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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

List of authors…

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 Commission Implementing Regulation (EU) 2023/138 on open data High-Value Datasets (HVDs) (REF).

This alignment is purposed for facilitating the integration of reporting obligations into a common data flow in the scope of the open data community, centralised on the European Data Portal (EDP) (REF).

Ultimately, the process is expected to minimise the implementation burden on Member States’ (MSs) data providers, while assuring compliance to the provisions set by these Directives and to the 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 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.

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 and published on XXX.

* 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.
* Others? – To be complete based on the related presentations (General and specific objectives)
* Mention the HVD Tagging good practice candidate.
  1. Pilot participants

The following stakeholders actively participated in this pilot testing:

* The 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), managing the EDP (REF), as future receptor of GeoDCAT-AP-based metadata and re-user of the XSLT transformation.
* The European Commission Directorate-General for Digital Services (DIGIT), through its SEMIC group, as point of contact for resolving and contributing to solutions when 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 the how the transformation help data providers in keeping compliance to the applicable legal framework.
* Definition and agreement on the HVD tagging candidate good practice, to smooth its potential endorsement by the INSPIRE MIG-T.
* Complete – Others?

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.

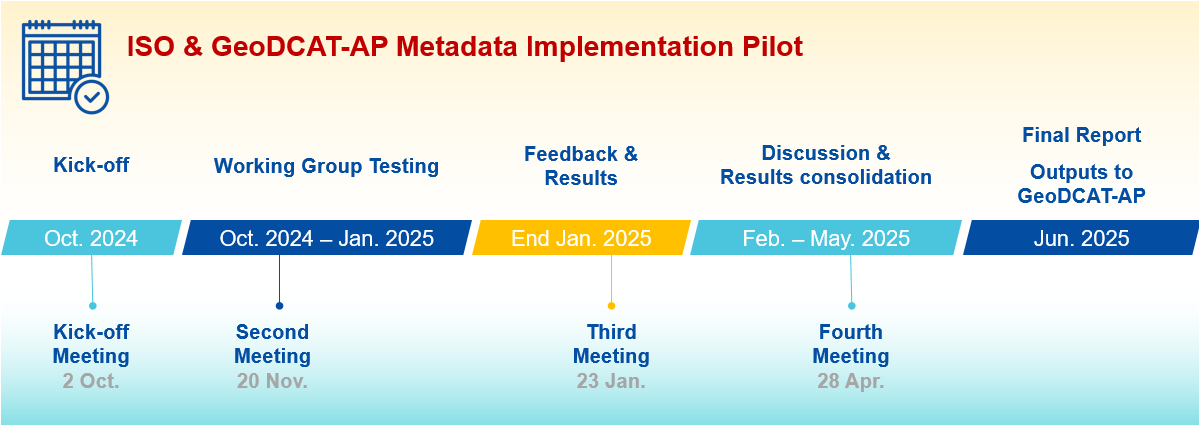
* 1. Expected benefits

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 channel their geospatial metadata descriptions through the open data reporting flow, easing them the reporting of HVDs.
* The (OP), responsible for the EDP (REF), will be able to harvest metadata with increased quality, minimising information losses and potential issues in extracting the results of HVD reporting process.
* 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.
* Complete – Others?
  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 summarises these information items 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 pluging 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 ishighlighted, so that the real implementation examples prepared with the GeoNetwork plugin can be tested during the pilot.

* 1. Czech Republic

Czech Republic was unable to participate in the Second Meeting of the pilot.

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

* 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. Once in that portal, the metadata information is transferred to the EDP (REF).

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 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 infrastructure to the current legal and technical context.

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 seconf pilot meeting (the version based on GeoDCAT-AP v2 or 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 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 are harvested from the INSPIRE national discovery service to the the national open data portal (OpenData.fi), and from there on further to the EDP.

Opendata.fi has implemented Geo-DCAT-AP v2, supports the use of 6 HVD categories. The Finish open data portal not participating in this pilot. The National Land Survey of Finland (NLS-FI) does it.

NLS-FI focuses its testing the 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).
* Available as both monolingual and multilingual metadata records.
* 9 service metadata records, of type WMS, WCS, OGC API Features, OGC API Processes, and INSPIRE-ATOM.
* 7 dataset metadata records (including geospatial dataset and dataset series)
* Majority of metadata include hvdCategory and ELI-code making use of two thesaurus.
  + 1. Preliminary work and experience

The XSL transformation (the version based on GeoDCAT-AP v2 or v3 ?) has been tested for a selected set of ISO 19115/19139 files in XMLformat using either XMLSpy (REF) or an ad-hoc commandline tool to convert them to DCAT-AP.

RDF2HTML tool has been also used to transform the RDF-files to html to be saved as PDF.

Both the XML/RDF and XSL files were 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.

SHACL Validation against DCAT-AP v3 also started 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 3: the dcatap:applicableLegislation element is optional for Dataset, DataService, Distribution (being mandatory in DCAT-AP for HVDs); also for DatasetSeries and Catalog (being missing in DCAT-AP for HVDs).
  + 1. Initial expectations and proposals

Regarding the pilot, Finland is expecting:

* Learning and improving together to achieve a smooth HVD-reporting process in the future.
* To get a clarification on the role of the service metadata. Are these metadata needed for the HVD-reporting?

The country also has some initial proposals regarding different aspects:

* Metadata encoding:
  + Willing to have a unified way to denote datasets as HVDs in their metadata.
* Metadata transformation / XSL amendment:
  + It would be probably of value if the XSL would also add Labels or Keywords, such as ‘Geospatial’.
  + The XSL could be extracting information from several hvdCategory elements (cardinality 0..\*) when a hvdCategory thesaurus is in use (CharacterString or Anchor).
  + The XSL should put the hvdCategory URIs, labels and the ELI-code in the/one right place(s) in the RDF file.
  + The INSPIRE priority data set codelist hosted in the INSPIRE Registry could be updated with the Open Data Discovery (ODD) / HVD legislation and the ELI-code to be reused by the XSL (this would not be necessary if the XSL can be built so that if hvdCategory information exist, then also ELI-code is put in automatically).
* Regarding SHACL Validation against DCAT-AP v3:
  + Amend XSL to retrieve only one geometry and one bounding box (bbox), otherwise shacl:violation.
  + Add a shacl:violation related to the identifiers, title and accessRights.
  + Many shacl:warnings related to invalid cardinality.
* Perhaps it would make sense to use of recommended keyword: rdfs: Literal [0..\*] for some keywords.
* It would be desiderable to support the use of the XSL as an API.
* Regarding the GeoDCAT-AP 3 specification, it is suggested to 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 fulfill 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 NGR, run through a Python based approach.

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

More details area 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 the existing 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 fro 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 EDP (data.europa.eu) (REF) through con terra. The portal harvests geocatalogues via a component called ‘geoharvester’, which currently maps ISO 19115/19139 to GeoDCAT-AP v2.

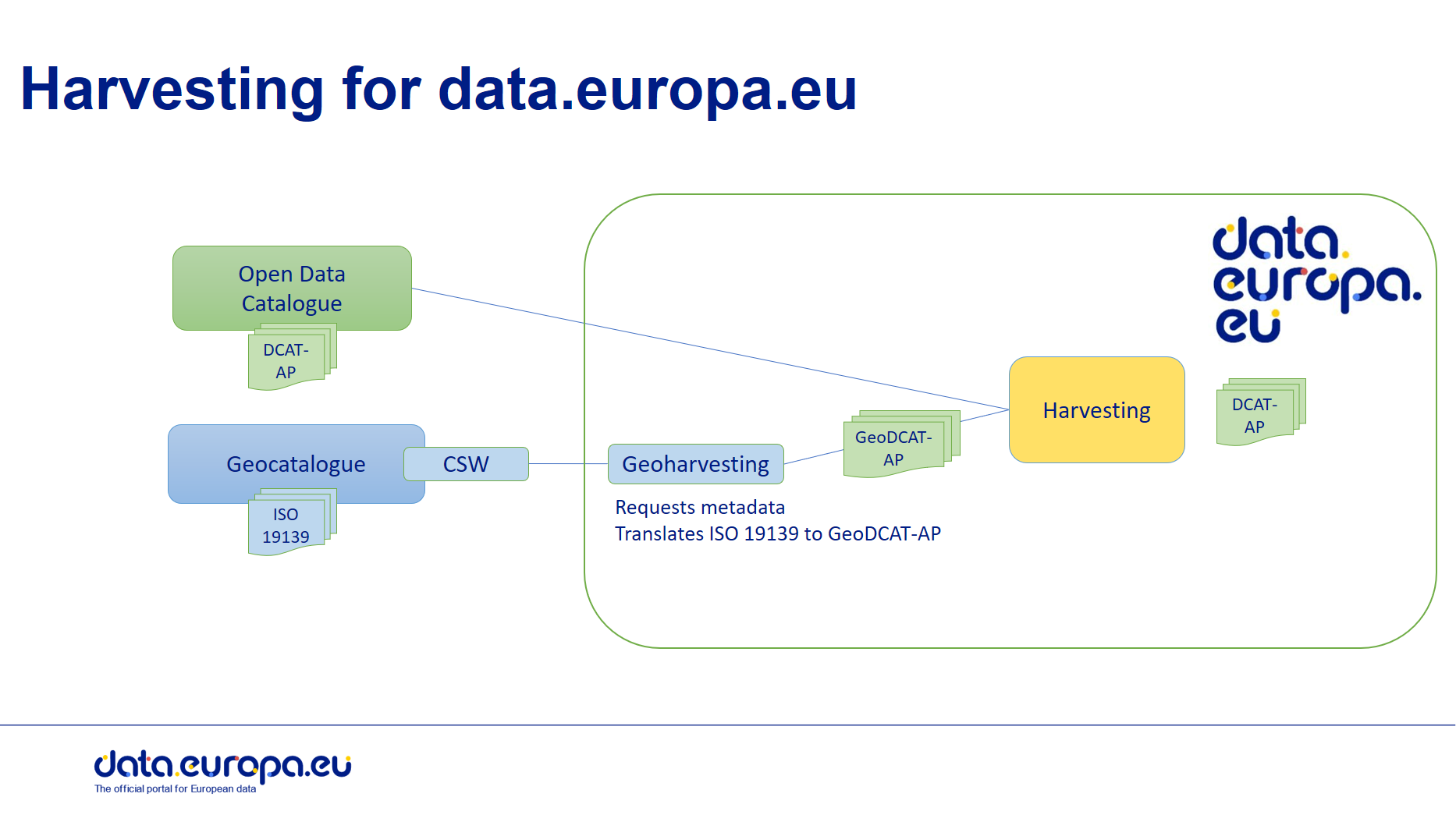
At the time of writing, the geoharvester is planned to be updated to GeoDCAT-AP v3. This portal will be implementing the changes introduced in the SEMIC XSLT (https://github.com/semiceu/iso-19139-to-dcat-ap/) (REF). The new version will not be available on data.europa.eu immediately, since coordination with other partners is needed in this process.

Therefore, the testing by OP/con terra is focused on indivisual GeoDCAT-AP metadata harvested 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 also from national Geoportals / Geocatalogues. In the later case, the role of the geoharvester requests metadata from national geocatalogues CSWs, translating the records from ISO 19115/19139 to GeoDCAT-AP. Afterwards, the geoharvester exposes the resuting 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).

According to the plans at the time of the Second Meeting of the pilot, the EDP will implement GeoDCAT-AP v3 by January 2025. The geoharvester has its own XSLT transformation, which we will be aligned to GeoDCAT-AP v3 thosugh this update.

Regarding the countries participating in the pilot (at the Second Meeting), the EDP currently harvest the geocatalogues from Italy, Denmark, The Netherlads, Slivakia 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.

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

The initial proposal is to not add the applicableLegislation at the information of the Open Data Directive, although it is possible to add the information on the INSPIRE Directive (could be derived, still to be decided).

For the HVD catagories (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 first version of the geoharvester aligned to GeoDCAT-AP v3, as well as for a quick help and resolution of any issues that could arise during the pilot.

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 needs to run the INSPIRE Monitoring and Reporting (MIWP 2021-2024), 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 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. In order to asure 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:

* Indentifying 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 beggini of the pilot, the JRC proposes:

* To open an inventory of related good practices from MSs, focused on 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.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, it is provided a summary of results and the enumeration of the issues identified, with references to the corresponding GitHub repositories.

A summary table for all participants is provided at the end of the section.

At the moment, the content is updated until the Third Meeting of the pilot (23 January 2025). MSs will update this section based on further work and the last testing steps performed until the end of the pilot expected in June 2025.

* 1. Belgium (Flanders)
     1. Summary of results

Plugin BE-Flanders DCAT-AP 2 to GeoNetwork core Open Source Software

DCAT contributions: DCAT-AP 2 to DCAT-AP 3 migration

ISO HVD Tagging + HVD reporting (February 9th)

Implementation started in GN core plugin for DCAT-AP 2 > DCAT-AP 3 migration

* + 1. Issues identified

Nunc vestibulum condimentum nisi.

* 1. Czech Republic
     1. Summary of results

National Metadata Profile (ISO profile) is too complicated.

We could use the XSLT in the Czech „metadata environment“ after some adjustments.

We are planning to simplify the Czech National Profile (ISO Profile) to be more compatible with DCAT-AP.

-> detailed mapping of National INSPIRE profile to GeoDCAT.

* + 1. Issues identified

Most issues with the transformation connected to the national extension of the INSPIRE metadata profile.

Issues identified

XSLT - transformation failed because of the bilinguality 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

Short term: Working towards Feb. 9th HVD deadline (datasets on Data.Europa.eu as well as qualitative reporting on progress, barriers, measures taken, etc.

Labelling of HVD datasets on the Danish geoportal has continued in line with the suggested approach (i.e. via anchored keywords)

Fundamental questions on how to proceed still remain unanswered

* + 1. Issues identified

Two overall approaches were considered during the pilot:

1. CSW ISO  XSLT Transformation (service + mapping)  CKAN

Problem: SEMIC API for transformation not maintained, no similar alternative identified

2. CSW DCAT (via GN 4.4.6+)  [“CSW header remover”]  CKAN

Problem: CKAN harvester not able to process/ignore csw:GetRecordsResponse element (among other things) around the RDF elements in the XML file.

Short-term solution: Manual fix

Medium-term solution: Proxy script to remove unwanted CSW wrapping

Long-term solution: Perhaps added functionality in GN 5+, different DMS for Danish portal, INSPIRE revision

A third approach that could work in the future?

Geonetwork getAsRdf (for instance https://geodata-info.dk/doc/api/index.html#/records/getAsRdf)

From Lars:

Preliminary issue identified:

INSPIRE/HVD-tagging on legislation level and on theme and category level

gmd:abstract -> dcat:description but gmd:purpose - > N/A? dcat:description?

Declaration of conformity -> dcat:conformsTo and prov:Activity?

All formats (gmd:distributionFormat) is listed in each dcat:Distribution

* + 1. Conclusions

Happy to have common ground on HVD labelling in INSPIRE metadata – remains to be worked into mapping

Need for coordination/documentation of semantic content of Geonetwork and standalone GeoDCAT-AP mapping if they diverge

Data Services remain a challenge

* 1. France
     1. Summary of results

We haven’t encountered major regression in our actual usage

Mapping to dct:rights for usage conditions not specified as URIs is an improvement in our workflow. We now have explicit URIs for licenses

Our data is not always INSPIRE-compliant and the XSLT can’t and should probably not deal with these non-conforming cases

* + 1. Issues identified

The main issue we still encounter is

Improve mapping to dcat:Distribution #57 https://github.com/SEMICeu/iso-19139-to-dcat-ap/issues/57

* + 1. Conclusions

Our approach is to base our transformation on the XSLT and to fix metadata upstream

By giving clear recommendations

Adding 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 place to share these specialized XSLT between member states may be useful

* 1. Italy
     1. Summary of results

Long experience in the application of GeoDCAT-AP

National catalogue for spatial data also includes GeoDCAT-AP\_IT API https://geodati.gov.it/geodcat-ap\_it/ based on a XSLT script customized with reference to the national metadata profiles

The API and the XSLT script are used for years to publish metadata from the catalogue for spatial data https://geodati.gov.it to open data portal https://dati.gov.it

Test made on metadata records published in the national spatial catalogue (in test environment) also including HVD tagging

* + 1. Issues identified

Add ‘HVD category’ and ‘documentation’ properties 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 data.europa.eu (issue to be opened)

For 1 bounding box in ISO XML, 4 instances of locn:geometry and 4 instances of dcat:bbox are provided after the transformation (issue to be opened)

Only WFS and WMS services are considered in the transformation as Distribution. A direct URL for downloading the dataset is not considered, but relevant for bulk download (issue to be opened)

* + 1. Conclusions

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

Align the requirements for GeoDCAT-AP properties with those ones in DCAT-AP (e.g. for accessRights)

Taking into account the optional properties (e.g. downloadURL) considered in the Metadata Quality Assessment (MQA) tool available in data.europa.eu in order to increase the metadata quality

* 1. Finland
     1. Summary of results

Focus on testing the XSL Transformation of INSPIRE compliant metadata

HVD-tagging, that is Eli-code and HVD main category in place in the national metadata portal

Identified national issues, for example

development needed on Open Data Portal to identify Anchors as key words

XSL needed when harvesting metadata portals that only support CharString

* + 1. Issues identified

Issues and questions raised for internal discussion https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/issues

Proposals related to the HVD tagging good practise

Proposal to add hvdCategory as optional to GeoDCAT-AP 3.0 and the XSL transformation

Transformation: The same key words emerge twice

Transformation: namespaces and standards

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

Work in progress

list of preliminary suggestions, questions and issues identified, which need more investigation and interaction with other pilot participants

* + 1. Conclusions

Need for a Good practise on GeoDCAT-AP encoding

Need for an iteration after transformation has been updated

Suggestion: Take this into account in the pilot work plan (deadlines step wise)

Regular pilot meetings and discussions on GitHub needed for communication and for reaching consensus

Suggestion: Schedule 1 hour online meetings a every second week for the rest of the rest of the pilot for interaction

* 1. The Netherlands
     1. Summary of results

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

We have learned a lot about how the transformation works and which solutions have been devised to unlock as much metadata as possible. We have gained insight into where the transformation is not yet working out well

* + 1. Issues identified

XSLT 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 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 vocabularie 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

We detected several issues in XSLT and SHACL

We expected substantive discussions about possible solutions

We expected an adjusted version of the XSLT at the end of the pilot in which improvements are included for the detected issues.

We would like clarity about where and by whom these issues are being addressed

We wonder which XSLT is used for transformation by the other member states

* 1. Spain
     1. Summary of results

Official Catalogue of INSPIRE Data and Services (CODSI) has 286 HVD classified on geospatial, earth observation, environment and mobility.

We´ve included the HVD category keywords in many resources but not in all.

We´ve transformed the 286 resources via python

XSLT used https://github.com/SEMICeu/iso-19139-to-dcat-ap

* + 1. Issues identified

Managing multiple languages #52

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

If a dataset has more than one language, only the first one is kept.

gmd:purpose to dct:description #70

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

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.

Transformation: HVD Category #7

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

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

Add 'HVD category' and 'documentation' properties related to high-value datasets #147, https://github.com/SEMICeu/GeoDCAT-AP/issues/147

* + 1. Conclusions

Transformation to ISO metadata to GeoDCAT via python is simple

There are errors in the GeoDCAT files that I don't know if I have to correct in the ISO metadata or it is an XSLT error.

Uncertain if the February 9th deadline for submitting metadata to EDP in GeoDCAT will be delivered.

GeoDCAT-AP does not have the richness of ISO metadata. There are ISO metadata elements that are not in the Metadata Regulation, that is, they are not mandatory and disappear in GeoDCAT-AP. For example: “purpose” or “supplementalInformation”.

* 1. Slovakia
     1. Summary of results

Successful integration of Spatial data registry into National Open data catalogue (DCAT documents)

https://rpi.gov.sk/api/opendata/katalog.json

Custom development tools based on JSON data structures of input metadata, because SK national OD portal does not support RDF XML

Implementation of DCAT version 3.0 (at Spatial data registry side), National open data catalogue still at version 2.0 DCAT

GeoDCAT extension in development process (available in DEV enviroment)

JSON-LD encoding

* + 1. Issues identified

Need to clarify, whether also metadata for datasets semanticaly falling under OD/HVD, but not yet INSPIRE harmonized shall be made available via GeoDCAT AP

GeoDCAT not yet supported at National Open Data portal – is it problem for reporting of “spatial” Open Data?

Pilot resulting metadata shall be made visible via main target portals (EU INSPIRE and Open Data) and discuss the usability of the content visible via such graffical user interfaces

* + 1. Conclusions

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

“Double registration” of the same datasets - National Open Data portal need to remove datasets registration for datasets in Spatial Data Registry

Currently only MD for the SK Ministry of environment are made available. Other providers will be consulted asap

Skipped using metadata for services as input - all the information are obtained from “GetCapabilities” for metadata for Data Services (need to tide up metadata in GetCap of services)

Main message:

Where possible – recommendation for future shift from XML to JSON

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

Geoharvester updated to GeoDCAT-AP 3 including HVD tagging

The geoharvester has its own XSLT, now aligned to GeoDCAT-AP 3

HVD according to “anchor” proposal [1]

currently tests in data.europa.eu’s pre-production environment (PPE)

Examples of GeoDCAT-AP (RDF-XML) can be provided – please let us know the specific ID(s)

Looking into validation issues [2]

Not yet on data.europa.eu

[1] https://github.com/INSPIRE-MIF/GeoDCAT-AP-pilot/blob/main/good-practices/hvd-tagging/CANDIDATE-ISO\_HVD\_Tagging\_Anchor\_Non-Multilingual.xml

[2] DCAT-AP validator https://www.itb.ec.europa.eu/shacl/dcat-ap/

* + 1. Issues identified

HVD applicableLegislation

http://data.europa.eu/eli/reg\_impl/2023/138/oj (required) vs. https://eur-lex.europa.eu/eli/reg\_impl/2023/138/oj

data.europa.eu maps both to http://data.europa.eu/eli/reg\_impl/2023/138/oj

other URLs (e.g. https://op.europa.eu/web/eu-vocabularies/concept/-/resource?uri=http://data.europa.eu/bna/c\_83aa10a6)are not mapped

Some validation issues cannot be solved

ISO distributions don‘t have applicable legislations

HVD‘s need to be accessible via an API – but not all ISO metadata have an OnlineLink (type: download) to be mapped as service distributions

* + 1. Conclusions

As expected, we encountered some difficulties due to the differences in ISO 19139 and GeoDCAT-AP

In ISO 19139 the equivalents mapped to hvdCategory , applicableLegislation, and license are all properties of the dataset described – not the distributions as in GeoDCAT-AP

Proposal to improve:

Offer guidance on how to describe API endpoints in ISO 19139, including service types (see discussion https://github.com/INSPIRE-MIF/helpdesk/discussions/161)

* 1. Joint Research Centre
     1. Summary of results

Revised GeoDCAT-AP 3 specification and provided comments (July – Sep. 2024).

Managing of the pilot, leading the meetings, engage with participants…

Pushed for the preparation, clarification and potential endorsement of the candidate good practice on High-value datasets tagging.

* + 1. Issues identified

Pending

Working in the selection of metadata records to be tested

INSPIRE compliant metadata from the INSPIRE Monitoring 2024 (ongoing task)

Selection of metadata records:

from Member States non participating in the pilot.

Related t different thematic domains.

Issues will be published on GitHub

* + 1. Conclusions

Not yet ready.

Need to push participants to publish their initial findings on GitHub – Pre-requirement for further analyses and reporting to SEMIC.

Further working meetings and discussions expected to provide an integrated / common vision, evaluation of issues and quality of the transformation.

An updated timeline is proposed (to be discussed today).

1. High-Value (geospatial) dataset tagging good practice

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1. Conclusions

This chapter discusses and interprets the study/research results and findings in the light of the policy question/problem and the objectives of the study/research presented in the Introduction. It should also present the recommendations when appropriate. The author is free to organise the body text under sub-headings in order to improve the presentation and readability.

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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>):

(Citing books):

Pollan, M., The omnivore's dilemma, Penguin Group, New York, 2006.

(Citing books with an editor):

Poston, T., A draft of history, edited by K. A. Hauke, University of Georgia Press, Athens, 2000.

(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 |

List of figures

Use the built-in function to generate a table of figures (References > Captions > Insert Table of Figures); or simply use the example in the template and update it (click on table field, press F9) when the report is complete.

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[**Figure 1.** ISO & GeoDCAT-AP metadata implementation pilot timeline. 14](#_Toc196713912)

[**Figure 2.** Harvesting from the European Data Portal (EDP) (data.europa.eu). 26](#_Toc196713913)

List of tables

Use the built-in function to generate a table of figures (References > Captions > Insert Table of Figures); or simply use the example in the template and update it (click on table field, press F9, update entire table) when the report is complete.

Note: Word does not distinguish between these tables; therefore when it asks if you want to replace the already inserted table (for boxes or figures), you answer No.

Annexes <optional>

Annex 1. Title of annex <numbering of annexes is mandatory, if there is more than one>

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

Back cover to be added

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