

OGC API – Features as an INSPIRE Download service

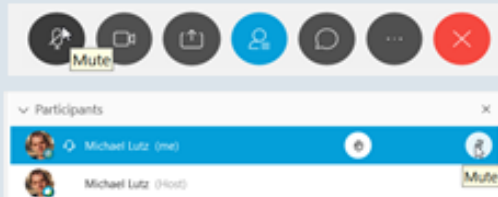


Workshop, 6 November 2020

Welcome. Some hints for participants!

Mute your mic!

To mute and unmute, click the microphone icon next to your name or at the bottom of the screen.



Turn off video

Share your webcam video **only** when you are talking. To do this, click video icon next to your name.



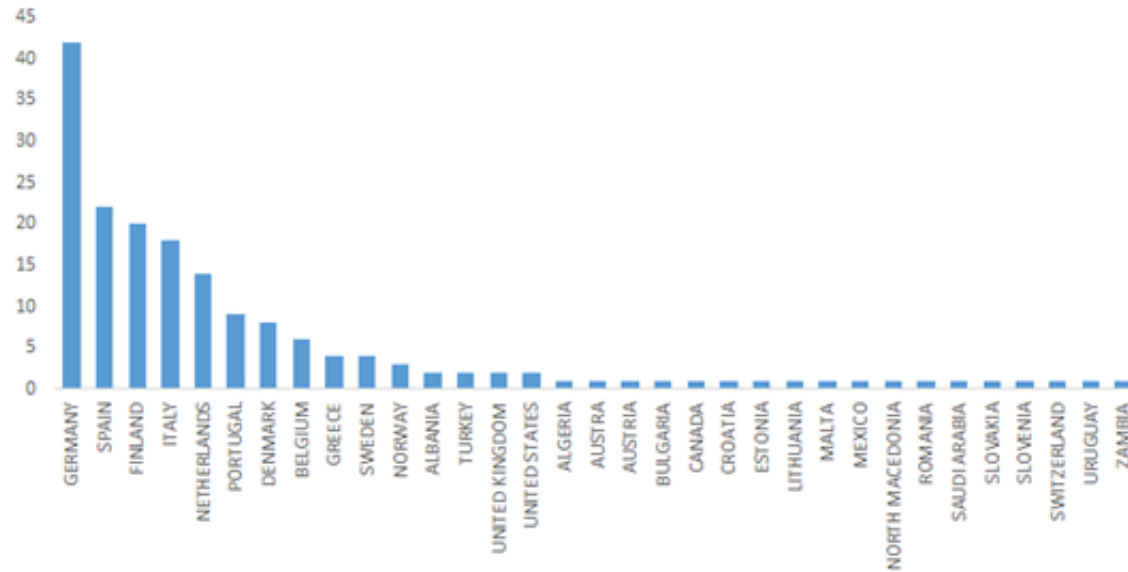
Ask a question

Use “raise hand” functionality to ask a question. Click the hand icon next to your name in the participant list. If this is not available write ‘hand’ in the chat.



Who are we

- 185 Registered attendees
- Public sector bodies, academia and students, software companies
- 33 countries
 - Member States
 - ENPI and Candidate Countries
 - USA, Mexico, Saudi Arabia, Uruguay, Zambia, Canada



Workshop structure

1. Context
2. Specifications
 - a. OGC API - Features in a nutshell
 - b. OGC API - Features as an INSPIRE Download service
3. Deployments of the OGC API - Features
4. Discussion and next steps

Context

Why do we need APIs in INSPIRE?

1. Political perspective
2. Organisational perspective
3. Technological perspective

Political perspective

1. European Strategy for Data, COM(2020)66 final - 19/2/2020

- Defines an agile approach for the establishment of a European Single market
- Create conditions for reuse of private, public and citizen data
- Thematic data spaces
 - incl. Green Deal Data Space, Agriculture data space, Mobility Data space
- **In that context simplifying the access to data is fundamental!**

2. Open Data Directive

- Defines six thematic categories
 - Geospatial, Earth observation and environment, Meteorological, Statistics, Companies and company ownership, Mobility
- High-value datasets to be made available through APIs

3. FAIR Principles in research

4. Agenda for modernising INSPIRE

Organisational perspective

- Web APIs act as a 'glue'
 - Improve processes inside the organisation
 - Facilitate the coordination between organisations
 - Common ground for public and private actors
- APIs help modernise legacy systems
 - e.g. through a proxying layer
- APIs and public sector delivery
- Paradigm shift
 - from obligation to adding value
- It is important that APIs follow standards

Technological perspective

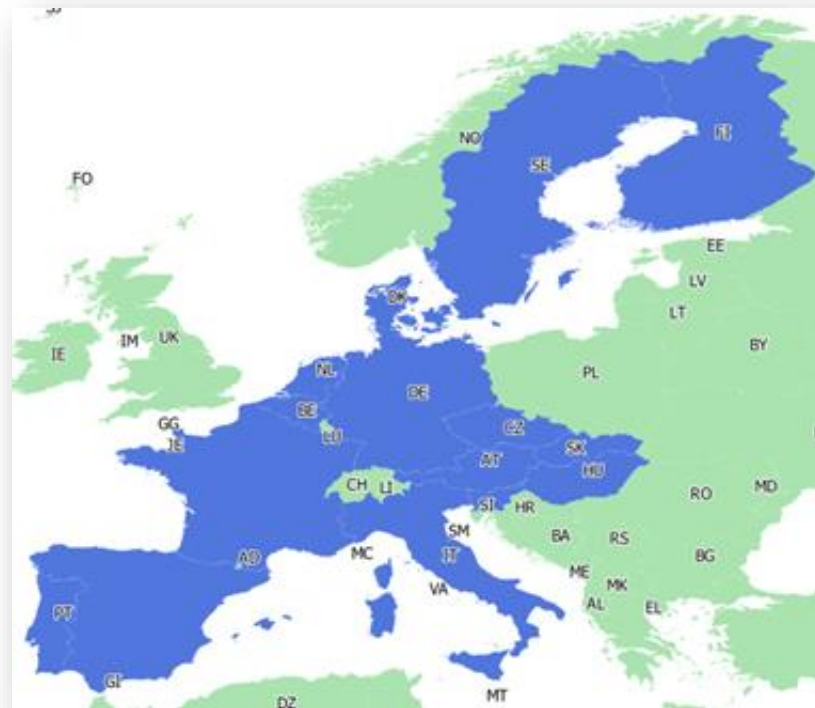
- Standard-based APIs
 - are a means for '*mainstreaming*' SDIs
 - Meet the expectations of developers
 - Improve the discoverability and simplification of data access
- Modernise INSPIRE's technological stack within the remit of existing legislation
- Good client support
- Leverage on new approaches of standardisation bodies
 - Agile development cycles
 - Extensive use of collaborative tools
 - Multiple client and server implementations (open and proprietary)



The INSPIRE 2020.1 work group

2020.1 group - overview

- Endorsed by the INSPIRE MIG
 - Short term action (Date of Completion: end of 2020)
 - Regular monthly meeting of the group
 - Attendees from 15 MS
- **In scope**
 - Prepare and submit for approval by the MIG an **INSPIRE good practice** dedicated to the use of the OGC API - Features as an INSPIRE Download service
- **Out of scope**
 - ETS covered separately (foreseen within the evolution of the INSPIRE Reference Validator)



A community approach to specification development

- Specification is drafted entirely on GitHub

<https://github.com/INSPIRE-MIF/gp-ogc-api-features>

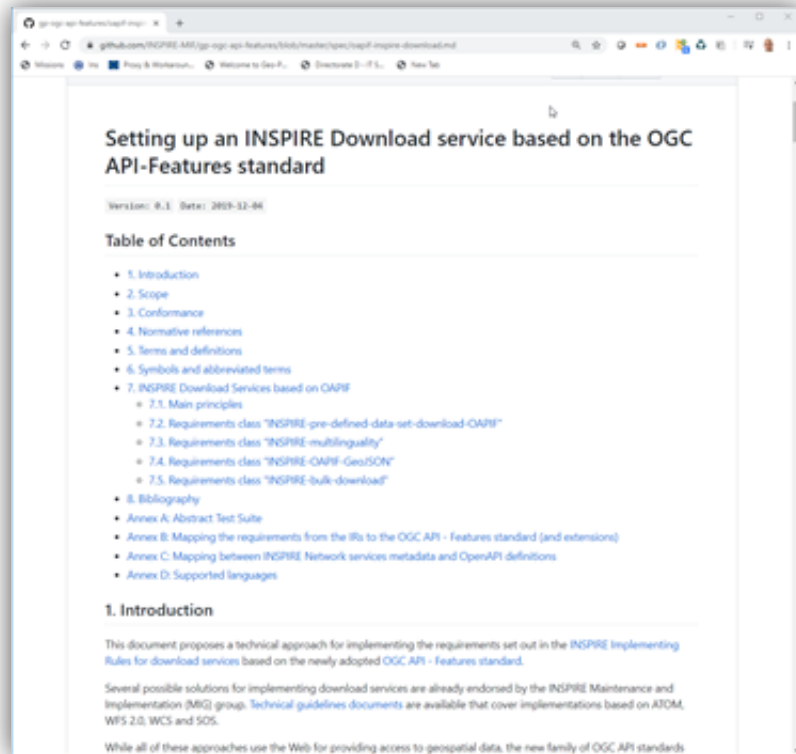
- Requirements classes

- [INSPIRE-pre-defined-data-set-download-OAPIF \(mandatory\)](#)
- [INSPIRE-multilinguality \(conditional\) ¹](#)
- [INSPIRE-OAPIF-GeoJSON \(optional\)](#)
- [INSPIRE-bulk-download \(optional\)](#)

- Abstract Test Suite

- Multiple iterations on the specification

- Solution providers and open source projects
- Representatives of the OGC
- Early adopters



INSPIRE Good practices

- Fully community-driven approach
- Fast track to development and endorsement of new technical approaches
- Implementation evidence is needed
- Updated Good Practice library available
- Procedure for endorsement
 - Step 1. Initiation
 - Step 2. Submission as good practice candidate
 - ➔ Step 3. Outreach
 - Step 4. Submission
 - Step 5. Feedback



INSPIRE Guidelines for Download Services

Technical guidelines are non-legally binding and propose an approach for meeting the legal obligations

Technical guidelines exist for:

- ATOM
- OGC WFS 2.0
- OGC SOS
- OGC WCS

The proposed specification complements the existing approaches



The OGC API - Features in a nutshell

“If you are using OGC Web Services right now, you want to start thinking about transitioning your operational systems to OGC API”

George Percivall, OGC CTO

May 2020, OGC Webinar: Future of sharing location information

OGC API Features - Overview

- Fundamental **Web API building blocks** for interacting with features
- Meets expectations of **developers** today
- Leverages **mainstream IT** specifications and technologies including **OpenAPI**, easier to learn and use, faster to implement and deploy
- Focuses on **JSON** for machine-to-machine communication
- **Simplifies access** to geospatial data for those that are not experts
- Acknowledges the importance of **HTML**, APIs can be accessed in a **web browser**, no special client necessary to view the data
- Standard driven by validation through **early implementations**
- Development in an **open, inclusive process**

OGC API Features - a Modular Specification

- OGC API standards are developed as **multi-part standards**
- Each part covers **a specific capability** and only that
 - You only need to read, understand and implement the parts that you need
- Each part specifies one or more **requirements classes**
- Implementations can only claim **conformance** to a requirements class, if they implement all requirements of that class
- A **profile** of OGC API Features should mainly identify the requirements classes that implementations have to conform to

OGC API Features - Roadmap

Part 1: Core - *the capabilities that almost all implementations will need*

- Started in 2017, approved and published in 2019; also published as [ISO 19168-1:2020](#)
- [OGC compliance tests](#) and [certified implementations](#) available

Part 2: Coordinate Reference Systems by Reference - *support beyond WGS 84*

- Capabilities needed to support data theme Coordinate Reference Systems
- Started in 2018, approved and published this week
- OGC compliance tests under development

Part 3: Filtering and the Common Query Language (CQL) - *more advanced filtering capabilities*

- Capabilities needed for an INSPIRE Direct Access Download Service
- Draft, started in 2019, multiple implementations, should be ready for “public comment” soon, target publication around mid 2021

Part 4: Simple Transactions - *support for Create/Update/Delete operations*

- Draft, started in 2019, needs more implementations, target publication late 2021

Priorities for additional capabilities are under discussion

Specifications. OGC API - Features as an INSPIRE Download service

Principles

OGC API - Features

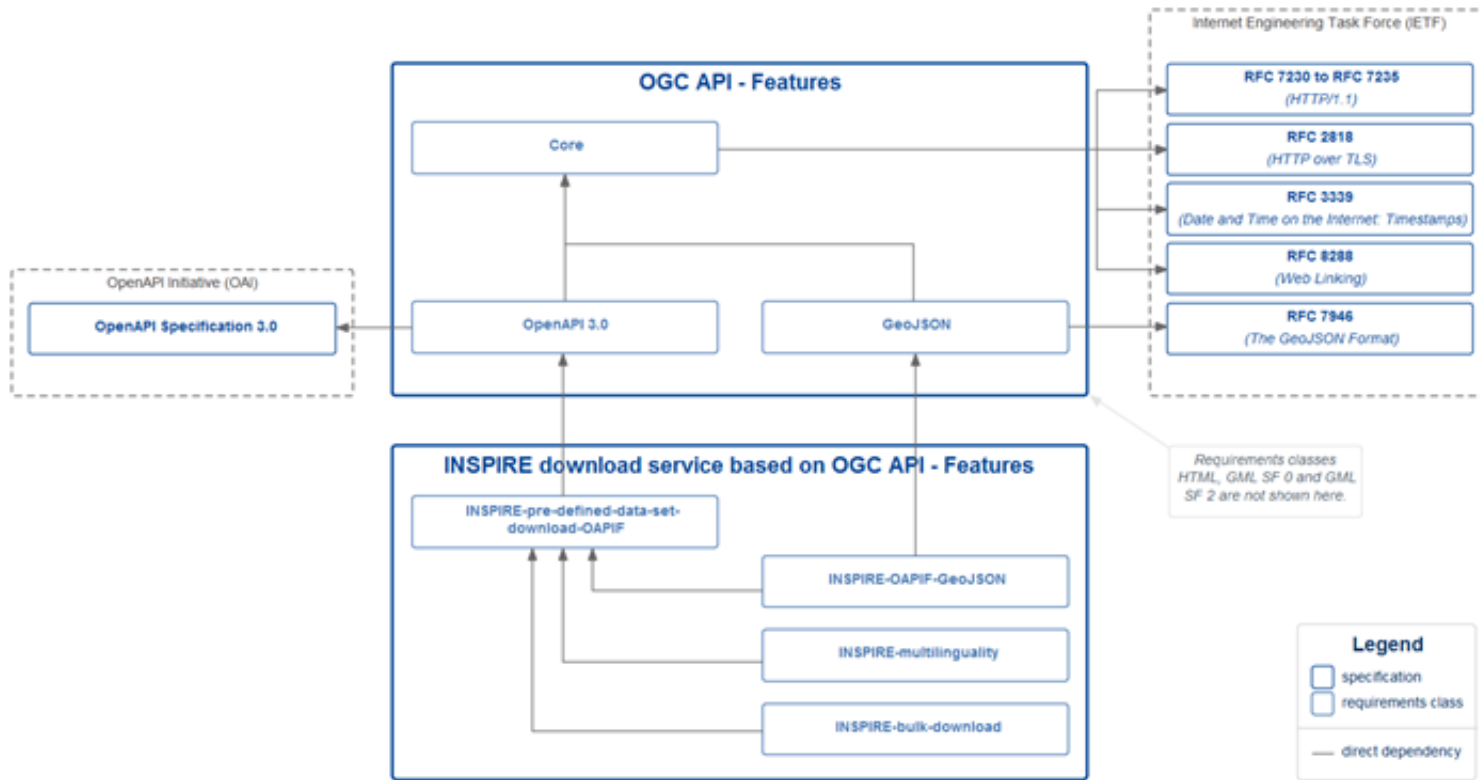
- A **Web API** provides data from one **data set**.
 - ! Data publishers often will need to provide more than one Web API
- A data set is structured into one or several **feature collections**.
- All feature collections available in one API (under the /collections path) are considered to be part of the data set provided by that Web API.

INSPIRE

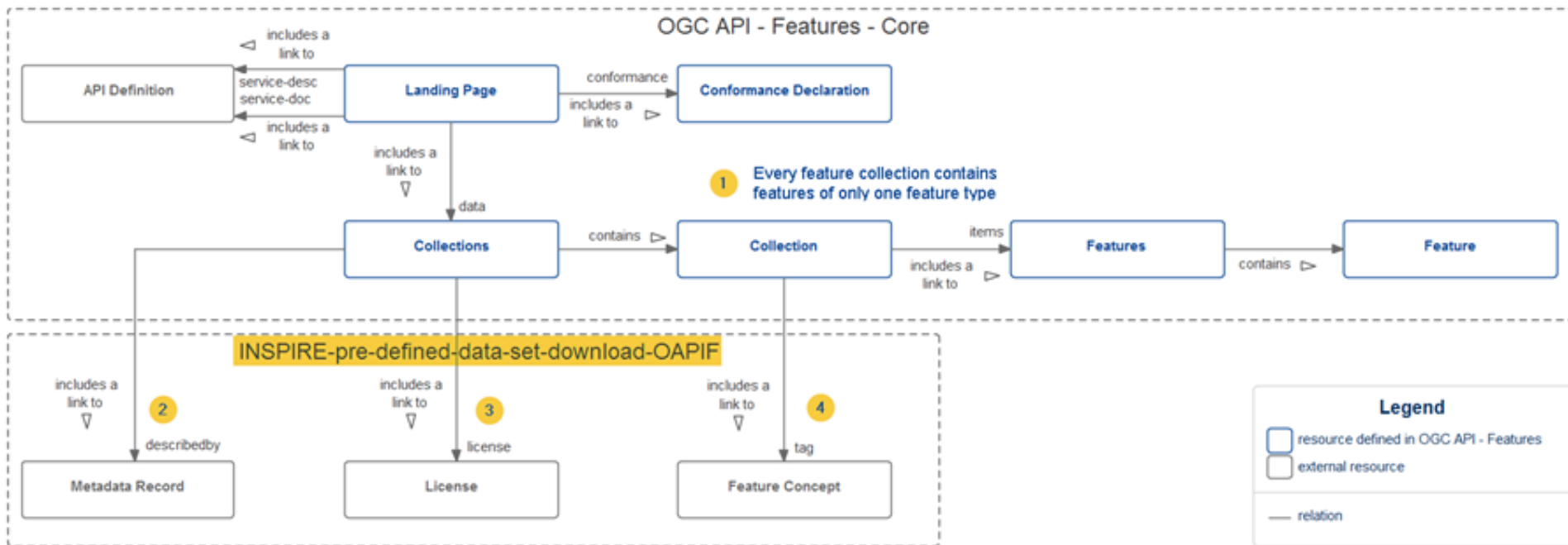
- No INSPIRE-specific extensions
- The composition of a data set is determined by the data publisher.
 - A data set can contain features belonging to different themes
- A feature collection contains features of only one feature type.

- Confirmed support by tools (client and server)

Requirements classes & dependencies



Mandatory requirements class




Conditional: Multilinguality

HTTP content negotiation:


- media type negotiation
- **language negotiation**
- character encoding negotiation

"Please give me GeoJSON or GML, in Finnish, Danish or English."



```
GET [URL]
Accept: application/geo+json, application/gml+xml
Accept-Language: fi,da,en
```

```
HTTP/1.1 200 OK
Content-Type: application/geo+json
Content-Language: en
```

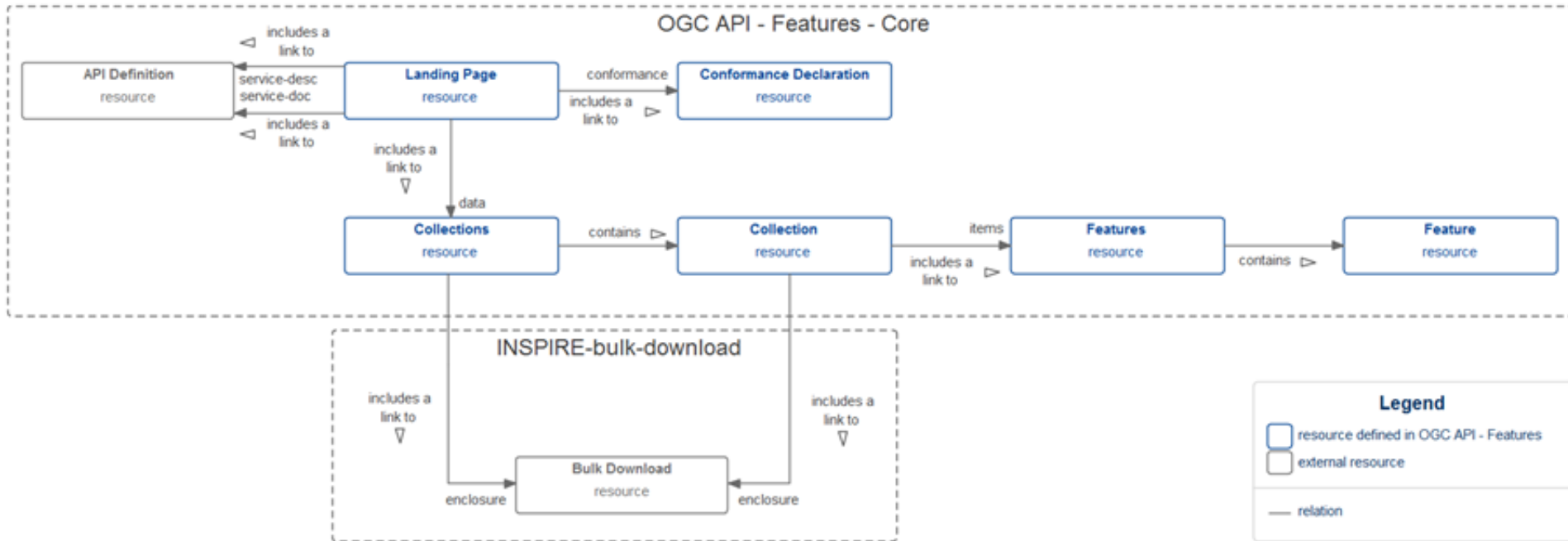


"Ok. I've returned GeoJSON in English."

Optional: GeoJSON

*The **GeoJSON encoding rule** used for each feature collection and the features it contains **SHOULD** be documented in accordance with the guidelines in the [repository for alternative encodings](#) and **SHOULD** be based on model transformations and conversion rules documented in that repository if the feature collection provides data that are harmonised according to the [\[IRs for ISDSS\]](#).*

Optional: bulk download (2 options)



Deployments

Finnish Meteorological Institute

- Weather observations from approximately 400 weather stations in Finland
 - Belongs INSPIRE theme [13. Atmospheric conditions and meteorological geographical features](#)
 - Features encoded using [Observation and Measurement Simple Feature JSON encoding](#).
- The server providing API is implemented using [SOFP server](#) with [Smartmet integration](#).
 - The data is extracted from database using [SmartMet Server](#).
 - All used software is OSS with MIT license.
- Extracting point time series from multidimensional data cubes is the most remarkable open implementation issue: <https://github.com/INSPIRE-MIF/gp-ogc-api-features/issues/70>

BRGM (Geological Survey) & OFB (Office for Biodiversity), France

Datasets

- **Surface Water:** River gage (EF), River Network and Physical (HY), Water flow/height Observation (O&M, INSPIRE D 2.9), URIs between instances
- **Ground Water:** Environmental Groundwater Quantity Monitoring Facility (EF), Hydrogeological Unit (GE), Groundwater level, temperature, etc...(O&M, INSPIRE D 2.9), URIs between instances

Configuration

- **OGC API Features** (Core, HTML, GeoJSON, OpenAPI,...)
- **OGC SensorThings API** (not today's webinar topic)
- APIs successfully tested with desktop (QGIS) & web client (WebGenesis, BLiV) : either in GeoJSON, GML, JSON-LD

Software

- **Geoserver 2.17.2** + modules & extensions (ogcapi, app-schema, features-templating for JSON-LD, GeoJSON) + core GeoJSON heuristics

Status

- Migration to **production environment** in progress

Detailed presentation

- <https://github.com/INSIDE-information-systems/API4INSPIRE>

SDI Rhineland-Palatinate, Germany

The interface is implemented as a proxy. The information providers are already existing WFS-interfaces, which are registered in a PostGIS database. Service metadata is generated on the fly and published via CSW-interface. The APIs are also published as CKAN resource views of type REST in our OpenData Portal.

- OGC API Features (Core, HTML, GeoJSON, OpenAPI, GML)
- API successfully tested with QGIS 3.14.10+ client
- Some collections are available access-restricted (http-auth)
- Using of [json-schema](#) for attribute mappings, in future: using of [json-ld context](#) for semantic mappings

Landing page for all OpenData-classified WFS-interfaces of the SDI Rhineland-Palatinate (70+) and

examples: <https://www.geoportal.rlp.de/spatial-objects/>, [Unesco World Heritage of the city Trier](#), [Legal Protected Sites of Rhineland-Palatinate](#), [Highway A61 thru Rhineland-Palatinate](#)

Status: Interfaces productive since November 2019, OSGEO Software under MIT-License (<https://git.osgeo.org/gitea/GDI-RP/Mapbender2.8>)

Future development: Migration to new django-based FOSS MrMap (<https://git.osgeo.org/gitea/GDI-RP/MrMap>), exchange own proxy solution with pygeoapi (<https://pygeoapi.io/>)

National Land Survey, Finland

Own server implementation by NLS Finland.

Java development (servlet) backed by a PostGIS database, configurable with a config file.

Services

Geographic Names <https://avoin-paikkatieto.maanmittauslaitos.fi/geographic-names/features/v1/>

Encoding: GeoJSON and GML 3.2.1

Status: In production (requires [authentication key](#))

Buildings <https://avoin-paikkatieto.maanmittauslaitos.fi/buildings/features/v1/>

Status: In production (requires [authentication key](#))

Adresses (INSPIRE AD) <https://beta-paikkatieto.maanmittauslaitos.fi/simple-addresses/features/v1/>

Buildings (INSPIRE BU) <https://beta-paikkatieto.maanmittauslaitos.fi/inspire-buildings/features/v1/>

Status: Beta (prototype)

North-Rhine Westphalia, Germany

Datasets

- **21 datasets** from multiple data providers on state-level: **mining permits** (AM), **fire brigade control centres** (US), **child care facilities** (US), **hospitals** (US), **low emission zones** (AM), various **agricultural datasets** relevant in the context of IACS (LC, LU); more datasets planned

Configuration

- **OGC API Features** (Core, HTML, GeoJSON, OpenAPI, CRS, CQL, and more)
- **OGC API Tiles** (Vector Tiles)
- **OGC API Styles** (Map Styles)

Software

- **XtraServer Web API**, using [Idproxy](#) ([OGC Reference Implementation](#), MPL 2.0)

Status

- Migration to **production environment** in progress

ISPRA Italy

DATASETS - TESTED



EUAP and Ramsar Protection area as INSPIRE Protection Site (PS) theme.



Data stored in Geopackage 1.x



Geological Map of Italy 1:1M as GeoSciML 4.1 version and INSPIRE Geology (GE) theme.



PostgreSQL Data stored in PostgreSQL 10.x
+ PostGIS 2.4.x



Marine wave monitoring Buoy Network as INSPIRE Environment Monitoring Facility (EF) + Oceanographic Geographic Feature (OF) theme.



Data stored in Linked Data N-Triple

SOFTWARE

Geoserver 2.19-Snapshot in pre-production

<http://193.206.192.142:8080/web>

Pygeoapi 0.8.0 Python server under test evaluation

CONFIGURATION CLASSES

OGC API Features:

- pre-defined-data-set-download,
- HTML,
- GeoJSON,
- GML

STATUS: Under development

Next steps

1. Submission of the good practice for endorsement
 - Targeting the 12th MIG meeting (26 - 27 November)
2. Validation of OGC API - Features instances
 - Conversion of existing ATS to ETS for the INSPIRE Reference validator
3. Uptake by data providers
4. Gradual evolution of the specification
 - Based on community demand
 - Entirely on GitHub

Discussion



Keep in touch



<https://github.com/INSPIRE-MIF/gp-ogc-api-features>