



# Improved Client Support for INSPIRE data

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Thorsten Reitz

Bucharest, 28/08/2019

 **FOSS4G** BUCHAREST 2019  
44.43555, 26.102347



# INSPIRE Directive



DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 March 2007

establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

- Aims to create a European SDI for the purposes of EU environmental policies:
  - environmental spatial data sharing, facilitation of public access to spatial data, and assisting in cross-boundary policy-making
  - based on the SDIs established and operated by the EU Member States
  - came into force on May 15, 2007, and will be implemented in various stages, with full implementation required by 2021.

2 <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007L0002>

# INSPIRE Directive

25.4.2007 EN Official Journal of the European Union L 108/1

(Acts adopted under the EC Treaty/Treaty whose publication is obligatory)

DIRECTIVES

**DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**  
of 14 March 2007  
establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 179(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Economic and Social Committee (¹),

After consulting the Committee of the Regions,

Acting in accordance with the procedure laid down in Article 251 of the Treaty, in the light of the joint text approved by the Conciliation Committee on 17 January 2007 (²),

Whereas

(i) Community policy on the environment must aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. Moreover, information, including spatial information, is needed for the formulation and implementation of this policy and other Community policies, which must integrate environmental protection requirements in accordance with Article 6 of the Treaty. In order to bring about such integration, it is necessary to establish a measure of coordination between the users and providers of the information so that information and knowledge from different sectors can be combined.

(2) The Sixth Environment Action Programme adopted by Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 (³) requires full consideration to be given to ensuring that the Community's environmental policy-making is undertaken in an integrated way, taking into account regional and local differences. A number of problems exist regarding the availability, quality, organisation, accessibility and sharing of spatial information needed in order to achieve the objectives set out in that programme.

(3) The problems regarding the availability, quality, organisation, accessibility and sharing of spatial information are common to a large number of policy and information themes and are experienced across the various levels of public authority. Solving these problems requires measures that address exchange, sharing, access and use of interoperable spatial data and spatial data services across the various levels of public authority and across different sectors. An infrastructure for spatial information in the Community should therefore be established.

(4) The Infrastructure for Spatial Information in the European Community (INSPIRE) should assist policy-making in relation to policies and activities that may have a direct or indirect impact on the environment.

(5) INSPIRE should be based on the infrastructures for spatial information that are created by the Member States and that are made compatible with common implementing rules and are supplemented with measures at Community level. These measures should ensure that the infrastructures for spatial information created by the Member States are compatible and usable in a Community and transboundary context.

(¹) OJ C 221, 8.5.2003, p. 33.  
(²) OJ C 116, 11.6.2003 (not yet published in the Official Journal).  
(³) OJ C 124, 25.3.2004, 118; Council Common Position of 21 January 2006 (OJ C 126 E, 30.3.2006, p. 16) and Position of the European Parliament of 13 June 2006 (not yet published in the Official Journal); Decision of the Council of 29 January 2007 and legislative resolution of the European Parliament of 13 February 2007 (not yet published in the Official Journal).

(¹) OJ L 242, 10.9.2002, p. 1.



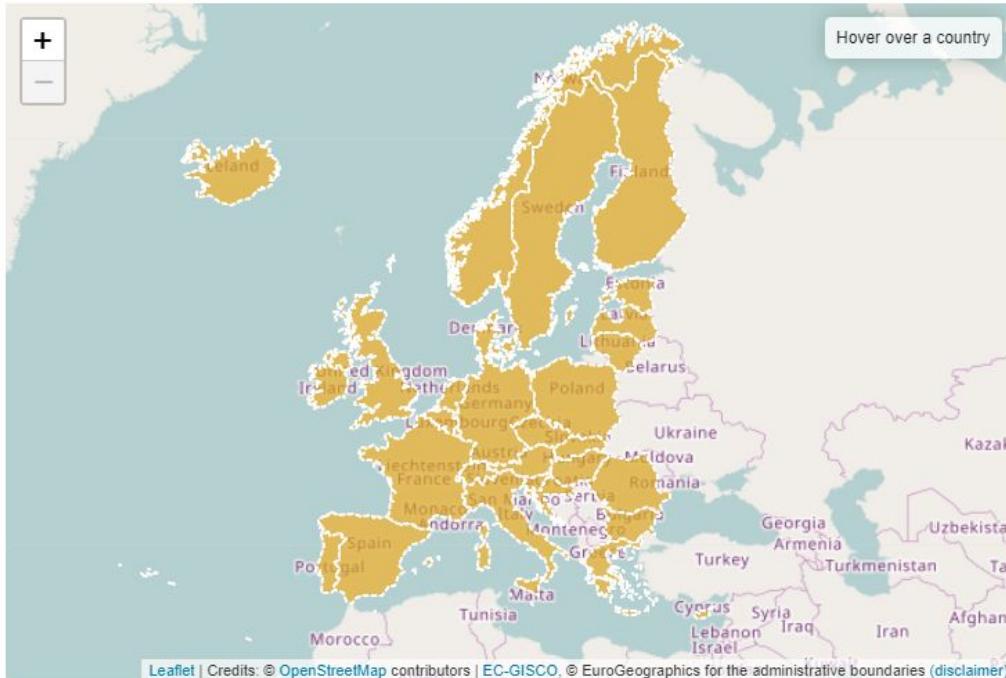
Nokia 2600, 15 million sold



European  
Commission

# INSPIRE Directive - where are we?

## INSPIRE Data Sets - EU & EFTA Country overview



Show:

Downloadable Viewable

### INSPIRE Geoportal Data Set Statistics

144713  
Metadata records

25109  
Downloadable Data Sets

[Leaflet](#) | Credits: © OpenStreetMap contributors | EC-GISCO, © EuroGeographics for the administrative boundaries (disclaimer)

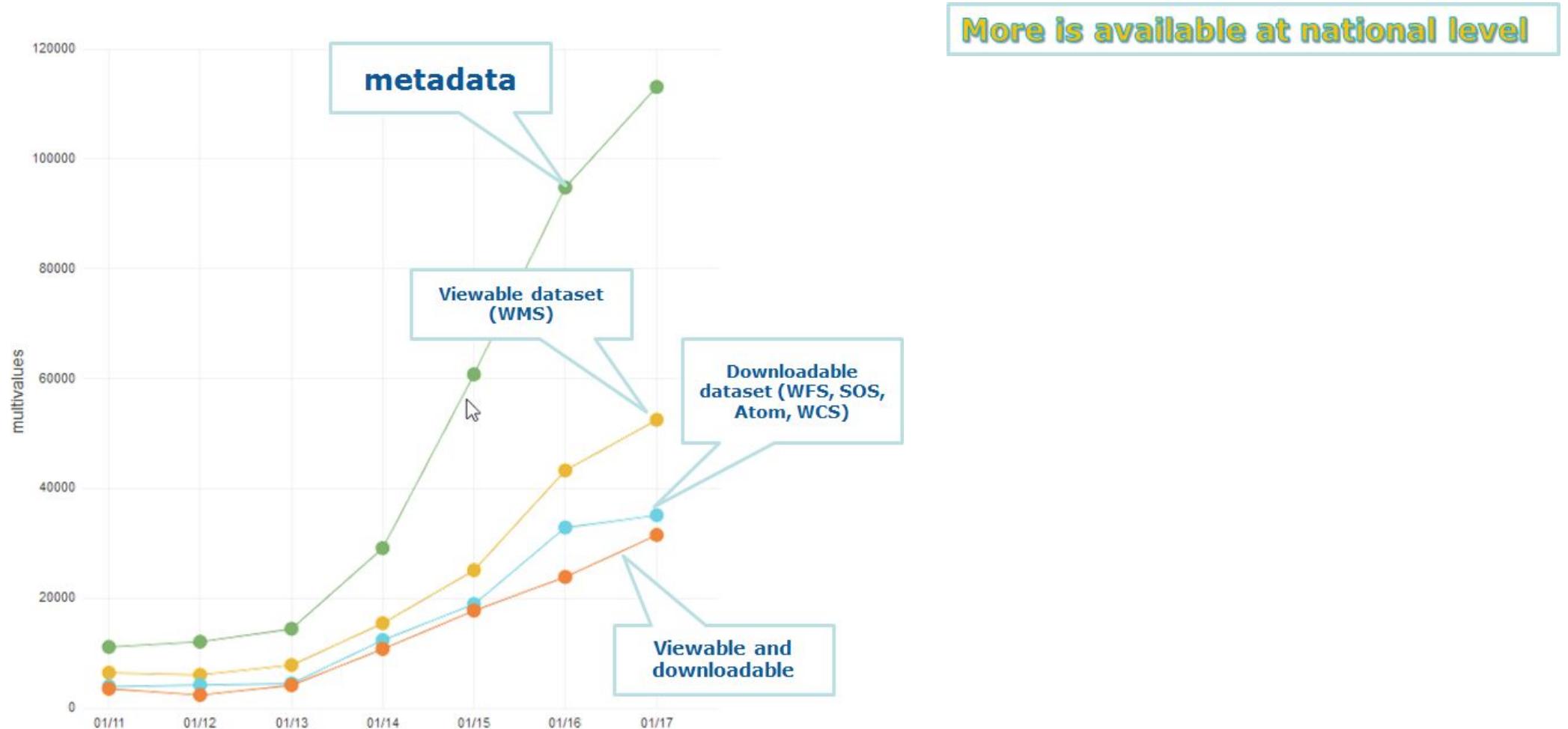
### Select a COUNTRY

Austria	548	418	463
Belgium	599	262	277
Bulgaria	169	4	3
Croatia	112	7	8
Cyprus	42	3	3
Czech Republic	148	37	93
Denmark	224	39	33
Estonia	75	14	23
Finland	554	41	156
France	40027	12588	14736
Germany	28832	10666	10656
Greece	57	2	57
Hungary	112	9	7
Iceland	147	7	0
Ireland	50	0	0
Italy	20523	7	209
Latvia	139	10	20
Liechtenstein	60	10	12
Lithuania	81	56	12
Luxembourg	217	192	163
Malta	157	136	152
Netherlands	204	123	133
Norway	167	42	13
Poland	28856	41	8
Sweden	295	30	127
Switzerland	208	2	0
United Kingdom	20787	63	165



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# Growing numbers; more on national level



# INSPIRE Directive – Spatial scope

- INSPIRE addresses 34 spatial data themes for environmental applications:

## ANNEX: 1



Addresses



Administrative units



Cadastral parcels



Coordinate reference systems



Geographical grid systems



Geographical names



Hydrography



Protected sites



Transport networks

## ANNEX: 2



Elevation



Geology



Land cover



Orthoimagery

## ANNEX: 3



Agricultural and aquaculture facilities



Area management / restriction / regulation zones & reporting units



Atmospheric conditions



Bio-geographical regions



Buildings



Energy resources



Environmental monitoring facilities



Habitats and biotopes



Human health and safety



Land use



Meteorological geographical features



Mineral resources



Natural risk zones



Oceanographic geographical features



Population distribution and demography



Production and industrial facilities



Sea regions



Soil



Species distribution

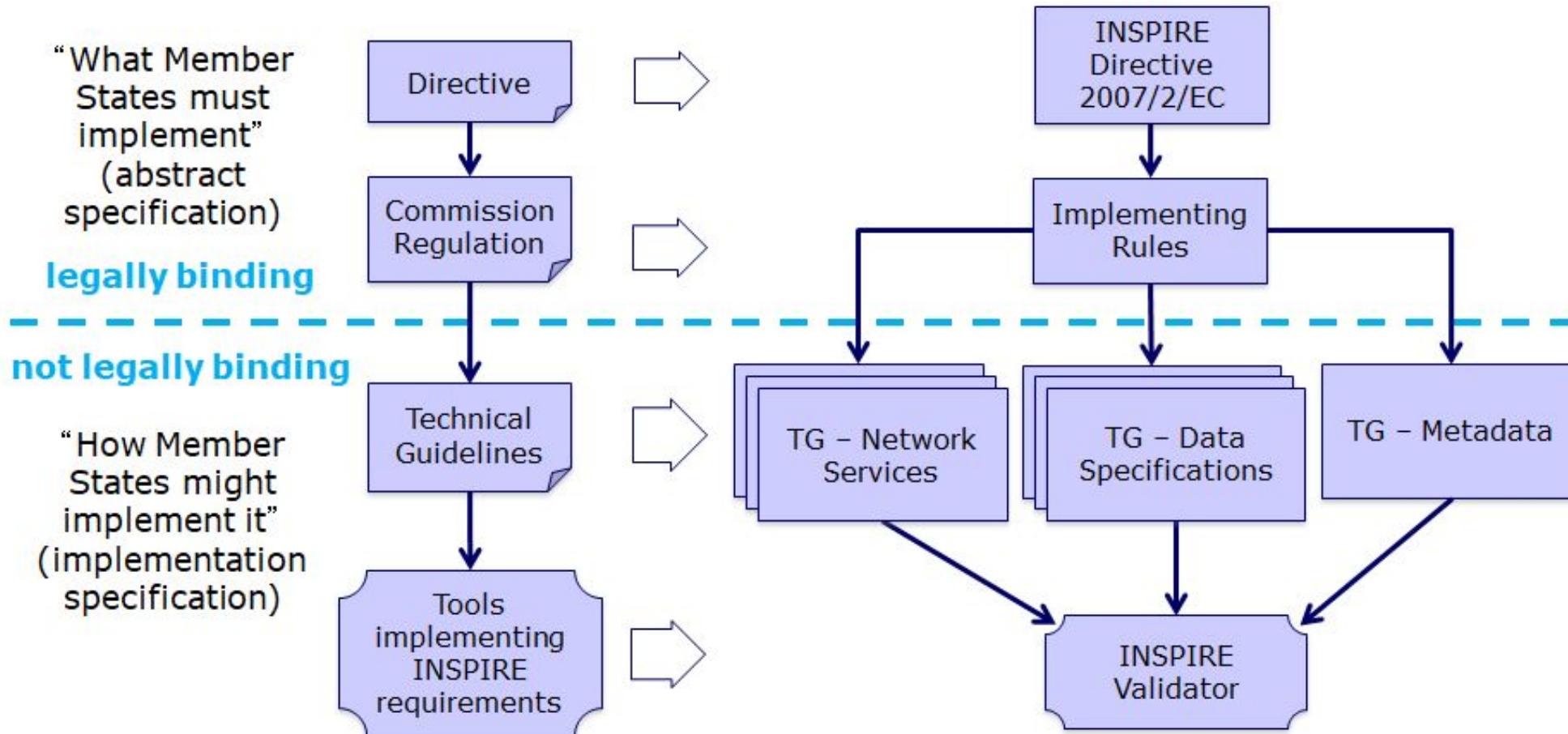


Statistical units



Utility and governmental services

# INSPIRE Directive – Requirements



<https://inspire.ec.europa.eu/inspire-implementing-rules/51763>

7 <https://inspire.ec.europa.eu/inspire-technical-guidance/57753>

# INSPIRE – Tools for implementers & users

- A rich ecosystem:
  - data **serving** (WMS/WMTS, WFS, WCS, SOS)



- data/metadata **catalogs** (CSW)



- ETL (Extract-Transform-Load) tools



# INSPIRE – Tools for implementers & users

Google INSPIRE site:osgeo.org -inspired

All Images Maps News Videos More Settings Tools

About 1,620 results (0.45 seconds)

The word cloud contains numerous terms related to geospatial technology and standards, including:

- Workshop, website, beta, Editor, GeoNode, default, management, tests, Language, Services, like, European, Inspiredata, application, fields, Documentation, Aim, GIS, directive, Error, using, tools, Previous, Service, ISO, OSGeo, MapServer, World, order, Lists, name, OSGeoLive, level, Mailing, bug, WFS, Style, info, compliant, WMS, QGIS, government, de Wiki, degree, SRS, Portugal, SVN, GML, Trac, Open, data, fix, add, en, SDI, UN, die, GDAL, SPatial, GeoNetwork, list, metadata, draft, files, XML, Web, use, see, su, new, MapServer, Inspire, Support, FOSSG, SOS, Free, Search, PDT, capabilities, Geospatial, s, View, profile, OGC, Europe, CSW, GSoC, standards, GRASS, Source, Developer, Software, PST, related, also, Download, based, pycsw, INfrastructure, User, version, Discovery, Release, message, Information, Results, basic, take, specifications, first, pour, english

European Commission

# Activities for Improved Client Support for INSPIRE data

## Options:

1. New encodings and standards
2. Modify existing data models
3. Updates to existing tools

# Context – Data structure and encoding

- INSPIRE defines the conceptual model using [UML](#):
  - the [default encoding rule](#) maps this UML model to [GML](#) application schemas (XML schemas)
  - [alternative encoding rules](#) are allowed in INSPIRE, provided that some conditions are met

*Article 7*

### Encoding

1. Every encoding rule used to encode spatial data shall conform to EN ISO 19118. In particular, it shall specify schema conversion rules for all spatial object types and all attributes and association roles and the output data structure used.
2. Every encoding rule used to encode spatial data shall be made available.



# MIWP 2016-2020 Action 2017.2

- “Alternative encodings for INSPIRE data”
  - **purpose**: develop concrete proposals for alternative/additional encodings of INSPIRE to improve usability in GIS desktop/web clients & define a template/procedure for proposing additional encoding rules
  - **result**: specifically developed for AD and EF themes & a template for alternate/additional encodings for INSPIRE data

README.md

## 2017.2

This is the Repository for action 2017.2 on alternative encodings.

The first encoding that the group specified is the [GeoJSON Encoding](#). GeoJSON may serve as an alternative or additional encoding for simple data sets for the Addresses and the Environmental Monitoring Facilities.

The template for alternative or additional encodings can be found [here](#).

The glossary of terms can be found [here](#).

# MIWP 2016-2020 Action 2017.2

- Generic UML-to-GeoJSON encoding rule
- Theme-specific model transformation rules
- Example for other alternative encodings

INSPIRE-MIF / 2017.2

Unwatch ▾ 10 Star 1 Fork 5

Code Issues 17 Pull requests 0 Projects 0 Wiki Security Insights Settings

Branch: master 2017.2 / GeoJSON / ads / examples / ads\_example\_1.geojson

Find file Copy path

thorsten-reitz address comments on PR ca18659 on Apr 6

1 contributor

32 lines (32 sloc) | 1.46 KB

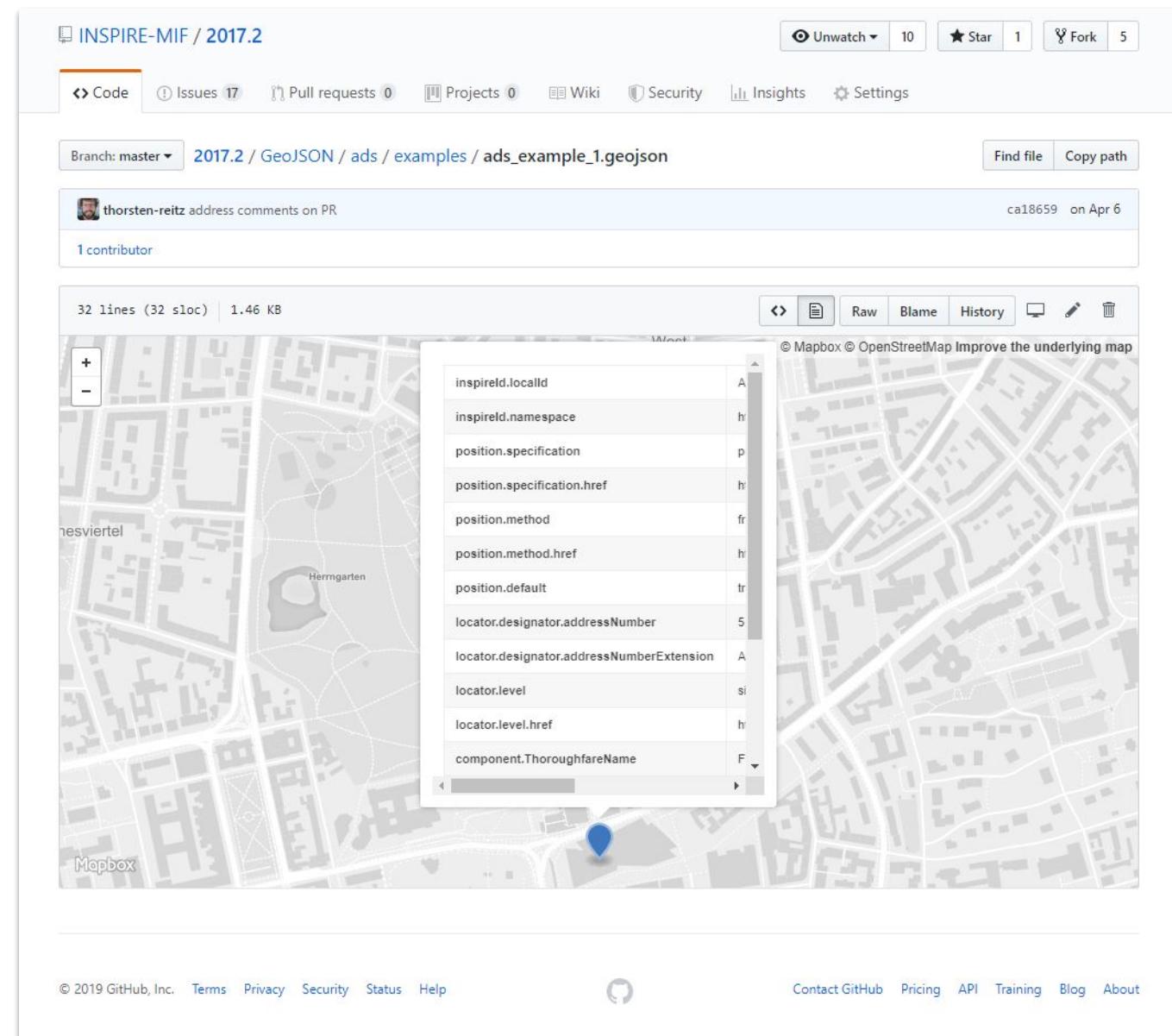
Raw Blame History

Mapbox © OpenStreetMap Improve the underlying map

inspireId.localId A  
inspireId.namespace h  
position.specification p  
position.specification.href h  
position.method fr  
position.method.href h  
position.default tr  
locator.designator.addressNumber 5  
locator.designator.addressNumberExtension A  
locator.level si  
locator.level.href h  
component.ThoroughfareName F

Mapbox

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# MIWP 2016-2020 Action 2017.3

“Improved client support for INSPIRE data”

- Purpose: help improve the support for INSPIRE data (GML and GeoJSON)

## Welcome to CanIUse INSPIRE

In this repository we document which features of INSPIRE GML and any alternative encodings (such as the GeoJSON encoding currently under development) can be used in which software product. The repository is created as part of the MIG 2017.3 action work to improve the usability of INSPIRE Data.

We have tested several client applications, including:

- QGIS 2.18 and QGIS 3.4
- Esri ArcMap 10.5
- Esri ArcGIS Online
- OpenLayers 3
- Leaflet 1.4
- OGR
- Safe Software FME
- wetransform hale studio

		Difficulty of Solution		
		Low	Medium	High
INSPIRE Priority	Low	Yellow		Red
	Medium	Green		Yellow
	High	Green		Yellow

# INSPIRE – Client support

- Outcomes from the 56<sup>th</sup> MIG-T meeting (April 2019):

INSPIRE Client support (1/2)

0 | 2 | 5

**Which are the most frequently used tools  
(choose a max of 3)?**

ArcGIS for Desktop



72 %

QGIS



88 %

Web platforms (e.g. ArcGIS Online, Google Maps, BING Maps,  
Geonode)



8 %

JS Tools (e.g. OpenLayers, LeafletJS)



44 %

ETL Tools (e.g. HALE, FME)



48 %

# INSPIRE – Client support

- Outcomes from the 56<sup>th</sup> MIG-T meeting (April 2019):

INSPIRE Client support (2/2)

0 2 5

**Which is the most desired functionality requested by your users (chose a max of 3)?**

Create and edit features



28 %

Styling features (based on properties)



36 %

Geoprocessing (based on properties)



56 %

Web-based visualisation



44 %

Handling multiple geometries



24 %

# INSPIRE – Tools for users

- A very rich INSPIRE-compliant ecosystem:
  - data **serving** (WMS/WMTS, WFS, WCS, SOS)



**GeoServer**



**MapServer**

open source web mapping

**deegree**

deegree



**esri**

- data/metadata **catalogs** (CSW)



**GeoNetwork**



**pycsw**



**esri**

- **ETL** (Extract-Transform-Load) tools



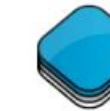
**hale**

STUDIO



- data **consumption**

**QGIS**



**OpenLayers**



**ArcGIS**



**GRASS GIS**

**Leaflet**

# Approach

Where did we start from:

- dedicated 2017.3 survey on the usability of INSPIRE data  
<https://ec.europa.eu/eusurvey/publication/UsabilityINSPIRE>

X EUSurvey

Results Individual Results Statistics Login | Help ▾ | Language

Published Results: UsabilityINSPIRE

Search Reset Export  

For performance reasons you can only set a maximum of 3 filters

1.1. What is your role in INSPIRE?	Please specify	2.1. Dataset description Please provide a brief narrative summary of the content of the dataset.	2.2. INSPIRE Data theme Please select the relevant data theme.	2.3. Applications schema Please list the application schema(s) which is/are used for encoding the data. INSPIRE schemas are available here	3.1. Intended use Please describe here the intended uses of the data. More than one application may be selected.	Please specify	3.2. Tool(s) being used Select the tools that are in place for the consumption of your INSPIRE dataset(s).
All Values ▾	<input type="text"/> 	<input type="text"/> 	All Values ▾	<input type="text"/> 	All Values ▾	<input type="text"/> 	All Values ▾
INSPIRE coordinator		WFS of the INSPIRE Administrative Units and Administrative Boundaries with three levels of administration		http://inspire.ec.europa.eu/schemas/au/4.0 - http://inspire.ec.europa.eu/applicationschema/au	Web mapping		Other
User		I wanted to test access to data in the INSPIRE			Web mapping Spatial analyses Spatial modelling		QuantumGIS ESRI ArcGIS OpenLayers

# Approach

Definition of test suites for:

- Default Encoding (GML)

<https://github.com/INSPIRE-MIF/caniuse/blob/master/docs/gml.md>

- Alternative Encoding (GeoJSON)  MIG Action 2017.2

<https://github.com/INSPIRE-MIF/caniuse/blob/master/docs/geoJSON.md>

# Approach

- discussions on the INSPIRE Community Forum  
<https://inspire.ec.europa.eu/forum>



The screenshot shows the homepage of the INSPIRE Community Forum. The header is dark blue with white text, reading "INSPIRE Community Forum" and "Supporting the implementation and use of INSPIRE". Below the header is a navigation bar with links for "Home", "Content Sections", "Discussion Groups", "Tags", "More", "Help", "My Account", and a search bar with a "Go" button. The main content area features a large heading "Welcome to the INSPIRE Community Forum" and a paragraph explaining the platform's purpose and organization into three main sections: Software & Tools, Thematic Domains, and INSPIRE & Environmental Policy. Each section has a corresponding icon below it.

## Welcome to the INSPIRE Community Forum

This collaborative platform is built upon 11 discussion groups. The three sections below group together content from these groups related to: Software & Tools, Thematic Domains and INSPIRE & Environmental Policy. For more specific queries you can use the "Search by Tag" tool.

Software & Tools



Thematic Domains



INSPIRE & Environmental Policy



# Approach

- Issues repositories of the specific Software tools

GML\_ATTRIBUTES\_TO\_OGR\_FIELDS=YES by default when loading GML #29641

 Open qgib opened this issue on Apr 10 · 1 comment

qgib commented on Apr 10

Contributor + 😊 ...

Author Name: Alexander Kotsev (Alexander Kotsev)  
Original Redmine Issue: [21826](#)

Redmine category: data\_provider/ogr

We work in Europe for the Joint Research Centre (European Commission) as technical coordinator of the EU INSPIRE Directive implementation. Within the context of INSPIRE, an increasing number of datasets are made available by European Union Member States as GML [1]. Application schemas (\*.xsd) for INSPIRE are available at [2]. Most, if not all of the GML instances that are made available use attributes of GML elements such as xlink:href pointing to a registry with persistent uri [3]. The default behaviour of QGIS ignores those attributes which is inherited from the default OGR/GDAL logic for creating a \*.gfs on first load of a GML instance. As a consequence, a significant portion of the available attribute content is 'invisible' in QGIS.

The issue is described in [4], and the solution is already available there. In a nutshell, when first loading the GML, the open option 'GML\_ATTRIBUTES\_TO\_OGR\_FIELDS' should be set to 'YES'. This would allow the generation of a fully-blown \*.gfs correctly showing all GML attributes in QGIS (which would make the life of a lot of European data providers a lot easier). Sample GML instances are attached.

Addressing this issue would be very much appreciated.

Marco Minghini and Alex Kotsev

[1] <http://inspire-geoportal.ec.europa.eu/>  
[2] <http://inspire.ec.europa.eu/schemas/>  
[3] <http://inspire.ec.europa.eu/registry/>  
[4] INSPIRE-MIF/canisue#3

• LandUseNL.gml (Alexander Kotsev)

New issue

Edits in GeoJson datasources are not saved anymore #28580

 Open qgib opened this issue on Dec 9, 2018 · 16 comments

qgib commented on Dec 9, 2018

Contributor + 😊 ...

Author Name: Ehsan Aliverdi (Ehsan Aliverdi)  
Original Redmine Issue: [20760](#)  
Affected QGIS version: 3.4.4  
Redmine category: data\_provider

I tested this issue in Qgis 3.4.0, 3.4.1, 3.4.2 in all the same issue in our company we work with Geojson files in Qgis. When editing the attributes of an existing feature in Geojson layer, QGIS creates a temp layer and applies the changes on that new temp layer and never applies the changes on original layer.  
this problem wasn't there in version 3.2.3

- equipment.geojson (Ehsan Aliverdi)
- 2018-12-18\_9-15-07.png (Ehsan Aliverdi)
- edit-geojson.gif (Ben Hur Pintor)
- geoJsonProblem.gif (Ehsan Aliverdi)

New issue

New issue

# Approach



... and personal experiences



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Commission |

# Test data

- Extracted from the INSPIRE Geoportal
  - Download services (WFS) and files (valid GML)
  - GeoJSON from 2017.2
- Themes
  - Addresses
  - Environmental Monitoring Facilities
  - Protected Sites
- Input data modified to represent additional complexity
  - multiple geometries
  - mixed geometries
  - complex types

# Test data

Documentation of test suites and test data:  
<https://github.com/INSPIRE-MIF/canidue>

Which INSPIRE GML and GeoJSON features can I use in which software?

161 commits 9 branches 0 releases 4 contributors

Branch: master ▾ New pull request Find File Clone or download ▾

alexanderkotsev Merge pull request #26 from INSPIRE-MIF/sMorrone-patch-2 ...	Latest commit 8d485e1 2 days ago
docs Update gml.md	5 months ago
generator Update out.html	9 days ago
results Merge pull request #26 from INSPIRE-MIF/sMorrone-patch-2	2 days ago
testcases Merge pull request #22 from INSPIRE-MIF/sMorrone-patch-2	10 days ago
README.md Update README.md	9 days ago
_config.yml Set theme jekyll-theme-slate	2 months ago
README.md	

Welcome to CanIUse INSPIRE

# Tests (GML)

<https://github.com/INSPIRE-MIF/caniuse/blob/master/docs/gml.md>

## 1. Load data

- Local file
- From web service

## 2. Create & Edit features

## 3. Big files handling

gml\_size\_200m\_load  
gml\_size\_200m\_display  
gml\_size\_1000m\_load  
gml\_size\_1000m\_display  
gml\_size\_2000m\_load  
gml\_size\_2000m\_display  
gml\_size\_3000m\_load  
gml\_size\_3000m\_display

## 4. Geometry

- mixed-type geometry
- multiple geometries for same feature

# Tests (GML)

<https://github.com/INSPIRE-MIF/caniuse/blob/master/docs/gml.md>

## 5. CRS handling

## 6. 3D coordinates (load/display)

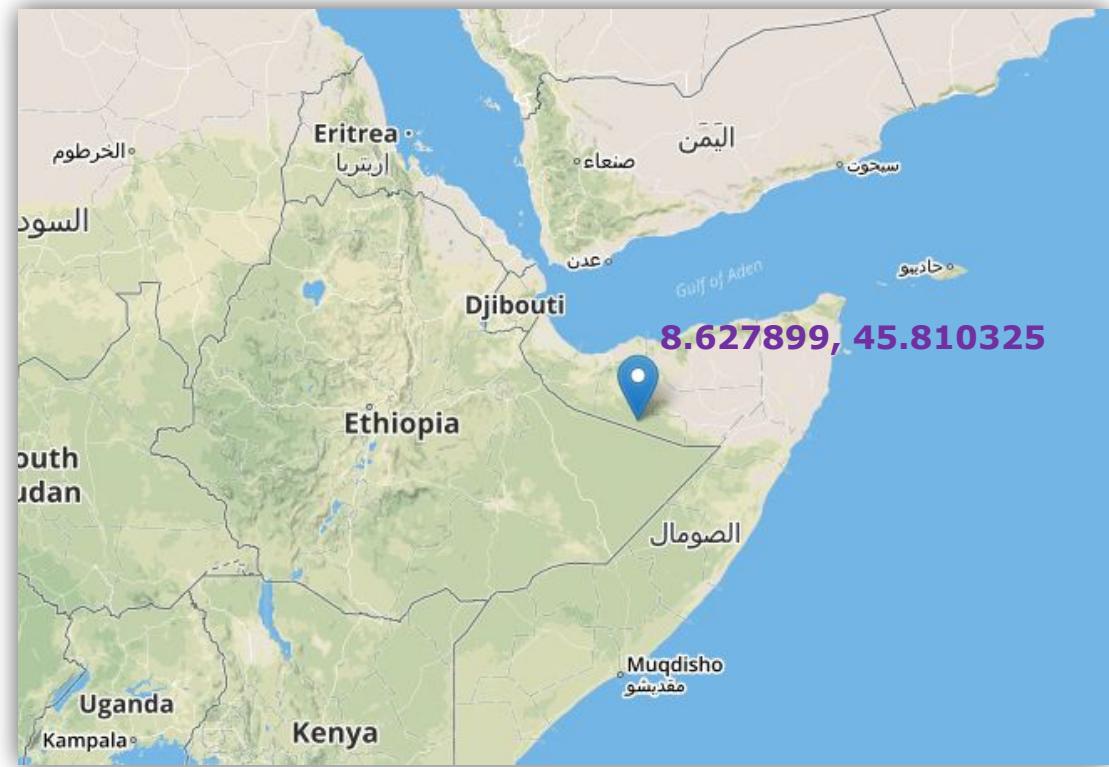
## 7. Different property types

- complex data types
- multiplicity >1
- Nillable properties and nilReason attribute

## 8. Object references

- load and display @xlink:href and @xlink:title attributes

## 9. Resolvable links



# Results - GML

Search for features..

## 1. Geography Markup Language (GML)

This section contains information on usability tests with INSPIRE GML data. The source data and overview of the individual test suits is available on [GitHub](#).

### gml\_file\_load

QGIS	ArcGIS Online	hale studio	OpenLayers	FME Desktop	Leaflet
2.18.24-Las Palmas					
3.4.4-Madeira	December 2018 update	3.4.1	5.3.0	2018.1	1.4.0

### gml\_file\_display

QGIS	ArcGIS Online	hale studio	OpenLayers	FME Desktop	Leaflet
2.18.24-Las Palmas					
3.4.4-Madeira	December 2018 update	3.4.1	5.3.0	2018.1	1.4.0

### gml\_WFS2\_load

QGIS	ArcGIS Online	hale studio	OpenLayers	FME Desktop	Leaflet
2.18.24-Las Palmas					
3.4.4-Madeira	December 2018 update	3.4.1	5.3.0	2018.1	1.4.0

### gml\_WFS2\_display

QGIS	ArcGIS Online	hale studio	OpenLayers	FME Desktop	Leaflet
2.18.24-Las Palmas					
3.4.4-Madeira	December 2018 update	3.4.1	5.3.0	2018.1	1.4.0

# Lessons learned 1/3



## INSPIRE GML

- Desktop tools handle data much better
- Poor support by JS tools
- ETL from/to INSPIRE data is needed

# Lessons learned 1/3

Certain modifications on the client side would have high impact .....

```
<PropertyDefn>
  <Name>description</Name>
  <ElementPath>description</ElementPath>
  <Type>String</Type>
  <Width>8</Width>
</PropertyDefn>
<PropertyDefn>
  <Name>name</Name>
  <ElementPath>name</ElementPath>
  <Type>String</Type>
  <Width>5</Width>
</PropertyDefn>
<PropertyDefn>
  <Name>localId</Name>
  <ElementPath>inspireId|Identifier|localId</ElementPath>
  <Type>String</Type>
  <Width>10</Width>
</PropertyDefn>
```



ogrinfo -oo GML\_ATTRIBUTES\_TO\_OGR\_FIELDS=YES ExistingLandUseCopy.gml

<https://github.com/INSPIRE-MIF/canuse/issues/3>

ExistingLandUse ExistingLandUseObject :: Features Total: 10, Filtered: 10, Selected: 0

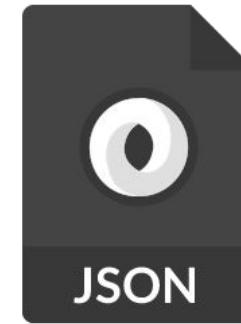
	gml_id	description	name	localId	namespace	eginLifespanVersio...	hilucsPresence	specificPresence	observationDate	validFrom	validTo
1	BBG2015_7	Railroad	4_1_2	BBG2015_7	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
2	BBG2015_6	Railroad	4_1_2	BBG2015_6	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
3	BBG2015_5	Railroad	4_1_2	BBG2015_5	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
4	BBG2015_4	Railroad	4_1_2	BBG2015_4	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
5	BBG2015_10	Railroad	4_1_2	BBG2015_10	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
6	BBG2015_9	Railroad	4_1_2	BBG2015_9	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
7	BBG2015_8	Railroad	4_1_2	BBG2015_8	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
8	BBG2015_3	Railroad	4_1_2	BBG2015_3	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
9	BBG2015_2	Railroad	4_1_2	BBG2015_2	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z
10	BBG2015_1	Railroad	4_1_2	BBG2015_1	NL.CBS.LU.Exist...	2018-09-30T22...			2015-07-30Z	2015-06-30Z	2015-08-30Z

ExistingLandUseCopy ExistingLandUseObject :: Features Total: 10, Filtered: 10, Selected: 0

	gml_id	description	name	localId	namespace	eginLifespanVersio...	hilucsLandUse_hre...	hilucsPresence	specificLandUse_title	specificLandUse_hre...	specificPresence	observationDate	validFrom	validTo	dataset_href	
1	BBG2015_7	Railroad	4_1_2	BBG2015_7	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
2	BBG2015_6	Railroad	4_1_2	BBG2015_6	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
3	BBG2015_5	Railroad	4_1_2	BBG2015_5	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
4	BBG2015_4	Railroad	4_1_2	BBG2015_4	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
5	BBG2015_10	Railroad	4_1_2	BBG2015_10	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
6	BBG2015_9	Railroad	4_1_2	BBG2015_9	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
7	BBG2015_8	Railroad	4_1_2	BBG2015_8	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
8	BBG2015_3	Railroad	4_1_2	BBG2015_3	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
9	BBG2015_2	Railroad	4_1_2	BBG2015_2	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...
10	BBG2015_1	Railroad	4_1_2	BBG2015_1	NL.CBS.LU.Exist...	2018-09-30T22...	http://inspire.e...		Spoorweg_Spoorweg		10		2015-07-30Z	2015-06-30Z	2015-08-30Z	https://www.na...

# Lessons learned 2/3

## INSPIRE GeoJSON



# JSON

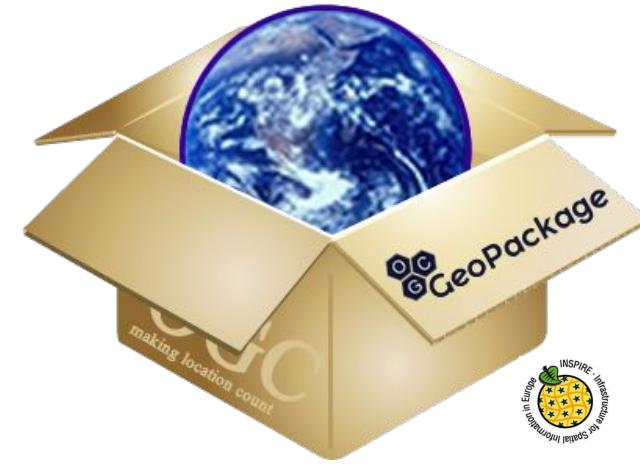
- Tests still ongoing
- Excellent support by JS clients
- GeoJSON is not a universal solution to all issues
- Issues with big file sizes



# Lessons learned 3/3

## GeoPackage & INSPIRE

- Excellent client support by Desktop Tools
- Highly desired by the community
- Encoding rule (still to be developed)
  
- Speed, size optimization ....



# Lessons learned 3/3

## GeoPackage & INSPIRE - an example



Source data:

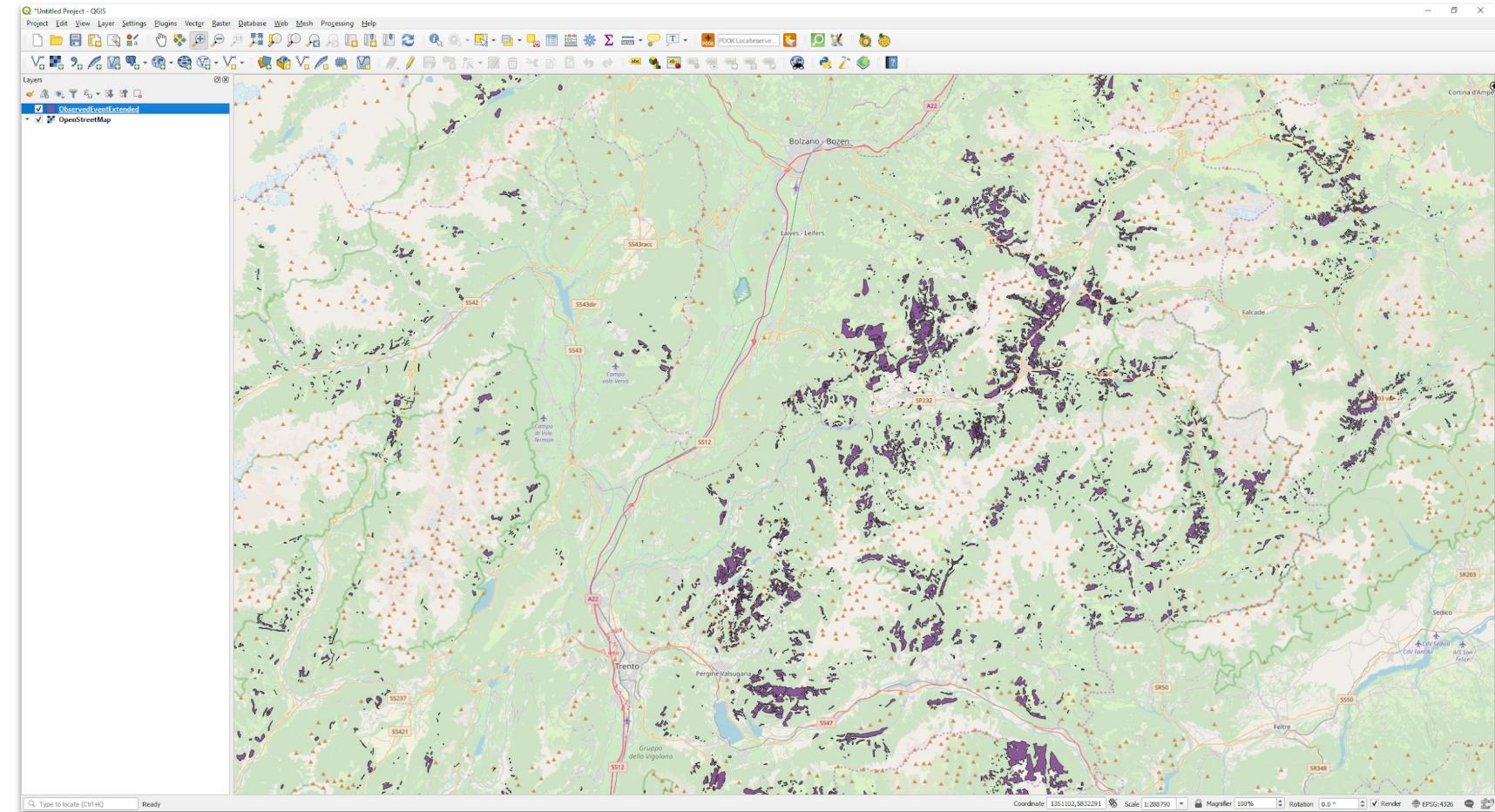
- 124 MB
- \*.shp
- 89k polygons

Harmonized data:

- GML: 257 MB
- GeoJSON: 201 MB
- GeoPackage: 106 MB

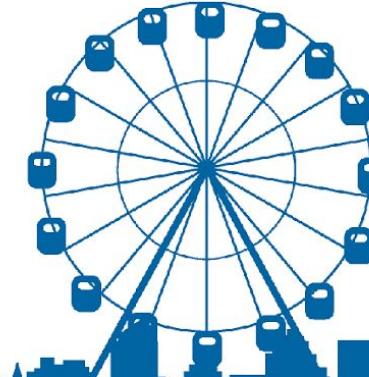
Time to load (OGR):

- GML: 10.48 sec.
- GeoJSON: 25.61 sec.
- GeoPackage: 0.76 sec.



# Inspire Helsinki 2019

22–24 October, Finland



- Organised by the Finnish National Land Survey and Ministry of Agriculture and Forestry & supported by the JRC of the European Commission and Spatineo.
- A technical event focused on **new technologies** for geospatial data:
  - keynote presentations
  - hands-on workshops
  - data challenges
    - team registration open until **September 8, 2019**
    - prizes and benefits worth more than **20'000€!**



#### Find the best seaside vacation spot

Develop solutions to find the best location for a seaside vacation depending on the interests and nature values ensuring sustainable nature of the planned activities.

[Learn more](#)



#### By the Beautiful Blue Danube

Discover alternative transport routings using the European waterways and railways instead of road networks for increased efficiency and lower the CO2 emissions.

[Learn more](#)

- **Join us in Helsinki**
  - **Address one of the 4 challenges**
  - **Cool awards :)**
  - **Possible follow-up**



#### Commuting 2.0

Make planning the day-to-day commuting safer and more pleasant for pedestrians, cyclists and other light traffic users using weather, air quality and road condition data.

[Learn more](#)



#### Let's make the most out of INSPIRE!

Figure out ways to improve how data is being delivered and encoded in particular use cases (e.g. building a cross-border dataset, or using a specific dataset in a particular software product).

[Learn more](#)

<https://www.inspire-helsinki-2019.fi>

# Thank you!

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## Questions?



# Stay in touch



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