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D02.01.1 Specification of GeoDCAT-AP

GeoDCAT-AP: a geospatial extension for the DCAT application profile for data portals in Europe

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1 INTRODUCTION

This document contains the specification for GeoDCAT-AP, an extension of the DCAT application profile for data portals in Europe (DCAT-AP) for describing geospatial datasets, data series, and services. It provides an RDF syntax binding for the union of metadata elements of the INSPIRE Metadata Regulation [1], the INSPIRE Regulation on interoperability of spatial datasets and services [2] and the ISO 19115:2003 Core [3]. Its basic use case is to make spatial datasets, data series, and services searchable on general data portals, thereby making geospatial information better searchable across borders and sectors. This can be achieved by the exchange of descriptions of data sets among data portals.

The GeoDCAT-AP specification does not replace the INSPIRE Metadata Regulation [1] **nor the INSPIRE Metadata technical guidelines** [4] **based on ISO 19115 and ISO19119.** Its purpose is to give owners of geospatial metadata the possibility to achieve more by providing an *additional* RDF syntax binding. Conversion rules to RDF syntax would allow Member States to maintain their collections of INSPIRE-relevant datasets following the INSPIRE Metadata technical guidelines [4] based on ISO 19115 and ISO19119, while at the same time publishing these collections on DCAT-AP-conform data portals [4]. A lossless conversion to RDF syntax allows additional metadata elements to be displayed on general-purposed data portals, provided that such data portals are capable of displaying additional metadata elements. Additionally, data portals may be capable of providing machine-to-machine interfaces where additional metadata could be provided.

1.1 Objectives

The objective of this work is to define an *RDF syntax* that can be used for the exchange of descriptions of *spatial* datasets among data portals. The RDF syntax should extend the DCAT Application Profile for data portals in Europe [5].

- To provide an RDF syntax binding for the *union* of the metadata elements in the INSPIRE Metadata Regulation and the ISO 19115:2003 core profile. The guiding design principles is to make the resulting RDF syntax as simple as possible; thereby maximally using existing RDF vocabularies such as the Dublin Core and DCAT-AP and only minting new terms when no suitable terms are available.
- To formulate recommendations to the Working Group dealing with the revision of the DCAT-AP, to maximally align DCAT-AP and GeoDCAT-AP.
- To take into account and refer to alignment of relevant controlled vocabularies (e.g., the alignments between GEMET, INSPIRE themes, EuroVoc carried out by the Publications Office[1]).

Additionally, the following outcomes may be achieved, outside the context of this specification:

- To define new controlled vocabularies or define mappings between controlled vocabularies;

[1] https://open-data.europa.eu/en/data/dataset/eurovoc

- To define executable transformation rules (e.g. using XSLT) for the ISO 19139 XML syntax for ISO 19115:2003 and the syntax bindings defined in the INSPIRE Metadata technical guidelines [4] and the RDF syntax bindings in this specification.
- To define an RDF syntax binding for the elements in ISO 19115-1:2014 core, as the corresponding XML Schema (part of ISO 19115-3:2015) has not yet been released, and as there are no datasets making use of this version of the standard yet.

1.2 Structure of this document

This document consists of the following sections:

- Section 1 introduces this document;
- Section 2 provides an overview of related work;
- Section 3 provides the use cases that motivate the creation of a GeoDCAT-AP specification;
- Section 4 provides the suggested RDF syntax bindings for metadata elements hereby maximally reusing existing RDF vocabularies;
- Section 5 provides definition of *new* RDF classes and properties that are defined within this specification;
- Section 6 provides an overview of controlled vocabularies with relevant URI sets;
- Section 7 provides a conformance statement, indicating the formal requirements that metadata sets need to meet in order to claim conformance to GeoDCAT-AP.

2 RELATED WORK

This section contains an overview of related work.

2.1 ISO 19115:2003, ISO 19139 and 19115:2014

ISO 19115:2003, a standard of the International Organization for Standardization (ISO), defines how to describe geographical information. ISO 19139 provides the XML Schema implementation schema for ISO 19115. ISO19115:2014 supersedes ISO19115:2003. At the time of writing this document, no XML binding for ISO19115:2014 has been defined yet (expected 2015).

As documented in the INSPIRE Metadata Implementing Rules Technical Guidelines [4], the conformance of a metadata set to ISO19115 Core does not guarantee conformance to the INSPIRE metadata specifications, although there is a large correspondence.

2.2 ISO 19157:2013 Geographic information - Data quality

ISO 19157:2013 *[6]* establishes the principles for describing the quality of geographic data. It

- defines components for describing data quality;
- specifies components and content structure of a register for data quality measures;
- describes general procedures for evaluating the quality of geographic data; and
- establishes principles for reporting data quality.

ISO 19157:2013 is referred to for the data quality metadata in the INSPIRE Data Specifications Technical Guidelines.

2.3 OGC Catalog Service for the Web

Catalog Service for the Web (CSW), is a standard for exposing a catalogue of geospatial records in XML on the Internet. It specifies *the interfaces, bindings, and a framework for defining application profiles required to publish and access digital catalogues of metadata for geospatial data, services, and related resource information.*

A profile of CSW is used in the INSPIRE Technical Guidance on Discovery Services.

2.4 INSPIRE Metadata Regulation and INSPIRE Metadata Implementing Rules Technical Guidelines

The INSPIRE Metadata Implementing Rules Technical Guidelines [1] include rules for the description of datasets based on ISO 19115 and ISO 19119, and by using their XML implementation defined in ISO 19139.

INSPIRE[2] is a Directive[3] of the European Parliament and of the Council aiming to establish a EU-wide spatial data infrastructure to give cross-border access to information that can be used to support EU environmental policies, as well as other policies or activities having an impact on the environment. The actual scope of this information corresponds to 34 environmental themes, covering also areas having cross-sector relevance – e.g., addresses, buildings, population distribution and demography.

In order to ensure cross-border interoperability of data infrastructures operated by EU Member States, INSPIRE sets out a framework based on common specifications for metadata, data, network services, data and service sharing, monitoring and reporting. Such specifications consist of a set of implementing rules (which take the form of Commission Regulations, i.e., they are legally binding in the EU Member States), along with the corresponding technical guidelines, defined by a regulatory committee composed of representatives of both EU Member States and European Union bodies and institutions.

2.5 DCAT and DCAT-AP

The DCAT Application profile for data portals in Europe (DCAT-AP) [5] is a specification based on the Data Catalogue vocabulary (DCAT) [7] for describing public sector datasets in Europe. Its basic use case is to enable cross-data portal search for data sets and make public sector data better searchable across borders and sectors. This can be achieved by the exchange of descriptions of datasets among data portals.

The application profile is a specification for metadata records to meet the specific application needs of data portals in Europe while providing semantic interoperability with other applications on the basis of reuse of established controlled vocabularies (e.g. EuroVoc) and mappings to existing metadata vocabularies (e.g. Dublin Core, SDMX, INSPIRE metadata, etc).

2.6 Alignment of INSPIRE metadata with Dublin Core

In 2008, JRC published a report [8] on the progress made in defining the proper way of expressing elements of INSPIRE metadata in conformance with ISO 15836 (Dublin Core).

2.7 Alignment of INSPIRE metadata with DCAT-AP

In 2014, the JRC conducted an alignment exercise between INSPIRE metadata and DCAT-AP in the framework of ISA Action 1.17. The results are available online at:

https://ies-svn.jrc.ec.europa.eu/projects/metadata/wiki/Alignment_of_INSPIRE_metadata_with_DCAT-AP

[2] European Commission – Joint Research Centre. INSPIRE Web site: http://inspire.ec.europa.eu/

[3] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). OJ L 108, 25.4.2007, p. 1–14. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007L0002:EN:NOT

The results of this alignment exercise are divided in two parts:

- A Core version which defines alignments for the subset of INSPIRE metadata elements supported by DCAT-AP.
- An Extended version which defines alignments for all the INSPIRE metadata elements using DCAT-AP and other vocabularies whenever DCAT-AP is not relevant.

What is so far missing are bindings for some of the metadata elements in the Core Profile of ISO19115.

2.8 Alignment of EuroVoc – GEMET – INSPIRE themes

EuroVoc is a multilingual, multidisciplinary thesaurus covering the activities of the EU. The EuroVoc and INSPIRE alignments comprises of 119 semantic alignments to the Inspire themes or feature concept dictionary. These alignments are the result of an exercise carried out outside the official framework of INSPIRE, and they have not been endorsed by the INSPIRE Maintenance and Implementation Group. As such, they must not be regarded as stating an official position of INSPIRE. These alignments are available at:

https://open-data.europa.eu/en/data/dataset/eurovoc/resource/52153fef-94bd-433a-bd4b-5bdcd5bfeb6b

Similarly, EuroVoc was also aligned to the GEneral Multilingual Environmental Thesaurus (GEMET) with 1676 semantic alignments. These alignments are available at:

https://open-data.europa.eu/en/data/dataset/eurovoc/resource/614a2b36-5257-428a-ad52-4e92d47609d8

3 MOTIVATION: USE CASE

The basic use case that GeoDCAT-AP intends to enable is a cross-domain data portal search for datasets, as documented in the DCAT-AP specification [5]. GeoDCAT-AP will make it easier to share descriptions of spatial datasets between spatial data portals and general data portals, and thus help increase public and cross-sector access to such high value datasets. The datasets could include:

- **Datasets on the INSPIRE Geoportal**. The INSPIRE Geoportal aggregates metadata for over 200k datasets across Europe. It provides the means to search for spatial data sets and spatial data services, and subject to access restrictions, to view spatial data sets from the EU Member States within the framework of the INSPIRE Directive. The metadata stored on this portal is structured according to the INSPIRE Metadata technical guidelines [4]. In order to maximise visibility and re-use, spatial datasets could also be listed on general-purpose Open Data Portals, such as the European Union Open Data Portal (EU ODP).
- **Datasets on national SDIs**. GeoDCAT-AP would facilitate the integration of SDIs operated by EU Member States with any data catalogue able to consume DCAT-AP-compliant metadata.
- **General geospatial datasets**. The geospatial community shares a common background and makes consistent use of consolidated standards and technologies. In particular, as far as metadata are concerned, it is widespread the use of standards like ISO 19115 / 19139, for the representation and encoding of metadata, and OGC's CSW (Catalog Service for the Web) for accessing and querying metadata records. These standards are also those currently recommended in INSPIRE.

An additional RDF syntax for INSPIRE and ISO19115 metadata elements is beneficial, especially when other data portals support the DCAT-AP metadata elements only.

Conversion rules to RDF syntax would allow Member States to maintain their collections of INSPIRE-relevant datasets following the INSPIRE Metadata technical guidelines [4] based on ISO 19115 and ISO19119, while at the same time publishing these collections on DCAT-AP-conform data portals [4]. A lossless conversion to RDF syntax allows additional metadata elements to be displayed on general-purposed data portals, provided that such data portals are capable of displaying of additional metadata elements. Furthermore, data portals frequently are complemented by a triple store, making that the full set of GeoDCAT-AP metadata can be queried through a SPARQL endpoint.

4 RDF SYNTAX BINDINGS FOR INSPIRE AND ISO19115 METADATA ELEMENTS

This section lists metadata element bindings to RDF.

4.1 Used namespaces

Table 1 gives an overview of the namespaces (and prefixes) used in the remainder of this document.

Table 1: Namespace prefixes

Prefix	Namespace	RDF Vocabulary
adms	http://www.w3.org/ns/adms#	Asset Description Metadata Schema
cnt	http://www.w3.org/2011/content#	Representing Content in RDF 1.0
dc	http://purl.org/dc/elements/1.1/	Dublin Core Metadata Element Set, Version 1.1
dcat	http://www.w3.org/ns/dcat#	Data Catalog Vocabulary
dct	http://purl.org/dc/terms/	DCMI Metadata Terms
earl	http://www.w3.org/ns/earl#	Evaluation and Report Language (EARL) 1.0
foaf	http://xmlns.com/foaf/0.1/	FOAF Vocabulary
locn	http://www.w3.org/ns/locn#	ISA Programme Core Location Vocabulary
prov	http://www.w3.org/ns/prov#	PROV-O: The PROV Ontology
rdf	http://www.w3.org/1999/02/22-rdf-syntax-ns#	Resource Description Framework (RDF): Concepts and Abstract Syntax
rdfs	http://www.w3.org/2000/01/rdf-schema#	RDF Vocabulary Description Language 1.0: RDF Schema
schema	http://schema.org/	schema.org

Prefix	Namespace	RDF Vocabulary
skos	http://www.w3.org/2004/02/skos/core#	SKOS Simple Knowledge Organization System - Reference
vcard	http://www.w3.org/2006/vcard/ns#	vCard Ontology
wdrs	http://www.w3.org/2007/05/powder-s#	Protocol for Web Description Resources (POWDER)
xsd	http://www.w3.org/2001/XMLSchema#	XML Schema Part 2: Datatypes Second Edition

4.2 Overview of bindings for GeoDCAT-AP Core

Table 2 provides an overview of GeoDCAT-AP Core. This includes bindings for metadata elements of the INSPIRE Metadata Regulation [1] and metadata elements in the ISO19115:2003 core [3] for which DCAT-AP provides an RDF syntax binding. This version is meant to enable the harvesting and re-use of spatial metadata records through DCAT-AP-conformant applications and services, including data portals and APIs. The alignments for INSPIRE and ISO19115:2003 core metadata elements that are not included GeoDCAT-AP Core are defined in GeoDCAT-AP Extended, see Section 4.2.

In both tables the starred elements (*) are used to indicate the corresponding metadata element in ISO19115:2003.

Table 2: INSPIRE Metadata Regulation [1]: element bindings

Element in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	DCAT-AP Property	Domain	Range	Comments
Resource title §1.1 *Dataset title (M)	dct:title	- (dcat:Dataset, dcat:Catalog)	rdf:PlainLiteral	See Section 4.4.1.
Resource abstract §1.2 *Abstract describing the dataset (M)	dct:description	- (dcat:Dataset, dcat:Catalog)	rdf:PlainLiteral	See Section 4.4.2.
Resource type §1.3 *not in ISO19115 core	rdf:type	- (dcat:Dataset, dcat:Catalog)	rdfs:Class (values dcat:Dataset dcat:Catalog)	See Section 4.4.3. DCAT-AP does not distinguish between datasets and dataset series. dcat:Catalog can be used for services.

Element in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	DCAT-AP Property	Domain	Range	Comments
Resource locator §1.4 *On-line resource (O)	dcat:landingPage	dcat:Dataset	foaf:Document	See Section 4.4.4. Does not apply to dcat:Catalog suggested for spatial data services.
Unique resource identifier §1.5 *not in ISO19115 core	dct:identifier	- (dcat:Dataset, dcat:Catalog)	rdfs:Literal	See Section 4.4.5.
Coupled resource §1.6 *not in ISO19115 core	dcat:dataset	dcat:Catalog	dcat:Dataset	See Section 4.4.6.
Resource language §1.7 *Dataset language (M)	dct:language	- (dcat:Dataset, dcat:Catalog)	dct:LinguisticSystem	See Section 4.4.7.
Keyword value §3.1 *not in ISO19115 core	dcat:keyword dcat:theme	dcat:Dataset	rdfs:Literal	See Section 4.4.8. dcat:keyword is for free keywords; dcat:theme for controlled vocabularies. Keywords whose controlled vocabulary is the one of the INSPIRE spatial data themes are mapped to dcat:theme, and expressed by the corresponding URI in the INSPIRE Registry. See controlled vocabulary for theme in Section 6. The domain restriction on dcat:theme makes that it can only be used on datasets, not on services (dcat:Catalog).
Geographic bounding box §4.1 *Geographic location of the dataset (by four coordinates or by geographic identifier) (C)	dct:spatial	- (dcat:Dataset dcat:Catalog)	dct:Location	See Section 4.4.10 on the preferred format to be used in RDF for the representation of geometries.
Temporal extent §5.1 *Additional extent information for the dataset (vertical and temporal) (O)	dct:temporal	- (dcat:Dataset dcat:Catalog)	dct:PeriodOfTime	See Section 4.4.11.

Element in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	DCAT-AP Property	Domain	Range	Comments
Date of publication §5.2 *Dataset reference date (M) - publication	dct:issued	- (dcat:Dataset dcat:Catalog)	xsd:date	See Section 4.4.11.
Date of last revision §5.3 *Dataset reference date (M) - revision	dct:modified	- (dcat:Dataset dcat:Catalog)	xsd:date	See Section 4.4.11.
Date of creation §5.4 *Dataset reference date (M) - creation	dct:created	- (dcat:Dataset dcat:Catalog)	xsd:date	See Section 4.4.11.
Conformity §7 *not in ISO19115 core	dct:conformsTo	- (dcat:Dataset dcat:Catalog)	dct:Standard	See Section 4.4.14. dct:conformsTo can model only one of the cases foreseen in INSPIRE. i.e., when the degree of conformity is "conformant".
Conformity Specification §7.1 *not in ISO19115 core	dct:title dct:issued, dct:modified, dct:created	rdfs:Resource	rdf:PlainLiteral xsd:date	See Section 4.4.14.
Conditions for access and use §8.1 *not in ISO19115 core	dct:rights	- (dcat:Distribution)	dct:RightsStatement	See Section 4.4.15. In DCAT-AP, this is a characteristic of a data catalogue and of a data distribution, not of a dataset.
Responsible party §9 *Dataset responsible party (O)	dct:publisher, dcat:contactPoint	- (dcat:Dataset)	dct:Agent vcard:Kind	See Section 4.4.16. DCAT-AP foresees only two of the 11 responsible party roles supported in INSPIRE. However, DCAT-AP suggests the use of the W3C PROV ontology to model information concerning provenance not covered in DCAT-AP.

4.3 Overview of bindings for GeoDCAT-AP Extended

This section provides an overview of the RDF syntax bindings in GeoDCAT-AP Extended. These are the syntax bindings for elements in the ISO19115:2003 core [3], the INSPIRE Metadata Regulation [1], and the INSPIRE Regulation on Interoperability of Spatial Datasets and Services [2] for which DCAT-AP does not provide a syntax binding. GeoDCAT-AP Extended is a *superset* of GeoDCAT-AP Core.

Table 3 contains the suggested RDF syntax binding for the INSPIRE Metadata Regulation [1] and Table 4 for the metadata elements in the INSPIRE Regulation on Interoperability of Spatial Datasets and Services [2]. In both tables the starred elements (*) are used to indicate the corresponding metadata element in ISO19115:2003 [3].

Table 3: INSPIRE Metadata Regulation [1]: element bindings

Element in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	Property	Domain	Range	Comments
Resource type §1.3 *not in ISO19115	dct:type	- (dcat:Dataset, dcat:Catalog)	skos:Concept	See controlled vocabulary for resource type in Section 6.
Topic category §2.1 *Dataset topic category (M)	dct:subject	- (dcat:Dataset, dcat:Catalog)	skos:Concept	See controlled vocabulary for topic category in Section 6.
Spatial data service type §2.2 *not in ISO19115 core	rdf:type	- (dcat:Dataset, dcat:Catalog)	rdfs:Class (values dcat:Dataset dcat:Catalog)	DCAT-AP foresees only one type of services - i.e., data catalogues.
Spatial data service type §2.2 *not in ISO19115	dct:type	- (dcat:Dataset, dcat:Catalog)	rdfs:Class	See controlled vocabulary for spatial data service type in Section 6.
Originating controlled vocabulary §3.2 *not in ISO19115 core	dcat:themeTaxonomy	dcat:Catalog	skos:ConceptScheme	DCAT defines theme taxonomy at the level of the catalog, not the dataset.

Element in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	Property	Domain	Range	Comments
Lineage §6.1 *Lineage (O)	dct:provenance	- (dcat:Dataset dcat:Catalog)	dct:ProvenanceStatement	
Spatial resolution §6.2 *Spatial resolution of the dataset (O)	*no candidate available*			
Conformity §7.1 *not in ISO19115 core	wdrs:describedBy	rdfs:Resource (dcat:DataSet)	rdfs:Resource (earl:Assertion)	dct:conformsTo can model only one of the cases foreseen in INSPIRE. i.e., when the degree of conformity is "conformant".
Conformity Specification §7.1 *not in ISO19115 core	earl:test	earl:Assertion	earl:Test	
Conformity degree §7.2 *not in ISO19115 core	earl:outcome	earl:TestResult	earl:OutcomeValue	See controlled vocabulary for conformity degree in Section 6.
Limitations on public access §8.2 *not in ISO19115 core	dct:accessRights dct:rights	- (dcat:Distribution)	dct:RightsStatement	In DCAT-AP, this is a characteristic of a data catalogue and of a data distribution, not of a dataset
Responsible party §9 *Dataset responsible party (O)	prov:Attribution	- (dcat:Dataset)	vcard:Kind	
Responsible party role	dct:type	- (prov:Attribution)	rdfs:Class	See controlled vocabulary for responsible party role in Section 6.
*Metadata file identifier (O)	dct:identifier	- (dcat:CatalogRecord)	rdfs:Literal	In RDF, this could also be represented as the URI of the metadata / catalogue record.
*Metadata standard name (O)	dct:conformsTo	- (dcat:CatalogRecord)	dct:Standard	

Element in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	Property	Domain	Range	Comments
*Metadata standard version (O)	owl:versionInfo	- (dcat:CatalogRecord)	rdfs:Literal	This can be part of the information specified for metadata standard name.
*Metadata character set (C)	cnt:characterEncoding	cnt:Content (dcat:CatalogRecord)	rdfs:Literal	Domain of cnt:characterEncoding is cnt:Content.
Metadata point of contact §10.1 *Metadata point of contact (M)	prov:qualifiedAttribution	- (dcat:CatalogRecord)	prov:Attribution	Issue: meaning of dcat:CatalogRecord for metadata on metadata.
	dcat:contactPoint	dcat:Dataset	vcard:Kind	Issue: meaning of dcat:CatalogRecord for metadata on metadata.
Metadata date §10.2 *Metadata date stamp (M)	dct:modified	- (dcat:CatalogRecord)	xsd:date	Issue: meaning of dcat:CatalogRecord for metadata on metadata.
Metadata language §10.3 *Metadata language (C)	dct:language	- (dcat:CatalogRecord)	dct:LinguisticSystem	Issue: meaning of dcat:CatalogRecord for metadata on metadata.

Table 4: INSPIRE Regulation on interoperability of spatial datasets and services [2]: element bindings

Element in INSPIRE Interoperability Regulation [2] *ISO19115:2003 Core Profile	Property	Domain	Range	Comments
Coordinate Reference System §13 *Reference System (0)	no candidate available			
Temporal Reference System §13 *Reference System (0)	no candidate available			

Element in INSPIRE Interoperability Regulation [2] *ISO19115:2003 Core Profile	Property	Domain	Range	Comments
Encoding §13 *Distribution format (O)	dct:format, dcat:mediaType	dcat:Distribution	dc:MediaTypeOrExtent	See controlled vocabularies for encoding in Section 6.
Topological Consistency §13 *not in ISO19115 core	wdrs:describedBy	rdfs:Resource (dcat:DataSet)	rdfs:Resource (earl:Assertion)	
Character Encoding §13 *Dataset character set (C)	cnt:characterEncoding	cnt:Content (dcat:Distribution)	rdfs:Literal	Domain of cnt:characterEncoding is cnt:Content.
*Spatial representation type (O)	no candidate available			
Data Quality – Logical Consistency – Conceptual Consistency	wdrs:describedBy	rdfs:Resource (dcat:DataSet)	rdfs:Resource (earl:Assertion)	For all elements about data quality, it is suggested to use the EARL vocabulary, including an EARL assertion, including the description of a quality test (earl:test) and outcome (earl:outcome).
Data Quality – Logical Consistency – Domain Consistency	wdrs:describedBy	rdfs:Resource (dcat:DataSet)	rdfs:Resource (earl:Assertion)	For all elements about data quality, it is suggested to use the EARL vocabulary, including an EARL assertion, including the description of a quality test (earl:test) and outcome (earl:outcome).
Maintenance information	dct:accrualPeriodicity	dctype:Collection (dcat:Dataset)	dct:Frequency	This element basically denotes the update frequency of a dataset. See: https://geo-ide.noaa.gov/wiki/index.php?title=File:MD_MaintenanceInformation.png This frequency is expressed with a code list, which can be partially mapped to the one recommended in DCAT-AP: http://dublincore.org/groups/collections/frequency/

4.4 Detailed usage notes and examples

This section contains further usage notes and examples on the mappings.

4.4.1 Resource title - *Dataset title (M)

The content of the element 'resource title' can be represented in RDF as a plain literal.

The proposed binding is dct:title.

This binding may also include the specification of the language by using attribute @xml:lang [XML]. The language to be specified is the one indicated by element metadata language, mapped to the language identifiers defined by IETF BCP 47 [9].

Example

```
# Resource metadata in GeoDCAT-AP

[]  dct:title "Forest / Non-Forest Map 2006"@en.
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata …
...
<gmd:identificationInfo>
       <gmd:MD_DataIdentification>
       <gmd:citation>
       <gmd:CI_Citation>
       <gmd:title>
              <gco:CharacterString> Forest / Non-Forest Map 2006</gco:CharacterString>
       </gmd:title>
       </gmd:CI_Citation>
       </gmd:citation>
       </gmd:MD_DataIdentification>
</gmd:identificationInfo>
```

Example

```
...
</gmd:MD_Metadata>
```

4.4.2 Resource abstract - *Abstract describing the dataset (M)

The content of the elements 'resource abstract' can be represented in RDF as a plain literal.

The proposed binding is dct:description.

This binding may also include the specification of the language by using attribute @xml:lang [XML]. The language to be specified is the one indicated by element metadata language, mapped to the language identifiers defined by IETF BCP 47 [9].

Example

```
# Resource metadata in GeoDCAT-AP

[]  dct:description "Pan-European Forest / Non Forest Map with target year 2006, Data Source: Landsat ETM+ and Corine Land Cover 2006, Classes: for-est, non-forest, clouds/snow, no data; Method: automatic classification performed with an in-house algorithm; spatial resolution: 25m. In addition, the forest map 2006 is extended to FTYPE2006 to include forest types (broadleaf, coniferous forest) that are mapped using MODIS composites."@en .
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata …
...
<gmd:identificationInfo>
       <gmd:MD_DataIdentification>
       <gmd:abstract>
              <gco:CharacterString> Pan-European Forest / Non Forest Map with target year 2006, Data Source: Landsat ETM+
              and Corine Land Cover 2006, Classes: for-est, non-forest, clouds/snow, no data; Method: automatic
              classification performed with an in-house algorithm; spatial resolution: 25m. In addition, the forest map 2006
```

Example

```
            is extended to FTYPE2006 to include forest types (broadleaf, coniferous forest) that are mapped using MODIS
            composites.
            </gco:CharacterString>
        </gmd:abstract>
        </gmd:MD_DataIdentification>
</gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

4.4.3 Resource type

In DCAT [7], the notion of dataset is quite broad, and may include both the INSPIRE notions of dataset and dataset series.

Moreover, currently no existing vocabulary provides suitable candidates for the INSPIRE notions of dataset series – the existing ones are very generic (e.g., dctype:Collection is defined as "An aggregation of resources" [DCTerms]).

Based on this, the proposal is to define both INSPIRE datasets and dataset series as instances of dcat:Dataset.

Moreover, in order to maintain the INSPIRE distinction between datasets and dataset series, following the work on aligning INSPIRE Metadata and the Dublin Core [8], the proposal is to denote it by using the resource type code list operated by the INSPIRE Registry, and by using dct:type.

As far as the INSPIRE notion of **service** is concerned, DCAT and DCAT-AP foresee a single class, namely, dcat:Catalog. Following the approach described above for datasets and dataset series, the proposed solution is to define any service as instance of dcat:Catalog, and to specify the spatial data service type by using dct:type with the corresponding code lists operated by the INSPIRE Registry.

Example

```
# Resource metadata in GeoDCAT-AP

## Resource type for datasets
```

Example

```
[]  a dcat:Dataset;
    dct:type <http://inspire.ec.europa.eu/codelist/ResourceType/dataset>

## Resource type for series

[]  a dcat:Dataset;
    dct:type <http://inspire.ec.europa.eu/codelist/ResourceType/series>

## Resource type for services (here, a view service)

[]  a dcat:Catalog;
    dct:type <http://inspire.ec.europa.eu/codelist/ResourceType/service> ,
        <http://inspire.ec.europa.eu/codelist/SpatialDataServiceType/view> .
```

```
<!– Resource metadata in ISO19139 -->

<!– MD_ScopeCode for a dataset in ISO19139 -->
<gmd:MD_Metadata ...
...
<gmd:hierarchyLevel>
<gmd:MD_ScopeCode
codeList="
http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">
dataset</gmd:MD_ScopeCode>
</gmd:hierarchyLevel>
...
</gmd:MD_Metadata>

<!– MD_ScopeCode for a data series in ISO19139 -->
<gmd:MD_Metadata ...
...
<gmd:hierarchyLevel>
```

Example

```
<gmd:MD_ScopeCode
codeList="
http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="series">
series</gmd:MD_ScopeCode>
</gmd:hierarchyLevel>
...
</gmd:MD_Metadata>

<!— MD_ScopeCode for a service in ISO19139 -->
<gmd:MD_Metadata ...
...
<gmd:hierarchyLevel>
<gmd:MD_ScopeCode
codeList="
http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="service">
dataset</gmd:MD_ScopeCode>
</gmd:hierarchyLevel>
...
</gmd:MD_Metadata>
```

4.4.4 Resource locator - *On-line resource (O)

In INSPIRE, this element, quoting, “defines the link(s) to the resource and/or the link to additional information about the resource”.

For datasets, DCAT [7] foresees a property, namely, dcat:landingPage, having exactly the same purpose. By contrast, the only property foreseen in DCATfor linking a service to an online resource is foaf:homepage.

Based on this, the proposed mappings of element “resource locator” are the following:

- dcat:landingPage for data sets and data set series;

- foaf:homepage for services.

Example

```
# Resource metadata in GeoDCAT-AP

## Resource locator for datasets and series

[]  a dcat:Dataset;
    dcat:landingPage <http://forest.jrc.ec.europa.eu/forestmap-download>

## Resource locator for services

[]  a dcat:Catalog; foaf:homepage <http://geohub.jrc.ec.europa.eu/efas_cc?service=WMS&request=GetCapabilities> .
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata …
...
<gmd:transferOptions>
    <gmd:MD_DigitalTransferOptions>
     <gmd:onLine>
     <gmd:CI_OnlineResource>
          <gmd:linkage>
               <gmd:URL> http://forest.jrc.ec.europa.eu/forestmap-download</gmd:URL>
          </gmd:linkage>
          <gmd:name>
               <gco:CharacterString> … </gco:CharacterString>
          </gmd:name>
          <gmd:description>
               <gco:CharacterString> … </gco:CharacterString>
          </gmd:description>
          <gmd:function>
```

Example

```
              <CI_OnLineFunctionCode codeListValue="information"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Codelist/ML_gmxCodelists.xml#
CI_OnLineFunctionCode" xmlns="http://www.isotc211.org/2005/gmd"/>
          </gmd:function>
     </gmd:CI_OnlineResource>
     </gmd:onLine>
     </gmd:MD_DigitalTransferOptions>
</gmd:transferOptions>
...
</gmd:MD_Metadata>
```

4.4.5 Unique resource identifier

Based on DCAT-AP [5], the proposed candidate for this element is property dct:identifier. The two components of this element (namespace and code), should be concatenated, using a slash (/) as separator.

Property dct:identifier should be typed as an xsd:string.

Example

```
# Resource metadata in GeoDCAT-AP

[]  a dcat:Dataset;
    dct:identifier "http://efdac.jrc.ec.europa.eu/947e5a55-e548-11e1-9105-0017085a97ab"^^xsd:string .
```

```
<!— Resource metadata in ISO19139 -->
```

4.4.6 Coupled resource

This element is used to link a service to the target datasets or dataset series, by using the corresponding Unique Resource Identifiers.

Both DCAT and DCAT-AP foresee a property, namely, dcat:dataset, having exactly the same purpose.

Example

```
# Resource metadata in GeoDCAT-AP

[]  a dcat:Catalog;
    dcat:dataset <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=14fda267-6da4-4024-bc6f-8bad1c0bf249> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=489e972e-560f-4faf-b40f-ce4ae554b46e> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=51db193b-39fa-46b1-810d-510b7653e992> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=73b4c188-be32-4a2e-949a-f6b186b5eedd> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=74d58a19-d494-48f0-953c-e1ba47c6af55> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=9060b16a-9772-43a1-bfac-1095da67119c> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=cbf13b10-9f28-4e74-ace1-4e162a0f6307> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=e81e7e5d-488f-4468-b7c0-fc263fc2c4be> ,
      <http://rdsi-portal.jrc.it:8080/geonetwork/srv/eng/xml_iso19139?uuid=f3430932-cc3f-44f1-853d-2492a8368ed7> .
```

```
<!— Resource metadata in ISO19139 -->
```

4.4.7 Resource language and metadata language - *Dataset language (M) and Metadata language (C)

In INSPIRE metadata, metadata and resource languages (which may be different) are specified by using the three-letter language codes defined in [ISO-639-2].

Based on DCAT and DCAT-AP, the proposal is to use for both elements is dct:language, and to specify the relevant language by using the language URI register operated by the EU Publications Office [MDR-LANG], available also in RDF format.

The following example assumes that the metadata language is English, and the resource language is German.

Example

```
# Resource metadata in GeoDCAT-AP
```

Example

```
# Resource metadata

[] dct:language <http://publications.europa.eu/resource/authority/language/DEU> ;

    foaf:isPrimaryTopicOf

# Metadata on metadata

[ dct:language
     <http://publications.europa.eu/resource/authority/language/ENG> ] .
```

```
<!— Resource metadata in ISO19139 -->
```

The metadata language can be also used to specify the language of textual elements of resource metadata by using the @xml:lang attribute [10].

Since @xml:lang takes as value language identifiers defined by IETF-BCP-47 [9], a mapping from the actual value of the metadata language is needed.

4.4.8 Topic category and keyword value - *Dataset topic category (M)

In INSPIRE, these two elements have specific purposes. Quoting from the INSPIRE Metadata Regulation [1] (§2.1 and §3.1, respectively):

- The topic category is a high-level classification scheme to assist in the grouping and topic-based search of available spatial data resources.
- The keyword value is a commonly used word, formalised word or phrase used to describe the subject. While the topic category is too coarse for detailed queries, keywords help narrowing a full text search and they allow for structured keyword search.

Moreover, two types of keywords are allowed:

- free keywords;
- keywords taken from a controlled vocabulary.

Finally, topic categories apply only to datasets and dataset series.

Topic category and keyword in datasets and dataset series

As far as dataset and dataset series metadata are concerned, in both DCAT and DCAT-AP, a distinction is made only between free keywords and keywords from controlled vocabularies, associated with a URI. For the former, dcat:keyword is used, whereas for the latter dcat:theme (which is a sub-property of dct:subject).

Since the INSPIRE Registry operates URI registers for topic categories and INSPIRE spatial data themes, and in order to keep the distinction existing in INSPIRE between topic categories and keywords, the proposal is as follows:

- Topic category is mapped to dct:subject, and expressed by the corresponding URI in the INSPIRE Registry.
- Keywords not associated with a controlled vocabulary will be mapped to dcat:keyword;
- Keywords whose controlled vocabulary is the one of the INSPIRE spatial data themes are mapped to dcat:theme, and expressed by the corresponding URI in the INSPIRE Registry.
- Keywords associated with other controlled vocabularies are mapped to dcat:theme, expressed as a skos:Concept associated with a skos:ConceptScheme, and annotated with the textual content and reference date(s) in the relevant INSPIRE metadata elements. Both skos:Concept and skos:ConceptScheme will be blank nodes (i.e., no URIs will be used to denote them).

In the last case, the representation of the information concerning the controlled vocabulary is illustrated in the following table.

Table 5: Mappings for metadata element 'originating controlled vocabulary'

Metadata Element			Proposed mapping	
Originating controlled vocabulary	Title		*skos:ConceptScheme*	*rdfs:label*
	Reference date	creation		*dct:created*
		last revision		*dct:modified*
		publication		*dct:issued*

Keyword in services

As far as service metadata are concerned, keywords can classify either a service or the datasets / series operated by the service itself. For the latter, INSPIRE Metadata Regulation requires using at least one of the keywords from the ISO 19119 code list of spatial data service categories.

Both DCAT and DCAT-AP do not foresee any specific property for keywords classifying either a service or the datasets / series operated by a service. Moreover, dcat:theme and dcat:keyword cannot be used for services, since their domain is restricted to dcat:Dataset.

In order to keep the distinction between these two types of keywords, the proposed solution is as follows:

- Keywords from the ISO 19119 codelist of spatial data service categories are mapped to dct:type, and expressed by the corresponding URI in the INSPIRE Registry.
- Keywords not associated with a controlled vocabulary will be mapped to dc:subject;
- Keywords whose controlled vocabulary is the one of the INSPIRE spatial data themes are mapped to dct:subject, and expressed by the corresponding URI in the INSPIRE Registry.
- Keywords associated with other controlled vocabularies are mapped to dct:subject and expressed as a skos:Concept associated with a skos:ConceptScheme, and annotated with the textual content and reference date(s) in the relevant INSPIRE metadata elements. Both skos:Concept and skos:ConceptScheme will be blank nodes (i.e., no URIs will be used to denote them).

In the last case, controlled vocabularies are represented as explained in the previous section.

Example

```
# Resource metadata in GeoDCAT-AP

## Datasets and series

[]  a dcat:Dataset ;

### Free keywords

    dcat:keyword "CHM"@en, "RDSI"@en ;

### Keywords from controlled vocabularies

    dcat:theme
      <http://inspire.ec.europa.eu/theme/lc> ,
      [ a skos:Concept ;
        skos:prefLabel "coniferous forest"@en ;
        skos:inScheme [ a skos:ConceptScheme ;
          rdfs:label "GEMET - Concepts, version 2.4"@en ;
          dct:issued "2010-01-13"^^xsd:date ] ] ;

### Topic categories

    dct:subject <http://inspire.ec.europa.eu/codelist/TopicCategory/geoscientificInformation> .

## Services

[]  a dcat:Catalog ;

### Free keywords

    dc:subject "hydrography"@en ;

### Keyword from ISO 19119 codelist of spatial data service categories
```

Example

```
    dct:type <http://inspire.ec.europa.eu/codelist/SpatialDataServiceCategory/humanGeographicViewer/> ;

### Keywords from controlled vocabularies

    dcat:theme <http://inspire.ec.europa.eu/theme/hy> ,
      [ a skos:Concept ;
        skos:prefLabel "Floods"@en ;
        skos:inScheme [ a skos:ConceptScheme ;
          rdfs:label "GEOSS - Societal Benefit Areas, version 1.0"@en ;
          dct:issued "2010-08-25"^^xsd:date ] ] .
```

```
<!— Resource metadata in ISO19139 -->


<gmd:MD_Metadata …
...
<gmd:topicCategory>

<gmd:MD_TopicCategoryCode>http://inspire.ec.europa.eu/codelist/TopicCategory/geoscientificInformation</gmd:MD_TopicCategoryCode>
</gmd:topicCategory>
...
</gmd:MD_Metadata>
```

4.4.9 Spatial data service type

See Section 4.4.3 on resource type.

4.4.10 Geographic bounding box - *Geographic location of the dataset (by 4 coordinates or by geographic identifier) (C)

In DCAT(-AP) [7] [5], the spatial coverage is specified by using property dct:spatial, having as range dct:Location.

When the area corresponding to the spatial coverage is denoted by a geometry, as in INSPIRE, DCAT-AP recommends the use of the Core Location Vocabulary [11], where this is done by using property locn:geometry, having as range a geometry specified as

- a URI - e.g., by using the geo URI scheme (IET RFC-5870) [12], or a geohash URI [13] [14];
- a syntax encoding scheme - e.g., geohashes [13] [14], WKT [ISO-19125], GML [15], KML [16], GeoJSON [17]; or
- a semantic representation - using vocabularies like W3C Lat/long [18] or schema.org [19].

It is worth noting that currently there is no agreement on a preferred format to be used in RDF for the representation of geometries. The provisional proposal is to represent the geometry as a GML literal (gml:Envelope), as specified in GeoSPARQL [20]. However, this is an issue that requires further investigation, both in the framework of the INSPIRE MIG and in relevant standardisation activities.

Example

```
# Resource metadata in GeoDCAT-AP
[] dct:spatial [ a dct:Location ;
       locn:geometry "<gml:Envelope srsName=\"http://www.opengis.net/def/EPSG/0/4326\">
                        <gml:lowerCorner>-10.58 34.56</gml:lowerCorner>
                        <gml:upperCorner>34.59 70.09</gml:upperCorner>
                      </gml:Envelope>"^^ogc:GMLLiteral ] .
```

```
<!— Resource metadata in ISO19139 -->
<gmd:MD_Metadata>
...
<gmd:identificationInfo>
<gmd:MD_DataIdentification>
<gmd:extent>
<gmd:EX_Extent>
<gmd:geographicElement>
<gmd:EX_GeographicBoundingBox>
     <gmd:extentTypeCode>
     <gco:Boolean>true</gco:Boolean>
     </gmd:extentTypeCode>
```

Example

```
      <gmd:westBoundLongitude>
      <gco:Decimal>-9.227701</gco:Decimal>
      </gmd:westBoundLongitude>
      <gmd:eastBoundLongitude>
      <gco:Decimal>2.687637</gco:Decimal>
      </gmd:eastBoundLongitude>
      <gmd:southBoundLatitude>
      <gco:Decimal>49.83726</gco:Decimal>
      </gmd:southBoundLatitude>
      <gmd:northBoundLatitude>
      <gco:Decimal>60.850441</gco:Decimal>
      </gmd:northBoundLatitude>
</gmd:EX_GeographicBoundingBox>
</gmd:geographicElement>
</gmd:EX_Extent>
</gmd:extent>
</gmd:MD_DataIdentification>
</gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

4.4.11 Temporal extent and metadata date –*Additional extent information for the dataset (vertical and temporal) (O) and *Metadata date stamp (M)

Temporal reference is a composite element consisting of the following possible child elements:

- temporal extent (temporal coverage);
- date of publication, last revision, and/or creation.

Based on DCAT(-AP) [7] [5], temporal extent is mapped to dct:temporal, having as range dct:PeriodOfTime. The time instant or interval is specified by using properties schema:startDate and schema:endDate, respectively.

By contrast, date of publication, last revision, and creation are mapped, respectively, to dct:issued, dct:modified, and dct:created.

DCAT(-AP) [7] [5] do not foresee a property equivalent to the INSPIRE metadata element metadata date. In INSPIRE, this element is defined as follows (Part B, §10.2)):

The date which specifies when the metadata record was created or updated.

Due to this ambiguity, the proposed mapping for this element is dct:modified.

Example

```
# Resource metadata in GeoDCAT-AP

## Creation, publication and last revision dates

[]  dct:created "2010-03-01"^^xsd:date ;
    dct:issued "2010-10-05"^^xsd:date ;
    dct:modified "2011-09-01"^^xsd:date ;

## Temporal extent

    dct:temporal [ a dct:PeriodOfTime ;
      schema:endDate "2006-12-31"^^xsd:date ;
      schema:startDate "2006-01-01"^^xsd:date ] ;

    foaf:isPrimaryTopicOf

# Metadata on metadata

## Metadata date

[ dct:modified "2012-08-13"^^xsd:date ] .
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata>
```

Example

```
...
<gmd:dateStamp>
     <gco:Date>2012-08-13</gco:Date>
</gmd:dateStamp>
...
<gmd:extent>
<gmd:EX_Extent>
<gmd:temporalElement>
<gmd:EX_TemporalExtent>
<gmd:extent>
     <gml:TimePeriod gml:id="w5633aaa">
          <gml:beginPosition>2006-01-01</gml:beginPosition>
          <gml:endPosition>2006-12-31</gml:endPosition>
     </gml:TimePeriod>
</gmd:extent>
</gmd:EX_TemporalExtent>
</gmd:temporalElement>
</gmd:EX_Extent>
</gmd:extent>
...
</gmd:MD_Metadata>
```

4.4.12Lineage - *Lineage (O)

In DCAT(-AP) [7] [5], no equivalent term is foreseen.

In the work on the alignment of INSPIRE metadata and the Dublin Core [8], the proposed mapping is dc:description. However, an equivalent property, namely, dct:description, is used in DCAT and DCAT-AP for what in INSPIRE corresponds to the resource abstract element.

For these reasons, the proposed candidate is dct:provenance. Since the range of dct:provenance is not a literal, but class dct:ProvenanceStatement, the free-text content of element "lineage" can be expressed by using rdfs:label, as illustrated in the DCMI user guide on publishing metadata [21].

Example

```
# Resource metadata in GeoDCAT-AP

[]  a dcat:Dataset ;
    dct:provenance [ a dct:ProvenanceStatement ;
      rdfs:label "Forest Map 2006 is derived from the IMAGE2006 (SPOT/LISS scenes) and CORINE2006 landcover dataset. In
                  addition, MODIS composites are used for the Forest type classification."@en ] .
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata>
...
<gmd:dataQualityInfo>
<gmd:DQ_DataQuality>
<gmd:lineage>
     <gmd:LI_Lineage>
     <gmd:statement>
     <gco:CharacterString> Forest Map 2006 is derived from the IMAGE2006 (SPOT/LISS scenes) and CORINE2006 landcover
dataset. In addition, MODIS composites are used for the Forest type classification.</gco:CharacterString>
     </gmd:statement>
     </gmd:LI_Lineage>
</gmd:lineage>
</gmd:DQ_DataQuality>
</gmd:dataQualityInfo>
...
</gmd:MD_Metadata>
```

4.4.13 Spatial resolution – Spatial resolution of the dataset (O)

In DCAT(-AP) [7] [5], no equivalent term is foreseen.

There are currently no candidates in existing vocabularies to represent such metadata elements.

It is worth noting that these elements are describing properties that in DCAT and DCAT-AP might be referred to the distribution(s) of a dataset, and not to the dataset itself – e.g., a dataset with distributions using different spatial resolution, coordinate reference systems, etc.

No RDF binding available.

Example

```
# Resource metadata in GeoDCAT-AP

/
```

```
<!– Resource metadata in ISO19139 -->

<gmd:spatialResolution gco:nilReason="">
  <gmd:MD_Resolution>{1,1}</gmd:MD_Resolution>
</gmd:spatialResolution>
```

4.4.14 Conformity

DCAT-AP [5] provides a single candidate, dct:conformsTo, which however can be used to map only a conformity of degree conformant.

Considering how conformity must be expressed (see the INSPIRE Metadata Regulation, Part B, §7), a possible suitable candidate is the W3C Evaluation and Report Language (EARL) [22].

The EARL mappings for the "conformity" INSPIRE metadata element are illustrated in the following table. The degree of conformity can be expressed by property earl:outcome, using the relevant code list values available from the INSPIRE Registry.

Table 6: Mappings for metadata element 'conformity'

<table>
<tr><th colspan="4">Metadata element</th><th colspan="3">Proposed mapping</th></tr>
<tr><td rowspan="5">Conformity</td><td rowspan="4">Specification</td><td colspan="2">Title</td><td rowspan="5">earl:Assertion</td><td rowspan="4">earl:test</td><td>dct:title</td></tr>
<tr><td rowspan="3">Reference date</td><td>creation</td><td>dct:created</td></tr>
<tr><td>last revision</td><td>dct:modified</td></tr>
<tr><td>publication</td><td>dct:issued</td></tr>
<tr><td colspan="3">Degree</td><td colspan="2">earl:result + earl:outcome</td></tr>
</table>

In order to grant interoperability with DCAT-AP, when conformity is of degree "conformant", the proposal is to use both EARL and dct:conformsTo.

Example

```
# Resource metadata in GeoDCAT-AP

[]  dct:conformsTo [
      dct:title "COMMISSION REGULATION (EC) No 976/2009 of 19 October 2009 implementing Directive 2007/2/EC of
the European Parliament and of the Council as regards the Network Services"@en ;
      dct:issued "2009-10-20"^^xsd:date ] ;
    wdrs:describedby [ a earl:Assertion ;
      earl:result [ a earl:TestResult ;
        earl:outcome <http://inspire.ec.europa.eu/codelist/DegreeOfConformity/conformant> ] ;
      earl:test [ dct:issued "2009-10-20"^^xsd:date ;
        dct:title "COMMISSION REGULATION (EC) No 976/2009 of 19 October 2009 implementing Directive 2007/2/EC of
the European Parliament and of the Council as regards the Network Services"@en ] ] .
```

Example

```
<!— Resource metadata in ISO19139 -->

<gmd:result>
<gmd:DQ_ConformanceResult>
  <gmd:specification>
      <gmd:CI_Citation>
        <gmd:title>
            <gco:CharacterString>COMMISSION REGULATION (EC) No 976/2009 of 19 October 2009 implementing
Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services
      </gco:CharacterString>
        </gmd:title>
        <gmd:date>
            <gmd:CI_Date>
              <gmd:date>
                  <gco:Date>2009-10-20</gco:Date>
              </gmd:date>
              <gmd:dateType>
                  <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/codelist/ML_gmxCo
delists.xml#CI_DateTypeCode" codeListValue="publication">publication</gmd:CI_DateTypeCode>
              </gmd:dateType>
            </gmd:CI_Date>
        </gmd:date>
      </gmd:CI_Citation>
  </gmd:specification>
  <gmd:explanation>
      <gco:CharacterString> </gco:CharacterString>
  </gmd:explanation>
  <gmd:pass><gco:Boolean>true</gco:Boolean></gmd:pass>
</gmd:DQ_ConformanceResult>
</gmd:result>
```

4.4.15 Conditions for access and use and limitations on public access

In DCAT(-AP) [7] [5], this information is specified on (a) data catalogues (services) and on (b) the distribution(s) of a dataset, and not on the dataset itself. The principle is that different dataset distributions may be associated with different licensing terms.

Both DCAT and DCAT-AP foresee two properties to express licensing terms for data catalogues and data distributions:

- dct:license, which is meant to be used to specify the URI of the relevant licence;
- dct:rights, which can be used to specify the licensing terms also with free text.

Since the two relevant INSPIRE metadata elements express licensing terms as free text, the suitable candidate is dct:rights. However, using the same property for both will result in losing the distinction between the two elements in the original metadata.

In order to address this issue, and following the work on the alignment between INSPIRE and Dublin Core [8], the proposed candidates for conditions for access and use and limitations on public access are, respectively, dct:rights and dct:accessRights. This does not break compatibility with DCAT-AP, which is also formally granted by the fact that dct:accessRights is a sub-property of dct:rights.

Since the range of both these properties is not a literal, but class dct:RightsStatement, the free-text content of the corresponding INSPIRE metadata elements can be expressed by using rdfs:label, as illustrated in [21].

Example

```
# Resource metadata in GeoDCAT-AP

[] dcat:distribution [ a dcat:Distribution ;
     dct:rights [ a dct:RightsStatement ;
       rdfs:label "Reuse is authorised according to the European Commission legal notice at
                   http://ec.europa.eu/geninfo/legal_notices_en.htm"@en ] ;
     dct:accessRights [ a dct:RightsStatement ;
       rdfs:label "no limitation"@en ] ] .
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata>
...
```

Example

```
<gmd:MD_LegalConstraints>
     <gmd:useLimitation>
     <gco:CharacterString>Refer to: R.D. Morton, C. Rowland, C. Wood, L. Meek, C. Marston, G. Smith, R. Wadsworth, I.
Simpson. July 2011 CS Technical Report No 11/07: Final Report for LCM2007 - the new UK land cover map. NERC/Centre for
Ecology & Hydrology (CEH Project Number NEC03259).</gco:CharacterString>
     </gmd:useLimitation>
     <gmd:accessConstraints>
     <MD_RestrictionCode codeListValue="license"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Codelist/ML_gmxCodelists.xml#
MD_RestrictionCode" xmlns="http://www.isotc211.org/2005/gmd"/>
     </gmd:accessConstraints>

</gmd:MD_LegalConstraints>
...
</gmd:MD_Metadata>
```

4.4.16 Responsible party and metadata point of contact - *Dataset responsible party and *Metadata point of contact (M)

DCAT(-AP) [7] [5] foresee properties to denote the publisher and the contact point for a dataset.

By contrast, the INSPIRE Metadata Regulation foresees 11 possible relationships between a resource (a dataset, a dataset series, a service) and an agent (organisation), plus one for metadata. For some of them, suitable candidates exist from widely used vocabularies (in particular, [DCTerms]). However, for some of them no suitable candidate is available in the existing vocabularies (in particular, for roles “user” and “processor”).

A possible solution is to support many-to-1 mappings whenever possible. For instance, roles “publisher” and “provider” could be both mapped to dct:publisher. However, besides losing the original semantics, this would result in creating ambiguities (e.g., two dct:publisher’s) that would not help interoperability with [DCAT-AP]. Therefore, it would be preferable to support 1-to-1 mappings only.

Another possible way of representing responsible organisations is to use the W3C PROV ontology [23], to specify the relationship between the resource and the responsible organisation. The W3C vCard ontology [24] can then be used to specify the contact information

concerning the responsible party. Finally, the responsible party role can be specified by using dct:type, and using the relevant code list values from the INSPIRE Registry.

These mappings are illustrated in the following table.

Table 7: Mappings for metadata element 'responsible party'

Metadata element			Proposed mapping		
Responsible party	Responsible party	Organisation name	*prov:Attribution*	*vcard:Kind*	*vcard:organization-name*
		Contact email address			*vcard:hasEmail*
	Responsible party role			*dct:type*	

This option has the advantage of preserving the semantics in the original metadata, and of preventing information loss. However, it would not help interoperability with data sources outside INSPIRE.

For these reason, the proposed solution is as follows:

- Represent responsible organisations by using the PROV ontology.
- If suitable candidates exist from widely used vocabularies, use them to represent the corresponding responsible parties and their roles, based on an agreed definition of 1-to-1 mappings.

The following table lists the proposed mappings for responsible party roles, taking into account only widely used vocabularies.

Table 8 Responsible party roles

INSPIRE Metadata Regulation [1]	Responsible party role	Description	Proposed RDF mapping	Mapping status
Part B §10.1	Metadata point of contact	This is the description of the organisation responsible for the creation and maintenance of the metadata.	dcat:contactPoint	Stable

INSPIRE Metadata Regulation [1]	Responsible party role	Description	Proposed RDF mapping	Mapping status
Part B §6.1	Resource provider	Party that supplies the resource.	N/A	
Part B §6.2	Custodian	Party that accepts accountability and responsibility for the data and ensures appropriate care and maintenance of the resource.	N/A	
Part B §6.3	Owner	Party that owns the resource.	dct:rightsHolder	Stable
Part B §6.4	User	Party who uses the resource.	N/A	
Part B §6.5	Distributor	Party who distributes the resource	N/a	
Part B §6.6	Originator	Party who created the resource.	dcat:creator	Stable
Part B §6.7	Point of contact	Party who can be contacted for acquiring knowledge about or acquisition of the resource.	dcat:contactPoint	Stable
Part B §6.8	Principal investigator	Key party responsible for gathering information and conducting research	N/A	
Part B §6.9	Processor	Party who has processed the data in a manner such that the resource has been modified.	N/A	
Part B §6.10	Publisher	Party who published the resource	dct:publisher	Stable
Part B §6.11	Author	Party who authored the resource.	N/A	

Example

```
# Resource metadata in GeoDCAT-AP

[] dct:rightsHolder [ a foaf:Organization ;
```

Example

```
     foaf:mbox <mailto:efdac@jrc.ec.europa.eu> ;
     foaf:name "European Union"@en ] ;
   prov:qualifiedAttribution [ a prov:Attribution ;
     dct:type <http://inspire.ec.europa.eu/codelist/ResponsiblePartyRole/resourceProvider> ;
       prov:agent [ a vcard:Kind ;
         vcard:hasEmail <mailto:efdac@jrc.ec.europa.eu> ;
         vcard:organization-name "European Commission, Joint Research Centre"@en ] ] ,
     [ a prov:Attribution ;
       dct:type <http://inspire.ec.europa.eu/codelist/ResponsiblePartyRole/author> ;
       prov:agent [ a vcard:Kind ;
         vcard:hasEmail <mailto:efdac@jrc.ec.europa.eu> ;
         vcard:organization-name " European Commission, Joint Research Centre "@en ] ] ,
     [ a prov:Attribution ;
       dct:type <http://inspire.ec.europa.eu/codelist/ResponsiblePartyRole/owner> ;
       prov:agent [ a vcard:Kind ;
         vcard:hasEmail <mailto:efdac@jrc.ec.europa.eu> ;
         vcard:organization-name "European Union"@en ] ] ;

    foaf:isPrimaryTopicOf

# Metadata on metadata

[  dcat:contactPoint [ a vcard:Kind ;
     vcard:hasEmail <mailto:efdac@jrc.ec.europa.eu> ;
     vcard:organization-name "European Commission, Joint Research Centre"@en ] ;
   prov:qualifiedAttribution [ a prov:Attribution ;
     dct:type <http://inspire.ec.europa.eu/codelist/ResponsiblePartyRole/pointOfContact> ;
     prov:agent [ a vcard:Kind ;
       vcard:hasEmail <mailto:efdac@jrc.ec.europa.eu> ;
       vcard:organization-name "European Commission, Joint Research Centre"@en ] ] ] .
```

```
<!— Resource metadata in ISO19139 -->
```

Example

```
<gmd:MD_Metadata>
...
<gmd:pointOfContact>
<gmd:CI_ResponsibleParty>
     <gmd:individualName>
     <gco:CharacterString>Morton, D</gco:CharacterString>
     </gmd:individualName>
     <gmd:organisationName>
     <gco:CharacterString>Centre for Ecology & Hydrology</gco:CharacterString>
     </gmd:organisationName>
     <gmd:contactInfo>
     <gmd:CI_Contact>
     <gmd:address>
     <gmd:CI_Address>
     <gmd:deliveryPoint>
     <gco:CharacterString>Lancaster Environment Centre, Library Avenue, Bailrigg</gco:CharacterString>
     </gmd:deliveryPoint>
     <gmd:city>
     <gco:CharacterString>Lancaster</gco:CharacterString>
     </gmd:city>
     <gmd:administrativeArea>
     <gco:CharacterString>Lancashire</gco:CharacterString>
     </gmd:administrativeArea>
     <gmd:postalCode>
     <gco:CharacterString>LA1 4AP</gco:CharacterString>
     </gmd:postalCode>
     <gmd:country>
     <gco:CharacterString>United Kingdom</gco:CharacterString>
     </gmd:country>
     <gmd:electronicMailAddress>
     <gco:CharacterString>danm@ceh.ac.uk </gco:CharacterString>
     </gmd:electronicMailAddress>
     </gmd:CI_Address>
```

Example

```
     </gmd:address>
     </gmd:CI_Contact>
     </gmd:contactInfo>
     <gmd:role>
     <gmd:CI_RoleCode codeListValue="pointOfContact"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Codelist/ML_gmxCodelists.xml#
CI_RoleCode">pointOfContact</gmd:CI_RoleCode>
     </gmd:role>
</gmd:CI_ResponsibleParty>
</gmd:pointOfContact>

...
</gmd:MD_Metadata>
```

4.4.17 *Metadata file identifier (O), *Metadata standard name (O), *Metadata standard version (O), Metadata characterset (C)

DCAT-AP includes the notion of "catalogue record" (dcat:CatalogRecord), which is meant to be, quoting the DCAT-AP specification (page 16), "*A description of a Dataset's entry in the Catalogue.*" As such, dcat:CatalogRecord does not completely correspond to the purpose of the INSPIRE metadata elements concerning the metadata point of contact, date and language, which instead are meant to provide information on the provenance and characteristics of metadata records. For this reason, dcat:CatalogRecord is not suitable for modelling them.

Another issue concerns how to link resource metadata to "metadata on metadata". The proposed solution is to use foaf:isPrimaryTopicOf [25], based on common practices, since this property is widely used for this purpose (and also to link a catalogue record to the corresponding dataset).

Example

```
# Resource metadata in GeoDCAT-AP
```

Example

```
[]
    foaf:isPrimaryTopicOf
# Metadata on metadata
[] .
```

```
<!– Resource metadata in ISO19139 -->
```

4.4.18 Metadata point of contact - Metadata point of contact (M)

See Section 4.4.16.

4.4.19 Metadata date - *Metadata date stamp (M)

See Section 4.4.11.

4.4.20 Metadata language - *Metadata language (C)

See Section 4.4.7.

4.4.21 Coordinate reference systems – Reference System (O)

In DCAT(-AP) [7] [5], no equivalent term is foreseen. This is also the case for the NeoGeo [26], GeoSPARL [20], and Core Location Vocabulary [11].

No RDF binding available.

Example

```
# Resource metadata in GeoDCAT-AP

/
```

Example

```
<!— Resource metadata in ISO19139 -->

<gmd:referenceSystemInfo>
    <gmd:MD_ReferenceSystem>
        <gmd:referenceSystemIdentifier>
            <gmd:RS_Identifier>
                <gmd:code>
                    <gco:CharacterString>urn:ogc:def:crs:EPSG:4326</gco:CharacterString>
                </gmd:code>
                <gmd:version>
                    <gco:CharacterString>6.18.3</gco:CharacterString>
                </gmd:version>
            </gmd:RS_Identifier>
        </gmd:referenceSystemIdentifier>
    </gmd:MD_ReferenceSystem>
</gmd:referenceSystemInfo>
```

4.4.22Temporal reference systems - Reference System (0)

In DCAT(-AP) [7] [5], no equivalent term is foreseen.

There are currently no candidates in existing vocabularies to represent such metadata elements.

It is worth noting that these elements are describing properties that in DCAT and DCAT-AP might be referred to the distribution(s) of a dataset, and not to the dataset itself – e.g., a dataset with distributions using different spatial resolution, coordinate reference systems, etc.

No RDF binding available.

Example

```
# Resource metadata in GeoDCAT-AP
```

Example

```
/

<!— Resource metadata in ISO19139 -->
```

4.4.23 Character encoding - Dataset character set (C)

In DCAT and DCAT-AP, the specification of the character encoding of a dataset is not explicitly foreseen.

According to RFC 4288 [27], the character set can be part of the media type specification, but only for type “text”. By contrast, in INSPIRE the charset can be specified also for other media types.

The W3C Content vocabulary [28] provides a possibly suitable candidate, namely, property cnt:characterEncoding, taking as value the character set names in the IANA register [29]. The proposal is to use this property.

Example

```
# Resource metadata in GeoDCAT-AP

[]  a dcat:Dataset ;
    dcat:distribution [ a dcat:Distribution ;
      cnt:characterEncoding "UTF-8"^^xsd:string ] .

<!— Resource metadata in ISO19139 -->

<MD_Metadata>
<!-- portions of metadata not shown -->
<language>
<LanguageCode codeList="http://www.loc.gov/standards/iso6392/"
codeListValue="eng"> English </LanguageCode>
</language>
```

Example

```
<characterSet>
<MD_CharacterSetCode codeList="resources/codelist/gmxcodelists.xml#MD_CharacterSetCode" codeListValue="utf8"> UTF-8
</MD_CharacterSetCode>
</characterSet>
<!-- portions of metadata not shown -- >
</MD_Metadata>
```

4.4.24 Encoding - Distribution format (O)

In both DCAT and DCAT-AP, this information is specified for the distribution(s) of a dataset, and not for the dataset itself.

Two properties are foreseen:

- dcat:mediaType: to be used when the format corresponds to one of the media types registered by IANA [30]
- dct:format: to be used in all the other cases

The same approach can be proposed for INSPIRE metadata.

In both cases, DCAT-AP recommends the use of the URI file type register [31], operated by the Metadata Registry of the Publications Office of the EU, to specify formats/media types. However, this register does not include many of the formats/media types typically used for INSPIRE data – as, e.g., GML, shapefiles and raster files – which are available through the INSPIRE media type register [32].

The proposal is then to use the file type register of the Publications Office, if it includes the relevant format/media type, and the INSPIRE Media Types otherwise.

Example

```
# Resource metadata in GeoDCAT-AP
```

Example

```
[]  a dcat:Dataset ;
    dcat:distribution [ a dcat:Distribution ;
      dcat:mediaType <http://publications.europa.eu/resource/authority/file-type/TIFF> ] .
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata>
...
<gmd:distributionInfo>
<gmd:MD_Distribution>
<gmd:distributionFormat>
     <gmd:MD_Format>
     <gmd:name>
     <gco:CharacterString>GeoTIFF</gco:CharacterString>
     </gmd:name>
     <gmd:version>
     <gco:CharacterString>1.0</gco:CharacterString>
     </gmd:version>
     </gmd:MD_Format>
</gmd:distributionFormat>
...
</gmd:MD_Distribution>
</gmd:distributionInfo>
...
</gmd:MD_Metadata>
```

4.4.25*Spatial representation type (O)

In DCAT(-AP) [7] [5], no equivalent term is foreseen.

No RDF binding available.

Example
Resource metadata in GeoDCAT-AP /
<!– Resource metadata in ISO19139 --> <gmd:spatialRepresentationType> <gmd:MD_SpatialRepresentationTypeCode codeListValue="vector" codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/codelist/gmxCodelists.xml#MD_SpatialRepresentat </gmd:spatialRepresentationType>

4.4.26 Data quality – logical consistency – topological consistency

In DCAT nor DCAT-AP equivalent terms are foreseen.

There are currently no candidates in existing vocabularies to represent such metadata elements.

It is worth noting that these elements are describing properties that in DCAT and DCAT-AP might be referred to the distribution(s) of a dataset, and not to the dataset itself – e.g., a dataset with distributions using different spatial resolution, coordinate reference systems, etc.

Example
Resource metadata in GeoDCAT-AP /
<!– Resource metadata in ISO19139 -->

4.4.27 Data quality – logical consistency – conceptual consistency

In DCAT(-AP) [7] [5], no equivalent term is foreseen.

Example

```
# Resource metadata in GeoDCAT-AP

[]  wdrs:describedby [ a earl:Assertion ;
        earl:result [ a earl:TestResult ;
        earl:outcome earl:Passed ] ;
        earl:test [
                dct:issued "2009-10-20"^^xsd:date ;
                dct:title "Logical consistency – conceptual consistency"@en ] ] .
```

```
<!— Resource metadata in ISO19139 -->

<gmd:MD_Metadata>
...
<gmd:dataQualityInfo>
     <gmd:DQ_DataQuality>
     <gmd:scope>
     <gmd:DQ_Scope>
     <gmd:level>
     <MD_ScopeCode codeListValue="dataset"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Codelist/ML_gmxCodelists.xml#
MD_ScopeCode" xmlns="http://www.isotc211.org/2005/gmd"/>
     </gmd:level>
     <gmd:levelDescription>
     <gmd:MD_ScopeDescription>
     <gmd:other>
     <gco:CharacterString>dataset</gco:CharacterString>
     </gmd:other>
```

Example

```
      </gmd:MD_ScopeDescription>
      </gmd:levelDescription>
      </gmd:DQ_Scope>
      </gmd:scope>
      <gmd:lineage>
      <gmd:LI_Lineage>
      <gmd:statement>
      <gco:CharacterString>LCM2007 uses a spatial framework based on OS MasterMap (R). MasterMap was generalised to remove
unnecessary detail, then the framework was segmented according to the underlying satellite data to split areas of non-
uniform landscape. The data was classified according to a parcel-based supervised maximum likelihood classification
procedure. The raster products are derived from the vector products. </gco:CharacterString>
      </gmd:statement>
      </gmd:LI_Lineage>
      </gmd:lineage>
      </gmd:DQ_DataQuality>
</gmd:dataQualityInfo>
...
</gmd:MD_Metadata>
```

4.4.28 Maintenance information

In ISO 19115, element “Maintenance information” is meant mainly to describe how frequently a resource is updated.

DCAT and DCAT-AP, the update frequency is expressed through dct:accrualPeriodicity, with the frequency codes defined in the Dublin Core Collection Description Frequency Vocabulary[4], which can be partially mapped to the ones used in ISO 19115, as shown in the following table (the missing alignments are in bold):

[4] http://dublincore.org/groups/collections/frequency/

ISO 19115 - MD_MaintenanceFrequencyCode	Dublin Core Collection Description Frequency Vocabulary
continual	continuous
daily	daily
weekly	weekly
fortnightly	biweekly
monthly	monthly
quarterly	quarterly
biannually	biennial
annually	annual
asNeeded	-
Irregular	irregular
notPlanned	-
unknown	-
-	triennial
-	semiannual
-	threeTimesAYear
-	bimonthly
-	semimonthly
-	threeTimesAMonth

ISO 19115 - MD_MaintenanceFrequencyCode	Dublin Core Collection Description Frequency Vocabulary
-	semiweekly
-	threeTimesAWeek

Example

 # Resource metadata in GeoDCAT-AP

<!— Resource metadata in ISO19139 -->

```
<gmd:MD_MaintenanceInformation id="" uuid="">
  <gmd:maintenanceAndUpdateFrequency gco:nilReason="">{1,1}</gmd:maintenanceAndUpdateFrequency>
  <gmd:dateOfNextUpdate gco:nilReason="">{0,1}</gmd:dateOfNextUpdate>
  <gmd:userDefinedMaintenanceFrequency gco:nilReason="">{0,1}</gmd:userDefinedMaintenanceFrequency>
  <gmd:updateScope gco:nilReason="">{0,unbounded}</gmd:updateScope>
  <gmd:updateScopeDescription gco:nilReason="">{0,unbounded}</gmd:updateScopeDescription>
  <gmd:maintenanceNote gco:nilReason="">{0,unbounded}</gmd:maintenanceNote>
  <gmd:contact xlink:actuate="" xlink:arcrole="" xlink:href="" gco:nilReason="" xlink:role="" xlink:show="" xlink:title=""
xlink:type="simple" uuidref="">{0,unbounded}</gmd:contact>
</gmd:MD_MaintenanceInformation>
```

5 NEW RDF CLASSES AND PROPERTIES

This section defines the *additional* classes introduced by GeoDCAT-AP that are not defined by related specifications.

Class name	Usage note for the Application Profile	URI	Reference

This section lists the *additional* properties introduced by GeoDCAT-AP, in addition to the DCAT-AP specification.

Property name	Usage note for the Application Profile	URI	Reference

6 CONTROLLED VOCABULARIES

This section lists the *referenced* controlled vocabularies introduced by GeoDCAT-AP.

Section 8.1 of the final version of the DCAT-AP specification sets out a number of requirements to be satisfied by controlled vocabularies used in metadata conformant with DCAT-AP. The relevant INSPIRE controlled vocabularies available through the INSPIRE Registry satisfy these requirements.

Table 9: Proposed controlled vocabularies

Element(s) in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	Controlled Vocabulary	Comment
Resource language **Metadata language** (ISO 639-2)	Language Named Authority List [33] operated by the Metadata Registry of the Publications Office of the EU http://publications.europa.eu/resource/authority/language	
Resource type	Register operated by the INSPIRE Registry for resource types defined in ISO 19139 http://inspire.ec.europa.eu/codelist/ResourceType	
Spatial data service type	Register operated by the INSPIRE Registry for service types http://inspire.ec.europa.eu/codelist/SpatialDataServiceType	
Topic category	Register operated by the INSPIRE Registry for topic categories defined in ISO 19115 http://inspire.ec.europa.eu/codelist/TopicCategory	
Keyword denoting one of the INSPIRE spatial data themes	INSPIRE spatial data theme register operated by the INSPIRE Registry http://inspire.ec.europa.eu/theme	

Element(s) in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	Controlled Vocabulary	Comment
Keyword denoting one of the spatial data service categories	Register operated by the INSPIRE Registry for spatial data service categories defined in ISO 19119 http://inspire.ec.europa.eu/codelist/SpatialDataServiceCategory	
Conformity degree	Register operated by the INSPIRE Registry for degrees of conformity http://inspire.ec.europa.eu/codelist/DegreeOfConformity	
Responsible party role	Register operated by the INSPIRE Registry for responsible party roles http://inspire.ec.europa.eu/codelist/ResponsiblePartyRole	
Encoding	*Register of media types* [32] *used for datasets in INSPIRE download services* *http://inspire.ec.europa.eu/media-types*	
Encoding	*File type Named Authority List* [31] *operated by the Metadata Registry of the Publications Office of the EU* *http://publications.europa.eu/resource/authority/file-type*	
Coordinate reference system	Register of coordinate reference systems included in the European Petroleum Survey Group (EPSG) Geodetic Parameter Dataset. http://www.opengis.net/def/crs/EPSG/ http://www.epsg-registry.org/	
Update frequency	Dublin Core Collection Description Frequency Vocabulary [34]	

Element(s) in INSPIRE Metadata Regulation [1] *ISO19115:2003 Core Profile	Controlled Vocabulary	Comment
	http://dublincore.org/groups/collections/frequency/	

7 CONFORMANCE STATEMENT

This section will list the requirements that provides and receivers of metadata must meet in order to claim conformance to this specification.

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Alejandra Sanchez			
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Andrea Perego	Joint Research Centre	JRC Data portal	IT
Angelos Tzotsos	IMIS Athena Research Centre		
Antonio Rotundo	Agenzia per l'Italia Digitale		IT
Gabriele Ciasulo			IT
Armin Retterath	Landesamt für Vermessung und Geobasisinformation Rheinland-Pfalz		IT
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Pierluigi Cara	Italian Civil Protection – Open Data Group		
Pieter Colpaert	iMinds/Ghent University/Open Knowledge Belgium		
Polyxeni Mylona	Publications Office of the EU		EU
Sonia Castro	Red.es		ES
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Vassilios Peristeras	European Commission		EU
Willem Van Gemert	Publications Office of the EU		EU
Wouter Schaubroeck	HP		
Yg Versil			

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[2] European Commission, "Commission Regulation (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services," 2010. [Online]. Available: http://eur-lex.europa.eu/eli/reg/com/2010/1089.

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