



# GeoServer OGC API improvements

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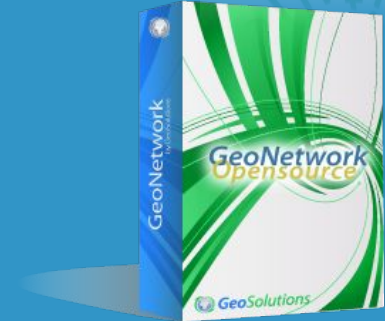
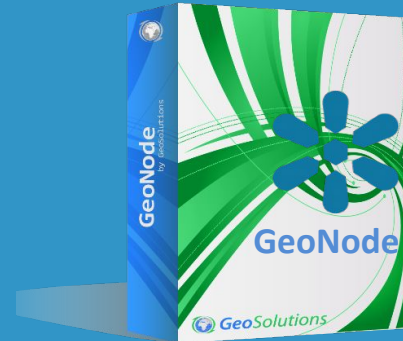
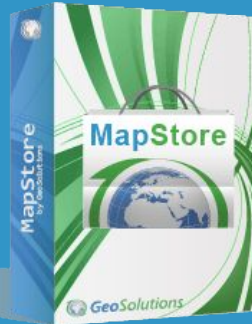


## *About us*

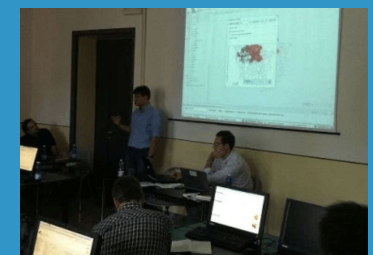
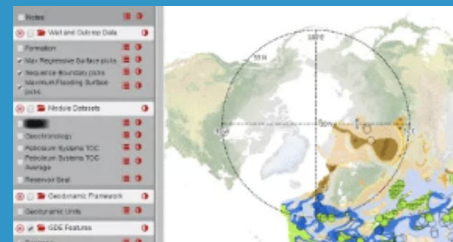


# GeoSolutions

- Offices in Italy & US, Global Clients/Team
- 40+ collaborators, 30+ Engineers
- Our products



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# Affiliations

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We strongly support **Open Source**, it is in our core



We actively participate in **OGC** working groups and get funded to **advance new open standards**



We support standards critical to **GEOINT**



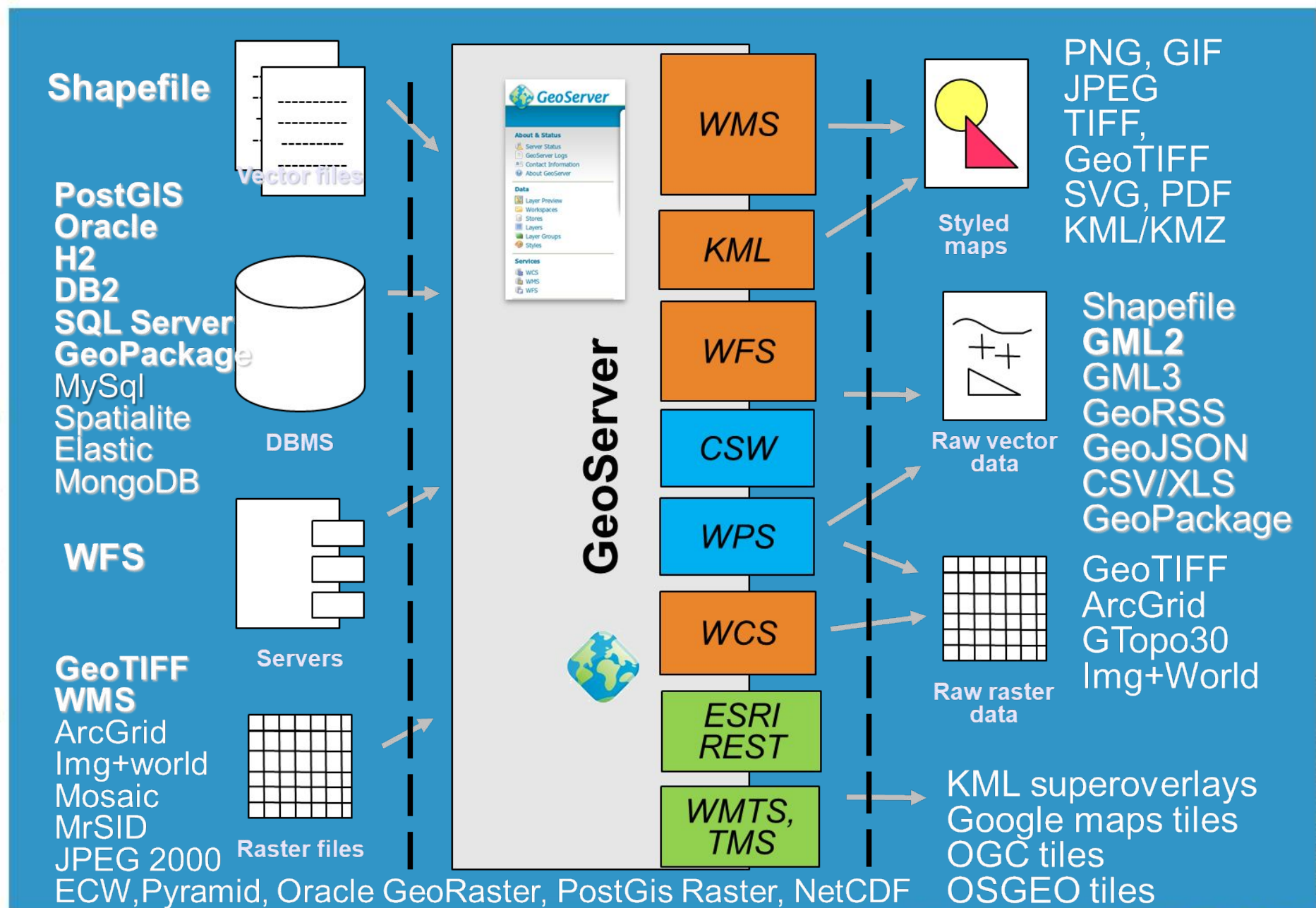
# *About GeoServer*





- **GeoSpatial enterprise gateway** [More Information](#)
  - Modular & extensible
  - Management & dissemination of raster and vector data
- **Cloud/ Big Data friendly**
  - Cluster deployments in AWS, Azure, On Premise
  - Powering petabytes-size data (EO, MetOcean, etc.)
  - Serving up to 10k+ requests per second
- **Standards compliant**
  - OGC WCS 1.0, 1.1.1 (RI), 2.0.1
  - OGC WFS 1.0, 1.1 (RI), 2.0
  - OGC WMS 1.1.1, 1.3
  - OGC WPS 1.0.0
  - OGC CSW 2.0.2
- **Google Earth/Maps support**
- License is GPL v2.0







## *About the project*





# Work objectives

- **GeoServer OGC API Features improvements**
  - OGC API - Features compliance (including CRS extension)
  - Dutch API guidelines compliance
  - INSPIRE download service compliance
- **Demo server showcasing improvements**





# OGC API features improvements

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

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# OGC API features improvements

- 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



- **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

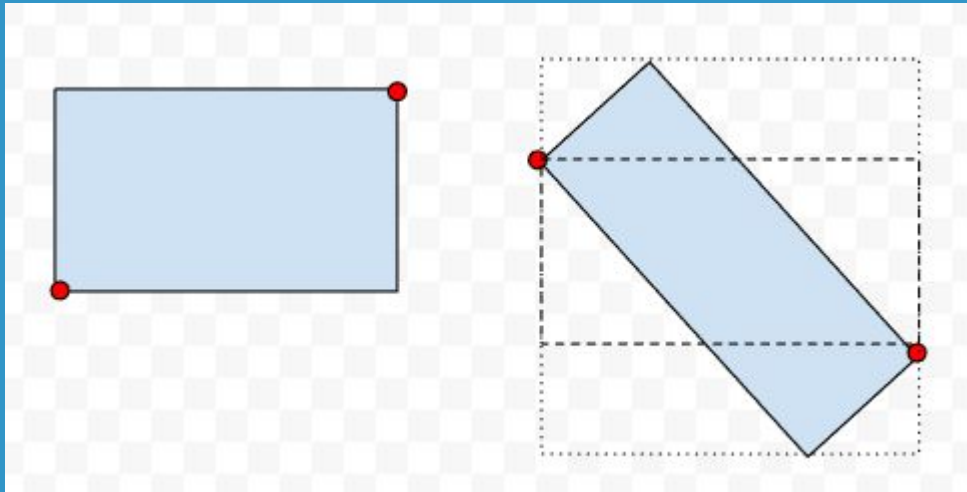
Name	Reason
if E... G... F... W... G... P...	





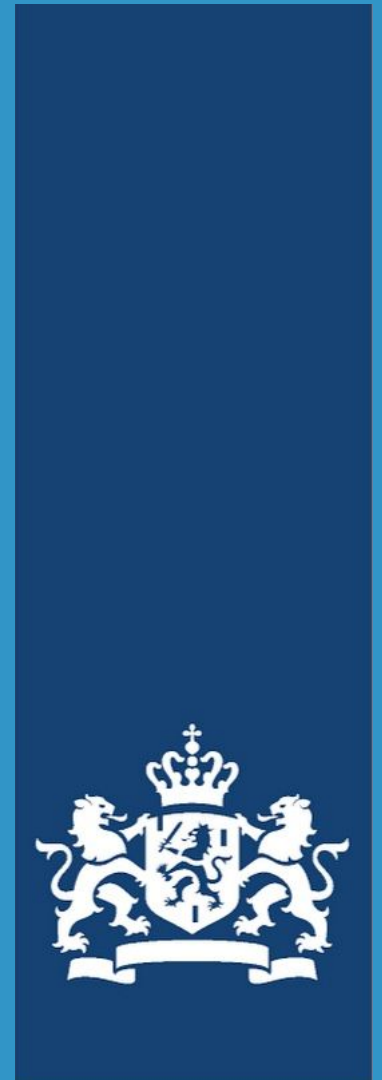
- CITE tests bug reports:

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



# Dutch API guidelines compliance

- Dutch API design rules extension
- Extra requirements on top of the OGC API ones
- One of them, currently in conflict (landing page at “/” while guidelines disallow trailing slash match)



# Dutch API guidelines, code changes

- [GEOS-10854] API definition of all services at “service/v1/openapi”
- [GEOS-10680] Return API full version as HTTP header, e.g. API-Version: 1.0.1
- [GEOS-10855] Major API version number in path, e.g. “ogc/features/v1”
- [GEOS-10889] API document should report spec version
- [GEOS-10882] Option to disable trailing slash match, and [GEOS-10895] Landing page exception



# Dutch API, results and reports



```
docker run --rm registry.gitlab.com/commonground/don/adr-validator
"https://geonovum.geosolutionsgroup.com/geoserver/inspire/ogc/features/v1"
Rule      Passed  Message
----      -
API-03    Yes
API-16    Yes
API-20    Yes
API-48    No       Path '/' ends with a slash
API-51    Yes
API-56    Yes
API-57    Yes
```

- **Issues reported at the ADR validator:**
  - The validator should provide details on conformance failures (fixed)
  - Add an exception for landind page path (pending)



# 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 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	



# INSPIRE download service

## OGC API Settings

## Collection level links

### Links

[+ Add link](#)

	Rel	Mime type	URL	Title
1	enclosure	application/geo	<a href="https://geonovum.geosolutionsgroup.com/geoserver/www/ADNL.apka">https://geonovum.geosolutionsgroup.com/geoserver/www/ADNL.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. 10 minutes and timeouts are possible.

Service URL



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

**Started** 10:39 AM - 16.03.2023

**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

[See report](#)

[Log file](#)

[Download report](#)

[Delete report](#)

[Re-run test](#)



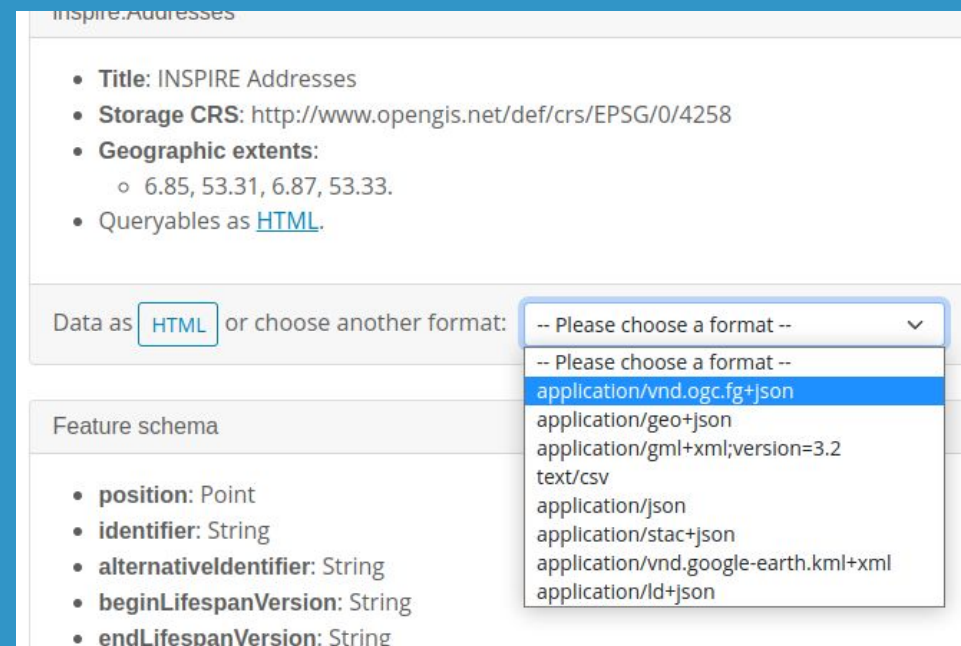


# JSON-FG support

- Implemented JSON-FG draft based on <https://docs.ogc.org/DRAFTS/21-045.html>
  - [GEOS-10928] [Draft JSON-FG implementation for OGC-API Features](#)
  - [GEOS-10937] [JSON-FG reprojected output should respect authority axis order](#)

- **Conformance classes implemented**

- Core
- Feature types and schemas



inspire:Addresses

- **Title:** INSPIRE Addresses
- **Storage CRS:** <http://www.opengis.net/def/crs/EPSG/0/4258>
- **Geographic extents:**
  - 6.85, 53.31, 6.87, 53.33.
- Queryables as [HTML](#).

Data as  or choose another format:

Feature schema

- **position:** Point
- **identifier:** String
- **alternativeIdentifier:** String
- **beginLifespanVersion:** String
- **endLifespanVersion:** String

Format selection dropdown options:

- Please choose a format --
- application/vnd.ogc.fg+json
- application/geo+json
- application/gml+xml;version=3.2
- text/csv
- application/json
- application/stac+json
- application/vnd.google-earth.kml+xml
- application/ld+json





# JSON-FG support, Core

- Example output on Addresses, in CRS84

<https://geonovum.geosolutionsgroup.com/geoserver/ogc/features/v1/collections/inspire:Addresses/items?f=application%2Fvnd.ogc.fg%2Bjson>

```
{
  type: "FeatureCollection",
  - features: [
    - {
      type: "Feature",
      id: "Addresses_1",
      - geometry: {
        type: "Point",
        - coordinates: [
          6.85412591,
          53.31983335
        ]
      },
      - properties: {
        identifier: "nl-imbag-ad-address-0003200000133985",
        alternativeIdentifier: null,
        beginLifespanVersion: "2016-05-10 11:35:53.0",
        endLifespanVersion: null,
        building: null,
        component_ThoroughfareName: "#nl-imbag-ad-thoroughfarename-000330000011720",
        component_PostalDescriptor: null,
        component_AddressAreaName: "#nl-imbag-ad-addressareaname-3386",
        component_AdminUnitName_1: "#nl-imbag-ad-adminunitname-528",
        component_AdminUnitName_2: null,
        component_AdminUnitName_3: null,
      }
    }
  ]
}
```



# JSON-FG support, Core

- Example output on Addresses, storage CRS:

<https://geonovum.geosolutionsgroup.com/geoserver/ogc/features/v1/collections/inspire:Addresses/items?f=application%2Fvnd.ogc.fg%2Bjson&crs=http://www.opengis.net/def/crs/EPSG/0/4258>

```
1 {
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "id": "Addresses_1",
      "place": {
        "type": "Point",
        "coordinates": [
          6.85412591,
          53.31983331
        ]
      },
      "properties": {
        "identifier": "nl-imbag-ad-address-0003200000133985",
        "alternativeIdentifier": null,
        "beginLifespanVersion": "2016-05-10 11:35:53.0",
        "endLifespanVersion": null,
        "building": null,
        "component_ThoroughfareName": "#nl-imbag-ad-thoroughfarename-0003300000117203",
        "component_PostalDescriptor": null,
        "component_AddressAreaName": "#nl-imbag-ad-addressareaname-3386",
        "component_AdminUnitName_1": "#nl-imbag-ad-adminunitname-528",
      }
    }
  ]
}
```

Mind the axis order change



# JSON-FG support, schema

- JSON-schema reference using “type” rel
- featureType
- geometryDimension

```
- {  
  title: "JSON schema",  
  type: "application/schema+json",  
  rel: "type",  
  href:  
    "https://geonovum.geosolutionsgroup.com/geoserver/ogc/features/v1/collections/inspire%3AAddresses/schemas/fg/collection.json"  
},  
featureType: "inspire:Addresses",  
geometryDimension: 0  
}
```



# JSON-FG support, schema

```

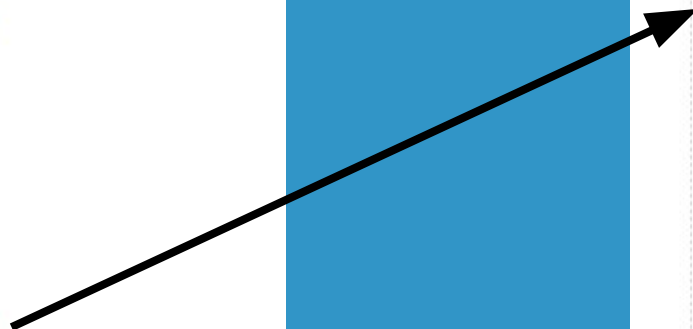
{
  $schema: "https://json-schema.org/draft/2019-09/schema",
  $id: "https://beta.schemas.opengis.net/json-fg/feature",
  title: "a JSON-FG Feature Collection",
  description: "This JSON Schema is part of JSON-FG version 1.0.0",
  type: "object",
  - required: [
    "type",
    "features"
  ],
  - properties: {
    - type: {
      type: "string",
      - enum: [
        "FeatureCollection"
      ]
    },
    - featureType: {
      $ref: "featuretype.json"
    },
    - geometryDimension: {
      type: "integer",
      minimum: 0,
      maximum: 3
    },
    - coordRefSys: {
      $ref: "coordrefsys.json"
    },
    - links: {
      type: "array",
      - items: {
        $ref: "link.json"
      }
    },
    - features: {
      type: "array",
      - items: {
        $ref: "feature.json"
      }
    }
  }
}
  
```

collections/Addresses/schemas/fg/collection.json

```

},
- properties: {
  - oneOf: [
    - {
      type: "null"
    },
    - {
      type: "object",
      - identifier: {
        type: "string",
        description: "string"
      },
      - alternativeIdentifier: {
        type: "string",
        description: "string"
      },
      - beginLifespanVersion: {
        type: "string",
        description: "string"
      },
      - endLifespanVersion: {
        type: "string",
        description: "string"
      },
      - building: {
        type: "string",
        description: "string"
      },
      - component_ThoroughfareName: {
        type: "string",
        description: "string"
      },
      - component_PostalDescriptor: {
        type: "string",
        description: "string"
      },
      - component_AddressAreaName: {
        type: "string",
        description: "string"
      },
      - component_AdminUnitName_1: {
        type: "string",
        description: "string"
      }
    }
  ]
}
  
```

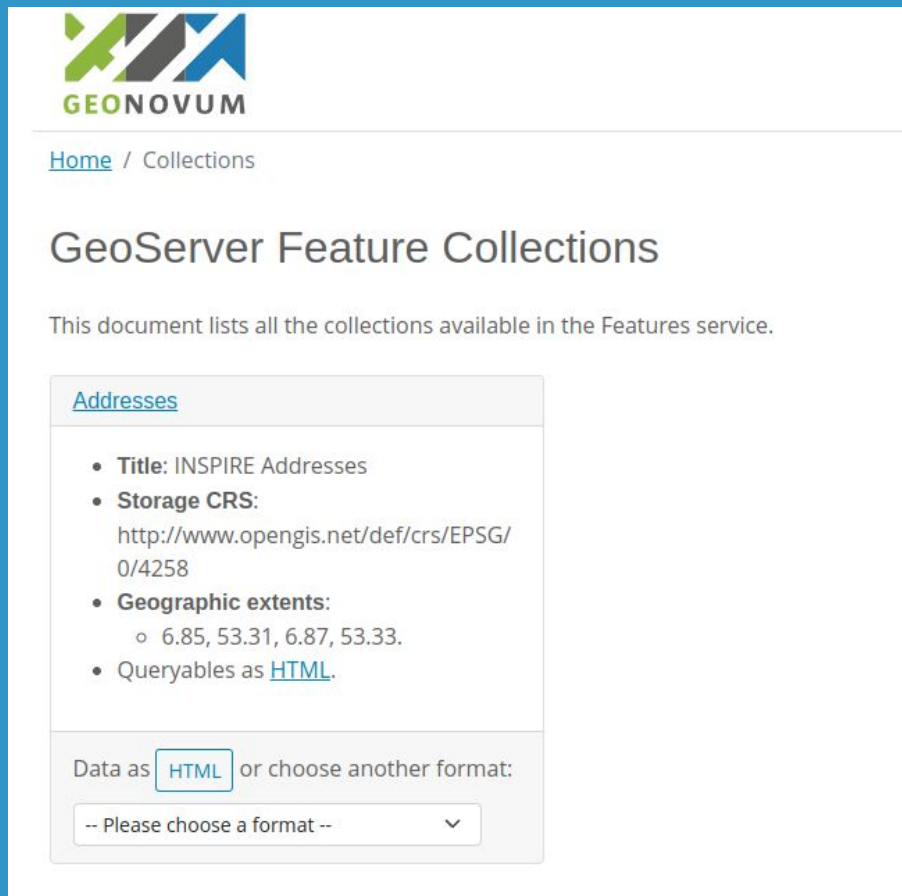
feature.json





- 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 states: "This document lists all the collections available in the Features service." A section titled "Addresses" contains a list of metadata for the "INSPIRE Addresses" collection:

- **Title:** INSPIRE Addresses
- **Storage CRS:**  
http://www.opengis.net/def/crs/EPSG/0/4258
- **Geographic extents:**
  - 6.85, 53.31, 6.87, 53.33.
- Queryables as [HTML](#).

At the bottom of the section, there is a label "Data as" followed by a dropdown menu currently set to "HTML", and the text "or choose another format:". Below this is another dropdown menu with "-- Please choose a format --" and a downward arrow.

<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





# Questions?