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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 an action running under the ISA² programme (Action 2016.28), namely Access to Base Registries (ABR).

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

This deliverable's purpose is to elaborate the draft specification of **BRegDCAT-AP**, an extension of the DCAT application profile for data portals in Europe (DCAT-AP) for describing base registries of Member States (MS), that will serve with specifications and tools to MS to create their own registries of registries.

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

- Create an ABR working group (WG) composed of MS representatives and other semantics experts and manage WG meetings to discuss the specification;
- Draft an application profile of the DCAT to describe the data contained in base registries (and registries of registries), 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 registries of registries;
- Shared challenges and other feedback from the MS representatives and other ABR working group (WG) members on other webinars aiming exchange of best practices.

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

[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

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 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.

[4] https://joinup.ec.europa.eu/solution/eira
[5] https://ec.europa.eu/isa2/eif
[6] https://ec.europa.eu/inea/en/connecting-europe-facility

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**[7], **DCAT**[8] (W3C Data Catalogue Vocabulary), **EUROVOC**[9], Publication Office's **MDR**[10] (Metadata Registry), **NUTS**[11](Nomenclature of Territorial Units for Statistics) and **ELI**[12] (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)[13], 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, organizational and multilingual barriers.

[7] https://joinup.ec.europa.eu/page/core-vocabularies
[8] https://www.w3.org/TR/vocab-dcat/
[9] http://eurovoc.europa.eu
[10] http://publications.europa.eu/mdr/authority/
[11] http://ec.europa.eu/eurostat/web/nuts/background
[12] https://eur-lex.europa.eu/eli-register/about.html
[13] 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, issued on 8th November 2018. 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[14], 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 item in a catalogue, a parent abstract concept of **Dataset**, **Data Service** and **Catalogue**. 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. 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.

[14] http://www.w3.org/RDF/

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 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[15]: ***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
cnt	http://www.w3.org/2011/content#	Representing Content in RDF 1.0
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, Version 1.1
dcat	http://www.w3.org/ns/dcat#	Data Catalog Vocabulary
dct	http://purl.org/dc/terms/	DCMI Metadata Terms
dctype	http://purl.org/dc/dcmitype/	DCMI Type Vocabulary

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

Prefix	Namespace	RDF 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
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

1. Overview of Classes and Properties

The following diagram represents the main classes and properties in UML format:

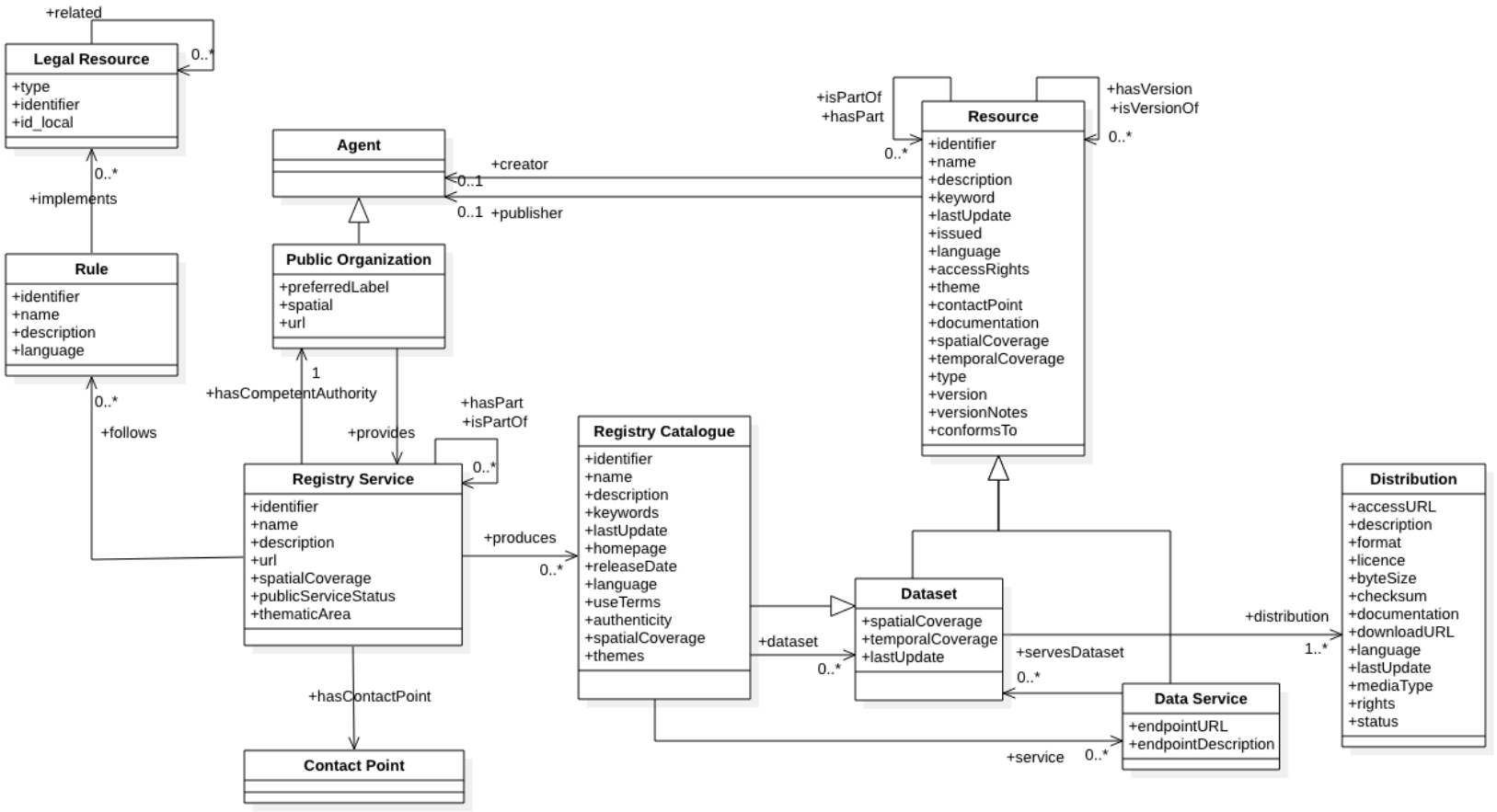

Fig. 2. UML Class Diagram

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, the Registries and/or Datasets.	foaf:Agent	http://xmlns.com/foaf/spec/#term_Agent
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.	dcat:DataService	https://www.w3.org/TR/vocab-dcat-2/#Class:Data_Service
Dataset	A conceptual entity that represents the information managed and/or published by the 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[16].	rdfs:Literal	http://www.w3.org/TR/rdf-concepts/#section-Literals
Public Organization	A Public Organization is the responsible Agent for the delivery of a Public Service. This specification uses the class from the Core Public Organisation Vocabulary[17], based also on the W3C Organization Ontology[18].	cv:PublicOrganization	https://joinup.ec.europa.eu/solution/core-public-service-vocabulary , http://www.w3.org/TR/vocab-org/

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

Class name	Usage note for the Application Profile	URI	Reference
Registry Catalogue	A catalogue or repository that lists the Datasets (Master Data and other resources) managed and provided by a Base Registry Service.	dcat:Catalog	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog
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
(Data) Resource	A Resource represents an individual item in a catalogue. This class is not intended to be used directly, but is the parent class of Dataset, Data Service and Registry Catalogue. Resource is effectively an extension point for defining a catalogue of any kind of 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
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 the 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.	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's entry in the Catalogue.	dcat:CatalogRecord	http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog-record
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

Class name	Usage note for the Application Profile	URI	Reference
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[19] 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
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

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

Class name	Usage note for the Application Profile	URI	Reference
Standard	A standard or other specification to which a Dataset or Distribution conforms	dct:Standard	http://dublincore.org/documents/dcmi-terms/#terms-Standard
Status	An indication of the maturity of a Distribution or the type of change of a Catalogue Record.	skos:Concept	http://www.w3.org/TR/vocab-adms/#status
Provenance Statement	A statement of any changes in ownership and custody of a resource since its creation that are significant for its authenticity, integrity, and interpretation	dct:ProvenanceStatement	http://dublincore.org/documents/dcmi-terms/#terms-ProvenanceStatement

3. Application Profile Properties per Class

Data Service

Data Service is a sub-class of Resource.

Mandatory properties for DataService

Property	URI	Range	Usage note	Cardinality
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.	1..n
endpoint URL	dcat:endpointURL	rdfs:Resource	This property indicates the root location or primary endpoint of a Data Service (an IRI).	1
endpoint URL	dcat:endpointDescription	rdfs:Resource	This property describes the services available via end-points, including their operations, parameters etc.	1..n
name	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 DataService

Property	URI	Range	Usage note	Cardinality
creator	dct:creator	foaf:Agent	This property contains the entity responsible for producing the Data Service.	0..1
contact point	dcat:contactPoint	vcard:Kind	This property includes contact information to provide feedback on a Data Service.	0..n

Property	URI	Range	Usage note	Cardinality
keyword	dcat:keyword	rdfs:Literal	This property contains a free-text keyword that describes a Data Service. 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 Organization, which makes the Data Service available.	0..1
serves dataset	dcat:servesDataset	dcat:Dataset	This property refers to the data that a data service can distribute.	0..n
theme	dcat:theme	skos:Concept	This property indicates a category of a Data Service. Multiple themes may be associated.	0..n

Optional properties for DataService

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
accrual periodicity	dct:accrualPeriodicity	dct:Frequency	This property refers to the frequency at which a Data Service is updated.	0..1
conforms to	dct:conformsTo	dct:Standard	This property indicates a compliance rule or standard that inspires the management of a Data Service.	0..n
documentation	foaf:page	foaf:Document	This property links to a document with information about a Data Service.	0..n

Property	URI	Range	Usage note	Cardinality
has version	dct:hasVersion	dcat:Dataset	This property refers to a Dataset that is a version of the described Data Service.	0..n
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the Data Service. There may be several identifiers, such as MAST/ADS[20], DataCite, DOI[21], EZID[22] or W3ID[23].	0..n
is version of	dct:isVersionOf	dcat:Dataset	This property refers to a Data Service of which the described Data Service is a version.	0..n
language	dct:language	dct:LinguisticSystem	This property indicates the language in which the Data Service is expressed. This property may be repeated in case there are different languages.	0..n
last update	dct:modified	rdfs:Literal	This property contains the latest modification date of a Data Service. This property should be typed as xsd:date or xsd:dateTime.	0..1
provenance	dct:provenance	dct:ProvenanceStatement	This property specifies information about the origin of a Data Service.	0..n
related resource	dct:relation	rdfs:Resource	This property refers to a related resource.	0..n
release date	dct:issued	rdfs:Literal	This property indicates the issuance date of the Data Service. It should be typed as xsd:date or xsd:dateTime.	0..1
version	owl:versionInfo	rdfs:Literal	This property contains a version number or other information about the version of the Data Service.	0..1

[20] http://archive.stsci.edu/pub_dsn.html
[21] http://www.doi.org/
[22] http://n2t.net/ezid
[23] https://w3id.org/

Property	URI	Range	Usage note	Cardinality
version notes	adms:versionNotes	rdfs:Literal	This property refers to a textual description on the specific features of a version of the Data Service. This property should be repeated in case there are texts in different languages.	0..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
name	dct:title	rdfs:Literal	This property refers to the descriptive title 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
creator	dct:creator	foaf:Agent	This property contains the entity responsible for producing the Dataset.	0..1
dataset distribution	dcat:distribution	dcat:Distribution	This property refers to a Distribution of a Dataset.	0..n

Property	URI	Range	Usage note	Cardinality
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 Organization, which makes the Dataset available.	0..1
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
documentation	foaf:page	foaf:Document	This property links to a document with information about 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

Property	URI	Range	Usage note	Cardinality
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the Dataset. There may be several identifiers, such as MAST/ADS[24], DataCite, DOI[25], EZID[26] or W3ID[27].	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
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
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
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
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
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

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

Property	URI	Range	Usage note	Cardinality
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..n

Recommended properties for Distribution

Property	URI	Range	Usage note	Cardinality
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

Property	URI	Range	Usage note	Cardinality
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
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
documentation	foaf:page	foaf:Document	This property links a document with information about a Distribution.	0..n
download URL	dcat:downloadURL	rdfs:Resource	This property contains a URL that is a direct link to a downloadable file.	0..n
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
last update	dct:modified	rdfs:Literal	This property contains the most recent date on which the Distribution was changed or modified.	0..1
media type	dcat:mediaType	dct:MediaTypeOrExtent	This property indicates the media type of the Distribution as defined in the IANA controlled vocabulary.	0..1

Property	URI	Range	Usage note	Cardinality
name	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
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

Registry Catalogue

Registry Catalogue is a sub-class of Dataset.

Mandatory properties for Registry Catalogue

Property	URI	Range	Usage note	Cardinality
dataset	dcat:dataset	dcat:Dataset	This property links a Dataset with the Registry Catalogue that is part of.	1..n
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
name	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
publisher	dct:publisher	foaf:Agent	This property refers to an agent (organisation or person) that makes the Catalogue available and accessible.	1..1
service	dcat:service	dcat:DataService	This property links a Data Service with the Registry Catalogue that is part of.	0..n

Recommended properties for Registry Catalogue

Property	URI	Range	Usage note	Cardinality
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
creator	dct:creator	foaf:Agent	This property contains the entity responsible for producing the Catalogue.	0..1
homepage	foaf:homepage	foaf:Document	This property refers to a landing page as entry point for a Registry Catalogue.	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
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
themes	dcat:themeTaxonomy	skos:ConceptScheme	This property refers to a knowledge organization system (i.e., thesaurus, taxonomy) used to classify Datasets in a Registry Catalogue.	0..n
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

Optional 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

Property	URI	Range	Usage note	Cardinality
has part	dct:hasPart	dcat:Catalog	This property links a Registry Catalogue that is part of the described one.	0..n
is part of	dct:isPartOf	dcat:Catalog	This property refers to a Registry Catalogue in which the described Registry Catalogue is physically or logically included.	0..n
use terms	dct:rights	dct:RightsStatement	This property includes a statement that specifies usage rights of the Registry Catalogue.	0..1
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

Registry Service

Mandatory properties for Registry Service

Property	URI	Range	Usage note	Cardinality
has competent authority	cv:hasCompetentAuthority	cv:PublicOrganization	This property indicates a body in charge of running the Registry Service.[28]	1..n
identifier	dct:identifier	Text	This property contains a formal identification of a Registry Service.	1..1
name	dct:title	Text	This property represents the official name of a Registry Service.	1..1

[28] 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”.

Recommended properties for Registry Service

Property	URI	Range	Usage note	Cardinality
data catalogue	cpsv:produces	Catalogue	This property defines the catalogue of datasets available and managed by a Base Registry Service.	0..n
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.	0..n
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
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..1
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
url	cpsv:hasChannel	rdfs:Resource	This property contains a URL to the main homepage of a Registry Service.	0..n

Optional properties for 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

Resource

Mandatory properties for Resource

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

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

Property	URI	Range	Usage note	Cardinality
creator	dct:creator	foaf:Agent	This property contains the entity responsible for producing the resource.	0..1
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 Organization, which makes the Dataset available.	0..1
theme	dcat:theme	skos:Concept	This property indicates a category of a Dataset. Multiple themes may be associated.	0..n

Optional properties for Resource

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
documentation	foaf:page	foaf:Document	This property links to a document with information about a Dataset.	0..n
has version	dct:hasVersion	dcat:Resource	This property refers to a Dataset that is a version of the described Dataset.	0..n
has part	dct:hasPart	dcat:Resource	This property links a Resource that is part of the described one.	0..n

Property	URI	Range	Usage note	Cardinality
identifier	dct:identifier	rdfs:Literal	This property contains an internal identifier for the Dataset. There may be several identifiers, such as MAST/ADS[29], DataCite, DOI[30], EZID[31] or W3ID[32].	0..n
is part of	dct:isPartOf	dcat:Resource	This property refers to a Resource in which the described Resource is physically or logically included.	0..n
is version of	dct:isVersionOf	dcat:Resource	This property refers to a Dataset of which the described Dataset is a version.	0..n
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
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
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
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
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

[29] http://archive.stsci.edu/pub_dsn.html
[30] http://www.doi.org/
[31] http://n2t.net/ezid
[32] https://w3id.org/

Property	URI	Range	Usage note	Cardinality
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

4. Controlled Vocabularies

List of controlled Vocabularies, including EUROVOC, ADMS, MDR, IANA.

Property URI	Used in Class	Vocabulary name	Vocabulary URI	Usage note