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Abstract

Max. 1550 characters with spaces.

Give, in up to five sentences, the most important conclusions, key facts and figures.

Include also a sentence or two on the policy relevance of the work.

It is to be used for eye-catching, newspaper type headlines to attract the reader.

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Please consult the [Interinstitutional Style Guide](http://publications.europa.eu/code/en/en-000500.htm) for drafting your report. It contains uniform stylistic rules and conventions which must be used by all the institutions, bodies, offices and agencies of the European Union. It is available in 24 EU languages, and is obligatory for all those involved in document production.

Acknowledgements

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Authors

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Executive summary

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Policy context

Typically around 130 words – up to maximum of 800 characters with spaces, reduced pro rata when graphics used

* What broader and then specific EU (ongoing) policy/political/legislative issue does the report address? For example, does it support a specific Directive, Regulation, or does it support EU industrial policy and then specifically advanced manufacturing? This is essential to ensure that a policy colleague(s) can straightaway determine its relevance to them.
* For who was the report done and, if applicable, with whom (e.g. external collaborators)?
* Is it relevant to a possible new policy or a current policy measure that has been proposed or to the implementation of a current policy?
* What is the issue(s) at stake? Are the stakes high?
* What does the report add (added value) to previous policy support work?
* Why is the report relevant now, e.g. is it to inform an upcoming or ongoing political (or media) debate or issue?
* Is it relevant to policies other than the one it was carried out to support, i.e. are there conclusions of more general application to several policies? If so, indicate which ones.

Key conclusions

Typically 350 words – maximum 2200 characters with spaces, excluding any graphics

* What are the main policy-relevant consequences of, or recommendations arising from, your findings for the policy/measure in question?
* What policy options could be proposed arising from your analysis?
* Have the main assumptions behind the existing policy or measures been confirmed or overturned?
* Has a new problem been identified? Should new policy measures be considered?
* Does the problem statement need to be adjusted?
* Have some additional impacts or alternative options been identified?
* Do the costs and benefits of the existing options need to be re-assessed?
* Are there potentially new innovations that could arise? What potential risks could there be to such innovations (not) being undertaken?
* What significant knowledge gaps and uncertainties still remain that are relevant for policy in this field?
* Has the report served to change the level of uncertainties?

Main findings

Typically 300 words – maximum 1850 characters with spaces, excluding any graphics

* Summarise the main findings, results from the work, including relevant data. Use (question) sub-headings for specific (sub-)topics.
* Use images, infographics, tables and graphs as much as possible.

Related and future JRC work

Typically 50 words – maximum 300 characters with spaces, excluding any graphics

* What other work by the JRC is relevant to this topic?
* What will be the follow-up or next steps from this report, including from a policy perspective (e.g. in regard to an upcoming new legislative proposal)?

**Recommendations for drafting an Executive Summary**

* The main target audience for an Executive Summary are (senior) policy colleagues across the Commission.
* Picture a Commissioner or Director-General having 10 minutes to read the Executive Summary only before discussing the topic at a meeting. They will want very concisely the main policy-relevant outcomes and do not want the details of how you came to your results/conclusions (they will trust that the JRC does this correctly).
* The Executive Summary should "tell a story," i.e. have a clear and relevant narrative.
* Use the questions in each section to guide you in your drafting to developing a narrative. Do not answer consecutively each question.
* Do not be overly technical. Use language that a non-specialist reader would understand and would want to read, e.g. do not overly use technical terms or acronyms and, if used, define these in the Overview section.
* Write it with a view that if a (non-expert) reader wishes to learn more, they can go to the (relevant section of the) report.
* When drafting, follow the Keep It Short and Simple (KISS) and "Less is More" approaches and put yourself in the shoes of the reader.
* Use (question) sub-headings to break up the text.
* Ask yourself, would the target audience reader find the information relevant and understandable?
* Ask a colleague with no knowledge of the report's content to read a draft then question them to see if they received the messages you want to convey.
* Use bullet points plus bold (sparsely!) to highlight key words, facts and figures.
* Therefore, the total number of words in the Abstract and Executive summary should be around 950 words, i.e. never exceed 6200 characters with spaces.
* The headings in this section and their order must not be changed, although you may modify the text of the sub-headings.

1. Introduction and purpose

As part of the GreenData4All initiative (REF), aimed at modernising the rules governing European environmental geospatial data sharing under the INSPIRE Directive (REF), their implementation is being aligned to the one of the Open Data Directive (REF) and its Implementing Act (Commission Implementing Regulation (EU) 2023/138) on open data High-Value Datasets (HVDs) (REF).

To support the overall objective of data interoperability, this alignment is purposed for 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) (REF).

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 (REF) and the European Data Union strategy (REF).

* 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 (REF) specification in October 2024.

It 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 and its related XSLT transformation (REF) (implementing the specification mapping) were open to public review until the end of September 2024.

* 1. 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.

1. Pilot description
   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.
  1. 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 Publication 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 (REF) and final publisher of these data, including a dedicated page on European HVDs (REF - https://data.europa.eu/data/datasets?is\_hvd=true&locale=en).
* 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.
  1. Outputs and Results

The following outputs and results are expected 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 (REF) and the XSLT transformation repository (REF), 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 **HVD geospatial tagging candidate good practice**, to smooth its potential endorsement by the INSPIRE MIG-T.

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.

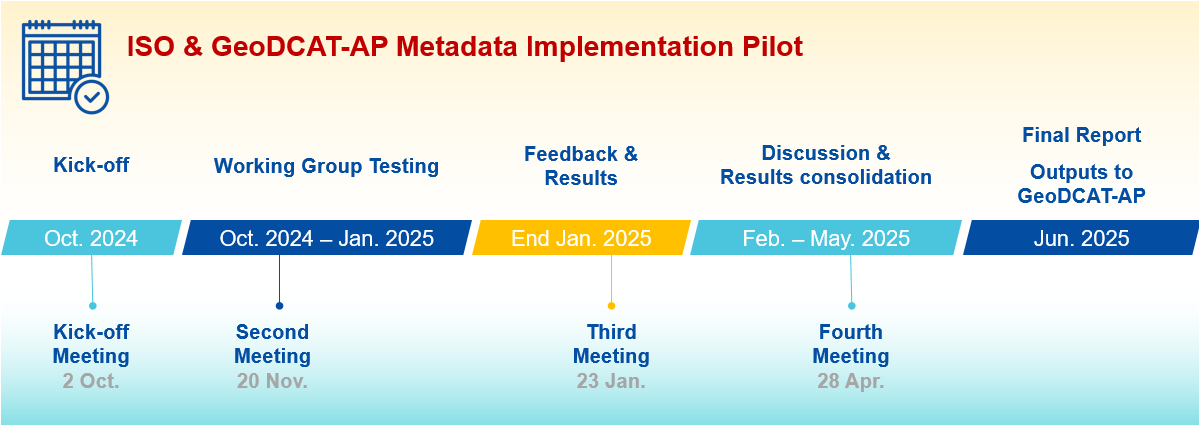
* 1. Expected benefits

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 open data DCAT format (GeoDCAT-AP), easing them their reporting through the open data HVDs 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 (REF), 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.
  1. 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.

* 1. Pilot repository

A GitHub repository 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>

1. Background, initial expectations and proposals

During the second meeting hold 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 / 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 these information for each of the participants.

* 1. Belgium (Flanders)
     1. Testing focus

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

* + 1. Preliminary work and experience

Belgium Flanders is leading a joint-effort working group to implement a DCAT schema plugin for GeoNetwork open source. 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 Fladers 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 elements. Encoding example in ISO and DCAT native format are available.

* + 1. 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.

* 1. Czech Republic
     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 then 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 and it also implements the HVD extension.

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

* + 1. 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.

* + 1. 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.

* 1. Denmark
     1. Testing focus

In Denmark, the national geoportal (geodata-info.dk) stores metadata records based on the ISO 19115-3 metadata standard. Later on, 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 (REF).

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://datavejviser.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.

* + 1. 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 (REF). 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.

* + 1. 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 XLST transformation, which could be used by different MSs.
* Metadata that can fulfill 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 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.
  1. France

France started its participation in the pilot after the second meeting.

Please, complete your contribution on expectations here (if needed)

* 1. Italy

Progress report not available.

Please, complete your contribution on expectations here (if needed)

* 1. Finland
     1. Testing focus

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

Opendata.fi has already (11/2024) implemented Geo-DCAT-AP v2 and technical supports the use of the 6 main HVD categories. The Finnish open data portal team is not participating in this pilot. The tests are carried out by the National Land Survey of Finland (NLS-FI).

NLS-FI focuses its testing on the SEMIC XSL transformation and the requirements for HVD-reporting.

The characteristics of the metadata to be tested in this pilot are summarised below:

* Natively produced and harvested metadata that passes the INSPIRE-validator tests, despite Conformance Class 8 (INSPIRE data set and dataset series linked service metadata).
* Monolingual and multilingual metadata records.
* 9 service metadata records, describing WMS, WCS, OGC API Features, OGC API Processes, and INSPIRE-ATOM services.
* 7 dataset metadata records, describing geospatial dataset and dataset series
* Most of the metadata have been marked with HVD information (HVD Category and ELI-code).
  + 1. Preliminary work and experience

The SEMIC XSLT supporting translation to version GeoDCAT-AP v3 was run for a selected set of ISO 19115/19139 files in XML format using either Altova XMLSpy ([XML Editor: XMLSpy | Altova](https://www.altova.com/xmlspy-xml-editor)) or an ad-hoc Command line tool to convert them to GeoDCAT-AP v3. The RDF2HTML tool (rhizomik.net/html/redefer/rdf2html-form/) was used to transform the XML/RDF-files to html and saved as PDF to support visual analysis.

Both the XML/RDF and XSL files were manually altered to include the xmlns:dcatap=http://data.europa.eu/r5r/ namespace, as well as dcatap:applicableLegislation and dcatap:hvdCategory to a few metadata records.

A few SHACL Validation runs against DCAT-AP v3 had also been run at the time of the second pilot meeting.

Additionally, a side-by-side comparison of the DCAT-AP for HVDs, GeoDCAT v3 and DCAT v3 specification was performed, noticing that:

* In DCAT-AP for HVDs: the dcatap:hvdCategory and dcatap:legislationApplication elements are mandatory for DataService, Dataset and Distribution.
* In GeoDCAT-AP v3: the dcatap:applicableLegislation element is optional for Dataset, DataService, Distribution (being mandatory in DCAT-AP for HVDs) and also for DatasetSeries and Catalog (being missing in DCAT-AP for HVDs).
  + 1. Initial expectations and proposals

Regarding the pilot, Finland is expecting:

* To learn about and to improve the SEMIC XSLT (https://github.com/semiceu/iso-19139-to-dcat-ap/) together to achieve a smooth process of HVD-reporting and provision of INSPIRE metadata to Open Data portals in the future.
* To get a clarification on the role of the service versus metadata in general and to avoid redundancy in HVD reporting. The country also has some initial proposals regarding different aspects based on of experiences so far:
* Metadata encoding:
  + Willing to have a unified way to denote datasets as HVDs in metadata so that to have a common XSLT, which supports HVD-reporting.
* Metadata transformation / XSL amendment:
  + It would be of value if the XSLT would also add Labels or Keywords, such as ‘Geospatial’ to the transformed file when transformining descriptive keywords in Anchor form from a thesaurus. Very little information is retrieved by XSLT from keywords in Anchor form <https://github.com/SEMICeu/GeoDCAT-AP/issues/134>.
  + The XSL should put the hvdCategory URIs, labels and the ELI-code in the/one right places in the RDF file.
  + The INSPIRE priority data set code list hosted in the INSPIRE Registry could be updated with the Open Data Directive (ODD) / HVD legislation and the ELI-code to be reused by the XSLT.
* Regarding SHACL Validation of a couple of transformed XML/RDF files against DCAT-AP v3 the following observed:
  + The XSL transformation produces multiple geometries and bounding boxes. With present SHACL rules, the XSL would need to be amended to retrieve only one geometry and one bounding box (bbox), otherwise you get a shacl:violation, i.e. the transformed XML/RDF file won’t pass the validation.
  + Shacl:violations related to identifiers, title and accessRights emerged.
  + Shacl:warnings related to invalid cardinality and one related to http://data.europa.eu/bna/c\_ac64a52d​ emerged.
* Support the usage of the XSLT as an API. The GeoDCAT-AP v2 XSLT was available as an API.
* Regarding the GeoDCAT-AP 3 specification, add also dcatap:hvdCategory as optional.
  1. The Netherlands
     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.
  + 1. Preliminary work and experience

Several tests have been performed on ISO-19115-NL compliant data from Dutch Nederlandse Geodetische Referentie (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>

* + 1. 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.
  1. Spain
     1. Testing focus

The focus for Spanish tests are centred in the XSLT transformation

Tests were carried out using the proof of concept API that was available for GeoDCAT-AP v2 (https://geodcat-ap.semic.eu/api/ - REF):

* 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 (CODSI), approximately 300 metadata records.

* + 1. 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>

* + 1. 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).
  1. Slovakia
     1. Testing focus

The national Slovak open data cataloque (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 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.

* + 1. 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 cataloque, 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.

* + 1. 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.
  1. Publications Office of the European Union
     1. Testing focus

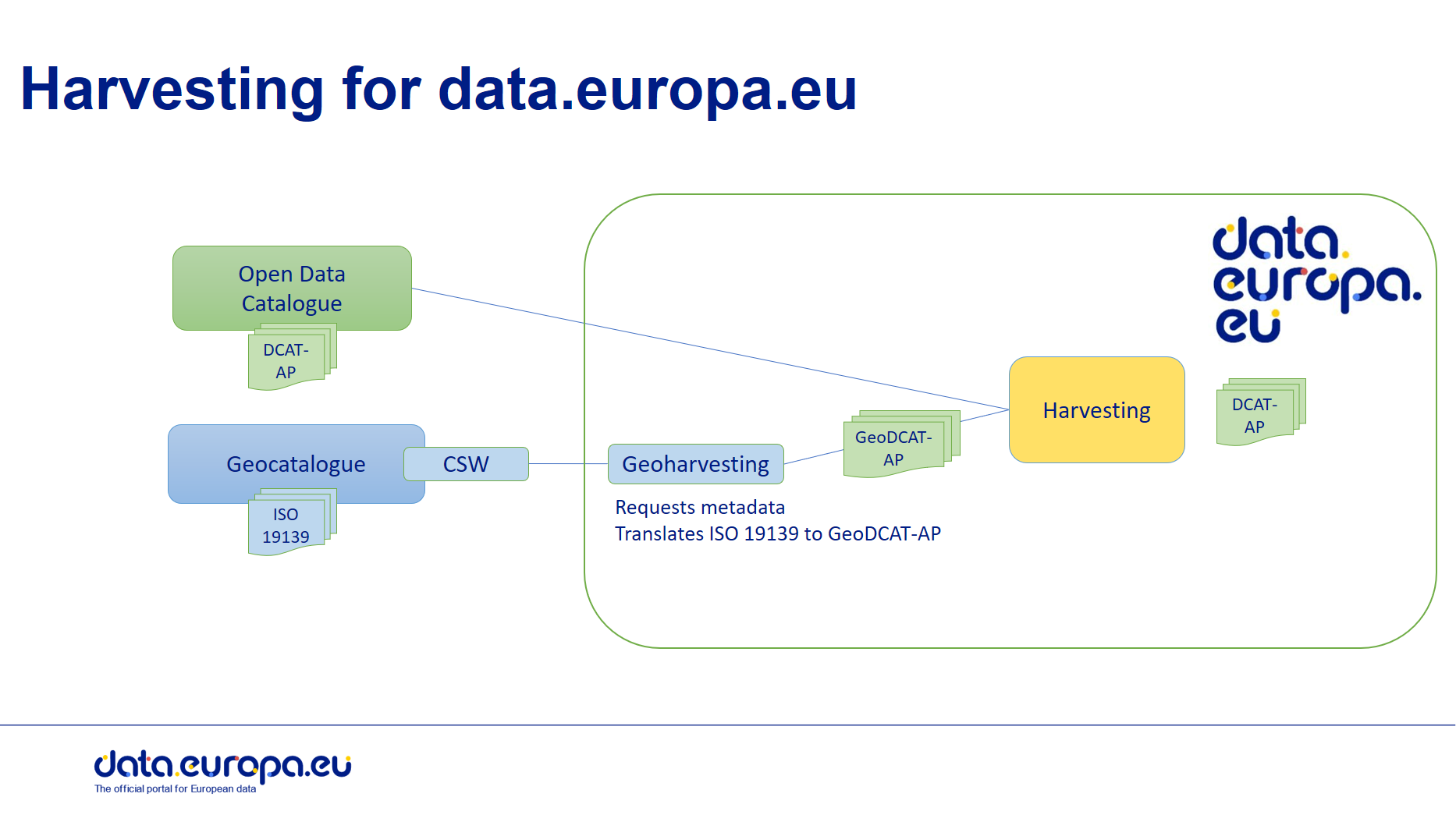
The OP manages the European Data Portal (data.europa.eu) (REF) that harvests both geospatial and non-geospatial data. t The portal harvests geocatalogues via a component called ‘Geoharvester’, which maps ISO 19115/19139 to GeoDCAT-AP., through an external company, con terra.

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/) (REF). 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.

* + 1. 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).



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.

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 ([[1]](#footnote-1)):

“*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 for the Open Data Directive without making assumptions.

For the HVD categories (dcatap:hvdCategory) it is still to be decided if any mapping will be implemented.

* + 1. 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, in order 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.

* 1. Joint Research Centre
     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 (https://inspire-geoportal.ec.europa.eu) 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.

* + 1. 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.

* + 1. 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 HVD geospatial 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.semic.eu/api/>
* Identify the best tools available to run the XSLT transformation in an automated way, and possibly draft related recommendations.

1. 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 for all participants is compiled at the end of the section.

* 1. Belgium (Flanders)
     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 HVD geospatial tagging good practice candidate, establishing active synergies of the previously mentioned working group (mainly during sprints 3 and 4) with the ISO & GeoDCAT-AP pilot.

* + 1. 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>.

* 1. Czech Republic
     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.

* + 1. 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>.

* 1. Denmark
     1. Summary of results

Denmark intensively worked towards the HVD reporting on 9 February 2025, with the goal to get the corresponding datasets on 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 candidate 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.

* + 1. 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, taking into account 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](https://geodata-info.dk/doc/api/index.html" \l "/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>

* + 1. 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.

* 1. France
     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.

* + 1. 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>.

* + 1. 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: <https://github.com/ecolabdata/ecospheres-isomorphe>
* XSLTs: <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.

* 1. Italy
     1. Summary of results

Italy has long experience in the application of GeoDCAT-AP. The national catalogue for spatial data also includes a ‘GeoDCAT-AP\_IT’ API (<https://geodati.gov.it/geodcat-ap_it/>) that is based on a XSLT customized script linked to the national metadata profiles.

The API and the XSLT script have been used for years to publish metadata from the spatial data catalogue (<https://geodati.gov.it>) to the open data portal (<https://dati.gov.it>).

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.

* + 1. 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.

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

* + 1. 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.

Two proposals for consideration:

* Align the requirements for GeoDCAT-AP properties with those ones in DCAT-AP (e.g. for accessRights).
* Take into account the optional properties (e.g. downloadURL) considered in the Metadata Quality Assessment (MQA) tool available in the EDP in order to increase the metadata quality.
  1. Finland
     1. Summary of results

The focus of the testing was to run the XSLT Transformation for INSPIRE compliant metadata. The plan was to use Altova XMLSpy for the transformations, but as it was unstable we used a Commandline tool, the Online XSLT Test Tool and the Free Online XSL Transformer (XSLT) - FreeFormatter.com in addition. We focused on using the SEMIC XSLT and analysing the transformed files. During the pilot, we did changes to our metadata to get better results in the SEMIC XSLT transformations and in EDP.

The HVD-tagging agreed in the Good Practice candidate, that is the eli-code and the HVD main category, was put in place for metadata maintained natively in the national metadata portal. During the pilot a harvester harvesting HVD metadata from our national metadata portal was added to the EDP. We analysed the results in EDP and made changes to our metadata to better fill the requirements of the geoharvester and HVD reporting. We also tried to use the geoharvester developed by con terra used in EDP alone as an XSLT but could not get it to work in the XSLT tools that we used and did not have time to try to resolve them.

The work also allowed identifying national issues. For example, development is needed in the national Open Data Portal to identify Anchors as keywords and to map the eli-code in such a way to the national profile so that it is preserved in the national DCAT pilot. Only then can these be further be remapped to the metadata profile of the EDP. In addition, some metadata portals that the national metadata portal is harvesting from only supports the provision of ‘CharacterString’ encodings, which can be solved before the next round of HVD reporting for example by adding XSL transformations to the harvesters.

* + 1. Issues identified

Finland raised some issues and questions for internal discussion at https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues, particularly

* Exchanges and proposals related to the HVD-tagging good practice and the XSLT transformation.

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

* Proposal to add ‘hvdCategory’ as optional in GeoDCAT-AP 3.0 and in the XSL transformation.

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

* XSLT Transformation: The same key words emerge twice.

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

* XSLT Transformation: namespaces and standards.

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

* Role of service metadata in the EDP, in HVD-reporting and in this pilot?

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

* Transformation: Distribution, LandingPage and Documentation

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

* Have you faced issues when transforming service and multilingual metadata? Service metadata and multilingual metadata could only be transformed with the core option. Multilingual metadata could not be transformed with the majority of tools tested.

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

They were posted in the pilot repository as there was a need for more exchange, investigation and interaction between participants in the pilot regarding specific issues.

Finland also contributed to discussions raised by others and raised issues in the SEMIC and INSPIRE repositories, for example

* Issues related to the transformation of identifiers. The intention of the XSLT is to transform both the *file identifier* and the *unique resource identifier* from the ISO metadata. It may be that the unique resource identifiers is transformed only if it is of type CharacterString, not if it’s Anchor. The *parent identifier* is not extracted/transformed by the XSLT.

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

* The role of the Priority dataset code list. There is a need to discuss it as the code list/thesaurus contains the ELI-codes to a wide variety of European environmental legislation. Should legislations be mapped as a regular keywords (theme, subject) or to the applicableLegislation in DCAT-AP in the future?

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

* The SEMIC XSLT produces multiple geometries and bounding boxes. With present SHACL rules, the XSL would need to be amended to retrieve only one geometry and one bounding box (bbox), otherwise you get a shacl:violation, i.e. the transformed XML/RDF file won’t pass the validationNote: the geoharvester developed by Conterra only extracts one of each (locn:geometry, dcat:bbox)).
  + 1. Conclusions

There is a need to continue the work. Particularly, more work must be done after the SEMIC transformation has been updated based on feedback so far. In the pilot work, we mainly looked at the transformed file contents, but did not really have the time to analyse possible contents loss on a whole. There is also a need to develop and test SHACL tests.

The role of service metadata is not yet clear. From HVD reporting point of view it might be even more cost-efficient to do it with service metadata, if such exist. This should be further investigated, and the role of service data should be clarified.

Open issues also remain. Some of the issues can be fed into the ongoing work of the ISO TC211 19115-1/5 project group, but some issues require further discussions, some with other relevant communities. Regular online meetings with central players may be needed to resolve them. Work should continue and there is a need for a clear owner of the process ahead and a plan on how to proceed.

Metadata maintenance strategies and implementations differ from data providers and countries. These are costly to change. It is important to have recommendations and an as flexible as possible joint transformation that only requires a minimum of efforts by MS to be followed and used. Otherwise, we risk having a big variety of solutions and encodings, which may risk smooth re-use of metadata. Guidelines and tools are needed to support the transition. A lot of transformations are emerging, which may not be avoidable. A common repository is needed where they can be linked and shared, so that someone could trace and maintain a summary of their differences to ease re-use.

Additional suggestions are to provide the XSLT transformation to GeoDCAT-AP v.3 as an API as GeoDCAT-AP v2 was and to consider working towards a GeoDCAT-AP 3.0 encoding Good Practice for different kinds for metadata types to support harmonised implementations.

* 1. The Netherlands
     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.

* + 1. Issues identified

The Netherlands raised some issues and questions for discussion.

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 validation-related 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>.

* + 1. 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 DEU, 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.

* 1. Spain
     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 (<https://github.com/SEMICeu/iso-19139-to-dcat-ap>).

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

* + 1. 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>.

* + 1. 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.

* 1. Slovakia
     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 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 current currently available in a development environment. At the moment, only JSON-LD and Turtle RDF encodings are supported.

* + 1. 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.

* + 1. 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.

At 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.

* 1. Publications Office of the European Union
     1. Summary of results

The Geoharvester was updated to GeoDCAT-AP 3, including the implementation of the HVD geospatial 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: [REF] https://gitlab.com/dataeuropa/geo-harvesting/-/blob/master/src/main/resources/iso2dcat.xsl

Tests were conducted in data.europa.eu’s pre-production environment, mainly looking into validation issues using a DCAT-AP validator (https://www.itb.ec.europa.eu/shacl/dcat-ap/).

Identification of HVDs and their categories is taking into account the agreements of the HVD tagging good practice proposal, based on the keyword element with ‘Anchor’ encodings (https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/blob/main/good-practices/hvd-tagging/CANDIDATE-ISO\_HVD\_Tagging\_Anchor\_Non-Multilingual-clarification.xml)

A description of the HVD tagging can be found in the documentation of the European Data Portal [REF] https://dataeuropa.gitlab.io/data-provider-manual/hvd/annotation\_in\_geometadata/

For the Member States participation 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/fin/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=GetCapabilities&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.

* + 1. 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>) 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 ([REC] <https://semiceu.github.io/GeoDCAT-AP/releases/3.0.0/#resource-locator---on-line-resource>) specifies this in the following table:

**Table 2.** GeoDCAT-AP ISO OnlineRecource 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, highlight added.

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 data.europa portal.

* 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 (see https://semiceu.github.io/DCAT-AP/releases/3.0.0-hvd/#denoting-a-hvd-dataset). 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.
  + 1. 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.

* 1. Joint Research Centre
     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.

Additionally, JRC has pushed for the preparation, clarification and potential endorsement of the candidate good practice on High-Value geospatial Datasets tagging, which at the time of the fourth meeting of the pilot is ready for endorsement.

* + 1. Issues identified

The JRC is still working to transform a selected set of INSPIRE-compliant metadata records from the INSPIRE Geoportal.

Results of this analysis / tests will be published on GitHub as issues. Metadata records to be analysed will be selected preferably from Member States not participating in the pilot, and scoped to different thematic domains.

* + 1. Conclusions

There is a need to push participants to publish some of their findings on GitHub, which is a pre-requirement for further analyses and reporting to SEMIC.

Further working meetings and discussions are expected to deliver a common and more integrated vision, evaluation of issues and quality of the XSLT transformation.

Further conclusions could be derived by June 2025.

1. High-Value geospatial dataset tagging good practice

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1. Conclusions

Pilot testing confirmed the feasibility of cross walking 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.

* 1. Pilot outcomes:
* Successful collaborative experience.
* Adoption of OGC API-Features reduced service maintenance costs by 30% in pilot countries, streamlining data access and updates.
* The most tangible result is the agreement on how to tag geospatial High-Value Datasets (HVDs) in metadata. A Good Practice candidate is available ready for potential endorsement by the community in the 82nd INSPIRE MIG-T meeting.
* 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 necessary. It is proposed to set a common repository to share these assets between Member States.
* Some Member States have concerns about the consistency between the current INSPIRE priority datasets codelist and the HVD categories / subcategories. This topic should be further discussed by the community.
* 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.
* There is a need to provide more guidance on how to describe API endpoints in ISO metadata, including service types.
* 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 and SHACL shapes used for validation is highly expected by the pilot participants. This need to be coordinated with SEMIC.

References

This section should contain complete list of citations in the report. Please see below for some examples.

Examples of references, presented according to the rules of the Interinstitutional style guide (<http://publications.europa.eu/code/en/en-250904.htm>):

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(Citing an article in a periodical):

Bagchi, A., ‘Conflicting nationalisms: the voice of the subaltern in Mahasweta Devi’s Bashai Tudu’, Tulsa Studies in Women's Literature, Vol. 15, No 1, Tulsa, 1996, pp. 41-50.

(Citing a report):

European Commission, Joint Research Centre, Stepniak, M., Cheimariotis, I., Lodi, C., Rataj, M., Zawieska, J., Grosso, M. and Marotta, A., *Research and Innovation on Drones in Europe,* Publications Office of the European Union, Luxembourg, 2024, https://data.europa.eu/doi/10.2760/02357, JRC137334.

List of abbreviations and definitions

|  |  |
| --- | --- |
| Abbreviations | Definitions |
| ABΓ | Alpha Beta Gamma |
| ΔΕΖ | Delta Epsilon Zeta Delta Epsilon Zeta Delta Epsilon Zeta Delta Epsilon Zeta Delta Epsilon Zeta Delta Epsilon Zeta |
| ΗΘΙ | Eta Theta Iota |

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Annexes <optional>

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Each annex has a numbered title. They do not start on new pages.

Back cover to be added

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1. () DCAT-AP HVD “applicable legislation” [https://semiceu.github.io/DCAT-AP/releases/2.2.0-hvd/#DataService.applicablelegislation](https://semiceu.github.io/DCAT-AP/releases/2.2.0-hvd/" \l "DataService.applicablelegislation) [↑](#footnote-ref-1)