



Quality Framework Application Guideline

Report by Task 3.2: European NAPs data quality

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- ☐ For review/ approval by the Core Alignment Team
- ☒ For approval by the NAPCORE Steering Committee

Abstract

This deliverable by NAPCORE WG3 summarizes basic concepts and methods for operational Quality Assessments to be undertaken at responsible organisations, as a complement to the Quality Frameworks published previously by WG3.

Abbreviations

Abbreviation	Meaning
EC	European Commission
ITPS	Intelligent Truck Parking Services
ITS	Intelligent Transport Systems
MMTIS	Multimodal Travel Information Services
NAP	National Access Point
NAPCORE	National Access Point Coordination Organisation for Europe
RTTI	Real-Time Traffic Information Services
SRTI	Safety-Related Information Services
WG	Working Group



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1. Introduction

Task 3.2 of the NAPCORE project is addressing the fourth objective of NAPCORE WG3 according to the Grant Agreement: “Set a robust framework for and bring into practice the evaluation of European NAP platforms’ data quality.” This is achieved by a sequence of work items oriented: a) to set up data quality assessment frameworks, and b) to clarify how these frameworks can be practically applied.

The first work item, the elaboration of Quality Frameworks, was concluded in a previous Milestone M3.8, represented by a set of Quality Frameworks for the assessment of NAP (meta)data quality and published at an Online Repository¹.

This report addresses the second work item, the practical application of the Quality Frameworks. It serves as a complementing Milestone M3.9.

The main goal of this work item is to explore efficient and practical ways to assess individual NAP (meta)data. So far, there has been a lack of experience and common understanding on how to do Quality Assessments in the NAP context, e.g., based on the above-mentioned Quality Frameworks.

To fill this gap, this report called “Quality Framework Application Guideline” summarizes basic concepts and methods for operational Quality Assessments to be undertaken at responsible organisations. It involves best-practice research and practitioners’ expertise. This guideline also accounts for various constellations regarding (meta)data provision and organisational setups. The assessment objects in this context are (meta)datasets, as provided on NAPs or other mobility data portals.

The guideline is mainly based on pilot Quality Assessments as realised in the former M3.8 elaborations. In such pilots, selected NAP (meta)data sets were assessed via dedicated methods. This way, specific Quality Assessments were demonstrated in real-life environments. Other methods were derived from previous research and works on the quality matter, and from expertise of NAPCORE stakeholders. Other inputs for this work are gathered from parallel NAPCORE activities, such as the NAP Reference Architecture work and DATA4PT guidelines.

¹ <https://napcore.eu/quality/>



2. Context

The contents of potential Quality Assessments in the NAP domain have been defined by Quality Framework (QFs) by NAPCORE. These QFs represent a set of definitions for actors dealing with NAP (meta)data quality. In each QF, individual quality criteria and quality levels are defined, but also recommendations and showcases how those criteria and quality levels can be assessed. The expectation behind these QFs is that Quality Assessments are conducted by responsible data managers at organisations which provide (meta)data on NAPs, and that results from these assessments are exposed to potential data consumers.

Any Quality Assessments (in the mobility domain and elsewhere) usually rely on concrete data-driven methods. Examples for such methods include the monitoring of equipment performance and availability; reference testing (e.g. against ground-truth data), and surveys of perceived quality by data users.

Any assessment method can be applicable for different uses and for studying different quality criteria. Further, each method involves different prerequisites and resources (e.g., staff and IT tools), is addressed to different target groups (e.g., internal quality managers, or external data users) and has different set-ups (e.g., embedded in regular data-processing workflows, or outsourced in occasional quality audits).

For a practitioner, it might be difficult to set up a procedure for a concrete Quality Assessment, i.e., identify applicable roles, approaches and methods for a concrete assessment setting. Thus, this guideline compiles relevant application guidance, as cited in the QFs by NAPCORE, or presented in other sources, in one central document.

It presents relevant actors and roles in Quality Assessment (chapter 3), basic principles (chapter 4) and concrete methods (chapter 5). Altogether, it serves as hands-on guidance for practitioners of data quality management in the NAP and mobility domain.

3. The actors and roles in Quality Assessment

In this chapter, we have compiled the most relevant actors and their recommended roles in Quality Assessment. As actors, we have defined: NAP operators, data providers, data consumers, National Bodies and other neutral organisations. As roles, we have defined recommended actions with two obligation levels: “should” and “may”.

This compilation is based on experience and common practice at the NAP actor community, as represented by NAPCORE. The main input here are the NAP Reference Architecture², guidance documents by DATA4PT³ and NAPCORE guidance for National Bodies⁴.

3.1 NAP operators

- Should **incentivise data producers** to provide correct data: complete, quality-assured, and valid on syntactic and semantic levels.
- Should provide **instructions to data providers**. In particular, a unified understanding of what to publish and a unified way to verify the quality of the dataset should be defined.
- NAP operators often do not have the responsibility of content data provided on a NAP, or they cannot give full instructions. However, they should **indicate to data providers what should be reported as metadata** elements. In this case, the quality is focused on data structure (schema, profiles,...) and metadata population, not on content.
- Should allow for cross-referencing of datasets to relevant other datasets that are temporal or spatial in nature. E.g., this might be the timetable of the upcoming year, the timetable of a neighbouring region, or an adjacent data theme. This way, datasets can be compared and complemented by data users.
- Should give guidance on the **management of relevant IDs** (i.e., IDs of data entities or the dataset itself) and **management of metadata**
- Should provide a **feedback channel** (e.g., a GUI button or an e-mail address) for questions/issues about (a) the NAP in general or (b) individual datasets. For (b): contact information to the data provider must be saved per dataset (optimally, as part of the metadata).
- May **provide an issue tracker** (to report a problem and track the solution) or a **user forum** (enabling a user discussion) for investigations of quality issues.
- May **provide own quality checking processes**, e.g., as the French NAP does for GTFS data feeds. For such cases, data providers should have access to the results of the quality process.
- May allow for an **upstream communication** about quality issues towards data providers. This can be done via an issue tracker and/or user forum (see above), and/or be forwarding specific problems towards the responsible data provider.

3.2 Data providers

- Should **consult guidelines or best-practices** on data quality (such as the NAPCORE Quality Frameworks⁵ or the TISA 5-Star-Rating⁶) before publishing data.

² NAPCORE, 2025: “Harmonized EU NAP architecture”, Milestone 2.11 report

³ https://data4pt.org/w/index.php?title=National_Access-Points

⁴ <https://napcore.eu/activity-wg5-national-bodies-and-compliance-assessment/>

⁵ <https://napcore.eu/quality/>

⁶ <https://tisa.org/successful-rtti-5-star-rating-evaluation-methodology-workshop>



- Should **publish relevant information about data/services** (e.g., metadata) and **information on the data quality** at the NAP.
- Should **analyse and validate data quality before sharing it** with the NAP. May repeat such quality analyses and validations on a regular basis.
- For dynamic data: should ensure that **data is updated at the appropriate and recommended time intervals**.
- For dynamic data: should **report current/planned quality integrity issues** (due to, e.g., temporary maintenance) in time to data consumers.
- Should **publish data in a prescribed format**, as defined in the EC Delegated Regulations.
- Should ensure that **published data is updated** at the appropriate and recommended time intervals.
- Should be able to **contact the data consumer** and to **respond to consumers' feedback**.
- Should publish content based on requirements from the Delegated Regulations **under the FRAND conditions**, fulfilling implicit requirements like completeness and timeliness.
- Should **assist the National Bodies/Compliance Assessments** when performing a compliance assessment and **correct any issues** found promptly.

3.3 Data consumers

- Should **check quality descriptions** before consuming data
- Should **ensure timely and accurate integration of the subscribed content** to their products and services.
- Should **provide feedback** on data quality issues found, using the NAP features for user communication (see section 3.1), including:
 - o Communicating proposals to solve issues.
 - o Telling reasons to data providers when datasets are rejected/or without value
 - o providing insights from own (cross-) validation, e.g., from end users
- May **express specific user requirements** through relevant fora, e.g., via NAPCORE stakeholder activities

3.4 National Bodies

- Should **evaluate** whether reported data quality matches with actual data quality.
- Should randomly and regularly **check the compliance of CPs and the NO with the Delegated Regulations** (i.e., data and metadata are compliant and processes of sharing the data and reporting are compliant with the rules set up by Delegated Regulations).
- Should use NAPCORE quality frameworks⁷ for dedicated (meta)data and service assessments
- Should **follow up on non-compliant results**, and report results to the MS and NO.
- Should **collaborate with CP** to reach a successful Compliance Assessment.
- Should **identify and contact entities** obliged to publish (meta)data to the NAP

⁷ <https://napcore.eu/quality/>

3.5 Other neutral organisations

- May **facilitate stakeholder fora and platforms** to discuss and define quality criteria and levels for specific data domains, such as the NAPCORE Quality Group or the TISA 5-Star-Rating activity.
- May **provide tools for quality checks and quality reports**, such as the online validator tools available for multimodal data formats⁸.
- May **execute independent assessment checks or regulatory actions** towards data providers, such as French authority responsible for the assessment of implementation of the MMTIS Regulation (L'Autorité de régulation des transports (ART)⁹).

⁸ see the NAPCORE MMTIS Quality Framework at <https://napcore.eu/quality/>

⁹ <https://www.autorite-transports.fr/>



4. Basic principles for Quality Assessment

This chapter presents some basic principles for Quality Assessment. These are rules and approaches defined above the level of concrete assessment methods, which are defined in the subsequent chapter.

4.1 Perform quality assessment in different stages of data provision chain/process

The provision of data to NAPs is one of the last stages of the data production and provision chain. Previous stages concern the production and collection of the data from the source, the processing (aggregation or other actions) and the final supply to the end user/consumer or the entity which may evaluate the implementation of the NAP. Different actors can be involved and depending on the country the NAP operator might have several roles in this chain.

The best practice is to perform quality checks in different stages to capture errors and inconsistencies early enough to be able to correct them efficiently. At each stage different quality criteria are assessed via different methods.

For example, this practice is adopted by Austrian Mobility Database, see the next table. The NAP in this case is involved in the stage 3 of checks “during data supply and provision”.

Table 1 Quality assessment in different stages of data collection and provision chain - the approach from Austria.

Stages of data collection and provision chain
Stage 1: During data collection
- Software quality checks (i.e. format) - Sample checks on content - User feedback
Stage 2: During data processing
- Software quality checks (integrity, consistency, plausibility, availability, completeness of stops, sections, lines, etc.) - Checks on content (logical), Connection queries (samples), Data processability, Automated log monitoring (process) - Reference queries (samples)
Stage 3: During data supply and provision
- Schema validation, Availability / accessibility, Plausibility / completeness, User feedback - Service use statistics

This principle is discussed in the NAPCORE MMTIS Quality Framework, including further examples¹⁰.

4.2 Establish different types of errors and relevant errors management

There are different types of errors that can appear during the data quality process. Some of those are critical and some are not so critical. Depending on the significance of the errors, a different quality management is required. For example, for some errors, the harvesting of dataset might stop, while for some other errors, the dataset might be adopted.

¹⁰ see the NAPCORE MMTIS Quality Framework, section 6.2.1., available at <https://napcore.eu/quality/>

The exemplary approach of Austria indicates three types of errors: a) critical error, b) error, c) warning. If a critical error is detected, it stops the harvesting of the complete data set while when an error is not critical (generating a warning) the data can be published.

This principle is discussed in the NAPCORE MMTIS Quality Framework, including further examples¹¹.

4.3 Define what exactly is being assessed

When assessing quality in the context of NAP data (or, in general, of mobility data), some confusion might arise about what exactly is being assessed. Thus, a clear and exact definition of the assessment object(s) is necessary.

Depending on the assessment setting, different assessment objects are possible.

The following figure shows exemplary assessment objects in the scenario where parking data is exchanged via a data portal. In such scenario, multiple elements are involved: real-life entities (e.g., a parking facility), data elements related to one facility (e.g., “name”), groups of entities combined under one dataset, and additional metadata (e.g., “license”).

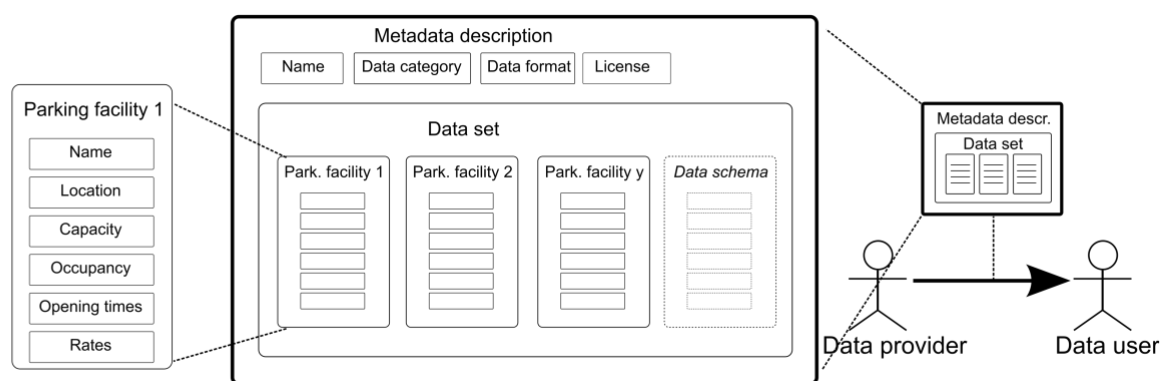


Figure 1 Data exchange scenario for parking data (based on Lubrich, 2021¹²)

In such scenario, a quality assessment could be executed for one or more objects:

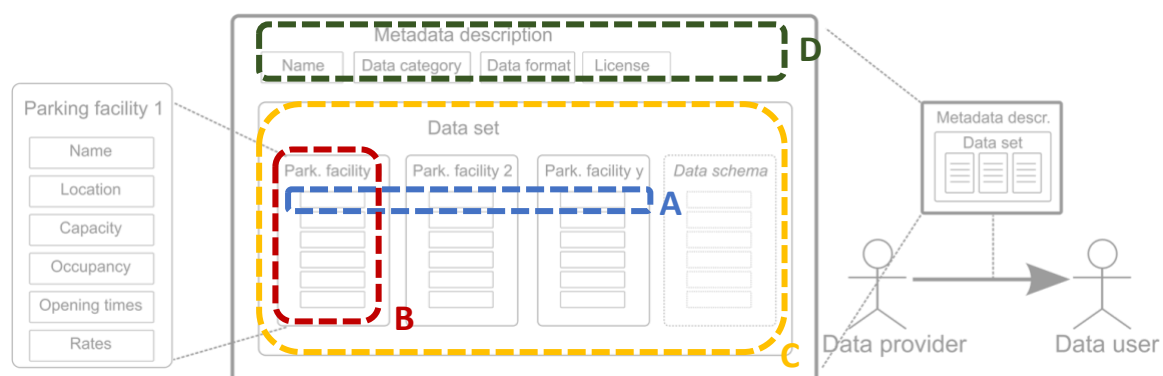


Figure 2 Potential assessment objects in the above scenario

¹¹ see the NAPCORE MMTIS Quality Framework, section 6.2.2., available at <https://napcore.eu/quality/>

¹² <https://doi.org/10.1177/03611981211031878>

- Assessment object A: One unique data element across multiple entities (e.g., are the “names” of all reported parking facilities correct?)
- Assessment object B: All data elements for one entity (e.g., are all elements for one parking facility complete?)
- Assessment object C: The entire data set (e.g., do all entities and their data elements comply with a given data scheme?)
- Assessment object D: The corresponding metadata (e.g., is the metadata complete and correct?)
- Or variants or combinations of the above

Such definition is usually done by the assessor before the actual assessment. The chosen assessment object(s) affect the scope and also the explanatory power of the assessment. In any case, the definition of the assessments object(s) must be clearly documented.

4.4 Provide proper and sufficient documentation

When documenting the assessment, not only the pure assessment results should be reported but also any context and background information. This might include a detailed description of the applied data sources, the calculation methods and other circumstances during the calculations.

Such comprehensive documentation will enable the data consumer to interpret the assessment results correctly, detect any biases or other implications, and utilize the findings for a (potential) data consumption.

In practice, we recommend a **“Quality Statement”** should be provided as an attachment to each individual dataset. Such “Quality Statement” should include the following items:

- Author of the Quality Statement
- Date of the Quality Statement
- Definition of the assessment object(s) (see the previous section)
- Quality Criteria and Metrics being calculated, each with:
 - Concrete definitions (ideally, referring back to the NAPCORE Quality Frameworks)
 - Calculation methods
 - Temporal and spatial scope of calculation
 - Calculation results, including statistical measures such as averages or deviations
- Any auxiliary information (e.g., identified outliers)
- Feedback/contact channel to the author

This Quality Statement should be published as part of the metadata of the dataset being assessed. This might be a downloadable PDF report or a free-text metadata, but should be accessible to any interested data consumer.

The mobilityDCAT-AP data model, being a metadata specification for NAPs and mobility data portals, provides a dedicated metadata field “Quality Description”¹³ where the Quality Statement can be saved under.

The following figure shows how the field “Quality Description” can be populated at a GUI of a real data platform, here at the NAP in Germany.

¹³ <https://mobilitydcat-ap.github.io/mobilityDCAT-AP/releases/index.html#dataset-quality-description>

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Search Results > Offer Details

Offered by: heliopus.ai GmbH Visibility: Public

Hochaufgelöste Bodenfeuchtekarte - Frühjahr 2022

CREATED	DATA MODEL	TYPE OF TERMS OF USE	BROKERING TYPE
02.12.2022	—	Licence, free use/open data	Not brokered

GEOGRAPHY See map CATEGORY Climate and weather

Offer Details

General Data Access Terms of Use **Quality Information**

Quality Description Im Rahmen Machbarkeitsstudie HABKIS wurde gezeigt, dass mit KI-basierten Methoden und geeigneten Daten, vor allem Satellitendaten, die räumliche Auflösung von Bodenfeuchtekarten von 50 km auf 10 m für beliebige Orte in Deutschland mit annähernd gleicher Qualität wie die des DWD AMBAV-Modells erhöht werden kann. Im Durchschnitt beträgt die Abweichung in der Studie 19,2 %nFK. Das Bestimmtheitsmaß liegt bei $R^2 = 0,736$.

Figure 3 Example of Quality Information as part of the GUI at the German NAP

5. Overview of assessment methods

In the following tables, relevant assessment methods are presented in a structured way, i.e., describing the following aspects per method:

- Method Description
- Data requirements
- Examples
- Applicability
- Usage
- Recommendation
- References

Please note that several references are made to NAPCORE Quality Frameworks (QFs), which are all available at the NAPCORE Quality Online Repository¹⁴. These QFs provide more details and examples on the methods presented below.

¹⁴ <https://napcore.eu/quality/>



Method 1: Cross-check or reference-check analysis

Method Description	A comparative analysis of multiple independent data sources describing the same object(s) in the mobility system.
Data Requirements	At least two independent data sources about the same information with the same temporal and spatial context.
Examples	Static and dynamic on-street parking data for a district of Hamburg, Germany, were analysed via a comparison of six data sources. Static data about a Low Emission Zone in Lisbon, Portugal, was cross-checked between a DATEX II dataset from the UVAR Box Tool and the Traffic Regulation Order from the Municipality. Delays and disruptions are compared via two data sources: road perspective (DATEX II) and public transport view (SIRI).
Applicability	<i>Scope:</i> Quality assessment <i>Type of data:</i> Status or event data <i>Type of process:</i> Offline and online <i>Parts of value chain:</i> Content detection + Content processing <i>Covered quality criteria:</i> All mentioned in the UVAR and Parking Quality Frameworks, e.g., location accuracy and Completeness
Usage	<i>Objective:</i> Check the consistency of information given in multiple data sources, in case of inconsistencies: analyse gaps and deltas and derive quality problems. <i>Stage:</i> Operation + problem resolution / diagnosis <i>Rate of use:</i> Single or spot check in case of problems
Transaction data from parking meters  Transaction data from mobile phone applications  Sensor data  Parking API  Geoportal Hamburg  Manual survey  <i>Example: Data sources used for cross-check analysis of parking data in Hamburg, Germany</i>	

Recommendation: The cross-check method allows for unambiguous quality metrics about a tested dataset derived from comparisons with alternative datasets. It results in unambiguous metrics such as error rates. Many of the required calculations are mathematically straight-forward and can be easily replicated. Special caution needs to be paid to finding a trustful reference dataset. External data sources might need to be tested first (e.g., commercial FCD). Further, it is not always evident which data source can be considered ground-truth. Even a manual survey might have errors. Thus, special care needs to be taken during analysis and interpretation.

Method 2: Logical and syntactic validation

Method Description	Validation tools have capabilities to validate the dataset against the relevant standards and their profiles. The most basic check is to confirm that the XML schema and the format of the dataset is correct and there are no syntactic errors. Additional rules can be applied to verify specific requirements (e.g., if compared with national profiles) and to check logical precision (e.g., “distance between stops is very small/very big depending on the transport mode”, “PT vehicles arrive at final stop before leaving previous stop” etc.).
Data Requirements	All type of data depending on the validator.
Examples	Validators for public-transport data are used in several countries: Finland, Norway, Austria, France, etc. Examples are given by DATA4PT ¹⁵ . An XML validator to verify the compatibility of a LEZ dataset from the Municipality of Lisbon with the recommended UVAR DATEX II profile from the DATEXII standard.
Applicability	<i>Scope:</i> Quality assessment <i>Type of data:</i> Static and dynamic data, depending on the validation rules and tool. <i>Type of process:</i> Offline and online (depending on the tool capabilities and NAP approach) <i>Parts of value chain:</i> Content detection / Content processing / Service provision/ Service presentation <i>Covered quality criteria:</i> Compatibility checks; Completeness (if compared against the relevant national or EU profile); Logical Precision correctness (see MMTIS QF)
Usage	<i>Objective:</i> To ensure that the data is interoperable and accurate <i>Stage:</i> Acceptance test/ operation/ problem / diagnosis <i>Rate of use:</i> Depending on the validation tool, but most of them periodic and/or continuous use

Check the quality of a file or a feed

Data type

NeTEx

The European program DATA4PT is in charge of deploying the NeTEx and SIRI standards. They publish a NeTEx validator [available online](#).

To access information related to European standards, you can browse [our documentation](#).

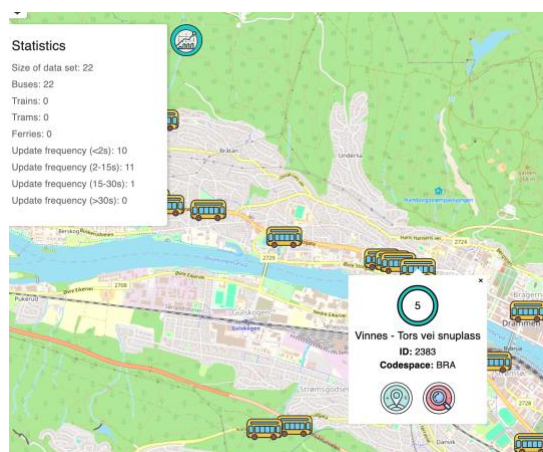
Example: validator GUI at the French NAP

Recommendation: Validation tools allow for automated and continuous checks about schema conformity and other pre-defined rules. Many open-source tool environments are available. NAP operators are advised to check and adopt existing validation tools available at other NAPs.

¹⁵https://data4pt.org/w/index.php?title=NeTEx#Software_&_tools_%F0%9F%A7%B0,
https://data4pt.org/w/index.php?title=SIRI#Software_&_tools_%F0%9F%A7%B0

Method 3: Visual check

Method Description	The visualisation maps enable the assessment of data in a manual way. They are meant to detect obvious inconsistencies or abnormal situations in the circulation of the vehicles and the network elements (like stops, stations etc.). Major errors regarding stop points, or journey patterns might be detected visually.
Data Requirements	Any geo referenced data, i.e., datasets containing coordinates or other locations (stop places, stations, points of interest etc.).
Examples	Norway: New modes visualization map (floating vehicles and docking stations) ¹⁶ ; Scheduled-modes vehicles visualization map ¹⁷
Applicability	<i>Scope:</i> Quality assurance of data where meaningful for human user visualisation can be developed <i>Type of data:</i> Location related (stop points for example) and traffic related (actual vehicle position etc.) <i>Type of process:</i> Offline and online (depending on the tool capabilities and NAP approach) <i>Parts of value chain:</i> Content processing, service provision, service presentation <i>Covered quality criteria:</i> Logical Precision / Correctness (see MMTIS QF)
Usage	<i>Objective:</i> To detect major errors regarding position related data. <i>Stage:</i> Problem diagnosis <i>Rate of use:</i> Depending on the tool and the nature of data. For real time data: continuous; for static data: periodic (every time a change is indicated).



Example: screenshot from the Norwegian vehicles visualization map

Recommendation: Visualisation tools are effective ways for manual inspection of geo-referenced data. As some NAPs have already deployed such tools, NAP operators are advised to check and adopt existing visualisation tools available at other NAPs.

¹⁶ <https://mobility-map.entur.org/>

¹⁷ <https://vehicle-map.entur.org/>

Method 4: Data user/consumer feedback

Method Description	This method is based on the data user's experience when utilising the data. Any relevant feedback can contribute to the improvement of data quality, once communicated back to the data provider. To facilitate this, technical feedback channels, issue trackers or user fora can be installed at a NAP platform, see section 3.1. The NAP itself might also be the consumer of the provided data and thus generate its own feedback. Feedback can be either generated by data users (e.g., when they encounter quality issues) or collected proactively by the data provider or the NAP operator (e.g., via questionnaires).
Data Requirements	Data and metadata, as it can be retrieved from a NAP
Examples	The proFund project¹⁸ provides an online tool "Roadwork Check" to collect users' feedback on the correctness of individual roadwork messages published on the German NAP. A NAP monitors that some published NeTEx datasets are not consumed at all. It also detects that these datasets contain non-valid XML files. The NAP will contact the responsible data provider and inform about the prevailing non-conformity. Norway (ENTUR) and Austria collect user's feedback with questions such as: To what extent has the data you have accessed been useful? How satisfied are you with the services NAP provides regarding data quality assessment?
Applicability	<i>Scope:</i> Quality assurance <i>Type of data:</i> Any <i>Type of process:</i> Offline and online <i>Parts of value chain:</i> Service provision, service presentation <i>Covered quality criteria:</i> Any
Usage	<i>Objective:</i> To derive quality issues from data user's experience <i>Stage:</i> Problem diagnosis <i>Rate of use:</i> Occasionally or regularly (for questionnaires)
 <i>Example: screenshot from the proFund Roadwork Check</i>	

Recommendation: Collection of direct user feedback can support the quality assessment of an operating service. It is a relatively easy way as actual users are the main source of quality information. Because the method provides only isolated and ex-post quality insights, the quality management should be complemented with other methods, in particular, more continuous and ex-ante methods.

¹⁸<https://bmdv.bund.de/SharedDocs/DE/Artikel/DG/mfund-projekte/meldungsqualitaet-baustellen-profund.html>

Method 5: In-Depth Metadata Evaluation

Method Description	This corresponds to the evaluation method [web/manual/doc/formal], as defined by the Cross-Domain Quality (CDQ) QF. It is a manual check on how well the data is described on a NAP, looking at the metadata population of the assessed data set.
Data Requirements	Metadata of an assessed data set, as published on a NAP.
Examples	NAPCORE partner CERTH has evaluated 39 catalogue records (sample NAP metadata sets), using the CDQ methodology. The results are published in tabular format at the 'NAP Browser'.
Applicability	<i>Scope:</i> Quality assessment <i>Type of data:</i> Metadata <i>Type of process:</i> Offline and online <i>Parts covered:</i> Content detection + Content processing <i>Covered quality criteria:</i> Availability, completeness, and usability of the metadata.
Usage	<i>Objective:</i> Manual assessment of all parameters against the evaluation criteria, using the CDQ framework. <i>Stage:</i> Operation + problem resolution / diagnosis <i>Rate of use:</i> Single or spot check in case of problems.

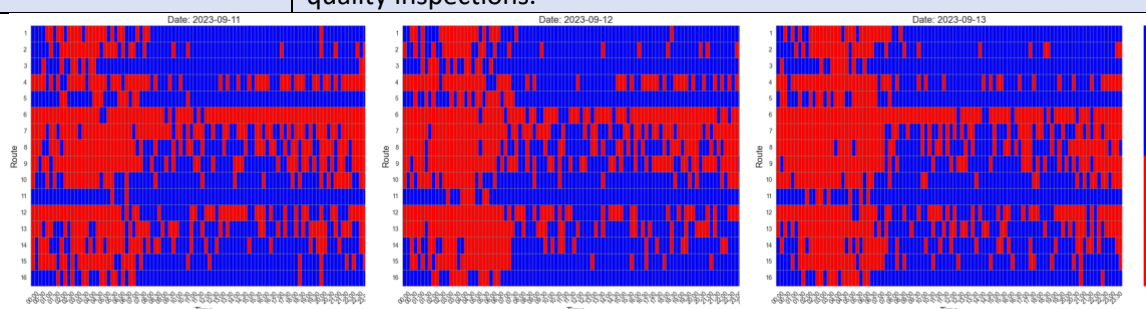
Evaluation of formal documentation quality									
[FIM, web-manual doc-formal] version: 2025030									
overall quality									
category	parameter	ref.	status	grade	value	index	comment		
Metadata information	evaluated catalogue record URL				https://spec.daceminfo.eu/en/sources/cv-ndc_d3-common/		Reference evaluation for the purpose of the presenting a typical evaluation according to the methodology. Meant to be used by other evaluators as a guidance.		
	evaluation date				02.01.2025				
	evaluator contact				Petr Burel				
	Metadata date	2.2.1.1	mandatory	C	01.03.2024	yes	at the bottom of the page, same for all records. Unclear when this specific record had changed		
	Metadata language	2.2.1.2	mandatory	C	cs, Czech, en: English	yes	inferred from the UI		
Contact point	name	2.2.1.3	optional	B	name: Ctřad Weissmann title: Manager of traffic information distribution department phone: +420 596663578 email: ctřad.weissmann@brd.cz		data derived from the web, provider information section, with all sufficient details; it is however unclear if this contact is also metadata provider (the person who put metadata together).		
	dataset identifier	2.2.1.1	mandatory	A	source-cv-ndc_d3-common		dataset url		
	name of the dataset	2.2.1.1	mandatory	A	DATA 11 - Common Traffic Information		within a dataset specification [cs, en]		
introduction data_and_evaluation support help									

Screenshot of the evaluation sheet of the Evaluation Form in the CDQ methodology

Recommendation: This is an efficient method with the goal to learn about the usability and applicability of data sets and data services, BEFORE such data and services are acquired by a data consumer, thus ensuring transparency and ex-ante quality. The tooling is ready to use, see the CDQ framework for documentation and spreadsheets. The outputs, using a scoring system, give a clear and neutral indication on the expected quality. Results are stored centrally and may be published online.

Method 6: Self Evaluation

Method Description	This assesses the quality of a dataset using its own internal characteristics rather than external validation sources. It is a direct approach that examines key quality dimensions and criteria such as completeness (temporal and content completeness), timeliness, granularity, and sampling rate. This method may prove particularly useful for particular quality dimensions and criteria in case that external ground truth data is unavailable or difficult to integrate.
Data Requirements	The dataset being evaluated. No additional data needed.
Examples	Assessing the temporal completeness of a dynamic traffic information service by verifying gaps (missing values) in time-series data. Evaluating the completeness of an Urban Vehicle Access Regulation (UVAR) dataset by comparing its structure to the required information set. Evaluating the number and types of events covered by an SRTI/RTTI data source.
Applicability	<i>Scope:</i> Quality assurance and quality assessment <i>Type of data:</i> Dynamic datasets, in particular datasets with continuous updates, such as real-time traffic data, geospatial information, or sensor-based measurements. <i>Type of process:</i> Offline and online <i>Parts covered:</i> Content processing <i>Covered quality criteria:</i> Completeness, Timeliness, Granularity, Sampling rate
Usage	<i>Objective:</i> To understand some aspects of the data source that shape its applicability in specific use cases. <i>Stage:</i> Operations <i>Rate of use:</i> Continuous or periodic, depending on the level of required quality inspections.

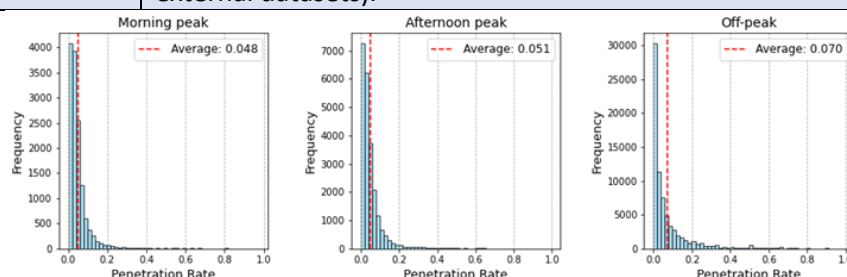


Example: missing records analysis from the FCD QF

Recommendation: Self-evaluation is useful for data providers to internally assess the quality of their datasets before making them available. The benefit is that data providers can proactively identify data gaps, inconsistencies, or anomalies, to reduce the risk of delivering low-quality datasets. It is further a cost-effective and efficient approach, especially when external reference or benchmark datasets are unavailable, such as traffic sensor data, GIS layers, or statistical records. In such cases, self-evaluation ensures that at least the internal consistency and structural integrity of the dataset are verified without requiring external validation sources.

Method 7: Contextual use of an additional data source

Method Description	This method involves using an additional data source to obtain essential contextual information required for quantifying specific quality metrics that cannot be directly derived from the primary (evaluated) dataset. Rather than serving as a benchmarking tool for comparison (see Method 1), the additional data source provides complementary data necessary for evaluating aspects such as penetration rate, spatial coverage, network coverage, and fleet representativeness. For example, in the case of FCD, it is impossible to determine the penetration rate without an independent reference such as loop detector counts or aggregate vehicle flow data. Similarly, when assessing the completeness of geospatial datasets, an authoritative road network dataset may be required to establish whether all relevant infrastructure is covered.
Data Requirements	At least one external dataset other than the evaluated one depending on the context.
Examples	Using inductive loop detector data to quantify the penetration rate of FCD-based travel time data. Using geospatial data to estimate the network coverage of traffic information service.
Applicability	<i>Scope:</i> Quality assurance and quality assessment <i>Type of data:</i> Static and dynamic traffic data, including spatial datasets. <i>Type of process:</i> Typically used in offline validation tasks <i>Parts covered:</i> Content detection <i>Covered quality criteria:</i> Spatial coverage, network coverage, penetration rate, fleet composition (see FCD QF)
Usage	<i>Objective:</i> To gain insight into the coverage of a data source and the extent to which is representative of the real-world conditions. <i>Stage:</i> Acceptance testing, operational monitoring, diagnosing data issues. <i>Rate of use:</i> Can be used periodically (e.g., during audits or performance evaluations) or continuously (e.g., real-time fusion with external datasets).



Example: penetration rate analysis from the FCD QF

Recommendation: This method is especially relevant for data providers responsible for monitoring the quality of ITS-related data at a national level. It provides a stronger validation approach than self-evaluation by incorporating an additional data source to support the quantification of additional quality metrics that cannot be derived directly from the evaluated dataset itself.

6. Conclusions and next steps

The NAPCORE project has provided a wide range of guidance, references, and tools with the goal to assess and ensure the quality of (meta)data, as provided on NAPs. The work done is based on extensive stakeholder engagement, evidence from data usage in real-world environments, and knowledge collected from literature and other projects.

The more tangible products of NAPCORE's quality activity are a set of Quality Frameworks and this Application Guideline. All products are made available to the public via a dedicated Online Repository¹⁹. These outputs represent the current state of quality management for ITS and mobility data. They also fill some knowledge gaps, represent the current consensus among relevant stakeholders, and provide orientation to actors dealing with the quality topic.

It is evident that the quality issue will remain one of the most relevant enablers (and bottlenecks) in the creation of efficient ITS and mobility data ecosystems in Europe, also following the various legal frameworks set out by the EC.

Many ongoing trends will give further momentum but will also provide new challenges for the quality topic. These trends include artificial intelligence, emerging data sources and new data use cases, as well as a constantly converging data ecosystem with a broad and heterogeneous stakeholder landscape.

To this end, discussions, collaboration, and concrete actions on the quality matter will be continued in the upcoming NAPCORE-X phase. Specific quality topics noted in the proposal for the NAPCORE-X project include:

- Discussing quality aspects at the strategical and tactical level among stakeholders in road & traffic information and management sector.
- Continue working on a sustainable and coherent data quality framework for the full scope of the EU Delegated Regulations.
- Embedding the quality perspective in the development of (meta)data standards and digital tools assisting in the value chain
- Defining best practices for quality management
- Aligning with the sectoral data quality standards such as the TISA 5-star rating model and comparable actions done in the RTTI-taskforce and emerging EU projects like TISGRADE

Future actions and results by the NAPCORE Quality Activity will be regularly reported via the NAPCORE website and social media channels.

¹⁹ <https://napcore.eu/quality/>

