



Phase 1 (October 2024 – June 2025)

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Abstract

The ISO & GeoDCAT-AP Pilot Final report outlines the work, analysis and results for the implementation and evaluation of the GeoDCAT-AP 3.0.0 specification and its XSLT (Extensible Stylesheet Language Transformation) transformation, which is used in transforming INSPIRE geospatial metadata to GeoDCAT-AP, geospatial extension of the DCAT RDF vocabulary. This transformation is crucial for integrating these metadata into the existing Open Data reporting flows, harvesting and embedding them in the European Data Portal (data.europa.eu)

The first phase of the pilot, which ran from October 2024 to June 2025, counted with the active participation of nine European Member States, the Publications Office of the European Union (OP), and several European Commission services – including the SEMIC group of Directorate-General for Digital Services (DIGIT), Directorate-General for Environment (ENV) and the Joint Research Centre (JRC), who organised and managed the pilot.

The work in this first phase involved the participation in six meetings, whose documentation and materials were stored on an ad-hoc GitHub repository, which helped to organise collaborative work and issue tracking. Issues stemming from the pilot, once a resolution was agreed on them after active discussion, have been progressively transferred to the SEMIC GitHub repositories.

Key findings include the need for further analysis of content loss during the transformation, robust SHACL (Shapes Constraint Language) validation, and clarification on the role of service metadata in geospatial High-Value Dataset (HVD) reporting. The diversity of national metadata practices highlighted the necessity for flexible transformation solutions to maintain metadata quality and reuse, and the need to keep track of existing EU-level and national transformations to allow better management and coordination.

The pilot is highly relevant for the GreenData4All initiative, revision of the INSPIRE Directive, aiming to modernize environmental geospatial data sharing and ensure compliance with the relevant regulations, especially the Open Data Directive and its Implementing Regulation on High-value datasets.

1 Introduction and purpose

The GreenData4All Initiative (European Commission, 2025a) aims at modernising the rules governing European environmental geospatial data sharing under the INSPIRE Directive (European Union, 2007). In particular, one of the scopes of the Initiative is to align more closely with the Open Data Directive (European Union, 2019) and its Implementing Act (Commission Implementing Regulation (EU) 2023/138) on open data High-value datasets (HVDs) (European Commission, 2023).

Notably, roughly two-thirds of the HVDs categories reference datasets that include geospatial data. For this reason, the need to support the overall objective of data interoperability is particularly relevant to datasets reported under the INSPIRE Directive (European Union, 2007), along with facilitating the integration of INSPIRE reporting obligations within the process for reporting HVDs in the scope of the open data community. This entails setting a common data flow, the proper identification of HVDs by Member States (MSs), and their harvesting by the European Data Portal (EDP) (European Union, 2025a).

Ultimately, the process is expected to minimise the implementation burden on MSs' data providers, while assuring compliance to the applicable legal framework, deploying the digital priorities of the von der Leyen Commission, conveyed through the European Strategy for Data (European Commission, 2020) and the European Data Union strategy (European Commission, 2025c).

1.1 GeoDCAT Application Profile 3.0.0 for geospatial portals in Europe

To this purpose, the Semantic Interoperability Centre Europe (SEMIC) Group of the Directorate-General for Digital Services (DIGIT) of the European Commission has publicly released the GeoDCAT-AP 3.0.0 (SEMIC, 2024b) specification in October 2024.

The specification facilitates the transformation of metadata managed by national geospatial data catalogues and their integration within the above-mentioned common reporting flow, by establishing an updated mapping between geospatial/INSPIRE metadata (in ISO 19139 / 19115 format) and DCAT metadata (in GeoDCAT format) used by the open data community. Furthermore, it incorporates additional provisions to comply with the HVDs Implementing Regulation.

The new GeoDCAT-AP 3.0.0 specification (SEMIC, 2024b) and its related XSLT transformation (SEMIC, 2024g) (implementing the specification mapping) were open to public review until the end of September 2024.

1.2 ISO & GeoDCAT-AP Metadata Implementation Pilot

This report defines the activities, work and results of a pilot sandboxing activity aimed at testing both resources, the GeoDCAT-AP 3.0.0 specification and its related XSLT transformation, to improve them and provide a mechanism to identify and report related issues beyond the previous public review period.

2 Pilot description

2.1 Objectives

Evaluating the adequacy of the GeoDCAT-AP 3.0.0 specification and its accompanying XSLT transformation regarding the following aspects:

- Quality of the transformation, quantification and evaluation of potential information losses.
- Degree of compliance of the transformed geospatial metadata (in GeoDCAT format) to the provisions set by the INSPIRE Directive and the HVDs Implementing Regulation.
- Potential implementation issues identified in the pilot to be reported.
- Develop and agree on a good practice candidate for tagging geospatial HVDs.

2.2 Pilot participants

The following stakeholders actively participated in this pilot testing:

- Nine MSs, through the contact points responsible for managing their national geospatial catalogues, as main users of GeoDCAT-AP specification and XSLT transformation to migrate current geospatial metadata. Particularly: Belgium (Flanders), the Czech Republic, Denmark, France, Italy, Finland, The Netherlands, Spain and Slovakia participated.
- The Publications Office of the European Union (OP), as future receptor of GeoDCAT-AP-based metadata and re-user of the XSLT transformation, responsible for harvesting national open and geospatial data catalogues, manager of the EDP (European Union, 2025a) and final publisher of these data, including a dedicated page on European HVDs (European Union, 2025b).
- The European Commission Directorate-General for Digital Services (DIGIT), through its SEMIC group, as point of contact for resolving and contributing to solutions when specification and transformation related issues are discovered within the pilot.
- The European Commission Directorate-General for Environment (ENV), as EU policy master in the environmental domain, responsible for the INSPIRE Directive and its potential revision under the GreenData4All.
- The European Commission Joint Research Centre (JRC), as technical coordinator of the INSPIRE infrastructure, and manager and organiser of the pilot, providing as well scientific knowledge on the applicable legal and technical framework.

2.3 Outputs and Results

The following outputs and results were defined in the context of this pilot:

- General feedback on the tested specification and transformation, including a detailed set of **issues** reported in the GeoDCAT-AP repository (SEMIC, 2025a) and the XSLT transformation repository (SEMIC, 2025b), from each participant in the pilot.
- Final report summarising the process and **results achieved** in the pilot, including an evaluation on how this transformation helps data providers in keeping compliance to the applicable legal framework.

- Definition and agreement on the **geospatial HVD tagging candidate good practice**, to smooth its potential endorsement by the INSPIRE MIG-T (INSPIRE Maintenance and Implementation – Technical Sub-group).

These outputs will support the SEMIC community to release an improved GeoDCAT-AP 3.0.0 specification and XSLT transformation, based on pragmatic outcomes from this pilot. This will deliver benefits to involved stakeholders, as summarised in 2.4.

2.4 Expected benefits

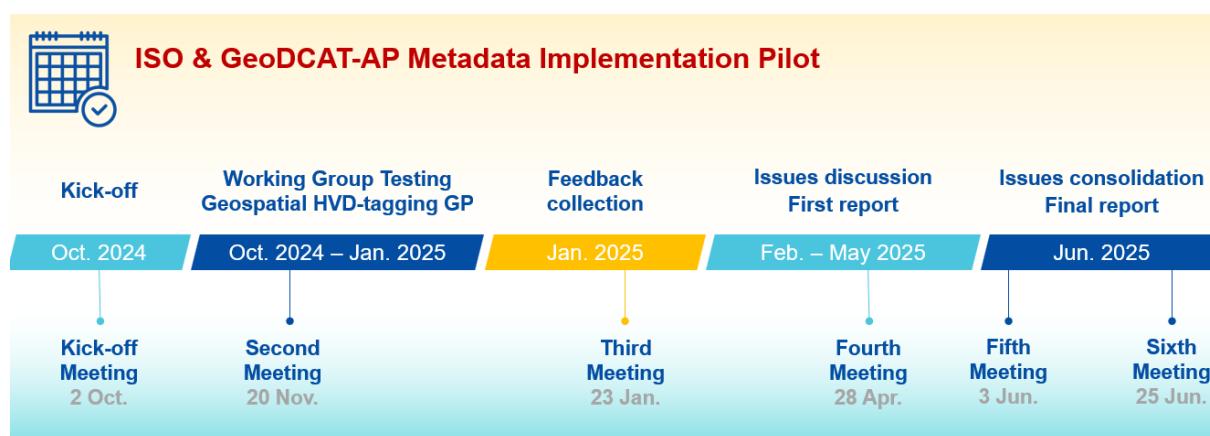
The following benefits are expected after running the activities foreseen in this pilot:

- Implementers in the MS will have at their fingertips an improved quality tested tool to transform their geospatial metadata descriptions to DCAT format (GeoDCAT-AP), thus integrating the metadata with the open data HVDs reporting flow. This makes these metadata records compatible with the harvesting by the EDP, ensuring interoperability of geospatial HVDs with other HVDs.
- The (OP), responsible for the EDP (European Union, 2025a), will be able to harvest metadata with increased quality, minimising information losses (see also Section 2.3).
- The SEMIC group of DIGIT and its underlying community will achieve a more solid release of the specification and XSLT transformation, based on the outcomes of a real testing case scenario.
- ENV and the JRC, main stakeholders driving INSPIRE and the GreenData4All, will attain a streamlined reporting mechanism aligned with the open data flows.

2.5 Timeline

The pilot was planned to run for nine months from the 2 October 2024 until 30 June 2025, as illustrated in **Figure 1**.

Figure 1. ISO & GeoDCAT-AP metadata implementation pilot timeline.



Source Figure created for the purpose of this pilot

2.6 Pilot repository

A GitHub repository (INSPIRE-MIF, 2025a) was created to host the materials for running this pilot, including description, meeting materials, outputs and results. It is publicly accessible under this URL:

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot>

Additionally, a set of issues were collected to discuss and agree on specific proposals and issues identified by the participants, where needed.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues>

3 Background, initial expectations and proposals

During the second meeting held on 20 November 2024, the participants were requested to provide some background information concerning the pilot. This included:

- Previous work and experience about the use of DCAT-AP (SEMIC, 2024a) / GeoDCAT-AP and the related transformations available.
- Expectations on the pilot and initial proposals (if any).
- Their selected focus for the pilot testing, i.e. mainly: the GeoDCAT-AP specification, the XSLT transformation, or both.

The subsections below summarise this information for each of the participants.

3.1 Belgium (Flanders)

3.1.1 Testing focus

Belgium-Flanders is interested in testing real implementation examples developed through available software (e.g. GeoNetwork), including geospatial metadata HVD implementations.

3.1.2 Preliminary work and experience

Belgium Flanders is leading a joint effort working group to implement a DCAT schema plugin for GeoNetwork open source (Metadata101, 2025). The repository of this working group is available at <https://github.com/metadata101/dcat-ap>.

As part of this work, different HVD metadata implementations from Germany, the Netherlands and Belgium were compared. This included discussions with SEMIC, which helped to converge in the regional approach currently in use in Flanders.

This approach includes the use of Flanders Spatial Data Infrastructure (SDI) thesauri for encoding keywords in geospatial metadata used for tagging INSPIRE and HVD dataset metadata records. The category and subcategory for HVDs are also encoded according to the HVDs Implementing Regulation.

Afterwards, a mapping is used to match these keywords to DCAT-AP (SEMIC, 2024a) elements. Encoding example in ISO and DCAT native format are available.

3.1.3 Initial expectations and proposals

Belgium Flanders is willing to push for the implementation of DCAT-based metadata plugins in GeoNetwork.

As organisers of the ‘DCAT schema plugin for GeoNetwork’ working group, they encourage the participants of the ISO & GeoDCAT-AP metadata implementation pilot to take part in the upcoming sprints of the mentioned working group, including related testing efforts.

The plan is to extend this DCAT-AP plugin also to GeoDCAT-AP.

Therefore, it is proposed to establishing synergies with between the ‘DCAT schema plugin for GeoNetwork’ working group and the ISO & GeoDCAT-AP metadata implementation pilot.

The convenience of aligning the timelines of both, the mentioned working group and the pilot, is highlighted, so that the real implementation examples prepared with the GeoNetwork plugin can be tested during the pilot.

3.2 Czech Republic

3.2.1 Testing focus

In the Czech Republic the provision of INSPIRE ISO metadata is (more or less) separated from open data DCAT metadata. Regarding INSPIRE ISO metadata there is the National metadata profile, which is a robust extension of INSPIRE metadata profile. ISO metadata are harvested on the National INSPIRE Geoportal and subsequently on the European INSPIRE Geoportal. Metadata for Open Data Portal are created separately and harvested from local catalogues to the national Open Data Portal and from there to the European Data Portal. Currently some publishers have to create metadata in two different formats and provide them to two local catalogues at the same time.

The Czech open data metadata profile (the metadata profile that requires Czech Open Data Portal) is based on DCAT-AP version 3.0 (SEMIC, 2024a) and it also implements the HVD extension.

The main testing focus in the Czech Republic is testing the XSLT transformation.

3.2.2 Preliminary work and experience

Czech National Metadata Profile (ISO metadata) was extended by several items to be compatible with the Czech Open Data profile (DCAT metadata). Therefore, a mapping and transformation from ISO to DCAT-AP is feasible in a simple way.

HVD items/tagging were added to the Czech ISO profile in spring 2024.

Czech National INSPIRE Geoportal has been able to transform ISO metadata to DCAT metadata for several years. In September 2024, the national requirements for HVD tagging were added into the transformation.

3.2.3 Initial expectations and proposals

The pilot can be the first step to the simplification of the Czech ISO metadata profile and INSPIRE profile. And, gradually, to get rid of the parallel system of metadata provision.

Some providers are currently planning to revamp their metadata catalogues and geoportals. Therefore, the results from the pilot could help them to define their requirements.

3.3 Denmark

3.3.1 Testing focus

In Denmark, the national geoportal (geodata-info.dk) stores metadata records based on the ISO 19115-3 metadata standard. Later, these records are also transformed and published as ISO 19115/19139 metadata. Subsequently, they are transformed to GeoDCAT-AP and harvested by the national open data portal (datavejviser.dk). Once in that portal, the metadata information is transferred to the EDP (European Union, 2025a).

As illustration, below it is shared the metadata for a single dataset in the three different portals:

- Danish Geoportal: <https://geodata-info.dk/srv/dan/catalog.search#/metadata/50b921ea-935e-d605-2287-4ee364046795>
- Danish Open Data portal: <https://dataejviser.dk/katalog/klimadatastyrelsen/8d1c3287-5b77-40dc-8ed8-e66ad8d42f0d>
- EDP: <https://data.europa.eu/data/datasets/https-geo-data-gov-dk-dataset-50b921ea-935e-d605-2287-4ee364046795~~1?locale=en>

Therefore, the testing for this country is twofold. On one hand, testing the overall transformation pipeline (including the XSLT transformation tool, the mapping from geospatial metadata to GeoDCAT-AP and the geoportal CSW output). On the other hand, testing the tagging of geospatial HVD metadata and their corresponding categories.

3.3.2 Preliminary work and experience

Denmark highlighted years of experience using the current and previous versions of GeoDCAT-AP and is willing to update its transformation setup to the current legal and technical context.

For the purpose of this pilot exercise, geospatial ISO 19115/19139 dataset metadata were transformed into DCAT-AP metadata using SAXON (Saxonica, 2024). After applying the transformation, a manual comparison of both the source and the output files was performed, finding several preliminary issues, which are included in this report.

The country initially tested the transformation of a limited number of metadata from national geoportal (geodata-info.dk) using the SEMIC XSLT transformation available at the time of the second pilot meeting, based on GeoDCAT-AP v3.

It is reported that the strict adherence to the mapping between the INSPIRE-theme keyword to HVD categories could likely create **false positives** and present issues for non-INSPIRE-HVD harvested from geoportals.

3.3.3 Initial expectations and proposals

Denmark's main interest is figuring out if its architecture is still viable in the current legal and technical requirements, i.e. creating stable links to open GeoDCAT-AP endpoints (transformed from the geoportal CSW) which can be harvested to the national open data portal.

The country is expecting:

- EU-wide shared tooling and recommendations to run the XSLT transformation, which could be used by different MSs.
- Metadata that can fulfil reporting obligations for both the INSPIRE Directive and the HVD Implementing Regulation.
- Definitive commonly agreed guidelines on HVD and license tagging, which prevents false positives.
- Rough sketch of better handling of data services outlined.

- Close correspondence between legal text and applicable profiles. As illustration, the DCAT-AP for HVDs profile (SEMIC, 2024d) incorporates requirements for metadata which cannot be identified in the HVD Implementing Regulation.

Danish participants also present some initial proposals:

- To map the ‘gmd:purpose’ ISO 19115/19139 metadata element to ‘dcat:description’ element in DCAT-AP / GeoDCAT-AP.
- Agree on a common way for tagging metadata as a HVD at legislation and category level. An input related proposal is available at <https://github.com/INSPIRE-MIF/hvd-inspire/issues/3>.
- Focus the pilot work on how to indicate the format(s) supported by each distribution.

3.4 France

3.4.1 Testing focus

The French national platform (data.gouv.fr) harvest other geographical catalogues using DCAT standards. As such, our main focus is to ensure ISO 19115/19139 INSPIRE metadata are correctly converted to (Geo)DCAT-AP for appropriate harvesting in the national catalogue. This national platform is also responsible for reporting High-value datasets at national and European levels via harvesting by data.europa.eu using DCAT.

3.4.2 Preliminary work and experience

In France, the ISO TO GeoDCAT-AP mapping has been compared and make sure no major regressions are in our current usage. Mapping to ‘dct:rights’ for usage conditions not specified as URLs is an improvement in the French workflow. Explicit URLs for licenses are available now. However, the data is not always INSPIRE-compliant, and the XSLT can not and probably should not deal with these non-conformant cases.

3.4.3 Initial expectations and proposals

The approach in France is to base the transformation on XSLT and to fix metadata upstream. This involves providing clear recommendations and adding tools to use small and specialized XSLTs. For example, we use tools like Isomorphe and specific XSLTs.

- Isomorphe (Ecolabdata, 2025a).
- XSLTs (Ecolabdata, 2025b).

France proposes to have a common repository to share these specialized XSLTs among Member States.

3.5 Italy

3.5.1 Testing focus

In Italy, GeoDCAT-AP is used to achieve an interoperable integration and coordination between the National Open Data Portal (dati.gov.it) and the National Catalogue for Spatial Data (RNDT). The aim

is also to ensure aligned, up-to-date and not conflicting descriptions of spatial data even available as open data. Indeed, spatial data, also available as open data, shall be only documented in RNDT (following the “once only” principle) according to the ISO/INSPIRE/Italian metadata profile. Afterwards, RNDT will make the metadata also available at the Italian Open Data Portal and, consequently, at data.europa.eu portal.

The testing focus for Italy is:

- Checking the application of the latest XSLT transformation script in order to assess impacts with respect to national extensions and to update the system described above.
- Testing a common approach for tagging HVDs to be compliant with the HVD Regulation.

3.5.2 Preliminary work and experience

Italy has a long experience in the definition and the application of GeoDCAT-AP specification. Representatives from Italy actively contributed as members of the Working Group established under the ISA² Programme and as editors to the first versions, and for the alignments between the controlled vocabularies used in ISO 19115 / INSPIRE metadata and those used in DCAT-AP.

A national extension of GeoDCAT-AP specification (named GeoDCAT-AP_IT) has been adopted in order to take into account the Italian extensions to the INSPIRE metadata profile and to DCAT-AP; an extended and customized XSLT script and the [GeoDCAT-AP_IT API](#) (by reusing and extending the one developed under the ISA² Programme) have been made available.

Preliminary tasks were:

- Tagging some datasets documented in the National Catalogue for Spatial Data as HVD.
- Updating the national XSLT script to add the transformation for HVD tagging.
- Applying the XSLT script made available by SEMIC.

3.5.3 Initial expectations and proposals

Regarding the pilot, Italy is expecting and proposes to:

- Have a common approach relevant for HVD reporting.
- Align the requirements for GeoDCAT-AP properties with those ones in DCAT-AP.
- Increase metadata quality.

3.6 Finland

3.6.1 Testing focus

In Finland, metadata for open geospatial data and services is harvested from the INSPIRE national metadata catalogue and discovery service to the national open data portal, OpenData.fi, and from there to the EDP.

As of November 2024, OpenData.fi has implemented Geo-DCAT-AP v2 and technically supports the provision of all six main High-Value Dataset (HVD) categories.

The National Land Survey of Finland (NLS-FI) is conducting the tests for Finland, focusing on the SEMIC XSL transformation and HVD reporting requirements. The metadata being tested in this pilot includes:

- 7 dataset metadata records describing geospatial datasets and dataset series.
- 9 service metadata records covering WMS, WCS, OGC API Features, OGC API Processes, and INSPIRE-ATOM services.

All metadata records pass the INSPIRE validator metadata tests (excluding Conformance Class 8: linked service metadata) and most have been tagged with HVD category and ELI code. Some of these metadata records are natively produced and other harvested from other metadata catalogues. Some are monolingual and other multilingual.

3.6.2 Preliminary work and experience

By the second pilot meeting, the SEMIC XSLT for converting ISO 19115/19139 XML (Extensible Markup Language) metadata to GeoDCAT-AP v3 was applied to the selected metadata records using either Altova XMLSpy or a custom command-line tool. The resulting RDF/XML files were transformed into HTML using the RDF to HTML tool (Rhizomik, 2025) and saved as PDFs for visual inspection.

Some RDF/XML records were manually edited to include the xmlns:dcatap=http://data.europa.eu/r5r/ namespace, along with the ‘dcatap:applicableLegislation’ and ‘dcatap:hvdCategory’ elements. These were then validated using SHACL against the DCAT-AP v3 specification on the EDP web site.

A side-by-side comparison of DCAT-AP for HVDs (SEMIC, 2024d), GeoDCAT-AP v3 (SEMIC, 2024b), and DCAT v3 (SEMIC, 2024a) revealed:

- In DCAT-AP for HVDs, ‘dcatap:hvdCategory’ and ‘dcatap:legislationApplication’ are mandatory for DataService, Dataset, and Distribution.
- In GeoDCAT-AP v3, ‘dcatap:applicableLegislation’ is optional for Dataset, DataService, and Distribution (though mandatory in DCAT-AP for HVDs), and also optional for DatasetSeries and Catalog (which are not covered in DCAT-AP for HVDs).

3.6.3 Initial expectations and proposals

Finland expects the following from the pilot:

- Improve the SEMIC XSLT collaboratively, to streamline HVD reporting and the provision of INSPIRE metadata to open data portals in general.
- Clarify the roles of service and dataset metadata, with the goal of reducing redundancy in HVD reporting.

3.7 The Netherlands

3.7.1 Testing focus

The aim of the Netherlands is to support the SEMIC community to release an improved GeoDCAT-AP v3 specification and XSLT transformation through these actions:

- Testing if the country can transform ISO-19115-NL compliant data to GeoDCAT-AP to fulfil HVD requirements.
- Testing to what extent the GeoDCAT-AP XSLT is usable for this task and if the XSLT is re-usable for the ISO-19115-NL to DCAT-AP-NL transformation.
- Examining GeoDCAT-AP and evaluate the DCAT-AP-NL compatibility with it.

3.7.2 Preliminary work and experience

Several tests have been performed on ISO-19115-NL compliant data from Dutch Nationaal Georegister (NGR), run through a Python based approach.

As a result, several Issues were submitted to the SEMIC GitHub repositories.

More details are available at:

https://github.com/Geonovum/ISO-2-DCAT/tree/main/geodcat_ap_3_xslt

3.7.3 Initial expectations and proposals

Regarding the pilot, the Netherlands is expecting:

- A common basis for transformation approaches.
- Clarity on conceptual level of the mapping between ISO-19115/19119 and GeoDCAT-AP, including a clear roadmap and vision on ISO-19139-to-DCAT-AP.xsl as transformation tool.
- To improve the usability and structure of the SHACL profile of GeoDCAT-AP.

3.8 Spain

3.8.1 Testing focus

The focus for Spanish tests is centred in the XSLT transformation

Tests were carried out using the proof-of-concept API that was available for GeoDCAT-AP v2 (SEMIC, 2025c):

- In the first transformations, errors were detected due to XML metadata (e.g. licence).
- HVD keywords were included in the metadata, although there are doubts on how to encode them in the XML schema.
- Compliance of the new HVD Implementing Regulation was also included as part of the tests.

The metadata used for the tests were extracted from the national INSPIRE geospatial metadata catalogue (Spanish Official Catalogue of INSPIRE Data and Services, CODSI), approximately 300 metadata records.

3.8.2 Preliminary work and experience

Spain is working on improving the XML metadata files, preparing them for the transformation to GeoDCAT-AP, particularly including:

- The HVD keywords, although the existing doubts on how to encode them in the XML schema.
- A single licence.
- The compliance to the HVD Implementing Regulation.

An example of HVD tagging using the ‘DQ_ConformanceResult’ ISO 19115/19139 metadata element is available at:

https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/blob/main/good-practices/hvd-tagging/inputs/Example_ES.jpg

3.8.3 Initial expectations and proposals

For further testing, Spain would find it useful to have available:

- An API (such as the previous proof of concept one) available to run the GeoDCAT-AP v3 XSLT transformation.
- Support on how to install / run the XSLT on GeoNetwork open source (e.g. a manual or tutorial).

3.9 Slovakia

3.9.1 Testing focus

The national Slovak open data catalogue (SK OpenData) is based on DCAT version 2.0. Support to version 3.0 is under development. At the time of writing, it is only supporting JSON-LD (JavaScript Object Notation for Linked Data) and Turtle RDF encodings.

The National open data metadata profile is based on DCAT version 3.0.

Regarding the Spatial Data Registry (SK INSPIRE), the transformation of INSPIRE/ISO metadata to DCAT/GeoDCAT is, at the time of writing, under development based on DCAT-AP documents using customised tools.

The focus of the testing in Slovakia is to check the compatibility of the GeoDCAT-AP v3 specification with the national DCAT-AP-based open data metadata profile. This also involved testing the XSLT transformation.

3.9.2 Preliminary work and experience

In Slovakia, a detailed analysis of the mapping of INSPIRE/ISO metadata to the DCAT-AP national metadata profile and the GeoDCAT-AP specification was performed.

The XML RDF encoding is not supported by National OpenData catalogue, at the time of writing.

Spatial Data Registry internally stores metadata in JSON format. JSON-LD encoding will be used for DCAT/GeoDCAT metadata. Approximately 1000 dataset records will be transformed.

The initial testing of the XSLT identified problems with the transformation of Distribution sections. These will be documented in GitHub.

3.9.3 Initial expectations and proposals

Slovakia is expecting from this pilot:

- A global agreement on RDF encoding exchange format (in XML, JSON-LD, Turtle RDF).
- A collection of use-cases, where GeoDCAT-AP v3.0 will deliver added value.
- Clarification on which EU and national client metadata apps will support GeoDCAT-AP v3.0.

3.10 Publications Office of the European Union

3.10.1 Testing focus

The OP manages the European Data Portal (data.europa.eu) (European Union, 2025a) that harvests both geospatial and non-geospatial data. The portal harvests geocatalogues via a component called 'Geoharvester', which maps ISO 19115/19139 to GeoDCAT-AP. The Geoharvester is developed and maintained by an external company, con terra.

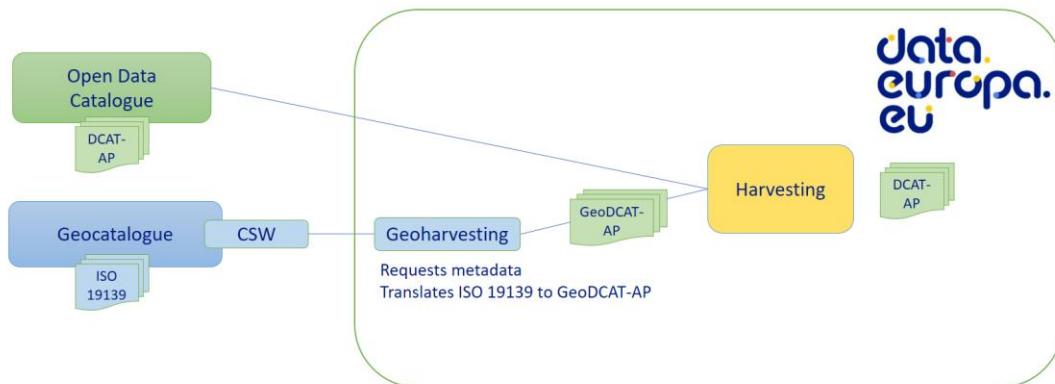
At the start of the pilot, in October 2024, the Geoharvester was still mapping to GeoDCAT-AP 2 and planned to be updated to GeoDCAT-AP v3. The plan was to implement the changes introduced in the SEMIC XSLT (<https://github.com/semiceu/iso-19139-to-dcat-ap/>) (SEMIC, 2024g). The new version would then be deployed on the European Data Portal's pre-production environment to be tested by harvesting from selected geocatalogues from the MSs.

3.10.2 Preliminary work and experience

Figure 2 shows how the EDP harvest data from MSs, from both national Open Data Portals / Catalogues and from national Geoportals / Geocatalogues. In the latter case, the Geoharvester requests metadata from national geocatalogues CSWs, translating the records from ISO 19115/19139 to GeoDCAT-AP. Afterwards, the Geoharvester exposes the resulting GeoDCAT-AP metadata making them available for the EDP harvesting component.

Figure 2. Harvesting from the European Data Portal (EDP) (data.europa.eu).

Harvesting for data.europa.eu



Source: Presentation from OP / con terra. Second meeting of the ISO & GeoDCAT-AP Pilot (20 November 2024).

The Geoharvester has its own XSLT transformation, which was aligned to GeoDCAT-AP v3 and deployed to the European Data Portal in January 2025.

Regarding the countries participating in the pilot at the second pilot meeting, the EDP harvest the geocatalogues from Italy, Denmark, the Netherlands, Slovakia and 3 regional ones from Spain. For Belgium and Finland, only the open data catalogues are harvested, since these two countries directly harvest geocatalogues from their open data portals. In January 2025, the Finnish geocatalogue was also included in the harvesting to meet the deadline for the HVD reporting. Due to the differences in ISO 19139 and (Geo)DCAT-AP, there is no obvious mapping that could be used for identifying HVDs in ISO 19139. Therefore, the tagging must be explicit. At the time of the second pilot meeting, in November 2024, there was no consensus on how to tag HVDs in ISO 19139 metadata.

Regarding how to derive the information on HVD from the ISO 19139 metadata, OP / con terra will not be assuming that all INSPIRE metadata of certain data themes are also HVD, to prevent the false positives. This concern was also raised by Denmark.

DCAT-AP HVD defines how '**applicableLegislation**' should be set to show which datasets are HVD (SEMIC, 2024e):

"The legislation that mandates the creation or management of the Dataset. For HVD the value must include the ELI http://data.europa.eu/eli/reg_impl/2023/138/oj".

While the information on the INSPIRE Directive could be derived from ISO 19139 INSPIRE metadata, this cannot be done for the Open Data Directive without making assumptions.

The HVD categories ('dcatap:hvdCategory') could have been derived from the INSPIRE Annex themes defined in the ISO metadata. However, because of OP / con terra's strong preference of avoiding assumptions, it was still to be decided if such a mapping would be implemented.

3.10.3 Initial expectations and proposals

In the context of the pilot, OP / con terra looks for the alignment of the Geoharvester to GeoDCAT-AP v3, as well as for the identification and resolution of any issues that may arise during the pilot, to harvest consistently geospatial HVDs into the European Data Portal.

OP / con terra can offer / provide transformed metadata in GeoDCAT-AP v3 (in XML) to any interested partners for testing.

3.11 Joint Research Centre

3.11.1 Testing focus

The aim of the JRC is to support the alignment of INSPIRE and High-value datasets in the context of the GrenData4All initiative.

As technical coordinators of the INSPIRE infrastructure, the JRC runs the INSPIRE Monitoring and Reporting (as per the INSPIRE Maintenance and Implementation Work Programme 2021-2024 and its extension), which will be integrated into the HVD reporting process in the near future. The final aim is to support MSs' metadata implementation to smooth this transition.

The focus of the testing from JRC will be therefore focused on assuring that geospatial INSPIRE-compliant metadata keeps consistency and compliancy with the legal framework after the transformation to GeoDCAT-AP v3.

For this purpose, a selected set of INSPIRE-compliant metadata records from the INSPIRE Geoportal (European Commission, 2025d) will be used. To ensure the representativeness of the metadata sample, a mix of metadata implementations making use of the traditional data-service-linking and the data-service-linking simplification approach, coming from a variety of sources (e.g. different endpoints / countries, and thematic domains), will be chosen.

3.11.2 Preliminary work and experience

The preliminary task performed by the JRC includes the revision of the GeoDCAT-AP 3 specification, providing comments in the period from July to September 2024.

As main role, the JRC will take care of the pilot organisation and management and running selected INSPIRE-compliant metadata testing. For the later purpose, a semi-automated transformation process is foreseen. Tools for testing have not been selected at the time of the second meeting of the pilot.

On the other hand, the JRC is and will be supporting the identification of examples on tagging HVDs, based on the inputs provided by different Member States. The goal is to promote an INSPIRE good practice on this matter.

3.11.3 Initial expectations and proposals

The main JRC expectations on the pilot are:

- Identifying the limitations of the XSLT transformation (e.g. DCAP-AP requirements for HVDs still missing in XSLT due to the lack of harmonized tagging in geospatial metadata).

- Understanding the difficulties in validating geospatial metadata in GeoDCAT-AP v3.
- Evaluating INSPIRE compliancy after the transformation to GeoDCAT-AP, in the current absence of ad-hoc tools available for this purpose. Manual tests will be probably needed, which means also fuzzy testing outcomes.

At the beginning of the pilot, the JRC proposes:

- To open an inventory of related good practices from MSs, focused on geospatial HVD tagging practices (but not only) at: <https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/tree/main/good-practices>
- Promote the potential update of the GeoDCAT-AP Proof-of-Concept API, if it is demonstrated to be useful for MSs: <https://geodcat-ap.semico.eu/api/>
- Identify the best tools available to run the XSLT transformation in an automated way, and possibly draft related recommendations.

4 Pilot results

This section presents the results achieved by each participant of the pilot during the pilot testing. For each participant, a summary of results and the enumeration of the issues identified is provided, with references to the corresponding GitHub repositories.

A summary table, including all the issues posted by the pilot participants, is referenced at the end of the Section 4.12.

4.1 Belgium (Flanders)

4.1.1 Summary of results

BE-Flanders have led the working group for the development of a DCAT schema plugin for GeoNetwork open source. Particularly, the team has developed a plugin based on DCAT-AP 2 that is currently being embedded in the GeoNetwork core branch of this open source software. Thus, it is available for other organisations willing to test and/or reuse it.

As part of this work, the team has contributed to the migration from DCAT-AP 2 to DCAT-AP 3. Implementation of the migration in GeoNetwork already started.

BE-Flanders team has extensively contributed to the sharing of views and agreement of the geospatial HVD tagging good practice, establishing active synergies of the previously mentioned working group (mainly during sprints 3 and 4) with the ISO & GeoDCAT-AP pilot.

4.1.2 Issues identified

The DCAT schema plugin for GeoNetwork working group collected the issues related to the plugin at <https://github.com/metadata101/dcat-ap/issues> (Metadata101, 2025).

4.2 Czech Republic

4.2.1 Summary of results

The Czech ISO 19115/19139 Metadata Profile is complex. Czech Republic could use the XSLT in this environment after some adjustments.

The country is planning to simplify this profile to increase compatibility with DCAT-AP. As part of this work, a detailed mapping of the national INSPIRE profile to GeoDCAT will be carried out.

4.2.2 Issues identified

Most of the issues identified with the transformation are connected to the national extension of the INSPIRE metadata profile:

- XSLT - transformation failed because of the bilingualism of the gmd:country item

<https://github.com/SEMICeu/GeoDCAT-AP/issues/148>

- More than one dataset identifier

<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/71>

- Duplicity of schema:startDate/schema:endDate after transformation
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/72>.

4.3 Denmark

4.3.1 Summary of results

Denmark intensively worked towards the HVD reporting on 9 February 2025, with the goal to get the corresponding datasets on the EDP (data.europa.eu). A qualitative analysis of the reporting progress, barriers, measures taken, etc. has been performed as part of this work.

Tagging of geospatial HVD datasets on the Danish geoportal continued in line with the good practice agreed in the context of the pilot (i.e. using Anchor encoding keywords).

The country is looking forward to the answers / solutions to the fundamental questions/issues identified through this pilot.

4.3.2 Issues identified

Two overall approaches were considered during the pilot:

- Pipeline transforming CSW ISO metadata to DCAT in CKAN using the SEMIC XSLT Transformation (service + mapping), which was already in place before the pilot.

The problem of this pipeline is that the SEMIC Proof of Concept API for using the transformation is neither updated to GeoDCAT-AP 3 nor maintained in the SEMIC repository. No similar alternative was identified.

- Pipeline transforming CSW ISO metadata to DCAT (using GeoNetwork 4.4.6+), subsequently harvested to CKAN using a ‘CSW header remover’.

The problem of this pipeline is that the CKAN harvester is not able to process/ignore csw:GetRecordsResponse element (among other things) around the RDF elements in the XML file.

In the short-term, manual fixes will be performed. In the medium-term, a Proxy script solution to remove unwanted CSW wrapping will be used.

As a long-term solution, perhaps new functionality could be added in GeoNetwork v5.x, together with a different DMS for the Danish portal, considering the revision of INSPIRE.

In the future:

- A third approach that could perhaps work in the future: using the getAsRdf function in GeoNetwork – Example: <https://geodata-info.dk/doc/api/index.html#/records/getAsRdf>.

The main issues identified are:

- How to map ‘gmd:purpose’ element? Suggested to be also mapped to dcat:description (like is it the case for ‘gmd:abstract’)
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/70>.
- All formats (‘gmd:distributionFormat’) are listed in each dcat:Distribution

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/8>.

- Transformation to LandingPage: ‘dcat:landingPage’ is identified by missing ‘OnlineFunctionCode’ in ISO 19115 metadata. This is by not optimal and to provide a missing ‘OnlineFunctionCode’ is not sufficiently supported by data catalogue platforms today. The option to select an empty code was not intended by ISO 19115, which is understandable.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/9>

4.3.3 Conclusions

Demark appreciates to have common agreement on how to tag HVD in INSPIRE metadata, although it remains to be implemented into the mapping and the related transformation.

There is a need for coordination / documentation of semantic transformation assets in GeoNetwork and the standalone SEMIC GeoDCAT-AP specification / mapping, in case they diverge.

The approach to be used for Data Services remains a challenge and needs further discussions.

4.4 France

4.4.1 Summary of results

France have not encountered major regression in actual usage of the transformation.

Mapping of usage conditions to ‘dct:rights’, when they are not specified as URIs is an improvement in the workflow. The country is now applying explicit URIs for licenses.

French data is not always INSPIRE-compliant and the XSLT transformation cannot and should probably not deal with these non-conforming cases.

4.4.2 Issues identified

The main issue that France identified is:

- Improve the mapping to ‘dcat:Distribution’

<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/57>.

4.4.3 Conclusions

The French approach is to base the national transformation on the XSLT and to fix metadata upstream, by giving clear recommendations and adding specific tooling to use small and specialized XSLT:

- Isomorphe (Ecolabdata, 2025a): <https://github.com/ecolabdata/ecospheres-isomorphe>
- XSLTs (Ecolabdata, 2025b): <https://github.com/ecolabdata/ecospheres-xslt/tree/main/xslts>

A common repository to share these specialized/national XSLT transformation from Member States could be useful.

4.5 Italy

4.5.1 Summary of results

In the context of the pilot, a test was made on metadata records published in the national spatial catalogue (using a test environment), also including the encodings for the agreed HVD tagging.

Some issues were encountered and are described in the following section. No transformation is made with respect to the geospatial HVD tagging.

4.5.2 Issues identified

- Add ‘HVD category’ and ‘documentation’ properties related to HVDs in GeoDCAT-AP 3.0.

<https://github.com/SEMICeu/GeoDCAT-AP/issues/147>.

- Align vocabulary for the ‘accessRights’ property.

DCAT-AP refers to the Access Rights Named Authority List – relevant for metadata quality assessment in the EDP.

<https://github.com/SEMICeu/GeoDCAT-AP/issues/150>.

- For 1 bounding box in ISO XML, 4 instances of ‘locn:geometry’ and 4 instances of ‘dcat:bbox’ are provided after the transformation.

<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/76>.

- Only WFS and WMS services are considered in the transformation as Distribution. A direct URL for downloading the dataset is not considered, although relevant for bulk download required for HVDs.

<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/74>

4.5.3 Conclusions

It would be useful to have a unique and complete specification (and a corresponding XSLT script) also including the missing properties relevant for the HVD reporting.

The properties coming from the DCAT-AP High-value datasets and not yet included in the GeoDCAT-AP specification should be added there to have metadata records compliant with the HVD Regulation.

4.6 Finland

4.6.1 Summary of results

Finland focused on testing the SEMIC XSLT transformation for INSPIRE-compliant HVD metadata. While Altova XMLSpy was initially planned for use, instability led to the adoption of alternative tools, including a command-line utility, the Online XSLT Test Tool, and FreeFormatter.com (Canada Inc, 2025). The main effort was on iteratively applying the SEMIC XSLT and analysing the transformed outputs.

National metadata was adjusted during the pilot to improve the SEMIC XSLT transformation results and the transformed metadata visible in European Data Portal (EDP). HVD tagging — using the ELI code and main category as defined in the Good Practice — was applied to metadata maintained in the national portal. A harvester was also set up to harvest metadata from the national metadata catalogue to the EDP.

The pilot also revealed national-level issues and deficits in metadata content. The Finnish open data portal needs to better support Anchor-form keywords and ensure that ELI codes are preserved in the national DCAT profile. There is insufficient quality and use of some metadata elements (e.g. protocol and functions) in the Finnish INSPIRE metadata, which are needed for the transformations (SEMIC XSLT, Geoharvester by EDP/con terra).

4.6.2 Issues identified

Finland raised several technical and conceptual issues during the pilot, contributing actively to discussions in the GeoDCAT-AP pilot repository (SEMIC, 2025a) and related SEMIC and INSPIRE repositories.

Metadata Encoding and HVD Tagging:

- Finland proposed making ‘dcatap:hvdCategory’ optional in GeoDCAT-AP v3 and in the SEMIC XSLT transformation.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/3>

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/2>

- Clarification is needed on the role of service metadata in HVD reporting and its treatment in the EDP.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/4>

Metadata Transformation / XSLT Enhancements:

- The XSLT could handle Anchor-form keywords in a better way, e.g., adding labels like “Geospatial”.

<https://github.com/SEMICeu/GeoDCAT-AP/issues/134>

- Keywords sometimes appear duplicated in transformed files.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/6>

- Namespace and standards handling needs refinement.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/5>

- Improvements are needed in the mapping to Distribution, LandingPage, and Documentation elements.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/9>

- Issues faced when transforming service and multilingual metadata.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/11>

SHACL Validation Challenges:

- The XSLT currently produces multiple geometries and bounding boxes, causing shacl:violation errors. Only one of each should be extracted.

<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/78>

- The Geoharvester developed by con terra extracts only one geometry and bounding box, which aligns better with present SHACL rules. Additional violations were observed related to identifiers, titles, access rights, and cardinality.

Specification and Registry Feedback:

- Further discussion is needed on whether other than HVD legislation references should be treated as regular keywords or mapped to applicableLegislation in (Geo)DCAT-AP.

<https://github.com/INSPIRE-MIF/helpdesk-registry/issues/115>

4.6.3 Conclusions

The pilot work in Finland highlighted both progress and challenges in transforming INSPIRE-compliant metadata to GeoDCAT-AP v3. While initial testing of the SEMIC XSLT transformation provided valuable insights, further work is needed — particularly after updates are made based on current feedback. A deeper analysis of potential content loss during transformation and more robust SHACL validation testing are also required.

The role of service metadata in HVD reporting remains unclear. This should be further explored and clarified.

Several open issues also remain, which should be addressed through standardization efforts (e.g. ISO/TC 211) and interaction between communities (e.g. GeoNetwork, SEMIC/DCAT-AP, INSPIRE). Regular coordination meetings and a clearly defined process owner are essential for moving forward.

Given the diversity in national metadata practices, flexible and low-effort transformation solutions are key. Without this, metadata quality and reuse may suffer. Common guidelines, tools, and a central repository for transformation resources can support consistency.

4.7 The Netherlands

4.7.1 Summary of results

The Netherlands created a structured way of testing the XSLT and the GeoDCAT-AP profile with jupyter notebook: https://github.com/Geonovum/ISO-2-DCAT/tree/main/geodcat_ap_3_xslt

During this process, the Netherlands have gained insight into how the transformations work and the issues that still exist to properly implement the transformation for the country.

4.7.2 Issues identified

The following issues / proposals are the result of the testing from the Netherlands.

XSLT v2 support in Python:

- The only XSL transformer to support XSLT v2 seems to be the Saxon processor. The 'standard' python xml modules (lxml or ElementTree) only support v1. It would be good to make this very clear in the instructions how to use the XSLT. If you're new to the XSLT world the difference between v1 and v2 are not immediately clear, things seem to work but you get unexpected results.

Once this is clear, it is relatively straightforward to use Saxon for XSLT v2 support in Python.

XSLT modularity and version management:

- The GeoDCAT-AP XSLT is written as one massive XSLT file. While this is a 'simple' approach in reusing templates and functions within the file, the file itself becomes very large and complex to understand. A more modular approach might provide more flexibility in supporting different scenarios.
- It is not immediately obvious from the repository structure which XSLT is applicable to GeoDCAT-AP 3.0.0 and whether there are previous versions or not. We would have expected branches or folders for separate versions for example.

ISO-19139-to-dcat-ap XSLT-related issues:

- blank nodes for distribution, dataservice and catalogrecord:
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/58>.
- mapping of Distribution and DataService:
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/59>.
- 'MD_Keywords' to 'dcat:theme' transformation is incomplete:
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/60>.
- 'dcat:CatalogRecord' should always have a 'foaf:primaryTopic':
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/63>.
- multiple geometry serialisations for 'dcat:bbox':
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/64>.
- clarify the statement on usage for HVD datasets:
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/66>.
- transformation of 'dct:license':
<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/68>.

GeoDCAT-AP SHACL design:

- The choice for one massive SHACL file with all constraints makes it quite complex to understand the file. The design decision to use UUIDs (Universally Unique Identifiers) for the unique identification of individual SHACL constraints might make sense for a 'computer generated' approach, but it does diminish readability of the file. The original design of DCAT-AP with separate files for the different aspects can also be done with UUIDs.

GeoDCAT-AP issues:

- Misalignment between GeoDCAT-AP ‘dct:Standard’ properties and XSLT transformation rules.
<https://github.com/SEMICeu/GeoDCAT-AP/issues/141>.
- Create the GeoDCAT-AP SHACL file as an extension to the DCAT-AP SHACL file:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/142>.
- Guidance on the use of ‘prov:qualifiedAttribution’ on Dataset would be welcome:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/143>.
- A.7.13 Spatial resolution - text and provided example are confusing:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/144>.
- Conflicting namespace prefix in geodcat-ap-SHACL.ttl:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/145>.
- Controlled vocabulary to be used for adms:representationTechnique:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/137>.
- Controlled vocabulary Theme:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/138>.
- A.7.4 Resource locator - On-line resource:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/139>.
- A.7.6 Coupled resource:
<https://github.com/SEMICeu/GeoDCAT-AP/issues/140>.

4.7.3 Conclusions

The Netherlands detected several issues in the XSLT transformation and the SHACL validation. Regular meetings and substantive discussions about possible solutions are needed for reaching consensus and solving the issues. At the moment, different XSLT transformation are used by EDP, SEMIC, GeoNetwork and the Member States. A joint approach to achieving one transformation saves resources and prevents substantive deviations. A modular structure of transformation and validation files (SHACL) can be used to support various domain-specific and Member State-specific adjustments.

4.8 Spain

4.8.1 Summary of results

The Spanish Official Catalogue of INSPIRE Data and Services (CODSI) has 286 HVDs on geospatial, earth observation, environment and mobility classified, which have been transformed to GeoDCAT using a Python script using the SEMIC XSLT (SEMIC, 2024g).

The process to assign HVD category keywords was performed for many of these resources but is pending for some.

4.8.2 Issues identified

- Managing multiple languages - If a dataset has more than one language, only the first one is kept.

<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/52>.

- ‘gmd:purpose’ to ‘dct:description’ - If in the ISO file there is an abstract and a purpose, in GeoDCAT the purpose is lost. In ‘dct:description’ only the abstract is recognized.

<https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/70>.

- Transformation: HVD Category - When transforming from ISO to RDF, the INSPIRE and HVD keywords are not in the RDF file.

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues/7>.

- Add ‘HVD category’ and ‘documentation’ properties related to High-value datasets.

<https://github.com/SEMICeu/GeoDCAT-AP/issues/147>.

4.8.3 Conclusions

Spain found that the transformation to ISO metadata to GeoDCAT using an ad-hoc Python is easy and simple.

There were errors in the GeoDCAT files that still do not know if could be prevented with corrections in the ISO metadata, or they are due to XSLT errors.

There were some concerns about the first HVDs reporting of GeoDCAT metadata to EDP on 9 February 2025.

GeoDCAT-AP does not have the richness of ISO metadata. There are ISO metadata elements that are not in the INSPIRE Metadata Regulation. That is, they are not mandatory and will disappear in the GeoDCAT-AP format. For example: ‘purpose’ or ‘supplementalInformation’ ISO elements.

4.9 Slovakia

4.9.1 Summary of results

Slovakia successfully integrated the Spatial data registry into the National Open data catalogue (<https://rpi.gov.sk/api/opendata/katalog.json>).

Custom development tools were used, based on JSON data structures of input metadata, because the Slovak national open data portal does not support RDF XML format.

DCAT v3.0 (World Wide Web Consortium, 2024) was implemented at the Spatial data registry. The national open data catalogue is still only supporting DCAT 2.0.

Support to GeoDCAT extension is in process. It is currently available in a development environment. For the moment, only JSON-LD and Turtle RDF encodings are supported.

4.9.2 Issues identified

There is a need to clarify whether also metadata for datasets semantically falling under the Open Data / HVDs, but not yet INSPIRE harmonized, shall be made available via GeoDCAT-AP.

GeoDCAT is not yet supported at the national open data portal, which could be a problem for reporting of ‘spatial’ open data.

Pilot resulting metadata should be made visible via main target portals (INSPIRE EU and EDP) and discuss the usability of the content visible using such graphical user interfaces.

4.9.3 Conclusions

Some input metadata still needs to be updated to fulfil all requirements of the National Profile as well as for GeoDCAT.

There is problem about ‘Double registration’ of the same datasets: the National Open Data portal need to remove datasets already registered in the Spatial Data Registry.

Currently, only metadata from the Slovak Ministry of Environment are made available. Other data providers will be engaged as soon as possible.

For the moment, service metadata files were skipped as in input for the transformation. All the services information is currently obtained from the ‘GetCapabilities’ of the services.

As main message, if possible, a recommendation for the future shift from XML to JSON is requested.

4.10 Publications Office of the European Union

4.10.1 Summary of results

The Geoharvester was updated to GeoDCAT-AP 3, including the implementation of the geospatial HVD tagging good practice. The system uses its own XSLT transformation, now aligned to GeoDCAT-AP 3. This update was deployed on the European Data Portal production environment on January 31, 2025.

The XSLT of the Geoharvester is available on GitLab (data.europa.eu, 2025a):

<https://gitlab.com/dataeuropa/geo-harvesting/-/blob/master/src/main/resources/iso2dcat.xsl>

Tests were conducted in the European Data Portal’s (data.europa.eu) pre-production environment, mainly looking into validation issues using a DCAT-AP validator (European Commission, 2025e).

Identification of HVDs and their categories is considering the agreements of the geospatial HVD tagging good practice proposal, based on the keyword element with ‘Anchor’ encodings (INSPIRE-MIF, 2025b).

A description of the geospatial HVD tagging can be found in the documentation of the European Data Portal (data.europa.eu, 2025b).

For the Member States participating in this pilot, we checked which geocatalogues are being harvested by the European Data Portal and whether the metadata includes the HVD tagging that will lead to the metadata sets being identified as HVD (see Table 1). This exercise shows that most pilot participants tag their HVDs in their ISO metadata according to the recommendation. The

Member States where no HVD are detected most likely do not use their geocatalogues for describing HVDs.

Table 1. Harvested geocatalogues from participating Member States (April 2025).

Country	European Data Portal	HVD detected	CSW
Spain (ES)	Catálogo Oficial de Datos Y Servicios INSPIRE (CODSI) https://data.europa.eu/data/catalogues/codsi?locale=en	yes	https://www.idee.es/csw-codsi-idee/srv/spa/csw?request=GetCapabilities&service=CSW&version=2.0.2
Netherlands (NL)	National Georegister of the Netherlands: https://data.europa.eu/data/catalogues/ngr-nl?locale=en	yes	https://www.nationaalgeoregister.nl/geonetwork/srv/dut/csw?service=CSW&Request=GetCapabilities
Finland (FI)	Paikkatietohakemisto https://data.europa.eu/data/catalogues/paikkatietohakemisto?locale=en	yes	https://www.paikkatietohakemisto.fi/geonetwork/hvd/fi/n/csw?SERVICE=CSW&REQUEST=GetCapabilities
Finland (FI)	Finnisch Meteorological Institute https://data.europa.eu/data/catalogues/fmi	yes	http://catalog.fmi.fi/geonetwork/srv/en/csw?SERVICE=CSW&REQUEST=GetCapabilities
Denmark (DK)	Danske Geoportal: https://data.europa.eu/data/catalogues/geodata-info-dk?locale=en	yes	https://geodata-info.dk/srv/eng/csw?service=CSW&Request=GetCapabilites&version=2.0.2
Slovakia (SK)	INSPIRE Discovery Service Slovakia: https://data.europa.eu/data/catalogues/csw-sk?locale=en	no	https://zbgisws.skgeodesy.sk/zbgiscsw/Service.svc/post
France (FR)	Geocatalogue France: https://data.europa.eu/data/catalogues/geocatalogue-fr?locale=en	no	https://www.geocatalogue.fr/api-public/services/inspire/CSWSERVICE.CSWSERVICEPORT/
Czech Republic (CZ)	INSPIRE Geoportal of the Czech Republic https://data.europa.eu/data/catalogues/geoportal-cr?locale=en	no	https://micka.cenia.cz/csw?service=CSW&Request=GetCapabilities&version=2.0.2
Italy (IT)	Italian Catalogue of metadata for Spatial Data https://data.europa.eu/data/catalogues/rndt?locale=en	no	https://geodati.gov.it/RNDT/csw?service=CSW&Request=GetCapabilities&version=2.0.2

Source: Table created for the purpose of this pilot

4.10.2 Issues identified

Related to HVD ‘applicableLegislation’ element:

- Current metadata records are either using the required European Legislation Identifier ELI http://data.europa.eu/eli/reg_impl/2023/138/oj or URLs (https://eur-lex.europa.eu/eli/reg_impl/2023/138/oj or <https://op.europa.eu/web/eu-vocabularies/concept/>)

[/resource?uri=http://data.europa.eu/bna/c_83aa10a6](https://resource?uri=http://data.europa.eu/bna/c_83aa10a6)) to reference the HVD Implementing Regulation through the ‘applicableLegislation’ element.

- OP was asked to also map the other URLs because it would have been difficult for the MS to change the metadata to the correct ELI, so the Geoharvester maps these URLs to the expected ELI.

Some of the issues identified cannot be solved:

- HVDs need to be accessible via an API. However, not all ISO metadata have an OnlineResource digital transfer option of ‘download’ type to be mapped as service distribution. In ISO 19115/19139 the links for datasets defined in *gmd:distributionInfo/gmd:MD_Distribution/gmd:transferOptions* are mapped to different fields in the DCAT-AP representation of the metadata depending on the codeListValue defined in the ‘*gmd:function*’ element. The GeoDCAT-AP specification (SEMIC, 2024c) specifies this in the following table:

Table 2. GeoDCAT-AP ISO OnlineResource vs. DCAT distribution.

ISO 19115 – CI_OnlineFunctionCode	Property	Domain	Range
(not provided)	dcat:landingPage	dcat:Dataset	foaf:Document
download	dcat:accessURL	dcat:Distribution	rdfs:Resource
Information	foaf:page	dcat:Dataset	foaf:Document
offlineAccess	dcat:accessURL	dcat:Distribution	rdfs:Resource
order	dcat:accessURL	dcat:Distribution	rdfs:Resource
search	foaf:page	dcat:Dataset	foaf:Document

Source: <https://semiceu.github.io/GeoDCAT-AP/releases/3.0.0/#resource-locator---on-line-resource>

Only ‘*gmd:transferOptions*’ with the codeListValues ‘download’, ‘offlineAccess’ or ‘order’ are mapped to distributions. ‘*gmd:transferOptions*’ with the codeListValues ‘information’ or ‘search’ are mapped as ‘*foaf:page*’. If no ‘*gmd:function*’ element is defined the links are mapped as ‘*dcat:landingPage*’. These links still exist in the metadata but are not displayed as distributions in the EDP.

- As described above, the HVD tagging good practice proposal defines that HVDs are tagged in ISO metadata using the “keyword” element with Anchor encoding. However, keywords are dataset-level elements that are not available to describe individual distributions inside the dataset. Hence, it is not possible to apply the proposed HVD tagging to individual distributions in the ISO metadata. In contrast, the corresponding element *applicableLegislation* in DCAT-AP can and should be used for distributions that are identified in the scope of HVD (SEMIC, 2024f). As a result, different distributions of the same dataset in DCAT-AP can have different applicable legislations. E.g. one distribution could have the *applicableLegislation* http://data.europa.eu/eli/reg_impl/2023/138/oj (HVD) while the second one could have <http://data.europa.eu/eli/dir/2007/2/oj> (INSPIRE). This is not possible in ISO metadata. As a workaround, the Geoharvester adds the *applicableLegislation* to all distributions of the dataset when the dataset is tagged as HVD in ISO metadata.

4.10.3 Conclusions

As expected, the OP / con terra encountered some difficulties due to the differences in ISO 19139 and GeoDCAT-AP and found solutions to work around these. It was considered helpful to have the participants of the pilot as a ‘sounding board’ for the recommendation of the HVD tagging, and also learn from the difficulties they encountered and shared in the meetings or on GitHub.

4.11 Joint Research Centre

4.11.1 Summary of results

The JRC revised the GeoDCAT-AP 3 specification, providing comments and potential enhancements in the period from July to September 2024.

The organisation has also organised and managed the pilot, leading the meetings, and engaging with participants to progress and deliver results. All this work is available at the Pilot repository (INSPIRE-MIF, 2025a): <https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot>

Additionally, JRC has pushed for the preparation, clarification, formalisation and potential endorsement of the good practice on geospatial High-value datasets tagging, which is ready for endorsement.

4.11.2 Issues identified

The JRC has applied the XSLT transformation, using the FreeFormatter online transformation tool (Canada Inc, 2025), to a selected set of INSPIRE-compliant metadata records extracted from the INSPIRE Geoportal. A total of ten metadata records from Austria (AT), Croatia (HR) and Malta (MT) – Member States not participating in the pilot – and Spain (ES), trying to select different thematic domains, have been selected.

The analysis of the results is still pending and will be published on GitHub as issues in an eventual continuation of the pilot

4.11.3 Conclusions

There is a need to push participants to continue publishing their findings on GitHub, which is a pre-requirement for further analyses and reporting the issues to SEMIC.

The first phase of the pilot has identified an initial but relevant set of issues. Working meetings and discussions have been actively promoted in this period, which allowed participants to acquire a common and more integrated vision, evaluate existing of issues and the quality of the XSLT transformation.

Further analysis and conclusions will be promoted in an eventual continuation of the pilot, beyond June 2025.

4.12 Summary table

A summary table, including all the issues posted by the pilot participants, is available at:

https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/blob/main/final-report/ISO-GeoDCAT-AP_Pilot_issues_v3_FinalReport.xlsx

5 High-Value geospatial dataset tagging good practice

The specification of the geospatial HVD tagging good practice developed and agreed in the context of this pilot, including reference implementation examples, are available at:

<https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/tree/main/good-practices/hvd-tagging>

It was proposed for endorsement by the INSPIRE MIG-T at the 82nd INSPIRE MIG-T Meeting (European Commission, 2025b), on 27 June 2025, coinciding with the end of the first phase of the pilot.

6 Conclusions

Pilot testing confirmed the feasibility of migrating ISO 19139 metadata to DCAT-AP for HVD reporting, ensuring interoperability between INSPIRE and open data portals.

A case study from BE-Flanders is available and demonstrated 85% automation success in bidirectional mapping (ISO ↔ DCAT-AP), reducing manual efforts for dual compliance.

Pilot outcomes are summarised below:

- Successful collaborative experience.
- The most tangible result is the agreement on how to tag geospatial High-value datasets (HVDs) in metadata. A Good Practice has been made available and was endorsed by the INSPIRE community in the 82nd INSPIRE MIG-T meeting (European Commission, 2025b).
- Several mappings and transformations to GeoDCAT-AP exist: the one from the SEMIC community, national transformations and other ad-hoc transformation embedded in existing software solutions) - Coordination and documentation are necessary. It is proposed to set a common repository to share these assets between Member States. A more coordinated conceptual approach and management of the XSLT transformations would be welcomed by Member States.
- Some Member States have expressed a potential need to retain legislative references within GeoDCAT-AP metadata. Further discussion with the community is needed to determine the best approach—potentially by leveraging the INSPIRE Priority Data Sets code list.
- Approach for Data Services remains a challenge:
 - There is a need to analyse if the Data-service linking simplification is compatible with a comprehensive service description in (Geo)DCAT. Discussions are still ongoing
 - data.europa.eu harvests ISO service metadata ('hierarchyLevel' service) so they will display as data services, but there is no connection to other metadata on corresponding datasets ('hierarchyLevel' dataset). The use of relationship between datasets and distributions in DCAT should be considered.
- As illustrated by the previous bullet, from an HVD-compliance perspective, it would be welcome to perform a holistic analysis of the current changing context: the revision of INSPIRE under the GreenData4All, the legal requirements on HVDs and related reporting obligations, the current INSPIRE metadata technical guidelines, the IT systems/websites involved, as well as the harvesting of metadata and the reporting of HVDs made possible through the EDP.
- There is a need to provide more guidance on how to describe API endpoints in ISO metadata, including service types.
- Several discrepancies have been identified between attributes that exist at the distribution level in DCAT-AP vs. the dataset level in ISO, e.g. data formats and licenses.
- Further testing is needed to evaluate loss of information for INSPIRE-compliant metadata records when transformed to GeoDCAT-AP.

- A timely update of the SEMIC XSLT transformation, the SHACL shapes used for validation, and the GeoDCAT-AP specification, are highly expected by the pilot participants. These updates need to be coordinated with SEMIC.
- Issues identified during the pilot should be fed into relevant standardisation efforts, to make standards evolve in a pragmatic manner. Some issues can be soon addressed by the ISO TC211 19115-1/5 project group.

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List of abbreviations and definitions

Abbreviations	Definitions
BE-Flanders	Belgium - Flanders
CZ	Czech Republic
DCAT	Data Catalog Vocabulary
DCAT-AP	DCAT Application Profile for data portals in Europe
DIGIT	European Commission Directorate-General for Digital Services
DK	Denmark
EDP	European Data Portal, data.europa.eu
ENV	European Commission Directorate-General for Environment
ES	Spain
FI	Finland
FR	France
GeoDCAT-AP	Geospatial extension of the DCAT Application Profile for data portals in Europe
HVD	High-Value Datasets
INSPIRE	Infrastructure for Spatial Information in the European Community
ISO	International Organization for Standardization
IT	Italy
JRC	European Commission Directorate-General Joint Research Centre
JSON-LD	JavaScript Object Notation for Linked Data

Abbreviations	Definitions
MIG-T	INSPIRE Maintenance and Implementation – Technical Sub-group
MS	Member State/s
NL	The Netherlands
OP	Publications Office of the European Union
SHACL	Shapes Constraint Language
SK	Slovakia
UUID	Universally Unique Identifier
XLST	Extensible Stylesheet Language Transformation
XML	Extensible Markup Language

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