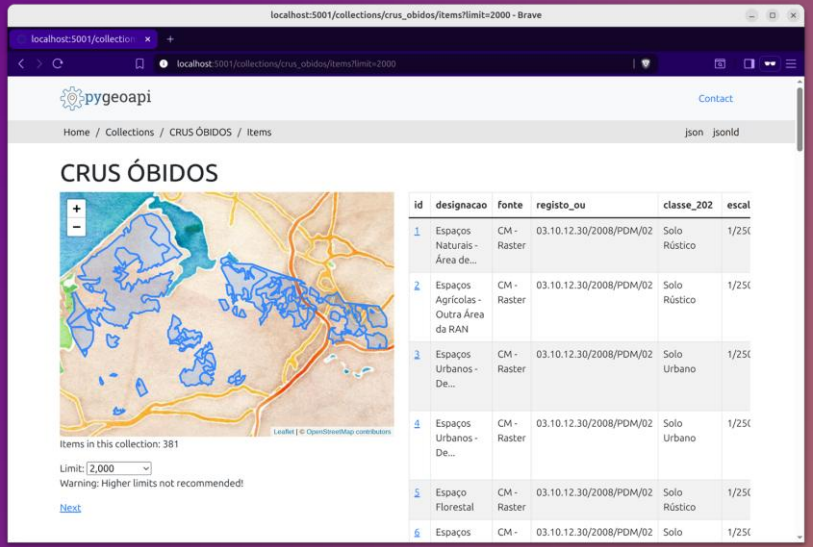
Como publicar dados geoespaciais usando os novos padrões OGC API

Joana Simões



Sobre Mim

- Directora Executiva ByteRoad
- Developer Relations OGC
- Membro do Conselho Administrativo da OSGeo
- Contribuidora de projetos de software livre

Open Geospatial Consortium
OSGeo
GEOMOB
DevRel Collective
GDAL
pygeoapi
QGIS
GSDI Global Spatial Data Infrastructure Association

Objetivo deste webinar

- Publicar dados em OGC API, com recurso a um software livre e de código aberto.

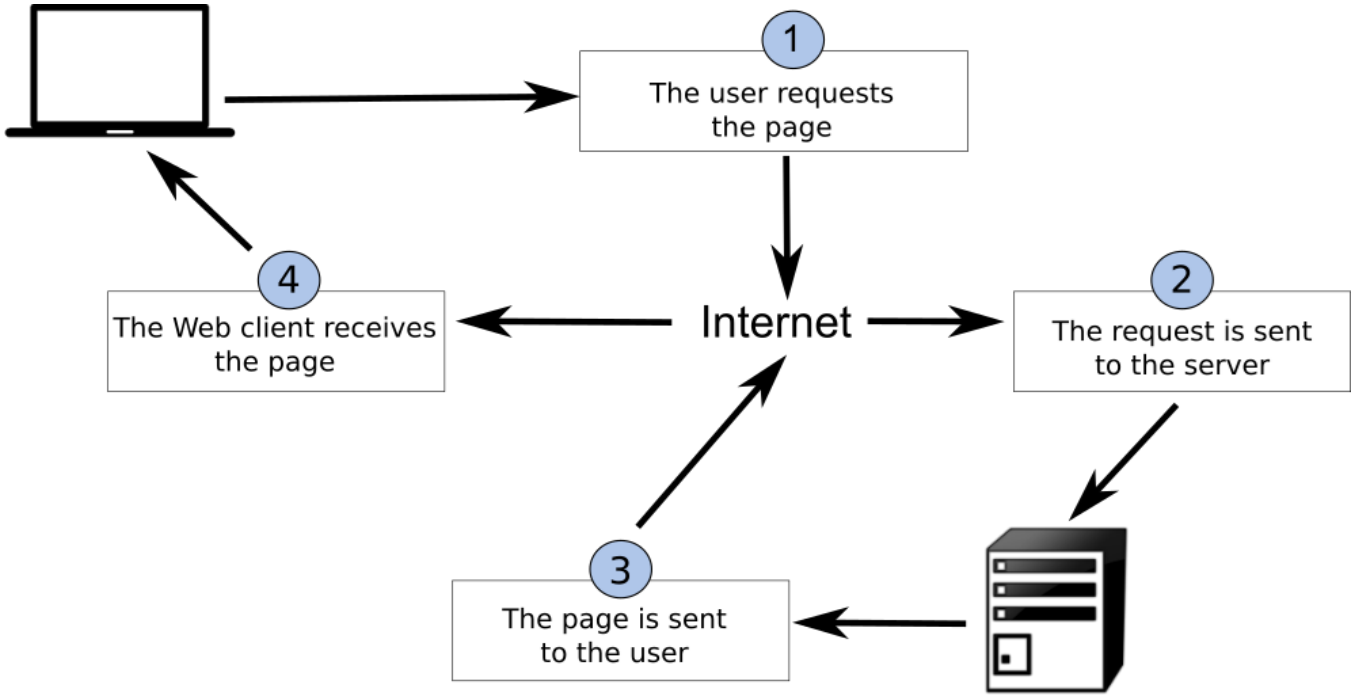
Conteúdo adicional que vamos cobrir neste webinar:

- ✅ docker
- ✅ YAML
- ✅ pygeoapi

Conteúdo adicional que **não** vamos cobrir neste webinar:

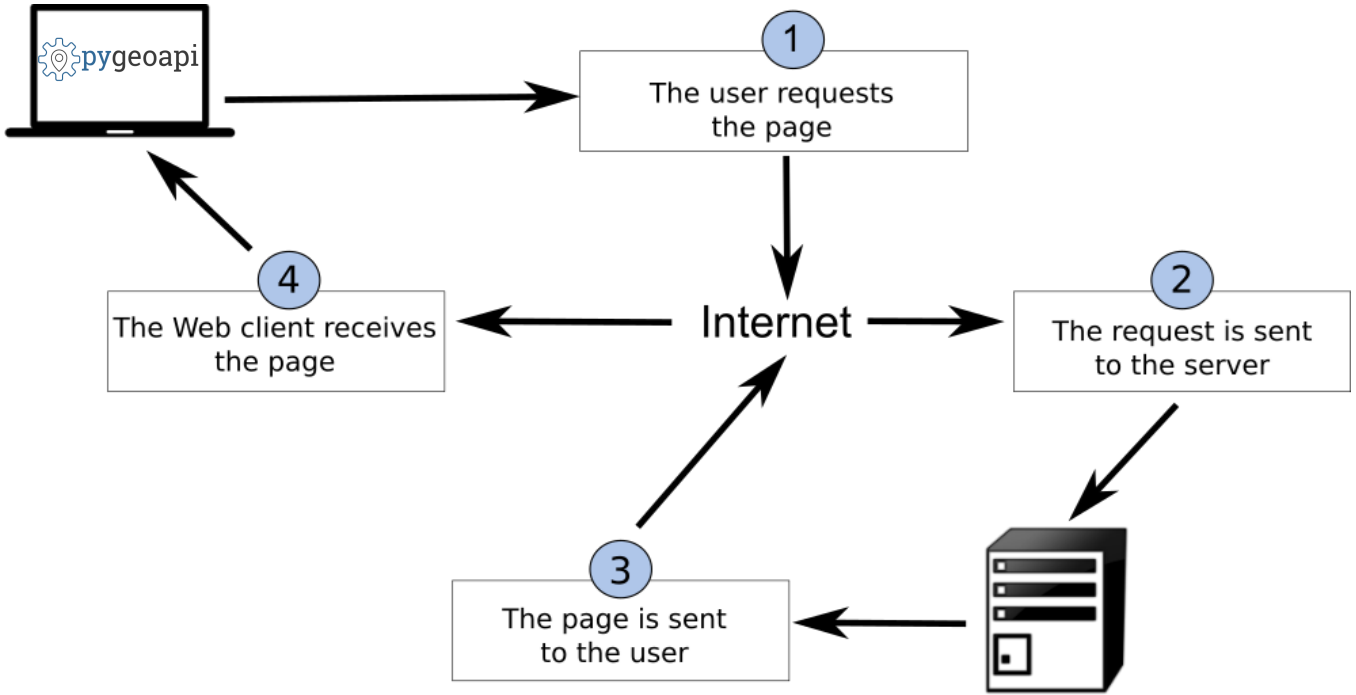
- ❌ OGC
- ❌ OGC API

Arquitetura Servidor-Cliente



Source: https://volaya.github.io/gis-book/en/index.html

Arquitetura Servidor-Cliente



Source: https://volaya.github.io/gis-book/en/index.html

pygeoapi

https://pygeoapi.io/

- Servidor em Python que implementa um conjunto de OGC APIs.
- Certificado como OGC compliant.
- Software Livre (MIT).
- As opções de instalação incluem pip e docker.

Certified
Open Geospatial Consortium
COMPLIANT

RI ogcapi-features-1 1.0
RI ogcapi-edr-1 1.0.1
RI ogcapi-tiles-1 1.0
ogcapi-processes-1 1.0

OSGeo Project

YAML

https://yaml.org/

- *YAML Ain't Markup Language*
- Linguagem de serialização de dados amigável para humanos e compatível com todas as linguagens de programação.
- A indentação (baseada em espaços) expressa a estrutura dos dados
- Comentários com #

XML	JSON	YAML

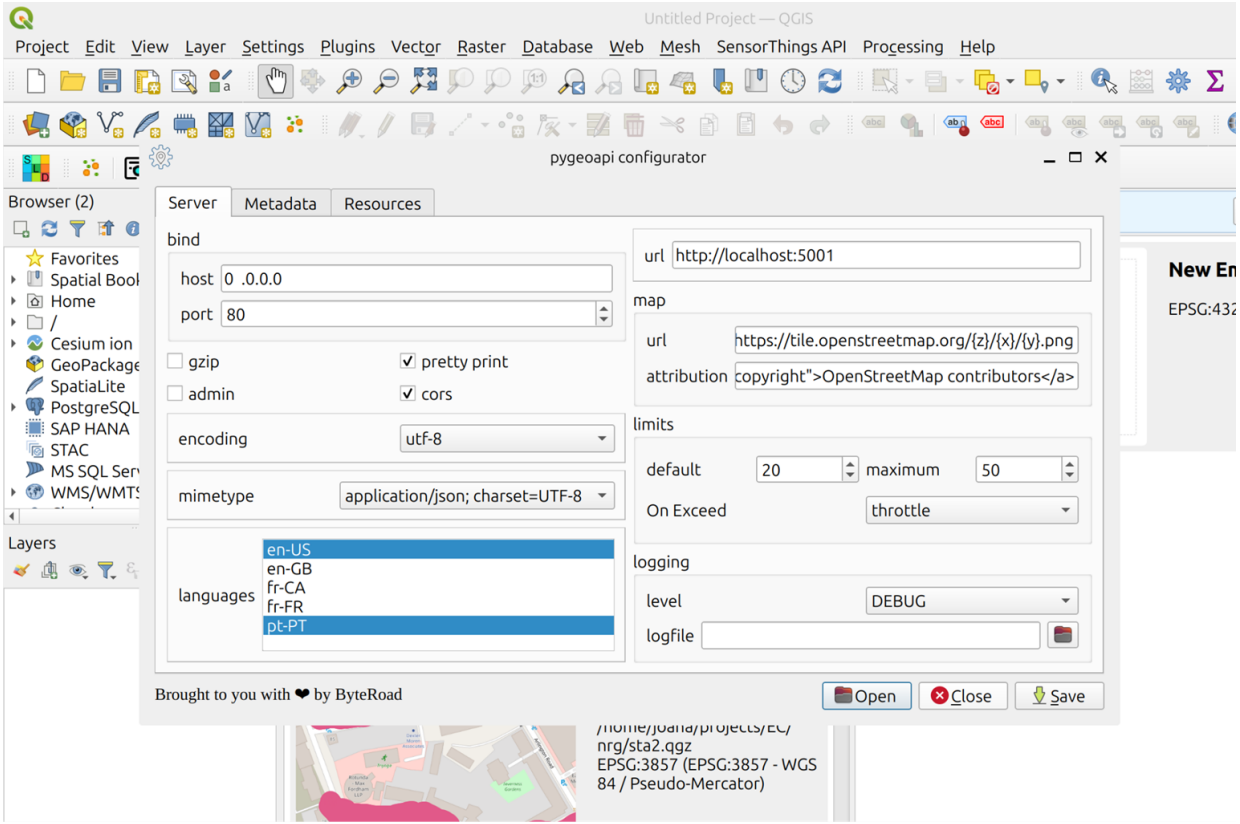
<Servers>
<Server>
<name>Server1</name>
<owner>John</owner>
<created>123456</created>
<status>active</status>
</Server>
</Servers>
	{
	Servers: [
	{
	name: Server1,
	owner: John,
	created: 123456,
	status: active
	}
	]
	}
		Servers:
		- name: Server1
		owner: John
		created: 123456
		status: active

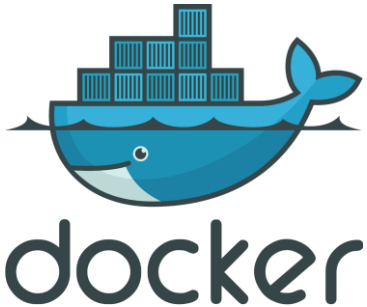
A configuração da pygeoapi usa YAML

```yaml
server:
    bind:
        host: 0.0.0.0
        port: 80
    url: http://localhost:5001
    mimetype: application/json; charset=UTF-8
    encoding: utf-8
    gzip: false
    languages:
        - pt-PT
        - en-US
    # cors: true
    pretty_print: true
    limits:
        default_items: 20
        max_items: 50
    map:
        url: https://tile.openstreetmap.org/{z}/{x}/{y}.png
        attribution: '&copy; <a href="https://openstreetmap.org/copyright">OpenStreetMap contributors<
    admin: false # enable admin api

logging:
    level: ERROR
    #logfile: /tmp/pygeoapi.log
```

Em breve...


Untitled Project — QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh SensorThings API Processing Help
pygeoapi configurator
Server
Metadata
Resources
bind
host 0 .0.0.0
port 80
gzip
pretty print
admin
cors
encoding
utf-8
mimetype
application/json; charset=UTF-8
languages
en-US
en-GB
fr-CA
fr-FR
pt-PT
url http://localhost:5001
map
url https://tile.openstreetmap.org/{z}/{x}/{y}.png
attribution copyright">OpenStreetMap contributors
limits
default 20
maximum 50
On Exceed
throttle
logging
level DEBUG
logfile
Brought to you with ❤ by ByteRoad
Open
Close
Save
Browser (2)
Favorites
Spatial Book
Home
/
Cesium ion
GeoPackage
SpatiaLite
PostgreSQL
SAP HANA
STAC
MS SQL Serv
WMS/WMTS
Layers
nrg/sta2.qgz
EPSG:3857 (EPSG:3857 - WGS 84 / Pseudo-Mercator)



https://www.docker.com/

- *Infraestrutura como código:* permite criar, empacotar e executar aplicações em containers leves e portáteis.
- O container inclui o código da aplicação junto com todas as suas dependências, bibliotecas e configurações, garantindo que a aplicação funciona da mesma forma em qualquer ambiente.

Portável | Leve | Eficiente | Consistente

"Mas, funciona na minha máquina...!"

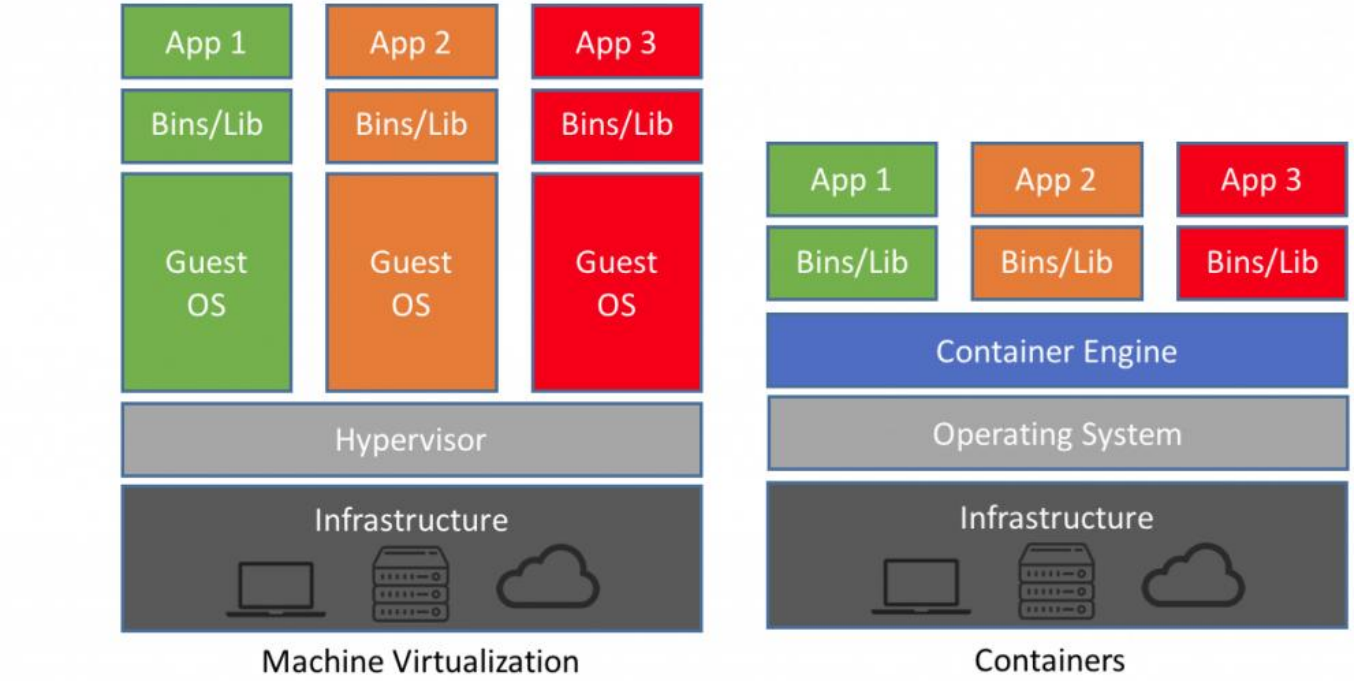
Developer:

It works on my computer

Product Manager:

Yes, but we are not going to give your computer to the customer

Tecnologias de virtualização



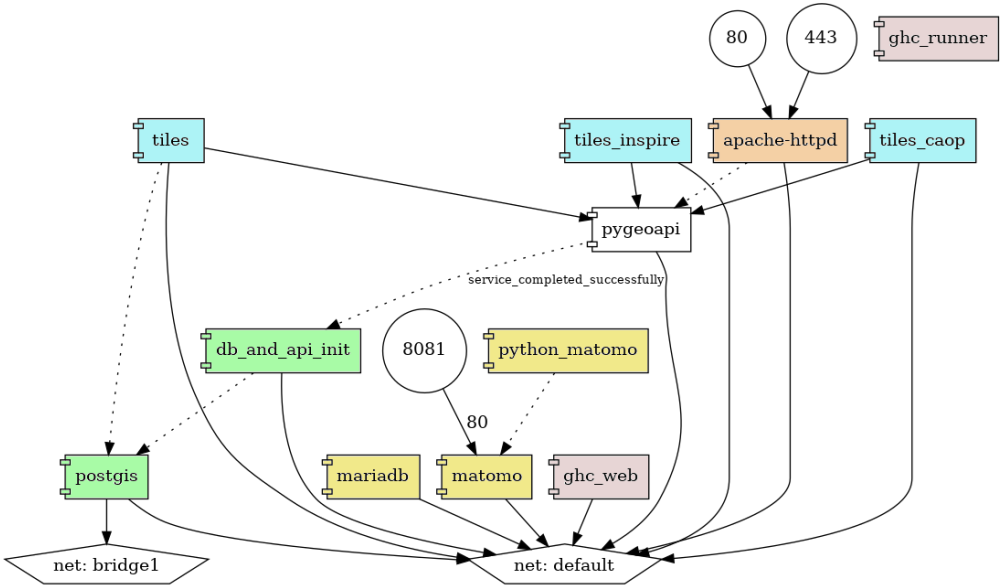
Exemplo de comando para executar um container

bash

```
docker run -p 5000:80 \
-v $(pwd)/data:/pygeoapi/mydata \
-v $(pwd)/default.config.yml:/pygeoapi/pygeoapi-
config.yml \
-e PYGEOAPI_CONFIG=/pygeoapi/pygeoapi-config.yml \
geopython/pygeoapi:latest
```

restart ↻

Que acontece quando temos arquiteturas mais complexas?

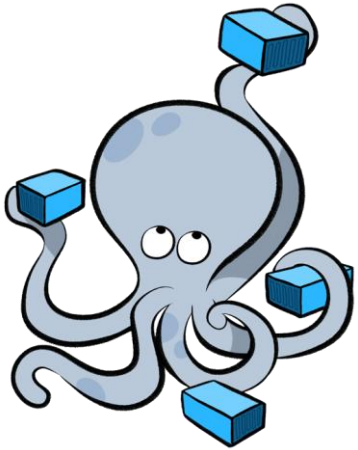


https://github.com/dgterritorio/OGCAPI

Docker Compose

https://docs.docker.com/compose/

- Ferramenta que permite definir e gerir aplicações Docker com múltiplos containers de forma simples e organizada.
- A configuração é feita num único ficheiro YAML, normalmente chamado docker-compose.yml.



```
▷Run All Services
services:

  ▷Run Service
  pygeoapi:
    image: geopython/pygeoapi:latest
    container_name: pygeoapi
    ports:
      - "5001:80"
    environment:
      PYGEOAPI_CONFIG: docker-config.yml
      PYGEOAPI_OPENAPI: example-openapi.yml
    volumes:
      - ./docker.config.yml:/pygeoapi/local.config.yml
      - ./data/:/data/
```

OGC API

OGC API – Joins

OGC API – Discrete Global Grid Systems

New

OGC API – Records

New

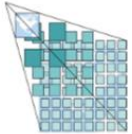
OGC API - Maps

OGC API – Connected Systems

OGC API - Styles

OGC API – Moving Features

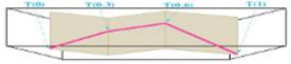
OGC API - Tiles



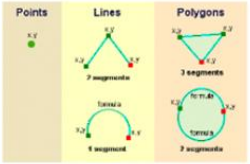
OGC API - Common

OGC API - Routes

OGC API – Environmental Data Retrieval

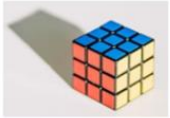


OGC API - Features

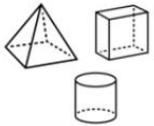


OGC API - Processes

OGC API – Coverages



OGC API – 3D GeoVolumes



OGC SensorThings API

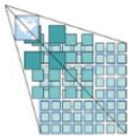
Solid green border = approved and published | Dashed green border = approved and publication pending

OGC API

OGC API - Maps

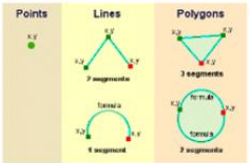
Pedir mapas customizados pela web.

OGC API - Tiles



Obter informação sobre os tilesets disponíveis e pedir as tiles.

OGC API - Features



Criar, modificar e pesquisar dados vetoriais na web.

Conjunto de Dados

https://snig.dgterritorio.gov.pt/rndg/srv/por/catalog.search#/metadata/198497815bf647ecaa990c34c42e932e

Carta Administrativa Oficial de Portugal Continental, 2024. Distritos

- GeoPackage
- Serviço WMS da DGT

OGC API - Features

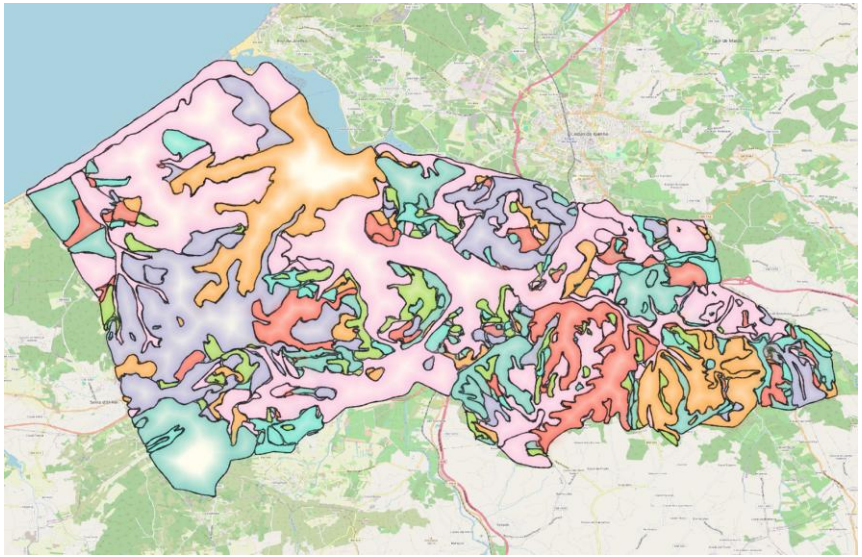
OGC API - Maps

Conjunto de Dados

https://snig.dgterritorio.gov.pt/rndg/srv/por/catalog.search#/metadata/517c5023-04cc-47a4-99f7-bb32814dd62f

Carta do Regime de Uso do Solo - ÓBIDOS

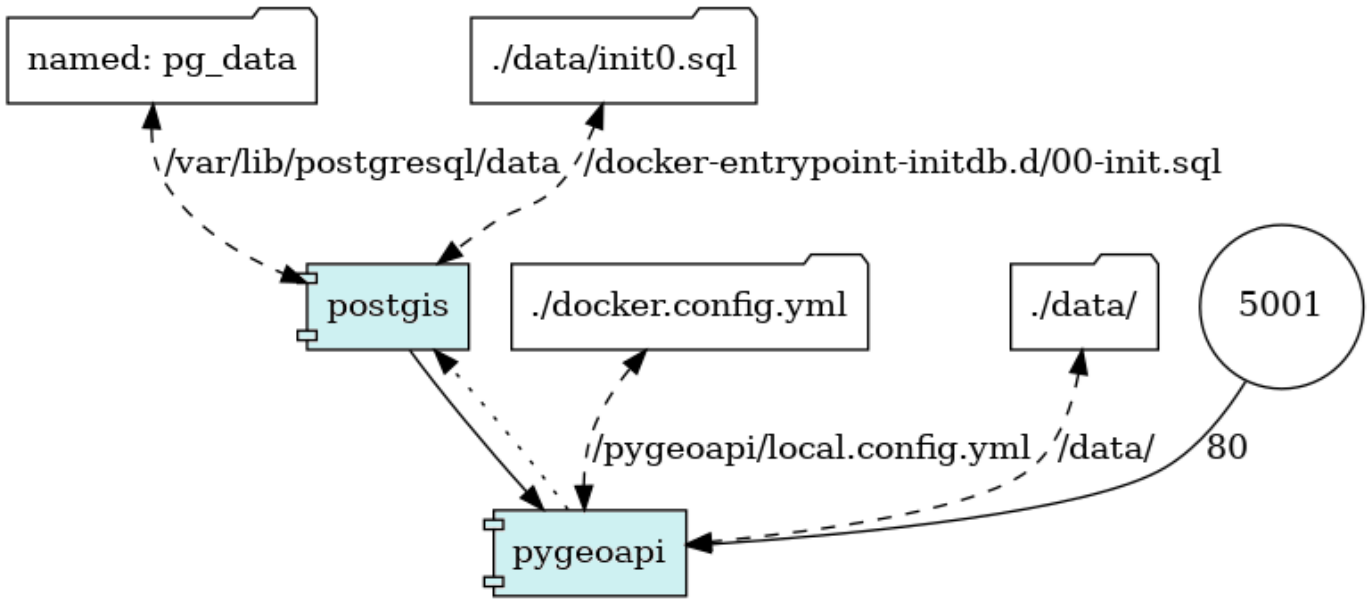
- PostGIS database



OGC API - Features

OGC API - Tiles

Tecnologias



Providers da pygeoapi: https://docs.pygeoapi.io/en/latest/data-publishing/index.html#providers-overview

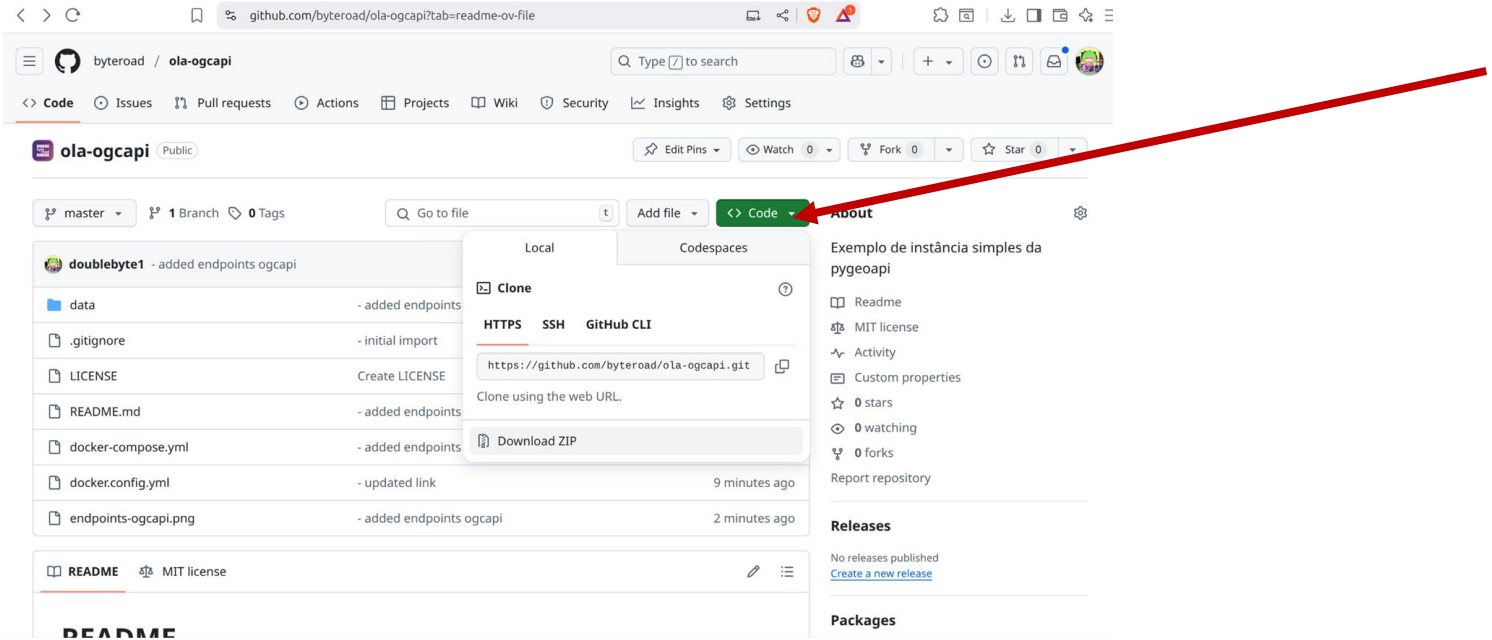
Parte Prática

- ✅ ~33 MB de espaço em disco livres
- ✅ Docker
- ✅ Terminal
- ✅ Editor de texto
- ✅ Git (opcional)

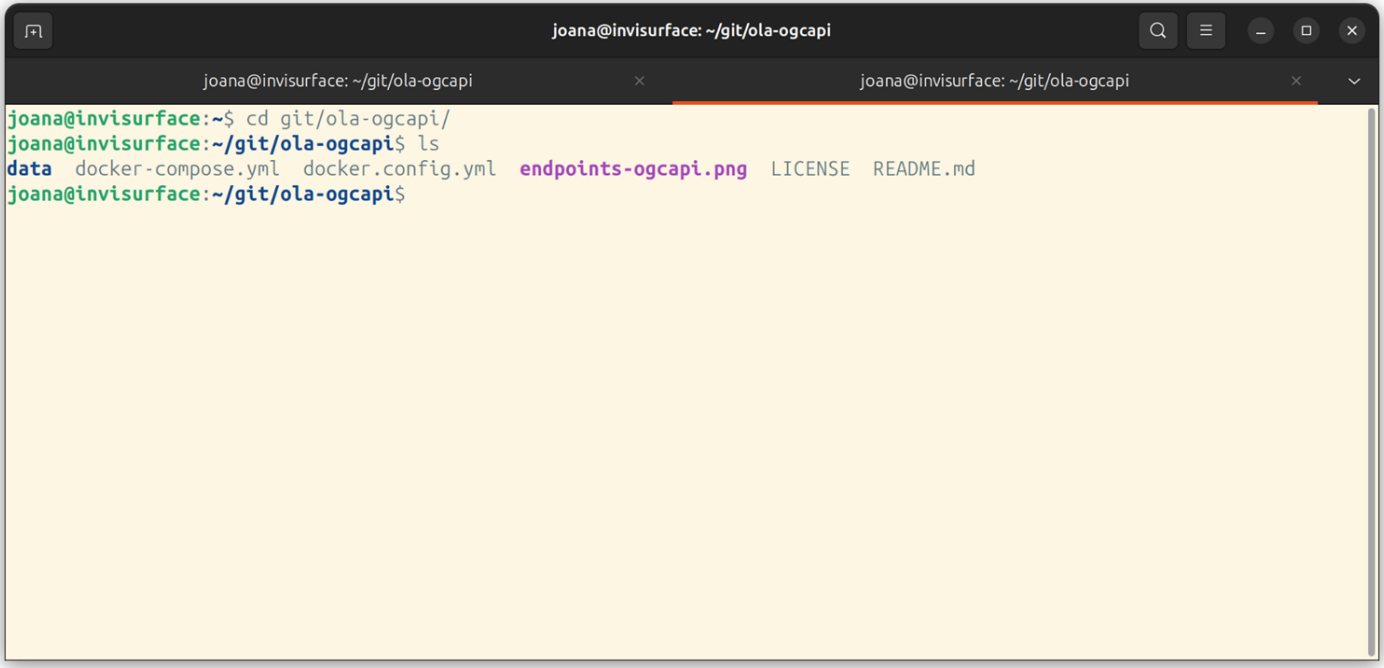
Parte Prática

https://github.com/byteroad/ola-ogcapi

Copiar o repositório para local, usando git clone ou fazendo download do zip



Abrir um terminal e navegar para a directoria onde está o repositório



Acknowledgments

https://ogcapi.dgterritorio.gov.pt/

https://dgterritorio.github.io/ogcapi-admin/

https://andywoodruff.com/posts/2024/qgis-hand-drawn-maps/

https://developer.ogc.org/

https://dive.pygeoapi.io/

info@byteroad.net

https://byteroad.net

Thank you !

Algumas imagens nesta apresentação foram criadas com recurso a IA, no DALL-E 3 e Bing/create