



Open
Geospatial
Consortium

OGC API

Trazendo as práticas de web
modernas às IDE

Joana Simoes

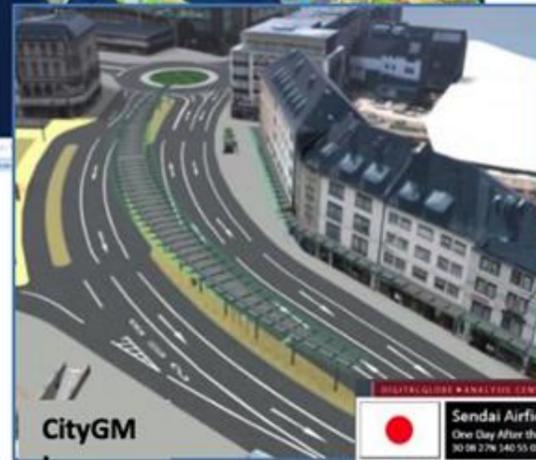
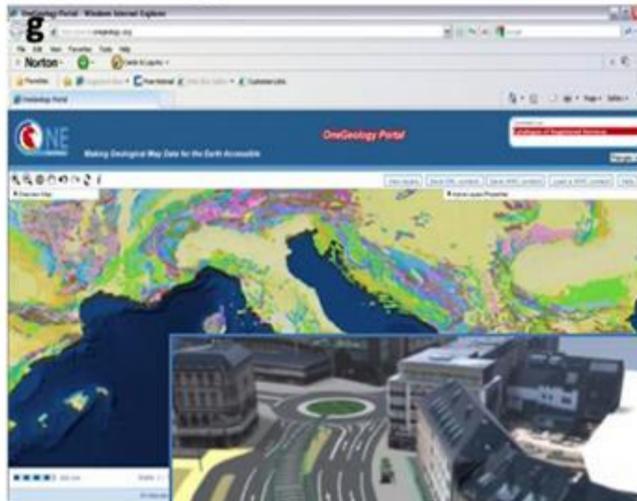


Milhões de Conjuntos de Dados Espaciais em >200K Servidores

OGC Web Services (OWS)
Web Map Service (WMS)
Web Map Tile Service (WMTS)
Web Feature Service (WFS)
Web Coverage Service (WCS)

OpenI0OS.Org

OneGeology.Or

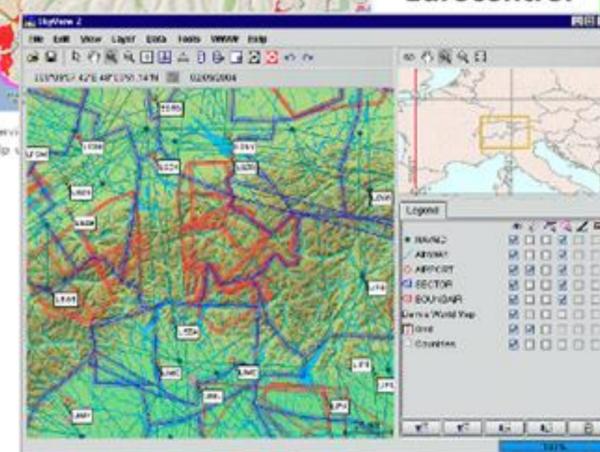


Emergency / Disaster Management

<http://oos.soest.hawaii.edu/pacios/voyager/news/2013/>

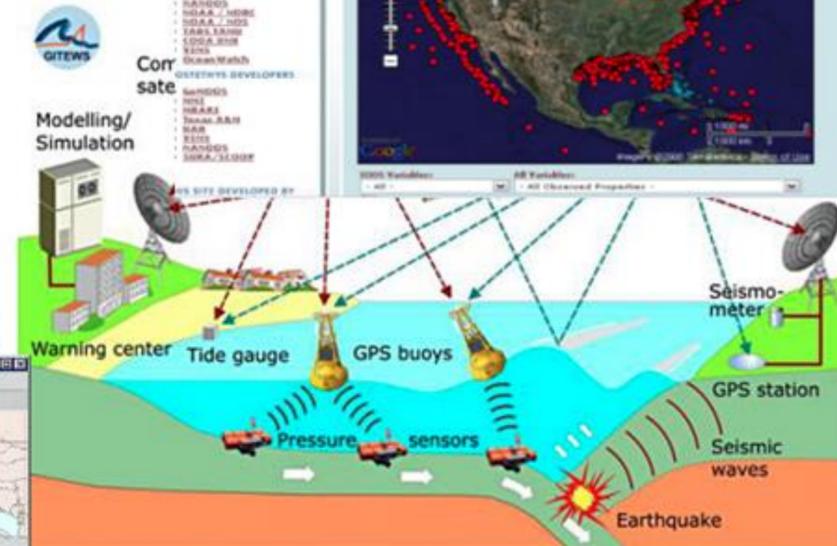


DigitalGlobe



Aviation Flight Information / Safety

Eurocontrol



Meteorology, Hydrology, Ocean Monitoring

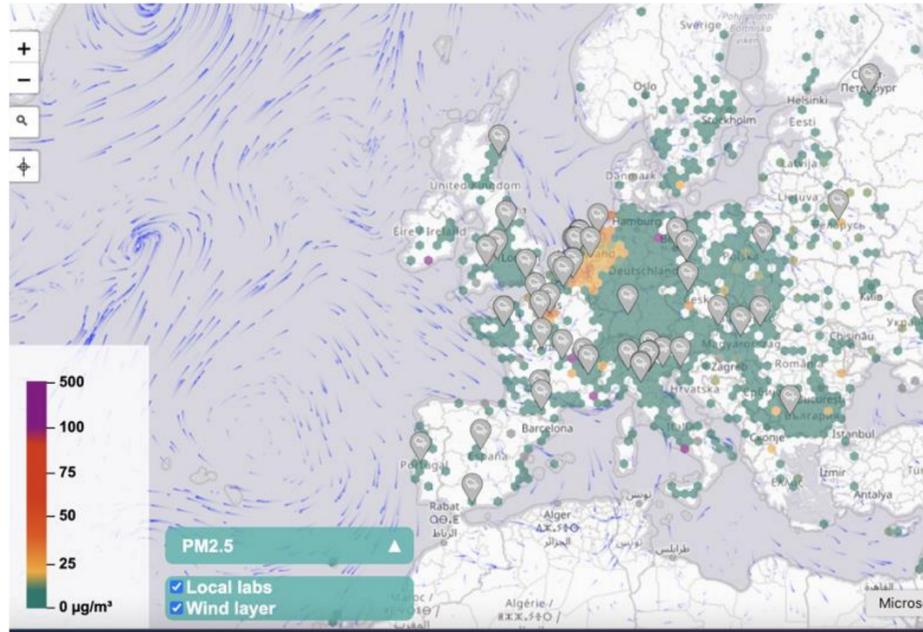


1ª Geração de Serviços de Web OGC (W*s)

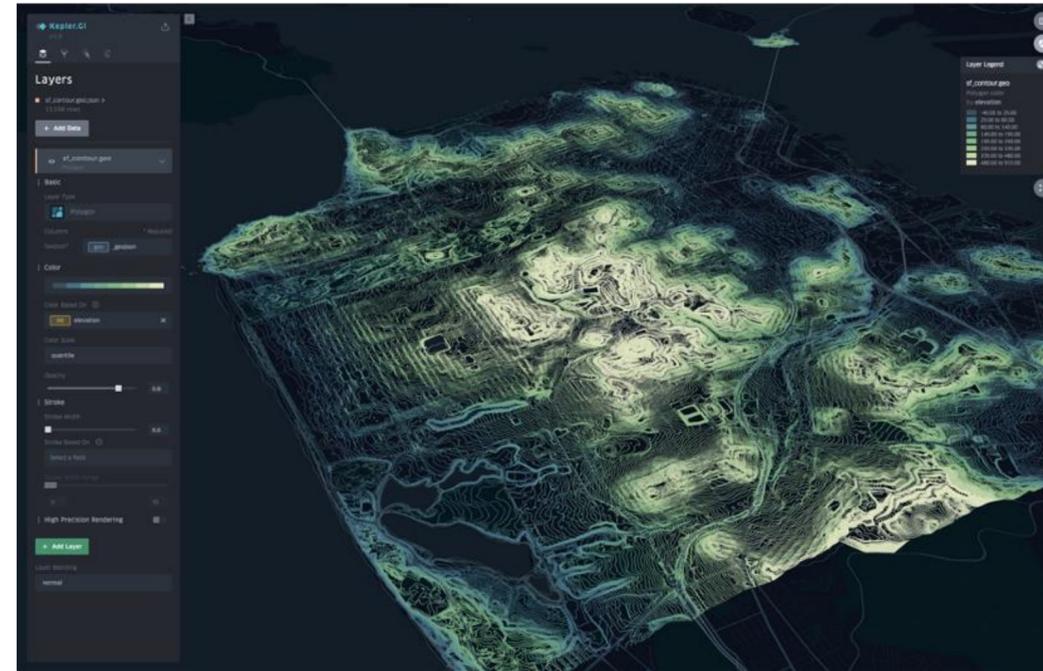
	WMS	WFS	WCS	WPS	SOS	SPS	CSW	WMTS
Use HTTP methods explicitly.	Y	N	Y*	N	N	N	N	Y
Be stateless.	Y	Y	Y	Y	Y	Y	Y	Y
Expose directory structure-like URIs.	N	N	N	N	N	N	N	Y
Use HTTP Error codes	N	N	N	N	N	N	N	N
Transfer XML, JavaScript Object Notation (JSON), or image.	Image	XML	Any	Any	XML	XML	XML	Image



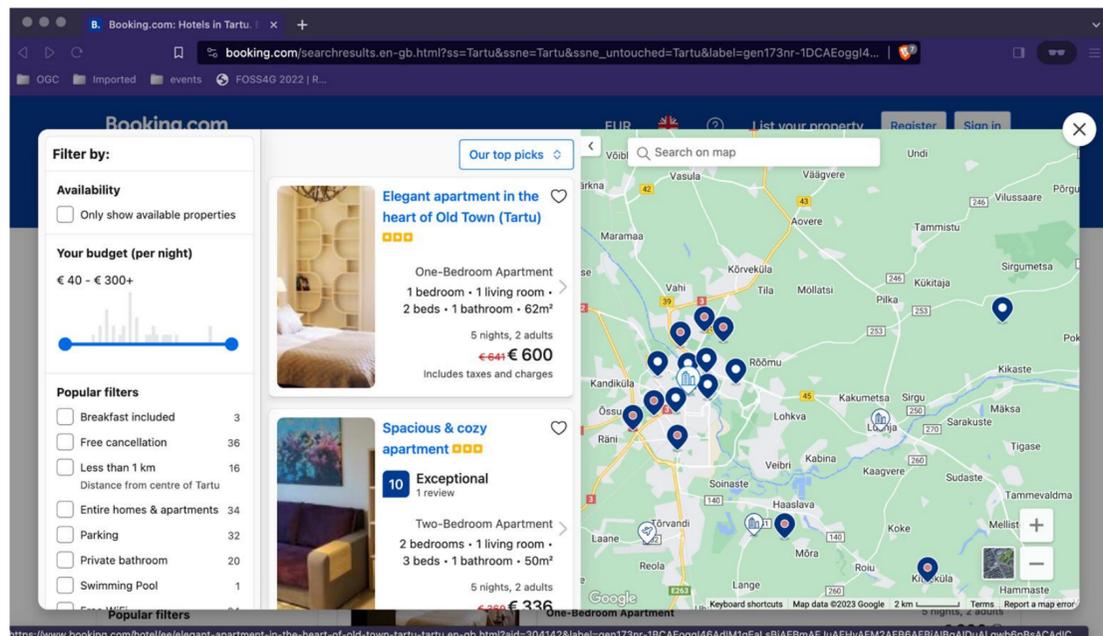
Os Dados Espaciais tornaram-se *mainstream*



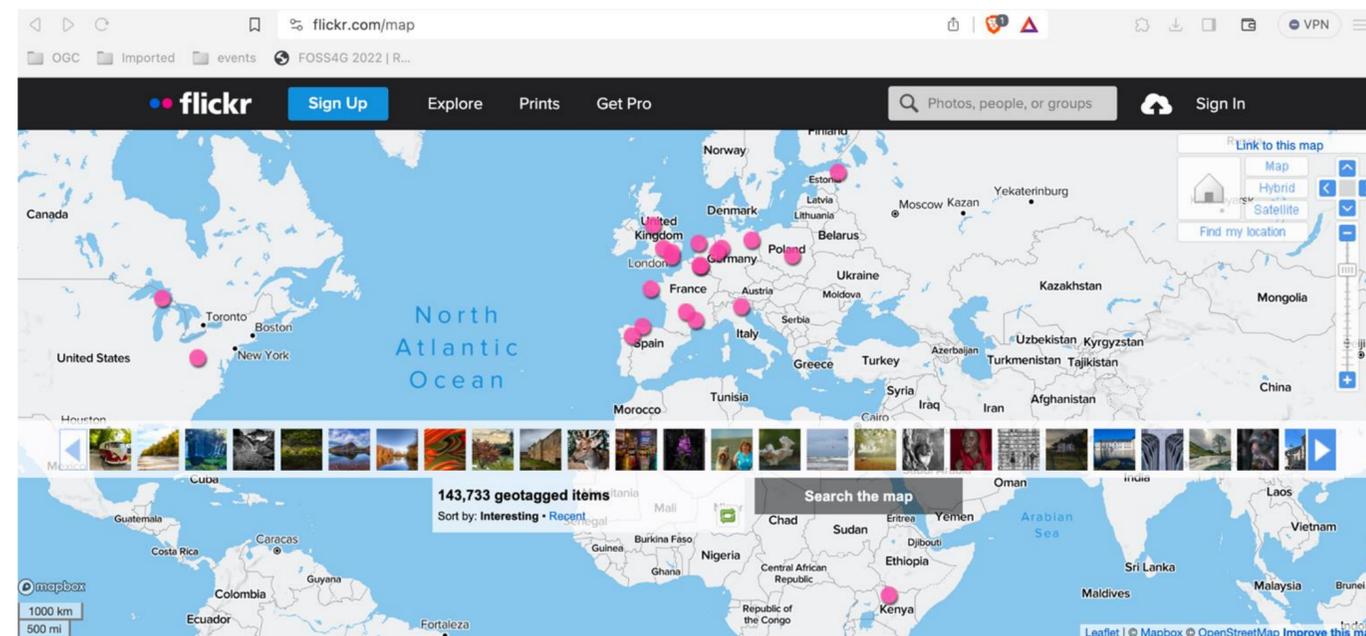
Sensor.community



Uber

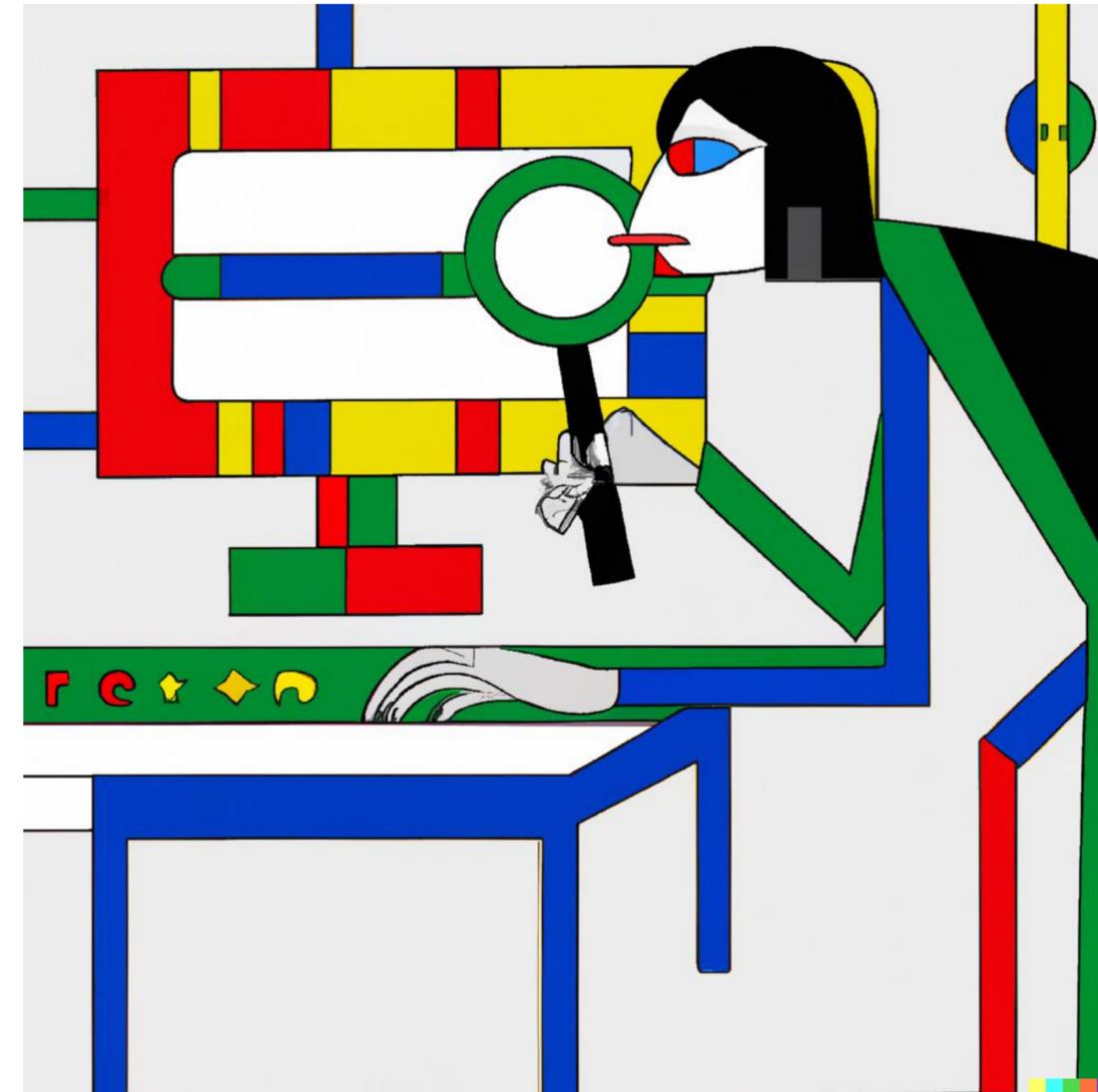


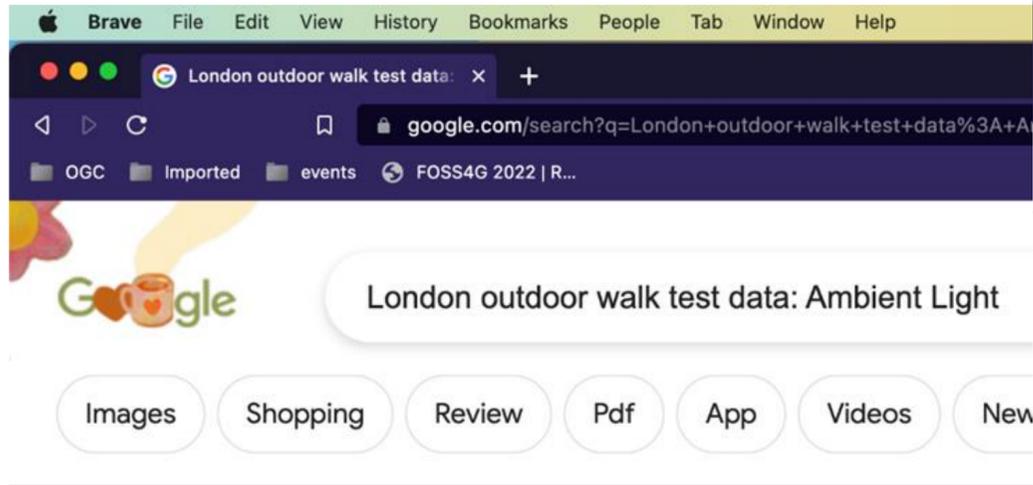
Booking



Flickr

O é que os utilizadores esperam quando procuram informação espacial?





About 2,430,000 results (0.40 seconds)

ByteRoad
https://emotional.byteroad.net > openapi

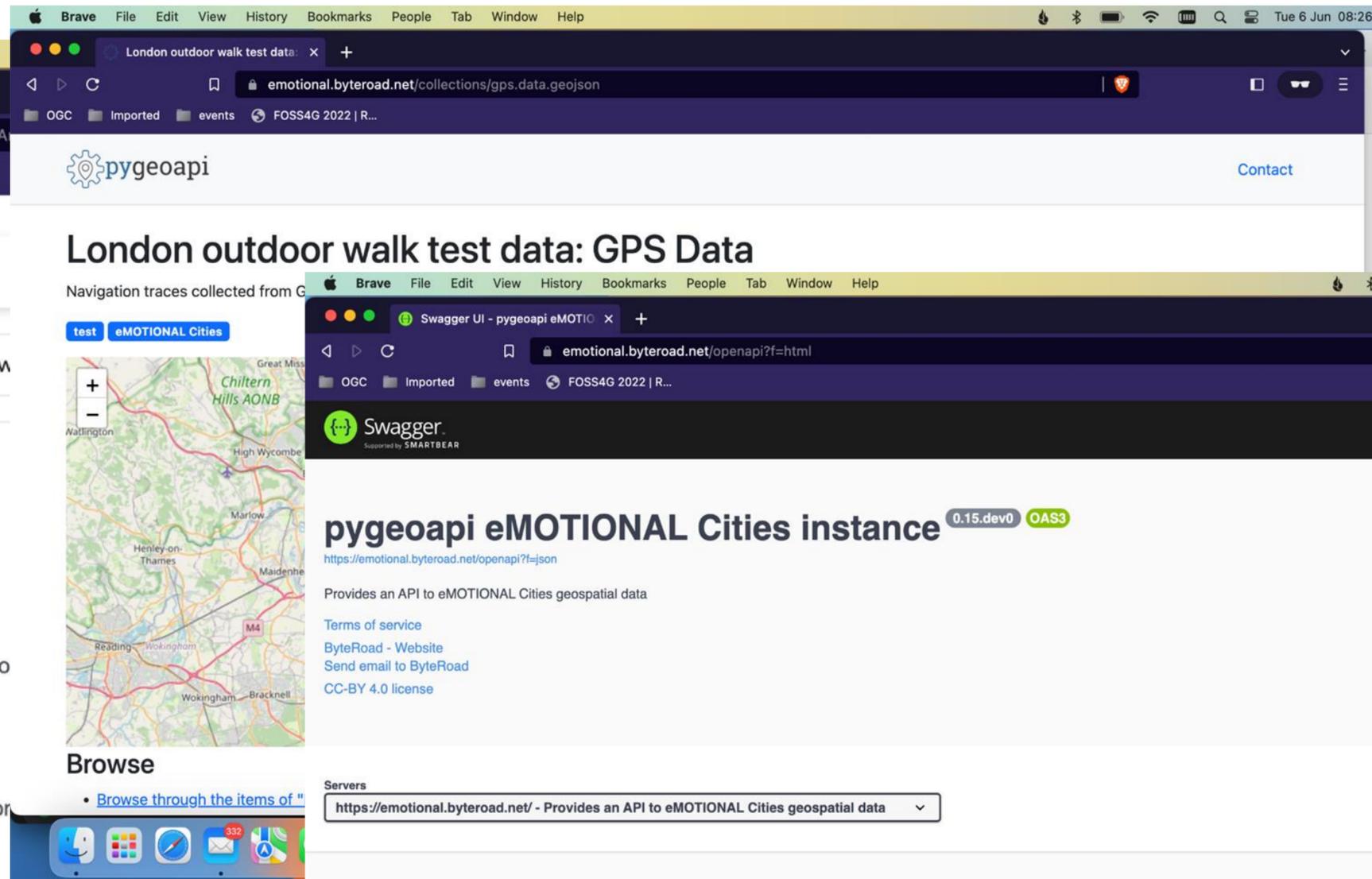
Swagger UI - pygeoapi eMOTIONAL Cities instance
Get London outdoor walk test data: Ambient Light queryables.
GET/collections/ambientlight.ambientlight.geojson/tiles. Fetch a London outdoor...

https://emotional.byteroad.net > collections > gps.data....

London outdoor walk test data: GPS Data
London outdoor walk test data: GPS Data ... Navigation traces collected from during a test walk in London for benchmarking data acquisition platform.

Springer
https://link.springer.com > Security Journal

Ambient lighting, use of outdoor spaces and perceptions ...



OGCAPI

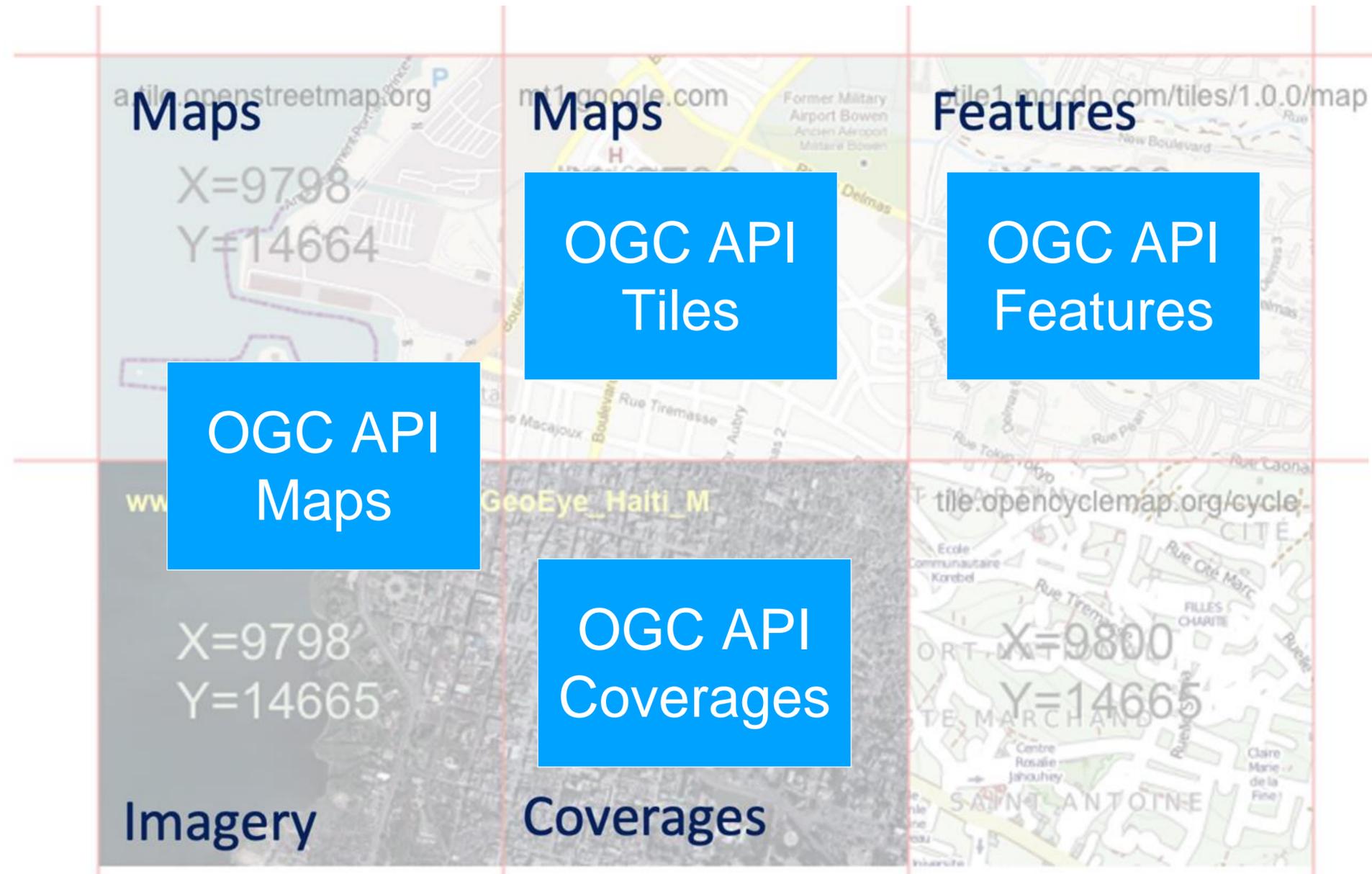
- Asseguram que os dados espaciais sejam “web native”.
- Melhoram a experiência dos programadores.
- Eventualmente, substituirão e melhorarão os Serviços Web OGC (W*s).



{ REST }



OWS -> OGCAPI



Discover via
OGC API
Records

Multiple Maps with common semantics - Interoperability (Source: Joan Maso)

OGCAPI

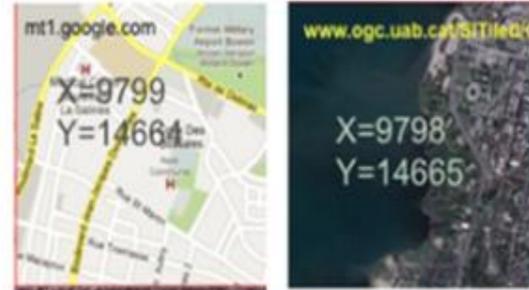
OGC API –
Discrete Global Grid Systems



OGC API –
Records



OGC API - Maps



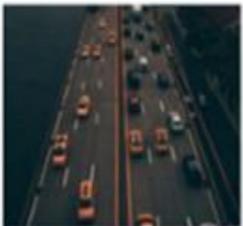
OGC API - Styles



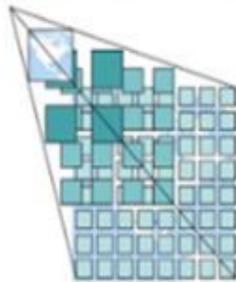
Sensor Things API



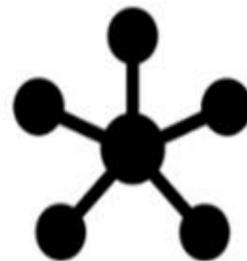
OGC API –
Moving Features



OGC API - Tiles



OGC API - Common



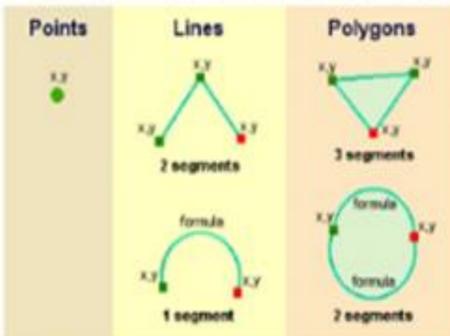
OGC API - Routes



OGC API –
Environmental Data Retrieval



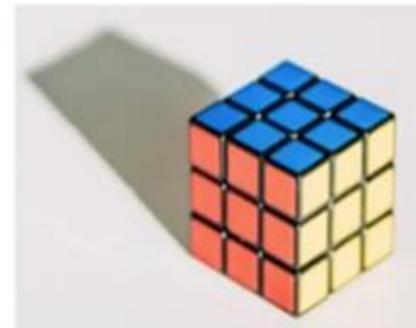
OGC API - Features



OGC API - Processes



OGC API – Coverages

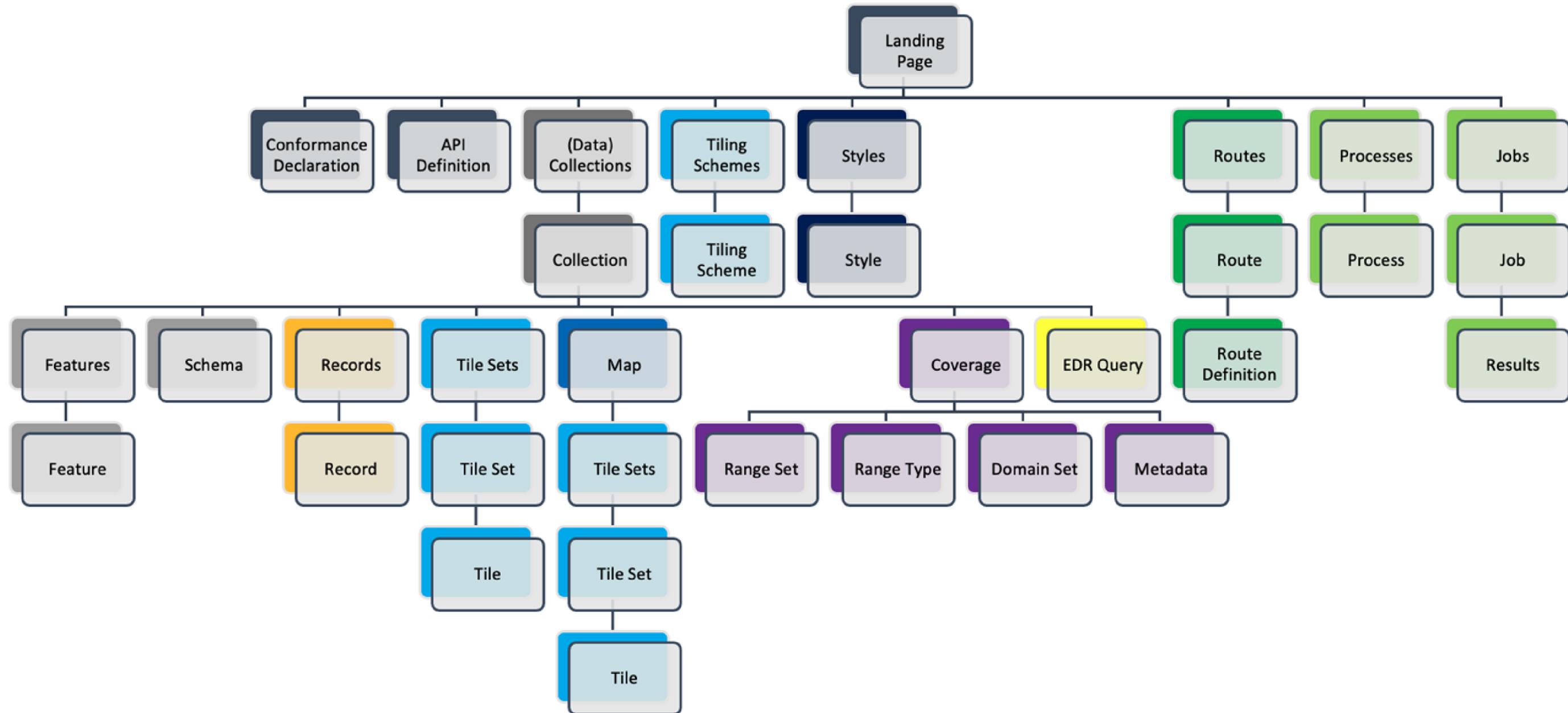


OGC API –
Joins



Green
border
means
approved

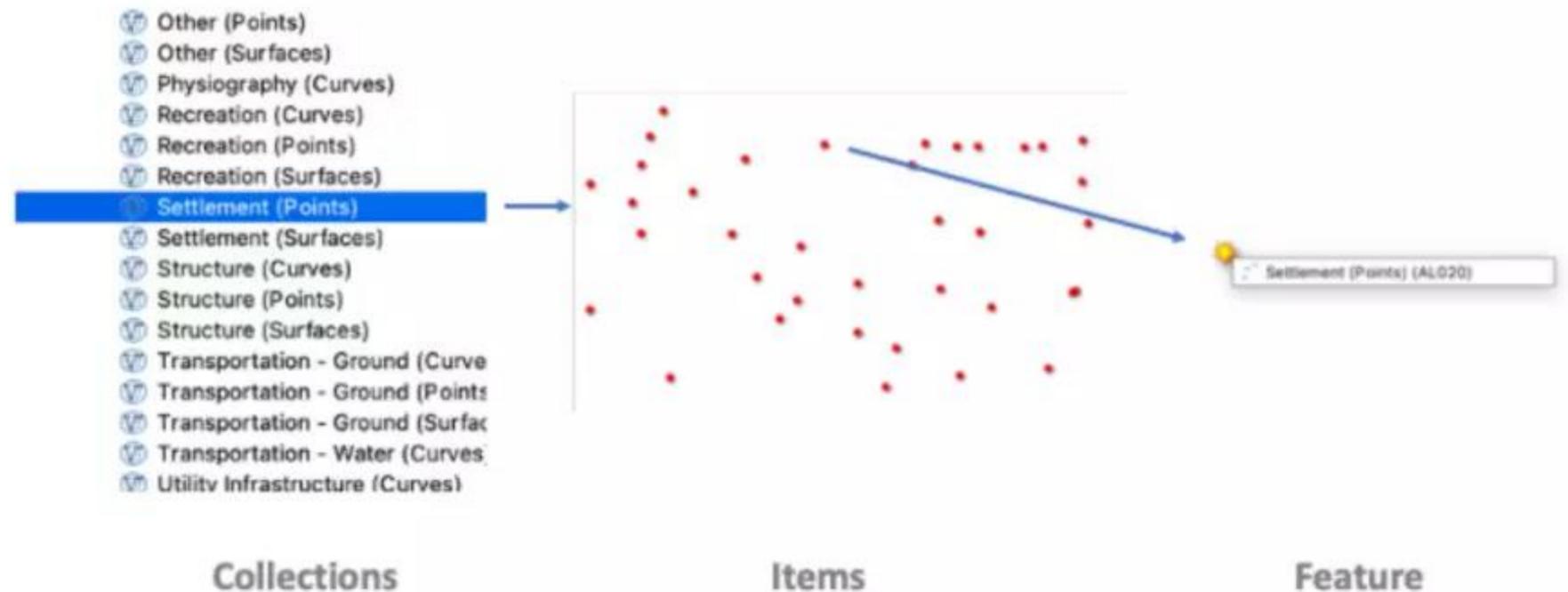
Recursos em OGCAPI

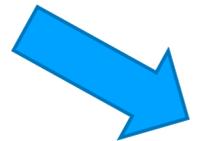


OGC API - Features

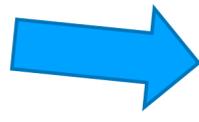


- Especifica o comportamento de APIs de web que dão acesso a entidades de um conjunto de dados, de forma independente do armazenamento dos dados.
- Sucessora do WFS.

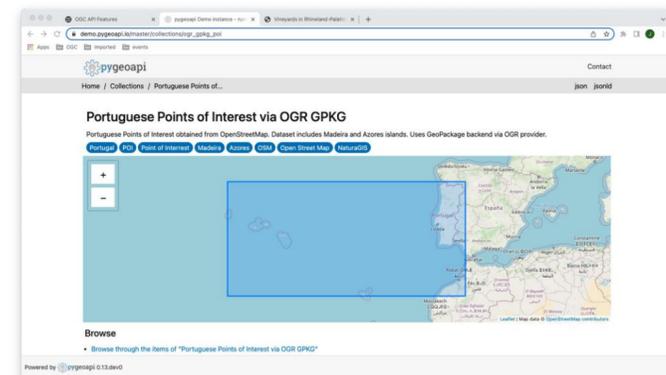
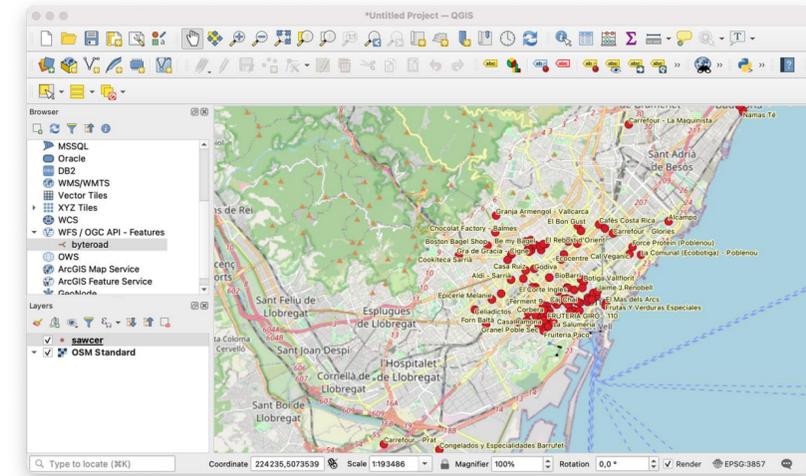
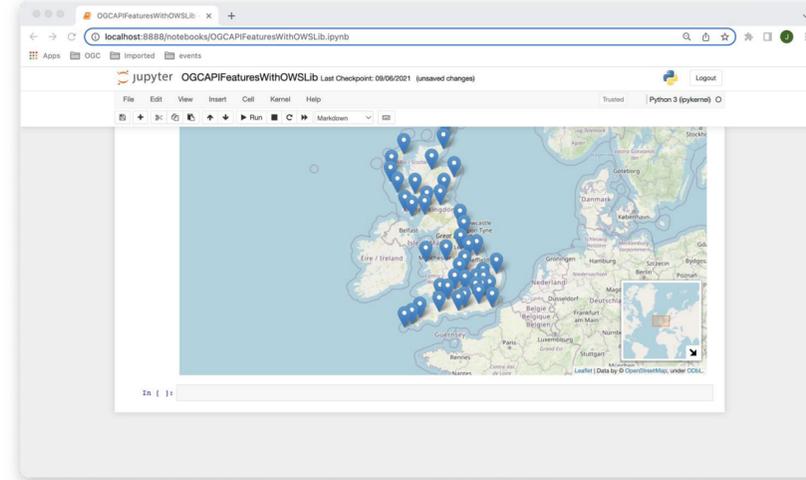
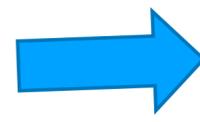
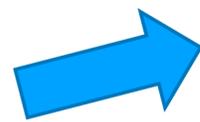




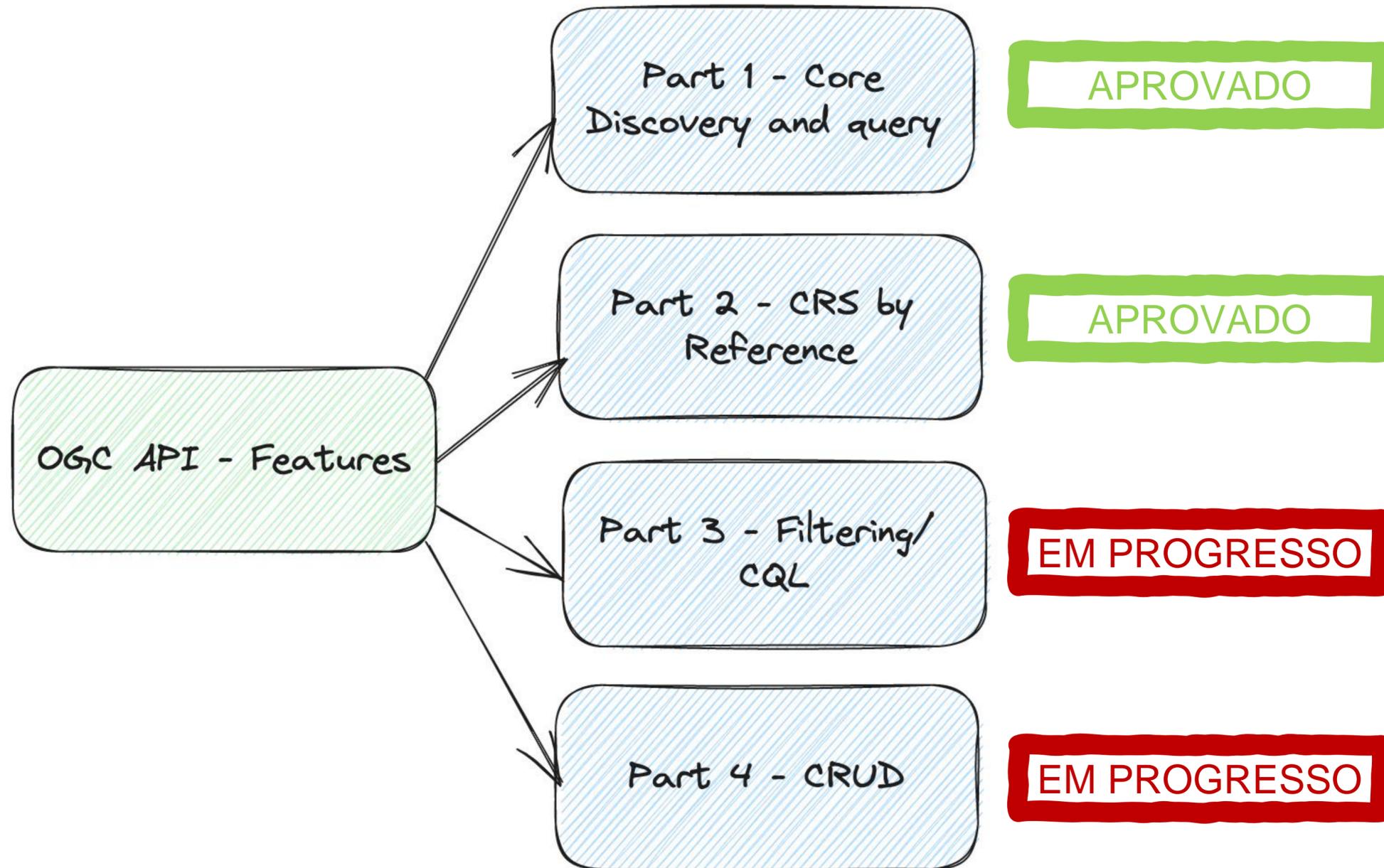
elasticsearch

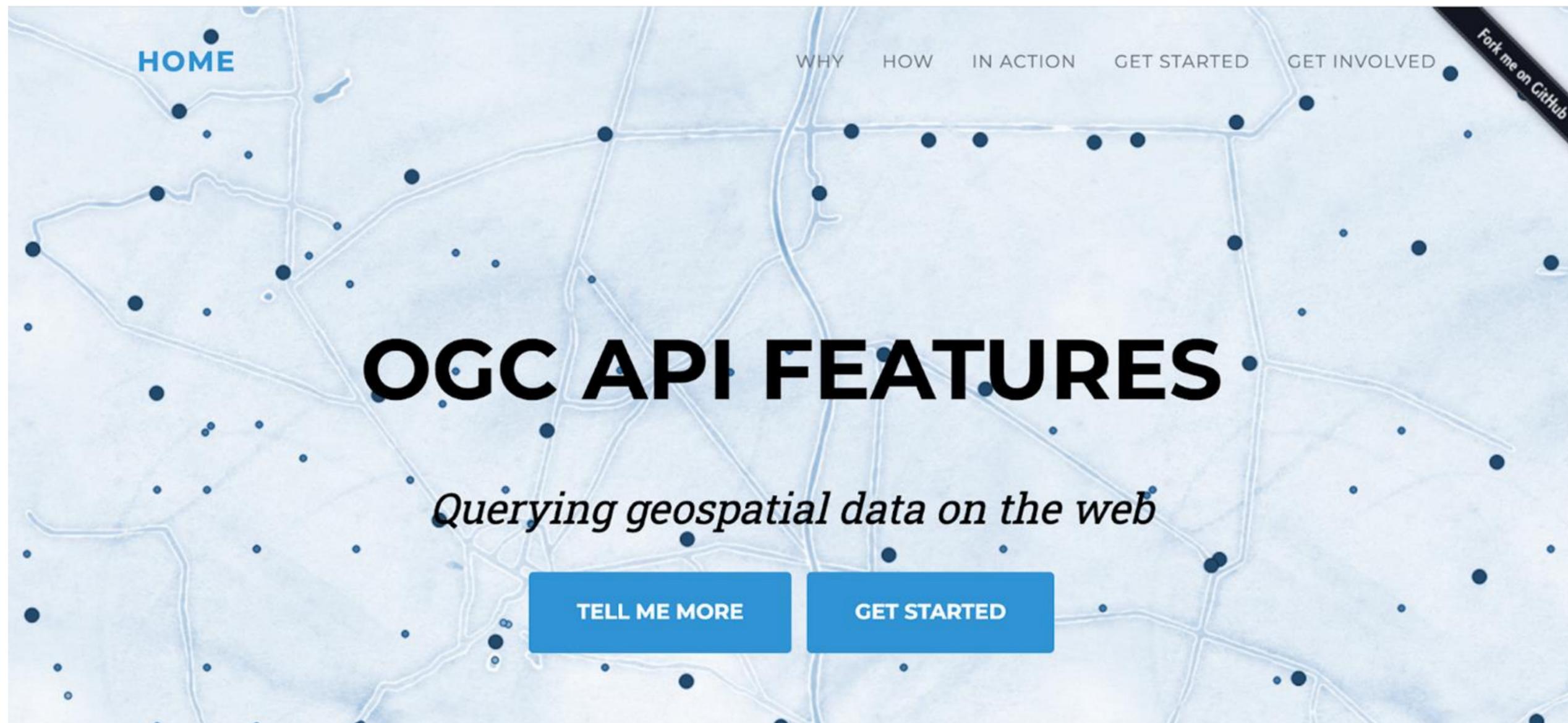


OGC API - Features



Estado da OGC API - Features

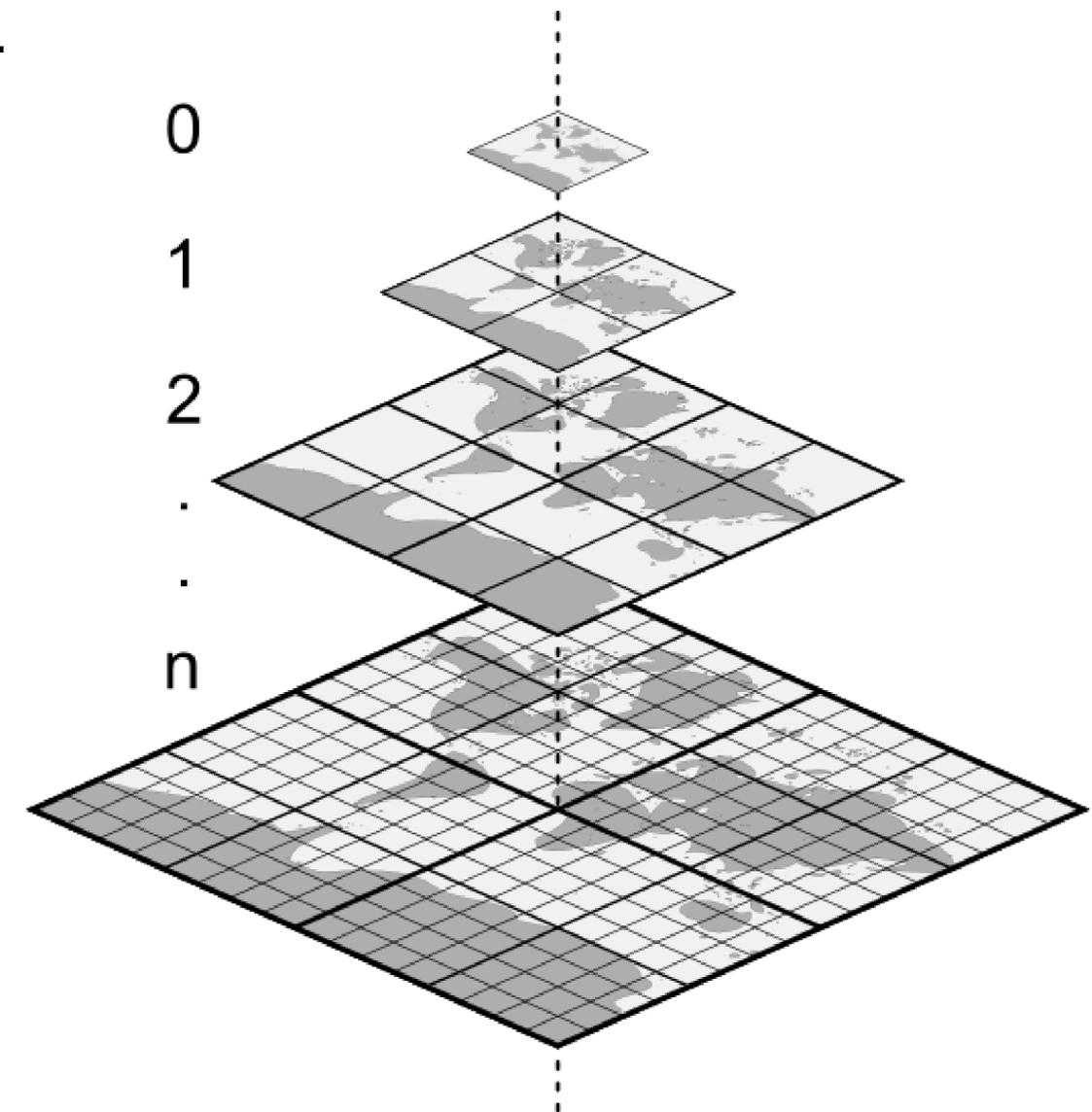


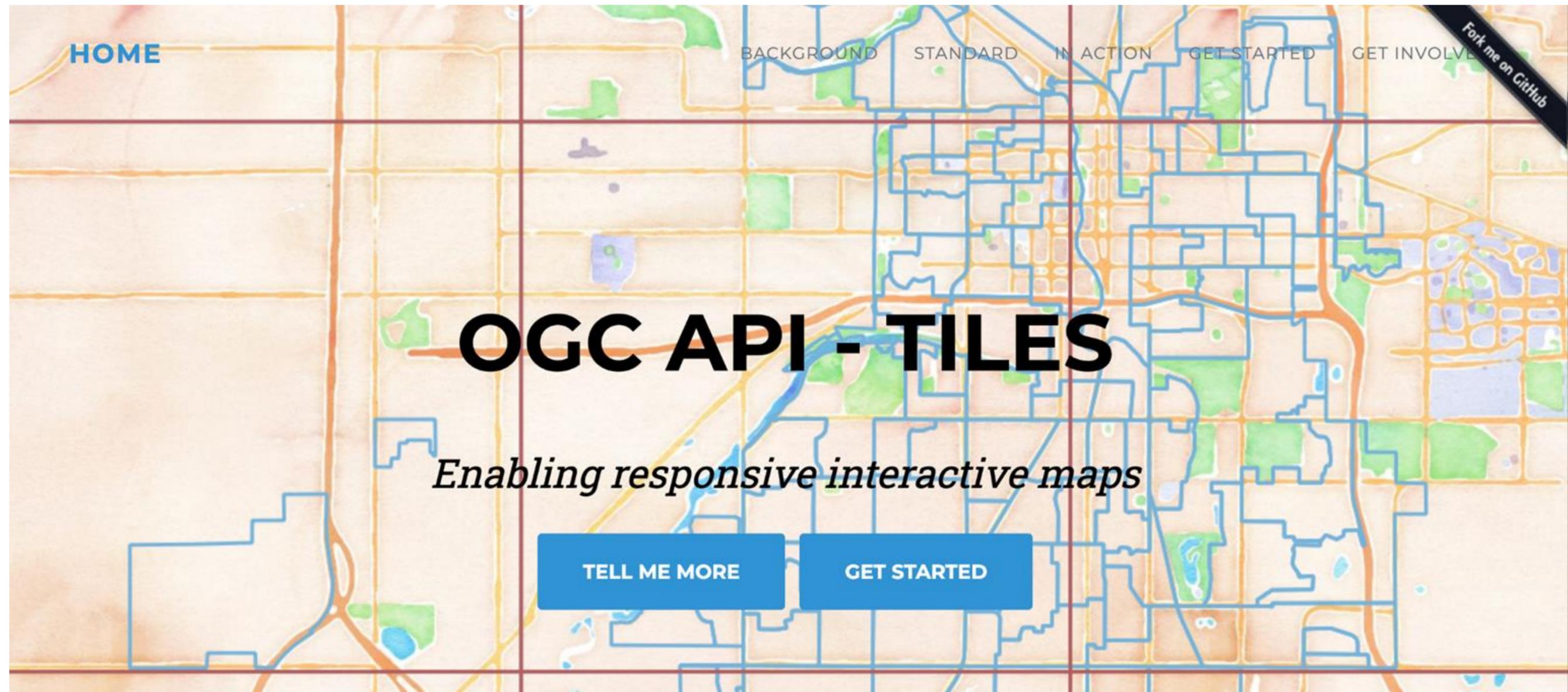


<https://features.developer.ogc.org>

OGC API - Tiles

- Descreve como os clientes de mapas (e.g.: páginas web) podem pedir informações sobre os tilesets e como pedir as tiles.
- São suportados diferentes tipos de tiles (e.g.: MVT, imagens satélite).
- Core (P1): muito simples e adiciona um pouco de formalidade ao que as pessoas já têm estado a fazer com os tilesets XYZ.
- Sucessora do WMTS.



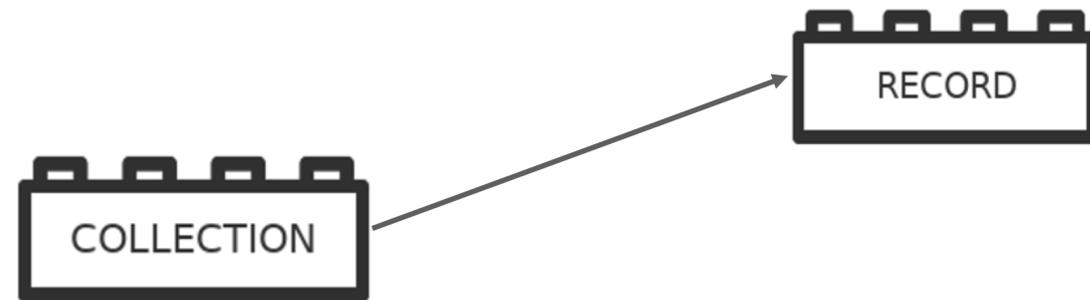


<https://tiles.developer.ogc.org/>

OGC API - Records

- Descoberta e acesso a metadados sobre recursos espaciais.
- Modelo de conteúdo + mecanismos de acesso.
- Diferentes padrões de implantação.
- Sucessor do CSW.

EM PROGRESSO



Record

- Unidade atômica de informação num catálogo.
- Modelo simples, baseado em Dublin core.
- Formatos: JSON, YAML

Queryable	Requirement	Description
recordId	M	A unique record identifier assigned by the server.
conformsTo	O	A list of identifiers indicating that the record conforms to one or more extensions. Ideally, the requirements of each listed extension is formally published.
created	O	The date this record was created in the server.
updated	O	The most recent date on which this record was changed.
language	O	The natural language used for textual values (i.e. titles, descriptions, etc) of this record.
languages	O	The list of languages in which this record can be requested.
time	M	A characteristic temporal instance or interval associated with the resource; can be <i>null</i> if not known or applicable.
geometry	M	A characteristic spatial extent associated with the resource; can be <i>null</i> if not known or applicable.
type	M	The nature or genre of the resource described by this record.
title	M	A human-readable name given to the resource described by this record.
description	O	A free-text description of the resource.
keywords	O	A list of free-form keywords or tags associated with the resource.
resourceLanguages	O	A list of languages in which the resource can be requested.
externalIds	O	A list of identifiers for the resource assigned by one or more external entities.
themes	O	A knowledge organization system used to classify the resource.
formats	O	A list of available distributions for the resource.
contacts	O	A list of entities to contact about the resource.
license	O	A legal document under which the resource is made available.
rights	O	A statement that concerns all rights not addressed by the license such as a copyright statement.
links	O	A list of links including links for accessing the resource (e.g. download link, access link, etc.) in one of the supported distribution formats, links to other resources associated with this resource and links for navigating the API (e.g. prev, next, alternate, etc.). See link schema .

Collection

- Descreve uma colecção de recursos.
- Contém links para aceder aos recursos.

CrudeP - Obesity - Age Above 18 years	Model-based estimate for crude prevalence of obesity among adults aged ≥ 18 years, 2019 AND Estimated confidence interval for crude prevalence of obesity among adults aged ≥ 18 years		
CrudeP - Physical Health Not Good for People Aged Above 18 Years	Model-based estimate for crude prevalence of physical health not good for ≥ 14 days among adults aged ≥ 18 years, 2019 AND Estimated confidence interval for crude prevalence of physical health not good for ≥ 14 days among adults aged ≥ 18 years		
CrudeP - Stroke -Age Above 18 Years	Model-based estimate for crude prevalence of stroke among adults aged ≥ 18 years, 2019 AND Estimated confidence interval for crude prevalence of stroke among adults aged ≥ 18 years		
Demo data for workshop	Read data from the data lake		
STA Things	SensorThings API Things		
STA Datastreams	SensorThings API Datastreams		
STA Observations	SensorThings API Observations		

Records collections

Title	Description	Show
eMOTIONAL Cities Metadata catalog	eMOTIONAL Cities Metadata catalog (OGC API Records)	

Outras OGCAPI

- OGC API - Maps: interface para mapas, customizados usando parâmetros.
- OGC API - Styles: interface para estilos para dados espaciais.
- OGC API - Coverages: interface para colecções homogéneas de valores no espaço e no tempo.
- OGC API - Processes: interface para envolver tarefas computacionais dentro de processos executáveis.
- OGC API - EDR: interface para aceder a dados ambientais, através de amostragens espacio-temporais.

EM PROGRESSO

EM PROGRESSO

EM PROGRESSO

APROVADO

APROVADO

developer.ogc.org

OGC Imported events FOSS4G 2022 | R...

TESTIMONIALS GET STARTED LEARN COMMUNITY Fork me on GitHub

Build interoperable, geospatial, solutions with OGC standards

- ✓ Providing a consistent way for different systems to interoperate and share geospatial data.
- ✓ Enabling applications to more easily access and use geospatial data from a wide variety of sources.
- ✓ Made by developers, for developers.

```
curl -X 'GET' \
'https://demo.pygeoapi.io/maste'
-H 'accept: application/geo+jsc'
```

Copy

LEARN GET STARTED

<https://developer.ogc.org/>

Implementações das OGC APIs

- OGC API - Features – 21
- OGC API - Tiles -17
- OGC API Records - 11
- OGC API - Processes - 9
- OGC API - Maps - 9
- OGC API - Coverages - 7
- OGC API - EDR - 6



Fonte:

<https://github.com/opengeospatial/>
(10/10/2023)

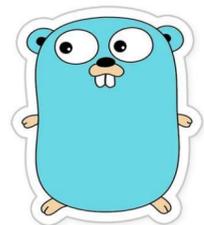


OSGeo Implementações certificadas das OGC APIs

OSGeo Product	Badges
pygeoapi 0.9.0	   
Degree OGCAPI 1.3	   

Fonte:

<https://www.ogc.org/resources/certified-products/>
(03/10/2023)



Compliant



Reference
Implementation



Early
Implementer



OGCAPI
Implementation



DOI 10.5281/zenodo.7949496

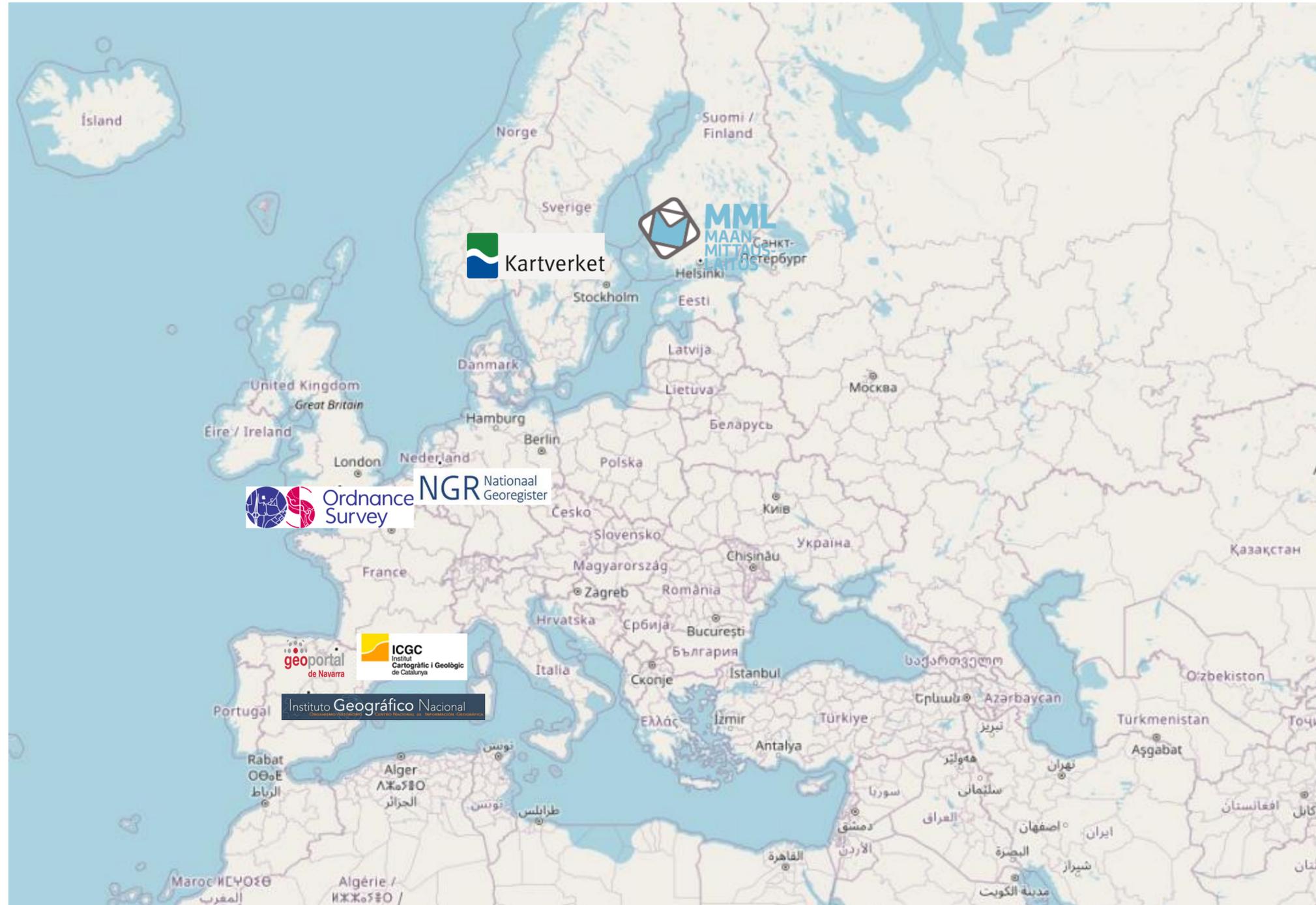


- Implementação em Python de um servidor da suite de standards OGC API.
- O projeto emergiu em 2018 como parte dos esforços para a próxima geração de APIs da OGC.
- Fornece às organizações a capacidade de ter uma API, usando tecnologias modernas de web.
- FOSS (MIT).

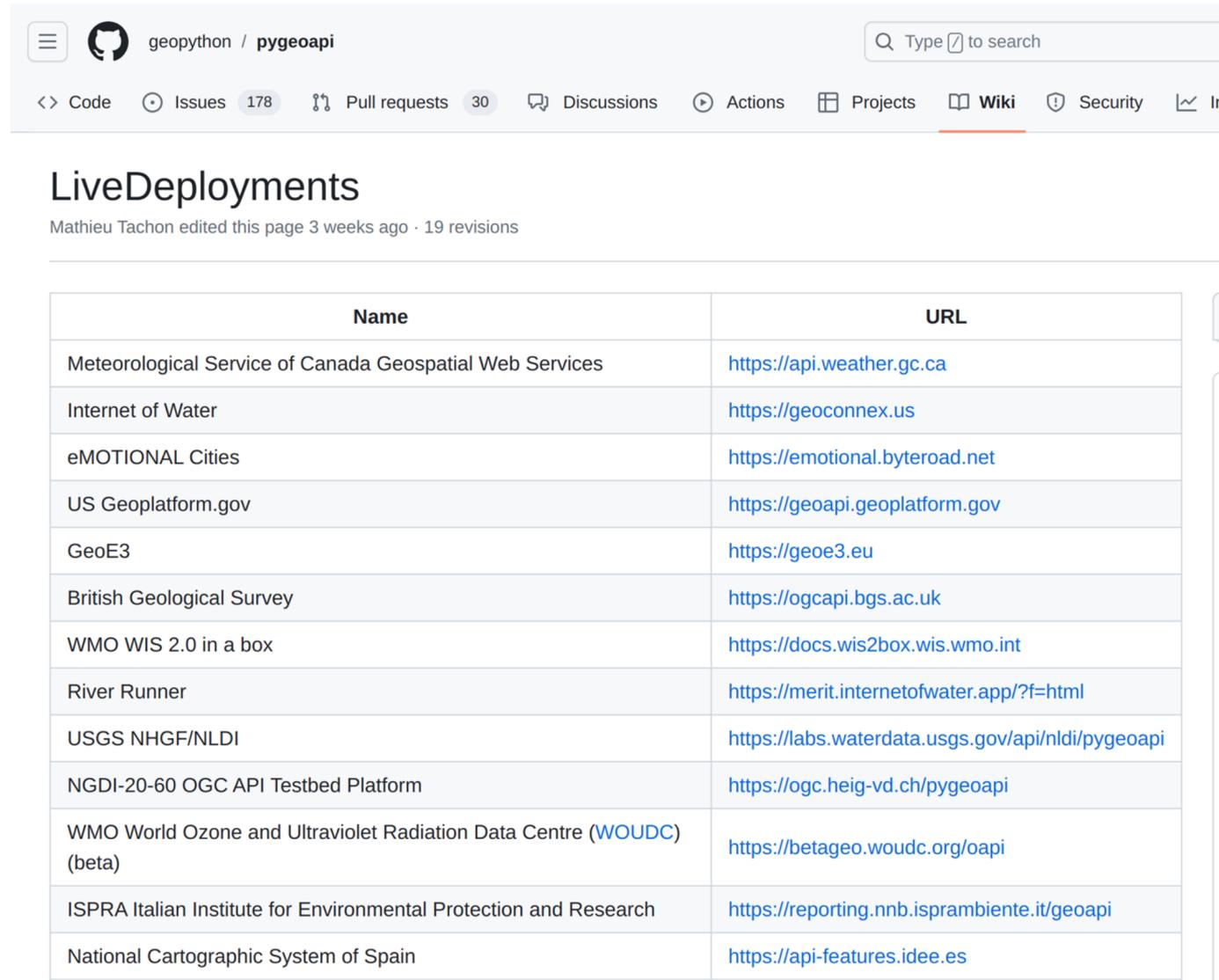


<https://pygeoapi.io/>

Agências Cartográficas que publicam dados com uma ou mais OGC API



Mais Casos de Uso (em todo o mundo):



The screenshot shows the GitHub Wiki page for the repository 'geopython / pygeoapi'. The page title is 'LiveDeployments' and it was last edited 3 weeks ago. Below the title is a table with two columns: 'Name' and 'URL'. The table lists 14 different use cases of the pygeoapi library, including the Meteorological Service of Canada, Internet of Water, eMOTIONAL Cities, US Geoplatform.gov, GeoE3, British Geological Survey, WMO WIS 2.0 in a box, River Runner, USGS NHGF/NLDI, NGDI-20-60 OGC API Testbed Platform, WMO World Ozone and Ultraviolet Radiation Data Centre (beta), ISPRA Italian Institute for Environmental Protection and Research, and National Cartographic System of Spain.

Name	URL
Meteorological Service of Canada Geospatial Web Services	https://api.weather.gc.ca
Internet of Water	https://geoconnex.us
eMOTIONAL Cities	https://emotional.byteroad.net
US Geoplatform.gov	https://geoapi.geoplatform.gov
GeoE3	https://geoe3.eu
British Geological Survey	https://ogcapi.bgs.ac.uk
WMO WIS 2.0 in a box	https://docs.wis2box.wis.wmo.int
River Runner	https://merit.internetofwater.app/?f=html
USGS NHGF/NLDI	https://labs.waterdata.usgs.gov/api/nldi/pygeoapi
NGDI-20-60 OGC API Testbed Platform	https://ogc.heig-vd.ch/pygeoapi
WMO World Ozone and Ultraviolet Radiation Data Centre (WOUDC) (beta)	https://betageo.woudc.org/oapi
ISPRA Italian Institute for Environmental Protection and Research	https://reporting.nnb.isprambiente.it/geoapi
National Cartographic System of Spain	https://api-features.idee.es

- <https://github.com/geopython/pygeoapi/wiki/LiveDeployments>

Como participar na OGC?



Participar como membro ✓

- Juntar-se e participar nos Grupos de Trabalho de Standards e Domínios.

Seguir os repositórios do GitHub ✓

- Criar issues.
- Contribuir com PRs.

Juntar-se aos code sprints ✓

- Criar/actualizar implementações.
- Dar feedback.
- Patrocinar.

Seguir o ILAF ✓

- Participar na lista de discussão.
- Participar nos eventos.

Participar nos Grupos de Trabalho



- Grupos de trabalho dos standards – Grupos que trabalham nos standards (novos ou revisões) através do processo OGC RFC.
- Grupos de trabalho de domínio – Grupo que trabalham na tecnologia ou requisitos específicos de domínio para a interoperabilidade.

Land Administration DWG✓

- Actividades relacionadas com a administração do território.

Metadata and Catalog DWG✓

- Aborda a forma como os metadados devem estar especificados em standards OGC
- Mantém uma colaboração estreita com o ISO TC/211.

Urban Digital Twins DWG✓

- Fórum para a discussão e apresentação de requisitos de interoperabilidade, no contexto dos Digital Twins Urbanos.

Coordinate Reference System DWG✓

- Desenvolve estratégias para codificar os CRS da terra e para fazer transformações entre CRS.

Seguir os repositórios do GitHub

The screenshot shows the GitHub interface for the repository 'opengeospatial/ogcapi-features'. At the top, there is a search bar and navigation links for 'Pull requests', 'Issues', 'Marketplace', and 'Explore'. The repository name is displayed with statistics: 56 watchers, 122 stars, and 38 forks. Below this, there are tabs for 'Code', 'Issues (68)', 'Pull requests (4)', 'Actions', 'Projects (4)', 'Wiki', 'Security', 'Insights', and 'Settings'. The current view is the 'README.md' file for the 'master' branch. A commit by 'cportele' is shown, adding part 3 to the README. The file statistics are 141 lines (96 sloc) and 7.71 KB. The README content includes the title 'OGC API - Features', a description of the repository's purpose, and an 'Overview' section.

Branch: master **ogcapi-features / README.md** Find file Copy path

OGC API - Features

This GitHub repository contains [OGC's](#) standard for querying geospatial information on the web, "OGC API - Features". The latest version of the specification can be found at docs.opengeospatial.org/is/17-069r3/17-069r3.html.

OGC API standards define modular API building blocks to spatially enable Web APIs in a consistent way. [OpenAPI](#) is used to define the reusable API building blocks with responses in JSON and HTML.

The OGC API family of standards is organized by resource type. OGC API Features specifies the fundamental API building blocks for interacting with features. The spatial data community uses the term 'feature' for things in the real world that are of interest.

If you are unfamiliar with the term 'feature', the explanations on [Spatial Things, Features and Geometry](#) in the W3C/OGC Spatial Data on the Web Best Practice document provide more detail.

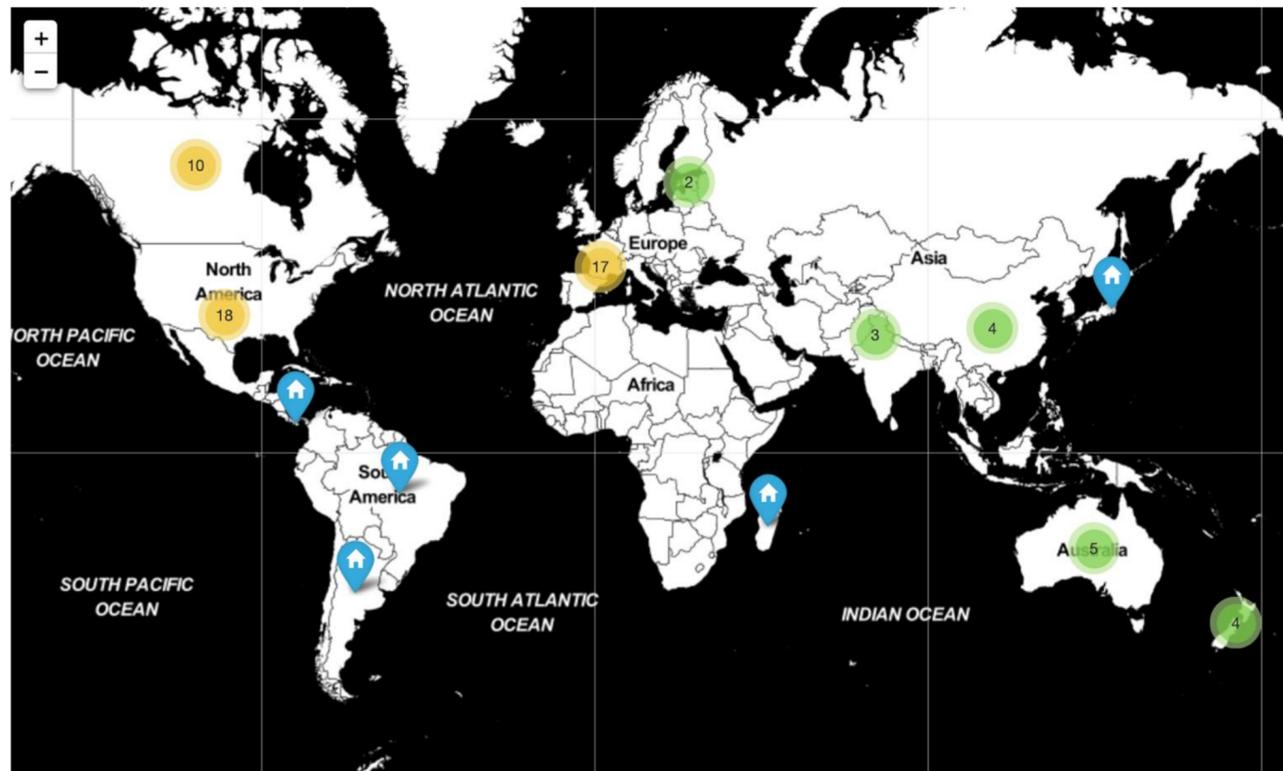
Overview

OGC API Features provides access to collections of geospatial data.

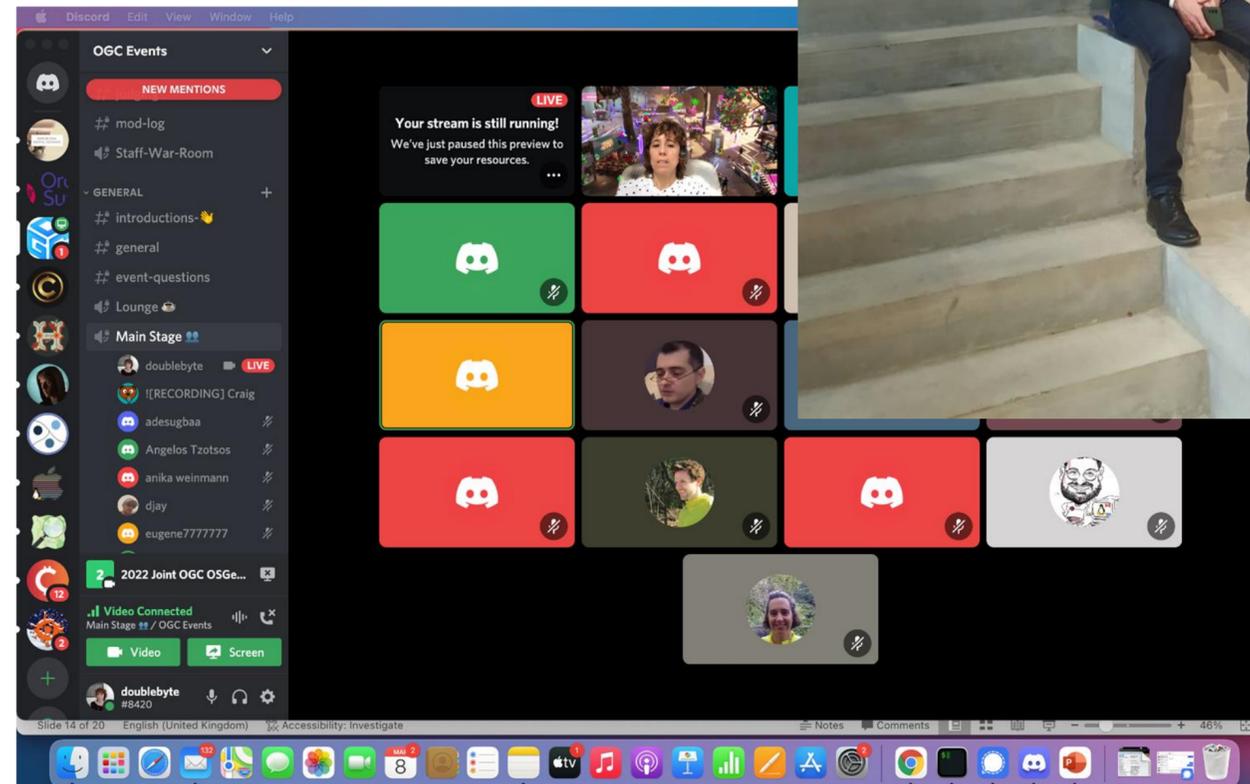
<https://github.com/opengeospatial/>

Participar nos Code Sprints

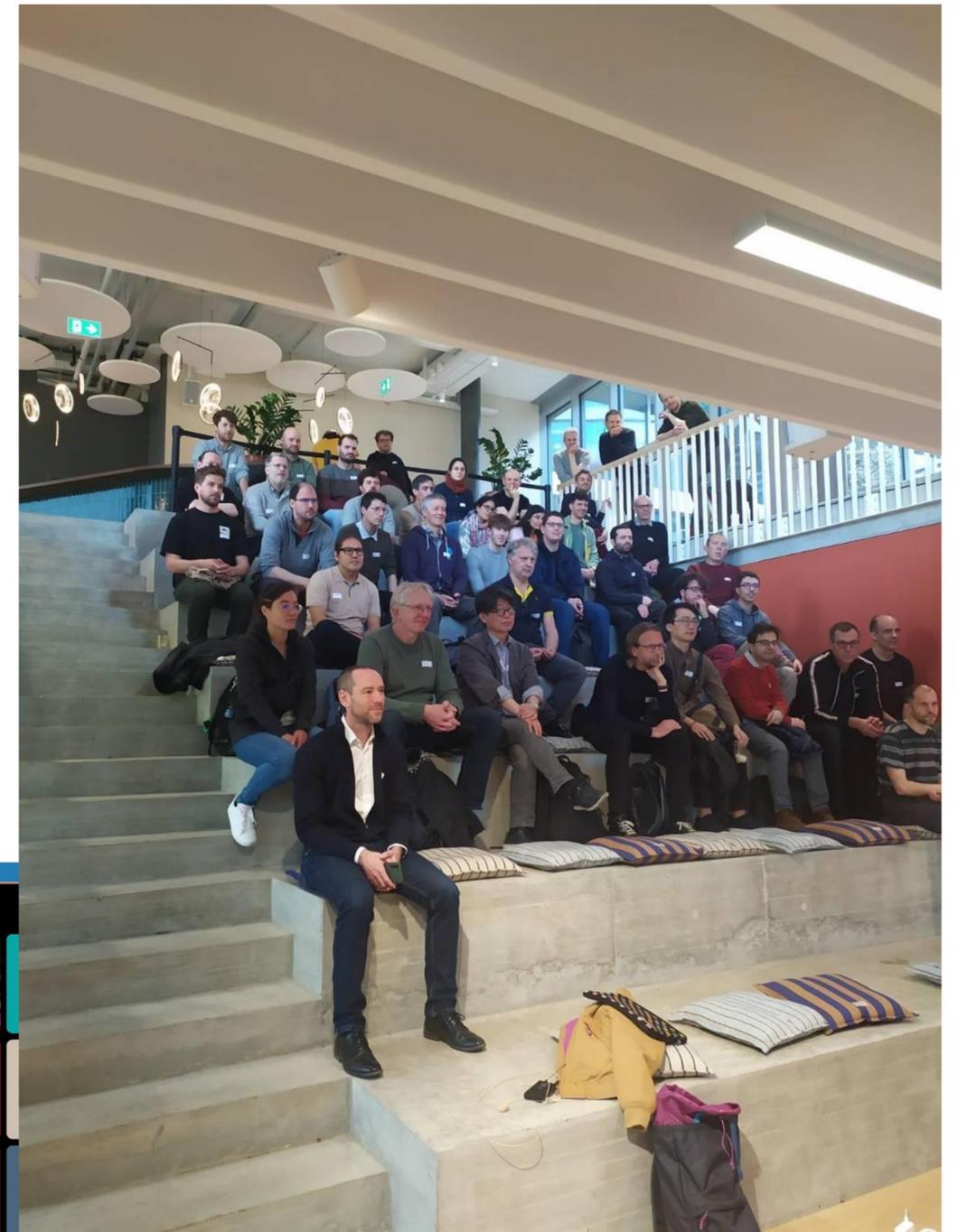
- Eventos colaborativos de três dias (híbridos).
- Impulsionar o desenvolvimento dos standards através de discussões/feedback
- Apoiar/encorajar implementações dos standards.
- Proporcionar tutoriais e orientação para todos aqueles que queiram aprender mais sobre os standards.



Source: Geospatial API November 2021 Code Sprint



Source: Open Standards and Software March 2022 Code Sprint



Source: Open Standards and Software April 2023 Code Sprint

Seguir o Foro Ibérico e Latino-Americano da OGC

- Pretende abarcar a comunidade de língua espanhola e portuguesa interessada nos desenvolvimentos e objetivos da OGC.
- Engloba tanto os membros da OGC como todos aqueles que sem o ser, partilhem o interesse nos ditos desenvolvimentos e objetivos.



Inscrever-se na lista: ila.forum@lists.opengeospatial.org

https://external.ogc.org/twiki_public/ILAFpublic/WebHome

Thank You

Community

- 500+ International Members
- 110+ Member Meetings
- 60+ Alliance and Liaison partners
- 50+ Standards Working Groups
- 45+ Domain Working Groups
- 25+ Years of Not for Profit Work
- 10+ Regional and Country Forums

Innovation

- 120+ Innovation Initiatives
- 380+ Technical reports
- Quarterly Tech Trends monitoring

Standards

- 65+ Adopted Standards
- 300+ products with 1000+ certified implementations
- 1,700,000+ Operational Data Sets
- Using OGC Standards



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@doublebyte

