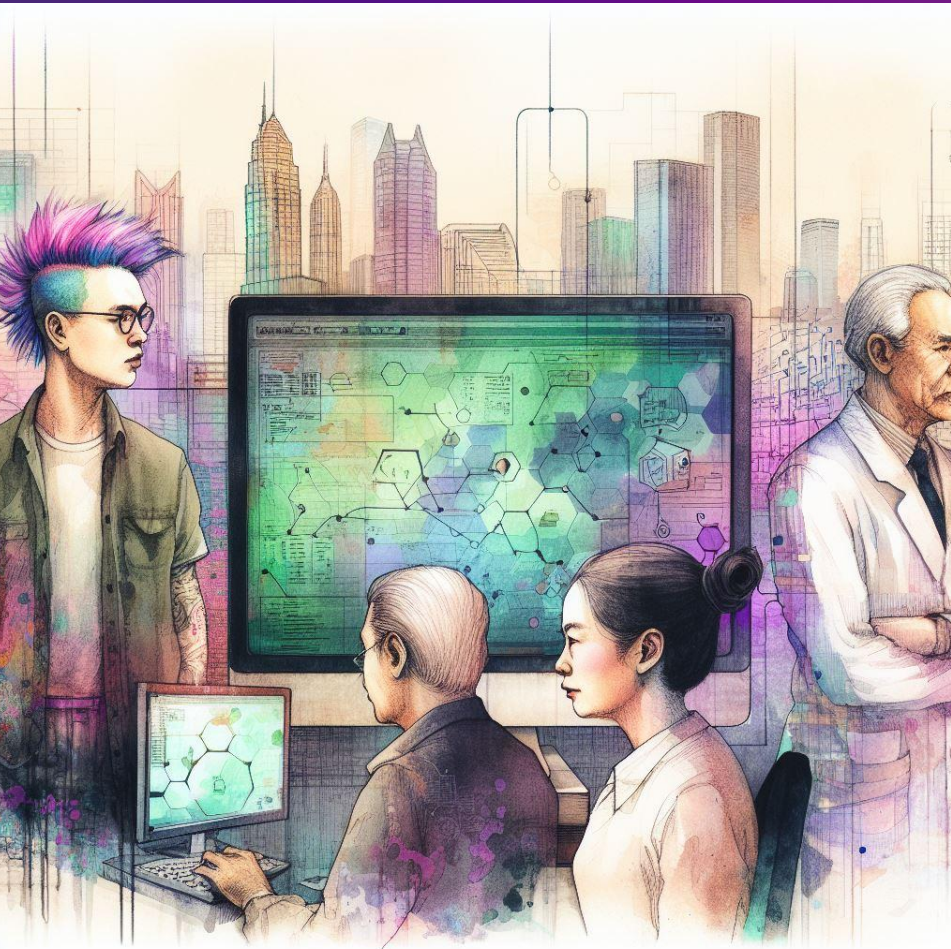




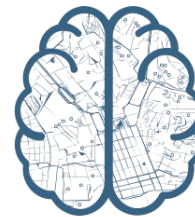
Publish Vector Data with #OGCAPI

Antonio Cerciello & Joana Simoes



Agenda

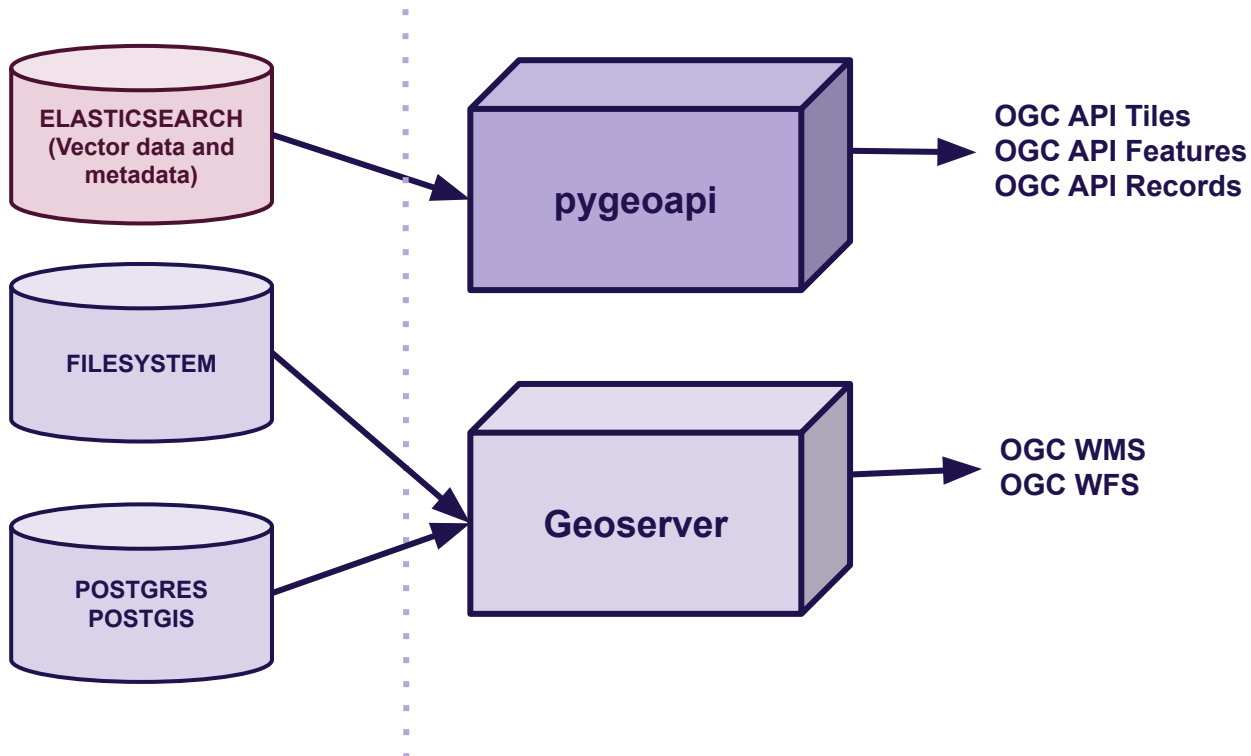
1. The eMOTIONAL Cities Project
2. The Spatial Data Infrastructure
3. Outline demonstration



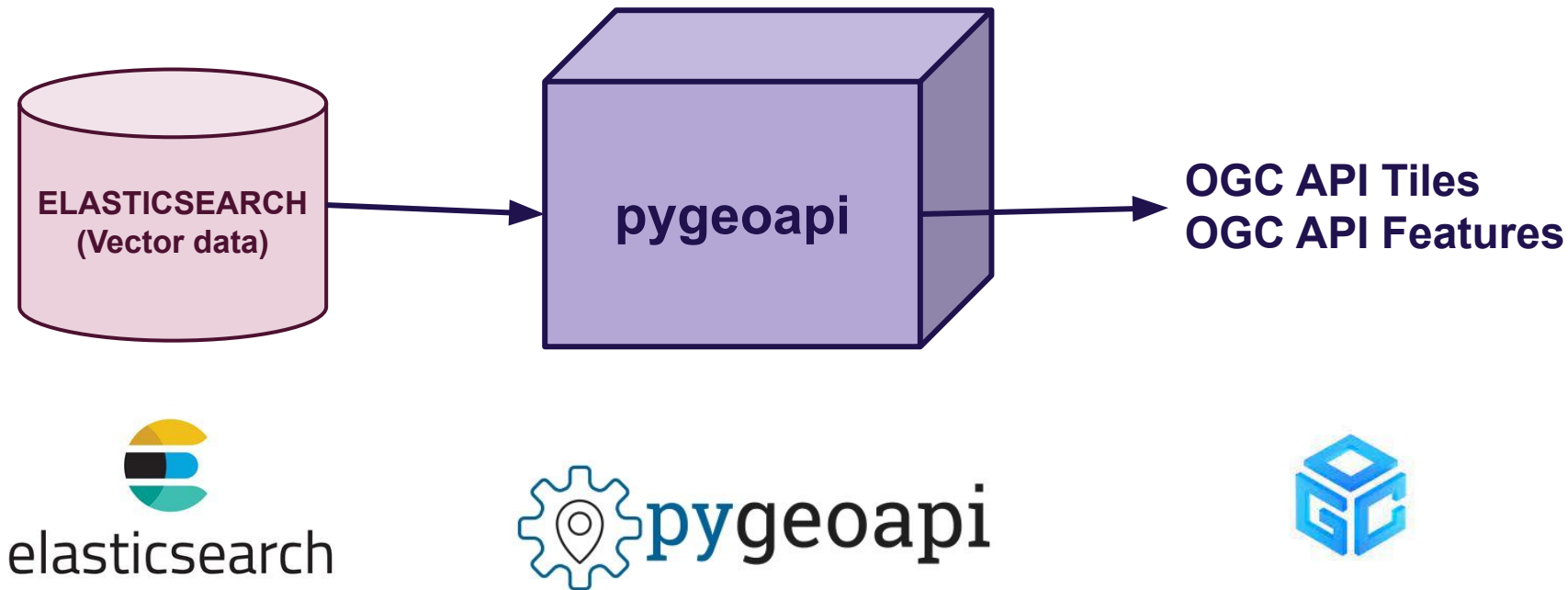
eMOTIONAL Cities

Provide robust scientific evidence on how the natural and built urban environment shapes the neural system underlying human cognitive and emotional processing.

<https://emotionalcities-h2020.eu>

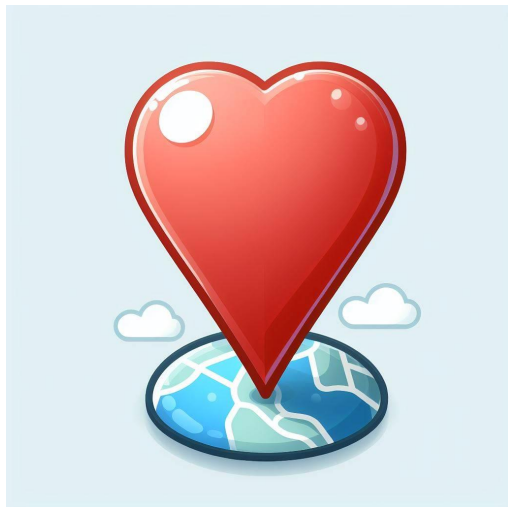


ArcGIS





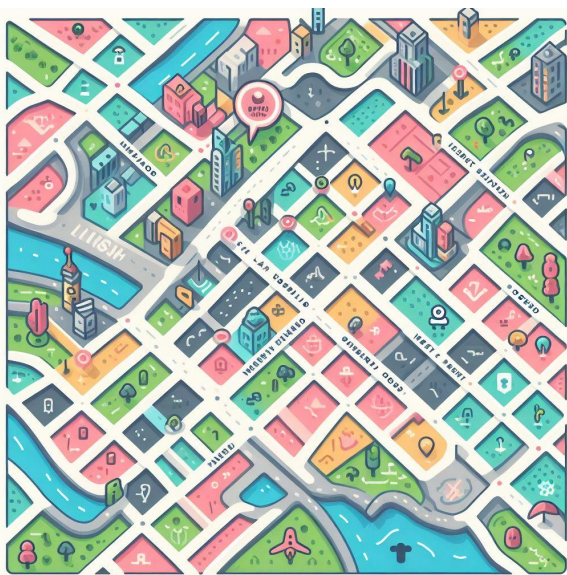
A REST API allowing requests for geographical features across the web using platform-independent calls



What is a feature?

A feature is an entity that retains its geographic depiction, commonly expressed as a point, line, or polygon, within one of its attributes (or fields) in the dataset row.

A REST API standard for serving pre-rendered or run-time computed georeferenced map tiles over the Internet.



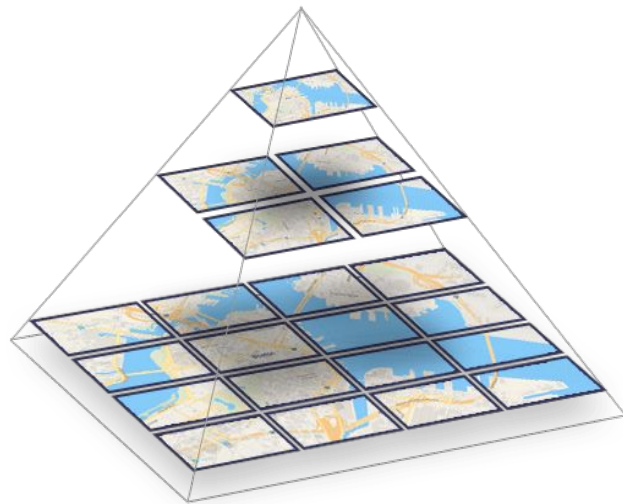
What is a tile?

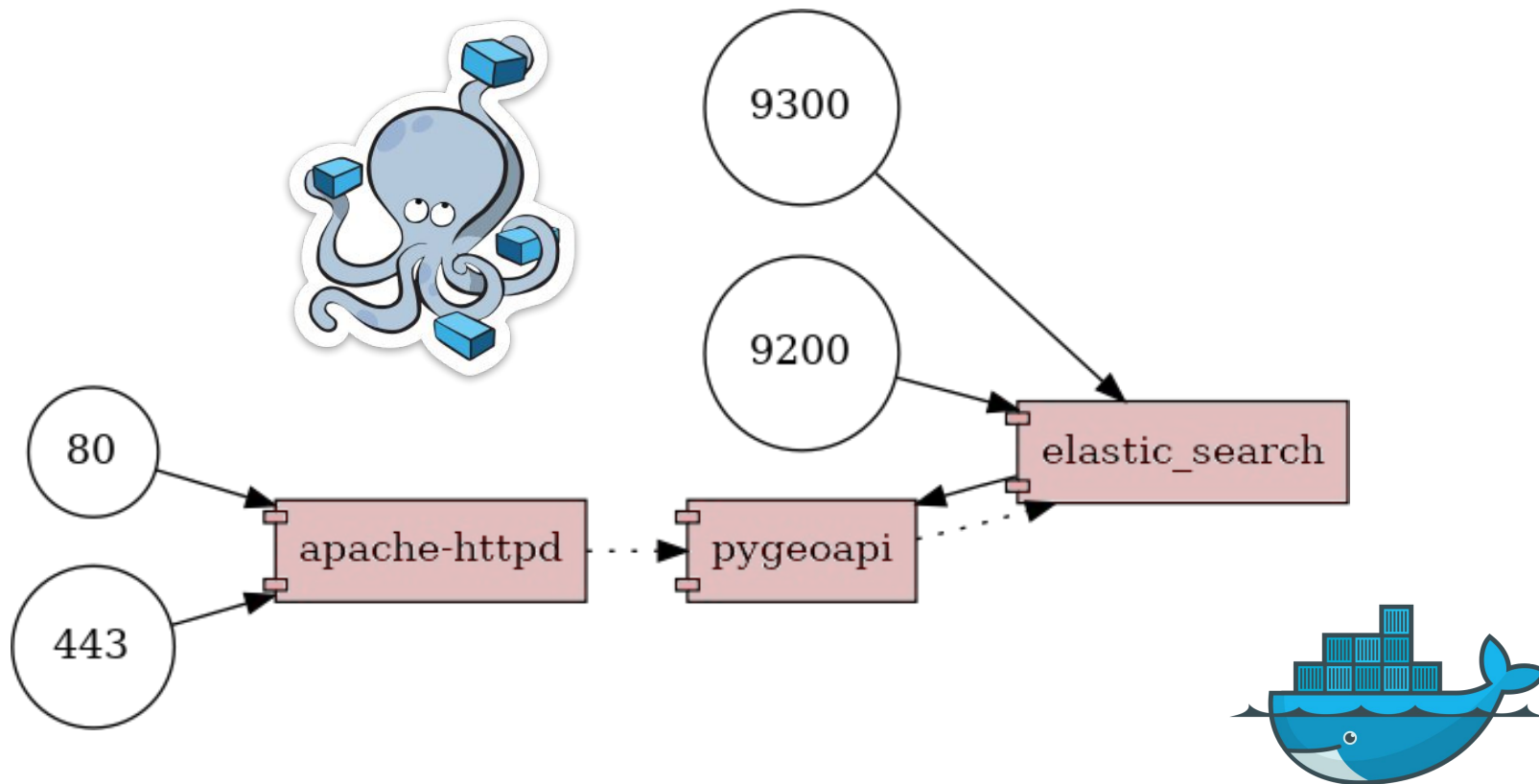
A structure to organize a spatial dataset, raster or vector data, into rectangular blocks of pixels, usually employed to enhance data accessibility for extensive datasets.



Geographic data, packaged into pre-defined roughly-square shaped "tiles" for transfer over the web.

- **Fast delivery.**
- **Design flexibility.**
- **Protobuf/MVT (vector-tile-spec)**







- Python server implementation of the OGC API suite of standards.
- FOSS (MIT).
- Certified OGC compliant, reference implementation.
- Plugin architecture

<https://pygeoapi.io/>

<https://github.com/geopython/pygeoapi>

Open Source Geospatial Foundation

Certified



Open
Geospatial
Consortium

COMPLIANT

pygeoapi 0.9.0

RI

ogcapi-edr-1 1.0.1

RI

ogcapi-features-1 1.0

ogcapi-tiles-1 1.0

Valid Until: 2025-01-09

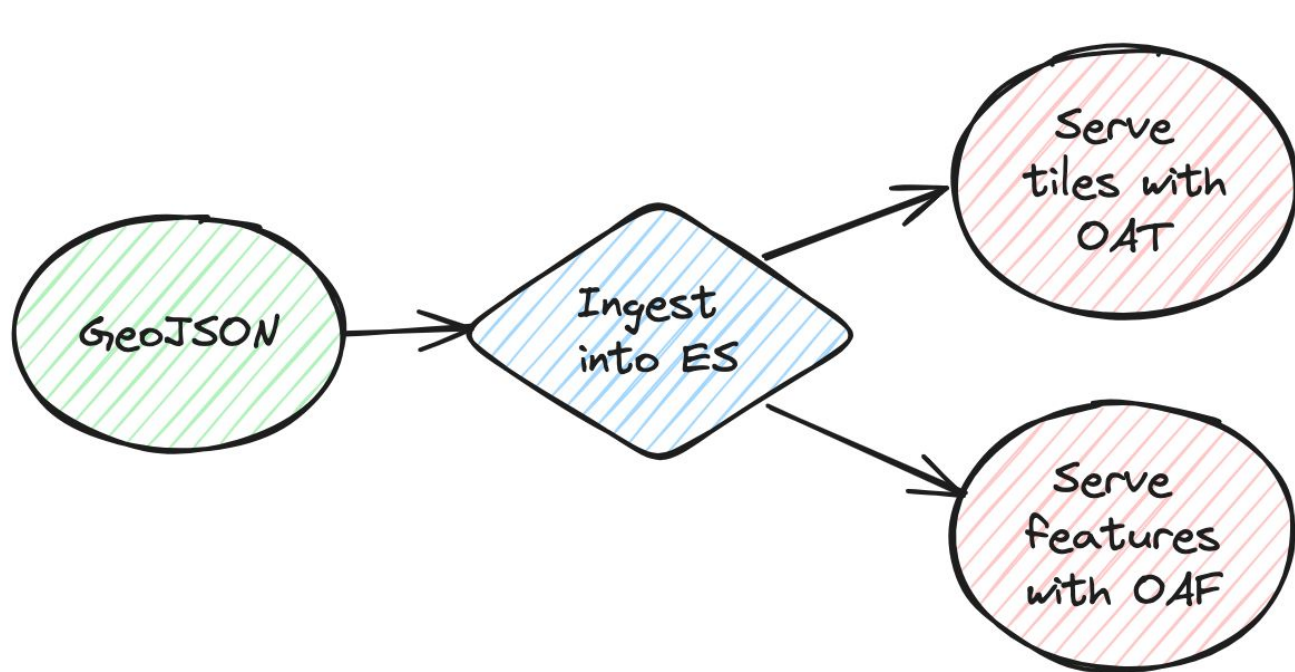


elasticsearch

- Search engine based on the Lucene library.
- Dual licensed.
- Fast and scalable.
- >8: Elasticsearch vector tile search API

<https://www.elastic.co/elasticsearch/>

<https://github.com/elastic/elasticsearch>



Leaflet



ArcGIS





EC Datasets

- Lisbon outdoor walk: test data (5773 features).
- Particulate Matter - PM10 (3516 features).



https://emotional.byteroad.net/collections/ec_catalog/items/lisbon_20210912_pr

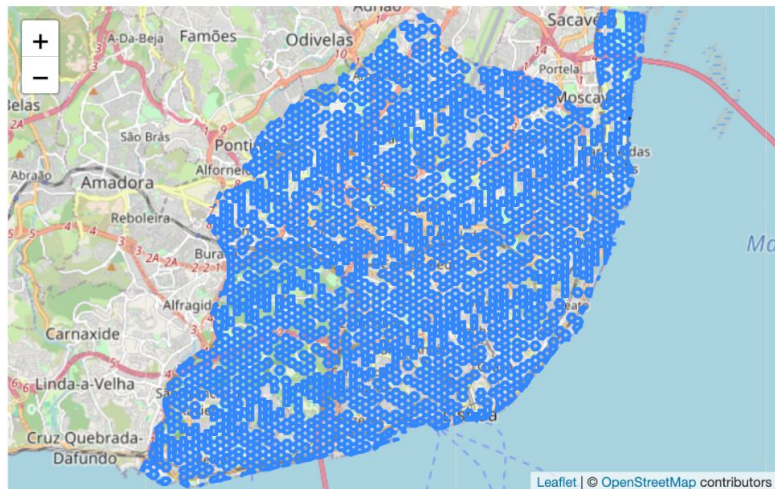
https://emotional.byteroad.net/collections/ec_catalog/items/pm10



Particulate Matter (PM₁₀)

Particulate Matter (PM₁₀)

Items in this collection.



Warning: Higher limits not recommended!

Limit:

[Next](#)

id	GRID_ID	pm10
0	AJ-17	15.355799675
1	X-50	14.4497995377
2	BO-43	16.9032993317
3	BA-49	14.9940004349
4	BA-57	15.3579998016
5	AH-20	14.428899765
6	BY-18	15.4228000641
7	BV-37	16.224199295
8	BN-12	17.4648990631
9	BB-24	16.5284996033
10	BO-52	14.8404998779



Lisbon outdoor walk: test data

Lisbon outdoor walk: test data

Items in this collection.



Warning: Higher limits not recommended!

Limit:

[Next](#)

id	datetime	DRd_Altitude- Altitude_cm	DRd_Altitude- Geoidal Separation_cm	DRd_Motion- Course_deg
ba9fc3fd5...	2021/09/12 08:35:31			55.36
33ba154c9...	2021/09/12 08:35:32	3040.0	5070.0	55.36
26648056f...	2021/09/12 08:35:33	3040.0	5070.0	37.54
5a5d98263...	2021/09/12 08:35:34	3030.0	5070.0	50.53
2040cc539...	2021/09/12 08:35:35	2930.0	5070.0	270.78
44fdc99c2...	2021/09/12 08:35:36	2830.0	5070.0	264.31
e8d5abedb...	2021/09/12	2770.0	5070.0	266.33



What we will use in this demo

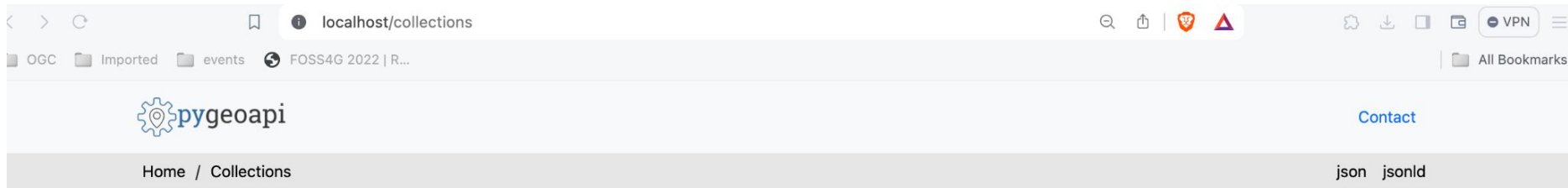
Server:

```
git clone -b vector-ws  
https://github.com/emotional-cities/openapi-sdi
```

Client:

```
git clone -b vector-ws  
https://github.com/emotional-cities/vtiles-example
```





Collections in this service

Name	Type	Description
Lisbon outdoor walk: test data	feature	Outdoor walk test data for calibrating instruments; run on 12/09/2021.
Particulate Matter (PM10)	feature	Data Platform IGOT - Physical Environment Data
Collection of data about Lisbon	tile	Particulate Matter (PM10) and Outdoor walk test data for calibrating instruments; run on 12/09/2021.

```
git clone -b vector-ws https://github.com/emotional-cities/openapi-sdi
```




File | /Users/joana/git/vtiles-example/demo-oat.htm

OGC Imported events FOSS4G 2022 | R...

Map view showing a coastal area with a blue grid overlay. The map includes labels for locations like Damaia, Burac, Alfragide, and Almada. A blue circular marker is visible on the map.

Network tab active. Filter: All. Fetch/XHR Doc CSS JS Font Img Media Manifest WS Wasm Other. Blocked response cookies Blocked requests 3rd-party requests.

Timeline view showing network requests. The waterfall view displays the following data:

Name	Sta...	Type	Initiator	Size	T..	Waterfall
3138.png	200	png	leaflet.js:5	39...	2...	
3139.png	200	png	leaflet.js:5	30...	2...	
3139.png	200	png	leaflet.js:5	12...	2...	
3140.png	200	png	leaflet.js:5	33...	2...	
3138.png	200	png	leaflet.js:5	36...	2...	
3138.png	200	png	leaflet.js:5	36...	2...	
3140.png	200	png	leaflet.js:5	26...	2...	
3140.png	200	png	leaflet.js:5	10...	2...	
3139.png	200	png	leaflet.js:5	25...	2...	
3139.png	200	png	leaflet.js:5	1.5...	2...	
3138.png	200	png	leaflet.js:5	33...	2...	
3138.png	200	png	leaflet.js:5	4.7...	2...	
3140.png	200	png	leaflet.js:5	16...	2...	
3140.png	200	png	leaflet.js:5	22...	2...	
marker-icon.png	200	png	leaflet.css	1.7...	3...	
marker-icon-2x.png	200	png	Other	2.7...	5...	
marker-shadow.png	200	png	Other	76...	2...	

24 requests 15.9 MB transferred 16.1 MB resources Finish: 3.07 s DOMContentLoaded: 150

Console Issues

git clone -b vector-ws https://github.com/emotional-cities/vtiles-example



Possible improvements/limitations

- Elastic non FOSS license
- Limitations on the free version of elastic
- Elastic performance on a single node cluster
- Limitations of the Mvt-elastic provider



info@byteroad.net

https://byteroad.net



https://emotionalcities-h2020.eu

https://emotional.byteroad.net

Thank you !