

# Hoe (spatial) data on the web best practices het geo landschap veranderen

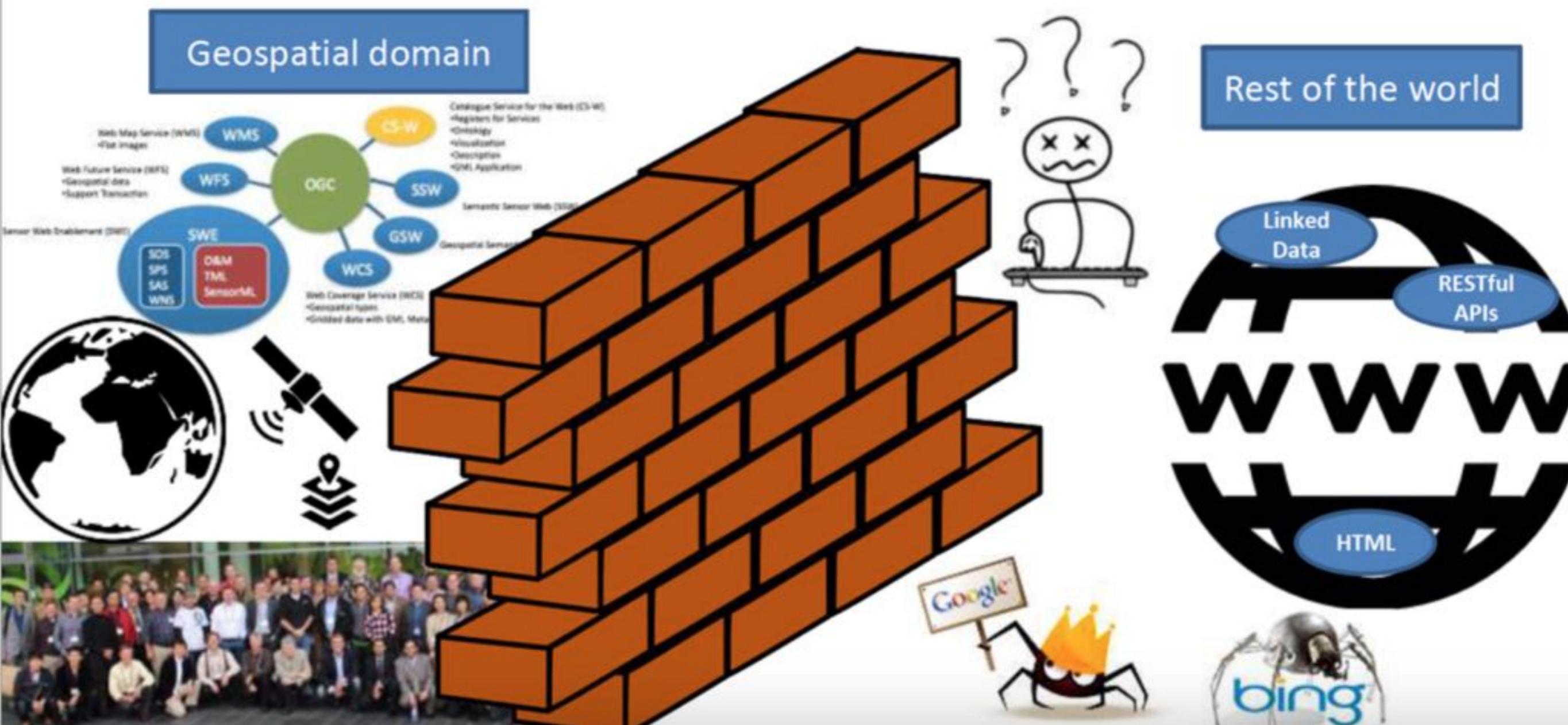
## het catalogus perspectief

Paul van Genuchten

Open Geo Dag  
oktober 2019 Amersfoort

# Inhoud

- Spatial data on the web
- SDI.Next - OGC API's
- Zoek machines & catalogi
- What's next



Spatial data on the web, 2016, OGC/Geonovum

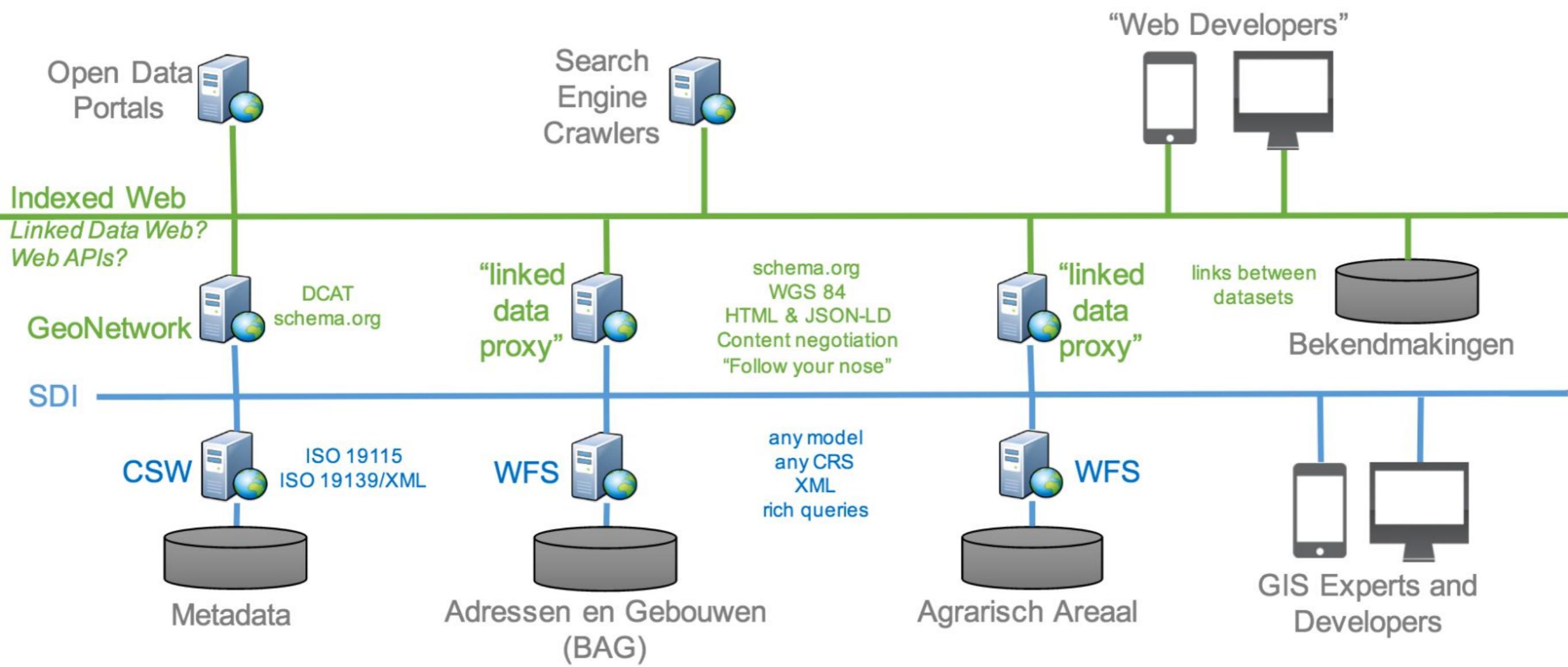
Html, URL,  
microdata,  
json-ld, RDFa,  
Schema.org,  
OpenGraph

RDF, OWL,  
DCAT, VOID,  
SPARQL, TTL,  
DBpedia, SSN

GeoJson,  
TopoJson,  
VectorTiles,  
TMS

OData  
stat-dcat

OKFN,  
DataPackage,  
CSV



Alle

Maps

Shopping

Afbeeldingen

Nieuws

Meer

Instellingen

Tools

Ongeveer 141 resultaten (0,46 seconden)

**Kaderrichtlijn Water oppervlaktewaterlichamen RWS, lijnen - Datasets ...**

<https://data.overheid.nl/data/.../kaderrichtlijn-water-oppervlaktewaterlichamen-rws-lijn...> ▾

De Rijkswaterstaat **Kaderrichtlijn Water oppervlaktewaterlichamen** bevat de waterlichamen die in beheer zijn bij Rijkswaterstaat en is een onderdeel van het ...

**Kaderrichtlijn Water oppervlaktewaterlichamen RWS, vlakken ...**

<https://data.overheid.nl/.../kaderrichtlijn-water-oppervlaktewaterlichamen.../714263bf...> ▾

Veld, Waarde. Dataset, **Kaderrichtlijn Water oppervlaktewaterlichamen RWS, vlakken**. Laatst gewijzigd, 2 februari, 2017. Gecreëerd, 2 februari, 2017. Formaat ...

**Kaderrichtlijn Water oppervlaktewaterlichamen RWS, vlakken**

<https://www.nationaalgeoregister.nl/.../srv/.../2e31680f-68b5-4ff3-94a4-9c24109ffd5...> ▾

De Rijkswaterstaat **Kaderrichtlijn Water oppervlaktewaterlichamen** bevat de waterlichamen die in beheer zijn bij Rijkswaterstaat en is een onderdeel van het ...

**krw\_oppervlaktewaterdelen\_rws\_vlakken.xml - Rijkswaterstaat**

[www.rijkswaterstaat.nl/apps/.../dmc/.../krw\\_oppervlaktewaterdelen\\_rws\\_vlakken.xml](http://www.rijkswaterstaat.nl/apps/.../dmc/.../krw_oppervlaktewaterdelen_rws_vlakken.xml) ▾

De oppervlaktewaterdelen zijn een onderverdeling van de Rijkswaterstaat **Kaderrichtlijn Water oppervlaktewaterlichamen** (vlak) in verschillende waterdelen ...

**622a632a-c57b-44a2-83a4-e51223d5f15f utf8 dataset Servicedesk ...**

[geoservices.rijkswaterstaat.nl/metadata/GEO DATA.WVLI\\_owl\\_lijen](http://geoservices.rijkswaterstaat.nl/metadata/GEO DATA.WVLI_owl_lijen) ▾

De Rijkswaterstaat **Kaderrichtlijn Water oppervlaktewaterlichamen** bevat de waterlichamen die in beheer zijn bij Rijkswaterstaat en is een onderdeel van het ...



Alle

Afbeeldingen

Nieuws

Shopping

Maps

Meer ▾

Zoekhulpmiddelen

Pagina 3 van ongeveer 18.500 resultaten (0,17 seconden)

### Lopik, Lopikerweg west 50 - Services

[www.ldproxy.net/bag/inspireadressen/inspireadressen.2414293/](http://www.ldproxy.net/bag/inspireadressen/inspireadressen.2414293/) ▾

Lopik, Lopikerweg west 50. id: inspireadressen.2414293. streetAddress: Lopikerweg west 50. addressLocality: Lopik. postalCode: 3411AP.

### Groesbeek, Hommelstraat 10 - Services

[www.ldproxy.net/bag/inspireadressen/inspireadressen.8795076/](http://www.ldproxy.net/bag/inspireadressen/inspireadressen.8795076/) ▾

Groesbeek, Hommelstraat 10. id: inspireadressen.8795076. streetAddress: Hommelstraat 10. addressLocality: Groesbeek. postalCode: 6561ZH.

### Groningen, Oosterkade 1001 - Services

[www.ldproxy.net/bag/inspireadressen/inspireadressen.236/](http://www.ldproxy.net/bag/inspireadressen/inspireadressen.236/) ▾

Groningen, Oosterkade 1001. id: inspireadressen.236. streetAddress: Oosterkade 1001. addressLocality: Groningen. postalCode: 9711RS.

### Joure, Sjoerd Wiersmahof 21 - Services

[www.ldproxy.net/bag/inspireadressen/inspireadressen.8794864/](http://www.ldproxy.net/bag/inspireadressen/inspireadressen.8794864/) ▾

Joure, Sjoerd Wiersmahof 21. id: inspireadressen.8794864. streetAddress: Sjoerd Wiersmahof 21. addressLocality: Joure. postalCode: 8501VA.

## 7. Best Practices Summary

[\*\*Best Practice 1:\*\* Provide metadata](#)

[\*\*Best Practice 2:\*\* Provide descriptive metadata](#)

[\*\*Best Practice 3:\*\* Provide structural metadata](#)

[\*\*Best Practice 4:\*\* Provide data license information](#)

[\*\*Best Practice 5:\*\* Provide data provenance information](#)

[\*\*Best Practice 6:\*\* Provide data quality information](#)

[\*\*Best Practice 7:\*\* Provide a version indicator](#)

[\*\*Best Practice 8:\*\* Provide version history](#)

[\*\*Best Practice 9:\*\* Use persistent URIs as identifiers of datasets](#)

[\*\*Best Practice 10:\*\* Use persistent URIs as identifiers within datasets](#)

[\*\*Best Practice 11:\*\* Assign URIs to dataset versions and series](#)

[\*\*Best Practice 12:\*\* Use machine-readable standardized data formats](#)

[\*\*Best Practice 13:\*\* Use locale-neutral data representations](#)

[\*\*Best Practice 14:\*\* Provide data in multiple formats](#)

[\*\*Best Practice 15:\*\* Reuse vocabularies, preferably standardized ones](#)

[\*\*Best Practice 16:\*\* Choose the right formalization level](#)

[\*\*Best Practice 17:\*\* Provide bulk download](#)

[\*\*Best Practice 18:\*\* Provide Subsets for Large Datasets](#)

[\*\*Best Practice 19:\*\* Use content negotiation for serving data available in multiple formats](#)

[\*\*Best Practice 20:\*\* Provide real-time access](#)

[\*\*Best Practice 21:\*\* Provide data up to date](#)

[\*\*Best Practice 22:\*\* Provide an explanation for data that is not available](#)

[\*\*Best Practice 23:\*\* Make data available through an API](#)

[\*\*Best Practice 24:\*\* Use Web Standards as the foundation of APIs](#)

[\*\*Best Practice 25:\*\* Provide complete documentation for your API](#)

[\*\*Best Practice 26:\*\* Avoid Breaking Changes to Your API](#)

[\*\*Best Practice 27:\*\* Preserve identifiers](#)

[\*\*Best Practice 28:\*\* Assess dataset coverage](#)

[\*\*Best Practice 29:\*\* Gather feedback from data consumers](#)

[\*\*Best Practice 30:\*\* Make feedback available](#)

[\*\*Best Practice 31:\*\* Enrich data by generating new data](#)

[\*\*Best Practice 32:\*\* Provide Complementary Presentations](#)

[\*\*Best Practice 33:\*\* Provide Feedback to the Original Publisher](#)

[\*\*Best Practice 34:\*\* Follow Licensing Terms](#)

[\*\*Best Practice 35:\*\* Cite the Original Publication](#)

## § Best Practices Summary

Best Practice 1: Use globally unique persistent HTTP  
URIs for Spatial Things

Best Practice 2: Make your spatial data indexable by  
search engines

Best Practice 3: Link resources together to create the  
Web of data

Best Practice 4: Use spatial data encodings that match  
your target audience

Best Practice 5: Provide geometries on the Web in a  
usable way

Best Practice 6: Provide geometries at the right level of  
accuracy, precision, and size

Best Practice 7: Choose coordinate reference systems  
to suit your user's applications

Best Practice 8: State how coordinate values are  
encoded

Best Practice 9: Describe relative positioning

Best Practice 10: Use appropriate relation types to link  
Spatial Things

Best Practice 11: Provide information on the changing  
nature of spatial things

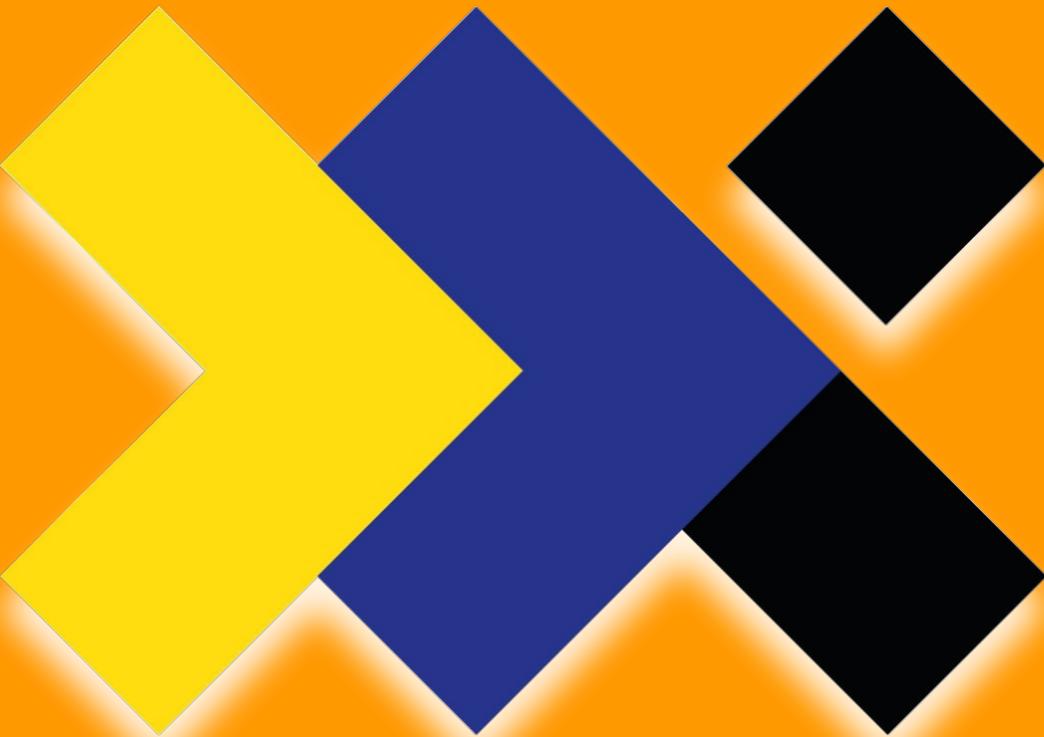
Best Practice 12: Expose spatial data through  
'convenience APIs'

Best Practice 13: Include spatial metadata in dataset  
metadata

Best Practice 14: Describe the positional accuracy of  
spatial data

# key best practices for sdi's

- Identifiers:
  - DWBP 9: Use persistent URIs as identifiers of datasets
  - DWBP 10: Use persistent URIs as identifiers within datasets
  - [SDWBP 1: Use globally unique persistent HTTP URIs for Spatial Things](#)
- Discovery:
  - [SDWBP 2: Make your spatial data indexable by search engines](#)
- Linking:
  - [SDWBP 3: Link resources together to create the Web of data](#)
- Modelling:
  - DWBP 15: Reuse vocabularies, preferably standardized ones
- Data access:
  - [SDWBP 12: Expose spatial data through 'convenience APIs'](#)
  - DWBP 12: Use machine-readable standardized data formats
  - DWBP 14: Provide data in multiple formats
  - DWBP 24: Use Web Standards as the foundation of APIs



# SDI.Next OGC API's



Search or jump to...

Pull requests Issues Marketplace Explore



opengeospatial / WFS\_FES

Watch 43

Star 53

Fork 12

Code

Issues 46

Pull requests 5

Projects 0

Wiki

Insights

Branch: master

WFS\_FES / README.md

Find file Copy path



cportele Link to license text, not the GitHub page

64e3078 on Apr 16

4 contributors



OGC

94 lines (63 sloc) | 4.82 KB

Raw

Blame

History



# Web Feature Service 3.0

This GitHub repository contains the new revision of the OGC's Web Feature Service standard for querying geospatial information on the web. It is a complete rewrite of previous versions, focusing on a simple RESTful core specified as reusable OpenAPI components with responses in JSON and HTML.

## Overview

A Web Feature Service is a standard API that represents collections of geospatial data.

GET /collections

♥ Jeff Harrison and 2 others liked

**Open Geospatial: OGC** @opengeospatial · 20 Apr 2018

**OGC** An overview of OGC's recent **WFS3** hackathon: moving towards a major overhaul of the Web Feature Service with implications for almost all OGC web services standards. [go.myogc.org/2H9vgLI](http://go.myogc.org/2H9vgLI)



4



9

- Code marathon in Ft. Collins (USA)

[Code](#)[Issues 21](#)[Pull requests 0](#)[Projects 1](#)[Wiki](#)[Insights](#)

No description, website, or topics provided.

[23 commits](#)[4 branches](#)[0 releases](#)[3 contributors](#)[View license](#)

Branch: master ▾

[New pull request](#)[Create new file](#)[Upload files](#)[Find File](#)[Clone or download ▾](#) cmheazel Misspelling ...

Latest commit 5567b1b 14 days ago

[OAPI-Common](#)

Misspelling

14 days ago

[OAPI-Elements](#)

March 6 update

3 months ago

[CONTRIBUTORS.md](#)

March 6 update

3 months ago

[DEVELOPMENT.md](#)

March 6 update

3 months ago

[LICENSE](#)

March 6 update

3 months ago

[README.md](#)

Cleanup May 7

15 days ago

[implementations.md](#)

March 6 update

3 months ago

[index.adoc](#)

Initial population

8 months ago

[README.md](#)

## OGC API (OAPI) Common Specification

OGC API standards define modular API building blocks to spatially enable Web APIs. The OGC API family of standards is organized by resource type. Each resource has an associated API standard. These resource-specific API standards share a common core. This OGC API Common standard specifies requirements which are shared by all OGC API standards. The OGC API Common standard is maintained on this GitHub repository.

# Based on best practices

- Based on REST / Open API
- Create in a practical interactive way
- Developers validating the standards
- Support various encodings (JSON & HMTL first)

# OAPI Coverages

 [opengeospatial / ogc\\_api\\_coverages](#)

 Watch ▾ 14

 Star 1

 Fork 0

 Code

 Issues 16

 Pull requests 0

 Projects 0

 Wiki

 Insights

[WIP] OpenAPI for Coverages [http://www.github.com/opengeospatial/...](http://www.github.com/opengeospatial/)

 31 commits

 2 branches

 0 releases

 3 contributors

 Apache-2.0

Branch: master ▾

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Schpidi Adjust as discussed in teleconference on 20190508

Latest commit fbf871a 15 days ago

 CIS+WCS-standards

PB: added relevant background information

2 months ago

 OAPI-Coverages

Adjust as discussed in teleconference on 20190508

15 days ago

 CONTRIBUTORS.md

Additional cleanup

3 months ago

 DEVELOPMENT.md

Additional cleanup

3 months ago

 LICENSE

First file

3 months ago

 README.md

Update README.md

a month ago

 README.md

# OAPI Tiles

 [opengeospatial / OGC-API-Map-Tiles](#)

 Watch ▾ 9

 Star 3

 Fork 1

 Code

 Issues 4

 Pull requests 0

 Projects 0

 Wiki

 Insights

OGC API - Map Tiles draft specification [http://www.github.com/opengeospatial/...](http://www.github.com/opengeospatial/)

 15 commits

 2 branches

 0 releases

 3 contributors

 Apache-2.0

Branch: master ▾

New pull request

Create new file

Upload files

Find File

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joanma747 Added a note about the work in the Swagger HUB

Latest commit 5c204c7 11 hours ago

 standard

Renamed the "OAPI-MapsTiles" folder to "standard"

2 months ago

 .gitignore

Renamed the "OAPI-MapsTiles" folder to "standard"

2 months ago

 CONTRIBUTORs.md

Raw Template

2 months ago

 DEVELOPMENT.md

Raw Template

2 months ago

 LICENSE

Raw Template

2 months ago

 README.md

Added a note about the work in the Swagger HUB

11 hours ago

 index.adoc

Raw Template

2 months ago

<http://geo.weather.gc.ca/geomet-beta/features/collections/hydrometric-daily-mean/items/10SB001.1992-01-11>

JSON		Raw Data	Headers
<a href="#">Save</a> <a href="#">Copy</a> <a href="#">Collapse All</a> <a href="#">Expand All</a>			
<pre>▼ geometry:   type: "Point"   ▼ coordinates:     0: -94.0583267211914     1: 67.5250015258789   type: "Feature"   ▼ properties:     STATION_NUMBER: "10SB001"     LEVEL: null     LEVEL_SYMBOL_EN: null     FLOW: 0     FLOW_SYMBOL_EN: "Ice Conditions"     FLOW_SYMBOL_FR: "Conditions à glace"     LEVEL_SYMBOL_FR: null     DATE: "1992-01-11"     STATION_NAME: "HAYES RIVER ABOVE CHANTREY INLET"     IDENTIFIER: "10SB001.1992-01-11"     PROV_TERR_STATE_LOC: "NU"</pre>			
<pre>— 1 —</pre>			

# In QGIS

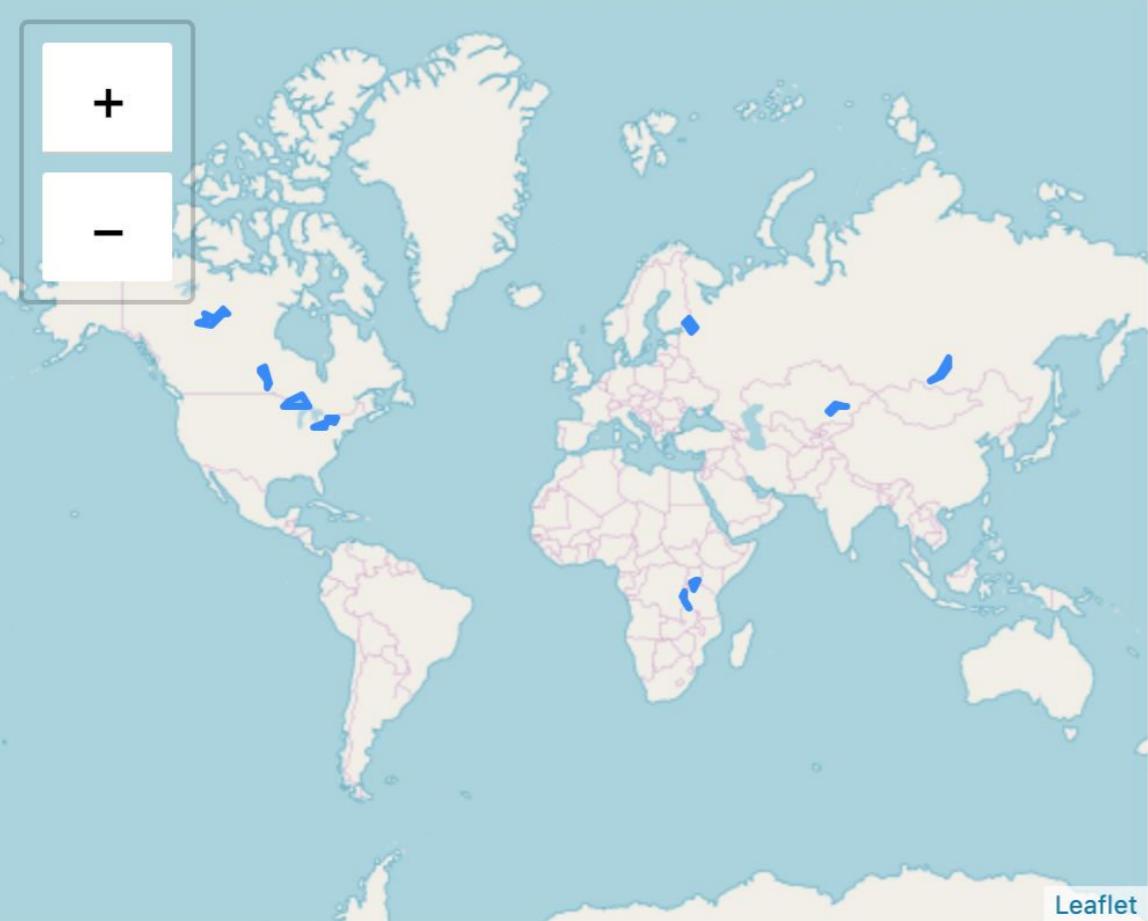


# In a browser

pygeoapi Demo instance - running latest GitHub version [Contact](#)

[Home](#) / [Collections](#) / [Large Lakes](#) / [Items](#) [JSON](#)

## Items



Leaflet

### Items

<b>id</b>	<b>id</b>	sc...	na...	na...	ad...	fea...
0	0	0	Lake	No...	No...	Lake
1	1	0	Lake	No...	No...	Lake
2	2	0	Gr...	No...	No...	Lake
			Sla...			
			Lake			

[\[PDF\] Landgoed De Poll - Gemeente Vo](#)

<https://www.voorst.nl> › Vastgesteld › Landgoed

18 apr. 2012 - potentiële nieuwe woningbouwlocaties kleinschalig agrarisch gebied tussen de plaatsen Bus die gebouwd is op de huidige locatie van **Huis de**.

Ontbrekend: pygeoapi

### Afbeeldingen van De (nieuwe) Poll / H



→ Meer afbeeldingen voor De (nieuwe) Poll / H  
pygeoapi

### Landgoed de Poll | IJsselID

<https://ijsselid.nl> › landgoed-de-poll

Landgoed de Poll bestaat binnen- en buitendijks geb

**Huis de Poll of Huis te Gietelo** is een landhuis, land

Ontbrekend: pygeoapi

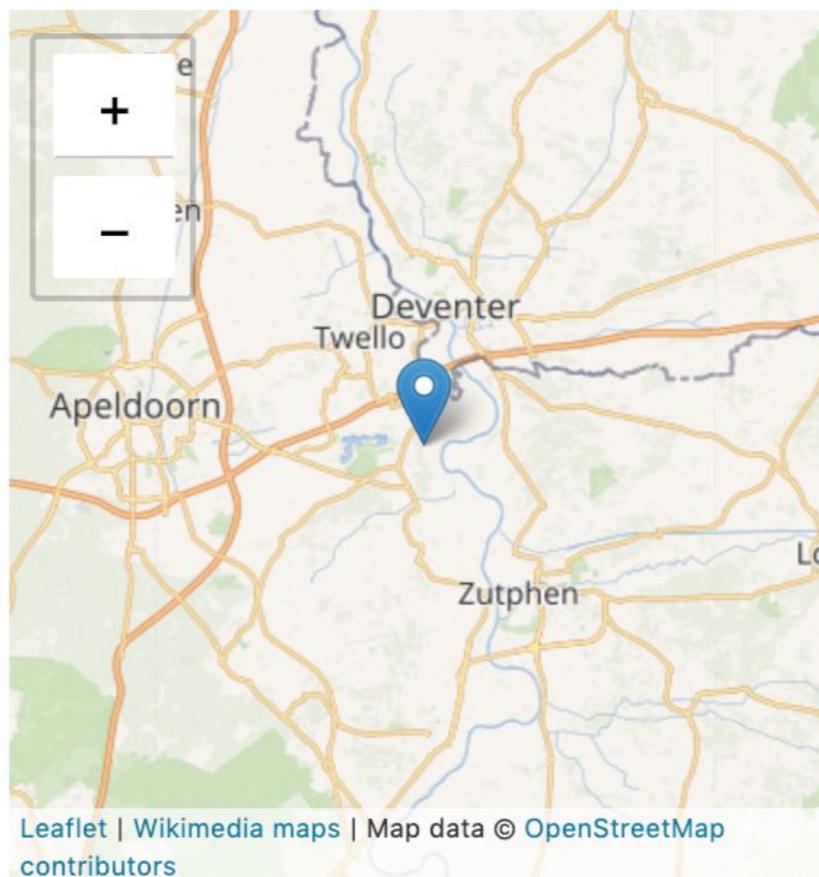
### pygeoapi Demo instance - running latest GitHub version -

<https://demo.pygeoapi.io> › collections › dutch\_castles › items › kastelen

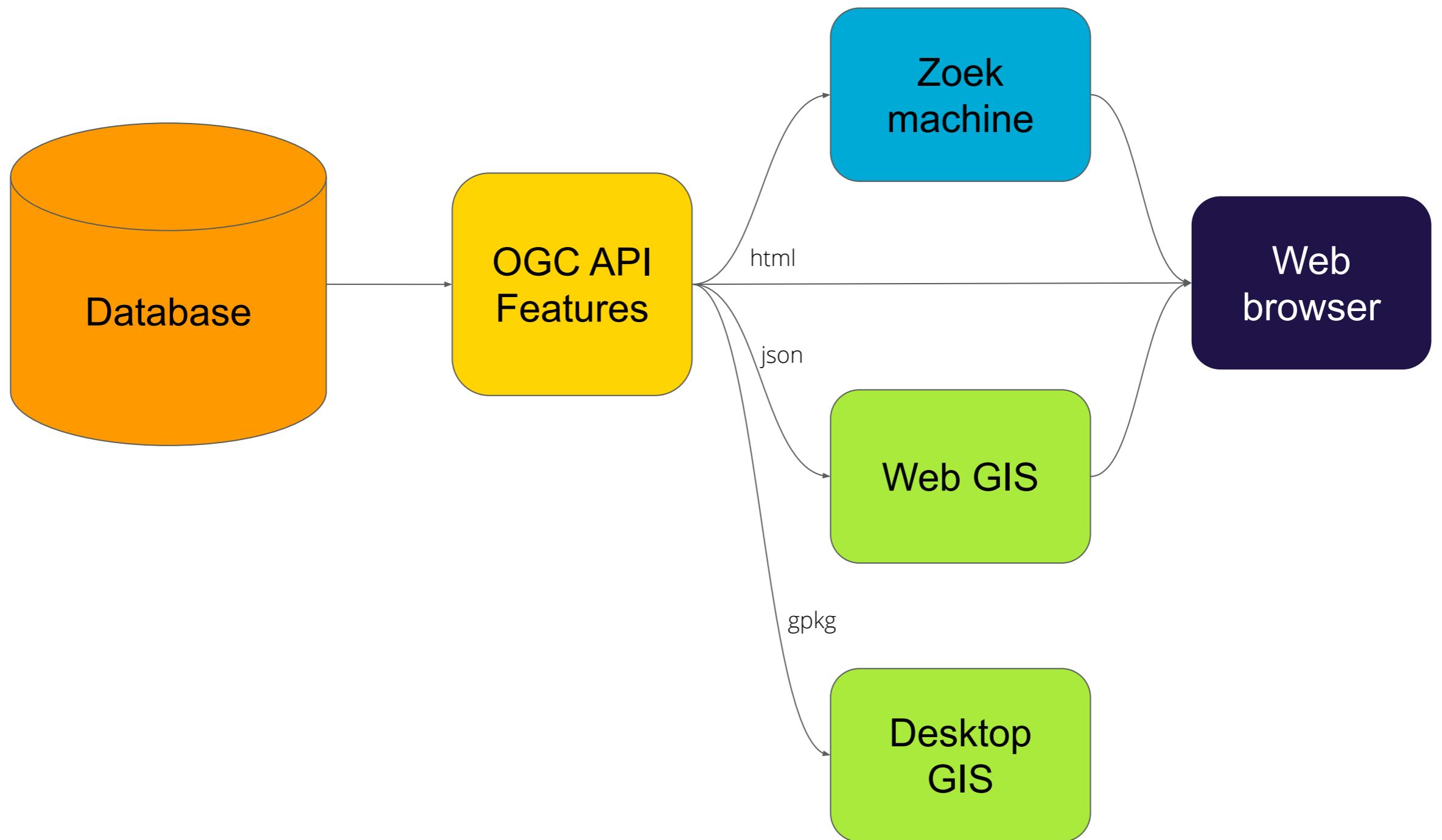
pygeoapi Demo instance - running latest GitHub version. ... id, kastelen.4. gid, 4. cchin, 000011.

naam, De (nieuwe) Poll / Huis Gietelo. plaats, Bussloo. info\_link ...

### Item kastelen.4



Property	Value
id	kastelen.4
gid	4
cchin	000011
naam	De (nieuwe) Poll / Huis Gietelo
plaats	Bussloo
info_link	<a href="https://www.cchin...object=000011">https://www.cchin...object=000011</a>





## Dataset

Thing > CreativeWork > Dataset

A body of structured information describing some topic(s) of interest.

[more...]

Property	Expected Type	Description
<strong>Properties from Dataset</strong>		
<b>distribution</b>	<a href="#">DataDownload</a>	A downloadable form of this dataset, at a specific location, in a specific format.
<b>includedInDataCatalog</b>	<a href="#">DataCatalog</a>	A data catalog which contains this dataset. Supersedes <a href="#">catalog</a> , <a href="#">includedDataCatalog</a> . Inverse property: <a href="#">dataset</a> .
<b>issn</b>	<a href="#">Text</a>	The International Standard Serial Number (ISSN) that identifies this serial publication. You can repeat this property to identify different formats of, or the linking ISSN (ISSN-L) for, this serial publication.
	<a href="#">Text</a> or <a href="#">URL</a>	A technique or technology used in a <a href="#">Dataset</a> (or <a href="#">DataDownload</a> , <a href="#">DataCatalog</a> ), corresponding to the method used for measuring

Windmills Within The Netherlands  
h1 1378.21 × 37.33

# Windmills within The Netherlands

Locations of windmills within the Netherlands from Rijksdienst voor het Cultureel Erfgoed (RCE) INSPIRE WFS. Uses GeoServer WFS v2 backend vi

Netherlands INSPIRE Windmills Heritage Holland RD

## View

- Browse through the items of "Windmills within The Netherlands"

## Links

- information (text/html)
- Features as GeoJSON (application/geo+json)
- Features as HTML (text/html)

Powered by  pygeoapi 0.6.0

Elements Console Sources Network Performance Memory Application Security Audits axe

```
<!doctype html>
<html lang="en">
  <head>...</head>
  <body>
    <header class="sticky row">...</header>
    <div class="sticky row crumbs">...</div>
    <main>
      <div class="container">
        <div class="row">
          <div class="col-sm-12 col-md-10 col-md-offset-1">
            <br>
            <section id="collection" itemscope itemtype="https://schema.org/Dataset"> == $0
              <span itemprop="includedInDataCatalog" itemscope itemtype="https://schema.org/DataCatalog">...</span>
              <h1 itemprop="name">Windmills within The Netherlands</h1>
              <meta itemprop="url" content="https://demo.pygeoapi.io/master" />
            </section>
          </div>
        </div>
      </div>
    </main>
  </body>
</html>
```

# Schema.org annotations

geython / pygeoapi

Unwatch 13 Star 26 Fork 15

Code Issues 24 Pull requests 0 Projects 1 Wiki Insights

## add schema-org microdata based on schema.org/DataCatalog & Dataset #91

Merged tomkralidis merged 3 commits into geython:master from pvgencuhten:schema-org-primer 28 days ago

Conversation 2 Commits 3 Checks 0 Files changed 6 +148 -38

pvgencuhten commented on Apr 12

A suggestion to use microdata to annotate root, collections & collection pages

Due to header having service-title, I had to link it to other metadata about the service using itemref="collections"

Pages validated in google structured data testing tool:

home

DataCatalog

	DataCatalog	3 ERRORS 0 WARNINGS
@type	DataCatalog	
url	http://localhost:5000	
name	pygeoapi default instance	
description	pygeoapi provides an API to geospatial data	
keywords	geospatial, data, api,	
license	CC-BY 4.0 license	
provider		
@type	Organization	
name	Organization Name	
url	https://github.com/geython/pygeoapi	
contactPoint		

Reviewers

- tomkralidis
- jorgejesus

Assignees

- jorgejesus

Labels

- None yet

Projects

- None yet

Milestone

- No milestone

# Google Dataset Search Beta

Search for Datasets



Google Dataset Search



Dutch addresses otterlo



About

1 result found



Dutch addresses (subset  
Otterlo). OGR SQLite Driver

[demo.pygeoapi.io](http://demo.pygeoapi.io)



Not seeing a result you  
expected?

[Learn](#) how you can add new  
datasets to our index.

Dutch addresses (subset Otterlo). OGR SQLite Driver

[Explore at pygeoapi Demo instance - ru...](#)

Available download formats from providers

geojson, json, html

Description

Dutch addresses subset.

**Maar wat is dan nog de  
rol van de catalogus?**

# Catalogi & zoekmachines

Het zijn de catalogi die datasets bekend maken bij zoekmachines

Zoekmachines helpen vinden, daarna komt de evaluatie of de bron geschikt is

Bronnen die niet (publiekelijk) op internet staan...

Hoe kunnen we de rijkheid van  
het web ontsluiten in  
traditionele GIS tools?

# Web 4 geo

Vanuit feature-info doorklikken naar meer informatie

Afscheid nemen van het laag denken?

Denk in gekoppelde objecten, locatie is een extra koppel mogelijkheid



# Nieuwe standaarden = nieuwe tools

# Webtools

Reguliere web IT heeft veel tools die met adoptie van web standaarden bruikbaar worden

- Gebruiks statistieken
- Beschikbaarheids monitoring
- XACML authorisatie
- Link checking

# Kennis uit service gebruik

Meeste gebruik zit aan de top

Zoek machine

Daar wordt meeste gebruiks  
kennis opgebouwd

Nationaal  
portaal

Portalen hebben verantwoor-  
delijkheid om opgebouwde  
kennis in de keten te delen

Regionaal

Lokaal

# Vindbaarheid is een keuze

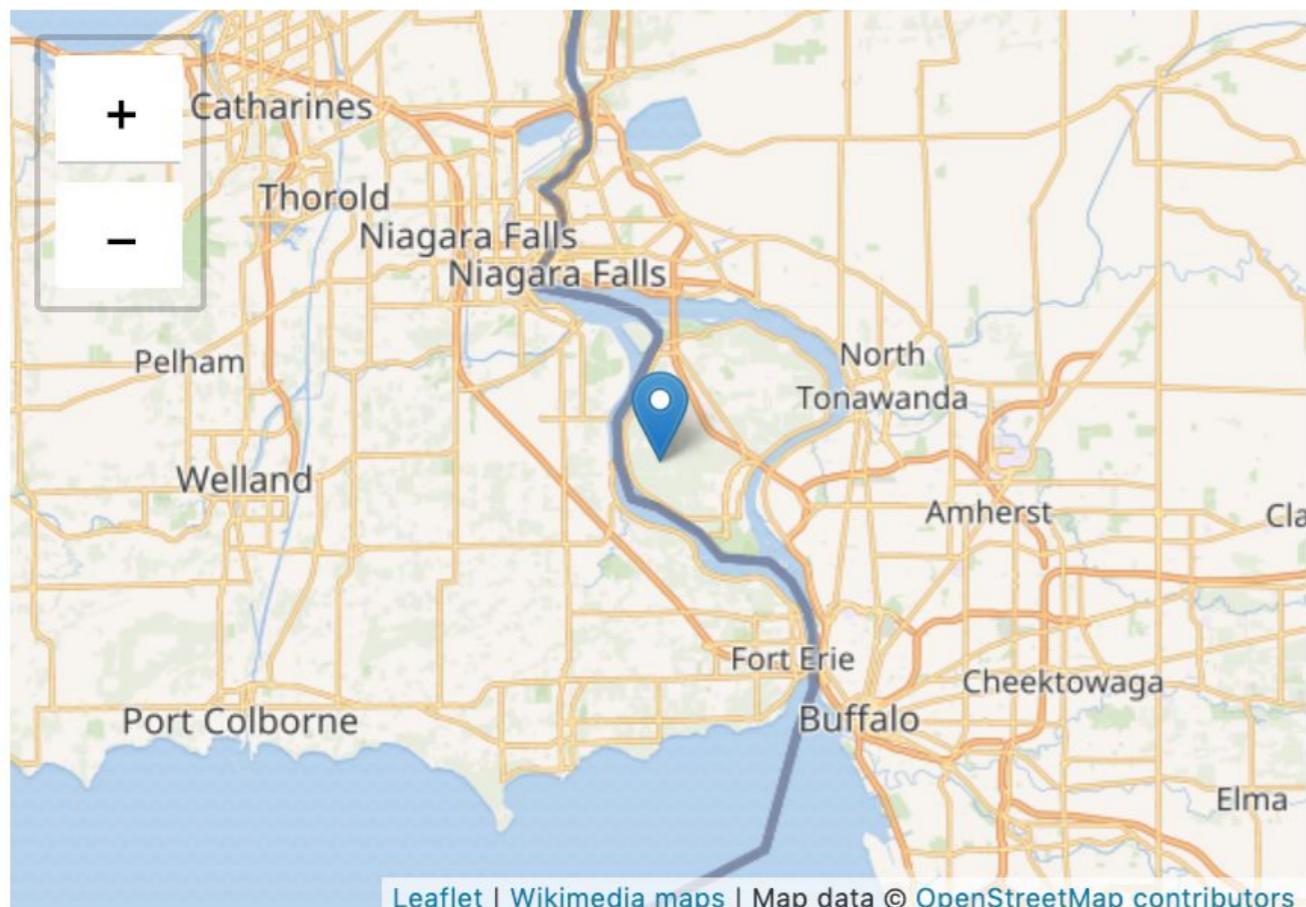
# Om over na te denken

Met een nieuwe versie van Geoserver zal OGC-API beschikbaar komen

Dan moet je dus nadenken over welk logo je op die html output wilt hebben

Is de inhoud klaar om ontsloten te worden in search engines

## Item 238

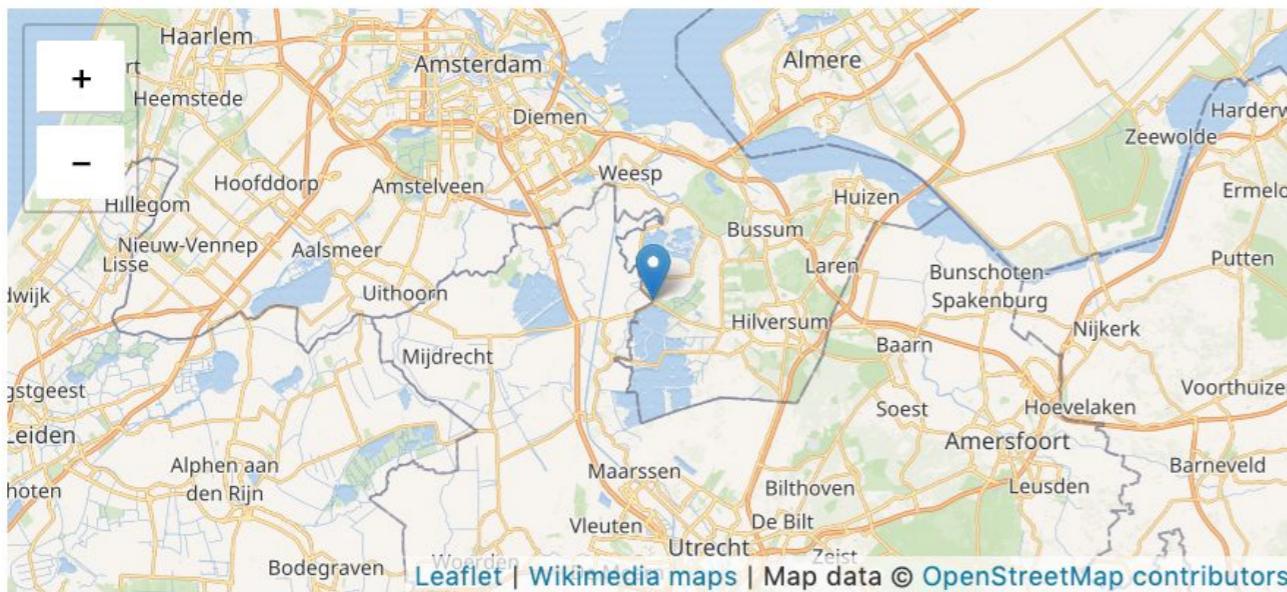


Property	Value
id	238
stn_id	2147
datetime	2007-10-30T08:57:29Z
value	103.5

[Prev](#)[Next](#)

# Eervolle vermeldingen

## Item Molens.2



Property	Value
id	Molens.2
gid	2
NAAM	Molen Gabriël of Voorste Molen
PLAATS	Kortenhoef
CATEGORIE	windmolen
FUNCTIE	poldermolen
TYPE	8-kante grondzeiler binnenkruier
STAAT	bestaand
RMONNUMMER	17405
TBGCNUMMER	00005
INFOLINK	<a href="https://zoeken.allemolens.nl/tenbruggenc...">https://zoeken.allemolens.nl/tenbruggenc...</a>
THUMBNAIL	A small thumbnail image of a traditional Dutch windmill with a white wooden structure and a blue roof, set against a backdrop of trees and sky.
HFDFUNCTIE	poldermolen
FOTOGRAAF	onbekend



Search a place



IMGEOBRONHOUDERNAAM	datum object aangemaakt	Global ID	afnameverplichting (m3/u)	debietmeter	status
Wo646	2015-10-26T23:32:03	{Do6oBCBE-oC93-48C4-874F-9E4E3C50CCoB}	60	Nee	gerealiseerd/in bedrijf/in gebruik/operationeel

Showing 1 to 1 of 1 rows

-ERENCE  
10 August 2019

10 August 2019



**BUCHAREST 2019**  
 44.43555, 26.102347

STRATEGIC  
PARTNERS

POWERED BY

PLATINUM SPONSOR



# Thank you!