# OGC API feature tools

## MIG-T

**Auteur** Ine de Visser

**Datum** 28 April 2023

GEONOVUM

# Factsheets HVD

To explain which INSPIRE network services can be seen as HVD API

Advice what in (near) future to implement

Available at:
https://docs.geostandaarden.nl/eu/hvdl/englishfactsheets/

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## APIs and the High Value Dataset List

**This factsheet for INSPIRE data providers describes the policy for unlocking the High Value Dataset List via Application Programming Interfaces (APIs).**

### High Value Dataset List

The 2019 EU Open Data Directive (ODD) allows the EC to maintain a High Value Data List (HDVL), which imposes an obligation on all Member States to publish data1. Various datasets on the HDVL are already accessed via INSPIRE metadata and services. Now the EC also imposes obligations for opening up the hvdl: this data must be published and accessed as open data by all Member States, if available, via APIs and bulk download (incl. metadata). These requirements are in line with the INSPIRE Directive, both reinforce each other; the technical requirements for multiple HVD themes are based on INSPIRE and explicit open data requirements are introduced in the context of INSPIRE.

The question is: does the current access via the INSPIRE network services meet requirements of the ODD and hvdl?

### APIs

The hvds must be accessed legibly via an API machine. An API is defined in ODD as "**a set of functions, procedures, definitions and protocols for communication between machines and seamless data exchange.**" No technical regulation for API functionality and technology has been drawn up. Therefore, no "technical" choice or API style is required for APIs. However, it should be "functional APIs corresponding to the reasonable needs of re-users". For the themes geo-data, earth observation and environment and mobility, it is indicated that it is an API such as 'the INSPIRE direct access download services'. The INSPIRE direct acccess download service implementation makes it possible to download only part of the dataset by own selections. Inspire data providers with HDVL data sets can use the INSPIRE network services in the following way for the HDVL2:

| Inspire "network service" | API | Bulk Download |
|---|---|---|
| OWS: WFS, WCS, SOS | X | X |
| OGC API: Sta, API Features | X | X |
| Atom feeds | | X |

### Standards

The international standards for INSPIRE APIs have been developed by the OGC. These first generation OWS standards, such as WFS, WCS and SOS, are based on RPC and XML. These standards are still valid and in use, but are gradually replaced by the new generation. This new generation, the OGC APIs are based on general Web architecture, i.e. REST. In the general Web architecture, the Dutch API strategy of the government is also applied.

### Advice

In short, datasets accessed via INSPIRE direct access download services can also be used as HDVL APIs. There are no prescribed technical implementation rules from ODD and HDVL, but an expectation that APIs will grow with the reasonable wishes of re-users.

Therefore, implement and encourage the use of REST APIs in accordance with the Dutch API strategy and in accordance with the OGC API standards such as STA and OGC API features (INSPIRE Good Practises). This new generation of APIs are open to a much wider public for reuse. Also follow the broad European developments in the field of API implementation and ensure that the Dutch API interests are guaranteed.

[1] See also the EU Information Handling.

[2] MIG-T meeting 25 November 2022

This factsheet shows the state of play around APIs and the High Value Dataset List as best as possible and is updated every time. Feedback is welcome at inspire@geonovum.nl.

# Advice

In short;

- Datasets accessed via INSPIRE direct access download services can also be used as HDV APIs.
- There are no prescribed technical implementation rules from ODD or HVD, but an expectation that APIs will grow with the reasonable wishes of re-users.
- Therefore, **implement and encourage the use** of REST APIs in accordance with the Dutch API strategy and in accordance with the OGC API standards such as STA and **OGC API features** (INSPIRE Good Practises).
- Follow the broad European developments in the field of API implementation and ensure that the Dutch API interests are guaranteed.

This new generation of APIs are open to a much wider public for reuse.

# But.....

Tools to serve spatial data via OGC-API-Feature does not fully comply with the standards

# So we have launched an open tender

Improve the tooling to serve spatial data via OGC-API-Features in the Netherlands and EU according to the standards:

1. OGC standards:
   - OGC-API-Features Part 1:Core
   - OGC-API-Features Part 2 on coordinate systems.
2. INSPIRE good practice:

   OGC API – Features as an INSPIRE download service

1. Dutch API Design Rules

# Why?

Geonovum wants to strengthen the Dutch public geospatial infrastructure by:

- making the Dutch public geospatial data better accessible, also outside the geodomain;
- helping Dutch INSPIRE and HVD data providers;
- following and supporting EU developments like the European data space;
- Improving interoperability by stimulating the use of standards.

# Tool requirements for tender

- Tool to be adjusted must be an existing well maintained open source tool with a solid community
- The tool must have (expected) users in the Netherlands and/or EU.
- It concerns OGC-API-Feature services, so no other OGC-API services.

# Adjusted tools

- Geoserver: Geosolutions
- Deegree: Wetransform
- Pygeoapi: Geocat + JustObjects

# Changes made

1. Comply with OGC-API-Features Part 2
   - By supporting more than one coordinate systems

2. Comply with Dutch API Design Rules
   - Optional functionality to comply with Dutch API requirements

3. Comply with INSPIRE requirements
   - Functionality to support required links (metadata, license, etc.. )

# Deegree

Datasets / simplified-addresses / Collections / SimpleAddress JSON XML HTML

## SimpleAddress

| | |
|---|---|
| Links | Features as HTML<br>Download all features as GeoJSON<br>Download all features as GML<br>Feature concept Address |
| Spatial Extent |  |
| Temporal Extent | - |
| Coordinate Reference Systems | http://www.opengis.net/def/crs/OGC/1.3/CRS84<br>http://www.opengis.net/def/crs/EPSG/0/4326<br>http://www.opengis.net/def/crs/EPSG/0/4258 |
| Storage CRS | http://www.opengis.net/def/crs/EPSG/0/4258 |

# Deegree

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## We added seven pull requests to deegree

2 PR already merged

- Fixes the use of storage CRS code from list of supported CRS
- Add support for overriding accepted format

5 PR still to be merged

- Support configuring additional links for collections
- Support enabling API version response header
- Support optional API version segment in path
- feat: serve OpenAPI description also as YAML
- feat: add "openapi" alias for api endpoint

# deegree OGC API – Features: How to try it out

**Test instance of our deegree OAF fork available here:**

https://test.haleconnect.de/ogcapi/datasets/simplified-addresses

It includes all current changes merged into https://github.com/wetransform-os/deegree-ogcapi/ (devel branch) with the example workspace from this repository: https://github.com/wetransform-os/deegree-ogcapi-example/

**Direct link to API definition:**

https://test.haleconnect.de/ogcapi/datasets/simplified-addresses/v1/openapi.yaml

# Pygeoapi – adding CRS support

## ASPECTS

- metadata: CRS list and storageCRS
- parameter: CRS bounding box
- parameter: CRS
- HTTP response header: Content-CRS
- documentation

# DEVELOPMENT ASPECTS

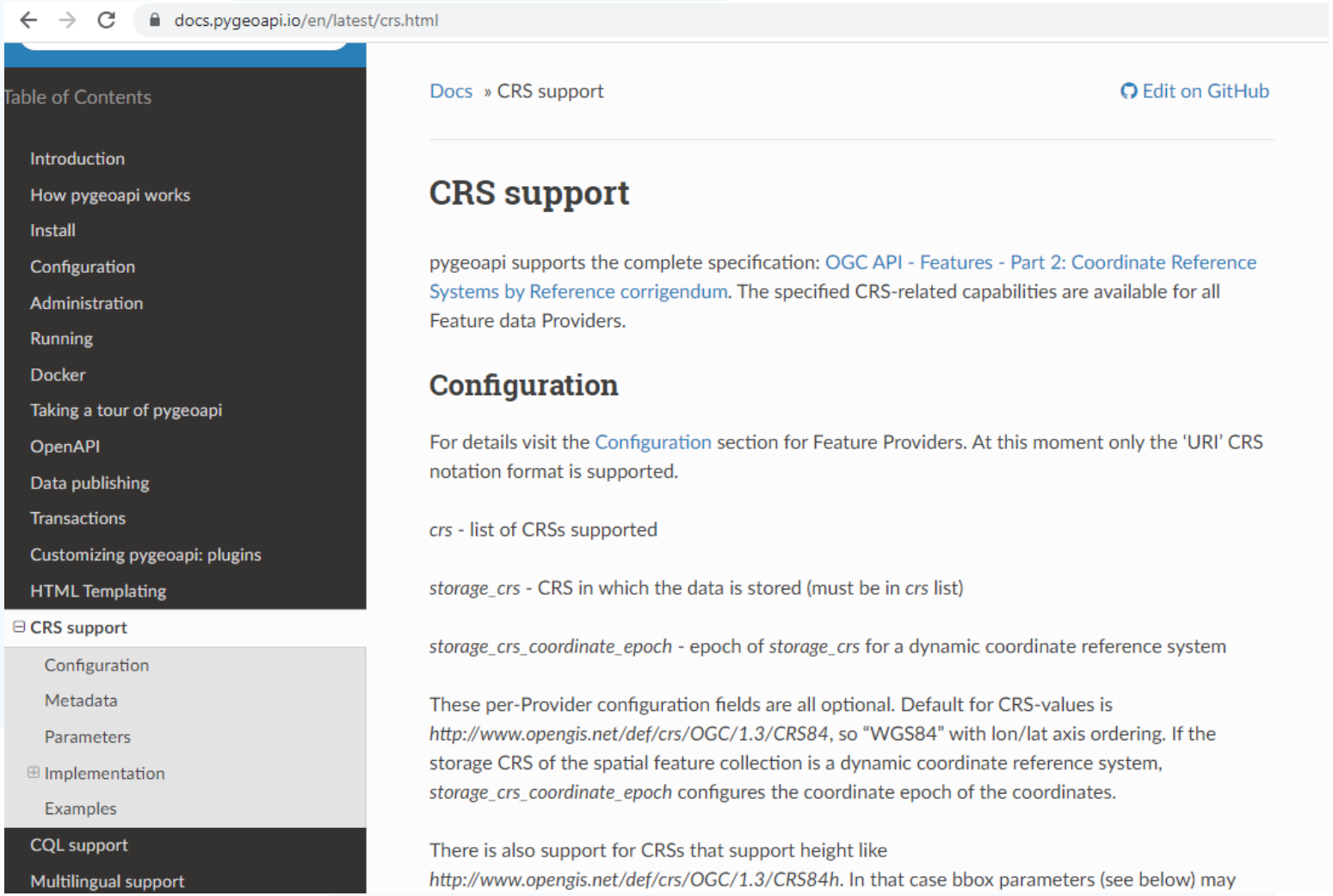
- Added to core via PR 1174
- Community cooperation - Mathieu Tachon!
- demo: Geonovum testbed server
- documentation

# Pygeoapi – INSPIRE improvements

# DEVELOPMENT (2/2)

- Created `UrlPrefetcher` to get content details of `enclosure` links (`HEAD` request)
- Note: response may not contain `Content-Type` or `Content-Length` headers
- Added to core via PR 1173
- Documentation

# Pygeoapi documentation

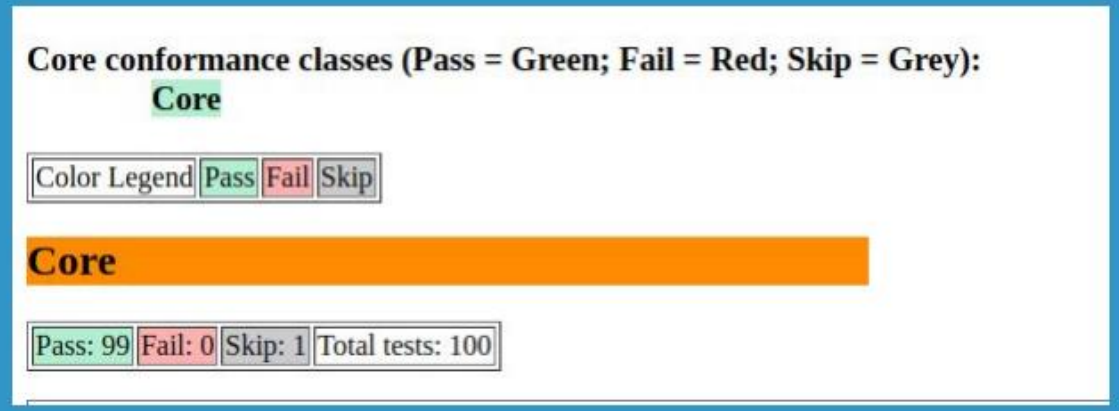


# OGC API features improvements

- **CITE compliance:**
  - Core (implemented, needed bug fixes)
  - CRS (support available, but outdated, update to 1.0

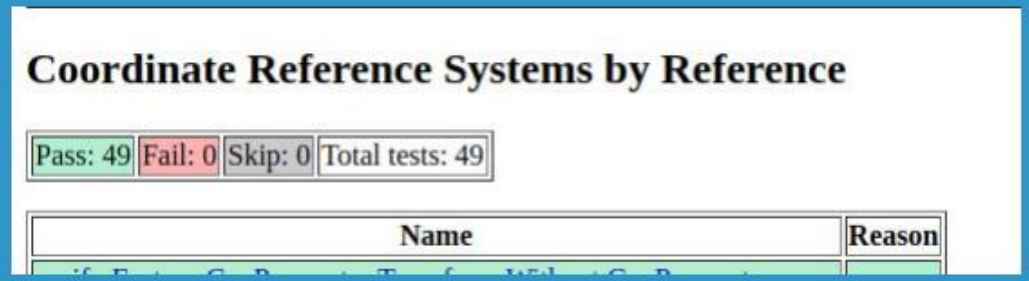
# OGC API features improvements

- **Core conformance changes:**
  - [GEOS-10853] Do not declare GML-SF0 compliance (GeoServer generates generic GML, not SF0)



# OGC API features, GeoServer fixes

- **CRS conformance changes:**
  - [GEOS-10853] Declare CRS conformance class
  - [GEOT-7314] Handle the OGC authority, e..g, https://www.opengis.net/def/crs/OGC/1.3/CRS84
  - [GEOS-10881] [GEOS-10887] Add “Content-Crs” header in responses, with proper form
  - [GEOS-10884] Return 400 if bbox-crs content is invalid
  - [GEOS-10885] Remove axis order from response headers (got removed from spec.)



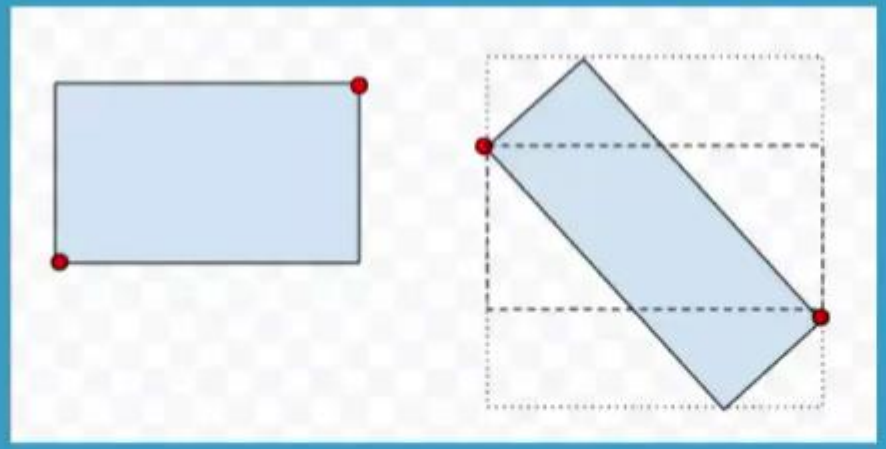
**Coordinate Reference Systems by Reference**

| Pass: 49 | Fail: 0 | Skip: 0 | Total tests: 49 |
|---|---|---|---|

| Name | Reason |
|---|---|

# OGC API features, CITE issues

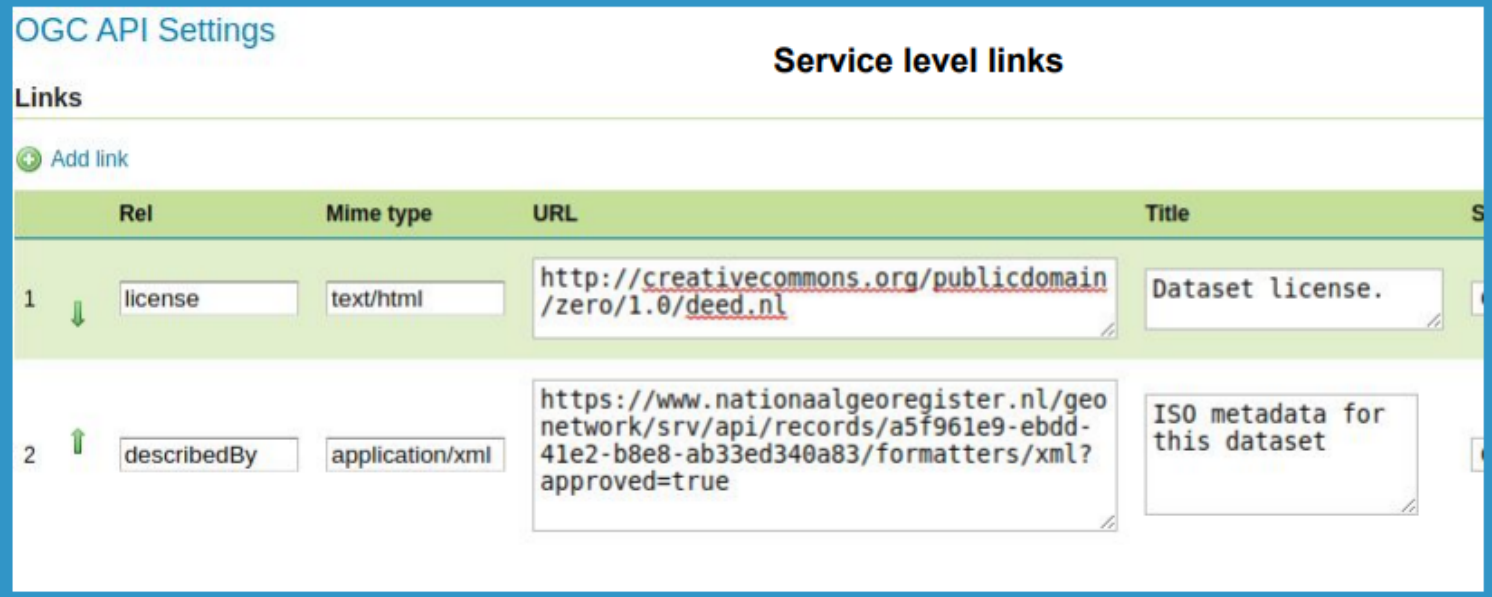
- **CITE tests bug reports:**
  - Unclear error messages
  - CRS tests fail against empty feature collections
  - Using transformed extent as bbox fails in many cases (work around, expand original BBOX)



OGC APIs

# INSPIRE download service

- Need to set up a number of links
- At least a few of them need to be provided by the admin
- [GEOS-10892] Allow configuration of custom links for colllections/collection



# INSPIRE download service

OGC API Settings

**Collection level links**

**Links**

Add link

| | | Rel | Mime type | URL | Title |
|---|---|---|---|---|---|
| 1 | ⇩ | enclosure | application/geo | https://geonovum.geosolutionsgroup.com/geoserver/www/ADNL.gpkg | Addresses raw data. |
| 2 | ⇧⇩ | describedBy | application/xml | https://www.nationaalgeoregister.nl/geonetwork/srv/api/records/a5f961e9-ebdd-41e2-b8e8-ab33ed340a83/formatters/xml?approved=true | ISO metadata. |
| 3 | ⇧⇩ | tag | text/html | https://inspire.ec.europa.eu/featureconcept/Address | INSPIRE Address feature |
| 4 | ⇧ | describedBy | text/html | https://github.com/INSPIRE-MIF/2017.2/blob/master/GeoJSON/ads/simple-addresses.md | GeoJSON Encoding Rule for INSPIRE Addresses |

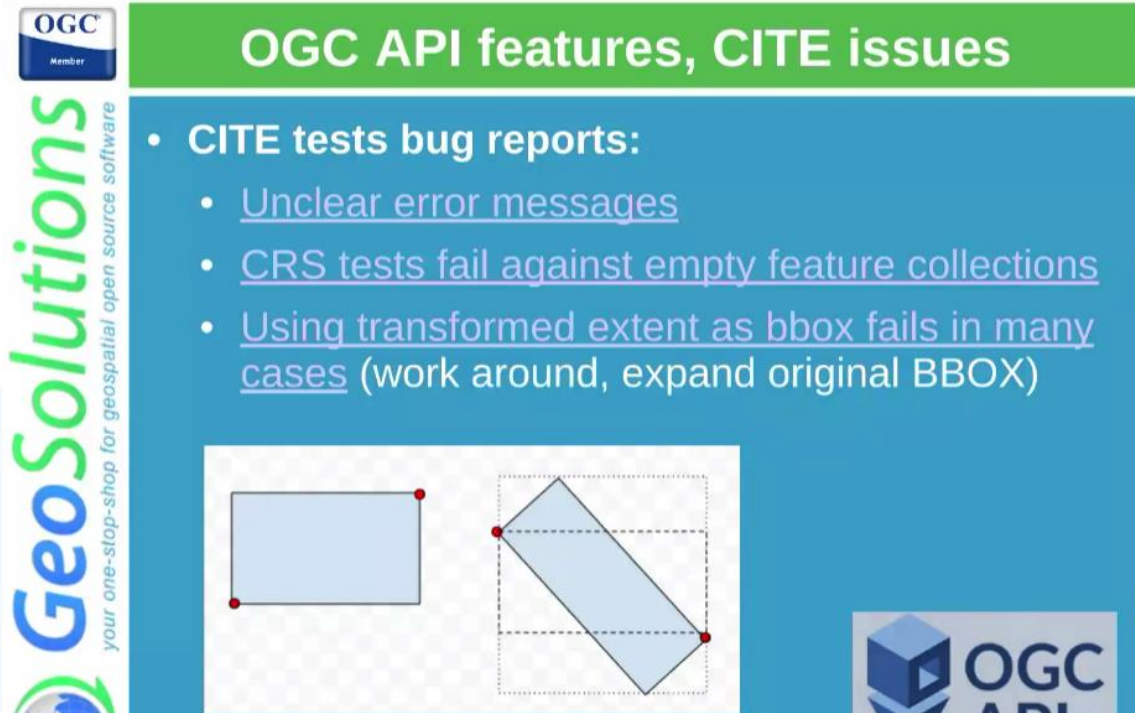
# INSPIRE download service

- Test compliance
- Just a proxy to the OGC CITE tests, so far
- Not actually checking the links

# CITE test bug reports

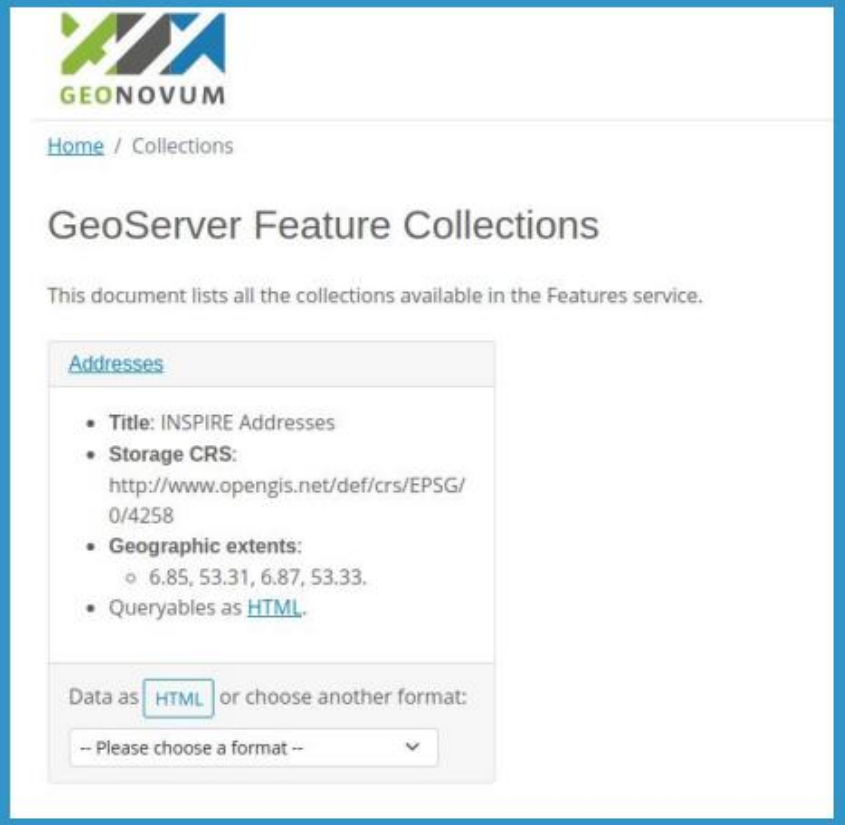
- Unclear error messages (minor issue). https://github.com/opengeospatial/ets-ogcapi-features10/issues/200
- CRS tests fail against empty feature collections (removed empty collections from test server). https://github.com/opengeospatial/ets-ogcapi-features10/issues/201

- Using transformed extent as bbox fails in many cases (expanded the bounding box in the collection declaration to compensate for imprecise reprojection).
- https://github.com/opengeospatial/ets-ogcapi-features10/issues/199 en zie ook: https://github.com/Geonovum/KP-APIs/issues/574



# Demo server

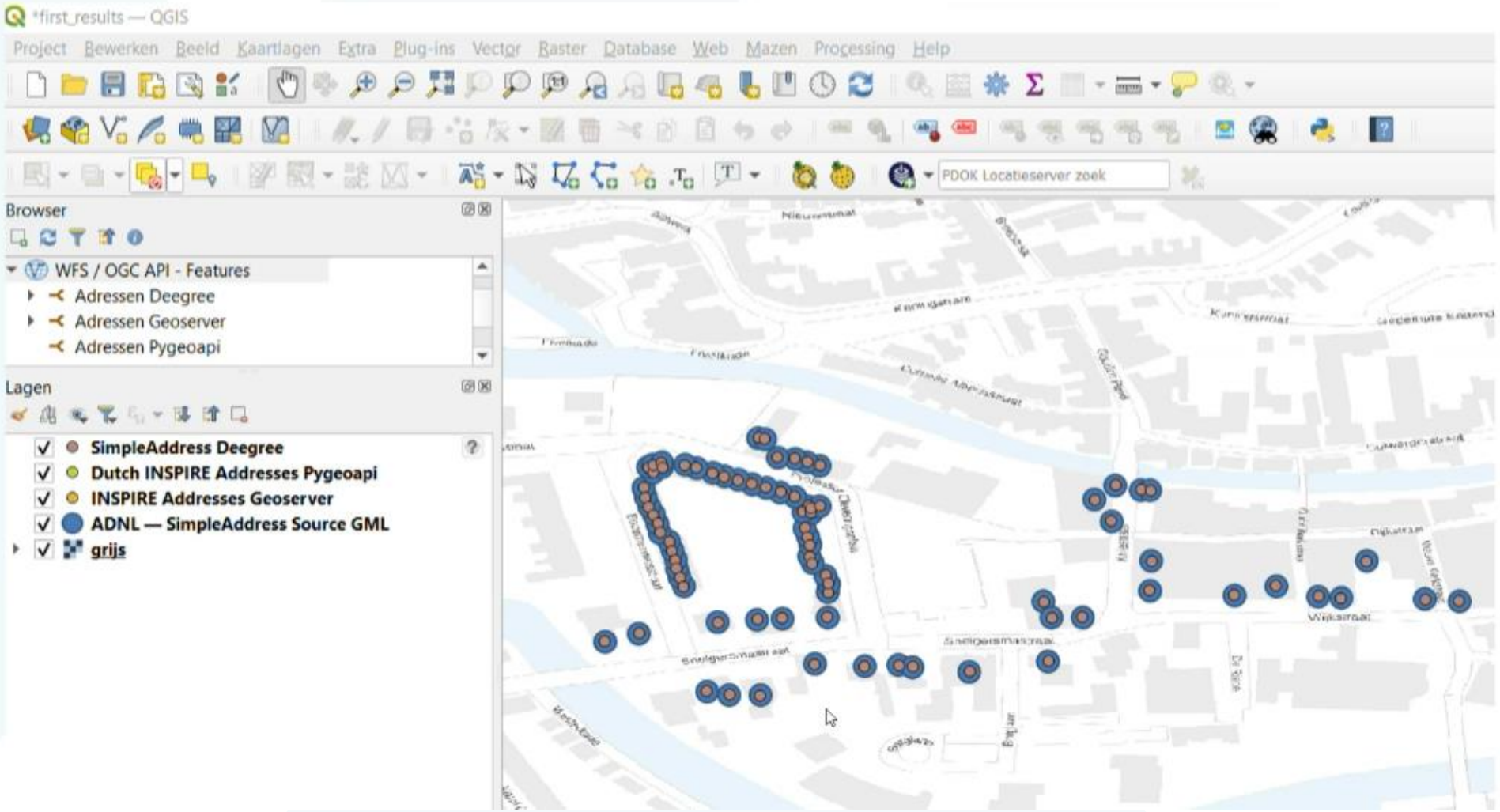
- **Demo server based on Geonovum ogc-api-tested repository (starting point)**
  https://github.com/Geonovum/ogc-api-testbed/tree/main/services/geoserver/data




https://geonovum.geosolutionsgroup.com/geoserver/inspire/ogc/features/v1

# Downloading the updates

- All changes landed in the official GeoServer repository
- Use nightly builds of the development branch: https://geoserver.org/release/main/
- Will be part of the 2.24 release in September 2023
- We hope by then the OGC API module will also graduate to official extension


*first_results — QGIS
Project Bewerken Beeld Kaartlagen Extra Plug-ins Vector Raster Database Web Mazen Processing Help
PDOK Locatieserver zoek
Browser
WFS / OGC API - Features
Adressen Deegree
Adressen Geoserver
Adressen Pygeoapi
Lagen
SimpleAddress Deegree
Dutch INSPIRE Addresses Pygeoapi
INSPIRE Addresses Geoserver
ADNL — SimpleAddress Source GML
grijs

# INSPIRE issues – How to link to the description of the encoding

The tender resulted in 3 different implementations, because it is not prescribed how it should be done:

Deegree:

{"href":"https://github.com/INSPIRE-MIF/2017.2/tree/master/GeoJSON/ads","rel":"describedby","type":"text/html","title":"Encoding description"} at /collections level

Pygeoapi:

{"href":“https://github.com/INSPIRE-MIF/2017.2/tree/master/GeoJSON/ads”,"rel":"about","type":"text/html","title":"Description of the encoding","hreflang":"en"} at /collections/Addresses level

Geoserver:

{"href":"https://github.com/INSPIRE-MIF/2017.2/blob/master/GeoJSON/ads/simple-addresses.md","rel":"describedBy","type":"text/html","title":"GeoJSON Encoding Rule for INSPIRE Addresses"} at /collections/AddressesNL level

See https://github.com/INSPIRE-MIF/gp-ogc-api-features/issues/87 and

INSPIRE-MIF/gp-geopackage-encodings#25 conclusion it should be documented in the metadata

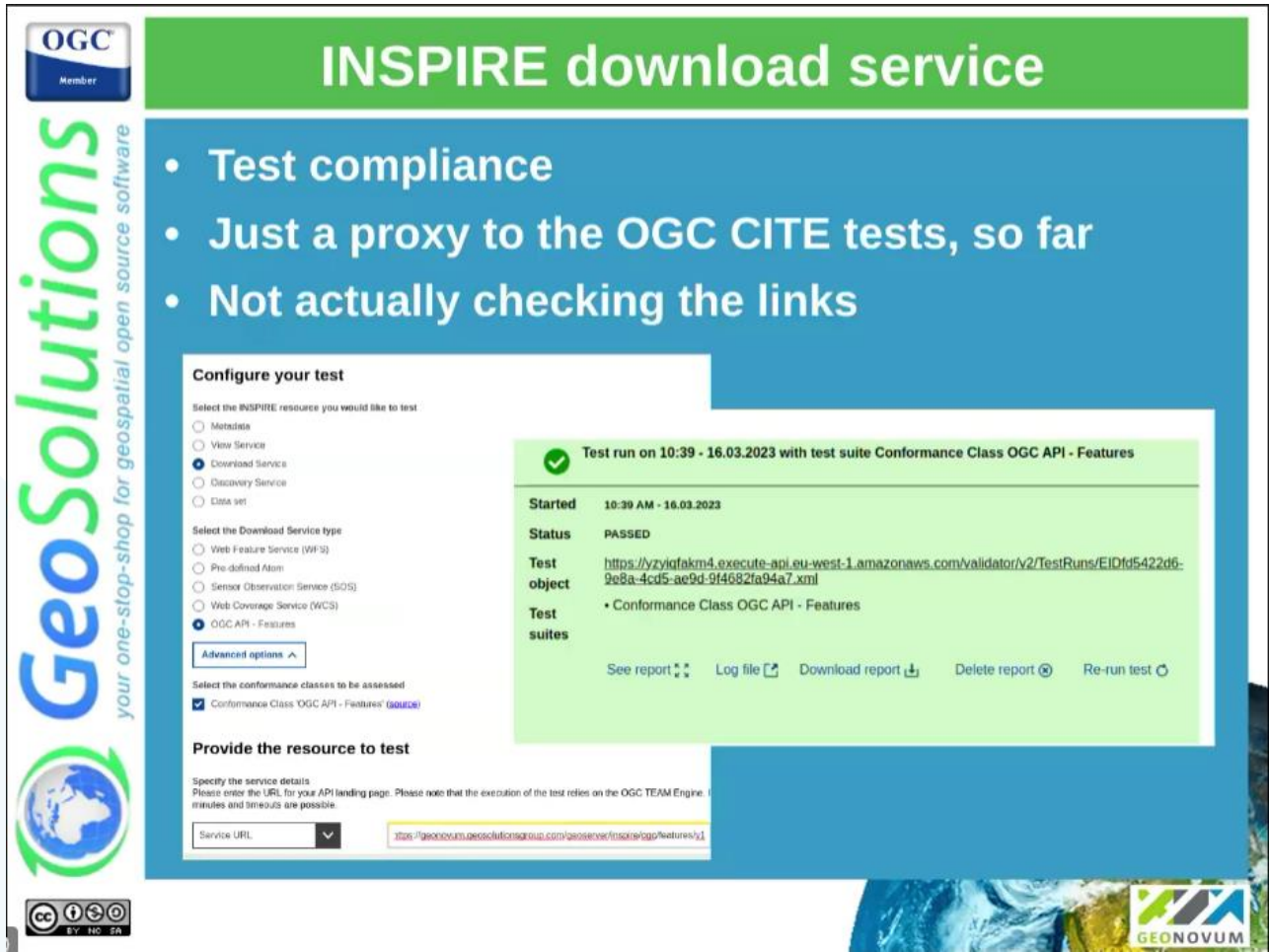
# INSPIRE issues – Level of linking

The links as asked for in the Requirements class “INSPIRE-pre-defined-data-set-download-OAPIF” (metadata dataset, feature concept, license) are to be set at /collections level,

but it should also be possible at /collections/{collectionID} level like it is possible for the bulkdownload link. This is needed when the different collections come from different datasets.

# INSPIRE issues - validator

The Inspire validator does not yet test on the required links as set in the good practice for Setting up an INSPIRE Download service based on the OGC API-Features standard.



# Presentations

- https://www.geonovum.nl/uploads/documents/Geosolutions.pdf
- https://www.geonovum.nl/uploads/documents/deegree%20OGC%20API%20Features.pdf
- https://pygeoapi.io/presentations/geonovum-tender-2023/#/frontpage
- A public presentation (20 april) recording: https://youtu.be/xR66SUPh_9I

# Thank you!


## Ine de Visser

### Contact

**E-mail:** i.devisser@geonovum.nl

**Telefoon:**


### Bezoek onze website

www.geonovum.nl