



DCAT Application Profile for data portals in Europe Version 2.0.0



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1. INTRODUCTION

1.1. Context

This document has been prepared in the context of Action 1.1 – Improving semantic interoperability in European eGovernment systems¹ of the European Commission's Interoperability Solutions for European Public Administrations (ISA) programme².

Studies conducted on behalf of the European Commission³ show that businesses and citizens still face difficulties in finding and re-using public sector information. In its communication on Open Data⁴ 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 the major semantic change release process described in the Change and Release Management Policy for DCAT-AP⁵ and was built starting from DCAT-AP version 1.2.1⁶.

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 and an alignment with the upcoming release of W3C DCAT 2.0.

¹ 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

² European Commission. Interoperability Solutions for European Public Administrations (ISA). http://ec.europa.eu/isa/index_en.htm

³ 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

⁴ European Commission. Communication on Open Data. http://ec.europa.eu/information_society/policy/psi/docs/pdfs/opendata2012/open_data_communication/en.pdf

⁵ European Commission. Joinup. Change and Release Management Policy for DCAT-AP <https://joinup.ec.europa.eu/document/change-and-release-management-policy-dcat-ap>

⁶ European Commission. Joinup. DCAT Application Profile for data portals in Europe. <https://joinup.ec.europa.eu/release/dcat-ap/121>

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 Group⁷ at W3C. DCAT is an RDF⁸ 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 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. The DCAT specification

The DCAT Application Profile defined in this document is based on the specification of the Data Catalog Vocabulary (DCAT) of 16 January 2014⁹, and the Data Catalog Vocabulary (DCAT) - Version 2, W3C Candidate Recommendation 03 October 2019¹⁰.

⁷ W3C. Government Linked Data (GLD) Working Group.
http://www.w3.org/2011/gld/wiki/Main_Page

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

⁹ W3C. Data Catalog Vocabulary (DCAT). W3C Recommendation 16 January 2014.
<http://www.w3.org/TR/2014/REC-vocab-dcat-20140116/>

¹⁰ Data Catalog Vocabulary (DCAT) - Version 2. W3C Candidate Recommendation 03 October 2019 <https://www.w3.org/TR/2019/CR-vocab-dcat-2-20191003/>

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 2119¹¹.

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.

¹¹ IETF. RFC 2119. Key words for use in RFCs to Indicate Requirement Levels. <http://www.ietf.org/rfc/rfc2119.txt>

The class 'Distribution' is classified as 'Recommended' in section 0 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.

All other classes are classified as 'Optional' in section 0. A further description of the optional classes is only included as a sub-section in section 4 if the Application Profile specifies mandatory or recommended properties for them.

The Application Profile reuses terms from various existing specifications. Classes and properties specified in the next sections have been taken from the following namespaces:

- adms: <http://www.w3.org/ns/adms#>
- dcat: <http://www.w3.org/ns/dcat#>
- dcatap: <http://data.europa.eu/r5r/>
- dct: <http://purl.org/dc/terms/>
- foaf: <http://xmlns.com/foaf/0.1/>
- locn: <http://www.w3.org/ns/locn#>
- owl: <http://www.w3.org/2002/07/owl#>
- odrl: <http://www.w3.org/ns/odrl/2/>
- rdfs: <http://www.w3.org/2000/01/rdf-schema#>
- schema: <http://schema.org/>
- skos: <http://www.w3.org/2004/02/skos/core#>
- spdx: <http://spdx.org/rdf/terms#>
- xsd: <http://www.w3.org/2001/XMLSchema#>
- vann: <http://purl.org/vocab/vann/>
- voaf: <http://purl.org/vocommons/voaf#>
- vcard: <http://www.w3.org/2006/vcard/ns#>

Application Profile classes shows a UML diagram of all classes and properties included in the DCAT Application Profile.

| Class name | Usage note for the Application Profile | URI | Reference |
|------------|--|---------------|---|
| 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 ¹³ . | rdfs:Literal | http://www.w3.org/TR/rdf-concepts/#section-Literals |
| Resource | Anything described by RDF. | rdfs:Resource | http://www.w3.org/TR/rdf-schema/#ch_resource |

3.2. Recommended Classes

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

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 | http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog-record |
| Data Service | A collection of operations that provides access to one or more datasets or data processing functions. | dcat:DataService | https://www.w3.org/TR/vocab-dcat-2/#Class:Data_Service |
| 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 | http://spdx.org/rdf/terms#Checksum |
| Document | A textual resource intended for human consumption that contains information, e.g. a web page about a Dataset. | foaf:Document | http://xmlns.com/foaf/spec/#term_Document |
| Frequency | A rate at which something recurs, e.g. the publication of a Dataset. | dct:Frequency | http://dublincore.org/documents/dcmi-terms/#terms-Frequency |
| 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 | http://www.w3.org/TR/vocab-adms/#identifier |

¹³ IETF. BCP 47. Tags for Identifying Languages. <http://www.rfc-editor.org/rfc/bcp/bcp47.txt>

| | | | |
|----------------------|--|-------------------------|---|
| 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 | http://www.w3.org/TR/2014/NOTE-vcards-rdf-20140522/#d4e181 |
| Linguistic system | A system of signs, symbols, sounds, gestures, or rules used in communication, e.g. a language | dct:LinguisticSystem | http://dublincore.org/documents/dcmi-terms/#terms-LinguisticSystem |
| 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 ¹⁴ is recommended, following the approach described in the GeoDCAT-AP specification. | dct:Location | http://dublincore.org/documents/dcmi-terms/#terms-Location |
| Media type | A media type, e.g. the format of a computer file | dct:MediaType | https://www.dublincore.org/specifications/dublin-core/dcmi-terms/#terms-MediaType |
| Period of time | An interval of time that is named or defined by its start and end dates. | dct:PeriodOfTime | http://dublincore.org/documents/dcmi-terms/#terms-PeriodOfTime |
| Publisher type | A type of organisation that acts as a publisher | skos:Concept | http://www.w3.org/TR/vocab-adms/#dcterms-type |
| Relationship | An association class for attaching additional information to a relationship between DCAT Resources | dcat:Relationship | https://www.w3.org/TR/vocab-dcat-2/#Class:Relationship |
| 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 | http://dublincore.org/documents/dcmi-terms/#terms-RightsStatement |
| Role | A role is the function of a resource or agent with respect to another resource, in the context of resource attribution or resource relationships. Note it is a subclass of skos:Concept. | dcat:Role | https://www.w3.org/TR/vocab-dcat-2/#Class:Role |
| Standard | A standard or other specification to which a Dataset or Distribution conforms | dct:Standard | http://dublincore.org/documents/dcmi-terms/#terms-Standard |
| Status | An indication of the maturity of a Distribution or the type of change of a Catalogue Record. | skos:Concept | http://www.w3.org/TR/vocab-adms/#status |
| 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 | http://dublincore.org/documents/dcmi-terms/#terms-ProvenanceStatement |

¹⁴ European Commission. Joinup. Core Location Vocabulary.
<https://joinup.ec.europa.eu/solution/core-location-vocabulary>

4. DCAT APPLICATION PROFILE PROPERTIES PER CLASS

A quick reference table of properties per class is included in Annex I. The list of included properties contain a selection of the properties from the W3C DCAT 2.0 specification on which DCAT-AP expresses additional constraints or on which DCAT-AP wants to emphasize their usage. A property which is not mentioned but would be applicable for a class according to DCAT 2.0 specification is considered out of scope for DCAT-AP.

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:title | 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 |
| spatial/ geographic | dct:spatial | dct:Location | This property refers to a geographical area covered by the Catalogue. | 0..n |
| 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 |
| service | dcat:service | dcat:DataService | This property refers to a site or end-point that is listed in the catalog. | 0..n |
| catalogue | dcat:catalog | dcat:Catalog | This property refers to a catalog whose contents are of interest in the context of this catalog | 0..n |
| creator | dct:creator | foaf:Agent | This property refers to the entity primarily responsible for producing the catalogue | 0..1 |

4.2. Catalogue Record

4.2.1. Mandatory properties for Catalogue Record

| Property | URI | Range | Usage note | Card. |
|--------------------------|-------------------|--|---|-------|
| primary topic | foaf:primaryTopic | dcat:Dataset or dcat:DataService or dcat:Catalog | This property links the Catalogue Record to the Dataset, Data service or Catalog 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 | dct:Standard | 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. | 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. Data Service

4.3.1. Mandatory properties for Data Service

| Property | URI | Range | Usage note | Card |
|--------------|------------------|---------------|--|------|
| endpoint URL | dcat:endpointURL | rdfs:Resource | The root location or primary endpoint of the service (an IRI). | 1..n |

| Property | URI | Range | Usage note | Card |
|----------|-----------|--------------|--|------|
| title | dct:title | rdfs:Literal | This property contains a name given to the Data Service. This property can be repeated for parallel language versions of the name. | 1..n |

4.3.2. Recommended properties for Data Service

| Property | URI | Range | Usage note | Card |
|----------------------|--------------------------|---------------|---|------|
| endpoint description | dcat:endpointDescription | rdfs:Resource | This property contains a description of the services available via the end-points, including their operations, parameters etc. The property gives specific details of the actual endpoint instances, while dct:conformsTo is used to indicate the general standard or specification that the endpoints implement. | 0..n |
| serves dataset | dcat:servesDataset | dcat:Dataset | This property refers to a collection of data that this data service can distribute. | 0..n |

4.3.3. Optional properties for Data Service

| Property | URI | Range | Usage note | Card |
|---------------|------------------|---------------------|--|------|
| access rights | dct:accessRights | dct:RightsStatement | This property MAY include information regarding access or restrictions based on privacy, security, or other policies. | 0..1 |
| description | dct:description | rdfs:Literal | This property contains a free-text account of the Data Service. This property can be repeated for parallel language versions of the description. | 0..n |
| licence | dct:license | dct:LicenseDocument | This property contains the licence under which the Data service is made available. | 0..1 |

4.4. Dataset

4.4.1. 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 |

4.4.2. Recommended properties for Dataset

| Property | URI | Range | Usage note | Card |
|--------------------------------|-------------------|-------------------|---|------|
| contact point | dcat:contactPoint | vcad: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 |
| 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 |

| Property | URI | Range | Usage note | Card |
|-----------------|--|--------------|--|------|
| 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 |

4.4.3. 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 |
| creator | dct:creator | foaf:Agent | This property refers to the entity primarily responsible for producing the dataset | 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 referenced by | dct:isReferencedBy | rdfs:Resource | This property provides a link to a description of a relationship with another resource | 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 ¹⁵ , DataCite ¹⁶ , DOI ¹⁷ , EZID ¹⁸ or W3ID ¹⁹ . | 0..n |

¹⁵ Mikulski Archive for Space Telescopes (MAST). Referencing Data Sets in Astronomical Literature. http://archive.stsci.edu/pub_dsn.html

¹⁶ DataCite. <http://www.datacite.org/>

¹⁷ DOI. Digital Object Identifier. <http://www.doi.org/>

¹⁸ EZID. <http://n2t.net/ezid>

¹⁹ W3C Permanent Identifier Community Group. Permanent Identifiers for the Web. <https://w3id.org/>

| Property | URI | Range | Usage note | Card. |
|------------------------------|--------------------------------|--|--|-------|
| provenance | dct:provenance | dct:ProvenanceStatement | This property contains a statement about the lineage of a Dataset. | 0..n |
| qualified attribution | prov:qualifiedAttribution | prov:Attribution | This property refers to a link to an Agent having some form of responsibility for the resource | 0..n |
| qualified relation | dcat:qualifiedRelation | dcat:Relationship | This property is about a related resource, such as a publication, that references, cites, or otherwise points to the 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 resolution | dcat:spatialResolutionInMeters | xsd:decimal | This property refers to the minimum spatial separation resolvable in a dataset, measured in meters. | 0..n |
| temporal resolution | dcat:temporalResolution | xsd:duration | This property refers to the minimum time period resolvable in the dataset. | 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 |
| 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 |
| was generated by | prov:wasGeneratedBy | prov:Activity | This property refers to an activity that generated, or provides the business context for, the creation of the dataset. | 0..n |

4.5. Distribution

4.5.1. Mandatory properties for Distribution

| Property | URI | Range | Usage note | Card |
|------------|----------------|---------------|---|------|
| access URL | dcat: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 |

4.5.2. Recommended properties for Distribution

| Property | URI | Range | Usage note | Card |
|--------------|---------------------|-----------------------|--|------|
| availability | dcatap:availability | skos:Concept | This property indicates how long it is planned to keep the Distribution of the Dataset available. | 0..1 |
| 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 |
|---------|-------------|---------------------|---|------|

4.5.3. Optional properties for Distribution

| Property | URI | Range | Usage note | Card. |
|--------------------------|---|--|---|-------|
| access service | dcat:accessService | dcat:DataService | This property refers to a data service that gives access to the distribution of the dataset | 0..n |
| byte size | dcat: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. The checksum is related to the downloadURL. | 0..1 |
| compression format | dcat:compressFormat | dct:MediaType | This property refers to the format of the file in which the data is contained in a compressed form, e.g. to reduce the size of the downloadable file. It SHOULD be expressed using a media type as defined in the official register of media types managed by IANA. | 0..1 |
| Documentation | foaf:page | foaf:Document | This property refers to a page or document about this Distribution. | 0..n |
| download URL | dcat:downloadURL | rdfs:Resource | This property contains a URL that is a direct link to a downloadable file in a given format. | 0..n |
| has policy | odrl:hasPolicy | odrl:Policy | This property refers to the policy expressing the rights associated with the distribution if using the ODRL vocabulary | 0..1 |
| 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 | dcat:mediaType, subproperty of dct:format | dct:MediaType | This property refers to the media type of the Distribution as defined in the official register of media types managed by IANA. | 0..1 |
| packaging format | dcat:packageFormat | dct:MediaType | This property refers to the format of the file in which one or more data files are grouped together, e.g. to enable a set of related files to be downloaded together. It SHOULD be expressed using a media type 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 |
| spatial resolution | dcat:spatialResolutionInMeters | xsd:decimal | This property refers to the minimum spatial separation resolvable in a dataset distribution, measured in meters. | 0..n |
| status | adms:status | skos:Concept | This property refers to the maturity of the Distribution. It MUST take one of the values Completed, Deprecated, Under Development, Withdrawn. | 0..1 |
| temporal resolution | dcat:temporalResolution | xsd:duration | This property refers to the minimum time period resolvable in the dataset distribution. | 0..n |
| 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 |

4.6. Agent

4.6.1. 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 |

4.6.2. 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 |

4.7. Category Scheme

4.7.1. Mandatory property for Category Scheme

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

4.8. Category

4.8.1. 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 |

4.9. Checksum

4.9.1. 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 |

4.10. Identifier

4.10.1. 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 ²⁰ | This property contains a string that is an identifier in the context of the identifier scheme referenced by its datatype. | 0..1 |
|----------|---------------|--|---|------|

4.11. Licence Document

4.11.1. 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..n |

4.12. Location

4.12.1. Recommended properties for Location

| Property | URI | Range | Usage note | Card. |
|--------------|---------------|--------------|---|-------|
| bounding box | dcat:bbox | rdfs:Literal | This property refers to the geographic bounding box of a resource. | 0..1 |
| centroid | dcat:centroid | rdfs:Literal | This property refers to the geographic center (centroid) of a resource. | 0..1 |

Please note that the order of usage is as follows : use the most specific geospatial relationship by preference. E.g. if the spatial description is a bbox, use dcat :bbox, otherwise use locn:geometry

4.12.2. Optional properties for Location

| Property | URI | Range | Usage note | Card. |
|----------|---------------|--------------|---|-------|
| geometry | locn:geometry | rdfs:Literal | This property associates any resource with the corresponding geometry | 0..1 |

4.13. Period of Time

4.13.1. Recommended properties for Period of Time

| Property | URI | Range | Usage note | Card. |
|------------|----------------|--|--|-------|
| start date | dcat:startDate | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the start of the period | 0..1 |
| end date | dcat: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 recommended, 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)

²⁰ DataCite Resource Identifier Scheme.
<http://purl.org/spar/datacite/ResourceIdentifierScheme>

4.13.2. *Optional properties for Period of Time*

| Property | URI | Range | Usage note | Card. |
|-----------|-------------------|--------------|---|-------|
| beginning | time:hasBeginning | time:Instant | This property contains the beginning of a period or interval. | 0..1 |
| end | time:hasEnd | time:Instant | This property contains the end of a period or interval | 0..1 |

4.14. Relationship

4.14.1. *Mandatory properties for Relationship*

| Property | URI | Range | Usage note | Card. |
|----------|--------------|---------------|--|-------|
| had role | dcat:hadRole | dcat:Role | This property refers to the function of an entity or agent with respect to another entity or resource. | 1..n |
| relation | dct:relation | rdfs:Resource | This property refers to the resource related to the source resource. | 1..n |

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 ²¹ | http://www.iana.org/assignments/media-types/media-types.xhtml | |
| dc:theme | Dataset | Dataset Theme Vocabulary | http://publications.europa.eu/resource/authority/data-theme | The values to be used for this property are the URIs of the concepts in the vocabulary. |
| dc:themeTaxonomy | Catalogue | Dataset Theme Vocabulary | http://publications.europa.eu/resource/authority/data-theme | 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 | EU Vocabularies Frequency | http://publications.europa.eu/resource/authority/frequency | |

²¹ Internet Assigned Numbers Authority (IANA). Media Types
<http://www.iana.org/assignments/media-types/>

| Property URI | Used for Class | Vocabulary name | Vocabulary URI | Usage note |
|---------------|--|---|--|--|
| | | Named Authority List ²² | | |
| dct:format | Distribution | EU Vocabularies File Type Named Authority List ²³ | http://publications.europa.eu/resource/authority/file-type | |
| dct:language | Catalogue, Dataset, Catalogue Record, Distribution | EU Vocabularies Languages Named Authority List ²⁴ | http://publications.europa.eu/resource/authority/language | |
| dct:publisher | Catalogue, Dataset | EU Vocabularies Corporate bodies Named Authority List ²⁵ | http://publications.europa.eu/resource/authority/corporate-body | 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 | EU Vocabularies Continents Named Authority List ²⁶ , EU Vocabularies Countries Named Authority List ²⁷ , EU Vocabularies Places Named Authority List ²⁸ , Geonames | http://publications.europa.eu/resource/authority/continent/ , http://publications.europa.eu/resource/authority/country , http://publications.europa.eu/resource/authority/place/ , http://sws.geonames.org/ | The EU Vocabularies 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. |

²² EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Frequency. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/frequency>

²³ EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. File type. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/file-type>

²⁴ EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Language. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/language/>

²⁵ EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Corporate body. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/corporate-body/>

²⁶ EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Continent <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/continent>

²⁷ EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Country. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/country>

²⁸ EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Place. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/place>

| Property URI | Used Class for | Vocabulary name | Vocabulary URI | Usage note |
|---------------------|------------------|--------------------------------------|---|---|
| adms:status | Distribution | ADMS status vocabulary | http://purl.org/adms/status/ | The list of terms in the ADMS status vocabulary is included in the ADMS specification ²⁹ |
| dct:type | Agent | ADMS publisher type vocabulary | http://purl.org/adms/publisher-type/ | The list of terms in the ADMS publisher type vocabulary is included in the ADMS specification |
| dct:type | Licence Document | ADMS licence type vocabulary | http://purl.org/adms/licence-type/ | The list of terms in the ADMS licence type vocabulary is included in the ADMS specification |
| dcatap:availability | Distribution | Distribution availability vocabulary | http://data.europa.eu/r5r/availability/ | The list of terms for the availability levels of a dataset distribution in the DCAT-AP 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 EuroVoc³⁰, the CERIF standard vocabularies³¹, the Dewey Decimal Classification³² and numerous other schemes.

5.4. Licence vocabularies

Concerning licence vocabularies, implementers are encouraged to use widely recognised licences such as Creative Commons licences³³, and in particular the CC Zero Public Domain Dedication³⁴, the Open Data Commons Public Domain Dedication

²⁹ European Commission. Joinup. Asset Description Metadata Schema (ADMS). <https://joinup.ec.europa.eu/solution/asset-description-metadata-schema-adms>

³⁰ EuroVoc. <http://eurovoc.europa.eu/>.

³¹ http://www.eurocris.org/Uploads/Web%20pages/CERIF-1.5/CERIF1.5_Semantics.xhtml

³² OCLC. Dewey Summaries as Linked Data. <http://www.oclc.org/dewey/webservices.en.html> and <http://dewey.info/>

³³ Creative Commons. About The Licenses. <http://creativecommons.org/licenses/>

³⁴ Creative Commons. CC0 1.0 Universal (CC0 1.0) Public Domain Dedication. <http://creativecommons.org/publicdomain/zero/1.0/>

and License (PDDL)³⁵, the European Union Public Licence (EUPL)³⁶ or an open government licence such as the UK Open Government Licence³⁷.

Further activities in this area are undertaken by the Open Data Institute³⁸ with the Open Data Rights Statement Vocabulary³⁹ and by the Open Digital Rights Language (ODRL) Initiative⁴⁰.

³⁵ Open Data Commons Public Domain Dedication and License (PDDL). <http://opendatacommons.org/licenses/pddl/>

³⁶ European Commission. Joinup. Open Source Software. European Union Public Licence (EUPL). <https://joinup.ec.europa.eu/collection/eupl>

³⁷ The National Archives. Open Government Licence for public sector information. <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/2/>

³⁸ Open Data Institute. <http://www.theodi.org/>

³⁹ Open Data Institute. Open Data Rights Statement Vocabulary. <http://schema.theodi.org/odrs/>

⁴⁰ 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 4.4.1.
- Provide descriptions of Distributions, if any, of Datasets in the Catalogue, including at least the mandatory properties specified in section 4.5.1.
- Provide descriptions of Data Services, if any, of Datasets in the Catalogue, including at least the mandatory properties specified in section 4.3.1
- Provide descriptions of all organisations involved in the descriptions of Catalogue and Datasets, including at least the mandatory properties specified in section 4.6.1.
- 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 4.7.1.
- Provide descriptions of all categories involved in the descriptions of Datasets in the Catalogue, including at least the mandatory properties specified in section 4.8.1.

For the properties listed in the table in section 0, 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), 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 List⁴¹ maintained by the Publications Office of the EU. Other domain-specific sources for additional properties are the INSPIRE Responsible Party roles⁴², the Library of Congress' MARC relators⁴³ and DataCite's contributor types⁴⁴. To enable the use of such properties, they must be defined as RDF properties with URIs in a well-managed namespace.

⁴¹ EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Roles. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/role>

⁴² European Commission. INSPIRE Registry. Responsible Party Role. <http://inspire.ec.europa.eu/metadata-codelist/ResponsiblePartyRole/>

⁴³ Library of Congress. MARC Code List for Relators. <http://loc.gov/marc/relators/relaterm.html>

⁴⁴ 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, Appendix 1, table 5.

A second approach is based on the use of W3C's PROV ontology⁴⁵ 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 agreed⁴⁶. 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 and on the requests of implementors and stakeholders, the DCAT Application Profile release 2.0.0 is extended with additional roles as proposed by DCAT Version 2, W3C Working Draft 28 May 2019⁴⁷ that have proven to be useful across domains. Precisely, properties `dct:creator`, `prov:qualifiedAttribution` and `prov:qualifiedRelation` have been added to `dcat:dataset` class to further facilitate relationships between datasets and agents.⁴⁸

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.

⁴⁵ W3C. PROV-O: The PROV Ontology. W3C Recommendation 30 April 2013. <http://www.w3.org/TR/prov-o/>

⁴⁶ 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/discussion/geodcat-ap-how-express-different-responsible-party-roles-supported-iso-19115-inspire>

⁴⁷ DCAT Version 2, W3C Working Draft 28 May 2019 <https://www.w3.org/TR/2019/WD-vocab-dcat-2-20190528/>

⁴⁸ <https://www.w3.org/TR/vocab-dcat-2/#qualified-attribution>

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 BCP47⁴⁹, which allows the use of the "t" extension for text transformations defined in RFC6497⁵⁰ with the field "t0"⁵¹ 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 negotiation⁵² mechanism may be used whereby different content is served based on the Accept-Languages indicated by the browser.

⁴⁹ Internet Engineering Task Force (IETF). BCP47. Tags for Identifying Languages. <http://tools.ietf.org/html/bcp47>

⁵⁰ Internet Engineering Task Force (IETF). BCP47 Extension T – Transformed Content. <http://tools.ietf.org/html/rfc6497>

⁵¹ UNICODE Consortium. CLDR - Unicode Common Locale Data Repository. BCP47, transform_mt.xml. http://unicode.org/cldr/trac/browser/trunk/common/bcp47/transform_mt.xml

⁵² Apache Web Server: content negotiation. <http://httpd.apache.org/docs/current/content-negotiation.html>

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.

9. ACKNOWLEDGEMENTS

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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:spatial | dcat:catalog dct:creator dct:hasPart dct:isPartOf dcat:record dct:rights dcat:service |
| 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 | | |
| Data Service | Dcat:DataService | dcat:endpointURL dct:title | dcat:endpointDescription dcat:servesDataset | dct:accessRights dct:description dct:licence |
| Dataset | dcat:Dataset | dct:description dct:title | dcat:contactPoint dcat:distribution dcat:keyword dct:publisher dct:spatial dct:temporal dcat:theme | adms:identifier adms:sample adms:versionNotes dcat:landingPage dcat:spatialResolutionInMeters dcat:temporalResolution dcat:qualifiedRelation dct:accessRights dct:accrualPeriodicity dct:conformsTo dct:creator dct:hasVersion dct:isReferencedBy dct:isVersionOf dct:identifier dct:issued dct:language dct:modified dct:provenance dct:relation dct:source dct:type foaf:page owl:versionInfo prov:qualifiedAttribution prov:wasGeneratedBy |
| Distribution | dcat:Distribution | dcat:accessURL | dcatap:availability dct:description dct:format dct:license | adms:status dcat:accessService dcat:byteSize dcat:compressFormat dcat:downloadURL dcat:mediaType dcat:packageFormat dcat:spatialResolutionInMeters dcat:temporalResolution dct:conformsTo dct:issued dct:language dct:modified dct:rights dct:title foaf:page odrl:hasPolicy spdx:checksum |
| Document | foaf:Document | | | |
| Frequency | dct:Frequency | | | |
| Identifier | adms:Identifier | skos:notation | | |

| | | | | |
|-------------------|----------------------|------------------------------|--------------------------------|----------------------------------|
| Kind | vcard:Kind | | | |
| Licence Document | dct:LicenseDocument | | dct:type | |
| Licence Type | skos:Concept | | | |
| Linguistic System | dct:LinguisticSystem | | | |
| Literal | rdfs:Literal | | | |
| Location | dct:Location | | dcat:bbox dcat:centroid | locn:geometry |
| Media Type | dct:MediaType | | | |
| Period Of Time | dct:PeriodOfTime | | dcat:startDate dcat:endDate | time:hasBeginning time:hasEnd |
| Publisher Type | skos:Concept | | | |
| Relationship | dcat:Relationship | dct:relation dcat:hadRole | | |
| Resource | rdfs:Resource | | | |
| Rights Statement | dct:RightsStatement | | | |
| Role | dcat:Role | | | |
| Standard | dct:Standard | | | |
| Status | skos:Concept | | | |

Annex II. CHANGE LOG

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

| URI | Type | Action | Description | Issue | Release |
|-----------------------|---------------------------------------|---------|---|----------------------------|---------------------|
| foaf:primaryTopic | Mandatory property (Catalogue Record) | Update | Extended the range to cover the dcat:Resource subclasses dcat:Catalog, dcat:Dataset and dcat:DataService | DCAT-AP-92 | 2.0 |
| dct:MediaTypeOrExtent | Optional Class | Deleted | A media type or extent, e.g. the format of a computer file | DCAT-AP-80 | 2.0 |
| dct:MediaType | Optional Class | New | A media type, e.g. the format of a computer file | DCAT-AP-80 | 2.0 |
| dct:language | property | Update | Align with w3C DCAT 2.0: add to usage of controlled vocabulary for all usages | DCAT-AP-88 | |
| dcat:mediaType | Optional Property (Distribution) | Update | Updates Range: dct:MediaTypeOrExtent →dct:MediaType | DCAT-AP-80 | 2.0 |
| locn:geometry | Optional property (Location) | New | Range: rdfs :Literal This property associates any resource with the corresponding geometry | DCAT-AP-85 | 2.0 |
| dcat:bbox | Recommended property (Location) | New | Range : rdfs :Literal This property refers to the geographic bounding box of a resource. | DCAT-AP-85 | 2.0 |
| dcat:centroid | Recommended property (Location) | New | Range : rdfs :Literal This property refers to the geographic center (centroid) of a resource | DCAT-AP-85 | 2.0 |
| time:hasEnd | Optional property (Period Of Time) | New | Range : time:Instant This property contains the end of a period or interval. | DCAT-AP-84 | 2.0 |
| time:hasBeginning | Optional property (Period Of Time) | New | Range : time:Instant This property contains the beginning of a period or interval. | DCAT-AP-84 | 2.0 |
| dcat:endDate | Recommended property (Period Of Time) | New | Range : rdfs:Literal typed as xsd:date or xsd:dateTime This property contains the end of the period | DCAT-AP-83 | 2.0 |
| dcat:startDate | Recommended property (Period Of Time) | New | Range : rdfs:Literal typed as xsd:date or xsd:dateTime This property contains the start of the period | DCAT-AP-83 | 2.0 |
| schema:endDate | Optional property (Period Of Time) | Deleted | Range : rdfs:Literal typed as xsd:date or xsd:dateTime This property contains the end of the period/time | DCAT-AP-83 | 2.0 |
| schema:startDate | Optional property (Period Of Time) | Deleted | Range : rdfs:Literal typed as xsd:date or xsd:dateTime This property contains the start of the period/time | DCAT-AP-83 | 2.0 |
| dcat:Role | Optional class | New | A role is the function of a resource or agent with respect to another resource, in the context of resource attribution or resource relationships. | DCAT-AP-82 | 2.0 |
| dct:relation | Mandatory property (Relationship) | New | Range : rdfs :Resource This property refers to the resource related to the source resource. | DCAT-AP-81 | 2.0 |
| dcat:hadRole | Mandatory property (Relationship) | New | Range : dcat :Role This property refers to the function of an entity or agent with respect to another entity or resource. | DCAT-AP-81 | 2.0 |
| dcat:Relationship | Optional class | New | An association class for attaching additional information to a relationship between DCAT Resources | DCAT-AP-81 | 2.0 |
| odrl:hasPolicy | Optional property (Distribution) | New | Range: odrl:Policy | DCAT-AP-77 | 2.0 |

| | | | | | |
|--------------------------------|------------------------------------|-----|---|--|---------------------|
| | | | This property refers to the policy expressing the rights associated with the distribution if using the ODRL vocabulary | | |
| dcat:accessService | Optional property (Distribution) | New | Range: dcat :DataService This property refers to a data service that gives access to the distribution of the dataset | DCAT-AP-77 | 2.0 |
| dcat:spatialResolutionInMeters | Optional property (Distribution) | New | Range: xs :decimal This property refers to the minimum spatial separation resolvable in a dataset distribution, measured in meters. | DCAT-AP-78 | 2.0 |
| dcat:temporalResolution | Optional property (Distribution) | New | Range:xsd:duration This property refers to the minimum time period resolvable in the dataset distribution. | DCAT-AP-78 | 2.0 |
| dcat:compressFormat | (Optional property (Distribution)) | New | Range: dct:MediaType This property refers to the format of the file in which the data is contained in a compressed form, e.g. to reduce the size of the downloadable file. | DCAT-AP-79, DCAT-AP-95, DCAT-AP-79 | 2.0 |
| dcat:packageFormat | Optional property (Distribution) | New | Range: dct:MediaType This property refers to the format of the file in which one or more data files are grouped together, e.g. to enable a set of related files to be downloaded together. | DCAT-AP-79, DCAT-AP-95, DCAT-AP-79 | 2.0 |
| dct:isReferencedBy | Optional property (Dataset) | New | Range : rdfs :Resource This property is about a related resource, such as a publication, that references, cites, or otherwise points to the dataset. | DCAT-AP-75 | 2.0 |
| dcat:qualifiedRelation | Optional property (Dataset) | New | Range dcat :Relationship This property provides a link to a description of a relationship with another resource | DCAT-AP-75 | 2.0 |
| dct:creator | Optional property (Dataset) | New | Range:foaf:Agent This property refers to the entity primarily responsible for producing the dataset | DCAT-AP-75 | 2.0 |
| prov:qualifiedAttribution | Optional property (Dataset) | New | Range: prov:Attribution This property refers to a link to an Agent having some form of responsibility for the resource | DCAT-AP-75 | 2.0 |
| prov:wasGeneratedBy | Optional property (Dataset) | New | Range: prov:Activity This property refers to an activity that generated, or provides the business context for, the creation of the dataset. | DCAT-AP-75 | 2.0 |
| dcat:spatialResolutionInMeters | Optional property (Dataset) | New | Range: xsd:decimal This property refers to the minimum spatial separation resolvable in a dataset, measured in meters. | DCAT-AP-76 | 2.0 |
| dcat:temporalResolution | Optional property (Dataset) | New | Range: xsd :duration This property refers to the minimum time period resolvable in the dataset. | DCAT-AP-76 | 2.0 |
| dcat:service | Optional property (Catalogue) | New | Range: dcat :DataService This property refers to a site or end-point that is listed in the catalog. | DCAT-AP-72 | 2.0 |
| dcat:catalog | Optional property (Catalogue) | New | Range : dcat :Catalog This property refers to a catalog whose contents are of interest in the context of this catalog | DCAT-AP-72 | 2.0 |
| dct:creator | Optional property (Catalogue) | New | Range foaf :Agent This property refers to the entity primarily responsible for producing the catalogue | DCAT-AP-72 | 2.0 |
| dct:accessRights | Optional property (Data Service) | New | Range : dct:RightsStatement This property MAY include information regarding access or restrictions based on privacy, security, or other policies. | DCAT-AP-73 | 2.0 |
| dct:description | Optional property (Data Service) | New | Range : rdfs:Literal This property contains a free-text account of the Data Service. This property can be repeated for parallel language versions of the description. | DCAT-AP-73 | 2.0 |
| dct:license | Optional property (Data Service) | New | Range: dct:LicenseDocument This property contains the licence under which the service is made available. | DCAT-AP-73 | 2.0 |

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|--|-------------------------------------|---------|---|----------------------------|-----------------------|
| dcats:dataset | Recommended property (Data Service) | New | Range : dcats:Dataset This property refers to a collection of data that this data service can distribute. | DCAT-AP-73 | 2.0 |
| dcats:endpointDescription | Recommended property (Data Service) | New | Range : This property contains a description of the services available via the end-points, including their operations, parameters etc. The property gives specific details of the actual endpoint instances, while dct:conformsTo is used to indicate the general standard or specification that the endpoints implement. | DCAT-AP-73 | 2.0 |
| dcats:endPointIRI | Mandatory property (Data Service) | New | Range : rdfs:Resource The root location or primary endpoint of the service (an IRI). | DCAT-AP-73 | 2.0 |
| dct:title | Mandatory property (Data Service) | New | Range : rdfs:Literal This property contains a name given to the Data Service. This property can be repeated for parallel language versions of the name. | DCAT-AP-73 | 2.0 |
| dcats:DataService | Optional Class | New | Range : A collection of operations that provides access to one or more datasets or data processing functions. | DCAT-AP-73 | 2.0 |
| dcats:availability | Recommended property (Distribution) | New | Range skos:Concept This property indicates how long it is planned to keep the Distribution of the Dataset available. It MUST take one of the values: temporary, experimental, available, stable. | DCAT-AP-40 | 2.0 |
| adms:status (Catalog Record) | Controlled vocabulary | Removed | <i>Removed : The ADMS change type vocabulary http://purl.org/adms/change-type/ (:created, :updated, :deleted) does not exist and has been removed from the specification.</i> | DCAT-AP-45 | 2.0 |
| dct:spatial | Recommended property (Catalog) | Updated | <i>Updates</i> Optional property → Recommended property | DCAT-AP-3 | 2.0 |
| dct:spatial | Recommended property (Dataset) | Updated | <i>Updates</i> Optional property → Recommended property | DCAT-AP-9 | 2.0 |
| dct:temporal | Recommended property (Dataset) | Updated | <i>Updates</i> Optional property → Recommended property | DCAT-AP-64 | 2.0 |
| schema:startDate schema:endDate | UML schema | Updated | <i>Updates : Reversed the order of the properties startDate and endDate from dct:PeriodOfTime</i> | DCAT-AP-50 | 1.2.1 |
| dcats:theme dcats:themeTaxonomy dct:accrualPeriodicity dct:format dct:language dct:publisher dct:spatial | Controlled Vocabularies | Updated | <i>Updates</i> http://publications.europa.eu/mdr/authority/data-theme/ → http://publications.europa.eu/resource/authority/data-theme , http://publications.europa.eu/mdr/authority/data-theme/ → http://publications.europa.eu/resource/dataset/data-theme , http://publications.europa.eu/mdr/authority/frequency/ → http://publications.europa.eu/resource/authority/frequency , http://publications.europa.eu/mdr/authority/file-type/ → http://publications.europa.eu/resource/authority/file-type , http://publications.europa.eu/mdr/authority/language/ → http://publications.europa.eu/resource/authority/language , http://publications.europa.eu/mdr/authority/corporate-body/ → http://publications.europa.eu/resource/authority/corporate-body , http://publications.europa.eu/mdr/authority/continent/ → http://publications.europa.eu/resource/authority/continent/ , | DCAT-AP-54 | 1.2.1 |

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|---------------------|---|---------|--|---|---------------------|
| | | | http://publications.europa.eu/mdr/authority/country/ → http://publications.europa.eu/resource/authority/country , http://publications.europa.eu/mdr/authority/place/ → http://publications.europa.eu/resource/authority/place/ . | | |
| dct:type | Recommended property (Licence Document) | Updated | <i>Updates</i> Cardinality: 0..1 → 0..n This property can be repeated in the case that multiple licence types apply to a licence document. | DCAT AP-1 | 1.2 |
| 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. | CO4 | 1.1 |
| dcat:contactPoint | Recommended property (Dataset) | Updated | <i>Updates</i> URI: adms:contactPoint→dcat:contactPoint Range: VCard→vCard:Kind | MO8 | 1.1 |
| dct:LicenseDocument | Recommended class | Updated | <i>Updates</i> Optional class → recommended class | OB4 | 1.1 |
| dct:Location | Optional class | Updated | Added reference to GeoDCAT-AP for expression of co-ordinates | IM4 | 1.1 |
| dct:source | Optional property (CatalogRecord) | New | Range: dcat:CatalogRecord This property links to the original metadata that was used in creating metadata for the Dataset | MO5 | 1.1 |
| owl:versionInfo | Optional property (Dataset) | Updated | <i>Updates</i> URI: adms:version→owl:versionInfo | CO4 | 1.1 |
| 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. | PR1 | 1.1 |
| 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. | PR1 | 1.1 |
| 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 | PR1 | 1.1 |
| 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. | PR1 | 1.1 |
| 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). | MO4 | 1.1 |
| dct: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. | PR28 | 1.1 |
| dct:provenance | Optional property (Dataset) | New | Range: dct:ProvenanceStatement This property contains a statement about the lineage of a Dataset. | PR6 , PR13 , PR14 , MO5 | 1.1 |
| dct:source | Optional property (Dataset) | New | Range: dcat:Dataset This property refers to a related Dataset from which the described Dataset is derived. | PR6 , PR13 , PR14 , MO5 | 1.1 |

| | | | | | |
|------------------------|---|---------|---|---|---------------------|
| dct:accessRights | Optional property (Dataset) | New | Range: dct:RightsStatement This property refers to information that indicates whether the Dataset is open data, has access restrictions or is not public. | PR2 , PR3 | 1.1 |
| 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. | PR5 , PR16 , MO12 | 1.1 |
| 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. | PR5 , PR16 , MO12 | 1.1 |
| dct:relation | Optional property (Dataset) | New | Range: rdfs:Resource This property refers to a related resource. | PR19 , MO12 | 1.1 |
| foaf:page | Optional property (Dataset) | New | Range: foaf:Document This property refers to a page or document about this Dataset. | PR19 , PR26 | 1.1 |
| dcat:mediaType | Controlled vocabulary | Updated | Modifications: MDR list → IANA types | PR22 , VO3 | 1.1 |
| dct:spatial | Controlled vocabulary | Updated | Modifications: Added recommendation to use sws.geonames.org if the needed place is not listed in the MDR | VO9 | 1.1 |
| 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. | nesting | 1.1 |
| adms:sample | Optional property (Dataset) | New | This property is related to sample(s) of the dataset | PR21 | 1.1 |
| foaf:page | Optional Property (Distribution) | New | A page or document about this Distribution | M02 | 1.1 |
| dct:hasPart | Optional property (Catalogue) | New | Range: dcat:Catalog This property refers to a related Catalogue that is part of the described Catalogue | nesting | 1.1 |
| 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 | VO2 | 1.1 |
| 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 | VO2 | 1.1 |
| dct:type | Optional Property (Dataset) | New | This property refers to a type of the Dataset | | 1.1 |
| dct:conformsTo | Recommended Property (Catalogue Record) | New | This property refers to an Application Profile that the Dataset's metadata conforms to | | 1.1 |
| 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 | | 1.1 |
| dcat:landingPage | Optional property (Dataset) | Updated | Updates Cardinality: 0..1 → 0..n | Issuelink | 1.1 |

Further textual changes (release 1.2):

- Updated the change management process in chapter 1 as now is based on Change and Release Management Policy for DCAT-AP.
- Updated Figure 1 - DCAT Application Profile UML Class Diagram

- Added column Release in the change log table
- Editorial fix in the quick reference in Annex I

Further textual changes (release 1.2.1):

- Updated Figure 1 - DCAT Application Profile UML Class Diagram
- Updated references 21-27 and 41 to point from Metadata Registry (MDR) to EU Vocabularies
- In section 5.2 Controlled vocabularies to be used, updated the entries in table column "Vocabulary name" (MDR-> EU Vocabularies)
- MDR has been replaced with EU Vocabularies within text.
- Updated Joinup references: 6, 13, 28, 35, 36, 46.

Further textual changes (release 2.0.0)

- Throughout the document, links are made clickable
- Apply various typo fixes indicated in the public review
- Page 15, Table 4.4.3, Optional properties for Distribution, the usage note for `adms:status` property has been updated to include « It MUST take one of the values Completed, Deprecated, Under Development, Withdrawn »
- Page 8, the following namespaces has been added :
 - vann : <http://purl.org/vocab/vann/>
 - dcatap: <http://data.europa.eu/r5r/>
 - voaf : <http://purl.org/vocommons/voaf/#>
 - odrl : <http://www.w3.org/ns/odrl/2/>
 - locn : <http://www.w3.org/ns/locn#>
- section 4. Added explanatory paragraph on the relationship with W3C DCAT 2.0
- Page 29, updated text to reflect agent roles and their relations to dataset using new added properties.
- Section 9, added list of contributors.