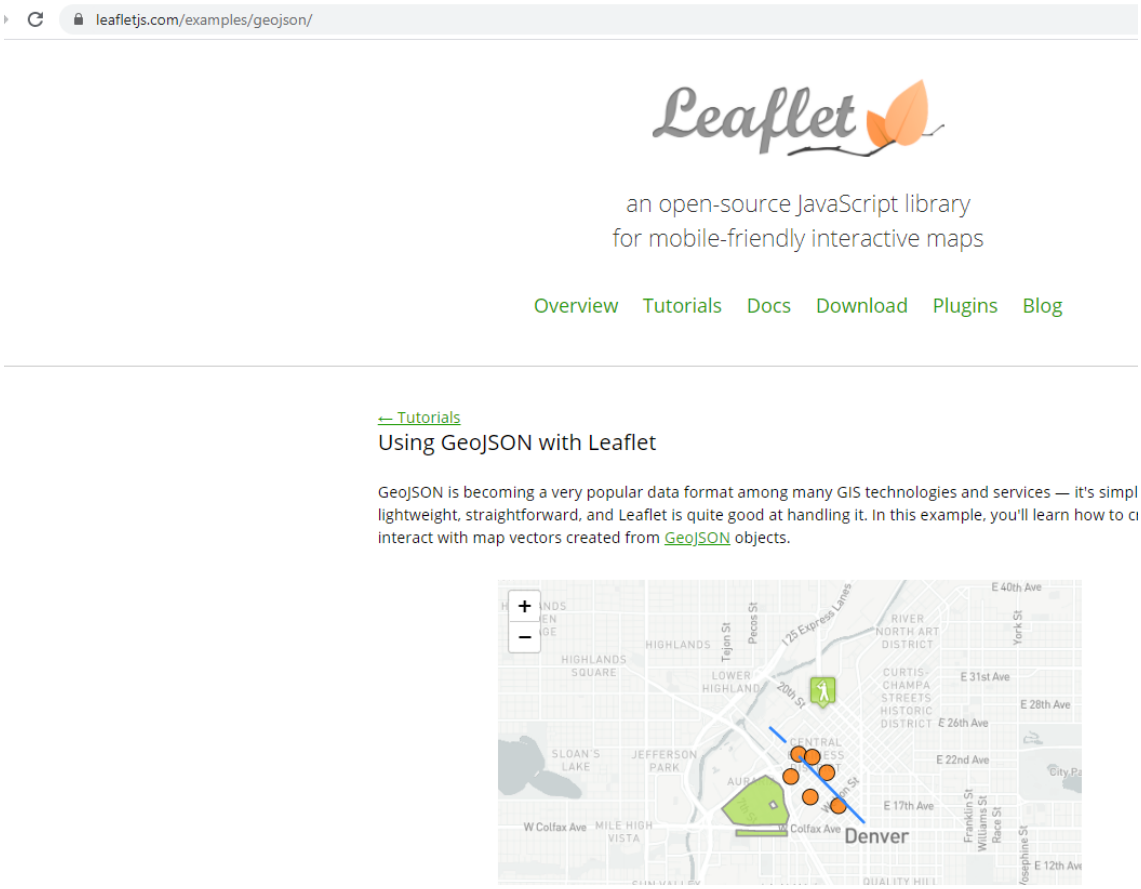
https://labs.easyblog.it/maps/leaflet-panel-layers/examples/custom-item.html



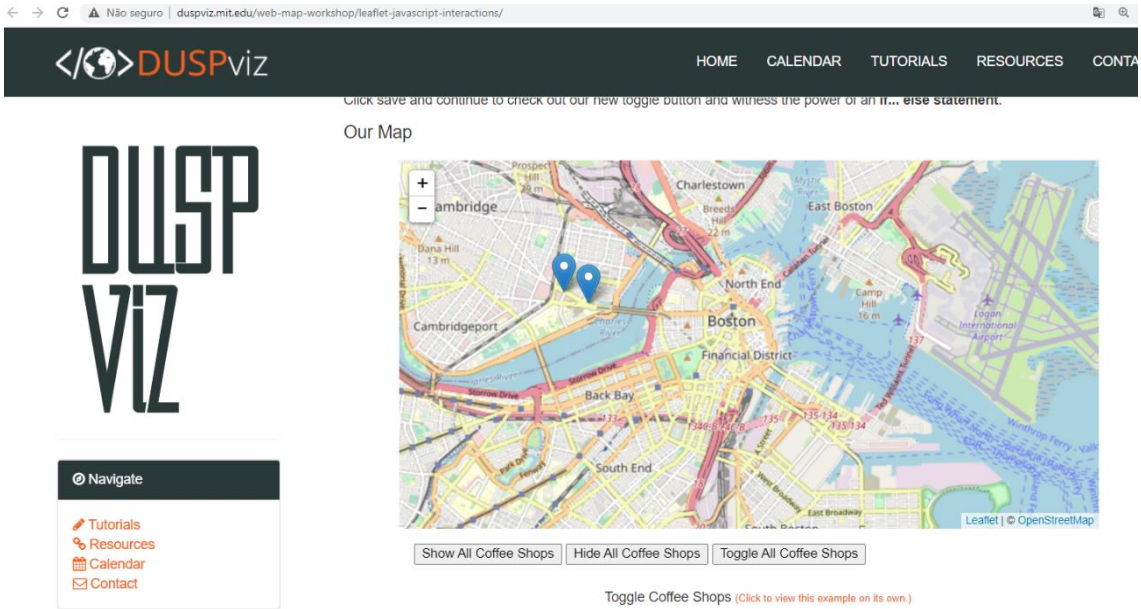
2.2 Leaflet e GeoJSON

Considere os exemplos em:

https://leafletjs.com/examples/geojson/



Poderá executar também o seguinte tutorial: http://duspviz.mit.edu/web-map-workshop/leaflet-javascript-interactions/



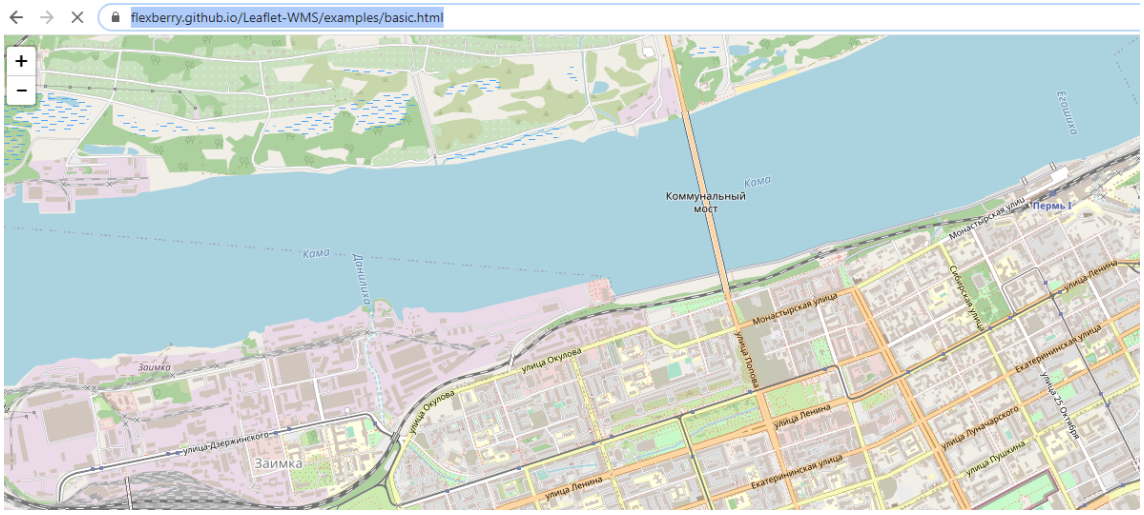
2.3. Leaflet with XML

Maps from a Database: Reading XML data into Leaflet: http://erica.altschul.info/Tutorial_XML-to-Leaflet.pdf

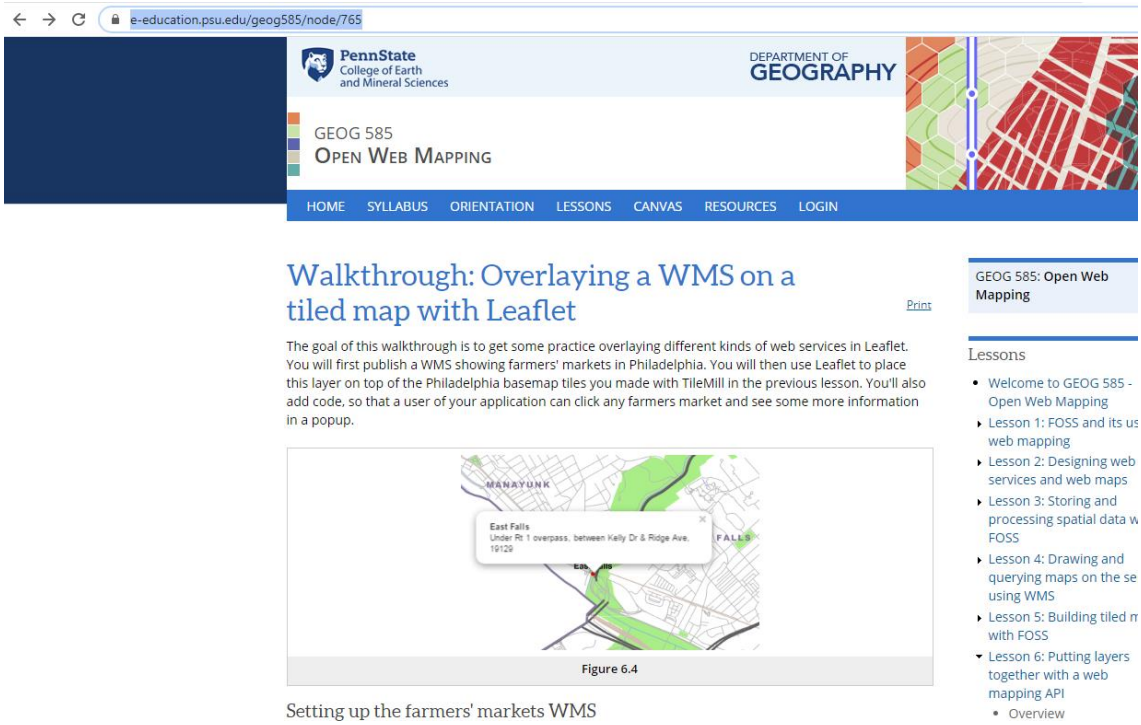
2.4 Leaflet e WMS as a service

Considere o exemplo do link: https://leafletjs.com/examples/wms/wms.html

Considere também o seguinte exemplo: https://flexberry.github.io/Leaflet-WMS/examples/basic.html



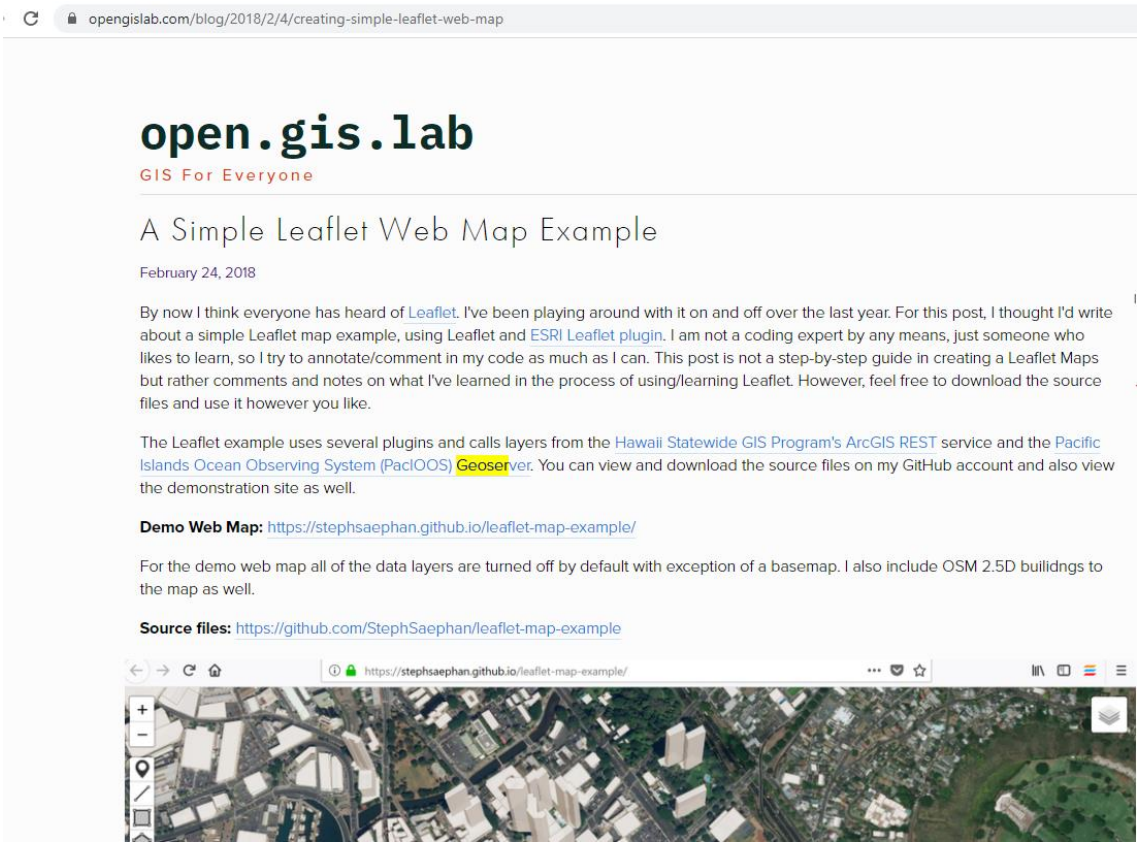
Considere também o exemplo seguinte: https://www.e-education.psu.edu/geog585/node/765



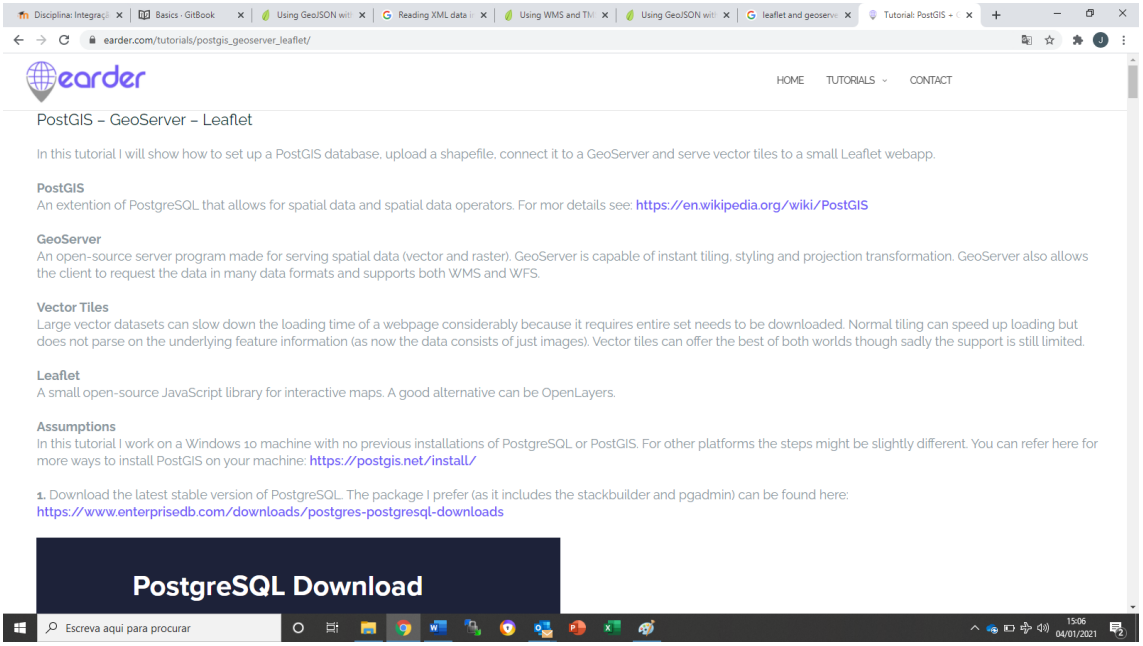
2.5 PostGIS + GeoServer + Leaflet

Considere o exemplo de exploração do Leaflet com Geoserver, disponível em:

https://opengislab.com/blog/2018/2/4/creating-simple-leaflet-web-map



Considere o exemplo de exploração do Leaflet com Geoserver e PostgreSQL, disponível em: https://www.earder.com/tutorials/postgis_geoserver_leaflet/



https://labs.easyblog.it/maps/gpx-simplify-optimizer/