

#SDI.Next: WFS 3.0



OpenGeoDag
Thijs Brentjens
2 oktober 2019
@thijsbrentjens
#DataToBuildOn

SDI.Net

The logo for SDI.Next, featuring the text "SDI.Ne" in white, followed by a stylized "x" composed of a yellow arrow pointing right and a blue arrow pointing left, and ending with "t" in white.

#SDI.Next: ~~WFS 3.0~~ OGC API Features



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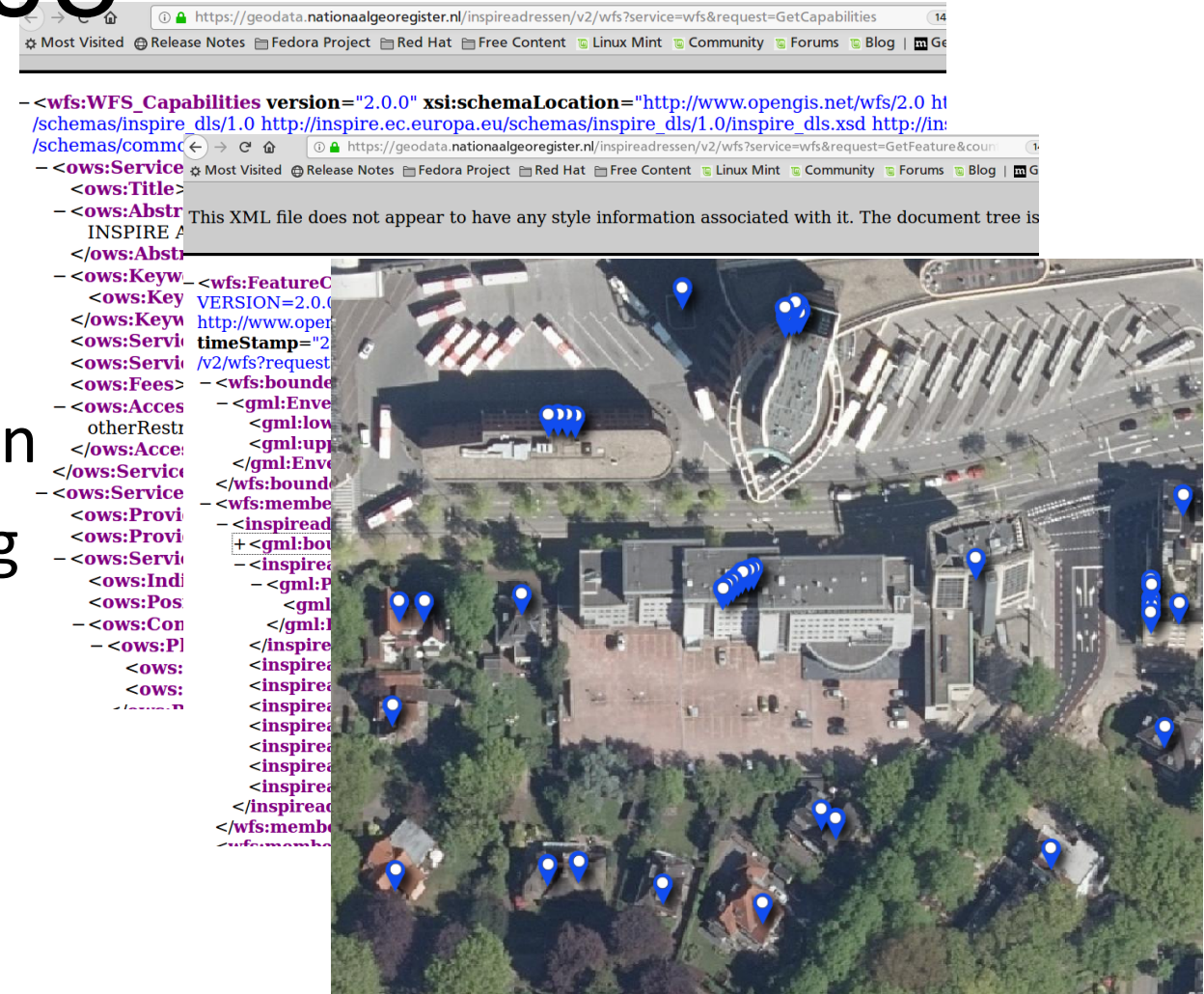
SDI.Next



Nu: WFS 2.0 uit 2008

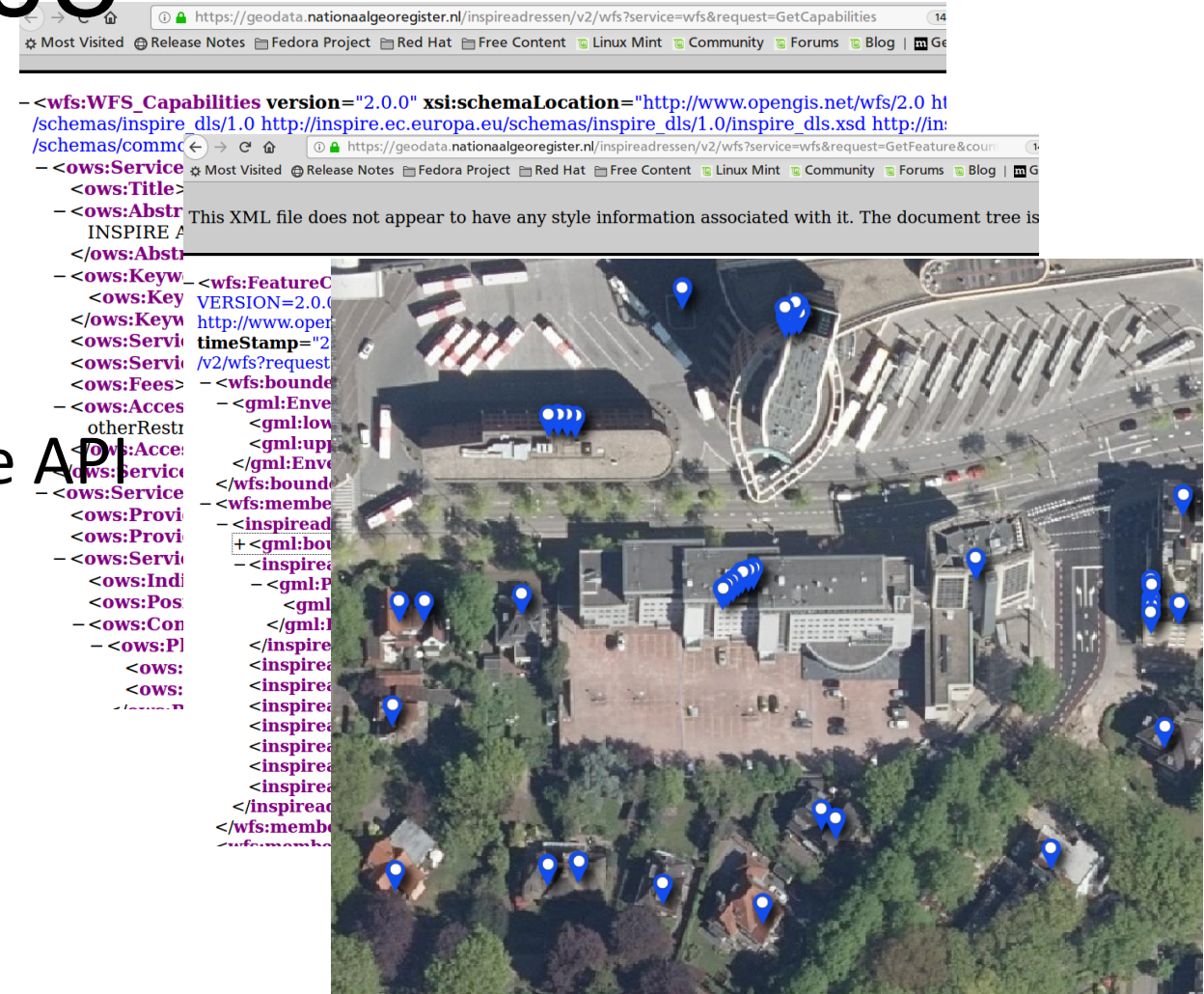
- gestandaardiseerde operaties (OGC)
- geodata bevragen
- optioneel geodata bewerken
- uitgebreide standaard: filtering, CRSen
- Ondersteuning in allerlei (geo) tooling
- in NL alleen al: honderden services

Maar....



Nu: WFS 2.0 uit 2008

- Technisch gedateerd
- Redelijk complex
- Vooral voor geo-wereld
- XML encodings: GML, Capabilities
- HTTP, maar geen REST, geen moderne API



Nu: technologie van het moderne web

- URIs en links
- HTML, indexeerbare data, zoekmachines
- APIs met JSON, HTTP, REST, Content negotiation



OGC API – Features

- “WFS, maar dan op een web manier”
- Opgesteld via Github, open proces
 - Bijna officieel (release candidate)
- **Eenvoudige basis + modulair**
 - Data bevragen: meest simpele scenario
 - Uit te breiden met extensies (CRS bijv)
 - Inbedden in andere APIs
- 1 API = 1 dataset bevragen

*“In de trein van
Amsterdam naar Utrecht
gelezen en begrepen”
– Just*



OGC API – Features

- Moderne API: content negotiation, “puur” HTTP, REST, JSON, HTML, links, ...
- Functionaliteit:
 - Opvragen van alle data
 - Opvragen van data op basis van id, bbox, time
 - Pagineren
 - (optioneel) eenvoudige alfanumerieke filtering
- Encodings: vaak HTML en (Geo)JSON (ook GML)



{ REST }



OGC API Features beloftes

- Beter te gebruiken door allerlei ontwikkelaars:
 - Makkelijker aan te roepen en in te bouwen
 - Sneller
 - Beter te begrijpen
 - (leuker?)
- APIs en data beter te vinden via zoekmachines
- Minder zware software nodig voor aanbieden data en voor verwerken data (clients / apps)
- Toekomstvast



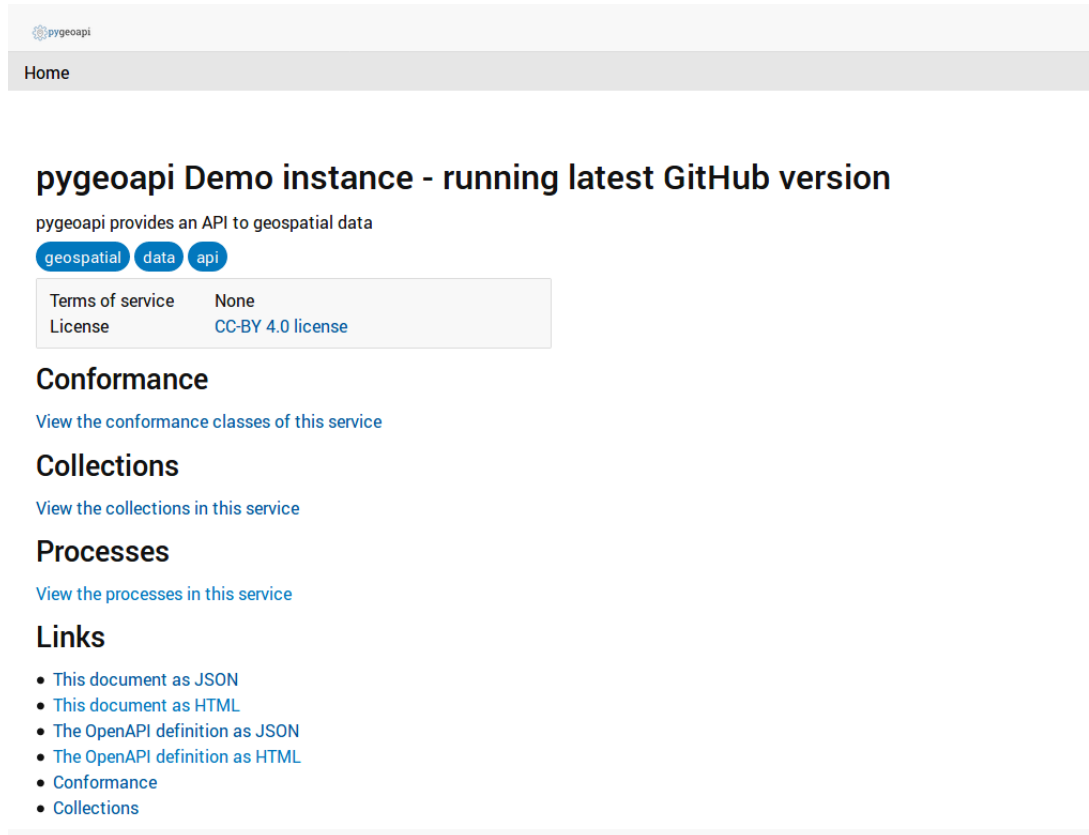
OGC API Features in 1 slide

<code>/</code>	→ landing page (html of json)
<code>/api</code>	→ API beschrijving (Open API)
<code>/conformance</code>	→ Welke modules zijn ondersteund
<code>/collections</code>	→ Lijst van feature collections
<code>/collections/{collectionId}</code>	→ Feature collection metadata
<code>/collections/{collectionId}/items</code>	→ Alle items (“features”) (gepagineerd)
<code>/collections/{collectionId}/items/{featureId}</code>	→ 1 feature



OGC API Features voorbeelden

<https://demo.pygeoapi.io/master/>



The screenshot shows the homepage of the pygeoapi Demo instance. At the top, there's a navigation bar with the pygeoapi logo and a 'Home' link. Below the navigation bar, the main heading reads 'pygeoapi Demo instance - running latest GitHub version'. Underneath, a subheading states 'pygeoapi provides an API to geospatial data'. There are three buttons: 'geospatial', 'data', and 'api'. A table lists 'Terms of service' as 'None' and 'License' as 'CC-BY 4.0 license'. Below this, there are sections for 'Conformance' (with a link to view conformance classes), 'Collections' (with a link to view collections), and 'Processes' (with a link to view processes). At the bottom, a 'Links' section lists several links: 'This document as JSON', 'This document as HTML', 'The OpenAPI definition as JSON', 'The OpenAPI definition as HTML', 'Conformance', and 'Collections'.

pygeoapi Demo instance - running latest GitHub version

pygeoapi provides an API to geospatial data

[geospatial](#) [data](#) [api](#)

Terms of service	None
License	CC-BY 4.0 license

Conformance

[View the conformance classes of this service](#)

Collections

[View the collections in this service](#)

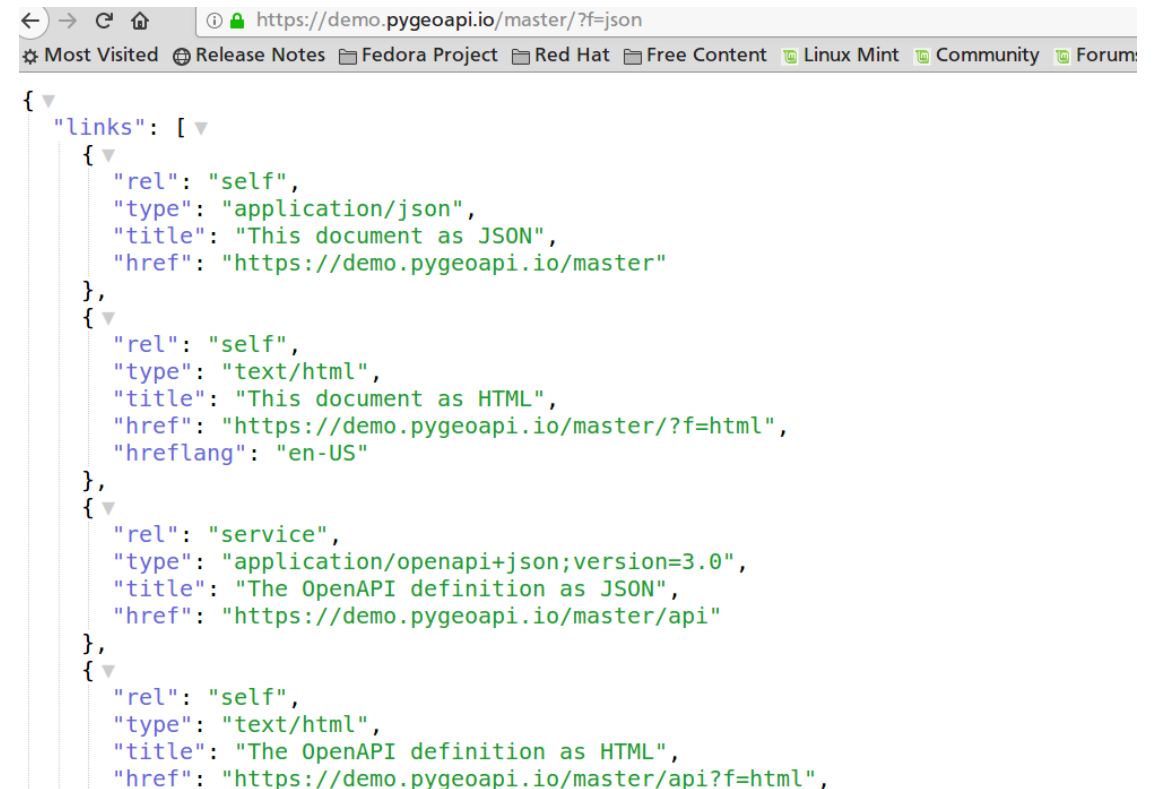
Processes

[View the processes in this service](#)

Links

- [This document as JSON](#)
- [This document as HTML](#)
- [The OpenAPI definition as JSON](#)
- [The OpenAPI definition as HTML](#)
- [Conformance](#)
- [Collections](#)

<https://demo.pygeoapi.io/master/?f=json>



The screenshot shows the API definition as JSON for the pygeoapi Demo instance. The browser address bar displays the URL 'https://demo.pygeoapi.io/master/?f=json'. The page content shows a JSON object with a 'links' array. The first link is for the 'self' document as JSON, with a href of 'https://demo.pygeoapi.io/master'. The second link is for the 'self' document as HTML, with a href of 'https://demo.pygeoapi.io/master/?f=html' and a hreflang of 'en-US'. The third link is for the 'service' OpenAPI definition as JSON, with a href of 'https://demo.pygeoapi.io/master/api' and a type of 'application/openapi+json;version=3.0'. The fourth link is for the 'self' document as HTML, with a href of 'https://demo.pygeoapi.io/master/api?f=html' and a type of 'text/html'.

```
{
  "links": [
    {
      "rel": "self",
      "type": "application/json",
      "title": "This document as JSON",
      "href": "https://demo.pygeoapi.io/master"
    },
    {
      "rel": "self",
      "type": "text/html",
      "title": "This document as HTML",
      "href": "https://demo.pygeoapi.io/master/?f=html",
      "hreflang": "en-US"
    },
    {
      "rel": "service",
      "type": "application/openapi+json;version=3.0",
      "title": "The OpenAPI definition as JSON",
      "href": "https://demo.pygeoapi.io/master/api"
    },
    {
      "rel": "self",
      "type": "text/html",
      "title": "The OpenAPI definition as HTML",
      "href": "https://demo.pygeoapi.io/master/api?f=html",

```



OGC API Features voorbeelden

<https://.../collections?f=html>

Collections in this service

Name	Description
Observations	Observations
Large Lakes	lakes of the world, public domain
Windmills within The Netherlands	Locations of windmills within the Netherlands from Rijksdienst voor het Cultureel Erfgoed (RCE) INSPIRE WFS. Uses GeoServer WFS v2 backend via OGRProvider.
Castles within The Netherlands	Locations of castles within the Netherlands from Rijksdienst voor het Cultureel Erfgoed (RCE) INSPIRE WFS. Uses GeoServer WFS v2 backend via OGRProvider.
Dutch Georef Stations via OGR WFS	Locations of RD/GNSS-reference stations from Dutch Kadaster PDOK a.k.a RDInfo. Uses MapServer WFS v2 backend via OGRProvider.

<https://.../collections?f=json>



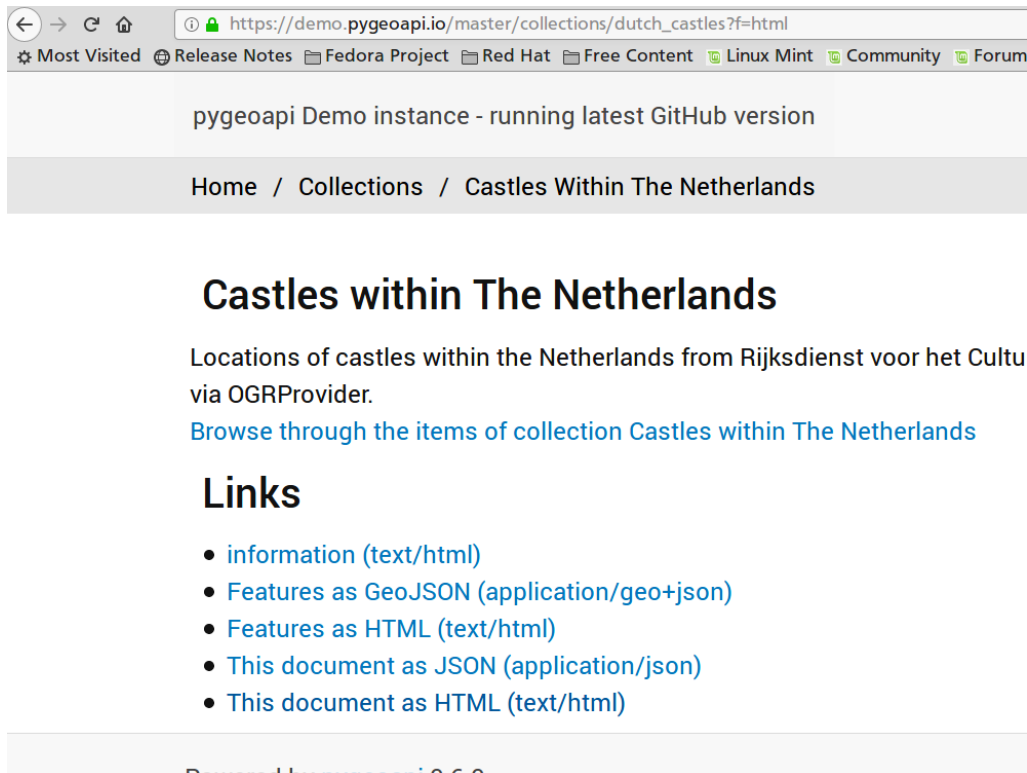
```
{
  "collections": [
    {
      "links": [
        {
          "type": "text/csv",
          "rel": "canonical",
          "title": "data",
          "href": "https://github.com/mapserver/mapserver/blob/branch-7-0/msautotest/wxs/data/c",
          "hreflang": "en-US"
        },
        {
          "type": "text/csv",
          "rel": "alternate",
          "title": "data",
          "href": "https://raw.githubusercontent.com/mapserver/mapserver/branch-7-0/msautotest/",
          "hreflang": "en-US"
        },
        {
          "type": "application/geo+json",
          "rel": "item",
          "title": "Features as GeoJSON",
          "href": "https://demo.pygeoapi.io/master/collections/obs/items?f=json"
        },
        {
          "type": "text/html",
          "rel": "item",
          "title": "Features as HTML",
          "href": "https://demo.pygeoapi.io/master/collections/obs/items?f=html"
        }
      ]
    },
    {
      "type": "application/json",
```



OGC API Features voorbeelden

https://.../collections/dutch_castles?f=html

.../dutch_castles?f=json



pygeoapi Demo instance - running latest GitHub version

Home / Collections / Castles Within The Netherlands

Castles within The Netherlands

Locations of castles within the Netherlands from Rijksdienst voor het Cultu via OGRProvider.

[Browse through the items of collection Castles within The Netherlands](#)

Links

- [information \(text/html\)](#)
- [Features as GeoJSON \(application/geo+json\)](#)
- [Features as HTML \(text/html\)](#)
- [This document as JSON \(application/json\)](#)
- [This document as HTML \(text/html\)](#)

Powered by pygeoapi 0.6.0

LINKS →

GeoJSON →

HTML →



```
{
  "links": [
    {
      "type": "text/html",
      "rel": "canonical",
      "title": "information",
      "href": "http://www.nationaalgeoregister.nl/geonetwork/srv/dut/catalog.search#/metadata/e",
      "hreflang": "nl-NL"
    },
    {
      "type": "application/geo+json",
      "rel": "item",
      "title": "Features as GeoJSON",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json"
    },
    {
      "type": "text/html",
      "rel": "item",
      "title": "Features as HTML",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=html"
    },
    {
      "type": "application/json",
      "rel": "self",
      "title": "This document as JSON",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles?f=json"
    },
    {
      "type": "text/html",
      "rel": "alternate",
      "title": "This document as HTML",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles?f=html"
    }
  ],
  "crs": [
    "http://www.opengis.net/def/crs/OGC/1.3/CRS84"
  ]
}
```



OGC API Features voorbeelden

https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json

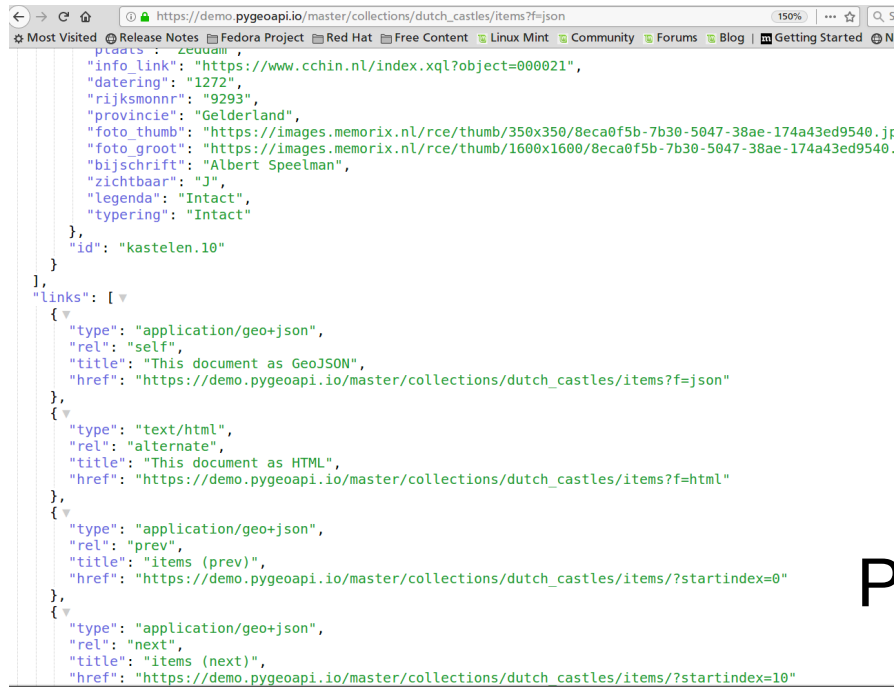
```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "geometry": {
        "type": "Point",
        "coordinates": [
          5.890354808676677,
          50.922380105241835
        ]
      },
      "properties": {
        "gid": 1,
        "cchin": "000007",
        "naam": "De Dael / Oelsbroeck",
        "plaats": "Nuth",
        "info_link": "https://www.cchin.nl/index.xql?object=000007",
        "datering": "1382",
        "rijksmonnr": "30919",
        "provincie": "Limburg",
        "foto_thumb": "https://images.memorix.nl/rce/thumb/350x350/51a5f4c2-020d-bba3-c332-65647254a522.jpg",
        "foto_groot": "https://images.memorix.nl/rce/thumb/1600x1600/51a5f4c2-020d-bba3-c332-65647254a522.jpg",
        "bijschrift": "Albert Speelman",
        "zichtbaar": "J",
        "legenda": "Intact",
        "typering": "Intact"
      },
      "id": "kastelen.1"
    },
    {
      "type": "Feature",
      "geometry": {
        "type": "Point",
        "coordinates": [
          6.122757898978117,
          51.90362875467979
        ]
      },
      "properties": {}
    }
  ]
}
```



OGC API Features voorbeelden

https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json

https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json&startindex=10



```
{
  "features": [
    {
      "type": "Feature",
      "id": "kastelen.10",
      "info_link": "https://www.cchin.nl/index.xql?object=000021",
      "datering": "1272",
      "rijksmonnr": "9293",
      "provincie": "Gelderland",
      "foto_thumb": "https://images.memorix.nl/rce/thumb/350x350/8eca0f5b-7b30-5047-38ae-174a43ed9540.jpg",
      "foto_groot": "https://images.memorix.nl/rce/thumb/1600x1600/8eca0f5b-7b30-5047-38ae-174a43ed9540.jpg",
      "bijschrift": "Albert Speelman",
      "zichtbaar": "J",
      "legenda": "Intact",
      "typering": "Intact"
    }
  ],
  "links": [
    {
      "type": "application/geo+json",
      "rel": "self",
      "title": "This document as GeoJSON",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json"
    },
    {
      "type": "text/html",
      "rel": "alternate",
      "title": "This document as HTML",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=html"
    },
    {
      "type": "application/geo+json",
      "rel": "prev",
      "title": "items (prev)",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json&startindex=0"
    },
    {
      "type": "application/geo+json",
      "rel": "next",
      "title": "items (next)",
      "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json&startindex=10"
    }
  ]
}
```

Paginerings links in GeoJSON output!



OGC API Features werkweek

- Resultaten uit WFS 3 werkweek:
 - er is al software om API aan te bieden (ook voortbouwend op bestaande infrastructuur, bijv met WFS 2 als bronsysteem)
- API gebruiken:
 - Snel in te bouwen in client applicatie
 - Al (beperkte) ondersteuning in sommige pakketten
- Zoekmachines: API indexeerbaar, zelfs de data (= voordeel en nadeel)



OGC API Features werkweek

Niet afgemaakt / uitgezocht:

- Linked data: JSON-LD ?
- WFS3 voor INSPIRE? (→ inmiddels nadere analyse gedaan)
- Beveiliging
- OGC API Features ↔ NL API Strategie?
- 3D, 4D?

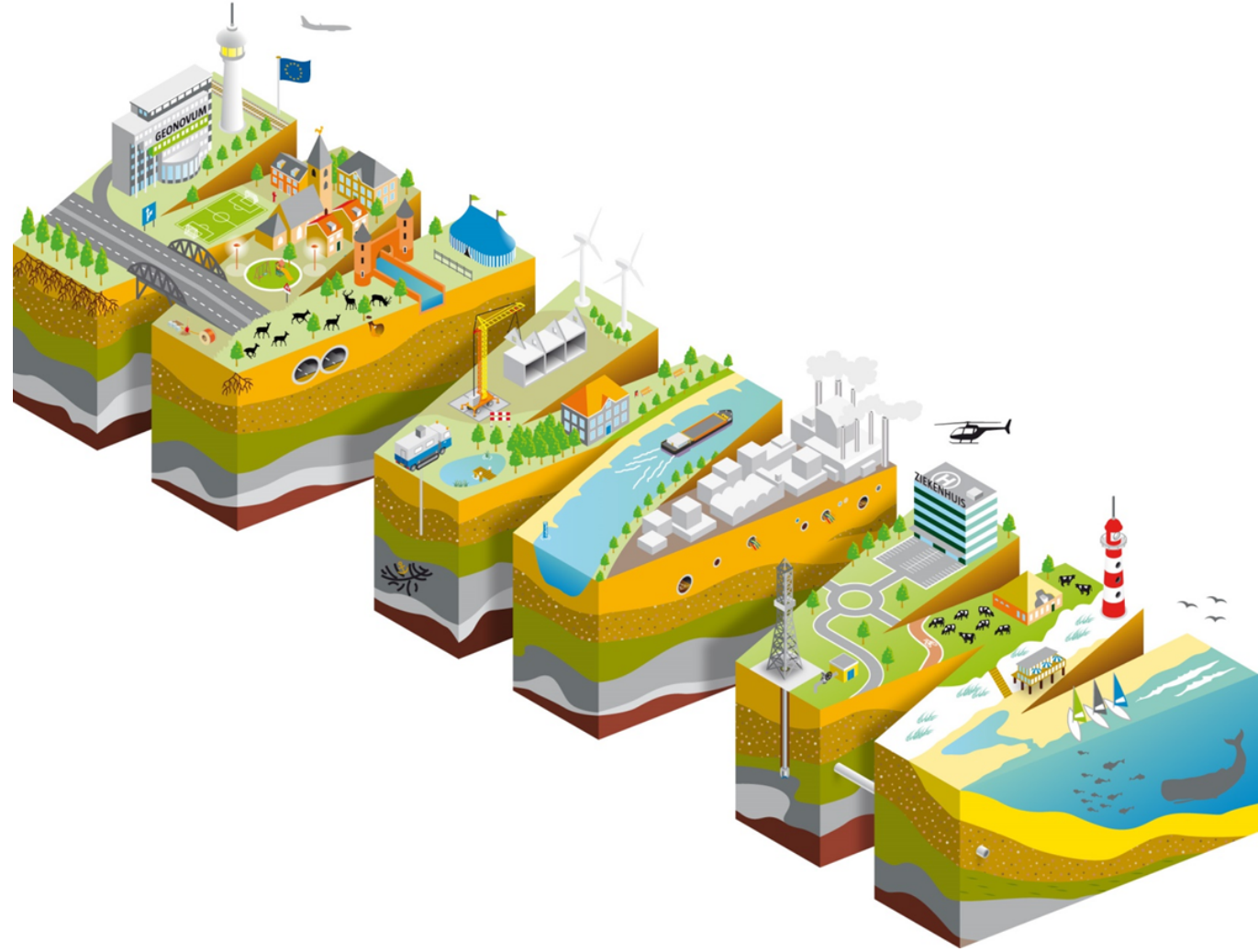


OGC API Features werkweek

Aandacht nodig:

- Spec: CRS ondersteuning
- Tips voor aanbieden API uitwerken: documentatie voor ontwikkelaars, configuratie API limieten, identifiers
- Ondersteuning in standaard (geo)software en bibliotheken





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OGC API Features referenties

- Specificatie: <http://docs.opengeospatial.org/DRAFTS/17-069r1.html>
- Github: https://github.com/opengeospatial/WFS_FES/
- Implementaties:
https://github.com/opengeospatial/WFS_FES/blob/master/implementations.md
- Checklist implementatie:
https://github.com/opengeospatial/WFS_FES/blob/master/guide/conformance_checklist.md
- WFS 3 werkweek: <https://geonovum.github.io/wfs3-experiments/>



OGC API – Features

- Extensies die waarschijnlijk volgen:

“The OGC Features API SWG has identified the following extensions to Part 1 (Core) as the highest priority:

- *support for Coordinate Reference Systems (Part 2);*
- *filter / query capabilities;*
- *simple transactions.”*

