NAP Reference Architecture

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

17.04.2025

# KPI Framework

To assess a NAP LoS based on a framework of Key Performance Indicators (KPIs) related to the offered NAP interoperability features and services. The tool is called **“NAP LoS KPI Framework tool” (NLKF)** and it is used by NAP operators as a self-assessment survey in periodic (yearly) scoring exercises (starting in spring 2023). NLKF helps NAP harmonization activities such as:

* Supporting the NAP operators with insights on current state and gaps on existing and new potential NAP features, that can be added to its roadmap in order to increase performance to a desired level;
* Supporting supervising bodies of European or national regulations and agreements;
* Creating NAP European benchmark reference based on the minimum, average and other statistic scores of all Member states.

NLKF is as bottom-up principle, as a state of practice in Europe going from individual KPIs. NLKF includes both quantitative and qualitative KPIs and differentiates the provided answers when a different platform (2 types) is operated for one or more Delegated Regulations supplementing the ITS Directive (2010/40/EC). The aggregated results for feature categories or for a NAP as a whole are expressed in quantitative manner (Grade of Achievement, GA) or qualitative (Maturity Level, LoS 1 to 5).



Figure: KPI Framework

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**Dokument\_link**: https://rupprechtconsultde.sharepoint.com/:w:/r/sites/NAPCOREallpartners/\_layouts/15/Doc.aspx?sourcedoc=%7B7476787F-B2DF-472B-ADC5-5F98B8F5E1AE%7D&file=NLKF%20tables%202024%20v0.2\_subset%20KPI%20descritpion.docx&action=default&mobileredirect=true

## Access KPIs

NAPs (National Access Points) are publicly available online, allowing immediate access without authentication. They comply with web design standards, ensuring simplicity, navigability, and accessibility. NAPs are available in English to cater to international users and adhere to EU data protection policies. Data publishers must register to enhance security, while data consumers register for full access and customization. APIs facilitate automated data exchange, and visualization tools help users quickly understand data relevance.



Figure: Access KPIs

### KPI 1.1 Online availability

*Date Modified: 21.03.2025 14:08:08, GUID: {8BFE2113-E64D-4e68-8B54-D066BB7A0999}*

**“On-line availability”** KPI assesses whether the NAP platform is online or not. In this case, both REQ and ACC value is set to 1 to reflect that the on-line availability of a NAP constitutes a fundamental prerequisite.

Values:

0: No

1: Yes

**Minimum acceptable value for interoperability: 1**

### KPI 1.10 Security – providers verification

*Date Modified: 01.10.2024 14:54:02, GUID: {3F00CF71-2F41-413b-BAA8-CAF56CF80F39}*

**“Security – providers verification”** KPI assesses the extent to which the authenticity of provided data (e.g., input provided during the registration process) is verified. In case that a self-verification process is in place for data providers, this KPI takes a value equal to 1. On the other hand, when the authenticity of provided, data is doubled checked by both data providers and NAP operator, this KPI gets a value equal to 2.

Note: This is about metadata of a data provider regarding registration process (i.e., before obtaining username and password or other identity). It’s about trust/credibility of a provider

N/A: No data provider can use the NAP interface

0: No

1: Self-authentication of data providers (e.g., via e-mail)

2: Authentication of data providers is double checked, i.e., by the data provider and approved by the NAP operator

Minimum acceptable value for interoperability: 1

### KPI 1.11 Personal data protection

*Date Modified: 01.10.2024 14:55:29, GUID: {98803393-08B6-41af-BF7A-64B27C0FB955}*

**“Personal data protection”** KPI aims to assess whether personal data is stored in a manner compliant to GDPR norms. This KPI is not addressed as affecting the minimum level of service of a NAP; however, the existence of a GDPR-compliant procedure for handling personal data is associated with an increased level of service.

If the NAP stores personal information about registered users (consumers and/or providers), is the storage and handling of personal information compliant with GDPR?

N/A: There is no user data stored at NAP

0: Non-compliance to GDPR

1: GDPR compliance at the platform level (i.e., “platform GDPR compliance”)

Minimum acceptable value for interoperability: 1

### KPI 1.12 Procedure for input of metadata or data to the NAP

*Date Modified: 01.10.2024 14:56:15, GUID: {CC4B272E-7DCA-4084-AF3B-71E934E4BF43}*

**“Procedure for publication of data on the NAP”** KPI assesses whether data providers need to register to add data/metadata. It gets a value equal to 0 when data or metadata is uploaded by the NAP operator, equal to 1 when data providers upload data/metadata by themselves, equal to 2 when the uploaded data has no verification process performed from the NAP side, equal to 3 when data providers are inputting data and/or metadata and content is verified manually in some random samples by the NAP operator, as well as equal to 4 when the uploaded data is verified automatically by the NAP. REQ level of service is associated with possibility on behalf of data providers to upload data/metadata by themselves with no verification from the NAP.

In what way can data providers add data and/or metadata to the NAP?

0: No data or metadata can be provided via the NAP online/web interface

1: Data resource metadata and/or providers' data is added by the NAP operator

2: The data providers are inputting data and/or metadata themselves, no verification process is performed from the NAP side

3: The data providers are inputting data and/or metadata + content of the (meta)data is verified manually in some random samples by the NAP operator (like technical or logical check of correct input type or completeness of the mandatory fields)

4: The data providers are inputting data and/or metadata + content of the (meta)data is verified (partially) automatically by the NAP (there is some verification process automatically running, like technical or logical check of correct input type or completeness of the mandatory fields)

Minimum acceptable value for interoperability: 2

### KPI 1.13 Metadata output and access restrictions

*Date Modified: 01.10.2024 14:56:52, GUID: {5E6E9B2A-B90D-4b97-81D1-ECE9E45EDF5B}*

**“Metadata access restrictions”** KPI assesses whether NAP users/data consumers require to register to access the metadata of a NAP’s publications. The indiscriminate need of NAP users/data consumers to access any type of metadata is not addressed as a favourable condition for a NAP’s level of service, considering the imposed barrier to a NAP’s content discoverability. Therefore, it is assumed that a minimum level of service is associated with the possibility on behalf of NAP users/data consumers to freely access the metadata of publicly available publications.

Do data consumers need to register to search through the metadata information of the NAP?

0: No metadata is provided via the online/web NAP interface

1: Consumers need to register to view (search/get access to metadata) any NAP content

2: Consumers need to register to get access to specific metadata of any dataset

3: Consumers need to register to get access to specific metadata only for non-publicly available datasets

4: No registration necessary / consumers have full access to the metadata and the search functionalities

Minimum acceptable value for interoperability: 3

### KPI 1.14 Data security and access restrictions for data uploading

*Date Modified: 01.10.2024 14:57:28, GUID: {28E122D6-8DA1-4746-BA9B-01CEDB73BF9C}*

**“Data security and access restrictions for uploading”** KPI aims to assess the availability of security mechanisms controlling and restricting the possibility of data uploading. This KPI is addressed as making sense only if a NAP complies with the concept of a data portal. Given that several access and authentication control methods exist, the value of this KPI is increased by 1 when more than one method is applied. The predetermined options include (a) the utilization of the HTTP Strict Transport Security (HSTS) mechanism that enables the interaction of a NAP’s server with other machines only through HTTPS connections, (b) the utilization of IP Address Authentication mechanism configuring the API Gateway of a NAP to allow its interaction with machines the IP address of which is included in the list of accepted IP addresses, (c) the Basic RFC 7617 Authentication mechanism which enforces the transmission of credentials (e.g., username and password) encoded according to Base64, (d) the utilization of the Digest RFC 7617 Authentication which enforces the transmission of credentials and any other requested information in an encrypted form, (e) the authentication by URL parameters enabling the provision of authentication information to a NAP in the form of query string parameters, and (f) authentication through client certificates that allow a machine to communicate with a NAP only when a client certificate (e.g., a PKCS12 file) is loaded onto that machine.

When uploading data as a provider, are there security mechanisms in place to ensure the trust in the data or restricting the access to the NAP?

N/A: Metadata directory case (No data can be uploaded via the NAP online/web interface)

0: No data can be uploaded via the NAP online/web interface in a data platform NAP type

0: No security or authentication mechanisms are in place in a data platform NAP type

0: Security and/or authentication mechanisms are in place to ensure the trust in the data or restrict the access for your NAP

Value+1 (for each of the following options): Which security mechanisms are in place to ensure the trust in the data or restrict the access for your NAP? You can select more options:

a. Transport security (https)

b. Authentication by IP filter (access based on IP address of the provider)

c. Basic authentication according to RFC 7617

d. Digest authentication according to RFC 7616 (https://tools.ietf.org/html/rfc7616)

e. Authentication by URL parameters

f. Authentication by client certificate (incl. EU-wide common user authentication mechanism)

Minimum acceptable value for interoperability: 2

### KPI 1.15 Data security and access restrictions for data downloading

*Date Modified: 01.10.2024 14:58:17, GUID: {FF1FD326-276A-49ad-A615-783A959D7C6B}*

**“Data security and access restrictions for downloading”** follows the same logic as the previous one with the only difference being that data downloading is in the spotlight (instead of data uploading).

When accessing data as a consumer, are there security mechanisms in place to ensure the trust in the data or restricting the access to the NAP or the data?

**Minimum acceptable value for interoperability: 3**

Values:

N/A: Metadata directory case (No data is provided via NAP online/web interface)

0: No data is provided via NAP online/web interface in a data platform NAP type

0: No security or authentication mechanisms are in place in a data platform NAP type

0: Security and/or authentication mechanisms are in place to ensure the trust in the data or restrict the access for the NAP

Value+1 (for each of the following options): Which security mechanisms are in place to ensure the trust in the data or restrict the access for your NAP? You can select more options:

a. Transport security (https)

b. Authentication by IP filter (access based on IP address of the consumer)

c. Basic authentication according to RFC 7617 (https://tools.ietf.org/html/rfc7617)

d. Digest Authentication according to RFC 7616 (https://tools.ietf.org/html/rfc7616)

e. Authentication by url parameters

f. Authentication by client certificate (private keys, certificates, incl. EU-wide common user authentication mechanism)

Minimum acceptable value for interoperability: 2

### KPI 1.16 Indication of data modification

*Date Modified: 04.10.2024 14:16:55, GUID: {0D51A185-39DD-41c0-AFC9-4FFC32EE8D97}*

**Link NAR Open: Part of Meta Data Description**

**“Indication of data modification”** KPI assesses the extent to which the change of a dataset compared to its previous state is indicated by a NAP. Changes encompass both changes in the actual content of a dataset that is stored in a NAP (e.g., static data) and changes in its metadata. In such a case, it is assumed that a minimum level of service is associated with the support by the webserver of a NAP of either “if-modified-since” or “if-none-match” method, while an advanced level of service is associated with the support by the webserver of a NAP of both methods. The former method expresses the ability of a NAP’s webserver to specify the last time a change has been made on a provided content, while the latter expresses the ability of a NAP’s webserver to use ETag headers (the value of which supports the assessment of whether a change has been made or not) and return the changed part of the provided content.

When accessing the data stored at NAP (snapshots / static datasets), is an indication of the change of the dataset available in comparison to previous access?

0: No data is provided via NAP interface and no metadata is used for the information about data modification; or no change/modification information is provided

1: Webserver uses “Last updated time” information

2: Webserver uses either if-modified-since or if-none-match (etag) headers

3: Webserver uses both if-modified-since and if-none-match (etag) headers

Minimum acceptable value for interoperability: 1

### KPI 1.17 Data transfer optimization

*Date Modified: 01.10.2024 15:00:14, GUID: {025CAF43-3430-4650-B487-6B6AAF7E6C50}*

**“Data transfer optimization”** KPI assesses the extent to which a NAP can optimize data transferring by compressing the requested content. This KPI is addressed as making sense only if a NAP complies with the concept of a data portal, since a data directory is not involved at all in the data transferring process. A value equal to 0 indicates that such a functionality does not exist, while a value equal to 1 indicates that a NAP serving as a data portal can provide either compressed or uncompressed content based on a client’s request.

Can the NAP server compress the requested content to speed up the transfer?

N/A: Metadata directory case (No data is provided via the NAP online/web interface)

0: No data is provided via the NAP online/web interface in a data platform NAP type or no possibility of data transfer optimization there (i.e., no reaction to a client request, data is provided in an uncompressed form)

0: Data is provided (un)compressed per clients' request

Value+1 (for each of the following options): You can select more options:

a. Data is (or can be) provided compressed (may include compression in Geopackage, WFS/WMS API's, TN-ITS update messages)

b. The user can select if the data will be provided uncompressed or compressed

c. Data can be provided in a differential form, i.e., new data only and/or changes to the previous state where a relevant date/time/period can be set by the user

Minimum acceptable value for interoperability: 1

### KPI 1.18 API usage for data transfer

*Date Modified: 01.10.2024 15:01:05, GUID: {37F65E8F-2DCF-410e-BC8B-09B70FE6C162}*

**“API usage for data transfer”** KPI investigates whether a NAP is equipped with an Application Programming Interface (API) service that allows clients of data consumers to request and download through external code data and metadata content or other resources matching specific queries. Moreover, it investigates whether such a service allows the clients of data providers to automatically upload and import (through external coding) new data and metadata content but also update it or even delete it. In line with the previous KPI, the current one is addressed as making sense only if a NAP complies with the concept of a data portal, since a data directory is not involved at all in the data transferring process. Given that the focus of NAPs is placed (or at least should be placed) on machine-to-machine communication and data exchange supporting the operation of ITS systems, a minimum level of service is associated with the existence of an API service allowing at least the automated upload of data and metadata content.

Does the NAP include Application Programming Interfaces for automated data exchange?

N/A: Metadata directory case (No data is transferred via the NAP interface)

0: No data is transferred via the NAP interface in a data platform NAP type

0: No API, just the web-based interface is used in a data platform NAP type

0: API is available in a data platform NAP type

Value+1 (for each of the following options): Which Application Programming Interfaces for automated data exchange are used for your NAP? You can select more options:

a. API for upload (data producers)

b. API for download (data consumers)

Minimum acceptable value for interoperability: 1

### KPI 1.2 Compatibility with web browsers

*Date Modified: 01.10.2024 14:51:00, GUID: {E60C5591-AB99-4a20-B975-9734FE18899F}*

**“Compatibility with web browsers”** KPI refers to the compatibility of NAP with different web browsers. The ACC KPI value is set to 1 indicating that a NAP platform should be operational with at least one web browser, whereas the REQ required KPI value is set to 2 to indicate an increased level of service when a NAP is operational with the most common web browsers. This KPI is closely related to the previous one, considering that its quantification makes sense only when a NAP is available online.

0: No

1: Yes, with one or more specific web browsers (e.g., Firefox)

2: Yes, with all of the following 5 browsers: Firefox, Google Chrome, Microsoft Edge, Apple Safari and Opera

**Minimum acceptable value for interoperability: 1**

### KPI 1.3 Web performance – latency

*Date Modified: 01.10.2024 14:51:06, GUID: {A1BA8118-FD66-4705-9494-A432A308D211}*

What is the NAP approximate webpage response/latency time duration **in milliseconds** during peak hours (time delay from some stimulus to work with the website to reaction, typically loading the introductory (main) web page)?

*For the measurement, you can use the development tool in the web browser (Ctrl+Shift+I in Chrome or F12 in Firefox).*

Value 0 to infinity

**Minimum acceptable value for interoperability: 2000**

### KPI 1.4 Responsiveness

*Date Modified: 01.10.2024 14:51:15, GUID: {A619225B-8550-4dca-B6EE-0505006A4749}*

**“Responsiveness”** KPI examines whether a NAP’s web design is adaptable to different devices and screen sizes. There are three possible values that this KPI may take. A value equal to 0 indicates that there is no responsiveness, a value equal to 1 indicates that a NAP is responsive to different screen sizes and, lastly, a value equal to 2 indicates that a NAP is responsive to both different screen sizes and devices. The minimum level of service is associated, in this case, with the responsivity of a NAP to at least different screen sizes.

0: No responsive web design

1: Responsive web design for different screen sizes on PC

2: Responsive web design for different screen sizes and devices

**Minimum acceptable value for interoperability: 1**

### KPI 1.5 Web performance – Simplicity / usability

*Date Modified: 01.10.2024 14:51:21, GUID: {19537BDF-1852-45b1-A148-C47A90792691}*

What is the average number of operations (e.g., key presses, mouse wheel movements, mouse/screen clicks) required to get access to metadata (without getting the data itself)?

*The value should be relevant for getting access to “metadata language” or “metadata contact point” (if you are having both, please, use an average).*

*The value should be relevant to a skilled user, i.e., who already knows the set-up of the website (where to find the metadata).*

*The value refers to unregistered or logged-in user (the logging process is not involved in the parameter).*

Value **0** to **infinity**

**Minimum acceptable value for interoperability: 10**

### KPI 1.6 Data visualization

*Date Modified: 01.10.2024 14:51:40, GUID: {029037A9-99C2-45b7-BA28-87E427702779}*

Not linked to NAR elements!!

Does the NAP include data visualization functionalities?

Note: The visualization can include graphs summaries of data aggregation, time series, maps with areas of service, maps with information from data (location of pitstops) etc.

Note: Even if no data is provided via NAP interface (like in metadata directories), it is still possible to have visualization available, e.g., through WMS.

0: No visualization of data

0: Visualization is available

Value+1 (for each of the following options): What types of data visualization functionalities are available? You can select more options:

a. Data download, allowing the user to do some visualization at the clients' side

b. Visualization available as images presented on the web

c. Visualization available as interactive web map services

d. Visualization available projecting a time-lapse video (for a selected time period)

**Minimum acceptable value for interoperability: 1**

### KPI 1.7 Web performance – Consistency and navigability

*Date Modified: 04.10.2024 14:04:43, GUID: {4B3700B3-CF65-470c-83D9-B0FB0A7D7E69}*

Not linked to NAR!

Does the NAP adhere to principles of web structure, page layout and menu structure?

Initial value 0 and then +1 for each of the following options: You can select more options:

a. Menus are in the same position

b. Use of same fonts and colours throughout the site

c. Availability of a search box on each page

d. Logo links back to the home page

e. Existence of a hierarchical arrangement of web subpages

f. Existence of a “sitemap” page easing navigation (e.g., a tree structure with links to individual pages)

**Minimum acceptable value for interoperability: 2**

### KPI 1.8 Support of commonly used languages

*Date Modified: 01.10.2024 14:52:40, GUID: {69E72527-738E-4f0d-AB71-879AF126CC0A}*

**“Support of commonly used languages”** KPI may take four possible values. A value equal to 0 indicates that a NAP supports only the national language. A value equal to 1 indicates that although a NAP supports English, some of its content (e.g., metadata of included publications) is provided only in the national language. On the other hand, a value equal to 2 indicates that a NAP fully supports the English language.

Note: This is relevant to the webpage while this is not relevant to the metadata/data content that depend on its publisher.

0: Supports national language only, other than EN

1: Supports EN but some content in national language only (other than EN)

2: Supports EN for platform and all content (user interface and all text content)

Minimum acceptable value for interoperability: 1

### KPI 1.9 Security – Technical

*Date Modified: 01.10.2024 14:53:12, GUID: {F1AE9278-2AB5-4ade-9476-7518D07969C2}*

**“Security – Technical”** KPI addresses the existence of security features (i.e., security certificates) and the protection of personal data provided by NAP users. A value equal to 0 points out the absence of any security feature. On the other hand, a value equal to 1 indicates the existence of security certificates in specific parts of a NAP’s website, while a value equal to 2 indicates the existence of security certificates throughout the website of a NAP. In that case, a minimum level of service is assumed to be exhibited by a NAP when SSL certificates cover at least the most critical (in terms of data protection) parts of a NAP’s website.

0: Absence of security certificates

1: Partial existence of security certificates (e.g., in the landing page but not in the elements of the main sitemap)

2: Existence of security certificates in the entirety of the platform’s elements

Minimum acceptable value for interoperability: 1

## Communication KPIs

NAPs should offer help desks, email support, and messaging services to assist data publishers, preventing misunderstandings during data uploads. Promoting NAPs at national and international events is crucial for attracting more data providers and consumers. Direct communication between data consumers and providers is essential for resolving issues and building trust. Additionally, NAPs should send mass notifications about changes in content, functionality, procedures, and data exchange policies to keep users informed.



Figure: Communication KPIs

### KPI 2.1 Support to users to register or add data/metadata

*Date Modified: 04.10.2024 14:20:32, GUID: {57015FD8-66C2-45e3-8AB9-93A0EAFB1656}*

**“Support to users to register and add data/metadata”** KPI assesses whether a NAP provides information to support NAP users to register and (more importantly) to add data, metadata, or both (depending on the type of NAP under evaluation). It is assumed that a NAP shall at minimum provide downloadable support information in the local language. This condition is indicated by a value equal to 1. The value of this KPI is increased by 1, when such information is also available in the English language, when additional support can be provided via contact form and/or e-mail, and, finally, when additional support can be provided directly via telephone.

Is support to users to register and add data/metadata available?

0: No support or telephone number only is available

0.5: Instructions or support information is available on the site but not in English

1: Instructions or support information is available in English

Value+1 (for the following option):Is there other type of support to register and add data/metadata?:

a. Via contact form and/or E-mail

Minimum acceptable value for interoperability: 2

### KPI 2.2 Related services monitoring functionality

*Date Modified: 04.10.2024 14:21:21, GUID: {57A18050-B4C1-42f9-881F-A8C6AE3EAF1A}*

**Link to NAR: ???**

**“Related projects monitoring service”** KPI assesses whether there is an implemented service that monitors the external relations of a NAP to indicate its influence on the development and operation of ITS services. This KPI is addressed as complementary and, thus, not associated with any level of service, given that the implementation of such a service cannot be strictly addressed as a NAP’s functional prerequisite.

Is there a monitoring functionality to track the use of the data available at the NAP?

For example, the possibility for data users to provide feedback information on which applications they are using the data. This could also be done by a (periodical) questionnaire or other monitoring / tracking method.

0: No

1: Yes

Minimum acceptable value for interoperability: 1

### KPI 2.3 Related services built on the data offered at the NAP

*Date Modified: 04.10.2024 14:21:46, GUID: {010C9F9B-1F46-41df-9ECF-6AD6D4E9AD39}*

**Link to NAR: ???**

**“Related projects built on the NAP data”** KPI is aims to assess how many external projects, platforms, or websites are based and benefited from NAP published in/accommodate through NAPs (irrespective of the utilized monitoring method). It is assumed that at least one project should be based on NAP data for achieving a minimum acceptable level of service.

How many related services (applications, websites, end-user information services, etc.), were built, according to your best knowledge, using data offered by NAP within the last calendar year?

N/A: The information is not monitored (KPI 2.2 is zero)

Value 0 to infinity

Minimum acceptable value for interoperability: 1

### KPI 2.4 NAP promotion – number of channels

*Date Modified: 04.10.2024 14:22:24, GUID: {1942245D-8D8A-425c-8364-D8364B8407EA}*

**Not connected to NAR**

**“NAP promotion – number of channels”** KPI records the number of different official channels, such as conferences, webinars, and social networking, that are used by the NAP operator or national body within the last calendar year for promoting NAP. It is assumed that at least three different channels shall be utilized for achieving a minimum acceptable level of service.

Were official channels used to regularly promote the NAP within the last calendar year?

For instance, conferences, webinars, social networks, homepage, printed media, flyers, etc.

If Yes: How many promotional channels were used regularly within the last calendar year?

0: No

Value 1 to infinity: Yes

Minimum acceptable value for interoperability: 3

### KPI 2.5 NAP promotion – number of publications

*Date Modified: 04.10.2024 14:22:36, GUID: {19B43C9A-3E39-4803-B4E6-522EDE72F449}*

**Not connected to NAR**

**“NAP promotion – number of publications”** KPI records the number of publications made by the NAP operator or national body within the last calendar year. It is assumed that at least three publications shall be made for achieving a minimum acceptable level of service.

How many publications were made by the NAP operator and/or national body within the last calendar year using the channels mentioned in KPI 2.4?

Publications mean: number of conference papers with NAP as main subject + webinars with NAP as main subject + social media posts with NAP as main subject + printed publications with NAP has main subject

Value 0 to infinity

Minimum acceptable value for interoperability: 3

### KPI 2.6 Contact means

*Date Modified: 04.10.2024 13:42:20, GUID: {B16F5B80-17AC-48ed-9C43-CADE9CDCF62A}*

**“Contact means”** KPI aims to assess whether a NAP provides contact information of the NAP operator and ideally data providers to data consumers. The possible values of this KPI range from 0 to 4 with a value equal to 0 indicating that there are no provided contact means, a value equal to 1 indicating that the contact details of a NAP operator are published through the NAP web page, a value equal to 2 indicating that both contact details of a NAP operator and some data providers are made available through the NAP web page, a value equal to 3 indicating that contact details of a NAP operator and all data providers are published, and, lastly, a value equal to 4 indicating that more than one contact means is provided to data consumers. It is assumed that a NAP shall at least provide contact information of the NAP operator and all data providers for achieving a minimum acceptable level of service.

Have contact means (ways to get in contact with NAP or data providers ) been provided on the NAP website?

0: No contact is available

1: Contact details of NAP operator are published

2: Contact details of NAP operator and some data providers are published

3: Contact details of NAP operator and all data providers are published

4: More than one contact means is provided

Minimum acceptable value for interoperability: 3

### KPI 2.7 Mass notifications – data providers

*Date Modified: 04.10.2024 14:24:23, GUID: {1F17B282-6DF7-4368-8BF9-EB565BA7D4D5}*

**Link to NAP: Functionality missing**

**“Mass notifications – data providers”** and **“Mass notification – data consumers”** KPIs assess whether a NAP can massively notify registered data providers and data consumers, respectively, about the latest updates and changes. Its value ranges from 0 to 3. A value equal to 0 expresses that no mass notification functionality or procedure is in place. A value equal to 1 expresses mass notifications encompassing only legal updates (e.g., changes in terms and conditions of data reuse). A value equal to 2, on the other hand, indicates that mass notifications encompassing both legal and content updates (e.g., new datasets or substantial changes in already published datasets). Finally, a value equal to 3 indicates that mass notifications are tailored to the needs of data providers and consumers, respectively. It is assumed that this KPI does not relate to the minimum acceptable level of service of a NAP but expresses an advanced level of service when notifications encompass both legal and content updates.

Are mass notifications available on the NAP website for the registered data providers?

Mass notification means: ability to deliver a message or information to all data providers.

Example of a Mass notification could be: “Inform all data providers that the use of Mobility DCAT-AP is mandatory from 2025.”

N/A: No data providers accounts / no registrations

0: Mass notifications are not available to registered providers

1: Mass notifications are possible only for legal (T&C) updates

2: Mass notifications are possible for legal and content updates or news

3: Mass notifications are tailored according to the data provider's needs

4: Mass notifications are available on the NAP website to the registered data providers

Minimum acceptable value for interoperability: 1

### KPI 2.8 Mass notifications – data consumers

*Date Modified: 04.10.2024 14:24:27, GUID: {6069CE61-FD93-4212-A7EC-BA701EBE8A7E}*

**Link to NAP: Functionality missing**

**“Mass notifications – data providers”** and **“Mass notification – data consumers”** KPIs assess whether a NAP can massively notify registered data providers and data consumers, respectively, about the latest updates and changes. Its value ranges from 0 to 3. A value equal to 0 expresses that no mass notification functionality or procedure is in place. A value equal to 1 expresses mass notifications encompassing only legal updates (e.g., changes in terms and conditions of data reuse). A value equal to 2, on the other hand, indicates that mass notifications encompassing both legal and content updates (e.g., new datasets or substantial changes in already published datasets). Finally, a value equal to 3 indicates that mass notifications are tailored to the needs of data providers and consumers, respectively. It is assumed that this KPI does not relate to the minimum acceptable level of service of a NAP but expresses an advanced level of service when notifications encompass both legal and content updates.

Are mass notifications available on the NAP website for the registered data consumers?

Mass notification means: ability to deliver a message or information to all data consumers.

Example of a Mass notification could be: “Inform all data consumers that the use of Mobility DCAT-AP is mandatory from 2025.”

N/A: No data consumers user accounts / no registrations

0: Mass notifications are not available to registered users

1: Mass notifications are possible only for legal (T&C) updates

2: Mass notifications are possible for legal and content updates, news

3: Mass notifications are tailored according to the data consumer's needs

4: Mass notifications are available on the NAP website to the registered data consumers

Minimum acceptable value for interoperability: 1

## Data Discovery KPIs

NAPs should ensure the traceability of data through discovery services and search functionalities, such as engines and search masks for querying and filtering. Providing appropriate metadata is crucial for the reusability and discoverability of data resources, helping users understand data structure, usage rights, and license terms. Machine-readable metadata, exportable in formats like XML and RDF DCAT-AP, enhances discoverability for both humans and machines. Additionally, supporting map-based searches allows users to find data at national, regional, and local levels.



Figure: Data Discovery KPIs

### KPI 3.1 Search functionalities

*Date Modified: 04.10.2024 13:43:14, GUID: {4CE86A2C-C410-439b-AFFD-9793CCF8B41E}*

**“Search functionalities”** KPI assesses whether dataset discovery services are incorporated into a NAP. It is assumed that the existence of such services is associated with a minimum acceptable level of service, irrespective of the extent to which these services rely on the use of harmonized/coordinated metadata records. Provided that harmonized/coordinated metadata records are used, there are several additional parameters through which the maturity of these services can be judged. Depending on whether existing services comply with those parameters, the value of the current KPI is increased by one. The first two parameters relate to the possibility of searching the dataset by using free-text or proposed keywords that are both based on harmonized metadata records. The third parameter involves the possibility of including wildcard characters—or other expressions limiting the search results as required—in the search queries logical operators. The next parameter involves search options based on enumeration values. The final two parameters involve map- or location-based search functionalities as well as the possibility to save search patterns and settings.

Can a user search/filter content on the NAP?

0 N/A

1: Discovery services available (not necessarily based on harmonized metadata)

2. Discovery services available (search/filtering) based on harmonized metadata (free text or keywords)

Value+1 (for each of the following options) Which search/filtering functionalities are available to the user? You can select more options:

a. Search/filtering options AND, OR, wildcard (\*), range (from... to...) available

b. Enumeration search/filtering based on harmonized metadata

c. Map-based search

d. Other location-based search (e.g., NUTS-Code)

Minimum acceptable value for interoperability: 2

### KPI 3.2 Search results

*Date Modified: 04.10.2024 13:43:29, GUID: {3EDFD1C1-DFC2-44f5-B31C-F85FBB99684A}*

**Search results”** KPI aims to assess the performance of a NAP in terms of presenting and further analyzing search results. Foreseen possibilities include the listing of search results, their further filtering and sorting, or even their visualization (e.g., in the form of a map). It is assumed that a simple listing of search results constitutes a minimum acceptable operational prerequisite of a NAP.

Are the search results displayed?

0: No

1: Yes (at least list of search results)

Value+1 (for each of the following options): Are there more features than a basic list of search results? How are the search results displayed? You can select more options:

a. List of search results that can be further “filtered or sorted”

b. Map-based presentation of search results

c. Option to save search pattern or settings

Minimum acceptable value for interoperability: 1

### KPI 3.3 Machine-readable metadata

*Date Modified: 04.10.2024 13:43:45, GUID: {9BD4B8DE-4CA0-4a91-95F8-F0A7FD7CE558}*

**“Machine – readable metadata”** KPI aims to assess the machine readability of a NAP’s metadata. A value equal to 1 indicates that metadata are machine readable and can be represented in a common self-describing format (e.g., JSON, XML), while a value equal to 2 indicates that metadata comply to a harmonized application profile and can be represented in a common format promoting the concept of Linked Data (e.g., RDF).

Is machine-readable metadata provided by the NAP?

0: No availability of machine-readable metadata

1: Provision of machine-readable metadata in a self-describing format (JSON, XML, …)

2: Provision of machine-readable metadata as Linked Data (“RDF” that also can be expressed in JSON-LD, ...) in a self-describing format

3: Provision of machine-readable metadata in a self-describing format complying to commonly agreed standard mobilityDCAT-AP

Minimum acceptable value for interoperability: 2

## Update and Maintenance KPIs

NAP services should be constantly maintained and updated, including software updates, backups, and hosting. Data providers must regularly check and update their publications to keep information current. Periodic monitoring and evaluation of NAPs are essential, focusing on data usage, system performance, and user feedback. Additionally, NAP operators should assess the platform’s impact on service and application development by calculating metrics and gathering feedback.



Figure: Update and Maintenance KPIs

### KPI 4.1 IT services

*Date Modified: 04.10.2024 13:44:10, GUID: {074C6AF9-ECAC-4279-AFF2-82CE9E415FE6}*

**“IT services”** KPI assesses whether there are established responsibilities for resolving as quickly as possible technical issues that may affect the operation of a NAP (both software- and hardware-related issues are encompassed). A value equal to 1 indicates that there are established agreements for the provision of relevant IT services, while a value equal to 2 indicates that there are also established measures assuring the operational continuity of NAP services that can be financially supported in the long run. It is assumed that a minimum acceptable level of service is associated with the existence of established agreements for the provision of IT services.

How is a NAP continuity guaranteed?

0: Responsibilities not established for the NAP services (system, software and hardware) maintenance and updates, backups, and hosting

1: Common responsibilities established (signed SLA with IT company(s)) for the NAP services (system, software and hardware) maintenance and updates, backups, and hosting

2: Measures for the NAP services continuity in the long term and subsequent funding are foreseen

Minimum acceptable value for interoperability: 1

### KPI 4.2 Content and metadata

*Date Modified: 04.10.2024 13:44:23, GUID: {0C2EEA46-1380-4551-AA7C-0AADCB4E42ED}*

**“Content and metadata”** KPI assesses the existence of predetermined processes and responsibilities among NAP operators, data suppliers, and data publishers for controlling the quality and maintaining up to date NAP datasets on a regular basis. The difference between the values that the specific KPI may obtain relates to the frequency with which the quality of data and metadata are evaluated.

How has the NAP guaranteed that the links are not broken and (meta)data is up-to-date?

0: Procedures not established for maintenance of data and metadata on a regular basis or for checking links

1: Common responsibilities and procedures for the NAP content and metadata maintenance and updates established on a regular basis between NAP operators, data suppliers and data publishers: Keeping the data up-to date by systematically assessing data quality. For data and metadata resources – at least once a year; checking if links are still functioning (to and from datasets) – at least once every six months

2: Common responsibilities and procedures for the NAP content and metadata maintenance and updates established on a regular basis between NAP operators, data suppliers and data publishers: Keeping the data up-to date by systematically assessing data quality. For data and metadata resources – at least every six months; checking if links are still functioning (to and from datasets) – at least once every three months

Minimum acceptable value for interoperability: 1

### KPI 4.3 Monitoring and evaluation

*Date Modified: 04.10.2024 14:27:20, GUID: {56CF5FF2-7112-4bd3-9E60-B10AE222362F}*

**Not connected to NAR**

**“Monitoring and evaluation”** KPI assesses whether a NAP has defined procedures for monitoring and evaluating its content. The value of this KPI is increased by 1, when a NAP complies with each one of the following parameters. The first parameter involves the monitoring of the visibility of a NAP web page and the number of subscribers. The second one involves the collection of statistics regarding the visibility and usage of the datasets. The third one involves the measurement of the performance of the system (e.g., downtime, consequences for other systems, etc.), while the final one involves the assessment of the usefulness of a NAP (e.g., qualitative feedback, re-use rating of quality, surveys, etc.). It is assumed that the current KPI is not related to the minimum acceptable level of service of a NAP.

Have procedures been established to monitor and evaluate the success and impact of the NAP?

**0:** No

**0:** Yes

**Value+1** (for each of the following options): Which procedures are established to monitor and evaluate the success and impact of the NAP? You can select more options:

**a.** Counting of the access to the NAP or subscriber

**b.** Collecting statistics on the consumption of datasets (e.g., downloads, page views, re-use)

**c.** Measuring performance of the system (e.g., downtime, consequences for other systems, etc.)

**d.** Measuring usefulness of the NAP (e.g., qualitative feedback, re-use, rating of quality, surveys, etc.)

Minimum acceptable value for interoperability: 1

## Dataset information KPIs

Datasets should be described in detail to help data consumers understand and assess their relevance. This includes using standard vocabularies or dictionaries (e.g., DCAT-AP) to reduce ambiguity and enhance machine readability.



Figure: Dataset information KPIs

### KPI 5.1 Documentation & description of datasets

*Date Modified: 04.10.2024 13:45:55, GUID: {DEAE1C7A-1D84-41ec-8301-E4726F387B6F}*

**“Documentation & description of datasets”** KPI assesses whether the datasets of a NAP are accompanied by supporting material, such as documentation, high-level descriptions (included in a metadata filed), or even explanatory links providing further information (e.g., schemas). The minimum level of service is associated with a high-level description of datasets on the platform. In case there are available links with additional information about datasets, an advanced level of service is assumed.

How is the NAP providing documentation and description of datasets?

N/A: Metadata directory case (No relevancy, this is a responsibility of data providers)

0: Lack of dataset documentation and description or high-level description of datasets on the platform (e.g., in the metadata page)

1: Availability of links and supporting material (e.g., XML schemas), where necessary

2: Availability of links and validated supporting material (e.g., validated and up-to-date XML schemas), where necessary

Minimum acceptable value for interoperability: 1

### KPI 5.2 Classification of datasets

*Date Modified: 04.10.2024 13:46:11, GUID: {83214B25-55CB-415c-B142-439C41EEF164}*

**“Classification of datasets”** is the second KPI grouped into this category. Dataset classification can be based either on custom parameters such as parameters indicating the type of network or on formal terminology and coordinated metadata. A classification based on the former parameters is associated with a minimum acceptable level of service, while a classification based on the latter parameters is associated with a REQ required level of service.

Does the NAP provide classification of datasets based on standard/controlled vocabularies?

0: Lack of dataset classification

1: Classification of datasets based on custom parameters only (e.g., transport mode/network covered)

2: Classification of datasets based at least on formal terminology/keywords (vocabulary of the mobility-DCAT-AP) or coordinated metadata catalogues

Minimum acceptable value for interoperability: 1

## Interoperability KPIs

Interoperability features ensure NAPs can efficiently communicate and exchange information. This includes adopting a Coordinated Metadata Catalogue for a common approach to metadata publication and the ability to harvest and index datasets from other NAPs, though the latter is not mandatory.



Figure: Interoperability KPIs

### KPI 6.1 Metadata specification

*Date Modified: 04.10.2024 13:46:29, GUID: {808C630F-74B1-46ed-91AF-3A16E94E6616}*

“**Metadata Catalogue (CMC)”** KPI indicates whether a NAP’s metadata follow the specifications set by the CMC (or not). It gets a value equal to 0 when there is lack of CMC adoption, a value equal to 1 when metadata slightly deviates from CMC’s specifications, and a value equal to 2 when metadata are completely compliant with CMC. It is assumed that a NAP shall have at least partially adopted the CMC for achieving a minimum acceptable level of service.

Has the NAP adopted the Coordinated Metadata Catalogue or the mobilityDCAT-AP?

0: The NAP did not consider suggestions from the mobilityDCAT-AP,

1: The NAP considered suggestions from the mobilityDCAT-AP, but the available metadata deviates – to some extent – from that specification (e.g., NAPs that had partial or full adoption of the EU-EIP specification – the Coordinated Metadata Catalogue)

2: Full compliance/adoption with the MobilityDCAT-AP specification

Minimum acceptable value for interoperability: 2

### KPI 6.2 Harvesting functionalities

*Date Modified: 04.10.2024 14:29:26, GUID: {3031B4C2-3C66-4139-BC26-B3914F8D3146}*

**Link to NAR: Functionality is missing**

**“Harvesting functionalities”** KPI aims to assess the potential of a NAP to index datasets of other data portals and platforms and the potential of its datasets to be indexed in other portals or platforms as well (i.e., data harvesting). A value equal to 0 points out the absence of any harvesting functionalities. On the other hand, a value equal to 1 indicates the support of one-way harvesting functionalities, while a value equal to 2 indicates the support of two-way harvesting functionalities. Although this KPI is not associated with the minimum level of service of a NAP, the existence of harvesting functionalities declares an advanced level of service.

Does the NAP support harvesting functionalities?

0: Absence of harvesting functionalities

0: Support of harvesting functionalities

Value+1 (for each of the following options): Which kind of support is provided? You can select more options:

a. Provision of metadata for harvesting interface of other NAPs (i.e., machine-to-machine readable metadata as Linked Data)

b. Existence of harvesting interface for integration (e.g., indexing) of data sets from other portals

Minimum acceptable value for interoperability: 1

## Data Exchange and Operational KPIs

NAPs should clearly describe the terms and conditions for data re-use and their operational procedures to avoid disputes and facilitate impact estimation. This includes providing prespecified licenses for data providers and clear instructions on user roles, registration, and dataset updates. NAPs should also endorse high-quality data that complies with ITS Directive requirements, allowing data providers to indicate data quality. Promoting self-declarations from data providers can aid compliance activities. Additionally, NAPs should cover all data types in the ITS Directive, serving as a single access point for Intelligent Transport System services.



Figure: Data Exchange and Operational KPIs

### KPI 7.1 Data reuse – NAP

*Date Modified: 04.10.2024 14:30:42, GUID: {D72070D6-9ECF-411a-8281-534019823FD6}*

**Link to NAR: ???**

**“Data reuse – NAP”** KPI assesses, from the perspective of a NAP operator, whether a NAP operator provides descriptive/detailed information about the terms and conditions for data reuse (or not). A value equal to 0 points out an absence of such a provision, a value equal to 1 indicates that there is a descriptive provision, while a value equal to 2 indicates that there is a detailed provision through sample contracts or standardized data licensing frameworks. It is assumed that a NAP should at least provide descriptive information about the terms and conditions for data reuse.

Does the NAP provide Terms and Conditions for reuse of metadata, data and other relevant information displayed at the NAP?

0: No

1: Descriptive (brief text description)

2: Detailed (where necessary – terms and conditions and/or standardized licenses framework)

Minimum acceptable value for interoperability: 1

### KPI 7.2 Data reuse – data provider

*Date Modified: 04.10.2024 14:30:39, GUID: {8A1CF06F-F5C9-4f65-B5F6-84DA47139132}*

**Link to NAR: ???**

**“Data reuse – data provider”** KPI assesses, from the perspective of data provider, whether a data provider provides descriptive/detailed information about the terms and conditions for data reuse (or not). A value equal to 0 points out an absence of such a provision, a value equal to 1 indicates that there is a descriptive provision, while a value equal to 2 indicates that there is a detailed provision through sample contracts or standardized data licensing frameworks. It is assumed that a NAP should at least provide descriptive information about the terms and conditions for data reuse.

Is it possible for the NAP to provide “Terms and Conditions” for reuse of data published by the data provider at the NAP?

0: No

1: Descriptive (brief text description)

2: Detailed (where necessary – full sample contract conditions and/or standardized licenses framework)

Minimum acceptable value for interoperability: 2

### KPI 7.3 Operational procedure information

*Date Modified: 04.10.2024 14:30:52, GUID: {16AB0A17-9AC4-4aec-9EAA-7EA1F349055C}*

**Link to NAR: ???**

**“Operational procedure information”** KPI assesses whether a NAP includes guidelines about the operational procedures that need to be followed for becoming a data provider of a NAP or, in general, who is responsible for doing what. In this case, the ACC value is set to 1 reflecting that NAPs shall provide such guidelines.

Does the NAP provide operational procedure information, i.e., information about the processes in the NAP, e.g., how a potential data provider/consumer becomes accredited, how the data is provided, what is a contact point where to discuss the technical issues etc.?

0: No

1: Yes

Minimum acceptable value for interoperability: 1

### KPI 7.4 Dataset indicators

*Date Modified: 04.10.2024 13:48:10, GUID: {78665FD8-6086-4226-8ABE-C8E96A54FE8C}*

**“Dataset indicators”** KPI examines whether a NAP provides information about the compliance of its datasets with the requirements set by the Delegated Regulations supplementing the ITS Directive (e.g., regarding the quality, accessibility, exchange timeframe, re-use, and update of the provided data). A value equal to 1 indicates that a NAP provides information about whether a self-declaration form has been submitted by the provider of a dataset, while a value equal to 2 indicates that a NAP provides information about the results of the compliance assessment process (if any). However, this KPI is assumed as not relating to the minimum acceptable level of service of a NAP.

Does the NAP provide information about the compliance of its datasets with the requirements set by the Delegated Regulations supplementing the ITS Directive (e.g., regarding the quality, accessibility, exchange timeframe, re-use, and update of the provided data)

0: No

1: Provision of information about whether a self-declaration has been provided

2: Provision of information about whether a positive compliance assessment has been executed

Minimum acceptable value for interoperability: 1

### KPI 7.5 Compliance assessment

*Date Modified: 04.10.2024 14:32:06, GUID: {CD0A503A-335F-4864-8536-9F4576474961}*

**Link to NAR: Not defined yet in WG5**

**“Compliance assessment”** KPI assesses whether a NAP facilitates the procedure of compliance assessment by providing self-declaration templates or by enabling data providers to submit self-declarations (to National Bodies). In the first case, the KPI is equal to 1, whereas in the second one the KPI is equal to 2. This KPI is once again assumed as not relating to the minimum acceptable level of service of a NAP.

Does the NAP facilitate the procedure of compliance assessment by providing self-declaration templates or by enabling data providers to submit self-declarations to the NAP. ?

0: No

1: NAP provides self-declaration forms/templates without any additional involvement in process.

2: NAP facilitates the submission of self-declarations , in addition to providing the templates.

Minimum acceptable value for interoperability: 1

### KPI 7.6 Association of published datasets with Delegated Regulations

*Date Modified: 04.10.2024 13:48:37, GUID: {747DB3C3-C956-4030-9637-30756698054B}*

**“Association of published datasets with Delegated Regulations”** KPI assesses whether the metadata provided by a NAP can indicate the relevance of its datasets with the Delegated Regulations supplementing the ITS Directive. Both ACC and REQ value is set to 1, reflecting that such an association is necessary.

Are datasets published associated with Delegated Regulations supplementing the ITS Directive?

0: No

1: Yes

Minimum acceptable value for interoperability: 1

### KPI 7.7 Quality indicators for datasets

*Date Modified: 04.10.2024 13:48:50, GUID: {C344E742-01BB-4f58-B613-19C5B75E57B6}*

**“Quality indicators for datasets”** KPI assesses the extent to which a NAP provides insight into the quality of the provided data/metadata. There are four possible values that this KPI may take. A value equal to 1 indicates that a NAP includes a description of the quality of the provided metadata (e.g., based on a pre-established metadata quality assessment scheme). A value equal to 2 indicates that a NAP provides a description of general quality definitions to support its users to self-assess the quality of utilized data or high-level quality assessment statements in the metadata of hosted publications. On the other hand, a value equal to 3 indicates that a more detailed data quality description is provided in the metadata of hosted publications; however, provided details and values do not cover the entirety of quality fields that may relate to the nature of exchanged data. Finally, a value equal to 4 indicates that there is a solid description of all fields. It is assumed that a NAP shall at least provide metadata quality descriptions for achieving a minimum acceptable level of service.

Does the NAP provide information or descriptions for data quality?

0: No

1: Yes, a metadata field where the data provider can describe the quality of the dataset.

2: Yes, description of general quality definitions

3: Yes, description of some of datasets (fields) quality

4: Yes, description of all datasets (fields) quality

Minimum acceptable value for interoperability: 1