



*SC118DI07171*

**DCAT Application Profile for data portals in Europe**  
**Version 1.1**



## Document Metadata

Property	Value
Date	2015-10-23
Status	Final
Version	1.1
Rights	© 2015 European Union
Licence	ISA Open Metadata Licence v1.1, retrievable from <a href="https://joinup.ec.europa.eu/category/licence/isa-open-metadata-licence-v11">https://joinup.ec.europa.eu/category/licence/isa-open-metadata-licence-v11</a> .
Access URL	This specification can be downloaded from the Joinup web site: <a href="https://joinup.ec.europa.eu/node/137964/">https://joinup.ec.europa.eu/node/137964/</a>

### Disclaimer

This specification was prepared for the ISA programme by:  
PwC EU Services

The views expressed in this draft specification are purely those of the authors and may not, in any circumstances, be interpreted as stating an official position of the European Commission. The European Commission does not guarantee the accuracy of the information included in this study, nor does it accept any responsibility for any use thereof.

Reference herein to any specific products, specifications, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favouring by the European Commission.

All care has been taken by the author to ensure that s/he has obtained, where necessary, permission to use any parts of manuscripts including illustrations, maps, and graphs, on which intellectual property rights already exist from the titular holder(s) of such rights or from her/his or their legal representative.

## Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>3</b>
1.1	CONTEXT .....	3
1.2	SCOPE OF THE REVISION.....	3
1.3	CHANGE MANAGEMENT PROCESS .....	4
1.4	THE DCAT SPECIFICATION .....	6
<b>2</b>	<b>TERMINOLOGY USED IN THE DCAT APPLICATION PROFILE.....</b>	<b>7</b>
<b>3</b>	<b>APPLICATION PROFILE CLASSES .....</b>	<b>9</b>
3.1	MANDATORY CLASSES.....	9
3.2	RECOMMENDED CLASSES.....	9
3.3	OPTIONAL CLASSES.....	9
<b>4</b>	<b>DCAT APPLICATION PROFILE PROPERTIES PER CLASS.....</b>	<b>11</b>
4.1	CATALOGUE .....	11
4.2	CATALOGUE RECORD .....	11
4.3	DATASET .....	12
4.4	DISTRIBUTION .....	14
4.5	AGENT .....	15
4.6	CATEGORY SCHEME .....	15
4.7	CATEGORY .....	15
4.8	CHECKSUM .....	15
4.9	IDENTIFIER .....	15
4.10	LICENCE DOCUMENT .....	15
4.11	PERIOD OF TIME.....	16
<b>5</b>	<b>CONTROLLED VOCABULARIES .....</b>	<b>17</b>
5.1	REQUIREMENTS FOR CONTROLLED VOCABULARIES .....	17
5.2	CONTROLLED VOCABULARIES TO BE USED .....	17
5.3	OTHER CONTROLLED VOCABULARIES .....	18
5.4	LICENCE VOCABULARIES .....	19
<b>6</b>	<b>CONFORMANCE STATEMENT.....</b>	<b>20</b>
6.1	PROVIDER REQUIREMENTS .....	20
6.2	RECEIVER REQUIREMENTS .....	20
<b>7</b>	<b>AGENT ROLES .....</b>	<b>21</b>
<b>8</b>	<b>ACCESSIBILITY AND MULTILINGUAL ASPECTS .....</b>	<b>23</b>
<b>9</b>	<b>ACKNOWLEDGEMENTS .....</b>	<b>24</b>
	<b>ANNEX I. QUICK REFERENCE OF CLASSES AND PROPERTIES .....</b>	<b>26</b>
	<b>ANNEX II. DATASET THEME VOCABULARY .....</b>	<b>27</b>
	<b>ANNEX III CHANGE LOG .....</b>	<b>28</b>

## 1 INTRODUCTION

### 1.1 Context

This document has been prepared in the context of Action 1.1 – Improving semantic interoperability in European eGovernment systems<sup>1</sup> of the European Commission's Interoperability Solutions for European Public Administrations (ISA) programme<sup>2</sup>.

Studies conducted on behalf of the European Commission<sup>3</sup> show that businesses and citizens still face difficulties in finding and re-using public sector information. In its communication on Open Data<sup>4</sup> of 12 December 2011, the European Commission states that the availability of the information in a machine-readable format as well as a thin layer of commonly agreed metadata could facilitate data cross-reference and interoperability and therefore considerably enhance its value for reuse.

Much of the public sector information that would benefit from interoperability is published as datasets in data portals. Therefore, an agreement on a common format for data exchange would support the sharing, discovery and re-use of this data.

This document is the result of a revision in 2015 of the first version of the agreement that was published in September 2013<sup>5</sup>.

### 1.2 Scope of the revision

The objective of this work is to produce an updated release of the DCAT Application Profile based on requests for change coming from real-world implementations of the specification.

The Application Profile specified in this document is based on the specification of the **Data Catalog Vocabulary** (DCAT) developed under the responsibility of the Government Linked Data Working Group<sup>6</sup> at W3C. The work on DCAT was initiated<sup>7</sup> at the Digital Enterprise Research Institute (DERI) and the Greek National Centre for Public Administration and Decentralization. DCAT is an RDF<sup>8</sup> vocabulary designed to facilitate interoperability between data catalogues published on the Web. Additional classes and properties from other well-known vocabularies are re-used where necessary.

The Working Group that worked on the revision of the Application Profile took into account the following criteria in deciding which changes to make to the specification:

- (1) **Improve the discovery of datasets.** Priority was given to those aspects that can be used in searching and navigating and requests that had to do with dataset management and operational issues were not considered. Some

---

<sup>1</sup> European Commission. Interoperability Solutions for European Public Administrations (ISA). Improving semantic interoperability in European eGovernment systems.

[http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-1action\\_en.htm](http://ec.europa.eu/isa/actions/01-trusted-information-exchange/1-1action_en.htm)

<sup>2</sup> European Commission. Interoperability Solutions for European Public Administrations (ISA). [http://ec.europa.eu/isa/index\\_en.htm](http://ec.europa.eu/isa/index_en.htm)

<sup>3</sup> Review of recent studies on PSI reuse and related market developments, Graham Vickery. [http://ec.europa.eu/information\\_society/policy/psi/docs/pdfs/report/final\\_version\\_study\\_psi.docx](http://ec.europa.eu/information_society/policy/psi/docs/pdfs/report/final_version_study_psi.docx)

<sup>4</sup> European Commission. Communication on Open Data. [http://ec.europa.eu/information\\_society/policy/psi/docs/pdfs/opendata2012/open\\_data\\_communication/en.pdf](http://ec.europa.eu/information_society/policy/psi/docs/pdfs/opendata2012/open_data_communication/en.pdf)

<sup>5</sup> [https://joinup.ec.europa.eu/asset/dcat\\_application\\_profile/asset\\_release/dcat-application-profile-data-portals-europe-final](https://joinup.ec.europa.eu/asset/dcat_application_profile/asset_release/dcat-application-profile-data-portals-europe-final)

<sup>6</sup> W3C. Government Linked Data (GLD) Working Group. [http://www.w3.org/2011/gld/wiki/Main\\_Page](http://www.w3.org/2011/gld/wiki/Main_Page)

<sup>7</sup> Fadi Maali, Richard Cyganiak, Vassilios Peristeras: Enabling Interoperability of Government Data Catalogues. EGOV 2010: 339-350.

<sup>8</sup> W3C. Resource Description Framework (RDF). <http://www.w3.org/RDF/>

implementation advice of a general nature was included but no further deployment advice for specific operational environments was added.

- (2) **Ensure compliance with DCAT.** Requests that aimed at changing the model of DCAT or replacing properties that already existed in DCAT by others with similar semantics were not taken into account. Only elements have been added that could be re-used from existing namespaces and no new terms were created in a new namespace.
- (3) **Ensure simplicity: keep a narrow scope.** Only elements were added for which there was evidence that they were needed and that the information was commonly available in existing systems; if there were several ways to meet a requirement, the simplest one was chosen.
- (4) **Ensure application domain neutrality.** Requests that were only relevant for certain types of datasets were not considered. In particular, requirements that were related to geographic characteristics and to handling of statistical data were referred to parallel activities, GeoDCAT-AP<sup>9</sup> and StatDCAT-AP.

The work does not cover implementation issues like mechanisms for exchange of data and expected behaviour of systems implementing the Application Profile other than what is defined in the Conformance Statement in section 6.

The Application Profile is intended to facilitate data exchange and therefore the classes and properties defined in this document are only relevant for the data to be exchanged; there are no requirements for communicating systems to implement specific technical environments. The only requirement is that the systems can export and import data in RDF in conformance with this Application Profile.

### 1.3 Change management process

The work is conducted according to the change management process for structural metadata that was developed by the ISA Programme of the European Commission. Firstly, the methodology prescribes a governance structure for managing changes and releases. Secondly, it specifies specific processes for managing changes in specifications, for managing the preparation of releases of specification, and for managing the process of publication of a releases.

Based on the governance structure as prescribed in the ISA methodology, the following governance levels, activities and roles have been identified for the revision process of the DCAT Application Profile:

**Table 1: Governance structure for the revision of DCAT-AP**

Governance level	Activities	Who
<b>Steering Committee (SC)</b>	<ul style="list-style-type: none"> <li>▪ Approve general directions</li> <li>▪ Stay informed about activities and progress</li> <li>▪ Endorse new release</li> </ul>	ISA Coordination Group, PSI Expert Group (DG CNECT)
<b>Governance Committee (GC)</b>	<ul style="list-style-type: none"> <li>▪ Organise &amp; safeguard proper execution of maintenance activities</li> <li>▪ Identify need for revision</li> <li>▪ Instruct the Operational Team to apply changes</li> <li>▪ Establish Working Groups</li> <li>▪ Prepare release for Steering Committee endorsement</li> </ul>	ISA Programme Management Team

<sup>9</sup> European Commission. Joinup. DCAT application profile for data portals in Europe. GeoDCAT-AP working drafts. <https://joinup.ec.europa.eu/node/139283>

<b>Operational Team (OT)</b>	<ul style="list-style-type: none"> <li>▪ Gather change requests</li> <li>▪ Advise Governance Committee on nature of changes</li> <li>▪ Provide the editor for Working Groups</li> <li>▪ Document the resolution of change requests</li> </ul>	Contractor of ISA action 1.1.
<b>Working Group (WG)</b>	<ul style="list-style-type: none"> <li>▪ Bring expertise</li> <li>▪ Reach consensus</li> </ul>	<ul style="list-style-type: none"> <li>- Chair: Norbert Hohn, Willem Van Gemert (Publications Office of the EU)</li> <li>- Editor: Makx Dekkers</li> <li>- Organisations implementing the specification</li> <li>- Individual experts</li> </ul>

The ISA change management methodology identified five phases in the change management and release process. These phases will apply to the revision of the DCAT Application Profile:

### 1. Request handling

This phase starts with the receipt of requests for change (RFC) from stakeholders. A log of all change requests received will be made available via Joinup<sup>10</sup>. The requests are evaluated by the Operational Team (OT) and grouped into issues on Joinup<sup>11</sup>. Based on the analysis by the OT, the Governance Committee (GC) decides on the further process. If the request is rejected because it is not clear or not relevant for the specification at hand, the GC informs the submitter of the rejection with a justification. If the request is accepted, the GC will schedule the request for inclusion in a new release.

### 2. Request resolution

In order to resolve the requests for semantic changes, the GC establishes a Working Group (WG). The WG elaborates one or more drafts of the revised specification and discusses these drafts until consensus is reached. It then submits the draft to the GC who publishes the draft for public review. The WG resolves any comments and finalises the new specification. The process continues with the Release preparation phase.

### 3. Release preparation

The GC instructs the OT to prepare the specification and any additional documentation. The GC notifies the Steering Committee (SC) that the new release is ready for publication and requests endorsement by the SC.

### 4. Release endorsement

The SC discusses the new release and endorses its publication.

### 5. Release publication

Following endorsement by the SC, the GC publishes the new release and notifies the stakeholders and the wider public of its availability. The new release of the DCAT-AP will be made available on Joinup<sup>12</sup>.

<sup>10</sup> Request analysis: [https://joinup.ec.europa.eu/sites/default/files/dcat-ap\\_revision\\_requests\\_v0.03.xlsx](https://joinup.ec.europa.eu/sites/default/files/dcat-ap_revision_requests_v0.03.xlsx)

<sup>11</sup> DCAT-AP Issue Log: [https://joinup.ec.europa.eu/asset/dcat\\_application\\_profile/issue/all](https://joinup.ec.europa.eu/asset/dcat_application_profile/issue/all)

<sup>12</sup> Revised DCAT-AP on Joinup: <https://joinup.ec.europa.eu/node/137964>

### 1.4 The DCAT specification

The specification of the Data Catalog Vocabulary (DCAT) was published by W3C as a W3C Recommendation on 16 January 2014<sup>13</sup>.

The DCAT Application Profile defined in this document is based on this officially published version.

---

<sup>13</sup> W3C. Data Catalog Vocabulary (DCAT). W3C Recommendation 16 January 2014.  
<http://www.w3.org/TR/2014/REC-vocab-dcat-20140116/>

## 2 TERMINOLOGY USED IN THE DCAT APPLICATION PROFILE

An **Application Profile** is a specification that re-uses terms from one or more base standards, adding more specificity by identifying mandatory, recommended and optional elements to be used for a particular application, as well as recommendations for controlled vocabularies to be used.

A **Dataset** is a collection of data, published or curated by a single source, and available for access or download in one or more formats.

A **Data Portal** is a Web-based system that contains a data catalogue with descriptions of datasets and provides services enabling discovery and re-use of the datasets.

In the following sections, classes and properties are grouped under headings 'mandatory', 'recommended' and 'optional'. These terms have the following meaning.

- **Mandatory class:** a receiver of data **MUST** be able to process information about instances of the class; a sender of data **MUST** provide information about instances of the class.
- **Recommended class:** a sender of data **SHOULD** provide information about instances of the class; a sender of data **MUST** provide information about instances of the class, if such information is available; a receiver of data **MUST** be able to process information about instances of the class.
- **Optional class:** a receiver **MUST** be able to process information about instances of the class; a sender **MAY** provide the information but is not obliged to do so.
- **Mandatory property:** a receiver **MUST** be able to process the information for that property; a sender **MUST** provide the information for that property.
- **Recommended property:** a receiver **MUST** be able to process the information for that property; a sender **SHOULD** provide the information for that property if it is available.
- **Optional property:** a receiver **MUST** be able to process the information for that property; a sender **MAY** provide the information for that property but is not obliged to do so.

The meaning of the terms **MUST**, **MUST NOT**, **SHOULD** and **MAY** in this section and in the following sections are as defined in RFC 2119<sup>14</sup>.

In the given context, the term "processing" means that receivers must accept incoming data and transparently provide these data to applications and services. It does neither imply nor prescribe what applications and services finally do with the data (parse, convert, store, make searchable, display to users, etc.).

Classes are classified as 'Mandatory' in section 3.1 if they appear as the range of one of the mandatory properties in section 4.

The class 'Distribution' is classified as 'Recommended' in section 3.2 to allow for cases that a particular Dataset does not have a downloadable Distribution, and in such cases the sender of data would not be able to provide this information. However, it can be expected that in the majority of cases Datasets do have downloadable Distributions, and in such cases the provision of information on the Distribution is mandatory.

---

<sup>14</sup> IETF. RFC 2119. Key words for use in RFCs to Indicate Requirement Levels.  
<http://www.ietf.org/rfc/rfc2119.txt>





### 3 APPLICATION PROFILE CLASSES

#### 3.1 Mandatory Classes

Class name	Usage note for the Application Profile	URI	Reference
Agent	An entity that is associated with Catalogues and/or Datasets. If the Agent is an organisation, the use of the Organization Ontology <sup>15</sup> is recommended. See section 7 for a discussion on Agent roles.	foaf:Agent	<a href="http://xmlns.com/foaf/spec/#term-Agent">http://xmlns.com/foaf/spec/#term-Agent</a> <a href="http://www.w3.org/TR/vocab-org/">http://www.w3.org/TR/vocab-org/</a>
Catalogue	A catalogue or repository that hosts the Datasets being described.	dcat:Catalog	<a href="http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog">http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog</a>
Dataset	A conceptual entity that represents the information published.	dcat:Dataset	<a href="http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-dataset">http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-dataset</a>
Literal	A literal value such as a string or integer; Literals may be typed, e.g. as a date according to xsd:date. Literals that contain human-readable text have an optional language tag as defined by BCP 47 <sup>16</sup> .	rdfs:Literal	<a href="http://www.w3.org/TR/rdf-concepts/#section-Literals">http://www.w3.org/TR/rdf-concepts/#section-Literals</a>
Resource	Anything described by RDF.	rdfs:Resource	<a href="http://www.w3.org/TR/rdf-schema/#ch_resource">http://www.w3.org/TR/rdf-schema/#ch_resource</a>

#### 3.2 Recommended Classes

Class name	Usage note for the Application Profile	URI	Reference
Category	A subject of a Dataset.	skos:Concept	<a href="http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme">http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme</a>
Category scheme	A concept collection (e.g. controlled vocabulary) in which the Category is defined.	skos:ConceptScheme	<a href="http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme">http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme</a>
Distribution	A physical embodiment of the Dataset in a particular format.	dcat:Distribution	<a href="http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-distribution">http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-distribution</a>
Licence document	A legal document giving official permission to do something with a resource.	dct:LicenseDocument	<a href="http://dublincore.org/documents/2012/06/14/dcmi-terms/?v=terms#LicenseDocument">http://dublincore.org/documents/2012/06/14/dcmi-terms/?v=terms#LicenseDocument</a>

#### 3.3 Optional Classes

Class name	Usage note for the Application Profile	URI	Reference
Catalogue Record	A description of a Dataset's entry in the Catalogue.	dcat:CatalogRecord	<a href="http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog-record">http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog-record</a>
Checksum	A value that allows the contents of a file to be authenticated. This class allows the results of a variety of checksum and cryptographic message digest algorithms to be represented.	spdx:Checksum	<a href="http://spdx.org/rdf/terms#Checksum">http://spdx.org/rdf/terms#Checksum</a>
Document	A textual resource intended for human consumption that contains information, e.g. a web page about a Dataset.	foaf:Document	<a href="http://xmlns.com/foaf/spec/#term-Document">http://xmlns.com/foaf/spec/#term-Document</a>
Frequency	A rate at which something recurs, e.g. the publication of a Dataset.	dct:Frequency	<a href="http://dublincore.org/documents/dcmi-terms/#terms-Frequency">http://dublincore.org/documents/dcmi-terms/#terms-Frequency</a>

<sup>15</sup> W3C. The Organization Ontology. W3C Candidate Recommendation, 25 June 2013.  
<http://www.w3.org/TR/2013/CR-vocab-org-20130625/>

<sup>16</sup> IETF. BCP 47. Tags for Identifying Languages. <http://www.rfc-editor.org/rfc/bcp/bcp47.txt>

Identifier	An identifier in a particular context, consisting of the string that is the identifier; an optional identifier for the identifier scheme; an optional identifier for the version of the identifier scheme; an optional identifier for the agency that manages the identifier scheme	adms:Identifier	<a href="http://www.w3.org/TR/vocab-adms/#identifier">http://www.w3.org/TR/vocab-adms/#identifier</a>
Kind	A description following the vCard specification, e.g. to provide telephone number and e-mail address for a contact point. Note that the class Kind is the parent class for the four explicit types of vCards (Individual, Organization, Location, Group).	vcards:Kind	<a href="http://www.w3.org/TR/2014/NOTE-vcards-rdf-20140522/#d4e181">http://www.w3.org/TR/2014/NOTE-vcards-rdf-20140522/#d4e181</a>
Linguistic system	A system of signs, symbols, sounds, gestures, or rules used in communication, e.g. a language	dct:LinguisticSystem	<a href="http://dublincore.org/documents/dcmi-terms/#terms-LinguisticSystem">http://dublincore.org/documents/dcmi-terms/#terms-LinguisticSystem</a>
Location	A spatial region or named place. It can be represented using a controlled vocabulary or with geographic coordinates. In the latter case, the use of the Core Location Vocabulary <sup>17</sup> is recommended, following the approach described in the GeoDCAT-AP specification.	dct:Location	<a href="http://dublincore.org/documents/dcmi-terms/#terms-Location">http://dublincore.org/documents/dcmi-terms/#terms-Location</a>
Media type or extent	A media type or extent, e.g. the format of a computer file	dct:MediaTypeOrExtent	<a href="http://dublincore.org/documents/dcmi-terms/#terms-MediaTypeOrExtent">http://dublincore.org/documents/dcmi-terms/#terms-MediaTypeOrExtent</a>
Period of time	An interval of time that is named or defined by its start and end dates.	dct:PeriodOfTime	<a href="http://dublincore.org/documents/dcmi-terms/#terms-PeriodOfTime">http://dublincore.org/documents/dcmi-terms/#terms-PeriodOfTime</a>
Publisher type	A type of organisation that acts as a publisher	skos:Concept	<a href="http://www.w3.org/TR/vocab-adms/#dcterms-type">http://www.w3.org/TR/vocab-adms/#dcterms-type</a>
Rights statement	A statement about the intellectual property rights (IPR) held in or over a resource, a legal document giving official permission to do something with a resource, or a statement about access rights.	dct:RightsStatement	<a href="http://dublincore.org/documents/dcmi-terms/#terms-RightsStatement">http://dublincore.org/documents/dcmi-terms/#terms-RightsStatement</a>
Standard	A standard or other specification to which a Dataset or Distribution conforms	dct:Standard	<a href="http://dublincore.org/documents/dcmi-terms/#terms-Standard">http://dublincore.org/documents/dcmi-terms/#terms-Standard</a>
Status	An indication of the maturity of a Distribution or the type of change of a Catalogue Record.	skos:Concept	<a href="http://www.w3.org/TR/vocab-adms/#status">http://www.w3.org/TR/vocab-adms/#status</a>
Provenance Statement	A statement of any changes in ownership and custody of a resource since its creation that are significant for its authenticity, integrity, and interpretation	dct:ProvenanceStatement	<a href="http://dublincore.org/documents/dcmi-terms/#terms-ProvenanceStatement">http://dublincore.org/documents/dcmi-terms/#terms-ProvenanceStatement</a>

<sup>17</sup> European Commission. Joinup. Core Location Vocabulary.  
[https://joinup.ec.europa.eu/asset/core\\_location/description](https://joinup.ec.europa.eu/asset/core_location/description)

## 4 DCAT APPLICATION PROFILE PROPERTIES PER CLASS

A quick reference table of properties per class is included in Annex I.

### 4.1 Catalogue

#### 4.1.1 Mandatory properties for Catalogue

Property	URI	Range	Usage note	Card.
dataset	dc:dataset	dc:Dataset	This property links the Catalogue with a Dataset that is part of the Catalogue.	1..n
description	dct:description	rdfs:Literal	This property contains a free-text account of the Catalogue. This property can be repeated for parallel language versions of the description. For further information on multilingual issues, please refer to section 8.	1..n
publisher	dct:publisher	foaf:Agent	This property refers to an entity (organisation) responsible for making the Catalogue available.	1..1
title	dct:titleCatalogue	rdfs:Literal	This property contains a name given to the Catalogue. This property can be repeated for parallel language versions of the name.	1..n

#### 4.1.2 Recommended properties for Catalogue

Property	URI	Range	Usage note	Card.
homepage	foaf:homepage	foaf:Document	This property refers to a web page that acts as the main page for the Catalogue.	0..1
language	dct:language	dct:LinguisticSystem	This property refers to a language used in the textual metadata describing titles, descriptions, etc. of the Datasets in the Catalogue. This property can be repeated if the metadata is provided in multiple languages.	0..n
licence	dct:license	dct:LicenseDocument	This property refers to the licence under which the Catalogue can be used or reused.	0..1
release date	dct:issued	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the date of formal issuance (e.g., publication) of the Catalogue.	0..1
themes	dc:themeTaxonomy	skos:ConceptScheme	This property refers to a knowledge organization system used to classify the Catalogue's Datasets.	0..n
update/ modification date	dct:modified	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the most recent date on which the Catalogue was modified.	0..1

#### 4.1.3 Optional properties for Catalogue

Property	URI	Range	Usage note	Card.
has part	dct:hasPart	dc:Catalog	This property refers to a related Catalogue that is part of the described Catalogue	0..n
is part of	dct:isPartOf	dc:Catalog	This property refers to a related Catalogue in which the described Catalogue is physically or logically included.	0..1
record	dc:record	dc:CatalogRecord	This property refers to a Catalogue Record that is part of the Catalogue	0..n
rights	dct:rights	dct:RightsStatement	This property refers to a statement that specifies rights associated with the Catalogue.	0..1
spatial / geographic	dct:spatial	dct:Location	This property refers to a geographical area covered by the Catalogue.	0..n

### 4.2 Catalogue Record

#### 4.2.1 Mandatory properties for Catalogue Record

Property	URI	Range	Usage note	Card.
primary topic	foaf:primaryTopic	dc:Dataset	This property links the Catalogue Record to the Dataset described in the record.	1..1
update/ modification date	dct:modified	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the most recent date on which the Catalogue entry was changed or modified.	1..1

#### 4.2.2 Recommended properties for Catalogue Record

Property	URI	Range	Usage note	Card.
application profile	dct:conformsTo	rdfs:Resource	This property refers to an Application Profile that the Dataset's metadata conforms to	0..1
change type	adms:status	skos:Concept	This property refers to the type of the <i>latest</i> revision of a Dataset's entry in the Catalogue. It MUST take one of the values :created, :updated or :deleted depending on whether this <i>latest</i> revision is a result of a creation, update or deletion.	0..1
listing date	dct:issued	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the date on which the description of the Dataset was included in the Catalogue.	0..1

#### 4.2.3 Optional properties for Catalogue Record

Property	URI	Range	Usage note	Card.
description	dct:description	rdfs:Literal	This property contains a free-text account of the record. This property can be repeated for parallel language versions of the description.	0..n
language	dct:language	dct:LinguisticSystem	This property refers to a language used in the textual metadata describing titles, descriptions, etc. of the Dataset. This property can be repeated if the metadata is provided in multiple languages.	0..n
source metadata	dct:source	dcat:CatalogRecord	This property refers to the original metadata that was used in creating metadata for the Dataset	0..1
title	dct:title	rdfs:Literal	This property contains a name given to the Catalogue Record. This property can be repeated for parallel language versions of the name.	0..n

### 4.3 Dataset

#### 4.3.1 Mandatory properties for Dataset

Property	URI	Range	Usage note	Card
description	dct:description	rdfs:Literal	This property contains a free-text account of the Dataset. This property can be repeated for parallel language versions of the description.	1..n
title	dct:title	rdfs:Literal	This property contains a name given to the Dataset. This property can be repeated for parallel language versions of the name.	1..n

#### 4.3.2 Recommended properties for Dataset

Property	URI	Range	Usage note	Card
contact point	dcat:contactPoint	vcard:Kind	This property contains contact information that can be used for sending comments about the Dataset.	0..n
dataset distribution	dcat:distribution	dcat:Distribution	This property links the Dataset to an available Distribution.	0..n
keyword/tag	dcat:keyword	rdfs:Literal	This property contains a keyword or tag describing the Dataset.	0..n
publisher	dct:publisher	foaf:Agent	This property refers to an entity (organisation) responsible for making the Dataset available.	0..1
theme/category	dcat:theme, subproperty of dct:subject	skos:Concept	This property refers to a category of the Dataset. A Dataset may be associated with multiple themes.	0..n

### 4.3.3 Optional properties for Dataset

Property	URI	Range	Usage note	Card.
access rights	dct:accessRights	dct:RightsStatement	This property refers to information that indicates whether the Dataset is open data, has access restrictions or is not public. A controlled vocabulary with three members (:public, :restricted, :non-public) will be created and maintained by the Publications Office of the EU.	0..1
conforms to	dct:conformsTo	dct:Standard	This property refers to an implementing rule or other specification.	0..n
documentation	foaf:page	foaf:Document	This property refers to a page or document about this Dataset.	0..n
frequency	dct:accrualPeriodicity	dct:Frequency	This property refers to the frequency at which the Dataset is updated.	0..1
has version	dct:hasVersion	dcat:Dataset	This property refers to a related Dataset that is a version, edition, or adaptation of the described Dataset.	0..n
identifier	dct:identifier	rdfs:Literal	This property contains the main identifier for the Dataset, e.g. the URI or other unique identifier in the context of the Catalogue.	0..n
is version of	dct:isVersionOf	dcat:Dataset	This property refers to a related Dataset of which the described Dataset is a version, edition, or adaptation.	0..n
landing page	dcat:landingPage	foaf:Document	This property refers to a web page that provides access to the Dataset, its Distributions and/or additional information. It is intended to point to a landing page at the original data provider, not to a page on a site of a third party, such as an aggregator.	0..n
language	dct:language	dct:LinguisticSystem	This property refers to a language of the Dataset. This property can be repeated if there are multiple languages in the Dataset.	0..n
other identifier	adms:identifier	adms:Identifier	This property refers to a secondary identifier of the Dataset, such as MAST/ADS <sup>18</sup> , DataCite <sup>19</sup> , DOI <sup>20</sup> , EZID <sup>21</sup> or W3ID <sup>22</sup> .	0..n
provenance	dct:provenance	dct:ProvenanceStatement	This property contains a statement about the lineage of a Dataset.	0..n
related resource	dct:relation	rdfs:Resource	This property refers to a related resource.	0..n
release date	dct:issued	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the date of formal issuance (e.g., publication) of the Dataset.	0..1
sample	adms:sample	dcat:Distribution	This property refers to a sample distribution of the dataset	0..n
source	dct:source	dcat:Dataset	This property refers to a related Dataset from which the described Dataset is derived.	0..n
spatial/ geographical coverage	dct:spatial	dct:Location	This property refers to a geographic region that is covered by the Dataset.	0..n
temporal coverage	dct:temporal	dct:PeriodOfTime	This property refers to a temporal period that the Dataset covers.	0..n
type	dct:type	skos:Concept	This property refers to the type of the Dataset. A controlled vocabulary for the values has not been established.	0..1
update/ modification date	dct:modified	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the most recent date on which the Dataset was changed or modified.	0..1

<sup>18</sup> Mikulski Archive for Space Telescopes (MAST). Referencing Data Sets in Astronomical Literature. [http://archive.stsci.edu/pub\\_dsn.html](http://archive.stsci.edu/pub_dsn.html)

<sup>19</sup> DataCite. <http://www.datacite.org/>

<sup>20</sup> DOI. Digital Object Identifier. <http://www.doi.org/>

<sup>21</sup> EZID. <http://n2t.net/ezid>

<sup>22</sup> W3C Permanent Identifier Community Group. Permanent Identifiers for the Web. <https://w3id.org/>

Property	URI	Range	Usage note	Card.
version	owl:versionInfo	rdfs:Literal	This property contains a version number or other version designation of the Dataset.	0..1
version notes	adms:versionNotes	rdfs:Literal	This property contains a description of the differences between this version and a previous version of the Dataset. This property can be repeated for parallel language versions of the version notes.	0..n

## 4.4 Distribution

### 4.4.1 Mandatory properties for Distribution

Property	URI	Range	Usage note	Card
access URL	dcats:accessURL	rdfs:Resource	This property contains a URL that gives access to a Distribution of the Dataset. The resource at the access URL may contain information about how to get the Dataset.	1..n

### 4.4.2 Recommended properties for Distribution

Property	URI	Range	Usage note	Card
description	dct:description	rdfs:Literal	This property contains a free-text account of the Distribution. This property can be repeated for parallel language versions of the description.	0..n
format	dct:format	dct:MediaTypeOrExtent	This property refers to the file format of the Distribution.	0..1
licence	dct:license	dct:LicenseDocument	This property refers to the licence under which the Distribution is made available.	0..1

### 4.4.3 Optional properties for Distribution

Property	URI	Range	Usage note	Card.
byte size	dcats:byteSize	rdfs:Literal typed as xsd:decimal	This property contains the size of a Distribution in bytes.	0..1
checksum	spdx:checksum	spdx:Checksum	This property provides a mechanism that can be used to verify that the contents of a distribution have not changed	0..1
documentation	foaf:page	foaf:Document	This property refers to a page or document about this Distribution.	0..n
download URL	dcats:downloadURL	rdfs:Resource	This property contains a URL that is a direct link to a downloadable file in a given format.	0..n
language	dct:language	dct:LinguisticSystem	This property refers to a language used in the Distribution. This property can be repeated if the metadata is provided in multiple languages.	0..n
linked schemas	dct:conformsTo	dct:Standard	This property refers to an established schema to which the described Distribution conforms.	0..n
media type	dcats:mediaType, subproperty of dct:format	dct:MediaTypeOrExtent	This property refers to the media type of the Distribution as defined in the official register of media types managed by IANA.	0..1
release date	dct:issued	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the date of formal issuance (e.g., publication) of the Distribution.	0..1
rights	dct:rights	dct:RightsStatement	This property refers to a statement that specifies rights associated with the Distribution.	0..1
status	adms:status	skos:Concept	This property refers to the maturity of the Distribution	0..1
title	dct:title	rdfs:Literal	This property contains a name given to the Distribution. This property can be repeated for parallel language versions of the description.	0..n
update/ modification date	dct:modified	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the most recent date on which the Distribution was changed or modified.	0..1

## 4.5 Agent

### 4.5.1 Mandatory property for Agent

Property	URI	Range	Usage note	Card.
name	foaf:name	rdfs:Literal	This property contains a name of the agent. This property can be repeated for different versions of the name (e.g. the name in different languages)	1..n

### 4.5.2 Recommended property for Agent

Property	URI	Range	Usage note	Card.
type	dct:type	skos:Concept	This property refers to a type of the agent that makes the Catalogue or Dataset available	0..1

## 4.6 Category Scheme

### 4.6.1 Mandatory property for Category Scheme

Property	URI	Range	Usage note	Card.
title	dct:title	rdfs:Literal	This property contains a name of the category scheme. May be repeated for different versions of the name	1..n

## 4.7 Category

### 4.7.1 Mandatory property for Category

Property	URI	Range	Usage note	Card.
preferred label	skos:prefLabel	rdfs:Literal	This property contains a preferred label of the category. This property can be repeated for parallel language versions of the label.	1..n

## 4.8 Checksum

### 4.8.1 Mandatory properties for Checksum

Property	URI	Range	Usage note	Card.
algorithm	spdx:algorithm	spdx:checksumAlgorithm_sha1	This property identifies the algorithm used to produce the subject Checksum. Currently, SHA-1 is the only supported algorithm. It is anticipated that other algorithms will be supported at a later time.	1..1
checksum value	spdx:checksumValue	rdfs:Literal typed as xsd:hexBinary	This property provides a lower case hexadecimal encoded digest value produced using a specific algorithm.	1..1

## 4.9 Identifier

### 4.9.1 Mandatory property for Identifier

Property	URI	Range	Usage note	Card.
notation	skos:notation	rdfs:Literal typed with the URI of one of the members of the DataCite Resource Identifier Scheme <sup>23</sup>	This property contains a string that is an identifier in the context of the identifier scheme referenced by its datatype.	0..1

## 4.10 Licence Document

### 4.10.1 Recommended property for Licence Document

Property	URI	Range	Usage note	Card.
licence type	dct:type	skos:Concept	This property refers to a type of licence, e.g. indicating 'public domain' or 'royalties required'.	0..1

<sup>23</sup> DataCite Resource Identifier Scheme. <http://purl.org/spar/datacite/ResourceIdentifierScheme>



## 4.11 Period of Time

### 4.11.1 Optional properties for Period of Time

Property	URI	Range	Usage note	Card.
start date/time	schema:startDate	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the start of the period	0..1
end date/time	schema:endDate	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the end of the period	0..1

Please note that while both properties are optional, one of the two must be present for each instance of the class `dct:PeriodOfTime`, if such an instance is present.

The start of the period should be understood as the start of the date, hour, minute etc. given (e.g. starting at midnight at the beginning of the day if the value is a date); the end of the period should be understood as the end of the date, hour, minute etc. given (e.g. ending at midnight at the end of the day if the value is a date)

## 5 CONTROLLED VOCABULARIES

### 5.1 Requirements for controlled vocabularies

The following is a list of requirements that were identified for the controlled vocabularies to be recommended in this Application Profile.

Controlled vocabularies SHOULD:

- Be published under an open licence.
- Be operated and/or maintained by an institution of the European Union, by a recognised standards organisation or another trusted organisation.
- Be properly documented.
- Have labels in multiple languages, ideally in all official languages of the European Union.
- Contain a relatively small number of terms (e.g. 10-25) that are general enough to enable a wide range of resources to be classified.
- Have terms that are identified by URIs with each URI resolving to documentation about the term.
- Have associated persistence and versioning policies.

These criteria do not intend to define a set of requirements for controlled vocabularies in general; they are only intended to be used for the selection of the controlled vocabularies that are proposed for this Application Profile.

### 5.2 Controlled vocabularies to be used

In the table below, a number of properties are listed with controlled vocabularies that MUST be used for the listed properties. The declaration of the following controlled vocabularies as mandatory ensures a minimum level of interoperability.

Property URI	Used Class for	Vocabulary name	Vocabulary URI	Usage note
dc:mediaType	Distribution	IANA Media Types <sup>24</sup>	<a href="http://www.iana.org/assignments/media-types/media-types.xhtml">http://www.iana.org/assignments/media-types/media-types.xhtml</a>	
dc:theme	Dataset	Dataset Theme Vocabulary	<a href="http://publications.europa.eu/resource/authority/data-theme">http://publications.europa.eu/resource/authority/data-theme</a> , see Annex II.	The values to be used for this property are the URIs of the concepts in the vocabulary.
dc:themeTaxonomy	Catalogue	Dataset Theme Vocabulary	<a href="http://publications.europa.eu/resource/authority/data-theme">http://publications.europa.eu/resource/authority/data-theme</a> , see Annex II.	The value to be used for this property is the URI of the vocabulary itself, i.e. the concept scheme, not the URIs of the concepts in the vocabulary.
dct:accrualPeriodicity	Dataset	MDR Frequency Named Authority List <sup>25</sup>	<a href="http://publications.europa.eu/mdr/authority/frequency">http://publications.europa.eu/mdr/authority/frequency</a>	
dct:format	Distribution	MDR File Type Named Authority List <sup>26</sup>	<a href="http://publications.europa.eu/mdr/authority/file-type/">http://publications.europa.eu/mdr/authority/file-type/</a>	

<sup>24</sup> Internet Assigned Numbers Authority (IANA). Media Types

<http://www.iana.org/assignments/media-types/>

<sup>25</sup> Publications Office of the European Union. Metadata Registry. Authorities. Frequencies.

<http://publications.europa.eu/mdr/authority/frequency>

<sup>26</sup> Publications Office of the European Union. Metadata Registry. Authorities. File types.

<http://publications.europa.eu/mdr/authority/file-type/>

Property URI	Used for Class	Vocabulary name	Vocabulary URI	Usage note
dct:language	Catalogue, Dataset	MDR Languages Named Authority List <sup>27</sup>	<a href="http://publications.europa.eu/mdr/authority/language/">http://publications.europa.eu/mdr/authority/language/</a>	
dct:publisher	Catalogue, Dataset	MDR Corporate bodies Named Authority List <sup>28</sup>	<a href="http://publications.europa.eu/mdr/authority/corporate-body/">http://publications.europa.eu/mdr/authority/corporate-body/</a>	The Corporate bodies NAL must be used for European institutions and a small set of international organisations. In case of other types of organisations, national, regional or local vocabularies should be used.
dct:spatial	Catalogue, Dataset	MDR Continents Named Authority List <sup>29</sup> , MDR Countries Named Authority List <sup>30</sup> , MDR Places Named Authority List <sup>31</sup> , Geonames	<a href="http://publications.europa.eu/mdr/authority/country/">http://publications.europa.eu/mdr/authority/country/</a> , <a href="http://publications.europa.eu/mdr/authority/place/">http://publications.europa.eu/mdr/authority/place/</a> , <a href="http://publications.europa.eu/mdr/authority/continent/">http://publications.europa.eu/mdr/authority/continent/</a> , <a href="http://sws.geonames.org/">http://sws.geonames.org/</a>	The MDR Name Authority Lists must be used for continents, countries and places that are in those lists; if a particular location is not in one of the mentioned Named Authority Lists, Geonames URIs must be used.
adms:status	Catalogue Record	ADMS change type vocabulary	<a href="http://purl.org/adms/change-type/">http://purl.org/adms/change-type/</a>	:created, :updated, :deleted
adms:status	Distribution	ADMS status vocabulary	<a href="http://purl.org/adms/status/">http://purl.org/adms/status/</a>	The list of terms in the ADMS status vocabulary is included in the ADMS specification <sup>32</sup>
dct:type	Agent	ADMS publisher type vocabulary	<a href="http://purl.org/adms/publisher-type/">http://purl.org/adms/publisher-type/</a>	The list of terms in the ADMS publisher type vocabulary is included in the ADMS specification
dct:type	Licence Document	ADMS licence type vocabulary	<a href="http://purl.org/adms/licence-type/">http://purl.org/adms/licence-type/</a>	The list of terms in the ADMS licence type vocabulary is included in the ADMS specification

### 5.3 Other controlled vocabularies

In addition to the proposed common vocabularies in section 5.2, which are mandatory to ensure minimal interoperability, implementers are encouraged to publish and to use further region or domain-specific vocabularies that are available online. While those may not be recognised by general implementations of the Application Profile, they may serve to increase interoperability across applications in the same region or domain. Examples are the full set of concepts in EuroVoc<sup>33</sup>, the CERIF standard vocabularies<sup>34</sup>, the Dewey Decimal Classification<sup>35</sup> and numerous other schemes.

<sup>27</sup> Publications Office of the European Union. Metadata Registry. Authorities. Languages. <http://publications.europa.eu/mdr/authority/language/>

<sup>28</sup> Publications Office of the European Union. Metadata Registry. Authorities. Corporate bodies. <http://publications.europa.eu/mdr/authority/corporate-body/>

<sup>29</sup> Publications Office of the European Union. Metadata Registry. Authorities. Continents. <http://publications.europa.eu/mdr/authority/continent/>

<sup>30</sup> Publications Office of the European Union. Metadata Registry. Authorities. Countries. <http://publications.europa.eu/mdr/authority/country/>

<sup>31</sup> Publications Office of the European Union. Metadata Registry. Authorities. Places. <http://publications.europa.eu/mdr/authority/place/>

<sup>32</sup> European Commission. Joinup. Asset Description Metadata Schema (ADMS). ADMS 1.00. <http://joinup.ec.europa.eu/asset/adms/release/100>

<sup>33</sup> EuroVoc. <http://eurovoc.europa.eu/>

<sup>34</sup> [http://www.eurocris.org/Uploads/Web%20pages/CERIF-1.5/CERIF1.5\\_Semantics.xhtml](http://www.eurocris.org/Uploads/Web%20pages/CERIF-1.5/CERIF1.5_Semantics.xhtml)

<sup>35</sup> OCLC. Dewey Summaries as Linked Data. <http://www.oclc.org/dewey/webservices.en.html> and <http://dewey.info/>

## 5.4 Licence vocabularies

Concerning licence vocabularies, implementers are encouraged to use widely recognised licences such as Creative Commons licences<sup>36</sup>, and in particular the CC Zero Public Domain Dedication<sup>37</sup>, the Open Data Commons Public Domain Dedication and License (PDDL)<sup>38</sup>, the ISA Open Metadata Licence<sup>39</sup>, the European Union Public Licence (EURL)<sup>40</sup> or an open government licence such as the UK Open Government Licence<sup>41</sup>.

Further activities in this area are undertaken by the Open Data Institute<sup>42</sup> with the Open Data Rights Statement Vocabulary<sup>43</sup> and by the Open Digital Rights Language (ODRL) Initiative<sup>44</sup>.

---

<sup>36</sup> Creative Commons. About The Licenses. <http://creativecommons.org/licenses/>

<sup>37</sup> Creative Commons. CC0 1.0 Universal (CC0 1.0) Public Domain Dedication. <http://creativecommons.org/publicdomain/zero/1.0/>

<sup>38</sup> Open Data Commons Public Domain Dedication and License (PDDL). <http://opendatacommons.org/licenses/pddl/>

<sup>39</sup> ISA Open Metadata Licence v1.1, <https://joinup.ec.europa.eu/category/licence/isa-open-metadata-licence-v11>

<sup>40</sup> European Commission. Joinup. Open Source Software. European Union Public Licence (EURL). <http://joinup.ec.europa.eu/software/page/eupl>

<sup>41</sup> The National Archives. Open Government Licence for public sector information. <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/2/>

<sup>42</sup> Open Data Institute. <http://www.theodi.org/>

<sup>43</sup> Open Data Institute. Open Data Rights Statement Vocabulary. <http://schema.theodi.org/odrs/>

<sup>44</sup> Open Digital Rights Language (ODRL) Initiative. <http://www.w3.org/community/odrl/>

## 6 CONFORMANCE STATEMENT

### 6.1 Provider requirements

In order to conform to this Application Profile, an application that provides metadata **MUST**:

- Provide a description of the Catalogue, including at least the mandatory properties specified in section 4.1.1.
- Provide information for the mandatory properties specified in section 4.2.1, if descriptions of Catalogue Records are provided – please note that the provision of descriptions of Catalogue Records is optional.
- Provide descriptions of Datasets in the Catalogue, including at least the mandatory properties specified in section 4.3.1.
- Provide descriptions of Distributions, if any, of Datasets in the Catalogue, including at least the mandatory properties specified in section 4.4.1.
- Provide descriptions of all organisations involved in the descriptions of Catalogue and Datasets, including at least the mandatory properties specified in section 4.5.1.
- Provide descriptions of all category schemes that contain the categories that are asserted in any of the descriptions of Datasets in the Catalogue, including at least the mandatory properties specified in section 4.6.1.
- Provide descriptions of all categories involved in the descriptions of Datasets in the Catalogue, including at least the mandatory properties specified in section 4.7.1.

For the properties listed in the table in section 5, the associated controlled vocabularies **MUST** be used. Additional controlled vocabularies **MAY** be used.

In addition to the mandatory properties, any of the recommended and optional properties defined in section 4 **MAY** be provided.

Recommended and optional classes may have mandatory properties, but those only apply if and when an instance of such a class is present in a description.

### 6.2 Receiver requirements

In order to conform to this Application Profile, an application that receives metadata **MUST** be able to:

- Process information for all classes specified in section 3.
- Process information for all properties specified in section 4.
- Process information for all controlled vocabularies specified in section 5.2.

As stated in section 3, "processing" means that receivers must accept incoming data and transparently provide these data to applications and services. It does neither imply nor prescribe what applications and services finally do with the data (parse, convert, store, make searchable, display to users, etc.).

## 7 AGENT ROLES

The DCAT Application Profile specified in this document has a single property to relate an Agent (typically, an organisation) to a Dataset. The only such 'agent role' that can be expressed in the current version of the profile is through the property `dct:publisher` (<http://purl.org/dc/terms/publisher>), defined as "An entity responsible for making the dataset available". A second property is available in the DCAT recommendation, `dcat:contactPoint` ([http://www.w3.org/TR/vocab-dcat/#Property:dataset\\_contactPoint](http://www.w3.org/TR/vocab-dcat/#Property:dataset_contactPoint)), defined as "Link a dataset to relevant contact information which is provided using VCard", but this is not an agent role as the value of this property is contact data, rather than a representation of the organisation as such.

In specific cases, for example in exchanging data among domain-specific portals, it may be useful to express other, more specific agent roles. In such cases, extensions to the base profile may be defined using additional properties with more specific meanings.

Two possible approaches have been discussed, particular in the context of the development of the domain-specific GeoDCAT Application Profile, an extension of the base DCAT Application Profile.

The first possible approach is based on the use of a predicate vocabulary that provides a set of properties that represent additional types of relationships between Datasets and Agents. For example, properties could be defined, such as `foo:owner`, `foo:curator` or `foo:responsibleParty`, in addition to the use of existing well-known properties, such as `dct:creator` and `dct:rightsHolder`. A possible source for such additional properties is the Roles Named Authority List<sup>45</sup> maintained by the Publications Office of the EU. Other domain-specific sources for additional properties are the INSPIRE Responsible Party roles<sup>46</sup>, the Library of Congress' MARC relators<sup>47</sup> and DataCite's contributor types<sup>48</sup>. To enable the use of such properties, they must be defined as RDF properties with URIs in a well-managed namespace.

A second approach is based on the use of W3C's PROV ontology<sup>49</sup> which provides a powerful mechanism to express a set of classes, properties, and restrictions that can be used to represent and interchange provenance information generated in different systems and under different contexts. In the context of work on GeoDCAT-AP, a PROV-conformant solution for expressing agent roles was agreed<sup>50</sup>. This solution uses `prov:qualifiedAttribution` in combination with a `dct:type` assertion pointing to the code list for Responsible Party Role in the INSPIRE registry. To enable the use of such types, they must be defined with URIs in a well-managed namespace.

Based on the experience gained with the use of domain-specific extensions for additional 'agent roles' in the exchange of information about Datasets, the base DCAT

<sup>45</sup> Publications Office of the European Union. Metadata Registry. Authorities. Roles.

<http://publications.europa.eu/mdr/authority/role/>

<sup>46</sup> European Commission. INSPIRE Registry. Responsible Party Role.

<http://inspire.ec.europa.eu/metadata-codelist/ResponsiblePartyRole/>

<sup>47</sup> Library of Congress. MARC Code List for Relators. <http://loc.gov/marc/relators/relaterm.html>

<sup>48</sup> DataCite Metadata Schema for the Publication and Citation of Research Data, version 3.1. In: [https://schema.datacite.org/meta/kernel-3/doc/DataCite-MetadataKernel\\_v3.1.pdf](https://schema.datacite.org/meta/kernel-3/doc/DataCite-MetadataKernel_v3.1.pdf), Appendix 1, table 5.

<sup>49</sup> W3C. PROV-O: The PROV Ontology. W3C Recommendation 30 April 2013.

<http://www.w3.org/TR/prov-o/>

<sup>50</sup> European Commission. Joinup. DCAT application profile for data portals in Europe. GeoDCAT-AP – How to express the different responsible party roles supported in ISO 19115 / INSPIRE.

<https://joinup.ec.europa.eu/node/141757>

Application Profile may in the future be extended with additional roles that have proven to be useful across domains.

It should be noted that, even if a more expressive approach is used in a particular implementation, the provision of information using `dct:publisher` for the Catalogue is still mandatory under the rules laid down in the Conformance Statement in section 6, while the provision of information using `dct:publisher` is strongly recommended for Dataset. The provision of such information using `dct:publisher` will ensure interoperability with implementations that use the basic approach of DCAT-AP.

## 8 ACCESSIBILITY AND MULTILINGUAL ASPECTS

**Accessibility** in the context of this Application Profile is limited to information about the technical format of distributions of datasets. The properties `dcat:mediaType` and `dct:format` provide information that can be used to determine what software can be deployed to process the data. The accessibility of the data within the datasets needs to be taken care of by the software that processes the data and is outside of the scope of this Application Profile.

**Multilingual aspects** related to this Application Profile concern all properties whose contents are expressed as strings (i.e. `rdfs:Literal`) with human-readable text. Wherever such properties are used, the string values are of one of two types:

- The string is free text. Examples are descriptions and labels. Such text may be translated into several languages.
- The string is an appellation of a 'named entity'. Examples are names of organisations or persons. These names may have parallel versions in other languages but those versions don't need to be literal translations.

Wherever values of properties are expressed with either type of string, the property can be repeated with translations in the case of free text and with parallel versions in case of named entities. For free text, e.g. in the cases of titles, descriptions and keywords, the **language tag** is mandatory.

Language tags to be used with `rdfs:Literal` are defined by BCP47<sup>51</sup>, which allows the use of the "t" extension for text transformations defined in RFC6497<sup>52</sup> with the field "t0"<sup>53</sup> indicating a machine translation.

A language tag will look like: "en-t-es-t0-abcd", which conveys the information that the string is in English, translated from Spanish by machine translation using a tool named "abcd".

For named entities, the language tag is optional and should only be provided if the parallel version of the name is strictly associated with a particular language. For example, the name 'European Union' has parallel versions in all official languages of the union, while a name like 'W3C' is not associated with a particular language and has no parallel versions.

For linking to different language versions of associated web pages (e.g. landing pages) or documentation, a content negotiation<sup>54</sup> mechanism may be used whereby different content is served based on the Accept-Languages indicated by the browser. Using such a mechanism, the link to the page or document can resolve to different language versions of the page or document.

All the occurrences of the property `dct:language`, which can be repeated if the metadata is provided in multiple languages, **MUST** have a URI as their object, not a literal string from the ISO 639 code list.

How multilingual information is handled in systems, for example in indexing and user interfaces, is outside of the scope of this Application Profile.

<sup>51</sup> Internet Engineering Task Force (IETF). BCP47. Tags for Identifying Languages. <http://tools.ietf.org/html/bcp47>

<sup>52</sup> Internet Engineering Task Force (IETF). BCP47 Extension T – Transformed Content. <http://tools.ietf.org/html/rfc6497>

<sup>53</sup> UNICODE Consortium. CLDR - Unicode Common Locale Data Repository. BCP47, transform\_mt.xml. [http://unicode.org/cldr/trac/browser/trunk/common/bcp47/transform\\_mt.xml](http://unicode.org/cldr/trac/browser/trunk/common/bcp47/transform_mt.xml)

<sup>54</sup> Apache Web Server: content negotiation. <http://httpd.apache.org/docs/current/content-negotiation.html>



## 9 ACKNOWLEDGEMENTS

This work was elaborated by a Working Group under the ISA programme. The Working Group was chaired by **Norbert Hohn** and **Willem Van Gemert** from the Publications Office. The ISA Programme of the European Commission was represented by **Vassilios Peristeras** and **Athanasios Karalopoulos**. **Makx Dekkers** was the editor of the specification.

The members of the Working Group:

Name	Organisation
Øystein Åsnes	DIFI, Norway
Leda Bargiotti	PwC EU Services
Peter Biro	
Valérie Brasse	IS4RI, France
Georges Charlot	Centre d'Informatique pour la Région Bruxelloise (CIRB), Belgium
Pieter Colpaert	MultiMedia Lab, Ghent University, iMinds, Belgium
Marco Combetto	Informatica Trentina, Italy
Alex D.	Sciamlab, Italy
Michiel de Keyzer	PwC EU Services
Makx Dekkers	AMI Consult, EU
Anastasia Dimou	University of Ghent
Benjamin Dittwald	Fraunhofer FOKUS, Germany
Martin Dürst	W3C
Simon Dutkowski	Fraunhofer FOKUS, Germany
Jan Dvorak	
Udo Einspanier	con terra, Germany
Enrico Francesconi	ITTIG-CNR, Italy
Emilio García	Ministerio de Hacienda y Administraciones Públicas, Spain
Stijn Goedertier	PricewaterhouseCoopers, Belgium
Christopher Gutteridge	University of Southampton, UK
Bart Hanssens	Fedict, Belgium
Pascal Heus	Integrated Data Management Services and Metadata Technology North America, USA
Norbert Hohn	Publications Office of the European Union, Luxembourg
Antonio Ibáñez Pascual	Junta de Castilla y León, Spain
Carlos Iglesias	Spain
Athanasios Karalopoulos	European Commission
Dominik Klauser	Bundeskanzleramt, Austria
Stefanos Kotoglou	PwC EU Services
Javier Lacasta Miguel	University of Zaragoza
Deirdre Lee	Derilinx, Ireland
Nikolaos Loutas	PwC EU Services
Carlo Marchetti	Senato della Repubblica, Italy
Florian Marienfeld	Fraunhofer FOKUS, Germany
Andrea Maurino	University of Milano-Bicocca, Italy
Michael Ostling	MetaGIS, Sweden
Hans Overbeek	KOOP Kennis- en Exploitatiecentrum Officiële Overheidspublicaties, Netherlands

## DCAT Application Profile for Data Portals in Europe

---

Theodoros Papadopoulos	Ministry of Administrative Reform and E-Governance, Greece
José Pastor Camarasa	Publications Office of the European Union, Luxembourg
Andrea Perego	Joint Research Centre (JRC)
Vassilios Peristeras	European Commission
Hannes Reuter	EUROSTAT, Luxembourg
Pascal Romain	Conseil général de la Gironde, France
Antonio Rotundo	Agenzia per l'Italia Digitale (AgID), Italy
Martin Seiler	Bundesamt für Kartographie und Geodäsie, Germany
Enric Staromiejski	Everis, Belgium
Angelos Tzotsos	National Technical University of Athens, Greece
Jorgen Van Den Langenbergh	PwC EU Services
Willem Van Gemert	Publications Office of the European Union, Luxembourg
Bert Van Nuffelen	TenForce, Belgium
Brecht Wyns	PwC EU Services
Agnieszka Zajac	Publications Office of the European Union, Luxembourg

## ANNEX I. QUICK REFERENCE OF CLASSES AND PROPERTIES

Class	Class URI	Mandatory prop.	Recommended prop.	Optional properties
Agent	foaf:Agent	foaf:name	dct:type	
Category	skos:Concept	skos:prefLabel		
Category Scheme	skos:ConceptScheme	dct:title		
Catalogue	dcat:Catalog	dcat:dataset dct:description dct:publisher dct:title	foaf:homepage dct:language dct:license dct:issued dcat:themeTaxonomy dct:modified	dct:hasPart dct:isPartOf dcat:record dct:rights dct:spatial
Catalogue Record	dcat:CatalogRecord	dct:modified foaf:primaryTopic	dct:conformsTo adms:status dct:issued	dct:description dct:language dct:source dct:title
Checksum	spdx:Checksum	spdx:algorithm spdx:checksumValue		
Dataset	dcat:Dataset	dct:description dct:title	dcat:contactPoint dcat:distribution dcat:keyword dct:publisher dcat:theme	adms:identifier adms:sample adms:versionNotes dcat:landingPage dct:accessRights dct:accrualPeriodicity dct:conformsTo dct:hasVersion dct:isVersionOf dct:identifier dct:issued dct:language dct:modified dct:provenance dct:relation dct:source dct:spatial dct:temporal dct:type foaf:page owl:versionInfo
Distribution	dcat:Distribution	dcat:accessURL	dct:description dct:format dct:license	adms:status dcat:byteSize dcat:downloadURL dcat:mediaType dct:conformsTo dct:issued dct:language dct:modified dct:rights dct:title foaf:page spdx:checksum
Document	foaf:Document			
Frequency	dct:Frequency			
Identifier	adms:Identifier	skos:notation		
Kind	vcad:Kind			
Licence Document	dct:LicenseDocument	dct:type		
Licence Type	skos:Concept			
Linguistic System	dct:LinguisticSystem			
Literal	rdfs:Literal			
Location	dct:Location			
Media Type or Extent	dct:MediaTypeOrExtent			
Period Of Time	dct:PeriodOfTime			schema:startDate schema:endDate
Publisher Type	skos:Concept			
Resource	rdfs:Resource			
Rights Statement	dct:RightsStatement			
Standard	dct:Standard			
Status	skos:Concept			

## **ANNEX II. DATASET THEME VOCABULARY**

A new vocabulary for use in dcat:theme is being defined by the Publications Office of the European Union.

The EU Data Theme Vocabulary will be available at the URI <http://publications.europa.eu/resource/authority/data-theme>, and described at the landing page <http://publications.europa.eu/mdr/authority/data-theme>.

## ANNEX III CHANGE LOG

The table below summarises the changes applied to the current release of the DCAT-AP.

URI	Type	Action	Description	Issue
adms:versionNotes	Optional property (Dataset)	Updated	<i>Updates</i> Cardinality: 0..1 → 0..n This property can be repeated for parallel language versions of the version notes.	<a href="#">CO4</a>
dc:contactPoint	Recommended property (Dataset)	Updated	<i>Updates</i> URI: adms:contactPoint → dc:contactPoint Range: VCard → vCard:Kind	<a href="#">MO8</a>
dc:LicenseDocument	Recommended class	Updated	<i>Updates</i> Optional class → recommended class	<a href="#">OB4</a>
dc:Location	Optional class	Updated	Added reference to GeoDCAT-AP for expression of co-ordinates	<a href="#">IM4</a>
dc:source	Optional property (CatalogRecord)	New	Range: dc:CatalogRecord This property links to the original metadata that was used in creating metadata for the Dataset	<a href="#">MO5</a>
owl:versionInfo	Optional property (Dataset)	Updated	<i>Updates</i> URI: adms:version → owl:versionInfo	<a href="#">CO4</a>
spdx:algorithm	Mandatory property (Checksum)	New	Range: spdx:checksumAlgorithm_sha1 Cardinality: 1..1 This property identifies the algorithm used to produce the subject Checksum. Currently, SHA-1 is the only supported algorithm. It is anticipated that other algorithms will be supported at a later time.	<a href="#">PR1</a>
spdx:Checksum	Optional class	New	A value that allows the contents of a file to be authenticated. This class allows the results of a variety of checksum and cryptographic message digest algorithms to be represented.	<a href="#">PR1</a>
spdx:checksum	Optional property (Dataset)	New	Range: spdx:Checksum Cardinality: 0..1 This property provides a mechanism that can be used to verify that the contents of a Distribution have not changed	<a href="#">PR1</a>
spdx:checksumValue	Mandatory property (Checksum)	New	Range: rdfs:Literal typed as xsd:hexBinary Cardinality: 1..1 This property provides a lower case hexadecimal encoded digest value produced using a specific algorithm.	<a href="#">PR1</a>
vCard:Kind	Optional class	Updated	<i>Updates</i> Class name: VCard → Kind URI: VCard → vcard:Kind The class Kind is the parent class for the four explicit types of vCards (Individual, Organization, Location, Group).	<a href="#">MO4</a>
dc:language	Optional property (Catalogue Record)	New	This property refers to a language used in the textual metadata describing titles, descriptions, etc. of the Datasets in the Catalogue. This property can be repeated if the metadata is provided in multiple languages.	<a href="#">PR28</a>
dc:provenance	Optional property (Dataset)	New	Range: dc:ProvenanceStatement This property contains a statement about the lineage of a Dataset.	<a href="#">PR6</a> , <a href="#">PR13</a> , <a href="#">PR14</a> , <a href="#">MO5</a>
dc:source	Optional property (Dataset)	New	Range: dc:Dataset This property refers to a related Dataset from which the described Dataset is derived.	<a href="#">PR6</a> , <a href="#">PR13</a> , <a href="#">PR14</a> , <a href="#">MO5</a>
dc:accessRights	Optional property (Dataset)	New	Range: dc:RightsStatement This property refers to information that indicates whether the Dataset is open data, has access restrictions or is not public.	<a href="#">PR2</a> , <a href="#">PR3</a>

dct:hasVersion	Optional property (Dataset)	New	Range: dcat:Dataset This property refers to a related Dataset that is a version, edition, or adaptation of the described Dataset.	<a href="#">PR5</a> , <a href="#">PR16</a> , <a href="#">MQ12</a>
dct:isVersionOf	Optional property (Dataset)	New	Range: dcat:Dataset This property refers to a related Dataset of which the described Dataset is a version, edition, or adaptation.	<a href="#">PR5</a> , <a href="#">PR16</a> , <a href="#">MQ12</a>
dct:relation	Optional property (Dataset)	New	Range: rdfs:Resource This property refers to a related resource.	<a href="#">PR19</a> , <a href="#">MQ12</a>
foaf:page	Optional property (Dataset)	New	Range: foaf:Document This property refers to a page or document about this Dataset.	<a href="#">PR19</a> , <a href="#">PR26</a>
dcat:mediaType	Controlled vocabulary	Updated	Modifications: MDR list → IANA types	<a href="#">PR22</a> , <a href="#">VO3</a>
dct:spatial	Controlled vocabulary	Updated	Modifications: Added recommendation to use sws.geonames.org if the needed place is not listed in the MDR	<a href="#">VO9</a>
dct:isPartOf	Optional Property (Catalogue)	New	Range: dcat:Catalog This property refers to a related Catalogue in which the described Catalogue is physically or logically included.	<a href="#">nesting</a>
adms:sample	Optional property (Dataset)	New	This property is related to sample(s) of the dataset	<a href="#">PR21</a>
foaf:page	Optional Property (Distribution)	New	A page or document about this Distribution	<a href="#">MQ2</a>
dct:hasPart	Optional Property (Catalogue)	New	Range: dcat:Catalog This property refers to a related Catalogue that is part of the described Catalogue	<a href="#">nesting</a>
dcat:themeTaxonomy	Controlled vocabulary	Updated	Modification Changed the recommendation to use new EU Data Theme vocabulary proposed by the Publications Office instead of EuroVoc. Added clarification that value is the URI of the concept scheme, not of the concepts	<a href="#">VO2</a>
dcat:theme	Controlled vocabulary	Updated	Modifications: Changed the recommendation to use terms from the new EU Data Theme vocabulary proposed by the Publications Office instead of EuroVoc domains. URI: dct:theme -> dcat:theme	<a href="#">VO2</a>
dct:type	Optional Property (Dataset)	New	This property refers to a type of the Dataset	
dct:conformsTo	Recommended Property (Catalogue Record)	New	This property refers to an Application Profile that the Dataset's metadata conforms to	
dct:accrualPeriodicity	Controlled vocabulary	Updated	Modification Changed the recommendation to use terms from the Frequency Name Authority List maintained by the Publications Office instead of the Dublin Core Collection Description Frequency Vocabulary	
dcat:landingPage	Optional property (Dataset)	Updated	<i>Updates</i> Cardinality: 0..1 → 0..n	<a href="#">Issue link</a>

#### Further textual changes:

- Removed sections on related work, use cases and deployment issues.
- Updated references to DCAT to refer to the W3C Recommendation of 14 January 2014.
- Added section 7 on Agent roles.
- Added explanation on how to express that text was machine-translated using RFC6497 in section 8.
- Updated the membership list in section 9.
- Updated the quick reference in Annex I.
- Added Annex II with links to the new EU Data Theme vocabulary.