NAP Reference Architecture

This report defines one of the Views of the NAP Reference Architecture

10.02.2025

# NAP Functional View

The Functional View focuses on the functional aspects of a system. Defines the architectural elements that deliver the system’s functionality documenting the system’s functional structure including the key functional elements their responsibilities the interfaces they expose and the interactions between them.

The View contains a chain of **Functions** connected via the **Functional data flows**, at both ends with a **Terminator.** This chain represents a process of data processing in a designed system. **Data stores** represent the ability of a function to store and retrieve data and model real databases.

Functions are for clarity purposes grouped into modules - see physical view.

The Functional View is elaborated with respect of minimum functionality of two NAP types: **Metadata Directory** and **Data Platform,** building upon the functionality of the previous type

Those types are presented via TWO diagrams, each depicting functionality of respective type.



Figure: Functional Tree of F3.6 Provide NAP



Figure: NAP Functional View - Metadata Directory



Figure: NAP Functional View - Data Platform

## Selected terms and definitions

**Function**: An action that processes input data and outputs it to another function or as instructions to an external entity. Functions are divided into High-Level Functions (HLFs), which oversee specific data processing parts and contain Low-Level Functions (LLFs), and LLFs, which handle specific data processing tasks and meet user needs in the FRAME Methodology.

**Data Store**: A repository for data, often managed by LLFs, that serves multiple other LLFs, linking to Functional Areas or HLFs.

**Data Flow**: The movement of data within the system, occurring between LLFs, between LLFs and Data Stores, or between LLFs and external entities.

**Terminators**: External entities not modelled within the FRAME Architecture, such as different vehicle types or traveller roles

**Metadata directory:** The data portal that contains descriptions of the data and services important for their identification, assessment, and subscription by consumer, i.e., metadata. It provides facilities to authenticate data provider and functionality to insert a metadata records. The NAP provides search and discovery services of the hosted records to end users and via machine readable content to other portals. The NAP is not directly involved in the data exchange between data providers and data consumers.

**Data platform**: The data portal that contains descriptions of the data and services important for their identification, assessment, and subscription by consumer, i.e., metadata, together with the data and/or services themselves. It provides facilities to authenticate data provider, and optionally, data consumer and functionality to insert a data and metadata records to NAP internal database. The NAP provides search and discovery services of the hosted records to end users and via machine readable content to other portals and distribution interfaces for data dissemination. The NAP is an intermediary between data provider and consumer, the data however remain in the ownership of the data provider.

**EA GUID** Enterprise Architect unique identifier, uniquely identifying the object within the model.

## Functions

This chapter defines functions for **both NAP types**, Metadata Directory and Data Platform.

Functions are categorized into various levels: High-Level Functions (HLF) and Low-Level Functions (LLF).

### High Level Functions

High Level Functions contain a group of functions concerned with a specific part of data processing and always have component Low Level Functions.

#### F3.6 Operate National Access Point

*Date Modified: 10.02.2025 11:07:23, GUID: {7ADE914E-925B-4d69-8E2A-6E26A0C42EEE}*

This High-level function shall provide the facilities needed to enable a National Access Point (NAP) to operate. It shall include functionality that enables information objects containing NAP data to be provided and stored. These information objects shall consist of meta-data describing the data that is available and pointers to the Internet address from which data may be obtained. NAP Content Consumers shall be able to discover, search for and obtain some or all the NAP information objects. These information objects will be provided to and entered for the first time by the NAP Content Provider once they have been approved as Content Providers.

### Low Level Functions

Low Level Functions perform a specific part of the data input, process, or information output process and have no component functions.

#### F3.6.1 Manage NAP Metadata Repository

*Date Modified: 13.01.2025 21:17:02, GUID: {28A2C553-2939-4542-B14B-8A13B25BC494}*

This Function shall be capable of providing the following facilities:

(1) The ability to manage the store of Metadata.

(2) The ability to ensure that all data sent to the store is stored in a coherent and logical manner.

(3) The ability to read, edit, update and erase data from the store as and when requested.

(4) The ability to enable Metadata to be created in advance of their publication on the NAP so it could be checked before its publication.

(5) The ability to carry out its activities in such a way that they do not interfere with one another, and that the integrity of the data being stored and read is preserved.

(6) This function manages all data mentioned in the mobilityDCAT-AP (https://mobilitydcat-ap.github.io/mobilityDCAT-AP/releases/index.html) and other relevant information (e.g. quality info, possible data comments etc.)

#### F3.6.10 Provide Data Quality Checks

*Date Modified: 30.01.2025 10:58:47, GUID: {D01EFD87-A3E1-4216-81D9-855530ECE1B9}*

This Function shall be capable of providing the following facilities:

(1) The ability to provide periodical and initial checking of published data quality based on pre specified rules and procedures (including appropriate time frequencies). Main tests performed are schema validation and availability of provided data against the metadata information.

(2) The ability to retrieve data to be checked from the NAP Data store.

(3) The ability to disseminate and store the outcomes of data quality checks to the NAP Data store.

(4) The function shall be capable to request metadata from NAP Metadata store, to compare with data, by invoking the functionality of Manage NAP Data Repository for data validation purposes

(5) Ability to perform the checks based on data events (data insert, data update) in the NAP Data store

#### F3.6.2 Manage Registrations and Provide Authorisation Service

*Date Modified: 13.01.2025 21:17:02, GUID: {15D991EA-63BC-40ac-936A-A0B8D3CBC28A}*

This Function shall be capable of providing the following facilities:

(1) The ability to receive and process a request from an entity that wants to become new NAP User.

(2) The ability to check the new NAP User in (1) above to include electronic identification, verification that the requesting entity exists based on information included in the request and agree with terms of the NAP User (different for NAP Content Provider and NAP Content Consumer)

(3) The ability to load information about the entity submitting the request in (1) above into the NAP Users data store, if the identification, verification, and acceptance in (2) above is successful.

(4) The ability to provide authorisation credentials to the requesting entity.

(5) The ability to send a rejection notice (including the reason for rejection) to the entity that submitted the request in (1) above if the identification, verification, and acceptance in (2) and (3) above was not successful.

(6) The ability to check the authorisation of an entity which sends its credentials to the NAP functions and to response to those functions if the authorisation check has been successful.

(7) The ability to process the information provided in an unsuccessful request for the update of NAP User data so that a suitable response can be sent to the entity that made the request and future unsuccessful update requests monitored.

(8) The ability to register multiple user accounts within a NAP User account, i.e. users' organization.

(9) The ability to register multiple machine accounts within a NAP User account, i.e. users' organization, for consuming or providing content from / to the NAP. The machine accounts stand for Data Requesting Systems and Data Supplying System.

(10) The ability to organize user and machine account registered under one NAP User into organization, where user accounts have different rights to access the NAP Users data store, i.e. view, modify, add, and delete records.

(11) The ability to remove electronic identity of the NAP User from the NAP Users data store based on reception of a request from a NAP User.

(12) The ability to register the as one or both NAP Content Provider and NAP Content Consumer with different rights / responsibilities to perform tasks assigned to provider or consumer in the NAP via Functions Manage Content Providers Metadata and Manage NAP Metadata Retrieval.

(13) Ability to provide registered NAP User data upon its successful authorization

(14) Ability to log in events connected with NAP User Activity to the NAP User data store

NOTE: one physical user can be part of more NAP Users but under the different electronic identity.

#### F3.6.3 Manage Content Providers Metadata

*Date Modified: 13.01.2025 21:17:02, GUID: {E8D1212C-A787-4da1-A4EB-B4E1896ABD19}*

This Function shall be capable of providing the following facilities:

(1) The ability to receive and process request to upload new or updated metadata from a NAP Content Provider.

(2) The ability to forward the authorisation credentials of the NAP Content Provider to the Function Manage NAP User Registrations and to receive a result about the authorised registration of the NAP Content Provider from the Function Manage NAP User Registrations.

(3) The ability to perform basic and consistency checks on filled in metadata (e.g. the data are filled in expected manner and are structurally complete)

(4) The ability to send the metadata included in the request in (1) above to the Function Manage NAP Metadata Repository for loading into the data store if the checks in (2) above were successful.

(5) The ability to send a "failure" response to the entity that made the request in (1) above if the checks in (2) and (3) above were unsuccessful or a “success” response if the checks were successful.

(6) Ability to provide metadata created by the NAP Content Provider and data created by the NAP, i.e. quality records and NAP User event log to the NAP Content Provider.

(7) Ability to record NAP Content Provider Activity into the NAP Users data store.

(8) Ability to update, amend or delete existing metadata records.

NOTE: the ability to browse, search and view metadata is in the functionality F3.6.4 Manage Metadata Retrieval. It is assumed that NAP Content Provider is also logged in as NAP Content Consumer.

#### F3.6.4 Manage Metadata Retrieval

*Date Modified: 13.01.2025 21:17:02, GUID: {2F2393E9-9A59-4344-A2C0-207945E7F438}*

This Function shall be capable of providing the following facilities:

(1) The ability to provide a query form or comparable search interface to define keywords or refine demands in different available metadata elements.

(2) The ability to receive and process requests from NAP Content Consumers to be provided with NAP metadata.

(3) The ability to process the request in (1) above so that all suitable search results to the request are retrieved from the Data Store NAP Metadata.

(4) The ability to format the NAP metadata search results obtained in (3) above and send it to the entity that made the request in (2) above or to display them in an overview results page.

(5) Ability to provide metadata at the NAP including data created by the NAP, i.e. quality records.

(6) Ability to provide all or parts of metadata stored in the NAP Metadata store in a machine-readable format for reasons of harvesting the metadata by Metadata Requesting System (machine to machine access).

(7) The ability to provide all relevant metadata without NAP Content Consumer registration

NOTE: It is assumed that NAP Content Provider could perform all the task of the NAP Content Consumer.

#### F3.6.5 Provide NAP User Support

*Date Modified: 13.01.2025 21:17:02, GUID: {E4E0DD97-20AB-4868-B0DE-C0C3C14EA4BA}*

This Function shall be capable of providing the following facilities:

(1) The ability to receive and process support requests from any existing or potential NAP Content Provider or NAP Content Consumer.

(2) The ability to respond to user support requests adequately at least in a form of first-level support.

(3) The ability to consult other NAP roles for issues which cannot be responded with the own knowledge.

(4) The ability to manage issues and log the issue resolution for later use by NAP Users or by an Auditing entity

NOTE: this could be done via a ticketing system

#### F3.6.6 Provide Metadata Quality Checks

*Date Modified: 13.01.2025 21:17:02, GUID: {15BFF38A-05D9-4775-84C9-6604B0EEA3C6}*

This function shall be capable of providing the following facilities:

(1) The ability to perform metadata quality checks based on pre specified rules and procedures (including appropriate time frequencies). The checks follow the MQA and InQMS methodology, at minimum it is an availability of the urls provided in metadata.

(2) The ability to retrieve data to be checked from the NAP Metadata store.

(3) The ability to disseminate and store the outcomes of data quality checks to the NAP Metadata store.

(4) Ability to perform the checks based on metadata events (data insert, data update) in the NAP Metadata store

#### F3.6.7 Manage NAP Data Repository

*Date Modified: 13.01.2025 21:17:03, GUID: {57AEF510-D710-4920-9CCE-96BE708F6AAC}*

This Function shall be capable of providing the following facilities:

(1) The ability to manage the store of traffic and travel data.

(2) The ability to ensure that all data sent to the store is stored in a coherent and logical manner.

(3) The ability to read, create and overwrite data from the store as and when requested.

(4) The ability to hide data in the NAP Data store so it could be checked before it is made available.

(5) The ability to carry out its activities in such a way that they do not interfere with one another, and that the integrity of the data being stored and read is preserved.

(6) Ability to send request for Metadata from F3.6.1 Manage NAP Metadata Repository and provide this data to connected functionality,

(7) Ability to store data event logs

#### F3.6.8 Manage Data Input

*Date Modified: 13.01.2025 21:17:03, GUID: {5B4F357F-A164-4a3f-8909-C370F4C0615F}*

This Function shall be capable of providing the following facilities:

(1) The ability to receive and process traffic and travel data in different message types from NAP Content Provider or Data Provision System.

(2) The ability to forward the authorisation credentials of the NAP Content Provider or of the Data Provision System to the Function Manage Registrations and Provide Authorisation Service and to receive a result about the authorised access.

(3) The ability to perform basic checks on filled in information about data access (for automatic data retrieval by NAP) or checks of data format and expected size of the NAP Content Provider manually uploaded data.

(4) The ability to send the data included in the request in (1) above to the Function Manage NAP Data Repository for loading into the data store if the checks in (2) and (3) above were successful.

(5) The ability to send a “failure" response to the entity that made the request in (1) above if the checks in (2) and (3) above were unsuccessful or a “success” response if the checks were successful.

(6) Ability to provide all data created by the NAP Content Provider and also data created by the NAP, i.e. quality records and data event log.

(7) Ability to record NAP Content Provider activity into the NAP Data store.

#### F3.6.9 Manage NAP Data Retrieval

*Date Modified: 10.02.2025 11:08:50, GUID: {A3764B72-97E2-400c-81B8-C945964F9E0D}*

This Function shall be capable of providing the following facilities:

(1) The ability to receive and process request for data retrieval from a NAP Content Consumer or Data Requesting System.

(2) The ability to forward the authorisation credentials of the NAP Content Consumer or Data Requesting System to the Function Manage NAP User Registrations and Provide Authorisation Service and to receive a result about the authorisation of the said entities.

(3) The ability to send the request in (1) above to the Function Manage NAP Data Repository for retrieving data identified in the request from the NAP Data store if the checks in (2) above were successful.

(4) The ability to send a "failure" response to the entity that made the request in (1) above if the checks in (2) above were unsuccessful or a “success” response with the retrieved data if the checks were successful to the requesting entity.

(5) Ability to provide data retrieved from the NAP Data store to the NAP Content Consumer or Data Requesting System in a way which is requested.

(6) Ability to record NAP User Activity into the NAP Users data store.

(7) Requested data are either traffic or travel information or its support information stored in the NAP Data store (e.g. quality information, last update time) or both.

## Terminators

This chapter defines terminators for **both NAP types**, Metadata Directory and Data Platform.

### Data Provision System

*Date Modified: 29.09.2024 0:39:50, GUID: {13412496-2C40-428c-B961-F0F374D991C8}*

The generic terminator role Data Provision System represents any interested entity in traffic, travel data storage. The Data Provision System can request storing traffic and travel data in the NAP Data store. Therefore, Function F3.6.8 Manage Data Input offers an access interface for machine-to-machine data upload. Authorisation is necessary, the Data Provision System must use credentials obtained by Content Provider. When registering the Content Provider will obtain credentials and / or to set up a machine account from which data are pushed.

**Key issue**: Request to store data at NAP.

**Area of responsibility**: Be compliant with the agreement with content provider

**Tasks**: Upload content

**Mnemonic**: nap.dps

### Data Requesting System

*Date Modified: 10.02.2025 11:09:06, GUID: {6CBF0F02-2909-4086-A608-C5EA1E42A9F6}*

The generic terminator role Data Requesting System represents any interested entity in traffic, travel data. The Data Requesting System can request traffic and travel data available in the NAP Data store. Therefore, Function F3.6.9 Manage NAP Data Retrieval offers a data distribution interface for machine-to-machine data retrieval.

In some cases, especially when the data are pushed to the Content Consumer systems and / or authorisation is necessary the Data Requesting System must use credentials obtained by Content Consumer. When registering the Content Consumer will obtain credentials and / or to set up a machine account to which data are pushed.

**Key issue**: Request data stored at NAP.

**Area of responsibility**: Be compliant with the agreement with content provider

**Tasks**: Receive content

**Mnemonic**: nap.drs

### Metadata Provision System

*Date Modified: 10.02.2025 11:09:16, GUID: {0DEEF50F-C3BA-4005-A27B-57A30C4C009C}*

The generic terminator role Metadata Provision System represents any compatible entity in metadata storage.

The Metadata Provision System can request storing metadata in the NAP Metadata store. Therefore, Function Metadata Management Module offers an access interface for machine-to-machine data upload. Authorisation is necessary, the Metadata Provision System must use credentials obtained by Content Provider. When registering the Content Provider will obtain credentials and / or to set up a machine account from which data are pushed.

**Key issue**: Request to store metadata at NAP.

**Area of responsibility**: Be compliant with the agreement with content provider

**Tasks**: Upload metadata

**Mnemonic**: todo

### Metadata Requesting System

*Date Modified: 29.09.2024 0:41:46, GUID: {DEB4AC48-7332-4f57-99D5-79169FCA6F1F}*

The generic terminator role Metadata Requesting System represents any interested entity in traffic and transport metadata dissemination. The Metadata Requesting System can request information stored in the NAP Metadata store in a standardized format (mobilityDCAT-AP) to incorporate said data into its information services (i.e. metadata harvesting). Therefore, Function F3.6.4 Manage NAP Metadata Retrieval offers a data distribution interface for machine-to-machine data retrieval.

**Key issue**: Request metadata stored at NAP.

**Area of responsibility**: Be compliant with the agreement with the NAP operator

**Tasks**: Receive information about the content in a standardized manner, i.e. metadata

**Mnemonic**: nap.mdrs

### NAP Actors

*Date Modified: 10.02.2025 11:13:03, GUID: {E89EDD6C-D939-4b97-AB60-AAD3FA5FE237}*

This Terminator shall represent the actors that participate in the National Access Point (NAP) ITS Service. This ITS Service provides a mechanism that enables organisations to access data available from other ITS Services. It shall consist of the following Terminators.

* NAP Content Provider
* NAP Content Consumer

Mnemonic: nap

#### NAP Content Consumer

*Date Modified: 30.09.2024 19:17:57, GUID: {6713B765-606E-4208-8FE8-99B0D50851A5}*

The generic terminator role of the NAP Content Consumer represents any interested entity in traffic and transport data. The Content Consumer can find available data via the NAP. Therefore, Function F3.6.4 Provide Access for NAP Meta-Data Retrieval offers an interface (typically a graphical user interface freely accessible via the Internet) to search the meta-data in D3.15 NAP Meta-Data

**Key issue**: Request high-quality services; provide feedback about relevant content

**Area of responsibility**: Be compliant with the agreement with the NAP content provider

**Tasks**: Receive content

**Mnemonic**: nap.cc

#### NAP Content Provider

*Date Modified: 10.02.2025 11:16:10, GUID: {7F7723C2-1334-495d-8C3F-1CA486951DD2}*

The generic terminator role of the NAP Content Provider represents any provider of traffic and transport data.

The NAP Content Provider describes traffic and transport data with meta-data on the NAP (stored in D3.15 NAP Meta-Data). Information about the Content Provider, such as contact details, kept in D3.17 NAP Content Providers.

Content Providers are public and private road operators, road authorities, service providers, transport authorities, transport operators, infrastructure managers, and transport on-demand service providers. The obligations to make traffic and transport data accessible via the NAP depend on the type of data according to the ITS Directive and its respective delegated regulations (see Content Provider Actor)

**Key issue**: Provide and publish content (which the content provider has the legal rights to publish); collect content.

**Area of responsibility**: Provide timely and accurate traffic and transport data.

**Tasks**: Provide content relevant to the ITS domain and according to contracts with the NAP and content consumers

**Mnemonic**: nap.cp

## Functional Data Flows

This chapter defines functional data flows for **both NAP types**, Metadata Directory and Data Platform.

### High Level FDFs

High Level Functional Data Flows cary a specific data between two High Level Functions. They always have component Low Level Functional Data Flows.

#### fnap-mt\_inputs

*Date Modified: 10.02.2025 11:16:33, GUID: {90829C59-D7DB-4ff9-8AB7-F4BBCEA7422B}*

It consists of data objects received from the NAP Actors that contain either Internet addresses from which data objects provided by ITS Services can be obtained, or requests for the Internet addresses.

#### From NAP Actors

*Date Modified: 30.09.2024 19:20:17, GUID: {C6FE2F39-008F-4811-AE0F-95EB671FFFD2}*

This data flow only appears in the Context Diagram and contains input from the NAP Actors Terminator. It contains data objects containing either the Internet address from which other data objects about ITS Services are available, or a request for access to these data objects.

#### tnap-mt\_outputs

*Date Modified: 30.09.2024 19:20:11, GUID: {B767384A-BAB2-4802-A07C-DA9BA8B1132A}*

It contains outputs to the NAP Actors that have been created from data objects provided by functionality in the Manage Traffic Functional Area and includes either confirmation of acceptance of inputs, or the Internet addresses from which access to data objects provided by ITS Services can be obtained.

#### tnap-mt\_outputs

*Date Modified: 30.09.2024 19:20:11, GUID: {EACAFE4C-395F-4a01-B251-D6ED49DAFC30}*

It contains outputs to the NAP Actors that have been created from data objects provided by functionality in the Manage Traffic Functional Area and includes either confirmation of acceptance of inputs, or the Internet addresses from which access to data objects provided by ITS Services can be obtained.

#### To NAP Actors

*Date Modified: 30.09.2024 19:20:05, GUID: {98E4FDFE-8123-4b37-B03A-5DCCED4FE24B}*

This data flow only appears in the Context Diagram and contains output to the NAP Actors Terminator. It contains data objects containing either confirmation that the Internet address from which other data objects about ITS Services are available has been recorded, or the result of aa request for access to these data objects.

#### To NAP Actors

*Date Modified: 30.09.2024 19:20:05, GUID: {ADFABE98-0117-47ee-946B-6FFF3043F214}*

This data flow only appears in the Context Diagram and contains output to the NAP Actors Terminator. It contains data objects containing either confirmation that the Internet address from which other data objects about ITS Services are available has been recorded, or the result of aa request for access to these data objects.

### Low Level FDFs

Low Level Functional Data Flows carry a specific data between two Low Level Functions.

#### fnap.cc-data\_request

*Date Modified: 14.01.2025 22:46:44, GUID: {AFB3FDE3-5682-463a-A966-CEF77741C6A9}*

It consists of inputs from the NAP Content Consumer containing data objects that provide request for retrieval of traffic or travel data stored in NAP Data store. Besides the identification of data to be retrieved the request must contain the authorisation credentials of the entity that is providing it, so that this can be checked to ensure that it is a registered entity with right to access the data.

NOTE: authorisation credentials might be void if the data to be retrieved are freely available (i.e. open data)

#### fnap.cc-metadata\_search\_request

*Date Modified: 14.01.2025 22:46:46, GUID: {CE5CAFBE-137B-4743-AB12-5EA3827B901A}*

It consists of inputs from the NAP Content Consumer containing data objects that provide a request for information about accessible traffic, travel data and any other relevant information which are described with metadata in the store of NAP Metadata. The request shall contain keywords or any refining demand in at least one metadata element.

#### fnap.cc-registration\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {7777AD14-8D53-466c-9949-22CFAB635676}*

It consists of inputs from the NAP Content Consumer containing data objects that provide a registration request of and information about a potential NAP Content Consumer which wants to register or a request with credentials of registered NAP Content Consumer for retrieval of its data upon a successful authorisation. (Details of the information about the NAP Content Consumer will be found in the description of the store of NAP Users).

The registration request contains relevant information about the entity to be registered under NAP Content Consumer account, including identity information, licence terms approval, users, machines, and organization information.

#### fnap.cc-support\_request

*Date Modified: 30.01.2025 15:12:13, GUID: {1309E545-2913-41f6-920A-68A496630817}*

It consists of inputs from the NAP Content Consumer containing data objects that provide a request for support describing an issue the NAP User have and to which the NAP Operator shall respond. The data objects are used by functionality in the Manage Traffic Functional Area.

#### fnap.cp-data\_&\_authorisation\_credentials

*Date Modified: 14.01.2025 22:46:45, GUID: {60297FF0-CD09-4e8d-8221-0B0FF35E3239}*

It consists of inputs from the NAP Content Provider containing data objects that provide new or updated traffic or travel data to be loaded into the store of NAP Data store.

Besides the data itself the request must contain the authorisation credentials of the entity that is providing it, so that this can be checked to ensure that it is a registered entity.

#### fnap.cp-metadata\_&\_authorisation\_credentials

*Date Modified: 14.01.2025 22:46:46, GUID: {8D75B934-0C29-40d6-9C80-4963B533B29D}*

It consists of inputs from the NAP Content Provider containing data objects that provide new or updated metadata to be loaded into the store of NAP metadata. The required and optional elements of metadata can be found in a metadata catalogue: https://mobilitydcat-ap.github.io/mobilityDCAT-AP/releases/index.html .

Besides the metadata itself the request must contain the authorisation credentials of the entity that is providing it, so that this can be checked to ensure that it is a registered entity.

#### fnap.cp-registration\_request

*Date Modified: 14.01.2025 22:46:46, GUID: {2165053D-3E67-4324-90F7-172FAA37E259}*

It consists of inputs from the NAP Content Provider containing data objects that provide a registration request of and information about a potential NAP Content Provider which wants to register or a request with credentials of registered NAP Content Provider for retrieval of its data upon a successful authorisation. (Details of the information about the NAP Content Provider will be found in the description of the store of NAP Users).

The registration request contains relevant information about the entity to be registered under NAP Content Provider account, including identity information, licence terms approval, users, machines, and organization information.

#### fnap.cp-support\_request

*Date Modified: 14.01.2025 22:46:46, GUID: {1ED4DEC1-3019-4933-A419-5FE60CC29FF4}*

It consists of inputs from the NAP Content Provider containing data objects that provide a request for support describing an issue the NAP User have and to which the NAP Operator shall respond. The data objects are used by functionality in the Manage Traffic Functional Area.

#### fnap.dps-data\_&\_authorisation\_credentials

*Date Modified: 14.01.2025 22:46:45, GUID: {8EC048EF-B06E-497b-A29E-EFB18412560E}*

It consists of inputs from the Data Provision System containing data objects that provide new or updated traffic or travel data to be loaded into the store of NAP Data store.

Besides the data itself the request must contain the authorisation credentials of the entity that is providing it, so that this can be checked to ensure that it is a registered entity.

#### fnap.drs-data\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {A57EDCA4-5B76-4808-9C68-5DDF06E70C93}*

It consists of inputs from the Data Requesting System containing data objects that provide request for retrieval of traffic or travel data stored in NAP Data store. Besides the identification of data to be retrieved the request must contain the authorisation credentials of the entity that is providing it, so that this can be checked to ensure that it is a registered entity with right to access the data.

NOTE: authorisation credentials might be void if the data to be retrieved are freely available (i.e. open data)

#### fnap.mdrs-metadata\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {1F8479D1-6CEC-42fd-8CD2-79F9AD3334A4}*

It consists of inputs from the Metadata Requesting System containing data objects that provide request for retrieval of information stored in NAP Metadata store as DCAT-AP records. The request shall contain keywords or any refining demand in at least one metadata element.

#### mt\_load\_NAP\_data

*Date Modified: 14.01.2025 22:46:45, GUID: {38D2C47E-7C5D-4d8d-B7B5-05AFC34DF3CA}*

It contains data objects that provide either new data to be loaded into the store of NAP Data, or a request for data to be retrieved. The data that is to be loaded into the store consist of traffic of travel information (static or dynamic) which are made accessible by the NAP Content Provider. The required data objects are further elaborated in NAP Data store.

Apart from real data content the information object loaded to data store shall contain data quality records and NAP Data event logs, Identification of the data and access information.

#### mt\_load\_NAP\_metadata

*Date Modified: 14.01.2025 22:46:46, GUID: {B475FFED-C26D-4c49-A824-6030645EFB86}*

It contains data objects that provide either new metadata to be loaded into the store of NAP Metadata, or a request for metadata to be retrieved. The metadata that is to be loaded into the store shall give information about the contents which are made accessible by the NAP Content Provider. The required and optional elements of metadata can be found in a mobilityDCAT-AP https://mobilitydcat-ap.github.io/mobilityDCAT-AP/releases/index.html.

Apart from data specified by the above said catalogue other data are managed by the load function these are data quality records and NAP User event log.

#### mt\_load\_NAP\_user\_data

*Date Modified: 14.01.2025 22:46:46, GUID: {EFA11DF3-9ABC-46b9-8E31-B15D7F357F69}*

It contains data objects that provide either new data to be loaded into the store of NAP Users, or a request for data objects to be retrieved. The data objects that are to be loaded into the store will include information about a previously unregistered NAP User or modifying, extending, deleting previously registered NAP User.

#### mt\_NAP\_data\_for\_quality\_check

*Date Modified: 14.01.2025 22:46:45, GUID: {12DD5935-707F-445e-B70C-4401AE81022C}*

It contains data objects with the traffic or travel information that has been retrieved from the store of NAP Data following a scheduled or triggered event. The data object also contains quality information that is to be updated after the quality check of the retrieved data content.

#### mt\_NAP\_data\_mod\_authorisation\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {E20BF73E-7630-4235-9E13-54B7C5C78E46}*

It contains data objects that provide credentials of a NAP Content Provider or Data Providing System to be checked against the data stored in NAP Users data store to authorize the claimant to insert data records in the store of NAP Data.

#### mt\_NAP\_data\_mod\_authorisation\_response

*Date Modified: 14.01.2025 22:46:45, GUID: {310CD8FD-F1FA-4b44-A502-9A7D061FD2BE}*

It contains data objects that provide information about the validity of the authorisation credentials of a NAP Content Provider or Data Providing System that authorize the claimant to modify / insert data records in the store of NAP Data.

#### mt\_NAP\_data\_mod\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {B7FC7C2F-C1AA-4bf8-82D4-0EA2370C6BC9}*

It contains data objects that provide either new data or updates to data that has been previously loaded into the store of NAP Data or a request for data objects to be retrieved. The updated data objects that are to be loaded into the store includes traffic or travel data objects and supporting metadata allowing linking the data object to information stored in NAP Metadata store and accessibility information by the NAP Content Consumers.

#### mt\_NAP\_data\_mod\_response

*Date Modified: 14.01.2025 22:46:45, GUID: {E340D2D2-B614-4c5f-BA76-FBD43E68CF5E}*

It contains data objects that provide information about the success of loading the newly provided or updated NAP Content Provider data into the store of NAP Data or provide data objects containing the NAP Data metadata (e.g. events associated with data access, quality information).

#### mt\_NAP\_data\_quality\_check\_result

*Date Modified: 14.01.2025 22:46:45, GUID: {8AE74C5A-125D-4ce5-ABD4-89818AAE054B}*

It contains data objects created by Provide Data Quality Checks after checking quality of data that has been retrieved from the store of NAP Data following a scheduled or triggered event. The data is timestamp and success of failure (with number of errors found) of the checks and aggregated information i.e. average of the characteristic per time period.

#### mt\_NAP\_data\_read\_authorisation\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {D487FAFF-4F5B-4520-BC53-427580A77997}*

It contains data objects that provide credentials of a NAP Content Consumer or Data Requesting System to be checked against the data stored in NAP Users data store to authorize the claimant to read data records from the store of NAP Data.

#### mt\_NAP\_data\_read\_authorisation\_response

*Date Modified: 14.01.2025 22:46:45, GUID: {C050FEDE-4276-4730-8B5C-0F605084BE69}*

It contains data objects that provide information about the validity of the authorisation credentials of a NAP Content Consumer or Data Requesting System that authorize the claimant to read data records from the store of NAP Data.

#### mt\_NAP\_data\_read\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {50A2D529-AAC6-4908-919C-7838C607386A}*

It contains a request for identified data objects to be retrieved from the NAP Data store together with requestor identification. The data objects that are to be retrieved include traffic or travel data objects and supporting metadata information related to the identified data including last update timestamp and quality information.

#### mt\_NAP\_data\_read\_response

*Date Modified: 14.01.2025 22:46:45, GUID: {3D6B17A5-0D0F-4944-9E8F-FB446B82FF2F}*

It contains data objects with traffic or travel information from the store of NAP Data following a previous request to retrieve data and last update timestamp and quality information.

#### mt\_NAP\_metadata\_for\_data\_check\_and\_store\_request

*Date Modified: 14.01.2025 22:46:45, GUID: {A65597A1-4E9A-40cc-9665-4640823B199F}*

It contains data objects that provide a request from Manage NAP Data Repository functionality for set of metadata related to NAP Data to be checked/stored/updated. The request shall contain keywords or any refining demand in at least one metadata element together with a request identifier.

#### mt\_NAP\_metadata\_for\_data\_check\_and\_store\_response

*Date Modified: 14.01.2025 22:46:45, GUID: {2FD69798-3950-48ea-B7F0-F52F39470F34}*

It contains data objects that provide items of NAP metadata which have been retrieved from the store of NAP Metadata following a previous request.

#### mt\_NAP\_metadata\_for\_quality\_check

*Date Modified: 14.01.2025 22:46:45, GUID: {EB72DA4A-A638-4946-B10F-21C536686F6C}*

It contains data objects with the metadata information that has been retrieved from the store of NAP Metadata following a scheduled or triggered event. The data object also contains quality information that is to be updated after the quality check of the retrieved metadata content.

#### mt\_NAP\_metadata\_mod\_authorisation\_request

*Date Modified: 14.01.2025 22:46:46, GUID: {D4D31515-ABC4-468d-964E-F6D5D4F77136}*

It contains data objects that provide credentials of a NAP Content Provider to be checked against the data stored in NAP Users data store to authorize the claimant to modify metadata records in the store of NAP Metadata.

#### mt\_NAP\_metadata\_mod\_authorisation\_result

*Date Modified: 14.01.2025 22:46:46, GUID: {C526D3EC-9CD9-465e-B6AB-D13F6308EBB3}*

It contains data objects that provide information about the validity of the authorisation credentials of a NAP Content Provider that authorize the claimant to modify metadata records in the store of NAP Metadata.

#### mt\_NAP\_metadata\_mod\_request

*Date Modified: 14.01.2025 22:46:46, GUID: {E5EE6235-7DA8-4f7c-B007-A5F039A31397}*

It contains data objects that provide either new metadata or updates to data that has been previously loaded into the store of NAP Metadata or a request for data objects to be retrieved. The updated data objects that are to be loaded into the store includes information that is being made accessible by the NAP Content Provider. The required and optional elements of metadata can be found in a metadata catalogue: https://mobilitydcat-ap.github.io/mobilityDCAT-AP/releases/index.html

#### mt\_NAP\_metadata\_mod\_result

*Date Modified: 14.01.2025 22:46:46, GUID: {3947BAD7-63D3-4efd-9308-DDBCD8C288F9}*

It contains data objects that provide information about the success of loading the newly provided or updated NAP Content Provider metadata into the store of NAP Metadata or provide data objects containing the NAP Content Provider metadata All information stored in the NAP Metadata store about the authorised NAP Content Provider may be retrieved this way.

#### mt\_NAP\_metadata\_quality\_check\_result

*Date Modified: 14.01.2025 22:46:45, GUID: {01233765-5DC4-4cf9-879E-4DC6961C9611}*

It contains data objects created by Provide Metadata Quality Checks after checking quality of metadata that has been retrieved from the store of NAP Metadata following a scheduled or triggered event. The data is timestamp and success of failure (with number of errors found, level of service achieved) of the checks and overall aggregated summary. The checks follow the MQA and InQMS methodology, at minimum it is an availability of the urls provided in metadata.

#### mt\_NAP\_metadata\_search\_request

*Date Modified: 14.01.2025 22:46:46, GUID: {F2F9B90C-BD35-4b2a-8DCB-4B8F834C419A}*

It contains data objects that provide a request from the NAP Content Consumer for information about traffic, travel data and any other relevant information which are described with metadata in the store of NAP Metadata. The request shall contain keywords or any refining demand in at least one metadata element together with a request identifier.

#### mt\_NAP\_metadata\_search\_result

*Date Modified: 14.01.2025 22:46:46, GUID: {F378C3C8-88CC-48f5-8713-7E685951CC86}*

It contains data objects that provide metadata items which have been retrieved from the store of NAP Metadata following a previous search request. A request identifier must be included so that it can be related to a particular request (there may be multiple requests being made from the same source) and returned to the requestor.

#### mt\_read\_NAP\_data

*Date Modified: 14.01.2025 22:46:45, GUID: {30332204-58C2-432d-A2FE-1801EA8E123F}*

It contains data objects that provide data that has been retrieved from the store of NAP Data following a request. The data that has been read from the store contains the traffic or travel information content together with its metadata which are made accessible to authorised NAP Functionality.

The required data objects are further elaborated in NAP Data store.

Apart from real data content the information object retrieved from data store may contain data quality records and NAP Data event logs, Identification of the data and access information.

#### mt\_read\_NAP\_metadata

*Date Modified: 14.01.2025 22:46:46, GUID: {1E6C064E-67D4-4638-9588-0E0DCF2813ED}*

It contains data objects that provide metadata that has been retrieved from the store of NAP Metadata following a request. The metadata that has been read from the store gives information about the contents which are made accessible by the NAP Content Provider. The required and optional elements of metadata can be found in a metadata catalogue: https://mobilitydcat-ap.github.io/mobilityDCAT-AP/releases/index.html

Apart from data specified by the above said catalogue other data are managed by the read function these are data quality records and NAP User event log.

#### mt\_read\_NAP\_user\_data

*Date Modified: 14.01.2025 22:46:46, GUID: {6D08A3DC-FB6E-47d7-B1BF-B68208337A4F}*

It contains data objects that provide data that has been read from the store of NAP Users, following a previous request for data to be retrieved. The data that is to be read from the store will be information about a registered NAP User, or a "no data" found response. (Details of the type of information about the NAP Users that is available will be found in the description of the store of their data).

#### ps\_metadata & data source

*Date Modified: 29.01.2025 13:37:57, GUID: {36B4BBF5-5B68-4d38-AF28-7669EFF35137}*

Source is provided by CP

Credentials are requested by Provision System or not

Source has to meet technical requirements of NAP (API Type, data language)

#### ps\_metadata & success report

*Date Modified: 29.01.2025 13:37:57, GUID: {1B63FEAE-619D-4b2e-B48D-663FEAC9BE9D}*

#### tnap.cc-data\_response

*Date Modified: 14.01.2025 22:46:45, GUID: {F7412343-95F0-4611-8149-58EA48466E80}*

It contains outputs to the NAP Content Consumer that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the response to a previous request to retrieve data. The response can be either “successful” or “failed”, which must be accompanied by a reason for the “failure” i.e. invalid authorisation credentials. Also based on the successful request it contains data objects representing traffic or travel data from the NAP Data store related to that request and last update timestamp and quality information.

#### tnap.cc-metadata\_search\_result

*Date Modified: 14.01.2025 22:46:46, GUID: {DDCEDB1B-C3C2-4d88-AAF0-8371D10BF745}*

It contains outputs to the NAP Content Consumer that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are items of NAP metadata which have been retrieved from the store of NAP metadata following a previous search request.

#### tnap.cc-registration\_response

*Date Modified: 14.01.2025 22:46:45, GUID: {60E6A67C-C9D0-464b-900F-9F28DC71E886}*

It contains outputs to the NAP Content Consumer that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the response (“acceptance” or “rejection”) to a previous registration request from a NAP Content Consumer. In case of a successful registration, it includes credentials for the Content Consumer to prove its authorisation to access NAP functionality that needs authorisation. Also based on the successful request it contains data of the registered NAP Content Consumer.

#### tnap.cc-support\_response

*Date Modified: 30.01.2025 15:12:13, GUID: {27BFFD1B-0E50-4c8b-8CDF-8F958078802C}*

It contains outputs to the NAP Content Consumer that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the responses to previous requests for support, i.e. information about handling and resolving the issue.

#### tnap.cp-data\_upload\_result\_report

*Date Modified: 14.01.2025 22:46:45, GUID: {A6E68B7A-7C94-474f-B168-C2A98537BC37}*

It contains outputs to the NAP Content Provider that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the response to a previous request for newly provided or updated traffic or travel data to be loaded into the store of NAP Data. The response can be either “successful” or “failed”, which must be accompanied by a reason for the “failure”. In case of invalid authorisation credentials, the Content Provider should be invited to (newly) register through the Manage NAP User Registrations and Provide Authorisation Service function.

#### tnap.cp-metadata\_&\_success\_report

*Date Modified: 14.01.2025 22:46:46, GUID: {169488F2-0C7D-4eef-8B43-C324785B730D}*

It contains outputs to the NAP Content Provider that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the response to a previous request to create, update delete Content Provider related metadata in the store of NAP Metadata. The response can be either “successful” or “failed”, which must be accompanied by a reason for the “failure”. In case of invalid authorisation credentials, the Content Provider should be invited to (newly) register through the Manage NAP User Registrations function. Also based on the successful request it contains data objects from the NAP Metadata store related to that NAP Content Provider.

#### tnap.cp-registration\_response

*Date Modified: 14.01.2025 22:46:46, GUID: {AFD11DEB-11FE-4692-8BEB-B81835B7A4AD}*

It contains outputs to the NAP Content Provider that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the response (“acceptance” or “rejection”) to a previous registration request from a NAP Content Provider. In case of a successful registration, it includes credentials for the Content Provider to prove its authorisation to access NAP functionality that needs authorisation. Also based on the successful request it contains data of the registered NAP Content Provider

#### tnap.cp-support\_response

*Date Modified: 14.01.2025 22:46:46, GUID: {997937B5-775D-4297-8297-D9ABB198ACF2}*

It contains outputs to the NAP Content Provider that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the responses to previous requests for support. i.e. information about handling and resolving the issue.

#### tnap.dps-data\_upload\_result\_report

*Date Modified: 14.01.2025 22:46:45, GUID: {FBD65825-894B-415a-AE17-8AD14FDF8F08}*

It contains outputs to the Data Provision System that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the response to a previous request to upload data. The response can be either “successful” or “failed”, which must be accompanied by a reason for the “failure” i.e. invalid authorisation credentials.

#### tnap.drs-data\_response

*Date Modified: 14.01.2025 22:46:46, GUID: {53ED8069-70B8-44ac-85D7-ED06B5283424}*

It contains outputs to the Data Requesting System that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are the response to a previous request to retrieve data. The response can be either “successful” or “failed”, which must be accompanied by a reason for the “failure” i.e. invalid authorisation credentials. Also based on the successful request it contains data objects representing traffic or travel data from the NAP Data store related to that request.

#### tnap.mdrs-metadata\_response

*Date Modified: 14.01.2025 22:46:46, GUID: {CA529868-7C49-48f9-AD5E-F796011DFDF5}*

It contains outputs to the Metadata Requesting System that have been created from data objects provided by functionality in the Manage Traffic Functional Area that are items of NAP Metadata which have been retrieved from the store of NAP Metadata following a previous request. Data are formatted as DCAT-AP records compliant with mobilityDCAT-AP.

## Data Stores

This chapter defines data stores for **both NAP types**, Metadata Directory and Data Platform.

### D3.15 NAP Metadata

*Date Modified: 30.09.2024 18:45:05, GUID: {107C58F6-DF90-4243-BEBB-A50AAACE3DF0}*

This Data Store shall be used within the Manage Traffic Functional Area. It shall contain information objects that provide metadata about traffic, travel data and any other relevant information. The required and optional elements of metadata have been harmonised and can be found in a metadata catalogue: https://mobilitydcat-ap.github.io/mobilityDCAT-AP/releases/index.html.

Metadata is structured in the data store to:

(1) describe data provider, where each data provider may list multiple of

(2) data sets or services and each of such can be provided by more than one way by specifying its

(3) distribution parameters.

The content and the structure are governed by the mobilityDCAT-AP.

Further on the data store also contains:

(4) log of events with respect of metadata creation, update and

(5) quality information per data set.

### D3.17 NAP Users

*Date Modified: 30.09.2024 18:45:05, GUID: {6EFCE4AC-8716-4e03-A229-875C0AA05392}*

This Data Store shall be used within the Manage Traffic Functional Area. It shall contain information objects that provide details of NAP Users, i.e. NAP Content Providers and NAP Content Consumers (for Data Platform NAP type) . The Data Store contains private information used by NAP Users to access the NAP, to provide agreement on terms and conditions. Public metadata about traffic and travel information and other related information are stored in NAP Metadata store (D3.15).

For Content Providers the data store contains following data objects:

(1) organization with name (1.1), postal address (1.2), website (1.3), agreement on licence terms (1.4), unique identifier assigned to organization (1.5), name and contact details of a responsible person to act as a contact (1.6).

(2) user account(s) with name (2.1), email (2.2), credentials (2.3), user type (2.4).

\*(3) machine account with url (3.1), connection type (3.2), credentials (3.3).

For Content Consumers the data store contains following data objects:

\*(1) organization with name (1.1), postal address (1.2), website (1.3), agreement on licence terms (1.4), unique identifier assigned to organization (1.5), name and contact details of a responsible person to act as a contact (1.6).

\*(2) user account(s) with name (2.1), email (2.2), credentials (2.3), user type (2.4).

\*(3) machine account with url (3.1), connection type (3.2), credentials (3.3).

\* Optional data object for Data Platform NAP type and even there it is optional provided the data is not openly accessible.

Additionally, for both:

(4) Event information (log in, log out, change of data)

### D3.18 NAP Data

*Date Modified: 29.09.2024 1:32:40, GUID: {B1156E38-B7ED-4dcd-BD87-C003C660A85A}*

This Data Store shall be used within the Manage Traffic Functional Area. It shall contain information objects that provide traffic and travel data.

Each information object in the Store shall contain the following data objects:

(1) actual stored traffic or travel related data that is considered as a compact and comprehensive data content

(2) data quality information

(3) relation of the data content to the metadata elements, allowing to identify data distribution

(4) access credentials to stored content identifying the information object creator and updater and its readers

(5) last update time information

(6) size of the object

Data content to be stored in the data store is given mainly by the obligations to make certain data content accessible via the NAP. The obligation together with a list of data is stipulated in the ITS Directive 2010/40/EU and its revised version (EU) 2023/2661 and complementary Delegated Regulations 885/2013, 886/2013, 2015/962, 2017/1926, 2022/670 and 2023/1804.