



DCAT Application Profile for data portals in Europe

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1. INTRODUCTION

1.1. Context

This document is prepared in the context of Action 1.1 – Improving semantic interoperability in European eGovernment systems¹ of the European Commission's Interoperability 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 these data.

This document is the result of a revision in 2015 of the first version of the agreement that was published in September 2013⁵.

1.2. Scope of the revision

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

The Application Profile specified in this document is based on the specification of the **Data Catalog Vocabulary** (DCAT)⁶ developed under the responsibility of the Government Linked Data Working Group⁷ at W3C. The work on DCAT was initiated⁸ at the Digital Enterprise Research Institute (DERI) and the Greek National Centre for Public Administration and Decentralization. DCAT is an RDF⁹ 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.

¹ European Commission. Interoperability 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 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 https://joinup.ec.europa.eu/asset/dcat_application_profile/asset_release/dcat-application-profile-data-portals-europe-final

⁶ ~~W3C. Data Catalog Vocabulary (DCAT). W3C Working Draft, 12 March 2013. <http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/>.~~

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

⁸ Fadi Maali, Richard Cyganiak, Vassilios Peristeras: Enabling Interoperability of Government Data Catalogues. EGOV 2010: 339-350.

⁹ W3C. Resource Description Framework (RDF). <http://www.w3.org/RDF/>

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 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 re-model 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 and StatDCAT.

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 [6.7](#).

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 (ISA Programme - European Commission, 2015). 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
Steering Committee (SC)	<ul style="list-style-type: none"> ▪ Approve general directions ▪ Stay informed about activities and progress ▪ Endorse new release 	ISA Coordination Group, PSI Expert Group (DG CNECT)

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Governance Committee (GC)	<ul style="list-style-type: none"> ▪ Organise & safeguard proper execution of maintenance activities ▪ Identify the need for revision ▪ Instruct the Operational Team to apply changes ▪ Establish Working Groups ▪ Prepare release for Steering Committee endorsement 	ISA Programme Management Team
Operational Team (OT)	<ul style="list-style-type: none"> ▪ Gather change requests ▪ Advise Governance Committee on nature of changes ▪ Provide the editor for Working Groups ▪ Document the resolution of change requests 	Contractor of ISA action 1.1.
Working Group (WG)	<ul style="list-style-type: none"> ▪ Bring expertise ▪ Reach consensus 	<ul style="list-style-type: none"> - Chair: Norbert Hohn, Willem Van Gemert (Publications Office) - Editor: Makx Dekkers - Organisations implementing the specification - Individual experts

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 Joinup¹⁰. The requests are evaluated by the Operational Team (OT) and grouped into issues on Joinup¹¹. 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.

¹⁰ Request analysis: https://joinup.ec.europa.eu/sites/default/files/dcat-ap_revision_requests_v0.03.xlsx

¹¹ DCAT-AP Issue Log: https://joinup.ec.europa.eu/asset/dcat_application_profile/issue/all

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 Joinup¹².

1.4. The DCAT specification

The specification of the Data Catalog Vocabulary (DCAT) was published by W3C as a W3C Recommendation on 16 January 2014¹³.

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

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

¹³ 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 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 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, if it is available.
- **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 2119¹⁴.

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.

¹⁴ 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 ¹⁵ is recommended.	foaf:Agent	http://xmlns.com/foaf/spec/#term_Agent http://www.w3.org/TR/vocab-org/
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
Catalogue	A catalogue or repository that hosts the Datasets being described.	dcat:Catalog	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog
Dataset	A conceptual entity that represents the information published.	dcat:Dataset	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-dataset
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 ¹⁶ .	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
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
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

¹⁵ W3C. The Organization Ontology. W3C Candidate Recommendation, 25 June 2013.

<http://www.w3.org/TR/2013/CR-vocab-org-20130625/>

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

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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
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).	vcard:Kind	http://www.w3.org/TR/2014/NOTE-vcard-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 ¹⁷ is recommended, following the approach described in the GeoDCAT-AP specification ¹⁸ .	dct:Location	http://dublincore.org/documents/dcmi-terms/#terms-Location
Media type or extent	A media type or extent, e.g. the format of a computer file	dct:MediaTypeOrExtent	http://dublincore.org/documents/dcmi-terms/#terms-MediaTypeOrExtent
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
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
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 CatalogRecord.	skos:Concept	http://www.w3.org/TR/vocab-adms/#status

¹⁷ European Commission. Joinup. Core Location Vocabulary.

https://joinup.ec.europa.eu/asset/core_location/description

¹⁸ European Commission. Joinup. GeoDCAT-AP. <https://joinup.ec.europa.eu/node/139283/>

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: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
themes	dc:themeTaxonomy	skos:ConceptScheme	This property refers to a knowledge organization system (KOS) 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 changed or modified.	0..1

4.1.3. Optional properties for Catalogue

Property	URI	Range	Usage note	Card.
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
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..n
has part	dct:hasPart	dc:Catalog	This property refers to a related Catalogue that is part of the described 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.
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
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

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
licence	dct:license	dct:LicenseDocument	This property refers to the licence under which the metadata for the Dataset is made available.	0..1
source metadata	dct:source	dc: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. This property can be repeated for parallel language versions of the name.	0..n
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

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

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4.3.2. Recommended properties for Dataset

Property	URI	Range	Usage note	Card
contact point	dc:contactPoint	vcard:Kind	This property contains contact information that can be used for flagging errors in the Dataset or sending comments	0..n
dataset distribution	dc:distribution	dc:Distribution	This property links the Dataset to an available Distribution.	0..n
keyword/tag	dc:keyword	rdfs:Literal	This property contains a keyword or tag describing the Dataset.	0..n
publisher	dc:publisher	foaf:Agent	This property refers to an entity (organisation) responsible for making the Dataset available.	0..1
theme/category	dc:theme, subproperty dc:subject	of 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
conforms to	dc:conformsTo	dc:Standard	This property refers to an implementing rule or other specification.	0..n
authority	dc:creator	foaf:Agent	This property refers to the authority under whose responsibility the Dataset is made available.	0..1
frequency	dc:accrualPeriodicity	dc:Frequency	This property refers to the frequency at which the Dataset is updated.	0..1
identifier	dc: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
landing page	dc:landingPage	foaf:Document	This property refers to a web page that provides access to the Dataset, its Distributions and/or additional information.	0..1
language	dc:language	dc: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 ¹⁹ , DataCite ²⁰ , DOI ²¹ , EZID ²² or W3ID ²³ .	0..n
release date	dc:issued	rdfs:Literal typed as xsd:dateTime	This property contains the date of formal issuance (e.g., publication) of the Dataset.	0..1
spatial/geographical coverage	dc:spatial	dc:Location	This property refers to a geographic region that is covered by the Dataset.	0..n
temporal coverage	dc:temporal	dc:PeriodOfTime	This property refers to a temporal period that the Dataset covers.	0..n
update/modification date	dc: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

¹⁹ Mikulski Archive for Space Telescopes (MAST). Referencing Data Sets in Astronomical Literature. http://archive.stsci.edu/pub_dsn.html

²⁰ DataCite. <http://www.datacite.org/>

²¹ DOI. Digital Object Identifier. <http://www.doi.org/>

²² EZID. <http://n2t.net/ezid>

²³ W3C Permanent Identifier Community Group. Permanent Identifiers for the Web. <https://w3id.org/>

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Property	URI	Range	Usage note	Card.
provenance	dct:provenance	dct:ProvenanceStatement	This property contains a statement about the lineage of a Dataset.	0..n
source	dct:source	dcat:Dataset	This property refers to a related Dataset from which the described Dataset is derived.	0..n
access rights	dct:accessRights	dct:RightsStatement	This property refers to information about who can access the Dataset or an indication of its security status.	0..n
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
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
related resources	dct:relation	rdfs:Resource	This property refers to a related resource.	0..n
documentation	foaf:page	foaf:Document	This property refers to a page or document about this Dataset.	0..n
sample	adms:sample	dcat:Distribution	This property refers to a sample distribution of the dataset	0..n

4.4. Distribution

4.4.1. 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

4.4.2. 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	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	0..1
download URL	dcat:downloadURL	rdfs:Resource	This property contains a URL that is direct link to a downloadable file in a given format.	0..n
media type	dcat: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

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Property	URI	Range	Usage note	Card.
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
linked schemas	dct:conformsTo	dct:Standard	An established schema to which the described Distribution conforms.	0..n
documentation	foaf:page	foaf:Document	A page or document about this Distribution.	0..n
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

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
checksumValue	spdx:checksumValue	xsd:hexBinary	This property provides a lower case hexadecimal encoded digest value produced using a specific algorithm.	1..1

4.9. Licence Document

4.9.1. 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

4.10. Period of Time

4.10.1. 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. 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.

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- 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.

Property URI	Used for Class	Vocabulary name	Vocabulary URI	Usage note
dcat:mediaType	Distribution	IANA Media Types ²⁴	http://www.iana.org/assignments/media-types/media-types.xhtml	
dcat:theme	Dataset	New 17-term vocabulary EuroVoc domains ²⁵ Under discussion	(Under construction, see Annex II) http://eurovoc.europa.eu/100142 through 100162	
dcat:themeTaxonomy	Catalogue	New 17-term vocabulary EuroVoc ²⁶ Under discussion	(Under construction, see Annex II) http://eurovoc.europa.eu/	
dct:accrualPeriodicity	Dataset	Dublin Core Collection Description Frequency Vocabulary ²⁷ Under discussion	http://purl.org/cld/freq/	
dct:format	Distribution	MDR File Type Named Authority List	http://publications.europa.eu/mdr/authority/file-type/	
dct:language	Catalogue, Dataset	MDR Languages Named Authority List ²⁸	http://publications.europa.eu/mdr/authority/language/	
dct:publisher	Catalogue, Dataset	MDR Corporate bodies Named Authority List ²⁹	http://publications.europa.eu/mdr/authority/corporate-body/	To 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.

²⁴ Internet Assigned Numbers Authority (IANA). Media Types
<http://www.iana.org/assignments/media-types/>

²⁵ European Union. EuroVoc domains and micro-thesauri.
<http://eurovoc.europa.eu/drupal/?q=node/555>

²⁶ European Union. EuroVoc, the European Union's multilingual thesaurus.
<http://eurovoc.europa.eu/drupal/>

²⁷ Dublin Core Metadata Initiative. Dublin Core Collection Description Frequency Vocabulary.
<http://dublincore.org/groups/collections/frequency/>

²⁸ Publications Office of the European Union. Metadata Registry. Authorities. Languages.
<http://publications.europa.eu/mdr/authority/language/>

²⁹ Publications Office of the European Union. Metadata Registry. Authorities. Corporate bodies.
<http://publications.europa.eu/mdr/authority/corporate-body/>

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Property URI	Used for Class	Vocabulary name	Vocabulary URI	Usage note
dct:spatial	Catalogue, Dataset	MDR Countries Named Authority List ³⁰ , MDR Places Named Authority List ³¹	http://publications.europa.eu/mdr/authority/country/ , http://publications.europa.eu/mdr/authority/place/ , http://sws.geonames.org/	The Countries vocabulary is to be used if the scope is a particular country. The Places vocabulary is to be used if the scope is a part of a country. If places are not in the Named Authority Lists, use Geonames URIs
adms:status	Catalogue Record	ADMS change type vocabulary	http://purl.org/adms/changetype/	:created, :updated, :deleted
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 ³²
dct:type	Agent	ADMS publisher type vocabulary	http://purl.org/adms/publishertype/	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/licencetype/	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, further region or domain-specific vocabularies can be used. 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, the CERIF standard vocabularies³³, the Dewey Decimal Classification³⁴ and numerous other schemes.

5.4. Licence vocabularies

Concerning licence vocabularies, implementers are encouraged to use widely recognised licences such as Creative Commons licences³⁵, and in particular the CC Zero Public Domain Dedication³⁶, the Open Data Commons Public Domain Dedication and License (PDDL)³⁷, the ISA Open Metadata Licence³⁸, the European Union Public

³⁰ Publications Office of the European Union. Metadata Registry. Authorities. Countries.

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

³¹ Publications Office of the European Union. Metadata Registry. Authorities. Places.

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

³² European Commission. Joinup. Asset Description Metadata Schema (ADMS). ADMS 1.00.

<http://joinup.ec.europa.eu/asset/adms/release/100>

³³ http://www.eurocris.org/Uploads/Web%20pages/CERIF-1.5/CERIF1.5_Semantics.xhtml

³⁴ OCLC. Dewey Summaries as Linked Data. <http://www.oclc.org/dewey/web/services.en.html> and <http://dewey.info/>

³⁵ Creative Commons. About The Licenses. <http://creativecommons.org/licenses/>

³⁶ Creative Commons. CC0 1.0 Universal (CC0 1.0) Public Domain Dedication.

<http://creativecommons.org/publicdomain/zero/1.0/>

³⁷ Open Data Commons Public Domain Dedication and License (PDDL).

<http://opendatacommons.org/licenses/pddl/>

³⁸ ISA Open Metadata Licence v1.1, <https://joinup.ec.europa.eu/category/licence/isa-open-metadata-licence-v11>

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Licence (EUPL)³⁹ or an open government licence such as the UK Open Government Licence⁴⁰.

Further activities in this area are undertaken by the Open Data Institute⁴¹ with the Open Data Rights Statement Vocabulary⁴² and by the Open Digital Rights Language (ODRL) Initiative⁴³.

³⁹ European Commission. Joinup. Open Source Software. European Union Public Licence (EUPL). <http://joinup.ec.europa.eu/software/page/eupl>

⁴⁰ The National Archives. Open Government Licence for public sector information. <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/2/>

⁴¹ Open Data Institute. <http://www.theodi.org/>

⁴² Open Data Institute. Open Data Rights Statement Vocabulary. <http://schema.theodi.org/odrs/>

⁴³ Open Digital Rights Language (ODRL) Initiative. <http://www.w3.org/community/odrl/>

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6. 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.	CO4
dc:contactPoint	Recommended property (Dataset)	Updated	<i>Updates</i> URI: adms:contactPoint → dc:contactPoint Range: VCard → vCard:Kind	MO8
dct:creator	Optional property (Dataset)	New	Range: foaf:Agent This property refers to the authority under whose responsibility the Dataset is made available	CO5
dct:license	Optional property (CatalogRecord)	New	Range: dct:LicenseDocument This property refers to the licence under which the metadata for the Dataset is made available.	(Lee)
dct:LicenseDocument	Recommended class	Updated	<i>Updates</i> Optional class → recommended class	OB4
dct:Location	Optional class	Updated	Added reference to GeoDCAT-AP for expression of co-ordinates	IM4
dct:source	Optional property (CatalogRecord)	New	Range: dc:CatalogRecord This property links to the original metadata that was used in creating metadata for the Dataset	MO5
dct:valid	Optional property (Dataset)	New	Range: dct:PeriodOfTime This property refers to a temporal period for which the Dataset is valid.	PR18
owl:versionInfo	Optional property (Dataset)	Updated	<i>Updates</i> URI: adms:version → owl:versionInfo	CO4
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
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
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
spdx:checksumValue	Mandatory property (Checksum)	New	Range: hexBinary Cardinality: 1..1 This property provides a lower case hexadecimal encoded digest value produced using a specific algorithm.	PR1
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
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
dct:provenance	Optional property (Dataset)	New	Range: dct:ProvenanceStatement This property contains a statement about the lineage of a Dataset.	PR6 , PR13 , PR14 , MO5

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dct:source	Optional property (Dataset)	New	Range: dct:Dataset This property refers to a related Dataset from which the described Dataset is derived.	PR6 , PR13 , PR14 , MO5
dct:accessRights	Optional property (Dataset)	New	Range: dct:RightsStatement This property refers to information about who can access the Dataset or an indication of its security status.	PR2 , PR3
dct:hasVersion	Optional property (Dataset)	New	Range: dct:Dataset This property refers to a related Dataset that is a version, edition, or adaptation of the described Dataset.	PR5 , PR16 , MO12
dct:isVersionOf	Optional property (Dataset)	New	Range: dct:Dataset This property refers to a related Dataset of which the described Dataset is a version, edition, or adaptation.	PR5 , PR16 , MO12
dct:relation	Optional property (Dataset)	New	Range: rdfs:Resource This property refers to a related resource.	PR19 , MO12
foaf:page	Optional property (Dataset)	New	Range: foaf:Document This property refers to a page or document about this Dataset.	PR19 , PR26
dcat:mediaType	Controlled vocabulary	Modified	Modifications: MDR list → IANA types	PR22 , VO3
dct:spatial	Controlled vocabulary	Modified	Modifications: Added recommendation to use sws.geonames.org if the needed place is not listed in the MDR	VO9
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
adms:sample	Optional property (Dataset)	New	This property is related to sample(s) of the dataset	PR21
foaf:page	Optional Property (Distribution)	New	A page or document about this Distribution	MO2
	Multilingual aspects	New	Language tags to be used with rdfs:Literal are defined by BCP47, which allows the use of the "t" extension for text transformations	MO6
dct:hasPart	Optional Property (Catalogue)	New	Range: dcat:Catalog This property refers to a related Catalogue that is part of the described Catalogue	nesting
dcat:themeTaxonomy	Controlled vocabulary	Modified	Modification Changed the recommendation to use new 17-term vocabulary proposed by the Publications Office instead of Eurovoc	VO2
dcat:theme	Controlled vocabulary	Modified	Modification Changed the recommendation to use terms from the new 17-term vocabulary proposed by the Publications Office instead of Eurovoc domains	VO2

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 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.](#)

7. CONFORMANCE STATEMENT

7.1. 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.

7.2. 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.).

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 `dc:format` 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 of Datasets and Distributions, the **language tag** is mandatory.

Language tags to be used with `rdfs:Literal`⁴⁴ are defined by BCP47⁴⁵, which allows the use of the "t" extension for text transformations defined in RFC6497⁴⁶ with the field "t0"⁴⁷ 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.

The requirement in section 3.3 for multilingual links can be met through a content negotiation⁴⁸ mechanism whereby different content is served based on the Accept-Languages indicated by the browser. Using such a mechanism, the link to the landing page can resolve to different language versions of the web page with more information about the Dataset.

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

⁴⁴ W3C. RDF 1.1 Concepts and Abstract Syntax. W3C Recommendation 25 February 2014. 3.3 Literals. <http://www.w3.org/TR/rdf11-concepts/#section-Graph-Literal>

⁴⁵ Internet Engineering Task Force (IETF). BCP47. Tags for Identifying Languages. <http://tools.ietf.org/html/bcp47>

⁴⁶ Internet Engineering Task Force (IETF). BCP47 Extension T – Transformed Content. <http://tools.ietf.org/html/rfc6497>

⁴⁷ UNICODE Consortium. CLDR - Unicode Common Locale Data Repository. BCP47, transform_mt.xml. http://unicode.org/cldr/trac/browser/trunk/common/bcp47/transform_mt.xml

⁴⁸ Apache Web Server: content negotiation. <http://httpd.apache.org/docs/current/content-negotiation.html>

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ANNEX I. QUICK REFERENCE OF CLASSES AND PROPERTIES

Class	Class URI	Mandatory properties	Recommended properties	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	dct:issued dct:language dct:license dct:modified dcat:themeTaxonomy foaf:homepage	dcat:record dct:rights dct:spatial dct:isPartOf dct:hasPart
Catalogue Record	dcat:CatalogRecord	dct:modified foaf:primaryTopic	adms:status dct:issued	dct:description dct:license dct:source dct:title dct:language
Checksum	spdx:Checksum	spdx:algorithm spdx:checksumValue		
Dataset	dcat:Dataset	dct:description dct:title	dcat:contactPoint dcat:distribution dcat:keyword dcat:theme dct:publisher	dct:conformsTo dct:creator dct:accrualPeriodicity dct:identifier dcat:landingPage dct:language adms:identifier dct:issued dct:spatial dct:temporal dct:modified owl:versionInfo adms:versionNotes dct:provenance dct:source dct:accessRights dct:hasVersion dct:isVersionOf dct:relation foaf:page adms:sample dct:conformsTo
Distribution	dcat:Distribution	dcat:accessURL	dct:description dct:format dct:license	dcat:byteSize spdx:checksum dcat:downloadURL dcat:mediaType, dct:issued dct:rights adms:status dct:title dct:modified dct:conformsTo foaf:page dct:language
Document	foaf:Document			
Frequency	dct:Frequency			
Identifier	adms:Identifier			
Kind	vcard:Kind		hasEmail	hasTelephone
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	At least one of: schema:startDate schema:endDate		
Publisher Type	skos:Concept			
Resource	rdfs:Resource			
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ANNEX II. THEME VOCABULARY

The following terms have been proposed in a new vocabulary for use in dcat:theme. URIs for the vocabulary and the terms in it are being defined at the Publications Office of the European Union.

(1) Agriculture, Fisheries, Forestry, foods

(2) Education, training, communication

(3) Environment

(4) Energy

(5) Transports

(6) Research, innovation, technology

(7) Economy and Finance

(8) Population and social conditions

(9) Employment, job, consumer

(10) Trade, industry, services

(11) Health

(12) Government, Public sector

(13) Regions; Cities

(14) Geospatial information

(15) Culture

(16) Justice, legal system, public safety

(17) International issues