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ISA[2] Action 2016.28: Access to Base Registries

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Introduction

This document represents the deliverable under Task-02 in the framework of the specific contract n°157 under ABCIV-Lot 3, regarding the project on the continuation of Action 2016.28, namely Access to Base Registries (ABR), running under the ISA² programme.

The overall purpose of the aforementioned task is to elaborate a draft of registry of registries (RoR) specification, and define the main aspects and elements to be served for the creation of potential Registry of Registries at the European level in the future.

This deliverable's purpose is to elaborate the RoR specification, namely **BRegDCAT-AP**, an extension of the DCAT application profile for data portals in Europe (DCAT-AP), aiming to facilitate MS work on creation of their own RoR.

With regard to the elaboration of this deliverable, the project team performed the following activities:

- Creation and animation of an ABR working group (WG) composed of MS representatives and other semantics experts, to discuss the specification;
- Draft an application profile of the DCAT to describe the data contained in base registries (and RoR), implementing relevant suggestions and proposals from WG members, incorporating comments.

The work is based on the following:

- Relevant aspects from the existing documentation on Action 2016.28;
- Alignment with the existing similar initiatives on the European Union level;
- Best practices and challenges that MS face in creation of their RoR;

The outcome of the deliverable, on the long-term, will serve to fulfil one of the goals of a European Registry of Base Registries (ERBR), namely to provide a full interconnection of base registries at the European level.

Context

One of the targets of the **Digital Single Market**[1] is to deliver cross-border and cross-sector public services in Europe. So, in order to succeed with this objective, Member State's base registries need to be interconnected. **Base registries** are trusted and reliable sources of basic information on data items such as citizens, corporations, vehicles, driver licenses, buildings, and locations. They are the cornerstone of public services and essential entities for public administration management.

The interoperability of base registries is key for the development of the **EU Single Digital Gateway**[2] (or just Gateway), a platform that aims to be the single point of access to public EU Member State's services, facilitating digital public services among public administrations and citizens. The implementation of the Gateway relies on **the once-only principle**, ensuring data that is submitted once to at least one EU Member State, could be reused by any public authority across the EU.

The development of a **European Registry of Base Registries (ERBR)**, a pan-European registry of base registries, will improve the interoperability of individual base registries and harmonise the existing registries of base registries, enabling a one-stop-platform for citizens, business and public bodies to access and manage base registries across the European Union and across different domains. The ERBR development initiative works in close liaison with **The Once-Only Principle Project (TOOP)**[3], launched by the European Commission in 2017 with the objective of exploring and demonstrating the once-only principle across borders. In particular, TOOP is focused on creating an innovative pan-European federated architecture for interacting with existing national infrastructures, connecting base registries and eGovernment platforms in different countries. As TOOP is based on the reuse of existing EU interoperability Frameworks, such as the **European Interoperability Reference Architecture (EIRA)**[4], the **European**

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[1] https://ec.europa.eu/commission/priorities/digital-single-market_en
[2] https://ec.europa.eu/growth/single-market/single-digital-gateway_en
[3] http://www.toop.eu
[4] https://joinup.ec.europa.eu/solution/eira

Interoperability Framework (EIF)[5], and **Connecting Europe Facility (CEF)[6]**, an **ERBR** may contribute to this project of interoperability development.
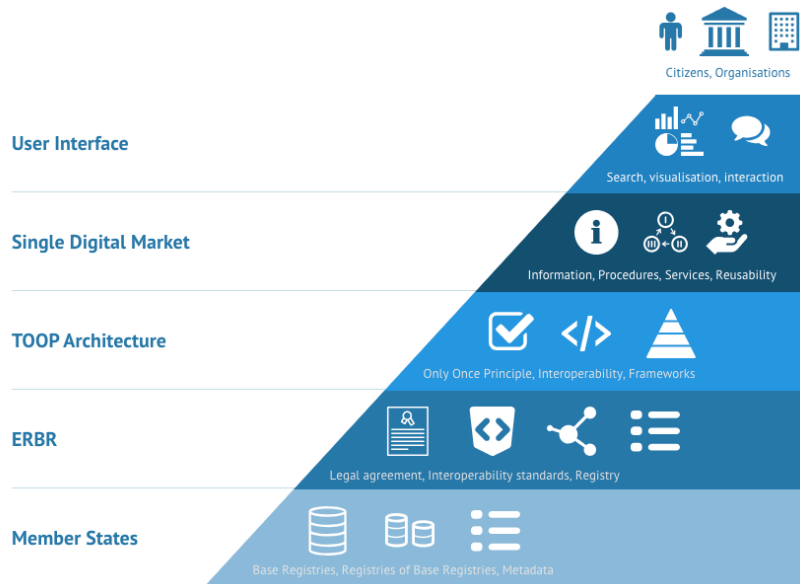
Fig. 1. ERBR Framework Stack

The development of the ERBR requires defining a **data model** to support the description of Base Registries and Registries of Base Registries. This abstract model will drive the creation of a subsequent vocabulary to represent registries, registries of registries and the ERBR itself. This vocabulary, along with a proper set of taxonomies and value schemas, would be a key component to share information between national registries and the ERBR.

This specification expects to be aligned with other standards such as the **Core Public Service Vocabulary Application Profile (CPSV-AP)**[7] and the **European Legislation Identifier (ELI)**[8], guaranteeing the full compatibility with the existing implementations.

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[5] https://ec.europa.eu/isa2/eif
[6] https://ec.europa.eu/inea/en/connecting-europe-facility
[7] https://ec.europa.eu/isa2/solutions/core-public-service-vocabulary-application-profile-cpsv-ap_en
[8] https://publications.europa.eu/en/web/eu-vocabularies/eli

DCAT-AP and ISA[2] Core Vocabularies

Both, the data model and the vocabulary must be based on recognised schemes and ontologies such as the **ISA[2] Core Vocabularies**[9], **DCAT**[10] (W3C Data Catalogue Vocabulary), **EUROVOC**[11], Publication Office's **MDR**[12] (Metadata Registry), **NUTS**[13](Nomenclature of Territorial Units for Statistics) and **ELI**[14] (European Legislation Identifier).

Since the ERBR will manage registries —i.e., catalogues of data and catalogues of catalogues—, the development of the vocabulary will be based on the W3C DCAT specification, a standard to describe data catalogues and their content. More specifically, the ERBR will extend **DCAT-AP** (DCAT Application Profile for Data Portals in Europe)[15], a technical specification that ISA[2] developed for describing public sector datasets in order to achieve a successful exchange of metadata among data portals in Europe. Thus, a new **DCAT Application profile for base registries in Europe** (**BRegDCAT-AP**) will be created, as a DCAT-AP extension for describing base registries, their contents, and the services they provide.

This deliverable defines the **BRegDCAT-AP** specification. Its application will enable cross-border interoperability between Base Registries and Registries of Base Registries, defining a semantic model to describe registries and their contents, facilitating data discovery and exchange of data, reducing redundancy by supporting the Once-Only principle. This set of recommendations will enable a mechanism for the update of EU base registries and their content, reducing technical, organisational and multilingual barriers.

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[9] https://joinup.ec.europa.eu/page/core-vocabularies
[10] https://www.w3.org/TR/vocab-dcat/
[11] http://eurovoc.europa.eu
[12] http://publications.europa.eu/mdr/authority/
[13] http://ec.europa.eu/eurostat/web/nuts/background
[14] https://eur-lex.europa.eu/eli-register/about.html
[15] https://joinup.ec.europa.eu/solution/dcat-application-profile-data-portals-europe

The Application Profile specified in this document is based on the specification of the latest of **DCAT Application Profile** for data portals in Europe, in concrete version 1.2.1, issued on 28th May 2019. Public services representing base registers are based on the **CPSV-AP**[16] (Core Public Service Vocabulary Application Profile) model, in its latest version (2.2.1). The legal information regarding the implementation of services is represented through the ELI Ontology[17].

Likewise the original version of DCAT-AP, BReg-DCAT-AP does not cover implementation issues like mechanisms for exchange of data and expected behaviour of systems implementing the Application Profile.

The Application Profile is intended to facilitate data exchange and therefore the vocabulary of classes and properties defined in this document is 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[18], in any format and serialization, in conformance with this Application Profile.

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, in this case the definition of **Base Registries and Registries of Base Registries**, as well as recommendations for controlled vocabularies to be used.

A **Resource** represents an individual data item in a catalogue, a parent abstract concept of **Dataset** and **Data Service**. A **Dataset** is a collection of data, published or curated by a single source, and available for access or download in one or more

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[16] https://joinup.ec.europa.eu/solution/core-public-service-vocabulary-application-profile/release/221
[17] https://publications.europa.eu/en/web/eu-vocabularies/eli
[18] http://www.w3.org/RDF/

formats. Datasets of this application profile will be primarily collections of Master Data, catalogued on Base Registries. A **Data Service** represents a collection of operations accessible through an interface that provide access to one or more datasets or data processing functions.

A **Base Registry** is a Web-based system that contains an inventory of descriptions of **Master datasets** and provides services enabling discovery and re-use of the datasets. The mandate of a Base Registry is given by specific legislation. At EU level, National Registers aggregates information about Base Registries in Registries of Base Registries. A **Base Registry is considered as a Catalogue** of collections of metadata about datasets or data services.

In the following sections, classes and properties of the vocabulary are classified as 'mandatory', 'recommended' and 'optional', according to the following meaning:

Classes:

- **Mandatory**: 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**: 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**: 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.

Properties:

- **Mandatory**: a receiver *must* be able to process the information for that property; a sender *must* provide the information for that property.

- **Recommended**: 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**: 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*, *should* and *may* in this document, is compliant with the specifications of RFC 2119[19]: *must* mean that the definition is an absolute requirement of the specification; *should*, or the adjective *recommended*, mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course; and *may*, or the adjective *optional*, mean that an item is truly optional.

In the given context, the term "processing" means that receivers 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, list, store, make searchable, display to users, etc.).

The Application Profile reuses terms from various recognised standard schemas and ontologies. In order to simplify the notation, this specification will refer to **namespaces** that represents the following vocabularies and ontologies:

Prefix	Namespace	RDF Vocabulary
adms	http://www.w3.org/ns/adms#	Asset Description Metadata Schema
cv	http://data.europa.eu/m8g/	Core Vocabulary
cpsv	http://purl.org/vocab/cpsv#	Core Public Service Vocabulary
dc	http://purl.org/dc/elements/1.1/	Dublin Core Metadata Element Set, v1.1
dcat	http://www.w3.org/ns/dcat#	Data Catalog Vocabulary
dcatap	http://data.europa.eu/r5r/	DCAT Application Profile

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[19] https://www.ietf.org/rfc/rfc2119.txt

dct	http://purl.org/dc/terms/	DCMI Metadata Terms
dctype	http://purl.org/dc/dcmitype/	DCMI Type Vocabulary
dqv	http://www.w3.org/ns/dqv#	Data Quality Vocabulary
eli	http://data.europa.eu/eli/ontology#	European Legislation Identifier
foaf	http://xmlns.com/foaf/0.1/	FOAF Vocabulary
locn	http://www.w3.org/ns/locn#	ISA Programme Core Location Vocabulary
owl	http://www.w3.org/2002/07/owl#	OWL Web Ontology Language
prov	http://www.w3.org/ns/prov#	PROV-O: The PROV Ontology
qb	http://purl.org/linked-data/cube#	Data Cube Vocabulary
rdf	http://www.w3.org/1999/02/22-rdf-syntax-ns#	Resource Description Framework (RDF): Concepts and Abstract Syntax
rdfs	http://www.w3.org/2000/01/rdf-schema#	RDF Vocabulary Description Language 1.0: RDF Schema
schema	http://schema.org/	schema.org
skos	http://www.w3.org/2004/02/skos/core#	SKOS Simple Knowledge Organization System - Reference
vcard	http://www.w3.org/2006/vcard/ns#	vCard Ontology
xsd	http://www.w3.org/2001/XMLSchema#	XML Schema Part 2: Datatypes Second Edition

This specification will be released before the W3C DCAT version 2 is considered as a formal standard (Recommendation, in W3C's jargon), and subsequently before DCAT-AP 2 is available. This dependence requires a further update of the BReg-DCAT-AP draft specification after the final version of DCAT-AP 2 is released.

1. Overview of Classes and Properties
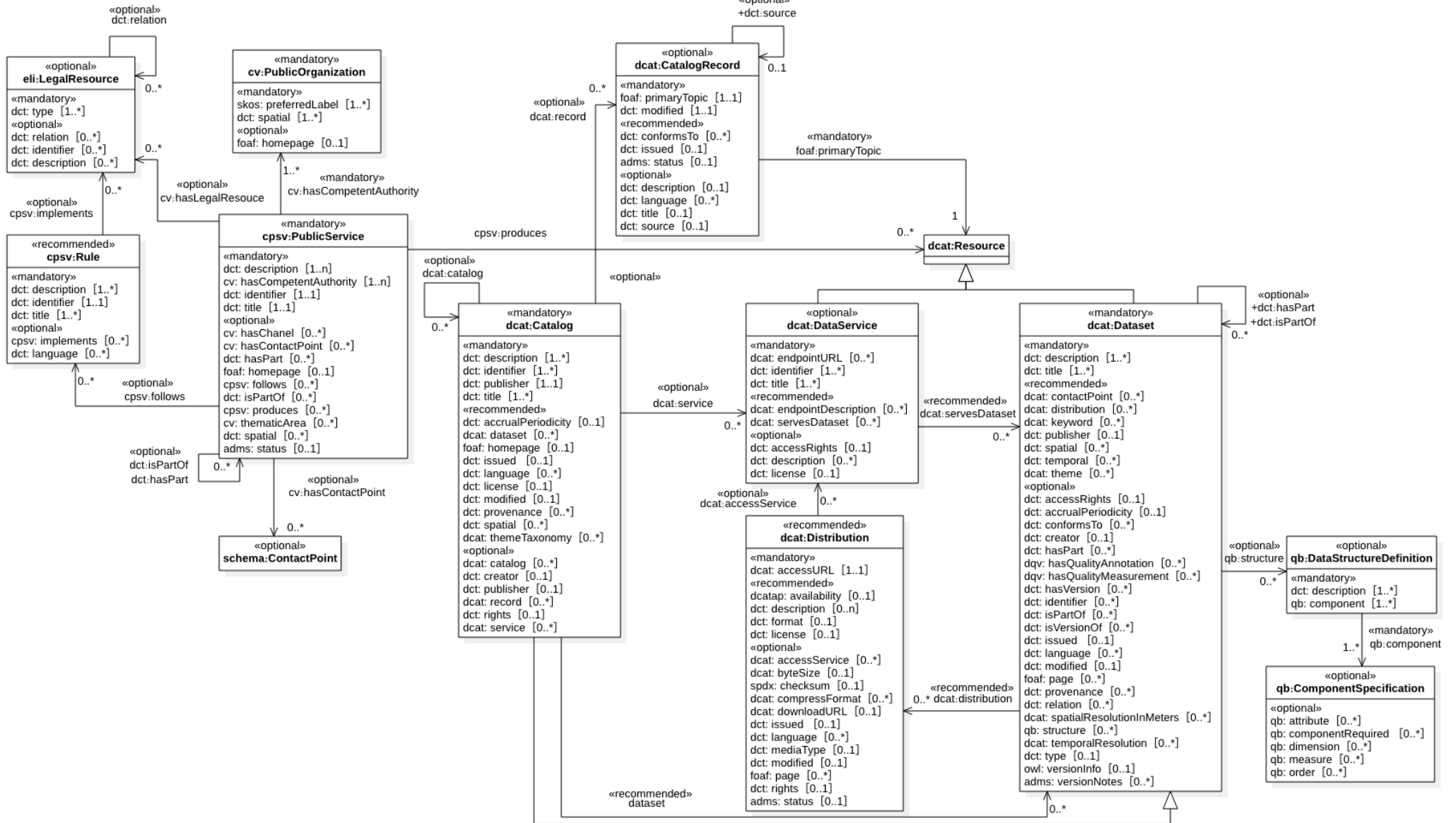
Fig. 2. UML Class Diagram

2. Application Profile Classes

Mandatory Classes

Class name	Usage note for the Application Profile	URI	Reference
Agent	An entity that is associated with Public Services, Registries and/or Datasets. Agents may be either organisations or persons.	foaf:Agent	http://xmlns.com/foaf/spec/#term_Agent
Dataset	A conceptual entity that represents the information managed and/or published by a Registry Service.	dcat:Dataset	https://www.w3.org/TR/vocab-dcat-2/#Class:Dataset
Literal	A literal value such as a text string or a 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[20].	rdfs:Literal	http://www.w3.org/TR/rdf-concepts/#section-Literals
Public Organisation	A Public Organisation is the responsible Agent for the delivery of a Public Service. This specification uses the class from the Core Public Organization Vocabulary[21], based also on the W3C Organization Ontology[22].	cv:PublicOrganization	https://joinup.ec.europa.eu/solution/core-public-service-vocabulary http://www.w3.org/TR/vocab-org/

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[20] http://www.rfc-editor.org/rfc/bcp/bcp47.txt
[21] https://joinup.ec.europa.eu/solution/core-public-organisation-vocabulary/
[22] https://www.w3.org/TR/vocab-org/

Registry Catalogue	A catalogue or repository that lists Datasets or Data Services managed and provided by a Base Registry Service. The Registry Catalogue is the main output produced by a Register, so this specification considers both, DCAT-AP and CPSV-AP to model services and content.	dcat:Catalog cv:Output	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog https://joinup.ec.europa.eu/solution/core-public-service-vocabulary
Public Registry Service	A Registry Service is a public service that creates, maintains and/or manages Base Registries or a Registry of Base Registries. This service, provided by public administrations, or by other organisations on their behalf, stores and provides basic information on authoritative data items such as people, companies, vehicles, licences, buildings, locations and roads.	cpsv:PublicService	https://joinup.ec.europa.eu/solution/core-public-service-vocabulary
Catalogued Resource	A Catalogued Resource represents an individual item in a catalogue. This auxiliary class **is not intended to be used directly**, but is the parent class of Dataset and Data Service. Resource is effectively an extension point for defining a catalogue of any kind of data resource.	dcat:Resource	https://www.w3.org/TR/vocab-dcat-2/#Class:Resource

Recommended Classes

Class name	Usage note for the Application Profile	URI	Reference
Distribution	A physical embodiment of the Dataset in a particular format accessible through specific means (e.g., file download, web service request, etc.).	dcat:Distribution	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-distribution
Legal Resource	A Legal Resource refers to legislation, policy or policies that lie behind the Rules that defines the governance of a Base Registry Service. Legal Resource descriptions will be represented through the ELI ontology.	eli:LegalResource	https://publications.europa.eu/en/publication-detail/-/publication/8159b75d-5efc-11e8-ab9c-01aa75ed71a1
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

Class name	Usage note for the Application Profile	URI	Reference
Distribution	A physical embodiment of the Dataset in a particular format accessible through specific means (e.g., file download, web service request, etc.).	dcat:Distribution	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-distribution
Legal Resource	A Legal Resource refers to legislation, policy or policies that lie behind the Rules that defines the governance of a Base Registry Service. Legal Resource descriptions will be represented through the ELI ontology.	eli:LegalResource	https://publications.europa.eu/en/publication-detail/-/publication/8159b75d-5efc-11e8-ab9c-01aa75ed71a1
Rule	A Rule is a document that sets out the specific guidelines or procedures followed by the Base Registry. It may include the requirements of the information managed and the services provided by a Public Base Registry.	cpsv:Rule	https://joinup.ec.europa.eu/solution/core-public-service-vocabulary
Theme	Thematic area, subject of a Base Registry, a Catalogue and/or a Dataset/Data Service.	skos:Concept	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme
Thematic scheme	A taxonomy, or other type of controlled vocabulary, in which the Themes are defined.	skos:ConceptScheme	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme

Optional Classes

Class name	Usage note for the Application Profile	URI	Reference
Catalogue Record	A description of a Dataset or Data Service entry in the Catalogue.	dcat:CatalogRecord	https://www.w3.org/TR/vocab-dcat-2/#Class:Catalog_Record
Component Specification	A component specification is an entity that defines the properties of a component (i.e., attributes, dimensions, and measurements) of a Data Structure Definition.	qb:ComponentSpecification	https://www.w3.org/TR/vocab-data-cube/#dfn-qb-componentspecification

Data Service	A data service is a collection of operations accessible through an interface (API) that provide access to one or more datasets or data processing functions listed in a data registry or catalogue.	dcat:DataService	https://www.w3.org/TR/vocab-dcat-2/#Class:Data_Service
Data Structure Definition	A data structure definition is the model that defines the structure of a Dataset, this is: measurements, dimensions and attributes of the data.	qb:DataStructureDefinition	https://www.w3.org/TR/vocab-data-cube/#dfn-qb-datastructuredefinition
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
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[23] is recommended, following the approach described in the GeoDCAT-AP specification.	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
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 Catalogue Record; or the status of a Public Service.	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

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[23] https://joinup.ec.europa.eu/asset/core_location/description

3. Application Profile Properties per Class

Catalogue Record

Mandatory properties for Catalogue Record

Property	URI	Range	Usage note	Cardinality
primary topic	foaf:primaryTopic	dcat:Resource	This property links a Catalogue Record to a Dataset or Data Service described in the record.	1..1
last update	dct:modified	rdfs:Literal	This property contains the latest modification date of a catalogue entry. This property should be typed as xsd:date or xsd:dateTime.	1..1

Recommended properties for Catalogue Record

Property	URI	Range	Usage note	Cardinality
application profile	dct:conformsTo	dct:Standard	This property refers to an Application Profile that the Dataset's metadata conforms to.	0..1
release date	dct:issued	rdfs:Literal	This property indicates when the catalogue entry was listed. It should be typed as xsd:date or xsd:dateTime.	0..1
status	adms:status	skos:Concept	This property indicates the status of the latest revision of a Dataset's entry in the Catalogue (i.e., created, deleted or updated)	0..1

Optional properties for Catalogue Record

Property	URI	Range	Usage note	Cardinality
description	dct:description	rdfs:Literal	This property contains descriptive textual information about the Catalogue Record. This property should be repeated in case there are various versions of the text in different languages.	0..n
language	dct:language	dct:LinguisticSystem	This property indicates the language in which a catalogue entry is expressed. This property may be repeated in case there are different languages.	0..n
source metadata	dct:source	dcat:CatalogRecord	This property refers to the original metadata that was used in creating a catalogue entry.	0..1
title	dct:title	rdfs:Literal	This property refers to the descriptive title of a Catalogue Record. This property should be repeated in case there are various versions of the text in different languages.	1..n

Component Specification

Optional properties for Component Specification

Property	URI	Range	Usage note	Cardinality
attribute	qb:attribute	qb:AttributeProperty	This property defines the type of a component as an attribute component, to qualify and interpret the observed value(s) in a dataset. They enable specification of the units of measure, any scaling factors and metadata such as the status of the representation (e.g. estimated, provisional). The SDMX standard includes a set of content oriented guidelines (COG) that define a set of common statistical concepts and associated code lists that are intended to be reusable across data sets: http://purl.org/linked-data/sdmx/2009/attribute#	0..n
component required	qb:componentRequired	rdfs:Literal (xsd:boolean)	This property indicates whether a component property is required (true) or optional (false) in the context of a data structure definition. Only applicable to components corresponding to an attribute. Defaults to false (optional).	0..n
dimension	qb:dimension	qb:DimensionProperty	This property defines the type of a component as a measure that represents the phenomenon being represented in the dataset. The SDMX standard includes a set of pre-defined measure components: http://purl.org/linked-data/sdmx/2009/dimension#	0..n
measure	qb:measure	qb:MeasureProperty	This property defines the type of a component as a measure that represents the phenomenon being represented in the dataset. The SDMX standard includes a set of pre-defined measure components: http://purl.org/linked-data/sdmx/2009/measure#	0..n
order	qb:order	rdfs:Literal (xsd:int)	This property indicates a priority order for a component in a set of components of a data structure. Lower order numbers come before higher numbers, un-numbered components come last.	0..n

Data Service

Data Service is a sub-class of Resource.

Mandatory properties for Data Service

Property	URI	Range	Usage note	Cardinality
endpoint URL	dcat:endpointURL	rdfs:Resource	This property indicates the root location or primary endpoint of a Data Service (an IRI).	1..n
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the data service.	1..*[24]
title	dct:title	rdfs:Literal	This property refers to the descriptive title of a Data Service. This property should be repeated in case there are various versions of the text in different languages.	1..n

Recommended properties for Data Service

Property	URI	Range	Usage note	Cardinality
endpoint description	dcat:endpointDescription	rdfs:Resource	This property describes the services available via end-points, including their operations, parameters etc.	0..n
serves dataset	dcat:servesDataset	dcat:Dataset	This property refers to the data that a data service can distribute.	0..n

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[24] Mandatory to be compatible with CPSV-AP 2.2.1

Optional properties for Data Service

Property	URI	Range	Usage note	Cardinality
access rights	dct:accessRights	dct:RightsStatement	This property indicates the level of openness of the data service (i.e., if it has access restrictions or it is public). Values of this property must belong to a controlled vocabulary representing the values: non public, public, and restricted.	0..1
description	dct:description	rdfs:Literal	This property contains descriptive textual information about the Data Service. This property should be repeated in case there are various versions of the text in different languages.	0..n
licence	dct:license	dct:LicenseDocument	This property contains the licence under which the Data service is made available.	0..1

Data Structure Definition

Mandatory properties for Data Structure Definition

Property	URI	Range	Usage note	Cardinality
description	dct:description	rdfs:Literal	This property contains descriptive textual information about the structure of a dataset. This property should be repeated in case there are various versions of the text in different languages.	1..n
component	qb:component	qb:ComponentSpecification	This property defines a property of a component (attribute, dimension, measure) that is specific to a dataset.	1..n

Dataset

Dataset is a sub-class of Resource.

Mandatory properties for Dataset

Property	URI	Range	Usage note	Cardinality
description	dct:description	rdfs:Literal	This property contains descriptive textual information about the Dataset. This property should be repeated in case there are various versions of the text in different languages.	1..n
title	dct:title	rdfs:Literal	This property refers to the descriptive title or name of a Dataset. This property should be repeated in case there are various versions of the text in different languages.	1..n

Recommended properties for Dataset

Property	URI	Range	Usage note	Cardinality
contact point	dcat:contactPoint	vcard:Kind	This property includes contact information to provide feedback on a Dataset.	0..n
dataset distribution	dcat:distribution	dcat:Distribution	This property refers to a Distribution of a Dataset.	0..n
keyword	dcat:keyword	rdfs:Literal	This property contains a free-text keyword that describes a Dataset. This property may be repeated in case there are several tags associated.	0..n
publisher	dct:publisher	foaf:Agent	This property refers to an entity, usually a Public Organisation, which makes the Dataset available.	0..1
spatial coverage	dct:spatial	dct:Location	This property indicates an administrative or geographic area that is covered by the Dataset.	0..n

temporal coverage	dct:temporal	dct:PeriodOfTime	This property indicates a temporal period that is covered by a Dataset (e.g., in temporal series data).	0..n
theme	dcat:theme	skos:Concept	This property indicates a category of a Dataset. Multiple themes may be associated.	0..n

Optional properties for Dataset

Property	URI	Range	Usage note	Cardinality
access rights	dct:accessRights	dct:RightsStatement	This property indicates the level of openness of the data (i.e., if it has access restrictions or it is public). Values of this property must belong to a controlled vocabulary representing the values: non-public, public, and restricted.	0..1
accrual periodicity	dct:accrualPeriodicity	dct:Frequency	This property refers to the frequency at which a Dataset is updated.	0..1
conforms to	dct:conformsTo	dct:Standard	This property indicates a compliance rule or standard that inspires the management of a Dataset.	0..n
creator	dct:creator	foaf:Agent	This property contains the entity responsible for producing the Dataset.	0..1
has quality annotation	dqv:hasQualityAnnotation	dqv:QualityAnnotation	This property represents a quality annotation associated to a dataset.	0..n
has quality measurement	dqv:hasQualityMeasurement	dqv:QualityMeasurement	This property represents a quality measurement associated to a dataset.	0..n

has version	dct:hasVersion	dcat:Dataset	This property refers to a Dataset that is a version of the described Dataset.	0..n
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the Dataset. There may be several identifiers, such as MAST/ADS[25], DataCite, DOI[26], EZID[27] or W3ID[28].	0..n
is version of	dct:isVersionOf	dcat:Dataset	This property refers to a Dataset of which the described Dataset is a version.	0..n
issued (release date)	dct:issued	rdfs:Literal	This property indicates the issuance date of the Dataset. It should be typed as xsd:date or xsd:dateTime.	0..1
language	dct:language	dct:LinguisticSystem	This property indicates the language in which the Dataset is expressed. This property may be repeated in case there are different languages.	0..n
modified (last update)	dct:modified	rdfs:Literal	This property contains the latest modification date of a Dataset. This property should be typed as xsd:date or xsd:dateTime.	0..1
page (documentation)	foaf:page	foaf:Document	This property links to a document with information about a Dataset.	0..n
provenance	dct:provenance	dct:ProvenanceStatement	This property specifies information about the origin of a Dataset.	0..n
related resource	dct:relation	rdfs:Resource	This property refers to a related resource.	0..n

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[25] http://archive.stsci.edu/pub_dsn.html
[26] http://www.doi.org/
[27] http://n2t.net/ezid
[28] https://w3id.org/

spatial resolution	dcat:spatialResolutionInMeters	xsd:decimal	This property refers to the minimum spatial separation resolvable in a dataset, measured in meters.	0..n
structure	qb:structure	qb:DataStructureDefinition	This property refers to the structure to which a data set conforms.	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. It must use a controlled vocabulary that offers the type *Master Data* to represent specific data of Base Repositories.	0..1
version	owl:versionInfo	rdfs:Literal	This property contains a version number or other information about the version of the Dataset.	0..1
version notes	adms:versionNotes	rdfs:Literal	This property refers to a textual description on the specific features of a version of the Dataset. This property should be repeated in case there are texts in different languages.	0..n

Distribution

Mandatory properties for Distribution

Property	URI	Range	Usage note	Cardinality
access URL	dcat:accessURL	rdfs:Resource	This property refers to a URL that enables the access to a Dataset Distribution. The access URL may contain information to access/fetch the data.	1..1

Recommended properties for Distribution

Property	URI	Range	Usage note	Cardinality
availability	dcatap:availability	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.	0..1
description	dct:description	rdfs:Literal	This property specifies a descriptive text informing about the Distribution. This property should be repeated in case there are various versions of the text in different languages.	0..n
format	dct:format	dct:MediaTypeOrExtent	This property refers to the format of the Distribution data.	0..1
licence	dct:license	dct:LicenseDocument	This property refers to a licence under which the Distribution is made available. It may include the access and reuse rights associated.	0..1

Optional properties for Distribution

Property	URI	Range	Usage note	Cardinality
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	This property indicates the size of a Distribution in bytes. It must be typed as xsd:decimal.	0..1
checksum	spdx:checksum	spdx:Checksum	This property provides a mechanism to verify the integrity of the Distribution content.	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.	0..n
download URL	dcat:downloadURL	rdfs:Resource	This property contains a URL that is a direct link to a downloadable file.	0..1
issued	dct:issued	rdfs:Literal	This property indicates the date when the Distribution was the first time issued.	0..1
language	dct:language	dct:LinguisticSystem	This property refers to a language used in the Distribution. This property should be repeated in case there are various versions of the text in different languages.	0..n
media type	dcat:mediaType	dct:MediaTypeOrExtent	This property indicates the media type of the Distribution as defined in the IANA controlled vocabulary.	0..1
modified (last update)	dct:modified	rdfs:Literal	This property contains the most recent date on which the Distribution was changed or modified.	0..1
title	dct:title	rdfs:Literal	This property contains a descriptive title of the Distribution. This property should be repeated in case there are various versions of the text in different languages.	0..n
page (documentation)	foaf:page	foaf:Document	This property links a document with information about a Distribution.	0..n
rights	dct:rights	dct:RightsStatement	This property refers to an informative statement that set out the access and management rights of the Distribution.	0..1
status	adms:status	skos:Concept	This property indicates the maturity level of the Distribution.	0..1

Legal Resource

Mandatory properties for Legal Resource

Property	URI	Range	Usage note	Cardinality
type	dct:type	eli:ResourceType	This property refers to the type of a legal resource (e.g. "Directive", "Règlement grand ducal", "law", "Règlement ministériel", "draft proposition", "Parliamentary act", etc.). Member states are encouraged to make their own list of values in the corresponding concept scheme. EU Publications Office provides a list of values for EU resource types[29].	1..n

Recommended properties for Legal Resource

Property	URI	Range	Usage note	Cardinality
description	dct:description	rdfs:Literal	This property contains descriptive textual information about the Legal Resource. This property should be repeated in case there are various versions of the text in different languages.	0..n
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the rule.	0..1

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[29] https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/resource-type

Optional properties for Legal Resource

Property	URI	Range	Usage note	Cardinality
related	dct:relation	eli:LegalResource	This property represents another instance of the Legal Resource class that is related to a particular Legal Resource being described.	0..n

Public Organisation

Mandatory properties for Public Organisation

Property	URI	Range	Usage note	Cardinality
preferred label	skos:prefLabel	rdfs:Literal	This property is used to name the organisation, using the preferred denomination. This property should be repeated in case there are various versions of the text in different languages	1..n
spatial coverage	dct:spatial	dct:Location	This property contains the geographic or administrative region covered by a Public Organisation. The value of this property should be a URI from the Administrative Territorial Units Named Authority List[30] maintained by the Publications Office's Metadata Registry.	1..n

Recommended properties for Public Organisation

Property	URI	Range	Usage note	Cardinality
homepage	foaf:homepage	foaf:Document	This property refers to the homepage of a Public Organisation.	0..1

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[30] https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/atu

Public Registry Service

Mandatory properties for Public Registry Service

Property	URI	Range	Usage note	Cardinality
description	dct:description	rdfs:Literal	This property is used to describe a Registry Service using natural text. This property may be repeated in case of having descriptions in multiple languages.	1..n
has competent authority	cv:hasCompetentAuthority	cv:PublicOrganization	This property indicates a body in charge of running the Registry Service.[31]	1..n
identifier	dct:identifier	Text	This property contains a formal identification of a Registry Service.	1..1
title	dct:title	Text	This property represents the official name of a Registry Service. This property may be repeated in case of having descriptions in multiple languages.	1..*

Recommended properties for Public Registry Service

Property	URI	Range	Usage note	Cardinality
homepage	foaf:homepage	foaf:Document	This property refers to the homepage of a Registry Service.	0..1

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[31] The term Competent Authority is defined in the Services Directive (2006/123/EC) as: "Any body or authority which has a supervisory or regulatory role in a Member State in relation to service activities, including, in particular, administrative authorities, including courts acting as such, professional bodies, and those professional associations or other professional organisations which, in the exercise of their legal autonomy, regulate in a collective manner access to service activities or the exercise thereof".

has part	dct:hasPart	cpsv:PublicService	This property indicates a related Registry Service that is included either physically or logically in the described resource. This relation is used to describe Registries of Base Registries	0..n
is part of	dct:isPartOf	cpsv:PublicService	This property indicates a related Registry Service in which is included. This property is the inverse of dct:hasPart.	0..n
produces (data resource)	cpsv:produces	cv:Output	This property defines the output of the service as a data resource available and managed by a Base Registry Service. **The output must be also described as a dcat:Catalog**, a **dcat:Dataset or a dcat:DataService**.	0..n
thematic area	cv:thematicArea	skos:Concept	This property represents the primary topic(s) of a Registry, according to a defined classification schema.	0..n
type	dct:type	skos:Concept	This property indicates the type of a Registry Service, as described in a controlled set of concepts (e.g., Base Registry and Registry of Base Registries).	0..n
spatial coverage	dct:spatial	dct:Location	This property contains the geographic or administrative region covered by a Registry Service.	0..n
status	adms:status	skos:Concept	This property specifies the status of the Registry Service (i.e., active, inactive, under development etc.) according to a predefined vocabulary.	0..1

Optional properties for Public Registry Service

Property	URI	Range	Usage note	Cardinality
follows	cpsv:follows	cpsv:Rule	This property links a Registry Service to the Rule(s) under which it operates.	0..n
has contact point	cv:hasContactPoint	schema:ContactPoint	This property refers to the point of contact in a Registry Service. This contact information should be relevant to the Registry Service that may not be the same as contact information for the Competent Authority.	0..n

| has legal resource | cv:hasLegalResouce | eli:LegalResource | This property links a Public Service to a Legal Resource. It indicates the Legal Resource (e.g. legislation) to which the Public Service relates, operates or has its legal basis. | 0..n |

Registry (Catalogue)

Registry Catalogue is a sub-class of *dcat:Dataset* and considered as a *cv:Output*.

Mandatory properties for Registry (Catalogue)

Property	URI	Range	Usage note	Cardinality
description	dct:description	rdfs:Literal	This property contains a textual description of a Registry Catalogue. This property should be repeated in case there are various versions of the text in different languages.	1..n
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the catalogue. [32]	1..1
publisher	dct:publisher	foaf:Agent	This property refers to an agent (organisation or person) that makes the Catalogue available and accessible.	1..1
title	dct:title	rdfs:Literal	This property contains a descriptive name of the Registry Catalogue. This property should be repeated in case there are various versions of the text in different languages.	1..n

Recommended properties for Registry (Catalogue)

Property	URI	Range	Usage note	Cardinality
accrual periodicity	dct:accrualPeriodicity	dct:Frequency	This property indicates the frequency at which a Registry Catalogue is updated with new/edited Datasets.	0..1

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[32] *identifier* is mandatory according to compatible with CPSV-AP (required for cv:Output)

dataset	dcat:dataset	dcat:Dataset	This property links a Dataset with the Registry Catalogue that is part of.	0..n
homepage	foaf:homepage	foaf:Document	This property refers to a main page as entry point for a Registry Catalogue.	0..1
issued (release date)	dct:issued	rdfs:Literal	This property contains the date of first publication of a Registry Catalogue. This property should be typed as xsd:date or xsd:dateTime.	0..1
language	dct:language	dct:LinguisticSystem	This property specifies the language used in a catalogue to describe textual metadata of the Datasets in a Registry Catalogue. This property should be repeated in case there are various versions of the text in different 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
modified (last update)	dct:modified	rdfs:Literal	This property contains the most recent date on which the Registry Catalogue was modified. This property should be typed as xsd:date or xsd:dateTime.	0..1
provenance (authenticity)	dct:provenance	dct:ProvenanceStatement	This property indicates a statement of the authenticity and the integrity of the Datasets contained a Registry Catalogue.	0..n
spatial coverage	dct:spatial	dct:Location	This property indicates a geographical/administrative area that is covered by a Registry Catalogue. This property may be repeated in case there are several resources involved.	0..n
theme taxonomy	dcat:themeTaxonomy	skos:ConceptScheme	This property refers to a knowledge organisation system (i.e., thesaurus, taxonomy) used to classify Datasets in a Registry Catalogue.	0..n

Optional properties for Registry (Catalogue)

Property	URI	Range	Usage note	Cardinality
catalogue	dcat:catalog	dcat:Catalog	This property links a catalogue that is listed in the described catalogue.	0..n
creator	dct:creator	foaf:Agent	This property contains the entity responsible for producing the catalogue.	0..1
publisher	dct:publisher	foaf:Agent	This property contains the entity responsible for exposing and publishing the catalogue.	0..1
record	dcat:record	dcat:CatalogRecord	This property refers to a Catalogue Record that is part of the Catalogue.	0..n
rights (use terms)	dct:rights	dct:RightsStatement	This property includes a statement that specifies usage rights of the Registry Catalogue.	0..1
service	dcat:service	dcat:DataService	This property links a Data Service with the Registry Catalogue that is part of.	0..n

Rule

Mandatory properties for Rule

Property	URI	Range	Usage note	Cardinality
description	dct:description	rdfs:Literal	This property contains descriptive textual information about the Rule. This property should be repeated in case there are various versions of the text in different languages.	1..n
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the rule.	1..1
title	dct:title	rdfs:Literal	This property refers to the descriptive title or name of a Resource. This property should be repeated in case there are various versions of the text in different languages.	1..n

Recommended properties for Rule

Property	URI	Range	Usage note	Cardinality
implements	cpsv:implements	eli:LegalResource	This property links a Rule to relevant legislation or policy documents, such as the Legal Resource under which the Rules are defined.	0..n
language	dct:language	dct:LinguisticSystem	This property represents the language(s) in which the Rule is available. This could be one or multiple languages, for instance in countries with more than one official language.	0..n

4. Controlled Vocabularies

Description of services, their related legislation and content of registries rely on specific controlled vocabularies for specific properties, such as service status, theme of data, type of organization, etc.

Requirements for controlled vocabularies

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

Controlled vocabularies should:

- Be public and published under an open licence.

- Be 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.

- Have terms that are identified by URIs with each URI resolving to documentation about the term.

- Have associated persistence and versioning policies.

Controlled vocabularies to be used

The use of the following controlled vocabularies is mandatory to guarantee a minimum level of interoperability.

Property URI	Used in Class	Vocabulary name	Vocabulary URI	Usage note
dct:accessRights	Dataset; Catalogue; Distribution	Access Rights NAL	http://publications.europa.eu/resource/authority/access-right	Datasets, Catalogue and Distribution must include the level of access rights according to the list of values (i.e., Public, non-public, and restricted).

Property URI	Used in Class	Vocabulary name	Vocabulary URI	Usage note
dct:accrualPeriodicity	Dataset; Catalogue	Frequency NAL	http://publications.europa.eu/resource/authority/frequency	Datasets and catalogues must specify the frequency of update using the EU Publications Office File Frequency NAL (e.g., continuous, daily, hourly, etc.).
dct:creator	Dataset; Catalogue; Data Service;	Corporate Bodies NAL	http://publications.europa.eu/resource/dataset/corporate-body	The Corporate bodies NAL includes all the European institutions and a reduced set of international organisations. National and regional organisations must use local controlled vocabularies, if available.
dct:format	Distribution	File Type NAL	http://publications.europa.eu/resource/authority/file-type	The media type of distributions must be represented using the concrete list of document file types of the EU Publications Office File Type NAL.
dct:language	Dataset; Data Service; Distribution; Catalogue; Rule	Languages NAL	http://publications.europa.eu/resource/authority/language	Descriptions of Datasets, Data Service, Catalogues, Rules, and Distributions must include the languages using the EU Publications Office NAL.
dct:licence	Distribution	Licences NAL	http://publications.europa.eu/resource/dataset/licence	This vocabulary must be used in case the licence of a distribution is internationally recognised is included in the EU Publications Office NAL.
dcat:mediaType	Distribution	IANA Media Types	https://www.iana.org/assignments/media-types/media-types.xhtml	Distributions must represent the format of the document using the IANA Media Types list (e.g., application/mp4, application/pdf, etc.)
dct:publisher	Dataset; Catalogue; Data Service;	Corporate Bodies NAL	http://publications.europa.eu/resource/dataset/corporate-body	The Corporate bodies NAL includes all the European institutions and a reduced set of international organisations. National and regional organisations must use local controlled vocabularies, if available.

Property URI	Used in Class	Vocabulary name	Vocabulary URI	Usage note
dct:spatial	Dataset; Catalogue; Registry Service; Public Organisation	Continents NAL, Countries NAL, Places NAL	http://publications.europa.eu/resource/dataset/continent http://publications.europa.eu/resource/dataset/country http://publications.europa.eu/resource/dataset/place	Spatial coverage must be represented using the NAL according to the scope of the description (i.e., continent, country or region).
adms:status	Distribution	ADMS Status vocabulary	http://purl.org/adms/status/	Data Distributions must indicate the status of the resource according to the ADMS Status vocabulary (i.e., Completed, Deprecated, Under Development, Withdrawn).
cv:thematicArea	Registry Service	EuroVoc	http://publications.europa.eu/resource/dataset/eurovoc	EuroVoc will be used at any hierarchical level, in a flexible way, to describe the thematic area of a service.
dcat:theme	Dataset; Data Service	EuroVoc Data Theme Taxonomy NAL	http://publications.europa.eu/resource/dataset/eurovoc http://publications.europa.eu/resource/authority/data-theme	EuroVoc will be used at any hierarchical level, in a flexible way, to describe the theme of a resource, dataset or data service. The EU Publications Office Data Theme NAL is used to describe catalogues and datasets in open data portals.
dcat:themeTaxonomy	Registry Catalogue	EuroVoc Data Theme Taxonomy NAL	http://publications.europa.eu/resource/dataset/eurovoc http://publications.europa.eu/resource/authority/data-theme	The Registry Catalogue must specify the URI to the thesaurus that defines the potential themes of its resources, as well as the taxonomy of the Data Theme NAL.
dct:type	Legal Resource	Resource Type NAL	http://publications.europa.eu/resource/authority/resource-type	Legal Resource must indicate the type of the document represented (e.g., Amended proposal, Agreement, etc.).