“napDCAT-AP”

A DCAT-AP extension for Metadata in National Access Points

Monitoring and Harmonisation of National Access Points in Europe

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# Document Information

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# Introduction

## Context

A National Access Point (NAP) is an intermediary digital platform and is part of EU Delegated Regulations 2017/1926, 885/2013, 886/2013 and 2015/962 of the EU ITS Directive 2010/40/EU[[1]](#footnote-1). One of the main functions is to enable access and exchange of traffic and mobility data via a NAP. A detailed and standardized data set description – the so-called Metadata – facilitates such access by enabling discoverability of data sets within an NAP.

A working group composed by NAP representatives from the Netherlands, Germany, Austria and Sweden started an approach to harmonise Metadata descriptions and structures for the following reasons:

* to help to make data available and searchable for pan-European service providers,
* to ensure Metadata to be machine-readable in a later stage, and
* to ensure a common understanding of the listed data content.

One major outcome was the “Coordinated Metadata Catalogue” (CMC), describing a common minimum metadata set which describes all potential data to be provided in a NAP, according to the EU Directive and the respective Delegated Regulations. Specifically, it contains all necessary information for Metadata definitions in NAPs:

* Definition of data elements which are necessary to describe a dataset in a minimal but adequately way
* Definition of wordings and semantics
* Definition of predefined categorisations
* Definition of data field name
* Definition of data value type
* Recommendations of data field length

The first version of CMC dates back to 2015. Though continuing exchange with NAP stakeholders, it is now widely know and accepted among many NAPs in Europe. It has been also recommended by the European Commission as a blueprint for Metadata structures at each individual NAP in the EU.

However, the evolving field of mobility data ecosystems, including NAPs, requires further evolution of the CMC. A recent update was released in 2019[[2]](#footnote-2). A major milestone in this update was the additional coverage of multi-modal travel data and services (MMTIS), according to Delegated Regulation (EU) 2017/1926. It now contains definitions for 32 Metadata elements, including their description, types and obligation levels

During the recent work in this context, a requirement was often formulated to provide a more structured and machine-readable representation of the CMC. This requirement is addressed by the work presented in this document.

First of all, this includes some logical modelling of the pre-defined metadata elements. In contrast to a sequential list of metadata elements, as introduced so far in the CMC, such model will also consider hierarchical structures and interdependencies between the Metadata elements.

Further, the modelling work is based on standardised methodologies. The logical model will be expressed with the Unified Modelling Language (UML). The description of model elements, such as classes and relationships, will be made compatible to DCAT-AP, as a specification for metadata records on European data portals.

In more detail, the contents of the CMC were translated into a proper extension to DCAT-AP. The working title for such an extension is “napDCAT-AP” (DCAT-AP extension for National Access Points).

The presented work is based on the following, consecutive steps. The work was led by BASt with support by EU EIP 4.6 partners:

* Requirement analysis
* Discussion of references, investigation of (meta)data modelling approaches, definition of a modelling strategy
* Definition of modelling steps according to the modelling strategy
* Metadata modelling and drafting of “napDCAT-AP” (iterative process)
* Review process with the NAP community
* Publication on EU EIP Website

It is expected that that the metadata modelling and drafting of “napDCAT-AP” will add several benefits towards efficiency and acceptability of the CMC. Technically, it will also allow the machine-readability of the Metadata definitions in the CMC

## Purpose of the DCAT-AP extension for NAP metadata

DCAT-AP is an Application Profile (AP) based on the Data Catalogue Vocabulary (DCAT), developed by W3C[[3]](#footnote-3). According to W3C definitions, *“DCAT is an RDF vocabulary designed to facilitate interoperability between data catalogues published on the Web, was originally developed in the context of government data catalogues […] but it is also applicable and has been used in other contexts”.*

An AP is an adaptation of a vocabulary to meet the needs of a particular application or implementation. Technically, it is a set of metadata elements, policies, and guidelines defined for a particular application. It mainly consists of vocabulary terms, including their definitions and usage rules (such as cardinalities)[[4]](#footnote-4).

DCAT-AP is an AP for data portals in Europe, developed by a joint initiative of the EU organizations DG DIGIT, DG CONNECT and the Publications Office of the EU[[5]](#footnote-5). According to its definitions, DCAT-AP is a *“specification for metadata records to meet the specific application needs of data portals in Europe while providing semantic interoperability with other applications on the basis of reuse of established controlled vocabularies […] and mappings to existing metadata vocabularies […].”*

There are many arguments to build up the Coordinated Metadata Catalogue upon the DCAT-AP specification:

* The specification is used in a wide range of data portals in Europe, in particular, European data portals for open data.
* This specification provides standard serialization formats for metadata in XML and JSON, making metadata machine-readable.
* The specification is extensible. Examples of established extension are GeoDCAT-AP for describing geospatial data, and DQV (Data Quality Vocabulary) for describing data quality.
* The specification allows linking between distributed metadata catalogues, making metadata searchable and discoverable across catalogues using standard query facilities. This way, interoperability of metadata with data portals in Europe, also outside the transportation domain, will be fostered.
* The specification allows content aggregators (like the European Data Portal) to aggregate metadata into a single point of access.
* The specification (and its extensions) are developed and maintained in a well-defined process by established organisations, including W3C and EU.
* The specification supported by available software products –including Open Source products (like CKAN)

Following these arguments, a DCAT-AP extension for the domain of NAP metadata is developed: “napDCAT-AP”. The following figure indicates how such an extension is related to DCAT-AP and other, existing extensions.



Figure 1: Relation of DCAT-AP and its extensions

It is noted that the main result of the present work is a draft of “napDCAT-AP”, to be proposed to and discussed with NAP stakeholders. Additional governance processes and structures for maintaining and updating of “napDCAT-AP” (as being done for other DCAT-AP extensions) are out the scope of EU EIP, and need to be established as a future, follow-up work.

In the following sections, the contents and characteristics, and usage notes of “napDCAT.AP” are described. Whenever the Coordinated Metadata Catalogue (CMC) is cited, the latest 2019 version is meant.

# Terminology and Definitions

## Related to NAPs

Certain terms and definitions need to be specified to achieve a common understanding. The following definitions relate to any NAP, independent if a NAP has metadata registry according to napDCAT-AP or not. The following definitions are based on Coordinated Metadata Catalogue (CMC), version 2019, however partially adopted to the DCAT-AP concept of data catalogues.

This figure is used for an easy understanding and the common idea of the metadata that describes both, the content of data and the publication i.e. the way data is accessible:



Figure 2: Concept of data provision and the relevance of Metadata in the NAP domain

**Data set**

A dataset contains any kind of mobility data, e.g. static parking information for truck drivers.

**Distribution**

A distribution describes the data formats and communication methods for a dataset. There may be one or multiple distributions for one dataset. For example, the same data set (e.g. static parking information for truck drivers) can be provided in different ways e.g. as downloadable zip file or as XML using a SOAP web service. These are two distributions based on one data set.

**Publication**

A publication is an abstract construct that covers a dataset published by a data publisher and which has one or multiple distributions.

(Note: This differs to former CMC definitions, where a publication had one data set with only one data format and one communication method. Following the DCAT.AP logic of “a dataset has 0..n distributions”, the option of multiple “Distributions” is introduced, which each cover a specific data format and communication method.) .

**Metadata registry**

A Metadata registry is a digital recording of all Metadata sets in a NAP, each describing the administration, organisation, and content of individual publications, including the published data set and the corresponding distributions. Metadata are therefore crucial elements to make NAPs accessible and searchable. The most visible Metadata representation are the dataset descriptions in NAP portals, see the example from the Mobility Data Marketplace (MDM, German NAP) in Figure 3.

A Metadata set is the collection of all metadata elements.

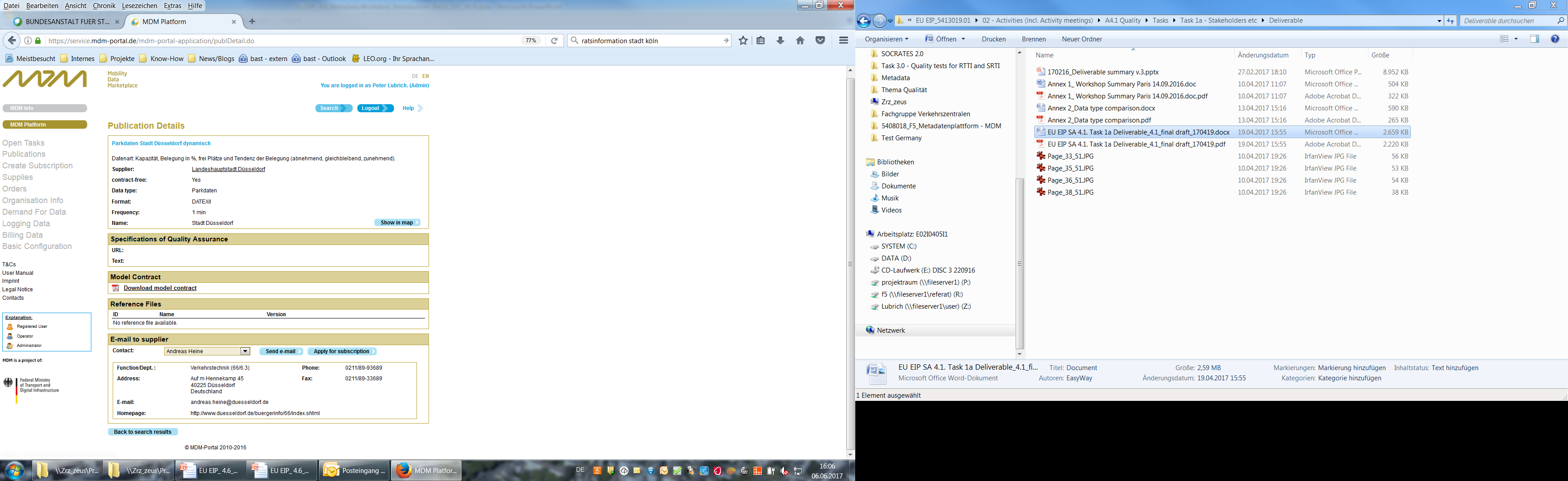


Figure 3: Metadata as part of the data set description in a NAP portal

**Service**

Services are any digital services in the domain of Intelligent Transport Systems (ITS), which reuse NAP data sets. These may be traveller information services, navigation services, etc.

A more concrete definition of services is given in EU Regulation 2017/1926, regarding services for multi-modal traveller information (e.g. routing services).

In the context of NAPs, there is a discussion if service should be also discoverable within NAPs, besides conventional data sets. This may include to a technical service, e.g. an API that can be used to invoke routing information. In this case, the Metadata definitions are to be adapted to describe not only data sets but also services.

Such a perspective is difficult in the context of DCAT-AP, as DCAT-AP sees only the catalogue (in our case, the NAP Metadata registry) as a “service”. However, in the CMC, version 2019, as well as in this napDCAT-AP specification, the “service” aspect has been considered in two Metadata fields (respectively, the properties of the “Dataset” class): “resource type and “service type category”.

**Metadata Creator**

A Metadata Creator is the entity (company, authority or person) who creates and maintains the metadata record about the dataset at the NAP and is liable for the correctness of the metadata.

**Publisher**

A Publisher is the entity (company, authority or person) who publishes a dataset. He holds up the data access and defines data routines.

**Data Owner**

A Data owner is the entity (company or authority) which owns or produces data. It is liable for processing, aggregation, quantity and quality of the data.

The three entities mentioned above (Metadata Creator, Publisher and Data Owner) may be identical or not.

## Related to the DCAT-AP

The following definitions are based on the original DCAT-AP specification[[6]](#footnote-6) and adopted to the NAP context. Further, explanations on “Classes” and “Properties”, as basic elements of the DCAT-AP data model, are added.

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

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

A **Catalogue** is a repository that hosts the Datasets.

A **Data Portal** is a Web-based system that contains a data catalogue with descriptions of datasets and provides services enabling discovery and re-use of the datasets. In a NAP context, this corresponds to a concrete NAP system, i.e., a web portal, where NAP datasets are discoverable.

A **Catalogue Record** is a description of a Dataset’s entry in the Catalogue. In a NAP context, this corresponds to the metadata record about one publication on the NAP.

A **Distribution** is a physical embodiment of the Dataset in a particular format.

DCAT-AP is expressed as a RDF schema[[7]](#footnote-7). A RDF schema provides a data-modelling vocabulary for RDF data. It provides mechanisms for describing groups of related resources and the relationships between these resources. This is done via a class and property system,

A **Class** is a group of resources. Classes are themselves resources. They are often identified by IRIs and may be described using properties.

A **Property** is a relation between subject resources and object resources.

The following figure shows the core elements of the DCAT-AP data model, denoting how the above-mentioned terms and relations are expressed as classes and properties. This figure also shows, how NAP-related terms, such as publications, are related to this class and property structure.

dcat:Catalog

dcat:Dataset

dcat:distribution

dcat: Distribution

dcat:Catalog Record

0..\*

dcat:record

0..\*

foaf:primaryTopic

1..1



Figure 4: Core elements of the DCAT-AP data model

In the following sections, classes and properties are grouped under headings ‘mandatory’, ‘recommended’ and ‘optional’. These terms have the following meaning, relating to potential responsibilities of metadata senders and metadata receivers.

Such metadata senders and receivers are important actors for interoperable metadata, i.e. whenever there is an exchange of metadata between IT systems. This may happen when there are metadata import and export functions in a NAP. In this case, metadata senders and receivers are other data portals, e.g. allowing harvesting of metadata. So, the following terms refer to the capability of a NAP to provide corresponding metadata in an export function, or to read them in an import function.

(Note: Here, it is important not to confuse “senders” and “receivers” with providers and users of NAP data!)

**Mandatory class:** a receiver of metadata MUST be able to process information about instances of the class; a sender of metadata MUST provide information about instances of the class.

**Recommended class:** a sender of metadata SHOULD provide information about instances of the class; a sender of metadata MUST provide information about instances of the class, if such information is available; a receiver of metadata MUST be able to process information about instances of the class.

**Optional class:** a receiver MUST be able to process information about instances of the class; a sender MAY provide the information but is not obliged to do so.

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

**Recommended property:** a receiver MUST be able to process the information for that property; a sender SHOULD provide the information for that property if it is available.

**Optional property:** a receiver MUST be able to process the information for that property; a sender MAY provide the information for that property but is not obliged to do so.

The meaning of the terms MUST, MUST NOT, SHOULD and MAY in this section and in the following sections are as defined in RFC 2119 .

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

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

* adms: http://www.w3.org/ns/adms#
* dcat: http://www.w3.org/ns/dcat#
* dcatap: http://data.europa.eu/r5r/
* napdcatap: https://eueip.github.io/napDCAT-AP/
* dct: http://purl.org/dc/terms/
* foaf: http://xmlns.com/foaf/0.1/
* locn: http://www.w3.org/ns/locn#
* owl: http://www.w3.org/2002/07/owl#
* odrl: https://www.w3.org/TR/odrl-vocab/#
* rdfs: http://www.w3.org/2000/01/rdf-schema#
* schema: http://schema.org/
* skos: http://www.w3.org/2004/02/skos/core#
* spdx: http://spdx.org/rdf/terms#
* xsd: http://www.w3.org/2001/XMLSchema#
* vann: http://purl.org/vocab/vann/
* voaf: http://purl.org/vocommons/voaf#
* vcard: [http://www.w3.org/2006/vcard/ns#](http://www.w3.org/2006/vcard/ns)

As seen above, an additional namespace with an own URL has been established for this napDCAT-AP extension (“napdcatap:”), to be able to provide some new properties which are not covered by the other namespaces. This URL has been provisionally stored under a Github repository dedicated to this napDCAT-AP project[[8]](#footnote-8).

# UML visualisation of the napDCAT-AP data model

The following UML diagram compiles all classes and properties of DCAT-AP, including all additions/amendments defined for the napDCAT-AP extension.

# Classes per obligation level

The following tables compile all classes used in napDCAT-AP per obligation level. The column “Obligation” indicates the following obligation levels: M=Mandatory, R=Recommended, O=Optional.

The following definitions follow mostly the DCAT-AP 2.0.0 specification. No additional classes have been added in NAPDCAT-AP, comparing to DCAT-AP 2.0.0. In two cases (class “CatalogueRecord” and “Distribution”), the obligation levels have been raised. In several cases, the “Usage Notes” have been adopted to the NAP domain.

All changes and text additions, comparing to DCAT-AP 2.0.0, are marked below with a red font.

## Mandatory Classes

| **No.** | **Obligation** | **Class Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Domain** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | M | Agent | foaf:Agent | <http://xmlns.com/foaf/spec/#term_Agent> ,<http://www.w3.org/TR/vocab-org/> | An entity that is associated with provision of a NAP service and/or NAP Datasets. If the Agent is an organisation, the use of the Organization Ontology is recommended.. | dct:publisher (Catalog), dct:publisher (Dataset) dct:creator (Dataset), napdcatap:contactPoint (CatalogRecord) |
| 2 | M | Catalogue | dcat:Catalog | <http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog> | A concrete NAP system, i.e, a web portal, where NAP datasets are discoverable. . |  |
| 3 | M | Dataset | dcat:Dataset | <http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-dataset> | A conceptual entity that represents the information published. | dcat:dataset (Catalog),  foaf:primaryTopic (CatalogRecord) |
| 4 | M | Literal | rdfs:Literal | <http://www.w3.org/TR/rdf-concepts/#section-Literals> | A literal value such as a string or integer; Literals may be typed, e.g. as a date according to xsd:date. Literals that contain human-readable text have an optional language tag as defined by BCP 47. | dcat:keyword (Dataset),  … |
| 5 | M | Resource | rdfs:Resource | <http://www.w3.org/TR/rdf-schema/#ch_resource> | Anything described by RDF. | dct:conformsTo (Catalog Record),  … |
| 6 | M | Catalogue Record | dcat:CatalogRecord | <http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-catalog-record> | A description of a Dataset’s metadata entry in the NAP.  To make sure that each dataset has actually a Metadata entry in a NAP, the obligation level is raised to “mandatory”. | dcat:record (Catalog) |
| 7 | M | Distribution | dcat:Distribution | <http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-distribution> | A physical embodiment of the Dataset in a particular format.  The class ‘Distribution’ has been classified in the original DCAT-AP specification as ‘Recommended’, to allow for cases that a particular Dataset does not have a downloadable Distribution. However, for the NAP context, it can be expected that a NAP dataset all have downloadable Distributions, and in such cases the provision of information on the Distribution is raised to mandatory. | dcat:distribution, adms:sample (Dataset) |
| 8 | M | Location | dct:Location | <http://dublincore.org/documents/dcmi-terms/#terms-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[[9]](#footnote-9) is recommended, following the approach described in the GeoDCAT-AP specification.  To make sure that each dataset has actually a geographical reference, the obligation level is raised to “mandatory”. | dct:spatial (Dataset, Catalog) |

## Recommended Classes

| **No.** | **Obligation** | **Class Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Domain** |
| --- | --- | --- | --- | --- | --- | --- |
| 9 | R | Category | skos:Concept | <http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme> | A subject of a Dataset. | dcat:theme (Dataset) |
| 10 | R | Category scheme | skos:ConceptScheme | <http://www.w3.org/TR/2013/WD-vocab-dcat-20130312/#class-category-and-category-scheme> | A concept collection (e.g. controlled vocabulary) in which the Category is defined. | dcat:themeTaxonomy (Catalog) |
| 11 | R | Licence document | dct:LicenseDocument | <http://dublincore.org/documents/2012/06/14/dcmi-terms/?v=terms#LicenseDocument> | A legal document giving official permission to do something with a resource. | dct:license (Distribution) |

## Optional Classes

| **No.** | **Obligation** | **Class Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Domain** |
| --- | --- | --- | --- | --- | --- | --- |
| 12 | O | Data Service | dcat:DataService | [https://www.w3.org/TR/vocab-dcat-2/#Class:Data\_Service](https://www.w3.org/TR/vocab-dcat-2/%23Class:Data_Service) | A collection of operations that provides access to one or more datasets or data processing functions. | dcat:service(Catalog) |
| 13 | O | Checksum | spdx:Checksum | <http://spdx.org/rdf/terms#Checksum> | A value that allows the contents of a file to be authenticated. This class allows the results of a variety of checksum and cryptographic message digest algorithms to be represented. | spdx:checksum (Distribution) |
| 14 | O | Document | foaf:Document | <http://xmlns.com/foaf/spec/#term_Document> | A textual resource intended for human consumption that contains information, e.g. a web page about a Dataset. | foaf:page (Distribution), dcat:landingPage (Dataset), foaf:page (Catalog) |
| 15 | O | Frequency | dct:Frequency | <http://dublincore.org/documents/dcmi-terms/#terms-Frequency> | A rate at which something recurs, e.g. the publication of a Dataset. | dct:accrualPeriodicity (Dataset) |
| 16 | O | Other Identifier | adms:Identifier | <http://www.w3.org/TR/vocab-adms/#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 (Dataset) |
| 17 | O | Kind | vcard:Kind | <http://www.w3.org/TR/2014/NOTE-vcard-rdf-20140522/#d4e181> | 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). | dcat:contactPoint (Dataset, CatalogRecord) |
| 18 | O | Linguistic system | dct:LinguisticSystem | <http://dublincore.org/documents/dcmi-terms/#terms-LinguisticSystem> | A system of signs, symbols, sounds, gestures, or rules used in communication, e.g. a language | dct:language (Dataset, Catalog, Catalog Record, Distribution) |
| 19 | O | Media type | dct:MediaType | https://www.dublincore.org/specifications/dublin-core/dcmi-terms/#terms-MediaType | A media type, e.g. the format of a computer file | dcat:mediaType (Distribution), dcat:packageFormat (Distribution), dct:format (Distribution) |
| 20 | O | Period of time | dct:PeriodOfTime | <http://dublincore.org/documents/dcmi-terms/#terms-PeriodOfTime> | An interval of time that is named or defined by its start and end dates. | dct:temporal (Dataset) |
| 21 | O | Publisher type | skos:Concept | <http://www.w3.org/TR/vocab-adms/#dcterms-type> | A type of organisation that acts as a publisher |  |
| 22 | O | Relationship | dcat:Relationship | [https://www.w3.org/TR/vocab-dcat-2/#Class:Relationship](https://www.w3.org/TR/vocab-dcat-2/%23Class:Relationship) | An association class for attaching additional information to a relationship between DCAT Resources | prov:qualifiedRelation (Catalog) |
| 23 | O | Rights statement | dct:RightsStatement | <http://dublincore.org/documents/dcmi-terms/#terms-RightsStatement> | 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:accessRight s (Dataset), dct:rights (Catalog, Distribution) |
| 24 | O | Role | dcat:Role | [https://www.w3.org/TR/vocab-dcat-2/#Class:Role](https://www.w3.org/TR/vocab-dcat-2/%23Class:Role) | A role is the function of a resource or agent with respect to another resource, in the context of resource attribution or resource relationships. | dct:hadRole (Relationship) |
| 25 | O | Standard | dct:Standard | <http://dublincore.org/documents/dcmi-terms/#terms-Standard> | A standard or other specification to which a Dataset or Distribution conforms | dct:conformsTo (Distribution, Dataset) |
| 26 | O | Status | skos:Concept | <http://www.w3.org/TR/vocab-adms/#status> | An indication of the maturity of a Distribution or the type of change of a Catalogue Record. |  |
| 27 | O | Provenance Statement | dct:ProvenanceStatement | <http://dublincore.org/documents/dcmi-terms/#terms-ProvenanceStatement> | 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:provenance  (Dataset) |

# Properties per Class

The following tables compile all properties used in napDCAT-AP per class. The numbering corresponds to the above-introduced class numbers, e.g. “no. 1.3” points to class no. 1 and its property no. 3. The column “Obligation” indicates the following obligation levels: M=Mandatory, R=Recommended, O=Optional.

The following definitions follow mostly the DCAT-AP 2.0.0 specification. A couple additional properties have been added in napDCAT-AP, reflecting Metadata elements from the CMC, which are not covered by DCAT-AP or other vocabularies. Also, for some properties taken over from DCAT-AP 2.0.0, the obligation levels have been raised to reflect obligations from the CMC. In certain cases, the “Usage Notes” have been adopted to the NAP domain. Such changes are summarised later in section 8.

In cases there is a mapping possible between a property and a metadata element from the CMC, a note is added (e.g. “Corresponds to CMC element 2.2.1.1 Metadata Date…”).

All changes and text additions, comparing to DCAT-AP 2.0.0, are marked in the table below with a red font.

## Class “Catalogue”

| **No.** | **Obligation** | **Property Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Card.** |
| --- | --- | --- | --- | --- | --- | --- |
| 2.1 | M | dataset | dcat:dataset | dcat:Dataset | This property links the NAP with a publication that is part of the NAP.  This is a direct link from a NAP to a dataset. To also link the NAP to a Metadata record of a dataset, it is recommended always also to use the property “record” (see below). | 1..n |
| 2.2 | M | description | dct:description | rdfs:Literal | This property contains a free-text account of the NAP. This property can be repeated for parallel language versions of the description. | 1..n |
| * + 1. 2.3 | * + 1. M | publisher | dct:publisher | foaf:Agent | This property refers to an entity (organisation) responsible for making the NAP available. | 1..1 |
| * + 1. 2.4 | * + 1. M | title | dct:title | rdfs:Literal | This property contains a name given to the NAP. This property can be repeated for parallel language versions of the name. | 1..n |
| * + 1. 2.5 | * + 1. R | homepage | foaf:homepage | foaf:Document | This property refers to a web page that acts as the main page for the NAP. | 0..1 |
| 2.6 | R | language | dct:language | dct:LinguisticSystem | This property refers to a language used in the textual metadata describing titles, descriptions, etc. of the Datasets in the NAP. This property can be repeated if the metadata is provided in multiple languages. | 0..n |
| 2.7 | R | licence | dct:license | dct:LicenseDocument | This property refers to the licence under which the NAP can be used or reused. | 0..1 |
| 2.8 | R | release date | dct:issued | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the date of formal issuance (e.g., publication) of the NAP. | 0..1 |
| 2.9 | R | spatial/ geographic | dct:spatial | dct:Location | This property refers to a geographical area covered by the NAP, which is usually a country. | 0..n |
| 2.10 | R | themes | dcat:themeTaxonomy | skos:ConceptScheme | This property refers to a knowledge organization system used to classify the NAP’s Datasets.  A controlled vocabulary by the EU Publications Office must to be applied according to DCAT-AP. The value for this should be set to rdf:resource=" <http://publications.europa.eu/resource/authority/data-theme/TRAN>". | 0..n |
| 2.11 | R | update/ modification date | dct:modified | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the most recent date on which the NAP was modified. | 0..1 |
| 2.12 | O | has part | dct:hasPart | dcat:Catalog | This property refers to a related Catalogue that is part of the described NAP.  This property could be used to link the NAP to another data portal, by e.g. harvesting metadata from this other portal into the NAP. | 0..n |
| 2.13 | O | is part of | dct:isPartOf | dcat:Catalog | This property refers to a related Catalogue in which the described NAP is physically or logically included.  This property could be used to link the NAP to another data portal, by e.g. harvesting metadata from the NAP into this other portal. | 0..1 |
| 2.14 | M | record | dcat:record | dcat:CatalogRecord | This property refers to a metadata record that is part of the NAP.  It is assumed that metadata records are essential in NAPs, so the obligation is raised to “mandatory”. | 1..n |
| 2.15 | O | rights | dct:rights | dct:RightsStatement | This property refers to a statement that specifies rights associated with the NAP. | 0..1 |
| 2.16 | O | service | dcat:service | dcat:DataService | This property refers to a site or end-point that is listed in the NAP.  It is recommended not to use this property in the NAP domain. An URL for the NAP can be declared via the property “homepage”. | 0..n |
| 2.17 | O | catalogue | dcat:catalog | dcat:Catalog | This property refers to a catalogue whose contents are of interest in the context of this NAP.  It is recommended not to use this property in the NAP domain. Relationships with other data portals can be declared via “has part” and “is part”. | 0..n |

## Class “Catalogue Record”

| **No.** | **Obligation** | **Property Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Card.** |
| --- | --- | --- | --- | --- | --- | --- |
| 6.1 | M | primary topic | foaf:primaryTopic | dcat:Dataset | This property links the metadata record to the publication described in the record.  . | 1..1 |
| 6.2 | M | update/ modification date | dct:modified | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the most recent date on which the metadata record was created or modified. It will be generated by the NAP system.  Corresponds to CMC element 2.2.1.1 Metadata Date. | 1..1 |
| 6.3 | M | metadata creator | dct:creator | foaf.Agent | This property refers to an entity (organisation) responsible for the creation and maintenance of the metadata record.  Corresponds to CMC element 2.2.1.3 Contact Point | 1..1 |
| 6.4 | M | contact point | dcat:contactpoint | vcard:Kind | This property refers to contact data of an entity (organisation and person) responsible for the creation and maintenance of the metadata record.  For privacy reasons only non-person data fields (e.g. organisation name, organisation address etc.) might be displayed in the user interface.  Only “Name” and “E-Mail” from the vCard ontology are mandatory. The “name” should be mapped from “metadata creator” (see above).  Corresponds to CMC element 2.2.1.3 Contact Point | 1..1 |
| 6.5 | R | application profile | dct:conformsTo | rdfs:Resource | This property refers to an Application Profile that the publication’s metadata conforms to.  When following this presented work, the value will be an URI of “napDCAT-AP version x.x”. | 0..1 |
| 6.6 | R | change type | adms:status | skos:Concept | This property refers to the type of the latest revision of a Dataset's entry in the Catalogue.  Potential types according to skos:Concept are “Completed”, “Deprecated”, “UnderDevelopment” and “Withdrawn”. | 0..1 |
| 6.7 | R | listing date | dct:issued | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the date on which the description of the publication was included in the NAP. | 0..1 |
| 6.8 | O | description | dct:description | rdfs:Literal | This property contains a free-text account of the record. This property can be repeated for parallel language versions of the description.  Note that this is NOT the description about the publication but only about the metadata record. This property could be used if the description varies between the publication and the metadata record. | 0..n |
| 6.9 | M | language | dct:language | dct:LinguisticSystem | This property refers to a language used in the textual metadata describing titles, descriptions, etc. of the Dataset. This property can be repeated if the metadata is provided in multiple languages.  A controlled vocabulary is to be used, see section 6.2.  The value should correspond by default to the language of the county of the NAP. If a NAP has multilingual user interfaces (for example, in the original language and additionally in English), and also allows entering the Metadata in multiple languages, the value will be set according to the current language of the user interface. It will be generated by the NAP system.  Corresponds to CMC element 2.2.1.2 Metadata Language. | 1..n |
| 6.10 | O | source metadata | dct:source | dcat:CatalogRecord | This property refers to the original metadata that was used in creating metadata for the Dataset | 0..1 |
| 6.11 | O | title | dct:title | rdfs:Literal | This property contains a name given to the Catalogue Record. This property can be repeated for parallel language versions of the name.  Note that this is NOT the title of the publication but only of the metadata record. This property could be used if the title varies between the publication and the metadata record. | 0..n |

## Class “Dataset”

| **No.** | **Obligation** | **Property Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Card.** |
| --- | --- | --- | --- | --- | --- | --- |
| 3.1 | M | description | dct:description | rdfs:Literal | This property contains a free-text account of the Dataset. This property can be repeated for parallel language versions of the description.  The author is encouraged to write a meaningful description. This element is only for a brief overview, because free text fields are unsuitable for searches, due to spelling mistakes, different wordings and other aspects. The categorisation of the data sets is done within other elements.  Corresponds to CMC element 2.2.2.2 Description of Dataset. | 1..n |
| 3.2 | M | title | dct:title | rdfs:Literal | This property contains a name given to the Dataset. This property can be repeated for parallel language versions of the name.  Corresponds to CMC element 2.2.2.1 Name of Dataset. | 1..n |
| 3.3 | M | contact point | dcat:contactPoint | vcard:Kind | This property contains contact information about an entity (organisation and/or person) that publishes the data sets. This entity is responsible for the given information, can receive comments about the Dataset, and concludes a contract if applicable.  This property is used in addition to the property ““publisher” (see below), to add contact details to the publisher’s name,  For privacy reasons only non-person data fields (e.g. organisation name, organisation address etc.) might be displayed in the user interface.  Only “Name” and “E-Mail” from the vCard ontology are mandatory. The “Name” should be mapped from “publisher” (see below).  Corresponds to CMC element 2.2.6.1 Publisher | 1..1 |
| 3.4 | M | dataset distribution | dcat:distribution | dcat:Distribution | This property links the Dataset to an available Distribution. | 1..n |
| 3.5 | M | transportation mode | napdcatap:transportationMode | rdfs:Resource | This property refers to the transportation mode covered by a dataset.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.5.1 Transportation Mode Covered | 1..n |
| 3.6 | M | quality description | napdcatap:qualityDescription | rdfs:Resource | This property describes quality criteria of a data set and (if applicable) methods and results of a quality assessment. Applicable quality criteria, quality requirements as well as assessment methods are defined precisely by the so-called “Quality Packages” , elaborated by EU EIP sub-activity 4.1 (“Determining Quality of European ITS Services”) for individual data and service types, according to the EU Delegated Regulations.  This information shall assist data consumers in determining the value of data for their own services. Furthermore, it can be helpful for the validation process by a national body, where necessary.  It is proposed to provide the quality assessment information by explicitly referencing to and/or re-using the definitions from the mentioned Quality Packages, where possible. The information can be provided by free text and/or an URL to further quality information.  If there is absolutely no quality information, at least a note “quality information is unknown” is required.  Corresponds to CMC element 2.2.9.2 Quality description | 1..n |
| 3.7 | R | keyword/ tag | dcat:keyword | rdfs:Literal | This property contains a keyword or tag describing the Dataset.  For the NAP domain, it is not recommended to use keywords, as they might be ambiguous and make data search difficult. Instead, the property “theme/ category” (see below) is recommended, with controlled vocabularies. | 0..n |
| 3.8 | M | publisher | dct:publisher | foaf:Agent | This property refers to an entity (organisation) that publishes the data sets. He or she is responsible for the given information, can receive comments about the Dataset, and concludes a contract if applicable.  Corresponds to CMC element 2.2.6.1 Publisher | 1..1 |
| 3.9 | M | spatial/ geographical coverage | dct:spatial | dct:Location | This property refers to a geographic region that is covered by the Dataset. | 1..n |
| 3.10 | M | network coverage | napdcatap:networkCoverage | rdfs:Resource | This property describes the part of the transport network (functional road classes or other forms of link-based transport infrastructure) that is covered by a data set.  A controlled vocabulary is to be used see section 6.2.  Corresponds to CMC element 2.2.4.2 Network Coverage | 1..n |
| 3.11 | R | temporal coverage | dct:temporal | dct:PeriodOfTime | This property refers to a temporal period that the Dataset covers. | 0..n |
| 3.12 | M | theme/ category | dcat:theme, subproperty of dct:subject | skos:Concept | This property refers to a category of the Dataset. A category is important for data seekers who are interested for a particular type of data. A Dataset may be associated with multiple themes.  Following an usage note from GeoDCAT-AP (see section II.8), key words from controlled vocabularies should be expressed with dcat:theme.  The CMC has introduced a dataset category description in two hierarchy levels::  • “Dataset type category”: mandatory; only one selection possible; describes the classification of the dataset content on an aggregated level.  • “Dataset detailed description”: optional; multiple-selections possible; Describes the classification of the data set content on a detailed level. It is used to concretise the “Dataset type category”.  This means the data provider would select one generic option of a “Dataset type category” first, and then optionally concretise this with one or more options of “Dataset detailed description”.  These category descriptions are used as a controlled vocabulary, see section 6.2.  In addition, another controlled vocabulary by the EU Publications Office must to be applied according to DCAT-AP. The value for this should be set to rdf:resource=" <http://publications.europa.eu/resource/authority/data-theme/TRAN>" for any metadata record in NAPs.  Corresponds to CMC elements 2.2.2.4 Dataset Type Category and 2.2.2.5 Data Set Detailed Type | 1..n |
| 3.13 | O | access rights | dct:accessRights | dct:RightsStatement | This property refers to the condition of use: whether a free and unrestricted use is possible, a contract has to be concluded or a license has to be agreed on to use a dataset. This should allow potential data consumers to check and prove terms and conditions before getting in touch with the publisher.  A controlled vocabulary is to be used, see section 6.2.  A corresponding property “rights” is mandatory under class “Distribution”. It could be optionally copied for this property..  Corresponds to CMC element 2.2.7.1 Contract or Licence | 0..1 |
| 3.14 | M | creator | dct:creator | foaf:Agent | This property refers to the entity that owns the data set and is responsible for content and quality of the data set. In case that the publisher is also the data owner the value will be copied from the publisher value.  Corresponds to CMC element 2.2.6.2 Data Owner. | 1..1 |
| 3.15 | O | conforms to | dct:conformsTo | dct:Standard | This property refers to an implementing rule or other specification.  Do not use for information about data formats etc. This should be noted under the class “Distribution” (properties “conforms to” and “media type”. | 0..n |
| 3.16 | O | documentation | foaf:page | foaf:Document | This property refers to a page or document about this Dataset. | 0..n |
| 3.17 | M | frequency | dct:accrualPeriodicity | dct:Frequency | This property refers to the update rate of the data set. If there is a specific time interval or data only provided on occurrence precise information should be given.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.9.1 Update Frequency. | 1..1 |
| 3.18 | O | has version | dct:hasVersion | dcat:Dataset | This property refers to a related Dataset that is a version, edition, or adaptation of the described Dataset. | 0..n |
| 3.19 | O | identifier | dct:identifier | rdfs:Literal | This property contains the main identifier for the Dataset, e.g. the URI or other unique identifier in the context of the Catalogue.  It may be an unique ID for a NAP publication. | 0..n |
| 3.20 | O | is referenced by | dct:isReferencedBy | rdfs:Resource | This property provides a link to a description of a relationship with another resource | 0..n |
| 3.21 | O | is version of | dct:isVersionOf | dcat:Dataset | This property refers to a related Dataset of which the described Dataset is a version, edition, or adaptation. | 0..n |
| 3.22 | O | landing page | dcat:landingPage | foaf:Document | This property refers to a web page that provides access to the Dataset, its Distributions and/or additional information. It is intended to point to a landing page at the original data provider, not to a page on a site of a third party, such as an aggregator. | 0..n |
| 3.23 | M | language | dct:language | dct:LinguisticSystem | This property refers to a language of the Dataset. This property can be repeated if there are multiple languages in the Dataset.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.2.7 Dataset Language. | 1..n |
| 3.24 | O | other identifier | adms:identifier | adms:Identifier | This property refers to a secondary identifier of the Dataset, such as MAST/ADS[[10]](#footnote-10), DataCite[[11]](#footnote-11), DOI[[12]](#footnote-12), EZID[[13]](#footnote-13) or W3ID[[14]](#footnote-14). | 0..n |
| 3.25 | O | provenance | dct:provenance | dct:ProvenanceStatement | This property contains a statement about the lineage of a Dataset. | 0..n |
| 3.26 | O | qualified attribution | prov:qualifiedAttribution | prov:Attribution | This property refers to a liink to an Agent having some form of responsibility for the resource | 0..n |
| 3.27 | O | qualified relation | dcat:qualifiedRelation | dcat:Relationship | This property is about a related resource, such as a bibliographic publication, that references, cites, or otherwise points to the dataset. | 0..n |
| 3.28 | O | related resource | dct:relation | rdfs:Resource | This property refers to a related resource.  It may be a link between two individual NAP publications, e.g. one publication with static parking data, and one with dynamic parking data. both covering the same parking facilities. | 0..n |
| 3.29 | O | release date | dct:issued | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the date of formal issuance of the Dataset. | 0..1 |
| 3.30 | O | sample | adms:sample | dcat:Distribution | This property refers to a sample distribution of the dataset | 0..n |
| 3.31 | O | source | dct:source | dcat:Dataset | This property refers to a related Dataset from which the described Dataset is derived. | 0..n |
| 3.32 | O | spatial resolution | dcat:spatialResolutionInMeters | xsd:decimal | This property refers to the minimum spatial separation resolvable in a dataset, measured in meters. | 0..n |
| 3.33 | O | temporal resolution | dcat:temporalResolution | xsd:duration | This property refers to the minimum time period resolvable in the dataset. | 0..n |
| 3.34 | O | type | dct:type | skos:Concept | This property classifies the resource of the publication, depending on if it is a conventional “data set” or a “service” (referring to the ability of NAPs to allow discovery of services). This also allows distinguishing what the publication is aimed for in the context of EU Regulation 2017/1926. As an example for public transport, a “service” may enable Open Journey Planners, while a “data set” would enable a conventional routing service.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.2.3 Resource Type. | 0..1 |
| 3.35 | O | update/ modification date | dct:modified | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the most recent date on which the Dataset was changed or modified. | 0..1 |
| 3.36 | O | version | owl:versionInfo | rdfs:Literal | This property contains a version number or other version designation of the Dataset. | 0..1 |
| 3.37 | O | version notes | adms:versionNotes | rdfs:Literal | This property contains a description of the differences between this version and a previous version of the Dataset. This property can be repeated for parallel language versions of the version notes. | 0..n |
| 3.38 | O | was generated by | prov:wasGeneratedBy | prov:Activity | This property refers to an activity that generated, or provides the business context for, the creation of the dataset. | 0..n |
| 3.39 | R | service type category | napdcatap:serviceTypeCategory | rdfs:Resource | This property refers to the classification of a service, in accordance to possible services listed in EC Delegated Regulation 2017/1926 (Priority Action A / Multimodal Travel Information Services). In particular, this property will describe, if a Dataset is intended to explicitly support specific services listed in EC Regulation 2017/1926. Examples for such services are “location search”, which is based on a data set describing address identifiers, or “trip plan computation”, which is based on a data set describing the road network.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.2.6 Service Type Category | 0..n |
| 3.40 | * + 1. O | network coverage description | napdcatap:networkCoverageDescription | rdfs:Literal | This property describesdetails of transport network in addition to the property “network coverage”. This is necessary due to different meanings and understanding of different terms in each country. This element is optional and free text, so each country can describe the parts of the road network covered by the data set.  Corresponds to CMC element 2.2.4.2 Network Coverage Description | 0..1 |
| 3.41 | R | georeferencing method | napdcatap:geoReferencingMethod | rdfs:Resource | This property refers to the the georeferencing method which is applied within the payload.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.2.8 Georeferencing Method | 0..n |
| 3.42 | O | national body assessment status | napdcatap:nationalBodyAssessmentstatus | rdfs:Resource | This property describes the assessment status of the National Body about the dataset.  EU Delegated Regulations require Member States to set up procedures to assess the compliance of the Delegated Regulations, e.g. regarding the provisioning of data via a NAP. These assessment processes are handled by National Bodies and installed individually in each Member State.  This property can be used to indicate the history and status of such an assessment. It may include the date and the result of the recent assessment procedure. It is optional and only needed for the assessment of compliance process. assist data consumers in determining the value of data for their own services. Furthermore, it can be helpful for the validation process by a national body, where necessary.  The information can be provided by free text and/or an URL to further information.  Corresponds to CMC element 2.2.9.3 National Body Assessment Status | 0..1 |

## Class “Distribution”

| **No.** | **Obligation** | **Property Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Card.** |
| --- | --- | --- | --- | --- | --- | --- |
| 7.1 | M | access URL | dcat:accessURL | rdfs:Resource | This property contains a URL that gives access to the current data set or a connection link to a service.  The type of this ULR depends on the type of the publication:  • If the data is accessible for everyone, the URL may be link directly to the data access.  • If some agreements between the data provider and the data user need to be established first, the access URL becomes no public metadata but is linked to a subscription that enables the access to the publication. Alternatively, this URL may link to a general web site of the data provider, which explains further steps how to establish the data access.  Corresponds to CMC element 2.2.8.8 Access URL | 1..1 |
| 7.2 | R | 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 |
| 7.3 | R | description | dct:description | rdfs:Literal | This property contains a free-text account of the Distribution. This property can be repeated for parallel language versions of the description. | 0..n |
| * + 1. 7.4 | * + 1. M | format | dct:format | dct:MediaType | This property refers to the formatting of a dataset, described on four layers. This way, a data user will be able to learn about how to read and interpret a dataset, when he discovers it on the NAP.  • Encoding, describing a character set standard. Encoding is usually controlled by syntax standards today, see below.  • Syntax, as the base standard that specifies syntactically correct documents. On this level, only base elements of building documents properly are specified and can be proved by syntax checks.  • Grammar, describing the standard on top of the elementary syntax that describe data structures in the dataset.  • Data Model, desctibing concrete data models that use the specification elements to specify specific data models. The NAP should keep references of the concrete data model used for a dataset.  Values on the Syntax and Data Model are mandatory in this property, Encoding and Grammar are optional.  Controlled vocabularies for these layers are to be used, see section 6.2.  Corresponds to CMC elements 2.2.8.1 Data Format- Encoding, 2.2.8.2 Data Format- Syntax, 2.2.8.3 Data Format- Grammar, and 2.2.8.4 Data Format- Data Model. | 1..n |
| * + 1. 7.5 | M | rights | dct:rights | dct:RightsStatement | This property refers to the condition of use: whether a free and unrestricted use is possible, a contract has to be concluded or a license has to be agreed on to use a dataset. This should allow potential data consumers to check and prove terms and conditions before getting in touch with the publisher.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.7.1 Contract or Licence | 1..1 |
| * + 1. 7.6 | R | condition for use | napdcatap:contitionForUse | rdfs:Literal | This property gives detailed, free-text information about the condition of use, as a free text and in addition to the property “rights“ (see above).If common terms are used, they may be also referenced here (e.g. open data licences such as CC 0, CC BY 4.0, etc.).  If a concrete (sample) contract or terms of are to be provided, e.g. as an URL to a PDF, such documents may be made accessible via the property “licence” (see below).  Corresponds to CMC element 2.2.7.2 Condition for Use | 0..1 |
| * + 1. 7.7 | * + 1. R | licence | dct:license | dct:LicenseDocument | This property refers to the licence under which the Distribution is made available.  It refers to a concrete (sample) contract or terms, in addition to the property “condition for use”  Corresponds to CMC element 2.2.7.2 Condition for Use | 0..1 |
| * + 1. 7.8 | * + 1. O | access service | dcat:accessService | dcat:DataService | This property refers to a data service that gives access to the distribution of the dataset | 0..n |
| 7.9 | * + 1. O | byte size | dcat:byteSize | rdfs:Literal typed as xsd:decimal | This property contains the size of a Distribution in bytes. | 0..1 |
| * + 1. 7.10 | * + 1. O | checksum | spdx:checksum | spdx:Checksum | This property provides a mechanism that can be used to verify that the contents of a distribution have not changed | 0..1 |
| * + 1. 7.11 | * + 1. O | 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 |
| * + 1. 7.12 | * + 1. O | documentation | foaf:page | foaf:Document | This property refers to a page or document about this Distribution. | 0..n |
| * + 1. 7.13 | * + 1. O | download URL | dcat:downloadURL | rdfs:Resource | This property contains a URL that is a direct link to a downloadable file in a given format. | 1..n |
| * + 1. 7.14 | * + 1. O | has policy | odrl:hasPolicy | odrl:Policy | This property refers to the policy expressing the rights associated with the distribution if using the ODRL vocabulary | 0..1 |
| * + 1. 7.15 | * + 1. O | language | dct:language | dct:LinguisticSystem | This property refers to a language used in the Distribution. This property can be repeated if the metadata is provided in multiple languages. | 0..n |
| * + 1. 7.16 | * + 1. O | linked schemas | dct:conformsTo | dct:Standard | This property refers to an established schema to which the described Distribution conforms. | 0..n |
| * + 1. 7.17 | * + 1. O | media type | dcat:mediaType, subproperty of dct:format | dct:MediaType | This property refers to the media type of the Distribution as defined in the official register of media types managed by IANA. | 0..1 |
| * + 1. 7.18 | * + 1. O | packaging format | dcat:packageFormat | dct:MediaType | This property refers to the format of the file in which one or more data files are grouped together, e.g. to enable a set of related files to be downloaded together. | 0..n |
| * + 1. 7.19 | * + 1. O | release date | dct:issued | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the date of formal issuance (e.g., publication) of the Distribution. | 0..1 |
| * + 1. 7.20 | * + 1. O | spatial resolution | dcat:spatialResolutionInMeters | xsd:decimal | This property refers to the minimum spatial separation resolvable in a dataset distribution, measured in meters. | 0..n |
| * + 1. 7.21 | * + 1. O | status | adms:status | skos:Concept | This property refers to the maturity of the Distribution. It MUST take one of the values Completed, Deprecated, Under Development, Withdrrawn. | 0..1 |
| * + 1. 7.22 | * + 1. O | temporal resolution | dcat:temporalResolution | xsd:duration | This property refers to the minimum time period resolvable in the dataset distribution. | 0..n |
| * + 1. 7.23 | * + 1. O | title | dct:title | rdfs:Literal | This property contains a name given to the Distribution. This property can be repeated for parallel language versions of the description. | 0..n |
| * + 1. 7.24 | * + 1. O | update/ modification date | dct:modified | rdfs:Literal typed as xsd:date or xsd:dateTime | This property contains the most recent date on which the Distribution was changed or modified. | 0..1 |
| * + 1. 7.25 | * + 1. O | data format description | napdcatap:dataFormatDescription | rdfs:Literal | This property can optionally be used to provide additional, free-text information on the data format, in addition to the property “format”.  Corresponds to CMC element 2.2.8.5 Data Format Description. | 0..1 |
| * + 1. 7.26 | * + 1. M | application layer protocol | napdcatap:applicationLayerProtocol | rdfs:Resource | This property refers to the IT protocol of the data interface that will be used to transfer data.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.8.6 Access Interface – Application Layer Protocol | 1..1 |
| * + 1. 7.27 | * + 1. M | communication method | napdcatap:communicationMethod | rdfs:Resource | This property refers to the transmitting procedure from data provider to data receiver. This element gives the service provider the opportunity to check the common data procedure on compatibility.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.8.7 Communication Method | 1..n |

## Class “Location”

| **No.** | **Obligation** | **Property Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Card.** |
| --- | --- | --- | --- | --- | --- | --- |
| 8.1 | M | geographic identifier | locn:Address | rdfs:Resource | This property describes the geographic area covered by a data set. Data sets can be valid for more than one area,.  A controlled vocabulary is to be used, see section 6.2.  Corresponds to CMC element 2.2.4.1 Area Covered by Publication. | 1..n |
| 8.2 | R | bounding box | dcat:bbox | rdfs:Literal | This property refers to he geographic bounding box of a resource. | 0..1 |
| * + 1. 8.3 | * + 1. R | centroid | dcat:centoid | rdfs:Literal | This property refers to the geographic center (centroid) of a resource. | 0..1 |
| * + 1. 8.4 | * + 1. O | geometry | locn:geometry | rdfs:Literal | This property associates any resource with the corresponding geometry | 0..1 |

## Class “Period of Time”

| **No.** | **Obligation** | **Property Name** | **URI** | **Reference / Type / Range** | **Usage Note** | **Card.** |
| --- | --- | --- | --- | --- | --- | --- |
| 6.1 | R | start date | dcat:startDate | rdfs:Literal typed as xsd:date or xsd:dateTime | This property describes the starting time from which the data delivery is applicable. The applicability is defined depending on the type of the publication:  • In cases of real-time/dynamic data, this property describes the first time when the data feed is (or will be) delivered technically via the NAP. The time reference of the delivered information (e.g. duration of road works) is then part of the feed.  • In cases of static data, it is assumed that the data delivery is not time-restricted. So, this propertywill directly describe the time reference of the delivered information (e.g. validity time of a public transport time table.)  Corresponds to CMC element 2.2.3.1 Valid From | 0..1 |
| 6.2 | R | end date | dcat:endDate | rdfs:Literal typed as xsd:date or xsd:dateTime | This property describes the ending time from which the data delivery is applicable. How this applicability is defined, see above at “start date.”  Corresponds to CMC element 2.2.3.2 Valid To | 0..1 |
| 6.3 | O | beggining | time:hasBeginning | time:Instant | This property contains the beginning of a period or interval. | 0..1 |
| * + 1. 6.4 | * + 1. O | end | time:hasEnd | time:Instant | This property contains the end of a period or interval | 0..1 |

# Controlled Vocabularies

## Requirements for controlled vocabularies

DCT\_AP 2.0.0 introduces is a list of requirements that were identified for the controlled vocabularies.According to this, controlled vocabularies SHOULD:

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

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

It is noted, that some new controlled vocabularies have been introduced specifically for napDCAT-AP. These new controlled vocabularies do not meet all of the requirements above yet, as some further works are pending, such as maintainance structures.

It is further noted, that the concept of controlled vocabularies is seen as beneficial for the context of NAPS: In the Coordinated Metadata Catalogue, some Metadata lements were assigned with predefined elements, being described in one document with all Metadata descriptions.

A major advantage of controlled vocabularies is that they can be maintained and updated independently of the Metadata. This may be a benefit, if some of the vocabularies need to be adopted due to the technological progress. E.g., data formats could be added under the property “format” of the class “Distribution”, when needed.

## Controlled vocabularies to be used

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

Again, the basis for this table is the DCAT-AP 2.0.0 specification. However, several new NAP-related, controlled vocabularies are added. These additions are marked in red font.

| **Property Name** | **Used for Class** | **Vocabulary Name** | **Vocabulary URI** | **Usage Note** |
| --- | --- | --- | --- | --- |
| media type | Distribution | IANA Media Types[[15]](#footnote-15) | <http://www.iana.org/assignments/media-types/media-types.xhtml> |  |
| theme/ category | Dataset | Dataset Theme Vocabulary | http://publications.europa.eu/resource/authority/data-theme | The values to be used for this property are the URIs of the concepts in the vocabulary. |
| themes | Catalogue | Dataset Theme Vocabulary | http://publications.europa.eu/resource/dataset/data-theme | The value to be used for this property is the URI of the vocabulary itself, i.e. the concept scheme, not the URIs of the concepts in the vocabulary. |
| frequency | Dataset | EU Vocabularies Frequency Named Authority List[[16]](#footnote-16) | <http://publications.europa.eu/resource/authority/frequency> |  |
| format | Distribution | EU Vocabularies File Type Named Authority List[[17]](#footnote-17) | <http://publications.europa.eu/resource/authority/file-type> |  |
| language | Catalogue, Dataset, CatalogueRecord | EU Vocabularies Languages Named Authority List[[18]](#footnote-18) | <http://publications.europa.eu/resource/authority/language> |  |
| publisher | Catalogue, Dataset | EU Vocabularies Corporate bodies Named Authority List[[19]](#footnote-19) | <http://publications.europa.eu/resource/authority/corporate-body> | The Corporate bodies NAL must be used for European institutions and a small set of international organisations. In case of other types of organisations, national, regional or local vocabularies should be used. |
| spatial/ geographical coverage | Catalogue, Dataset | EU Vocabularies Continents Named Authority List[[20]](#footnote-20), EU Vocabularies Countries Named Authority List[[21]](#footnote-21), EU Vocabularies Places Named Authority List[[22]](#footnote-22), Geonames | <http://publications.europa.eu/resource/authority/continent/>, <http://publications.europa.eu/resource/authority/country>, <http://publications.europa.eu/resource/authority/place/>,  <http://sws.geonames.org/> | The EU Vocabularies Name Authority Lists must be used for continents, countries and places that are in those lists; if a particular location is not in one of the mentioned Named Authority Lists, Geonames URIsmust be used. |
| status | Distribution | ADMS status vocabulary | <http://purl.org/adms/status/> | The list of terms in the ADMS status vocabulary is included in the ADMS specification[[23]](#footnote-23) |
| type | Agent | ADMS publisher type vocabulary | <http://purl.org/adms/publishertype/> | The list of terms in the ADMS publisher type vocabulary is included in the ADMS specification |
| type | Licence Document | ADMS licence type vocabulary | <http://purl.org/adms/licencetype/> | The list of terms in the ADMS licence type vocabulary is included in the ADMS specification |
| theme/ category | Dataset | Categories of dataset types | <https://eueip.github.io/napDCAT-AP/vocabularies/datasetcategories_varA> | Pre-defined options, as defined in CMC |
| access rights | Dataset | Categories of access rights | <https://eueip.github.io/napDCAT-AP/vocabularies/accessrights> | Pre-defined options, as defined in CMC |
| frequency | Dataset | Categories of frequencies | <https://eueip.github.io/napDCAT-AP/vocabularies/frequencies> | Pre-defined options, as defined in CMC |
| service type category | Dataset | Categories of service types | <https://eueip.github.io/napDCAT-AP/vocabularies/servicetypes> | Pre-defined options, as defined in CMC |
| georeferencing method | Dataset | Categories of georeferencing methods | <https://eueip.github.io/napDCAT-AP/vocabularies/georeferencingmethods> | Pre-defined options, as defined in CMC |
| transportation mode | Dataset | Categories of transportation modes | <https://eueip.github.io/napDCAT-AP/vocabularies/transportationmodes> | Pre-defined options, as defined in CMC |
| network coverage | Dataset | Categories of functional road classes or other forms of link-based transport infrastructure | <https://eueip.github.io/napDCAT-AP/vocabularies/functionalroadclasses> | Pre-defined options, as defined in CMC |
| type | Dataset | Categories of resource types | <https://eueip.github.io/napDCAT-AP/vocabularies/resourcetypes> | Pre-defined options, as defined in CMC |
| rights | Distribution | Categories of access rights | <https://eueip.github.io/napDCAT-AP/vocabularies/accessrights> | Pre-defined options, as defined in CMC |
| format | Distribution | Character set standards (for the “Encoding” layer) | https://ddialliance.org/Specification/DDI-CV/CharacterSet\_1.0.html | Pre-defined options, as defined in CMC |
| format | Distribution | Categories of data syntax standards | <https://eueip.github.io/napDCAT-AP/vocabularies/datasyntaxstandards> | Pre-defined options, as defined in CMC |
| format | Distribution | Categories of data grammar standards | <https://eueip.github.io/napDCAT-AP/vocabularies/datagrammarstandards> | Pre-defined options, as defined in CMC |
| format | Distribution | Categories of data models | <https://eueip.github.io/napDCAT-AP/vocabularies/datamodels> | Pre-defined options, as defined in CMC |
| application layer protocol | Distribution | Categories of application layer protocols | <https://eueip.github.io/napDCAT-AP/vocabularies/applicationlayerprotocols> | Pre-defined options, as defined in CMC |
| communication method | Distribution | Categories of communication methods | <https://eueip.github.io/napDCAT-AP/vocabularies/communicationmethods> | Pre-defined options, as defined in CMC |
| geographic identifier | Location | NUTS classification (Nomenclature of territorial units for statistics) i | http://nuts.geovocab.org/ | The CMC recommends to use the NUTS classification, as a standard for territorial units by the European Union is recommended to provide a clear description of the area covered. The “NUTS Levels” define a possible selection of an area level :  NUTS 0: countries  NUTS 1: major socio-economic regions  NUTS 2: basic regions for the application of regional policies  NUTS 3: as small regions for specific diagnoses  NUTS level 0 is mandatory in napDCAT-AP, NUTS levels 1-3 are recommended. |

# Conformity Statement to DCAT-AP 2.0.0

…to be added…

# Changes to DCAT-AP 2.0.0

The following tables show the changes made for the napDCAT-AP extension, comparing to the original DCAT-AP 2.0.0 specification. The changes were necessary to consider the all metadata elements from the CMC, including their usage rules, within the napPDCAT-AP extension. This is the case when the existing classes and properties in DCAT-AP 2.0.0 are not sufficient.

| **Class** | **Property** | **Type of change** | **Property URI** | **Range** | **Note** | **Card** | **Obligation** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Catalogue | record | Obligation changed from “O” to “M” | dcat:record | dcat:CatalogRecord |  | 1..n | mandatory |
| Catalogue Record | metadata creator | Added property | dct:creator | Foaf:Agent | This property already exists for class “Dataset” and now is also used for class “CatalogueRecord | 1..1 | mandatory |
| Catalogue Record | contact point | Added property | dcat:contactPoint | vcard:Kind | This property already exists for class “Dataset” and now is also used for class “CatalogueRecord” | 1..1 | mandatory |
| Catalogue Record | language | Obligation changed from “O” to “M” | dct:language | dct:LinguisticSystem |  | 1..n | mandatory |
| Dataset | spatial/ geographical coverage | Obligation changed from “O” to “M” | dct:spatial | dct:Location |  | 1..n | mandatory |
| Dataset | contact point | Obligation changed from “R” to “M” | dcat:contactPoint | vcard:Kind |  | 1..1 | mandatory |
| Dataset | Dataset distribution | Obligation changed from “R” to “M” | dcat:distribution | dcat:Distribution |  | 1..n | mandatory |
| Dataset | publisher | Obligation changed from “R” to “M” | dct:publisher | foaf:Agent |  | 1..1 | mandatory |
| Dataset | creator | Obligation changed from “O” to “M” | dct:creator | foaf:Agent |  | 1..1 | mandatory |
| Dataset | service type category | Added property | napdcatap:serviceTypeCategory | rdfs:Resource | Controlled vocabulary provided | 0..n | recommended |
| Dataset | georeferencing method | Added property | napdcatap:geoReferencingMethod | rdfs:Resource | Controlled vocabulary provided | 0..n | recommended |
| Dataset | transportation mode | Added property | napdcatap:transportationMode | rdfs:Resource | Controlled vocabulary provided | 1..n | mandatory |
| Dataset | quality description | Added property | napdcatap:qualityDescription | rdfs:Resource |  | 1..n | mandatory |
| Dataset | network coverage | Added property | napdcatap:networkCoverage | rdfs:Resource | Controlled vocabulary provided | 1..n | mandatory |
| Dataset | network coverage description | Added property | napdcatap:networkCoverageDescription | rdfs:Literal |  | 0..1 | optional |
| Dataset | theme/ category | Added controlled vocabulary | dcat:theme | skos:Concept | Controlled vocabulary provided | 1..n | mandatory |
| Dataset | theme/ category | Obligation changed from “R” to “M” | dcat:theme | skos:Concept | Controlled vocabulary provided | 1..n | mandatory |
| Dataset | access rights | Added controlled vocabulary | dct:accessRights | dct:RightsStatement | Controlled vocabulary provided | 1..1 | mandatory |
| Dataset | frequency | Added controlled vocabulary | dct:accrualPeriodicity | dct:Frequency |  | 1..1 | mandatory |
| Dataset | frequency | Obligation changed from “O” to “M | dct:accrualPeriodicity | dct:Frequency |  | 1..1 | mandatory |
| Dataset | language | Obligation changed from “O” to “M | dct:language | dct:LinguisticSystem |  | 1..n | mandatory |
| Dataset | type | Added controlled vocabulary | dct:type | skos:Concept | Controlled vocabulary provided | 0..1 | optional |
| Dataset | national body assessment status | Added property | napdcatap:nationalBodyAssessmentstatus | rdfs:Resource |  | 0..1 | optional |
| Distribution | condition for use | Added property | napdcatap:contitionForUse | rdfs:Literal |  | 0..1 | recommended |
| Distribution | rights | Obligation changed from “O” to “M” | dct:rights | dct:RightsStatement | Controlled vocabulary provided | 1..1 | mandatory |
| Distribution | rights | Added controlled vocabulary | dct:rights | dct:RightsStatement | Controlled vocabulary provided | 1..1 | mandatory |
| Distribution | format | Obligation changed from “R” to “M | dct:format | dct:MediaType | Controlled vocabulary provided | 1..n | mandatory |
| Distribution | format | Added controlled vocabularies | dct:format | dct:MediaType | Controlled vocabulary provided | 1..n | mandatory |
| Distribution | data format description | Added property | napdcatap:dataFormatDescription | rdfs:Literal |  | 0..1 | optional |
| Distribution | application layer protocol | Added property | napdcatap: applicationLayerProtocol | rdfs:Resource | Controlled vocabulary provided | 1..1 | mandatory |
| Distribution | application layer protocol | Added controlled vocabulary | napdcatap: applicationLayerProtocol | rdfs:Resource | Controlled vocabulary provided | 1..1 | mandatory |
| Distribution | communication method | Added property | napdcatap:communicationMethod | rdfs:Resource | Controlled vocabulary provided | 1..n | mandatory |
| Distribution | communication method | Added controlled vocabulary | napdcatap:communicationMethod | rdfs:Resource | Controlled vocabulary provided | 1..n | mandatory |
| Location | geographic identifier | Added property | locn:Address | rdfs:Resource | Controlled vocabulary provided | 1..n | mandatory |

# Detailed usage Notes

## In general

NAP operators and NAP developers, who are considering DCAT-AP for their Metadata structures, are advised to use this napDCAT-AP extension, when defining their own Metadata syntax, semantics and model. This will result in these benefits:

* napDCAT-AP explicitly considers NAP-specific Metadata elements, which are not clearly defined in the original DCAT-AP specification or other DCAT-AP extensions.
* napDCAT-AP fosters interoperability between a NAP and other DCAT-AP-compatible data portals, in case e.g. a harvesting of Metadata is intended.
* napDCAT-AP will potentially ease a cross-border, multiple-NAP Metadata processing, when many NAPs follow this specification.

Of course, the presented specification is a first, non-validated version, which probably will go through many iterative revisions. However, it is assumed the majority of definitions will remain stable, as they rely on the established frameworks of DCAT-AP and the Coordinated Metadata Catalogue.

For NAP operators and NAP developers, who are familiar with the former Coordinated Metadata Catalogue (CMC, Version 2019), the richness of the class and property definitions, as introduced above, may be surprising. The CMC used to have 32 Metadata elements, where napDCAT-AP has many more.

This due to the fact that this work is based on the DCAT-AP 2.0.0 specification, and all elements from DCAT-AP 2.0.0 have been taken over for compatibility reasons. However, DCAT-AP 2.0.0 is targeted to any data portals, not only for the transport or ITS domain, so many elements from it bay be obsolete in the NAP context. Most of these additional elements are also classified as non-mandatory, so they can be omitted in a NAP Metadata registry. In cases of mandatory elements, which have not been defined in the CMC, a usage note is given in the tables below, indicating how this element is to be filled in a NAP context.

Overall, it is assumed that this work of napDCAT-AP should be promoted among the NAP community and should be deployed in practice. Any feedback from that practice will lead to future validation and improvements of napDCAT-AP.

## For Class/Property “xxx”

…to be added…

# Mapping table CMC to napDCAT-AP

A mapping table has been prepared to show how the Metadata elements from the original “Coordinated Metadata Catalogue” (Version 2019) compare to the classes and properties of this draft of “napDCAT-AP”, see the Annex.

# Summary, Recommendations and Future Steps

## Summary

…to be added…

## Recommendations

…to be added…

## Future Steps

…to be added…

1. European Commission (2010). Directive 2010/40/EU of the European Parliament and of the

   Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the

   field of road transport and for interfaces with other modes of transport. [↑](#footnote-ref-1)
2. https://www.its-platform.eu/highlights/harmonised-metadata-national-access-points [↑](#footnote-ref-2)
3. https://www.w3.org/TR/vocab-dcat-2/ [↑](#footnote-ref-3)
4. Karen Coyle, Dublin Core Metadata Initiative (DCMI): Introduction to Metadata Application Profiles, Webinar https://www.youtube.com/watch?v=hEOBRUcfApg [↑](#footnote-ref-4)
5. https://joinup.ec.europa.eu/solution/dcat-application-profile-data-portals-europe/about [↑](#footnote-ref-5)
6. DCAT-AP Version 2.0.0, Copyright © European Union, 2019 Original author: See Section 11 of DCAT-AP 2.0.0 (https://joinup.ec.europa.eu/solution/dcat-application-profile-data-portals-europe/release/200) [↑](#footnote-ref-6)
7. https://www.w3.org/TR/rdf-schema/ [↑](#footnote-ref-7)
8. https://github.com/EUEIP/napDCAT-AP [↑](#footnote-ref-8)
9. EuropeanCommission. Joinup. Core Location Vocabulary. <https://joinup.ec.europa.eu/solution/core-location-vocabulary> [↑](#footnote-ref-9)
10. Mikulski Archive for Space Telescopes (MAST). Referencing Data Sets in Astronomical Literature. <http://archive.stsci.edu/pub_dsn.html> [↑](#footnote-ref-10)
11. DataCite. <http://www.datacite.org/> [↑](#footnote-ref-11)
12. DOI. Digital Object Identifier. <http://www.doi.org/> [↑](#footnote-ref-12)
13. EZID. <http://n2t.net/ezid> [↑](#footnote-ref-13)
14. W3C Permanent Identifier Community Group. Permanent Identifiers for the Web. <https://w3id.org/> [↑](#footnote-ref-14)
15. Internet Assigned Numbers Authority (IANA). Media Types <http://www.iana.org/assignments/media-types/> [↑](#footnote-ref-15)
16. EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Frequency. [https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/frequency](http://publications.europa.eu/mdr/authority/frequency)  [↑](#footnote-ref-16)
17. EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. File type. [https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/file-type](https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/file-type%20)  [↑](#footnote-ref-17)
18. EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Language. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/language/> [↑](#footnote-ref-18)
19. EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Corporate body. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/corporate-body/> [↑](#footnote-ref-19)
20. EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Continent <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/continent> [↑](#footnote-ref-20)
21. EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Country. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/country> [↑](#footnote-ref-21)
22. EUROPA. Publications Office of the EU. EU Vocabularies. Controlled Vocabularies. Authority tables. Place. <https://publications.europa.eu/en/web/eu-vocabularies/at-dataset/-/resource/dataset/place> [↑](#footnote-ref-22)
23. European Commission. Joinup. Asset Description Metadata Schema (ADMS). <https://joinup.ec.europa.eu/solution/asset-description-metadata-schema-adms> [↑](#footnote-ref-23)