

INSPIRE ecosystem: geospatial interoperability with open standards and open source software

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**The European Commission's
science and knowledge service**
Joint Research Centre



FOSS4G-IT 2019
PADOVA 20-24 FEBBRAIO 2019



A European Spatial Data Infrastructure: why?

- Public [consultation](#) in the early 2000s identified a number of [obstacles](#) preventing the widespread use of geospatial data needed for environmental policy at the EU level:



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**.

INSPIRE Directive – Spatial focus

- 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

- **Implementing Rules** (legally binding):
 - Metadata
 - Data Specifications
 - Network Services (Discovery, View & Download)
 - Data and Service Sharing
 - Spatial Data Services
 - Monitoring and Reporting
- **Technical Guidelines** (non legally binding):
 - specify how legal obligations can be implemented to maximize interoperability
 - make reference to existing geospatial **open standards** (ISO, OGC)

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

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

INSPIRE Directive – Governance

- INSPIRE Coordination Team (CT):
 - Directorate General Environment (DG ENV), Joint Research Centre (JRC) & European Environmental Agency (EEA)
- INSPIRE Committee (IC):
 - Member States representatives
- Member States National Contact Points (NCPs)
- INSPIRE Maintenance and Implementation Group (MIG):
 - representatives of the NCPs
 - MIG-P (Political) & MIG-T (Technical)
 - Maintenance and Implementation Work Programme (MIWP)
- INSPIRE stakeholders

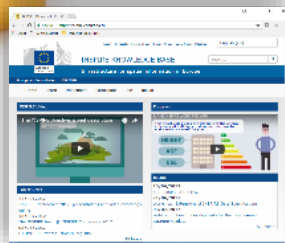
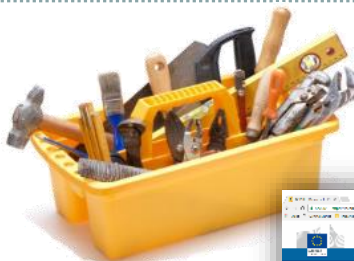
INSPIRE Directive – Where are we in 2019?

1



draft

2



implement

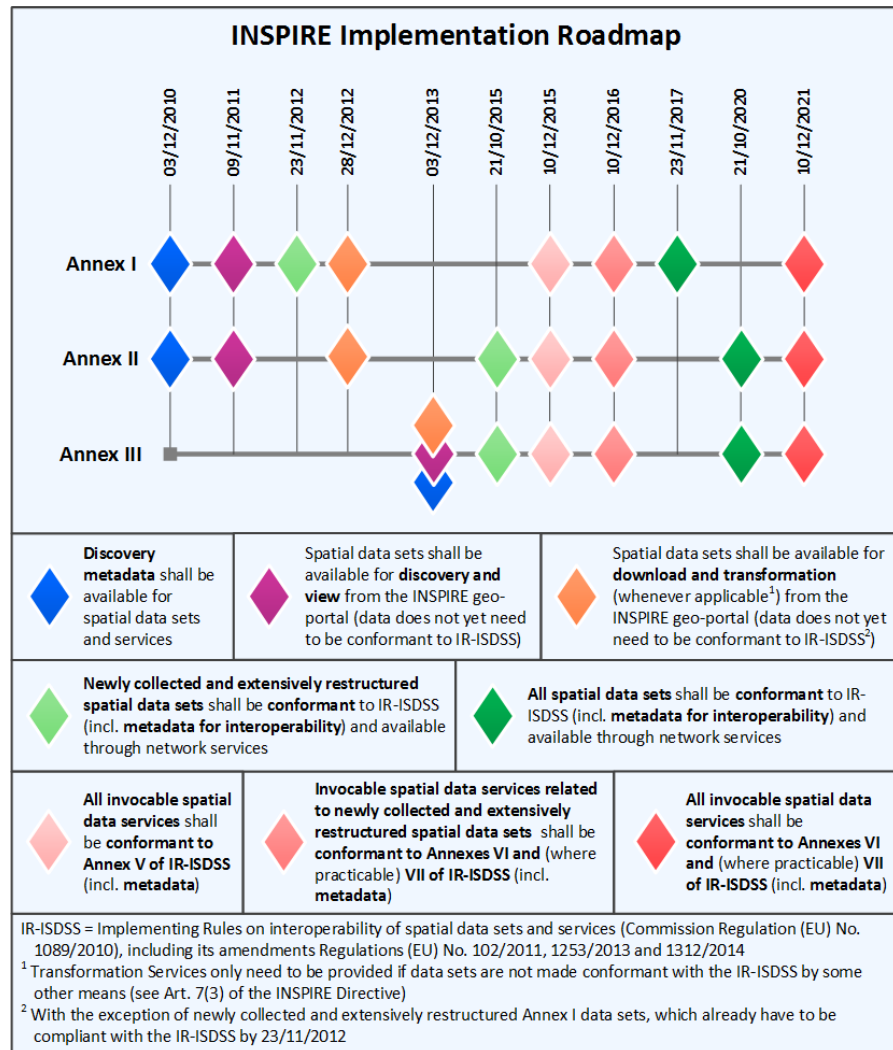
3



use

INSPIRE Directive – Roadmap


- Implementation in subsequent stages:
 - depending on the **Annex**
 - depending on the **resource type**
 - metadata
 - services (Discovery / View / Download)
 - data sets (as-is / compliant)



INSPIRE Geoportal

- Allows to **search, view & download** data sets using **2 viewers**:
 - Priority Data Sets Viewer
 - INSPIRE Thematic Viewer

Priority Data Sets Viewer




Credits: Map data: Google | Map style: snazzymap | Icons: Nick Roach

The application displays the availability and provides access to the selected priority data sets ¹ used for environmental reporting. It allows filtering by environmental domain, environmental legislation and country.

[Browse Priority Data Sets](#)

INSPIRE Thematic Viewer

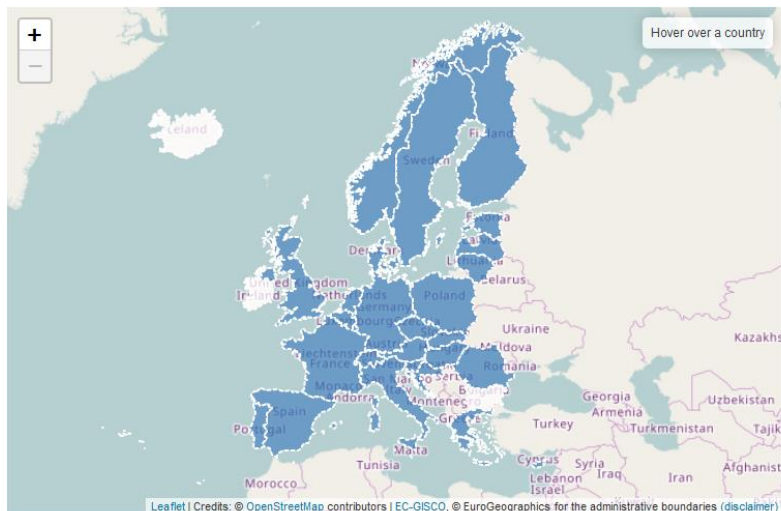


Credits: Map data: Google | Map style: snazzymap | Icons: INSPIRE

The application displays the availability and provides access to all EU MS data sets falling under the scope of INSPIRE Directive filtered by data themes and countries (i.e. Annex I, II and III).

[Browse INSPIRE Thematic Data Sets](#)

INSPIRE Geoportal – Implementation overview



Show:

Downloadable Viewable

INSPIRE Geoportal Data Set Statistics

156699

Metadata
records

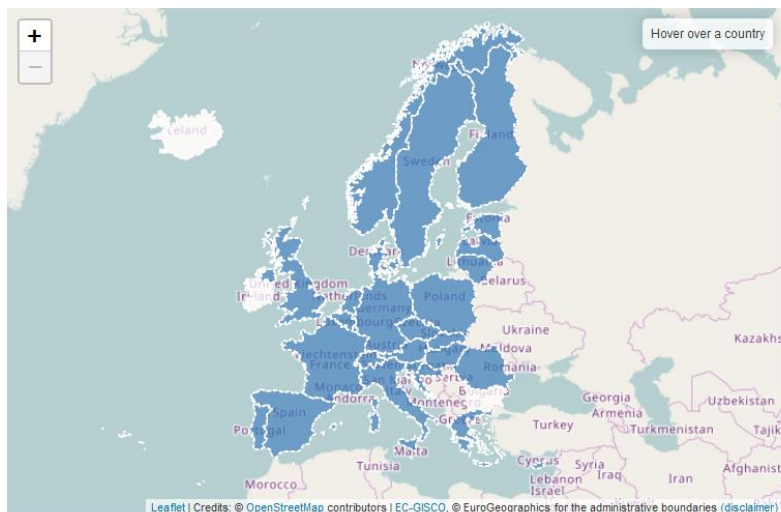
26623

Viewable
Data Sets

Select a COUNTRY

Austria	547 400 414	Finland	602 51 52	Latvia	140 3 4	Portugal	738 131 236
Belgium	543 170 405	France	39055 1099 13173	Liechtenstein	57 9 11	Romania	119 20 14
Bulgaria	29 0 0	Germany	32101 9248 10643	Lithuania	48 1 5	Slovakia	7180 4 12
Croatia	121 3 4	Greece	41 34 34	Luxembourg	224 211 169	Slovenia	95 8 8
Cyprus	42 28 6	Hungary	110 0 1	Malta	158 128 151	Spain	219 141 143
Czech Republic	147 14 93	Iceland	142 7 0	Netherlands	210 113 131	Sweden	285 28 136
Denmark	189 20 21	Ireland	54 4 0	Norway	223 12 11	Switzerland	213 1 3
Estonia	73 15 23	Italy	20130 0 388	Poland	32077 53 16	United Kingdom	20787 64 316

INSPIRE Geoportal – Implementation overview



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Downloadable Viewable

INSPIRE Geoportal Data Set Statistics

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records

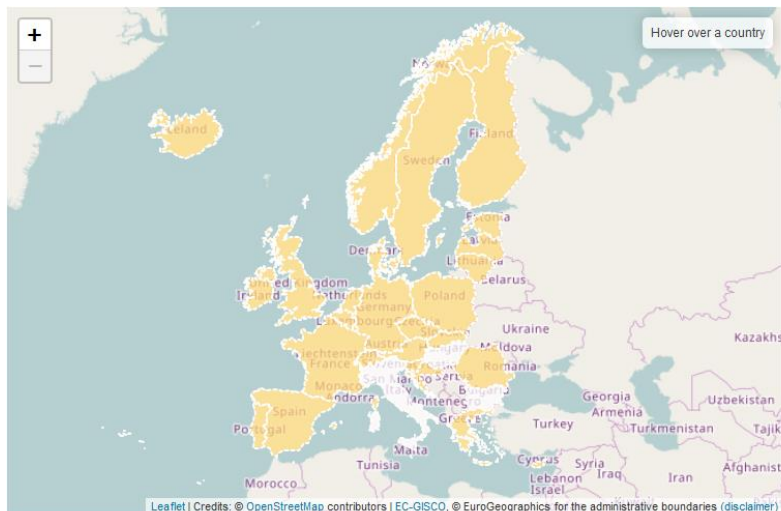
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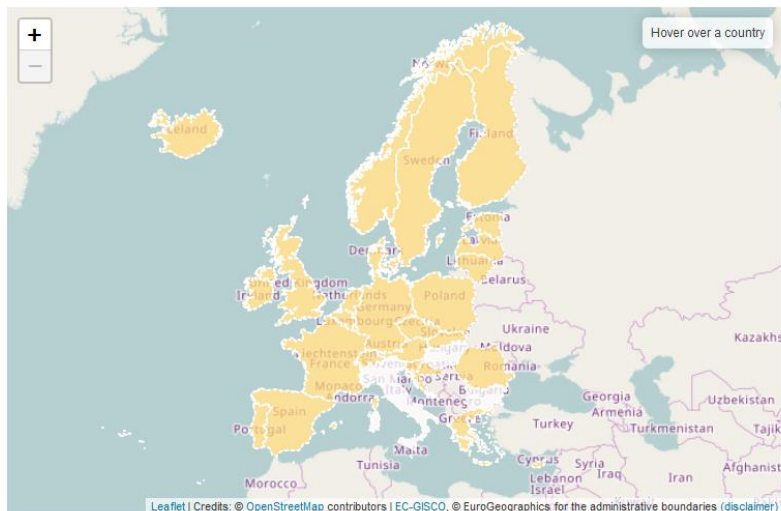
12020

Downloadable
Data Sets

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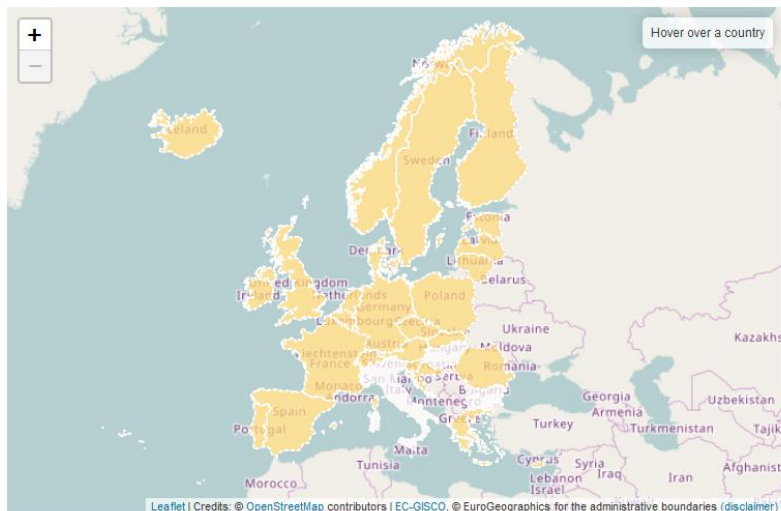
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INSPIRE Geoportal – Data access









































- Data set and service availability:

Data sets in Malta

158 | 128 | 151

Filters: ☐ Downloadable ☐ Viewable

☐ Show data with national coverage ⓘ

Title	Properties
 Photovoltaic panels installed in the domestic sector per 1000 residents	  
 11kV Overhead Line	  
 Article 12 Birds Range	  
 Article 12 Birds Distribution	  
 Unemployment rate (15 to 74 years) by District	  
 Article 17 Habitats Range	  
 Article 17 Species Range	  
 Article 17 Species Distribution	  
 Article 17 Habitats Distribution	  
 Malta European geostatistical 1km grid	  
Title	Properties

Show entries Showing 1 to 10 of 158 entries

Previous 1 2 3 4 5 ... 16 Next

INSPIRE Geoportal – Data access

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 Article 17 Species Range	  
 Article 17 Species Distribution	  
 Article 17 Habitats Distribution	  
 Malta European geostatistical 1km grid	  
Title	Properties

Show 10 entries Showing 1 to 10 of 158 entries

Previous 1 2 3 4 5 ... 16 Next

INSPIRE Geoportal – Data access

- Metadata access:

Article 17 Habitats Range

[Download Options ▾](#)
[View Options ▾](#)
[Data set Metadata ▾](#)

Resource Title

Article 17 Habitats Range

Resource Abstract

Article 17 of the Habitats Directive requires Member States to report every six years about the progress made with the implementation of the Habitats Directive. As the main focus of the directive is on maintaining and/or restoring a favourable conservation status for habitat types & species of community interest, monitoring & reporting under the directive is focusing on that. Monitoring of conservation status is not restricted to Natura 2000 sites and data need to be collected both in and outside the Natura 2000 network to achieve a full appreciation of conservation status. Some data on sensitive species is restricted from public access, as the disclosure of such might adversely affect the conservation of the species in question; this is in line with the provisions of Article 4 2(h) of Directive 2003/4/EC.

Lineage

Habitats Directive - Article 17 Report - Malta - 2013 submitted on 11 Dec 2013;
Habitats Directive - Article 17 Report - Malta - 2007 submitted on 07 Mar 2008.

Unique Resource Identifier

Reporting Tags

[Directive 92/43/EEC - Biogeographical regions \(Habitats Directive\)](#)
[Directive 92/43/EEC - Habitat maps using INSPIRE geographical grid system \(Habitats Directive\)](#)


Conditions Applying To Access And Use

No conditions apply

Limitations On Public Access

Some data on sensitive species is restricted from public access, as the disclosure of such might adversely affect the conservation of the species in question; this is in line with the provisions of Article 4 2(h) of Directive 2003/4/EC.

Geographic Bounding Box



INSPIRE Geoportal – Data access

- View Service:



Article 17 Habitats Range

Download Options ▾					
View Options ▾					
Search..					
Simple Viewer	Layer title	Layer name	CRS	Desktop Tool ⓘ	Service metadata
Preview Data Set ⚠	Habitat Range	HB.HabitatRange	EPSG:4258	Google Earth	📄
Preview Data Set ⚠	Habitat Range	HB.Habitat.Range	EPSG:4258	Google Earth	📄
Data set Metadata ▾					

INSPIRE Geoportal – Data access


- View Service:

Article 17 Habitats Range

Download Options ▾					
View Options ▾					
Search..					
Simple Viewer	Layer title	Layer name	CRS	Desktop Tool ⓘ	Service metadata
Preview Data Set ⚠	Habitat Range	HB.HabitatRange	EPSG:4258	Google Earth	
Preview Data Set ⚠	Habitat Range	HB.Habitat.Range	EPSG:4258	Google Earth	
Data set Metadata ▾					

INSPIRE Geoportal – Data access

- View Service:
 - service metadata

 MSDI Harmonised Datasets WMS Close

Resource Title MSDI Harmonised Datasets WMS	Conditions Applying To Access And Use NONE
Resource Abstract MSDI Harmonised INSPIRE WMS View service	Limitations On Public Access None
	Resource Locator https://msdi.data.gov.mt/deegree/services/wms?request=GetCapabilities&service=WMS&version=1.3.0
	Responsible Party Organisation name Malta Information Technology Agency E-mail inspire.mita@gov.mt
	Metadata Point Of Contact Organisation name MITA E-mail inspire.mita@gov.mt
Metadata Language	Metadata Date

INSPIRE Geoportal – Data access

- View Service:
 - data set preview

Article 17 Habitats Range

Download Options ▾

[View Options ▾](#)

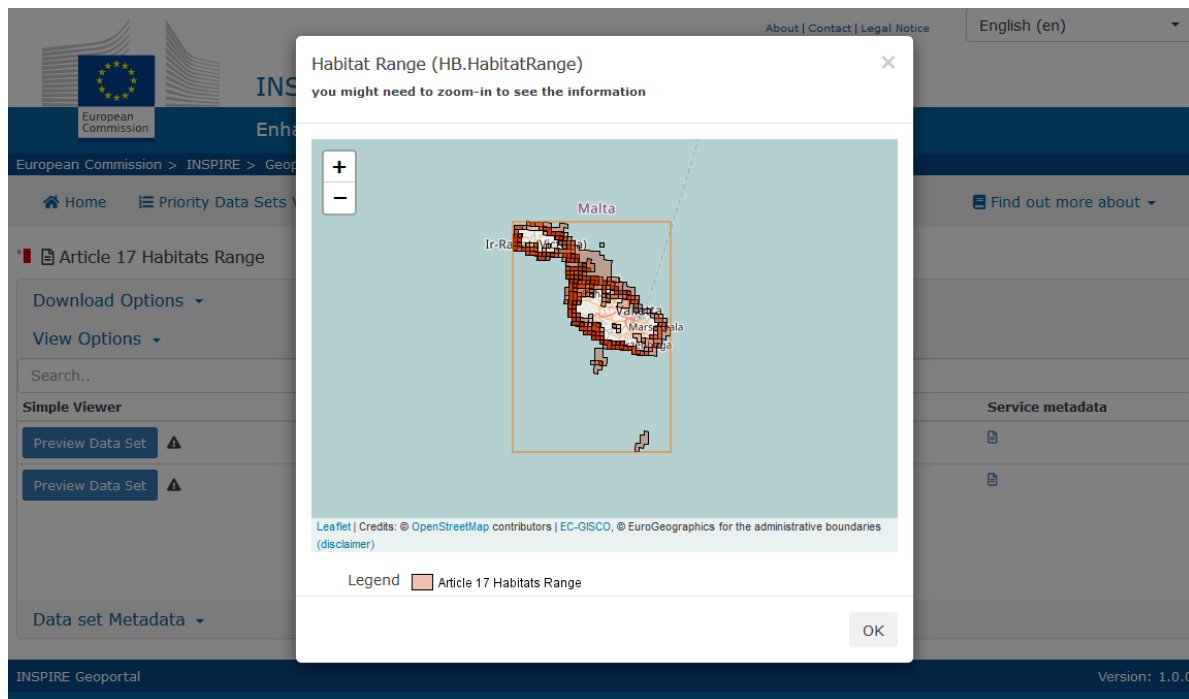
Search..

Simple Viewer	Layer title	Layer name	CRS	Desktop Tool ⓘ	Service metadata
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Preview Data Set ⚠	Habitat Range	HB.Habitat.Range	EPSG:4258	Google Earth	📄

Data set Metadata ▾

INSPIRE Geoportal – Data access

- View Service:
 - data set preview in a Leaflet Web map



INSPIRE Geoportal – Data access



- Download Service:

Article 17 Habitats Range

Download Options ▾			
Search..			
Download link	Data Format	CRS	Service Metadata
Get Data Set ⚠		http://www.opengis.net/def/crs/EPSSG/0/3045	Service Metadata
Get Data Set ⚠		http://www.opengis.net/def/crs/EPSSG/0/3045	Service Metadata
View Options ▾			
Data set Metadata ▾			

INSPIRE Geoportal – Data access

- Download Service:
 - service metadata

  WFS Article 17 Habitats Range Close

Resource Title WFS Article 17 Habitats Range	Conditions Applying To Access And Use No conditions apply
Resource Abstract WFS Download service for Article 17 of the Habitats Directive requires Member States to report every six years about the progress made with the implementation of the Habitats Directive. As the main focus of the directive is on maintaining and/or restoring a favourable conservation status for habitat types & species of community interest, monitoring & reporting under the directive is focusing on that. Monitoring of conservation status is not restricted to Natura 2000 sites and data need to be collected both in and outside the Natura 2000 network to achieve a full appreciation of conservation status. Some data on sensitive species is restricted from public access, as the disclosure of such might adversely affect the conservation of the species in question; this is in line with the provisions of Article 4 2(h) of Directive	Limitations On Public Access no limitation
	Resource Locator https://msdi.data.gov.mt/geoserver/MITA_WFS_Art17HabRange/ows?request=GetCapabilities&service=WFS&AcceptVersions=2.0.0
	Responsible Party Organisation name Malta Information Technology Agency (MITA) E-mail euaffairs.mita@gov.mt
	Metadata Point Of Contact Organisation name Malta Information Technology Agency E-mail euaffairs.mita@gov.mt

INSPIRE – Data usability

- Increasing attention from data **availability** (providers) to data **usability** (users):
 - **MIWP 2017.2** *Alternative encodings for INSPIRE data*
 - **MIWP 2017.3** *Better client software/tool support for INSPIRE data*

Alternate Encoding for INSPIRE Data: GeoJSON

Table of Contents

- Introduction
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 - Cross-cutting INSPIRE requirements
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 - Requirements and Recommendations
 - Alternate Coordinate Reference Systems
- Conformance Classes
 - Simple Addresses
 - Simple Environmental Monitoring Facilities
- Annex I (Normative/Informative): Abstract / Executable Test Suite
- Annex II (Informative): Examples

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. This repository is created as part of the MIG 2017.3 work to improve the usability of INSPIRE Data.

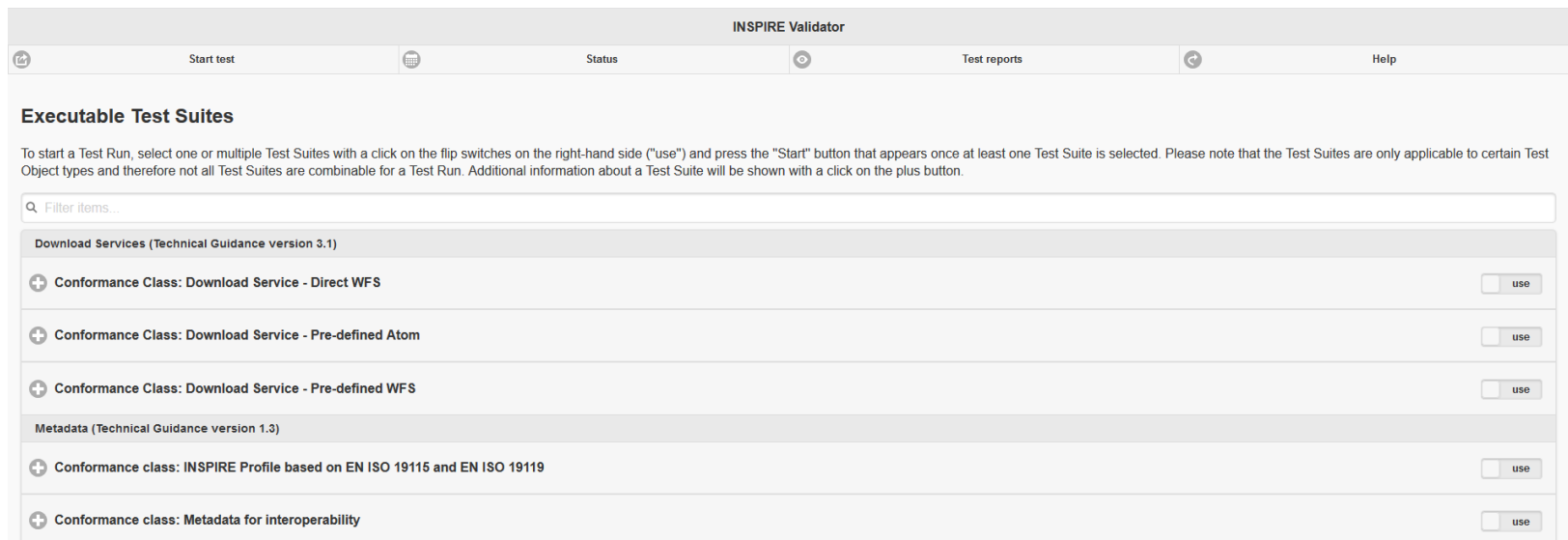
We will test several client applications, including but not limited to:

- 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

INSPIRE – Other JRC open source tools



- INSPIRE Reference Validator:
 - web application to **validate** metadata, data sets & services
 - **open source** under the European Union Public License (EUPL)




<http://inspire-sandbox.jrc.ec.europa.eu/etf-webapp>

26 <https://github.com/etf-validator>

INSPIRE – Other JRC open source tools

- INSPIRE Registry:
 - tool to manage and share **reference codes** (i.e. unique identifiers)
 - **open source** under the European Union Public License (EUPL)

Registry manager: **European Commission, Joint Research Centre**

Other formats:  XML Re3gistry  XML ISO 19135  RDF/XML  JSON  Atom  CSV

Registers

Filter Label
Label
INSPIRE application schema register
INSPIRE code list register
INSPIRE enumeration register
INSPIRE feature concept dictionary
INSPIRE glossary
INSPIRE layer register
INSPIRE media-types register
INSPIRE metadata code list register
INSPIRE reference document register
INSPIRE theme register

Items per page: 50 Showing 1 to 10 of 10 entries

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<http://inspire.ec.europa.eu/registry>

27 <https://joinup.ec.europa.eu/solution/re3gistry>



European
Commission

INSPIRE – Open source tools for implementers

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



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



- data **consumption**



- ETL (Extract-Transform-Load) tools



INSPIRE on the OSGeoLive

A screenshot of a desktop environment. On the left, the OSGeoLive application menu is open, showing various GIS tools and services. A tooltip for "INSPIRE resources" is visible. In the background, a Mozilla Firefox browser window is open, displaying the INSPIRE wiki page at https://wiki.osgeo.org/wiki/INSPIRE. The page title is "INSPIRE - OSGeo - Mozilla Firefox". The URL bar shows the address. The page content includes the OSGeo logo, the title "INSPIRE", and a list of links for implementation of the EU INSPIRE Directive. The browser window also shows a search bar and navigation links like "Log in" and "Request account".

INSPIRE - OSGeo - Mozilla Firefox

about:sessionrestore x INSPIRE - OSGeo x +

https://wiki.osgeo.org/wiki/INSPIRE

Log in Request account

Page Discussion Read View source View history Search

OSGeo

INSPIRE

Resources for implementation of the EU INSPIRE Directive [Mailing list](#)

Main page
Current events
Recent changes
Random page
Help

Tools
What links here
Related changes
Special pages
Printable version
Permanent link
Page information
Browse properties

Contents [hide]

- 1 Introduction
 - 1.1 Scope
 - 1.2 The INSPIRE Components
- 2 OSGeo's involvement
- 3 What is available and what is missing?
- 4 Background information
 - 4.1 Presentations and conferences
 - 4.2 Use Cases
 - 4.3 See also

Introduction

INSPIRE [@](#) (Infrastructure for Spatial Information in Europe) is an initiative launched by the European Commission and developed in collaboration with the EU Member States and accession countries. It aims at making available relevant, harmonized and qualitative geographic

The future of INSPIRE

- Do we still need an SDI?

The future of INSPIRE

- Do we still need an SDI? **YES!**
 - the exponential growth and heterogeneity of data raises the importance of an integrated (a.k.a. SDI) approach towards **data management**

The future of INSPIRE

- Do we still need an SDI? **YES!**
- How will it look like in the future?



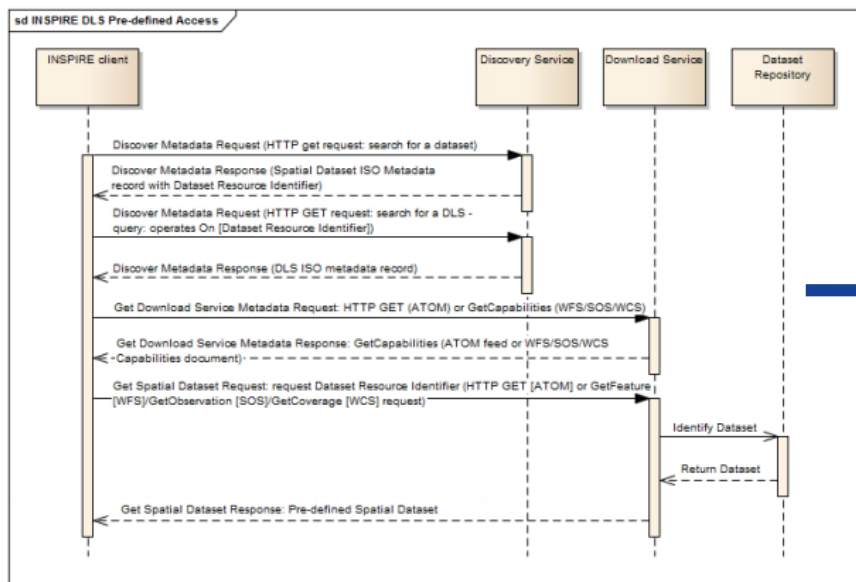
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 - new **data sources** from citizens & companies
 - **licensing** & **legislative** framework
 - **FOSS4G** is a pillar!

Thank you!

Questions?

marco.minghini@ec.europa.eu
@MarcoMinghini

Stay in touch



EU Science Hub: [***ec.europa.eu/jrc***](https://ec.europa.eu/jrc)



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LinkedIn: [***Joint Research Centre***](https://www.linkedin.com/company/joint-research-centre)



YouTube: [***EU Science Hub***](https://www.youtube.com/EU_Science_Hub)