

# OGC API feature tools

MIG-T

**Auteur** Ine de Visser

**Datum** 28 April 2023





# 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/>

## 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 data<sup>1</sup>. 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 access 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.

<sup>1</sup> See also the [EU Information Handling](#).

<sup>2</sup> [MIG-T meeting 25 November 2022](#)

# 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.. )

## SimpleAddress

### Links

- [Features as HTML](#)
- [Download all features as GeoJSON](#)
- [Download all features as GML](#)
- [Feature concept Address](#)

### Spatial Extent



### Temporal Extent

-

### Coordinate Reference Systems

- <http://www.opengis.net/def/crs/OGC/1.3/CRS84>
- <http://www.opengis.net/def/crs/EPSSG/0/4326>
- <http://www.opengis.net/def/crs/EPSSG/0/4258>

### Storage CRS

- <http://www.opengis.net/def/crs/EPSSG/0/4258>

## 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](#)

## ASPECTS

- Collection link(s) to data license
- Collection link(s) to "description of encoding"
- Collection link(s) for bulk downloads

## DEVELOPMENT (2/2)

- Created `urIPrefetcher` 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

← → ↻ docs.pygeoapi.io/en/latest/crs.html

Table of Contents

- Introduction
- How pygeoapi works
- Install
- Configuration
- Administration
- Running
- Docker
- Taking a tour of pygeoapi
- OpenAPI
- Data publishing
- Transactions
- Customizing pygeoapi: plugins
- HTML Templating

☰ CRS support

- Configuration
- Metadata
- Parameters
- ⊕ Implementation
- Examples

CQL support

Multilingual support

Docs » CRS support [Edit on GitHub](#)

## CRS support

pygeoapi supports the complete specification: [OGC API - Features - Part 2: Coordinate Reference Systems by Reference corrigendum](#). The specified CRS-related capabilities are available for all Feature data Providers.

### Configuration

For details visit the [Configuration](#) section for Feature Providers. At this moment only the 'URI' CRS notation format is supported.

*crs* - list of CRSs supported

*storage\_crs* - CRS in which the data is stored (must be in *crs* list)

*storage\_crs\_coordinate\_epoch* - epoch of *storage\_crs* for a dynamic coordinate reference system

These per-Provider configuration fields are all optional. Default for CRS-values is <http://www.opengis.net/def/crs/OGC/1.3/CRS84>, so "WGS84" with lon/lat axis ordering. If the storage CRS of the spatial feature collection is a dynamic coordinate reference system, *storage\_crs\_coordinate\_epoch* configures the coordinate epoch of the coordinates.

There is also support for CRSs that support height like <http://www.opengis.net/def/crs/OGC/1.3/CRS84h>. In that case bbox parameters (see below) may



# OGC API features improvements



**GeoSolutions**  
your one-stop-shop for geospatial open source software



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







# OGC API features improvements



**GeoSolutions**  
your one-stop-shop for geospatial open source software



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

Core conformance classes (Pass = Green; Fail = Red; Skip = Grey):

**Core**

Color Legend Pass Fail Skip

**Core**

Pass: 99 Fail: 0 Skip: 1 Total tests: 100





# OGC API features, GeoServer fixes



**GeoSolutions**  
your one-stop-shop for geospatial open source software



- **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

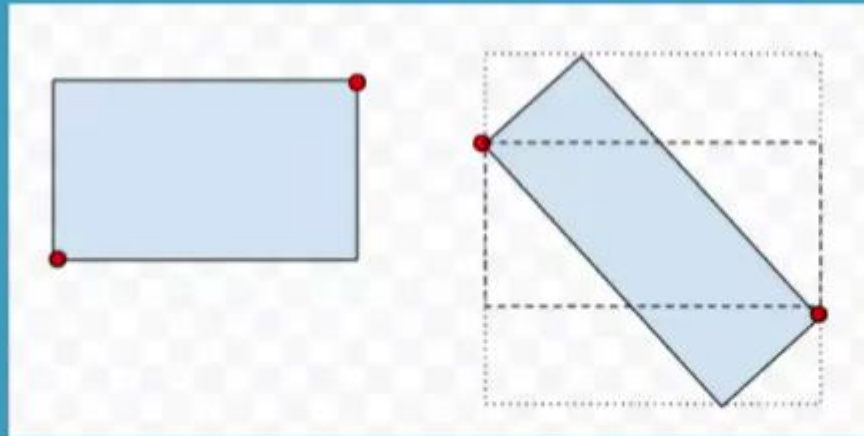
Pass: 49 Fail: 0 Skip: 0 Total tests: 49

Name	Reason
if E... G... P... F... G... W... G... P...	





- 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)





- 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 collections/collection

OGC API Settings

### Service level links

Links

+ Add link

	Rel	Mime type	URL	Title	S
1	license	text/html	<a href="http://creativecommons.org/publicdomain/zero/1.0/deed.nl">http://creativecommons.org/publicdomain/zero/1.0/deed.nl</a>	Dataset license.	
2	describedBy	application/xml	<a href="https://www.nationaalgeoregister.nl/geonetwork/srv/api/records/a5f961e9-ebdd-41e2-b8e8-ab33ed340a83/formatters/xml?approved=true">https://www.nationaalgeoregister.nl/geonetwork/srv/api/records/a5f961e9-ebdd-41e2-b8e8-ab33ed340a83/formatters/xml?approved=true</a>	ISO metadata for this dataset	



OGC API Settings

Collection level links

Links

[+ Add link](#)

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



# INSPIRE download service

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

## Configure your test

Select the INSPIRE resource you would like to test

- Metadata
- View Service
- Download Service
- Discovery Service
- Data set

Select the Download Service type

- Web Feature Service (WFS)
- Pre-defined Atom
- Sensor Observation Service (SOS)
- Web Coverage Service (WCS)
- OGC API - Features

Advanced options ^

Select the conformance classes to be assessed

- Conformance Class 'OGC API - Features' [\(source\)](#)

## Provide the resource to test

Specify the service details

Please enter the URL for your API landing page. Please note that the execution of the test relies on the OGC TEAM Engine. Minutes and timeouts are possible.

Service URL

<https://geonovum.geosolutionsgroup.com/geoserver/inspire/ogp/features/>



Test run on 10:39 - 16.03.2023 with test suite Conformance Class OGC API - Features

<b>Started</b>	10:39 AM - 16.03.2023
<b>Status</b>	PASSED
<b>Test object</b>	<a href="https://zyyiqfakm4.execute-api.eu-west-1.amazonaws.com/validator/v2/TestRuns/EIDfd5422d6-9e8a-4cd5-ae9d-9f4682fa94a7.xml">https://zyyiqfakm4.execute-api.eu-west-1.amazonaws.com/validator/v2/TestRuns/EIDfd5422d6-9e8a-4cd5-ae9d-9f4682fa94a7.xml</a>
<b>Test suites</b>	• Conformance Class OGC API - Features
	<a href="#">See report</a> <a href="#">Log file</a> <a href="#">Download report</a> <a href="#">Delete report</a> <a href="#">Re-run test</a>

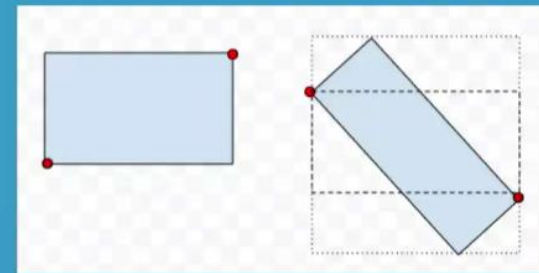
# CITE test bug reports

- 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>



## OGC API features, CITE issues

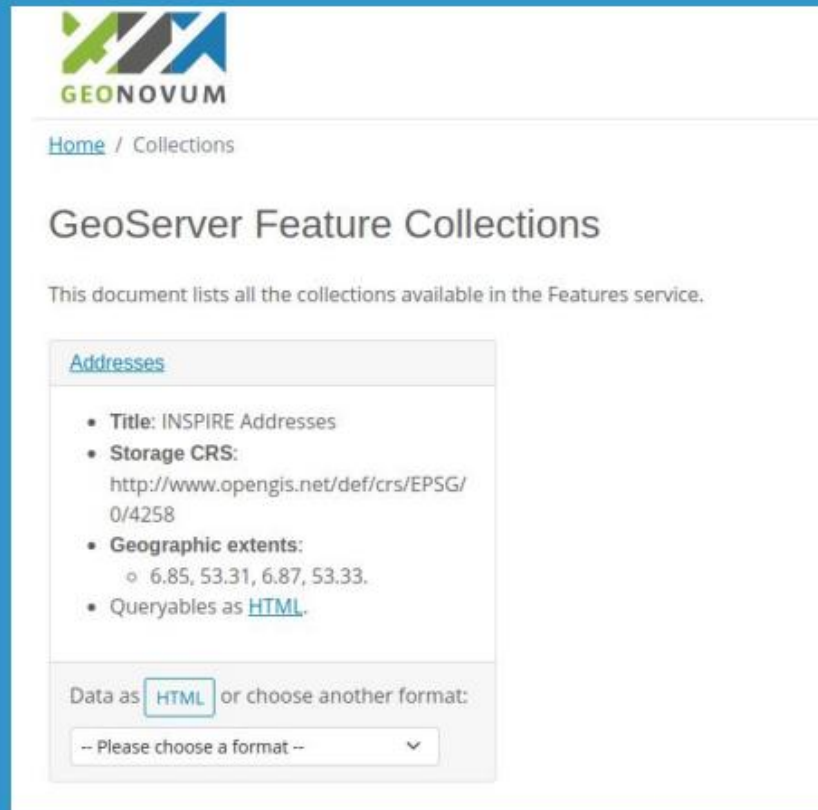
- CITE tests bug reports:
  - [Unclear error messages](#)
  - [CRS tests fail against empty feature collections](#)
  - [Using transformed extent as bbox fails in many cases](#) (work around, expand original BBOX)





- Demo server based on Geonovum ogc-api-tested repository (starting point)

<https://github.com/Geonovum/ogc-api-testbed/tree/main/services/geoserver/data>



The screenshot shows the Geonovum GeoServer interface. At the top is the Geonovum logo. Below it is a breadcrumb trail: Home / Collections. The main heading is "GeoServer Feature Collections". A sub-heading reads: "This document lists all the collections available in the Features service." There is a section titled "Addresses" containing a list of metadata for the "INSPIRE Addresses" collection: Title: INSPIRE Addresses; Storage CRS: http://www.opengis.net/def/crs/EPSSG/0/4258; Geographic extents: 6.85, 53.31, 6.87, 53.33; and Queryables as HTML. At the bottom, there is a "Data as" section with a dropdown menu set to "HTML" and a "Please choose a format" dropdown.

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







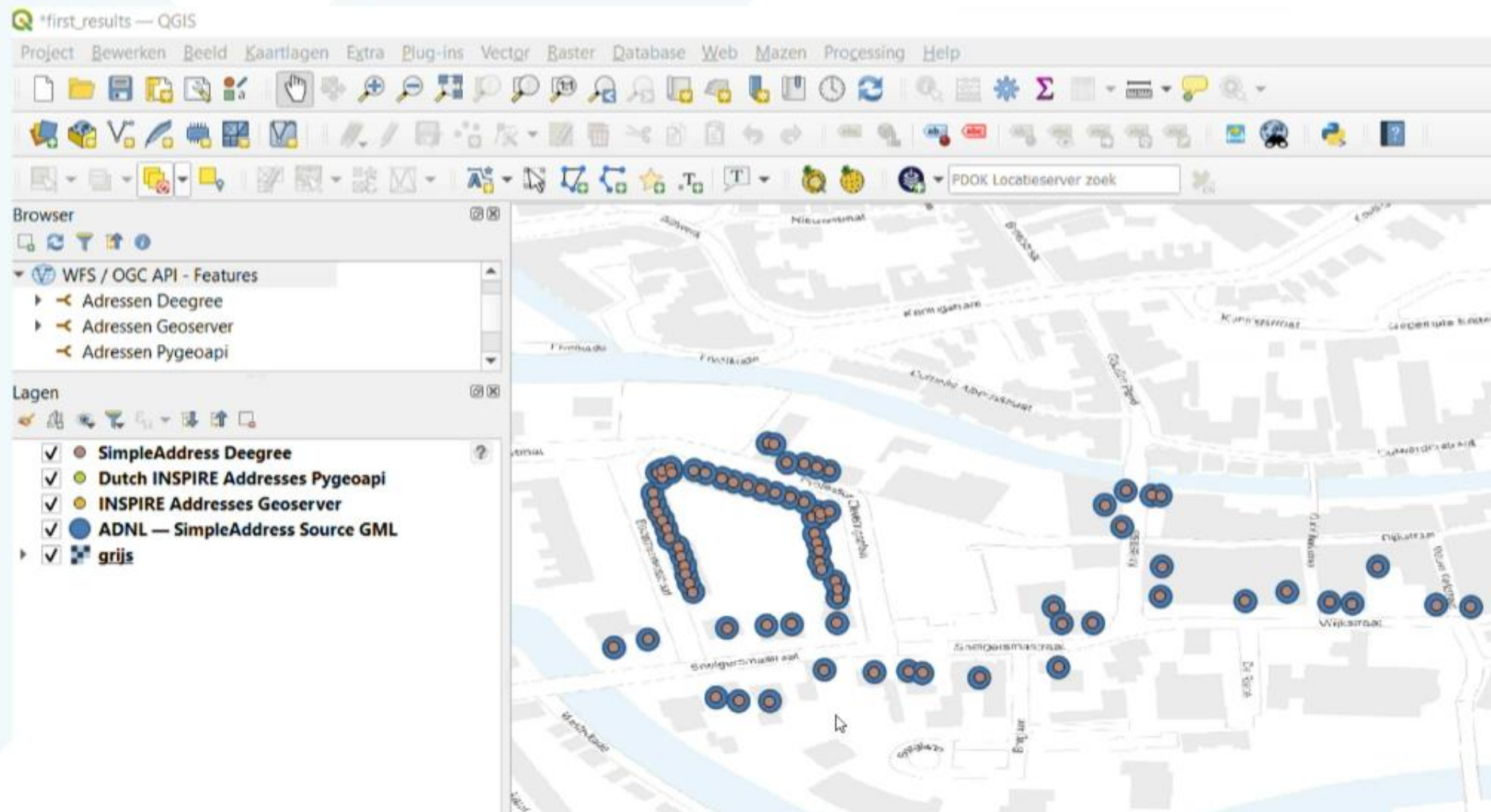
# Downloading the updates



**GeoSolutions**  
your one-stop-shop for geospatial open source software

- 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







# 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](https://github.com/INSPIRE-MIF/gp-geopackage-encodings#25) conclusion it should be documented in the metadata

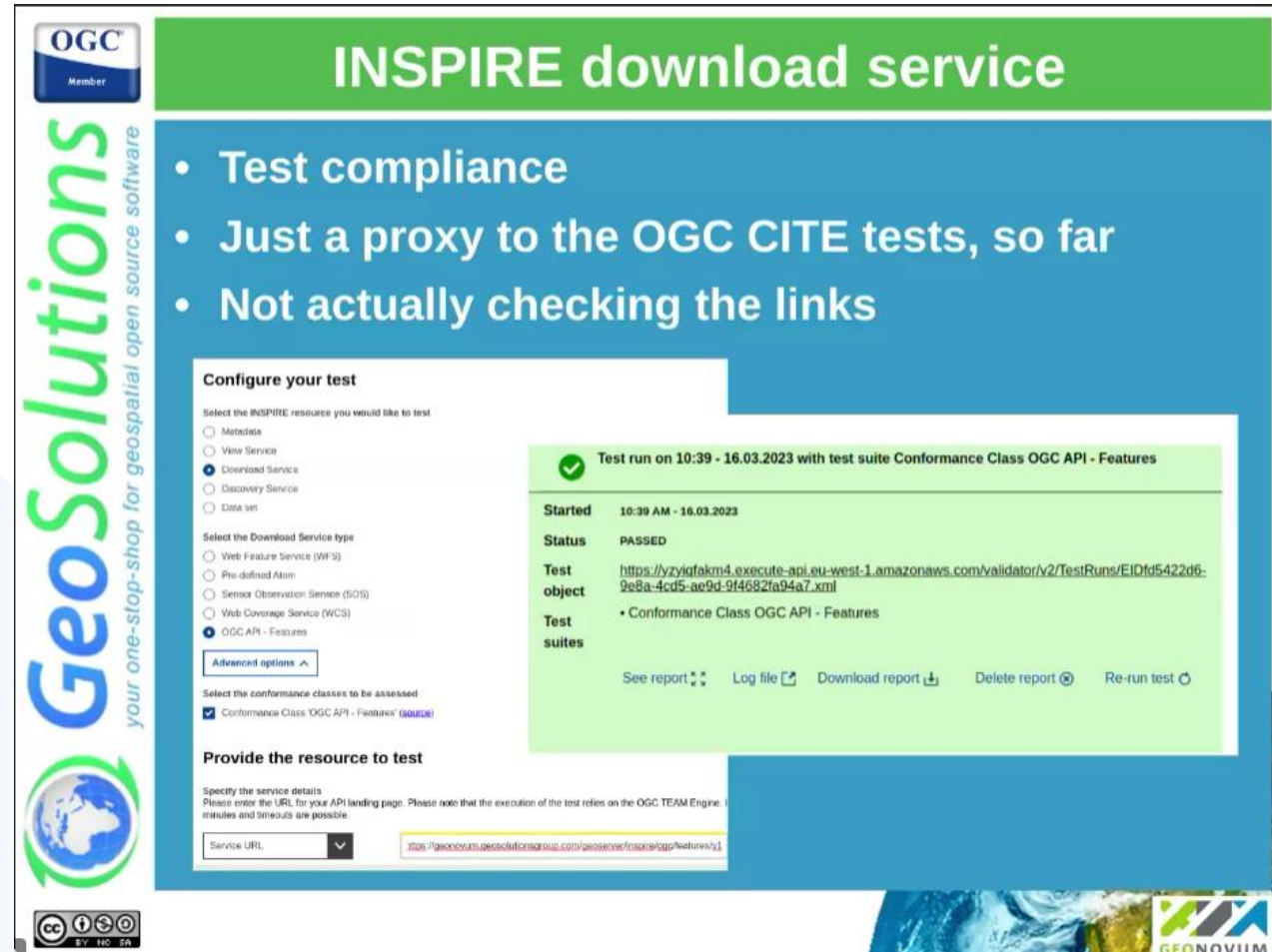
# INSPIRE issues – Level of linking

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](#).



The screenshot displays the 'INSPIRE download service' interface. On the left, there is a vertical banner for 'GeoSolutions' with the tagline 'your one-stop-shop for geospatial open source software'. The main content area is titled 'INSPIRE download service' and contains a list of bullet points:

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

Below the list, there is a 'Configure your test' section with the following options:

Select the INSPIRE resource you would like to test:

- Metadata
- Vint Service
- Download Service
- Discovery Service
- Data set

Select the Download Service type:

- Web Feature Service (WFS)
- Pre-defined Atom
- Sensor Observation Service (SOS)
- Web Coverage Service (WCS)
- OGC API - Features

Advanced options

Select the conformance classes to be assessed:

- Conformance Class 'OGC API - Features' (OGC)

Provide the resource to test

Specify the service details  
Please enter the URL for your API landing page. Please note that the execution of the test relies on the OGC TEAM Engine. Minutes and seconds are possible.

Service URL:

Test results summary:

- Test run on 10:39 - 16.03.2023 with test suite Conformance Class OGC API - Features
- Status: PASSED
- Test object: <https://yzyiqfakm4.execute-api.eu-west-1.amazonaws.com/validator/v2/TestRuns/EIDfd5422d6-9e8a-4cd5-ae9d-9f4682fa94a7.xml>
- Test suites: Conformance Class OGC API - Features

Actions: See report, Log file, Download report, Delete report, Re-run test

At the bottom left, there is a Creative Commons BY-NC-SA license logo. At the bottom right, there is a small 'GEONOVUM' logo.

# 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](https://youtu.be/xR66SUPh_9I)

# Thank you!

**Ine de Visser**

**Contact**

E-mail: [i.devisser@geonovum.nl](mailto:i.devisser@geonovum.nl)

Telefoon:

**Bezoek onze website**

[www.geonovum.nl](http://www.geonovum.nl)

