

#SDI.Next: Stoomcursus WFS 3.0

Kickoff WFS 3.0 Werkweek

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#DataToBuildOn

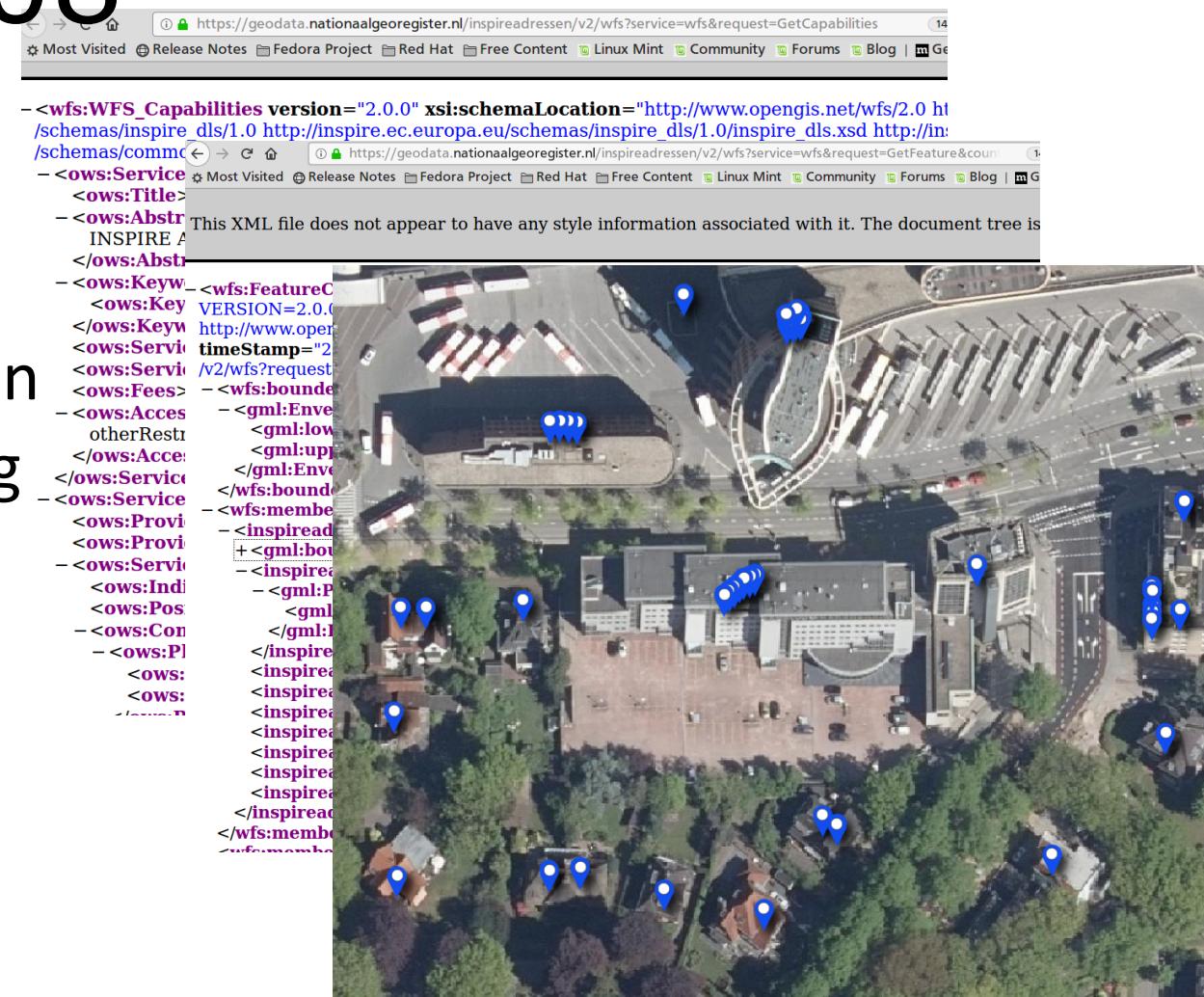


SDI.Nexxt

Nu: WFS 2.0 uit 2008

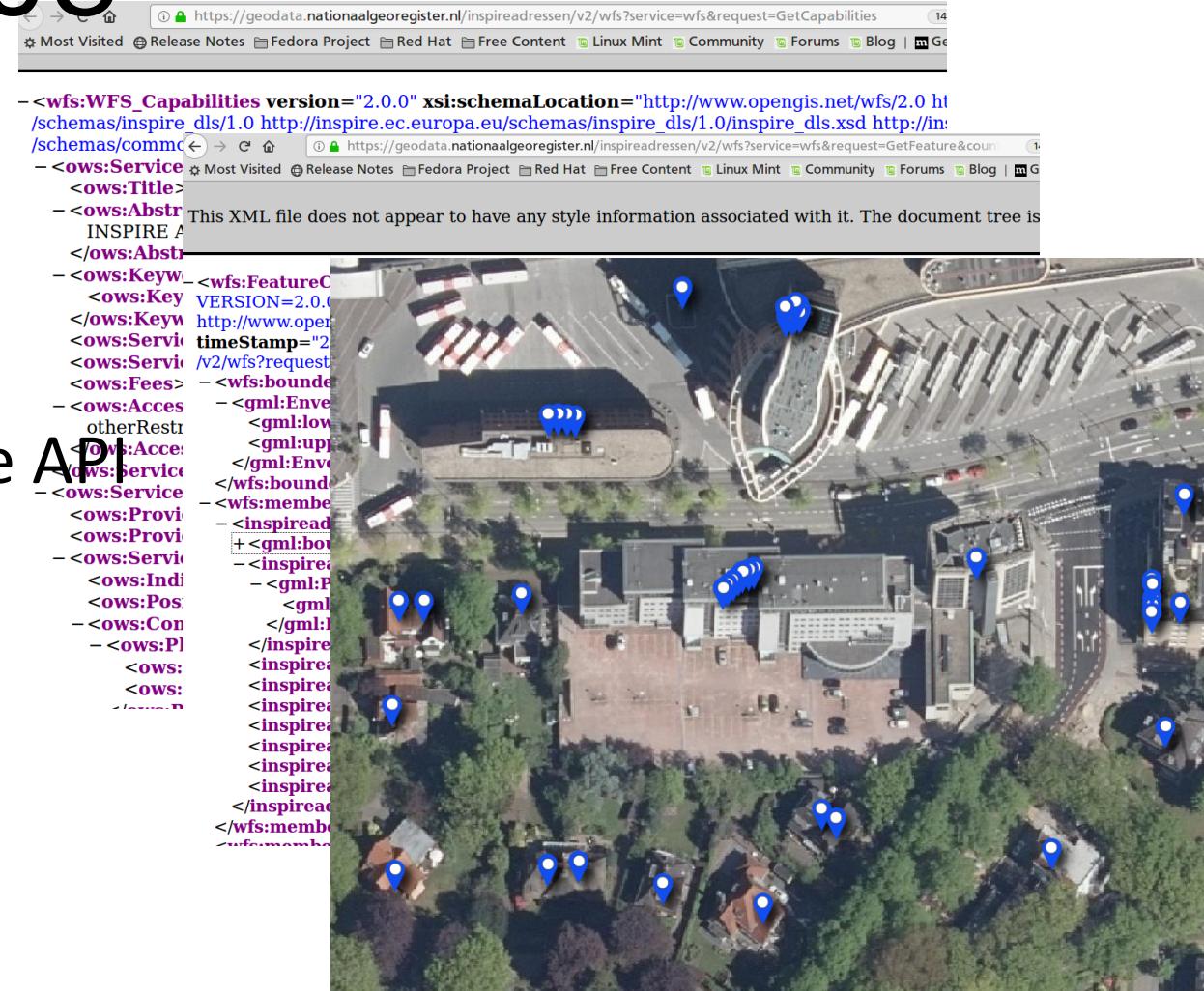
- gestandaardiseerde operaties (OGC)
- geodata bevragen
- optioneel geodata bewerken
- uitgebreide standaard: filtering, CRSen
- Ondersteuning in allerlei (geo) tooling
- in NL alleen al: honderden services

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



WFS 3 a.k.a. OGC API – Features

- “WFS, maar dan op een web manier”
- Opgesteld via Github, open proces
 - Nog niet officieel, wel bijna
- **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



WFS 3 a.k.a. 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
 - Paginering
 - (optioneel) eenvoudige alfanumerieke filtering
- Encodings: vaak HTML en (Geo)JSON (ook GML)



WFS 3 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



WFS 3 in 1 slide

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



WFS 3 voorbeelden

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

The screenshot shows the homepage of the pygeoapi Demo instance. At the top, it says "pygeoapi Demo instance - running latest GitHub version". Below that is a "Home" button and a "JSON" link. The main content area has a heading "pygeoapi Demo instance - running latest GitHub version" and a sub-section "pygeoapi provides an API to geospatial data" with links for "Keywords", "Terms of service", and "License". There are also sections for "Conformance", "Collections", and "Processes".

pygeoapi Demo instance - running latest GitHub version

pygeoapi provides an API to geospatial data

Keywords 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](#)

The screenshot shows the contact information page. It includes a "Provider" section with "pygeoapi Development Team" and a link to "https://pygeoapi.io". Below that is a "Contact point" section with fields for "Email" (you@example.org), "Telephone" (+xx-xxx-xxxx), "Fax" (+xx-xxx-xxxx), "Contact URL" (Contact URL), "Hours" (Hours of Service), and "Contact instructions" (During hours of service. Off on weekends).

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

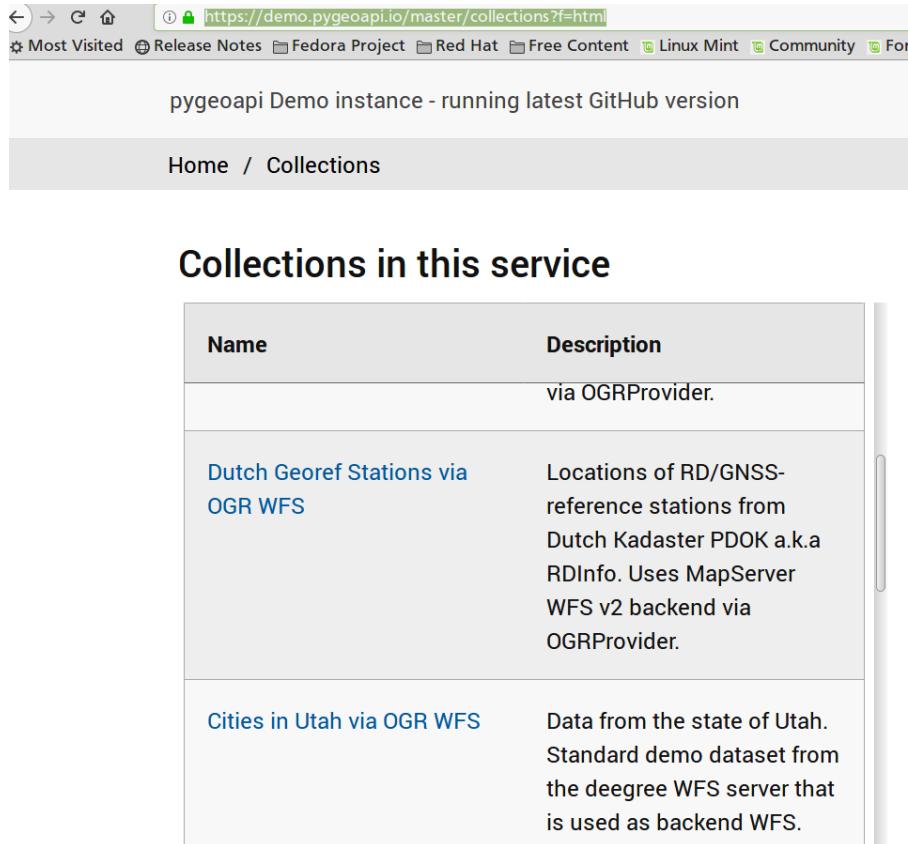
The screenshot shows the JSON representation of the WFS 3 service. The JSON object contains a "links" array with several items, each representing a different format and type of document:

```
{
  "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"
    }
  ]
}
```



WFS 3 voorbeelden

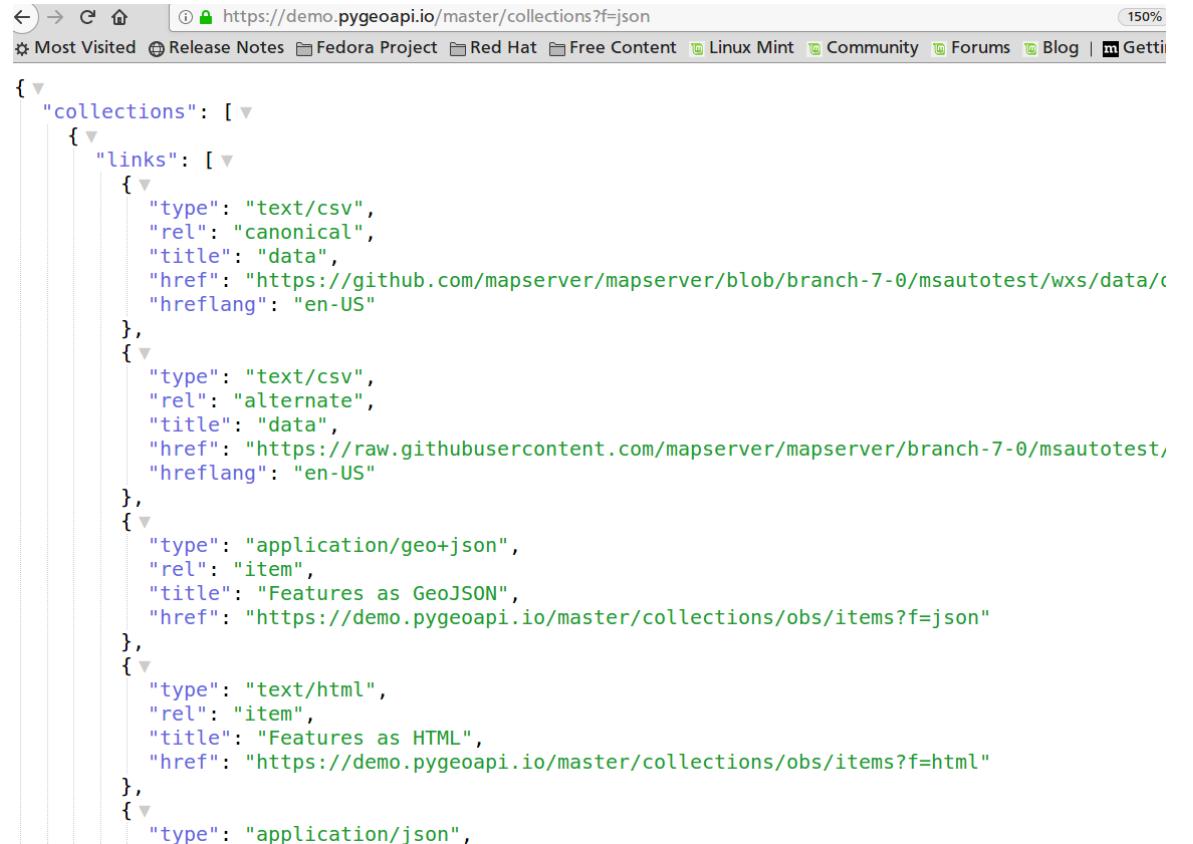
<https://.../collections?f=html>



The screenshot shows a web browser window with the URL <https://demo.pygeoapi.io/master/collections?f=html>. The page title is "pygeoapi Demo instance - running latest GitHub version". Below the title, there is a breadcrumb navigation bar with "Home / Collections". The main content area is titled "Collections in this service" and contains a table with three rows. The first row has a single entry: "via OGRProvider.". The second row is for "Dutch Georef Stations via OGR WFS", which includes a detailed description of the dataset. The third row is for "Cities in Utah via OGR WFS", also with a detailed description.

Name	Description
	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.
Cities in Utah via OGR WFS	Data from the state of Utah. Standard demo dataset from the degreee WFS server that is used as backend WFS.

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



The screenshot shows a web browser window with the URL <https://demo.pygeoapi.io/master/collections?f=json>. The page title is "pygeoapi Demo instance - running latest GitHub version". Below the title, there is a breadcrumb navigation bar with "Home / Collections". The main content area is titled "Collections in this service" and contains a JSON object representing the collections. The object has a "collections" key, which is an array containing one item. This item has a "links" key, which is an array containing five objects. Each object represents a different format and type of link for the collection, such as "text/csv" for canonical data or "application/json" for features as GeoJSON.

```
{
  "collections": [
    {
      "links": [
        {
          "type": "text/csv",
          "rel": "canonical",
          "title": "data",
          "href": "https://github.com/mapserver/mapserver/blob/branch-7-0/msautotest/wxs/data/cities.csv",
          "hreflang": "en-US"
        },
        {
          "type": "text/csv",
          "rel": "alternate",
          "title": "data",
          "href": "https://raw.githubusercontent.com/mapserver/mapserver/branch-7-0/msautotest/cities.csv",
          "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",
          "rel": "item",
          "title": "Features as JSON",
          "href": "https://demo.pygeoapi.io/master/collections/obs/items"
        }
      ]
    }
  ]
}
```



WFS 3 voorbeelden

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

The screenshot shows a web browser window with the URL https://demo.pygeoapi.io/master/collections/dutch_castles?f=json. The page title is "pygeoapi Demo instance - running latest GitHub version". Below the title, there are navigation links: "Most Visited", "Release Notes", "Fedora Project", "Red Hat", "Free Content", "Linux Mint", "Community", and "Forum". The main content area displays the title "Castles within The Netherlands" and a brief description: "Locations of castles within the Netherlands from Rijksdienst voor het Cultuurhistorisch Onderzoek via OGRProvider." It also includes a link to "Browse through the items of collection Castles within The Netherlands". A section titled "Links" lists several options: "information (text/html)", "Features as GeoJSON (application/geo+json)", "Features as HTML (text/html)", "This document as JSON (application/json)", and "This document as HTML (text/html)". At the bottom, it says "Powered by [pygeoapi](#) 0.6.0".

LINKS →

GeoJSON →

HTML →

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

The screenshot shows a web browser window with the URL https://demo.pygeoapi.io/master/collections/dutch_castles?f=json. The page title is "pygeoapi Demo instance - running latest GitHub version". Below the title, there are navigation links: "Most Visited", "Release Notes", "Fedora Project", "Red Hat", "Free Content", "Linux Mint", "Community", "Forums", "Blog", and "Gett...". The main content area displays a JSON object representing the collection's metadata and links. The "links" array contains five entries: 1) "information" (text/html, canonical, href: <http://www.nationaalgeoregister.nl/geonetwork/srv/dut/catalog.search#/metadata/e>, hreflang: nl-NL). 2) "Features as GeoJSON" (application/geo+json, item, href: https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json). 3) "Features as HTML" (text/html, item, href: https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json). 4) "This document as JSON" (application/json, self, href: https://demo.pygeoapi.io/master/collections/dutch_castles?f=json). 5) "This document as HTML" (text/html, alternate, href: https://demo.pygeoapi.io/master/collections/dutch_castles?f=json). The "crs" array contains one entry: "http://www.opengis.net/def/crs/OGC/1.3/CRS84".

```
{
  "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=json"
    },
    {
      "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=json"
    }
  ],
  "crs": [
    "http://www.opengis.net/def/crs/OGC/1.3/CRS84"
  ]
}
```

WFS 3 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": {}  
    }  
  ]  
}
```



WFS 3 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

```
① 🔍 https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json 150% ⋮ ⌂ 🔍 S
Most Visited Release Notes Fedora Project Red Hat Free Content Linux Mint Community Forums Blog | Getting Started ⓘ
  pdat : zeudam ,
  "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.jp
  "foto_groot": "https://images.memorix.nl/rce/thumb/1600x1600/8eca0f5b-7b30-5047-38ae-174a43ed9540.
  "bijchrift": "Albert Speelman",
  "zichtbaar": "J",
  "legenda": "Intact",
  "typering": "Intact"
},
"id": "kastelen.10"
},
"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=json"
  },
  {
    "type": "application/geo+json",
    "rel": "prev",
    "title": "items (prev)",
    "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items/?startindex=0"
  },
  {
    "type": "application/geo+json",
    "rel": "next",
    "title": "items (next)",
    "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items/?startindex=10"
  }
]
```

Paginering links in GeoJSON output!



WFS 3 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

```
① 🔍 https://demo.pygeoapi.io/master/collections/dutch_castles/items?f=json 150% ⋮ ⌂ 🔍 S
Most Visited Release Notes Fedora Project Red Hat Free Content Linux Mint Community Forums Blog | Getting Started ⓘ
  pdat : zeudam ,
  "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.jp
  "foto_groot": "https://images.memorix.nl/rce/thumb/1600x1600/8eca0f5b-7b30-5047-38ae-174a43ed9540.
  "bijchrift": "Albert Speelman",
  "zichtbaar": "J",
  "legenda": "Intact",
  "typering": "Intact"
},
"id": "kastelen.10"
},
"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=json"
  },
  {
    "type": "application/geo+json",
    "rel": "prev",
    "title": "items (prev)",
    "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items/?startindex=0"
  },
  {
    "type": "application/geo+json",
    "rel": "next",
    "title": "items (next)",
    "href": "https://demo.pygeoapi.io/master/collections/dutch_castles/items/?startindex=10"
  }
]
```

Paginering links in GeoJSON output!



WFS 3 aan de slag

- Nu al implementaties:
https://github.com/opengeospatial/WFS_FES/blob/master/implementations.md
- Uitzoeken wat wel en niet werkt



WFS 3 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



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