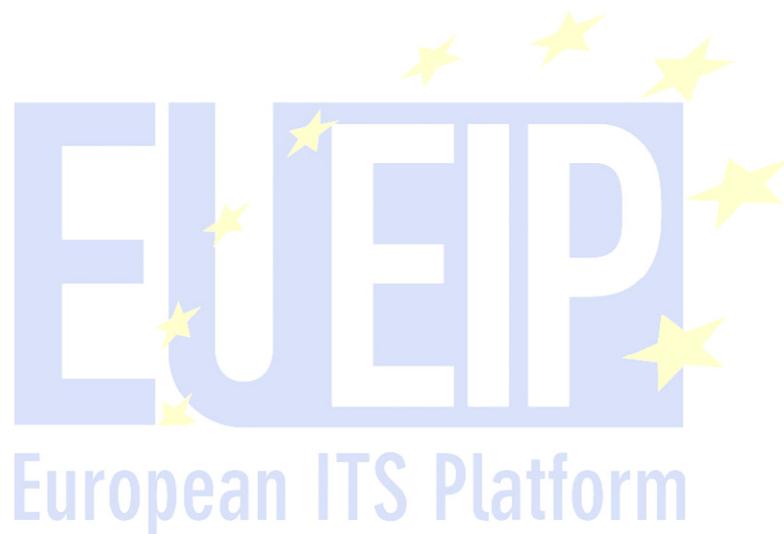


EU EIP SA46

Coordinated Metadata Catalogue

**Monitoring and Harmonisation of National Access
Points in Europe**



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Authors

Name	Organisation
Peter Lubrich	BASt (DE)
Jens Ansorge	BASt (DE)
Martin Böhm	AustriaTech (AT)
Louis Hendriks	RWS (NL)
Timo Hoffmann	BASt (DE)
Jonas Jaderberg	Trafikverket (SE)
Andreas Kochs	BMVI (DE)
Christian Lüpkes	Albrecht Consult (DE)
Lutz Rittershaus	BASt (DE)
Stefan Schwillinsky	AustriaTech (AT)
Benjamin Witsch	AustriaTech (AT)
Tiffany Vlemmings	NDW (NL)

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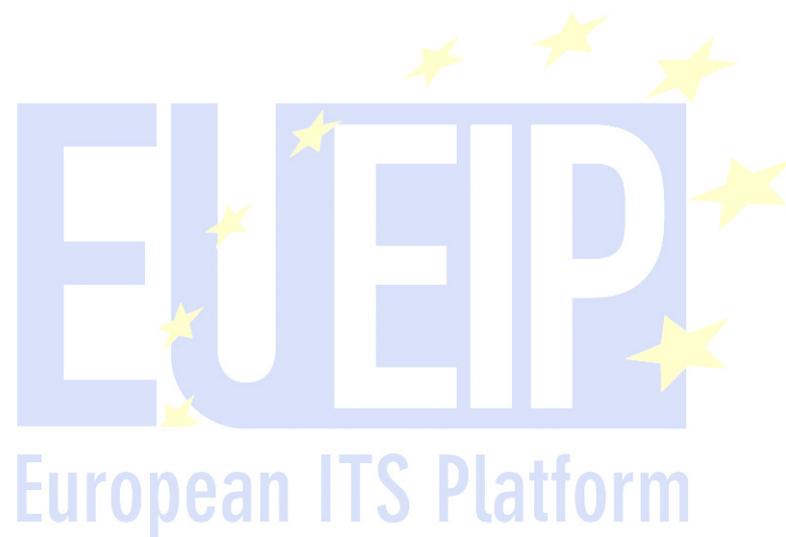
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TABLE OF CONTENTS

Document Information	2
TABLE OF CONTENTS	3
1. Introduction	6
1.1. Context	6
1.2. Purpose	6
1.3. Definitions	8
2. Minimum Metadata Elements - Description	10
2.1. Overview	10
2.2. Metadata elements	13
2.2.1. Category “Metadata information”	13
2.2.1.1. <i>ELEMENT “METADATA DATE”</i>	13
2.2.1.2. <i>ELEMENT “METADATA LANGUAGE”</i>	13
2.2.1.3. <i>ELEMENT “CONTACT POINT”</i>	14
2.2.2. Category “Content Information”	15
2.2.2.1. <i>ELEMENT “NAME OF DATASET”</i>	15
2.2.2.2. <i>ELEMENT “DESCRIPTION OF DATASET”</i>	15
2.2.2.3. <i>ELEMENT “RESOURCE TYPE”</i>	16
2.2.2.4. <i>ELEMENT “DATASET TYPE CATEGORY”</i>	16
2.2.2.5. <i>ELEMENT “DATASET DETAILED TYPE”</i>	17
2.2.2.6. <i>ELEMENT “SERVICE TYPE CATEGORY”</i>	18
2.2.2.7. <i>ELEMENT “DATASET LANGUAGE”</i>	18
2.2.2.8. <i>ELEMENT “GEOREFERENCING METHOD”</i>	19
2.2.3. Category “Temporal information”	19
2.2.3.1. <i>ELEMENT “VALID FROM”</i>	20
2.2.3.2. <i>ELEMENT “VALID To”</i>	20

2.2.4. Category “Geographical coverage”	21
2.2.4.1. ELEMENT “AREA COVERED BY PUBLICATION”	21
2.2.4.2. ELEMENT “NETWORK COVERAGE”	21
2.2.4.3. ELEMENT “NETWORK COVERAGE DESCRIPTION”	22
2.2.5. Category “Transportation System”	22
2.2.5.1. ELEMENT “TRANSPORTATION MODES COVERED”	22
2.2.6. Category “Responsibilities”	23
2.2.6.1. ELEMENT “PUBLISHER”	23
2.2.6.2. ELEMENT “DATA OWNER”	24
2.2.7. Category “Condition for use”	25
2.2.7.1. ELEMENT “CONTRACT OR LICENCE”	25
2.2.7.2. ELEMENT “CONDITION FOR USE”	25
2.2.8. Category “Access information”	26
2.2.8.1. ELEMENT “DATA FORMAT - ENCODING”	26
2.2.8.2. ELEMENT “DATA FORMAT - SYNTAX”	27
2.2.8.3. ELEMENT “DATA FORMAT - GRAMMAR”	27
2.2.8.4. ELEMENT “DATA FORMAT - DATA MODEL”	28
2.2.8.5. ELEMENT “DATA FORMAT DESCRIPTION”	29
2.2.8.6. ELEMENT “ACCESS INTERFACE – APPLICATION LAYER PROTOCOL”	29
2.2.8.7. ELEMENT “COMMUNICATION METHOD”	30
2.2.8.8. ELEMENT “ACCESS URL”	30
2.2.9. Category “Quality information”	31
2.2.9.1. ELEMENT “UPDATE FREQUENCY”	31
2.2.9.2. ELEMENT “QUALITY DESCRIPTION”	32
2.2.9.3. ELEMENT “NATIONAL BODY ASSESSMENT STATUS”	32
3. Mapping table to DCAT-AP and INSPIRE	34
4. Summary, Recommendations and Future Steps	36
4.1. Summary	36
4.2. Recommendations	36
4.3. Future Steps	38

ANNEX I – Options for Metadata elements "Dataset type category" and "Dataset detailed type"	40
ANNEX II – Mapping Table to DCAT and INSPIRE	41
ANNEX III – Change Log	42



1. Introduction

1.1. Context

A National Access Point (NAP) is an intermediary digital platform and is part of the four EU Delegated Regulations following Priority Actions a, b, c and e of the EU ITS Directive 2010/40/EU¹. 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 representatives from the Netherlands, Germany, Austria and Sweden started an approach to work on common Metadata definitions, namely attribute names and data field definitions, to be applied across individual NAPs in Europe. The goal is to support easy data exchange and to prevent data errors when exchanging data between databases.

This approach has several benefits for the potential user seeking for information via a NAP. For example: if an international user accesses NAPs of several EU Member States, there should be no difference in wording and their meaning between the metadata provided, even in different languages. Therefore it was found necessary to commonly define Metadata elements which we call a “Coordinated Metadata Catalogue”.

1.2. Purpose

According to EU Delegated Regulations 2017/1926, 885/2013, 886/2013 and 2015/962, each EU Member State has to implement a National Access Point (NAP) to make traffic and travel data discoverable for its country. In order to allow potential data users to successfully and cost-efficiently discover the relevant data, it is necessary to properly describe the content and structure of this data using appropriate Metadata.

There is a need 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.

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.

For reasons of data exchange, compatibility and interoperability the responsible partners of the Netherlands, Germany, Austria and Sweden started a working group to develop a common minimum metadata set which describes all data covered by the EU Directive and the respective Delegated Regulations, called the “Coordinated Metadata Catalogue”.

This “Coordinated Metadata Catalogue” describes the most important Metadata elements, a technical description of the Metadata elements and contains all necessary information for the Metadata definition necessary to fulfil the duties of the national NAPs.

The objectives of this paper are:

- 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 definition of data elements, wordings and predefined categorisations form the core element for data exchange and interoperability. For a technical information exchange and later database operations technical parts like value type and length need to be harmonised.

The common minimum Metadata set should be compatible with the INSPIRE regulation (2007/2/EG), where appropriate, and take into account the DCAT - AP (Application profile for data profiles in Europe) specification. Every national implementation is free to add more metadata elements then described in this document. However it should adhere to the minimum metadata set as specified here.

This paper focuses only on content and the technical aspects of the minimum metadata set. This paper does not cover the exchange format and the communication protocol that shall be used for automatic (meta)data exchange². It neither covers recommendations about the user interface, front end, data presentation or any other web part including all national laws (e.g. privacy).

In addition to this paper, some strategic guidance to NAP operators is given in form of a “Metadata Guideline”³. This guideline depicts and discusses alternative Metadata

² A possible specification would be a XML-schema for the metadata (like INSPIRE do) and the definition of a SOAP web service for communication.

³ Document link: https://portal.its-platform.eu/filedepot_download/1976/6295

approaches for individual NAP environments, taking into account higher-level considerations for NAP implementations.

1.3. Definitions

Certain terms and definitions need to be specified to achieve a common understanding.

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:

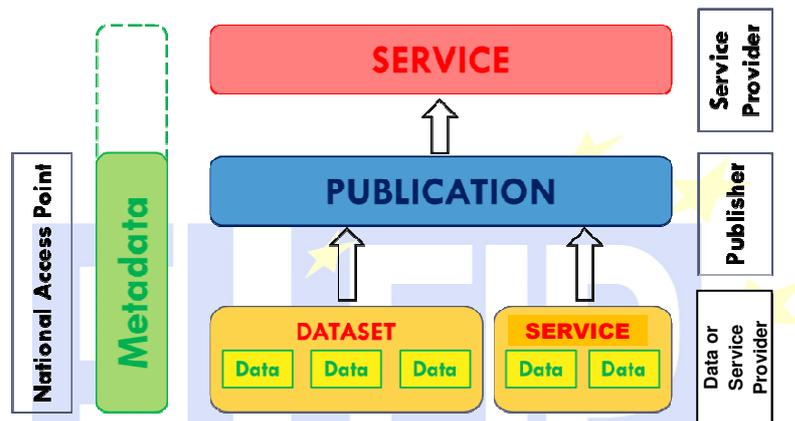


Figure 1: Concept of data provision and the relevance of Metadata

Publication

A publication is an abstract information element that covers the (recurring) data set(s) of a distinct content provided in a specific data format based on a specific communication method.

So a publication is the combination of a data set and the way the data is published (made accessible). 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 publications based on one data set.

Metadata set

Metadata describe the administration, organisation, and content of a data set. Metadata datasets 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 2.

A Metadata set is the collection of all metadata elements.

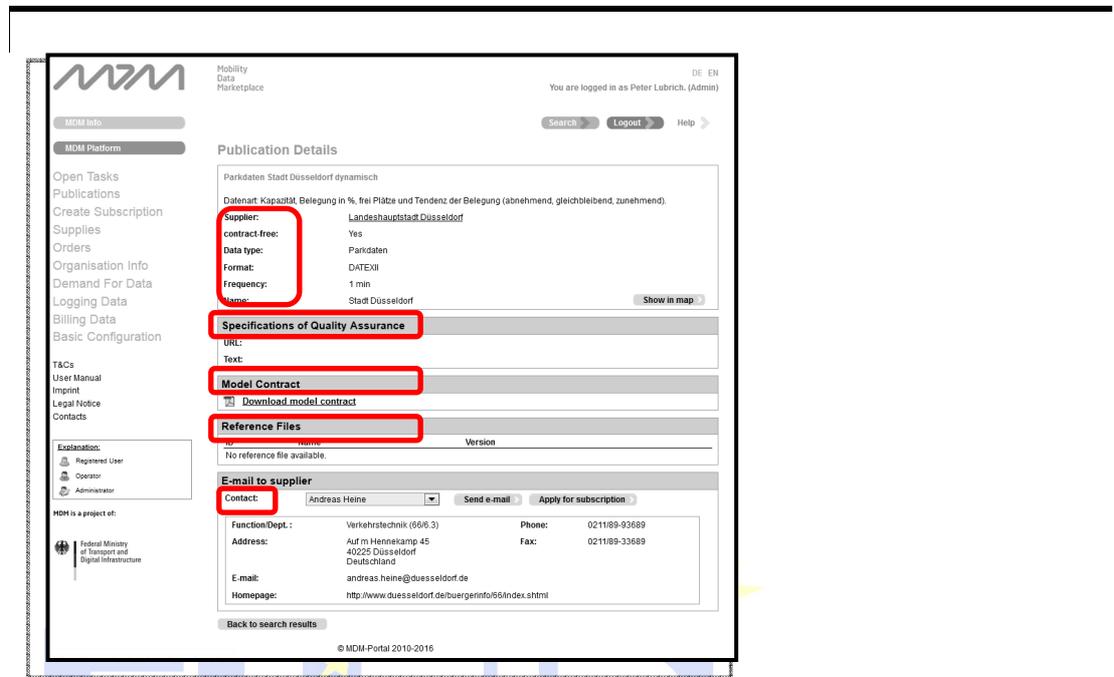


Figure 2: Metadata as part of the data set description in a NAP portal

Data set

A data set contains the traffic or travel data which are provided by the data owner.

Service

The EU Regulation 2017/1926 gives some implications that services for multi-modal traveller information (e.g. routing services) need to be considered within NAPs, besides that pure provision of data sets.

First, a NAP may allow the discovery of such services in addition to the discovery of pure data sets, see the bottom of Figure 1. This corresponds 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.

Second, data sets may be provided in a NAP to explicitly support specific services, see at the top of Figure 1. Specific services for multi-modal travel are listed in EU 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. In this context, the Metadata have to provide additional information about for which services the data set is intended.

The Metadata definitions in this paper consider the context of services, where possible, by adding some extra definitions or re-definitions to allow discovery of services within a NAP.

To ease readability of this document, only the wording “data set” is used, but can always be also referred to “services”. E.g., the Metadata element “Name of data set” could be also interpreted as “Name of a service”.

Publisher

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

Contact Point

A Contact Point is the entity (company, authority or person) who registered the dataset at the NAP and is liable for the correctness of the metadata. In most case this will be the data owner.

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.

2. Minimum Metadata Elements - Description

2.1. Overview

The following table shows an overview of the Metadata elements, as defined in this Coordinated Metadata Catalogue. The most-right column shows an example, how the Metadata elements could be filled for a specific publication coming from a Car Sharing company as a data provider.

To allow the before mentioned interoperability of NAP databases, at least the element name, the element type and the obligation (mandatory or not) are considered to be equal in each NAP. In the detailed description (followed in the chapters below), there are more details on the expected contents of each Metadata element, proposed format descriptions as well as proposed database field name and lengths.

Category	Element Name	Element type	Mandatory	Example for a data set from a Car Sharing company
Metadata information	Metadata date	<i>DateTime</i>	<i>yes</i>	2015-10-23T09:00:00+01:00
	Metadata language	<i>predefined</i>	<i>yes</i>	ger; eng;
	Contact point	<i>vCard-Textfields</i>	<i>partially*</i>	Hans Maier, Super Car Sharing GmbH, Data Street 1 Berlin, hans@supercs.de, www.supercs.de
Content information	Name of dataset	<i>free text</i>	<i>yes</i>	“Stationary Car Sharing stations”
	Description of dataset	<i>free text</i>	<i>yes</i>	“Contains information per station: ID, name, location, vehicle types”
	Resource type	<i>predefined</i>	<i>no</i>	Data set
	Dataset type category	<i>predefined</i>	<i>yes</i>	Demand-responsive modes
	Dataset detailed type	<i>predefined</i>	<i>no</i>	Location of Car-sharing stations
	Service type category	<i>predefined</i>	<i>conditionally*</i>	(not applicable)
	Dataset language	<i>predefined</i>	<i>yes</i>	ger; eng;
Temporal information	Valid From	<i>DateTime</i>	<i>yes</i>	2015-10-23T09:00:00+01:00
	Valid To	<i>DateTime</i>	<i>no</i>	(no information)
Geographical coverage	Area covered by publication	<i>predefined</i>	<i>yes</i>	DE30
	Network coverage	<i>predefined</i>	<i>yes</i>	Urban and local roads
	Network coverage description	<i>free text</i>	<i>no</i>	“Business area of Super Car Sharing in Berlin”

Category	Element Name	Element type	Mandatory	Example for a data set from a Car Sharing company
Transportation system	Transportation modes covered	<i>predefined</i>	<i>yes</i>	Demand-responsive / car-sharing
Responsibilities	Publisher	<i>vCard-Textfields</i>	<i>partially*</i>	Hans Maier, Super Car Sharing GmbH, Data Street 1 Berlin, hans@supercs.de, www.supercs.de
	Data owner	<i>vCard-Textfields</i>	<i>partially*</i>	(to be copied from "Publisher")
Conditions for use	Contract or license	<i>predefined</i>	<i>yes</i>	Licence and Free of charge
	Conditions for use	<i>URL</i>	<i>conditionally*</i>	www.supercs.de/terms.pdf
Access information	Data format - Encoding	<i>predefined</i>	<i>no</i>	(not applicable)
	Data format - Syntax	<i>predefined</i>	<i>yes</i>	JSON
	Data format - Grammar	<i>predefined</i>	<i>no</i>	JSON Schema
	Data format - Data Model	<i>predefined</i>	<i>yes</i>	other
	Data format description	<i>free text</i>	<i>conditionally*</i>	"Proprietary model in accordance to GEN TC278 / WG17 / Urban ITS"
	Access interface	<i>predefined</i>	<i>yes</i>	FTP
	Communication method	<i>predefined</i>	<i>conditionally*</i>	(not applicable)
	Access URL	<i>URL</i>	<i>conditionally*</i>	www.supercs.de/access.htm
Quality information	Update frequency	<i>predefined</i>	<i>yes</i>	Up to Monthly
	Quality description	<i>free text</i>	<i>yes</i>	"Quality Criteria "Correctness" and "Completeness" fulfilled to 99%, assessed by ground- truth testing"
	National body assessment status	<i>Date</i>	<i>no</i>	"No assessment done"

** see details in the following chapters*

Table 1: Overview on Metadata elements from the Coordinated Metadata Catalogue

2.2. Metadata elements

2.2.1. CATEGORY "METADATA INFORMATION"

2.2.1.1. ELEMENT "METADATA DATE"

Description and References

Describes the date stamp (date and time) when the current version of the metadata set was created or last modified. It will be generated by the system. Therefore it is mandatory.

Obligation: mandatory

Type: DateTime

Format description: YYYY-MM-DD'T'hh:mm:ssTZD [2015-10-23T09:00:00+01:00]; NOT NULL

Proposed database field name: metadata_date

Proposed database field length: -

2.2.1.2. ELEMENT "METADATA LANGUAGE"

Description and References

Describes the language in which the metadata is described. This Metadata field 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, this Metadata field will be set according to the current language of the user interface. In this case, the Metadata field will be set by the NAP system instead by the data provider.

According to the ISO 639 standard part 2, there is a 3 letter code for 24 EU languages, which should be used (see below). At least one language has to be set. If the NAP has an international character or if a MS has multiple official languages it should be possible to select more than one language. It is preferred to have a predefined selection of languages.

The list of codes for the 24 official EU languages is:

Bulgarian – bul	Irish – gle
Croatian – hrv	Italian – ita
Czech – cze	Latvian – lav
Danish – dan	Lithuanian – lit
Dutch – dut	Maltese – mlt
English – eng	Polish – pol
Estonian – est	Portuguese – por

Finnish – fin Romanian – rum
 French – fre Slovak – slo
 German – ger Slovenian – slv
 Greek – gre Spanish – spa
 Hungarian – hun Swedish – swe

The list of all the codes is defined at <http://www.loc.gov/standards/iso639-2/>

Regional languages also are included in this list.

Obligation: mandatory

Type: Predefined options

Format description: Predefined; UTF8; NOT NULL

Proposed database field name: md_language

Proposed database field length: -

2.2.1.3. ELEMENT "CONTACT POINT"

Description and References

Describes an organisation, if applicable a person, which is responsible for creation and maintenance of the metadata. This person or company is the direct contact for the National Access Point and data searching users. This information is mandatory but each user can decide if the information is shown in the NAP Interface.

For the data fields the common vCard-format is used. The vCard standard defines up to 40 fields, which could be filled in. To simplify the Metadata input, only a selection of such fields is used here. For privacy reasons only non-person data fields (e.g. organisation name, organisation address etc.) might be displayed in the user interface.

Obligation: Organisation Name and E-Mail: mandatory, other fields: optional

Type: vCard-Textfields

Title	Proposed database field name	Type	Proposed database field length	Format description
Name	cp_name	Free text	50	Text, utf8, NULL
Organisation Name	cp_org_name	Free text	50	Text, utf8, NOT NULL
Address	cp_address	Free text	50	Text, utf8, NULL
E-Mail	cp_email	Free text	50	Text, utf8, NOT NULL

Website	cp_website	Free text	50	Text, utf8, NULL
Telephone number	cp_tel	Free text	50	Text, utf8, NULL

2.2.2. CATEGORY “CONTENT INFORMATION”

2.2.2.1. ELEMENT “NAME OF DATASET”

Description and References

Describes the dataset in a generic term or gives a short 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. If more than one language is marked at “metadata language”, for each language there should be another description.

Obligation: mandatory

Type: free text

Format description: Free Text (e.g. Highway Network); utf8; NOT NULL

Proposed database field name: cont_name

Proposed database field length: 200

2.2.2.2. ELEMENT “DESCRIPTION OF DATASET”

Description and References

Gives the user more information about content of the dataset or service a brief description is mandatory. It’s a free text field. The used language for the description should be the language from the element “metadata language”. If more than one language is marked at “metadata language”, for each language there should be another description.

Obligation: mandatory

Type: free text

Format description: Free Text (e.g. “Contains static high priority network of Austria: Road Name, Lane number, Direction”); NOT NULL

Proposed database field name: cont_description

Proposed database field length: 1000

2.2.2.3. ELEMENT "RESOURCE TYPE"

Description and References

Classifies the resource of the publication, depending on if it is a "data set" or a "service" (referring to the ability of NAPs to allow discovery of services, see the definitions on page 8). A similar metadata field is also used in the INSPIRE metadata definitions and has been transferred here. This 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.

Predefined options:

- Data set
- Service

Obligation: optional

Type: Predefined options, only one selection possible

Format description: predefined elements, NOT NULL

Proposed database field name: cont_res

Proposed database field length: -

2.2.2.4. ELEMENT "DATASET TYPE CATEGORY"

Preamble

A description of a dataset type as a category is important for data seekers who are interested for a particular type of data. This is usually done by a pre-defined category list. However, as there are many possible categories with all applicable EC Delegated Regulations, such a category list needs to be both extensive and practical. It was decided to use a two-hierarchy category description:

- "Dataset type category": mandatory, only one selection possible
- "Dataset detailed description": optional, multiple-selections possible

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".

As one purpose of the Metadata Catalogue is to allow data provisioning according to the EC Delegated Regulations, the defined categories may also be assigned to the datasets listed in the EC Delegated Regulations. In other cases, the definitions may be more based to a “logical clustering” of any possible mobility data (i.e. with or without reference to the EC Delegated Regulations).

This way, there are two variants below to define the possible dataset type categories:

- Variant A: logical clustering - a category may be assigned to one or more of the EC Delegated Regulations
- Variant B: strict reference to EC Delegated Regulations - each category is clearly assigned to one EC Delegated Regulation

Description and References

Describes the classification of the dataset content on an aggregated level.

Possible categories are listed in ANNEX 1, together with a coded reference to the concerned EC Delegated Regulation. This coded reference links to the data categories as listed in the EC Delegated Regulations. E.g., a code “B-1 a I” links to the category “geometry” of the EC Delegated Regulation for Priority Action B, under the list item “1. (a) (i)”.

Obligation: mandatory, if a data set is published on a NAP (in contrast to a service)

Type: Predefined options, only one selection possible

Format description: predefined elements, NOT NULL

Proposed database field name: cont_agr_type

Proposed database field length: -

2.2.2.5. ELEMENT “DATASET DETAILED TYPE”

Description and References

Describes the classification of the data set content on a detailed level. It is used to concretise the above element “Dataset type category”.

Possible categories are listed in ANNEX 1, together with a coded reference to the concerned EC Delegated Regulation. This coded reference links to the data categories as listed in the EC Delegated Regulations. E.g., a code “B-1 a I” links to the category “geometry” of the EC Delegated Regulation for Priority Action B, under the list item “1. (a) (i)”.

Obligation: optional

Type: Predefined options, multiple selection possible

Format description: predefined elements, NULL

Proposed database field name: cont_det_type

Proposed database field length: -

2.2.2.6. ELEMENT "SERVICE TYPE CATEGORY"

Description and References

Describes the classification of a service, in accordance to possible services listed in EU Delegated Regulation 2017/1926 (Priority Action A / Multimodal Travel Information Services).

Possible categories are:

- Location search
- Information service
- Trip plans
- Trip plans, auxiliary information, availability check
- Trip plan computation - scheduled modes transport
- Dynamic Passing times, trip plans and auxiliary information
- Dynamic Information service
- Dynamic availability check
- Other

Obligation: mandatory, if a service is published on a NAP (in contrast to a pure data set).

Type: Predefined options, multiple selection possible

Format description: predefined elements, NOT NULL

Proposed database field name: cont_serv_type

Proposed database field length: -

2.2.2.7. ELEMENT "DATASET LANGUAGE"

Description and References

Describes the language of the data contents (text fields, addresses etc.). Depending on the data source the language will be different. According to the ISO 639 standard part 2, there

is a 3 letter code for 24 EU languages, which should be used (see list above at element “Metadata language”). At least one language has to be set. If the NAP has an international character or if a MS has multiple official languages it should be possible to select more than one language. It is preferred to have a predefined selection of languages.

Obligation: mandatory

Type: Predefined options, multiple selection possible

Format description: Text; UTF8; NOT NULL

Proposed database field name: cont_lang

Proposed database field length: -

2.2.2.8. ELEMENT “GEOREFERENCING METHOD”

Description and References

Describes the georeferencing method which is applied within the payload.

Predefined options:

- ALERT-C (LCL)
- Geocoordinates WGS84
- Geocoordinates ETRS89
- ISO 19148
- OpenLR
- other

Obligation: optional

Type: Predefined options, multiple selection possible

Format description: predefined elements, NOT NULL

Proposed database field name: cont_georef

Proposed database field length: -

2.2.3. CATEGORY “TEMPORAL INFORMATION”

2.2.3.1. ELEMENT "VALID FROM"

Description and References

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 Metadata field 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 Metadata field will directly describe the time reference of the delivered information (e.g. validity time of a public transport time table.)

In the metadata registry, this element can be set optional for the user input but for the data base it is mandatory. If there is no entry it means that the publication gets valid immediately and the timestamp is the same as the metadata timestamp.

Obligation: mandatory (no entry means that the publication gets valid immediately)

Type: DateTime

Format description: YYYY-MM-DD'T'hh:mm:ssTZD [2015-10-23T09:00:00+01:00]; NOT NULL

Proposed database field name: temp_valid_from

Proposed database field length: -

2.2.3.2. ELEMENT "VALID TO"

Description and References

Describes the ending time from which the data delivery is applicable. How this applicability is defined, see above at "Valid from"

This element is optional, if there is no entry it means that the publication does not expire.

Obligation: optional

Type: DateTime

Format description: YYYY-MM-DD'T'hh:mm:ssTZD [2015-10-23T09:00:00+01:00]; NOT NULL

Proposed database field name: temp_valid_to

Proposed database field length: -

2.2.4. CATEGORY "GEOGRAPHICAL COVERAGE"

2.2.4.1. ELEMENT "AREA COVERED BY PUBLICATION"

Description and References

Describes the geographic area covered by a data set. Data sets can be valid for more than one region, for that reason a multiple choice selection should be applied. A dataset without an area is not valid, therefore this element is mandatory.

NUTS (Nomenclature des unités territoriales statistiques) 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 (city, district, and region):

http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NUTS_22&StrLanguageCode=DE&IntPcKey=&StrLayoutCode=HIERARCHIC&IntCurrentPage=1

The standard selection is "Nuts 0". It is the country level and tells that the data are valid in one or more countries. The Nuts-Level is another categorisation field.

Obligation: mandatory

Type: Predefined options

Format description: Predefined NUTS 0-3; UTF8; Multiple choice; NOT NULL

Proposed database field name: geo_area

Proposed database field length: -

2.2.4.2. ELEMENT "NETWORK COVERAGE"

Description and References

Describes the part of the transport network (functional road classes or other forms of link-based transport infrastructure) that is covered by data sets of the publication in a general way.

The options are (proposal from the working group, as no commonly agreed European definition is existing):

- Motorways
- Arterial road network (in the meaning of state roads or federal roads)
- Regional roads
- Urban and local roads

- Rail (long-distance or heavy-rail)
- Metro or light-rail network
- Other public transport network
- Waterways
- Air network
- other

Obligation: mandatory

Type: Predefined options, multiple selection possible

Format description: predefined elements; multiple choice; NOT NULL

Proposed database field name: geo_network

Proposed database field length: -

2.2.4.3. ELEMENT "NETWORK COVERAGE DESCRIPTION"

Description and References

Describes details of transport network in addition to the element "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.

Obligation: optional

Type: Free text

Format description: Free Text (e.g. structural separated bidirectional lanes, 2 to 4 lanes, minimum speed 80); NULL

Proposed database field name: geo_description

Proposed database field length: 1000

2.2.5. CATEGORY "TRANSPORTATION SYSTEM"

2.2.5.1. ELEMENT "TRANSPORTATION MODES COVERED"

Description and References

Describes the transportation mode covered by a data set. Data sets can be valid for more than one transportation mode, for that reason a multiple choice selection should be applied. A dataset without a transportation mode is not valid, therefore this element is mandatory. There is no standard selection, so the person has to select at least one active.

- Scheduled
 - Air
 - rail (including high speed rail)
 - conventional rail
 - light rail
 - long-distance coach
 - maritime (including ferry)
 - metro
 - tram
 - bus
 - trolley-bus
- Demand-responsive
 - Shuttle bus
 - shuttle ferry
 - taxi
 - car-sharing
 - car-pooling
 - car-hire
 - bike-sharing
 - bike-hire
- Individual
 - car
 - truck
 - motorcycle
 - cycle
 - pedestrian
 - Other

Obligation: mandatory

Type: Predefined options, multiple selection possible

Format description: Predefined elements; Multiple choice; NOT NULL

Proposed database field name: trans_mode

Proposed database field length: -

2.2.6. CATEGORY "RESPONSIBILITIES"

2.2.6.1. ELEMENT "PUBLISHER"

Description and References

Describes an entity (company and person) that publishes the data sets. He or she is responsible for the given information and concludes a contract if applicable. The contact information has to be as complete as possible to establish a direct contact to the publisher. The publisher contact information is mandatory.

For the data fields the common vCard-format is used. The vCard standard defines up to 40 fields, which could be filled in. To simplify the Metadata input, only a selection of such fields is used here. For privacy reasons only non-person data fields (e.g. organisation name, organisation address etc.) might be displayed in the NAP user interface.

Obligation: Organisation Name and E-Mail: mandatory, other fields: optional

Type: vCard-Textfields

Title	Proposed database field name	Type	Proposed database field length	Format description
Name	p_name	Free text	50	Text, utf8, NULL
Organisation Name	p_org_name	Free text	50	Text, utf8, NOT NULL
Address	p_address	Free text	50	Text, utf8, NULL
E-Mail	p_email	Free text	50	Text, utf8, NOT NULL
Website	p_website	Free text	50	Text, utf8, NULL
Telephone number	p_tel	Free text	50	Text, utf8, NULL

2.2.6.2. ELEMENT "DATA OWNER"

Description and References

Describes the company 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 contact data will be copied from the publisher entry.

Obligation: Organisation Name and E-Mail: mandatory, other fields: optional

Type: vCard-Textfields

Title	Proposed database field name	Type	Proposed database field length	Format description
Name	do_name	Free text	50	Text, utf8, NULL
Organisation Name	do_org_name	Free text	50	Text, utf8, NOT NULL

Address	do_address	Free text	50	Text, utf8, NULL
E-Mail	do_email	Free text	50	Text, utf8, NOT NULL
Website	do_website	Free text	50	Text, utf8, NULL
Telephone number	do_tel	Free text	50	Text, utf8, NULL

2.2.7. CATEGORY “CONDITION FOR USE”

2.2.7.1. ELEMENT “CONTRACT OR LICENCE”

Description and References

Describes 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. Therefore there are predefined options where only one can be selected. “No license – No contract” is preselect, for this mandatory element.

Predefined options:

- No licence – No contract
- Licence and Free of charge
- Licence and Fee
- Contract and Free of charge
- Contract and Fee
- Not relevant

Obligation: mandatory

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: con_lic

Proposed database field length: -

2.2.7.2. ELEMENT “CONDITION FOR USE”

Description and References

If the option “Licence” or “Contract” in element “Contract or license” is selected, the condition of use has to be clarified. Here a sample contract or the terms of use need shall be provided, in order to allow potential data consumers to check and prove terms and

conditions before getting in touch with the publisher. 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.).

This field may contain an URL to a PDF document, which contains all important information, or describe the conditions explicitly. The NAP operator can decide to store that document on the NAP server to ensure that the document is accessible.

Obligation: mandatory if “contract” or “license” is selected in the Metadata element above

Type: Free text

Format description: free text; NULL

Proposed database field name: con_description

Proposed database field length: 1000

2.2.8. CATEGORY “ACCESS INFORMATION”

Preamble

On the lowest physical layer, a dataset exchanged between the source and the destination is a finite sequence of bits. This is totally independent of the communication channel used.

This sequence of bits represents a formatted dataset, where the formatting is performed on four layers: Encoding, Syntax, Grammar and Data Model.

As part of the minimum Metadata set, the working group suggests to introduce these four layers as explicit Metadata elements. This way, a data user will be able to learn about how to read and interpret a data set, when he discovers it on the NAP.

2.2.8.1. ELEMENT “DATA FORMAT - ENCODING”

Description and References

This describes the atomic element of the transfer syntax description. System that can go down to single bits are called “binary”. Systems that are specified base on character standards where a single character has more than one bit are specified by the name of the character standard used. Encoding is usually controlled by syntax standards today, see below.

Predefined options:

- ASCII
- UTF-8
- UTF-16

- ISO-8859-1
- ISO-8859-15
- other

Obligation: optional

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: acc_enc

Proposed database field length: -

2.2.8.2. ELEMENT "DATA FORMAT - SYNTAX"

Description and References

This describes 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.

Predefined options:

- XML
- JSON
- CSV
- ASN.1 encoding rules
- Protocol buffers
- Other

Obligation: mandatory

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: acc_syn

Proposed database field length: -

2.2.8.3. ELEMENT "DATA FORMAT - GRAMMAR"

Description and References

This describes standards on top of the elementary syntax that describe data structures in the dataset.

Predefined options:

- XSD
- JSON Schema
- ASN.1
- Protocol buffers
- other

Obligation: optional

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: acc_gra

Proposed database field length: -

2.2.8.4. ELEMENT "DATA FORMAT - DATA MODEL"

Description and References

This describes concrete data models that use the specification elements so far to specify specific data models. The NAP should keep references of the concrete data model used for a dataset.

Predefined options:

- DATEX II
- OCIT-C
- DATEX II Light
- NeTeX (CEN/TS 16614)
- SIRI (CEN/TS 15531)
- GTFS
- VDV Standard (VDV 452, 455, 462, ...)
- IFOPT
- ETSI / ISO Model (DENM, CAM, SPAT/MAP, IVI, ...)
- tpegML Model (TPEG2-TEC, TPEG2-PKI, ...)
- DINO
- INSPIRE data specification (according to Delegated Regulation (EC) No 1089/2010)
- GML
- other

Obligation: mandatory

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: acc_mod

Proposed database field length: -

2.2.8.5. ELEMENT "DATA FORMAT DESCRIPTION"

Description and References

Can be optionally used to provide additional information on the data format, in addition to the Metadata elements introduced before

Obligation: optional

Type: Free text

Format description: free text; NULL

Proposed database field name: acc_description

Proposed database field length: 200

2.2.8.6. ELEMENT "ACCESS INTERFACE – APPLICATION LAYER PROTOCOL"

Description and References

Describes the IT protocol of the data interface that will be used to transfer data. For error minimising there are predefined options. It is mandatory and the minimum selection is "other".

Predefined options:

- OTS2
- HTTP/HTTPS
- HTTP/HTTPS-SOAP
- FTP
- RSS
- AMQP
- MQTT
- gRPC
- other

Obligation: mandatory

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: acc_int

Proposed database field length: -

2.2.8.7. ELEMENT "COMMUNICATION METHOD"

Description and References

Describes the transmitting procedure from data provider to data receiver. It differs between push and pull. This element gives the service provider the opportunity to check the common data procedure on compatibility. If the data could be received by more than one method, a multiple choice selection could be done.

Predefined options:

- Push
- Push periodic
- Pull

Obligation: mandatory

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: acc_con

Proposed database field length: -

2.2.8.8. ELEMENT "ACCESS URL"

Description and References

Provides a general link for access to the current data set or a connection link to a service.

The type of this URL 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.

Obligation: mandatory

Type: Free text

Format description: URL (<http://nap.austriatech.at/sampledata/asf.html>); NOT NULL

Proposed database field name: acc_url

Proposed database field length: 250

2.2.9. CATEGORY "QUALITY INFORMATION"

2.2.9.1. ELEMENT "UPDATE FREQUENCY"

Description and References

Describes 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. It is mandatory to select one update category.

- On occurrence
- Up to 1min
- Up to 5min
- Up to 10 min
- Up to 15 min
- Up to 30 min
- Up to 1h
- Up to 2h
- Up to 3h
- Up to 12h
- Up to 24h
- Up to Weekly
- Up to Monthly
- Up to every 3month
- Up to every 6month
- Up to yearly
- Less frequent than yearly

Obligation: mandatory

Type: Predefined options

Format description: Predefined elements; NOT NULL

Proposed database field name: qual_freq

Proposed database field length: -

2.2.9.2. ELEMENT "QUALITY DESCRIPTION"

Description and References

Describes quality criteria of a data set and (if applicable) methods and results of a quality assessment. Within such an assessment, individual quality criteria of a data set are checked and compared with pre-defined quality requirements. Applicable quality criteria, quality requirements as well as assessment methods are defined precisely by the so-called "Quality Packages"⁴, 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.

Obligation: mandatory

Type: Free text

Format description: Text/URL; NOT NULL

Proposed database field name: qual_ass

Proposed database field length: 1000

2.2.9.3. ELEMENT "NATIONAL BODY ASSESSMENT STATUS"

Description and References

⁴ The currently published Quality Packages are available at :
<https://eip.its-platform.eu/highlights/update-eu-eip-quality-package-srti-and-rtti>
<https://eip.its-platform.eu/highlights/multimodal-travel-information-services-mmtis-update-quality-framework>
<https://eip.its-platform.eu/highlights/intelligent-truck-parking-services-itps-quality-framework-published>

The 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 Metadata element can be optionally 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.

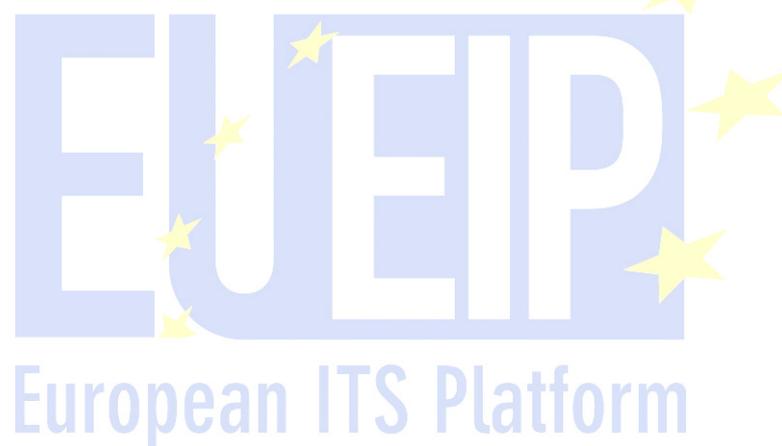
Obligation: optional

Type: Free text

Format description: Text; NULL

Proposed database field name: qual_natbod

Proposed database field length: 1000



3. Mapping table to DCAT-AP and INSPIRE

A mapping table has been prepared to show how the Metadata elements from this “Coordinated Metadata Catalogue” compare to parallel Metadata definitions in DCAT-AP and INSPIRE.

Such a mapping table aims to support interoperability of NAPs, when they are embedded in wider data ecosystems (e.g. Open Data portals following DCAT-AP specifications). Also, conversion of different Metadata approaches can be supported this way.

The mapping table is shown in ANNEX II (the German specification of DCAT-AP has been considered here).

There are four possible cases, when Metadata elements are mapped between the parallel Metadata definitions:

Mapping Case 1: Direct mapping

Metadata entries can be mapped directly, as the Metadata definitions are consistent. See an example below.

“Coordinated Metadata Catalogue” element	DCAT-AP property	INSPIRE element
Name of dataset	dcat:title	Resource title

Mapping Case 2: Conversion needed

Some converting of Metadata entries is required, as the Metadata definitions are not fully consistent. Such a conversion needs to be done by a data supplier or a NAP operator. Some advices for conversions are mentioned in the mapping table. See an example below.

“Coordinated Metadata Catalogue” element	DCAT-AP property	INSPIRE element
Area covered by publication → defined by NUTS codes	dct:spatial/geographical coverage → Allowed vocabulary: https://www.dcat-ap.de/def/politicalGeocoding/Level/	Geographic bounding box → longitudes & latitudes

Mapping Case 3: No mapping possible

A Metadata field, as defined in the “Coordinated Metadata Catalogue”, is not foreseen in DCAT-AP or INSPIRE. The Metadata entries will be ignored in the parallel Metadata definitions. See an example below.

“Coordinated Metadata Catalogue” element	DCAT-AP property	INSPIRE element
Network coverage	n/a	n/a

Mapping Case 4: Filling of mandatory fields

DCAT-AP or INSPIRE has a mandatory field which is not defined by the “Coordinated Metadata Catalogue”. Some pre-setting is required to fill in the gaps. Some advices for such pre-setting are mentioned in the mapping table. See an example below.

“Coordinated Metadata Catalogue” element	DCAT-AP property	INSPIRE element
n/a	dcat:theme → pre-set as “Transport”	n/a

4. Summary, Recommendations and Future Steps

4.1. Summary

EU EIP sub-activity 4.6 presents a new version of the *Coordinated Metadata Catalogue*. It contains definitions for 32 Metadata elements, including their description, types and obligation levels. It has been substantially updated since the previous 2015 version. A major motivation was to consider new data domains, especially in the context of multi-modal traveler information services. Further, practicability and understandability of the Catalogue was improved.

The *Catalogue* is considered a blueprint for Metadata structures at each individual National Access Point (NAP) in the EU. When applied across all EU NAPs, we strongly believe that an interoperable, large-scale data ecosystem among the many data stakeholders in the mobility sector will be eased. The *Catalogue* is mainly triggered by the EC Delegated Regulations, and their obligations regarding the provision and characteristics of NAPs. The Metadata definitions, however, may also apply to any mobility-related platforms and data sets, also outside the scope of the Delegated Regulations.

This way, the presented work is a further milestone of EU EIP in supporting and harmonising data provision and exchange for the ITS domain.

To understand the scope of this work correctly: this Catalogue is a baseline for a harmonized Metadata approach. The individual NAPs will decide on the concrete implementation of the Metadata structure, in particular how it is technically implemented in a database system. In the current form, the Catalogue provides “just” a list of mandatory and optional Metadata elements. It is NOT a sophisticated approach towards a NAP Metadata standard, e.g. building up on pre-existing formal standards. This could be done by defining an extension to DCAT-AP, and also establishing governance processes and structures for the maintaining and updating of such an extension. This may be, however, a future step for the development of this Catalogue, see below.

4.2. Recommendations

As the NAP landscape across the continent is quite heterogeneous and still evolving, a full, ad-hoc adoption of the *Catalogue* is not realistic. We propose to adopt the definitions from this *Catalogue*, when a NAP is newly developed or an existing one is upgraded. For strategic considerations on how to set up Metadata structures within a NAP, also looking to

parallel approaches such as DCAT, we refer to the “Metadata Guideline”⁵, also elaborated by EU EIP sub-activity 4.6.

Individual NAP implementations may add own Metadata definitions, corresponding to their NAP set-ups, so this *Catalogue* are understood as a minimum set of Metadata.

Further, specific recommendations are given for individual Metadata elements as follows:

- Metadata elements “Dataset type category” and “Dataset detailed type”

Expanding the potential scope of NAPs towards multi-modal travel (according to EU Regulation 2017/1926), the amount of possible data categories may become complex and confusing. This challenge was coped with a two-layer category description, where only the first layer (“Dataset type category”) is obligatory. If using the second layer (“Dataset detailed type”), the NAP system should correlate between these two layers. For example: after the user has selected the first layer (e.g. “Road work information”), only the applicable options of the second layer should be visible/selectable (e.g. “Long-term road works”). Further, additional data categories should be allowed in individual NAPs, addressing specific use cases which may go beyond the EU Regulations.

- Metadata element “Service type category”

This new Metadata element results from the wider NAP context in the context of multi-modal traveler information services. It is evident that a data service is correlating to the dataset offered by a NAP. Thus, it is advised to predefine correlations between “service types” and “dataset types”. This will help to avoid wrong correlations. As an example, a service “location search” may be correlated to a dataset of “Park & Ride Stops”.

- Metadata elements “Data format” (Encoding, Syntax, Grammar and Data Model)

As the use cases and data domains of NAPs are still evolving, the number and complexity of applicable data formats may further grow. To prevent misunderstandings, a hierarchical concept of four “Data format” Metadata elements was introduced. This way, it is possible to add further data formats, e.g. for future use cases, as long as they can be appropriately described by the Metadata elements. For all four “Data formats” elements, some predefined options have been given, based on current practice of data formats in the NAP context. In particular, data formats from the Delegated Regulations have been considered (e.g. DATEX II). Again, as the applicable data formats are evolving and may be

⁵ Document link: https://portal.its-platform.eu/filedepot_download/1976/6295

different in each NAP, the definite options may include further/other format options as well, and should be set individually.

The NAP implementations should also allow multiple data formats for a single publication. E.g. a public-transport data set may be formatted both in NaTEx and GTFS. There are different options how to implement this: via multiple publications or via one publication with multiple format options. In the latter case, the related Metadata information must be provided multiple times as well.

- Metadata element “Quality description”

One challenge when describing the quality of data are inconsistent definitions and assessment approaches. The referenced “Quality Packages” by EU EIP sub-activity 4.1 are a first approach for a harmonised description of data quality. We advise to re-use the definitions from the “Quality Packages” where possible. To be able to report data quality, however, quality assessment methods need to be installed at the data provider’s organisation. It is strongly recommended to install such methods, for example as dedicated functions of the data processing at an organisation.

During the review phase for this Catalogue, some proposals were made to add further Metadata elements. To keep the “minimum set” approach, it was decided not to implement all these proposals. Instead, the following recommendations are made:

- An “Update date” was proposed as a Metadata element, indicating the time point when e.g. a static data set is exchanged occasionally. It is recommended to implement such information within the payload, i.e. the data as such. Alternatively, such information may be considered within the Element “Description of data set”.
- An “Availability period” was proposed as a Metadata element, indicating the service time of the data provision. It is recommended to implement such information as a quality criterion within the element “Quality description”.
- A “Source of location data” was proposed as a Metadata element, indicating the source of the base map or other location data. It is recommended to implement such information within the Element “Description of data set”.

4.3. Future Steps

As a further step towards harmonisation of Metadata, some logical modelling of the defined Metadata elements is envisioned. In contrast to a sequential list of Metadata elements, as introduced in the *Catalogue*, a model would also consider hierarchical structures and interdependencies between the Metadata elements. It would be expressed in standardised

ways, e.g. with the Unified Modelling Language (UML). DCAT-AP, as a parallel Metadata approach, has already defined such models. A harmonised Metadata model for EU NAPs is planned to be elaborated in the near future.

A modelling of the Catalogue would also eventually allow a machine-readable version of the Metadata definitions made herewith.

As another further development of the Catalogue, translations of all the defined Metadata elements and possible entries (e.g. for the “Dataset type category”) in the official EU languages may be elaborated. In the meantime, it is noted that some Member States that are implementing the “Catalogue” have already translated the Catalogue items in the context of their NAP implementations (e.g. DE and AT).

Finally, the presented *Catalogue* reflects the state-of-the-art usage of NAPs and the data sets herein. As the EU NAP landscape is still evolving, we expect that the Catalogue may need future updates, considering ongoing experiences and requirements from the many NAP stakeholders.

A fairly new development is the consideration of vehicle-generated data in the context of NAPS, as currently discussed by the “Data Task Force”. It is expected that many of the Metadata elements will need revisions to correctly describe such data. For trials in this field, any NAP may add/adopt individual Metadata accordingly. However, an official update of the Catalogue towards vehicle-generated data should be done after more experience is gained on that matter.

EU EIP sub-activity 4.6 and potential follow-up projects will look into such potential updates.

European ITS Platform

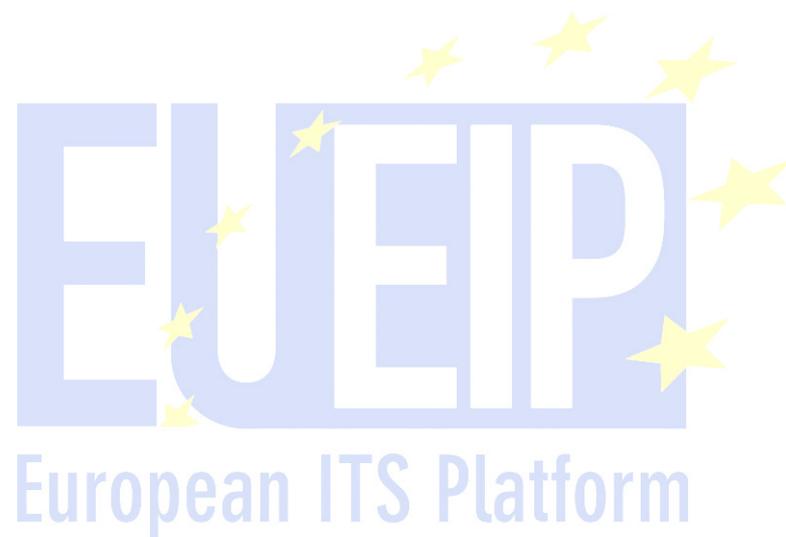
ANNEX I – Options for Metadata elements "Dataset type category" and "Dataset detailed type"

See table *EU EIP_Coord. Metadata Catalogue_Annex I_v2.0_191115.xlsx*



ANNEX II – Mapping Table to DCAT and INSPIRE

See table *EU EIP_Coord. Metadata Catalogue_Annex II_v2.0_191115.xlsx*



ANNEX III – Change Log

These are the changes comparing to the previously published “Coordinated Metadata Catalogue”, Version 17.12.2015⁶:

- Extensions to allow data provision in accordance to EU Delegated Regulation 2017/1926 (Priority Action A / Multimodal Travel Information Services):
 - Additional Metadata element “Resource type”
 - Extension of predefined options for Metadata element “Dataset type category”
 - Extension of predefined options for Metadata element “Dataset detailed type”
 - Additional Metadata element “Service type category”
 - Additional Metadata element “Georeferencing Method”
 - Extension of predefined options for Metadata element “Network coverage”
 - Extension of predefined options for Metadata element “Data format”
 - Additional Metadata element “Transportation modes covered”
- Further revisions of Metadata elements:
 - Redefinition of “Structure of publication”: disaggregated into a four-layer system to describe the data format (Encoding, Syntax, Grammar and Data Model)
 - Redefinition of “Quality indicator”: renamed to “Quality description”, referenced to quality definitions of EU EIP sub-activity 4.1
 - Redefinition of “National Body assessment date”: renamed to “National body assessment status”, changed from type “date” to “free text”
- Recommendations for NAP implementers added
- Mapping table to DCAT-AP and INSPIRE added

⁶ Document link: https://www.its-platform.eu/filedepot_download/1701/5355