

# DATEX II User Forum 2024

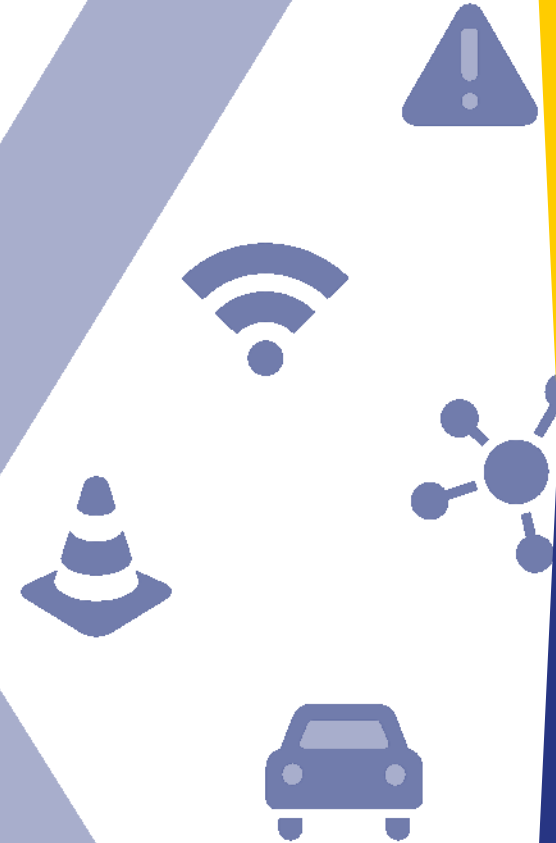
## DATEX@NAPs



**Lessons Learned from  
Consuming DATEX II  
from NAPs  
across Europe**

**Bucharest 2024-10-09**

**by Jan Vlčinský – TamTam Research s.r.o.**



# Analogies between Travel Journal & Our Study

Travel Journal (of the coffee addict)	Data Distribution
Country or a location to enjoy	Country
Tourist Information Office	National Access Point
Leaflet about a Café	Catalogue Record
Café	Publisher
How to get into the Café and sit	Subscription Process
Coffee available for consumption	Distribution
Process to order one coffee	Protocol
Particular type of coffee served	Format

Imagine:

- **Missing** or **closed** Tourist Information Office, **no leaflets** there, leaflets with **outdated** or **misleading** information, leaflets **only in local language**
- Café open **only for VIP**, serving only coffee you do not like
- Waiters **not serving** English speaking guests or serving only tables with even numbers
- Coffee with name you **never heard of**, or not conforming to **quality standards**

# DATEX@NAPs: travel journal documenting our journey across all EU countries, their NAPs and their SRTI distributions

- **Consumers** will find links to NAPs, XML samples and schemas, audited protocols, and other technical resources.
- **Publishers** will discover a rich set of hints and best practices
- **Managers** will receive a checklist and requirements to help their staff become even better data providers.

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

DATEX@NAPs is a study conducted by TamTam Research s.r.o. (Czechia) and CERTH (Greece).

# Scope of the study

- EU and EEA Countries and their NAPs
- Safety Related Traffic Information
- Data since June 2024
- Concepts
  - Countries, NAPs, Catalogue Records
  - Publishers, Distributions, Subscription Processes, Formats, Protocols
  - Metrics of collected Distributions Data (size, number of records, update intervals, validity against XML Schema)
- Published
  - DATEX II User Forum (Pre-Release)
  - NAPCORE Mobility Data Dayse (Release)

# Overview



# Terminology – based on mobilityDCAT-AP v1.0.1

**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/>

# 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

# Status

- Done (by DATEX II User Forum)
  - Data collected, catalogue records evaluated, formats identified, subscription processes recognized, protocols implemented
  - Website set up, shows countries, NAPs, distributions, catalogue records formal quality evaluation.
- To complete (till NAPCORE Mobility Data Days)
  - publish subscription processes, protocols
  - visualize metrics of collected distribution samples
  - add summarizing evaluations (for distributions, NAPs, subscription processes etc.)



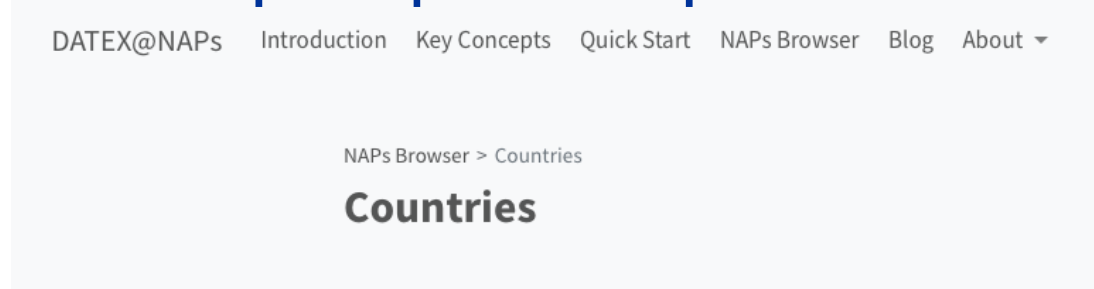
# Findings



# Countries

- Explored 31 countries (in EU or EEA)
- Most countries declare existence of a NAP for SRTI
- Iceland and Lichenstein do not have SRTI related NAPs

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



DATEX@NAPs Introduction Key Concepts Quick Start NAPs Browser Blog About ▾

NAPs Browser > Countries

## Countries



NAPs Browser ▾

Countries ▾

Austria

Belgium

Bulgaria

Croatia

Cyprus

Czechia

Denmark

Estonia

Finland

France

Filter

ISO Alpha-2	Country Name
at	Austria
be	Belgium
bg	Bulgaria
hr	Croatia

# 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

Liechtenstein

Norway

[Expand To Show Page \\_metadata.yml](#)

## NAPs

Country	NAP	Name
cz	<a href="#">registr.dopravniinfo.cz</a>	National Traffic Information Registry

## Catalogue Records

NAP	Publisher	Distribution	Format	Protocol	Area Covered	Grade
<a href="#">registr.dopravniinfo.cz</a>	<a href="#">cz-ndic</a>	<a href="#">d2-common</a>	DATEX II	Push on occurrence	CZ0	B
<a href="#">registr.dopravniinfo.cz</a>	<a href="#">cz-ndic</a>	<a href="#">d2-common-pull</a>	DATEX II	Pull on request	CZ0	B

## Publishers

Identifier	Name
<a href="#">cz-ndic</a>	<a href="#">Subscription Register</a>

## Distributions

On this page

[NAPs](#)[Catalogue Records](#)[Publishers](#)[Distributions](#)Co-funded by  
the European Union

# National Access Points (NAPs)

- [zjazdnost.sk](http://zjazdnost.sk) shows information on maps, but does not allow consumption (not really mentioning a word NAP).
- <https://www.cciss.it> talks about being a NAP and refer to delegated acts, but does not serve any catalogue records
- NAPs using only local language, having broken language switch or having incomplete description of distributions in English
- Simple NAPs providing contact information, and they react and serve
- NAPs (e.g. <https://nap.si/en>) with rich set of catalogue records, allow searching, support multiple languages and content seems correct.

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

[NAPs Browser](#) > [NAPs](#) > [tarktee.ee](#)

## tarktee.ee

National Access Point (NAP)

- NAPs Browser ▾
- Countries >
- NAPs ▾
  - [www.mobilitydata.gov](#)
  - [transportdata.be](#) >
  - [datasheet.api.bg](#) >
  - [www.promet-info.hr](#) >
  - [www.traffic4cyprus.org](#)
  - [registr.dopravniinfo.c](#)
  - [du.vd.dk](#) >
  - [tarktee.ee](#) ▾
    - Catalogue Records >
  - [www.digitraffic.fi](#) >
  - [www.bison-fute.gouv.fr](#) >

[Expand To Show Page\\_metadata.yml](#)

### Catalogue Records

Order By ▾

Filter

#### Title

[ee-tark-tee\\_d2-srti](#)

On this page

[Catalogue Records](#)

# Catalogue Records

- Most records do not provide XML Schema (very bad practice)
- Formats often documented “by example” – this is not enough for serious usage
- Some are structured according to Coordinated Metadata Catalogue, few follow mobilityDCAT-AP (which is very new)

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

DATEX@NAPs Introduction Key Concepts Quick Start NAPs Browser Blog About ▾

NAPs Browser > Index > Catalogue Records

## Catalogue Records

Catalogue records across all NAPs

NAPs Browser  
Countries  
NAPs  
Publishers  
Index  
Catalogue Records  
Distributions  
Subscription Processes  
Formats  
Protocols

Catalogue Records are published on a NAP and always refer to a Distribution published by a Publisher.  
Format and Protocol listed here are what was declared in the Catalogue Record.  
To learn more about a Distribution, follow link from Catalogue Record page.

IF Order By ▾

NAP	Publisher	Distribution	Format	Protocol	Area Covered	Grade
<a href="#">www.mobilitydata.gv.at</a>	<a href="#">at-oamtc</a>	<a href="#">oamtc</a>	DATEX II	pull	Austria	B
<a href="#">transportdata.be</a>	<a href="#">be-verkeerscentrum</a>	<a href="#">d2-vlaanderen</a>	DATEX II Profile	Pull	VLAAMS GEWEST	B
<a href="#">transportdata.be</a>	<a href="#">be-wallonie</a>	<a href="#">wallonie</a>	DATEX II Profile	Push	RÉGION WALLONNE	B
<a href="#">datasheet.api.bg</a>	<a href="#">bg-ria</a>	<a href="#">d2-accidents</a>	DATEX II	pull	Bulgaria	C
<a href="#">datasheet.api.bg</a>	<a href="#">bg-ria</a>	<a href="#">d2-danger</a>	DATEX II	pull	Bulgaria	C
<a href="#">datasheet.api.bg</a>	<a href="#">bg-ria</a>	<a href="#">d2-closures</a>	DATEX	pull	Bulgaria	C

- NAPs Browser >
- Countries >
- NAPs >
- www.mobilitydata.gv.at >
- transportdata.be >
- datasheet.api.bg >
- www.promet-info.hr >
- www.traffic4cyprus.org.cy >
- registr.dopravniinfo.cz >
- du.vd.dk >
- tarktee.ee >
- www.digitraffic.fi >
- www.bison-fute.gouv.fr >
- mobiliteh.info >
- data.nap.gov.gr >
- napportal.kozut.hu >
- data.gov.ie >
- www.cciss.it >
- www.transportdata.gov.lv >
- maps.eismoinfo.lt >
- data.public.lu >
- geoservices.transport.gov.mt >
- ntm.ndw.nu >
- transportportal.no >
- kpd.gddkia.gov.pl >
- nap-portugal.imt-ip.pt >
- pna.cestrin.ro >
- www.zjazdnost.sk >
- nap.si >
- nap.dgt.es >
- Catalogue Records >
- es-dgt\_d2-accidents >
- es-dgt\_d2-accidents-basque >
- es-dgt\_d2-accidents-catalonia >
- trafficdata.se >
- opentransportdata.swiss >
- Publishers >
- Index >

**Distribution**

[Publisher > es-dgt > Distribution > d2-accidents-catalonia](#)

**Evaluated catalogue record URL**

<https://nap.dgt.es/en/dataset/incidencias-dt-gv>

**Data Access URL**

<https://infocar.dgt.es/datex2/sct/SituationPublication/all/content.xml>

**Data Format Model**

DATEX II

**Protocol**

pull

**Area covered**

ES51

**Evaluation Metadata** >

**Metadata Information** >

**Content Information** v

Grade	Parameter	Value
A	Name of the Dataset <sup>17</sup>	Incidents SCT <sup>18</sup>
A	Description of Dataset <sup>19</sup>	Traffic incidents in Catalonia <sup>20</sup>
C	Resource Type <sup>21</sup>	Dataset <sup>22</sup>
B	Dataset Type Category <sup>23</sup>	Static road data; Dynamic road data; Real-time traffic information; Adverse weather conditions; Safety Related Traffic Information; <sup>24</sup>
C	Dataset Detailed Type <sup>25</sup>	Situations <sup>26</sup>
-	Service Type Category <sup>27</sup>	<sup>28</sup>
A	Dataset Language <sup>29</sup>	spa <sup>30</sup>
C	Georeferencing Method <sup>31</sup>	AlertCMethod4Point, AlertCMethod4Linear, TpegPointLocation, TpegLinearLocation <sup>32</sup>
F	Dataset Documentation <sup>33</sup>	<sup>34</sup>
F	Related Linked Data Sources <sup>35</sup>	<sup>36</sup>

# Publishers

- Sometime identical with NAP, often one or more publishers serving one NAP.
- Publishers are in control of subscription processes, protocols and formats.

<https://.../naps-browser/publisher/>



Co-funded by  
the European Union

## Publishers

- NAPs Browser
- Countries
- NAPs
- Publishers**
- de-mobiliteh
- dk-vejdirektoratet
- eu-datex2
- se-trafikverket-data
- at-asfinag
- com-tomtom
- ee-tark-tee
- be-wallonie
- hr-promet
- at-oamtc
- be-verkeerscentrum
- se-trafikverket-bransch
- hu-kozut
- fi-digitraffic
- es-dgt
- lv-lvceli
- no-vegvesen
- nl-ndw
- fr-bison-fute
- pl-gddkia
- si-ncup
- lu-data-public
- cz-ndic
- bg-ria
- ro-costrin



Identifier	Name
at-asfinag	ASFINAG
be-verkeerscentrum	Flemish Traffic Center
be-wallonie	Service public de Wallonie Mobilité et Infrastructures
bg-ria	Road Infrastructure Agency
com-tomtom	TomTom Intermediate Traffic Service
cz-ndic	Subscription Register
dk-vejdirektoratet	Danish Road Directorate
ee-tark-tee	Smart Road DATEX II data gateway of Estonian Transport Administration
es-dgt	National Access Point for Transport and Mobility
eu-datex2	Virtual publisher
fr-bison-fute	Tipi/Bison Futé
hr-promet	Hrvatski autoklub
hu-kozut	Hungarian Public Roads
lu-data-public	Administration des Ponts et Chaussées



NAPs Browser &gt; Publishers &gt; si-ncup

# si-ncup

Publisher

- NAPs Browser >
- Countries >
- NAPs >
- Publishers >
  - de-mobilithek >
  - dk-vejdirektoratet >
  - eu-datex2 >
  - se-trafikverket-data >
  - at-asfinag >
  - com-tomtom >
  - ee-tark-tee >
  - be-wallonie >
  - hr-promet >
  - at-oamtc >
  - be-verkeerscentrum >
  - se-trafikverket-bransch >
  - hu-kozut >
  - fi-digitraffic >
  - es-dgt >
  - lv-lvceli >
  - no-vegvesen >
  - nl-ndw >
  - fr-bison-fute >
  - pl-gddkia >
  - si-ncup** >
  - Protocols >
  - Subscription Processes >
  - Formats >

## Distributions

Publisher	Distribution Identifier	Title
si-ncup	<a href="#">d2-srti</a>	Traffic incidents - TISA SRTI (DATEX II v3.3)
si-ncup	<a href="#">d2-accidents</a>	Traffic incidents

## Formats

Publisher	Format Identifier	Standard	Version	Content Model
si-ncup	<a href="#">d2-accidents</a>	DATEX II	v2.3	SituationPublication
si-ncup	<a href="#">d2-srti</a>	DATEX II	v2.3	SituationPublication

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[Distributions](#)[Formats](#)

# Subscription Processes

Allow consumer to get the data legally and technically

- some as simple as “Click the URL and get it”
- some use user interface to register and configure
- none using API for this (yet)
- some require manual approval at the publisher
- communication may take hours, but sometime 30-63 days (especially during July and August)

Note: Subscription processes are not published on the website yet

<https://.../naps-browser/index/subscription-process/>

# Distributions (and their metrics)

The “real data” – collection of samples.

Where possible, we have samples for last 30 days + their metrics (currently as samples.parquet file, soon as charts showing size, number of records, update intervals in time, validity)

<https://.../naps-browser/index/distribution/>

NAPs Browser > Publishers > nl-ndw > Distributions > d2-srti

## d2-srti

Distribution

- NAPs Browser >
- Countries >
- NAPs >
- Publishers >
  - de-mobilithek >
  - dk-vejdirektoratet >
  - eu-datex2 >
  - se-trafikverket-data >
  - at-asfinag >
  - com-tomtom >
  - ee-tark-tee >
  - be-wallonie >
  - hr-promet >
  - at-oamtc >
  - be-verkeerscentrum >
  - se-trafikverket-bransch >
  - hu-kozut >
  - fi-dieittraffic >

i Expand To Show Page \_metadata.yml

**Publisher**  
nl-ndw

**Distribution**  
d2-srti

**GitLab Folders**  
[Distribution](#)

[Samples](#)

i **Note**

WIP: Given folder contains samples.parquet with metrics for last 30 days.

Soon charts and tables with the metrics will be presented here.

# Formats

- Formats too often miss XML schema
- DATEX II v1, v2 (most popular), v3

<https://.../naps-browser/index/format/>

Publisher	Format	Standard	Version	Specific Content Model	Serialization
hr-promet	d2-events	DATEX II	v2.0	SituationPublication	XML
hr-promet	d2-roadworks	DATEX II	v2.0	SituationPublication	XML
cz-ndic	d2-common-v1.1	DATEX II	v2.0	SituationPublication	XML
dk-vejdirektoratet	d2-common	DATEX II	v3.2	SituationPublication	XML
ee-tark-tee	d2-srti	DATEX II	v2.3	SituationPublication	XML
fi-digitraffic	d2-accidents	DATEX II	v2.2	SituationPublication	XML
fi-digitraffic	d2-roadworks	DATEX II	v2.2	SituationPublication	XML
de-mobilithek	d2-motorways	DATEX II	v2.3	SituationPublication	XML
de-mobilithek	d2-accidents	DATEX II	v2.2	SituationPublication	XML
de-mobilithek	d2-roadworks-long	DATEX II	v2.3	SituationPublication	XML
de-mobilithek	d2-roadworks-short	DATEX II	v2.3	SituationPublication	XML
si-ncup	d2-accidents	DATEX II	v2.3	SituationPublication	XML
si-ncup	d2-srti	DATEX II	v2.3	SituationPublication	XML



# Protocols

- Mostly PULL, few PUSH, small fraction using SOAP, mostly using REST.
- Auth: none, by special URL, basic, API-KEY, OAuth20, TLS cert, signed SOAP request.

<https://.../naps-browser/index/protocol/>

Publisher	Distribution	Pattern	HTTP Method	SOAP	Authentication
at-asfinag	d2-roadworks	pull	HTTP/GET	no	url
at-asfinag	d2-srti	pull	HTTP/GET	no	url
be-verkeerscentrum	d2-vlaanderen	pull	HTTP/GET	no	none
be-wallonie	wallonie	push			
bg-ria	d2-accidents	pull	HTTP/GET	no	none
bg-ria	d2-danger	pull	HTTP/GET	no	none
bg-ria	d2-closures	pull	HTTP/GET		none
bg-ria	d2-closures-roadways	pull	HTTP/GET		none
bg-ria	d2-roadworks	pull	HTTP/GET		none
hr-promet	d2-events	pull	HTTP/GET	no	basic
hr-promet	d2-roadworks	pull	HTTP/GET	no	basic
cz-ndic	d2-common	push	HTTP/POST	no	basic
cz-ndic	d2-common-pull	pull	HTTP/GET	no	basic
dk-vejdirektoratet	d2-common	pull	HTTP/GET	no	OAuth20 Client Credentials
ee-tark-tee	d2-srti	pull	HTTP/GET	no	X-DATEX-API-KEY' header
fi-digitraffic	d2-roadworks	pull	HTTP/GET	no	none
fi-digitraffic	d2-accidents	pull	HTTP/GET	no	none
fr-bison-fute	d2-action-c	pull	HTTP/GET	yes	basic
de-mobilithek	d2-motorways	pull	HTTP/GET	no	client certificate



# Top N Recommendations



# Top N Recommendations

- Always publish (profiled) schema
  - most distributions are missing their schema
  - docs by example is not sufficient. (profiled) schema is a must
  - profiled schema tells the consumer: here you have simpler structure we deliver and promise you to deliver values, which are otherwise optional
- Support conditional HTTP requests
  - serve Last-Modified and/or ETag HTTP headers, clients can then use If-Modified-Since or If-None-Match headers to prevent downloading what they already have
  - Do not change Publication Time if the rest of the publication did not change (otherwise you force client to fetch what they already have)
- Keep things reasonably simple
  - Subscription Process (complicated process is expensive and slow)
  - Protocol (REST-full PULL is simple)
  - Authentication: use none, Basic, TLS certificate, Bearer, OAuth20

# Notes from our discussions





# SOAP being phased out

- Only small fraction of distributions use SOAP
- REST approach is the most popular
- Other protocols (AMQP/MQTT) present (for PUSH)

It is time to move away from SOAP, probably to REST

# Used Authentication methods are weak

- The data we publish/consume are “almost public”
- Used authentication schemes are more or less weak
- Authentication may help cutting off bad-behaving clients

It's time to agree on proper authentication methods for typical use cases

# Publishing delta messages (PUSH)

Snapshots for growing datasets with long-living events are not efficient

- existing HTTP POST for PUSH is not used much (3xPUSH vs thousands PULL)
- different attempts for more efficient ways:
  - Server Sent Events (SSE)
  - French “directory of changes”
  - Dutch “small snapshots”
  - Notification via AMQP/MQTT

Existing HTTP POST based PUSH is too difficult.

It is time to find more efficient publishing of changes (delta-messages)

# Three publishing Use Cases

- Long living events (Situation with roadworks)
- Short living events (Current status, e.g. travel times)
- Complete history of events (not seen in practice)

Lifetime of published events/data affects complexity to get snapshot of currently valid ones.

Short living: easy, you get all updated within (short) lifetime

Long living: requires care to catch every change

# Geo-Fragmentation

Large areas need to be split to fragments to keep messages smaller

- Dynamic filters (area/roads) are tricky
- Preset filters are better:
  - predictable setup (e.g. of queues)
  - allow REST-full caching of results

# Robust service – aspects of

To build robust service, consider:

- Geo-Fragmentation (to make payload smaller)
- Prevent keeping client status at Publisher (to preserve Publisher's resources)
- Rate/Bandwidth limiting (reject service to bad-behaving clients)
- Authenticate to allow cutting off guilty consumers

# Next Actions



# Next Actions

- [ ] Me: Call Massi re Recommended Authentication
- [ ] Me: Call Luka Krevs re Protocols proposal
- [ ] TTR: Complete publishing findings on website
- [ ] You: Visit NAPCORE Mobility Data Days (for updated presentation)
- [ ] You: Explore the website:

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





# Thank You

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- <https://tamtamresearch.com>

