



Navigating NAPs: Content, Service Quality and Accessibility under the ITS Directive

NAPCORE Mobility Data Days

07th November 2024

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Apetizers

InQMS (live)

- Collect, archive and evaluate metrics and quality of 30+ real distributions across Europe

DATEX@NAPs (static website)

- summarize (29)NAPs, (25)publishers, (40)distributions, (5+)protocols, formats, content quality from all

EuroRoaSt (live)

- Collect and Visualize traffic information on map of Europe

InQMS: Integrated Quality Management System

- collect and archive data
- create metrics (size, records, update intervals, validity)
- validate against (XML) schemas
- access to current as well as historical samples
- set up alerts for unexpected situations
- serve as (internal) data publisher with unified protocol

▾ ndic/d2-weather/2018-06-20

Published files					
created ▾	errors	records	compression ratio	update period	details
2024-10-31 23:59:53	0	2	3	00:07:01	details
2024-10-31 23:52:52	0	2	3	00:05:01	details
2024-10-31 23:47:51	0	2	3	00:06:01	details
2024-10-31	0	2	3	00:05:01	details

1

2

3

4

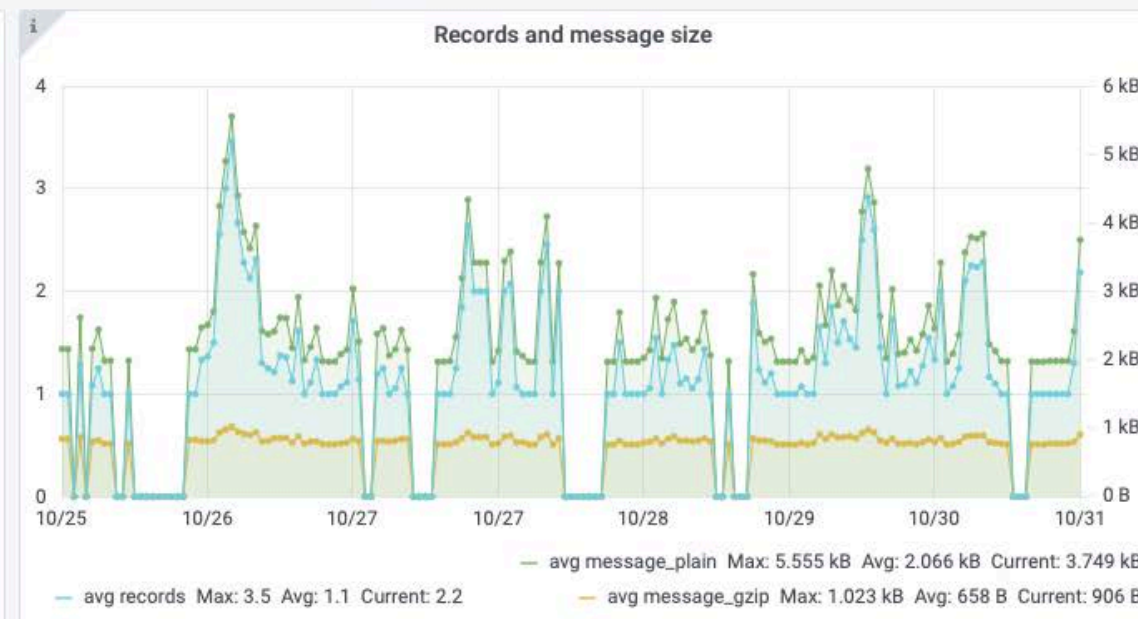
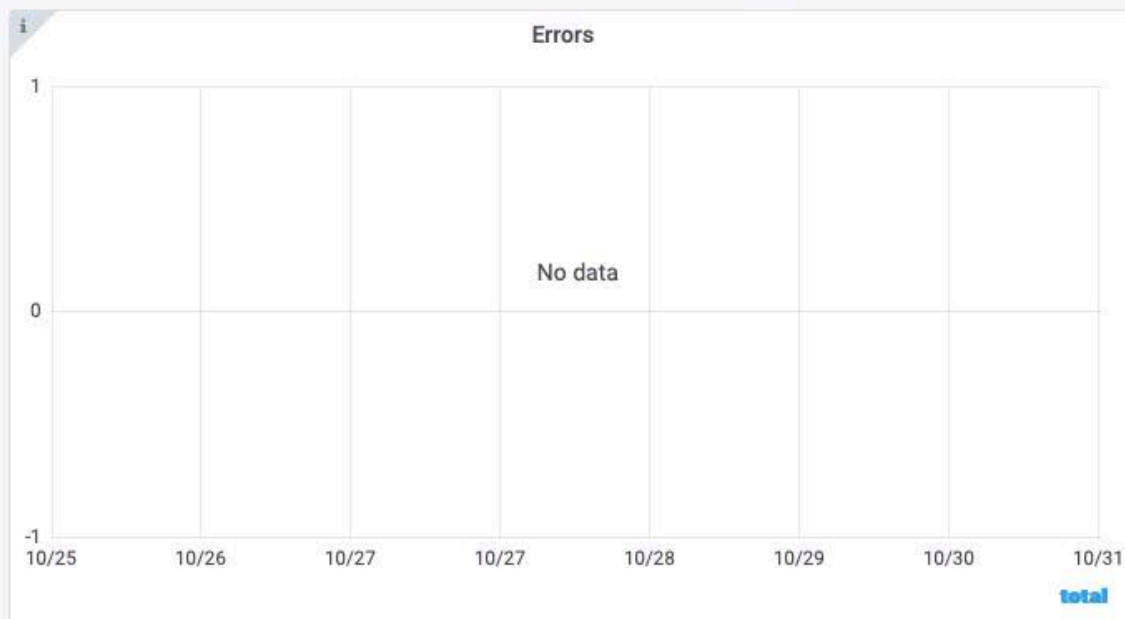
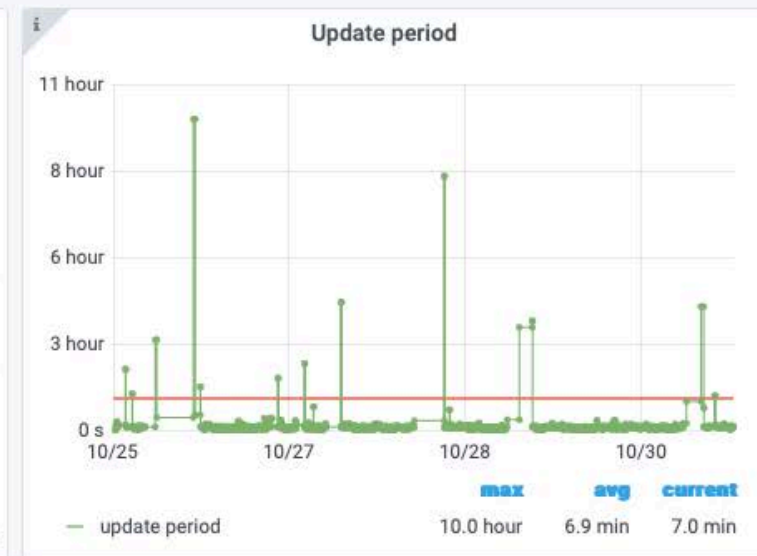
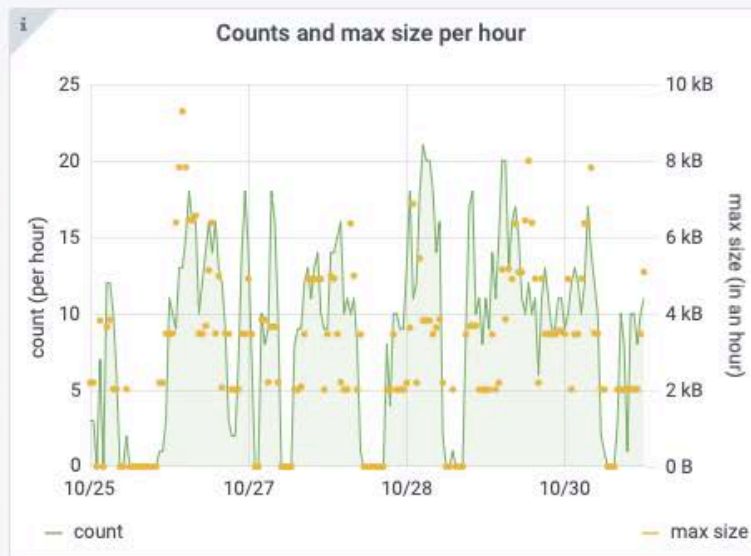
5

6

7

8

9



DATEX@NAPs

- <https://datex2.naps.inqms.cz>

NAPs Browser > Countries > Czechia

Czechia

Country

NAPs Browser

Countries

Austria

Belgium

Bulgaria

Croatia

Cyprus

Czechia

Denmark

Estonia

Finland

France

Germany

Greece

Hungary

Ireland

Italy

Latvia

Lithuania

Luxembourg

Malta

Netherlands

Poland

Portugal

Romania

Slovakia

Slovenia

Spain

Sweden

Iceland

Switzerland

Expand To Show Page _metadata.yml

NAPs

Country	NAP	Name
cz	registr.dopravniinfo.cz	National Traffic Information Registry

Catalogue Records

NAP	Publisher	Distribution	Format	Protocol	Area Covered	Grade
registr.dopravniinfo.cz	cz-ndic	d2-common	DATEX II	Push on occurrence	CZ0	B
registr.dopravniinfo.cz	cz-ndic	d2-common-pull	DATEX II	Pull on request	CZ0	B

Publishers

Identifier	Name
cz-ndic	Subscription Register

Distributions

Publisher	Distribution	Content	Protocol	Country	License
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On this page

[NAPs](#)

[Catalogue Records](#)

[Publishers](#)

[Distributions](#)



EuroRoaSt

- <https://eunapviz.napcore.imet.gr/>

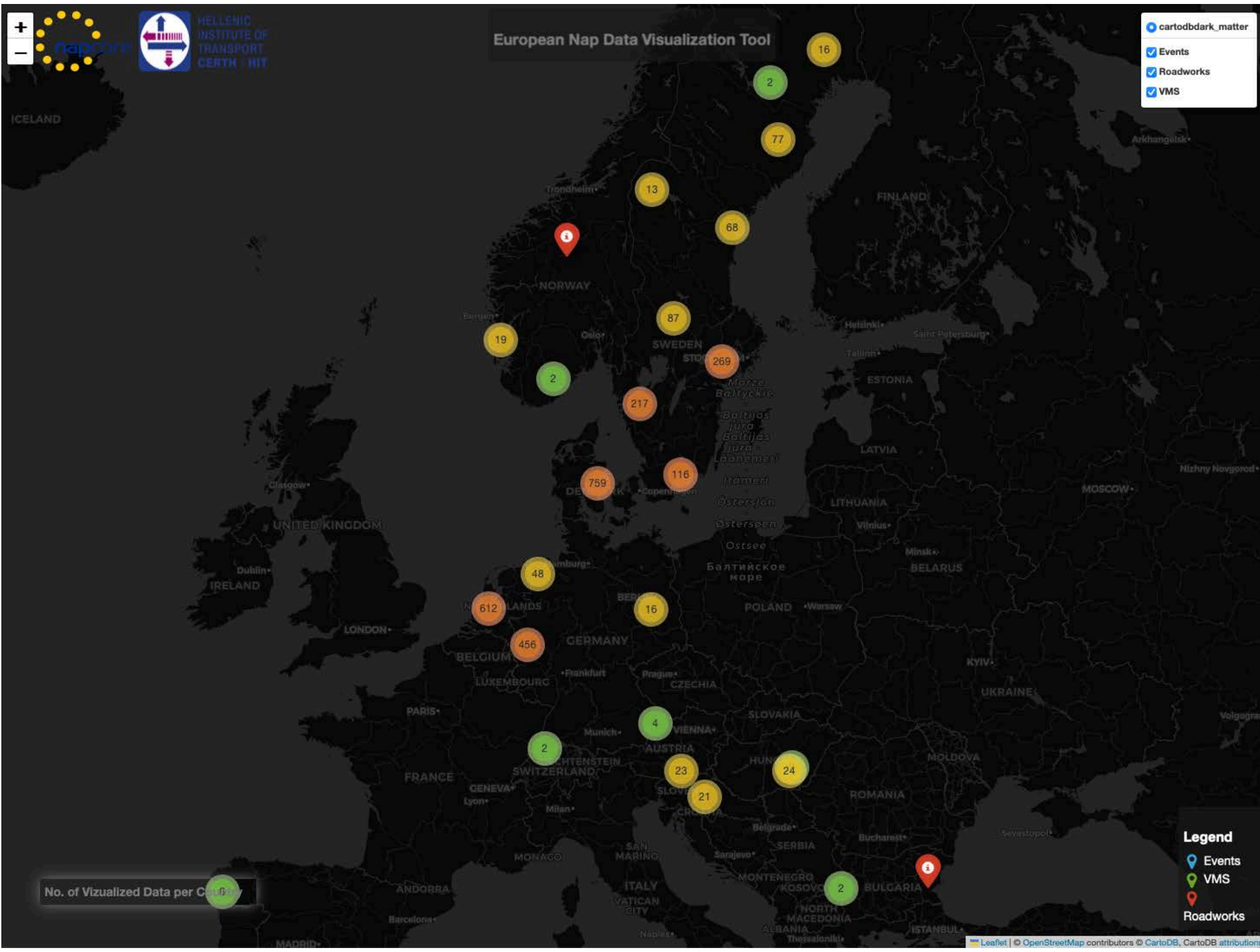


HELLENIC INSTITUTE OF
TRANSPORT
CERTH · MIT

European Nap Data Visualization Tool

cartodbdark_matter

- ☒ Events
- ☒ Roadworks
- ☒ VMS



No. of Visualized Data per Country

Legend

- Events
- VMS
- Roadworks



Speakers

- CERTH

- Chrysostomos Mylonas chmylonas@certh.gr
- Maria Stavara mstavara@certh.gr

- TamTam Research s.r.o.

- Jan Vlčinský jan.vlcinsky@tamtamresearch.com

Terms and definitions (see mobilityDCAT-AP)

NAP: Data Portal serving a catalogue of catalogue records

Catalogue Record: metadata about (datasets and) distribution

Distribution: content provided by a publisher using single format and protocol

Publisher: an entity responsible for making the distribution legally and technically available

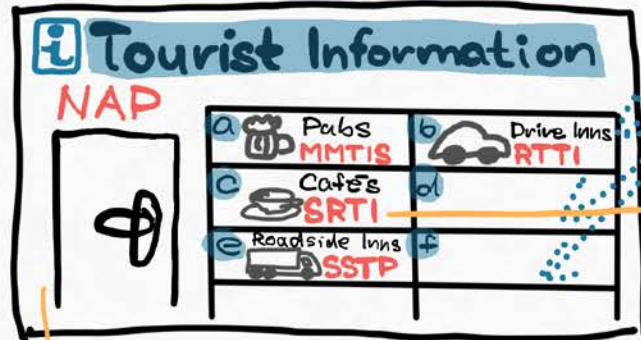
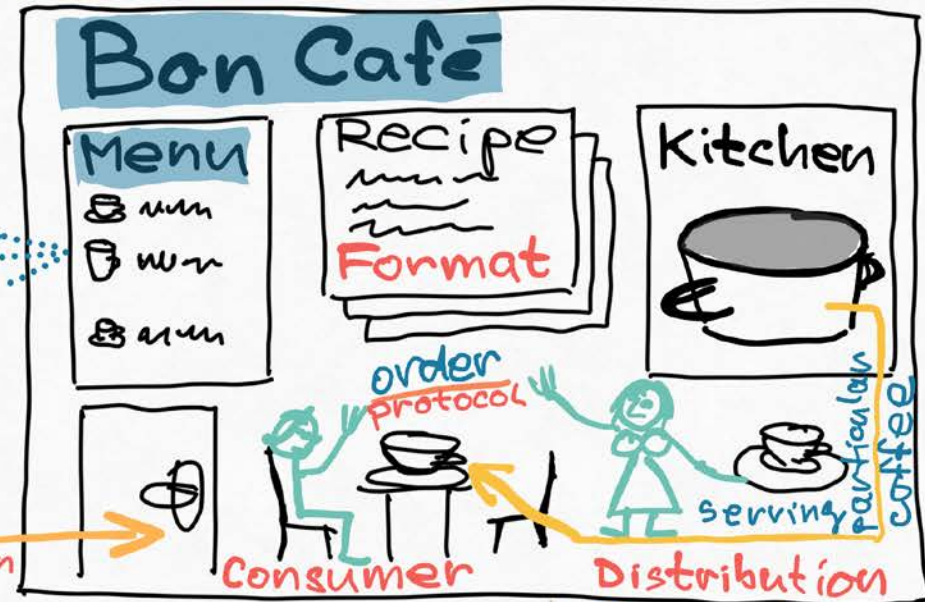
<https://w3id.org/mobilitydcat-ap/releases/>

<https://datex2.naps.inqms.cz/key-concepts.html>

Catalogue Record



Publisher



get in & sit
subscription process



eunapmonitoring.napcore.imet.gr



DATEX@NAPs

datex2.naps.inqms.cz



Cross Domain Quality Evaluation Framework



Integrated Quality Management System

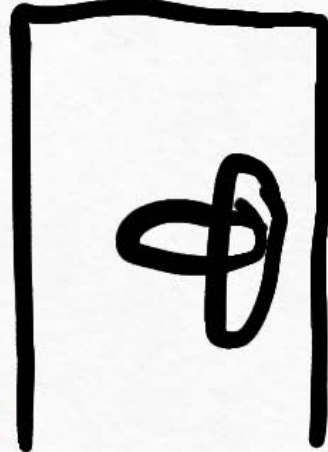
inqms.cz

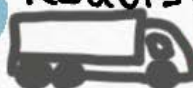


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Tourist Information

NAP



a  Pubs MMTIS	b  Drive Inns RTTI
c  Cafes SRTI	d
e  Roadside Inns SSTP	f

Catalogue Record

Leaflet

Bon
Cafe



Machiatto



Recipe
~
~

Open

Dress Code

Cards

accepted



Catalogue Record

Leaflet

Bon Cafe



Machiatto



Recipe

Open

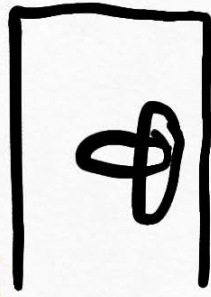


Dress Code

Cards accepted

Tourist Information

NAP



a	Pubs MMTIS	b	Drive Inns RTTI
c	Cafes SRTI	d	
e	Roadside Inns SSTP	f	



get in & sit

subscription process

Record

to Open 
Dress Code

Cards 
accepted

Publisher

Bon Cafe

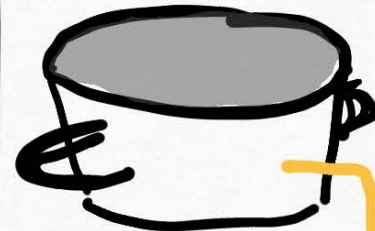
Menu

☕ mm
☕ mm
☕ am

Recipe

Format

Kitchen



get in & sit

subscription
process

order
protocol

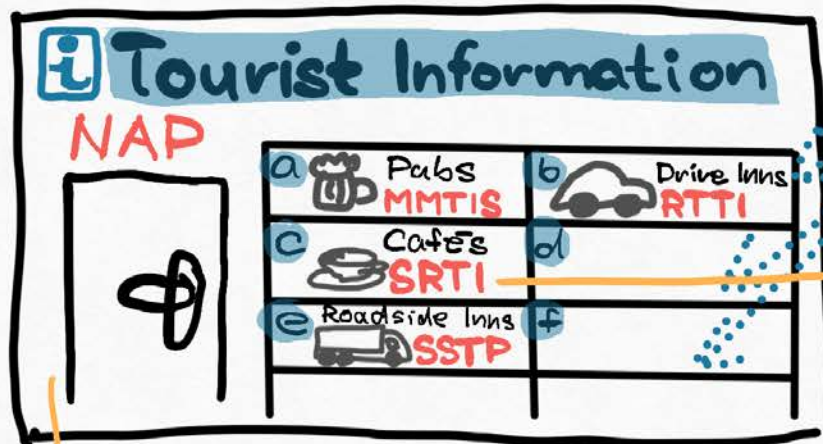
Consumer

serving

Distribution

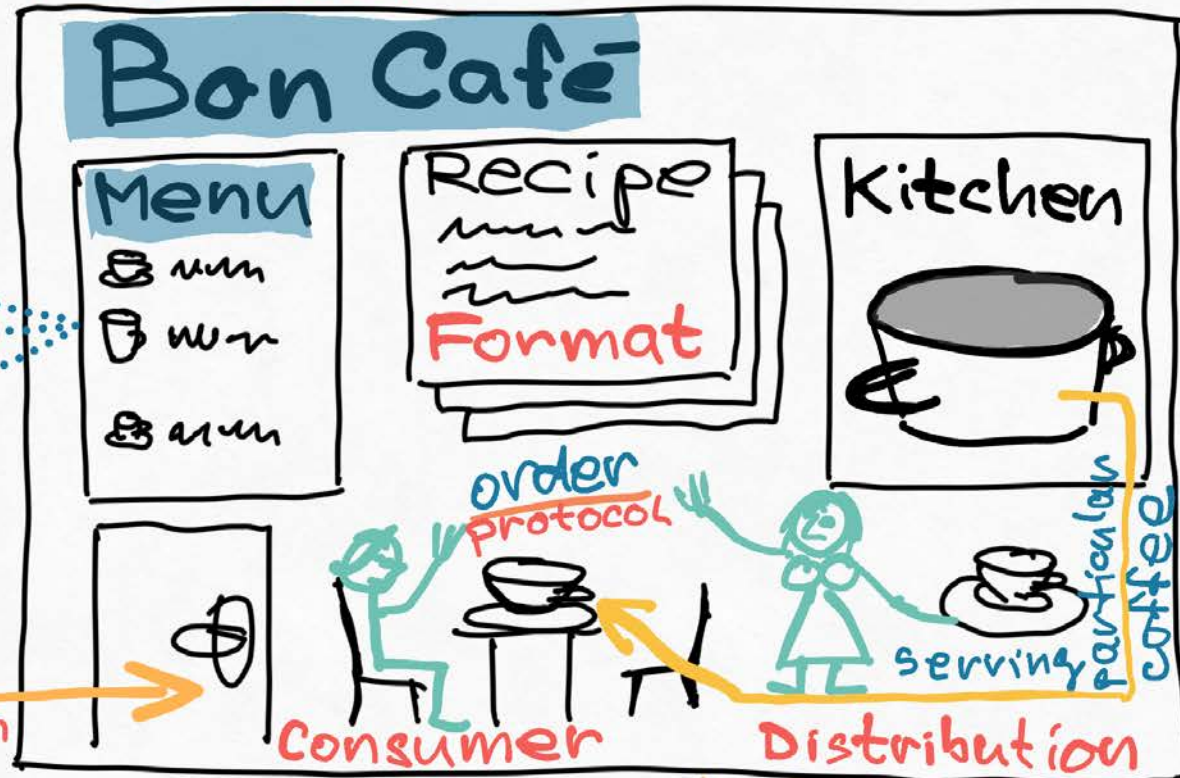
particular
coffee

Catalogue Record



get in & sit
subscription process

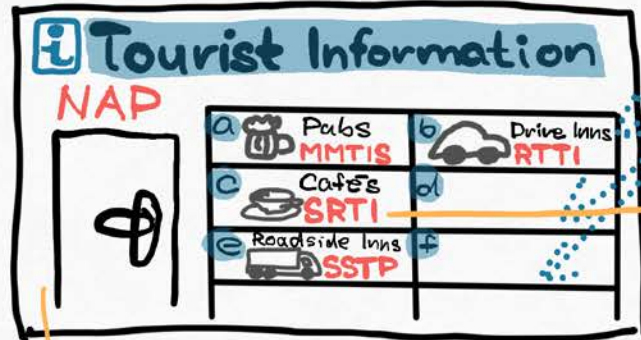
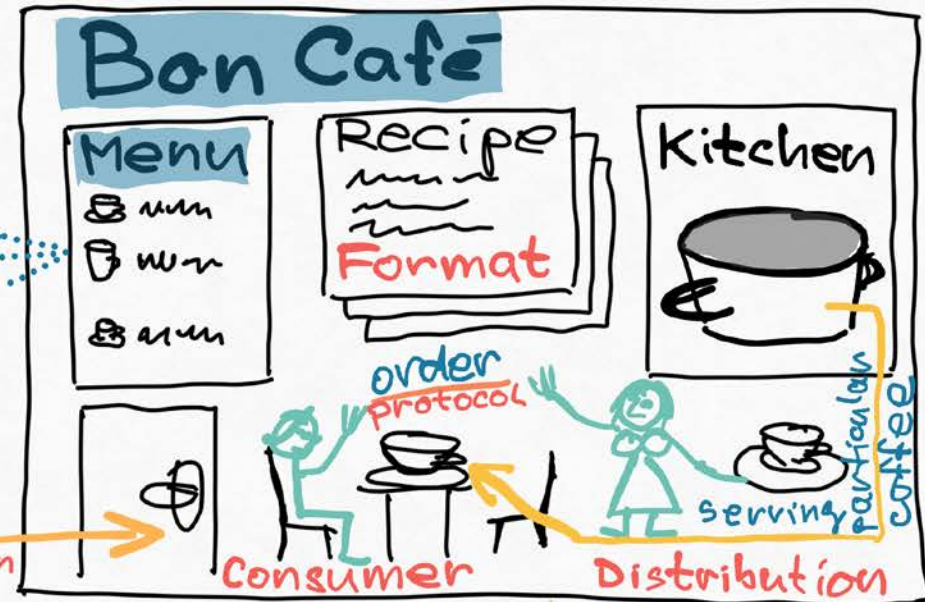
Publisher



Catalogue Record



Publisher



get in & sit
subscription process



eunapmonitoring.napcore.imet.gr



DATEX@NAPs

datex2.naps.inqms.cz



Cross Domain
Quality Evaluation
Framework



Integrated Quality
Management System

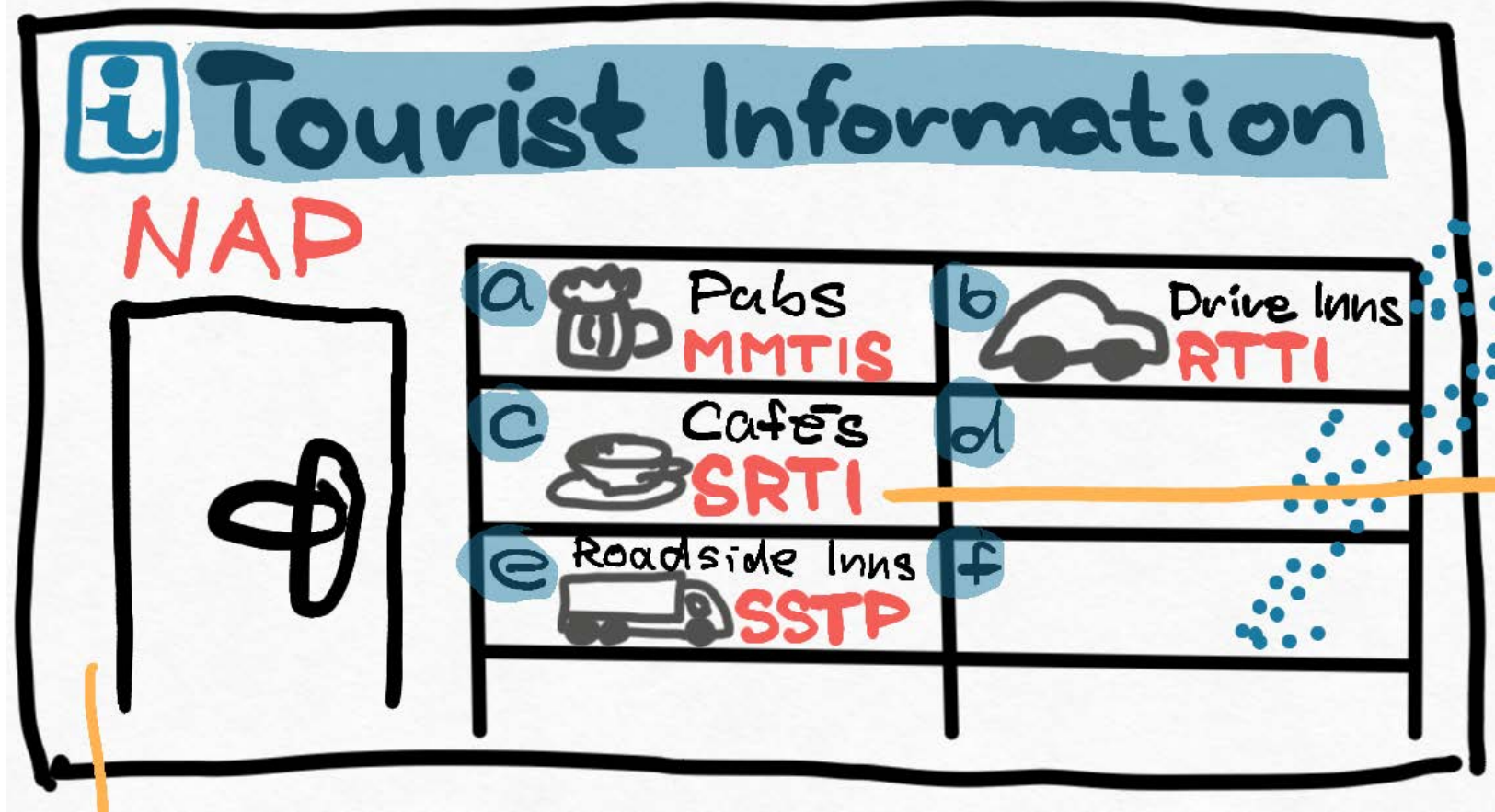
inqms.cz



eunapviz.napcore.imet.gr

Agenda

- Introduction
- NAPs and catalogue records
 - NAPs theoretical offerings
 - Discovering NAPs and SRTI Distributions
 - Evaluation of the Catalogue Records Formal Quality
- Distribution Quality
 - InQMS: Exploring Distribution Quality
 - Distribution Quality Summary
 - EuroRoaSt – Visualizing content
- Expenses
 - Public Sector Expenses Survey
- Getting Better
 - InQMS serving NAP operators and Publishers
 - Best Practices
 - Discussion



NAPs theoretical offerings

NAPs: Theoretical-practical-legal basis

What is it? A node in which ITS-related data are concentrated and published in the form of datasets (catalogue records)

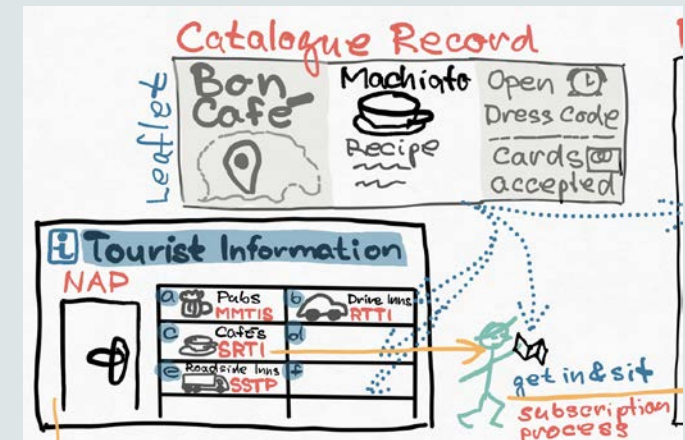
What is its mission?
To facilitate easy access, exchange, and reuse of transport-related data in Europe so as to support the provision of EU-wide interoperable travel and traffic services to end users

NAP

Legal framework

1. ITS Directive (2010/40/EU)
2. Delegated Regulation (EU) No 886/2013
3. Delegated Regulation (EU) No 885/2013
4. Delegated Regulation (EU) No 2015/962
5. Delegated Regulation (EU) No 2017/1926
6. **Revised ITS Directive (EU) 2023/2661**
7. Delegated Regulation (EU) 2024/490

Analogy



Revised ITS Directive (2023/266 I)

Key amendments

- Addition & delimitation of data types based on cost-benefit and market analyses (list of “crucial” data types – **set out in Annex III**)
- Extension of geographical coverage to urban nodes, in addition to TEN-T corridors and primary roads
- Deadlines for data & service availability

Implications for Member States

- (Digitize) and make available traffic & travel information
- Establish & maintain NAPs for accessible and machine-readable ITS data
- Ensure interoperability and geographical continuity of ITS services
- Implement the appropriate specifications & standards
- Cooperate with EC and other MSs to ensure consistent, coordinated, and harmonized deployment of ITS services
- Provide periodic reports to EC

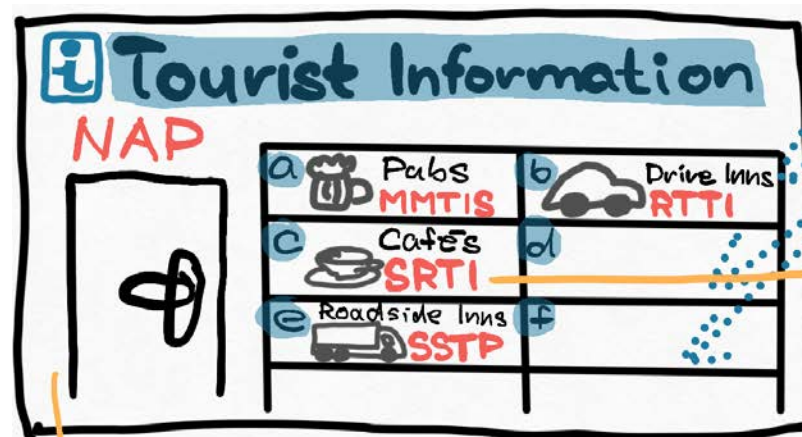
“Crucial” data types - Annex III

Data types	Geographical & network coverage
Static and dynamic traffic regulations	
Access conditions for tunnels	- TEN-T (core & comprehensive) road network - Other national primary roads with average daily traffic volume ≥ 8,500 vehicles - Streets at the center of Urban Nodes with average daily traffic volume ≥ 7,000 vehicles - Streets at the center of Urban Nodes
Access conditions for bridges	
Speed limits	
Overtaking bans on heavy goods vehicles	
Weight/length/width/height restrictions	
One-way streets	
Freight delivery regulations	
Direction of travel on reversible lanes	- TEN-T (core & comprehensive) road network - Other national primary roads with average daily traffic volume ≥ 8,500 vehicles - Streets at the center of Urban Nodes with average daily traffic volume ≥ 7,000 vehicles
Traffic circulations plans	
Permanent access restrictions	
Boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones	
Dynamic road network state	
Road closures	TEN-T (core & comprehensive) road network
Lane closures	
Roadworks	
Temporary traffic management measures	
Information and reservation services for safe and secure parking places for trucks and commercial vehicles	
Static data related to the parking areas	TEN-T (core & comprehensive) road network
Information on safety and equipment of the parking area	
Dynamic data on availability of parking places including whether a parking is: full, closed or number of free places available	

“Crucial” data types - Annex III

Data types	Geographical & network coverage
Road-safety-related minimum universal traffic information	
Situations: • Temporary slippery road • Animal, people, obstacles, debris on the road • Unprotected accident area • Short-term road works • Wrong-way driver • Unmanaged blockage of a road	• TEN-T (core & comprehensive) road network • Other motorways
Situations: • Reduced visibility • Exceptional weather conditions	
Static multimodal traffic data for EU-wide multimodal travel information services	
Location of identified access nodes for all scheduled modes, including information on accessibility of access nodes and paths within an interchange (such as existence of lifts, escalators)	The entire transport network

NAP Data Availability Monitoring Tool (self-assessment)



eunapmonitoring.napcore.imet.gr

European NAP monitoring (self-assessment)

How did this work start?

- Activity of **EU EIP project** aiming to monitor and harmonize NAPs in Europe.
- Kicked off in **2016** via the “**annual NAP reports**”; later version from 2017 to 2021

Methodological approach: annual surveys completed by responsible ministries, NAP operators, and NBs.

NAPCORE took over the continuation of the NAP monitoring!

Objectives/purpose of the relevant reports:

- Monitor the development and data availability of NAPs across Europe
- Identify commonalities and substantial differences amongst the NAPs
- Enable knowledge exchange between various MSs in the field of NAPs

Methodological approach: 6-month survey (**self-assessment**) completed by NAP operators, responsible ministries, or nominated NBs

Main outputs:

1. NAP status (e.g., under development, fully operational)
2. Data and metadata availability
3. Geographical, network, and transport mode coverage
4. Implemented data standards (per DR per data category)
5. Implemented NAP architectures (web-link repositories, database, both types)
6. Utilized licensing models
7. Usage of NAPs (number of data providers and data consumers)
8. Compliance assessment (level of implementation)
9. Crucial Data Types (2661/2023) 

Input data collection and reporting process



Step 1: MSs' self assessment
National responders reply to survey questions via specific tokens.

Step 2: Input integration
Responses are saved to LimeSurvey's dedicated MySQL database.

Step 3: Input processing
Responses are archived or updated using temporal rules

Step 4: Input visualization (reporting)
The visualization platform is permanently connected with the database. It is comprised of several python scripts that produce a set of HTMLs visualizing the collected info.

To participate in this restricted survey, you need a valid access code.

If you have been issued an access code, please enter it here:

* Access code:

id	token	startdate	enddate	language	seed	startdate	enddate
1	France	2023-06-26 16:03:21.000	2023-07-20 10:58:33.000	en	1518094324	2023-06-26 15:14:14.000	2023-07-20 10:58:33.000
2	54 Romania	2023-07-20 10:58:33.000	2023-07-20 10:58:33.000	en	1743097323	2023-07-20 10:58:33.000	2023-07-20 10:58:33.000
3	58 England	2023-06-25 16:02:53.000	2023-06-25 16:02:53.000	en	674455205	2023-06-25 15:52:22.000	2023-06-25 16:02:53.000
4	59 Portugal	2023-06-25 16:44:55.000	2023-06-25 16:44:55.000	en	532774188	2023-06-25 16:13:44.000	2023-06-25 16:44:55.000
5	60 Luxembourg	2023-06-26 14:59:56.000	2023-06-26 14:59:56.000	en	810999332	2023-06-26 14:30:46.000	2023-06-26 14:59:56.000
6	52 Latvia	2023-07-18 11:47:52.000	2023-07-18 11:47:52.000	en	1572363101	2023-07-18 11:20:40.000	2023-07-18 11:47:52.000
7	51 Poland	2023-07-18 06:14:35.000	2023-07-18 06:14:35.000	en	1019098227	2023-07-17 12:29:56.000	2023-07-18 06:14:35.000
8	56 Greece	2023-06-28 18:43:54.000	2023-06-28 18:43:54.000	en	191331364	2023-07-24 12:26:43.000	2023-06-28 18:43:54.000
9	57 Malta	2023-08-25 15:29:42.000	2023-08-25 15:29:42.000	en	517515322	2023-08-25 15:16:53.000	2023-08-25 15:29:42.000
10	45 Czechia	2023-07-08 01:25:42.000	2023-07-08 01:25:42.000	en	1234779960	2023-07-08 00:25:21.000	2023-07-08 01:25:42.000
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12	39 Finland	2023-07-14 15:13:00.000	2023-07-14 15:13:00.000	en	191991968	2023-06-27 11:44:53.000	2023-07-14 15:13:00.000
13	36 Estonia	2023-06-30 16:23:22.000	2023-06-30 16:23:22.000	en	175122387	2023-06-29 13:59:58.000	2023-06-30 16:23:22.000
14	37 Slovenia	2023-06-28 15:34:20.000	2023-06-28 15:34:20.000	en	1931636087	2023-07-12 13:01:17.000	2023-06-28 15:34:20.000
15	47 Italy	2023-07-12 13:57:00.000	2023-07-12 13:57:00.000	en	611765441	2023-06-30 22:33:50.000	2023-07-12 13:57:00.000
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17	30 Spain	2023-06-30 16:25:00.000	2023-06-30 16:25:00.000	en	259170076	2023-06-27 08:49:36.000	2023-06-30 16:25:00.000
18	32 Cyprus	2023-06-28 16:57:16.000	2023-06-28 16:57:16.000	en	1761894337	2023-06-19 17:02:16.000	2023-06-28 16:57:16.000
19	56 Greece	2023-07-24 12:52:16.000	2023-07-24 12:52:16.000	en	1404202918	2023-06-29 18:05:36.000	2023-07-24 12:52:16.000
20	43 Denmark	2023-07-07 13:00:55.000	2023-07-07 13:00:55.000	en	191331364	2023-07-24 12:26:43.000	2023-07-07 13:00:55.000
21	33 Sweden	2023-06-27 08:19:23.000	2023-06-27 08:19:23.000	en	1271286676	2023-07-03 12:00:41.000	2023-06-27 08:19:23.000
22	26 Norway	2023-06-30 17:50:47.000	2023-06-30 17:50:47.000	en	767136283	2023-06-12 10:45:20.000	2023-06-30 17:50:47.000
23	27 Belgium	2023-07-08 13:15:36.000	2023-07-08 13:15:36.000	en	1866419415	2023-06-12 18:21:12.000	2023-07-08 13:15:36.000
24	23 Croatia	2023-06-15 10:09:06.000	2023-06-15 10:09:06.000	en	1681610152	2023-07-14 15:27:58.000	2023-06-15 10:09:06.000
25	24 Lithuania	2023-06-25 17:16:00.000	2023-06-25 17:16:00.000	en	1026172306	2023-06-13 14:19:37.000	2023-06-25 17:16:00.000
26	12 Bulgaria	2023-06-14 13:57:55.000	2023-06-14 13:57:55.000	en	809420860	2023-06-12 14:49:09.000	2023-06-14 13:57:55.000
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28	50 Germany	2023-07-14 16:04:25.000	2023-07-14 16:04:25.000	en			
29	19 Ireland	2023-07-07 16:48:40.000	2023-07-07 16:48:40.000	en			
30	15 Hungary	2023-06-19 15:16:01.000	2023-06-19 15:16:01.000	en			
31	21 Austria	2023-06-30 09:48:08.000	2023-06-30 09:48:08.000	en			

NAP data availability monitoring

Surveys / ... / Responses and statistics

Settings Structure

Overview

General settings

Text elements

Privacy policy

Theme options

Participant settings

Notifications & data

Publication & access

Survey permissions

Survey menu

Overview questions & groups

Survey participants

Security update! A security update is available. [Click here to use ComfortUpdate.](#)

Survey responses

Response summary

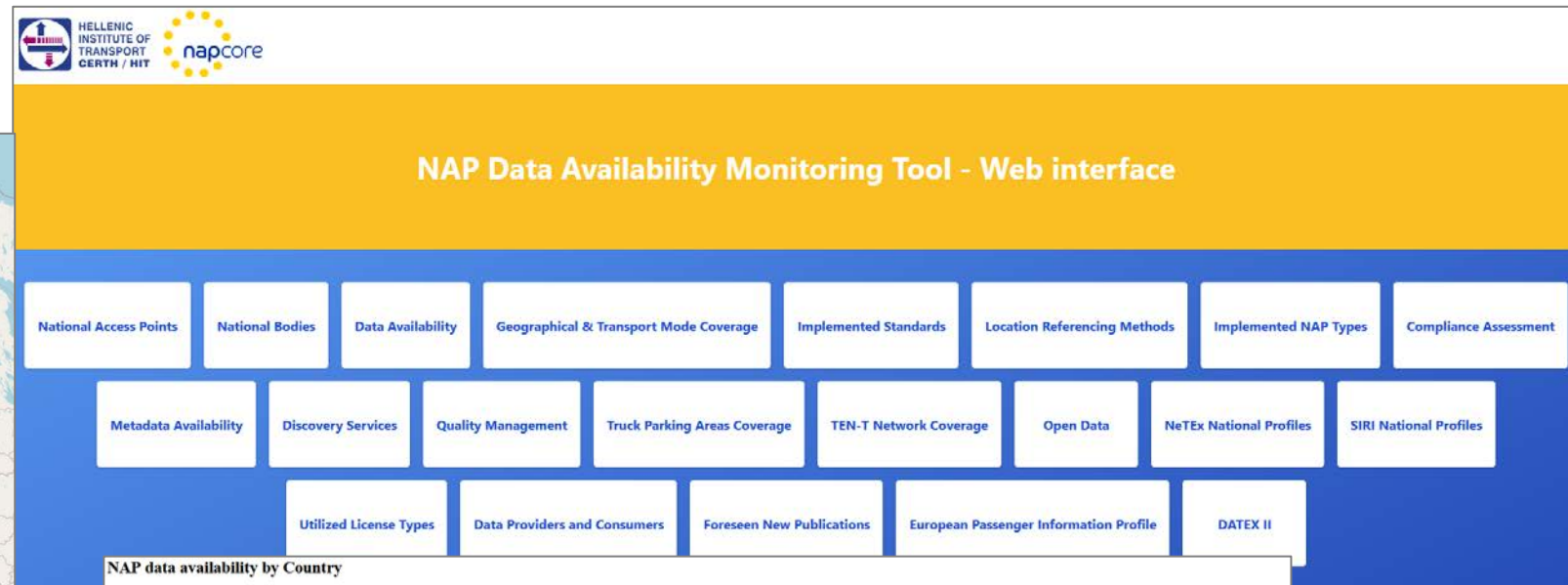
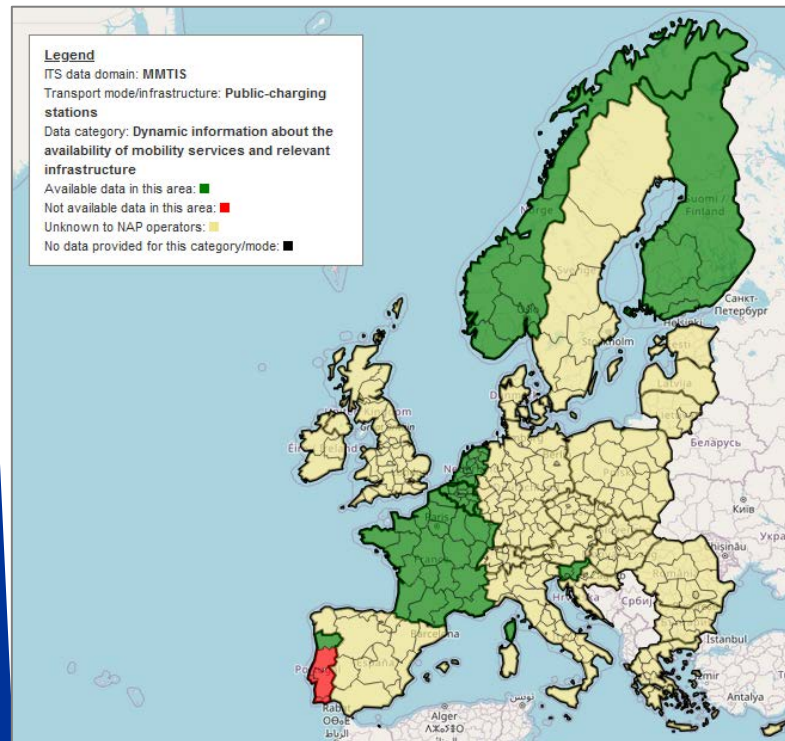
Full responses	30
Incomplete responses	0
Total responses	30

Response summary

All responses Saved but not submitted responses



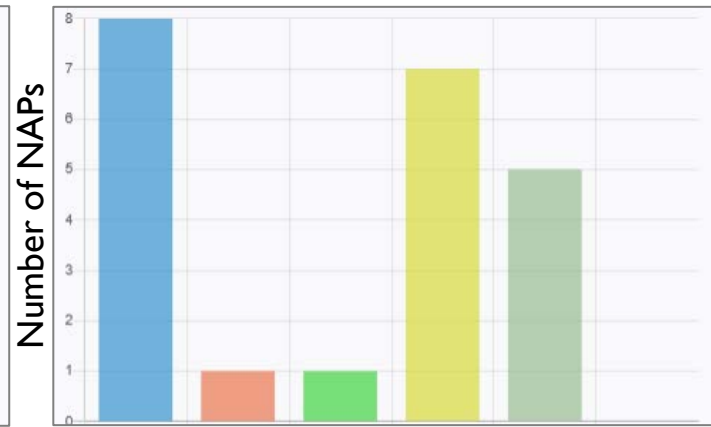
<https://eunapmonitoring.napcore.imet.gr/>

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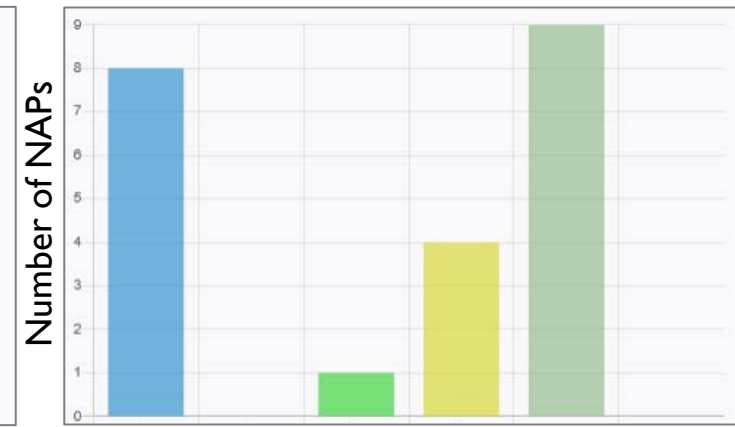
Network coverage – NAP data/Annex III



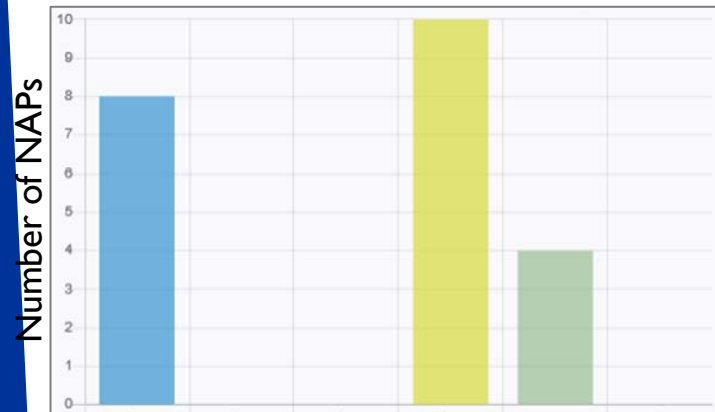
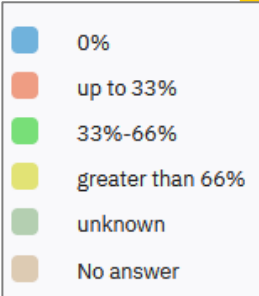
Access conditions for tunnels –
TEN-T



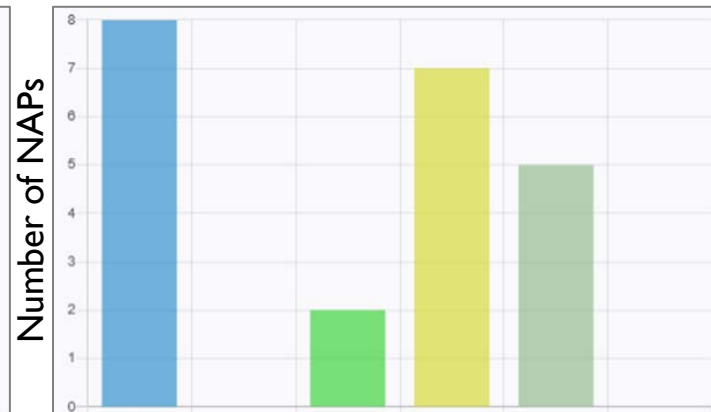
Access conditions for tunnels –
national primary roads



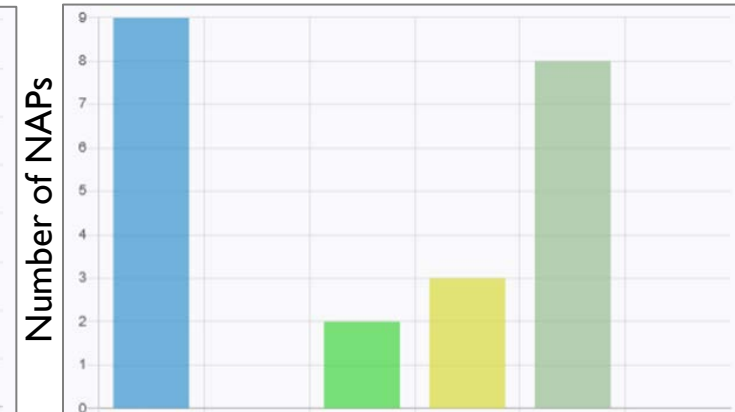
Access conditions for tunnels –
urban roads



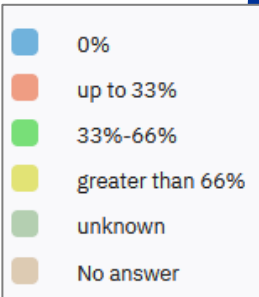
Access conditions for bridges –
TEN-T



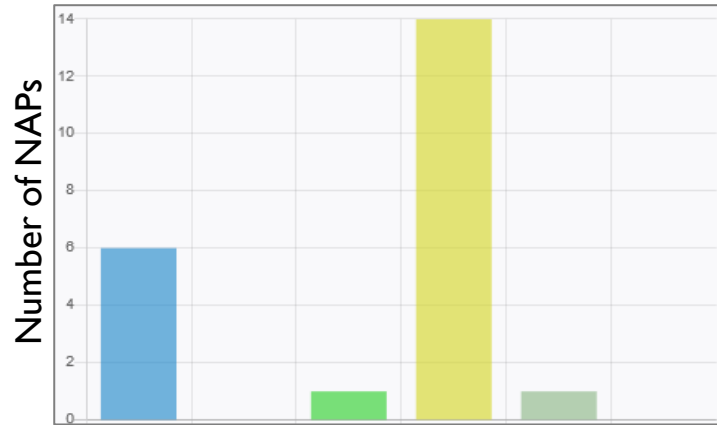
Access conditions for bridges –
national primary roads



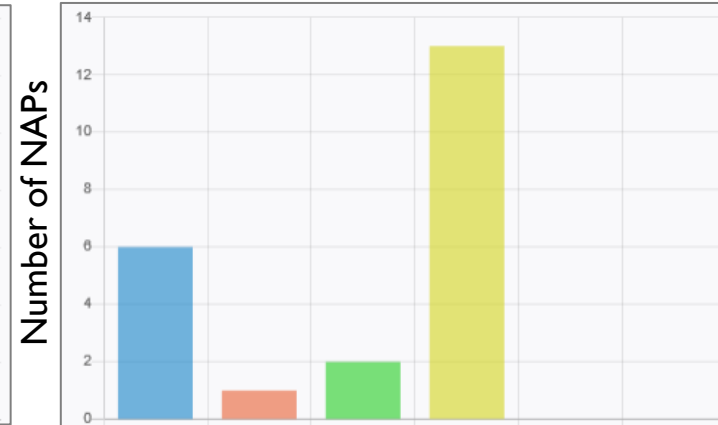
Access conditions for bridges –
urban roads



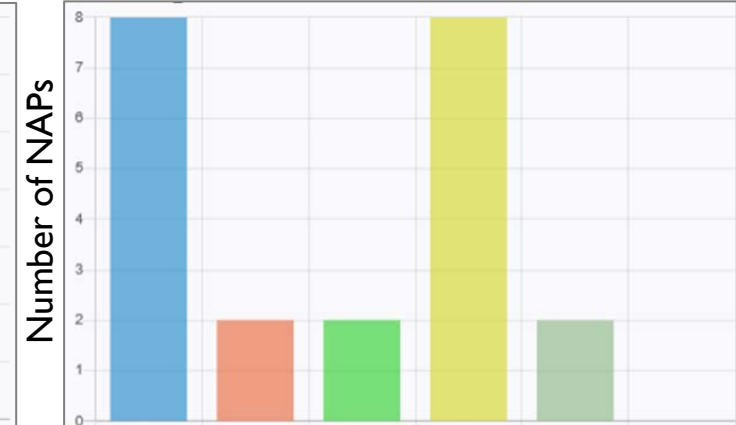
Network coverage – NAP data/Annex III



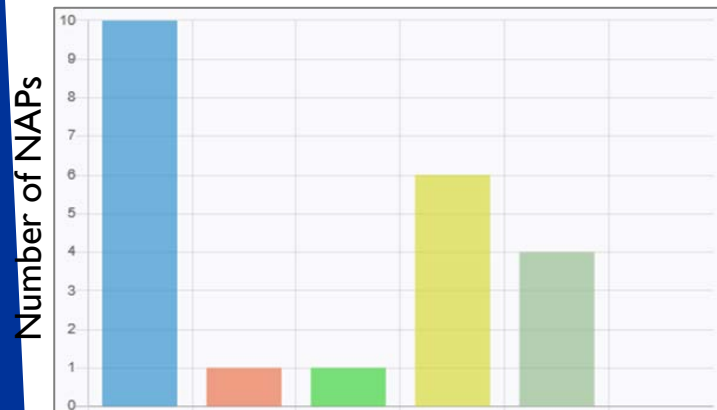
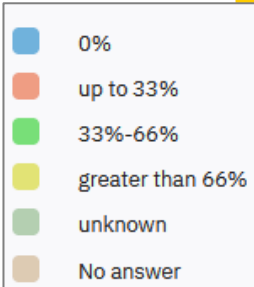
**Speed limits –
TEN-T**



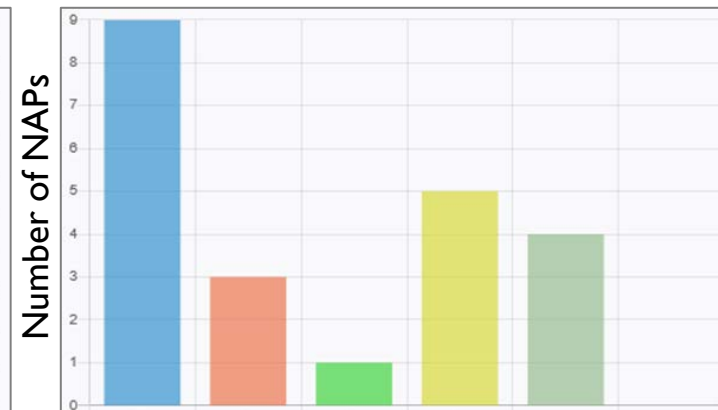
**Speed limits –
national primary roads**



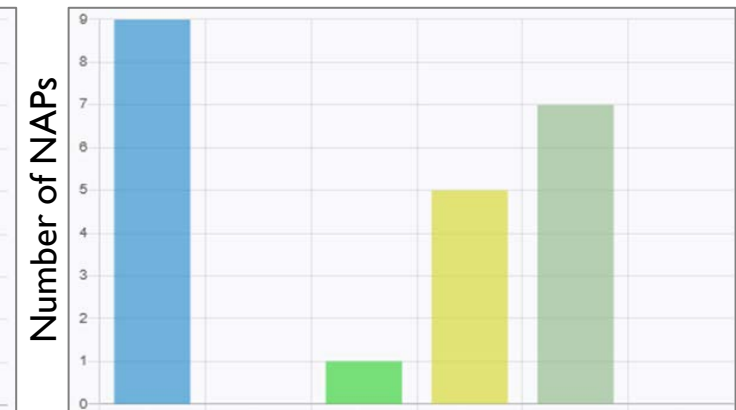
**Speed limits –
urban roads**



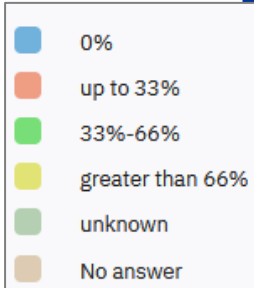
**Overtaking bans on heavy goods
vehicles –
TEN-T**



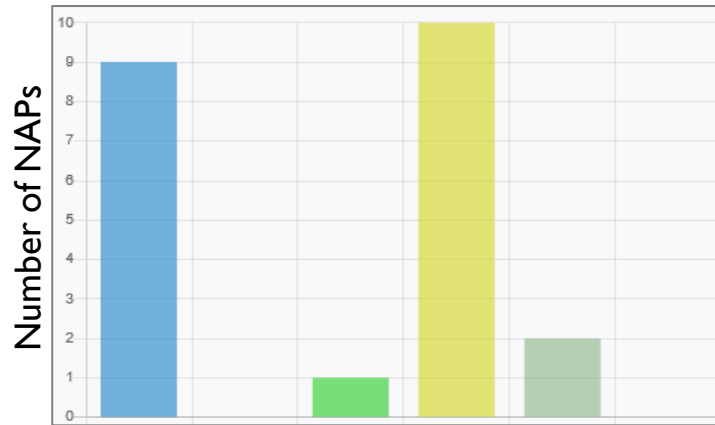
**Overtaking bans on heavy goods
vehicles –
national primary roads**



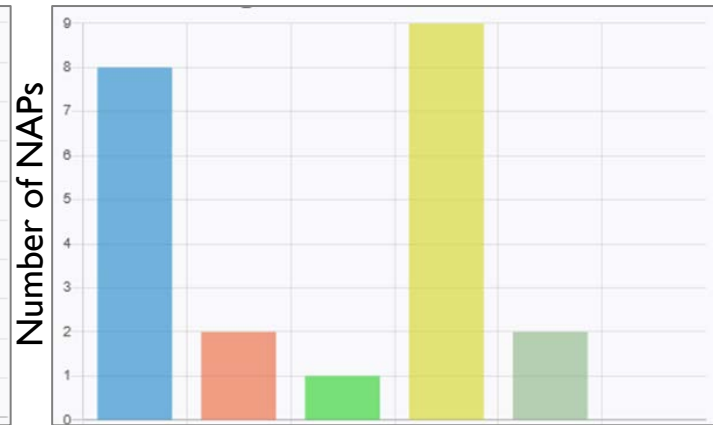
**Overtaking bans on heavy goods
vehicles –
urban roads**



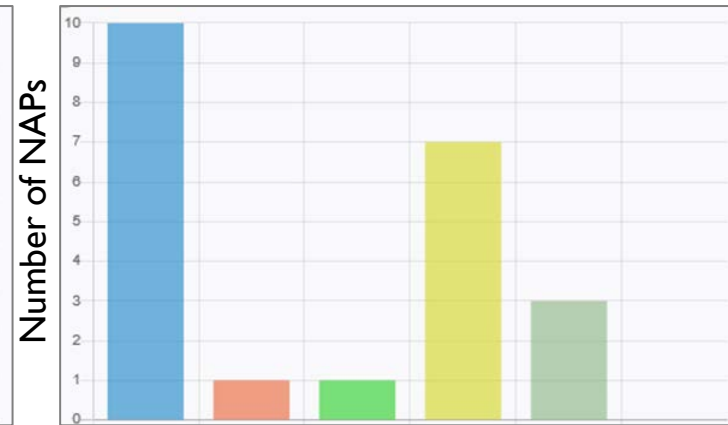
Network coverage – NAP data/Annex III



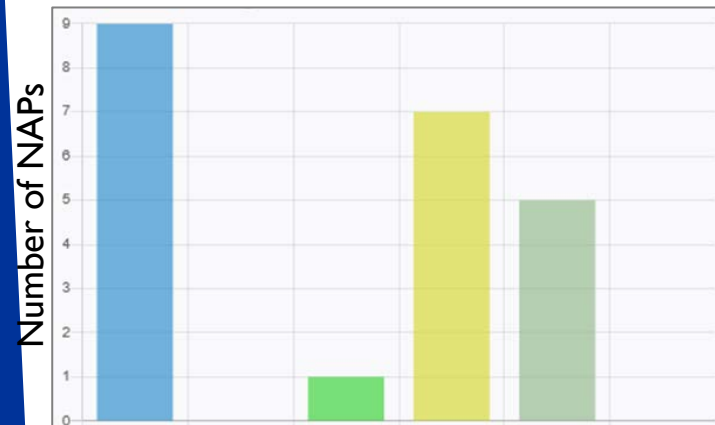
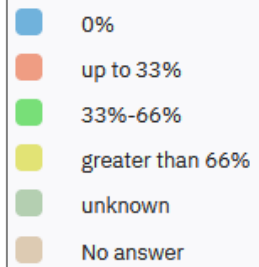
Weight/length/width/height vehicle restrictions – TEN-T



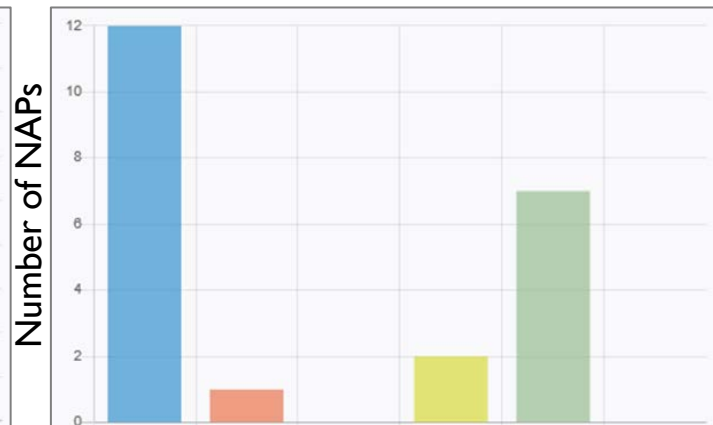
Weight/length/width/height vehicle restrictions – national primary roads



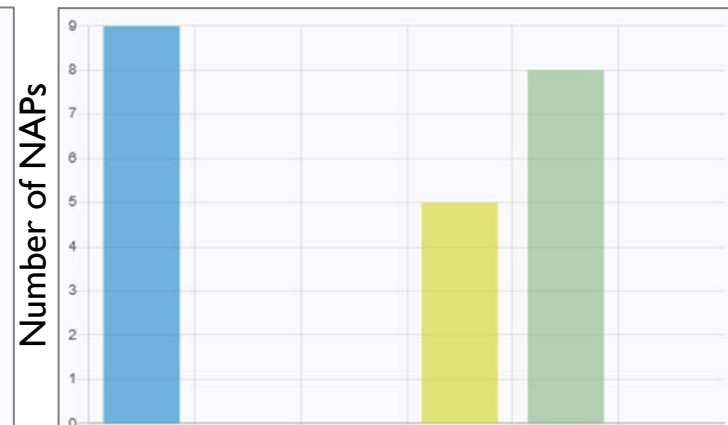
Weight/length/width/height vehicle restrictions – urban roads



One-way streets – urban roads



Freight delivery regulations – urban roads



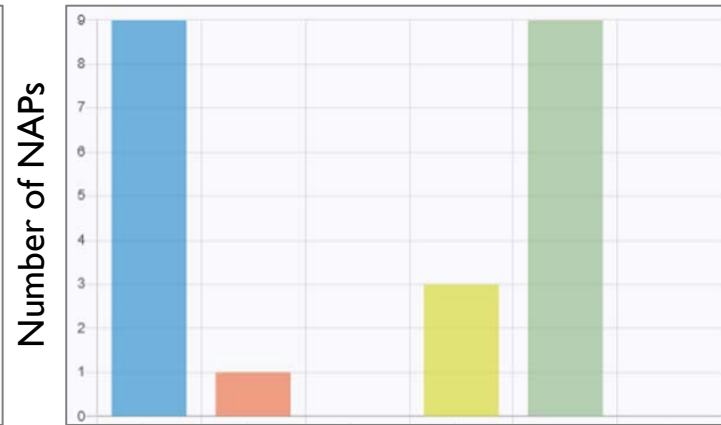
Direction of travel on reversible lanes – TEN-T



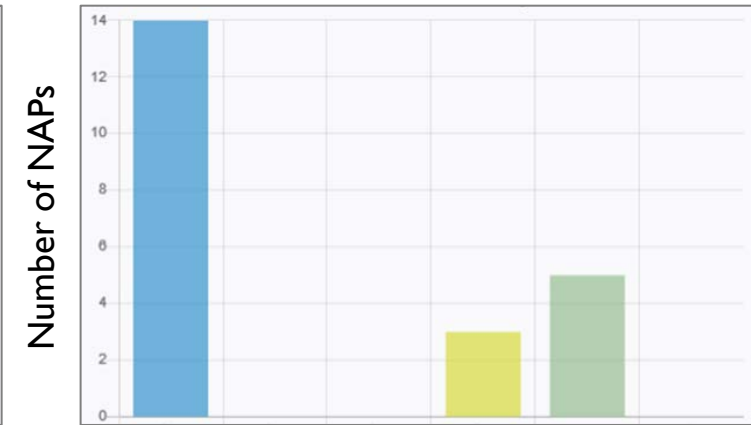
Network coverage – NAP data/Annex III



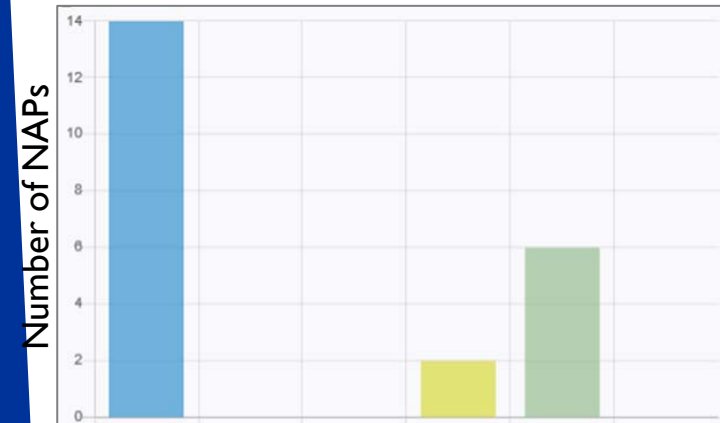
Direction of travel on reversible lanes – national primary roads



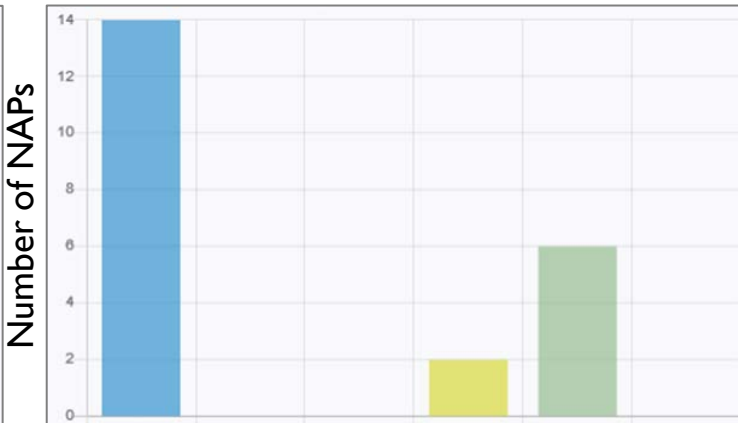
Direction of travel on reversible lanes – urban roads



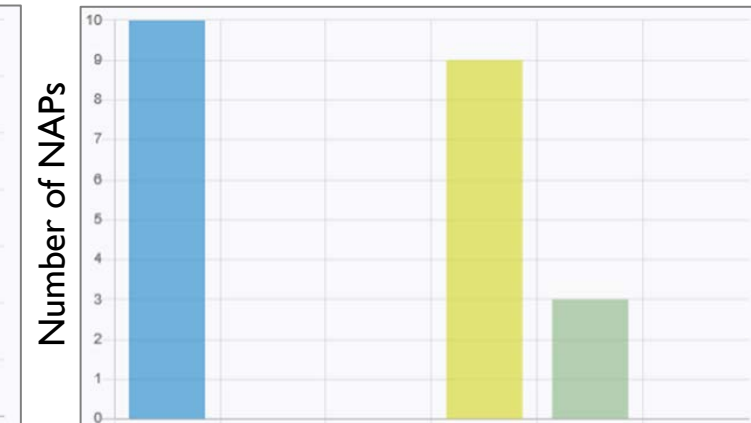
Traffic circulation plans – TEN-T



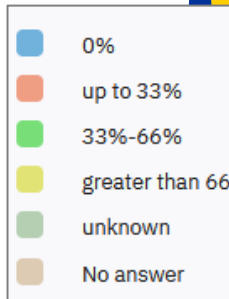
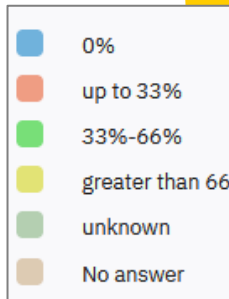
Traffic circulation plans – national primary roads



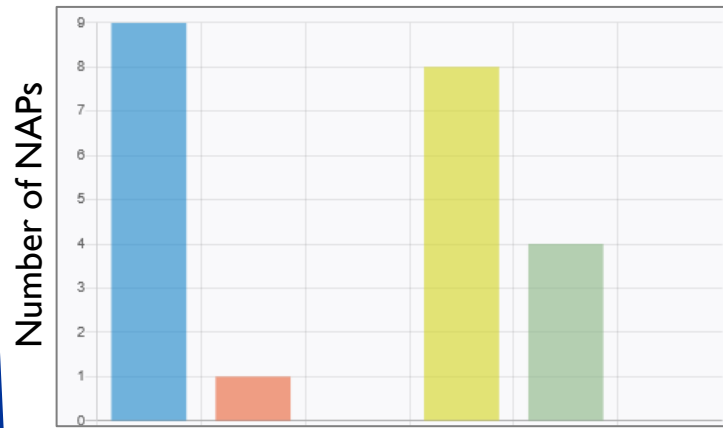
Traffic circulation plans – urban roads



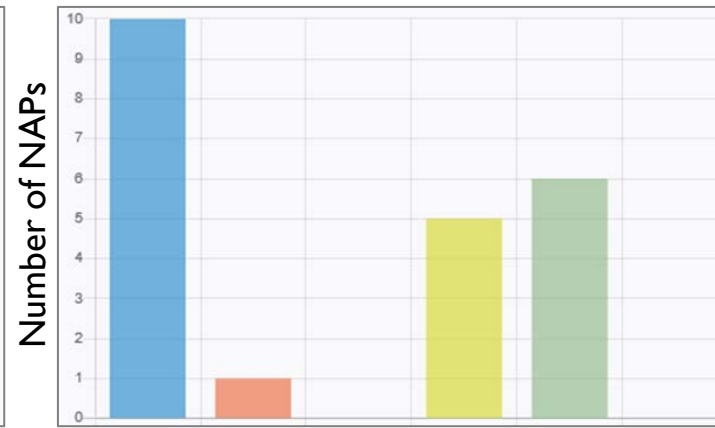
Permanent access restrictions – TEN-T



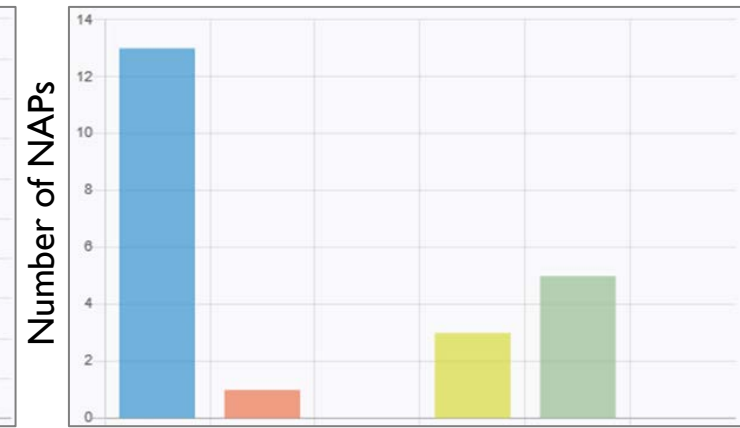
Network coverage – NAP data/Annex III



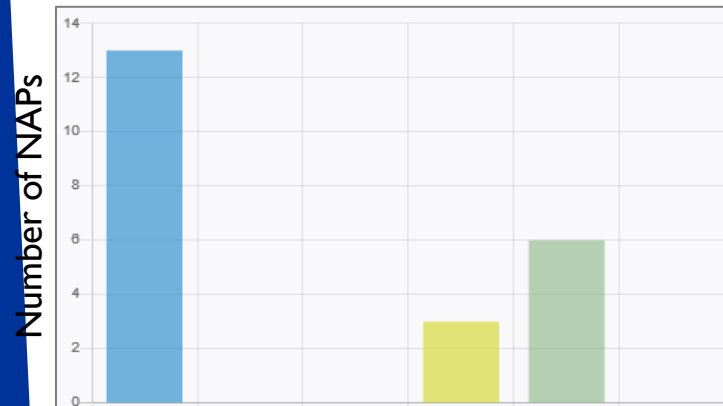
Permanent access restrictions –
national primary roads



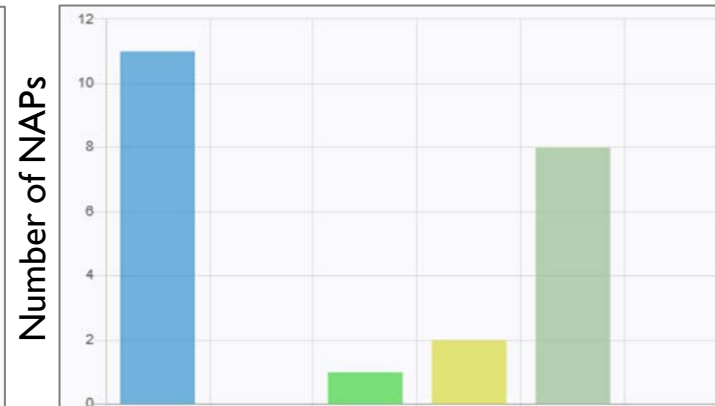
Permanent access restrictions –
urban roads



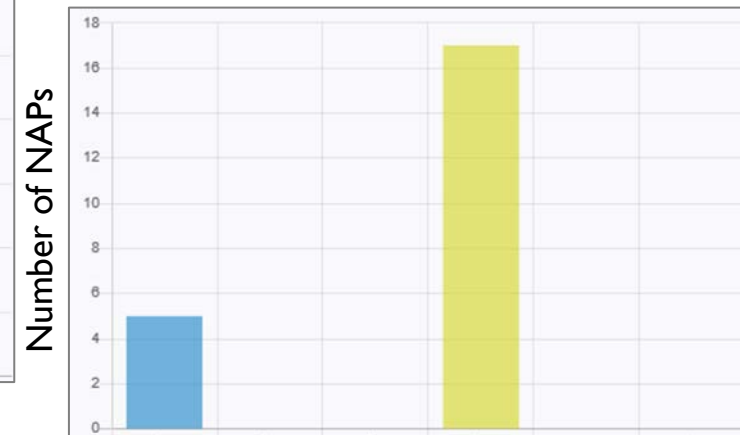
Boundaries of restrictions, prohibitions or
obligations with zonal validity, current access
status and conditions for circulation in
regulated traffic zones – TEN-T



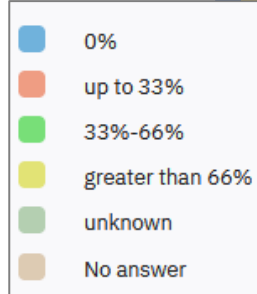
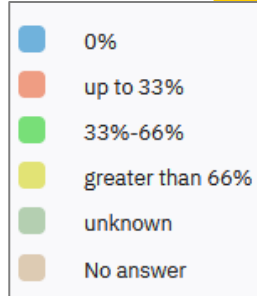
Boundaries of restrictions, prohibitions or
obligations with zonal validity, current
access status and conditions for
circulation in regulated traffic zones –
national primary roads



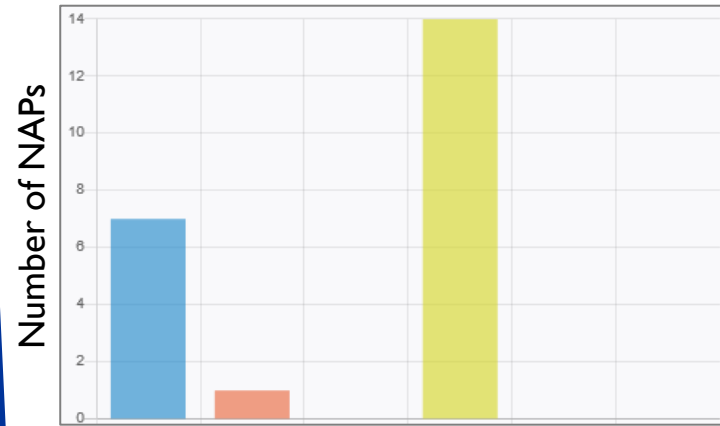
Boundaries of restrictions, prohibitions or
obligations with zonal validity, current
access status and conditions for
circulation in regulated traffic zones –
urban roads



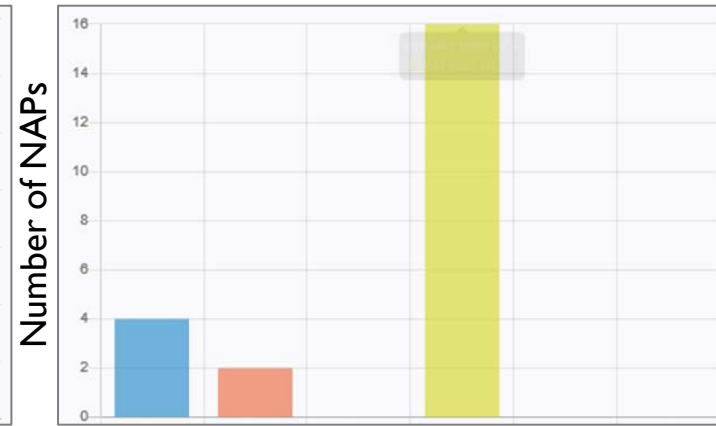
Road closures –
TEN-T



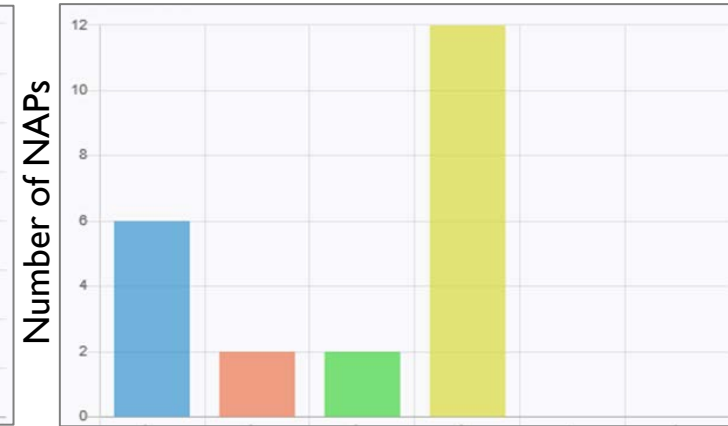
Network coverage – NAP data/Annex III



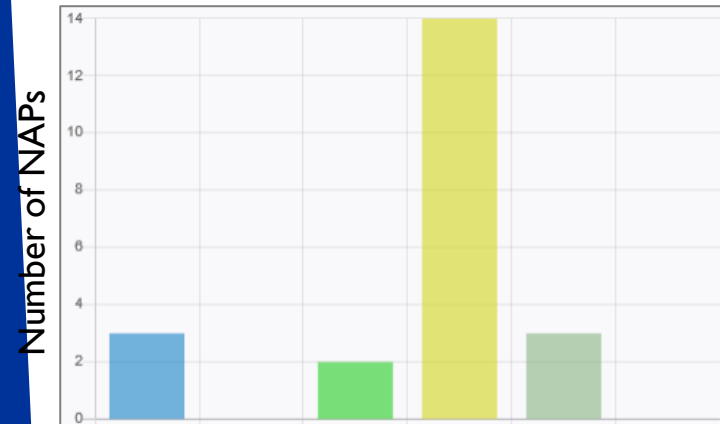
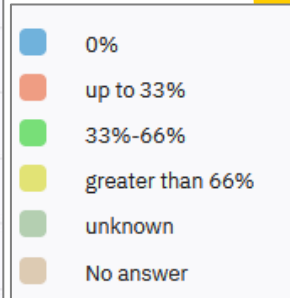
**Lane closures –
TEN-T**



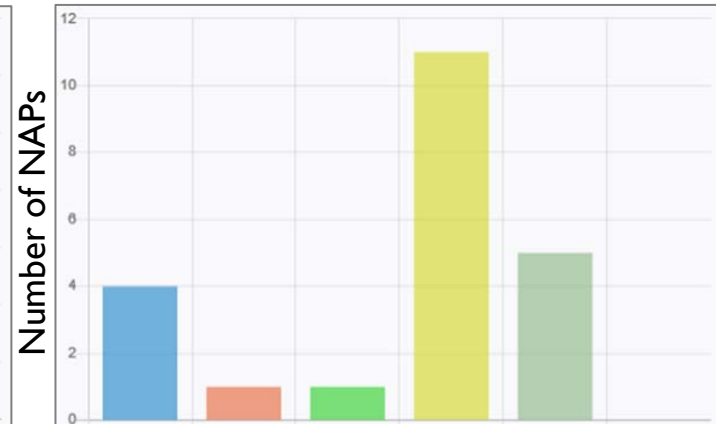
**Roadworks –
TEN-T**



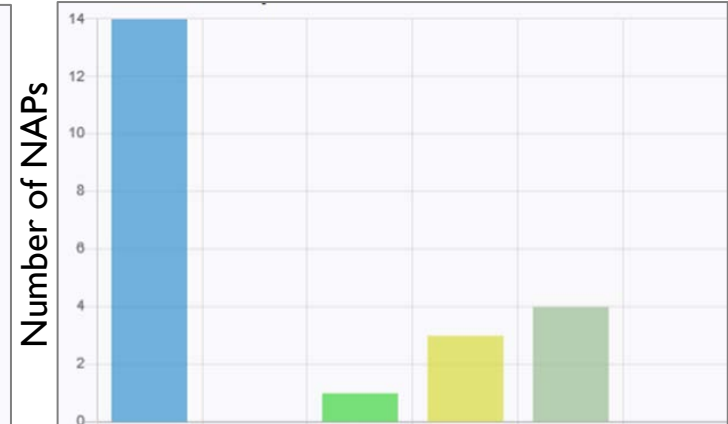
**Temporary traffic management
measures –TEN-T**



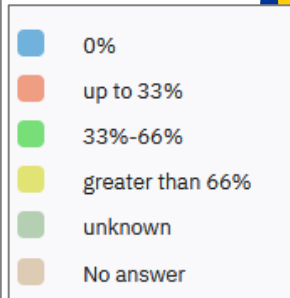
**Static data related to SSTP areas –
TEN-T**



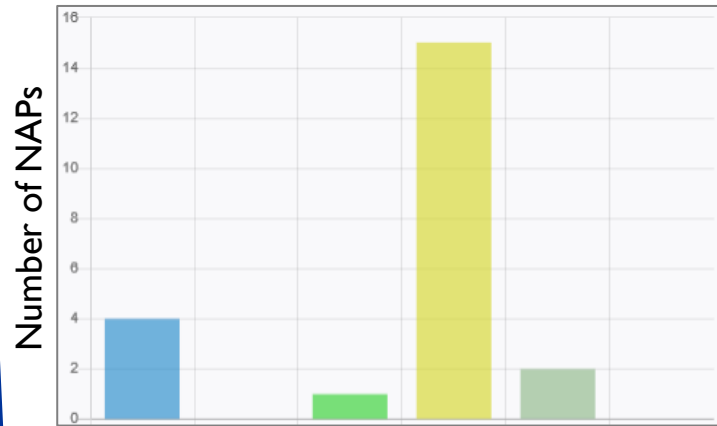
**Information on safety and
equipment of SSTP areas –
TEN-T**



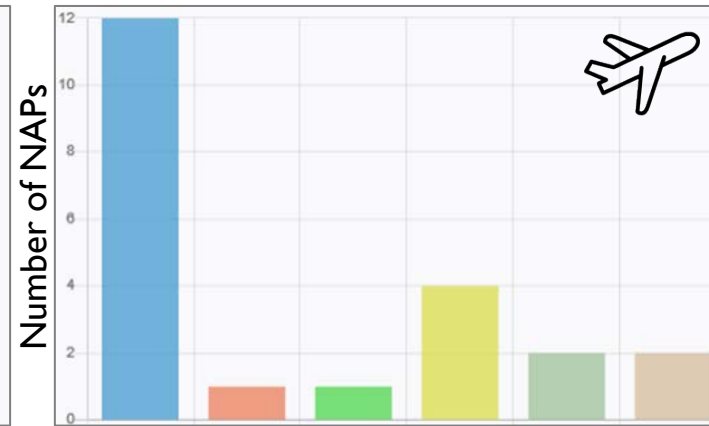
**Dynamic data on availability of
parking places –
TEN-T**



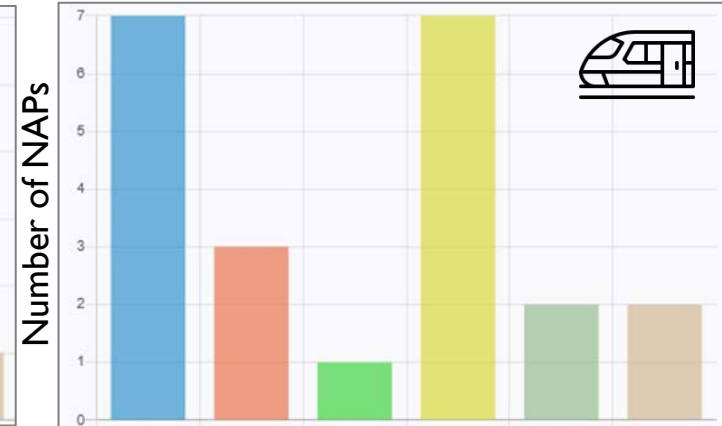
Network coverage – NAP data/Annex III



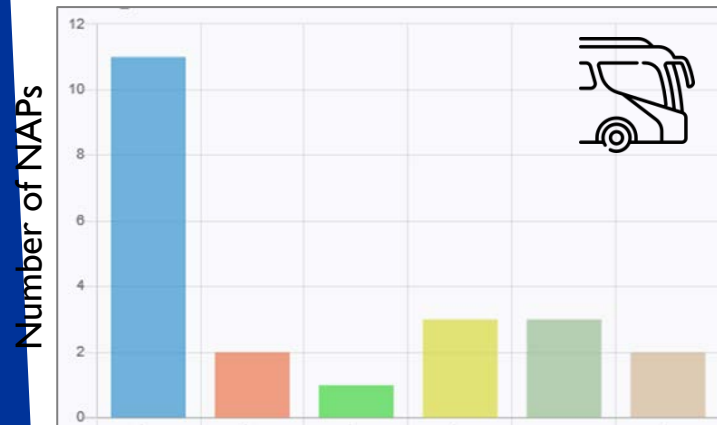
Information on situations implying accident risk (SRTI) – TEN-T



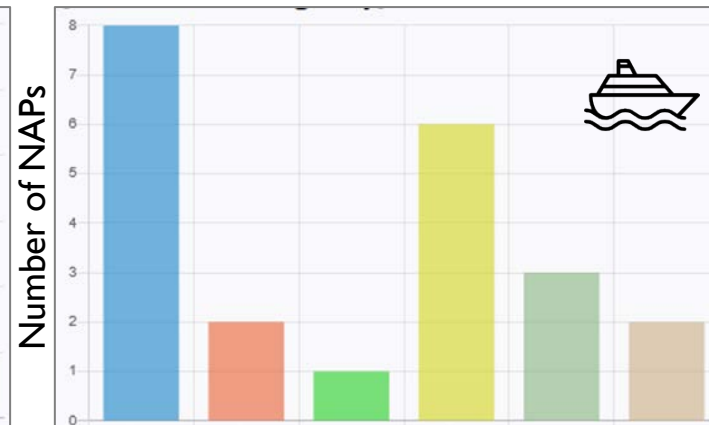
Location of identified access nodes – air transport



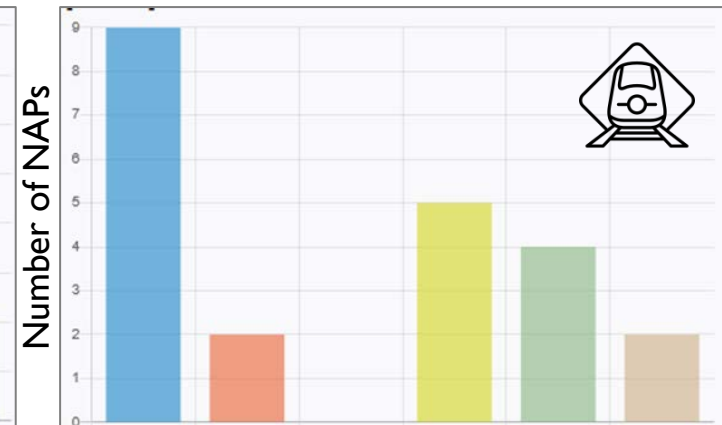
Location of identified access nodes – rail transport



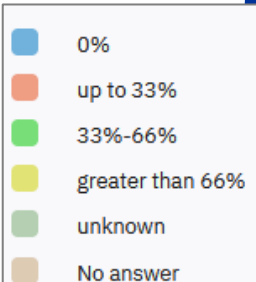
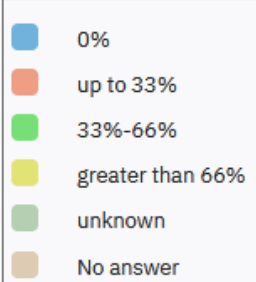
Location of identified access nodes – long-distance coach



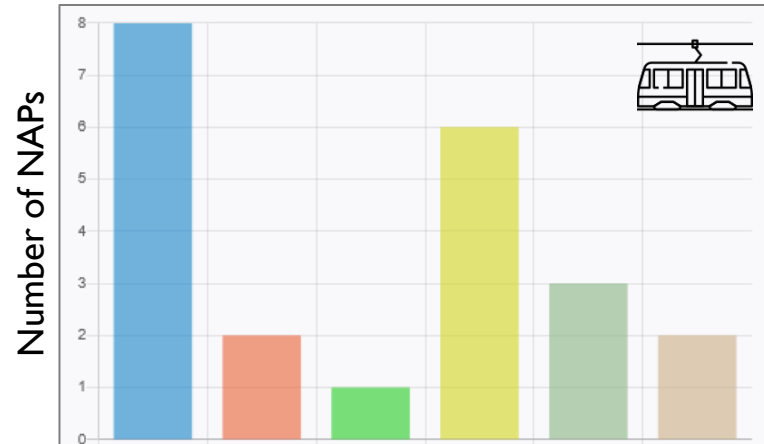
Location of identified access nodes – maritime transport



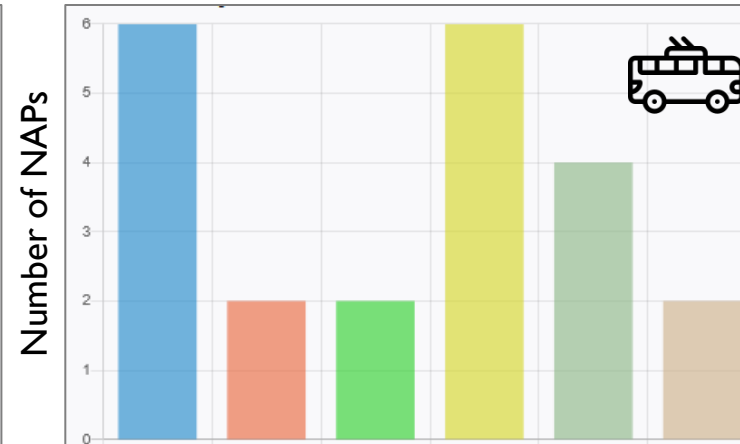
Location of identified access nodes – metro



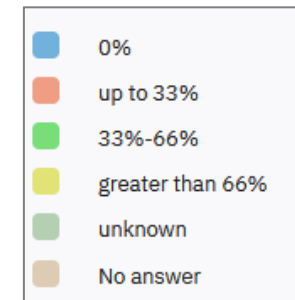
Network coverage – NAP data/Annex III



Location of identified access nodes –
tram



Location of identified access nodes –
bus/trolley



Summary

Data types with best coverage (≥66%)

Data type/reference network	Number of NAPs
Speed limits – TEN-T	14 out of 22
Speed limits – national primary roads	13 out of 22
Road closures – TEN-T	17 out of 22
Lane closures – TEN-T	14 out of 22
Roadworks – TEN-T	16 out of 22
Temporary traffic management measures – TEN-T	12 out of 22
Static data related to parking areas – TEN-T	14 out of 22
Information on situations implying accident risk (SRTI) – TEN-T	15 out of 22

Note1: Not all MSs have responded yet to the survey.

Note2: The NAP monitoring tool will provide disaggregated information.

Summary

Data types with **moderate** coverage

- **Access conditions for tunnels@TEN-T/National primary roads/Urban roads**
- **Access conditions for bridges@TEN-T/National primary roads/Urban roads**
- **Speed limits@Urban roads**
- **Overtaking bans on heavy goods vehicles@TEN-T/National primary roads/Urban roads**
- **Weight/length/width/height vehicle restrictions@TEN-T/National primary roads/Urban roads**
- **One-way streets@Urban roads**
- **Direction of travel on reversible lanes@TEN-T/National primary roads/Urban roads**
- **Permanent access restrictions@TEN-T/National primary roads/Urban roads**
- **Location of identified access nodes@Rail transport/Long-distance coach/Maritime transport/Metro/Tram/Bus-trolley**

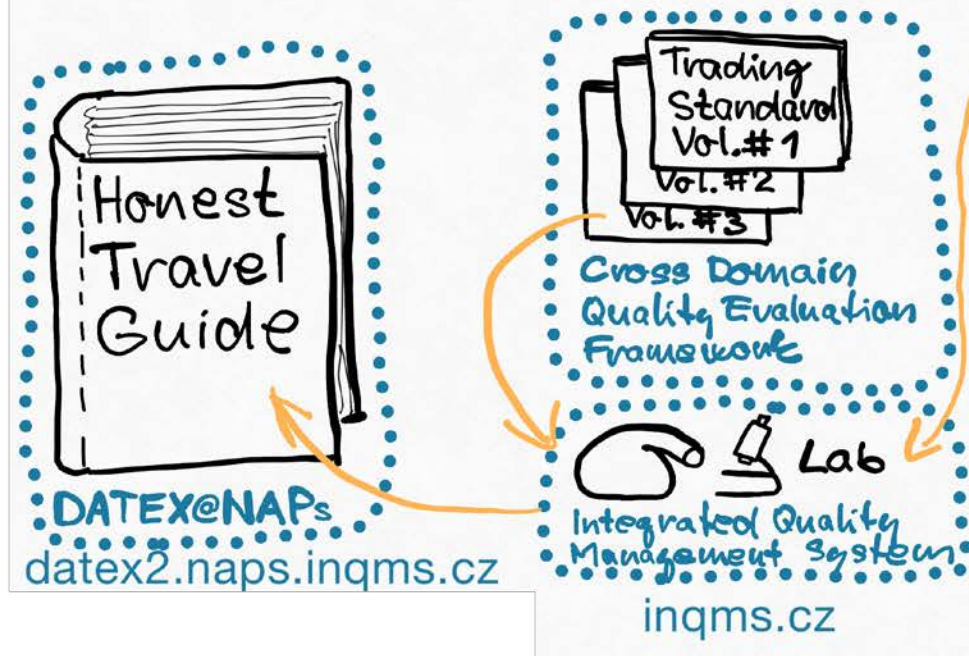
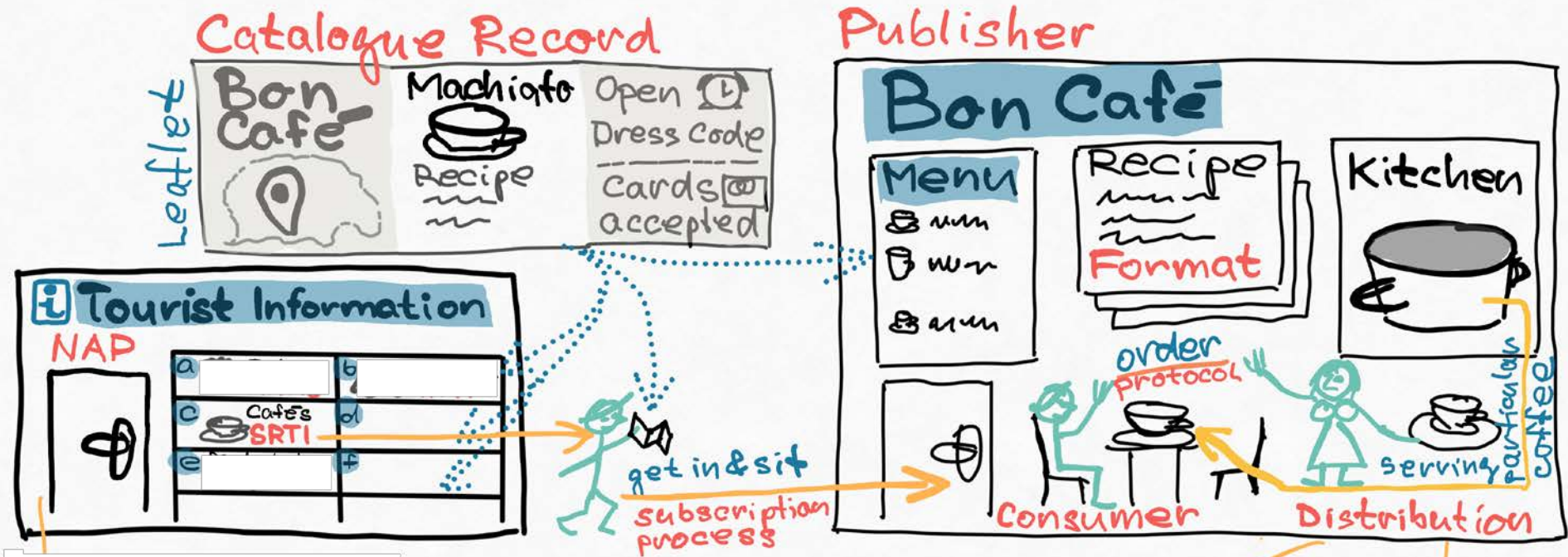
Summary

Data types with no coverage (0%)

Data type/reference network	Number of NAPs
Freight delivery regulations – urban roads	12 out of 22
Traffic circulation plans – TEN-T	14 out of 22
Traffic circulation plans – national primary roads	14 out of 22
Traffic circulation plans – urban roads	14 out of 22
Boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones – TEN-T/national primary roads	13 out of 22
Boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones – urban roads	11 out of 22
Dynamic data on availability of parking places – TEN-T	14 out of 22
Location of identified access nodes – <u>air transport</u>	12 out of 22

Discovering NAPs and SRTI distributions

<https://datex2.naps.inqms.cz/introduction.html#methodology>



Concepts explored

- Country, NAP, Catalogue Record
- Publisher
 - Subscription Process
 - Distribution (incl. samples, sizes, upd. intervals)
 - Format
 - Protocol

Statistics

Concept	#	Comment
Countries	31	EU or EEA
NAPs	29	Missing Iceland, Lichenstein
DATEX II versions	3	v1, v2, v3
Catalog Records Evaluated	39	10 categories of 49 criteria for each catalogue record
Publishers	25	Incl. TomTom
Distributions evaluated	40	(not all are consumed)
Distributions consumed	31	
Distr. Schema validation	28	
Authentications implemented	7	None, basic, URL, TLS cert, OAuth2, token In header, signed SOAP
Methods implemented	5 (+ auth)	GET REST, GET SOAP, Daily URL, POST SOAP, PUSH POST



Catalogue Records

Formal Quality

<https://datex2.naps.inqms.cz/naps-browser/index/catalogue-record/>

NAP Catalogue Records

NAP

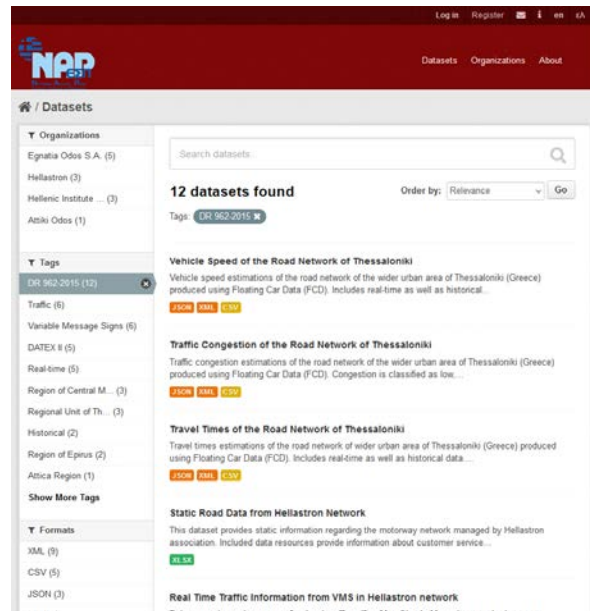
Data portal serving a collection of ITS-related catalogue records

NAP Catalog Records

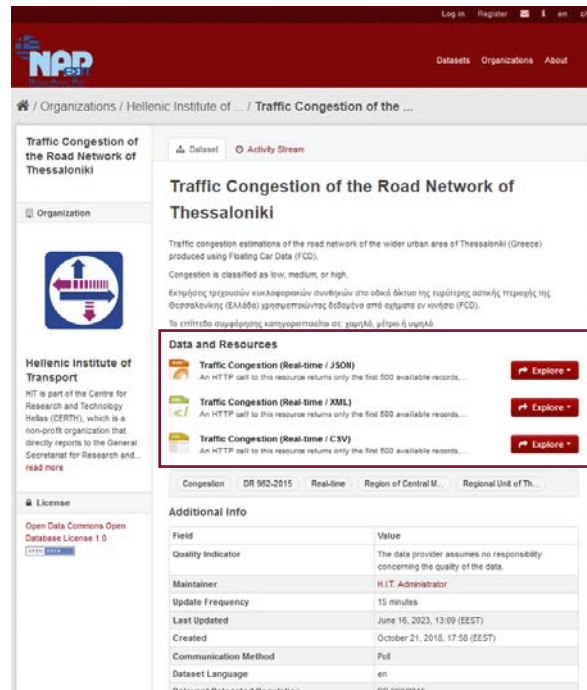
Descriptions (metadata) of datasets and (data) distributions published on NAPs

NAP datasets and (data) distributions

Datasets = collections of data published by a single publisher sharing some common metadata & provided via one or more distributions; Distributions = content provided by a publisher using single format and protocol

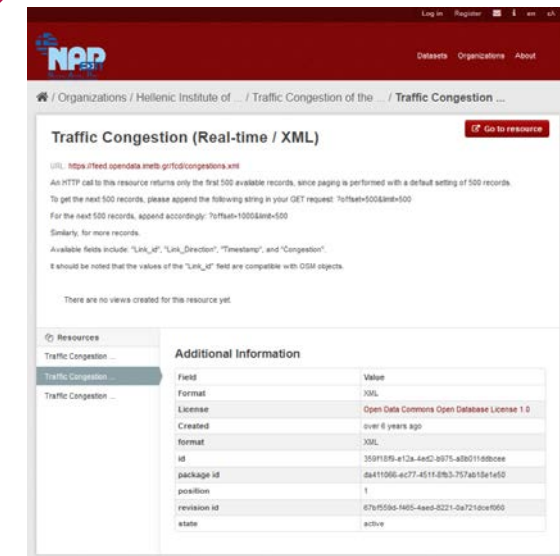


List of datasets



Catalogue records of a dataset

Data distributions



Catalogue records of a distribution

Formal Quality

What is it?

A manual check of the completeness & properness of descriptions provided to NAP datasets and (data) distributions.

Note: This check mostly focuses on parameters being present (or not) and the expected format.

Key aspects:

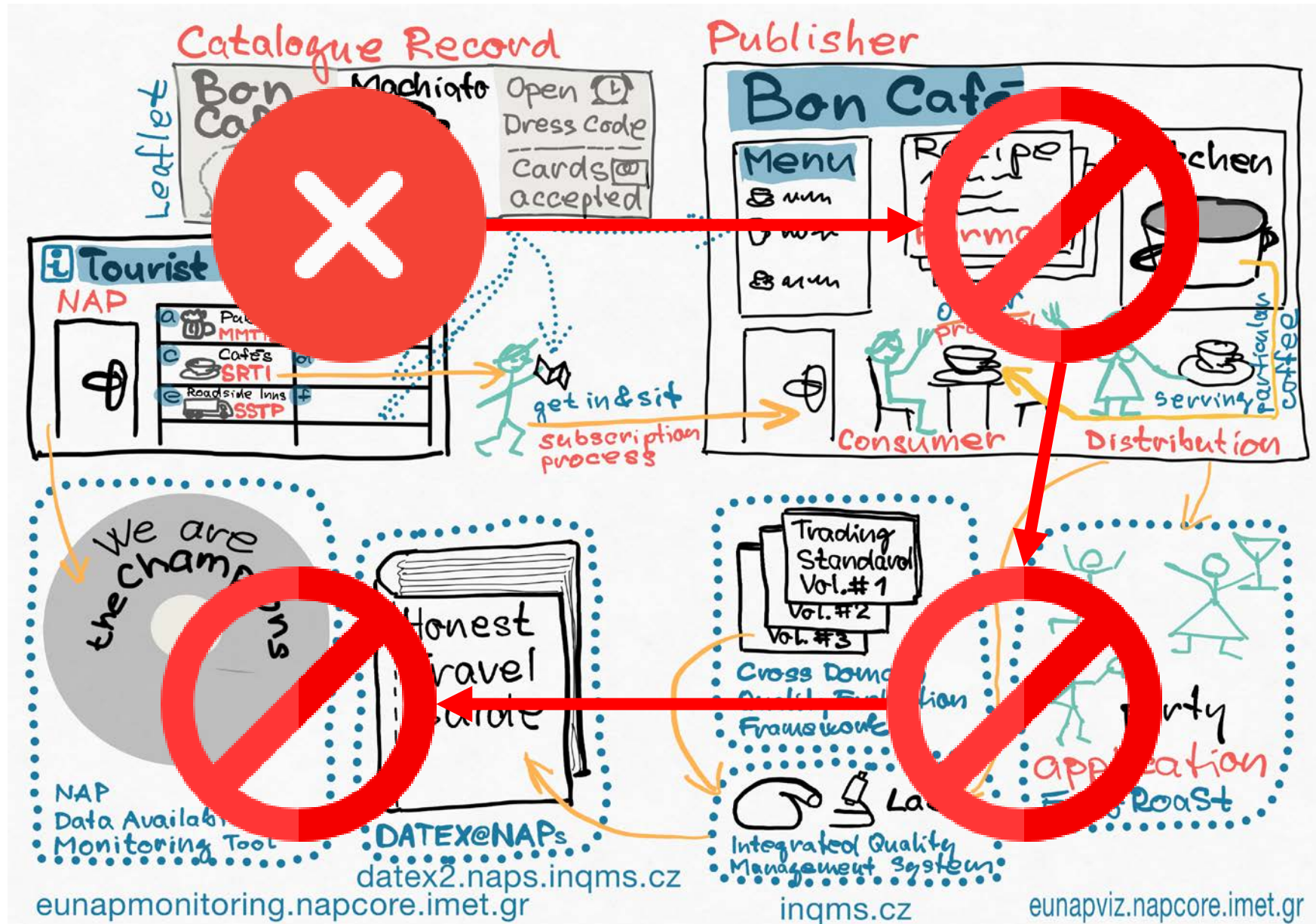
- Identification of the content
- Identification of the content provider and owner
- Documentation of the main concepts and structure
- Existence of samples and validation schemas
- Technical and organizational details, licensing, and subscription

Why is it important?

Imagine:

- **Missing** or **closed** Tourist Information Office, **no leaflets** there, leaflets with **outdated** or **misleading** information, leaflets **only in local language**

Formal Quality – failure of a critical node



Formal Quality

How is it done?

Inputs:

Documents and information that the evaluator **can retrieve** about the evaluated dataset or (data) distribution **from the NAP web interface**.

Outputs:

Filled-in form (incl. parameters) and **collected documentation** (e.g., sample files, schemas, pdf documents providing necessary details).

Evaluation of formal documentation quality							
[FRM - web-manual-doc-formal]				version 20240621			
overall quality				B	TODO		
Category	Parameter Name	ref.	obligation	evaluation	data provided or implied	implied?	comment
Evaluation metadata	content provider contact			-	chmylonas@certh.gr		
	evaluated dataset url			-	https://www.transportdata.be/en/dataset/datex2-feed-verkeerscentrum-vlaanderen-full-version		
	evaluation date			-	25/09/2024		
	evaluator			-	Chrysostomos Mylonas		
Metadata information	Metadata date	2.2.1.1	mandatory	A	23/8/2024 9:54		Provided as expected
	Metadata language	2.2.1.2	mandatory	B	French		Not in the correct format
	Contact point	2.2.1.3	partially*	B	Direction de l'Exploitation des Réseaux routiers; SPW Mobilité Infrastructures		email is missing; available only in french
	Dataset identifier		recommended	A	e732e2f3-dd72-447b-85d4-a635b11d7275		Provided as expected
Content information	Name of the dataset	2.2.2.1	mandatory	A	Walloon road traffic events		Provided as expected
	Description of dataset	2.2.2.2	mandatory	A	This feed contains real-time traffic information and safety related traffic information for the Walloon Region : traffic events, incidents, traffic jams, disruptive works.		Provided as expected
	Resource type	2.2.2.3	mandatory	A	Dataset		Provided as expected
	Dataset type category	2.2.2.4	mandatory	A	RTTI - Real time traffic information services		Provided as expected
	Dataset detailed type	2.2.2.5	optional	A	SRTI - Safety related traffic information		Provided as expected
	Service type category	2.2.2.6	conditionally*	-	Real-time traffic data		Provided as expected
	Dataset language	2.2.2.7	mandatory	B	French		Not in the correct format
	Georeferencing method	2.2.2.8	recommended	C			Provided description is void
	Dataset documentation		recommended	F			Not available
	Related linked data sources		recommended	F			Not available

Formal Quality

How is it done?

List of parameters:

- **Metadata information** (date, language, contact point, dataset identifier)
- **Content information** (dataset name, description, category & detailed type, language, geo-referencing method, documentation, linked data sources)
- **Temporal information** (start/end date of publication)
- **Geo-coverage** (area covered, network coverage, description)
- **Transport system** (modes covered)
- **Responsibilities** (publisher, owner)
- **Conditions for use** (contract/license, conditions)
- **Format - access information** (encoding, syntax, grammar, data model, sample, schema/validation, format description, access interface, security mechanisms, communication method, protocol documentation, access URL)
- **Quality information** (update frequency, availability, data collection method, cross-verification, problem reporting process, reaction time to response, quality description, national body assessment status, applicable DRs)

Types of parameters:

- Mandatory
- Partially mandatory
- Conditional
- Recommended
- Optional

NAP Catalogue Records - Formal Quality

How is it done?

- Individual parameter grading (A to F)
- Individual parameter weighting (obligation and importance)

obligation	w	importance	w
optional	0,25	normal	1
partial	0,75	important	2
mandatory	1	very important	3
conditional	1		
recommended	0,5		

overall quality	B	2,16
-----------------	---	------

grade	Value	Description
A	1	Metadata is provided in the expected format with prescribed values as defined by the relevant standard (i.e., CMC). = Parameter value(s) in the metadata exactly as expected.
B	2	Metadata is provided as part of easily identifiable substructures. It does not have to be directly in the expected format (e.g., contact data in different forms, different wordings of the keywords), but it is semantically compatible. = Parameter value(s) in the metadata, in a different form than expected but semantically compatible.
C	3	Metadata is not provided directly but is inferable from the collected evidence. It does not “fit” in terms of format and structure. = Parameter value(s) are not in the metadata, but findable elsewhere and semantically compatible.
F	4	Metadata is not provided and cannot be “easily” derived from the collected evidence (including samples and schemas provided). = Parameter value(s) are not found/filled in. Assumptions and guessing are needed to fill in the item, and correctness is not assured.
-	0	(Not relevant) The item is not evaluated because it makes no sense in the context.

$$Q = \frac{\sum_i^n \text{obligation} * \text{importance} * \text{grade}}{\sum_i^n \text{obligation} * \text{importance}}, \text{ where } n \text{ is a number of characteristics}$$

NAP Catalogue Records - Formal Quality

European study (DATEX@NAPs)

- Focus on **SRTI** datasets (DATEX II)
- 31 countries, 30 NAPs, 24 publishers, and 41 datasets identified
- 19 countries, 19 NAPs, 21 publishers, 39 catalogue records **evaluated**
- Some datasets do not include catalogue records
- Inputs recorded by using the excel form of CDQ
- Results available at: <https://datex2.naps.inqms.cz/>

Country	NAP	Name
at	www.mobilitydata.gv.at	Mobilitydata Austria mobilitydata.gv.at
be	transportdata.be	Belgium's National Access Point (NAP) for information on Intelligent Transport Systems (ITS)
bg	datasheet.api.bg	National Access Point
hr	www.promet-info.hr	Croatian National Access Point
cy	www.traffic4cyprus.org.cy	National Access Point (NAP) of Cyprus
cz	registr.dopravniinfo.cz	National Traffic Information Registry
dk	du.vd.dk	Danish National Access Point (NAP).
ee	tarktee.ee	Smart Road DATEX II data gateway
fi	www.digitraffic.fi	Digitraffic
fr	www.bison-fute.gouv.fr	Traffic information related to road safety - Action C
de	mobilithek.info	Mobilithek
gr	data.nap.gov.gr	The National Access Point (NAP) of Greece
hu	napportal.kozut.hu	The National Access Point
ie	data.gov.ie	Ireland's open data portal
it	www.cciss.it	National Access Point
lv	www.transportdata.gov.lv	Transport.Mobility
lt	maps.eismoinfo.lt	Lietuva National Access Point
lu	data.public.lu	Open Data Platform
mt	geoservices.transport.gov.mt	Geoservices.Transport.
nl	ntm.ndw.nu	Nationaal Toegangspunt Mobiliteitsdata
no	transportportal.no	Norway's National Access Point for transport data
pl	kpd.gddkia.gov.pl	National Access Point
pt	nap-portugal.imt-ip.pt	National Road Information Access Point
ro	pna.cestin.ro	National Access Point of Romania
sk	www.zjazdnost.sk	Zjazdnost
si	nap.si	National access point
es	nap.dgt.es	National Access Point for Transport and Mobility
se	trafficdata.se	The portal Trafficdata.se
ch	opentransportdata.swiss	Open data platform mobility Switzerland
sk	odoprave.info	Welcome to nginx!

NAP	Publisher	Distribution	Format	Protocol	Area Covered
www.mobilitydata.gv.at	at-oamtc	oamtc	DATEX II	pull	Austria
transportdata.be	be-verkeerscentrum	d2-vlaanderen	DATEX II Profile	Pull	VLAAMS GEWEST
transportdata.be	be-wallonie	wallonie	DATEX II Profile	Push	RÉGION WALLONNE
datasheet.api.bg	bg-ria	d2-accidents	DATEX II	pull	Bulgaria
datasheet.api.bg	bg-ria	d2-danger	DATEX II	pull	Bulgaria
datasheet.api.bg	bg-ria	d2-closures	DATEX II	pull	Bulgaria
datasheet.api.bg	bg-ria	d2-closures-roadways	DATEX II	pull	Bulgaria
datasheet.api.bg	bg-ria	d2-roadworks	DATEX II	pull	Bulgaria
www.promet-info.hr	hr-promet	d2-events	DATEX II Profile	pull	Croatia
www.promet-info.hr	hr-promet	d2-roadworks	DATEX II Profile	pull	Croatia
registr.dopravniinfo.cz	cz-ndic	d2-common	DATEX II	Push on occurrence	CZ0
registr.dopravniinfo.cz	cz-ndic	d2-common-pull	DATEX II	Pull on request	CZ0
du.vd.dk	dk-vejdirektoratet	d2-common	DATEX II Profile	pull	Denmark
www.digitraffic.fi	fi-digitraffic	d2-roadworks	DATEX II	pull	

NAP Catalogue Records - Formal Quality

DATEX@NAPs

An In-Depth Look at DATEX II on National Access Points

Some characteristics, were not met in many cases, leading to **0 A** grades, **21 B** grades, **18 C** grades and **0 F** grades

Introduction

We are writing a travel journal from our journey across European countries and their National Access Points (NAPs), where we search for something delicious — DATEX II Safety...



Key Concepts

This page provides an overview of the most relevant concepts and terms in our study.



Quick Start

This chapter shall help the inpatient readers willing to use this website for something practical as soon as possible.



NAPs Browser

Concepts are structured as tree of resources (parents owning subresources):



2,08	1,79	1,93	3,13	2,87
2,12	1,79	2,08	3,13	1,89
2,02	1,59	2,06	2,43	1,98
2,93	1,59	1,95	2,69	2,13
2,91	2,99	2,34	2,67	2,52
2,9	3,09	2,23	2,75	2,55
2,9	3,09	2,28	1,81	2,6
2,91	3,1	2,28	1,81	

B	B	B	C	C
B	B	B	C	B
B	B	B	B	B
C	B	B	C	B
C	C	B	C	C
C	C	B	B	C
C	C	B	B	

at	hr	de	lu	ee
be	hr	de	lu	es
be	cz	de	nu	es
bg	cz	de	nu	es
bg	dk	hu	no	se
bg	fi	lv	pl	se
bg	fi	lv	si	se
bg	fr	lv	si	

NAP Catalogue Records - Formal Quality

Key findings – NAPs

- Most countries declare existence of a NAP for SRTI
- Some NAPs use only **local language**, having broken language switch or having incomplete description of distributions in English
- Some NAPs do not serve catalogue records, **simply visualizing information on a map or describing how to use an API**

NAP Catalogue Records - Formal Quality

Key findings – Catalogue Records

- Most records **do not provide XML Schema** (bad practice)
- **Formats** often documented “**by example**” – this is not enough for serious usage
- CRs are structured according to Coordinated Metadata Catalogue, few follow mobilityDCAT-AP (which is very new)
- **Location referencing method is not well documented** – in most cases further investigation and inference was required
- **Area and network coverage** was very **often implied** by dataset name and description
- The distinction between “**publisher**” and “**data owner**” was not clear
- **Communication method** was frequently **not explicitly declared**
- **Protocol documentation** was **often missing**
- **Quality descriptions** were **barely available**



InQMS: Exploring Distribution Quality

<https://inqms.cz>

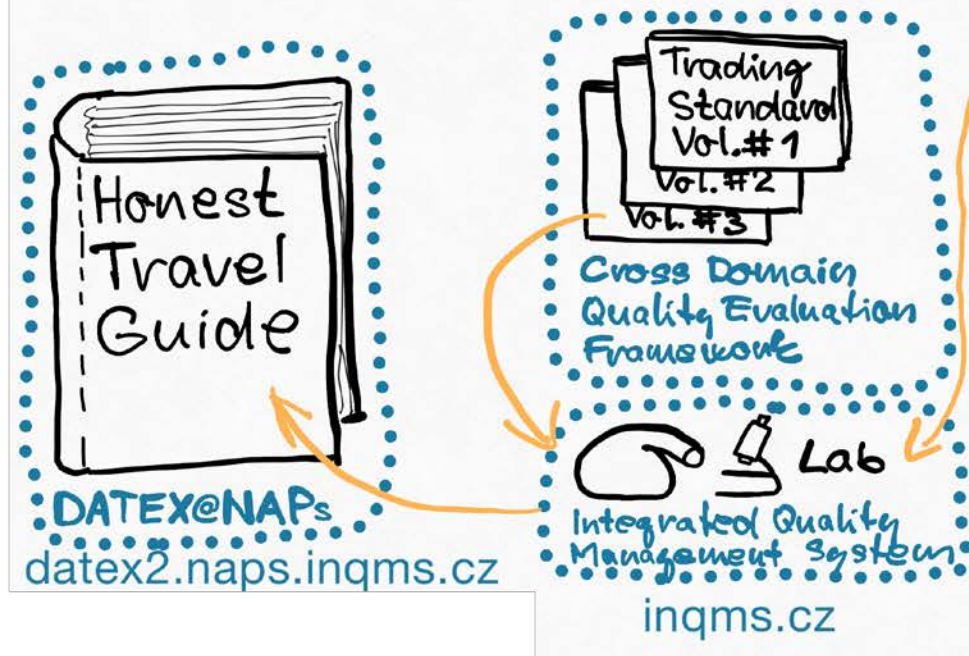
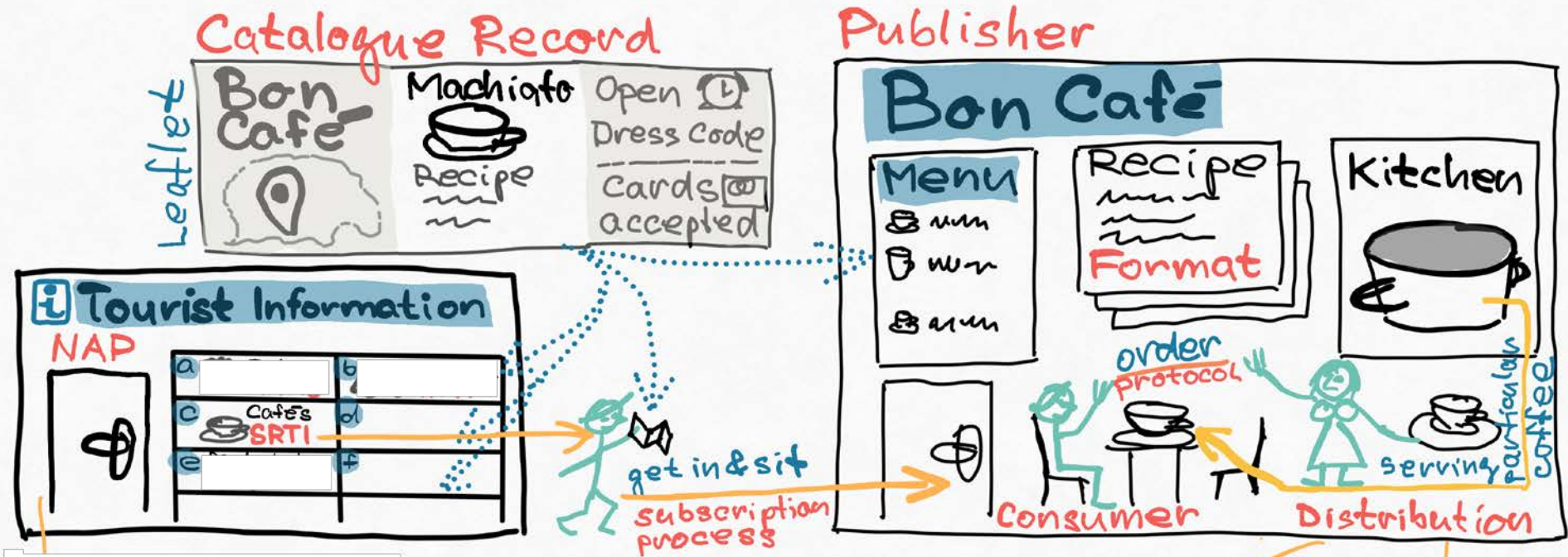
InQMS: Integrated Quality Management System

How it serves when exploring distributions:

- Collect and archive samples
- Access to samples (historical & the latest ones)
- Show metrics (sizes, records, update intervals)
- Validate against (XML) schemas

Distribution Quality Summary

<https://datex2.naps.inqms.cz/naps-browser/>



Evaluated aspects

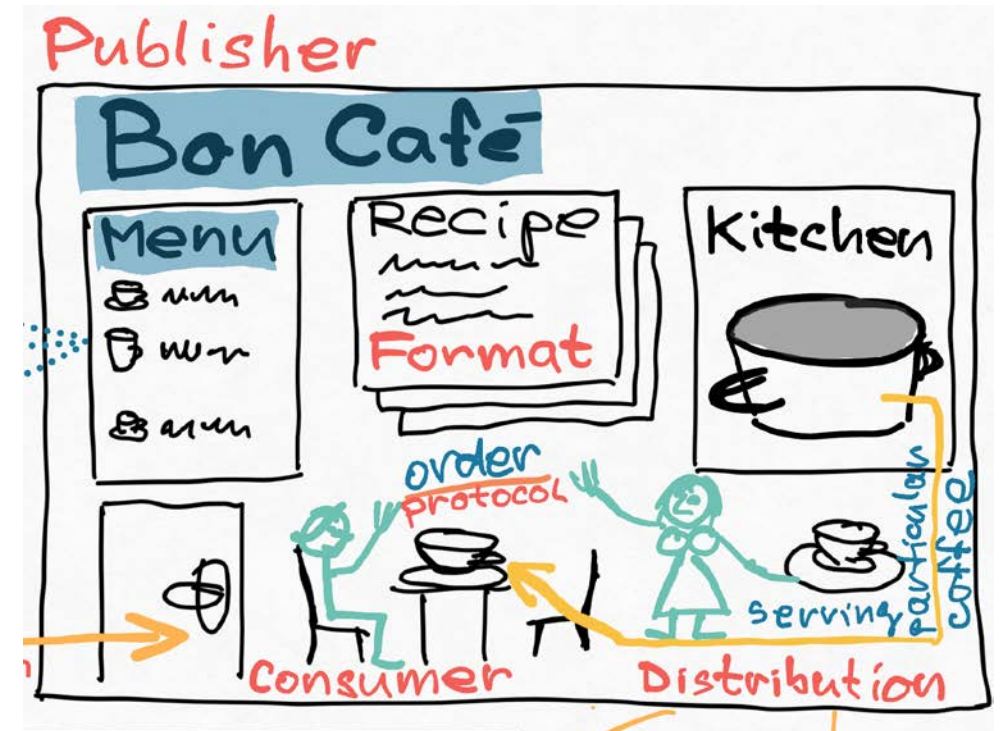
- Subscription Process
- Protocols
<https://datex2.naps.inqms.cz/blog/posts/protocols.html>
- Format
<https://gitlab.com/tamtamresearch-public/datex2/naps-datex-support>
- Distribution (incl. samples.parquet)

Recommended Practice

- Publish profiled DATEX II XML schema
- Protocols
 - be Conditional HTTP request friendly
<https://datex2.naps.inqms.cz/blog/posts/conditional-http-friendly.html>
 - Support/enforce gzip compression
 - Authentication: keep it simple (e.g. basic authentication)
- Provide supplementary data, where needed

EuroRoasT

Visualising content across Europe



EuroRoaSt web application

(European Road Status visualization)

Motivation:

- (1) Provide a real-life example of NAP data utilization all around Europe
- (2) Test the capacity of NAPs to act as data exchange infrastructures - provision of end-user services

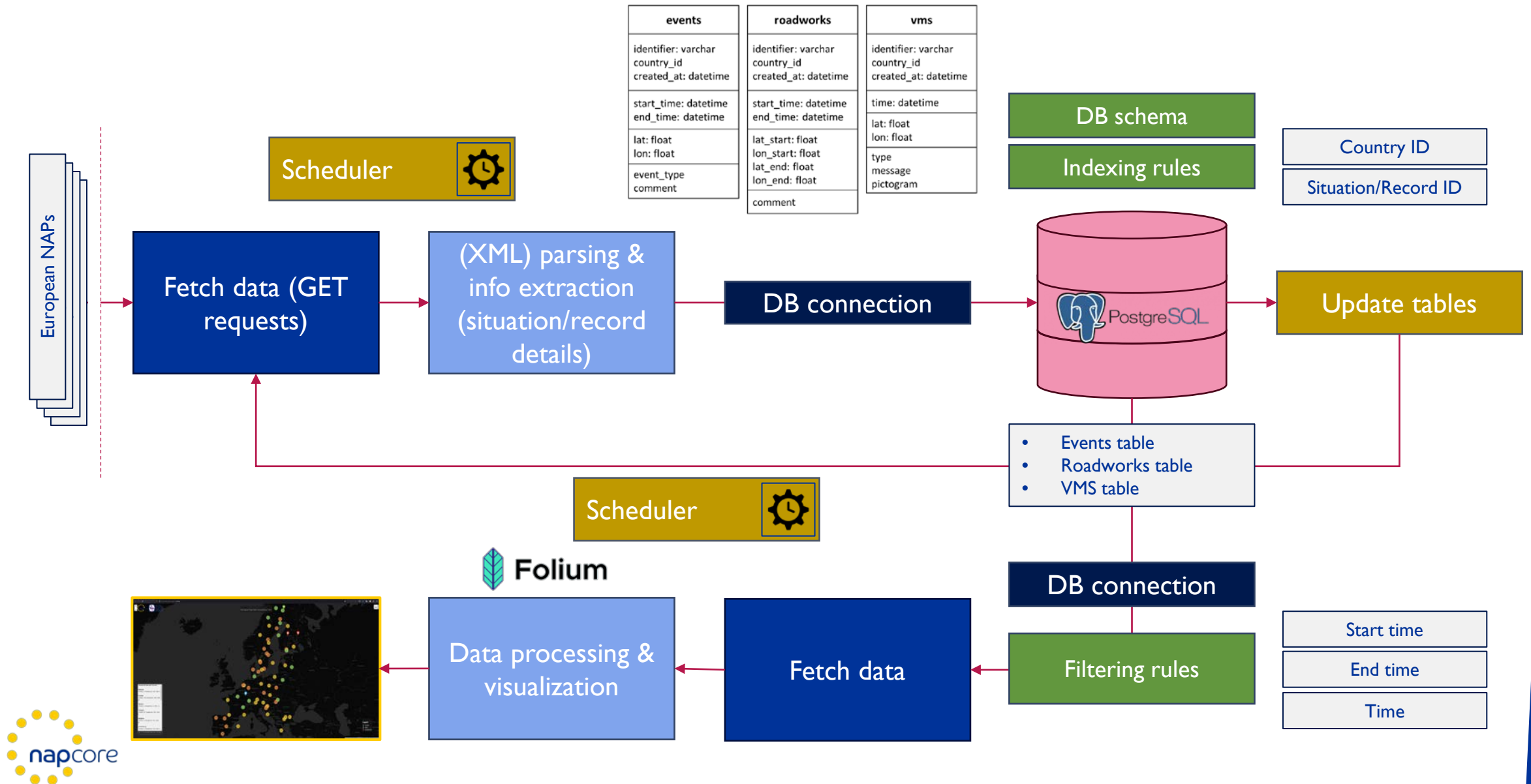
Types of consumed data resources (scope)

Type	Description
Roadworks	Situations corresponding explicitly to short- to long-term maintenance or construction activities along the road network
Events	Generic situations interrupting traffic flow conditions, including accidents, public events (co-including in certain cases roadworks)
VMS	Information broadcasted through variable message signs



Note: 90% of consumed content is in DATEX II (situation publication, VMS publication, VMS table publication)

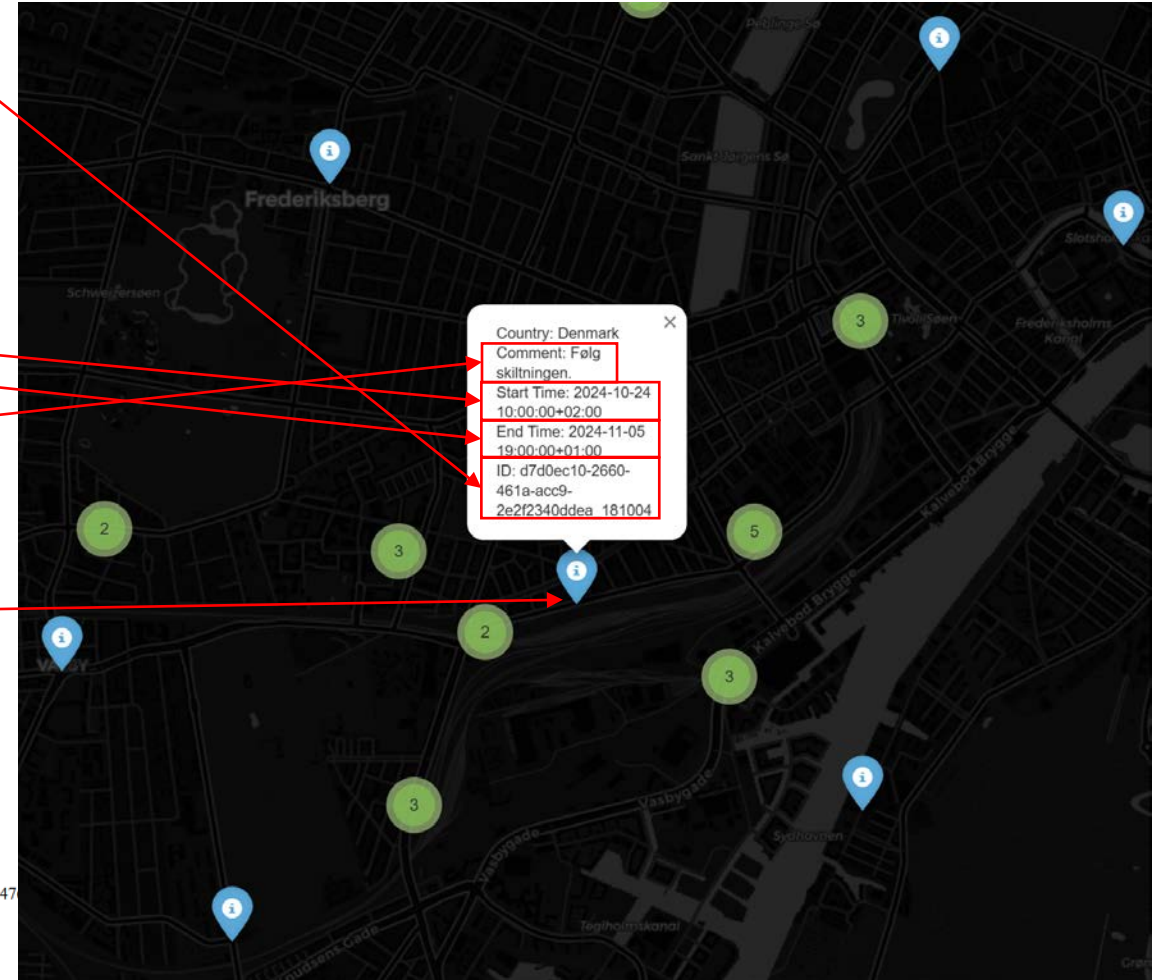
EuroRoaSt: Operational structure



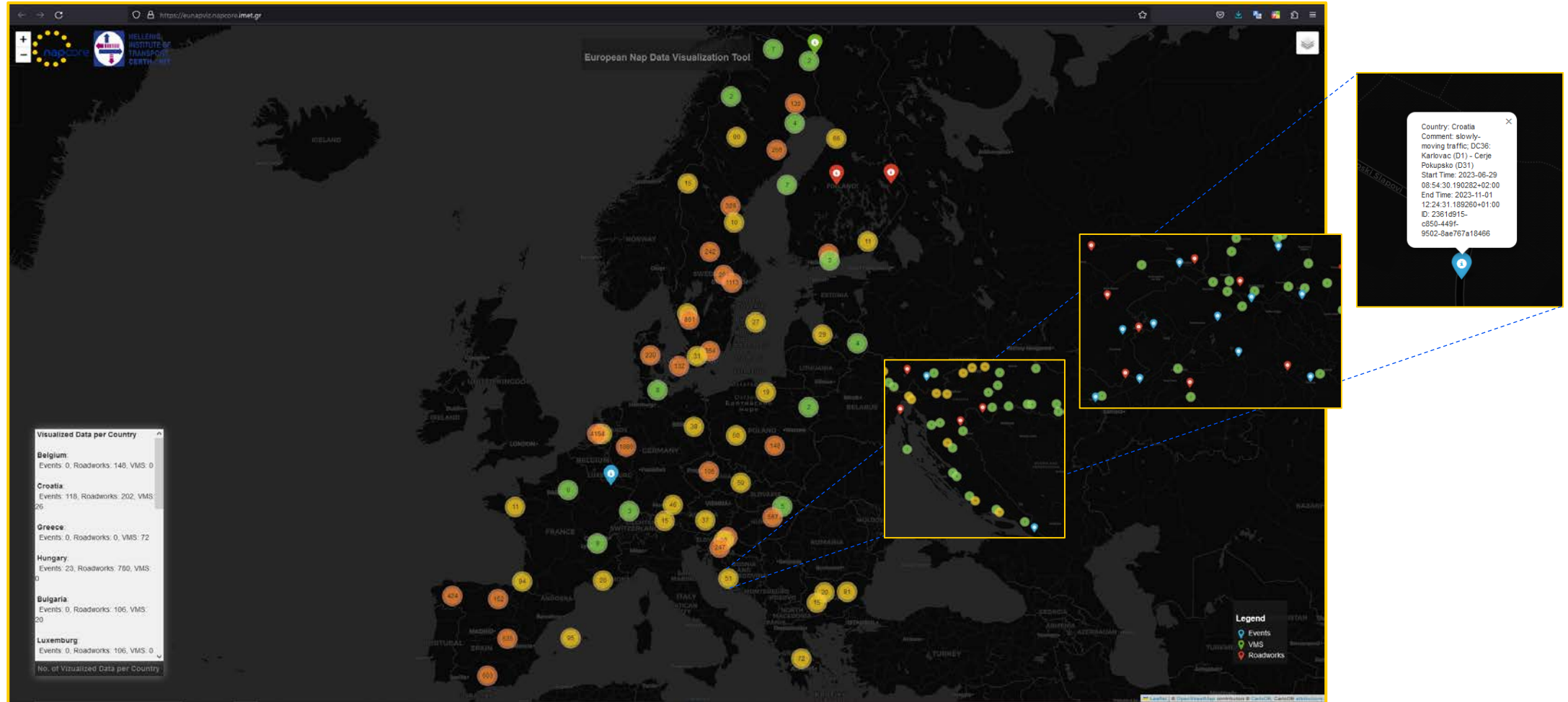
EuroRoaSt: Operational structure

```

<sit:situationRecord xsi:type="sit:RoadOrCarriagewayOrLaneManagement" id="d7d0ec10-2660-461a-acc9-2e2f2340ddea_181004.2" version="3">
  <sit:situationRecordCreationTime>2024-10-24T06:09:55.637455Z</sit:situationRecordCreationTime>
  <sit:situationRecordVersionTime>2024-10-30T13:56:12.512792Z</sit:situationRecordVersionTime>
  <sit:probabilityOfOccurrence>ertain</sit:probabilityOfOccurrence>
  <sit:safetyRelatedMessage>>false</sit:safetyRelatedMessage>
  <sit:source>
    <com:sourceName>
      <com:values>
        <com:value lang="da-dk">Københavns Kommune</com:value>
      </com:values>
    </com:sourceName>
    <com:sourceType>roadAuthorities</com:sourceType>
  </sit:source>
  <sit:validity>
    <com:validityStatus>definedByValidityTimeSpec</com:validityStatus>
    <com:validityTimeSpecification>
      <com:overallStartTime>2024-10-24T05:00:00Z</com:overallStartTime>
      <com:overallEndTime>2024-11-05T16:00:00Z</com:overallEndTime>
    </com:validityTimeSpecification>
  </sit:validity>
  <sit:impact>
    <sit:numberOfOperationalLanes>1</sit:numberOfOperationalLanes>
  </sit:impact>
  <sit:generalPublicComment>
    <sit:comment>
      <com:values>
        <com:value lang="da-dk">Følg skiltningen</com:value>
      </com:values>
    </sit:comment>
  </sit:generalPublicComment>
  <sit:locationReference xsi:type="loc:LinearLocation">
    <loc:coordinatesForDisplay>
      <loc:latitude>55.66398</loc:latitude>
      <loc:longitude>12.548513</loc:longitude>
    </loc:coordinatesForDisplay>
    <loc:supplementaryPositionalDescription>
      <loc:locationDescription>
        <com:values>
          <com:value lang="da-dk">
            Ingerslevsgade mellem Knud Lavards Gade og Erik Ejegods Gade
          </com:value>
        </com:values>
      </loc:locationDescription>
      <loc:supplementaryPositionalDescription>
        <loc:gmlLineString srsDimension="2" srsName="EPSG:4258">
          <loc:posList>
            55.663977726649556 12.548513481041972 55.66395591938536 12.548334933825036 55.663840026076265 12.547523661638229 55.663754179947
          </loc:posList>
        </loc:gmlLineString>
      </loc:supplementaryPositionalDescription>
    </sit:locationReference>
    <sit:complianceOption>mandatory</sit:complianceOption>
    <sit:roadOrCarriagewayOrLaneManagementType>narrowLanes</sit:roadOrCarriagewayOrLaneManagementType>
  </sit:situationRecord>
  
```



EuroRoaSt: User Interface



EuroRoaSt: Issues logged

- **Mixed DATEX II formats** within one resource (cumulative data distributions enclosing current and historical information)
- **Variety** of utilized methods for **location referencing**
- **ALERT-C** Location Referencing requires **Location Tables** (to find and get the data might be **difficult**)
- **Missing information** for assessing the **time validity** (end time) of certain “event” types – critical for roadworks and maintenance activities
- Some countries use **older versions of DATEXII** (e.g., v1.0 or v2.0), while other have already transitioned to much newer versions (e.g., v3.0)
- **Physical (metal) signs** are sometimes included in **VMS publication**

EuroRoaSt: Issues logged

```
<alertCLinear xsi:type="AlertCMethod4Linear">
  <alertCLocationCountryCode>de</alertCLocationCountryCode>
  <alertCLocationTableNumber>1</alertCLocationTableNumber>
  <alertCLocationTableVersion>21.2</alertCLocationTableVersion>
  <alertCDirection>
    <alertCDirectionCoded>positive</alertCDirectionCoded>
  </alertCDirection>
  <alertCMethod4PrimaryPointLocation>
    <alertCLocation>
      <alertCLocationName>
        <values>
          <value lang="de">Kerpen</value>
        </values>
      </alertCLocationName>
      <specificLocation>11113</specificLocation>
    </alertCLocation>
    <offsetDistance>
      <offsetDistance>4795</offsetDistance>
    </offsetDistance>
  </alertCMethod4PrimaryPointLocation>
  <alertCMethod4SecondaryPointLocation>
    <alertCLocation>
      <alertCLocationName>
        <values>
          <value lang="de">Frechen</value>
        </values>
      </alertCLocationName>
      <specificLocation>11114</specificLocation>
    </alertCLocation>
    <offsetDistance>
      <offsetDistance>1422</offsetDistance>
    </offsetDistance>
  </alertCMethod4SecondaryPointLocation>
</alertCLinear>
```

Offered by: Bundesanstalt für Straßenwesen (BASt) Visibility: Public

Arbeitsstellen auf deutschen Autobahnen



Die Publikation beinhaltet Informationen zu Arbeitsstellen auf den deutschen Bundesautobahnen. Neben Arbeitsstellen mit einer Dauer von mind. 4 Tage (meldepflichtig) kann die Publikation auch zeitlich kürzere Arbeitsstellen (nicht meldepflichtig) beinhalten. Die Datenbereitstellung erfolgt durch das...

CREATED	DATA MODEL	TYPE OF TERMS OF USE	BROKERING TYPE
21.06.2023	DATEX II V2	royalty-free	Brokered
GEOGRAPHY	CATEGORY		
Deutschland (DE)	Road work information		

Geographic Information

Geo Reference Method in ALERT_C (LCL), Instruction Road Information Database (ASB)

Content data

Spatial Coverage Germany (DE)



The
BASt

Highway
Construction

Bridges and Structural
Technology

Traffic
Engineering

Automot
Engineer

Homepage > Traffic Engineering > Special Subjects > Location Code List / Event Code List

Location Code List / Event Code List

How to order the Location Code List and the Event Code List

All participants of traffic information services receive currently a license at no charge to use the LCL and the ECL.

Acceptance of the conditions of use for the German LCL and ECL is required prior to the receipt of the LCL and the ECL. In accordance with the conditions of use, BASt must then be notified about the purposes of use. Following this notification, the current LCL and ECL is then sent in a zipped data package (12 MB) via e-mail.

- [Conditions for Use](#)

I agree with the terms and conditions *

☐

Continue



EuroRoaSt: Issues logged

events event_type IN ('ConstructionWorks')									
	ABC identifier	ABC country_id	123 lat	123 lon	start_time	end_time	ABC event_type	ABC comment	created_at
1	211882	8	0	0	2023-11-10 22:56:24.000	[NULL]	ConstructionWorks	[NULL]	2023-11-15 00:20:15.561
2	212330	8	49.574818	6.1226983	2023-12-02 21:54:32.000	[NULL]	ConstructionWorks	[NULL]	2023-12-03 07:00:13.337
3	230410-001026	6	46.621735	4.291996	2023-04-04 18:31:00.000	[NULL]	ConstructionWorks	[NULL]	2023-10-30 06:55:26.700
4	230705-001364	6	46.364998	4.5758657	2023-07-05 12:00:00.000	[NULL]	ConstructionWorks	[NULL]	2023-10-17 05:19:00.408
5	231011-000518	6	43.392498	1.704714	2023-10-11 06:35:47.000	[NULL]	ConstructionWorks	[NULL]	2023-10-12 18:56:56.187
6	231024-000531	6	46.70095	4.392356	2023-10-24 06:01:53.466	[NULL]	ConstructionWorks	[NULL]	2023-11-08 15:14:36.731

events event_type IN ('MaintenanceWorks')									
	ABC identifier	ABC country_id	123 lat	123 lon	start_time	end_time	ABC event_type	ABC comment	created_at
1735	DARS;691386;2ed426ee-630d-43b3-84ce-293f581c	10	46.058758	14.506565	2024-01-07 20:51:56.533	2024-01-08 22:59:00.000	MaintenanceWorks		2024-01-07 23:35:33.193
1736	DARS;691451;f57c1ebc-a0ae-4bb3-a730-33f92440	10	45.53904	13.734222	2024-01-08 07:36:57.007	2024-01-08 15:00:00.000	MaintenanceWorks		2024-01-08 12:00:47.022
1737	DARS;692414;7c2ca16f-6593-497d-823c-387666ca	10	46.54129	15.45019	2024-01-15 06:44:46.427	2024-01-23 22:59:00.000	MaintenanceWorks		2024-01-22 15:45:27.317
1738	DARS;692682;b8f78c7f-7777-4762-9901-841172324b	10	46.25027	15.000512	2024-01-21 06:50:38.110	2024-01-21 12:00:00.000	MaintenanceWorks		2024-01-21 07:45:24.201
1739	GUID-1089004-1	11	41.32532	2.033067	2020-10-10 13:35:58.000	[NULL]	MaintenanceWorks		2023-10-06 09:10:41.544
1740	GUID-1181178-1	11	41.134083	1.3054142	2022-05-24 18:08:41.000	[NULL]	MaintenanceWorks		2023-11-09 05:55:46.941
1741	GUID-1185698-1	11	41.632378	1.6896926	2022-06-17 12:03:20.000	[NULL]	MaintenanceWorks		2024-01-09 11:55:54.767
1742	GUID-1187549-1	11	41.576973	1.6710128	2022-06-27 08:00:00.000	[NULL]	MaintenanceWorks		2023-12-22 21:15:46.096
1743	GUID-1207250-1	11	41.55619	1.9884012	2022-10-18 10:18:16.000	[NULL]	MaintenanceWorks		2024-01-07 01:05:42.025
1744	GUID-1208710-1	11	41.54061	0.9184774	2022-10-25 08:00:00.000	[NULL]	MaintenanceWorks		2023-10-06 09:10:41.552

EuroRoaSt: Issues logged



```
<payload dlp1:type="q1:VmsPublication" lang="de-at" modelBaseVersion="3">
  <publicationTime>2024-01-09T13:44:26+01:00</publicationTime>
  <publicationCreator>
    <country>at</country>
    <nationalIdentifier>ASFINAG</nationalIdentifier>
  </publicationCreator>
  <q1:headerInformation>
    <confidentiality>noRestriction</confidentiality>
    <informationStatus>real</informationStatus>
  </q1:headerInformation>
  <q1:vmsControllerStatus>
    <q1:vmsControllerTableReference id="WVZ_TLS_ASFINAG" version="4.0" targetClass="vms:VmsControllerTa
    <q1:vmsControllerReference id="424_Metalsign" version="4.0" targetClass="vms:VmsController"/>
  </q1:vmsControllerStatus>
  <q1:vmsStatus vmsIndex="424">
    <q1:vmsStatus>
      <q1:workingStatus>working</q1:workingStatus>
    </q1:vmsStatus>
    <q1:vmsMessage messageIndex="0">
      <q1:vmsMessage>
        <q1:messageInformationType>trafficManagement</q1:messageInformationType>
        <q1:timeLastSet>2018-02-20T15:11:24+01:00</q1:timeLastSet>
        <q1:displayAreaSettings displayAreaIndex="0">
          <q1:displayAreaSettings dlp1:type="q1:PictogramDisplay">
            <q1:pictogram dlp1:type="q1:RegularPictogram">
              <q1:customPictogramCode>32</q1:customPictogramCode>
              <q1:_pictogramExtension>
                <q1:extendedPictogram>
                  <additionalPictogramDetails>
                    <weight>3.5</weight>
                  </additionalPictogramDetails>
                </q1:extendedPictogram>
                <q1:_pictogramExtension>
                  <q1:pictogramDescription _extendedValue="overtakingByGoodsVehiclesProhibited">other</q1:p
                </q1:pictogram>
              </q1:displayAreaSettings>
            </q1:displayAreaSettings>
          </q1:displayAreaSettings displayAreaIndex="1">
            <q1:displayAreaSettings dlp1:type="q1:SupplementaryText">
              <q1:textLine>
                <q1:textLine>KFZ über 7.5t</q1:textLine>
              </q1:textLine>
            </q1:displayAreaSettings>
          </q1:displayAreaSettings>
        </q1:vmsMessage>
      </q1:vmsMessage>
    </q1:vmsStatus>
  </q1:vmsStatus>
</q1:vmsControllerStatus>
```

Public Sector Expenses Report

Public sector expenses – relation with quality

Objective: Understand the magnitude and types of costs induced by public data providers for making their data available through NAPs

Identified cost categories

Data collection and processing	Collecting, processing, and <u>formatting the data to make it suitable for publication on the NAP</u>
Data exchange infrastructure	IT infrastructure e.g., servers and network resources
Data management & quality assurance	Continuous data monitoring and <u>error detection</u>
Security & privacy compliance	Safeguarding data through measures e.g., encryption and regular audits to comply with privacy laws
Licensing & intellectual property	Applicable to proprietary data, including possible licensing agreements with third-party rights holders
Promotion & outreach	Awareness campaigns and stakeholder engagement to enhance data use and collaboration
Technical support & maintenance	User support, troubleshooting, and updating technical systems <u>to meet evolving standards</u> (e.g., mobilityDCAT-AP)

Public sector expenses – relation with quality

Participants

15 Public data providers

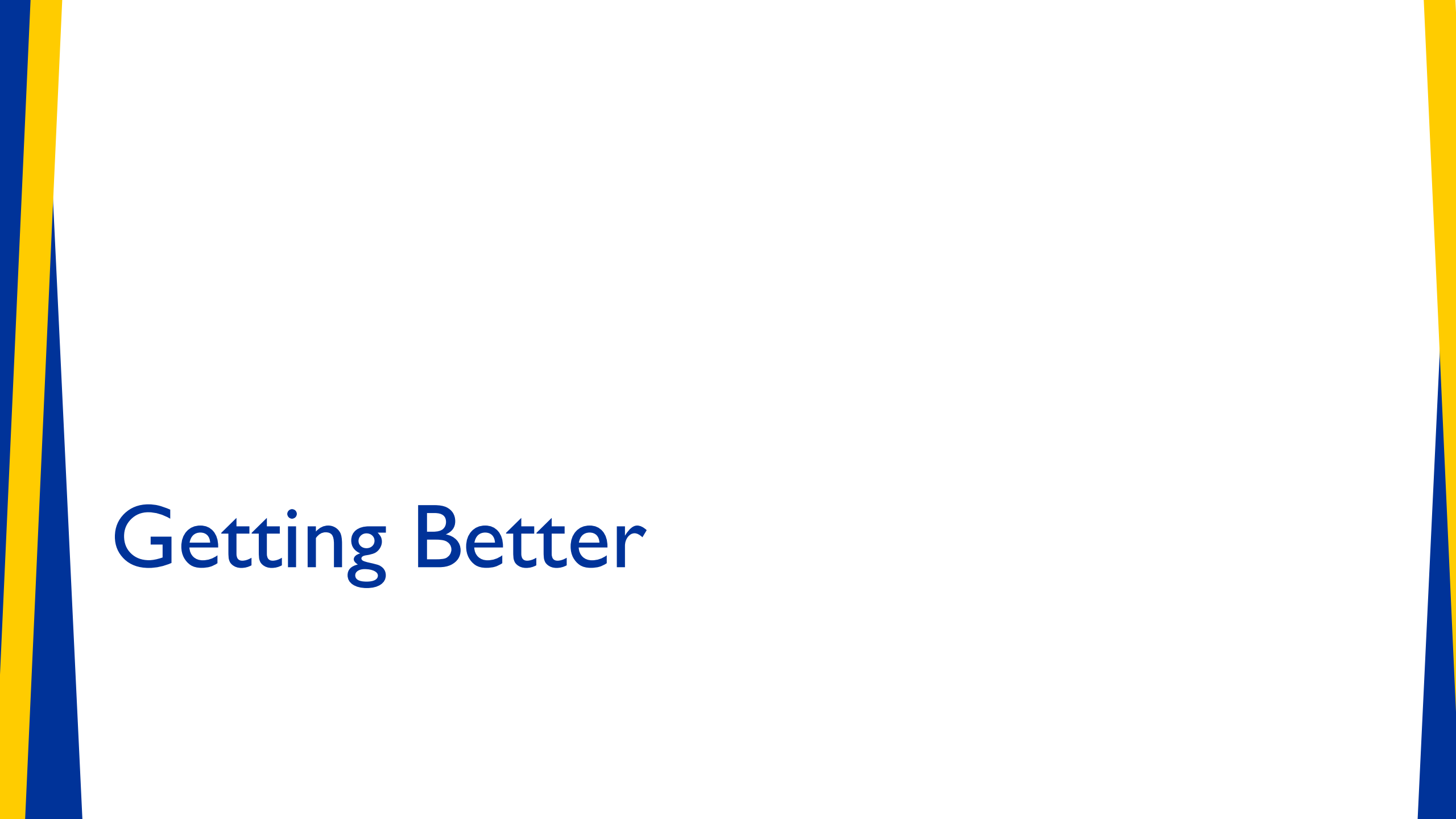
Findings

Costs types with relatively “high” perceived intensity: Data collection & processing; Data management & **quality** assurance

Costs types with “moderate” perceived intensity: Data exchange infrastructure; Technical support & maintenance; Security & privacy compliance

Costs types with “low” perceived intensity: Promotion & Outreach; Licensing & intellectual property

- The identified as “low” cost categories have been declared as not valid by certain data providers.
- All public data providers participated in this survey provide their data free of charge



Getting Better



InQMS serving
NAP operators & Publishers

<https://inqms.cz>

InQMS: More information

- <https://youtu.be/TljPYLTF0jg?t=266>
Video presentation about InQMS serving
web service quality evaluation
(3 years old, in Czech, updated video planned)

NAP operators, Nominated Bodies and Publishers taking advantages of InQMS

- **Audit:**
Prove, that expected content is really published and at what quality.
- **Monitoring and Alerting:**
Quickly detect abnormal situations.
- **Problem analysis:**
Easy insights for problem analysis.

Best Practices & Recommendations

<https://datex2.naps.inqms.cz/blog/>

Top N recommendations

1. Enhance formal quality

- Ensure metadata descriptions are complete and usable. Missing or incomplete metadata (e.g., dataset descriptions, contact points) can hinder usability.
- Implement stricter validation processes and provide the means for schema validation.

2. Improve Language Accessibility

- Provide multilingual support and ensure that language switches are functional. It's crucial to have clear and complete descriptions available in widely used languages (e.g., English) to maximize accessibility.

3. Adopt Standardized Documentation Formats

- Utilize standardized frameworks, e.g., CMC or MobilityDCAT-AP for metadata documentation instead of custom formats. This will improve interoperability and ease of use for data consumers and machines.
- Clearly document location referencing methods (critical for service provision) and provide access to required linked data sources.
- Resolve inconsistencies in data formats (e.g., DATEX II) to ensure data uniformity.

Top N recommendations

4. Clarify Roles and Responsibilities

- Clearly define and document the roles of data publishers and data owners. This distinction can streamline data governance and ensure responsibility for updates and maintenance.

5. Provide Detailed Technical Documentation

- Include comprehensive protocol documentation, communication methods, and interface details to support developers and data users in integrating with NAP services effectively.

6. Enhance Quality Descriptions

- Offer descriptions of data quality, including update frequency, data collection methods, and mechanisms for reporting and addressing data issues (transparency).

Next Actions

- You
 - Explore <https://datex2.naps.inqms.cz> (find your favourites)
 - Revisit the website in near future (for more content)
- Us
 - Publish remaining content
 - Extend Best Practices (blog entries)

Thank You

- Chrysostomos Mylonas <chmylonas@certh.gr>
- Maria Stavara <mstavara@certh.gr>
- Jan Vlčinský <jan.vlcinsky@tamtamresearch.com>